1992
PEST MANAGEMENT
RESEARCH REPORT

Compiled for:

THE EXPERT COMMITTEE
ON PEST MANAGEMENT

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1992
RAPPORT DE RECHERCHE
DE LA LUTTE DIRIGÉE

Préparé pour:

LE COMITÉ D'EXPERTS
DE LA LUTTE DIRIGÉE

Président - M.G. Dolinski
Secrétaire - C. Hunter

par:

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This annual report is designed to encourage and facilitate the rapid diss of pest management research results amongst researchers, the pest managem industry, university and government agencies, and others concerned with t development, registration and use of effective pest management strategies of alternative and integrated pest management products is seen by the ECP integral part in the formulation of sound pest management strategies. If about the registration status of a particular product, consult the Pestic Directorate, Food Production and Inspection Branch, Agriculture Canada, O Ontario, K1A 0C5.

L'objectif poursuivi par la compilation du rapport annuel est de facilite diffusion des résultats de la recherche de la lutte dirigée auprès des ch des industries, des universités, des organismes gouvernementaux et toutes personnes ou groupes concernés par le développement, la fabrication, l'ho et l'emploi des produits pour la lutte dirigée. Utilization de produits lutte intégrée ou de produits alternatifs est perçu par Le Comité d'exper lutte dirigée comme faisant parti intégrante de l'élaboration d'une strat la lutte dirigée. En cas de doute relatif à l'enregistrement d'un produi consulter la Direction des pesticides, Direction générale de la productio l'inspection des aliments, Agriculture Canada, Ottawa (Ontario) K1A 0C5.

FORWARD

The Expert Committee on Pest Management (ECPM), formerly the National Com Pesticide Use in Agriculture (NCPUA) and more recently the Expert Committ Pesticide Use in Agriculture, formed in 1961 by its parent body, the Nati Coordinating Committee on Agricultural Services, is one of ten Expert Com reporting to the Canada Committee on Crop Production Services (CCCPS) whi is one of 6 Canada Committees reporting to the Canadian Agricultural Serv Coordinating Committee (CASCC).

The Expert Committee on Pest Management has been tasked with summarizing available current information on pest management on an annual basis. Thi there were 162 reports. We are indebted to the research workers for thei cooperation in this field, from provincial and federal departments, as we universities and industry, together with the section editors and members Scientific Information Retrieval Section for making this report possible.

Michael Dolinski
Chairman, ECPM
January, 1993

AVANT-PROPOS

Le Comité d'experts sur la lutte dirigée (CELD), autrefois appelé Comité pour l'emploi des pesticides en agriculture (CNEPA) et plus récemment, Co d'experts pour l'emploi des pesticides en agriculture, formé en 1961 par organisme parent, le comité de coordination des services agricoles canadi (CCSAC), est l'un des dix groupes d'experts qui relèvent directement du C canadien des productions végétales (CCPV), lequel à son tour fait partie comités placés sous l'autorité du Comité de coordination des services agr canadiens (CCSAC).

Le Comité d'experts sur la lutte dirigée à la responsabilité de compiler de rapports de recherche et de diffuser, chaque année, les données les pl récentes, sur la lutte dirigée contre les ravageurs. Ainsi, cette année, rapports. Les membres du Comité tiennent à remercier chaleureusement les des ministères provinciaux et fédéraux, des universités et du secteur pri oublier les rédacteurs et le personnel de la Section d'information sur la scientifique dont la collaboration a permis de rédiger le présent rapport

Michael Dolinski
Président, CELD
Janvier 1993

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#001

STUDY DATA BASE: 387-1411-8912

CROP: Sweet Corn

PEST: European Corn Borer, *Ostrinia nubilalis* (Huebner)

NAME AND AGENCY:
YU, D.S. and BYERS, J.R.
Agriculture Canada, Research Station, Lethbridge, Alberta T1J 4B1
Tel: (403) 327-4561 Fax: (403) 382-3156

TITLE: **INUNDATIVE RELEASE OF *TRICHOGRAMMA EVANESCENS* WESTWOOD FOR CONTROL EUROPEAN CORN BORER**

MATERIALS AND METHODS: Three fields of irrigated, processing sweet corn w used in the experiment. Each field had two square 1-hectare plots, 100 m apart and at least 25 m from the edge of the field, that were randomly assigned as release or control plot. The parasitic wasps, *T. evanescens*, mass-reared by Bio-Logicals, Ciba-Geigy Canada Ltd. at Guelph, Ontario, a sent by overnight courier to Lethbridge. Wasp-cards, with about 1,000 wa each, were stapled in a protective, cardboard tent and attached to corn p with twist ties. A streak of honey was applied to the cardboard to provi food for the emerging wasps. The release rate was 49 wasp-cards per rele plot distributed evenly at 49 release points. There were four weekly rel starting on 10 July, providing a total release rate of about 196,000 wasp hectare. During the flight period of the ECB from 15 July to 21 August, randomly sampled plants per plot were examined for ECB egg masses. About week before harvest, 500 randomly sampled plants per plot were examined f ECB damage.

RESULTS: None of the 27 egg masses found in the control plots were parasitized, but 86% of the 57 egg masses found in the release plots were The proportion of plants infested with ECB in the control plots were 42, and 6% compared to the release plots of 6, 3 and 0.4% respectively, givin average reduction in damage to corn plants in the release plots of 86%. reduction in cobs with ECB larvae ranged from 81 to 100%.

CONCLUSIONS: The results show that *T. evanescens* can provide effective control of ECB. Further experiments will be conducted to determine the e of reducing the number of wasps and/or release points.

#002

STUDY DATA BASE: 348-1461-4802

CROP: Apple

PEST: Apple maggot (AM), *Rhagoletis pomonella* (Walsh)

NAME AND AGENCY:
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Agriculture Canada, Smithfield Experimental Farm
P.O. Box 340, Trenton, Ontario K8V 5R5
Tel: (613) 392-3527 Fax: (613) 392-0359

TITLE: **EVALUATION OF TRAPS FOR MONITORING APPLE MAGGOT**

MATERIALS: BioLure Consep Membrane lure (Apple volatiles)

METHODS: Three traps were evaluated for monitoring AM using a randomized complete block design. The traps tested were a single red sphere; a sing red sphere + a BioLure; and a baited sticky yellow panel + 2 red spheres (O.M.A.F. recommended AM trap). All the red spheres were coated with bru Tangle-Trap; the yellow panel was pre-baited. The AM traps were evaluate nine orchards (5 replicates per orchard) of various cultivars on various rootstocks at the Smithfield Experimental Farm. On June 18 the traps wer placed on the outside rows of each orchard in trees with fruit. Each trap separated by at least 10 m. The yellow sticky panels were changed every weeks; the BioLures were changed once on July 23. Traps were checked twi week until September 10 and the number of AM caught on the red spheres ar yellow panel was recorded separately for each sex. After each inspection when one or more AM's were caught, traps were moved one position within e replicate to minimize the effect of location on trap performance. Flies a other debris were removed from the trap surface on each trap check date.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: The analysis of the data over the whole season showed that t O.M.A.F. recommended trap caught significantly more AM's than did the rec sphere with or without the BioLure. There was no statistical difference the efficacy of the red sphere with or without the BioLure. In orchards high AM pressure, the O.M.A.F. recommended trap was the most effective. one orchard block with low AM pressure, the red sphere + BioLure caught t highest number of AM over the season.

Trap type	Mean no. AM caught on Red Sphere Male	Female	Total	Mean total no. AM caught
Yellow sticky panel + 2 red spheres	1.5 a*	1.1 a	2.7 a	3.9 a
Red sphere	0.9 b	0.7 b	1.6 b	1.6 b
Red sphere + BioLure	1.1 b	0.8 b	1.8 b	1.9 b

* Means followed by the same letter in each column are not significantly different using Duncan's Multiple Range Test (P=0.05).

#003

STUDY DATA BASE: 352-1461-8501

CROP: Apple cv. McIntosh

PEST: Codling moth, *Cydia pomonella* (L.)

NAME AND AGENCY:
MARSHALL, D.B. and PREE, D.J.
Agriculture Canada, Research Station, Vineland Station, Ontario, L0R 2E0
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TITLE: **CONTROL OF CODLING MOTH WITH VARIOUS INSECTICIDES**

MATERIALS: RH-5992 240 F, LATRON 1956 (adjuvant), GUTHION 50 WP, GUTHION 360 F (azinphos-methyl)

METHODS: This trial was conducted in an eight-year-old orchard in the Jor area. Trees cv. McIntosh were spaced 3.1 m by 4.9 m and were on M26 rootstock. Treatments were replicated four times and assigned to two-tre plots separated by guard trees and arranged according to a randomized com block design. Application timing was determined from pheromone trap catc of male moths. Sprays were applied with a Rittenhouse truck-mounted spra equipped with a Spraying Systems handgun fitted with a D-6 orifice plate. Insecticides were diluted to a rate comparable to 3000 L of water per ha sprayed until runoff at 2000 kPa pressure. Plots were first treated June (about 11 L per plot) at egg hatch of first generation codling moths (CM) Aug. 17 all treatments were reapplied (14 L per plot) for control of the generation. Plots were first sampled July 21 when 200 fruit from each pl

(100 per tree) were examined for deep CM damage (deep damage is caused b larvae feeding through the flesh of the apple to the core and seeds). A sample was taken Sept. 14 when one bushel of fruit was picked from the c (100 - 152 apples), and a second bushel taken from the ground (86 - 177 apples), in each plot. Percentages of CM damage (rated as deep or shall injury, - shallow damage is caused by first instar larvae excavating cha below the skin of the fruit) from tree and ground samples were calculate Data were angularly transformed to degrees, and analysed with an analysi variance and Duncan's Multiple Range Test at the 0.05 significance level

RESULTS: As presented in the table below.

CONCLUSIONS: In the sample taken July 21 to assess effects of treatments the first generation, damage was similar in all plots. In the Sept. 14 s (first and second generation damage) the percentage of deep CM injury w significantly higher in the untreated Control plots than the treated plo both tree and ground samples. Both formulations of Guthion produced sim results. Injury rated as shallow CM damage was highest in untreated Con plots.

Treatments June 22, Aug. 17	Rate g AI/ha	% CM Damage July 21 tree pick deep	Sept. 14 tree pick deep	 shallow	 ground deep	 sampl sh
RH-5992 240 F with LATRON 1956	240 0.06%	2.0A*	0.3 B	1.1 B	2.0 B	1
GUTHION 50 WP	1050	0.8A	0.2 B	0.5 B	2.0 B	
GUTHION 360 F	1050	3.1A	0.4 B	2.0AB	1.8 B	
Control	-----	5.9A	6.0A	5.4A	23.5A	

* Means followed by the same letter not significantly different (P<0.05, Duncan's Multiple Range Test).

#004

STUDY DATA BASE: 402-1461-9093

CROP: Apple cv. Spartan

PEST: Codling Moth, *Cydia pomonella* L.

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ISMAN, M.B.
Department of Plant Science, U.B.C., Vancouver, B.C. V6T 1Z4
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TITLE: **EVALUATION OF A NEEM-BASED INSECTICIDE FOR CONTROL OF CODLING MOTH APPLE**

MATERIALS: GUTHION 50 WP (azinphos-methyl), Neem 5 EC

METHODS: The trial was conducted in a twenty-four-year-old planting of Sp trees on M7 rootstock, spaced 4.8 m by 4.8 m, located at the Summerland Research Station. Treatments were assigned to four-tree plots, replicated three times in a completely random design. The plots treated with neem we sprayed on May 25th, June 10th and 17th to control the first brood and or 17th and 24th to control the second brood. The plots treated with Guthion sprayed on May 29th and July 17th. All treatments were applied with a tractor-mounted Turbo Mist sprayer equipped with a Spraying Systems Co. handgun with a D-6 orifice plate. Insecticides were sprayed until runoff (35-40 litres per plot) at 2000 kPa pressure. The two inner trees of each were harvested between August 31st and September 10th, with the fruit bei rated as with or without any codling moth damage. Data were analyzed usin analysis of variance and Student-Newman-Keuls test at the 0.05 significan level.

RESULTS: As presented in the table below.

CONCLUSIONS: The standard commercial product, Guthion, and the neem-based insecticide applied at the highest rate significantly reduced codling mot damage compared to the control and to the two lower rates of neem. Althou none of the treatments in this trial resulted in commercially acceptable levels of codling moth control, the results of the 60 ppm neem treatment indicate that further evaluation of this material is desirable.

Treatment	Rate (ppm)	Percentage of Apples with Damage*
Control	0	37.5 A
Neem 5 EC	15	46.5 A
Neem 5 EC	30	36.1 A
Neem 5 EC	60	19.4 B
GUTHION 50 WP	370	15.4 B

* Means followed by the same letter are not significantly different (P=0. Student-Newman-Keuls test).

#005

STUDY DATA BASE:

CROP: Apple cv. Red Delicious

PEST: European Red Mite, *Panonychus ulmi* (Koch)

NAME AND AGENCY:
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Vaughn Agr. Research Serv. Ltd.,
96 Inverness Drive, Cambridge, Ontario N1S 3P3
Tel: (519) 740-8739 Fax: (519) 740-8857

TITLE: **CONTROL OF EUROPEAN RED MITE IN APPLES USING FLUAZINAM**

MATERIALS: fluazinam (500 g/l SC), OMITE 30WP (propargite 30%)

METHODS: An eighteen year old orchard in St. George, Ontario was used. Treatments (Table 1) were assigned to single tree plots, replicated 4 tim and arranged according to a randomized complete block design. Applicatio were timed when mite populations reached 7-10 adults per leaf. Applicati was dilute, to run off, using a hand-held spray gun delivering 3000 L/ha. Spray pressure was 2760 KPa (400 PSI) at the source. Visual phytotoxicit ratings were conducted at 7, 14, 21 and 27 DAT. Efficacy ratings were conducted at the same interval and consisted of counts made with microsco and hand lens on 25 whole leaves per tree. Data were analyzed using an analysis of variance and Duncan's Multiple Range Test at the P = 0.05 significance level.

Table 1. Treatement rates.

Treatment	Rate (prod/ha)	Timing
1. Untreated control	---	-----------------
2. FLUAZINAM 500 SC	1.0 L	7-10 adults/leaf
3. FLUAZINAM 500 SC	0.75 L	7-10 adults/leaf
4. FLUAZINAM 500 SC	0.50 L	7-10 adults/leaf
5. OMITE 30 WP	7.2 KG	7-10 adults/leaf

RESULTS: Efficacy data is presented in Table 2 and Table 3. There was no visual phytotoxicity to trees in any of the treatments tested.

CONCLUSIONS: All treatments provided significantly greater control compar untreated check plots after 7 days. No treatments were significantly dif than the check after 21 days. This may be due to variability in the untr check population, which may have been due to unseasonably low temperature Although discrete treatment differences were not observed, there was a tr towards a dose response of the mite population to fluazinam.

Table 2. Response of mites to various chemical treatments 7 and 14 days a treatment (DAT).

		Mean Number of Mites/Eggs per Leaf					
		7 DAT			14 DAT		
Trt	Rate (prod/ha)	Adult	Nymph	Egg	Adult	Nymph	Egg
1	-----	9.20 a*	11.73 a	58.15 a	2.00 a	3.55 a	47.85
2	1.0 L	0.75 bc	0.04 b	23.35 c	0.14 b	0.12 b	29.82
3	0.75 L	2.03 bc	0.10 b	34.50 bc	0.65 b	1.15 b	43.05
4	0.50 L	3.50 b	0.18 b	42.05 ab	0.85 ab	1.73 ab	54.80
5	7.2 KG	0.20 c	0.14 b	26.45 bc	0.25 b	0.45 b	33.40

* Means followed by the same letter not significant (P=0.05, Duncan's Mul Range Test).

Table 3. Response of mites to various chemical treatments 21 and 27 days treatment (DAT).

		Mean Number of Mites/Eggs per Leaf					
		21 DAT			27 DAT		
Trt	Rate (prod/ha)	Adult	Nymph	Egg	Adult	Nymph	Egg
1	-----	2.35 a*	11.93 a	26.65 a	3.08 a	3.55 a	14.88 a
2	1.0 L	0.31 a	0.26 a	19.23 a	0.28 b	0.50 ab	6.95 a
3	0.75 L	1.05 a	1.10 a	18.83 a	1.75 ab	2.45 ab	12.95 a
4	0.50 L	2.75 a	1.85 a	31.25 a	2.20 ab	3.17 ab	13.18 a
5	7.2 KG	0.13 a	0.11 a	26.10 a	0.25 b	0.10 b	13.53 a

* Means followed by the same letter not significant (P=0.05, Duncan's Mul Range Test).

#006

STUDY DATA BASE: 352-1461-8501

CROP: Apple cv. Red delicious

PEST: European Red Mite, *Panonychus ulmi* (Koch)

NAME AND AGENCY:
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TITLE: **CONTROL OF EUROPEAN RED MITE WITH VARIOUS ACARICIDES**

MATERIALS: KELTHANE AP-35 (dicofol), KELTHANE 50W (dicofol),
OMITE 30W (propargite),
SAFERS ULTRAFINE SPRAY OIL 4L, SAFERS INSECTICIDAL SOAP

METHODS: An orchard cv. Red delicious in the Simcoe area was used. Trees on either M111 or M107 rootstock and spaced 7.6 m by 3.1 m. Treatments w assigned to single-tree plots, arranged according to a randomized complet block design, and replicated four times. Previous laboratory studies hac determined that approximately 20 percent of this population was resistant

KELTHANE. Plots were sampled pre-treatment Aug. 5, and twice post-treatm Aug. 12 and 19. Fifty leaves were picked between a height of 1 and 2 m a arm's length into the canopy from each plot. Samples were examined using steromicroscope (45 leaves were brushed with a Henderson McBurnie mite brushing machine and 5 leaves examined without brushing) and numbers of European red mite (ERM) eggs and actives (nymphs and adults) were recorde On Aug. 5 acaricides were diluted to a rate comparable to 3000 L per ha a sprayed until runoff (except SAFERS INSECTICIDAL SOAP which was sprayed o until foliage was wet) with a Rittenhouse truck-mounted sprayer equipped a Spraying Systems handgun fitted with a D-6 orifice plate. Approximatel - 40 liters of spray mix were used per treatment. Pressure was set at 20 kPa. Data were analysed using an analysis of variance and means separated a Duncan's Multiple Range Test at the 0.05 significance level.

RESULTS: Presented in the table below.

CONCLUSIONS: Prespray Aug.5, similar numbers of eggs and actives were fou all plots. In the Aug.12 sample, numbers of eggs were similar in all plo but numbers of actives were significantly reduced in treated plots. By Au 19, numbers of eggs in treated plots were not significantly different tha control. In the Aug. 19 sample, KELTHANE AP, KELTHANE WP, OMITE and ULTR SPRAY OIL treated plots had significantly fewer active mites than unspray controls. Numbers in SAFERS INSECTICIDAL SOAP-treated plots were not different from unsprayed controls. No phytotoxicity was observed in plot treated with SAFERS ULTRAFINE SPRAY OIL or SAFERS INSECTICIDAL SOAP. The temperature at the time of treatment was 22oC. Predatory mites were too to include in the results.

Number of ERM Eggs and Actives/leaf

Treatment	Rate AI/ha	Aug. 5 eggs	Aug. 5 actives	Aug. 12 eggs	Aug. 12 actives	Aug eggs	act
OMITE 30W	1650 g	56.8 A*	25.0 A	6.0 A	1.4 B	7.3 AB	1
KELTHANE AP-35	1575 g	67.1 A	21.2 A	5.1 A	3.1 B	7.8 AB	5
KELTHANE 50W	1575 g	52.9 A	20.0 A	7.9 A	3.4 B	4.1 B	3
SAFERS ULTRAFINE SPRAY OIL 4L	2L/100L	42.6 A	17.2 A	19.9 A	2.2 B	12.4 AB	2
SAFERS INSECTICIDAL SOAP	2L/100L	51.5 A	21.8 A	9.5 A	4.9 B	16.5 A	13
CONTROL		36.4 A	15.4 A	16.4 A	15.0 A	12.2 AB	11

* Means followed by the same letter not significantly different (P<0.05, Duncan's Multiple Range Test)

#007

STUDY DATA BASE: 352-1461-8501

CROP: Apple cv. McIntosh

PEST: European Red Mite, *Panonychus ulmi* (Koch)

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TITLE: **PERSISTENCE OF MORESTAN RESIDUES**

MATERIAL: MORESTAN 25 WP (oxythioquinox)

METHODS: A four-year-old orchard of cv. McIntosh in the Jordan Station ar was selected for this trial. Trees were spaced 3.1 m by 4.9 m and plante M26 rootstock. MORESTAN 25 WP at 562.5 g AI/ha was diluted to a rate comparable to 3000 L of water per ha and applied to runoff using a Ritter truck-mounted sprayer equipped with a Spraying Systems handgun fitted wit D-6 orifice plate. Pressure was set at 2000 kPa. MORESTAN 25 WP was app twice; July 20 and August 17. For each timing, plots were replicated fou times and arranged adjacent to each other in the same row. A different r was used for each timing. The first treatment was applied (ca. 15 L/plot July 20 to plots of three trees each. Postspray samples were taken 0 anc days after. The second application (ca. 17 L/plot, three trees/plot) Aug was sampled 0, 3, 7, and 15 days post-treatment (on day 15 there were 2 instead of 4 replicates). Treatments were sampled by picking 5 leaves frc each plot and cutting 5, 1.5 cm-diameter leaf disks for each of 4 replica These disks were placed top surface up on moist rayon (IDA brand) pads. adult female European red mites (ERM) from a lab colony reared on Elberta Loring peach seedlings were placed on each leaf disk. Similar numbers of disks from unsprayed control trees were established at each sample date. Disks were examined after 48 h. Mites were considered dead if they were incapable of coordinated movement or if they were off the leaf disk and i water (onto the moist rayon pad). Percent mortality was angularly transf to degrees prior to mean comparison with a paired t-test.

RESULTS: As presented in the tables below.

CONCLUSIONS: Rapid decreases in percent mortality (either in the moist ra or dead on the leaf disk) can be related to rainfall. For example, a tot rainfall of 18.3 mm on July 20 and 23 reduced mortality in the first MORE treatment from 84.5 on day 0 (July 20) to 10 percent on day 4. In the se trial, there was no significant rainfall until 11 days after application total mortality on residues weathered 7 days was 62.3 %. In both tests a percentage of ERM were repelled off the treated surface rather than kille MORESTAN residues.

Table 1.

Treatment July 20	July 20 Application - % Mortality Day 0 water*	total	Day 4 water	total
MORESTAN 25 W	81.0	84.5	7	10
Control	4.5	9.5	5.5	10
calculated t	-9.91	-13.86	-0.60	0.13

Treatment August 17	August 17 Application - % Mortality Day 0 water	total	Day 3 water	total	Day 7 water	total	Da water	t
MORESTAN 25 W	78.5	97.0	78.5	84.0	54.3	62.3	6.0	
Control	2.0	2.0	3.0	4.0	3.5	8.0	6.0	
calculated t	-9.99	-63.14	-7.35	-10.0	-5.68	-6.89	0	

critical t0.05 =3.182, 3 d.f., comparisons are between treatments for day
* water refers to mites repelled from the leaf disk
** critical t0.05=12.706, 1 d.f.

Table 2.

Test 1. Date	rainfall (mm)	Test 2. Date	rainfall (mm)
July 20	2.8	Aug 25	.5
23	15.5	27	1.0
		28	25.2

#008

STUDY DATA BAS: 348-1461-4802

CROP: Apple cv. McIntosh

PEST: Gypsy moth (GM), *Lymantria dispar* (L.);
Obliquebanded leafroller (OBLR), *Choristoneura rosaceana* (Harris);
Redbanded leafroller (RBLR), *Argyrotaenia velutinana* (Walker);

Eye-spotted bud moth (ESBM), *Spilonota ocellana* (D. and S.)

NAME AND AGENCY:
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TITLE: **EVALUATION OF INSECTICIDES FOR SPRING FEEDING CATERPILLAR (SFC) CO**

MATERIALS: DIPEL WP (*Bacillus thuringiensis* var. *kurstaki*) (*B.t.*); GUTHION 50 WP (azinphos-methyl); IMIDAN 50 WP (phosmet)

METHODS: A six-year-old orchard of McIntosh apple trees on M.26 rootstock used in this randomized complete block design trial. Seven-tree plots we replicated four times with two guard trees between each plot. The materi were sprayed to runoff (11-15 L/plot) using a hydraulic handgun attached Rittenhouse sprayer operating at 2700 kPa. DIPEL was applied on May 15 (pink); May 15 and June 2 (calyx); May 15, 22 and 29; and June 2. GUTHIO sprayed on May 15; and June 2. IMIDAN was sprayed on June 2.

On May 14, a prespray sample of 100 trees was taken from throughout the orchard. The five middle trees per plot were checked for SFC and SFC dama June 9 and July 7. All the leaves on five terminal shoots and 20 fruiting clusters per tree were checked for SFC and SFC damage on each date. All fruit on each tree up to a maximum of 50 fruit per tree were checked for damage on June 9 and July 7. The data were analyzed using an analysis of variance and Duncan's Multiple Range Test (P=0.05).

RESULTS: The prespray sample taken on May 14 showed an average of 0.13 da terminals + clusters and 0.01 caterpillars per tree. The results are summarized in the table below.

CONCLUSIONS: As of June 9, all the sprayed treatments significantly reduc the mean number of GM larvae relative to the unsprayed check. All sprayed treatments, except the calyx spray of DIPEL, provided significant protect to the terminals and clusters as compared to the check on June 9. The tw and three- spray programs of DIPEL provided equivalent or better protecti the terminals and clusters relative to the organophosphate treatments. A July 7, the calyx organophosphate sprays had less SFC damage on the fruit relative to the unsprayed check.

Three years of data show that a two- or three-spray program using *B.t.* wa effective as a prebloom or calyx application of an organophosphate in controlling the number of SFC and damage caused by SFC. A single prebloo application of *B.t.*, however, provided less protection to the terminals s relative to the three- spray *B.t.* or organophosphate treatments in two of years (1990 and 1991).

Treatment	Rate of product/ 100 L	Date of appl.	Mean no. GM June 9	Mean no. damaged terminals + clusters* June 9	July 7	% wi c J
Check	-	-	0.8 a**	3.1 a	4.6 a	0.
DIPEL WP	74.4 g	May 15	0.2 b	1.6 bc	4.0 ab	0.
DIPEL WP	74.4 g	May 15, June 2	0.3 b	0.6 c	2.3 bcd	0.
DIPEL WP	74.4 g	May 15, 22 & 29	0.0 b	0.7 c	1.0 d	0.
DIPEL WP	74.4 g	June 2	0.3 b	2.1 ab	3.1 abc	0.
GUTHION 50 WP	46.7 g	May 15	0.2 b	0.9 c	2.9 abc	0.
GUTHION 50 WP	46.7 g	June 2	0.0 b	0.7 c	1.4 cd	0.
IMIDAN 50 WP	83.3 g	June 2	0.0 b	1.5 bc	2.0 cd	0.

* All leaves on 20 fruiting clusters and 5 terminal shoots per tree chec
** Means followed by the same letter in each column are not significantly different using Duncan's Multiple Range Test (P=0.05).

#009

STUDY DATA BASE: 352-1461-8501

CROP: Apple cv. Red Delicious

PEST: Spotted Tentiform Leafminer, *Phyllonorycter blancardella* (F.)

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TITLE: **CONTROL OF FIRST GENERATION SPOTTED TENTIFORM LEAFMINER**

MATERIALS: AC 303,630 120 EC, DECIS 2.5 EC (deltamethrin), NTN-33893 240 FS (imidacloprid), RH-5992 240 F, LATRON 1956 (adjuvant)

METHODS: A four-year-old orchard cv. Red Delicious in the Jordan area was for this trial. Trees were spaced 3.1 by 4.9 m and were on M26 rootstock Three-tree plots were replicated four times and randomized according to a randomized complete block design. On May 19, a prespray sample of thirty fruit spur leaf clusters was collected over the entire block from the low central part of the tree canopy and examined for spotted tentiform leafmi (STLM) eggs. Three NTN-33893 treatments were applied, each to a separate of plots. The first was May 20 at the first hatch of STLM eggs (tree fru bud development was at the pink stage), the second June 8 when the first fourth instar STLM was observed (bud development was petal fall), and the third treatment was applied at both these events (May 20 and June 8). AC 303,630, DECIS, and RH-5992 were applied May 20. Insecticides were di to a rate comparable to 3000 L of water per ha. Applications were made u runoff (20 - 28 L per treatment) using a Rittenhouse truck-mounted spraye with a Spraying Systems handgun fitted with a D-6 orifice plate. Pressu was set at 2000 kPa. Postspray, samples were collected July 3 when 25 clu were picked per plot. Samples were examined using a stereomicroscope and various STLM life stages and numbers of the parasites, *Pholetesor ornigis* *Sympiesis* spp. (Hymenoptera: Chalcidoidea), recorded. Data were analysed an analysis of variance and Duncan's Multiple Range Test at the 0.05 significance level. Parasitism data, expressed as percent, were angularl transformed to degrees prior to analysis.

RESULTS: One of the 118 STLM eggs found on 30 clusters in the May 19 pres sample had hatched. The first fourth instar was observed June 2 during b Postspray results are presented in the table below.

CONCLUSIONS: Treated plots had significantly fewer numbers of STLM and mi than the control plots. Numbers of STLM and mines were similar in NTN-338 plots treated once at first hatch (May 20), to those treated twice, at fi hatch (May 20) and again when the first fourth instar was observed (June These two treatments significantly reduced numbers of STLM and mines comp to NTN-33893 applied once at first fourth instar (June 8). In plots treat with AC 303,630, levels of parasitism by *P. ornigis* were significantly re compared to the control, possibly a reflection of host availability. Per parasitism by chalcids was lowest in NTN-33893 treated plots.

Treatment	Rate g AI/ha	Application date	No. STLM/ plot*	No. mines/ plot**	July 3 % Parasitism*** by *P. ornigis*/ plot	%Paras by Cha plot
AC 303,630 240 SC	200.0	May 20	3.0D****	40.8C	12.5B	41.
DECIS 2.5 EC	12.5	May 20	7.3D	7.5D	37.0AB	17.
NTN-33893 240 FS	90.0	May 20	6.8D	12.5D	66.9A	0.
NTN-3893 240 FS	90.0	May 20,June 8	5.0D	8.5D	39.1AB	0.0
RH-5992 240 F + LATRON B-1956	360.0 0.06%	May 20	37.8C	50.0C	56.4A	11.
NTN-33893 240 FS	90.0	June 8	53.8B	77.0B	75.2A	7.
Control	----		91.8A	104.0A	63.1A	13

* STLM includes living larvae, pupae, emerged adults, parasitized larv mines containing *P. ornigis* cocoons and chalcid pupae
** mines includes mines formed by both early and late instars.
*** % parasitism = number of larvae parasitized (by either *P. ornigis* or chalcids) divided by STLM x 100
**** means followed by the same letter not significantly different (P<0.0 Duncan's Multiple Range Test).

#010

CROP: Filbert cv. Barcelona

PEST: Filbert Aphid, *Myzocallis coryli* Goetze

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TITLE: **EVALUATION OF LORSBAN FOR THE CONTROL OF INSECT PESTS OF FILBERT**

MATERIALS: LORSBAN 4E (480 g/L) (chlorpyrifos)

METHODS: Plots consisting of 1 tree each and were replicated 4 times in a randomized complete block design. Treatments consisted of Lorsban, water and untreated check were applied May 16. Lorsban 2.3 kg a.i./ha, water w applied (690 kPa) using a tractor-mounted sprayer equipped with a sprayin systems handgun jet.

Plots were sampled (12 leaves per tree) prespray, 24 and 48 hours postspr Data on aphid control (other insect infestations were too low to assess) analyzed using an analysis of variance and Duncan's Multiple Range Test a 0.05 significance level.

RESULTS: As presented in the table below.

Treatment June 12	Rate kg ai/ha	Prespray count June 12	Postspray count June 13	Postspray coun June 14
LORSBAN 4E (chlorpyrifos)	2.3	97 a*	22 b	11 b
WATER ONLY	-	106 a	113 a	102 a
CONTROL (no treatment)	-	108 a	121 a	99 a

* Means in columns followed by the same letter are not significant (P<0.0 Duncan's Multiple Range Test)

In addition to the above trial three other trials on three different site conducted with Lorsban at 2.3 kg ai/ha primarily for residue analysis. Lo was applied on 3 different dates i.e., May 16, August 15 and September 10 Inspections were carried out to ascertain the insect control. Leaves wer collected on June 21 (36 days after spraying) and aphid counts were made. results were as follows:

- Sprayed leaves (32) average number aphids/leaf = 2.25
- Unsprayed leaves (32) average number of aphids/leaf = 79.28

CONCLUSIONS: Lorsban spray significantly reduced filbert aphid counts bel control plots.

#011

STUDY DATA BASE: 306-1462-9008

CROP: Lowbush blueberry

PEST: Blueberry leaf beetle, *Tricholochmaea vaccinii* (Fall) (Chrysomelidae)

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TITLE: **EVALUATION OF VARIOUS INSECTICIDES FOR BLUEBERRY LEAF BEETLE CONTROL**

MATERIALS: DECIS 2.5 EC (deltamethrin),
DYLOX 420 SN (trichlorfon),
MALATHION 50 EC, SEVIN XLR (carbaryl)

METHODS: A commercial blueberry field in Pictou Co., N.S., infested with blueberry leaf beetle, was used for the trial. Plots were 6m x 6m and eac treatment (see table) was replicated 5 times in a Latin square design. Materials were applied on 6 June 1991 using a CO_2 propelled backpack sprayer with an 8002E nozzle. Adult leaf beetles were monitored a standard 30 cm sweep net and 50, 180° sweeps/plot/date. Sampling was non-destructive: insects were counted and re-released in the plot of capt Data were transformed to the square root scale and analysed using the ANO directive in Genstat 5 release 2.1. LSD values were calculated when the F was significant at the 5% level.

RESULTS: The backtransformed means and LSD letters are presented in the t below.

CONCLUSIONS: Adult leaf beetle populations were significantly lower in al insecticide treatments than in the control 4 days after spraying. After o week, populations remained significantly lower in the Sevin XLR and Decis plots. Populations in all plots were similar after 27 days, presumably du immigration and continued emergence of overwintered and first generation adults.

		Leaf beetle counts (mean of five plots/treatment)			
Treatment	Rate (L/ha)	days after treatment 0	4	7	27
DECIS	0.30	35.7	0.6 bc	3.5 bc	13.7
DYLOX	2.75	19.1	5.2 b	18.3a	27.6
MALATHION	2.50	17.1	2.9 b	12.1ab	19.3
SEVIN XLR	5.00	8.9	0.0 c	0.5 c	16.1
WATER	-	17.3	19.7a	19.9a	19.5
LSD(5%)		ns			ns

#012

STUDY DATA BASE: 306-1462-9008

CROP: Lowbush blueberry

PEST: Blueberry leaf beetle, *Tricholochmaea vaccinii* (Fall) (Chrysomelidae)

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TITLE: **TOXICITY OF *BACILLUS THURINGIENSIS* AGAINST BLUEBERRY LEAF BEETLE**

MATERIALS: TRIDENT 6400 (*Bacillus thuringiensis tenebrionis*), M-ONE (*B.thuringiensis san diego*), FOIL (*B. thuringiensis kurs* AGRAL 90 (wetting agent).

METHODS: Blueberry leaf beetle larvae were from a laboratory colony and w 36 hours old or less when tested. For each treatment (see table), blueber foliage was immersed in the material for 5 seconds then air dried. Grou larvae were confined in petri dishes with similar amounts of treated foli There were 10 dishes per treatment and insects were kept at about 70% RH, 20 °C and with 16 h light. Foliage was replaced with untreated leaves as required. Mortality was assessed at regular intervals.

The time to 50% mortality for each treatment (LT_{50}) was calculated by log regression in Genstat 5 Release 2.1. Standard errors were calculated usir Fieller procedure in Genstat.

RESULTS: As presented in the table below.

CONCLUSIONS: Rate of application did not affect the LT_{50} significantly. Trident and Foil had similar toxicities with an LT_{50} of 2-4 days, but M- (was much slower (9 days) to achieve the same mortality.

Treatment	Rate (L/ha)	% mortality at days after treatment (cumulative)						LT_{50} (SE) (days)	
		1	3	5	7	10	13		
TRIDENT	7.0	2	76	80	86	88	96	2.3	0.2
TRIDENT	10.0	0	48	62	66	68	74	4.0	0.3
M-ONE	7.0	0	28	34	46	48	56	8.9	1.2
M-ONE	10.0	0	30	38	42	46	54	9.4	1.5
FOIL	7.0	6	64	72	72	84	84	2.8	0.2
FOIL	10.0	0	72	94	94	96	98	2.3	0.2
Agral	0.1	0	2	2	2	4	4	-	
water	-	2	2	2	6	6	14	-	

#013

STUDY DATA BASE: 390-1452-9201

ICAR: 92005039

CROP: Strawberry (new plantings)

PEST: Aphid spp.

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TITLE: **TOLERANCE OF NEWLY PLANTED STRAWBERRY TO PIRIMOR**

MATERIALS: PIRIMOR 50WP (pirimicarb)

METHODS: Stawberry plants (cv. Totem) were planted on May 14, 1992 in a randomized complete block design (four blocks, 10 plants/plot) near Abbotsford, B.C. Using a back-pack sprayer with a hollow cone nozzle, 0, 550, and 1100 g/ha PIRIMOR were applied in 240 L/ha water on July 8, Jul July 23, July 30, and September 14. Seven plants from each plot were harvested on September 24 and the plant weight, number of primary runners/plant, primary runner length, number of secondary runners/plant, number of daughter plants/plant recorded. The data were analyzed by ANO single degree of freedom orthogonal contrast was used to compare means o variables for the 1100 g/ha rate with the 0 g/ha rate. Linear and non-l trend analyses were conducted using orthogonal coefficients for the incr rate of PIRIMOR.

RESULTS: With the exception of the number of daughter plants/plant, significant differences were not found in the above analyses. A signifi decreasing trend was found for the response of the number of daughter plants/plant to increasing rates of PIRIMOR (p=0.0405, data shown below).

Treatment (g/ha PIRIMOR)	number of daughter plants/plant	standard error	coefficients for linear trend anal
0	4.04	0.29	-7
275	3.85	0.86	-3
250	3.18	1.14	1
1100	3.28	0.95	9

Regression analysis of this trend showed that y = 3.9-0.203x (r^2=13%) whe is the number of daughter plants/plant and x is the rate of PIRIMOR in g No difference was found when the high rate of PIRIMOR was compared to the control indicating that this trend may have been an anomaly.

CONCLUSIONS: There is a possible slight inhibitory effect of increasing of PIRIMOR on daughter plant production of strawberry.

#014

STUDY DATA BASE: 61002030

CROP: Kidney beans cv. California light red

PEST: Potato leafhopper, *Empoasca fabae* (Harris)

TITLE: **VALIDATION OF DAMAGE THRESHOLD USING LEAFHOPPER NYMPH COUNTS AS TH DECISION TOOL**

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MATERIALS: CYGON 480E (dimethoate)

METHODS: The crop was planted on 2 June, 1992 at 600,000 seeds/ha in rows m apart at Ridgetown, Ontario. Plots were 9 rows wide by 8 m in length. Treatments were arranged in a randomized complete block design with 4 replications. CYGON was applied broadcast at 0.48 kg AI/ha in 225 L wate at 241 kPa pressure with a field sprayer. Plots were sprayed on 11, 21 J 5 and 18 August. Leafhopper populations were estimated by counting nymph from 10 leaflets selected at random from the centre of the crop canopy. C were expressed as the average number of nymphs/trifoliate. Yields were t from 4 rows by 3 m out of the centre of the plot on 9 October and correct 18% moisture.

RESULTS: As presented in Table 1. Nymph populations did not exceed 2/trifoliate at any time during the study. Conditions were cool and wet during most of the growing season, except during the period 2-3 weeks aft planting.

CONCLUSIONS: No significant economic return was obtained when dimethoate applied at any of the decision thresholds reached. This was probably due the cool wet weather experienced after dimethoate was applied.

Table 1. Control of potato leafhoppers in kidney beans with foliar applications of dimethoate timed to decision thresholds based on nymph co

Decision Threshold (nymphs/trif.)	Spray Date	------------Potato leafhopper counts--------- (nymphs/trifoliate) 9 July 5-7 trif.	21 July e. bloom 21 trif.	28 July l. bloom	4 Aug e. pod	14 Aug l. pod	Yi T/
0.5	9 July	0.5 c*	0.2 a	0.0 c	0.1 a	0.9 a	1.
1.0	9 July	1.1 b	0.8 a	0.7 ab	0.4 a	1.2 a	1.
2.0	9 July	2.2 a	0.5 a	0.3 bc	0.2 a	0.5 a	1.
	Weekly	0.3 c	0.8 a	0.4 abc	0.1 a	0.2 a	1.
Control		0.7 bc	1.0 a	0.9 a	0.4 a		1.
CV %		36.9	101.4	80.1	133.3	94.4	19

* Means followed by the same letter are not significantly different (P<0.
Duncans's Multiple Range Test.

#015

STUDY DATA BASE: 61002030

CROP: White beans cv. ExRico

PEST: Potato leafhopper, *Empoasca fabae* (Harris)

TITLE: **EVALUATION OF UBI-2627 AS A SEED TREATMENT FOR THE CONTROL OF POTA LEAFHOPPER**

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MATERIALS: UBI-2627

METHODS: The crop was planted on 15 June, 1992 at 600,000 seeds/Ha in row 0.65 m apart at Ridgetown, Ontario. Plots were 9 rows wide by 8 m in len Treatments were arranged in a randomized complete block design with 4 replications. Seed treatments were applied to 9 kg lots of seed and mixe a large-capacity drum mixer for 1 min. Leafhopper populations were estim by counting nymphs from 10 leaflets selected at random from the centre of crop canopy. Counts were expressed as the average number of nymphs/trifoliate.

RESULTS: As presented in table 1.

CONCLUSIONS: UBI-2627 applied at the rates indicated as a seed treatment, did not control potato leafhoppers in the white bean crop.

Table 1. Efficacy of UBI-2627 as a seed treatment for the control of pota leafhopper in white beans. Ridgetown, Ontario. 1992.

Treatment	Rate		-Potato leafhopper counts--- ----nymphs/trifoliate------- 9 July 2 Trif.	21 July 5 Trif.	28 July 10 Trif.
UBI-2627	3.0	ml/kg seed	0.00 a*	1.73 a	1.80 a
UBI-2627	6.0	ml/kg seed	0.15 a	0.60 a	0.98 a
UBI-2627	9.0	ml/kg seed	0.08 a	0.75 a	1.27 a
CONTROL			0.08 a	1.95 a	1.95 a
CV %	=		133.3	67.6	53.3

* Means followed by same letter do not significantly differ (Duncan's MR P=.05)

#016

STUDY DATA BASE: 61002030

CROP: White beans cv. ExRico

PEST: Potato leafhopper, *Empoasca fabae* (Harris)

TITLE: **VALIDATION OF DAMAGE THRESHOLD USING LEAFHOPPER NYMPH COUNTS AS TH DECISION TOOL**

NAME AND AGENCY:
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MATERIALS: CYGON 480E (dimethoate)

METHODS: The crop was planted on 2 June, 1992 at 600,000 seeds/Ha in rows m apart at Ridgetown, Ontario. Plots were 9 rows wide by 8 m in length. Treatments were arranged in a randomized complete block design with 4 replications. CYGON was applied broadcast at 0.48 kg AI/ha in 225 L wate at 241 kPa pressure with a field sprayer. Plots were sprayed on 11, 21, July, 5, and 18 August. Leafhopper populations were estimated by countir nymphs from 10 leaflets selected at random from the centre of the crop ca Counts were expressed as the average number of nymphs/trifoliate. Yields were taken from 4 rows by 3 m out of the centre of the plot on 9 October corrected to 18% moisture.

RESULTS: As presented in Table 1. Nymph populations did not exceed 2/trifoliate at any time during the study. Conditions were cool and wet during most of the growing season, except during the period 2-3 weeks aft planting.

CONCLUSIONS: There was no significant economic return when dimethoate was applied at any decision threshold when compared with the non-treated cont This was due, mainly, to cool wet weather following applications of dimethoate.

Table 1. Control of potato leafhoppers in white beans with foliar applications of dimethoate timed to decision thresholds based on nymph co

Decision Threshold (nymphs/trif.)	Spray Date	------------Potato leafhopper counts--------- (nymphs/trifoliate) 9 July 5-7 trif.	21 July 12 trif. bloom	28 July 12-18 tr. l. bloom	4 Aug 25 tr. e. pod	14 Aug l. pod fill	Yield T/h
0.5	9 July	0.5 bc*	0.3 b	0.3 bc	0.2 b	1.7 a	2.1
1.0	9 July	1.1 a	2.1 a	0.8 b	1.1 a	2.2 a	1.9
2.0	21 July	0.6 b	1.8 a	2.0 a	0.4 b	1.5 a	1.8
	Weekly	0.0 c	0.1 b	0.0 c	0.0 b	0.5 a	1.
Control		0.2 bc	2.0 a	1.8 a	1.1 a	N/A	2.
CV %		67.75	60.0	44.7	77.6	71.5	6.

* Means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test.

#017

STUDY DATA BASE: 61002030

CROP: White bean var. Ex Rico

PEST: Seed corn maggot, *Delia platura*

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TITLE: **INSECTICIDES FOR THE CONTROL OF SEED CORN MAGGOT IN WHITE BEANS**

MATERIALS: AGROX B-3 (diazinon + lindane + captan),
AGROX DL PLUS (diazinon + lindane + captan),
COUNTER 15G (terbufos), DI-SYSTON 15G (disulfoton),
DYFONATE II 20G (fonofos), FORCE 1.5G and FORCE ST (tefluthrin
LORSBAN 15G (chlorpyrifos), UBI-2627,
VITAFLO 280 (carbathiin + thiram)

METHODS: The crop was planted on 25 May, 1992 at Ridgetown, Ontario on a loam soil near a manure pit, in 6 m rows spaced 0.76 m apart at 100 seeds plot, using a John Deere Max-emerge planter which was fitted with a cone seeder. Plots were single rows, arranged in a randomized complete block design with four replicates. Plots were prepared on top of winter wheat (killed with glyphosate + ammonium sulfate + Agral 90) green manure ploug in early May. Cattle manure was disced-in 4 weeks prior to planting. Pl were planted when adults were numerous (monitored by yellow sticky cards) granular materials were applied using a plot scale Noble applicator. T-b applications were placed in a 15 cm band over the open seed furrow. In-f applications were placed directly into the seed furrow. Seeds were treat 200 g lots using a desk-top treater supplied by UNIROYAL CHEMICAL. Perce emergence was calculated on 10 June by counting all the plants emerged pe plot at the first leaf stage and relating that to the total number of see planted. Percent injury was calculated the following day as the number o seedlings showing maggot injury over the number of seedlings dug up in a section of row.

RESULTS: Results are presented in Table 1.

CONCLUSIONS: The standard seed treatments containing lindane and diazinon provided the best level of control which was only around 50 % at best.

Table 1. Control of seed corn maggot in white beans with seed treatment
granular insecticides at Ridgetown, Ontario in 1992.

Treatment	Rate	Method	Percent Emergence	Percent Infestation
FORCE 1.5G	1.13 g AI/100m	IN-FURROW	26.8 b-f*	75.6 a-d
FORCE ST	0.4 g AI/kg	SEED T.	28.9 b-e	81.9 a-d
DI-SYSTON 15G	9 g AI/100m	T-BAND	29.4 b-e	65.3 bcd
DI-SYSTON 15G	11.25 g AI/100m	T-BAND	18.4 d-g	83.6 a-d
COUNTER 15G	9 g AI/100m	IN-FURROW	42.7 abc	61.5 cd
COUNTER 15G	11.25 g AI/100m	IN-FURROW	37.9 a-e	75.8 a-d
LORSBAN 15G	9 g AI/100m	IN-FURROW	39.0 a-d	91.8 abc
LORSBAN 15G	11.25 g AI/100m	IN-FURROW	36.9 a-e	62.7 cd
DYFONATE II 20G	9 g AI/100m	T-BAND	28.4 b-e	60.5 cd
DYFONATE II 20G	11.25 g AI/100m	T-BAND	31.5 a-e	64.2 bcd
UBI-2627	3.0 ml pr./kg	SEED T.	17.0 efg	88.1 a-d
UBI-2627	6.0 ml pr./kg	SEED T.	18.7 d-g	90.9 abc
UBI-2627	9.0 ml pr./kg	SEED T.	21.7 c-g	78.1 a-d
AGROX B-3 STANDARD	3.2 g pr./kg	SEED T.	41.2 abc	50.7 d
AGROX DL PLUS STANDARD	2.2 g pr./kg	SEED T.	46.2 ab	71.5 a-d
AGROX DL PLUS with	2.2 g pr./kg	SEED T.	53.9 a	65.2 bcd
VITAFLO 280	2.6 g pr./kg	SEED T.		
VITAFLO 280	2.6 g pr./kg	SEED T.	9.3 fg	84.4 a-d
NON-TREATED CONTROL	ROLLED IN TREATER		7.8 g	95.3 ab
NON-TREATED CONTROL	NON-ROLLED		18.4 d-g	96.8 a
CV % =			25.8	23.3

* Means followed by the same letter are not significantly different at t 5% level (New Duncan's Multiple Range Test). Data were transformed by ARCSIN(SQR(%)) before ANOVA and mean separation. Reported means were backtransformed.

#018

BASE DE DONNES DES ETUDES: 310-1452-8504

CULTURE: Brocoli, cv. Emperor

RAVAGEUR: Piéride du chou, *Pieris rapae* (L.); fausse-arpenteuse du chou, *Trichoplusia ni* (Hubner); fausse-teigne des crucifères, *Plutella xyloste*

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TITRE: EVALUATION DE 4 INSECTICIDES A BASE DE *BACILLUS THURINGIENSIS* CONT
LES LARVES PHYLLOPHAGES DU BROCOLI

PRODUITS: JAVELIN WG (*B. thuringiensis* var. *kurstaki*);
DIPEL WP (*B.thuringiensis* var. *kurstaki*);
Bactospeine (*B. thuringiensis* var. *kurstaki*);
THURICIDE-HPC (*B. thuringiensis* var. *kurstaki*);
ENTICE (phagostimulant).

METHODES: L'évaluation a été effectuée selon un plan à blocs complets aléatoires contenant 10 parcelles, répétés 3 fois. Chaque parcelle avait rangs de 3 m de long et espaces de 1 m. Les brocolis ont été transplanté 16 juillet 1991 à raison de 8 plants par rang espaces de 35 cm. Un trait avec l'herbicide TREFLAN, 2.0L/ha, a été effectué avec un pulvérisateur m sur tracteur à une pression de 2/KPa le 17 mai et un traitement de la mou du chou avec l'insecticide DASANIT 720 SC, 25 ml/rang - 100 m, a été effe le 16 juillet. Les traitements comprenaient 1 groupe avec les 4 produits seuls, un autre groupe avec les 4 produits mélanges avec ENTICE 2.83 g/L stimuler l'appetit des larves et 1 temoin dans chaque groupe. Les arrosa d'insecticides effectués à l'aide d'un pulvérisateur monté sur tracteur à pression de 5.5 kPa ont été faits le 31 aoét (formation des têtes) et les 12 septembre. Les dénombrements des 3 espèces de larves sur 8 plants cho au hasard dans les 4 rangs du centre de chaque parcelle ont eu lieu le 31 et les 4, 10 et 18 septembre. La récolte a été effectuée le 18 septembre la qualité commerciale des tête évaluée à ce moment.

RESULTATS: Voir tableau ci-dessous.

CONCLUSIONS: Le THURICIDE-HPC ainsi que le THURICIDE-HPC/ENTICE ont démon le moins d'efficacité pour combattre les insectes phyllophages du brocoli deux traitements n'ont montré aucune difference significative avec le tém ou le témoin/ENTICE. Les traitements DIPEL WP, DIPEL WP/ENTICE et BACTOS connurent de meilleurs résultats dans l'élimination des populations de la que les 2 traitements avec le THURICIDE-HPC en maintenant ces populations des niveaux plus bas. Cependant, ces insecticides n'ont pas réussi à pro un effet marqué sur la réduction des populations dans le temps. Les traitements BACTOSPEINE/ENTICE, JAVELIN et JAVELIN/ENTICE connurent respectivement, en ordre croissant d'efficacité, les meilleurs résultats tous les traitements. Ils ont entrainé une réduction importante du nombr larves et ont maintenu les populations à des niveaux les plus bas de tous traitements appliqués. L'usage de l'ENTICE comme phagostimulant semble a augmenté l'efficacité des insecticides BACTOSPEINE et JAVELIN.

Traitements	Dose u.i./ha	Nombre moyen de larves pour 8 plants* 31/08	04/09	10/09	18/09	Qualité* (%)
Groupe 1						
Thuricide HPC	$1,89 \times 10^{10}$	10,7a***	7,3a	32,7bcde	16,7abcd	96.1a
Dipel WP	$8,80 \times 10^{9}$	6,3a	11,7a	7,3cde	12,3cde	98,0
Bactospeine	$2,23 \times 10^{10}$	8,7a	8,3a	6,3cde	11,7cdef	96,1a
Javelin WG	$3,55 \times 10^{10}$	11,3a	9,3a	5,0de	4,7 h	95,7a
Témoin	-----	10,3a	8,7a	18,7ab	18,7ab	96,1
Groupe 2 (Entice)						
Thuricide HPC	$1,89 \times 10^{10}$	10,7a*	7,0a	13,7abc	17,3abc	96,1a
Dipel WP	$8,80 \times 10^{9}$	11,7a	10,0a	11,3abcd	11,3cdefg	98,0
Bactospeine	$2,23 \times 10^{10}$	10,3a	15,0a	8,3cde	6,7efgh	96,1a
Javelin WG	$3,55 \times 10^{10}$	9,3a	10,3a	3,0e	4,6h	95,7a
Témoin	-----	8,0a	12,0a	21,3a	21,7a	96,1

* Transformation sq root x + 0,5 sur les données originales avant le t
** Transformation arcsin des moyennes avant le test.
*** Valeurs suivies de la même lettre ne sont pas significativement différentes au seuil 0,05 (Test de l'écart multiple de Duncan).

#019

STUDY DATA BASE: 303-1452-8703

CROP: Cabbage cv. Lennox

PEST: Imported cabbageworm, *Artogeia rapae* (L.) and
Diamondback moth, *Plutella xylostella* (L.)

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TITLE: **EVALUATION OF INSECTICIDES FOR CONTROL OF IMPORTED CABBAGEWORM (IC AND DIAMONDBACK MOTH (DBM) ON CABBAGE, 1992**

MATERIALS: RH-5992 2F 23%, AC 303,630 SC 24%

METHODS: Cabbage seedlings were transplanted at Harrington, P.E.I., on Ju 17, 1992. Plants were spaced at about 45 cm within rows and 87 cm betwee rows. Each four-row plot measured 3.5 m wide by 23 m long. Plots were arranged in a randomized complete block design with five treatments each replicated a total of four times. Fertilizer was applied in accordance w recommendations for cole crop production on P.E.I. Plots were sampled we beginning on August 6 and ending on September 16. ICW and DBM larvae cou were derrived from the destructive sampling of five plants systematically selected from the two center rows of each plot. Insecticides were applie August 12 and whenever a threshold of 0.25 Cabbage Looper Equivalents (CL was surpassed. The number of ICW and DBM were multiplied by 0.67 and 0.2 respectively to convert to CLE. Insecticides were applied using a precisi plot sprayer delivering about 1240 L/ha at about 240 kPa. The spreader sticker LATRON-B was added to all spray mixtures and the untreated check the rate of 1.2 L/ha. Weeds were controlled by a pre-plant application o trifluralin at a rate of 600 g AI/ha on May 11, and several mechanical cultivations. Ten heads from the center two rows of each plot were harve on September 24, and weight, diameter, and marketability were recorded. which were free of insects, frass, and feeding damage were considered marketable. An analysis of variance was performed on the data and Least Squares Differences (LSD) determined.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: Insecticide-treated plots had significantly fewer ICW and DE larvae as compared to the untreated check plots. Plots treated with AC 3 required fewer sprays than those treated with RH-5992. There was a rate response between the rates tested for AC 303,630 and RH-5992 on most date Yield of marketable heads was signifacantly improved over the untreated c by all treatments with no significant differences between treatments.

TREATMENT	RATE (g AI/ha)	NO. OF SPRAYS	NUMBER OF ICW LARVAE/5 PLANTS AUGUST 6	14	21	27	SEPTEMBER 3	10	16
CHECK	-	-	0.0	0.8	1.0	3.3	9.3	5.0	3.8
RH-5992	140	6	0.0	0.8	0.3	0.0	0.0	0.0	0.3
RH-5992	240	5	0.3	0.3	0.0	0.5	0.0	0.3	1.0
AC 303,630	50	3	0.0	0.5	0.3	0.8	0.0	0.0	0.3
AC 303,630	100	2	0.0	0.3	0.3	0.5	1.0	0.0	0.0
LSD (P<0.05)			NS	NS	0.5	2.3	4.5	1.4	2.0

TREATMENT	RATE (g AI/ha)	NO. OF SPRAYS	NUMBER OF DBM LARVAE/5 PLANTS AUGUST 6	14	21	27	SEPTEMBER 3	10
CHECK	-	-	4.3	2.3	4.5	11.0	12.0	22.8
RH-5992	140	6	3.8	7.0	5.8	4.8	20.3	12.3
RH-5992	240	5	1.3	3.3	3.8	6.8	15.3	12.5
AC 303,630	50	3	5.0	4.8	4.8	1.3	1.3	0.3
AC 303,630	100	2	3.8	3.3	3.0	2.8	4.8	1.3
LSD (P<0.05)			2.9	4.3	NS	5.8	11.3	19.1

#020

CULTURE: Chou cv. Bartolo

RAVAGEURS: Piéride du chou, *Pieris rapae* (L.); fausse-teigne des crucifèr
Plutella xylostella (L.); fausse-arpenteuse du chou, *Trichoplusia ni* (Hub

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TITRE: ETUDE DES SEUILS D'INTERVENTION POUR MAITRISER LES LARVES PHYLLOPH
DU CHOU

PRODUITS: AMBUSH 500 EC (permethrin) 70 g m.a./ha

METHODES: L'étude a été effectuée selon un plan à blocs complets aléatoir contenant 6 parcelles répétées 3 fois. Chaque parcelle comprenait 8 rang 5 m de long espaces de 1 m. Les choux furent transplantés le 29 juin 199 raison de 14 plants/rang espaces de 35 cm. Une application d'herbicide trifluralin (TREFLAN 545 EC, 2,0 L/ha) fut effectuée le 19 mai avec un pulvérisateur monté sur tracteur à une pression de 1,7 kPa, ainsi qu'une application de fensulfothion (DASANIT 720 SC, 25 ml/rang - 100 m @ 4.8 kP contre la mouche du chou le 29 juin et une application de chlorpyrifos (LORSBAN 50 W, 2,25 Kg/ha @ 5,5 kPa) contre le ver-gris le 4 juillet. Le traitements comprenaient un témoin sans insecticide; application d'insect de façon régulière à tous les sept jours des la transplantation (Cédule); application d'insecticide à tous les sept jours dès la formation de la té (Tête); et application d'insecticide des l'obtention des seuils d'interve de 0,25; 0,50; 1,0 CLE (CLE: Cabbage Looper Equivalent). La parcelle tém ne reçu aucun insecticide. L'AMBUSH fut appliqué au moyen d'un pulvéris monté sur tracteur à une pression de 5,5 kPa avec un débit de 140 ml/ha. dépistage des trois espèces de lépidoptères larvaires sur 10 plants chois hasard dans les 4 rangs de centre de chaque parcelle fut effectué une foi semaine pour un total de 14 dépistages. La récolte a eu lieu le 13 octob Le poids, le diamètre et la qualité commerciale de 30 choux choisis au ha dans les rangs du centre de chaque parcelle furent enregistrés. Les chou étaient de qualité commerciale lorsqu'ils n'avaient aucune larves, matièr fécales ou dégâts causés par les insectes.

RESULTATS: Voir tableau ci-dessous.

Traitements	# d'arrosage	CLE (Moyenne)	Poids (g)	Diamêtre (cm)	Qua (
Cedule	13	0.013a*	1300.3ab	14.3	1
Tête	7	0.073b	1253.9b	14.1	1
0.25 CLE	3	0.162b	1289.7ab	14.3	9
0.5 CLE	1	0.185c	1352.5a	14.5	7
1.0 CLE	0	0.324d	1333.9ab	14.4	5
Témoin	0	0.311d	1268.9b	14.1	5

* Les valeurs suivies de la même lettre ne sont pas significativement différentes au seuil 5% (Duncan's Multiple Range Test).
** Transformation arcsin sq. rt x des données avant le test.

CONCLUSIONS: Le traitement Cédule avec 13 applications d'insecticide a significativement maintenu le CLE moyen le plus faible des 6 traitements. traitement Tête avec 7 applications d'insecticide a présenté un CLE moyen significativement supérieur au traitement Cédule mais une qualité commerc équivalente à ce dernier. Les traitements 0,25 et 0,5 CLE avec respecti 3 et 1 applications d'insecticide ne présentent pas de différence significative pour le CLE moyen mais le seuil d'intervention 0,5 CLE prés une qualité commerciale significativement inférieure à celle de 0,25 CLE. traitement 1,0 CLE ou il n'y eut aucun arrosage, et le Témoin n'ont pas démontre de différence significative entre eux pour le CLE moyen et la qu commerciale mais ces valeurs sont significativement les plus faibles de t les traitements. Le poids des choux a varié entre les traitements avec l traitement 0,5 CLE qui a obtenu un poids significativement supérieur à ce des traitements Tête et Témoin. Le seuil 0,25 CLE avec des économies de 4 arrosages par rapport aux traitements Cédule et Tête respectivement, a réussi à présenter une qualité commerciale non différente significativeme celles obtenues par ces deux derniers traitements. Cependant, sa qualité commerciale de 95,9% le place derrière le traitement Tête. Ainsi, le traitement Tête avec un CLE moyen supérieur au traitement Cédule a permis d'économiser 6 applications d'insecticide tout en produisant une même qua commerciale de choux.

#021

ICAR: 61006535

CROP: Cabbage, cv Superette

PEST: Imported Cabbageworm, *Pieris rapae* (L)

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TITLE: **INSECT CONTROL IN CABBAGE**

MATERIALS: MONITOR 480LC (methamidophos),
THURICIDE-HPC (*B. thuringiensis* var. *Kurstaki*),
AC 303,630, 360EC (experimental),
ASC-66884 (experimental), DECIS 5.0EC (deltamethrin)

METHODS: Cabbage was transplanted on June 3 in two row plots spaced 0.9m apart. Plots were 8m in length, replicated 4 times in a randomized compl block design. Spray applications were made with a back pack airblast spr at 240 L/ha of water. Insecticides were applied on July 3, 11, 20 and 28 0.1% v/v of the surfactant AGRAL 90 was added to each treatment. Insect feeding damage ratings were taken on July 22 and Aug. 4.

RESULTS: As presented in the tables below.

CONCLUSIONS: There are a number of outstanding Imported cabbageworm contr insecticides. All treatments performed well either singly or in sequenti spray programs. MONITOR 480LC, THURICIDE and AC 303,630 360EC were the m effective.

Treatments	Rate L pr/ha	Imported Cabbageworm Leaf Feeding Damage (0-10) July 22	Au
MONITOR 480LC	1.1	9.8a*	9.5
THURICIDE-HPC	4.0	9.8a	9.8
ASC-66884	0.75 kg	8.4b	7.5
ASC-66884	1.25 kg	9.8a	7.8
ASC-66884	1.75 kg	8.8ab	8.0
AC 303,630 360EC	0.28	8.8ab	9.0
AC 303,630 360EC	0.56	9.8a	9.8
DECIS 5.0EC; THURICIDE-HPC; AC 303,630 360EC; MONITOR 480LC	100.0 ml; 4.0; 0.28; 1.1	9.8a	8.8
Control		5.0c	2.3

* Means followed by the same letter are not significantly different (P<0
Duncan's Multiple Range Test)

** Imported Cabbageworm leaf feeding damage (0-10) - 0, no control, folia
severely damaged; 10, complete control

#022

CULTURE: Chou-fleur cv. Andes

RAVAGEUR: Piéride du chou, *Pieris rapae* (L.); fausse-arpenteuse du chou, *Trichoplusia ni* (Hubner); fausse-teigne des crucifères, *Plutella xylostella* (L.)

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TITRE: EMPLOI DE SEUILS D'INTERVENTION POUR MAITRISER LES LARVES PHYLLOPH
DU CHOU-FLEUR

PRODUITS: AMBUSH 500 EC (perméthrin), 70 m.a./ha

METHODES: L'étude fut réalisée selon un plan à blocs complets aléatoires contenant 6 parcelles répétées 4 fois. Chaque parcelle comptait 8 rangs m de long espaces de 1 m. Les choux-fleurs furent transplantés le 29 jui 1992 à raison de 14 plants/rang espaces de 35 cm. Une application d'herb trifluralin (TREFLAN 545 EC, 2.0 L/ha) fut réalisée le 19 mai à l'aide d' pulvérisateur monté sur tracteur à une pression de 1,7 kPa, ainsi qu'une application de fensulfothion (DASANIT 720 SC, 25 ml/rang - 100 @ 4,8 kPa) contre la mouche du chou le 29 juin et une application de chlorpyrifos (LORSBAN 50W, 2,25 Kg/ha @ 5,5 kPa) contre le ver-gris le 4 juillet. Les traitements comprenaient un témoin sans insecticide; application d'insect de façon régulière à tous les sept jours après la transplantation (Cédule application d'insecticide tous les sept jours des la formation de la tête (Tête) et application d'insecticide des l'obtention des seuils d'interven de 0,25; 0,50; et 1,0 CLE (CLE: Cabbage Looper Equivalent). L'insectici fut appliqué au moyen d'un pulvérisateur monté sur tracteur à une pressio 5,5 kPa avec un debit de 140 ml/ha. Le dépistage des 3 espèces larvaires 10 plants choisis au hasard dans les 4 rangs du centre de chaque parcelle était effectué 1 fois par semaine pour un total de 12 dépistages. Les récoltes se firent à la maturité des choux-fleurs, les 4, 9, 15 et 21 septembre. Le poids, le diamètre et la qualité commerciale de 30 choux-f choisis au hasard dans les rangs du centre de chacune des parcelles furen enregistrés. Les choux-fleurs étaient de qualité commerciale lorsqu'ils n'avaient pas de larves, de matières fécales ni de dégâts causes par les insectes.

RESULTATS: Voir tableau ci-dessous.

Traitements	# d'arrosage	CLE (Moyenne)	Poids (g)	Diamètre (cm)	Qua
Cédule	11	0.012a*	784.0	15.7a	
Tête	5	0.100b	699.5	15.0b	
0.25 CLE	2	0.128b	722.6	15.3b	
0.5 CLE	1	0.226c	726.4	15.1b	
1.0 CLE	0	0.369d	701.9	15.0b	
Témoin	0	0.355d	744.0	15.4ab	

* Les valeurs suivies de la même lettre ne sont pas significativement différentes au seuil 5% (Duncan's Multiple Range Test).
** Transformation arcsin sq. rt des données avant le test.

CONCLUSIONS: Le traitement Cedule avec 11 arrosages d'Ambush a maintenu u population larvaire significativement plus faible que les 5 autres traitements. Le traitement 0,25 CLE avec seulement 2 applications d'insecticide a maintenu un niveau de population non différent significativement de celui du traitement Tête qui a nécessité 5 applicati d'insecticide. Le seuil 0,5 CLE a enregistré un CLE moyen significativem supérieur à celui du seuil 0,25 CLE. Le traitement 1,0 CLE n'a reçu aucu insecticide et présente avec le Témoin les plus hauts niveaux de populati Aucune différence significative n'a été enregistrée dans le poids des têt pour les 6 traitements. Les traitements Cedule et Tête ont donné des qua commerciales de 100% alors que les traitements 0,25 et 0,5 CLE ont enregi des qualités commerciales de 85% et 79% respectivement. Le témoin et le 1,0 CLE ont présente les plus faibles qualités commerciales. Le traiteme Tête, avec un CLE moyen significativement supérieur au traitement Cedule, présente une qualité commerciale équivalente à ce dernier traitement mais 6 applications d'insecticide en moins. Le seuil 0,25 CLE avec un CLE moy comparable au traitement tête a permis d'économiser 3 applications d'insecticide mais il ne peut être retenu car sa qualité aurait été trop faible en production commerciale. Ainsi, les seuils d'intervention de 0, 0,5 CLE ont permis d'économiser respectivement 9 et 10 arrosages par rapp au traitement Cédule mais les pertes encourues sont trop importantes pour qu'ils soient envisagés dans le contexte de l'étude.

#023

STUDY DATA BASE: 364-1421-8704

CROP: Canola var. Westar

PEST: Crucifer Flea Beetle, *Phyllotreta cruciferae* (Goeze)

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TITLE: **CANOLA SEEDLING PROTECTION FROM FLEA BEETLE DAMAGE WITH GRANULAR A SEED DRESSING INSECTICIDES**

MATERIALS: FURADAN 10 G (carbofuran);
CLOAK (lindane 53.3%, carbathiin 4.5%, thiram 9%);
COUNTER 5 G, BIODAC 5 G (terbufos); TRIGARD 3 G (cyromazine);
AMAZE (isofenphos 93%, benomyl 20%, thiram 2%); FORCE (tefluth
TF3791 (tefluthrin 14.3%, thiabendazole 2%, thiram 6%);
UBI-2554-1 (cloethocarb 25%, carbathiin 6.25%, thiram 12.5%);
ROVRAL ST (lindane 50%, iprodione 16.7%);
VITAVAX RS (lindane 68%, carbathiin 4.5%, thiram 9%);
PREMIERE (lindane 51.2%, thiabendazole 2%, thiram 6%);

UBI-2608-1; NTN-33983

METHODS: Canola was seeded May 20, 1992 at 5.6 kg/ha to a depth of 2 to 3 with a double disc press drill with 17.5 cm row spacings at Glenlea, Mani Plots 1.25 m by 8.0 m were replicated 5 times in a randomized complete bl design. Four samples of 25 seeds/treatment were tested for germination a 25 °C on moistened filter paper for 7 days. Two plant counts/plot of 0.25 m^2 were taken June 19. Flea beetle damage was assessed June 19 and J 8 with a rating scale based on % of leaf surface area damaged; 0 = no dam 0.5 = 5%; 1.0 = 10%; 2 = 25%; 3 = 50%; 3.5 = 75%; 4 = 100%. Plots were harvested by straight combining on September 22-24 and yields were record from dried seed weights.

RESULTS: Rates in the table refer to the weight of the active ingredient the insecticide in the pesticide formulation. Both UBI-2608-1 and NTN-33 contain the fungicides carbathiin and thiram.

CONCLUSIONS: Seed treated with FORCE, TF3791, UBI-2554-1, and UBI-2608-1 significantly lower germination than the CHECK. All treatments reduced fe injury by flea beetles and increased plant stand except for CLOAK and TRI FORCE, UBI-2554-1, and ROVRAL ST were the only treatments in which the increase in the plant stand was not significant. Yields were increased significantly by UBI-2608-1, VITAVAX RS, NTN-33983, CLOAK, and UBI-2554-1 dressings, and by COUNTER granules. FURADAN and BIODAC granular treatment that included CLOAK also significantly increased yields. COUNTER was the granular treatment that did not show an increase in yield when CLOAK was added. TRIGARD was less effective than other granular treatments in incre yields. The seed dressings AMAZE, FORCE, and TF3791 gave yield increases comparable to the lindane formulations ROVRAL ST and PREMIERE.

Treatments	Rate (g AI/ kg seed)	Seed Germ. (%)	Plant Damage JN 19	Plant Damage JL 8	Canola Plants /m^2	(g
CHECK	-	91abc*	2.4	2.9	39.6hi	2
FURADAN	50	92abc	0.3	1.1	66.4b-g	2
FURADAN + CLOAK	50 + 12	88a-d	0.3	1.1	62.4c-g	3
COUNTER	50	95a	0.1	0.8	77.2bdc	2
COUNTER + CLOAK	50 + 12	89a-d	0.3	0.7	75.6b-e	2
BIODAC	50	96a	0.1	0.6	81.2bc	2
BIODAC + CLOAK	50 + 12	85a-e	0.7	1.3	54.4fgh	3
TRIGARD	5	96a	1.6	2.2	48.8ghi	2
TRIGARD	10	94ab	2.2	2.8	35.6i	2
TRIGARD + CLOAK	10 + 12	82b-e	1.7	2.5	35.6i	2
AMAZE	12	81c-f	0.3	1.1	69.2b-f	2
FORCE	2	60hi	1.7	2.0	55.2fgh	2
FORCE	4	57i	0.9	1.8	55.6fgh	2
TF3791	4	70fgh	1.2	1.8	62.4c-g	2
UBI-2554-1	4	78d-g	0.7	1.5	57.2e-h	3
ROVRAL ST	16	97a	1.0	1.3	57.6e-h	2
VITAVAX RS	15	86a-e	0.8	0.9	63.6c-g	3
CLOAK	12	89a-d	2.2	3.1	32.4i	2
PREMIERE	14.3	85a-e	0.1	0.5	83.2b	2
UBI-2608-1	10	76efg	0.7	1.1	67.6b-g	3
UBI-2608-1	20	68gh	0.4	1.2	59.6d-g	3
NTN-33983	10	97a	0.3	0.6	105.6a	3

* Means followed by the same letter are not significant (DMR test, P < 0.

#024

STUDY DATA BASE: 364-1421-8704

CROP: Canola cv. Westar

PEST: Crucifer flea beetle, *Phyllotreta cruciferae* (Goeze)

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TITLE: **SEEDLING PROTECTION AND FLEA BEETLE CONTROL IN CANOLA WITH SEED**

DRESSING INSECTICIDES

MATERIALS: AMAZE (isofenphos 93%, benomyl 20%, thiram 2%);
FORCE (tefluthrin);
TF3791 (tefluthrin 14.3%, thiabendazole 2%, thiram 6%);
UBI-2554-1 (cloethocarb 25%, carbathiin 6.25%, thiram 12.5%);
UBI-2608-1; NTN-33893; ROVRAL ST (lindane 50%, iprodione 16.7%
VITAVAX RS (lindane 68%, carbathiin 4.5%, thiram 9%);
PREMIERE (lindane 51.2%, thiabendazole 2%, thiram 6%)

METHODS: Treatments were seeded into sterile soil in 16 dram plastic vial that had a 2 mm hole in the bottom for water entry on May 25, 1992. Plar were thinned to a maximum of 3/vial. White quartz sand was placed on the and clear plastic cages with screened openings were placed overtop the vi after seedling emergence. Plots of 1 cage/treatment were replicated 7 ti Five beetles/plant were added to each cage 2-3 days after seedling emerge and beetle mortality was assessed 2, 4, and 7 days later. All dead beetl were replaced after each assessment. Plant damage was rated after 2, 4, 9 days according to % of leaf surface damaged by beetles: 0 = no damage; = 5%; 1.0 = 10%; 2.0 = 25%; 3.0 = 50%; 3.5 = 75%; 4.0 = 100%. The trial run in a greenhouse at 25-28 °C with a 16:8 photoperiod.

RESULTS: Flea beetle mortality presented in table below were adjusted by arcsin transformation before analysis by Duncan's Multiple Range Test.

CONCLUSIONS: Excellent flea beetle efficacy and seedling protection were provided by AMAZE and all 3 lindane formulations for all bioassays. TF37 the high rate of UBI-2608-1 also gave excellent protection against flea b damage, but efficacy for TF3791 declined after 7 days and for UBI-2608-1 was significantly less than AMAZE and lindane on all dates. FORCE, NTN-3 and the low rate of UBI-2608-1 also were significantly less effective at controlling beetles than AMAZE and lindane, but all treatments greatly re feeding injury. UBI-2554-1 failed to protect plants against flea beetle or provide effective flea beetle control.

Treatment	Rate (g AI/ kg seed)	Flea Beetle Mortality 2 D.	4 D.	7 D.	Plant Damage Ratin 2 D.	4 D.	7 D.
CHECK	-	3c*	0e	0e	1.7	2.3	2.7
AMAZE	12	100a	100a	100a	0	0.3	0.3
FORCE	1	76b	65b	36cd	0.7	0.7	1.2
FORCE	2	78b	56bc	69bc	0.3	0.5	0.5
TF3791	4	100a	93a	77b	0.2	0.1	0.2
UBI-2554-1	4	64b	16d	29cd	0.9	1.6	2.3
UBI-2608-1	10	84b	34cd	65bcd	0.3	0.8	1.1
UBI-2608-1	20	73b	57bc	64bcd	0.3	0.2	0.3
NTN-33893	10	77b	33cd	27d	0.5	0.7	0.9
ROVRAL ST	16	99a	100a	100a	0.1	0.1	0.1
VITAVAX RS	15	100a	100a	99a	0.1	0.2	0.2
PREMIERE	14.3	100a	100a	100a	0.1	0.1	0.2

* Means followed by the same letter are not significant (DMR test, P < 0.

#025

DATA BASE: 1252-352-8501

CROP: Carrot var. Caropac

PEST: Carrot rust fly, *Psila rosae* (Fab.)
Carrot weevil, *Listronous oregonensis* (Leconte)

NAME AND AGENCY:
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TITLE: **ASSESSMENT OF INSECTICIDES PROPOSED FOR REGISTRATION UNDER MINOR U PROGRAMME**

MATERIALS: IMIDAN 50W (phosmet), LORSBAN 4E (chlorpyrifos),
DIBROM EC (864 g/L naled), Cymbush 250 EC (cypermethrin)

METHODS: Minor use proposals were submitted for Imidan, Lorsban, and Dibr for control of carrot rust fly. Lorsban was also tested as a potential candidate for carrot weevil control. Experiment was conducted on organic at the OMAF Muck Research Station, Bradford, Ontario. Plots were 6 rows carrots, precision seeded (May 22), 1.7 m long. Treatments were replicat times. Sprays were applied with a custom (Rittenhouse) tractor-mounted p sprayer in 600 L water per hectare. Results were evaluated by harvesting carrots chosen at random fom the 4 interior rows of each plot October 7 a 14. Percentage damage was determined. Data were transformed (arc-sine) a analyzed using SAS ANOVA.

First-generation carrot rust fly - carrot weevil control: Imidan, Lorsbar Cymbush were compared to an untreated check. Sprays were applied June 16 23 and July 2 (three sprays were applied instead of the usual 2 because o small plots). Second-generation carrot rust fly: Dibrom (not considered candidate for carrot weevil control) was applied to the same plots as Cy had been earlier. Sprays were applied August 6, 14, 20, 26, and Septembe

RESULTS: As presented in table below.

CONCLUSIONS: Due to the late seeding date, insufficient 1st-generation ru fly damage occurred for evaluation. Three insecticides reduced carrot we damage significantly, but did not differ significantly. Although 2nd-generation carrot rust fly injury was lower with all treatments, none differed significantly from the untreated plots, probably due to the variability between plot locations. Further study using larger treated a is required to determine relative efficacy of the candidate insecticides.

Table 1. Mean percentage of damaged carrots.

Treatment	Rate (Product per hectare)	carrot rust fly 1st gen.	carrot rust fly 2nd gen.	carrot weevil
Imidan 50W	1.1 kg	1.0	9.6a	3.2a
Lorsban 4E	2.8 L	1.5	13.0a	7.4a
Cymbush (1st gen)	280.0 ml	0.9	-	8.8a
Dibrom EC	1.1 L	-	10.6a	-
Check		1.0	17.1a	22.2b

#026

STUDY DATA BASE: 206003

CROP: Carrot, cv. Caropak

PEST: Root Knot Nematode, *Meloidogyne hapla*, Pin nematode

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TITLE: **EVALUATION OF THE EFFECT OF MARIGOLDS, ONIONS AND CARROTS ON NEMAT POPULATIONS**

MATERIALS: Marigolds, Tagetes nemanon, and Onions, cv. Taurus

METHODS: Sites 1 and 2 were established in naturally-infested organic soi commercial fields in the Holland Marsh. Site 3 was established in microp of organic soil at the Muck Research Station that were artificially infes with root knot nematode. Marigolds were seeded at a rate of 3 kg/ha, oni at a rate of 40 seeds/m and carrots at a rate of 92 seeds/m. Plots at Si 1 and 2 were 4.25 m x 3.4 m, the microplots at Site 3 were 1 x 2 m. Ther were 4 replicates per treatment, with the exception of carrots at Site 2 were replicated 12 times. Plots were arranged in a randomized complete b design.

Soil samples were taken before seeding and at harvest (Oct. 2) and were analyzed for nematode populations at Agriculture Canada, Vineland, Ontari Populations of root knot and spiral nematodes were low at all sites. Populations of pin nematodes increased rapidly in Site 2. The percent of plants with root knot nematode damage was assessed at harvest.

RESULTS: As presented in table below.

CONCLUSIONS: Populations of pin nematodes at Site 1 and 2 increased marke where carrots were grown, and changed only slightly where onions or marig were grown. Populations of root knot nematodes were very low at all site even in the microplots which were naturally infested. Populations of spi nematodes were low at all sites. Marigolds and onions as a summer cover reduce the increase in pin nematodes in comparison to carrots. The pin nematodes caused very little damage to the carrots while root knot nemato at levels less than 15/kg soil did damage the carrot roots.

SITE ONE

	June, 1991 Nematodes/kg soil			October, 1991 Nematodes/kg soil			Perc Damag Root Nema
Treatment	Pin	Spiral	Root Knot	Pin	Spiral	Root Knot	
Marigolds	25	5	50 a*	0	0	15 a	0.
Onions	0	0	0 a	0	5	8 a	0.
Carrots	0	0	55 a	1,110	0	110 a	6.

SITE TWO

	June, 1991 Nematodes/kg soil			October, 1991 Nematodes/kg soil			Perce Damag Root Nema
Treatment	Pin	Spiral	Root Knot	Pin	Spiral	Root Knot	
Carrots	60 a	25 a	5	37,075 b	0	0	0.
Onions	70 a	20 a	0	110 a	0	0	0.
Marigolds	100 a	35 a	15	20 a	0	0	0.
Carrots	220 a	30 a	15	47,635 b	0	0	0.
Carrots	135 a	10 a	5	27,275 b	0	0	0.

SITE THREE

	June, 1991 Nematodes/kg soil			October, 1991 Nematodes/kg soil			Perc Damag Root Nema
Treatment	Pin	Spiral	Root Knot	Pin	Spiral	Root Knot	
Carrots	0	0	0 a	0	0	15 a	4.
Marigolds	0	0	70 a	0	0	50 a	0.
Onions	0	0	30 a	0	0	0 a	0.

* Values in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.

#027

STUDY DATA BASE: 390-1452-9201

ICAR: 92005039

CROP: Celery (cv. 5270R)

PEST: Aphid sp.

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TITLE: **TOLERANCE OF CELERY TO PIRIMOR AND LAGON 480**

MATERIALS: PIRIMOR 50WP (pirimicarb), LAGON 480E (dimethoate 480 g/L)

METHODS: Celery (cv. 5270R) was planted on June 8, 10, and ll, 1992 at th sites in the Fraser Valley, B.C, in a randomized complete block design wi four blocks. Between row spacing was 1m and within row spacing 0.30m. T proportions of organic matter, sand, silt, and clay varied among sites. addition to an unsprayed control, a back-pack sprayer with a hollow cone nozzle was used to apply both PIRIMOR and LAGON 480 at 137.5, 275, and 55 g/ha, and 350, 700, and 1400 mL/ha, respectively, in 360 L/ha water. PIF was sprayed on July 8, July 23, August 13, and October 6 (sites 2 and 3) October 8 (site 1). LAGON 480 was sprayed on July 8, July 23, August 13, September 29. The crop was harvested one week after the last applicatior taking 10 subsamples per plot at each site. From the subsamples, whole p weight, trimmed plant weight, and percent marketable plants were recordec data were analyzed by ANOVA for each location. Single degree of freedom contrasts were performed for: PIRIMOR vs. LAGON, PIRIMOR vs. control, anc LAGON vs. control. Trend analyses for the increasing rates of insecticic were performed using single degree of freedom tests for: PIRIMOR linear, linear, PIRIMOR non-linear, and LAGON non-linear.

RESULTS: Class comparisons were not significant. Linear trend analysis s a significant decline in the percent marketable plants in response to increasing rates of LAGON 480 at one site only (p=0.03). Regression anal of this trend showed that y = .985-0.066x (r^2=24%) where y is the percent marketable plants and x is the rate of LAGON 480 in mL/ha.

CONCLUSIONS: When applied to celery (cv. 5270R) under the specified conditions, PIRIMOR 50WP does not have phytotoxic properties which transl into a reduction in yield or quality. There is some indication that increasing rates of LAGON 480 under specific field conditions may reduce celery quality.

#028

STUDY DATA BASE: 206003

CROP: Spanish Onion cv. Cache

PEST: Onion Maggot, *Delia antiqua* (Meig.)

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TITLE: **EVALUATION OF LORSBAN 4E FOR ONION MAGGOT CONTROL ON SPANISH ONIO TRANSPLANTS**

MATERIALS: LORSBAN 4E (chlorpyrifos)

METHODS: Spanish onions were seeded in Plastomer trays in the greenhouse March 16, 1992. The plants were placed outdoors to harden off on May 4. May 11, one third of the trays were treated with LORSBAN 4E at the rate o 1.6 ml per 475 ml of water per tray. The Spanish onions were transplante into organic soil at the Muck Research Station on May 12. A randomized complete block arrangement with 4 blocks per treatment was used. Each replicate consisted of two 5 m rows, 43 cm apart with a plant spacing of cm. LORSBAN 4E at 210 ml in 1000 ml of water per 1000 m of row was appli to another one third of the transplants as a field drench on May 28. The effectiveness of the treatments for maggot control was evaluated by count the number of damaged and missing plants on September 28.

RESULTS: As presented in table below.

CONCLUSIONS: There were no significant differences among the treatments, although numerically the untreated check had the highest onion maggot dam and the tray drench treatment had the least. There was a great deal of variation in damage among replicates.

Method	Treatment	Rate ml/L	Percent damage
Tray Drench	LORSBAN 4E	3.40	3.85 a*
Field Drench	LORSBAN 4E	0.21	6.8 a
Check			11.8 a

* Numbers in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.

#029

ICAR/IRAC: 84100737

CROP: Onion, var. Fortress

PEST: Onion maggot, *Delia antiqua* (Meig.)
Onion smut, *Urocystis magica* Pass. Ap. Thum

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TITLE: **PESTICIDES FOR ONION MAGGOT CONTROL - PRECISION SEEDING**

MATERIALS: Each of the following treatments was applied at 3 different ra of application:
DYFONATE(R) 10 G (fonofos), LORSBAN(R) 15 G (chlorpyrifos),
TRIGARD 3 G (cyromazine), FORCE 1.5 G (tefluthrin),
AZTEC 2.1 G (phostebupirim 2.0% + cyfluthrin 0.1%),
BAY-NTN-33893 2.5 G (imidacloprid),
PRO GRO(R) (carbathiin 30%, thiram 50%),
BAY-MAT 2.0 G (phostebupirim).

METHODS: The tests were done at the Holland Marsh on muck soil. The experimental plot was arranged in a randomized complete block design with replicates. Seed was custom-coated PRO GRO-treated seed. The granular formulations were applied by using a Stan-Hay precision seeder in a bed o four double rows 24 metres long. Each bed had three different rates of application of a granular treatment and an untreated row. On June 1 init stand was based on the number of plants in each of two, two-metre lengths selected at random in each row. The designated segments for the first generation were checked on June 8, 11, 15, 18, 22, 25, 29, July 2, 6, 9, and 16, and damaged plants were counted and removed. On July 21, all pla were pulled from the same two, two-metre segments in each row and plants examined for maggot damage. On June 23, plants were measured in 2 metres each row to determine any growth effects due to toxicants. At the end of second and third generation, all plants were pulled from the designated t two-metre lengths in each row and plants were examined for maggot damage. June 18, fifty plants, four replicates were removed to determine smut infection. The plants were rinsed with water to remove adhering dirt and examined visually for smut symptoms. On September 29, five metres of oni of each row were harvested for yield.

RESULTS: As presented in Table 1.

CONCLUSIONS: In the first generation of the onion maggot, DYFONATE contro the infestation of the onion maggot more effectively than LORSBAN. The unregistered insecticides TRIGARD, AZTEC, and BAY-MAT were as effective the registered insecticides in controlling the onion maggot. FORCE was mediocre and BAY-NTN was not satisfactory in the control of the onion mag For the second and third generation the stand loss was high because of th high onion smut infection (22.3%) in combination with the onion maggot da The yields were inconsistent as a result of an unusually poor growing sea

Table 1. Initial onion stand, % maggot damage, % onion smut, % stand loss and yield following the indicated treatment at seeding.*

Treatments	Rate*2 kg AI/ha	Initial plant count*3	Ht*4 (cm)	% Maggot damage Gen 1*5	% Stand loss Gen 2*6	Gen 3*6	Yi (k x
DYFONATE 10 G	0	164	19	31.3b*8	46.9abc	51.6bcd	49.
	2.2	158	17	2.1def	19.4fgh	26.2fghi	45.
	4.5	158	18	0.6f	6.2h	9.9i	54.
LORSBAN 15 G	0	153	19	46.4a	46.2bcd	65.7ab	41.
	1.1	149	19	8.7cdef	30.7def	35.2def	51.
	2.2	154	19	7.2cdef	11.1fgh	27.9fgh	54.
	4.5	151	19	5.6cdef	9.6gh	18.5hi	61.
TRIGARD 3 G	0	159	19	30.9b	53.2abc	53.2bc	49.
	0.6	168	18	5.8cdef	28.3ef	31.5fgh	48.
	1.2	163	18	1.4def	20.6fgh	25.8fghi	48.
FORCE 1.5 G	0	138	20	30.8b	49.4abc	49.8bcde	37.
	0.45	156	19	11.7cde	27.4ef	34.2efgh	60.
	0.6	169	20	14.8c	41.8cde	40.4cdef	66.
	0.75	165	19	12.1cd	26.3ef	28.2fgh	67.
CHECK	0	157	19	43.8a	57.7ab	64.0ab	56.
BAY-NTN 2.5 G	0.75	147	19	37.7ab	61.5a	79.7a	37.
AZTEC 2.1 G	0.5	170	19	4.0cdef	25.3efg	26.3fgh	52.
BAY-MAT 2.0 G	0.5	163	19	3.7def	22.7fg	20.2ghi	67.

Onion Smut*9 - 22.3%

* Seeded May 6, 1992.
*2 Based on insecticide component.
*3 Counted June 1. Based on 4 metres of row, 4 replicates.
*4 Measured June 23.
*5 Accumulative counts June 8,11,15,18,22,25,29, July 2,6,9,13,16,21.
*6 2nd generation, final count Sept. 1; 3rd generation, final count Oct.
*7 Based on 5 meters, 4 replicates, Sept. 29.
*8 Means followed by the same letter are not significantly different (P=0.05 LSD test).
*9 June 18, 200 plants examined for smut infection.

#030

STUDY DATA BASE: 280-1213-9110

CROP: Cooking onion, cv. Taurus

PEST: Onion maggot (OM), *Delia antiqua* (Meigen)
Darksided cutworm (DSCW), *Euxoa messoria* (Harris)
Onion thrips (OT), *Thrips tabaci* Lindeman

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TITLE: **EVALUATION OF SEED- AND SEED FURROW GRANULAR INSECTICIDES FOR CONT OF INSECT PESTS OF COOKING ONIONS IN ORGANIC SOIL**

MATERIALS: BAY-NTN-33893 2.5G (imidachloprid);
UBI-2627 175SD (175 g AI/L) (imidachloprid);
FORCE 1.5G (tefluthrin); TF-3765 200SD (200 g AI/L) (tefluthri
LORSBAN 15G (chlorpyrifos); TRIGARD 75WP (cyromazine);
methyl cellulose

METHODS: Seed treatments were applied 05 May by tumbling cooking onion se moistened with 1% (w/v) methyl cellulose, with insecticides until seeds w uniformly coated. All seed was planted in London on 06 May in 3-row microplots (2.25 x 0.9 m) filled with insecticide residue-free organic sc all treatments were replicated 3x in a randomized complete block design. Before the seed furrow was closed, granular insecticides were hand-applie with a modified salt shaker, in a 2-3 cm band in the bottom of the furrow 03 June a total of 250 OM eggs were buried 1 cm deep beside 1 onion row i each plot. The infested row was delineated by stakes and the number of or counted. Infestations were repeated on 12, 16 June. Surviving onions we counted 4 wk after each infestation and % loss calculated. On 12 June, v onions had 2-3 true leaves, 1 replicate of 10, 4th-5th instar DSCW larvae confined in screened plastic cages over 1 treated row in each microplot. number of onion seedlings in each cage was counted; damaged onions were counted after 2 days and % damage calculated. On 16 July when onions hac developed 4-6 true leaves, 2 plants were pulled from both guard rows of e plot (12 plants/trt.) and the number of OT adults and nymphs counted. OT counts were repeated weekly until 06 August. On 22 Sept., 25 dry onions pulled from each plot and inspected for feeding damage from wild 2nd generation OM.

RESULTS: See table below.

CONCLUSIONS: Since statistical analyses showed no signficant differences onion loss among the 3 OM infestations, pooled results are presented. Al treatments significantly reduced onion losses relative to the CONTROL. L rates of application of both tefluthrin and imidachloprid, applied as see dressings, were significantly less effective than other treatments. Alth no treatment provided complete control of all leaf feeding by very high D populations in infested quadrats, seed furrow application of FORCE signficantly reduced moderate and heavy plant damage. Numbers of OT vari greatly from plant to plant. Nonetheless, lowest populations were counte plots treated with imidachloprid. Although imidachloprid did not elimina from treated plots, growers applying the insecticide for OM control might be able to delay initiation of foliar insecticide program for OT control. treatment significantly reduced onion damage by second generation OM.

RESIDUES: Samples of soil and onions for measurement of pesticide residue were collected from microplots for Treatments #2, #4, #6, #8 and #10. Analyses are incomplete. No residues were detected in onions grown in 19 soil treated with tefluthrin (detection limit 0.03 ppm) at 2.25 g AI/100 residues of 0.67 ppm were measured in onions grown in 1991 in soil treate with imidachloprid (detection limit 0.03 ppm) at 3.0 g AI/100 m.

#	Insecticide Treatment	Rate (g AI)	Mean % Onion Loss (I-III)	Mean % Damaged* Plants	Mean # OT Nymphs/ Plant 30/07	06/08	Me Da On
1	FORCE G***	1.13	15.9 cd****	33.3 bc	8.1 a	14.7 a	3
2	FORCE G	2.25	3.7 d	0.0 c	4.5 a	5.9 cd	2
3	NTN 983 G	1.50	15.1 cd	50.0 abc	4.3 a	7.5 bcd	1
4	NTN-33893 G	3.00	17.7 cd	100.0 a	2.0 a	3.7 d	2
5	TF-3765 SD*****	10.0	33.2 bc	33.3 bc	10.9 a	9.5 abcd	3
6	TF-3765 SD	20.0	6.8 d	100.0 a	7.1 a	11.8 abc	2
7	UBI-2627 SD	5.30	51.0 b	100.0 a	4.0 a	9.1 abcd	2
8	UBI-2627 SD	10.5	23.2 cd	100.0 a	3.0 a	5.4 cd	2
9	TRIGARD SD	35.0	12.1 d	100.0 a	10.3 a	13.9 ab	1
10	TRIGARD SD	50.0	10.5 d	87.5 ab	5.3 a	12.1 abc	
11	LORSBAN G	4.80	12.3 d	100.0 a	7.5 a	12.1 abc	2
12	CONTROL	----	84.8 a	95.6 a	8.1 a	9.9 abcd	2

* DSCW feeding damage: moderate (50% leaf consumption) + heavy (90%+ consumption);
** 2nd generation OM damage;
*** seed furrow granular treatment applied as g AI/100 m;
**** means within a column followed by the same letter are not significa different (P = 0.05) as determined by Duncan's New Multiple Range T
***** seed treatment applied as g AI/kg seed.

#031

DATA BASE: 1252-352-8501

CROP: Pepper var. Staddon's Select

PEST: Green Peach Aphid, *Myzus persicae* (Sulzer)

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TITLE: **CONTROL PROGRAMMES FOR APHIDS AND EFFECT ON YIELD**

MATERIALS: PIRIMOR 50WG (pirimicarb), 425 g/ha;
CYGON 2E (dimethoate), 2 L/ha;
THIODAN 400 EC (endosulfan), 1.5 L/ha

METHODS: Plots were 4 rows of 10 plants, replicated 4 times. Transplante June 2, 1992. Aphid activity was recorded by examining 10 leaves per plc at varying intervals. Leaf examined was the first of at least 5 cm lengt behind a terminal selected at random on a plant selected at random from t two centre rows of each plot. Sprays were applied with a Rittenhouse SBF Backpack power sprayer applying insecticides in 666 L water per hectare. Peppers were harvested on 8 occasions from august 5 to October 9, with tł numbers of fruits per row and the total weight per plot (6 dates only) recorded. On October 9, all peppers present on the plants were picked. Because of the unusual weather as well as the presence of suspected bacterial spot, the fruit was in generally poor condition, and marketabil of fruit from different treatments was not assessed. Data were analyzed using sas anova, and means separated with a Duncan's Multiple Range Test the 0.05 significance level.

RESULTS: Presented in the tables below.

CONCLUSIONS: Aphids appeared soon after transplanting, and increased in numbers until about mid-july when populations declined very rapidly throu natural mortality, mostly fungal in nature. Consequently, the sprays applied July 21 probably did not have a significant effect on results. Therefore, treatment # 4 was basically a dimethoate treatment, and the difference between treatments 2 and 3 one of timing. With no insecticide aphids reduced yields drastically, and plants did not recover from the effects of aphid feeding until too late in the season to produce marketak fruit. Four applications of pirimicarb produced the highest yields, but or two applications of pirimicarb and the dimethoate treatment improved yields significantly compared with no insecticides. Further experiments determine the adequacy of fewer than 4 sprays would be desirable.

Table 1. Control of aphids on pepper: 4 insecticide programmes.

Treatment #	1	2	3	4	5
Insecticide	Pirimor	Pirimor	Pirimor	Cygon-Thiodan	Nor
# sprays	4	2	1	3	0
		Mean # wingless aphids per leaf			
June 16	9.3	8.0	9.5	9.5	14.
June 17	Spray				
June 23	1.2a	18.6 b	22.1 b	20.3 b	19.
June 26	Spray	Spray		Spray (Cy.)	
June 29	0.5a	0.2a	52.3 b	2.7a	49.
July 6	18.4a	19.5a	103.1 b	33.2a	128.
July 7	Spray		Spray	Spray (Cy.)	
July 10	4.1	52.3	2.1	22.8	148.
July 17	5.6	60.2	4.3	50.8	190.
July 21	Spray	Spray		Spray (Thi.)	
July 24	0.0	0.1	1.6	0.6	0.

Table 2. Effect of aphid control on yield of sweet peppers.

		Mean cumulative # of fruit per plot			
August 11	30.0a	18.3a	15.8a	14.2ab	0.3
August 17	44.5a	27.0 b	30.3ab	27.3 b	1.3
August 25	63.0a	41.0 b	48.0ab	43.8ab	1.3
Sept. 2	76.3a	54.0a	60.0a	58.0a	2.5
Sept. 14	107.0a	67.0 b	79.0 b	84.5ab	2.8
Sept. 24*	212.0a	93.5 c	148.5 b	144.5 b	31.
Oct. 91	281.5a	133.8 cd	188.3 bc	205.5 b	107.

* Includes immature fruit.

#032

STUDY DATA BASE: 1451-85-21

CROP: Potato cv. Russet Burbank

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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Agriculture Canada, Research Station, P.O. Box 20280, Fredericton, NB, E3
Agriculture Canada, Research Station, P.O. Box 1210, Charlottetown, PEI,

TITLE: **CONTROL OF THE COLORADO POTATO BEETLE WITH NEMATODES AND STRAW MUL**

MATERIALS: NEMATODE (*Steinernema carpocapsae* All strains),
BELMARK 300EC (fenvalerate).

METHODS: Plots consisted of 4 rows 7.6 m long spaced 0.91 m apart. The p were laid out in a split-plot design, with two main treatments (straw spr over plots after application and no straw mulch present), 3 subplot treatments, replicated 4 times plus 4 single plots (early straw treatment where straw was applied June 18. Potatoes were planted May 21 at 40.6 cm spacing. Foliar applications of BELMARK and soil applications of the NEMATODES were applied to 3rd and 4th instar larvae July 16 after sunset a backpack sprayer (635 L/ha). All plots were sprayed with BELMARK July using a tractor mounted sprayer (950 L/ha, 1200 kPa) to prevent movement adult beetles between plots. The plots were topkilled Sept 2 and the 2 m rows of each plot were harvested Sept 16.

RESULTS: As presented in the table below.

CONCLUSIONS: There was no significant difference between plots with or wi mulch. This is likely due to the cool, damp summer negating any effect t straw mulch might have had. The early straw plots had the lowest mean 4t instar (L4) and adult numbers, lowest defoliation levels, highest mean nu of tubers. Yet the early straw plots had the lowest yield of any treatme This may have been due to competition with rye plants, that grew from the straw, inhibiting tuber bulking. The nematode treatment appears to have reduced the mean number of adults and increased yield compared to the che plots. BELMARK treated plots had mean numbers of 4th instars and adults were less than in the check plots, yet the defoliation levels were no les the yield was marginally less in the BELMARK treated plots than in the ch plots. Thus it appears that ground applications of nematodes gives bette control than foliar applications of BELMARK. The local Colorado potato b population is resistant to BELMARK.

Treatments	L4 (defoliation)		Adults (def.)*		Yield (t	
Product	Jul 16	Jul 22	Aug 12	Aug 19	Total	#
NEM 7.6 Bil./ha	15.63(2)**	62.38(2)	4.5(2)	13.75(2)	44.76	23
BELMARK	14.00(2)	50.88(3)	10.5(2)	21.88(3)	38.28	19
Early straw	6.75(2)	13.75(2)	4.0(2)	11.00(2)	34.45	24
Untreated check	22.25(2)	57.50(3)	26.38(2)	32.50(2)	38.36	20

* Defoliation index: 0-no defoliation; 1-some leaflets with holes; 2-som
leaflets consumed, a few bare petioles; 3-50% of one stem defoliated.
** N=8 except in the early straw treatment N=4.

#033

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Russet Burbank

PEST: Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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TITLE: **MANAGEMENT OF THE COLORADO POTATO BEETLE WITH ENTOMOPATHOGENIC NEMATODES - 1992**

MATERIALS: *Steinernema carpocapsae*, IMIDAN 50WP (Phosmet)

METHODS: Small, whole, seed pieces were planted in May 20, 1992 at Sherwo
P.E.I. Plants were spaced at about 0.4 m within a row and at 0.9 m betwe
rows in four-row plots. Plots, measuring 7.6 m in length and 3.6 m in wi
were arranged in a split plot design with two main treatments and four
sub-treatments each replicated four times in total. The main treatments
straw mulch present and absent. The sub-treatments were 1) CHECK, an
application of *Steinernema carpocapsae* at 2) 250,000 (NEMAS-L) and 3) 500
(NEMAS-H) nematodes per square meter, and 4) IMIDAN at 1.1 kg AI/ha. Plo
were sampled weekly from June 29 until September 9, 1992 and the number o

early instars (L1-L2), later instars (L3-L4), and adult s were counted or plants per plot. The nematodes and IMIDAN were applied on August 7, wher majority of population of CPB was in the later instars and approaching pupation. The straw mulch was applied to the base of the potato plants immediately after the application of nematodes. The two centre rows of e plot were harvested on October 8 and weighed and graded. Marketable tube had a diameter of at least 40 mm. Analyses of Variance were performed or data and Least Square Differences (LSD) were calculated.

RESULTS: The populations of CPB were extremely low on P.E.I. in 1992 presumably due to high winter mortality and a cool, wet growing season. results for adults of the CPB are reported below. Yield of tubers betwee main treatments and sub-treatments was not significant and averaged 36.6 for marketable yield and 43.9 t/ha for total yield.

CONCLUSIONS: A rate response between the low and higher rate of nematode noted on September 9 for plots not protected by the mulch. A similar tre was noted for plots protected with the mulch on the same date. The trenc fewer adults on September 9 in plots protected with mulch and nematodes compared to plots protected with nematodes only, suggests that the mulch increase the survival or persistence of nematodes. Further studies are planned for 1993.

MANAGEMENT OF THE COLORADO POTATO BEETLE WITH ENTOMOPATHOGENIC NEMATODES

		MEAN NO. CPB ADULTS/10 PLAN					
MULCH	TREATMENT	AUG 05	AUG 12	AUG 19	AUG 24	SEPT 02	SEF
NO	CHECK	0.3 A*	0.0 A	0.8 AB	2.3 AB	14 AB	28
NO	MEMAS-L	0.8 A	0.8 A	0.8 AB	0.5 B	11 B	45
NO	NEMAS-H	0.0 A	0.5 A	0.0 B	2.8 AB	16 AB	24
NO	IMIDAN	0.3 A	0.0 A	0.5 B	4.3 AB	4 B	2
YES	CHECK	0.0 A	0.5 A	1.8 AB	2.0 AB	27 A	21
YES	NEMAS-L	0.3 A	0.3 A	1.3 AB	1.0 B	15 AB	25
YES	NEMAS-H	0.3 A	0.3 A	2.5 A	5.8 A	14 AB	8
YES	IMIDAN	0.5 A	0.3 A	1.5 AB	3.3 AB	7 B	6

* Means followed by the same letter are not significant (P<0.05, Duncan's Multiple Range Test).

#034

BASE DE DONNEES DES ETUDES: 91000623

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
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TITRE: ESSAI D'EFFICACITE DU BIO-COLLECTOR CONTRE LE DORYPHORE DE LA POMM DE TERRE

PRODUITS: BIO-COLLECTOR (souflerie-collectrice, moyen mécanique de lutte) insecticides: DECIS 2,5 EC (deltametrine, 300 ml/ha), GUTHION 240 EC (azinphos-methyl, 1,75 l/ha), M-ONE LI (*Bacillus thuringiensis* var. *san diego*, 9,0 l/ha), RIPCORD 400 EC (cypermethrine, 87,5 ml/ha).

METHODES: L'essai a été effectué selon un plan à blocs aléatoires complet avec 4 répétitions. Les parcelles de 15 m de longueur comprenaient 4 ran espaces de 0,91 m. Le Bio-Collector a été utilisé 1, 2 et 3 fois/semaine 23 juin au 16 juillet. Les insecticides ont été appliqués du 17 juin au juillet selon la séquence suivante: GUTHION-RIPCORD-M-ONE-GUTHION-DECIS, (dose: p.c./ha, pression: 1723,7 k Pa, volume: 800 L/ha). L'évaluatio des densités du doryphore a été faite sur 10 plants pris au hasard dans l 2 rangées du centre.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: En conditions expérimentales, le Bio-Collector a montré une faible performance. Les densités ont été sensiblement comparables au tém et le dommage aux plants a augmenté progressivement en juillet et aoét. efficacité n'a pas été augmentée significativement avec 2 et 3 passages/semaine. Les insecticides se sont avérés de beaucoup plus performants dans l'ensemble.

Nombre moyen de larves de doryphores/plant (L) et dommage (D*), 1992

Traitement		juin		juillet			
		23	29	06	13	21	28
1. Bio-Collector	L	9,9	24,5ab**	43,6ab	28,8ab	19,3ab	7,0a
1x/semaine	D	1,0	1,0	1,0	2,0ab	2,7b	4,2b
2. Bio-Collector	L	12,2	30,6a	40,9ab	24,5b	14,3c	5,3b
2x/semaine	D	1,0	1,0	1,0	1,5ab	2,0b	3,5b
3. Bio-Collector	L	10,2	19,9bc	38,5b	25,4b	16,5bc	5,4b
3x/semaine	D	1,0	1,0	1,0	1,2b	1,5c	3,7b
4. Insecticides	L	7,8	12,5c	8,3c	7,3c	5,9d	3,2c
	D	1,0	1,0	1,0	1,0b	1,0d	1,0c
5. TEMOIN	L	6,9	26,6ab	48,8a	30,7a	20,8a	6,7ab
	D	1,0	1,0	1,2	2,7a	4,5a	5,7a

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents à un seuil de 0,05 (Waller-Duncan).

#035

STUDY DATA BASE: 1451-85-21

CROP: Potato cv. Russet Burbank

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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Forestry Canada, Maritimes, P.O. Box 4000, Fredericton, NB E3B 5P1

TITLE: **BIOLOGICAL CONTROL OF THE COLORADO POTATO BEETLE**

MATERIALS: KRYOCIDE 96W (fluoaluminate),
NOVODOR FC (3% *Bacillus thuringiensis* subsp *tenebrionis*),
M-TRAK (10% *B. thuringiensis* var *san diego* encapsulated),
FORAY 48B (12.48 B.I.U./L *B. thuringiensis* var *kurstaki*),
NEMATODE (*Steinernema carpocapsae* All strains),
BELMARK 300EC (fenvalerate).

METHODS: Plots had 4, 7.6 m long rows spaced at 0.91 m. Treatments were replicated 4 times in a randomized block design. Potatoes were planted M at 40.6 cm spacing. KRYOCIDE, NOVODOR and BELMARK were applied at 30% eg hatch July 3 and on July 8, 15 and 22. M-TRAK was applied July 15 and 22 Application was with a tractor mounted sprayer (950 L/ha, 1200 kPa) excep backpack sprayer (950 L/ha) was used July 8 due to a breakdown. Foliar s of FORAY, NEM/FORAY and NEM/M-TRAK were made after sunset via a backpack sprayer July 15 and 22. The plots were topkilled Sept 2 and their 2 midd rows harvested Sept 16.

RESULTS: The means of the treatments are presented in the table below.

CONCLUSIONS: NOVODOR, KRYOCIDE, M-TRAK and NEM/M-TRAK treated plots had yields superior to the check plots. FORAY and NEM/FORAY treated plots we no different from the check plots in 4th instar (L4), peak adult numbers, defoliations and yields. M-TRAK gave the same final control as treatment applied since 30% egg hatching. The number of B.t. sprays may be reduced and delayed when Colorado potato beetle (CPB) pressure is low and prolong by cool weather, lowering costs without reducing efficacy. The local CPB population is BELMARK resistant.

Treatment		L4-def.	Adults-def.*		Yiel
Product	Rate	Jul 28	Aug 11	Aug 19	To
NOVODOR	5.10 L/ha	0.0c-1**	0.0b-2	2.0b-3	48.
NOVODOR	8.55 L/ha	0.0c-1	1.3b-2	0.5b-2	47.
BELMARK	0.20 L/ha	23.5c-1	5.5b-3	10.8b-3	42.
KRYOCIDE	10.90 kg AI/ha	0.5c-1	1.8b-2	1.8b-3	49.
KRYOCIDE	13.00 kg AI/ha	0.0c-1	1.3b-1	8.0b-1	46.
NEM+FORAY	7.40 bil./ha + 1.00 L/ha	87.8a-3	18.0b-3	105.0a-3	37.
FORAY	1.00 L/ha	84.3a-3	41.5a-3	112.3a-3	34.
NEM+M-TRAK	7.40 bil./ha + 1.00 L/ha	11.5c-3	15.3b-2	5.0b-2	47.
M-TRAK	7.50 L/ha	2.5c-2	15.5b-2	11.3b-2	49.
CONTROL	-	51.3b-3	55.8-3	123.5a-3	38.

* defoliation index: 0 no defoliation; 1 some leaflets with holes; 2 some leaflets consumed, a few bare petioles; 3 50% of one stem defoliated.

** means followed by the same letter not significant (P<0.05, Duncan's multiple range test). N=4

#036

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Superior

PEST: Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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TITLE: **EVALUATION OF BACTERIAL AND ALTERNATIVE INSECTICIDES FOR CONTROL (COLORADO POTATO BEETLES ON POTATOES, 1992**

MATERIALS: NOVODOR 3% (*Bacillus thuringiensis* var. *tenebrionis*),
KRYOCIDE 96W (sodium aluminofluoride),
TRIDENT II 0.64% (*Bacillus thuringiensis* var. *tenebrionis*),
SAF-T-SIDE 80% (petroleum oil).

METHODS: Small, whole, seed pieces were planted in Sherwood, P.E.I. on Ma 1992. Plants were spaced at about 40 cm within rows and about 90 cm betw rows in four-row plots. Each plot measured 7.6 m long by 3.6 m wide. Pl were separated by two rows of potatoes and arranged in a Randomized Compl Block Design with eight treatments each replicated a total of four times. Insecticides were applied to all treatments on July 30 using a precision sprayer delivering approximately 300 L of spray mixture per hectare at a pressure of about 240 kPa. An additional spray of TRIDENT II at 3.5 L/ha applied on August 12 when a threshold of 10 CPB per net sweep was surpas Each week starting on June 22 and ending on August 24, the number of CPB 10 net sweeps (0.37 m diameter opening) were counted from the center two of each plot. Weeds were controlled with an application of metribuzin at g AI/ha and paraquat at 593 g AI/ha on June 16 and fluazifop-butyl at 25(AI/ha on June 24. Plots received recommended applications of chlorothalo at 1250 g AI/ha for blight control. Plants were sprayed with Reglone (diquat) at 300 kg AI/ha for top desiccation on September 1. Tubers from center two rows of each plot were harvested on September 29 and total and marketable (> 40 mm) recorded. Analyses of Variance were performed on th data and Least Squares Differences (LSD) were calculated.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: Plots treated with the 4.7 L/ha of NOVODOR plus SAF-T-SIDE, 7.0 L/ha of NOVODOR, and each rate of KRYOCIDE had significantly fewer ea instars one week following spray. The efficacy of all treatments (except lower rate of TRIDENT II) on late instars was significant as compared to check plots, two weeks following spray.

MEAN NUMBER CPB LARVAE/10 SWEEPS/PLOT

TREATMENT	RATE PROD/ha	1ST & 2ND INSTAR JUL		AUGUST			3RD & 4TH INS JULY	AUGUST		
		28	6	11	21	24	28	6	17	21
CHECK	-	0.5	5.0	5.3	1.0	0.0	0.0	2.5	7.5	0.8
NOVODOR+	4.7 L+									
SAF-T-SIDE	6.1 L	0.0	0.5	2.8	1.8	0.5	0.0	0.0	1.0	0.5
NOVODOR	4.7 L	0.3	2.0	1.5	0.3	0.8	0.3	1.5	0.8	1.8
NOVODOR	7.0 L	0.0	0.3	1.0	0.3	0.8	1.8	0.3	0.8	0.0
KRYOCIDE	11.2 kg	0.0	0.3	1.3	0.0	0.8	0.0	0.0	0.8	0.3
KRYOCIDE	13.4 kg	0.3	0.8	0.3	0.0	0.3	0.0	0.0	0.3	0.8
TRIDENT II	3.5 L	0.8	2.8	4.5	0.8	1.0	0.0	5.8	8.3	3.5
TRIDENT II	7.0 L	1.5	3.5	5.5	0.8	1.3	0.0	0.3	2.3	1.3
LSD (P<0.05)		NS	4.2	5.2	NS	NS	NS	5.3	3.9	2.7

#037

STUDY DATA BASE: 1451-85-21

CROP: Potato cv. Russet Burbank

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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TITLE: **SPRAY APPLICATION SYSTEMS FOR THE CONTROL OF THE COLORADO POTATO B**

MATERIALS: M-TRAK (10% *Bacillus thuringiensis* var *san diego* encapsulated)

METHODS: Plots consisted of 4 rows 7.6 m long spaced 0.91 m apart. Treat were replicated 4 times in a randomized block design. Potatoes were plan May 21 at 40.6 cm spacing. In the week of June 24, 50 adult beetles were to half the plots in an attempt to equalize the Colorado potato beetle population in the experimental field. There were 3, 7.5 L/ha sprays of M applied July 15, 22 and 28. The treatments were applied using a tractor mounted sprayer (950 L/ha, 1200 kPa). Treatment 1 was sprayed from above 3 nozzles/row at 0.3 m spacing between nozzles (the conventional method) each spray. Treatment 2 was sprayed with two drop nozzles 0.3 m on eithe of each row for Spray 1 and conventionally sprayed for Sprays 2 and 3. Treatment 3 was sprayed with 2 drop nozzles 0.3 m on either side of each for the Spray 1, 2 drop nozzles 0.45 m on either side of the row for Spra and conventionally sprayed for Spray 3. Treatment 4 was sprayed with 2 d nozzles 0.3 m on either side of each row for Spray 1, 2 drop nozzles 0.45 either side of the row and 1 nozzle spray-ing the top of the row for Spra and conventionally sprayed for Spray 3. The plots were topkilled Sept 2 the 2 middle rows of each plot were harvested Sept 15.

RESULTS: The results are presented in the table below.

CONCLUSIONS: The Colorado potato beetle population in the test field was and had a patchy distribution. The treatments resulted in yields that we significantly different. Therefore the most cost effective treatment, th with the fewest nozzles (lowest volume of B.t. sprayed) would be the trea of choice; in this case Treatment 3 followed by Treatments 2 and 4.

Treatment	Total Yield (t/ha)*
1	34.43
2	37.61
3	37.57
4	36.82

* N=4. No significant differences (P<0.05, Duncan's Multiple Range Test)

#038

BASE DE DONNEES DES ETUDES: 87000221

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
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TITRE: ESSAI DE M-ONE ET DE M-TRAK CONTRE LE DORYPHORE DE LA POMME DE TE

PRODUITS: M-ONE LI (endotoxine-delta de *Bacillus thuringiensis* var. *san d* 5,6%), M-TRAK LI (MYX-1806, endotoxine-delta encapsulée de *Bacillus thuringiensis* var. *san diego*, 10%).

METHODES: L'essai a été réalisé selon un plan a blocs aléatoires complets 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 rangs espaces de 0,91 m. Les insecticides biologiques M-ONE et M-TRAK ont été appliqués les 17, 23, 30 juin et 8 juillet (dose: p.c./ha, pression: 1 k Pa, volume: 800 L/ha). L'évaluation des densités du doryphore a été sur 10 plants pris au hasard dans les 2 rangées du centre. Ces 2 rangées été recoltées le 26 aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Quels que soient l'insecticide biologique et la dose utilisé les produits ont réduit considérablement les populations larvaires. Ils de plus procure une très bonne protection du feuillage tout au long de la saison. L'analyse statistique des résultats démontré que M-ONE et M-TRAK comparables. Cependant, M-TRAK semble d'une efficacité plus sure, conside les densités larvaires plus faibles en juillet et une protection du feuil plus stable jusqu'à la fin juillet. Les applications de M-TRAK à 6,0 et L/ha sont tout aussi performantes. L'emploi de M-TRAK pourrait être plus économique comparativement à la dose utilisée pour M-ONE.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable

Traitement Insecticide	Dose	Population larvaire juin 23	 29	 juillet 07	 21	Dommage* juillet 06	 14	 24	 31	Re (kg
l. M-ONE	9,0L	14,0*	14,3b	4,1b	5,1b	1,0b*	1,0b	1,0b	1,7b	6
2. M-TRAK	6,0L	12,4	7,0c	0,1b	2,1c	1,0b	1,0b	1,0b	1,0c	5
3. M-TRAK	7,5L	16,0	12,1bc	0,4b	1,6c	1,0b	1,0b	1,0b	1,0c	6
4. TEMOIN		17,1	58,6a	77,9a	17,4a	2,0a	5,0a	6,2a	6,5a	4

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).

** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).

#039

BASE DE DONNEES DES ETUDES: 87000221

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

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TITRE: ESSAI DE NOVODOR ET DE M-TRAK CONTRE LE DORYPHORE DE LA POMME DE T

PRODUITS: M-TRAK LI (MYX-1806, endotoxine-delta encapsulée de *Bacillus thuringiensis* var. *san diego*, 10%),
NOVODOR FC (endotoxine-delta de *Bacillus thuringiensis* var. *tenebrionis*, 3,0%),
insecticides chimiques: GUTHION 240-EC (azinphos-methyl),
RIPCORD 400-EC (cypermethrine).

METHODES: L'essai a été réalisé selon un plan à blocs aléatoires complets 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 rangs e de 0,91 m. Les insecticides biologiques et chimiques (séquence des produ GUTHION-RIPCORD-RIPCORD-GUTHION) ont été appliqués les 17, 23, 30 juin et juillet (dose: p.c./ha, pression: 1723,7 k Pa, volume: 800 L/ha). L'éval des densités du doryphore à été faite sur 10 plants pris au hasard dans l rangées du centre. Ces 2 rangées ont été défanées le 12 aoét et récoltée septembre.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Les insecticides biologiques NOVODOR et M-TRAK (MYX-1806) on donné des résultats significativement très performants. Leur efficacité comparé très bien à celle des insecticides chimiques. Cette performance d'autant plus intéressante que la saison à été très pluvieuse avec des températures fraiches. La plus faible dose de NOVODOR (4,6 L/ha) est très efficace et semble au moins égale à M-TRAK considérant que les résultats relativement semblables. A la plus forte concentration (7 L/ha), l'effic du NOVODOR n'est pas augmentée.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable

Traitement Insecticide	Dose	Population larvaire juin 22	29	juillet 07	16	Dommage* juillet 06	14	24	31	Re (kg
1. MYX-1806	7,5L	20,9b**	12,0b	1,1b	0,7c	1,0b**	1,0b	1,0b	1,0b	8
2. NOVODOR	4,6L	16,2b	7,5b	0,9b	1,4bc	1,0b	1,0b	1,0b	1,0b	7
3. NOVODOR	7,0L	36,1a	7,0b	1,8b	1,1bc	1,0b	1,0b	1,0b	1,0b	7
4. Chimiques***		13,4b	11,4b	2,0b	3,2b	1,0b	1,0b	1,0b	1,0b	6
5. TEMOIN		20,3b	44,3a	68,4a	30,4a	2,0a	4,5a	5,5a	6,2a	5

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).
*** Dose: GUTHION: 1,75 L p.c./ha; RIPCORD: 87,5 ML p.c./ha.

#040

BASE DE DONNEES DES ETUDES: 87000221

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

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TITRE: ESSAI D'UN PHAGOSTIMULANT (PHEAST) AVEC M-TRAK CONTRE LE DORYPHORE
POMME DE TERRE

PRODUITS: M-TRAK LI (MYX-1806, endotoxine-delta encapsulee de *Bacillus thuringiensis* var. *san diego*, 10%),
PHEAST (phagostimulant).

METHODES: L'essai a été réalise selon un plan totalement aléatoire avec 1
répétition par traitement. Les parcelles de 7,5 m de longueur comprenaie
rangs espaces de 0,91 m. L'insecticide biologique M-TRAK a été appliqué
en mélange avec PHEAST les 30 juin, 8 et 15 juillet (dose: p.c./ha, pre
1723,7 k Pa, volume: 800 L/ha). L'évaluation des densités du doryphore

faite sur 10 plants pris au hasard dans les 2 rangées du centre.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Les résultats de cet essai préliminaire ne démontrent aucun significatif du phagostimulant PHEAST utilisé avec M-TRAK sur les densité doryphores et la protection du feuillage. Le choix des produits et les d expérimentées devraient être rééalués.

Nombre moyen de larves de doryphores/plant et dommage, 1992

Traitement Insecticide	Dose	Population larvaire juillet 07	13	20	28	Dommage* juillet 06	14	24	31
1. M-TRAK	7,5L	13,7	6,6	2,6	1,7	1,0	1,0	1,0	1
2. M-TRAK + PHEAST	7,5L + 0,58kg	17,8	4,0	2,4	2,0	1,0	1,0	1,0	1
3. M-TRAK + PHEAST	7,5L + 1,12kg	22,7**	6,0	3,3	0,5	1,0	1,0	1,0	1
4. TEMOIN		110,8	87,7	29,8	6,4	2,0	5,0	7,0	7

* Evaluation visuelle par parcelle: indice de défoliation de 0 à 8 (0 à 100% de défoliation).

** Sans tenir compte du témoin, les résultats ne démontrent aucun effet significatif du traitement (ANOVA, seuil= 0,05) sur les densités.

#041

ICAR IDENTIFICATION NUMBER: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **COLORADO POTATO BEETLE CONTROL IN POTATOES USING *B.t.* MATERIALS**

MATERIALS: ASC-66895 (experimental *B.t.*), M-TRAK (experimental), M-ONE (*Bacillus thuringiensis* var. *san diego*), TRIGARD 75WP (cyromazine - a triazine insecticide), DECIS 5.0 Fl (deltamethrin)

METHODS: Potatoes were planted in two row plots, 6m in length with rows s 1m apart, replicated 4 times in a randomized complete block design. Potat seed pieces were planted with a commercial planter on May 12. Spray applications were made using a back pack airblast sprayer using 240 L/ha water. Treatments were applied on June 16, 30, July 11 and 22. Assessme were taken by counting Colorado potato beetle (CPB) larvae in intervals a the June 30 spray date, foliage damage rating caused by beetle feeding ar leafhopper damage on July 20, an overall foliar damage rating on Aug. 4 a yield on Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: The biological insecticides ASC-66895, M-ONE and M-TRAK were effective in controlling Colorado potato beetle larvae, as were the synth insecticides TRIGARD 75WP and DECIS 5.0 Fl. However, only DECIS 5.0 Fl w effective in controlling potato leafhoppers. It appeared to take longer TRIGARD 75WP to effect its CPB control with the higher rate showing impro control. ASC-66895, M-TRAK and M-ONE provided similar CPB control, howev M-ONE and possibly the lower rate of ASC-66895 showing a slight lessening control over time.

Table 1.

		CPB Larval Counts # of Days After Spraying June 30			
Treatments	Rate L pr/ha	0	2	6	
ASC-66895	4.0	2.2cd*	0.0d	2.3b	
ASC-66895	7.0	0.8d	0.0d	0.8b	
M-TRAK	7.5	0.0d	0.0d	0.6b	
M-ONE	9.0	0.0d	3.0cd	2.2b	1
TRIGARD 75WP	187.0 gm	46.3ab	34.5ab	10.2b	
TRIGARD 75WP	373.0 gm	10.2bc	12.3bc	0.8b	
DECIS 5.0 Fl	100.0 ml	19.0b	4.6c	9.6b	2
Control		88.1a	132.4a	166.9a	9

Table 2

Treatments	Rate L pr/ha	Foliar Damage Ratings (0-10)** CPB July 20	Leafhopper July 20	Overall Aug. 4	Yi kg/ Aug
ASC-66895	4.0	7.9ab	4.3bc	3.2de	1
ASC-66895	7.0	9.0a	3.7c	4.6cd	1
M-TRAK	7.5	9.0a	4.0bc	4.3cd	1
M-ONE	9.0	6.5b	4.0bc	2.8ef	1
TRIGARD 75WP	187.0 gm	8.4a	4.3bc	5.3bc	1
TRIGARD 75WP	373.0 gm	9.0a	4.3bc	6.9ab	1
DECIS 5.0 Fl	100.0 ml	7.9ab	9.0a	7.9a	1
Control		2.5c	5.0b	2.0f	

* means followed by the same letter are not significantly different (P<0 Duncan's Multiple Range Test).
** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged 10, complete control.

#042

ICAR IDENTIFICATION NUMBER: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **INFLUENCE OF MO-BAIT, AN IMITATION MOLASSES ADDITIVE, TO INCREASE THE INSECTICIDAL ACTIVITY OF SELECTED INSECTICIDES**

MATERIALS: AMBUSH 500EC (permethrin),
M-ONE (*Bacillus thuringiensis* var. *san diego*),
MO-BAIT (imitation molasses),
CATALYST (citric acid, 9-18-9 soluble fertilizer, Agri-Kelp, s

METHODS: Potatoes were planted in single row plots, 6m in length with row spaced 1m apart, replicated 4 times in a randomized complete block design

Potato seed pieces were planted with a commercial planter on May 13. Spr applications were made using a back pack airblast sprayer using 240 L/ha water. Treatments were applied on June 17, 25, July 30, 10 and 22. RCAT water was used throughout the trial. For the CATALYST treatments, the sp water pH was adjusted to 5.5 using citric acid. The CATALYST treatment w made up of citric acid, 11.2L product (pr)/ha foliar fertilizer 9-18-9, (pr/ha Agri-Kelp and 0.7 kg pr/ha sugar. Assessments were taken by countir Colorado potato beetles (CPB), rating foliage damage caused by CPB and leafhoppers, an overall foliage damage rating and yield.

RESULTS: As presented in the tables below.

CONCLUSIONS: The additive MO-BAIT and the CATALYST formulation had no significant insecticide properties when used alone. Yields, however, wer sustained even though the plants were severely attacked by Colorado potat beetles and leafhoppers. The insecticide control benefits when combined half rates of AMBUSH 500EC and M-ONE could not be clearly observed as the rate of these insecticides alone gave relatively high levels of insect control. M-ONE significantly reduced the number of CPB larvae compared t AMBUSH 500EC treatment whereas AMBUSH 500EC was more effective in control leafhoppers than M-ONE.

Table 1.

Treatments	Rate pr/ha	CPB Larval Counts - Days After June 30 Spray 0	2	6	10
CATALYST		187.4ab*	280.8a	250.2ab	280.8
MO-BAIT	0.25%	132.4ab	280.8a	166.9abc	166.9
AMBUSH 500	150.0 ml	38.8bcd	104.9ab	52.1bcd	99.(
AMBUSH 500	75.0 ml	55.2abc	176.8a	111.2a-d	166.9
AMBUSH 500 + CATALYST	75.0 ml	36.6bcd	111.2ab	840.4a	157.5
AMBUSH 500 + MO-BAIT	75.0 ml 0.25%	41.2bcd	176.8a	52.1bcd	176.8
M-ONE	9.0 L	3.7e	10.9c	20.1cd	49.1
M-ONE	4.5 L	7.9de	21.4c	10.2d	58.6
M-ONE + CATALYST	4.5 L	13.1cde	55.2b	28.9bcd	58.6
M-ONE + MO-BAIT	4.5 L 0.25%	4.0e	21.4c	27.2bcd	58.6
Control		210.3a	280.8a	236.1ab	187.4

Table 2.

Treatments	Rate pr/ha	Foliar Damage Ratings (0-10)** CPB July 20	Leafhoppers July 30	Overall Aug. 4	Yi kg Au
CATALYST		4.6c*	3.7d	4.3cd	14
MO-BAIT	0.25%	5.0c	5.7a-d	4.6bcd	14
AMBUSH 5001	150.0 ml	7.4ab	6.9abc	8.4a	16
AMBUSH 500	75.0 ml	6.1bc	7.9a	6.9abc	13
AMBUSH 500 + CATALYST	75.0 ml	7.4ab	7.4ab	7.4abc	13
AMBUSH 500 + MO-BAIT	75.0 ml 0.25%	5.7bc	7.9a	6.9abc	14
M-ONE	9.0 L	9.0a	4.6cd	9.0a	16
M-ONE	4.5 L	8.4a	5.0bcd	8.4a	14
M-ONE + CATALYST	4.5 L	9.0a	4.0d	8.4a	14
M-ONE + MO-BAIT	4.5 L 0.25%	8.4a	5.0bcd	7.9ab	14
Control		4.6c	5.0bcd	2.8d	8

* means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test).
** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged 10, complete control.

#043

ICAR/IRAC: 86100104

CROP: Potato, *Solanum tuberosum*, cv. Kennebec

PEST: Colorado potato beetle, *Leptinotarsa decemlineata* (Say)

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TITLE: **CONTROL OF COLORADO POTATO BEETLE WITH *BACILLUS THURINGIENSIS* (*B.t***
AND CONVENTIONAL INSECTICIDES

MATERIALS: M-TRAK (*B.t. san diego*), 15.8 g toxin/L, @5.0 and 7.5 L prod/h
DECIS 50 EC (deltamethrin), 50 g/L, @ 7.5 g AI/ha;
INCITE (piperonyl butoxide - Pbo), 920 g/L, @ 300 ml prod/ha;
CYMBUSH (cypermethrin), 250 g/L, @ 35 g AI/ha;
TRIDENT (*B.t. tenebrionis*), 3.3 billion *tenebrionis* units/L, @
10L prod/ha;
NOVODOR (*B.t. tenebrionis*), 3% active protein, @ 5.0 & 7.5 L p
TRIGARD (Cyromazine), 75 WP, @ 140 and 280 g AI/ha;
NTN-33893 (imidacloprid) 240 FS, @ 25 and 50 g AI/ha

METHODS: Potatoes were seeded on May 5 in 4-row plots, 15 m long. Rows we spaced at 0.9 m and plots were separated by 3 m spray lanes. Treatments arranged in a randomized complete block design. Insecticides were applie with a tractor-mounted, four-row boom sprayer that delivered 800 L/ha at kPa. DECIS + Pbo, DECIS, and CYMBUSH were applied to some of the plots o June 5 and 10 to evaluate control of adult beetles. One treatment of DEC Pbo was to be applied when the density of beetles reached 0.5 per plant a the other at a density of 2.0 per plant. Both thresholds were reached at same time because of the rapid increase in beetles moving into the plots overwintering sites. One hundred egg masses were tagged on June 8 and ch daily to determine hatch. On June 11 there was 1% hatched, on June 12, 1 had hatched and on June 15, 61% had hatched and all the treatments were applied. Applications of subsequent treatments were made June 22 and Jun

Populations of Colorado potato beetle were monitored 3-5 days after the treatments were applied by examining 5 plants in each plot and the number beetle larvae and adults were recorded. The number of beetle larvae per plant, estimated on a daily basis from weekly counts, was multiplied by t number of days larvae were present during the first generation to provide cumulative total of beetle-days for each treatment. The percent defoliat caused by adults and larvae was estimated each week. Mean defoliation fo period of adult and larval feeding during the first generation was calcul for each treatment. Yield data was obtained at harvest for the centre 2 of each plot on August 27. Cumulative beetle-days for small and large la mean defoliation and yield for all treatments, excluding the non-treated control, were compared by Analysis of Variance (SAS Inst.) and means sepa by Tukey's Studentized Range Test when significant.

RESULTS: As presented in the table below.

Insecticide	Rate (prod./ha)	No. appl.	Cum. No. Beetle-Days /Plant (26 June - 22 July) Small larvae	Large larvae	Mean % defol.	Yi (t/
Decis + PBO	150 + 300 mL	2	73.6 ef	6.4 de	3.9 cd	4
M-Trak	5.0 L	3				
Decis + PBO	150 + 300 mL	2	62.6 ef	7.6 de	3.8 cd	4
M-Trak	5.0 L	3				
Trigard	186 mL	2	705.9a	177.9a	16.7a	3
Trigard	373 mL	2	445.6 bcd	84.5 b	13.2a	3
Trigard	186 mL	3	589.2ab	31.4 cde	9.2 b	3
Trigard	373 mL	3	548.8abc	13.2 cde	7.4 bc	3
M-Trak	5.0 L	3	228.7 def	14.4 cde	4.8 cd	3
M-Trak	7.5 L	3	154.3 ef	7.6 de	4.9 cd	3
Novodor	5.0 L	3	185.8 ef	15.4 cde	5.1 cd	3
Novodor	7.5 L	3	166.7 ef	4.4 e	4.2 cd	3
NTN-33893	104 mL	3	29.8 f	0.1 e	3.9 cd	3
NTN-33893	208 mL	3	21.5 f	0.1 e	4.2 cd	4
Trident	10 L	3	316.2 cde	51.9 bcd	6.5 bcd	3
Decis	150 mL	2	237.0 def	13.4 cde	5.1 cd	3
Novodor	5.0 L	3				
Cymbush	90 mL	2	297.0 cde	54.2 bc	6.2 bcd	3
Trident	10 L	3				
CHECK		-	804.5	1337.6	57.6	1
(Tukey's Minimum Difference)			(258.6)	(46.2)	(3.7)	(1

Means in each column followed by the same letter are not significantly different at P = 0.05 (Tukey's Studentized Range Test [SAS Inst. 1987]).

CONCLUSIONS: No significant control of adult beetles in these small plots was obtained. All the treatments controlled larvae. TRIGARD required at least two applications to control larvae and under the wet, cool conditio of the 1992 season, three applications were more effective. NTN-33893 wa extremely effective and probably did not require three applications. NOVODOR was the most effective of the bacterial toxins, although all performed quite well at the rates tested. Defoliation was kept to a mini and yield was similar for all treatments. Percent defoliation was somewh greater in plots treated only twice with TRIGARD, but those plots yielded well as the others partly due to the excellent growing conditions.

#044

STUDY DATA BASE: 280-1213-9110

CROP: Potato, cv. Conestoga

PEST: Colorado potato beetle, (CPB) *Leptinotarsa decemlineata* (Say)

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TITLE: **EVALUATION OF MICROBIAL AND BOTANICAL INSECTICIDES FOR CONTROL OF COLORADO POTATO BEETLE ATTACKING POTATOES IN ORGANIC SOIL**

MATERIALS: MARGOSAN-O (0.3% azadirachtin);
M-TRAK 10AF (10% encapsulated delta endotoxin, *Bacillus thuringiensis* var. *san diego*;
CATALYST (citric acid, 09-18-09 foliar fertilizer, AGRIKELP molasses)

METHODS: Potatoes were planted in London on 12 May in single-row micropl (2.25 x 0.9 m) filled with insecticide residue-free organic soil; all treatments were replicated 3x in a randomized complete block design. On June, 5 plants, selected at random in each microplot, were flagged. All treatments were applied on 15, 18, 24 & 29 June at 220 kPa in 900 L wate using a single- nozzled (D-4 orifice disc, #25 swirl plate) Oxford preci sprayer. For Tmts. #3 and #4, spray solution was altered using the CATA formula (Add 11.2 L 09-19-09 foliar fertilizer/ha + 0.35 L AGRIKELP/ha + [v/v] molasses and adjust pH to 5.5 with citric acid.). CPB life stages counted on all flagged plants in all plots just prior to and 4-5 days aft all treatments. Feeding damage to foliage was assessed visually on 17 Ju & 13 July. Potatoes were dug on 17 August. Tubers were graded, counted weighed and marketable yields calculated.

RESULTS: See table below.

CONCLUSIONS: Under 1992 weather conditions, M-TRAK applied at 3.75 L/ha reduced foliage damage and populations of large CPB larvae, resulting in significantly increased potato yields relative to CONTROL plots. Mixtur either CATALYST or MARGOSAN-O at 3.0 L/ha with 3.75 L/ha M-TRAK did not improve M-TRAK performance. CATALYST alone did not affect CPB. Applica of MARGOSAN-O at 6.0 L/ha significantly reduced both foliage damage and populations of large CPB larvae; due to plot variability, the 96.7% yiel increase was, however, not statistically significant.

#	Insecti-cide(s)	Rate (pdct/ha)	Mean # CPB Larvae/Plant* 22/06	29/06	03/07	Foliar Damage** 07/07	13/07	Yi (t
1	M-TRAK	7.50 L	0.1 a***	0.0 c	0.1 d	9.7 a	9.6 a	19
2	M-TRAK	3.75 L	0.1 a	0.1 c	0.3 d	9.8 a	9.5 a	20
3	M-TRAK + "Catalyst"	3.75 L + ****	0.0 a	0.2 c	0.1 d	9.7 a	9.6 a	19
4	"Catalyst"	****	4.5 a	27.5 a	80.3 a	4.6 b	0.0 c	9
5	MARGOSAN-O	6.0 L	1.6 a	10.7 b	43.1 c	9.0 a	7.7 b	11
6	MARGOSAN-O	3.0 L	4.5 a	15.3 b	60.0 bc	8.4 a	0.3 c	10
7	M-TRAK + MARGOSAN-O	3.75 L + 3.0 L	0.2 a	0.1 c	1.5 d	9.6 a	9.2 a	18
8	CONTROL	---	2.5 a	14.1 b	78.0 ab	2.9 b	0.0 c	6

* large (3rd + 4th instar) larvae;
** rating scale (0-10): 0 = no control, plants defoliated,
10 = complete control, no CPB damage;
*** means within a column followed by the same letter are not significar
different (P = 0.05) as determined by Duncan's New Multiple Range Te
**** CATALYST formula: add 11.2 L 09-19-09 foliar fertilizer/ha + 0.35 L
AGRIKELP/ha + 0.5% (v/v) molasses and adjust pH to 5.5 with citric a

#045

STUDY DATA BASE: 280-1213-9110

CROP: Potato, cv. Conestoga

PEST: Colorado potato beetle, (CPB) *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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TITLE: **EVALUATION OF MICROBIAL INSECTICIDES FOR CONTROL OF COLORADO POTAT BEETLE ATTACKING POTATOES IN ORGANIC SOIL**

MATERIALS: M-TRAK 10AF (10% encapsulated delta endotoxin, *Bacillus thuringiensis* var. *san diego*);
NOVODOR 3FC (3% AI, *B. thuringiensis* var. *tenebrionis*);
AGRAL 90 (nonylphenoxy polyethoxy ethanol);

BOND (combination of synthetic latex + primary aliphatic oxyalkylated alcohol).

METHODS: Potatoes were planted in London on 14 May in single-row microplo (2.25 x 0.9 m) filled with insecticide residue-free organic soil; all treatments were replicated 3x in a randomized complete block design. On June, 5 plants, selected at random in each microplot, were flagged. All foliar treatments were applied on 16, 19, 25 & 30 June at 220 kPa in 900 water/ha using a single-nozzled (D-4 orifice disc, #25 swirl plate) Oxfor precision sprayer. CPB life stages were counted on all flagged plants ir plots just prior to and 4-5 days after all treatments. Feeding damage to foliage was assessed visually on 17 June, 07, 13 July and 04 August. Pot were dug on 19 August. Tubers were graded, counted and weighed and marke yields calculated.

RESULTS: See table below.

CONCLUSIONS: Under 1992 weather conditions, both microbial insecticides reduced foliage damage and populations of large CPB larvae. As CPB populations did not, however, peak until after potato blossom, yield effe were minimal; potato yields were significantly higher relative to CONTROL plots only in plots where BOND was added to M-TRAK. Addition of the surfactants, BOND or AGRAL 90, to M-TRAK, significantly affected neither populations nor foliage damage ratings.

#	Insecti-cide(s)	Rate (pdct/ha)	Mean # CPB Larvae/Plant* 24/06	30/06	03/07	Foliar Damage** 13/07	04/08	Yie (t/
1	NOVODOR	2.5 L	0.0 b***	0.0 b	0.1 b	9.8 a	9.5 a	31.
2	NOVODOR	5.0 L	0.0 b	0.0 b	0.0 b	9.9 a	9.2 a	33.
3	M-TRAK	7.5 L	0.3 b	0.0 b	0.1 b	9.9 a	9.3 a	34.
4	M-TRAK + BOND	7.5 L + 0.25%	0.0 b	0.0 b	0.0 b	9.9 a	9.5 a	38.
5	M-TRAK + AGRAL 90	7.5 L + 0.1%	0.0 b	0.0 b	0.0 b	9.8 a	9.5 a	31.
6	CONTROL	---	6.7 a	23.9 a	40.7 a	7.0 b	2.8 b	24.

* large (3rd + 4th instar) larvae;
** rating scale (0-10): 0 = no control, plants defoliated,
10 = complete control, no CPB damage;
*** means within a column followed by the same letter are not significar different (P = 0.05) as determined by Duncan's New Multiple Range Te

#046

BASE DE DONNEES DES ETUDES: 87000221

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

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TITRE: ESSAI DE M-ONE EN MELANGE AVEC BRAVO CONTRE LE DORYPHORE DE LA POM TERRE

PRODUITS: M-ONE LI (endotoxine-delta de *Bacillus thuringiensis* var. *san diego*, 5,6%),
BRAVO 500 (chlorothalonil)

METHODES: L'essai a été réalisé selon un plan à blocs aléatoires complets 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 rangs espaces de 0,91 m. L'insecticide biologique M-ONE et le fongicide BRAVO été appliqués les 17, 23, 30 juin et 8 juillet (dose: p.c./ha, pression 1723,7 k Pa, volume: 800 L/ha). L'évaluation des densités du doryphore été faite sur 10 plants pris au hasard dans les 2 rangées du centre. Ces rangées ont été récoltées le 26 aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Selon les résultats obtenus, M-ONE peut être utilisé en méla avec le fongicide BRAVO sans que soit affectée son efficacité contre les larves du doryphore. Sachant que M-ONE est efficace contre les petites l (L1 + L2) et que l'emploi des fongicides coincide davantage avec la prése des grosses larves (L3 + L4), l'emploi du M-ONE avec BRAVO contre ces sta de l'insecte n'est pas justifié. Par contre, ce mélange pourra très bien utilisé contre les petites larves de la génération d'été. Il demeure que M-ONE et M-ONE + BRAVO ont donné de très bons résultats comparativement a densités élevées et au dommage notes chez le témoin.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable

Traitement Insecticide	Dose	Population larvaire juin 23	29	juillet 07	16	Dommage* juillet 06	14	24	31	Rendem (kg
l. M-ONE	9,0L	14,0**	14,3b	4,1b	1,7b	1,0b**	1,0b	1,0b	1,7c	6(
2. M-ONE+ BRAVO	9,0L+ 2,0L	11,0	11,3b	5,0b	4,3b	1,0b	1,0b	1,0b	2,2b	62
3. TEMOIN		17,0	58,6a	77,9a	30,4a	2,0a	5,0a	6,2a	6,5a	4(

* Evaluation visuelle par parcelle: indice de défoliation de 0 à 8 (0 à 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).

#047

BASE DE DONNEES DES ETUDES: 87000221

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
DUCHESNE, RAYMOND-MARIE et JEAN, CHRISTINE
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TITRE: ESSAI DE M-TRAK EN MELANGE AVEC BRAVO ET DITHANE CONTRE LE DORYPHO LA POMME DE TERRE

PRODUITS: M-TRAK LI (MYX-1806, endotoxine-delta encapsulée de *Bacillus thuringiensis* var. *san diego*, 10%), BRAVO 500 (chlorothalonil), DITHANE M-45 (mancozebe).

METHODES: L'essai a été réalise selon un plan à blocs aléatoires complets 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 rangs espacés de 0,91 m. L'insecticide biologique M-TRAK et les fongicides BRA DITHANE ont été appliqués les 17, 23, 30 juin et 8 juillet (dose: p.c./ pression: 1723,7 k Pa, volume: 800 L/ha). L'évaluation des densités d doryphore a été faite sur 10 plants pris au hasard dans les 2 rangées du centre. Ces 2 rangées ont été récoltées le 26 aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Selon les résultats obtenus, M-TRAK peut être utilisé en mél avec les fongicides BRAVO et DITHANE sans que soit affectée son efficacit contre les larves du doryphore. Les résultats sont dans l'ensemble significativement comparables. M-TRAK, M-TRAK + BRAVO et M-TRAK + DITHAN demeurent toujours plus efficaces contre les petites larves selon des traitements rapprochés (5-7 jours). Les résultats sont dans l'ensemble tr bons comparativement aux densités élevées et au dommage notes chez le tém

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable 1992.

Traitement Insecticide	Dose	Population larvaire juin 23	juin 29	juillet 07	juillet 16	Dommage* juillet 06	juillet 14	juillet 24	juillet 31	Re (kg
l. M-TRAK	7,5L	16,0**	12,1b	0,4b	0,3b	1,0b**	1,0b	1,0b	1,0b	62
2. M-TRAK+ BRAVO	7,5L+ 2,0L	17,0	9,7b	3,7b	2,7b	1,0b	1,0b	1,2b	1,5b	61
3. M-TRAK+ DITHANE	7,5L+ 2,25kg	17,0	9,8b	2,1b	0,7b	1,0b	1,0b	1,0b	1,0b	6
4. TEMOIN		17,1	58,6a	77,9a	30,4a	2,0a	5,0a	6,2a	6,5a	4

* Evaluation visuelle par parcelle: indice de défoliation de 0 à 8 (0 à 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).

#048

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Superior

PEST: Colorado potato beetle (CPB) *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
LUND, J.E. and STEWART, J.G. Agriculture Canada, Research Station, P.O. Box 1210 Charlottetown, Prince Edward Island, C1A 7M8
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TITLE: **EFFICACY OF FULL AND REDUCED RATES OF A PYRETHROID INSECTICIDE WHE TANK MIXED WITH A BACTERIAL INSECTICIDE FOR CONTROL OF THE COLORAD POTATO BEETLE ON POTATOES, 1992**

MATERIALS: MYX-1806 (*Bacillus thuringiensis* var. *san diego*), DECIS 2.5 EC (deltamethrin)

METHODS: Small, whole seed pieces were planted on May 20, 1992 at Sherwoo P.E.I. Plants were spaced at about 0.4 m within a row and at 0.9 m betwe rows in four-row plots. Plots, measuring 7.6 m in length and 3.6 m in wi were arranged in a randomized complete block design with ten treatments e replicated four times in total. The treatments are listed in the table b All sprays were applied on July 31 using a back-pack sprayer that delive 300 L of spray mixture per hectare at a pressure of 240 kPa. The check w not sprayed. Plots were sampled weekly from June 29 until September 1, 1 and the number of early instars (L1-L2), later instars (L3-L4), and adult were counted after 10 sweeps per plot (0.37 m diameter net). The two cen rows of each plot were harvested on October 8 and weighed and graded. Marketable tubers had a diameter of at least 40 mm. Analyses of Variance performed on the data and Least Square Differences (LSD) were calculated.

RESULTS: The populations of CPB were extremely low on P.E.I. in 1992 - presumably due to high winter mortality and a cool, wet growing season. results for the CPB are reported below. Yield of tubers among treatments not significant and averaged 29.8 t/ha for marketable yield and 33.0 t/ha total yield.

CONCLUSIONS: MYX-1806 was less effective than DECIS at controlling young older instars of the CPB. The lower rates of application for the bacteri insecticide was less efficacious than the higher rate. Although not statistically significant, a rate response was observed for DECIS on all sample dates except July 27, the prespray sample. The addition of DECIS MYX-1806 was not synergistic.

		MEAN NO. CPB/10 SWEEPS					
		YOUNG (L1-L2)			OLDER (L3-		
TREATMENT	RATE (ML PROD/HA)	JUL.27	AUG.06	AUG.11	JUL.27	AUG.06	AU
1. CHECK	-	9.8A**	20.0A	10.8A	5.5A	19.0A	14
2. MYX	6000	18.3A	2.3C	3.0BCD	5.5A	7.8BC	4.
3. MYX	3000	14.5A	8.0B	6.3ABC	17.0A	9.8B	10.
4. MYX	1500	10.0A	5.0BC	7.0AB	10.8A	8.0BC	12.
5. DECIS	100	9.5A	0.5C	0.5D	13.0A	0.8E	2.
6. DECIS	50	9.2A	2.3C	1.5CD	11.0A	2.5DE	3.
7. DECIS	25	10.5A	4.3BC	1.8CD	13.5A	4.8CDE	3.
8. M+D	6000+100	9.3A	0.3C	0.5D	5.8A	0.8E	0.
9. M+D	3000+ 50	8.0A	1.8C	2.3BCD	6.3A	2.0DE	2.
10. M+D	1500+25	5.8A	4.0BC	2.5BCD	10.0A	5.0CD	5.5

* MYX + DECIS.
** Means in a column followed by the same letter are not different (Duncan's Multiple Range Test ($P < 0.05$).

#049

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Russet Burbank

PEST: Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
LUND, J.E., STEWART, J.G., and PLATT, H.W. Agriculture Canada, Research Station, P.O. Box 1210
Charlottetown, Prince Edward Island, C1A 7M8
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TITLE: **M-ONE TANK-MIXED WITH FUNGICIDES FOR THE MANAGEMENT OF THE COLORAD POTATO BEETLE, 1992**

MATERIALS: M-ONE (*Bacillus thuringiensis* var. *san diego*), BRAVO (chlorothalonil), DITHANE M-45 (mancozeb)

METHODS: Small, whole, seed pieces were planted on May 20, 1992 in Sherwo

P.E.I. Plants were spaced at about 0.4 m within a row and at 0.9 m betwe rows in four-row plots. Plots measuring 7.6 m in length and 3.6 m in wic were arranged in a randomized complete block design with six treatments e replicated four times in total. The treatments were 1) CHECK, 2) M-ONE 5 at 7 L prod/ha, 3) BRAVO at 1200 g AI/ha, 4) DITHANE M-45 at 1760 g a.i./ and 5) M-ONE plus BRAVO at the above noted rates, and 6) M-ONE plus DITHA the above-noted rates. All sprays were applied on July 31 and August 21 a back-pack sprayer that delivered 300 L of spray mixture per hectare at pressure of 240 kPa. The CHECK was not sprayed. Treatments 2, 4, and 5 sprayed on August 11 also. Plots were sampled weekly from June 29 until September 1, 1992 and the number of early instars (L1-L2), later instars (L3-L4), and adults were counted after 10 sweeps per plot (0.37 m diamete net). The two centre rows of each plot were harvested on October 8 and weighed and graded. Marketable tubers had a diameter of at least 40 mm. Analysis of variance were performed on the data and Least Square Differer (LSD) were calculated.

RESULTS: The populations of CPB were extremely low on P.E.I. in 1992 presumably due to high winter mortality and a cool, wet growing season. results for the CPB are reported below. Yield of tubers among treatments not significant and averaged 38.7 t/ha for marketable yield and 45.5 t/ha total yield.

CONCLUSIONS: Unlike studies conducted under laboratory conditions, neithe DITHANE or BRAVO caused any mortality of the Colorado potato beetle. How the low numbers of Colorado potato beetle coupled with the unseasonably c wet weather during the summer made for less than ideal conditions to conc this study. The experiment will be repeated in 1993.

TREATMENT	RATE L PROD/ha	MEAN NO. CPB/10 SWEEPS JULY 28	AUGUST 4	11	24	SEPT
CHECK		4 A*	9 A	14 A	21 A	
M-ONE	7.0	7 A	7 A	17 A	6 AB	
BRAVO	2.4	2 A	5 A	8 A	15 AB	
DITHANE M-45	2.2**	1 A	4 A	19 A	17 AB	
M-ONE + BRAVO	7.0+2.4	3 A	4 A	17 A	8 AB	
M-ONE + DITHANE M-45	7.0+2.2**	0 A	2 A	9 A	5 B	

* Means in a column followed by the same letter are not statistically different (P<0.05, Duncan's Multiple Range Test).
** kg product/ha

#050

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **COMPATIBILITY OF *B.T.* AND FOLIAR FUNGICIDES USED IN POTATOES**

MATERIALS: M-ONE (*Bacillus thuringiensis* var. *san diego*),
DITHANE M-45 (80% mancozeb), BRAVO 500 (chlorothalonil),
ASC-66895, M-TRAK (experimental *B.t.*)

METHODS: Potatoes were planted in single row plots, 6m in length with row spaced 1m apart, replicated 4 times in a randomized complete block design Potato seed pieces were planted with a commercial planter on May 12. Spr applications were made using a back pack airblast sprayer using 240 L/ha water. Treatments were applied on June 16, June 30 and July 21. DECIS 5 was applied in addition to the fungicide treatments in 1 and 5 to assure measure of insect control at a rate of 100 ml product/ha. Assessments we taken by reporting the foliar injury caused by the fungicides - *B.t.* interaction, foliage damage caused by Colorado Potato beetles and leafhop on July 20 and yields on Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: The concern regarding the phytotoxicity caused by mixing anc applying fungicides with *B.t.* insecticides was not observed in this trial year was generally cool and wet, resulting in healthy, vigorous potato foliage. Colorado potato beetle pressures were low and leafhopper damage moderate. The application of DECIS 5.0 Fl, which was added to the fungic BRAVO 500 and DITHANE M-45 controlled both pests while leafhopper ratings expected, were low when a *B.t.* insecticide was used alone. Yields were r affected by the treatments.

Treatments	Rate pr/ha	Phytotoxicity Ratings (0-10)**	Foliar Damage Ratings (0-10 CPB	Leafhop
BRAVO 500	2.25 L	10.0a*	8.3a	6.8a
BRAVO 500 + M-ONE	2.25 L 9.0 L	10.0a	8.5a	4.3b
BRAVO 500 + M-TRAK	2.5 L 7.5 L	10.0a	9.0a	3.5b
BRAVO 500 + ASC-66895	2.25 L 7.0 L	10.0a	8.6a	5.0b
DITHANE M-45	2.25 kg	10.0a	8.5a	7.8a
DITHANE M-45 + M-ONE	2.25 kg 9.0 L	10.0a	8.8a	4.5b
DITHANE M-45 + M-TRAK	2.25 kg 7.5 L	10.0a	9.0a	4.8b
DITHANE M-45 + ASC-66895	2.25 kg 7.0 L	10.0a	8.8a	5.0b
Control		10.0a	8.0a	5.0b

DECIS 5.0Fl was applied to the fungicide treatments when used alone - BRA
500 and DITHANE M-45.
* Means followed by the same letter are not significantly different (P<
Duncan's multilpe range test)
** Phytotoxicity Ratings (0-10) - 0, severe injury caused by the interac
between the fungicides and the *B.t.* insecticides; 10, no injury.
*** Foliar Damage Ratings (0-10) - CPB - Colorado Potato Beetles, Leafhop
0, severe damage, leaf curling or defoliation; 10, complete control.

#051

STUDY DATA BASE: 1451-85-21

CROP: Potato cv. Russet Burbank

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say);
Potato Aphid, *Macrosiphum euphoribae* (Thomas);
Green Peach Aphid, *Myzus persicae* (Sulzer)

NAME AND AGENCY:
BOITEAU, G., DREW, M.E., and OSBORN, W.
Agriculture Canada, Research Station, P.O. Box 20280, Fredericton, NB E3E

TITLE: **CONTROL OF THE COLORADO POTATO BEETLE AND TWO APHID SPECIES**

MATERIALS: BAY-NTN-33893 2.5G, BAY-NTN-33893 240FS, THIMET 15G (phorate).

METHODS: Plots had 4, 7.6 m long rows spaced at 0.91 m. The plots were completely randomized with 6 treatments replicated 4 times and the check replicated 6 times. Potatoes were planted June 3 at 40.6 cm spacing. NT 2.5G (3 rates) and THIMET (1 rate) were applied to the rows at planting v conveyor belt fertilizer applicator. Aug 7, 2 rates of NTN 240FS were ap via a tractor mounted sprayer (950 L/ha, 1200 kPa). One each of green ho reared potato and green peach aphids were manually put on each plant in t middle rows of each plot over 2 days starting July 8. Seeded aphids were disappearing so clip cages with 5 apterous aphids (replicated twice for b aphid species) were attached to potato leaflets in the highest rate of NT 2.5G and the check plots on Aug 10. There were few Colorado potato beetl the test field so beetles from a nursery field were moved (7 beetles/plot 9; 15 beetles/plot July 13) to the test field. Plots were topkilled Sept and their 2 middle rows harvested Sept 15.

RESULTS: The means of the treatments are presented in the table below. T mortality of both aphid species after 1 week in clip cages was 0% in the plots. In the plots treated with the highest rate of NTN G the average mortality was 82.5% and 92.5% for the green peach aphid and potato aphid, respectively.

CONCLUSIONS: NTN provided control superior to THIMET. The low yield in t g/100 m of row NTN treatment may be due to some of its plots being in are that were often water logged. Low beetle density might explain why the l applied NTN FS provided control almost as good as the early applied NTN G highest rate of NTN G provides long term aphid control.

Treatments	Potato aphid Aug 24	Green P. aphid Aug 24	4th Instar (def.)* Aug 12	Adult (def.) Aug 20	Yie (t/ Tot
NTN G 40 g/100 m of row	0.25b	0.0	0.75 b(1)**	0.00(1)	24.
NTN G 80 g/100 m of row	0.75b	0.0	0.00 b(1)	0.00(2)	18.
NTN G 120 g/100 m of row	0.0	0.0	0.00 b(1)	0.00(1)	28.
NTN FS 25 g A.I./ha	6.5a	2.5	0.00ab(2)	0.00(2)	27.
NTN FS 50 g A.I./ha	3.0ab	1.75	0.25ab(2)	1.50(2)	26.
THIMET 24.6 kg/ha	0.5 b	1.0	61.0a (3)	3.25(3)	22.
Untreated Check	1.75b	1.75	50.0a (3)	1.50(3)	11.

* Defoliation index: 0-no defoliation; 1-some leaflets with holes; 2-som leaflets consumed, a few bare petioles; 3-50% of one stem defoliated.
** N=4 except in the untreated check N=6. Means followed by the same let not significant (P<0.05, Duncan's Multiple Range Test).

#052

CROP: Potato cv. Chieftain

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
CODE, B.P., AND WRIGHT, K.H.
Ciba-Geigy Canada Ltd., 1200 Franklin Blvd., Cambridge, Ontario N1R 6T5
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TITLE: **EVALUATION OF TRIGARD 75WP FOR THE CONTROL OF COLORADO POTATO BEETLE III**

MATERIALS: TRIGARD 75WP (cyromazine),
RIPCORD 400EC (cypermethrin),
M-ONE (*B. thuringiensis*)

METHODS: The test site was located near Thedford, Ontario in a field with history of Colorado Potato Beetle (CPB) infestations. Potato seed pieces planted on June 15, 1992 into rows spaced 91cm apart, with a plant spacin 30cm. Plots were 6m long and 3 rows wide with an additional border row between each plot. Each treatment was replicated 4 times in a completely randomized block design. Treatment applications were made on the followi dates (application #): June 29 (1), July 7 (2), July 14 (3), and June 21

Consult the results table for the actual application dates for each treat since the schedules varied among the treatments. All treatments were app using a CO_2-pressurized 3m hand boom sprayer with XR11002VS flat fan tips delivering 400 L/ha at 345 kPa. Evaluation data were collected on June July 6, 13, 20 and August 4. On each date, the total numbers of CPB egg masses, 1st, 2nd, 3rd, 4th instar larvae, and adults counted in the full length (6m) of the centre row of each plot was recorded. Percent defolia due to CPB feeding was visually assessed on July 20 and August 4.

RESULTS: As presented in the table below.

CONCLUSIONS: TRIGARD 75WP effectively controlled Colorado potato beetles apparently by inhibiting the future development of early instar larvae, t significantly reducing the number of large larvae after one application. After two weekly applications, inhibition of the initial development of e instar larvae was also evident. RIPCORD provided very good early control all stages of CPB. TRIGARD and RIPCORD significantly reduced defoliation M-ONE provided good early control, however, this control weakened over ti

TREATMENT	RATE kg AI/ha	APPLICATION #	CPB LARVAL COUNTS 13/07 SL*	13/07 LL**	20/07 SL	20/07 LL	% DEFOL 20/07
CHECK	--	--	123.3c***	98.8c	15.0a	133.0b	13.8c
TRIGARD	0.14	1, 3	27.5ab	20.8ab	2.3a	20.5a	1.8a
TRIGARD	0.28	1, 3	27.5ab	8.3a	1.0a	10.5a	0.0a
TRIGARD	0.14	1,2,3,4	11.8a	3.8a	0.0a	1.5a	0.0a
TRIGARD	0.28;	1, 3,					
	0.14	2, 4	5.8a	1.8a	0.3a	1.5a	0.0a
RIPCORD	0.035	1,2,3,4	3.0a	6.5a	0.0a	4.3a	0.0a
M-ONE	7.5 L/ha	1, 3	80.5bc	64.3bc	0.5a	122.8b	5.3b

* SL= Small Larvae (1st + 2nd instars)
** LL= Large Larvae (3rd + 4th instars)
*** Means within a column followed by the same letter are not significant different (P=0.05, Duncan's Multiple Range Test).

#053

CROP: Potato cv. Chieftain

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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Ciba-Geigy Canada Ltd., 1200 Franklin Blvd., Cambridge, Ont., N1R 6T5
Tel: (519) 623-7600 Fax: (519) 623-9451

TITLE: **EVALUATION OF TRIGARD 75WP FOR THE CONTROL OF COLORADO POTATO BEET**

MATERIALS: TRIGARD 75WP (cyromazine), RIPCORD 400EC (cypermethrin), M-ONE (*B. thuringiensis*)

METHODS: The test site was located near Cambridge, Ontario in a potato fi being commercially grown. Potato seed pieces were planted on May 15, 199 into rows spaced 91cm apart, with a plant spacing of 30cm. Plots were 6m and 3 rows wide. Each treatment was replicated 4 times in a completely randomized block design. Treatment applications were made on the followi dates (application #): July 10 (1), July 17 (2), July 24 (3), and August (4). Consult the results table for the actual application dates for each treatment, since the schedules varied among the treatments. All treatmen were applied using a CO_2-pressurized 3m hand boom sprayer with XR11002VS fan tips delivering 400 L/ha at 345 kPa. Evaluation data were collected July 9, 16, 23, August 4, and 11. On each date, the total numbers of CPE masses, 1st, 2nd, 3rd, 4th instar larvae, and adults counted in the full length (6m) of the centre row of each plot were recorded. Percent defoli due to CPB feeding was visually assessed on August 4, and 11.

RESULTS: As presented in the table below. Insect populations were lower anticipated. There was less than 10 percent defoliation with any treatme due to the low insect pressure.

CONCLUSIONS: TRIGARD 75WP effectively controlled Colorado potato beetles apparently by inhibiting the future development of early instar larvae, t significantly reducing the number of large larvae after one application. treatments with 280g of TRIGARD performed better than similar treatments 140g. RIPCORD provided very good early control of all stages of CPB. M- provided good early control, however, this control weakened over time.

CPB LARVAL COUNTS

TREATMENT	RATE kg AI/ha	APPLICATION #	09/07 SL*	16/07 SL	16/07 LL**	23/07 LL	04 LL
			pre spray				
CHECK	--	--	33.0a*	24.5a	43.3b	34.5b	15
TRIGARD	0.14	1, 3	32.0a	19.8a	19.5ab	19.5ab	6
TRIGARD	0.28	1, 3	10.5a	9.8a	5.8a	5.8ab	4
TRIGARD	0.14	1,2,3,4	20.0a	16.3a	17.8ab	11.3ab	1
TRIGARD	0.28; 0.14	1, 3, 2, 4	8.0a	9.5a	9.0a	2.3a	6
RIPCORD	0.035	1,2,3,4	17.8a	1.0a	2.3a	0.3a	0
M-ONE	7.5 L/ha	1, 3	7.8a	18.3a	20.8ab	20.3ab	12

* SL= Small Larvae (1st + 2nd instars)
** LL= Large Larvae (3rd + 4th instars)
*** Means within a column followed by the same letter are not significant different (P=0.05, Duncan's Multiple Range Test).

#054

BASE DE DONNEES DES ETUDES: 86000718

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
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Tel: (418) 644-2156 Fax: (418) 646-0832

TITRE: ESSAI D'INSECTICIDES CHIMIQUES CONTRE LE DORYPHORE DE LA POMME DE

PRODUITS: DECIS 2,5 EC (deltametrine), NTN-33893 FS (imidacloprid), TRIGARD 75 W (cyromazine)

METHODES: L'essai a été réalisé selon un plan à blocs aléatoires complets avec 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 ra espaces de 0,91 m. Les insecticides ont été appliqués les 17 (trt: 1, 2 3, 4, 5), 23 (trt: 1, 4, 5), 30 juin (trt: 1, 3, 4, 5), 8 et 15 juillet (trt: 1), (dose: g m.a./ha, pression: 1723,7 k Pa, volume: 800 L/ha) L'évaluation des densités du doryphore a été faite sur 10 plants pris au hasard dans les 2 rangées du centre. Ces 2 rangées ont été récoltées le aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Le produit NTN-33893 a de nouveau donné de très bons résulta qui sont comparables entre les deux doses. La dose de 50 g m.a./ha sembl cependant plus sure. Des la 2e application, NTN a assure la protection d feuillage en réduisant l'apparition des grosses larves. La 3e applicati tenu les densités et le dommage a un niveau très bas et stable. Avec seulement une (No 2: eclosion des oeufs) et deux (No 3: éclosion + 15 jours) applications, TRIGARD a été relativement satisfaisant. Il s'est avéré plus efficace avec une 2e application, tout aussi performant que DE avec 5 applications et comparable a NTN pour la protection du feuillage. Pour TRIGARD, un été chaud et sec impliquerait sans doute une troisième application.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable 1992

Traitement Insecticide	Dose	Population larvaire juin 22	juin 30	juillet 07	juillet 23	Dommage* juillet 06	juillet 14	24	31	Re (kg
1. DECIS	7,5	13,7b**	6,2c	5,7bc	6,2c	1,0b**	1,0b	1,0c	1,2c	6
2. TRIGARD	140,0	21,4ab	15,1b	10,8b	10,3b	1,0b	1,0b	1,7b	2,2b	6
3. TRIGARD	140,0	22,8a	13,7b	6,9b	3,0d	1,0b	1,0b	1,2c	1,2c	6
4. NTN33893	25,0	16,7ab	0,8d	0,8cd	2,4d	1,0b	1,0b	1,0c	1,0c	6
5. NTN33893	50,0	15,7ab	0,1d	0,1d	0,6d	1,0b	1,0b	1,0c	1,0c	6
6. TEMOIN		21,5ab	49,4a	98,7a	16,3a	2,0a	4,7a	6,5a	7,0a	3

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).

#055

BASE DE DONNEES DES ETUDES: 86000718

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
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TITRE: ESSAI D'INSECTICIDES SELON LA PERIODE DE LA JOURNEE

PRODUITS: M-ONE LI 9,0 L p.c./ha (endotoxine-delta de *Bacillus thuringiensis* var. *san diego*),
GUTHION 240-EC 1,75 L p.c./ha (azinphos-methyl),
RIPCORD 400-EC 87,5 ML p.c./ha (cyperméthrine)

METHODES: L'expérience a été réalisée selon un plan à blocs aléatoires complets avec 4 répétitions. Les parcelles de 7,5 m de longueur comprena 4 rangs espaces de 0,91 m. Les insecticides ont été utilisés en rotatior selon certaines caractéristiques d'usage des produits (stade de l'insecte température de la journée) pour trois périodes de la journée: matin (avar h), midi (entre 11 h et 14 h) et soir (après 16 h). Il y a eu pour chacu des périodes quatre traitements: 17 (soir) et 18 juin (matin, midi), GUT 23 juin, M-ONE; 5 juillet, RIPCORD; 8 juillet, GUTHION (pression: 1723,7 Pa, volume: 800 L/ha). Une protection contre le vent a été assurée pou éviter la dérivé des traitements faits le midi. L'évaluation des densités doryphore a été faite sur 10 plants pris au hasard dans les 2 rangées du centre qui ont été récoltées le 26 aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Pour une 2e saison, les résultats n'identifient pas une péri de la journée comme étant plus efficace. Toutefois, on observé significativement moins de larves dans les parcelles traitées le midi et soir le 29 juin ainsi que le soir le 16 juillet. Ces différences restent mineures, les résultats dans leur ensemble ne permettent pas de justifier traitements le jour. Des applications le matin et en fin de journée base sur des rotations stratégiques de produits sont très valables et plus sécuritaires pour l'environnement.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable 1992

Période de traitement	Population larvaire juin		juillet			Dommage* juillet			Ren (kg
	22	29	07	16	06	14	24	31	
MATIN	15,2**	27,1b	5,2b	5,4b	1,0b**	1,0b	1,2b	1,5b	54
MIDI	11,3	16,5c	7,0b	4,4bc	1,0b	1,0b	1,0b	1,7b	59
SOIR	13,7	16,9c	2,9b	2,0c	1,0b	1,0b	1,0b	1,0b	56
TEMOIN	19,6	51,3a	86,4a	31,0a	2,0a	4,7a	6,0a	6,2a	39

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents à un seuil de 0,05 (Waller-Duncan).

#056

BASE DE DONNEES DES ETUDES: 86000718

CULTURE: Pomme de terre, cv. Superior

RAVAGEUR: Doryphore de la pomme de terre, *Leptinotarsa decemlineata* (Say)

NOM ET ORGANISME:
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Tel: (418) 644-2156 Fax: (418) 646-0832

TITRE: ESSAI DE DECIS AVEC UN ADJUVANT CONTRE LE DORYPHORE DE LA POMME DE

PRODUITS: DECIS 2,5 EC (deltamétrine),
DECIS 2,5 EC + BOND (latex synthetique 45% à 0,25% v/v)

METHODES: L'essai a été réalisé selon un plan à blocs aléatoires complets 4 répétitions. Les parcelles de 7,5 m de longueur comprenaient 4 rangs espaces de 0,91 m. Les applications ont été faites les 17, 23, 30 juin e juillet, (dose: g m.a./ha, pression: 1723,7 k Pa, volume: 800 L/ha). cinquième application a été faite le 15 juillet pour le traitement 1. L'évaluation des densités du doryphore a été faite sur 10 plants pris au hasard dans les 2 rangées du centre. Ces 2 rangées ont été récoltées le aoét.

RESULTATS: Voir le tableau ci-dessous.

CONCLUSIONS: Pour l'ensemble des résultats, l'ajout de l'adjuvant BOND n' augmenté significativement l'efficacité de DECIS. Cependant les densités été légèrement inférieures avec BOND du 30 juin au 23 juillet. Les 20 et juillet, les densités de grosses larves étaient significativement plus fa avec BOND, pour lequel il y a eu 4 applications en saison comparativement pour DECIS. Ces résultats permettent d'envisager une meilleure performar des insecticides homologués contre le doryphore par l'emploi d'un adjuvar efficace. Une plus grande rémanence des insecticides sur le feuillage se très avantageuse pour la gestion du doryphore pour les traitements effect en période d'émergence des petites larves.

Nombre moyen de larves de doryphores/plant, dommage et rendement vendable

Traitement Insecticide	Dose	Population larvaire juin 22	30	juillet 07	23	Dommage* juillet 06	14	24	31	Rer (kg/
DECIS	7,5	13,7b*	6,2b	5,7b	6,2b	1,0b**	1,0b	1,0b	1,2b	
DECIS + BOND	7,5	13,3b	3,1b	2,2b	2,9c	1,0b	1,0b	1,0b	1,0b	
TEMOIN		21,5a	49,4a	98,7a	16,3a	2,0a	4,7a	6,5a	7,0a	

* Evaluation visuelle par parcelle: indice de défoliation de 0 a 8 (0 a 100% de défoliation).
** Les résultats sans lettre ou suivis d'une même lettre ne sont pas significativement différents, à un seuil de 0,05 (Waller-Duncan).

#057

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Superior

PEST: Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say),
Potato flea beetle (PFB), *Epitrix cucumeris* (Harr.),
Potato aphid (PA), *Macrosiphum euphorbiae* (Thos.)

NAME AND AGENCY:
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TITLE: **EVALUATION OF SYNTHETIC INSECTICIDES FOR CONTROL OF INSECT PESTS (**

POTATOES, 1992

MATERIALS: NTN-33893 2.5 G (imidacloprid), NTN-33893 240 FS (imidaclopric
IMIDAN 50 WP (phosmet).

METHODS: Small, whole, seed pieces were planted in Sherwood, P.E.I. on Ma 1992. Plants were spaced at about 40 cm within rows and about 90 cm betw rows in four-row plots. Plots, which measured 7.6 m in length and 3.6 m width, were separated by two rows of potatoes. Plots were arranged in a randomized complete block design with seven treatments each replicated a of four times. Granular insecticides were applied at planting. Foliar treatments were applied on July 30 using a precision plot sprayer deliver approximately 300 L of spray mixture per hectare at a pressure of about 2 kpa. An additional spray of IMIDAN was applied on August 12 when a thres of 10 CPB per net sweep was surpassed. Each week starting on June 22 and ending on August 24, the number of insects per 10 net sweeps (0.37 m diam opening) and the number of PFB- induced holes per 4th terminal leaf per 1 plants, were counted from the center two rows of each plot. Weeds were controlled with an application of metribuzin at 750 g AI/ha and paraquat 593 g AI/ha on June 16, and fluazifop-butyl at 250 g AI/ha on June 24. P received recommended applications of chlorothalonil at 1250 g AI/ha for b control. Plants were sprayed with REGLONE (diquat) at 300 g AI/ha for to desiccation on September 1. Tubers from the center two rows of each plot harvested on September 29 and total and marketable (> 40 mm) yields recor Analysis of variance were performed on the data and least squares differe (LSD) were calculated.

RESULTS: PFB populations in insecticide-treated plots were not significan lower than in the untreated check plots after July 21. The other results summarized in the table below.

CONCLUSIONS: The efficacy of NTN-33893 on CPB was significant compared to non-treated plots. Plots sprayed with IMIDAN did not have significantly f CPB than the non-treated plots. PA populations were significantly lower all plots treated with NTN-33893 on August 7 and on August 11. The NTN-3 granular treatments reduced PFB populations until July 21. There was als rate response between the NTN-33893 granular treatments and the number of PFB/plot.

INSECT COUNTS 10 NET SWEEPS PER PLOT

TREATMENT	RATE (g AI/ha)	NUMBER OF CPB JULY 23	AUGUST 7	11	21	24	28	NUMBER (JULY 7	11	AUGU 21
CHECK	-	0.3	10.0	21.3	2.0	0.0	19.3	41.0	65.5	31.5
NTN-33893	2G 113	0.0	0.3	1.3	0.3	0.3	2.0	4.8	9.0	19.0
NTN-33893	2G 226	0.3	0.0	0.3	0.8	0.0	1.0	1.3	10.3	11.5
NTN-33893	2G 339	1.3	0.0	0.0	0.0	0.0	8.8	1.8	5.5	10.8
NTN-33893	FS 25	0.0	0.0	2.3	1.5	2.8	11.3	10.3	23.5	29.0
NTN-33893	FS 50	0.8	0.0	0.0	1.3	0.8	12.0	12.0	12.3	29.8
IMIDAN WP	1100	0.8	2.3	10.8	1.3	1.0	14.0	64.3	78.5	112.8
LSD (P<0.05)		NS	8.0	12.8	NS	2.1	15.3	26.3	28.1	22.2

TREATMENT	RATE (g AI/ha)	NUMBER OF PFB JUNE 23	30	JULY 7	15	21	HOLES/LEAF JUNE 23	30	JULY 7	15
CHECK	-	40	67	73	82	34	128	127	65	111
NTN-33893	2G 113	31	46	59	40	52	45	60	57	65
NTN-33893	2G 226	24	34	54	32	51	26	42	27	43
NTN-33893	2G 339	16	25	30	32	44	14	16	10	32
NTN-33893	FS 25	40	75	79	80	43	130	106	81	104
NTN-33893	FS 50	42	80	71	82	51	99	100	64	110
IMIDAN	WP 1100	39	73	93	83	40	115	148	80	129
LSD (P<0.05)		15	23	26	25	NS	36	49	48	50

#058

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Superior

PEST: Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say),
Potato flea beetle (PFB), *Epitrix cucumeris* (Harr.), and

Potato aphid (PA), *Macrosiphum euphorbiae* (Thos.)

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TITLE: **EVALUATION OF TIMED APPLICATIONS OF SYNTHETIC INSECTICIDES FOR CON OF INSECT PESTS ON POTATOES, 1992**

MATERIALS: TRIGARD 75 WP (cyromazine), AC 303,630 SC 24%

METHODS: Small, whole, seed pieces were planted in Sherwood, P.E.I. on Ma 1992. Plants were spaced at about 40 cm within rows and about 90 cm betw rows in four-row plots. Each plot measured 7.6 m long by 3.6 m wide. Pl were separated by two rows of potatoes and arranged in a Randomized Compl Block Design with seven treatments each replicated a total of four times. Insecticides were applied to all treatments on July 30 using a precision sprayer delivering approximately 300 L of spray mixture per hectare at a pressure of about 240 kPa. An additional spray, of TRIGARD at 0.14 kg AI and AC 303,630 at 0.05 kg AI/ha, was applied on August 12. Each week sta on June 22 and ending on August 24, the number of insects per 10 net swee (0.37 m diameter opening) and the number of PFB-induced holes per 4th ter leaf per 10 plants, were counted from the center two rows of each plot. W were controlled with an application of metribuzin at 750 g AI/ha and para at 593 g AI/ha on June 16, and fluazifop-butyl at 250 g AI/ha on June 24. Plots received recommended applications of chlorothalonil at 1250 g AI/ha blight control. Plants were sprayed with Reglone (diquat) at 300 g AI/ha top desiccation on Sept. 1. Tubers from the center two rows of each plot harvested on September 29 and total and marketable (> 40 mm) yields recor Analyses of variance were performed on the data and Least Squares Differe (LSD) were calculated.

RESULTS: PFB populations were not significantly different until August 24 populations were not significantly different on treated plots as compared the untreated check plots throughout the season. The other results are summarized in the table below.

CONCLUSIONS: The efficacy of all treatments on CPB was significant as com to the untreated check plots. The additional sprays of the lower rates o TRIGARD and AC 303,630 did not seem to enhance the level of control provi either product. Plots treated with the high rate and the two sprays of TRIGARD as well as with the two sprays of AC 303,630, had significantly f PFB than on check plots on August 24.

INSECT COUNTS PER 10 NET SWEEPS PER PLOT

TREATMENT	RATE (kg AI/ha)	TIME	CPB JULY 28	CPB AUGUST 6	11	21	24	A
CHECK	-	-	0.5	8.3	10.8	4.8	2.5	
TRIGARD	.14	30% EGG HATCH	1.5	1.0	1.3	0.3	0.7	
TRIGARD	.28	30% EGG HATCH	1.8	1.0	0.5	0.3	0.0	
TRIGARD	.14	30%+12 DAYS	1.5	2.0	0.5	0.3	0.0	
AC 303,630	.05	30% EGG HATCH	5.5	1.8	5.3	2.5	0.8	
AC 303,630	.10	30% EGG HATCH	2.8	1.5	2.3	1.0	2.0	
AC 303,630	.05	30%+12 DAYS	0.3	1.5	3.0	1.0	1.3	
LSD (P<0.05)			4.1	4.9	6.3	3.0	NS	3

#059

ICAR:61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **EFFICACY OF AC 303,630 FOR FOLIAR INSECT CONTROL IN POTATOES**

MATERIALS: AC 303,630, 120 SC (experimental),
LI700 (agricultural acidifier), MO-BAIT (molasses),
THIMET 15G (phosmet), CYMBUSH 250EC (cypermethrin),
FURADAN 480F (carbofuran)

METHODS: Potatoes were planted in two row plots, 6m in length with rows s 1m apart, replicted 4 times in a randomized complete block design. Potatc pieces were planted with a commercial planter on May 12. Granular insecti were applied onto the soil surface in a 20 cm band prior to planting. Fc insecticides were made using a back pack airblast sprayer using 240L/ha c water. The water was sourced at RCAT - tap water pH 7.1, and from a well Dresden with a pH of 8.2. LI700 was added to adjust the Dresden water tc of 6.5. AGRAL 90 was added to the AC 303,630 treatments at a rate of 0.1 Sprays were applied June 17, 30, July 11 and 21. Assessments were taken counting Colorado potato beetles (CPB), rating foliage damage caused by C and leafhoppers, an overall foliage rating and yield.

RESULTS: As presented in the tables below.

CONCLUSIONS: AC 303,630 provided outstanding Colorado potato beetle contr but only moderate leafhopper control. It is often observed that the firs sprays of the season require several days to show a positive effect on ir control. It appears that the high pH water from Dresden delays this acti even further. These results suggest, however, that the lag activity can reduced with the addition of a pH adjustor product LI700. After this init catch up phase the addition of LI700 was no longer warranted. The additi MO-BAIT had no positive effect on insect control in potatoes. The combir product, treatmemt 7, was no more effective than AC 303,630 when applied itself. The CPB populations in this trial location were not of the resis strains.

Table 1. CPB Larval Counts - days after spraying.

Treatments	Rate L pr/ha	Water Source	June 17 13	2	June 30 6	
AC 303,630 120SC(a)	0.83	RCAT	2.5b*	0.0b	1.3b	
AC 303,630 120SC	1.67	RCAT	0.0b	0.0b	0.0b	
AC 303,630 120SC	0.83	Dresden	142.5a	17.5b	0.0b	
AC 303,630 120SC +	0.83					
LI700	0.25%	Dresden	7.5b	0.0b	0.0b	
AC 303,630 120SC +	0.83					
MO-BAIT	0.25%	RCAT	7.5b	0.0b	1.3b	1
THIMET 15G	224.0**		135.0a	175.0a	187.5a	12
THIMET 15G;	224.0**					
CYMBUSH 250EC;	0.140;	RCAT				
AC 303,630 120SC;	0.83;	"				
FURADAN 480F;	1.1;	"				
AC 303,630 360SC	0.28	"	5.0b	0.0b	0.0b	
Control			127.5a	175.0a	217.5a	13

Table 2. Foliar Damage Ratings (0-10)****

Treatments	Rate L pr/ha	Water Source	CPB July 20	Leaf-hopper July 20	Over-all Aug. 4	Y k A
AC 303,630 120SC***	0.83	RCAT	9.3a	6.4ab	7.5a	1
AC 303,630 120SC	1.67	RCAT	9.5a	6.9a	8.5a	1
AC 303,630 120SC	0.83	Dresden	8.8a	6.8a	7.5a	1
AC 303,630 120SC +	0.83					
LI700	0.25%	Dresden	8.8a	6.4ab	7.5a	1
AC 303,630 120SC +	0.83					
MO-BAIT	0.25%	RCAT	8.8a	6.3ab	7.3a	1
THIMET 15G	224.0**		4.5b	7.5a	5.5b	1
THIMET 15G;	224.0**					
CYMBUSH 250EC;	0.140;	RCAT				
AC 303,630 120SC;	0.83;	"				
FURADAN 480F;	1.1;	"				
AC 303,630 360SC	0.28	"	8.9a	6.3ab	7.6a	1
Control			3.8b	5.0b	2.8c	

* means followed by the same letter are not significantly different (P
Duncan's Multiple Range Test);

** - gm pr/100m

*** The last spray application on June 21 used the 360EC formulation of AC 303,630;

**** Foliar Damage Ratings (0-10) 0, no control, foliage severely damaged; 10, complete control

#060

ICAR IDENTIFICATION NUMBER: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **EVALUATION OF CYROMAZINE FOR THE CONTROL OF COLORADO POTATO BEETLE IN POTATOES**

MATERIALS: TRIGARD 75WP (cyromazine),
RIPCORD 400EC (cypermethrin),
GUTHION 240SC (azinphos-methyl),
M-ONE (*Bacillus thuringiensis* var *san diego*)

METHODS: Potatoes were planted in two row plots, 6m in length with rows s 1m apart, replicated 4 times in a randomized complete block design. Potat seed pieces were planted with a commercial planter on May 13. Spray applications were made using a back pack airblast sprayer using 240 L/ha water. Insecticides were applied only once (single) on June 17 or multip times every 14 days on June 17, 30, July 15, 30, August 12 and 26. Assess were taken by counting Colorado potato beetle (CPB) larvae at intervals throughout the summer, foliage damage rating caused by beetle feeding and leafhopper damage on July 20, an overall foliar damage rating on Aug. 4 a yield on Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: TRIGARD 75WP is an effective Colorado potato beetle insectic when applied several times throughout the season. RIPCORD 400EC provided good foundation for TRIGARD 75WP as an initial spray to then be followed TRIGARD 75WP. In fact RIPCORD 400EC when used alone was the most effecti overall product providing control of both Colorado potato beetles and leafhoppers. TRIGARD 75WP is only moderately effective in controlling leafhoppers requiring a complimentary product for broadspectrum insect co in potatoes. Multiple applications of M-ONE were also effective in controlling CPB but were not effective in controlling leafhoppers.

Table 1. CPB Larval Counts - Days After Spraying.

Treatments	Rate Prod/ha	Applications	June 17 1	June 30 0	2	
TRIGARD 75WP	187.0 gm	single	4.3ab*	74.0ab	104.9ab	2
TRIGARD 75WP	373.0 gm	single	4.3ab	36.6bc	38.8bc	1
TRIGARD 75WP	187.0 gm	multiple (14 day)	2.8ab	41.2bc	49.1b	
TRIGARD 75WP;	373.0 gm	single				
TRIGARD 75WP	187.0 gm	multiple (14 day)	9.0ab	41.2bc	43.7bc	
RIPCORD 400EC;	90.0 ml	single				
TRIGARD 75WP	187.0 gm	multiple (14 day)	1.5b	18.4c	9.6cd	
RIPCORD 400EC;	90.0 ml	single				
TRIGARD 75WP;	187.0 gm	single				
GUTHION 240SC;	1.5 L	single				
TRIGARD 75WP	187.0 gm	single	3.0ab	25.6c	6.9d	
RIPCORD 400EC	90.0 ml	multiple (14 day)	2.3ab	27.2c	7.4d	
M-ONE	9.0 L	multiple (14 day)	1.1b	11.6d	3.5d	
Control			22.7a	222.9a	236.1a	3

* Means followed by the same letter are not significantly different (P<0.
Duncan's Multiple Range Test)

Table 2. Foliar Damage Ratings (0-10)*

Treatments	Rate Prod/ha	Applications	CPB July 20	Leaf-hopper July 20	Overall Aug. 4	A
TRIGARD 75WP	187.0 gm	single	4.0b	6.5bc	3.7c	
TRIGARD 75WP	373.0 gm	single	4.6b	5.7bcd	5.3b	1
TRIGARD 75WP	187.0 gm	multiple (14 day)	7.9a	4.6d	7.4a	1
TRIGARD 75WP; TRIGARD 75WP	373.0 gm 187.0 gm	single multiple (14 day)	7.9a	5.3cd	7.4a	1
RIPCORD 400EC; TRIGARD 75WP	90.0 ml 187.0 gm	single multiple (14 day)	8.4a	5.3cd	8.4a	1
RIPCORD 400EC; TRIGARD 75WP; GUTHION 240SC; TRIGARD 75WP	90.0 ml 187.0 gm 1.5 L 187.0 gm	single single single single	7.4a	9.0a	8.4a	1
RIPCORD 400EC	90.0 ml	multiple (14 day)	9.0a	8.0a	9.0a	1
M-ONE	9.0 L	multiple (14 day)	8.4a	4.6d	6.9ab	1
Control			3.2b	4.6d	3.5c	5

* Foliar Damage Ratings (0-10) - CPB - Colorado Potato Beetles, Leafhopper - 0, severe damage, leaf curling or defoliation; 10, complete control.

#061

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **METHOD OF APPLYING GRANULAR INSECTICIDES FOR THE CONTROL OF POTATO INSECTS**

MATERIALS: THIMET 15G (phorate), NTN-33893 2.5G (experimental)

METHODS: Potatoes were planted in single row plots, 6m in length with row spaced 1m apart, replicated 4 times in a randomized complete block desig Potato seed pieces were planted with a commercial planter on May 12. All insecticides were applied by hand in a 20 cm. band either in furrow or on soil surface prior to planting. Assessments were taken by counting the of Colorado potato beetle (CPB) larvae per plot on June 30, July 6, 11 an foliage damage ratings caused by beetle feeding and leafhopper foliar dam on July 20, an overall visual foliage damage rating on Aug. 4 and yield Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: NTN-33893 2.5G provided a significantly higher level of Colo potato beetle control while equal leafhopper control than THIMET 15G. Lat in the season this difference of CPB control was lessened. Rainfall conditions were higher than previous years where NTN-33893 had shown long periods of control and higher levels of leafhopper control. Yields refle the significance in insect control using granular insecticides. The difference in granular application, whether in furrow or on top of the so surface clearly separated itself only at the end of the season Aug. 4 and although not statistically significant, had a lower yield for both insecticides. In furrow applications appear to be the most reliable meth applying granular insecticides for maximum insect control and potato yiel

Table 1.

Treatments	Rate g prod /100m	Application	CPB Larval Counts June 30	July 6	July 11	J
THIMET 15G	224	In Furrow	65.0ab*	105.0a	101.3ab	7
THIMET 15G	224	Soil Surface	55.0ab	135.0a	85.0bc	4
NTN-33893 2.5G	80	In Furrow	10.0b	7.5b	30.0c	2
NTN-33893 2.5G	80	Soil Surface	12.5b	30.0b	58.8bc	3
Control			120.0c	200.0a	142.5a	5

Table 2.

Treatments	Rate g prod /100m	Application	Foliar Damage Ratings (0- CPB July 20	Leaf-hopper July 20	Overall Aug. 4	Y H A
THIMET 15G	224	In Furrow	4.3b	5.0a	7.9a	1
THIMET 15G	224	Soil Surface	4.0b	4.3a	5.7b	1
NTN-33893 2.5G	80	In Furrow	9.0a	5.3a	8.4a	1
NTN-33893 2.5G	80	Soil Surface	7.9a	6.5a	5.7b	1
Control			2.0c	2.5b	1.8c	

* means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test).
** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damage 10, complete control

#062

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say), Potato Leafhopper, *Empoasca fabae* (Harris)

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TITLE: **PESTICIDE TIMING (BACK TO BACK - EXTENDED INTERVALS) AND ITS EFFECT ON INSECT CONTROL IN POTATOES**

MATERIALS: GUTHION 240SC (azinphos-methyl), DECIS 5.0EC, 5.0Fl (deltamethrin), NTN-33893 2.5G, 240SC (experimental)

METHODS: Potatoes were planted in single row plots 6m in length with rows spaced 1m apart replicated 4 times in a randomized complete block design. Potato seed pieces were planted with a commercial planter on May 13. The single granular insecticide NTN was applied onto the soil surface in a 20 band prior to planting. Spray applications were made using a back pack airblast sprayer using 240 L/ha of water. Spray timing was scheduled eit every 7 days with and without a back to back spray (within the next 3 day every 14 days with and without a back to back spray (3 days later). The spray schedule was June 17, 24, July l1, 21, 29, Aug. 5, 12, 19 and 26. 14 day spray schedule was June 17, July 1, 21, 29, Aug. 12 and 26. Due t adverse weather conditions the scheduled July 8 and July 15 dates were sp as indicated on July 11 and 21. Also, there was no opportunity to apply back to back spray after the July 17 spray date. Assessments were taken counting Colorado potato beetle (CPB) larvae at intervals throughout the summer, foliage damage ratings caused by beetle feeding and leafhopper da on July 20 and potato yields on Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: The practice of halving the rates and applying each half rat a back to back spray schedule - within 3 days, appears to have lowered th number of CPB improving control at least with the DECIS formulations. Th level of control with GUTHION 240SC was extremely high on the susceptible strains found in this trial. A high order of resistance to synthetic pyrethroid insecticide may have been the reason why the back to back spra appeared to be working more effectively with DECIS. The benefits gained CPB using the back to back method did not appear to improve leafhopper control.

Table 1. Colorado potato beetle counts.

Treatments	Rate L Pr/ha	App'l Days	CPB Counts July 11	Foliar Dama Ratings (0- CPB July 20
GUTHION 240SC	1.75	7	3.0de*	9.0a
GUTHION 240SC	1.75	14	27.2bcd	7.9ab
GUTHION 240SC	0.875	BB 7	1.8e	9.0a
GUTHION 240SC	0.875	BB 14	22.7b-e	6.5abc
DECIS 5.0EC	100.0 ml	7	16.8cde	8.4ab
DECIS 5.0EC	100.0 ml	14	157.5ab	5.3cd
DECIS 5.0EC	50.0 ml	BB 7	9.0cde	8.4ab
DECIS 5.0EC	50.0 ml	BB 14	49.1abc	6.5abc
DECIS 5.0Fl	100.0 ml	7	6.1cde	9.0a
DECIS 5.0Fl	100.0 ml	14	157.5ab	6.1bc
DECIS 5.0Fl	50.0 ml	BB 7	5.0cde	9.0a
DECIS 5.0Fl	50.0 ml	BB 14	15.8cde	7.4abc
NTN33893 2.5G;	40.0 gm pr/100m;			
GUTHION 240SC;	1.75;	single(14)		
NTN33893 240SC	104.0 ml	single(14)	6.5cde	7.4abc
Control			236.1a	4.0d

Table 2. Foliar damage for leafhopper and yield.

Treatments	Rate L Pr/ha	App'l Days	Foliar Damage Ratings (0-10)* Leafhoppers July 20	Yield kg/plot Aug. 12
GUTHION 240SC	1.75	7	9.0a	16.8abc
GUTHION 240SC	1.75	14	8.4ab	16.8abc
GUTHION 240SC	0.875	BB 7	8.4ab	19.0a
GUTHION 240SC	0.875	BB 14	6.9ab	14.8abc
DECIS 5.0EC	100.0 ml	7	8.4ab	14.0bc
DECIS 5.0EC	100.0 ml	14	9.0a	13.1cd
DECIS 5.0EC	50.0 ml	BB 7	8.4ab	16.8abc
DECIS 5.0EC	50.0 ml	BB 14	7.4ab	14.8abc
DECIS 5.0Fl	100.0 ml	7	7.4ab	15.8abc
DECIS 5.0Fl	100.0 ml	14	6.5b	14.0bc
DECIS 5.0Fl	50.0 ml	BB 7	7.9ab	15.8abc
DECIS 5.0Fl	50.0 ml	BB 14	7.4ab	15.8abc
NTN33893 2.5G;	40.0 gm pr/100m;			
GUTHION 240SC;	1.75;	single(14)		
NTN33893 240SC	104.0 ml	single(14)	7.9ab	15.8abc
Control			4.6c	10.9d

* means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test).
** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged 10, complete control
BB back to back - 3 days apart

#063

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **POTATO INSECT CONTROL USING NTN33893 AND GUTHION INSECTICIDES**

MATERIALS: NTN-33893 2.5G, 240FS (experimental), GUTHION 240SC, 360Fl (azinphos-methyl), THIMET 15G (phorate)

METHODS: Potatoes were planted in two row plots, 6m in length with rows s 1m apart, replicated 4 times in a randomized complete block design. Pota seed pieces were planted with a commercial planter on May 12. The granul insecticides were applied by hand in furrow, while the foliar insecticide applied on June 16, 30, July 11 and 21 using a back pack airblast sprayer Assessments were taken by counting Colorado potato beetle larvae prior to spraying 1, 3, 7 days after spraying. Foliage was rated for flea beetle - number of holes per plot on June 19, CPB and leafhopper damage on July and yield on Aug. 12.

RESULTS: As presented in the tables below.

CONCLUSIONS: The granular insecticides NTN33893 2.5G and THIMET 15G provi both early and late season control of CPB and leafhoppers. THIMET 15G wa effective in controlling CPB, noticed especially on July 20 for both coun visual ratings compared to NTN, however, THIMET 15G was just as effective controlling mid to late season leafhoppers. There were fewer insects att the highest rate of NTN33893 2.5G but this difference could not be separa out statistically. Granular insecticides provided greater flea beetle co than a single foliar application applied on June 16 and rated 3 days late NTN33893 240FS and GUTHION 240SC proved to be as good or slightly better GUTHION 360 Fl in controlling CPB.

Table 1.

Treatments	Rate gm pr/100m	CPB Larval Counts - June 16 0	1	7	Days After Spra June 21 0	3
NTN33893 2.5G	40.0	1.3c*	1.0c	1.3b	65.0ab	49.1a
NTN33893 2.5G	80.0	1.5c	1.0c	0.0b	30.0bcd	24.1ab
NTN33893 2.5G	120.0	0.3c	1.0c	0.0b	23.8cd	34.5a
NTN33893 240FS	104.0 ml	27.5ab	20.0ab	0.0b	1.3d	2.5c
NTN33893 240FS	208.0 ml	17.5bc	22.5ab	0.0b	0.0d	3.5bc
GUTHION 240SC	1.75 L	22.5ab	25.0ab	2.5b	8.8cd	2.3c
GUTHION 360Fl	1.17 L	22.5ab	12.5bc	0.0b	45.0bc	24.1ab
THIMET 15G	224.0	1.3c	1.0c	0.0b	87.5a	70.0a
Control		36.3a	27.5ab	82.5a	41.5bc	98.8a

Table 2.

Treatments	Rate gm pr/100m	Foliar Beetle Damage Counts (holes) June 19	Foliar Damage Ratings (0-10)** CPB July 20	Leafhoppers July 20	Yiel kg/6 plo Aug.
NTN33893 2.5G	40.0	4.3d	6.5a	6.1a	14.0a
NTN33893 2.5G	80.0	6.8cd	7.4a	6.5a	11.6a
NTN33893 2.5G	120.0	1.8d	9.0a	8.4a	14.8a
NTN33893 240FS	104.0 ml	12.8bc	9.0a	7.9a	12.3a
NTN33893 240FS	208.0 ml	14.3ab	9.0a	7.4a	14.0a
GUTHION 240SC	1.75 L	16.3ab	9.0a	6.9a	13.1a
GUTHION 360Fl	1.17 L	11.0bc	6.9a	6.9a	14.0a
THIMET 15G	224.0	2.3d	4.6b	7.4a	11.6a
Control		20.5a	3.5b	3.2b	6.9b

* means followed by the same letter are not significantly different (P<0 Duncan's Multiple Range Test).

** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged 10, complete control

#064

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **SIGNIFICANCE OF ALKALINE HYDROLYSIS USING SELECTED INSECTICIDES FOR THE CONTROL OF CPB IN POTATOES**

MATERIALS: AMBUSH 500 (permethrin), LI700 (pH adjuster),
M-ONE (*Bacillus thuringiensis* var. *san diego*)

METHODS: Potatoes were planted in single row plots, 6m in length with rov spaced 1m apart, replicated 4 times in a randomized complete block desigr Potato seed pieces were planted with a commercial planter on May 13. Spr applications were made using a back pack airblast sprayer using 240 L/ha water. Treatments were applied on June 17, 30, July 11 and 21. Water sc were obtained from RCAT, town well water with a pH of 7.4 and from a farm outside of Dresden with a pH of 8.2. LI700 was added to RCAT water as a check. Assessments were taken by counting Colorado potato beetles (CPB), rating foliage damage caused by CPB and leafhoppers, an overall foliage r and yield.

RESULTS: As presented in the tables below.

CONCLUSIONS: There were no consistantly significant differences between t two sources of water with or without the pH adjuster LI700 for the contr(Colorado potato beetles or leafhoppers in potatoes. In general M-ONE rat higher in CPB control than AMBUSH 500, while AMBUSH 500 provided a higher level of leafhopper control than M-ONE. LI700 when used alone had no eff on CPB populations while it appeared to reduce the damage caused by leafhoppers. A study of even the numerical difference in the water sourc between comparible insecticide rates with and without LI700 indicated no consistant differences. When examing LI700, however, it appears that wher added to AMBUSH 500 it improved insect control and yields when RCAT water used while the opposite was true for M-ONE. Whenever LI700 was added it improved the activity whenever Dresden's water was used (see Treatment 3 6 for AMBUSH 500 and 9 vs. 12 for M-ONE).

Table 1.

Treatments	Rate ml pr/ha	Water Source	CPB Larval Counts - Days After June 30 Spray 0	2	6	
AMBUSH 500	150.0	Dresden	99.0a-d*	67.8bcd	93.4cde	2
AMBUSH 500	75.0	Dresden	157.5ab	124.9a-d	222.9abc	29
AMBUSH 500 +	75.0					
LI700	0.25%	Dresden	132.4abc	198.5ab	210.3abc	28
AMBUSH 500	150.0	RCAT	93.4bcd	38.8d	187.4a-d	22
AMBUSH 500	75.0	RCAT	140.3abc	176.8abc	236.1abc	25
AMBUSH 500 +	75.0					
LI700	0.25%	RCAT	148.6abc	104.9a-d	198.5abc	14
M-ONE	9.0 L	Dresden	34.5c	36.6d	55.2e	9
M-ONE	4.5 L	Dresden	58.6cde	52.1cd	111.2b-e	23
M-ONE +	4.5 L					
LI700	0.25%	Dresden	46.3de	78.4a-d	93.4cde	6
M-ONE	9.0 L	RCAT	27.2e	3.5e	43.7e	8
M-ONE	4.5 L	RCAT	58.2cde	10.9e	74.0de	17
M-ONE +	4.5 L					
LI700	0.25%	RCAT	49.1de	55.2bcd	157.5a-d	9
LI700	0.25%	Dresden	210.3ab	265.1a	280.8ab	26
Control			250.2a	280.8a	374.8a	29

Table 2.

			Foliar Damage Ratings (0-10)**			Y
Treatments	Rate ml pr/ha	Water Source	CPB July 20	Leafhopper July 20	Overall Aug. 4	kg/ Aug
AMBUSH 500	150.0	Dresden	6.9ab	8.4a	7.4ab	10.
AMBUSH 500	75.0	Dresden	5.3bcd	9.0a	7.9a	10.
AMBUSH 500 +	75.0					
LI700	0.25%	Dresden	4.0cde	7.4ab	6.9ab	9.
AMBUSH 500	150.0	RCAT	5.7bc	8.4a	7.9a	9.
AMBUSH 500	75.0	RCAT	5.3bcd	8.4a	6.9ab	9.
AMBUSH 500 +	75.0					
LI700	0.25%	RCAT	7.4ab	7.9a	7.9a	11.
M-ONE	9.0 L	Dresden	9.0a	6.9abc	7.9a	10.
M-ONE	4.5 L	Dresden	7.4ab	6.9abc	6.5b	9.
M-ONE +	4.5 L					
LI700	0.25%	Dresden	6.9ab	5.3b-e	6.9ab	10.
M-ONE	9.0 L	RCAT	9.0a	4.6de	6.5b	9.
M-ONE	4.5 L	RCAT	6.5ab	5.3b-e	6.5b	9.
M-ONE +	4.5 L					
LI700	0.25%	RCAT	7.4ab	4.0e	6.5b	6.
LI700	0.25%	Dresden	3.7de	6.5a-d	5.3c	8.
Control			3.5e	5.0cde	3.7d	6.

* means followed by the same letter are not significantly different (P<(
Duncan's Multiple Range Test).

** Foliar Damage Ratings (0-10) - 0, no control, foliage severely damagec
complete control

#065

ICAR: 61006535

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say),
Potato Leafhopper, *Empoasca fabae* (Harris)

NAME AND AGENCY:
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TITLE: **THE USE OF PACLOBUTRAZOL AS A POTATO SEED PIECE DIP FOR THE CONTRO COLORADO POTATO BEETLES**

MATERIALS: paclobutrazol, THIODAN 4EC (endosulfan)

METHODS: Potatoes were planted in single row plots, 6m in length with row spaced 1m apart, replicated 4 times in a randomized complete block desigr portion of the potato seed pieces were washed, then dipped into 5% acetor solutions of 3 different rates of paclobutrazol for 1 minute. The seed p were allowed to air dry then planted with a commercial planter on May 13. one treatment not dipped into paclobutrazol was sprayed on June 16, 30, J 10 and 22 using a back pack airblast sprayer using 240 L/ha of water. Assessments were taken by counting Colorado potato beetle larvae, taking visual ratings of foliage growth and damage caused by foliar potato insec and yield.

RESULTS: As presented in the tables below.

CONCLUSIONS: Paclobutrazol caused severe potato foliage stunting, especia at the higher rates. There were no loss in plants, however, the plants w short, dark green and slow growing. Paclobutrazol did not significantly control Colorado potato beetles. Yields were significantly reduced at th rates of paclobutrazol used in this trial.

Table 1. Foliar Damage

Treatment	Rate L pr/100L	Phytotoxicity Ratings (0-10)*** June 23	Ratings CPB Counts July 6	(0-10)**** CPB July 21	Y k p A
paclobutrazol	0.1	7.5b*	482.5a	4.3b	7
paclobutrazol	0.25	5.3c	445.0a	3.0c	7
paclobutrazol	0.5	3.0d	302.5b	2.3c	6
THIODAN 4EC	1.4**	8.5a	112.5c	8.3a	12
Control		8.3a	412.5ab	4.8b	6

* means followed by the same letter are not significantly different (F Duncan's Multiple Range Test)
** L pr/ha
*** Phytotoxicity Ratings - 0, severely damaged; 10, no foliage injury
**** Foliar Damage Ratings - 0, no control, foliage severely damaged; 10, complete control.

#066

STUDY DATA BASE: 280-1213-9110

CROP: Potato, cv. Conestoga

PEST: Colorado potato beetle, (CPB) *Leptinotarsa decemlineata* (Say)

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TITLE: **EVALUATION OF EXPERIMENTAL TREATMENTS FOR CONTROL OF COLORADO POTA BEETLE ATTACKING POTATOES IN MINERAL SOIL**

MATERIALS: TRIGARD 75WP (cyromazine);
M-TRAK 10AF (10% encapsulated delta endotoxin, *Bacillus thuringiensis* var. *san diego*);
CULTAR 250 g AI/L SC (paclobutrazol);
AC 303,630 360 g AI/L FW

METHODS: Seed potatoes were treated with CULTAR on 11 May by immersing fo sec in 10% (v/v) acetone:water; treated potatoes were blotted dry and hel room temperature until planting. All treatments were established in Lonc 13 May in single-row microplots (2.25 x 0.9 m) filled with insecticide residue-free mineral soil; all treatments were replicated 3x in a randomi complete block design. On 10 June, 5 plants, selected at random in each microplot, were flagged. All foliar treatments were applied on 15, 18, 2 June at 220 kPa in 900 L water/ha using a single- nozzled (D-4 orifice di #25 swirl plate) Oxford precision sprayer. CPB life stages were counted flagged plants in all plots just prior to and 4-5 days after all treatmen Feeding damage to foliage was assessed visually on 17 June, 07, 13 July August. Potatoes were dug on 18 August. Tubers were graded, counted anc weighed and marketable yields calculated.

RESULTS: See table below.

CONCLUSIONS: Under 1992 weather conditions, all foliar treatments reducec foliage damage and populations of large CPB larvae, resulting in signific increased potato yields relative to CONTROL plots. TRIGARD, applied 4x t potatoes, appeared to give slightly better protection of foliage than oth foliar treatments. At the tested rate, CULTAR, applied as a seed treatme affected neither CPB populations nor potato yields.

RESIDUES: Samples of both potatoes and soil for measurement of pesticide residues were collected from microplots for Tmt. #2. Analyses are incomp

#	Insecti- cide(s)	Rate (pdct/ha)	Mean # CPB Larvae/Plant* 22/06	29/06	03/07	Foliar Damage** 13/07	04/08	Yi (t
1	TRIGARD	187.5 g	0.0 a***	0.7 b	1.0 b	9.5 a	3.1 ab	30
2	TRIGARD	375.0 g	0.3 a	0.2 b	0.1 b	9.8 a	5.7 a	35
3	TRIGARD + M-TRAK	187.5 g + 3.75 L	0.1 a	0.3 b	0.1 b	9.8 a	3.0 ab	32
4	M-TRAK	3.75 L	0.0 a	0.0 b	0.1 b	9.7 a	2.3 ab	33
5	AC 303,630	0.35 L	0.1 a	0.0 b	0.0 b	9.8 a	3.7 ab	33
6	CULTAR	****	4.1 ab	27.1 a	57.6 a	2.9 b	0.3 b	18
7	CONTROL	---	8.8 b	20.0 a	63.5 a	0.8 b	0.0 b	14

* large (3rd + 4th instar) larvae;
** rating scale (0-10): 0 = no control, plants defoliated, 10 = complet control, no CPB damage;
*** means within a column followed by the same letter are not significantly different (P = 0.05) as determined by Duncan's New Mul Range Test;
**** 0.25 ppm ai applied as a dip treatment to seed potatoes.

#067

STUDY DATA BASE: 280-1213-9110

CROP: Potato, cv. Conestoga

PEST: Colorado potato beetle, (CPB)
Leptinotarsa decemlineata (Say)

NAME AND AGENCY:
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TITLE: **EVALUATION OF GRANULAR INSECTICIDES FOR CONTROL OF COLORADO POTATO BEETLE ATTACKING POTATOES IN MINERAL SOIL**

MATERIALS: NTN-33893 2.5G (imidacloprid); THIMET 15G (phorate)

METHODS: Potatoes were planted in London on 13 May in single-row microplo (2.25 x 0.9 m) filled with insecticide residue-free mineral soil; all treatments were replicated 3x in a randomized complete block design. Gra insecticides were hand-applied with a modified salt shaker in a 5 cm banc the bottom of the furrow below seed potatoes. Feeding damage to foliage assessed visually on 17 June, 07, 13 July & 04 August. Potatoes were dug August. Tubers were graded, counted and weighed and marketable yields calculated.

RESULTS: See table below.

CONCLUSIONS: All rates of NTN-33893 maintained excellent protection of po foliage until mid- July, resulting in significant yield increases relativ CONTROL plots. Late in the season, foliage damage was inversely related 33893 application rate; foliage in plots treated with highest rates of th insecticide showed least damage. Repeat application of NTN-33893 to the soil had no significant effect on either foliage damage or potato yield i 1992. Although THIMET provided a good measure of protection of potato fo this insecticide was not nearly as effective as NTN-33893.

#	Treatment	Rate (g AI/100 m)	Foliar Damage Rating* 17/06	07/07	13/07	04/08	Yiel (t/h
1	NTN-33893 2.5G	3.0	10.0 a**	10.0 a	9.9 a	8.9 a	32.5
2	NTN-33893 2.5G	3.0***	10.0 a	10.0 a	9.9 a	7.4 a	31.8
3	NTN-33893 2.5G	1.0	10.0 a	10.0 a	9.7 a	3.2 b	29.5
4	NTN-33893 2.5G	0.5	10.0 a	9.8 a	9.5 a	1.1 bc	29.0
5	THIMET 15G	26.3	9.9 a	8.5 b	7.6 b	0.1 bc	21.0
6	CONTROL	----	9.9 a	6.5 c	0.8 c	0.0 c	14.1

* rating scale (0-10) 0 = no control, plants defoliated,
10 = complete control, no CPB damage;

** means within a column followed by the same letter are not significant different (P = 0.05) as determined by Duncan's New Multiple Range Tes

*** NTN33893 applied to same soil at same rate in 1991

RESIDUES: Samples of soil and potatoes for measurement of pesticide resic were collected from microplots for Treatments #1, #2, and #6. Analyses a incomplete. No residues were detected in potatoes grown in 1991 in soil treated with imidachloprid (detection limit 0.04 ppm) at 3.0 g AI/100 m.

#068

CROP: Potato cv. Superior

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
WRIGHT, K.H. and CODE, B.P.
Ciba-Geigy Canada Ltd., 1200 Franklin Blvd.
Cambridge, Ontario N1R 6T5
Tel: (519) 623-7600 Fax: (519) 623-9451

TITLE: **EVALUATION OF TRIGARD 75WP FOR THE CONTROL OF COLORADO POTATO BEE**

MATERIALS: TRIGARD 75WP (cyromazine),
RIPCORD 400EC (cypermethrin),
M-ONE (*B. thuringiensis*)

METHODS: The test site was located near Greensville, Ontario in a field w history of intense Colorado Potato Beetle (CPB) infestations. Potato see pieces were planted on June 4, 1992 into rows spaced 91cm apart, with a p spacing of 30cm. Plots were 6m long and 3 rows wide with an additional b row between each plot. Each treatment was replicated 4 times in a comple randomized block design. Treatment applications were made on the followi dates (application #): July 8 (1), July 15 (2), July 22 (3), and August 5 Consult the results table for the actual application dates for each treatment, since the schedules varied among the treatments. All treatmen were applied using a CO_2-pressurized 3m hand boom sprayer with XR11002VS fan tips delivering 400 L/ha at 345 kPa. Evaluation data were collected July 7, 14, 21 and August 4, 12. On each date, the total numbers of CPB masses, 1st, 2nd, 3rd, 4th instar larvae, and adults counted in the full length (6m) of the centre row of each plot were recorded. Percent defoli due to CPB feeding was visually assessed on August 4 and 12.

RESULTS: As presented in the table below.

CONCLUSIONS: TRIGARD 75WP effectively controlled Colorado potato beetles apparently by inhibiting the future development of early instar larvae, t significantly reducing the number of large larvae after one application. After two applications, inhibition of the initial development of early in larvae was also evident. The higher rate of TRIGARD showed improved cont with significantly less defoliation. RIPCORD provided excellent early co of all stages of CPB. M-ONE provided good early control, however, this co weakened over time. Severe defoliation on August 12 was the result of a large adult population.

TREATMENT	RATE kg AI/ha	APPLICATION #	CPB LARVAL COUNTS 14/07 SL**	LL***	21/07 SL	LL	% DEFOLIAT 04/08
CHECK	--	--	74.3bc*	17.8b	118.0d	77.8b	81.8d
TRIGARD	0.14	1,2,4	95.5cd	11.8ab	43.0bc	17.3b	28.8bc
TRIGARD	0.28	1,2,4	82.0c	5.3ab	38.3bc	5.8a	11.0ab
TRIGARD	0.14	1,2,3,4	158.8e	12.8ab	36.8bc	20.5a	27.0bc
TRIGARD	0.28; 0.14	1,4; 2,3	142.8de	2.0a	23.0ab	10.0a	22.0abc
RIPCORD	0.035	1,2,3,4	3.3a	1.8a	4.0a	6.8a	2.8a
M-ONE	7.5 L/ha	1,2,4	26.5ab	5.5ab	57.3c	25.8a	40.0c

* Means within a column followed by the same letter are not significant different (P=0.05, Duncan's Multiple Range Test).
** SL= Small Larvae (1st + 2nd instars)
*** LL= Large Larvae (3rd + 4th instars)

#069

CROP: Potato cv. Cheiftain

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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Ciba-Geigy Canada Ltd., 1200 Franklin Blvd.
Cambridge, Ontario N1R 6T5
Tel: (519) 623-7600 Fax: (519) 623-9451

TITLE: **EVALUATION OF TRIGARD 75WP FOR THE CONTROL OF COLORADO POTATO BEET**

MATERIALS: TRIGARD 75WP (cyromazine),
RIPCORD 400EC (cypermethrin),
M-ONE (*B. thuringiensis*)

METHODS: The test site was located near Plattsville, Ontario. Potato see pieces were planted on June 3, 1992 into rows spaced 1m apart, with a pla spacing of 30cm. Plots were 6m long and 3 rows wide with an additional b row between each plot. Each treatment was replicated 4 times in a comple randomized block design. Treatment applications were made on the followi dates (application #): July 16 (1), July 24 (2), August 6 (3), and August (4). Consult the results table for the actual application dates for each treatment, since the schedules varied among the treatments. All treatmen were applied using a CO_2-pressurized 3m hand boom sprayer with XR11002VS fan tips delivering 400 L/ha at 345 kPa. Evaluation data were collected July 15, 22 and August 5, 12, 19. On each date, the total numbers of CPB masses, 1st, 2nd, 3rd, 4th instar larvae, and adults counted in the full length (6m) of the centre row of each plot were recorded. Percent defoli due to CPB feeding was visually assessed on August 12 and 19.

RESULTS: As presented in the table below.

CONCLUSIONS: Despite a light and variable pest infestation, TRIGARD 75WP displayed effective control of Colorado potato beetle. After one applica of TRIGARD at either rate, the development of small larvae to 3rd and 4th instars was inhibited. However, two applications were required for lasti control, especially at the lower rate. Those treatments receiving more t two applications did not show a similar rate response. RIPCORD provided excellent season-long control of CPB. Control by M-ONE weakened over tim Defoliation ratings were insignificant as a result of the low pest popula

TREATMENT	RATE kg AI/ha	APPLICATION #	CPB LARVAL COUNTS 22/07 SL**	22/07 LL***	05/08 SL	05/08 LL	12/08 SL
CHECK	--	--	14.0a*	4.8b	8.0ab	25.5b	3.5a
TRIGARD	0.14	1,3	13.8a	1.0ab	6.0ab	22.8b	1.0a
TRIGARD	0.28	1,3	19.5a	2.0ab	13.3b	13.5ab	0.3a
TRIGARD	0.14	1,2,3,4	43.5a	0.5ab	6.3ab	1.5a	0.0a
TRIGARD	0.28;	1,3;					
	0.14	2,4	14.8a	2.0ab	4.8ab	9.5ab	6.8a
RIPCORD	0.035	1,2,3,4	12.8a	0.0a	0.8a	3.5a	0.3a
M-ONE	7.5 L/ha	1,3	21.8a	1.0ab	4.5ab	18.3ab	2.3a

* Means within a column followed by the same letter are not significar different (P=0.05, Duncan's Multiple Range Test).
** SL= Small Larvae (1st + 2nd instars)
*** LL= Large Larvae (3rd + 4th instars)

#070

STUDY DATA BASE: 303-1452-8702

CROP: Potato cv. Russet Burbank

PEST: European corn borer (ECB), *Ostrinia nubilalis* (Hubner)

NAME AND AGENCY:
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TITLE: **MANAGEMENT OF THE EUROPEAN CORN BORER IN POTATOES, 1992**

MATERIALS: CYMBUSH 250 EC (cypermethrin), DECIS 2.5 EC (deltamethrin)
JAVELIN WG (*Bacillus thuringiensis* var. *kustaki*)

METHODS: Seed pieces were planted in mid-May 1992 at Tryon, P.E.I. Plots spaced at about 0.4 m within a row and at 0.9 m between rows. Plots, measuring 12.2 m in length and 11.7 m in width, were arranged in a randon complete block design with five treatments, each replicated four times ir total. Each week from July 2 until September 22, 20 stalks per plot were destructively sampled and the number of egg masses, larvae, and ECB-induc holes were counted. Insecticides were applied using a back-pack sprayer delivered about 300 L/ha of spray mixture at a pressure of 240 kPa. JAVE was applied weekly from July 17 until September 3. CYMBUSH and both rate DECIS were applied on July 31, and August 9, 13, and 24. Analyses of vari were performed on the data and the Least Square difference (LSD) were calculated.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: All three insecticides reduced the number of larvae and ECB-induced holes per plot relative to the not-treated control. The lack difference in the efficacy of the two rates of DECIS indicate that there advantage to using the higher rate for the management of the ECB in potat No phytotoxicity was observed in any of the plots.

			MEAN NUMBER ECB/20 STALKS				
TREATMENT	RATE G AI/	EGG MASSES	LARVAE			HOLES	
		JUL. 30	AUG.20	SEPT.10	SEPT.20	SEPT.10	SE
Check	-	0.8	0.5	10.3	10.3	10.8	1
CYMBUSH	35.0	0.3	0.3	0.0	0.0	0.0	
DECIS	7.5	0.3	0.0	0.0	0.0	0.0	
DECIS	12.5	0.5	0.0	0.0	0.0	0.0	
JAVELIN	64.5	0.8	0.0	0.8	1.3	1.3	
LSD (P=0.05)		NS	NS	2.6	3.4	3.0	

JAVELIN was applied at Billion International units per ha.

#071

STUDY DATA BASE: 206003

CROP: Radish, cv. Daiko (Japanese variety), Lo Bok (Chinese variety), Cha

PEST: Cabbage maggot, *Delia radicum* (L.)

NAME AND AGENCY:
McDONALD, Mary Ruth and FENIK,
Dennis Muck Research Station, H.R.I.O., R. R. # 1, Kettleby, Ontario L0G
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TITLE: **EVALUATION OF LORSBAN 4E FOR CABBAGE MAGGOT CONTROL ON DIRECT SEEI RADISHES**

MATERIALS: LORSBAN 4E (chlorpyrifos)

METHODS: On June 27, 1992, radish cultivars Lo Bok, Daiko, and Champion w seeded in organic soil at the Muck Research Station. Treatments of LORSB were applied on July 13, 1992. The treatments were 105 ml LORSBAN 4E/1,0 H_20/1,000 m row; 210 ml LORSBAN 4E/1,000 L H_20/1,000 m row and an untreat check per cultivar. Each plot consisted of 2 rows, 5 m in length. Plots replicated 3 times in a randomized block design. Champion was harvested o August 4, Lo Bok and Daiko were harvested on August 17. Evaluation of ma damage was done on the day of harvest on radishes in 1 m of row per repli

CONCLUSIONS: Application of LORSBAN 4E did not significantly control cabb maggot damage on the globe radish cultivar Champion compared to the untre check. The LORSBAN 4E drenches on the two ethnic cultivars (Lo Bok, Daik did significantly reduce the percent damage compared to the untreated che There was no significant difference between the two application rates of LORSBAN 4E at 105 ml and 210 ml/1,000 ml H_20/1,000 m of row respectively.

Variety	Treatment	ml product/ 1,000 L water	Percent Damage
Champion	LORSBAN 4E	105	41.1 a*
	LORSBAN 4E	210	40.0 a
	Check	-	32.0 a
Daiko	LORSBAN 4E	105	26.3 b
	LORSBAN 4E	210	17.3 b
	Check	-	49.7 a
Lo Bok	LORSBAN 4E	105	20.0 b
	LORSBAN 4E	210	14.0 b
	Check	-	55.0 a

* Data was transformed using an Arcsin transformation.
Numbers in a column followed by the same letter are not significantly different at P = 0.05 level, Protected L.S.D Test.

#072

ICAR: 86000421

CROP: Rutabaga cv. Laurentian

PEST: Cabbage maggot, *Delia radicum* (L.)

NAME AND AGENCY:
BROLLEY, W.B. and LAMBREGTS, J.
Centralia College of Agricultural Technology, Huron Park, Ontario, N0M 1Y
Tel: (519) 228-6691 Fax: 519-228-6491

TITLE: **EVALUATION OF VARIOUS INSECTICIDES FOR CABBAGE MAGGOT CONTROL**

MATERIALS: BIRLANE 40 EC (chlorfenvinfos), GUTHION 240 SC (azinphos-methy

GUTHION 50 WP (azinphos-methyl), FORCE 50 EC (tefluthrin)

METHODS: Rutabagas were seeded into a clay loam soil on May 27, 1992 in r 0.76 m apart at Huron Park, Ontario. Each plot, consisting of 8 rows x 1 were separated from adjacent plots by a single unsprayed row. The experi was replicated 4 times in a randomized complete block design. Upon emerge each row was thinned back to 1 rutabaga plant every 14 cm apart within th row. The insecticide drench treatments were applied July 8 in a 15 cm ba over top of the row using a 4 row tractor mounted CO_2 sprayer at 1250 L/h using D7-56 disc-core type nozzles at 200 kPa. The crop was harvested Au 25 prior to the onset of the 3rd generation cabbage maggot flies. Thirty roots harvested from the centre of each plot were weighed and rated for m damage using the 0 to 4 scale developed by King & Forbes, (1954.J. Econ. Entomol. 47:607-615).

RESULTS: As presented in the table below.

CONCLUSIONS: None of the treatments significantly affected total rutabaga yield (data not presented) however all treatments provided significant ca maggot control compared to the unsprayed control (post spray rating). Th rate of FORCE 50 EC did not provide as good of maggot control as did the treatments.

		Damage Index	
Treatment July 8	Rate g/100 m row	Prespray Rating July 6	Post Spray Ratir Aug. 25
BIRLANE 40 EC	12.8	1.6 A*	8.4 C
GUTHION 240 SC	22.8	0.0 A	17.3 C
GUTHION 50 WP	18.8	0.7 A	18.6 C
FORCE 50 EC	2.0	0.2 A	36.1 B
FORCE 50 EC	2.5	0.0 A	19.4 C
CONTROL		0.8 A	71.9 A

* means followed by the same letter are not significant ($P<0.05$, Duncan's multiple range test).

#073

CULTURE: Rutabaga cv. Laurentian

RAVAGEURS: Mouche du chou, *Delia radicum* (L.)

NOM ET ORGANISME: MALTAIS, P., NUCKLE, J.R. Département de biologie, Université de Moncton, Moncton, NB, E1A 3E9 Tel: (506) 858-4328 Fax: (5 858-4541

LEBLANC, P.V. Ferme Expérimentale Sénateur Hervé J. Michaud, Agriculture Canada Bouctouche, NB, E0A 1G0 Tel: (506) 743-2464 Fax: (506) 743-8316

TITRE: CONTROLE DE LA MOUCHE DU CHOU CHEZ LE RUTABAGA

PRODUITS: LORSBAN 15G et LORSBAN 50W (chlorpyrifos)

METHODES: L'étude fut réalisée selon un plan à blocs complets aléatoires contenant 16 parcelles répétées 4 fois. Chaque parcelle comptait 4 rangs 5,25 m de long espaces de 1 m. Les rutabagas furent transplantés les 3 e juin 1992 à raison de 35 plants/rang espacés de 15 cm. Une application d'herbicide trifluralin (TREFLAN 545 EC, 2,0 L/ha) fut effectuée le 19 ma avec un pulvérisateur monté sur tracteur à une pression de 1,7 kPa. Les traitements comprenaient:

A) LORSBAN 15G ajouté au terreau, en serre, avant la mise en terre des gr aux doses équivalentes à 1) 0,3 Kg/km; 2) 0,6 Kg/km; 3) 1,0 Kg/km; 4) Kg/km de rang.

B) LORSBAN 15G appliqué en bande de 8 cm de large sur le champ lors de la transplantation aux doses équivalentes a 5) 0,3 Kg/km; 6) 0,6 Kg/km; 7 Kg/km 8) 1,5 Kg/km de rang

C) LORSBAN 50W appliqué dans les cellules de transplantation en serre aux doses équivalentes a 9) 1,125 Kg/ha; 10) 2,25 Kg/ha; 11) 1,125 Kg/ha s 4 semaines plus tard en champ d'un arrosage copieux d'une dose équivalent 2,25 Kg/ha; 12) 2,25 Kg/ha suivi 4 semaines plus tard en champ d'un arro copieux d'une dose équivalente a 2,25 Kg/ha.

D) LORSBAN 50W appliqué sous forme d'arrosage copieux en champ au moment transplantation à des doses équivalentes a 13) 2,25 Kg/ha; 14) 2,25 Kg/ suivi 4 semaines plus tard d'un arrosage de même dose; 15) 2,25 Kg/ha su de deux autres arrosages de même doses à 4 semaines d'intervalle et; 16) parcelle témoin sans insecticide.

L'insecticide granulaire fut pesé avant d'être mélange au terreau en serr alors que les arrosages copieux furent appliqués a l'aide d'un pulvérisat main avec réservoir monté sur tracteur à une pression de 4,25 kPa. Le dépistage de la mouche du chou sur 5 plants choisis au hasard dans les 2 du centre de chaque parcelle fut effectué à toutes les 2 semaines pour un total de 4 dépistages. La récolte se fit le 12 aoét. Le poids, le diamè et la qualité commerciale de 10 rutabagas choisis au hasard dans les rang centre de chaque parcelle furent enregistrés. Les dommages furent évalué selon l'échelle 0-4 ou 0 = sans dommage, 1 = dommages légers, 2 = dommage modérés et 4 = dommages sérieux. Les rutabagas avec un indice égal ou supérieur à 1 étaient considérés non-commercialisables. Une analyse de variance fut effectuée sur les données.

RESULTATS: Voir tableau ci-dessous.

Traitements	Poids (g)	Diamètre (cm)	Qualité** (%)
LORSBAN 15G. Terreau			
0,3 Kg/km	920.6	12.5abc*	35.0de
0,6 Kg/km	987.1	13.0a	35.0de
1,0 Kg/km	927.4	12.8ab	32.5de
1,5 Kg/km	967.5	12.6abc	2.5dec
LORSBAN 15G. Champ			
0,3 Kg/km	877.1	12.1bc	42.5de
0,6 Kg/km	913.9	12.4abc	32.5de
1,0 Kg/km	923.1	12.9ab	42.5de
1,5 Kg/km	769.4	11.8c	45.0de
LORSBAN 50W. Cellule (T) et Champ (C)			
1,125 Kg/ha (T)	873.2	12.1bc	82.5abc
2,25 Kg/ha (T)	914.1	12.5abc	90.0ab
1,125 Kg/ha (T) 2,25 Kg/ha (C)	934.1	12.5abc	82.5abc
2,25 Kg/ha (T) 2,25 Kg/ha (C)	911.1	12.3abc	95.0a
LORSBAN 50W. - Arrosage copieux			
1 x 2,25 Kg/ha	1000.3	12.8ab	60.0cde
2 x 2,25 Kg/ha	908.1	12.6abc	65.0bcd
3 x 2,25 Kg/ha	949.3	12.4abc	87.5abc
Temoin	865.4	12.3abc	30.0e

* Les valeurs suivies de la même lettre ne sont pas significativement différentes au seuil 5% (Duncan's Multiple Range Test).
** Transformation arcsin (square root x) des données avant le test.

CONCLUSIONS: Les traitements au LORSBAN 50W 2,25 Kg/ha appliqué directeme aux cellules de transplantation ont donné les meilleures qualités commerc observées. L'efficacité du produit semble s'améliorer par l'addition d'arrosage copieux en champ 4 semaines plus tard. Si le produit est appl directement au champ sous forme d'arrosage copieux il faut au minimum 2 a arrosages pour obtenir une qualité commerciale comparable à ce qui peut é obtenue avec le traitement direct du terreau. Il est à noter qu'aucun de traitements n'a réussi à protéger les plants a 100%.

#074

STUDY DATA BASE: 61006538

CROP: Soybean cv. S2020

PEST: Seed corn maggot, *Delia platura* (Meigen)

NAME AND AGENCY:
SCHAAFSMA, A.W.
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TITLE: **SAFETY OF SEED TREATMENTS WITH INSECTICIDES IN COMBINATION WITH FUNGICIDES TO SOYBEANS PLANTED IN COLD SOIL**

MATERIALS: VITAFLO 280F (carbathiin plus thiram),
ANCHOR F (carbathiin plus thiram),
AGROX DL PLUS (diazinon, lindane plus captan),
AGROX B-3 (diazinon, lindane plus captan).

METHODS: Soybean seed was taken out of storage in February. From the sam of seed, 1 kg lots of seed were selected and assigned to a treatment date indicated in Table 1, below. Each 1 kg lot of seed was treated using a c top treater supplied by UNIROYAL CHEMICAL. VITAFLO was applied at 2.6 ml seed, ANCHOR at 6.0 ml/kg seed, AGROX DL PLUS at 2.2 g/kg seed, and AGROX at 3.2 g/kg seed. Treated seed was then stored in a cloth seed bag at ro temperature until planting time which was 2 May. Plots were single rows in length spaced 0.65 m apart, planted by hand at 100 seeds per plot. Th plots were arranged in a 6 X 6 factorial placed in a randomized complete design with 4 replicates. Emergence was evaluated on May 28, when the majority of beans were unifoliates.

RESULTS: There was a main effect due to treatment but not treatment date. There was no interaction between treatment date and treatment (tested at % level, Factorial ANOVA). Results are presented in Table 1, below. The month of May was cool and wet, presenting adverse emergence conditions. T were no visible differences in symptoms between treatments, so measuremen were not taken.

CONCLUSIONS: There was no evidence of phytotoxicity when soybean seed was pre-treated with fungicide in combination with insecticide seed treatment to 12 weeks before seeding and planted under adverse conditions.

Table 1. Summary of main effects for safety of fungicide and insecticide treatments applied in advance of planting to soybean emergence under cool conditions at Ridgetown, Ontario, 1992.

Seed	Mean % Emergence	Treatment Date	Mean Trea % Emerger
VITAFLO 280 plus AGROX B-3	68.1 a*	21 Feb	63.3
VITAFLO 280 plus AGROX DL PLUS	67.1 a	28 Feb	65.2
ANCHOR plus AGROX B-3	67.3 a	13 March	65.6
ANCHOR plus AGROX DL PLUS	68.2 a	27 March	66.1
ROLLED CHECK	59.8 b	10 April	65.6
NON-ROLLED CHECK	59.0 b	1 May	63.6
CV % (over all) = 13.5			

* Means followed by the same or no letter are not significantly different (P<0.05, PDIFF option of LSMEANS in PROC GLM of SAS STAT).

#075

STUDY DATA BASE: 61006538

CROP: Soybean cv. S2020

PEST: Seed corn maggot, *Delia platura* (Meigen)

NAME AND AGENCY:
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TITLE: **SAFETY OF SEED TREATMENTS WITH INSECTICIDES IN COMBINATION WITH FUNGICIDES TO SOYBEANS PLANTED IN WARM SOIL**

MATERIALS: VITAFLO 280F (carbathiin plus thiram),

ANCHOR F (carbathiin plus thiram),
AGROX DL PLUS (diazinon, lindane plus captan),
AGROX B-3 (diazinon, lindane plus captan)

METHODS: Soybean seed was taken out of storage in May. From the same lot seed, 1 kg lots of seed were treated and assigned to planting dates as indicated in Table 1, below. Each lot of seed was treated using a desk t treater supplied by UNIROYAL CHEMICAL. VITAFLO was applied at 2.6 ml/kg ANCHOR at 6.0 ml/kg seed, AGROX DL PLUS at 2.2 g/kg seed, and AGROX B-3 a g/kg seed. Treated seed was then stored in a cloth seed bag at room temperature until planting time which followed the schedule as indicated below. Plots were single rows 3 m in length spaced 0.65 m apart, plantec hand at 100 seeds per plot. The plots were arranged in a 5 X 6 factorial placed in a randomized complete block design with 4 replicates. Emergenc evaluated 2-3 weeks after planting when the majority of beans were unifoliates.

RESULTS: There was a main effect due to treatment date but not treatment. There was no interaction between treatment date and treatment (tested at 1% level, Factorial ANOVA). Results are presented in Table 1, below. Th month of May and early June was cool and wet, presenting adverse emergenc conditions. There were no visible differences in symptoms between treatm so measurements were not taken.

CONCLUSIONS: There was no evidence of phytotoxicity when soybean seed was pre-treated with fungicide in combination with insecticide seed treatment to 7 weeks before seeding and planted under adverse conditions. Reductic emergence during the earlier periods of the test could be attributed to c wet weather rather than seed treatment effects.

Table 1. Summary of main effects for safety of fungicide and insecticide treatments applied in advance of planting to soybean emergence under warm conditions at Ridgetown, Ontario, 1992.

Seed	Mean % Emergence	Planting Date	Mean Treatmer % Emergence
VITAFLO 280 plus AGROX B-3	85.5*	20 May	83.9 b
VITAFLO 280 plus AGROX DL PLUS	88.1	2 June	87.5 b
ANCHOR plus AGROX B-3	88.0	16 June	71.8 c
ANCHOR plus AGROX DL PLUS	84.1	30 June	92.8 a
ROLLED CHECK	84.8	7 July	91.8 a
NON-ROLLED CHECK	83.3		
CV % (over all) = 8.5			

* Means followed by the same or no letter are not significantly differer (P<0.05, PDIFF option of LSMEANS in PROC GLM of SAS STAT)

#076

STUDY DATA BASE: 61006538

CROP: Soybeans var. RCAT Persian

PEST: Seed corn maggot, *Delia platura* (Meigen)

NAME AND AGENCY:
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Ridgetown, Ontario N0P 2C0
Tel: (519) 674-5456 Fax: (519) 674-3504

TITLE: **INSECTICIDES FOR THE CONTROL OF SEED CORN MAGGOT IN SOYBEANS**

MATERIALS: AGROX B-3 (diazinon + lindane + captan),
AGROX DL PLUS (diazinon + lindane + captan),
FORCE ST (tefluthrin), UBI-2627,
VITAFLO 280 (carbathiin + thiram)

METHODS: The crop was planted on 25 May, 1992 at Ridgetown, Ontario on a loam soil near a manure pit, in 6 m rows spaced 0.76 m apart at 100 seeds plot, using a John Deere Max-emerge planter which was fitted with a cone seeder. Plots were single rows, arranged in a randomized complete block design with four replicates. Plots were prepared on top of winter wheat (killed with glyphosate + ammonium sulfate + Agral 90) green manure ploug in early May. Cattle manure was disced-in 4 weeks prior to planting. Plo were planted when adults were numerous (monitored by yellow sticky cards)

Seeds were treated in 200 g lots using a desk-top treater supplied by UNI CHEMICAL. Percent emergence was calculated on 9 June by counting all the plants emerged per plot at the first leaf stage and relating that to the number of seeds planted. Percent injury was calculated the following day the number of seedlings showing maggot injury over the number of seedling up in a 2 m section of row.

RESULTS: Results are presented in Table 1.

CONCLUSIONS: The standard seed treatments containing lindane and diazinon provided the best level of control which was only 60 %.Table 1. Control seed corn maggot in soybeans with seed treatment insecticides at Ridgetow Ontario in 1992.

Treatment	Rate	Percent Emergence	Percent Infestation
FORCE ST	0.4 g AI/kg	27.0 e*	49.1 b-e
AGROX B-3 STANDARD	3.2 g pr./kg	59.5 ab	35.8 de
AGROX DL PLUS STANDARD	2.2 g pr./kg	58.9 ab	44.0 cde
AGROX DL PLUS STANDARD VITAFLO 280	2.2 g pr./kg 2.6 ml pr./kg	65.0 a	32.0 e
UBI-2627	3.0 ml pr./kg	30.9 de	66.4 abc
UBI-2627	6.0 ml pr./kg	42.5 cd	47.7 cde
UBI-2627	9.0 ml pr./kg	49.0 bc	57.7 bcd
VITAFLO 280	2.6 g pr./kg	38.5 cde	44.2 cde
NON-TREATED CONTROL	TUMBLED	26.3 e	84.0 a
NON-TREATED CONTROL	NON-TUMBLED	28.7 de	72.0 ab
CV % =		14.13	18.70

* Means followed by the same letter are not significantly different at th level (New Duncan's Multiple Range Test). Data were transformed by ARCSIN(SQR(%)) before ANOVA and mean separation. Reported means were b transformed.

#077

STUDY DATA BASE: 387-1411-8717

CROP: Sugarbeet

PEST: Sugarbeet Root Maggot, *Tetanops myopaeformis* Roder

NAME AND AGENCY:
BERGEN, P. and BYERS, J.R. Alberta Sugar Company, Taber, Alberta, T0K 2G
Tel: (403) 223-3535 Fax: (403) 223-9699
and Agriculture Canada, Research Station, Lethbridge, Alberta, T1J 4B1

TITLE: **EVALUATION OF INSECTICIDE TREATMENTS FOR CONTROL OF SUGARBEET ROOT MAGGOT**

MATERIALS: 1. Four granular insecticides TEMIK 10 G (aldicarb), COUNTER 15 G (terbufos), DYFONATE 20 G (fonofos), FORCE 1.5 G (tefluthrin);
2. Three insecticides incorporated in the coating of pelleted FORCE, GAUCHO (imidacloprid), MESUROL (methiocarb).

METHODS: Plots were 7.6 m long by 6 rows wide (56-cm row spacing), at Tab Alberta. The treatments and a check were replicated 8 times in a latin square. Treatments were applied to the central 4 rows of each plot. The sugarbeets (HM 8282) were planted to stand (15-cm spacing) on May 14, 19 The granular treatments were applied onto the soil behind the V-style presswheel following seed furrows planted to uncoated seed. A light rake device attached behind each presswheel covered the insecticide with soil. pelleted seed with insecticides incorporated into the pelleting material supplied by Germian's U.K. Ltd. (Hansa Rd., King's Lynn, England, PE304L Check plots were planted to untreated, uncoated seed. Beet stand counts taken on July 3. On October 13 the beets were harvested, washed, rated f maggot damage, weighed and samples taken for determination of sugar conte Maggot damage was rated as: 0, no scars; 1, 1-4 small scars; 2, 5-10 scar more then 10 large scars; 4, 1/2 to 3/4 of root surface scarred; 5, more 3/4 of root surface scarred or otherwise severely damaged.

RESULTS: Presented in the table below.

CONCLUSIONS: Although the sugarbeet maggot infestation level was moderate damage scores were low there was a significant improvement in yield assoc with several treatments. TEMIK and COUNTER were the most effective in reducing sugarbeet root maggot damage. GAUCHO incorporated into the coat of pelleted seed also reduced sugarbeet root maggot damage and contribute yields of beets and sugar that equalled those obtained with TEMIK.

Treatment	Rate g AI/ha	# beets /15 m July 3	# beets /15 m Oct 13	# beets lost /15 m	Damage score	Beet yield (t/ha)	Extractabl sugar (kg/ha)
Gaucho (pellet)	105	69	57	12	0.24	45.46	6191
Temik 10 G	1120	62	53	8	0.03	45.83	6141
Counter 15 G	1120	53	47	6	0.02	42.34	5760
Force (pellet)	12	67	48	19	0.38	40.14	5497
Force 1.5 G	250	63	48	15	0.43	40.20	5478
Dyfonate 20 G	560	54	41	13	0.22	38.79	5225
Mesurol (pellet)	?	62	43	20	0.66	37.88	5103
Check	-	58	42	16	0.42	37.05	5009
L.S.D. (P = 0.05)		5	5	6	0.19	3.38	522

#078

ICAR IDENTIFICATION NUMBER: 61006535

CROP: Sweet corn cv Hybrid Sweet Challenger (Yellow-shy)

PEST: European corn borer, *Ostrinia nubilalis* (Hubner)

NAME AND AGENCY:
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TITLE: **COMPARISON OF DECIS FORMULATIONS FOR INSECT CONTROL IN SWEET CORN**

MATERIALS: DECIS 5.0EC, 5.0Fl (deltamethrin)

METHODS: Sweet corn was planted on June 4. Plots were 2 rows spaced 90 c apart, 8m in length, replicated 4 times in a randomized complete block de The plants were artificially infested with European corn borer (ECB) egg masses on July 24 and 27. Sprays were applied Aug. 5, 12, 19 and 26 usir back pack airblast sprayer at 240 L/ha of water. Treatments were evaluat harvest on Aug. 31 by counting the number of ECB larvae in the stalks anc cobs.

RESULTS: As presented in the tables below.

CONCLUSIONS: Heavy populations of ECB were observed both in the ear and i stalk due, in part, to the artificial infestation of corn borer egg masse late July. Excellent control, however, was observed in the cob when DECI formulations were sprayed every 7 days with significantly less control achieved when the spray interval was extended to 14 days. There were no difference in control activity between the two DECIS formulation 5.0EC vs Fl for the control of European Corn Borer in the ears of sweet corn.

Treatments	Rate	Spray Interval	% ECB Infestation Cob	
DECIS 5.0EC	250.0 ml pr/ha	7 day	16.0c*	3
DECIS 5.0EC	250.0 ml pr/ha	14 day	46.4b	7
DECIS 5.0 Fl	250.0 ml pr/ha	7 day	14.8c	4
DECIS 5.0 Fl	250.0 ml pr/ha	14 day	43.6b	8
Control			76.0a	9

* Means followed by the same letter are not significantly different (P<0. Duncan's Multiple Range Test)

#079

ICAR: 61002036

CROP: Field Tomato

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

NAME AND AGENCY:
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TITLE: **EVALUATION OF FOLIAR INSECTICIDES FOR THE CONTROL OF COLORADO POTATO BEETLE USING THE "DIP TEST"**

MATERIALS: GUTHION 240SC, 360Fl (azinphos-methyl),
CYMBUSH 250EC (cypermethrin),
AMBUSH 500EC (permethrin),
SEVIN XLR PLUS (carbaryl),
DECIS 2.5E (deltamethrin),

THIODAN 4EC (endosulfan),
NTN-33893 240SC (experimental)

METHODS: CPB adults were collected from 14 separate grower fields mostly the Leamington area between June 5 to 12. The initial choice of fields w through growers indicating a "heavy" insect population attacking their tomatoes. Large numbers of beetles were field collected then divided int groups of 30 adults per treatment. The beetles were placed into a strair and dipped into a freshly prepared insecticidal mixture for approximately seconds, then let drain, placed on absorbant towels for about 30 seconds. treated beetles were then placed into paper cups with a perforated lid to allow for air exchange. Beetles were evaluated 24 hours after treatment.

RESULTS: As presented in the tables below.

CONCLUSIONS: CPB that had been field collected, with the exception of the Delrue fields in Kent County, had been previously treated with insecticid commercially by the grower. This is necessary to point out as the water controls showed significant kill of beetles from these fields. It appear that increasing the free water moisture on beetles could resuspend or solublize the chemical residue presumably remaining on the exoskeleton of insect body. Consistant control was achieved in Essex county locations u GUTHION 240SC or 360Fl. The synthetic pyrethroids, CYMBUSH, AMBUSH and D worked well at most sights, however, there was quite a difference in CPB control in the Stasko field A versus much better control in Stasko field SEVIN XLR PLUS and THIODAN proved to be the most variable products giving control in some locations while poor control in others. NTN-33893 240FS failed only in 2 fields while providing excellent control in the others. one field that had not been sprayed previous to sampling were the Delrue fields A and B. It was surprising the difference in potential control be the two fields. The "Dip Test" would have suggested that AMBUSH, NTN or could be used whereas the other products would result in control failure. is important that the "Dip Test" be evaluated for its effectiveness in he direct growers to use the correct product. It appears that sampling beet at random, without knowing the grower's current spray program complicated test - control beetles die at much higher numbers than initially expected assure confidence in the "DIP" test we must evaluate and compare the lab recommendations to actual field results.

Table 1.

Treatments	Rate	Dip Rate/
GUTHION 240 SC	1.75 L pr/ha	6.3 ml
GUTHION 360 Fl	1.17 L pr/ha	4.2 ml
CYMBUSH 250 EC	140.0 ml pr/ha	0.5 ml
AMBUSH 500 EC	200.0 ml pr/ha	0.7 ml
SEVIN XLR Plus	1.25 L pr/ha	4.5 ml
DECIS 2.5 EC	200.0 ml pr/ha	0.7 ml
THIODAN 4 EC	1.4 L pr/ha	5.0 ml
NTN33893 240 FS	150.0 ml pr/ha	0.5 ml
Control		

Table 2.

	% CPB Control Field								
Location	GUTHION 240SC	GUTHION 360Fl	CYMBUSH	AMBUSH	SEVIN XLR	DECIS	THIODAN	NTN	Cont
Delelis	80	87	80	73	70	87	77	57	4
RCAT	100	90	90	83	67	87	90	70	7
Brown	97	90	73	77	80	73	97	97	8
Dick A	93	97	77	97	90	73	97	97	6
Dick B	100	97	100	90	87	77	97	77	7
Adamson A	97	87	100	83	90	83	97	77	7
Adamson B	100	97	90	90	80	90	50	100	7
Thiessen	100	100	100	97	63	97	100	93	6
Epp A	100	90	90	67	30	53	47	57	2
Epp B larvae	80	-	-	-	-	100	-	100	5
Stasko A	70	73	67	43	17	70	57	67	8
Stasko B	97	-	87	83	-	80	-	83	6
Delrue A	0	0	0	83	0	70	17	87	
Delrue B	47	23	30	87	7	36	77	83	

#080

ICAR: 61002036

CROP: Field Tomato, cv HY-9478

PEST: Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say)

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TITLE: **SIMULATED COLORADO POTATO BEETLE DAMAGE AND ITS EFFECT ON YIELDS I FIELD TOMATOES**

MATERIALS: BRAVO 500 (chlorothalonil)

METHODS: Tomatoes were transplanted on May 15 in two row plots spaced 1.5 apart. Plots were 8m in length, replicated 4 times in a randomized compl block design. Fourteen days after transplanting all the leaves were remo by hand in the SEVERELY DAMAGED treatments while half of each leaflet was removed from the MODERATELY DAMAGED treatments. Fungal disease control w achieved using BRAVO 500 at 2.8 L prod/ha. Spray applications were made a back pack airblast sprayer at 240 L/ha of water. Fungicides were appli a 10 day schedule July 11, 21, 31, Aug. 10 and 17. Assessments were take visually rating the plant growth on June 5 and yields on Aug. 31.

RESULTS: As presented in the tables below.

CONCLUSIONS: Under a simulated situation where young transplants were completely defoliated 14 days after transplanting similar to what an inse like the Colorado potato beetle could do, a significant loss in tomato yi was observed. The worse case scenario for this year was 51.2% loss in re fruit yields and 19.6% in total yields - including the green fruit yields However, under moderate defoliation when only half of the foliage was rem plants recovered quickly, and by June 5 plant growth was equal to plants had not been damaged at all. Tomato transplants can withstand moderate l of defoliation early in the season with no loss in yield.

Treatments	Ratings (0-10)** June 5	Red	Fruit Yields T/ha Green	Tota
Severely damaged	8.8b*	28.1b	22.9a	51.(
Moderately damaged	10.0a	43.4a	17.2a	60.6
Control no damage	10.0a	42.5a	18.7a	61.2

* Means followed by the same letter are not significantly different (P<(Duncan's Multiple Range Test). ** Plant Vigour Ratings (0-10) 10, heal foliage; 0, poor growth.

#081

STUDY DATA BASE: 61002030

CROP: Field corn, hybrid Pioneer 3737

PEST: Black cutworm, *Agrotis ipsilon* (Hufnagel)

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TITLE: **CONTROL OF BLACK CUTWORM IN FIELD CORN WITH INSECTICIDES**

MATERIALS: AMBUSH 500EC (permethrin), COUNTER 15G (terbufos), CYGARD 15G (phorate and terbufos), DYFONATE II 20G (fonofos), FORCE 1.5G (tefluthrin), LORSBAN 15G and 4E (chlorpyrifos), RIPCORD 400EC (cypermethrin)

METHODS: The crop was planted on 4 June, 1992 at Ridgetown Ontario using John Deere Max-emerge planter at 25 plants/plot in 0.76 m row spacing. T experiment was arranged in a randomized complete block design with 4 replicates, with 2-row plots 2 m long bounded by aluminum siding barrier X 1.8 m) sticking 15 cm above ground and buried 5 cm into the ground. Gra insecticides were applied at planting with plot-scale noble applicators mounted on the planter. Plots were infested on 16 June in the evening at 4-5th instars per plot at the 2-3 leaf stage of the crop. About 1 kg of well-rotted bark mulch was spread in each plot to provide cover for the cutworms. Rescue sprays were applied at 206 kPa pressure in 327 L/HA wat with an Oxford backpack sprayer 24 h after infesting with larvae (in the evening). Broadcast sprays were applied with a 1 m wide boom with 4 - 00 nozzles. Banded treatments were applied with a single 00 nozzle in a 25 band over the row. Each day after treatment cut plants were counted and marked. Feeding ceased by 6 July which was at the 5-6 leaf stage of the Plant stand was assessed on the day prior to treatment and on 15 July. Results from plots with rescue treatments were adjusted to take into acco plants cut before spray.

RESULTS: The results are summarized in Table 1.

CONCLUSIONS: With the exception of FORCE 1.5G and LORSBAN 15G t-banded, i general planting time treatments did not provide good protection against cutting. All the rescue treatments provided the same level of control, a these treatments were all significantly better than planting time treatme Banded applications of rescue treatments provided a similar level of cont compared with broadcast applications.

Table 1. Efficacy of insecticides for the control of black cutworm in field corn at Ridgetown, Ontario.

Treatment	Rate (g AI/100m kg AI/HA)	Timing	Method	Total % plants cut	Plant loss %
FORCE 1.5 G	1.125	at planting	t-band	25.4 bcd*	1.1 c
FORCE 1.5 G	1.125	at planting	in-furrow	52.1 a	36.0 a
LORSBAN 15G	11.25	at planting	t-band	33.7 abc	4.6 c
COUNTER 15 G	11.25	at planting	t-band	47.4 a	31.1 a
COUNTER 15 G	11.25	at planting	in-furrow	54.1 a	29.8 a
DYFONATE II 20 G	11.25	at planting	t-band	45.6 ab	11.4 b
CYGARD 15	11.25	at planting	t-band	43.1 ab	21.2 a
AMBUSH 500EC	0.15	post emergent	broadcast	21.2 cd	1.1 c
AMBUSH 500EC	0.15	post emergent	banded	13.3 d	0.3 e
LORSBAN 4E	1.15	post emergent	broadcast	17.8 cd	2.8 c
LORSBAN 4E	1.15	post emergent	banded	11.8 d	0.6 e
RIPCORD 400EC	0.07	post emergent	broadcast	17.1 cd	0.0 f
RIPCORD 400EC	0.07	post emergent	banded	20.7 cd	0.0 f
CHECK				43.5 ab	7.8 c
CV % =				23.0	60.8

* Means followed by the same letter are not significantly different ($P<0.05$, Duncan's Multiple Range Test). Data transformed to arcsine square root before analysis, means reported are back-transformed.

#082

ICAR NUMBER: 88100230

CROP: Field corn, inbred C0220

PEST: Northern corn rootworm, *Diabrotica barberi* Smith Lawrence
Western corn rootworm, *D. virgifera virgifera* LeConte

NAME AND AGENCY:
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TITLE: **EFFICACY OF CORN ROOTWORM INSECTICIDES IN 1992 AT ELORA, ONTARIO**

MATERIALS: COUNTER 15G and COUNTER 20CR (terbufos), DYFONATE II 20G (fonc
FORCE 1.5G CLAY and FORCE 1.5G GYPSUM (tefluthrin)

METHODS: Seven granular insecticide treatments were applied to field corr
planting time (23 May) using a John Deere Max-Emerge two-row planter equi
with granular applicators. The Noble meters on the applicators were
bench-calibrated for each insecticide. Each plot was one row, 15 m long.
spacing was 76 cm. Two treatments (COUNTER 15G and DYFONATE II 20G) were
applied in a 15-cm band over the row in front of the closing wheel. All
treatments were applied in furrow. One check plot was included for a tot
8 treatments which were replicated 4 times in a randomized complete block
design at Elora, Ontario.

Two methods were used to measure efficacy of the insecticides: 1) Five c
roots were taken per treatment from each replicate on 6 August. They wer
washed and rated for feeding damage using a 1-6 rating scale*. Root rati
were transformed by square root x+1 before analysis; 2) Corn plants were
observed for goosenecking on 18 September. Goosenecking data were transf
by arcsin square root 0.01x before analysis.

RESULTS: The results are summarized in the following table.

CONCLUSIONS: Only the check had root ratings greater than the economic
threshold of 3.0. COUNTER 20CR (in furrow) and 15G (banded) had signific
less goosenecking than the check, and the latter also had less root damag

Treatment	Rate (g AI/100 m)	Mean Root Rating*	Mean Goosenec
COUNTER 20CR (in furrow)	11.20	2.8 a**	2.5 b
COUNTER 20CR (in furrow)	8.40	2.8 ab	14.9 ab
COUNTER 15G (band)	11.25	2.4 b	0.5 b
COUNTER 15G (in furrow)	11.25	2.8 ab	20.8 a
DYFONATE II 20G (band)	11.00	2.8 ab	3.8 ab
FORCE 1.5G CLAY (in furrow)	1.13	2.7 ab	5.4 ab
FORCE 1.5G GYPSUM (in furrow)	1.13	2.9 a	11.8 ab
Check		3.1 a	21.7 a

* Root rating scale: 1 - no noticeable feeding damage, 2 - feeding scar no root pruning, 3 - at least one root pruned to within 4 cm but less the equivalent of an entire node of roots pruned, 4 - one node or equ pruned, 5 - two nodes or equivalent pruned, 6 - three or more nodes p

** Values followed by the same letter are not significantly different at 5% level (Duncan's Multiple Range Test).

#083

STUDY DATA BASE: 61002030

CROP: Field corn, inbred variety C0220

PEST: Western corn rootworm (75%), *Diabrotica virgifera virgifera* Leconte
Northern corn rootworm (25%), *Diabrotica barberi* Smith and Lawrence

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TITLE: **CANDIDATE INSECTICIDES FOR THE CONTROL OF CORN ROOTWORMS - 1992**

MATERIALS: COUNTER 15G, COUNTER 20CR (terbufos),
CYGARD 15G (terbufos plus phorate),
DI-SYSTON 15G and 720 LC (disulfoton),
DYFONATE 20G, DYFONATE II 20G (fonofos),
FORCE 1.5G (clay), FORCE 1.5G (gypsum) (tefluthrin),
FURADAN 10G (carbofuran), and LORSBAN 15G (chlorpyrifos)

METHODS: The crop was planted on 15, 14, and 13 May, 1992 at Thorndale, Parkhill, and Denfield, using a John Deere Max-emerge planter at 64,000 seeds/ha in 0.76 m row spacing. Plots were single rows 10 m in length pl in a randomized complete block design with 4 replicates. There were 3 cor plots per replicate and these were pooled in the ANOVA. The plots were fertilized and maintained by the grower using commercially acceptable practices. The granular materials were applied using plot-scale Noble applicators. T-band applications were placed in a 15 cm band over the op seed furrow. In-furrow applications were placed directly into the seed furrow. Liquid materials were applied during planting using an Oxford precision sprayer fitted with a single nozzle (Allman #0) in 120 L/ha wat The number of plants emerged were counted for each plot. For each plot, number of lodged plants per plot were counted and 4 roots per plot were c washed and scored for root injury using the Iowa 1-6 root injury scale.

RESULTS: The results are summarized in Table 1. Emergence was generally p at the Denfield location and counts were not taken. Lodging was measured all the locations but only significant differences are reported.

CONCLUSIONS: There were no significant differences in plant stand due to phytotoxicity. Rootworm pressure was lower than expected in 1992 at the sites chosen. Control was poor for all materials at the Parkhill locatic which received higher than normal precipitation. At the other two locati all the treatments provided good control with the exception of LORSBAN 15 Denfield. Reduced rates of COUNTER 15g or 20CR resulted in equivalent control.

Table 1. Rootworm insecticide efficacy test at Thorndale, Parkhill and Denfield, Ontario. Higher than normal rainfall, with excess at Parkhill.

		------Thorndale---------			---Parkhill---		Denfie
Treatment	Rate* Method	Emerge. #/plot Jun 10	Root Injury (1-6) Aug 10	Percent Lodging Aug 26	Emerge. #/plot Jun 10	Root Injury (1-6) Aug 20	Root Injur (1-6 Aug
COUNTER 15G	75 TB	44.5ab**	1.4bc	0b	36.3ab	2.9a	1.6
COUNTER 15G	75 IF	42.0ab	1.9b	0b	32.0abc	2.8a	1.9
COUNTER 15G	56 TB	44.0ab	1.4bc	0b	35.8ab	2.4a	1.5
COUNTER 15G	56 IF	46.8ab	1.4bc	0b	29.8abc	2.8a	1.7
COUNTER 20CR	56 IF	49.0ab	1.4bc	0b	35.5abc	2.7a	2.1
COUNTER 20CR	42 IF	42.8ab	1.3c	0b	25.5c	3.2a	1.6
CYGARD 15G	75 TB	45.3ab	1.4bc	0b	30.5abc	2.9a	1.3
DI-SYSTON 15G	75 TB	50.5a	1.1c	0b	28.3abc	3.1a	1.5
DI-SYSTON 720LC	15 TB	44.0ab	1.1c	0b	30.5abc	3.4a	1.8
DYFONATE 20G	55 TB	48.8ab	1.1c	0b	29.0abc	2.9a	1.5
DYFONATE II 20G	55 TB	45.8ab	1.3c	0b	32.8abc	2.5a	1.4
FORCE 1.5G (C)***	75 TB	47.5ab	1.3bc	0b	38.3a	2.9a	1.4
FORCE 1.5G (C)	75 IF	50.3a	1.1c	0b	33.0abc	2.8a	1.6
FORCE 1.5G (G)***	75 IF	47.3ab	1.2c	0b	28.8abc	3.1a	1.4
FURADAN 10G	110 TB	39.8b	1.4bc	0b	26.8bc	2.9a	1.7
LORSBAN 15G	75 TB	42.3ab	1.3bc	0b	32.3abc	3.2a	2.3
CHECK		45.9ab	3.1a	7a	28.8abc	2.4a	2.8
% =		12.7	27.9	195.3	19.1	19.6	27.8

* Rates are in ml or g product/100 m row. IF = INFURROW, TB = T-BAND
** Means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test).
*** C = clay carrier, G = gypsum carrier

#084

STUDY DATA BASE: 61002030

CROP: Field corn, inbred variety C0220

PEST: Western corn rootworm (75%), *Diabrotica virgifera virgifera* Leconte
Northern corn rootworm (25%), *Diabrotica barberi* Smith and Lawrence

NAME AND AGENCY:
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TITLE: **EXP-60655A INSECTICIDE FOR THE CONTROL OF CORN ROOTWORMS - 1992**

MATERIALS: COUNTER 15G (terbufos),
EXP-60655A 1.5G and 200SC

METHODS: The crop was planted on 15, 14, and 13 May, 1992 at Thorndale, Parkhill, and Denfield, using a John Deere Max-emerge planter at 64,000 seeds/ha in 0.76 m row spacing. Plots were single rows 10 m in length pl in a randomized complete block design with 4 replicates. There were 2 cor plots per replicate and these were pooled in the ANOVA. The plots were fertilized and maintained by the grower using commercially acceptable practices. The granular materials were applied using plot-scale Noble applicators. T-band applications were placed in a 15 cm band over the op seed furrow. In-furrow applications were placed directly into the seed furrow. Liquid materials were applied during planting using an Oxford precision sprayer fitted with a single nozzle (Allman #0) in 120 L/ha wat The number of plants emerged were counted for each plot. For each plot, number of lodged plants per plot were counted and 4 roots per plot were d washed and scored for root injury using the Iowa 1-6 root injury scale.

RESULTS: The results are summarized in Table 1. Emergence was generally p at the Denfield location and counts were not taken. Lodging was measured all the locations but only significant differences are reported.

CONCLUSIONS: There were no significant differences in plant stand due to phytotoxicity. Rootworm pressure was lower than expected in 1992 at the chosen. Under the conditions of the tests, control was poor for all mate at the Parkhill location which received higher than normal precipitation. the other two locations all the treatments provided good control regardle the method of application and rate used.

Table 1. EXP-60655A insecticide efficacy test at Thorndale, Parkhill anc
Denfield, Ontario. Higher than normal rainfall, with excess at Parkhill.

		------Thorndale---------			---Parkhill---		Denfie
Treatment	Rate* Method	Emerge. #/plot Jun 10	Root Injury (1-6) Aug 10	Percent Lodging Sept 1	Emerge. #/plot Jun 10	Root Injury (1-6) Aug 20	Root Injur (1-6) Aug 1
CHECK		39.3bc**	2.5a	41a***	23.9a	2.3a	2.
EXP-60655A 1.5G	57 TB	44.8abc	1.6b	26ab	30.5a	1.6a	1.
EXP-60655A 1.5G	75 TB	49.5a	1.2b	22ab	32.5a	2.1a	1.
EXP-60655A 1.5G	93 TB	48.5ab	1.2b	6b	23.8a	2.6a	1.
EXP-60655A 1.5G	57 IF	43.8abc	1.1b	17ab	26.5a	1.9a	1.
EXP-60655A 1.5G	75 IF	43.0abc	1.6b	20ab	30.0a	2.3a	1.
EXP-60655A 1.5G	93 IF	50.5a	1.5b	18ab	28.3a	1.9a	1.
COUNTER 15G	75 TB	46.0abc	1.3b	23ab	28.5a	1.7a	1.
COUNTER 15G	75 IF	36.8c	1.2b	18ab	22.3a	1.9a	1.
EXP-60655A 200SC (SPRAY)	5.6 TB	48.0ab	1.0b	5b	31.0a	1.9a	1.
EXP-60655A 200SC (SPRAY)	5.6 IF	44.3abc	1.6b	15ab	25.8a	1.9a	1.
CV% =		13.5	26.6	50.3	28.4	32.1	28.

* Rates are in ml or g product/100 m row. IF = INFURROW, TB = T-BAND
** Means followed by the same letter are not significantly different (P<0.05, Duncan's Multiple Range Test).
*** Lodging data transformed to arcsine before analysis, means reported a back-transformed.

#085

STUDY DATA BASE: 61002030

CROP: Field corn, Pioneer 3737

PEST: Western corn rootworm (75%), *Diabrotica virgifera virgifera* Leconte
Northern corn rootworm (25%), *Diabrotica barberi* Smith and Lawrence

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TITLE: **INSECTICIDES FOR SLOT INJECTION WITH ADDITIVES TO IMPROVE THE CONT OF CORN ROOTWORMS IN ARTIFICIALLY INFESTED PLOTS**

MATERIALS: FORCE 1.5G and 50EC (tefluthrin), BASUDIN 500EC (diazinon), LORSBAN 15G (chlorpyrifos)

METHODS: The crop was planted at 64,000 seeds/ha in a 0.76 m row spacing, 14 May, 1992 at Ridgetown, Ontario. Plots were single rows, 20 m in leng placed in a randomized complete block design with 4 replicates. One day to planting, the middle 2 m of each plot was infested with rootworm eggs 2,000 eggs/m in a 40 cm band 5 cm deep. The granular materials were appl using plot-scale Noble applicators in a T-band application placed in a 15 band over the open seed furrow. Liquid insecticides were applied with a slot-injector mounted on a 3 point hitch. On both sides of each row (at 1 cm from centre) a fluted-coulter, 3mm thick and 44.5 cm in diameter, oper the slot 7.5 cm deep and a straight- stream nozzle (TeeJet no. 20) inject the insecticide directly behind the coulter into the open slot at 3448 kP 280 L water or 28% UAN liquid fertilizer/ha. 28% UAN nitrogen was applie 234 L/ha and molasses at 6.6 L/ha. Injections were done on 22 June at th V4-5 stage. Eight roots per plot were dug, washed and scored for root in using the Iowa 1-6 root injury scale on 7 August.

RESULTS: The results analyzed over the whole experiment are summarized in Table 1. The results of a 4 X 3 (Additive [None, 28%UAN, Molasses, Molasses+28%UAN]; Insecticide [FORCE, DIAZINON, LORSBAN] factorial analys are given in Table 2.

CONCLUSIONS: Insect pressure was relatively low, however some conclusions be drawn. Granular insecticides applied at planting provided better cont than liquid insecticides injected without additives 6 weeks after plantin Adding 28%UAN nitrogen or molasses or a combination of the two to the injection treatment, resulted in rootworm control similar to that achieve with granular insecticide at planting. There was no significant differen ($P<0.05$) between insecticide type nor was there a difference between the additives (molasses, 28%UAN, or molasses plus 28%UAN)

Table 1. Control of corn rootworms with injected liquid insecticides with 28%UAN and/or molasses as carrier/additives in artificially infested plot Ridgetown, Ontario 1992.

Treatment	Rate g AI/ 100 m	Application Timing	Method	Root Injury (Iowa 1-6
FORCE 1.5G	1.125	AT PLANTING	T-BAND	1.2e*
FORCE 50EC	1.125	6 WKS POST PLANT	SLOT INJ	2.0bcd
FORCE 50EC 28%UAN	1.125	6 WKS POST PLANT	SLOT INJ	1.7cde
FORCE 50EC MOLASSES	1.125	6 WKS POST PLANT	SLOT INJ	1.6de
FORCE 50EC 28%UAN + MOLASSES	1.125	6 WKS POST PLANT	SLOT INJ	1.6de
BASUDIN 500EC	11.25	6 WKS POST PLANT	SLOT INJ	2.4ab
BASUDIN 500EC 28%UAN	11.25	6 WKS POST PLANT	SLOT INJ	1.9bcd
BASUDIN 500EC MOLASSES	11.25	6 WKS POST PLANT	SLOT INJ	1.7b-e
BASUDIN 500EC 28%UAN + MOLASSES	11.25	6 WKS POST PLANT	SLOT INJ	2.1bcd
LORSBAN 4E	11.25	6 WKS POST PLANT	SLOT INJ	2.3abc
LORSBAN 4E 28%UAN	11.25	6 WKS POST PLANT	SLOT INJ	1.9bcd
LORSBAN 4E MOLASSES	11.25	6 WKS POST PLANT	SLOT INJ	2.1bcd
LORSBAN 4E 28%UAN + MOLASSES	11.25	6 WKS POST PLANT	SLOT INJ	1.6de
CHECK				2.8a
CV% =				21.0

* Means followed by the same letters are not different (P = 0.05, Duncan's MRT)

Table 2. Main effect means for insecticides (a) and liquid additives (b) injected 6 weeks after planting for the control of corn rootworms in artificially infested plots at Ridgetown, Ontario, 1992.

Treatment	Rate g AI/ 100 m	Root Injury (Iowa 1-6)
FORCE 50EC	1.125	1.7*
BASUDIN 500EC	11.25	2.0
LORSBAN 4E	11.25	2.0
No additive		2.2**
28%UAN		1.8
Molasses		1.8
28%UAN + Molasses		1.8

* Significant at P=0.05 (T-test LSMEANS PDIFF option SAS STAT)
** Significant at P=0.09 (T-test LSMEANS PDIFF option SAS STAT)

#086

STUDY DATA BASE: 61002030

CROP: Field corn, Inbred C0220

PEST: Western corn rootworm (75%), *Diabrotica virgifera virgifera* Leconte
Northern corn rootworm (25%), *Diabrotica barberi* Smith and Lawrence

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TITLE: **INSECTICIDES FOR SLOT INJECTION WITH ADDITIVES TO IMPROVE THE CONT OF CORN ROOTWORMS IN NATURALLY INFESTED PLOTS**

MATERIALS: FORCE 1.5G and 50EC (tefluthrin),
BASUDIN 500EC (diazinon),
LORSBAN 4E (chlorpyrifos) and NTN-33893 240EC

METHODS: The crop was planted at 64,000 seeds/ha in a 0.76 m row spacing, 15, 13, and 14 May, 1992 at Thorndale, Denfield and Parkhill, Ontario. Pl were single rows, 20 m in length placed in a randomized complete block de with 4 replicates. The granular material was applied using plot- scale N applicators in a T-band application placed in a 15 cm band over the open furrow. Liquid insecticides were applied with a slot-injector mounted or point hitch. On both sides of each row (at 12.5 cm from centre) a fluted-coulter, 3mm thick and 44.5 cm in diameter, opened the slot 7.5 cm and a straight-stream nozzle (TeeJet no. 20) injected the insecticide dir behind the coulter into the open slot at 3448 kPa in 280 L water or 28% U liquid fertilizer/ha. 28% UAN was applied at 234 L/ha and molasses at 6. L/ha. Injections were done on 3 June, (3 weeks after planting), 11 June weeks after planting), 23 June (6 weeks after planting, 6 July (8 weeks a planting) at the V1, V2, V5, and V6 stages of crop growth. Four roots pe plot were dug, washed and scored for root injury using the Iowa 1-6 root injury scale on 8 August. Percent lodging was assessed by counting plant leaning more than 30% from vertical over the total number of plants in th row.

RESULTS: The results of applying FORCE 1.5G at planting or FORCE 50EC at various times after planting are given in Table 1. The results of the comparison of 3 liquid insecticides applied 6 weeks after planting withou additives are given in Table 2. The results of including an additive summarized over all insecticides are presented in Table 3.

CONCLUSIONS: Insect pressure was relatively low, however some conclusions be drawn. Liquid tefluthrin insecticide applied between 4 and 6 weeks of planting provided similar control to granular tefuthrin applied at planti Adding 28%UAN or molasses or a combination of the two to the injection treatment, did not result in improved rootworm control over that achieved granular insecticide at planting. Tefluthrin was a better material for injecting than either chlorpyrifos or diazinon. There was no difference between the additives (molasses, 28%UAN, or molasses plus 28%UAN).

Table 1. Effect of time of injection of liquid FORCE for the control of c
rootworms at several locations in Ontario, 1992.

Treatment	Applic. Timing	Method*	--Thorndale--- Root Injury (1-6)	Lodging %	---Denfield---- Root Injury (1-6)	Lodging %	---Parkhill- Root Injury (1-6)	Lodg %
FORCE 1.5G	PLANTING	T-BAND	1.6ab**	1b	1.6b	5c	2.7a	8
FORCE 50EC	3 WK	SLOT-INJ	1.9ab	4ab	2.9a	27b	1.6a	15
FORCE 50EC	4 WK	SLOT-INJ	1.3b	2ab	2.3ab	18bc	2.3a	31
FORCE 50EC	6 WK	SLOT-INJ	1.4b	3ab	1.7b	28b	2.4a	23
FORCE 50EC	8 WK	SLOT-INJ	1.5b	3ab	2.9a	32ab	2.0a	24
CHECK			2.2a	8a	3.2a	54a	2.3a	28
CV%	=		22.8	53.8	29.6	29.7	33.6	24

* T-BAND applied at planting, SLOT INJECTION applied 6 weeks after plant
FORCE applied at 1.125 g AI/100m.

** Means followed by the same letters are not different (P = 0.05, Duncar
NMRT).

Table 2. Comparison of 4 liquid insecticides injected at 6 weeks after planting with tefluthrin applied at planting as a granular for the contro corn rootworms at several locations in Ontario, 1992.

Treatment	Method*	--Thorndale--- Root Injury (1-6)	Lodging %	---Denfield---- Root Injury (1-6)	Lodging %	---Parkhill- Root Injury (1-6)	Lodgi %
FORCE 1.5G	T-BAND	1.6bc**	1b	1.6c	5b	2.6a	8b
FORCE 50EC	SLOT-INJ	1.4c	3ab	1.7c	28a	2.4a	23a
BASUDIN 500EC	SLOT-INJ	2.4a	5ab	2.6b	45a	2.7a	31a
LORSBAN 4E	SLOT-INJ	2.1abc	11a	3.7a	54a	2.7a	20a
NTN-33893 240EC	SLOT-INJ	1.4c	11a	3.6a	57a	2.7a	30a
CHECK		2.2ab	8ab	3.2ab	54a	2.3a	28a
CV% =		23.8	48.6	21.4	28.2	30.6	27.

* T-BAND applied at planting, SLOT INJECTION applied 6 weeks after plar tefluthrin applied at 1.125 g AI/100m, diazinon and chlorpyrifos at 11.25 g ai/100m and NTN-33893 at 0.5 g AI/100m.

** Means followed by the same letters are not different (P = 0.05, Duncan's NMRT).

Table 3. Summary over all insecticides of main effect of using additives liquid insecticides injected 6 weeks after planting to improve the contro corn rootworms at several locations in Ontario, 1992.

Treatment	--Thorndale--- Root Injury (1-6)	Lodging %	---Denfield---- Root Injury (1-6)	Lodging %	---Parkhill- Root Injury (1-6)	Lo
No additive	1.9*	14.3	2.7	40.4	2.6	29
28%UAN	2.1	15.8	3.0	43.4	2.3	35
Molasses	2.3	14.1	3.3	42.8	2.3	21
28%UAN + Molasses	2.1	15.3	3.5	44.5	2.6	25

* All means within columns are not significantly different at P=0.05 (T-t LSMEANS PDIFF option SAS STAT).

#087

STUDY DATA BASE: 374-1431-4733

CROP: Sweetclover cv. Norgold

PEST: Red clover seed weevil, *Tychius stephensi* Schonherr

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TITLE: **EVALUATION OF DECIS 2.5 EC FOR THE CONTROL OF RED CLOVER SEED WEE SWEETCLOVER**

MATERIALS: DECIS 2.5 EC (deltamethrin)

METHODS: Five plots of second year sweetclover cv. Norgold, each eight r wide and 30.5 m long, with 0.3m row spacings, were assessed. On July 3, Decis 2.5 EC was applied to three randomly selected plots of the sweetcl which was in the early to mid-bloom growth stage, with two unsprayed plot acting as checks. The chemical was applied at a rate of 2.0 g ai/ha with CO_2 pressurized hand-held sprayer at 275 kPa through three LF5 80 degree nozzles spaced 40 cm apart. Spray weather conditions were overcast skie calm winds, and a temperature of 12 °C. Weevil populations were sampled on five occasions by taking 10 walking sweeps per plot with a sta 38 cm diameter insect net. Plots were harvested using a small plot combi and seed weights per plot were determined. Means were separated using unpaired t-tests.

RESULTS: The results are presented in the table below.

CONCLUSIONS: The Decis application significantly decreased Tychius popula one week after application. Seed yields were significantly greater in spr than in unsprayed plots.

	Tychuis Numbers/10 Sweeps					
Trt	June 30	July 10	July 17	July 27	Aug 4	Yield (g)
Control	98	433*	120	325	134	921.8*
Decis EC	92	9	75	360	88	1184.3

* Means within columns are significantly different from each other (unpai t-tests, P<0.01 and P<0.10 for weevils and yield, respectively).

#088

ICAR: 86100101

HOST: Humans

PEST: Spring *Aedes* spp.

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TITLE: **EVALUATION OF THREE DEET (N,N-DIETHYL-M-TOLUAMIDE) FORMULATIONS, AVON-SKIN-SO-SOFT AND THE CITROSA PLANT AS REPELLENTS AGAINST SPRI *AEDES* SPP.**

MATERIALS: NERO INSECT REPELLENT SOLUTION(R) (75% DEET), ULTRATHON(R) (33% DEET), SKINTASTIK(R) (7% DEET), AVON-SKIN-SO-SOFT(R) and the Citrosa plant (*Pelargonium citros*

METHODS: The study location was the University of Guelph Arboretum in a wetland deciduous forest adjacent to a large (>1 hectare) snowmelt pool. Twelve sites each separated by a minimum of 10 meters from each other we marked in the study plot. Test subjects consisted of twelve individuals, males and 5 females ranging in weight from 50-100 kg. The subjects alwa dressed in green coveralls with sleeves rolled up and usually wore head Subjects were instructed not to wash during the 12-hour evaluation perio afterwards to clean arms and hands with Noxema(R) before showering. Sub were randomly assigned to a particular treatment and site for Day 1 of t evaluation. Each treatment was replicated once (2 subjects) for each da Thereafter subjects were treated with a different repellent each day unt they had tested all products. Evaluations were made over a ten day peri which each subject evaluated each product twice. The exceptions were th Citrosa plant and 0.6 mL 75% DEET where the same two students evaluated plants for five days followed by the DEET for five days. Subjects applie appropriate dosage-repellent combinations at 7:30 EDST. Application was to the hands and forearms of both arms. All coveralls were assigned to treatment rather than an individual to prevent any cross contamination. treated controls applied 2 mL of deionized water. Within ten minutes of application field evaluations were initiated. Field evaluation was repe at 11:30 EDST, 15:30 EDST and 19:30 EDST. Repellency was thus evaluated 4, 8, and 12 hours post- application. Citrosa plants were evaluated by subjects standing over a large 45 cm high plant or between 2 smaller 35 high plants separated by less than 0.5 m. At each time interval subject stood at their preassigned sites. Aspirators were used to capture mosqu that alighted on hands or forearms during 4 five-minute periods. Mosqui were blown into prelabelled vials, one for each five-minute period. Temp and relative humidity were recorded as well as general weather condition including wind speed. Vials were returned to the laboratory where the mosquitoes were killed by freezing and then counted. For each sample da randomly chosen mosquitoes were identified to species. During the secon of the trial all subjects applied repellents as the first week but wore examination gloves during field evaluation periods. New gloves were use each time period. Throughout the trial when mosquito feeding rates were than ten bites per non-treated individuals in 20 minutes all data for th particular time were ignored because of low feeding pressure. This occu on 9 of 40 potential time slots. For statistical analysis a generalized linear model with a log link and a Poisson error was applied to the data. Initial analysis had shown that there was no significant difference betw Week 1 or 2 relative to the use of gloves. Consequently the data were combined.

RESULTS: The results are summarized in the table. Eleven mosquito speci were recovered. The predominant species (86%) were *Aedes stimulans*, *A. canadensis*, *A. euedes*, and *A. fitchii*.

CONCLUSIONS: The 2.5 g of Ultrathon(R) (33% AI) and 2 mL of Nero(R) (75%

provided similar levels of protection with both products providing approximately 70% protection at 12 hours. Skintastik([R]) provided 4 hours protection and was superior to Avon-Skin-So- Soft([R]). The Citrosa plant not provide protection.

% Reduction of spring Aedes spp. biting activity to individuals treated w various products versus non-treated individuals, Guelph, Ontario, June 1(

product	amount applied	no. days tested	% Reduction** time 0 hrs.	time 4 hrs.	time 8 hrs.	time 12 hrs
NERO INSECT REPELLENT	2.0 mL	5	100.0 *A	97.9 *A	80.8 *AB	68.(
	1.2 mL	5	100.0 *A	95.1 *A	73.5 *AB	47.7
SOLUTION(R) (75% DEET)	0.6 mL	5	100.0 *A	88.9 *AB	72.9 *AB	24.3
ULTRA-THON(R) (33% DEET)	2.5 g	10	100.0 *A	100.0 *A	88.5 *A	72.8
SKIN-TASTIK(R) (7% DEET)	2.0 g	10	100.0 *A	84.2 *B	37.2 *C	9.4
AVON-SKIN -SO-SOFT(R)	2.0 mL	10	73.0 *B	58.4 *C	10.8 nsC	10.(
Citrosa plant	1 or 2 plants	5	0 ns	0 ns	0 ns	0

* Significantly different from non-treated controls (P<0.05).
** Values followed by the same letter, for the same time interval, are no significantly different (P<0.05). ns Not significantly different from non-treated controls (P<0.05).

#089

STUDY DATA BASE: 87000180

CROP: Assiniboine poplar, *Populus x deltoides* 'Assiniboine' and
Northwest poplar, *Populus deltoides c balsamifera* 'Northwest'

PEST: Cottonwood leaf beetle, *Chrysomela scripta Fabricius*

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TITLE: **EVALUATION OF INSECTICIDES FOR CONTROL OF COTTONWOOD LEAF BEETLE A**

MATERIALS: SEVIN XLR PLUS (carbaryl), DECIS 5 FL (deltamethrin)

METHODS: Two rows of 3-year old poplar stools located at the Shelterbelt Centre were used for the trial. One row contained 'Assiniboine' and the 'Northwest' poplar. Each treatment was replicated five times for each va and arranged in a randomized complete block design. Each plot consisted stools approximately 0.7 m apart with an additional 7 stools used as a bu between each plot. Counts were conducted by examining all above ground p of each stool. Treatments were applied the morning of May 8, 1992, using high pressure sprayer and horizontal boom with 8002 nozzles. Air temperat was about 2°C at the time of application. Insecticides were applied at 2 kPa while travelling 4.8 kph providing a rate of 230 L/ha. Counts were conducted one day prior to treatment and again 1, 3, 6 and 11 days after treatment. Maximum air temperatures on the pre-treatment day, and days 1, 6, and 11 post-treatment were 35.5, 8, 14.5, 18, and 34.5 °C, respectivel square root (x + 0.5) transformation was conducted prior to analysis of variance with means separated by a Student-Newman-Keuls test.

RESULTS: Results are summarized in the table below.

CONCLUSIONS: In pre-treatment counts, the number of adults was significar higher on 'Assiniboine' compared to 'Northwest', but this difference did continue through the remainder of the trial. Pre-treatment counts were r significantly different within each variety. The low counts in the check on day 1 were probably due to low air temperatures which caused beetles t re-enter cracks in the soil and therefore were not visible. In the 'Assiniboine' plots, one day after treatment SEVIN XLR PLUS significantly reduced the adult population compared to both DECIS and the check. From d until day 11, SEVIN XLR PLUS and DECIS were equally effective in reducing number of adults in the 'Assiniboine' plots. In the 'Northwest' plots, S XLR PLUS and DECIS caused significant reductions in the adult population on days 3 and 6. No phytotoxic damage was noted on either variety .

Treatment	Rate kg ai/ha	Pt1	Adult cottonwood leaf beetles Post-treatment Day 1	Day 3	Day 6	Day 11
	----------- 'Assiniboine' poplar -------------					
SEVIN XLR PLUS	0.6	5.8a**	0.1c	0.0b	0.1b	0.1b
DECIS 5FL	0.005	6.1a	0.4b	0.1b	0.2b	0.6b
Check	-	5.0a	0.9a	2.6a	3.7a	1.9a
	------------' Northwest poplar ---------------					
SEVIN XLR PLUS	0.06	2.4a	0.1a	0.1b	0.1b	0.5a
DECIS 5FL	0.005	3.7a	0.4a	0.1b	0.2b	0.5a
Check	-	3.8a	0.6a	2.4a	2.6a	2.1a

* Pt = Pre-treatment.
** Means followed by the same letter are not significantly different at t
5% level according to the Student-Newman-Keuls test.

#090

STUDY DATA BASE: 87000180

CROP: Assiniboine poplar, *Populus x deltoides* 'Assiniboine' and
Walker poplar, *Populus x deltoides* 'Walker'

PEST: Cottonwood leaf beetle, *Chrysomela scripta Fabricius*

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TITLE: **EVALUATION OF INSECTICIDES FOR CONTROL OF COTTONWOOD LEAF BEETLE L**

MATERIALS: SEVIN XLR PLUS (carbaryl),
DECIS 5EC (deltamethrin)

METHODS: The trial was conducted at the Shelterbelt Centre on 3-year old 'Assiniboine' and 'Walker' poplar stools. Treatments were replicated 10 in a randomized complete block design. Six shoots containing at least 5 larvae were selected and tagged in each plot. Larvae ranged from first to instar. The number of larvae on tagged shoots were counted 5 hours prior treatment and again 24 and 48 hours after treatment. Treatments were app at 15:00 on August 13, 1992, using a high pressure sprayer and vertical b containing 8002 nozzles. Insecticides were applied at 275 kPa while trave 4.8 kph providing a rate of 230 L/ha. Air temperature at application tim about 27 °C. A square root (x + 0.5) transformation was conducted prior to analysis of variance with means separated by a Student-Newman-Ke test.

RESULTS: Results are summarized in the table below.

CONCLUSIONS: Pre-treatment counts were not significantly different. SEVI PLUS and DECIS caused significant reductions in the larval population wit 24 hours and resulted in complete elimination by 48 hours. The reductior the check plots was due to predation by Pentatomids and Syrphids and beca last instar larvae were moving to other parts of the stool to feed or pup No phytotoxic damage was noted.

		Cottonwood leaf beetle larvae/shoot		
	Rate		Post-treatment	
Treatment	kg ai/ha	Pre-treatment	24 hrs	48 hrs
SEVIN XLR PLUS	0.6	18.2a1	0.1b	0.0b
DECIS 5EC	0.005	16.3a	0.3b	0.0b
Check	-	19.5a	7.9a	4.2a

* Means followed by the same letter are not significantly different at th level according to the Student-Newman-Keuls test.

#091

STUDY DATA BASE: 87000180

CROP: Bur oak, *Quercus macrocarpa*

PEST: Oak weevil, *Curculio* sp.

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TITLE: **EVALUATION OF INSECTICIDES FOR CONTROL OF OAK WEEVIL**

MATERIALS: SEVIN XLR PLUS (carbaryl), DECIS 5FL (deltamethrin)

METHODS: The trial was conducted on an single row, 4 to 5 m high, 18- yea old bur oak shelterbelt located on the Shelterbelt Centre. Each plot was composed of 2 trees, replicated 6 times and arranged in a randomized comp block design. There was at least 1 buffer tree between each plot. Oak fo was sampled (100 sweeps/sample date) with sweep nets twice weekly until a were first collected on July 8, 1992. On July 17 and again on July 28, treatments were applied with a high pressure hand gun sprayer at 690 kPa the point of run-off (15- 20 L/plot). Mature acorns were collected from ground on September 10 and again on September 21. Sub-samples of up to 2 acorns per tree per collection were taken to determine mean acorn weight, estimated yield per tree, and number of weevil-infested acorns per tree. Acorns were placed at 25 °C, 14L:10D and 60% RH for 3 weeks with weevil emergence recorded daily. After 3 weeks, all acorns were examined for exi holes and all acorns were cut open to determine if they had been damaged. square root (x + 0.5) transformation was conducted prior to analysis of variance with means separated by a Student-Newman-Keuls test.

RESULTS: Results are summarized in the table below.

CONCLUSIONS: In this test, insecticide treatments did not have a signific affect on acorn yield. Tree to tree variability was high for acorn yield (range, 46 to 3746 acorns per tree). Trees treated with DECIS and SEVIN PLUS had significantly fewer infested acorns. The total number of weevil larvae produced per tree could not be determined because some weevils had emerged from the acorns prior to the second collection date. Acorns from DECIS treated trees were significantly heavier than SEVIN XLR PLUS treate trees. This difference may have been related to extensive leaf burn note about 80% of the trees in the SEVIN XLR PLUS plots. No leaf burn was not trees in the DECIS or check plots.

Treatment	Rate kg ai/1000	Acorns/tree	Infested acorns/tree	Weight/acc
		---------- Collection - September 10 ----------		
DECIS 5FL	0.005	459a*	0.3b	2.3
SEVIN XLR PLUS	1.44	252a	0.8b	1.8
Check	-	165a	13.1a	2.1
		---------- Collection - September 21 ----------		
DECIS 5FL	0.005	352a	0.1b	2.0
SEVIN XLR PLUS	1.44	404a	1.1b	1.6
Check	-	352	14.0a	1.7
		--------- Total -------------------------------		
DECIS 5FL	0.005	811a	0.4b	2.1
SEVIN XLR PLUS	1.44	657a	1.8b	1.7
Check	-	516a	27.1a	1.9

* Means followed by the same letter are not significantly different at th
5% level according to the Student-Newman-Keuls test.

#092

STUDY DATA BASE: 306-1461-9019

CROP: Apple cv. Red Delicious

PEST: Tarnished plant bug, *Lygus lineolaris*

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TITLE: **EFFECT OF BAY-NTN-33893 240 FS ON TARNISHED PLANT BUG MORTALITY**

MATERIALS: BAY-NTN-33893 240 FS, RIPCORD 400 EC (cypermethrin)

METHODS: Treatments replicated 6 times were applied to apple shoots in a completely randomized design experiment. The sprays were applied to appl shoots in a 15 mL glass vial using a moving nozzle pot sprayer calibrated deliver 200 L/ha. Six adult tarnished plant bugs obtained from a canola were placed in a 4 L glass jar fitted with a saran screened lid and conta the treated apple shoot. Mortality was recorded at 24 hour intervals following treatment for four days. The experiment was repeated. Regressi data analysis was conducted on the combined data using binomial distribut and logit function.

RESULTS: Mean % mortality and standard error of the mean, SEM, predicted from analysis of the combined data are presented in the table below.

CONCLUSION: All rates of BAY-NTN-33893 240 FS tested were less effective cypermethrin (0.0016%) in controlling tarnished plant bug on apple shoots

Treatment	Rate (mL/ha)	Rate (g ai/ha)	% mortality (SEM) 24 hour	48 hour	72 hour	96
Control	-	-	2.8 (1.92)	4.2 (2.34)	5.7 (2.74)	11. (3.
BAY-NTN-33893 240FS	187.5	45	4.2 (2.33)	9.7 (3.45)	19.1 (4.70)	30. (5.
BAY-NTN-33893 240FS +SAFER'S SOAP	187.5 6000	45 3000	6.9 (2.94)	16.7 (4.31)	18.1 (4.48)	40. (5.
BAY-NTN-33893 240FS	375	90	4.2 (2.33)	13.9 (4.01)	23.6 (4.94)	36. (5.
BAY-NTN-33893 240FS	625	150	9.7 (3.40)	20.8 (4.68)	23.6 (4.94)	45. (5.
RIPCORD 400EC	125	30	81.9 (4.30)	95.8 (2.31)	97.2 (1.87)	97. (1.

#093

STUDY DATA BASE: 280-1315-9211

CROP: Cole Crops

PEST: Diamondback moth (DBM), *Plutella xylostella* (Linnaeus)

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TITLE: **MEASUREMENT OF PERMETHRIN RESISTANCE IN DIAMONDBACK MOTH IN ONTARI INSECTICIDE SUSCEPTIBILITY OF STRAINS FROM ONTARIO AND SASKATCHEWA**

MATERIALS: Technical grade permethrin, endosulfan and azinphos-methyl

METHODS: Insecticide susceptibility was measured in DBM collected from a treated Brussels sprouts field in Simcoe, Ontario where control was ineff and compared in late 1991 to levels measured in DBM from the London Resea Farm (LRC) where no insecticides were applied. In 1992, DBM were collect from cole crops in 2 Ontario fields (Chatham, Embro) and from 4 canola fi in Saskatchewan. Direct contact bioassays were done using a Potter spray tower. A range of serial concentrations (up to 1.0%) was chosen to cause 100% mortality. A solvent CONTROL (19:1 acetone:olive oil) was included each test. At each concentration at least two replicates of ten third-in larvae were sprayed with 5.0 ml of insecticide solution. Mortality was assessed after 18 hr. To compare susceptibility of collected DBM, LC50 v were estimated by means of log-probit graphs.

RESULTS: Results are summarized in the table below. Tested insecticides currently recommended for DBM control in cole crops in Ontario. DBM from field where control was ineffective (SIM91) showed 40x resistance to permethrin while DBM from two other Ontario strains (CHAT92, EMB92) remai susceptible to this insecticide. The EMB strain was more susceptible to endosulfan than the LRC strain. DBM were not a problem in the fall of 19 because of the cool, wet weather which reduced numbers to the extent that from LRC were unavailable for comparison. Four strains from canola field showed less than 10-fold variation in response among collections. In sev instances, and particularly for endosulfan, DBM from Saskatchewan were mo susceptible than DBM from LRC. The CHAMB strain exhibited a low slope response to permethrin, as did the CHAT strain to azinphos-methyl, indica development of resistance to these insecticides.

CONCLUSIONS: DBM collected from one field in Ontario in late 1991 were resistant to pe rmethrin. In 1992, tested Ontario populations were susce to both permethrin and endosulfan. Although Saskatchewan populations wer also susceptible, they exhibited some variation which may indicate resist development.

Insecticide	Location	Average % mortality of DBM larvae* 0.001	0.0033	0.01	0.033	0.1	0.33	1.0	Ratio**
permethrin	ONT-LRC	23	63	53	95	95			---
	ONT-SIM					5	50	98	x40
	ONT-CHAT	28	22	86	83	89			x1
	ONT-EMB	20	30	80	100	100			x1
	SASK-CHAMB		60	70	80				x1
	SASK-SASK	37	71	98	100				x0.33
	SASK-WILK	10	100	100					x0.5
	SASK-PLUN	70	100	100					x0.08
endosulfan	ONT-LRC				0	15	23	63	---
	ONT-SIM					5	28	67	x1
	ONT-CHAT				15	45	25	75	x1
	ONT-EMB			0	45	63	85	100	x0.06
	SASK-CHAMB				35	65	85	90	x0.07
	SASK-SASK					25	100	100	x0.18
	SASK-PLUN				30	60	90	95	x0.11
azinphos-methyl	ONT-LRC	0	10	83	100	100			---
	ONT-CHAT	0	6	38	56	84	84	100	x3.6
	ONT-EMB	0	25	57	95				x1
	SASK-CHAMB			65	100				x1
	SASK-SASK	33	44	100	100				x0.5
	SASK-WILK	15	20	40	100	100			x2
	SASK-PLUN	21	82	73					x0.3

* at indicated % insecticide solution;
** ratio of estimated LC50 of collected population compared to LC50 measu
for DBM from LRC.

#094

STUDY DATA BASE: 280-1452-9205

CROP: Horticultural Crops

PEST: Weeds in horticultural crops

NAME AND AGENCY:

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TITLE: **EFFECTS OF HERBICIDES ON ENZYMES IN SOIL**

MATERIALS: Technical (>90% purity) allidochlor, bentazon, chlorbromuron, dichlofop, EPTC, ioxynil, monolinuron, propazine, and nitrofen (85% purit

METHODS: Samples of 10 g sandy loam were treated with required amounts of herbicides. Triplicate samples of 2 g soil for each herbicide treatment w allowed to stand with 0.6 mL toluene for 15 min. and with 4 mL acetone-phosphate buffer at pH 5.5 and 5 mL of 5% sucrose solution for invertase determination. Samples were incubated at 28 °C. Invertase activity was determined using Prussian blue method for the reducing sugar sand-herbicide mixture was incorporated with 15 g of soil for the urease Soil urease was determined by incubating the samples at 28 °C in a system containing urea and measuring the formation of ammonium nitrogen b steam distillation. Untreated controls were also included.

RESULTS: Results are summarized in the table below.

CONCLUSION: None of the herbicides inhibited activities of soil invertase after 2 days nor urease which are important to soil fertility.

Rate Treatment	Invertase (ug/g)	Urease mg glucose/g Incubation period (days) 1	2	100ug(NH/4+-N)/g 2	14
Control	0	127	167	14	36
Allidochlor	10	94*	153	16	35
Bentazon	10	103*	167	13	35
Chlorbromuron	10	112*	178	18*	29
Diclofop	10	131	183	16	35
EPTC	10	127	164	18*	36
Ioxynil	10	126	152	16	35
Monolinuron	10	117*	160	17	34
Propazine	10	104*	166	14	35
Nitrofen	10	91*	147	15	36

* Significantly different from control at 5% level.

#095

STUDY DATA BASE: 280-1452-9205

CROP: Horticultural Crops

PEST: Weeds in horticultural crops

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TITLE: **EFFECTS OF HERBICIDES ON MICROBIAL DENITRIFICATION AND RESPIRATIO SANDY SOIL**

MATERIALS: Technical (>90% purity) allidochlor, bentazon, chlorbromuron, diclofop, EPTC, ioxynil, monolinuron, propazine and nitrofen (85% purity)

METHODS: Required amounts of herbicides were dissolved in l mL petroleum ether:acetone (1:1) mixture and incorporated with 0.5 g carrier sand. Af the solvent had evaporated, the sand was mixed in 20 g sandy loam to yiel application rate of 10 ug/g. Denitrification activity is reflected by ga nitrogen loss from NO_{3-}-N in soil. Each sample was brought to 60% moistu holding capacity. The activity of soil denitrification was determined by measuring formation of N_2O using a gas-chromatograph equipped with dualth conductivity detectors and Porapak Q columns. In soil respiration experi 8-g (oven-dry weight) portion of soil was placed in Warburg flasks. Oxyg consumption was measured at 30 °C at intervals of 4 days using a Gilson differential respirometer. Untreated controls were included with all tes All results are expressed on an oven-dry basis and are means of triplicat determinations.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: Herbicides had equal or stimulatory effects on denitrificati soil microbes during 2 wks. No inhibitory effect was observed in the respiratory study.

Treatment	Rate (ug/g)	Denitrification ug N/g soil		Respiration uL O_2/g
		Incubation period		
		1 wk	2 wk	4 days
Control	0	244	876	141
Allidochlor	10	127	3290	195
Bentazon	10	2752*	2820	217*
Chlorbromuron	10	2235	2531	215*
Diclofop	10	2883*	3813	250*
EPTC	10	1210	5415*	219*
Ioxynil	10	468	5202*	221*
Monolinuron	10	224	2360	219*
Propazine	10	205	3226	198*
Nitrofen	10	166	2040	184*

* Significantly different from control at 5% level.

#096

STUDY DATA BASE: 280-1452-9205

CROP: Horticultural Crops

PEST: Weeds in horticultural crops

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TITLE: **EFFECTS OF HERBICIDES ON MICROBIAL NITRIFICATION AND SULFUR OXIDATION IN SOIL**

MATERIALS: Technical (>94% purity) nitrapyrin, butylate, ethalfluralin, imazethapyr, linuron, metolachlor, metribuzin, and trifluralin.

METHODS: Herbicides were applied to the soil at a rate of 10 ug active ingredient per gram of soil except nitrapyrin at 30 ug/g. Samples were incubated at 28 °C and 60% moisture-holding capacity. Soil nitrification was determined by phenol disulfonic acid method for nitrate 410 nm in a spectrophotometer. Nitrite was determined by the diazotizati method with sulfanilic acid, naphthylamine hydrochloride and sodium aceta buffer read at 525 nm. The level of sulfur oxidation was determined turbidimetrically in the soil extracts at 429 nm for sulfate. Untreated controls were included with all tests. All results are expressed in ter oven-dried soil, and results are means of triplicate determinations. Anal of variance was employed for statistical analyses of results.

RESULTS: Results are summarized in the table below.

CONCLUSIONS: Nitrification was depressed up to 1wk after treatment with m herbicides, however, no inhibitory effect was observed by the end of 2 wk Oxidation of soil sulfur was not inhibited during the experiment. Althoug reduction in nitrification by some treatments is significant for up to 1 these effects were not deleterious to soil microbial activities important soil fertility over the periods of 2 wks after herbicide treatment.

Treatment	Rate (ug/g)	Nitrification ug(NO_{2^-} NO_3^-)-N/g		S-oxidation ug($SO_4^{=}$-S)/g	
		Incubation period(WK)			
		1	2	4	8
Control	0	7	12	27	22
Nitrapyrin	30	2*	9*	54*	53*
Butylate	10	6	13	55*	39*
Ethalfluralin	10	3*	13	40*	38*
Imazethapyr	10	4*	13	52*	36*
Linuron	10	3*	13	46*	35*
Metolachlor	10	5*	11	44*	32*
Metribuzin	10	5*	14*	66*	37*
Trifluralin	10	7*	16*	55*	29*

* Significantly different from Control at 5% level.

#097

STUDY DATA BASE: 280-1452-9205

CROP: Horticultural crops

PEST: Weeds in horticultural crops

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TITLE: **EFFECTS OF HERBICIDES ON MICROBIAL POPULATIONS IN SOIL**

MATERIALS: Technical (>94% purity) butylate, ethalfluralin, imazethapyr, linuron, metolachlor, metribuzin and trifluralin.

METHODS: Ten micrograms active ingredient of herbicide per gram of soil w dissolved in pentane-acetone (1:1) mixture and incorporated with carrier After the solvents had evaporated, the sand-herbicide mexture was incorporated with sandy soil by tumbling for 30 min. Changes in the soil microflora numbers were determined by soil dilution plate technique using sodium albuminate agar for bacteria and actinomycetes and rose-bengal streptomycin agar for fungi. Soil moisture was maintained at 60% moistur holding capacity. Samples were incubated at 28 °C for periods of 1 and 2 after treatment. Analysis of variance was used in statistical analysis of results.

RESULTS: Results are summarized in the table below.

CONCLUSIONS: Microbial populations were equal to or greater than that of control after 2 wk. These results suggest that there were no inhibitory effects of the herbicides on the numbers or biomass of microorganisms.

Treatment	Rate (ug/g)	Bacteria ($x10^5/g$)		Fungi ($x10^3/g$)	
		Period of incubation (wk)			
		1	2	1	2
Control	0	181	96	41	28
Butylate	10	125*	90	27*	25
Ethalfluralin	10	250*	176*	66*	32
Imazethapyr	10	214	102	52	19
Linuron	10	169	94	56*	24
Metolachlor	10	124*	137*	29	39
Metribuzin	10	148	118	32	18
Trifluralin	10	119*	106	43	39

* Significantly different ($p<0.05$) from control.

#098

STUDY DATA BASE: 280-1452-9205

CROP: Horticultural crops

PEST: Weeds in horticultural crops

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TITLE: **EFFECTS OF SEVEN HERBICIDES ON ACTIVITIES OF AMYLASE AND DEHYDROGE IN SANDY SOIL**

MATERIALS: Technical (>94% purity) butylate, ethalfluralin, imazethapyr, linuron, metolachlor, metribuzin, trifluralin

METHODS: Herbicides were applied to the soil at a rate of 10 :g active ingredient per gram of soil. Samples were incubated at 28 °C and 60% mois holding capacity. Triplicate samples of 2 g soil for each herbicide trea were allowed to stand with 0.6 mL toluene for 15 min. with 4 mL acetone-phosphate buffer at pH 5.5, and 5 mL of 2% starch solution for amylase determination. After mixing, samples were incubated at 28 °C. Amy activities were determined using the Prussian blue method for the reducir sugar. Values for the hydrolysis of starch by soil enzymes were correctec the reducing sugars produced on incubation of the soil without added substrate. Reducing sugars produced were estimated as glucose. The sand-herbicide mixture was incorporated with 15 g of soil for the dehydrogenase study. Dehydrogenase activity reflects oxidative activity c soil microflora. The activity of unbound soil dehydrogenase was determine incubating the soil samples at 28 °C in a system containing 2,3,5-triphenyltetrazolium chloride (TTC), and measuring the formation of 2,3,5-triphenyltetrazolium formazan, a reduction product of TTC, using a spectrophotometer at 470 nm. Untreated controls were also included.

RESULTS: Results are summarized in the table below.

CONCLUSION: None of the herbicide treatments inhibited activities of soil enzymes, amylase and dehydrogenase which are important to soil fertility.

Treatment	Rate (ug/g)	Amylase mg glucose/g soil		Dehydrogenase ug Formazan/gsoil	
		Incubation period			
		1day	3days	1wk	2wks
Control	0	3	4	6	10
Butylate	10	2	4	5	7
Ethalfluralin	10	1*	4	4*	9
Imazethapyr	10	2	4	6	9
Linuron	10	1*	4	6	11
Metolachlor	10	2	4	6	10
Metribuzin	10	2	4	5	6
Trifluralin	10	2	4	6	7

*Significantly different from Control at 5% level.

#099

STUDY DATA BASE 306-1452-9016

CROP: Potato

PEST: Colorado potato beetle (*Leptinotarsa decemlineata* L.)
European earwig (*Forficula auricularia* L.)
pharaoh ant (*Monomosium pharaonis*).

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TITLE: **Toxicity of INSECOLO to earwig, Colorado potato beetle and pharaoh adults**

MATERIALS: INSECOLO (baited diatomaceous earth)

METHODS: Adults obtained from the field were used within 24 hours of collection. The toxicity test unit consisted of 10 insects in a 15 mm diameter petri dish. For Colorado potato beetle tests 3 potato leaflets first added to the petri dish. The Potter spray tower was calibrated to deliver 75 kg/ha in 10 mL to the petri dish for the wet treatment. A wei amount of product was added to a petri dish for the dry treatment. Morta was recorded after 24 and 48 hours exposure at 22 °C, 75% R.H. & 16 hour photoperiod. Each test was repeated 2 times. Regression data analysis wa conducted using binomial distribution and logit function.

RESULTS: Results are shown in the table below.

CONCLUSION: The dry form of INSECOLO was effective in controlling Europea earwig.

Insect (SEM)	INSECOLO Rate (kg/ha)	% Mortality dry 24 h	dry 48 h	wet 24 h	wet 48 h
European earwig	0	3 (1.6)	7 (2.3)	-	-
	75	38 (4.4)	100 (0.0)	-	-
	150	55 (4.5)	100 (0.0)	-	-
Colorado potato beetle	0	2 (1.2)	2 (1.2)	0 (0.0)	1 (0.8)
	75	0 (0.0)	3 (1.4)	0 (0.0)	3 (1.6)
	150	2 (1.2)	12 (2.9)	3 (1.4)	14 (3.2)
Pharaoh ant	0	8 (2.5)	12 (2.9)	8 (2.4)	12 (2.9)
	75	3 (1.6)	8 (2.5)	42 (4.5)	47 (4.6)
	150	3 (1.4)	33 (4.3)	4 (1.8)	36 (4.4)

#100

CROP: Apple cv. Spy

PEST: Apple Scab, *Venturia inaequalis* (Cke.) Wint.

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TITLE: **CONTROL OF APPLE SCAB USING FLUAZINAM, BRAVO 500 AND BRAVO 825**

MATERIALS: Fluazinam (500g/l SC), BRAVO 500 SC (chlorothalonil 500g/l), BRAVO 825 WDG (chlorothalonil 82.5%)

METHODS: An abandoned apple orchard in St. George, Ontario was used. Trea were assigned to single tree plots, replicated 3 times and arranged accor to a randomized complete block design. Applications were made to treatme 2, 3, 6 and 7 beginning at green tip and continued every 7-10 days until bloom. Treatments 4 and 5 were made beginning at green tip and continued day intervals until petal fall. All treatments then followed 10 day inte until cessation of terminal growth and 14 days until mid-August. Applica were made dilute with a hand held sprayer at 3000 L/ha (runoff). Spray pressure was 2760 KPa. Maintenance treatments of fenvalerate (0.100 kgai were applied for control of insect pests. Ratings were conducted on the a leaves on July 6 and fruit on September 3 (preharvest). Percent scab of and fruit was calculated by counting the number with apple scab per 100 leaves/fruit (chosen at random). Data were analyzed using an analysis of variance and Duncan's multiple range test at the P = 0.05 significance le

RESULTS: As presented in table below.

CONCLUSIONS: All treatments significantly reduced the number of fruit anc leaves infected with apple scab when compared to the untreated check.

		Percent with apple scab	
Treatment	Rate (prod/ha)	% Disease (Leaf)	% Disease (Fruit)
FLUAZINAM	1.0 L	4.67 b*	2.17 b
FLUAZINAM	0.75 L	14.17 b	4.50 b
FLUAZINAM	0.50 L	15.17 b	14.00 b
BRAVO 500	2.0 L	18.83 b	21.00 b
BRAVO 825	1.3 KG	19.17 b	11.17 b
POLYRAM 80	6.0 KG	12.00 b	0.67 b
BRAVO 500	1 L	13.33 b	1.50 b
FLUAZINAM	0.5 L		
Untreated	-----	42.50 a	84.67 a

* Means followed by the same letter are not significantly different (P=0.

#101

STUDY DATA BASE: 348-1461-4802

CROP: Apple cv. Jerseymac

PEST: Apple scab, *Venturia inaequalis* (Cke.) Wint.;
Cedar-apple rust (CAR), *Gymnosporangium juniperi-virginianae* Schw.;
Frogeye leafspot (FELS), *Botryosphaeria obtusa* (Schwein.) Shoemaker
Quince rust (QR), *Gymnosporangium clavipes* (Cooke & Peck)

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TITLE: **EVALUATION OF FUNGICIDES FOR THE CONTROL OF FUNGAL DISEASES OF APP**

MATERIALS: CAPTAN 80 WP (captan),
CAPTAN 80 WDG (captan), DITHANE 75 DG (mancozeb),
ELITE 45 DF (tebuconazole), NOVA 40 WP (myclobutanil)

METHODS: Apple scab control was evaluated in a ten-year-old orchard on M. rootstock. Treatments were assigned to two-tree plots replicated four ti and arranged according to a randomized complete block design. The materi were sprayed to runoff (8-10 L/plot) using a hydraulic handgun attached t truck- mounted Rittenhouse sprayer operating at 2700 kPa. Unsprayed guar trees were left between plots to reduce spray drift. A 2.4 x 3.7 m plast tarp, supported by two 3.0 m x 4 x 9 cm boards, was placed around plots b sprayed, when necessary, in a further attempt to reduce spray drift.

Treatments 2 and 3 were applied on a 5 to 10 day protectant schedule on M 8, 15, 22, 29, June 8, 17, 22, 29 and July 6. Treatments 4 and 5 were sp at approximately 10 day intervals on May 4, 14, 25, June 4, 15, 25 and Ju Treatment 6 was two sprays of NOVA (11.3 g prod/100 L) on May 12, 22 foll by two sprays of NOVA + DITHANE (11.3 g and 100 g prod./100 L, respective June 1 and 11. On June 22, 29 and July 6, Treatment 6 was sprayed with D at 200 g prod/100 L. Treatment 7 consisted of two sprays of DITHANE (200 prod/100 L) on May 1 and 8; 2 sprays of NOVA (11.3 g prod/100 L) on May 2 29; 2 sprays of NOVA + DITHANE (11.3 g and 100 g prod/100 L, respectively June 8 and 18; and 3 applications of DITHANE (200 g prod/100 L) on June 2 and July 6. Mill's primary scab infection periods occurred on May 3, 9, 1 23-24, 26-27, 30-June 1, June 5-6, 24-25. Rust and FELS were assessed on 17 by checking all the leaves on 10 shoots and 100 fruit per plot. The incidence of scab was determined on July 2 by examining all the leaves an fruit on 20 fruiting clusters and all the leaves on 10 randomly selected shoots, per plot. On August 19, scab was assessed on all the leaves of 2 randomly selected shoots and on 100 fruit per plot.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: All sprayed treatments provided significant scab control on shoot and cluster leaves, throughout the season, relative to the unspraye check. As of July 2, CAPTAN 80 WDG provided better scab protection to the than did the DITHANE/NOVA treatment (Trmt. 7). By August 19, there was n difference among the sprayed treatments in the protection from scab on ei the leaves or fruit. All fungicides provided significant control of CAR FELS on the leaves and QR on the fruit as compared to the unsprayed check significant difference in CAR control on the fruit was observed among

treatments. The treatments using ELITE or NOVA (Trmt. 4, 5, 6 & 7) provi
the best protection from CAR and FELS on the shoot leaves.

		PERCENT WITH SCAB				
			JULY 2		AUGUST 19	
Treatment	Rate of product/ 100 L	Cluster leaves	Shoot leaves	Fruit	Shoot leaves	Fruit
1.Check	-	27.9 a*	38.4 a	74.1 a	79.0 a	99.8 a
2.CAPTAN 80 WP	125.0 g	1.8 b	3.1 b	2.1 bc	5.3 b	11.3 b
3.CAPTAN 80 WDG	125.0 g	0.9 b	2.0 b	0.0 c	1.4 b	2.5 b
4.ELITE 45 DF	13.9 g	0.2 b	2.3 b	4.7 bc	3.5 b	6.3 b
5.ELITE 45 DF + DITHANE DG	9.3 g 100.0 g	0.4 b	1.2 b	2.4 bc	2.4 b	3.5 b
6.NOVA 40 WP/ DITHANE DG	11.3 g 100 - 200 g	0.5 b	0.2 b	4.8 bc	5.7 b	9.3 b
7.DITHANE DG/ NOVA 40 WP	100 - 200 g 11.3 g	1.0 b	0.2 b	7.7 b	1.9 b	6.0 b

	JULY 17			
	% Shoot leaves with		% Fruit with	
Treatment	CAR	FELS	CAR	QR
1. Check	26.8 a	32.1 a	0.3 a	4.3 a
2. CAPTAN 80 WP	1.8 c	2.7 bc	0.0 a	0.0 b
3. CAPTAN 80 WDG	9.2 b	4.2 b	0.0 a	0.0 b
4. ELITE 45 DF	0.2 d	1.5 cd	0.0 a	0.0 b
5. ELITE 45 DF + DITHANE DG	0.0 d	0.4 d	0.0 a	0.0 b
6. NOVA 40 WP/ DITHANE DG	0.0 d	0.6 d	0.0 a	0.0 b
7. DITHANE DG/ NOVA 40 WP	0.0 d	0.5 d	0.0 a	0.0 b

* Means followed by the same letter in each column are not significantly different using Duncan's multiple range test (P=0.05). Percent data wer analyzed following arcsin transformation.

#102

STUDY DATA BASE: 348-1461-4802

CROP: Apple cv. McIntosh

PEST: Apple scab, *Venturia inaequalis* (Cke.) Wint.

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TITLE: **EVALUATION OF NOVA 40 WP AND DITHANE 75 DG FOR APPLE SCAB CONTROL**

MATERIALS: DITHANE 75 DG (mancozeb); NOVA 40 WP (myclobutanil)

METHODS: A twenty five-year-old orchard of standard sized apple trees was to evaluate NOVA and DITHANE for apple scab control. Numerous trees had previously been removed from the orchard. Plots consisting of 21 to 47 t were replicated five times according to a randomized complete block desig The materials were applied using an FMC Economist orchard sprayer operati 2700 kPa and delivering 841 L/ha. DITHANE was sprayed at a rate of 6 kg product per hectare on May 1 (green tip), and 8 (1/2" green). NOVA, at a of 340 g product per hectare, was mixed with 3 kg of DITHANE per hectare May 21 (bloom), June 1, 10 and 19. DITHANE (6 kg prod/hectare) was spray these same plots on June 29. Mill's primary scab infection periods occur on May 3, 9, 17-18, 23-24, 26-27, 30-June 1, June 5-6, 24-25.

The incidence of scab was determined on July 13 by examining all the leav and fruit on 20 fruiting clusters and all the leaves on 10 shoots on two per plot. On August 18, all the leaves on 20 shoots and 100 fruit on two trees per plot were checked for scab.

RESULTS: The results are summarized in the table below.

CONCLUSION: The NOVA 40 WP and DITHANE DG program provided significant season- long scab control on both the leaves and fruit relative to the unsprayed check.

		PERCENT WITH SCAB			
			JULY 13		AUGUST
Treatment	Rate of product/ HA	Cluster leaves	Shoot leaves	Fruit	Shoot leaves
Check	-	18.6 a*	45.8 a	41.5 a	73.5 a
NOVA 40 WP + DITHANE 75 DG**	340.0 g 3.0 kg	0.7 b	1.7 b	4.2 b	3.5 b

* Means followed by the same letter in each column are not significantly different using Duncan's multiple range test (P=0.05). The data were analyzed following arcsin transformation.

** Preceded by DITHANE on May 1, 8 and followed by DITHANE on June 29 (6 prod/ha).

#103

STUDY DATA BASE: 348-1461-4802

CROP: Apple cv. McIntosh

PEST: Apple scab, *Venturia inaequalis* (Cke.) Wint.

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TITLE: **EVALUATION OF NUSTAR 20 DF IN FUNGICIDE MIXES FOR THE CONTROL OF A SCAB**

MATERIALS: CAPTAN 75 WDG (captan), CAPTAN 80 WP (captan), MANZATE 200 DF (mancozeb), NUSTAR 20 DF (flusilazole)

METHODS: Apple scab control was evaluated in a twenty-one-year-old orchar McIntosh apples on M.9 or M.26 rootstock. Treatments were assigned to th tree plots and replicated four times using a randomized complete block de The fungicides were sprayed to runoff (7-9 L per plot) using a hydraulic handgun attached to a truck-mounted Rittenhouse sprayer operating at 2700

Unsprayed guard trees were left between plots to reduce spray drift. A 2 3.7 m plastic tarp supported by two 3.0 m x 4 x 9 cm boards was placed ar plots being sprayed, when necessary, in a further attempt to reduce spray drift.

Treatment 2 was sprayed at approximately 10 day intervals on May 4, 14, 2 June 4 followed by three sprays of MANZATE 200 DF (200 g prod/100 L) on J 22, 29 and July 6. Treatments 3, 4 and 5 were sprayed at about 10 day intervals on May 4, 14, 25, June 4, 15, 25 and July 6. Treatment 6 was sprayed on May 20, 29, June 8 and 18. It was preceded by one applicatior MANZATE (200 g prod/100 L) on May 4 and followed by three sprays of MANZA June 22, 29 and July 6 at the same rate. Mill's primary scab infection periods occurred on May 3, 9, 17-18, 23-24, 26-27, 30-June 1, June 5-6, 2

The incidence of scab was determined on June 26 by examining all the leav and fruit on 20 fruiting clusters and all the leaves on 10 randomly selec shoots, per plot. On August 21, scab was assessed on all the leaves of 2 randomly selected shoots and on 100 fruit per plot.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: All fungicide treatments provided significant scab control o both the leaves and fruit, throughout the season, as compared to the unsp check. All sprayed treatments provided equivalent season long scab protec to the fruit. As of August 21, the 7 spray programs using NUSTAR and cap or mancozeb (Treatments 3, 4, 5) provided better scab control on the shoo leaves than did either of the 4 spray programs using NUSTAR. No symptoms phytotoxicity were observed in this trial.

		PERCENT WITH SCAB				
			JUNE 26		AUGUST 21	
Treatment	Rate of product/ 100 L	Cluster leaves	Shoot leaves	Fruit	Shoot leaves	Fru
1. Check	-	6.1 a*	18.9 a	14.3 a	53.3 a	75.
2. NUSTAR 20 DF** (4 sprays)	6.7 g	0.2 b	2.4 b	0.5 b	8.0 b	1.
3. NUSTAR 20 DF + CAPTAN 80 WP (7 sprays)	3.3 g 62.5 g	0.0 b	0.7 b	0.0 b	1.0 c	0.
4. NUSTAR 20 DF + CAPTAN 75 WDG (7 sprays)	3.3 g 66.7 g	0.0 b	0.6 b	0.0 b	1.0 c	0.
5. NUSTAR 20 DF + MANZATE 200 DF (7 sprays)	3.3 g 100.0 g	0.3 b	0.4 b	0.0 b	2.0 c	0.
6. NUSTAR 20 DF + MANZATE 200 DF*** (4 sprays)	3.3 g 100.0 g	0.0 b	1.2 b	0.0 b	4.8 b	0.

* Means followed by the same letter in each column are not significantl different using Duncan's multiple range test (P=0.05). The data were analyzed following arcsin transformation.

** Followed by three sprays of MANZATE 200 DF (200 g prod/100 L) on June 29 and July 6.

*** Preceeded by one spray (May 4) and followed by three sprays (June 22, July 6) of MANZATE 200 DF at 200 g prod/100 L.

#104

CROP: Apple, cv. McIntosh

PEST: Apple scab, *Venturia inaequalis* (Cke.) Wint.

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TITLE: **EVALUATION OF MYCLOBUTANIL SPRAY SCHEDULES FOR APPLE SCAB CONTROL,**

MATERIALS: NOVA 40W (myclobutanil), DITHANE M-45 (80wp mancozeb), KUMULUS 80DF (sulphur).

METHODS: The trial was conducted using 5-6 year old McIntosh apple trees Winfield, B.C. Treatments were arranged in a randomized complete block design, with 3 trees per treatment and 4 replicates. Treatments included + DITHANE and NOVA + KUMULUS. Two rates of NOVA and both protectant and eradicant treatment schedules were tested. The low rate of NOVA correspo roughly to the estimated tree row volume rate based on tree size and spac Eradicant treatments included application within 32, between 32 and 64, a between 64 and 96 hours from the beginning of each infection period. One eradicant treatment also included a follow-up spray 7 days later, as recommended on the NOVA label. Protectant treatments were applied on a 10 schedule initiated after the first infection period. Infection periods w predicted to have occurred on April 16- 17, May 25-26, and June 12-13. A treatments were discontinued June 23. One- hundred leaves per tree were evaluated on one middle tree per plot on July 7 for the presence of scab lesions. All fruit on each tree were examined for scab lesions on July 2

RESULTS: The results are summarized in the table below.

CONCLUSIONS: Apple scab levels were low to moderate, therefore the trial not a stringent test for apple scab control. All fungicide treatments wi one exception (NOVA, 7.5 g/100 L + DITHANE applied within 96 hours as an eradicant) provided significant control of scab on leaves compared to the check. NOVA + DITHANE applied on a 10 day protectant schedule provided b control on leaves than when applied on an eradicant schedule. There were differences among fungicide treatments for fruit scab control. The eradi program provided a savings of 4 applications over the protectant program. Eradicant treatments provided acceptable levels of control in this trial.

This trial was funded by the Okanagan Valley Tree Fruit Authority.
Table 1. Mean percentage of leaves and fruit with apple scab lesions for treatment.

Fungicides	Rate g/100 L	Application Schedule	Number Sprays	Leaf Scab July 7	Fruit July
Nova 40W + Dithane M-45	11.5 100	Protectant	7	0.2 C*	0.0
Nova 40W + Dithane M-45	7.5 100	Protectant	7	0.2 C	0.0
Nova 40W + Dithane M-45	7.5 100	Eradicant 64 hrs.	3	5.7 B	0.4
Nova 40W + Dithane M-45	11.5 100	Eradicant 96 hrs + 7 day	6	6.1 B	0.0
Nova 40W + Kumulus DF	11.5 350	Eradicant 32 hrs.	3	6.3 B	0.1
Nova 40W + Dithane M-45	11.5 100	Eradicant 64 hrs.	3	6.5 B	0.0
Nova 40W + Kumulus DF	7.5 350	Eradicant 32 hrs.	3	7.0 B	0.4
Nova 40W + Dithane M-45	11.5 100	Eradicant 96 hrs.	3	7.0 B	0.4
Nova 40W + Dithane M-45	11.5 100	Eradicant 32 hrs.	3	7.7 B	0.0
Nova 40W + Dithane M-45	7.5 100	Eradicant 32 hrs.	3	8.3 B	0.0
Nova 40W + Dithane M-45	7.5 100	Eradicant 96 hrs.	3	12.1 AB	0.0
Control	---	---	0	17.5 A	6.2

* Numbers followed by the same letter within the columns are not signific different at P=0.05 according to Duncan's multiple range test. Data wa transformed using the square root transformation prior to ANOVA. The w means are shown in the table.

#105

ICAR: 91000658

CROP: Apple cv. Jersey Mac

PEST: Apple Scab, *Venturia inaequalis* (Cke.) Wint.

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TITLE: **EVALUATION OF STEROL INHIBITING FUNGICIDES AND APPLICATION TIMINGS THE CONTROL OF APPLE SCAB**

MATERIALS: NOVA 40 WP (myclobutanil), NUSTAR 20 DF (flusilazole), ELITE 45 DF (tebuconazole), DITHANE 75 DG (mancozeb), CAPTAN 80 WP (captan), MANZATE 75 DF (mancozeb), POLYRAM 80 DF (metiram)

METHODS: Trial was established in a nine year old plantation of Jersey Ma
trees on EM7 rootstock, spaced 3.7m X 5.5m, using a R.C.B. design with tw
tree plots and four replicates. Applications were made with a diaphram pu
handgun system, operating at 1660 kPa, and were made on a spray to run-of
basis. A full dilute rate of 3000L/ha was assumed and treatment mixes wer
diluted on this basis. INFECTION PERIODS: 13/05 (light, tight cluster), 1
(light, full pink), 27/05 (mod., apples 5mm), 31/05 (heavy, apples 6-8mm)
06/06 (light, apples 8-12mm), 07/06 (mod., apples 8-12mm), 12/06(mod., ap
12-15mm), 24/06 (mod., apples 18-25mm). TREATMENT DATES (hours from start
infection): TREATMENT 2 - POLYRAM: 02/05 (prot.), 25/05 (prot.); DITHANE:
30/05 (prot.), 08/06 (prot.), 24/06(prot.); MANZATE: 14/05 (20), 04/06
(prot.), 16/06 (prot.) - TREATMENT 3 - DITHANE: 02/05 (prot.), NOVA+ DITH
18/05 (112.5 & 10), 25/05 (cover), 4/06 (98.75), 16/06 (83); DITHANE: 24/
(prot.) - TREATMENT 4 - NOVA+DITHANE: 18/05 (112.5 & 10), 30/05 (67.5), 1
(62.25); DITHANE: 24/06 (prot.) - TREATMENT 5 - ELITE +CAPTAN: 18/05 (112
10), 25/05 (cover), 4/06 (98.75), 16/06 (83); DITHANE: 24/06 (prot.) -
TREATMENT 6 - NUSTAR+MANZATE: 18/05 (112.5 & 10), 25/05(cover), 4/06(98.7
16/06 (83); DITHANE: 24/06 (prot.). ASSESSMENTS: All leaves on 20 cluster
20 terminals/plot were examined for primary scab lesions; 100 and approx.
fruit/plot were examined for scab lesions, mid-season and at harvest
respectively.

RESULTS: As presented in the table below.

CONCLUSIONS: All treatments provided excellent fruit scab control. Treatm
gave less than the excellent leaf scab control that was seen with the oth
treatments. A comparison of the different schedules used (and the number
applications involved) with the scab control results obtained, indicates
with the sterol inhibitors, different approaches to scab control can now
used to obtain similar end results. The season was one where there were
relatively few primary infections, especially during early tree growth.
Treatment 2 was on a protectant schedule typical of commercial use patter
and received 8 applications. Treatments 3,5 & 6 were to have been on an
extended interval program to use the eradicant & protectant capabilities
their various components. But by full pink, with no infections having

occurred, it was decided to make full pink and calyx sprays, and then res the eradicant/protectant schedule. For application decision purposes, th light infections listed for 13/05 & 17/05 (as determined by the provincia extension department) were not considered to have occurred in the test orchard, 3 km from monitoring site. A total of 4 tank mix applications, one protectant at the end of the primary infections, were made on these treatments. Treatment 4 was similar in its schedule to Treatments 3, 5 & but instead of the automatic calyx application, the eradicant/protectant schedule was restarted immediately after bloom, thus the 2nd application not made until after the first post-bloom infection had occurred. This reduced the number of tank mix applications by one. All treatments recei three summer maintenance applications of captan.

Treatment	Rate g AI/ha	% Fruit Scab* 20/07	21/08	% Terminal Leaf Scab - 20/07	% Cluster Scab -
1.Control	-	25.8a	28.2a	22.6a**	21.8a*
2.POLYRAM; MANZATE;DITHANE	4800; 4500;4500	0.0b	0.0b	4.9b	5.9b
3.NOVA+DITHANE; DITHANE	110+2250; 3750	0.0b	0.0b	0.0c	0.0c
4.NOVA+DITHANE; DITHANE	110+2250 3750	0.0b	0.0b	0.0c	0.0c
5.ELITE+CAPTAN; DITHANE	125+1700 4500	0.0b	0.0b	0.0c	0.0c
6.NUSTAR+CAPTAN; MANZATE	20+1500 4500	0.0b	0.0b	0.0c	1.1c

* Means in same column, followed by same letter not signif.diff.(P<.05,D
** Data arcsin square root transformed before DMRT(detransformed data sho

#106

STUDY DATA BASE: 348-1461-4802

CROP: Apple cv. Golden Delicious

PEST: Cedar-apple rust (CAR), *Gymnosporangium juniperi-virginianae* Schw.; Quince rust (QR), *Gymnosporangium clavipes* (Cooke & Peck)

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TITLE: **CONTROL OF RUST DISEASES ON APPLE**

MATERIALS: DITHANE 75 DG (mancozeb), NOVA 40 WP (myclobutanil)

METHODS: A 3-year old orchard of trees on M.26 rootstock was used in this trial. Four-tree plots were replicated five times according to a randomi complete block design. Each plot consisted of one tree each of McIntosh, Empire, Red Delicious and Golden Delicious. The fungicides were sprayed runoff (7-14 L/plot) using a hydraulic handgun attached to a truck-mounte Rittenhouse sprayer operating at 2700 kPa. Unsprayed guard trees were le between plots to reduce spray drift. As well, a 2.4 x 3.7 m plastic tarp supported by two 3.0 m x 4 x 9 cm boards was placed around plots being sprayed, when necessary, in a further attempt to reduce spray drift.

DITHANE was sprayed on May 15 (pink); May 15 and June 1 (petal fall); and 1. NOVA was sprayed on May 27. The incidence of rust was determined by sampling the Golden Delicious trees in each plot. On July 28, all CAR le on each leaf of 10 shoots per plot were counted. All the fruit per plot, to 100, were checked for CAR or QR on the same date.

RESULTS: The results are summarized in the table below.

CONCLUSIONS: In 1992, the most severe rust infection period occurred from 26-27 (late bloom period of bud development). The treatments sprayed dur bloom or at petal fall provided significant CAR control on the shoot leav relative to the unsprayed check or the DITHANE treatment applied at the p stage of bud development. The two-spray program of DITHANE and the NOVA treatment provided the best CAR protection to the fruit. None of the spr treatments provided significant QR control as compared to the unsprayed c

The timing of fungicide sprays in relation to rust infection periods is m important than the number of sprays applied.

Treatment	Rate of product 100 L	% Leaves infected CAR	Mean no CAR lesions/ leaf	% Fruit wi CAR	(
Check	-	36.4 a*	12.1 a	27.5 a	4
DITHANE 75 DG (pink)	200.0 g	33.5 a	6.6 b	7.3 b	3
DITHANE 75 DG (pink + petal fall)	200.0 g	9.7 b	0.2 c	1.4 c	1
DITHANE 75 DG (petal fall)	200.0 g	9.3 b	0.3 c	6.0 b	7
NOVA 40 WP (bloom)	11.3 g	2.4 c	0.03 c	0.0 c	0

* Means followed by the same letter in each column are not significantly different using Duncan's multiple range test (P=0.05). The percent dat were analyzed following arcsin transformation.

#107

STUDY DATA BASE: 402-1461-8605

CROP: Apple cv. Jonagold

PEST: Powdery Mildew, *Podosphaera leucotricha* (Ell. and Ev.) Salm.

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TITLE: **USE OF MYCLOBUTANIL FOR POWDERY MILDEW CONTROL OF APPLE**

MATERIALS: KUMULUS S 80 WDG (sulfur), NOVA 40 WP (myclobutanil)

METHODS: The experiment was conducted at the Summerland Research Station 12-year-old Jonagold trees. Twenty-eight trees in two rows were separate into 4 blocks of 7 random single tree replicates per block. The single t replicates were separated from one another by an unsprayed tree on each s The 7 treatments were applied until runoff with a handgun operated at 500 Treatments were applied on April 9 (tight cluster), April 22 (pink), May (petal fall), May 20 (first cover), and June 3 (second cover).

Secondary powdery mildew was evaluated on June 23, 1992 by randomly selec 10 shoots on each single tree replicate and counting the number of leaves mildew and the area of mildew on each infected leaf. Twenty-five fruit p replicate were harvested on September 24. Each fruit was examined for ne russetting caused by powdery mildew.

RESULTS: As presented in the table below.

CONCLUSIONS: One application of Nova at petal fall provided the same low level of control, as two applications at petal fall and first cover, or c application at petal fall and two cover sprays of Kumulus. Nova at pink, petal fall and two cover sprays was the most effective spray regime. The addition of another Nova spray at tight cluster did not improve disease control.

Treatment	Rate of product/100 L	Timing	% Powdery Mildew Leaves	Leaf Area	Fr
Nova 40 WP	11.25 g	Petal Fall	32.8 B*	10.4 B	2.
Nova 40 WP Kumulus S	11.25 g 200.00 g	Petal Fall, 1st Cover, 2nd Cover	31.0 B	7.5 BC	0.
Nova 40 WP	11.25 g	Petal Fall, 1st Cover	28.8 B	9.7 B	0.
Nova 40 WP	11.25 g	Petal Fall, 1st Cover, 2nd Cover	15.5 C	6.5 C	0.
Nova 40 WP	11.25 g	Pink, Petal Fall, 1st Cover, 2nd Cover	6.0 D	2.5 D	0.
Nova 40 WP	11.25 g	Tight Cluster, Pink, Petal Fall, 1st Cover, 2nd Cover	6.5 D	4.8 CD	0.
Control	-	-	58.8 A	17.6 A	3.

* Means within the same column followed by the same letter are not signif different at P=0.05 as determined by the Waller-Duncan K-ratio t-test.

#108

CROP: Grape cv. Riesling

PEST: Powdery Mildew, *Uncinula necator* (Schw.) Burr.
Downy Mildew, *Plasmopara viticola* (Berk. & Curt.) Berl.& de Toni
Botrytis Bunch Rot, *Botrytis cinerea* Pers.
Black Rot, *Guignardia bidwellii* (Ellis) Viala & Ravaz

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TITLE: **CONTROL OF FUNGAL DISEASES IN GRAPES USING FLUAZINAM**

MATERIALS: Fluazinam (500 g/l SC), ROVRAL 50 WP (iprodione)

METHODS: The test was conducted in Vineland Ont. Treatments were assigned single row 5 m plots, replicated 3 times and arranged according to a randomized complete block design. Applications were made with a Solo bac sprayer at 1100 L/ha starting at shoot elongation (s)[2] or late bloom (a), continued at bunch closure (b), veraision (c) and preharvest (d). The sho elongation application was applied at 550 L/ha. Data was analyzed using analysis of variance and Duncan's multiple range test at the P = 0.05 significance level.

RESULTS: As presented in table below.

CONCLUSIONS: All treatments with the exception of ROVRAL provided excelle control of downy mildew. Several treatments provided control of powdery mildew and black rot. Excellent botrytis bunch rot control was achieved w treatments applied at shoot elongation.

Treatments	Rate pr/ha	Appl.Timing**	Mean Number of Diseased Leaves or Bunches*** Downy Mildew Aug.18	Powdery Mildew Aug.21/92	Black Rot	Bo bu Oc
Control	----	----	8.3 a*	8.3 a	12.3 a	
Fluazinam 500SC Rovral 50WP	1.5L 1.5kg	sab cd	0.3 c	0.3 b	4.7 bc	
Fluazinam 500SC Rovral 50WP	1.0L 1.5g	sab cd	0.0c	1.0 b	6.0 bc	
Rovral 50WP	1.5 kg	sabcd	6.3 ab	1.0 b	6.7 bc	
Fluazinam 500SC Rovral 50WP	1.5L 1.5 kg	ab cd	0.0 c	3.3 ab	9.3 ab	
Fluazinam 500SC	1.5L	abcd	0.0 c	2.0 b	6.3 bc	
Rovral 50WP	1.5 kg	abcd	2.3 bc	2.7 ab	9.0 ab	

* Means followed by the same letter are not significantly different (P
** Application timing abbreviations.
*** Downy mildew - mean number of infected leaves per 20 leaves Powdery m and Black rot - mean number of infected bunches per 20 bunches Botryt bunch rot - mean number of infected bunches per plot.

#109

CROP: Saskatoon, cv. Smoky

PEST: Leaf and berry spot; *Entomosporium mespili* (DC.) Sacc.; Powdery mildew, *Podosphaera clandestina* (Wallr.:Fr.) L v.; Rust, *Gymnosporangium* sp.

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TITLE: **EFFICACY AND PHYTOTOXICITY OF THREE FUNGICIDES ON SASKATOON**

MATERIALS: FUNGINEX 190 EC (triforine), POLYRAM 80 DF (metiram), HOLLYSUL MICRO-SULPHUR 92 WP (sulphur)

METHODS: This trial was conducted in a saskatoon orchard at the ASCHRC, Brooks. The experimental design was a randomized complete block with four replications per treatment. Uniform-sized bushes (average size 2.5 m hig 2.0 m wide) were selected and color coded for the respective fungicide or check treatment (Table 1). The required amount of each chemical was appl in 1.7 litres of water to two bushes in each of the replicates. Likewise bushes per replicate were sprayed with only water as a control. A C02-propelled, hand-held boom sprayer, equipped with four Tee Jet SS8002 nozzles spaced 48 cm apart and operated at 250 kPa, was used in the verti position to apply the treatments. Each bush was sprayed from two sides. Initial applications of all three fungicides and the water check were mad May 3 when the bushes were at the full bloom stage. Nine days later, at t petal fall stage, the POLYRAM, HOLLYSUL and check sprays were reapplied. Thereafter and for the duration of the experiment, only the sulphur and c treatments were continued on a 10- to 14-day schedule, i.e. May 22, June & 25, and July 6. At the mature fruit stage (July 24), phytotoxicity and disease symptoms on the foliage, if any, were assessed. Disease incidence determined by counting the number of affected leaves on each of four bran per bush. One chest-height branch was selected per compass point (N,S,E on each bush and, starting at the tip and progressing basipetally, the nu of leaves with mildew, rust or leaf spot out of 25 was recorded. The percentage of healthy leaves per bush was then calculated and the data fo two bushes in each replicate were averaged. These figures were subjected ANOVA. Disease assessments on the berries were not possible because of a fruit set. Phytotoxicity was subjectively assessed by visually examining foliage of each treated bush in mid-July.

RESULTS: See Table 1. There were no significant differences between the fungicide treatments for the percentage of healthy leaves. Most of the b in the 3X HOLLYSUL treatment exhibited a slight amount of leaf bronzing a blackening, a symptom of phytotoxicity. None of the other treatments cau any visible damage to the foliage.

CONCLUSIONS: Despite above-average precipitation during May, June and Jul significant levels of foliar diseases did not develop on saskatoons at th ASCHRC in 1992. Furthermore, a late spring frost caused a substantial am of fruit abortion and severely reduced the fruit set. This situation prevented a critical assessment of the efficacy of the products under tes against berry diseases. The repeated application of HOLLYSUL at 17.44 kg/ caused some leaf injury and left a heavy residue on the foliage. This treatment will not be included in future efficacy trials.

Table 1. Percentage healthy leaves on Smoky saskatoons treated with thre fungicides at Brooks, AB in 1992.

Fungicide	No. of applications	Rate (ai/ha)	% healthy* leaves
FUNGINEX	1	570 g	97.8
POLYRAM	2	4.80 kg	97.3
HOLLYSUL (1x)	7	5.98 kg	99.1
HOLLYSUL (2x)	7	11.96 kg	95.3
HOLLYSUL (3x)	7	17.94 kg	100.0
Check (water only)	7	--	99.4

* Each figure in this table is the mean of four replications.

#110

STUDY DATA BASE: 390-1452-9201 ICAR: 92005039

CROP: Snap bean (cv. 91-G)

PEST: Grey mold, *Sclerotinia*

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TITLE: **EVALUATION OF RONILAN FOR USE IN SNAP BEANS**

MATERIALS: RONILAN 50WP (vinclozolin)

METHODS: Snap beans (cv. 91-G) were planted on May 27, May 29, and June 5 in a randomized complete block design (four blocks) at a rate of 100 seec row, at each of three sites in the Fraser Valley, B.C. The proportions c organic matter, sand, silt, and clay varied among sites. In addition to control, 1, 2, and 4 kg/ha RONILAN were applied to the plants using a bac sprayer with a hollow cone nozzle on July 8 (preflower), July 15 (site 1- flower, site 2-20% flower, site 3-preflower), July 23 (site 1-40% fruit, 2- 10% fruit, site 3-5% fruit) and July 30 (site 1-50% fruit, site 2-90% site 3-15% fruit) in 250 L/ha water. Forty plants from each plot at each were harvested on August 6 and the plant weight (plant alone), total fres weight (plant + fruit), marketable bean yield, undersize bean yield, and weight recorded. The data were analyzed by ANOVA for each site. A singl degree of freedom contrast was performed for 4 kg/ha RONILAN vs. control. Linear and non-linear trend analyses were conducted using orthogonal coefficients for the increasing rate of RONILAN.

RESULTS: Neither the class contrast nor the trend analysis were significa sites one and two. Site three showed a significant non-linear trend for weight and total fresh weight such that there was an increase from the co to a peak value at 2 kg/ha followed by steady decline to 4 kg/ha. Becaus significant differences were not observed in either analysis for the othe variables, this trend was regarded as an anomaly. An adequate assessment disease control efficacy could not be made because disease incidence was low.

CONCLUSIONS: The efficacy of RONILAN in controlling grey mold and sclerot on beans is inconclusive. Snap bean (cv. 91-G) is tolerant to RONILAN up rate of 4 kg/ha when using yield components as indicators of crop tolerar

#111

STUDY DATA BASE: 206003

CROP: Carrot cv.'s Six Pak, Chantenay Red Core, Chanton

PEST: Cavity Spot, *Pythium* spp.

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TITLE: **EVALUATION OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) FOR THE CONTROL OF CAVITY SPOT**

MATERIALS: RIDOMIL MZ (metalaxyl), Plant Growth-Promoting Rhizobacteria (

isolates 1-102 (*Serratia proteamachulans*), 31-12 (*Pseudomonas fluorescens*
GR12-2 (*Pseudomonas putida*)

METHODS: Suspensions of PGPR (10^8 colony forming units/ml) were received
Allelix Soil Microbiology Department, Mississauga (now Esso Chemical Cana
Saskatoon) on June 2, 1988. Ten gram alliquots of carrot seed were soake
ml of suspension and then dried for 1 hour before seeding. Carrots were s
in naturally-infested organic soil at the Muck Research Station using a V
seeder, at a rate of 92 seeds/m for cv. Six Pak and 40 seeds/m for cv.'s
Chantenay Red Core and Chanton. The metalaxyl drench was applied in an 8
band over the seed row at a rate of 2.0 kg ai/ha in 2,000 L/ha of water.

Each replicate consisted of 1 row 6 m long. There were 4 replicates per
treatment arranged in a randomized complete block design.

Ten carrots per replicate were harvested at 2-3 week intervals throughout
season until December 3. Harvested carrots were washed and the percentag
carrots with cavity spot was recorded. Area under the disease incidence
(AUDIC) was calculated by summing the average percent cavity spot betweer
sample dates, multiplied by the number of days between the two sample dat

RESULTS: As presented in the table below. The cultivar by treatment
interaction was not significant, therefore, the main effects of cultivar
treatment are presented.

CONCLUSIONS: Seed dressings of the PGPR's GR12-2 and 1-102 and the metala
drench significantly reduced the incidence of cavity spot as compared to
untreated check. There were also significant differences in susceptibili
cavity spot among the carrot cultivars tested. Chanton had the highest
percentage of carrots with cavity spot, Six Pak had the lowest.

Treatment	N	Mean AUDIC	Cultivar	N	Mean AUDIC
Check	12	5278.6 a *	Chanton	20	5623.6 a
1-102	12	4181.7 b	Ch. Red Core	20	4524.3 b
34-13	12	4501.9 ab	Six Pak	20	2677.1 c
GR12-2	12	3667.7 b			
Drench	12	3745.1 b			

* Values in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.

#112

STUDY DATA BASE: 206003

CROP: Carrot cv. Caropak

PEST: Sclerotinia white mold, *Sclerotinia sclerotiorum* (Lib.) de Bary

NAME AND AGENCY:
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TITLE: **EVALUATION OF FUNGICIDES FOR THE CONTROL OF SCLEROTINIA ON CARROTS STORAGE**

MATERIALS: BENLATE 50 WP (benomyl), BRAVO 40.4% (chlorothalanil), ROVRAL 50WP (iprodione), Javex 6% (Sodium hypochlorite), BOTRAN 75W (dichloran)

METHODS: On May 27, 1991 carrots were seeded in naturally-infested soil a Muck Research Station. Field treatments were applied September 9, 20 and 1991 using a solid cone spray nozzle at 65 p.s.i. and 350 L of water per hectare. Plots were 2 rows wide, 5 m in length and replicated 4 times in randomized complete block design.

Approximately 10 kg of carrots from each plot were harvested on October 2 1991 plus an additional 10 kg sample from each of the check plots for the drench. Drench samples were washed and immersed in treatment solution fo seconds. All samples were placed in plastic containers and put in a Fila storage where the temperature and humidity were kept at approximately 1.0 and 90% respectively.

The number of carrots with and without visible white mold were counted an percent of carrots with disease and the degree of disease were calculated January 21, April 8 and June 4, 1992.

Degree of disease was assessed on the carrots that showed symptoms of sclerotinia white mold. A number was assigned to the degree of damage, 5 represented no damage; 3.7 represented moderate damage; and 1.0 represent severe damage such that the carrot was in a liquified state.

RESULTS: As presented in the table below.

CONCLUSIONS: Fungicide applications in the field or as a post harvest dip significantly controlled Sclerotinia white mold in storage compared to th untreated check or Javex dip on the April 8, 1992 evaluation date. The R drench and BOTRAN drench, provided best overall control on April 8, 1992. There were no statistical differences among the treatments on January 21 June 4, 1992.

CONTROL OF SCLEROTINIA ON CARROTS IN STORAGE - 1991-92

Treat-ment	Field Appli. kg/ha product	Post Har-vest Dip product per L/$H_2$0	January 21 % Disease*	January 21 Degree of Disease	April 8 % Disease	April 8 Degree of Disease	June 4 % Disease	June 4 Deg of Dise
BOTRAN	4.4	-	3.0a**	4.4a	3.0 bc	4.4a	41.5a	3.
BENLATE	1.50	-	2.1a	4.6a	2.3 bc	4.6a	16.5a	4.
BRAVO	2.40L	-	2.5a	4.7a	2.5 bc	4.7a	19.8a	3.
ROVRAL	2.0	-	3.9a	4.3a	3.8ab	4.3a	38.5a	3.
Javex drench	-	1.0 ml	5.0a	3.8a	5.0a	3.8a	56.0a	2.
ROVRAL drench	2.0	1.0 g	1.7a	4.7a	1.8 c	4.7a	25.3a	4.
BOTRAN drench	4.4	1.67 g	1.5a	4.4a	1.3 c	4.4a	34.5a	3.
Check	-	-	4.6a	4.4a	5.3a	4.4a	23.5a	3.

* Percent disease data was transformed using an Arcsin transformation.
** Numbers in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D Test.

#113

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar (*Brassica napus* L.)

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **COMPARISON OF THE EFFICACY OF 3 FUNGICIDES APPLIED AS SEED DRESSIN FOLIAR SPRAYS AND CONTROLLED RELEASE GRANULES FOR CONTROL OF BLACK ON CANOLA, 1991**

MATERIALS AND RATES:

Fungicide	seed dressing rate(g ai/kg)*	foliar rate (g ai/ha)**	granule rate 1 (g ai/ha)	granule rate 2 (g ai/ha)	g r (g
hexaconazole	0.1	200	307.6	461.4	
tebuconazole	0.025	300	77.0	115.5	
propiconazole	0.05	125	153.8	230.7	

* one-half the recommended rates (see text). Commercially prepared formulations were TF-3787 (hexaconazole 1.25%), HWG-1608 2.6 ST (tebuconazole 28%) and propiconazole 5%

** commercially prepared formulations were ANVIL (hexaconazole 4.8%), HWG-1608 3.6 FL (tebuconazole 43.2%), and TILT (propiconazole 25%)

METHODS: Seeds of canola (*B. napus* cv Westar) were treated with commercia prepared fungicides by adding the appropriate amount of fungicide to 200 seed in sealer jars, followed by shaking until the fungicide had dried or seed. Seed was then dispensed into seed packages and stored at 15 °C until planting. The seeding rate was 200 seeds per 6 m row. All subplot except the check subplots were planted with fungicide treated seeds. Controlled release granules were prepared by Grow Tec Ltd, Nisku, Alberta Canada by coating corn cob granules impregnated with technical grade fungicide. The granules were prepared such that 960 granules would be dispensed to each 6 m row carrying the fungicides at the rates shown abov Rate 1 for each fungicide was determined to be 200 times the seed dressir rate on an area basis. The granules were packaged in envelopes for each and were dispensed with the seed during planting. Foliar application was twice, at the 3 leaf growth stage, and at the beginning of bolting using & D plot sprayer at 276 kPa and 400 L solution /ha. The test area was lo on land containing abundant 2-year old *Leptosphaeria*-infected stubble. T test design was a 4 replicate split plot with fungicide as the main plot effect and mode of application/rates as the subplot effect. The subplots consisted of twelve rows 6 m long with 200 seeds per row, and, were separ by 6 rows of barley to reduce the spread of spores among subplots. The te area was irrigated regularly to enhance conditions for severe infection. Trifluralin pre-emergence herbicide at 1.0 kg ai/ha was applied to the te area 1 week before planting. Carbofuran granules were dispensed to the se rows at 200 g ai/ha for flea beetle control. The test was initially plant 30 May; however due to very poor emergence of seed in all subplots except check subplots (50 to 90% less than the check emergences), the test was reseeded on June 15 using seed treated at one-half the recommended seed dressing rate. Emerged seedlings were first removed by hoeing, and during reseeding, attempts were made to plant in the furrows of the first planti Additional fungicide granules were not added during reseeding since the freshly added seed would be in close proximity to the original granules. Emergence counts on 3 rows per subplot were done 3 weeks after seeding. plants were also sampled from the first row of each subplot to determine incidence of stem infection. One cm piece of stem immediately below the cotyledon axil from each plant was plated on V-8 medium amended with rose bengal and streptomycin. After 2 weeks incubation at room temperature ar diffuse lighting the plates were examined for the presence of Leptosphaer colonies. On July 31 at the beginning of flowering the test was rated for disease severity: all plants in row 3 were rated using a 6 point disease severity scale. On August 28 (at mid pod development) the test was agair rated for disease severity using the plants in row 5 of each subplot. Or September 12 rows 7 to 12 were harvested for yield determination. A dise severity value for each subplot and for each time of rating was calculate Analysis of variance was done for % emergence, % disease severity (DS), % plants infected (DI) and yield. Linear and quadratic contrast analyses w fungicides were done to determine the significance of the effects of the controlled release granule formulations on emergence, yield and disease severity and incidence. Simple contrast analyses within fungicides were to show the effects of foliar application on yield and disease severity a incidence. Location: Saskatoon, Saskatchewan.

RESULTS: The results are presented in the table.

CONCLUSIONS: Contrast analyses of % emergence indicated that tebuconazole granules caused a significant linear reduction in emergence. Tebuconazol seed dressing at 0.025 g ai.kg (in the foliar spray plots) did not induce phytotoxicity. The incidence of seedling stem infection was not reduced treatment; the incidence of infection was highly variable among replicate mid season (the first disease rating) the incidence and severity of lesic of the lower stem was low. No fungicide in a controlled release granule formulation reduced disease incidence (DI) or severity (DS). Hexaconazole applied as a foliar spray did not significantly reduce DI or DS but was significantly better than the granular formulation. Tebuconazole as a fol spray did significantly reduce DI but not DS. No formulation of propicor had any effect on disease incidence or severity. At season's end both hexaconazole and tebuconazole in granular formulations had a significant effect on reducing DI and DS. Both fungicides as foliar sprays also caus significant reduction in DS and DI, and were significantly better than th granular formulations. Again propiconazole did not have any effect on di incidence or severity. Yield was significantly improved only with the us foliar applied tebuconazole. A 13% yield increase was achieved.

Chemical /Mode of Application	% Emergence	% Seedling Infection	1st Disease Rating DS	1st Disease Rating DI	2nd Disease Rating DS	2nd Disease Rating DI	
hexaconazole							
check	53.8	23.8	11.2	25.8	43.0	80.1	
foliar	51.8	38.5	7.1	16.4	25.2*	52.6*	1
gran rate 1	55.0	28.4	11.4	27.7	38.9**	76.4**	
gran rate 2	59.7	35.9	10.4	22.3	36.6**	72.5**	1
gran rate 3	58.2	52.8	13.4	31.1	34.0**	65.5**	
tebuconazole							
check	49.6	42.3	14.1	31.1	41.3	79.9	
foliar	43.3	53.1	9.9	20.5*	28.1*	58.0*	1
gran rate 1	45.8**	46.0	13.8	26.8	38.5**	76.6**	1
gran rate 2	44.3**	24.5	13.4	28.3	32.7**	63.9**	1
gran rate 3	42.0**	32.8	15.2	28.9	33.0**	67.1**	1
propiconazole							
check	46.8	38.9	15.5	31.8	41.7	64.0	
foliar	54.8	35.0	18.8	35.6	37.6	63.1	
gran rate 1	51.5	43.3	14.6	32.0	36.7	71.6	
gran rate 2	48.1	34.6	15.0	32.0	40.2	70.7	
gran rate 3	47.7	51.3	13.6	30.1	45.4	80.6	
Standard Error of Subplot Means	4.9	9.4	3.0	5.7	6.5	9.1	

* Foliar application significantly different from check, according to contrast analysis, p = 0.05.
** Rates of granules show significant effect relative to the check, according to contrast analysis, p = 0.05.

#114

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **EFFICACY OF CONTROLLED RELEASE TEBUCONAZOLE GRANULES FOR CONTROL O BLACKLEG IN CANOLA, 1992**

MATERIALS: RAXIL 2.6 F (tebuconazole 28.0%), tebuconazole (technical grad

METHOD: Seeds of cv Westar were treated with RAXIL at 0.025 g ai/kg by ad the appropriate amount of fungicide to 200 g of seed in sealer jars, foll by shaking until the fungicide had dried on the seed. Seed was packaged stored at 15 °C until planting. The seeding rate was 200 seeds per 5 m row. Controlled release granules were prepared by Grow Tec Ltd, Nisku, Alberta, Canada by coating corn cob granules impregnated with technical g fungicide. The granules were prepared such that 300 granules would be dispensed to each 5 m row containing the fungicide at the rates shown in table. The test site was located on land which had abundant 2 year old Leptosphaeria - infected canola stubble. The test was arranged in a 4 - replicate RCB design with plots consisting of 9 rows with 200 seeds per r all plots were separated by 6 rows of barley to reduce interplot pycnidic spread. All plots were planted with RAXIL - treated seed (SD) except the check plots (0SD). The test area was irrigated (equivalent to 2 cm rain) least once a week to promote disease spread during dry periods. At crop growth stage 5.1, all plants in row 2 of each plot were assessed for dise severity and a disease rating (% DRAT) was then calculated for each plot Pesticide Research Report, 1982, p.233). In addition the % of plants tha were in the three highest disease categories was calculated. % plant sta was determined from rows 2 and 3. Rows 4 to 9 were harvested to determin yield response. Analysis of variance for % plant stand, % DRAT, % severe infected plants and yield, and the Waller Duncan k-ratio t test on treatm means was done. Location: Agriculture Canada Research farm, Saskatoon.

RESULTS: As presented in the table below.

CONCLUSIONS: Granules at 750 and 1000 g ai/ha significantly reduced the p stand. Although there were no significant differences in overall disease severity, the number of severely infected plants was reduced by granules rates 250 and 750 g ai/ha. Yield was significantly increased by granule of 250 and 1000 g ai/ha. The yield increase in the 1000 g ai/ha treatmen have been influenced by the reduced competition in the lower plant stand.

Treatment	% Plant Stand	% Plants With Severe Infection	% DRAT	
Check, 0 SD	75.9 a*	14.1 ab	25.8 a	96
Check, SD	70.0 ab	17.4 a	27.8 a	100
SD + granules at 100 g ai/ha	66.8 ab	10.9 ab	24.0 a	114
SD + granules at 250 g ai/ha	68.5 ab	7.7 b	19.8 a	127
SD + granules at 500 g ai/ha	69.0 ab	11.2 ab	23.1 a	115
SD + granules at 750 g ai/ha	66.8 b	9.1 b	21.9 a	112
SD + granules at 1000 g ai/ha	57.1 c	10.8 ab	22.2 a	127
Standard Error of Treatment Means	2.7	2.2	2.4	6

* Values followed by the same letter are not significantly different acco to the Waller - Duncan k - ratio t test, P = 0.05.

#115

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar.

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **EFFICACY OF FLUAZINAM FOR CONTROL OF BLACKLEG IN CANOLA, 1992**

MATERIALS: FLUAZINAM 500F (50% ai) (ISK Biotech Ltd).

METHOD: The test was arranged in a 4 - replicate RCB design with six 6 m per plot and 200 seeds per row. The test was located on land which had abundant 2 year old Leptosphaeria - infected canola stubble. The seed dr (SD) rate was 3 ml P/kg seed. The Preplant treatment was an applicatio FLUAZINAM at 1 or 2 L/ha to the soil with a plot sprayer at 207kPa and 35 solution /ha with subsequent discing to a depth of 5 cm. Foliar applicat of FLUAZINAM at 1 and 2 L/ha were done with a plot sprayer at 276 kPa anc solution/ha at 2 weeks (first true leaf) and at 4 weeks after emergence (leaf).

The test area was irrigated at least once per week to promote disease spr during dry periods. Emergence counts were done at two weeks after emerge At crop growth stage 5.0, all plants in one row of each plot were assesse disease severity, and a disease rating (% DRAT) was then calculated for e plot (see Pesticide Research Report, 1982, p. 233). Analysis of variance emergence and % DRAT, and, the Waller-Duncan k-ratio t test on the treatm means was done. Location: Agriculture Canada Research farm, Saskatoon, Saskatchewan, Canada.

RESULTS: As presented in the table below.

CONCLUSIONS: None of the treatments significantly reduced emergence of th seedlings. The dual foliar application at 2 L/ha with seed dressing significantly reduced disease severity of *L. maculans*.

Treatment	Rates (Product)	Emergence (%)	
check	---	73.8a*	4
Preplant	1 L/ha	86.1a	4
Preplant + Foliar @ 2 weeks	1 L + 1 L /ha	80.5a	3
Preplant + Foliar @ 2 weeks	2 L + 2 L /ha	82.9a	3
SD + Preplant + Foliar @ 2 weeks	3 ml/kg + 1 L + 1 L/ha	83.9a	3
SD + Foliar @ 2 weeks + @ 4 weeks	3 ml/kg + 1 L + 1 L/ha	74.2a	3
SD + Foliar @ 2 weeks + @ 4 weeks	3 ml/kg + 2 L + 2 L/ha	76.9a	3
Standard Error of Treatment Means		2.7	

* Values within a column followed by the same letter are not significantl different according to the Waller Duncan k-ratio t test, P = 0.05.

#116

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar (*Brassica napus* L).

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **EFFICACY OF SEED DRESSING FOR CONTROL OF BLACKLEG ON CANOLA, 1991**

MATERIALS: Rovral ST (iprodione 16.7%, lindane 50%),
Vitavax RS FL (carbathiin 4.5%, thiram 9%, lindane 67.5%),
Premiere (thiabendazole 1.6%, thiram 4.8%, lindane 40%),
MON-24004 (39.65% ai), EXP-80318A (20% ai),
TF-3787 (hexaconazole 1.25%), TF-3770 (hexaconazole 1.25%),
HWG-1608 2.6 ST (tebuconazole 28%)

METHOD: 100 gram lots of certified seed were treated with the seed dressi the seed was then packaged and stored at 20 °C for 1 week before seeding. Trifluralin pre emergence herbicide at 1.0 kg ai/ha was applied to the te area before seeding; carbofuran granules were dispensed to the seed rows 200 g ai/ha for flea beetle control. The test area was located on land containing abundant 2 - year old Leptosphaeria - infected canola stubble. test design was a 4 - replicate RCB; each plot consisted of three rows s long with 200 seeds per row. The area was irrigated at least once per we during dry periods using overhead sprinklers. Emergence counts were done weeks after seeding. Disease ratings on all plants in one row were done growth stages 3.2 (late rosette) and 5.2 (mid pod) using a 6 point rating scale. Disease rating values for each plot were calculated using a formu similar to that described in the 1982 Pesticide Research Report, p.233. Analysis of variance of % emergence, % disease incidence and % disease severity, and Waller-Duncan k ratio t-test on treatment means were done. Location: Agriculture Canada Research farm, Saskatoon, Saskatchewan, Cana

RESULTS: As presented in the table below.

CONCLUSIONS: Emergence in general was supressed due to soil compaction resulting from a long period of heavy rains after planting. MON-24004 at and 0.3 g ai/kg and Vitavax RS improved emergence probably due to control seed decay and damping-off soil fungi. HWG-1608 and TF-3770 significantl reduced emergence indicating phytotoxicity at these rates. At both the mi and end of the season, disease incidence and severity was significantly l in plots treated with TF-3770 and TF-3787. At the end of the season the treated with HWG-1608 also had significantly reduced disease incidence ar severity. It must be noted that plots treated with these three chemicals significantly lower plant stand and % infection: the low disease severity have been the result of disease escape rather than disease control.

Seed dressing	Rate (/kg seed)	% Emergence	% Disease Rating Mid season	Late season	% Infe Mid season
Vitavax RS FL	22.5 ml	33.4 a *	24.7 abcd	41.2 ab	63.6 a
Rovral ST FL	30.0 ml	23.5 bc	25.3 abcd	42.3 a	55.4 a
Premiere	28.0 ml	28.0 abc	26.0 abc	40.2 ab	64.5 a
MON-24004	0.15 g ai	32.7 a	28.7 a	47.3 a	60.4 a
MON-24004	0.3 g ai	29.5 ab	28.8 a	47.0 a	63.2 a
MON-24004	0.45 g ai	27.8 abc	24.7 abcd	40.9 ab	56.5 a
EXP-80318A	0.025 g ai	23.7 bc	26.6 abc	44.2 a	57.7 a
EXP-80318A	0.05 g ai	21.9 bcd	23.9 abcd	35.0 abc	59.4 a
TF-3770	0.2 g ai	12.3 e	15.9 cd	21.1 c	33.3 c
TF-3787	0.25 g ai	20.0 cde	13.9 d	21.2 c	38.7 bc
HWG-1608	0.05 g ai	15.1 de	16.3 bcd	25.5 bc	44.0 b
Check	---	23.9 bc	28.0 ab	45.1 a	58.1 a
Standard Error for Treatment Means		2.8	3.4	3.8	5.1

* Values within a column followed by the same letter are not significantl different according to the Waller-Duncan k ratio t-test, p = 0.05.

#117

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **EFFICACY OF SEED DRESSINGS FOR CONTROL OF EARLY BLACKLEG INFECTIO IN CANOLA, 1992**

MATERIALS: ROVRAL ST (iprodione 16.7%, lindane 50%),

VITAVAX RS (carbathiin 4.5%, thiram 9%, lindane 67.5%),
VITAVAX 4G (carbathiin 4% w/w),
PREMIERE (TBZ 1.6%, thiram 4.8%, lindane 40%),
BENOLIN R (carbendazim 5.0%, thiram 6.5%, lindane 49.5%),
MON-24015 (15%), FLUAZINAM 500 F (50% ai),
UBI-2617 (carbathiin 25%, thiram 2.5%, lindane 30%),
TF-3791 (tefluthrin 14.3%, TBZ 2%, thiram 6%),
RAXIL 2.6 F (tebuconazole 28%), LINDANE (gamma-BCH 67.1%)

METHOD: 100 gram lots of certified seed were treated with the seed dressi the seed was then packaged and stored 2 weeks before seeding. Lindane wa added to the MON-24015 formulation to give 15 g ai/kg seed. The test des was a 4 - replicate R C B with three 6 m row plots. 200 seeds and 0.8 g Furadan 10 G was added to each row during planting. The plots were separ by 6 rows of barley to reduce interplot spread of spores. At the cotylec stage, 10 days after emergence, 50 ml of pycnidiospore suspension at 10^6/ were sprayed on each row. The test was irrigated immediately before and hours after inoculation. Stand counts were done 2 weeks after emergence. Three weeks after inoculation, 50 plants in one row per plot were rated f disease severity; in addition, stem tissue at the cotyledon area of symptomless plants was plated on V-8 rose bengal medium to determine the presence of the fungus in these plants. Based on the resulting 7 disease categories, a disease severity rating (% DRAT) was calculated for each pl (Pesticide Research Report, 1982, p 233). Analysis of variance for % emergence, % DRAT and % uninfected plants, and, the Waller - Duncan k-rat test on treatment means were done.
Location: Agriculture Canada Research farm, Saskatoon

RESULTS: As presented in the table below.

CONCLUSIONS: Emergence of seeds treated with VITAVAX RS and MON-24015 was significantly higher than untreated seeds, due to their high efficacy aga Rhizoctonia spp which occur at a low level in the test site soil. RAXIL, VITAVAX RS +VITAVAX 4G resulted in significantly reduced emergence due to phytotoxicity. In the case of VITAVAX RS + VITAVAX 4G, seedlings were ki about 1 week after emergence. All other treatments were not significant different from the untreated check. No treatment reduced disease severit increased the incidence of uninfected plants at the time of sampling.

Treatment	Rate /kg seed	Emergence (%)	DRAT (%)	Uninfecte Plants (%
VITAVAX RS	22.5 ml P	86.7 a*	32.6 a	12.0 a
VITAVAX RS + VITAVAX 4G	22.5 ml P + 1.0 kg ai/ha	65.4 d	25.8 a	24.1 a
MON-24015 + LINDANE	0.45 g ai + 15.0 g ai	84.8 ab	26.5 a	17.7 a
UBI-2617	20.0 ml P	78.9 abc	26.8 a	23.9 a
UBI-2617	40.0 ml P	77.0 bc	21.7 a	29.1 a
ROVRAL ST	30.0 ml P	78.9 abc	26.5 a	19.3 a
TF-3791	28.0 ml P	74.9 c	29.3 a	17.1 a
PREMIERE	28.0 ml P	73.4 cd	34.9 a	10.3 a
FLUAZINAM 500 F	3.0 ml P	73.6 cd	26.7 a	16.6 a
BENOLIN R	32.0 ml P	72.8 cd	28.7 a	17.1 a
RAXIL 2.6 F	0.025 g ai	55.9 e	27.9 a	15.9 a
CHECK	-----	73.6 c	32.2 a	15.2 a
Standard Error of Treatment Means		2.8	3.1	4.7

* Values followed by the same letter are not significantly diffent accord the Waller Duncan k-ratio t test, P = 0.05.

#118

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar

PEST: Blackleg, *Leptosphaeria maculans*

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TITLE: **TIMING OF TEBUCONAZOLE FOLIAR APPLICATION FOR CONTROL OF BLACKLEG CANOLA, 1992**

MATERIALS: RAXIL 2.6 F (tebuconazole 28.0%), FOLICUR (tebuconazole 39.1%), RENEX

METHOD: The test site was located on land which had abundant 2 year old

Leptosphaeria - infected canola stubble. The test was arranged in a 4 - replicate split plot design with time of foliar application as the main p effect and rate of application as the subplot effect. Each subplot consi of nine 5m rows with 200 seeds per row; all subplots were separated by 6 of barley to reduce interplot pycnidiospore spread. All subplots were pl with seeds treated with RAXIL @ 0.025 g ai/kg seed(SD), except for the untreated check plot(0 SD). The times of application included single applications at 2,3, and 4 weeks after emergence plus combinations of application times. An R & D plot sprayer was used at 276 kPa and 350 L solution/ha. RENEX surfactant was used with FOLICUR at 150 ml/ha. The te area was irrigated (equivalent to 2 cm rain) at least once per week to pr disease spread during dry periods. At crop growth stage 5.1, all plants row 2 of each plot were assessed for disease severity and a disease ratir (%DRAT) was then calculated for each plot (see Pesticide Research Report, 1982, p.233). Six rows per plot were harvested to determine the yield response. Analysis of variance for % DRAT and yield, and t tests for comparisons of application time and rate combinations were done. Locatior Agriculture Canada Research farm, Saskatoon

RESULTS: As presented in the table below.

CONCLUSIONS: T-test analyses indicate that all Rate X Time combinations e 300 g ai/ha X 4 weeks and 500 g ai/ha X 4 weeks resulted in significantly disease severity than the checks with and without SD. 500 g ai/ha X 2 + 5 weeks was not significantly more effective than 500 g ai/ha X 2 + 4 weeks X 3 + 5 weeks, but was significantly better than all other combinations. check with SD was not significantly different from the check without SD. Time X Rate combinations except 300 g ai/ha X 3 weeks, 300 g ai/ha X 4 we and 500 g ai/ha X 4 weeks resulted in significantly higher yields than th check with SD. 500 g ai/ha X 2 + 5 weeks gave a significantly better yie response than all other Rate X Time combinations. The two check yields w not significantly different. Comparisons of rates at the various applica times indicate that 300 g ai/ha is as effective as 500 g ai/ha for reduci disease severity as is 500 g ai/ha when applied at 2, 3, 4, 3+5 and 2+4+6 weeks after emergence. For the remaining application times 500 g ai/ha is significantly better than 300 g ai/ha. For yield, 500 g ai/ha is significantly more effective than 300 g ai/ha only when applied at 2 + 5 weeks.

Application Time	Plant Growth Stage	Rate/Application Time(gai/ha)	DRAT (%)	Yie (g
CHECK,0 SD	0	0	42.4	7
CHECK, SD	0	0	39.0	8
2 WEEK	2.1	300	33.6	9
2 WEEK	2.1	500	29.3	9
3 WEEK	2.3-2.4	300	31.8	9
3 WEEK	2.3-2.4	500	30.4	9
4 WEEK	3.1	300	39.2	8
4 WEEK	3.1	500	39.4	8
2 WEEK + 4 WEEK	2.1+3.1	300	24.0	10
2 WEEK + 4 WEEK	2.1+3.1	500	18.2	11
2 WEEK + 5 WEEK	2.1+3.2	300	25.2	10
2 WEEK + 5 WEEK	2.1+3.2	500	16.9	12
3 WEEK + 5 WEEK	2.3+3.2	300	25.6	10
3 WEEK + 5 WEEK	2.3+3.2	500	20.8	10
2 WEEK+4 WEEK+6 WEEK	2.1+3.1+4.1	300	27.6	10
2 WEEK+4 WEEK+6 WEEK	2.1+3.1+4.1	500	24.0	11
T Test Critical Difference for Application Time X Rate			5.9	1
Standard Error of Application Time X Rate Means			2.0	

#119

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica rapa* L.) cv Tobin

PEST: Brown Girdling Root Rot, *Rhizoctonia solani*, *Fusarium* spp, *Pythium*

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TITLE: **EFFICACY OF SEED DRESSING AND CONTROLLED RELEASE FUNGICIDE GRANULE CONTROL OF BROWN GIRDLING ROOT ROT IN CANOLA, 1991**

MATERIALS: HWG-1608 2.6 ST (tebuconazole 28%), VITAVAX RS FL carbathiin 4
thiram 9%, lindane 67.5%), PREMIERE (thiabendazole 1.6%, thiram 4.8%, lir
40%), ROVRAL ST (iprodione 16.7%, lindane 50%), BENLATE (benomyl 50%), AF
(metalaxyl 20%), technical grade of hexaconazole, carbathiin, thiabendazc
iprodione, benomyl, metalaxyl.

Rates:

Fungicide	Seed Dressing Rate (g ai/kg)	Granule Rate 1 (g ai/ha)	Granule Rate 2 (g ai/ha)
hexaconazole	0.2	153.8	307.6
carbathiin	1.5	709.1	1418.2
thiabendazole	1.0	472.7	945.4
iprodione	5.0	2363.6	---
benomyl	3.0	1418.2	2836.3
metalaxyl	1.0	472.7	945.4

METHOD: Seeds of cv Tobin were treated with the commercially prepared
fungicides by combining the fungicides in suspension then adding the
appropriate amount of the mixture to 200 g of seed in sealer jars, follow
agitation until the fungicide had dried on the seed. Seed was then dispe
into seed packages and stored at 15 °C until planting. Controlled releas
granules were prepared by Grow Tec Ltd, Nisku, Alberta, Canada by coating
cob granules impregnated with technical grade fungicides. The granules w
prepared such that 500 granules containing the fungicides at the given ra
(Rate 1 or Rate 2) would be dispensed to each 7.5 m row. Rate 1 for each
fungicide was set to be 200 times the seed dressing rate on an area basis
The granules were packaged in envelopes for each row and were dispensed w
the seed during planting. The test sites were located in growers fields
had severe brown girdling root rot in previous years. The test design wa
replicate split plot with fungicide as the main plot effect and rate as t
subplot effect. The check subplots were planted with untreated seed wher
the subplots with a fungicide granule treatment were planted with seeds
treated with the corresponding seed dressing (SD). Each subplot consiste
three rows 7.5 m long with 250 seeds per row. Trifluralin pre emergence
herbicide at 1.0 kg ai/ha was applied to the test area before planting.
Carbofuran granules were dispensed to the seed rows during planting at 20
ai/ha for flea beetle control. At growth stage 5.1, all plants in the mid
row of each subplot were rated for disease severity using a 5 point ratin
scheme. Disease severity values (% DRAT) were calculated using a formula
described previously (1). The plants in the remaining rows were counted
estimate the mean emergence for each subplot. Analysis of variance was c

for mean % emergence and % DRAT. Linear and quadratic contrast analyses within fungicides were done to determine if the granular formulations of fungicide had any significant effect on emergence or disease severity.
Location: Beaverlodge, Alberta

Results: As presented in the table below.

Conclusion: None of the treatments improved emergence or reduced disease severity in either of two sites.

Reference:

(1) Pesticide Research Report, Expert Committee on Pesticide Use in Agriculture, 1982, p. 233.

Treatment	Site 1 % Emergence	Site 1 % DRAT	Site 2 % Emergence	Site 2 % DRAT
Hexaconazole + Benomyl +Metalaxyl				
check	59.4	64.1	49.2	45.
SD + Rate 1	58.6	65.3	53.1	45.
SD + Rate 2	65.8	62.2	44.2	47.
Carbathiin + Benomyl + Metalaxyl				
check	64.1	63.8	40.9	44.
SD + Rate1	63.7	65.1	39.6	45.
SD + Rate 2	60.6	67.4	45.3	41.
Thiabendazole + Benomyl + Metalaxyl				
check	58.8	66.1	38.8	41.
SD + Rate 1	61.3	67.3	33.8	43.
SD + Rate 2	65.3	65.9	43.6	45.
Iprodione + Benomyl + Metalaxyl				
check	64.5	63.2	45.2	43.
SD + Rate 1	69.1	65.6	56.3	43.
Benomyl + Metalaxyl				
check	68.1	62.1	42.5	46.
SD + Rate 1	58.3	67.3	29.6	42.
SD + Rate 2	60.2	64.0	42.9	43.
Standard Error of Subplot Means	2.9	1.8	3.5	1.

#120

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica rapa* L.) cv Tobin

PEST: Brown Girdling Root Rot, *Rhizoctonia solani*, *Fusarium* spp, *Pythium*

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TITLE: **EFFICACY OF SEED DRESSING AND CONTROLLED RELEASE FUNGICIDE GRANULE CONTROL OF BROWN GIRDLING ROOT ROT IN CANOLA, 1992**

MATERIALS: HWG-1608 2.6 ST (tebuconazole 28%),
VITAVAX RS FL carbathiin 4.5%, thiram 9%, lindane 67.5%),
PREMIERE (thiabendazole 1.6%, thiram 4.8%, lindane 40%),
ROVRAL ST (iprodione 16.7%, lindane 50%),
BENLATE WP(benomyl 50%), APRON (metalaxyl 20%),
MON-24015 (48%), MON-24039 (2% ai w/w, granules),
VITAVAX 4 G (carbathiin 2% w/w, granules), technical grade of hexaconazole, carbathiin, thiabendazole, iprodione, benomyl, metalaxyl

RATES:

Fungicide	Seed Dressing Rate(/kg)	Granule Rate 1 (g ai/ha) & Code	Granule Rate 2 (g ai/ha) &
a) GRO TECH Prepared Granules			
carbathiin	VITAVAX RS @ 22.5 ml P	500, V500	1000, V10
iprodione	ROVRAL ST @ 28 ml P	500, R500	1000, R10
benomyl	BENLATE WP @ 3.0 g ai	500, B500	1000, B10
metalaxyl	APRON @ 1 g ai	500, M500	1000, M10
b) Commercial Granules			
carbathiin	VITAVAX RS @ 22.5 ml P	VITAVAX 4 G @ 500,V4G500	-----
MON-24000	MON-24015 @ 0.3 g ai	MON-24039 @ 250, MON250	-----

METHOD: Seeds of cv Tobin were treated with the commercially prepared fungicides by adding the appropriate amount to 200 g of seed in sealer ja followed by agitation until the fungicide had dried on the seed. When ben and metalaxyl were included in the treatment the seed dressings were comb in solution then added to the seed. Seed was then dispensed into package stored at 15 °C until planting. Controlled release granules were prepared by Grow Tec Ltd, Nisku, Alberta, Canada by coating corn cob gran impregnated with technical grade fungicides. The granules were prepared

that 300 granules of a fungicide would be dispensed to each 7.5 m row. T
granules were packaged in envelopes for each row and were dispensed with
seed during planting. The test design was a 4 replicate RCB with a check
for every three test plots. The check plots were planted with untreated
whereas the plots with a fungicide granule(s) treatment were planted with
seeds treated with the corresponding fungicide(s). Each plot consisted of
three rows 7.5 m long with 300 seeds per row. The two test sites were lo
in growers' fields that had severe brown girdling root rot in previous ye
Trifluralin pre-emergence herbicide at 1.0 kg ai/ha was applied to the te
area before planting. Carbofuran granules were dispensed to the seed row
during planting at 200 g ai/ha for flea beetle control. Plots were rated
disease at growth stage 5.1. All plants in the middle row of each plot
rated using a 5 point rating scheme. Disease severity values (% DRAT) we
calculated using a formula described previously (1). In addition the pla
in the remaining rows were counted to estimate the mean plant stand for e
plot. Analysis of variance was done for mean % plant stand and % DRAT. T
tests were done to compare fungicide treatment to the correpsonding check

Location: Beaverlodge, Alberta

RESULTS: As presented in the table below.

CONCLUSIONS: No treatment improved plant stand at the Hythe Park site but
the Grande Prairie site, the treatments R500, R1000, RBM1000, VBM500, and
V1000 did significantly improve the plant stand. Disease severity was re
at the Hythe Park site by the treatment RBM1000; no treatment reduced dis
severity at the Grande Prairie site.

Reference:

Pesticide Research Report, Expert Committee on Pesticide Use in Agricultu
1982, p. 233.

Treatment	Park Site % Plant Stand	% DRAT	Grand Prairie Site % Plant Stand	% DRAT
R500	45.5	41.7	52.8**	40.0
R500 check	38.7	39.3	37.1	43.5
RBM500***	28.6	33.6	53.1	44.4
RBM500 check	37.3	39.0	43.0	44.7
R1000	43.3	36.2	52.7**	44.1
R1000 check	40.1	38.6	41.0	46.6
RBM1000	32.3	33.9*	46.9**	43.9
RBM1000 check	36.0	41.9	36.2	44.7
V500	41.7	36.6	55.8	34.5
V500 check	36.7	40.5	50.5	39.5
VBM500	33.1	37.5	52.4**	39.7
VBM500 check	36.1	40.1	34.2	46.1
V1000	44.4	39.6	56.8**	41.3
V1000 check	42.0	39.4	46.0	39.6
VBM1000	40.7	36.9	54.1	34.9
VBM1000 check	39.4	40.8	48.8	37.8
V4G500	40.7	34.9	49.6	38.1
V4G500 check	41.3	37.8	43.3	43.4
V4GBM500	46.9	40.0	47.6	36.5
V4GBM500 check	42.0	39.4	51.6	37.0
MON250	37.6	35.6	49.4	45.3
MON250 check	41.4	38.1	45.2	43.9
Critical Differ.	8.2	5.6	10.7	6.8

* % DRAT significantly less than the % DRAT of the corresponding check P = 0.05.
** % Emergence significantly greater than % Emergence of the correspond check, P = 0.05.
*** RBM500 means R500 + B500 + M500, with all fungicides included in the seed dressing.

#121

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar

PEST: Sclerotinia Stem Rot, *Sclerotinia sclerotiorum*

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TITLE: **A DOSE RESPONSE STUDY OF SEVERAL FUNGICIDES FOR CONTROL OF SCLEROT STEM ROT IN CANOLA, 1992**

MATERIALS: BENLATE 50 DF(benomyl 50%),
SPORTAK 40 EC(prochloraz 40%), ANVIL (hexaconazole 5%),
FOLICUR 39 F(tebuconazole 39.0%),
SAN-619 100 SL (cyproconazole 10%),
TILT 250 EC(propiconazole 25%), RENEX, ENHANCE

METHOD: The range of rates of application, 150 to 450 g ai/ha, was withir suggested experimental rates for the 5 unregistered fungicides. BENLATE w is registered for control of Sclerotinia stem rot of canola was used as t standard. Two test sites were established in areas where sclerotia of S. sclerotiorum were abundant in the soil. The tests consisted of 3m X 2m p arranged in a 4 - replicate split plot design. Fungicide was the main pl effect, and rate of fungicide was the subplot effect. The fungicides were applied at growth stage 4.1 (25% bloom) using a R&D plot sprayer at 276 k and 350 L solution/ha. Both sites were irrigated regularly to establish a dense canopy and to stimulate production of apothecia by S. sclerotiorum. the Outlook site overhead irrigation was done every third day from emerge to (growth stage 5.2). At the Saskatoon site overhead irrigation was discontinued at early flowering and multiple daily misting of the plots w begun to maintain leaf wetness and soil moisture. At growth stage 5.2, 1 plants per plot were categorized for disease severity and the numbers of plants in the 5 disease categories were used to calculate a disease ratir DRAT) for each plot (see Pesticide Research Report, 1982, p.238). Analysi variance for % DRAT, and linear and quadratic (quad) orthogonal compariso rates for each fungicide were done. Data from the Outlook is not given because of low incidence of infection. LOCATION : Agriculture Canada Rese farm, Saskatoon and Irrigation Development Center farm, Outlook, Saskatch
RESULTS: As presented in the table below.

CONCLUSIONS: BENLATE (the standard), SAN-619, and SPORTAK showed signific linear reduction in disease severity with increasing dose. Although neith SAN-619 and SPORTAK at 450 g ai/ha has the efficacy that BENLATE had at 4 ai/ha, the significant linearity of the responses indicate that an increa dosage may result in further decrease in disease severity. ANVIL, FOLICU TILT displayed no efficacy against Sclerotinia stem rot at the rates test

Fungicide	Rate (g ai/ha)	DRAT (%)	Orthogonal Compariso
BENLATE 50 DF	0	47.4	
	150	20.7	linear: Pr>F = 0.00
	300	17.9	quad: Pr>F = 0.38
	450	4.9	
SAN-619 100 SL	0	52.6	
	150	34.2	linear: Pr>F = 0.00
	300	23.5	quad: Pr>F = 0.29
	450	21.6	
SPORTAK 40 EC	0	52.9	
(+ ENHANCE@150ml/ha)	150	52.5	linear: Pr>F = 0.02
	300	41.9	quad: Pr>F = 0.39
	450	28.3	
ANVIL	0	44.0	
	150	43.3	linear: Pr>F = 0.29
	300	40.5	quad: Pr>F = 0.64
	450	32.6	
FOLICUR	0	45.1	
(+ RENEX@150 ml/ha)	150	31.2	linear: Pr>F = 0.65
	300	41.4	quad: Pr>F = 0.56
	450	36.4	
TILT	0	41.1	
	150	44.1	linear: Pr>F = 0.31
	300	32.9	quad: Pr>F = 0.85
	450	33.1	
Standard Error of Subplot Means		7.7	

* Linear and quadratic comparison results from SAS computer program, p =

#122

STUDY DATA BASE: 375 1421 8177

CROP: Canola (*Brassica napus* L.) cv Westar

PEST: Sclerotinia Stem Rot, *Sclerotinia sclerotiorum*

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TITLE: **EFFICACY OF FOLIAR APPLIED FUNGICIDES FOR CONTROL OF SCLEROTINIA S ROT IN CANOLA, 1992**

MATERIALS: BENLATE 50 DF(benomyl 50%),
EASOUT L 50 FW(thiophanate-methyl 50%)
MERTECT 45 FL(thiabendazole 45%),
SAN-619 100 SL(cyproconazole 10%), FLUAZINAM 500 F(50% ai)

METHOD: Two test sites were established in areas where sclerotia of S. sclerotiorum were abundant in the soil. The tests consisted of 3m X 2m p arranged in a 4 - replicate RCB design. The fungicides were applied at gr stage 4.2 using a R&D plot sprayer at 276 kPa and 350 L solution/ha. Both sites were irrigated regularly to establish a dense canopy and to stimula production of apothecia by S. sclerotiorum. At the Outlook site overhead irrigation was done every third day from emergence to early pod stage (gr stage 5.1). At the Saskatoon site overhead irrigation was discontinued a early flowering and daily misting of the plots was begun to maintain leaf wetness and soil moisture. At growth stage 5.2, 100 plants per plot were categorized for disease severity and the numbers of plants in the 5 disea categories were used to calculate a disease rating (% DRAT) for each plot Pesticide Research Report, 1982, p.238). Analysis of variance for % DRAT disease incidence, and, the Waller - Duncan k -ratio t test on treatment were done. The data from the 2 sites were combined. LOCATION : Agricultu Canada Research farm, Saskatoon and Irrigation Development Center farm, Outlook, Saskatchewan.

RESULTS: As presented in the table below.

CONCLUSIONS: Only BENLATE 50 DF at 500 g ai/ha significantly controlled t incidence and severity of sclerotinia stem rot.

Fungicide	Rate (g ai/ha)	%DRAT	Disease Incidence(%)
BENLATE 50 DF	500	2.0 c*	3.0 c
FLUAZINAM 500 F	500	46.7 ab	58.9 ab
FLUAZINAM 500 F	1000	37.2 b	52.3 b
EASOUT L 50 FW	500	39.1 b	53.5 b
MERTECT 45 FL	500	59.8 a	74.0 a
CHECK	----	51.6 ab	60.4 ab
Standard Error of Treat		5.0	5.3

* Values within a column followed by the same letter are not significantl
different according to the Waller Duncan k-ratio t test, P = 0.05.

#123

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar (*Brassica napus* L.)

PEST: Seed decay, Damping-off, Root Rot, *Rhizoctonia solani* AG-2-1 and AG

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TITLE: **EFFICACY OF FLUAZINAM FOR CONTROL OF RHIZOCTONIA SEED ROT PRE-EMER DAMPING-OFF AND ROOT ROT OF CANOLA, 1992**

MATERIALS: FLUAZINAM 500 F (50% ai) (ISK Biotech)

METHODS: 100 g seed lots of cv Westar were treated with FLUAZINAM; the tr (SD) and untreated seed were counted, packaged (200 seeds per package) ar stored at 20 °C 3 weeks before planting. The test was arranged in a 4 - replicate R C B design with six 6 m row plots and 200 seeds per row. Th preplant treatment was done 1 week prior to seeding by applying FLUAZINAN the soil with a plot sprayer using 207 kPa and 350 L solution/ha, then di at 5 cm depth. Foliar application was also done with a plot sprayer at 27 and 350 L solution/ha at 2 weeks after emergence. Trifluralin pre-emerge herbicide at 1.0 kg ai/ha was applied to the test area 3 weeks prior to planting. During planting, carbofuran granules at 200 g ai/ha, and 200 kernels of rye grain infested with Rhizoctonia solani AG-2-1 were added t each row. Emergence counts on all rows were done 4 weeks after emergence growth stage 5.0 all plants in one row of each plot were assessed for dis severity. A disease severity rating (% DRAT) was then calculated for eac plot (Pesticide Research Report, 1982, p 233). Analysis of variance for emergence and % DRAT, and, the Waller - Duncan k-ratio t test on treatmen means were done. Location: Agriculture Canada Research farm, Saskatoon

RESULTS: As presented in the table below.

CONCLUSIONS: All treatments significantly improved emergence with the SD L/ha preplant + 1 L/ha foliar and the 2 L/ha preplant + 2 L/ha foliar treatments being superior. Both SD treatments were very effective: they not significantly different from the 2 L/ha preplant + 2 L/ha foliar treatment. All treatments except the 1 L/ha preplant significantly reduc root rot severity. In general the seed treatments alone seem to be very effective in terms of reducing seed rot, damping-off and root rot.

Treatment	Rate (Product)	Emergence (%)	DRAT (%)
check	---	26.1 d*	79.2
SD	2 ml/kg	37.3 bc	61.1
SD	3 ml/kg	36.1 bc	66.4
Preplant	1 L/ha	32.4 c	72.3
Preplant + Foliar	1 L/ha + 1 L/ha	35.6 bc	66.7
Preplant + Foliar	2 L/ha + 2 L/ha	40.7 ab	59.4
SD + Preplant + Foliar	2 ml/kg + 1 L/ha + 1 L/ha	45.3 a	54.9
Standard Error of Treatment Means		1.8	3.0

* Values within a column followed by the same letter are not significantl different according to the Waller Duncan k-ratio t test, P = 0.05.

#124

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar, *Brassica napus* L. and cv Tobin B. rapa L.

PEST: Seed decay, Damping - off, Root Rot, *Rhizoctonia solani* AG 2-1

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TITLE: **EFFICACY OF SEED TREATMENT FUNGICIDES FOR CONTROL OF RHIZOCTONIA PRE-EMERGENCE DAMPING-OFF OF CANOLA, 1991**

MATERIALS: Vitavax RS FL (carbathiin 4.5%, thiram 9%, lindane 67.5%), Vitavax 4 G (granular, carbathiin 4% w/w), Rovral ST (iprodione 16.7%, lindane 50%), Premiere (thiabendazole 1.6, thiram 4.8%, lindane 40%), MON-24004 (48% ai), Lindane (gamma-BHC 75%), HWG-1608 2.6 ST (tebuconazole 28%), EXP-80318A (20% ai), TF-3770 (hexaconazole 1.25%), TF-3787 (hexaconazole 1.25%), Rizolex 50 WP (tolclofos-methyl 50%)

METHOD: 100 g seed lots of cvs Westar and Tobin were treated with the see dressings; the seed was then counted, packaged and stored at 20 °C 1 week before planting. The rate for Tobin was increased to 1.5 X that for Westar. The tests were arranged in a 4 - replicate R C B design with two rows/ plot and 200 seeds per row. The 2 cultivars were tested separatel Trifluralin pre emergence herbicide at 1.0 kg ai/ha was applied to the te area 1 week prior to planting. During planting carbofuran granules at 20 ai/ha and 200 kernels of rye grain infested with Rhizoctonia solani AG 2 were added to each row. Emergence counts on all rows were done 3 weeks a seeding at the first true leaf stage. Analysis of variance for % emergen the Waller - Duncan k-ratio t test on treatment means were done. Locatio Agriculture Canada Research farm, Saskatoon

RESULTS: As presented in the table below.

CONCLUSIONS: Rizolex and all rates and formulations of MON-24004 signific increased emergence of both cultivars. Vitavax RS also improved emergen Westar, and Vitavax 4G and Rovral ST significantly improved the emergence Tobin. Both TF3770 and TF-3787 at the tested rates appear to be phytoto Tobin.

Seed Dressing	Rate* (/kg seed)	Mean % Emergence Westar	Tobin
Vitavax RS FL	22.0 ml P	35.1 a**	21.1 defgh
Vitavax 4G	(1.1 kg ai/ha)***	21.1 fg	23.6 def
Rovral ST	30.0 ml P	25.2 defg	21.8 defg
Premiere	28.0 ml P	26.2 cdef	16.6 ghi
MON-24004	0.18 g ai	30.1 abcde	30.1 abc
MON-24004	0.37 g ai	31.9 abcd	31.9 a
MON-24004	0.55 g ai	36.6 a	30.4 ab
MON-24004 + Lindane	0.18 +7.5 gai	37.1 a	24.3 bcde
MON-24004 + Lindane	0.37 +7.5 gai	34.0 abc	24.0 cde
MON-24004 + Lindane	0.55 +7.5 g ai	33.3 abc	26.4 abcd
Rizolex	3.0 g ai	34.7 ab	29.8 abc
EXP-80318A	0.025 g ai	26.7 bcdef	18.6 efghi
EXP-80318A	0.05 g ai	26.6 cdef	17.4 fghi
HWG-1608	0.05 g ai	22.8 efg	14.4 i
TF-3770	0.2 g ai	22.0 fg	2.9 j
TF-3787	0.25 g ai	18.1 g	5.8 j
Check	---	18.8 fg	15.0 hi
Standard Error for Treatment Means		2.8	2.4

* Rates given are for Westar, rates for Tobin are 1.5 X the Westar rate
** Values within a column followed by the same letter are not significa
different according to Waller Duncan's k-ratio t test, P = 0.05.
*** Equivalent to 0.1 g ai / 200 Westar seeds / 6m row or 125.0 g ai/kg s

#125

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar, *Brassica napus* L. and cv Tobin, B. rapa L.

PEST: Seed decay, Damping - off, Root Rot, *Rhizoctonia solani* AG-2-1 and

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TITLE: **EFFICACY OF SEED TREATMENT FUNGICIDES FOR CONTROL OF RHIZOCTONIA S ROT AND PRE-EMERGENCE DAMPING-OFF OF CANOLA, 1992**

MATERIALS: MON-24015(15%), Lindane (gamma-BHC 67.1%),
Vitavax RS FL (carbathiin 4.5%, thiram 9%, lindane 67.5%),
VITAVAX 4G (carbathiin 4%w/w),
Rovral ST (iprodione 16.7%, lindane 50%),
Premiere (thiabendazole 1.6%, thiram 4.8%, lindane 40%),
Benolin R (benomyl 6%, thiram 10%, lindane 50%),
Fluazinam 500 F (50% ai),
UBI-2599-2 (carbathiin 45%, thiram 90%, lindane 53.3%),
TF-3791 (tefluthrin 14.3%), RAXIL 2.6 F (tebuconazole 28%)

METHOD: 100 g seed lots of cvs Westar and Tobin were treated with the see dressings; the seed was then counted, packaged and stored at 20 °C 3 weeks before planting. LINDANE was added to the MON formulation at 15 g seed before seed treatment ("+ L" in table below). The rates for Tobin wa increased to 1.5 X that for Westar. The tests were arranged in a 4 - replicate R C B design with two 6m rows/plot and 200 seeds per row. The cultivars were tested separately in adjacent tests. Trifluralin pre-emerg herbicide at 1.0 kg ai/ha was applied to the test area 3 weeks prior to planting. During planting carbofuran granules at 200 g ai/ha and 200 kerr of rye grain infested with Rhizoctonia solani AG-2-1 or AG-4 were added t each row. Emergence counts on all rows were done 3 weeks after emergence Analysis of variance for % emergence, and, the Waller - Duncan k-ratio t on treatment means were done.
Location: Agriculture Canada Research farm, Saskatoon.

RESULTS: As presented in the table below.

CONCLUSIONS: Except for RAXIL on cv Tobin, all fungicides significantly increased emergence of both cultivars. UBI-2599-2 gave best control of R solani on both Westar and Tobin. VITAVAX RS + VITAVAX 4 G resulted in dea many seedlings during the second week after emergence, particularly in th Tobin plots. The data in the table for this treatment reflect the numbers viable plants, not the actual emergence values.

Treatment	Rate/kg seed*	% Emergence Westar	Tobin
UBI-2599-2	22.5 ml P	75.3 a**	61.4 a
VITAVAX RS	22.5 ml P	73.4 ab	54.9 abc
VITAVAX RS +	22.5 ml P +		
VITAVAX 4G	1.0 kg ai/ha	70.5 ab	42.0 ef
ROVRAL ST	30.0 ml P	67.0 bc	55.1 abc
MON-24015	0.3 g ai	63.1 cd	58.7 ab
TF-3791	28.0 ml P	58.2 d	52.9 bc
FLUAZINAM	2.0 ml P	50.3 e	42.8 ef
BENOLIN R	32.0 ml P	49.8 e	50.6 cd
FLUAZINAM	3.0 ml P	47.4 ef	44.5 de
RAXIL	0.025 g ai	45.2 ef	36.1 fg
PREMIERE	28.0 ml P	40.7 f	44.9 de
CHECK	----	31.6 g	33.8 g
Standard Error of Treatment Means		2.3	2.5

* Rates for Tobin were 1.5 X Westar rates.
** Values within a column followed by the same letter are not significant different according to the Waller Duncan k-ratio t test, P = 0.05.

#126

STUDY DATA BASE: 375 1421 8177

CROP: Canola cv Westar, *Brassica napus* L. and cv Tobin, B. rapa L.

PEST: Seed decay, Damping-off, Root Rot, *Rhizoctonia solani* AG-2-1 and AC

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TITLE: **RELATIVE EFFICACY OF MON-24015 SEED TREATMENT FUNGICIDE FOR CONTRO OF RHIZOCTONIA SEED ROT, PRE-EMERGENCE DAMPING-OFF AND ADULT ROOT OF CANOLA, 1992**

MATERIALS: MON-24015(15% ai),

MON-24004 (48% ai),
Lindane(gamma-BHC 67.1%),
Vitavax RS FL (carbathiin 4.5%, thiram 9%, lindane 67.5%),
Rovral ST (iprodione 16.7%, lindane 50%),
Premiere (thiabendazole 1.6%, thiram 4.8%, lindane 40%)

METHODS: 100 g seed lots of cvs Westar and Tobin were treated with the se dressings; the seed was then counted, packaged and stored at 20 °C 3 weeks before planting. For one set of treatments, LINDANE was added to MON formulations at 15 g ai/kg seed before seed treatment ("+ L" in table The tests were arranged in a 4 - replicate R C B design with two 6 m rows/plot and 200 seeds per row. The 2 cultivars and the 2 AG isolates we tested separately in adjacent tests. Trifluralin pre emergence herbicide 1.0 kg ai/ha was applied to the test area 3 weeks prior to planting. Dur planting carbofuran granules at 200 g ai/ha and 200 kernels of rye grain infested with Rhizoctonia solani AG-2-1 or AG-4 were added to each row. Emergence counts on all rows were done 4 weeks after seeding. Disease ra for some treatments in the test infested with R.solani AG-2-1 were done a mid pod stage. Five disease categories were used: the values were weighte combined to produce a disease severity value (% DRAT) for each plot. The number of seeds that did not emerge (due to nonviability, seed rot and pre-emergence damping-off) was included in the % DRAT calculation. Analy of variance for % emergence and % DRAT, and, the Waller - Duncan k-ratio test on treatment means were done.
Location: Agriculture Canada Research farm, Saskatoon.

RESULTS: As presented in the table below.

CONCLUSIONS: MON-24015 at 0.45 g ai with L improved the emergence of West AG-2-1 plots to the level of that of the noninfested check. In these plo MON-24015 with LINDANE at 0.15 and 0.45 g ai were not significantly diff from VITAVAX RS and MON-24004 at 0.3 g ai/kg +L. MON-24015 at all rates without L was not significantly different from ROVRAL ST, but was superio PREMIERE. Emergence of Tobin in the AG-2-1 plots was increased to the lev the noninfested check by MON-24015 at 0.15 and 0.45 with L, VITAVAX, and 24004 at 0.3 g ai/kg + L. There was a trend for the addition of L to MON formulations to improve emergence of Tobin and Westar in the R. solani AG-2-1plots. In the AG-4 plots the emergence of Westar was increased to level of the noninfested check by all rates of MON-24015 with and without and was not significantly different from VITAVAX, and MON-24004 at 0.3 g without L. The emergence of Tobin in the AG-4 plots was increased to the level of the noninfested check by MON-24015 at 0.45 g ai/kg with and with L, and at 0.3 g ai/kg without L. L did not have a significant effect on t efficacy on MON in the AG-4 plots.

Disease severity of R. solani AG-2-1 on Westar was reduced by all fungici and rates. All rates of MON-24015 with L were not significantly different

Vitavax and MON-24004 at 0.3 g ai/kg + L, but were superior to PREMIERE. Tobin all fungicides except PREMIERE reduced disease severity. All rates MON-24015 with L were not significantly different from VITAVAX, ROVRAL ar 24004 with L. Only MON-24015 at 0.15 g ai/kg + L was superior to PREMIERE

		% DRAT AG-2-1		% Emergence AG-2-1		AG-4	
Treatment	Rate/Kg	Westar	Tobin	Westar	Tobin	Westar	
MON-24015	0.15gai	---	---	67.3de*	63.1cd	65.1ab	6
MON-24015	0.30gai	---	---	70.1cde	63.1cd	68.1ab	7
MON-24015	0.45gai	---	---	65.8e	52.7ef	67.6ab	7
MON-24015	0.15gai+L	51.5cd	41.9c	75.6bc	70.8abc	66.3ab	6
MON-24015	0.30gai+L	55.5c	48.8bc	70.3cde	64.1bcd	71.2a	6
MON-24015	0.45gai+L	52.1cd	44.7bc	78.6ab	67.1abc	66.4ab	7
MON-24004	0.30gai	---	---	64.9e	63.9bcd	67.6ab	6
MON-24004	0.30gai+L	48.1d	42.9bc	75.9bc	71.8ab	63.4b	6
VITAVAX RS	22.5ml P	54.5cd	39.0c	72.9bcd	69.1abc	68.3ab	6
ROVRAL ST	30.0ml P	55.5c	43.3bc	66.1e	59.1de	62.9b	5
PREMIERE	28.0ml P	69.1b	59.8ab	36.6f	48.6f	45.8c	5
Infested Check	---	77.5a	72.1a	26.8g	35.9g	28.6d	3
Noninfested Check	--	22.6e	33.9c	82.8a	73.7a	70.2a	7
Standard Error of Means		2.5	5.2	2.5	2.9	2.4	

* Values followed by the same letter are not significantly different according to the Waller - Duncan k-ratio t test, P = 0.05.

#127

STUDY DATA BASE: 390-1452-9201 ICAR: 92005039

CROP: Lettuce (cv. Salinas)

PEST: Grey mold

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TITLE: **TOLERANCE OF HEAD LETTUCE TO ROVRAL AND RONILAN**

MATERIALS: ROVRAL 50WP (iprodione), RONILAN 50WP (vinclozolin)

METHODS: Lettuce (cv. Salinas) was planted on June 30, 1992 at three site the Fraser Valley, B.C, in a randomized complete block design with four blocks. Between row spacing was 1m and within row spacing 0.45m. The proportions of organic matter, sand, silt, and clay varied among sites. back-pack sprayer with a hollow cone nozzle was used to apply both ROVRAL RONILAN at 0, 0.75, 1.5, and 3.0 kg/ha in 250 L/ha water on August 5, 13, and 27. At the time of the first application, the diameter range of the non-headed plants was 20-25 cm at site 1, 5-10 cm at site 2, and 15-20 cm site 3. On August 31 and September 1, lettuce was harvested by taking 15 subsamples per plot at each site. From the subsamples, the percent marke heads, mean marketable head weight, and mean head weight were recorded. data were analyzed by ANOVA for each location. Single degree of freedom contrasts were performed for: RONILAN vs. ROVRAL, RONILAN vs. control, an ROVRAL vs. control. Trend analyses for the increasing rates of fungicide were performed using single degree of freedom tests for: RONILAN linear, ROVRAL linear, RONILAN non-linear, and ROVRAL non-linear.

RESULTS: Class comparisons were not significant and there were no trend responses to increasing rates of either fungicide.

CONCLUSIONS: When applied to lettuce (cv. Salinas) under the specified conditions, neither RONILAN nor ROVRAL have phytotoxic properties which translate into a reduction in yield or quality. Quality differences due grey mold could not be determined as there was no incidence of disease in year this test was conducted.

#128

STUDY DATA BASE: 206003

CROP: Lettuce, cv. Ithaca

PEST: Lettuce drop, *Sclerotinia sclerotiorum* (Lib.) de Barry and Sclerotinia minor Jagger

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TITLE: **EFFICACY OF FUNGICIDES FOR THE CONTROL OF SCLEROTINIA DROP OF LETT**

MATERIALS: DITHANE M-22 (maneb 80%), ASC-66825 50 WP (fluazinam)

METHODS: For better representation of the growing season, two lettuce tri were grown, one in spring and the other late summer. The lettuce was see in Plastomer trays in the greenhouse on April 9 and June 30, 1992. Lettu plants were transplanted into naturally infested organic soil at the Muck Research Station on May 15 and August 17. A randomized complete block arrangement with 4 blocks per treatment was used for both trials. Each replicate consisted of 8 rows, 5 meters in length. The fungicide fluazir (ASC-66825) was applied at two rates, 1.0 kg and 2.0 kg/ha product. DITHANE M-22 was applied at 2.25 kg/ha product.

For the early trial, the treatments were applied on May 28 and June 10. late trial treatments were applied on September 16 and 30. All fungicide were applied as a foliar spray at 60 p.s.i. in 550 L/ha of water. The nu of heads infected with Sclerotinia was assessed at harvest. The early tr was harvested on July 10 and the late trial was harvested on October 7.

RESULTS: As presented in the table below.

CONCLUSIONS: Levels of lettuce drop were low in the early trial and no significant differences were found among any of the treatments. In the l trial, levels of lettuce drop were much higher, but still no differences found. Possibly more fungicide applications or a change in the timing of fungicide applications would improve control.

Harvest Date	Treatment	Rate kg/ha Product	Percent Marketable	Percer Scleroti
July 10	ASC-66825	1.0	86 a *	8
	ASC-66825	2.0	87 a	6
	DITHANE M-22	2.25	80 a	18
	Check	-	86 a	8
October 7	ASC-66825	1.0	40 a	56
	ASC-66825	2.0	52 a	34
	DITHANE M-22	2.25	42 a	47
	Check	-	41 a	53

* Numbers in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.
Data were subjected to an Arcsin transformation before analysis, untransformed data are presented in the table.

#129

STUDY DATA BASE: 206003

CROP: Lettuce cv. Ithaca

PEST: Lettuce drop, *Sclerotinia sclerotiorum* (Lib.) de Bary, Weeds

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TITLE: **WOOD MULCH FOR THE CONTROL OF LETTUCE DROP AND WEEDS IN LETTUCE**

MATERIALS: Wood mulch - 2.5 cm and smaller obtained from Eagle Recycling, Mississauga.

METHODS: On August 6, 1992, lettuce was transplanted into naturally infes organic soil at the Bradford Muck Research Station. The land was prepare 3 conformations: 1) raised beds, 15 cm high and 84 cm apart, 2) flat and covered with wood chip mulch, and 3) flat with no mulch. The raised bed conformation had 4 rows per replicate, the others had 8 rows per replicat Plants were 30 cm apart in the rows and all rows were 5 m long.

A randomized complete block arrangement with 4 blocks per treatment was u The wood chip mulch was applied prior to transplanting. On August 26, a count was taken on each replicate in a 0.5 m2 area.

Rating for Sclerotinia was done on October 1 on 25 heads of lettuce from center of each replicate. The number of marketable heads in each sample also rated.

RESULTS: As presented in table below.

CONCLUSIONS: The lowest weed pressure was obtained on lettuce grown on fl ground with the wood chip mulch. The difference in percentage of disease heads among treatments was not significant. The percentage of marketable heads was low due to the unfavourable wet weather conditions experienced during the growing season.

Treatment	Percent Diseased Plants	Weed Pressure Weeds/m^2	Percent Marketable	Percent Dead Plants
Raised beds	72 a *	141 a	12 a	16 a
Flat	67 a	125 a	23 a	10 a
Flat with mulch	69 a	19 b	21 a	10 a

* Numbers in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.

#130

CROP: Monarda, cv. Morden-3

PEST: Powdery mildew, *Erysiphe cichoracearum* DC.: Merat

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TITLE: **EFFICACY OF THREE FUNGICIDES AGAINST POWDERY MILDEW ON MONARDA, 19**

MATERIALS: MICRO-NIASUL W 92% WP (sulphur),
MICROTHIOL SPECIAL 80% WP (sulphur),
HOLLYSUL MICRO-SULPHUR 92% WP (sulphur)

METHODS: The trial was conducted in an experimental plot of monarda (Mona fistulosa L.) at the ASCHRC, Brooks. The rows were spaced 0.75 m apart a the spacing between plants within rows was 0.5 m. The plot had been established from transplants in 1990. Each treatment (see Table 1) was applied to three 20m^2 subplots, each containing about 50 plants. A simil set of subplots was sprayed with tapwater as a control. The treatments w arranged in a split-plot randomized complete block design with applicatio regimes (two versus three sprays/season) as the main plots and fungicides Table 2) as the subplots. The sprays were applied with a $C0^2$-propelled, hand-held boom sprayer equipped with two Tee Jet 8001 nozzles. One pass made over each row with the boom held about 30 cm above the canopy. The was directed onto the top and exposed sides of each row, and some penetra into the canopy also occurred. The plants were 30-40 cm tall and had flo buds on June 8 when the first sprays were applied. The equivalent of 20(of spray mixture was applied to each subplot using a boom pressure of 25(Powdery mildew had just begun to appear on the lower leaves of the plants this time. Two rates of each fungicide were used. For the two-spray regi applications were made on June 22 and July 6, while for the three-spray regime, they were done on June 8 & 22 and July 6. From July 22- 24, visu ratings of mildew severity were made by collecting 25 stems from each sub and counting the number of leaves with mildew symptoms per stem. These c were converted to the percent infected leaves per stem, arcsin-transforme subjected to analysis of variance (ANOVA). When the plants were at full (July 30), a 3m portion was harvested out of a center row in each subplot a fresh weight measurement was taken. A 300 g subsample of this material oven dried at 40 °C for 48 hr to determine the dry weight. A 2.0 kg subsample was also taken and frozen at -20 °C. One week later, a 500-850 g subsample of this material from each subplot was chopped and pl in a water cohabitation distillation flask where the essential oils were extracted, condensed and the volume measured. A small amount of each oil sample was subjected to gas-liquid chromatography to determine the % gera The dry matter and oil yield data were also statistically analyzed.

RESULTS: No significant differences were detected between the two- and th spray application regimes for any of the variables measured (Table 1), sc two data sets were combined to increase the number of replications to si› the numbers were re-analyzed as a randomized complete block experiment. Significant differences between fungicide treatments were obtained for th mildewed leaves and % geraniol, but not for oil or dry matter yields (Tak 2). All three fungicides provided significant control of powdery mildew all of the rates tested relative to the untreated check. The % geraniol significantly higher in all of the fungicide treatments, except MICRO-NI/ at 3.0 kg/ha, compared to the check. No phytotoxicity was seen in any of fungicide-treated subplots.

CONCLUSIONS: The three fungicides tested effectively controlled powdery mildew on monarda. They also tended to increase oil quality and oil and matter yields relative to the check, although the latter differences were statistically significant.

Table 1. A comparison of percent mildewed leaves, dry matter, oil yield a recovery, and percent geraniol in monarda sprayed either twice or three t per season with fungicides at Brooks, AB in 1992.*

Sprays/season	Mildewed leaves (%)**	Dry Matter (/ha)	Oil yield (L/ha)	Oil recovery (mL/100g oven dry wt)	Geraniol %
Two	35.2	4.83	163.1	3.38	95.42
Three	18.9	5.24	175.6	3.34	95.60
ANOVA P<0.05	*	ns	ns	ns	ns

* Figures in this table represent the main plot means of a split-plot experiment consisting of three replications and seven fungicide treatm (subplots).
** These data were arcsin transformed prior to analysis of variance. The detransformed means are presented here.

Table 2. A comparison of % mildewed leaves, dry matter, oil yield and rec and percent geraniol in monarda sprayed with three fungicides at Brooks, 1992.*

Treatment	Rate (product/ ha)	Mildwed leaves (%)**	Dry matter (T/ha)	Oil yield (L/ha)	Oil recovery (mL/100g oven dry wt)	Geraniol (%)
MICRO-NIASUL	3.0 kg	21.8ab	4.96	158.9	3.18	95.26ab
MICRO-NIASUL	5.0 kg	10.9ab	5.40	192.1	3.58	95.79cd
MICRO-THIOL	4.0 kg	40.7b	5.88	199.1	3.41	95.79cd
MICRO-THIOL	6.0 kg	6.8a	4.80	162.9	3.43	95.96d
HOLLY-SUL	3.0 kg	18.5ab	4.98	170.9	3.38	95.40bc
HOLLY-SUL	5.0 kg	11.3ab	5.29	175.5	3.33	95.41bc
Check	---	88.9c	3.95	126.4	3.20	94.95a
ANOVA P<0.05		---	ns	ns	ns	---

* The figures in this table are the means of six replications. Numbers followed by the same letter are not significantly different according Duncan's Multiple Range Test (P<0.05).
** These data were arcsin transformed prior to analysis of variance. The detransformed means are presented here.

#131

CROP: Monarda, cv. Morden-3

PEST: Powdery mildew, *Erysiphe cichoracearum* DC.: Merat

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TITLE: **EFFICACY OF MICRO-NIASUL W FUNGICIDE AGAINST POWDERY MILDEW ON MON 1992**

MATERIALS: MICRO-NIASUL W 92% WP (sulphur)

METHODS: The trial was conducted in an experimental plot of monarda (Mona fistulosa L.) at the ASCHRC, Brooks. The rows were spaced 1.0 m apart ar spacing between plants within rows was 0.5 m. The plot had been establis from transplants in 1988. Each treatment (see Table 1) was applied to fo $20m^2$ subplots, each containing ca. 40 plants. A similar set of subplots sprayed with tapwater as a control. The treatments were arranged in a completely random design. The sprays were applied with a $C0_2$-propelled, hand-held boom sprayer equipped with two Tee Jet 8001 nozzles. One pass made over each row with the boom held about 30 cm above the canopy. The was directed onto the top and exposed sides of each row, and some penetra into the canopy also occurred. The plants were 30-40 cm tall and had flo buds on June 16 when the first sprays were applied. The equivalent of 20 L/ha of spray mixture was applied to each subplot using a boom pressure o kPa. Powdery mildew had just begun to appear on the lower leaves of the plants at this time. Three rates of MICRO-NIASUL were used in this experiment. A second application of each treatment was made at the early bloom stage (July 7). From July 22-24, visual ratings of mildew severity made by collecting 25 stems from each subplot and counting the number of leaves with mildew symptoms per stem. These counts were converted to the percent infected leaves per stem, arcsin- transformed and subjected to analysis of variance (ANOVA). At full bloom (July 24), which is the opti time for harvesting this crop, 2 kg of plant material was cut from each subplot. A 500 g subsample from each harvested lot was oven dried at 40° 48 hr to determine the dry weight. The remainder of the material was fro at -20 °C immediately after cutting. One week later, a 500- 850 g subsample of this material from each subplot was chopped and placed in a cohabitation distillation flask where the essential oils were extracted, condensed and the volume measured. A small amount of each oil sample was subjected to gas-liquid chromatography to determine the % geraniol, the principal essential oil in monarda. The oil and dry matter yield data we also statistically analyzed.

RESULTS: See Table 1 below. MICRO-NIASUL provided significant control of powdery mildew relative to the unsprayed control as evidenced by a significantly lower incidence of powdery mildew in the sprayed subplots. statistically significant differences in the yield of essential oils or % geraniol were noted between treatments. No phytotoxicity was seen in any the MICRO-NIASUL- treated subplots.

CONCLUSIONS: MICRO-NIASUL W provided significant control of powdery milde under the conditions of this trial at all of the rates tested.

Table 1. Powdery mildew incidence, oil yield and percent geraniol in mona sprayed with three rates of MICRO-NIASUL W fungicide at Brooks, AB in 19

Treatment	Rate (product/ha)	Mildewed leaves (%)**	Oil yield (mL/100g oven dry weight)	Geramiol (%)
MICRO-NIASUL	4 kg	24.7a	4.31	95.05
MICRO-NIASUL	6 kg	17.5a	3.26	95.22
MICRO-NIASUL	8 kg	2.1a	3.28	95.30
Check (water only)	--	66.8b	3.54	94.48
ANOVA (P<0.05)		--	ns	ns

* Each value in the table is the mean of four replications. Numbers fol by the same letter are not significantly different according to a Dunc Multiple Range Test (P<0.05).
** These data were arcsin transformed prior to analysis of variance. The detransformed means are presented here.

#132

STUDY DATA BASE: 206003

CROP: Yellow Cooking Onions

PEST: Botrytis Leaf Blight, *Botrytis squamosa* Walker

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TITLE: **EVALUATION OF BOTRYTIS LEAF BLIGHT RESISTANCE**

MATERIALS: Six onion cultivars were obtained from Dr. Gabelman, University of Wisconsin.

METHODS: The onions were seeded in organic soil at the Muck Research Stat on May 14. A randomized complete block arrangement with 4 blocks per cul was used. Cultivars 1590-91, 1598-91 and 1610-91 each had one row per replicate. Cultivars 902-92 and 912-92 each had two rows per replicate ar cultivar 926-87 had 4 rows per replicate, due to seed availability.

The seeds were sown 1.5 cm deep with 43 cm row spacing in rows 3 m long u a V-belt seeder. The onions were evaluated on September 15 and 16 for percentage green tissue, number of dead leaves and number of green leaves Twenty five plants per replicate were sampled and the 3 lowest leaves on plant with approximately 80% or more green tissue were used. To rate the percentage green leaf area, a Manual of Assessment Keys for Plant Disease Clive James, Key No. 1.6.1 was used. Growing conditions were poor and th plants were immature when sampled, so no yield data was obtained.

RESULTS: As presented in the table below.

CONCLUSIONS: Significant differences in resistance to botrytis leaf bligh were found among these numbered cultivars. Cv. 926-87 had more green leaves/plant than cv.'s 1590-91, 1598-91 and 902-92. Cv. 902-92 was the susceptible to botrytis leaf blight and had the lowest number of green le and lowest percentage of green tissue. There were no significant differe in the number of dead leaves/plant among the cultivars.

Cultivar	Percentage Green Tissue	# of Green Leaves/plant	# of Dead Leaves/plant
1590-91	92.0 b *	6.0 b	3.4 a
1598-91	93.2 ab	6.5 ab	3.5 a
1610-91	92.3 ab	5.5 b	3.6 a
902-92	86.5 c	3.2 c	4.0 a
912-92	93.6 a	6.1 ab	3.1 a
926-87	93.2 ab	7.4 a	2.6 a

* Numbers in a column followed by the same letter are not significantly different at P = 0.05, Protected L.S.D. Test.

#133

STUDY DATA BASE: 206003

CROP: Onion

PEST: White Rot, *Sclerotium cepivorum* Berk.

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TITLE: **EVALUATION OF FUNGICIDES FOR THE CONTROL OF WHITE ROT ON MUCK SOIL**

MATERIALS: BRAVO 500 (chlorothalonil) 2.0 L/ha and ASC-66825 (fluazinam)

METHODS: The plot was established in the Holland Marsh on a 12 m x 10 m enclosed area artificially infested with white rot sclerotia at the Muck Research Station (M.R.S.). Onions were seeded on May 8 with a V-belt see in 7 m rows spaced 40 cm apart. All treatments were replicated 3 times w the exception of the preplant incorporation which was replicated 4 times. trial was arranged in a randomized complete block design. Fungicides wer applied with a back-pack sprayer directed at the base of the plant. For preplant incorporation the fluazinam was applied to the soil and worked i with a rake on May 8. On June 8 and June 22 all of the other fluazinam treatments were applied. BRAVO was applied at time of emergence on May 2 on June 3.

RESULTS: As presented in the table below.

CONCLUSIONS: All of the fluazinam treatments significantly reduced the percentage of white rot compared to the untreated check. The BRAVO drenc not significantly reduce white rot. Fluazinam applied as a directed spra a rate of 2.0 L/ha provided the best control of white rot.

M. R. S. S I T E

Treatment	Rate ai/ha	% Onions Infected
Check	-	9.32 a *
fluazinam (PPI)	2.0 L	4.87 bc
BRAVO Drench	1.0 kg	6.91 ab
fluazinam	0.50 L	4.11 bc
fluazinam	2.0 L	2.34 c

* Numbers in a column followed by the same letter are not significantly different at the P = 0.05, Protected L.S.D. Test.

#134

STUDY DATA BASE: 206003

CROP: Onion

PEST: White Rot, *Sclerotium cepivorum* Berk.

NAME AND AGENCY:
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TITLE: **EVALUATION OF ONION LINES FOR WHITE ROT RESISTANCE**

MATERIALS: Onion breeding lines were obtained from Dr. W.B. Gabelman, University of Wisconsin.

METHODS: Plots were established on each of three farms with known histori white rot, located in the Holland Marsh. The plot sizes at Site 2 and Si were 3 m x 28 rows and Site 1 was 6.4 m x 32 rows. Because the amount of was limited, six different white rot resistant cultivars were seeded at farm. On May 1 and 4, Site 1 was seeded, May 7, Site 2 was seeded and Ma Site 3 was seeded. On May 8, resistant cultivars were also seeded in a 1 10 m plot artificially infested with white rot sclerotia at the Muck Rese Station (M.R.S.). The commercial cultivar Aries was included as a suscep check in all trials. Each cultivar was replicated four times and arrange a randomized complete block design. At the M.R.S. plot, the rows were 7 long and spaced 40 cm apart. These cultivars were replicated 3 times and arranged in a randomized complete block design. The total number of onio and the number of onions with white rot were counted at the time of harve

RESULTS: As presented in the table below.

CONCLUSIONS: At Site 1, the resistant cultivar 1292-91 had a significantl lower percentage of white rot than Aires or 1122-87-90. However it did n differ significantly from the other cultivars in the percentage of white At Sites 2 and 3, there were no significant differences among the cultiva At Site 3, there was a low disease incidence throughout the plot. At the M.R.S. site, the susceptible cultivar Aries had a significantly higher am of white rot than the resistant cultivar 1564-91.

SITE 1		M.R.S. PLOT	
Cultivar	% White Rot Infection	Cultivar	% White Rot Infection
1042-87	47.21 ab *	1564-91	0.47 b
1043-91	36.26 ab	O Hotuk	7.02 ab
1104-91	31.92 ab	Aires	9.32 a
1115-87-90	48.25 ab		
1122-87-90	53.40 a		
1292-91	9.47 b		
Aires	65.79 a		

SITE 2		SITE 3	
Cultivar	% White Rot Infection	Cultivar	% White Rot Infection
1004-91	2.38 a	1306-91	0.00 a
1005-91	0.78 a	1337-91	1.10 a
1014-91	4.28 a	1352-91	0.00 a
1017-89-90	0.00 a	1399-91	1.07 a
1041-87	5.65 a	1562-91	0.00 a
1033-91	0.00 a	1563-91	0.00 a
Aires	10.89 a	Aires	1.19 a

* Numbers in a column followed by the same letter are not significantly different at the P = 0.05, Protected L.S.D. Test.

#135

ICAR: 89060230

CROP: Processing Peas cv. Bolero

PEST: Root Rot, *Aphanomyces*

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TITLE: **EVALUATION OF SEED TREATMENTS FOR ROOT ROT CONTROL IN PROCESSING P**

MATERIALS: CAPTAN 400 D (captan),
APRON 317 FL (UBI-2379),
TACHIGAREN 70 WP (UBI-2631)

METHODS: This root rot trial was located at Wood Hall Farm, Woodham, Onta in a field known to have a severe pea root rot history (disease index of Treatments were assigned to a single 6 m row, with 100 seeds per row, replicated 10 times in a randomized complete block design. The peas were planted June 3 in 0.76 m rows using a cone seeder mounted on top of a Joh Deere Max Emerge Planter Unit. Seed treatments consisting of APRON and 2 rates of TACHIGAREN were applied as a slurry (May 27) to Bolero pea seed was previously treated with CAPTAN. Number of pea seedlings emerged were counted and plots were visually assessed for root rot resistance.

RESULTS: As presented in the table below.

CONCLUSIONS: Percent emergence of the peas were not affected by any of th seed treatments tested. Root rot symptoms and treatment affects were not noticeable until the peas were at the 7 to 8 leaf stage (July 7). Heavy frequent rainfall during the month of July favoured the development of ro rot. Consequently none of the seed treatments tested provided acceptable rot control although the TACHIGAREN treatment gave significantly better r rot control then either the CAPTAN or the CAPTAN + APRON treatments.

Treatment	Rate g ai/100 kg seed	Percent Emergence (June 13)	Visual July 7	Rating July 2
CAPTAN 400 D*	76	89 A***	7.5 A	3.1 A
CAPTAN 400 D + APRON 317 FL	76 + 14.9	92 A	8.0 B	3.1 A
CAPTAN 400 D + TACHIGAREN 70 WP	76 + 245	96 A	8.6 B	3.4 B
CAPTAN 400 D + TACHIGAREN 70 WP	76 + 490	88 A	8.5 B	3.3 B

* Standard commercial pea seed treatment.
** Rating scale of 1 to 10 (1 meaning dead plants and 10 meaning vigorou growth)
*** Means followed by the same letter not significantly different (P>0.05 Duncan's multiple range test).

#136

STUDY DATA BASE: 344-1421-7861

CROP: Soybean cv. Maple Glen

PEST: Seed mould (*Diaporthe / Phomopsis*)

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TITLE: **INFLUENCE OF SEED TREATMENTS ON GERMINATION, PLANT LOSS AND YIELD SEED INFECTED WITH *DIAPORTHE PHASEOLORUM* VAR. *CULIVORA* AND *PHOMOPS LONGICOLLA***

MATERIALS: Vitaflo-280 (carbathiin 14.9%, thiram 13.2%),
Vitavax 200 F (carboxin 17%, thiram 17%),
Anchor (carbathiin 66.7 g/L, thiram 66.7 g/L)

METHODS: Seed treatments were applied the day prior to planting and treat seed was stored at 3 °C. Experiments were planted at the Woodslee sub-station (clay-loam) and Harrow Research Station (sandy loam) on 24/05 and 21/05/91, respectively. Plots consisted of 4 rows each 4.5 m in leng with a row spacing of 0.6 m and a seeding rate of 75 seeds/row. Treatmen were replicated 5X in a randomized block design.

Emergence and final stand counts at Woodslee were made 12/06/91 and 29/07 respectively. Emergence and final stand counts at Harrow were made 17/06 and 02/08/91 respectively. Percentage plant loss was determined by divid the number of plants at final stand by number of plants emerged. Plots w harvested at Harrow and Woodslee on 03/09/91 and 05/09/91, respectively.

RESULTS: See Table 1.

CONCLUSIONS: Seed treatments improved emergence at Harrow and Woodslee an reduced mid-season plant loss at Woodslee. Drought at both locations contributed to low yields.

Table 1. Emergence, plant loss and yield of Maple Glen soybeans infected Phomopsis/Diaporthe seed mould* following seed treatment at Harrow and Woodslee, 1991.

Location	Treatment	Rate g a.i./ kg seed	Emergence (%)	Plant Loss (%)	Yield kg/ha
Harrow	Control	0	39a	32a	588a
	Vitaflo 280	0.81	48b	48b	705a
	Vitavax 200	1.0	48b	39ab	681a
	Anchor	0.80	45b	41ab	647a
Woodslee	Control	0	30a	53a	793a
	Vitaflo 280	0.81	36a	36b	1068a
	Vitavax 200	1.0	45b	31b	1114a
	Anchor	0.80	45b	29b	1252a

Note: Means from the same location in the same column followed by the sam letter do not differ significantly according to Duncan's Multiple Range T P = 0.05.
* Seed lot contained 83% infected seed determined by surface disinfestati and plating on acidified PDA.

#137

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv HY-9478

PEST: Early Blight, *Alternaria solani* (Ell. & Mart.) L.R. Jones & Grout; Anthracnose, *Colleotrichum coccodes* (Wallr.) S.J. Hughes

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TITLE: **FOLIAR DISEASE CONTROL IN FIELD TOMATOES**

MATERIALS: DITHANE M-45 80WP, 75DG (mancozeb), RHC-387 (surfactant), BRAVO 500 (chlorothalonil)

METHODS: Tomatoes were transplanted on May 15 in two twin row plots space 1.65m apart. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack air sprayer at 240 L/ha of water spraying only one twin row leaving the other exposed to natural infection. Fungicides were applied based on TOM-CAST July 11, 20, Aug. 3 and 17. Foliar disease assessments were made on Aug. Sept. 1 and 11. Anthracnose counts were taken by randomly selecting 100 fruits per plot at harvest on Sept. 15.

RESULTS: As presented in the tables below.

CONCLUSIONS: Early to mid season foliar disease control was achieved by a products. It was in the latter part of the season where DITHANE 75 DG outperformed the wettable powder formulation DITHANE M-45. The addition the surfactant RHC- 387 appeared to improve the activity of the mancozeb products but these differences were not shown to be statistically signifi Late season control was achieved with the use of BRAVO 500.

RESULTS: As presented in the table below.

Treatments	Rate	Aug. 17	Foliar Disease Ratings (0-10)** Sept. 1	Sept. 11	% Anthrac-nose
DITHANE 75 DG	3.2 kg pr/ha	9.0a*	7.9a	6.5ab	1.5b
DITHANE 75 DG + RHC-387	3.2 kg pr/ha 100.0 ml pr/ha	9.0a	8.4a	9.0a	1.2bc
DITHANE 75 DG + RHC-387; BRAVO 500***	3.2 kg pr/ha 100 ml pr/ha 2.8 L pr/ha	9.0a	9.0a	9.0a	0.9bcd
DITHANE M-45	3.25 kg pr/ha	8.4a	5.7b	5.0bc	0.8bcd
DITHANE M-45 + RHC-387	3.25 kg pr/ha 100.0 ml pr/ha	7.9a	5.3b	3.7c	0.2cd
BRAVO 500	2.8 L pr/ha	9.0a	9.0a	9.0a	0.0d
Control		3.2b	2.2c	0.9d	3.7a

Spray applications timed based on TOM-CAST

* Means followed by the same letter are not significantly different (P<0.05, Duncan's multiple range test)
** Foliar Disease Ratings (0-10) - 0, no control, foliage severely damag complete control
*** DITHAN 75DG + RHC-387 were applied for the first two sprays followed BRAVO 500.

#138

ICAR: 61002036

CROP: Field Tomato, cv HY-9478

PEST: Early Blight, *Alternaria solani* (Ell. & Mart.) L.R. Jones & Grout; Anthracnose, *Colletotrichum coccodes* (Wallr.) S.J. Hughes

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TITLE: **FUNGICIDES AND THEIR TIMING FOR THE CONTROL OF FUNGAL DISEASES IN FIELD TOMATOES**

MATERIALS: BRAVO 500 82.5DG (chlorothalonil), DITHANE M-45 75DG (mancozeb

METHODS: Tomatoes were transplanted on May 15 in two twin row plots space 1.65m apart. Plots were 8m in length, replicated 4 times in a randomizec complete block design. Spray applications were made with a back pack air sprayer at 240 L/ha of water spraying only one twin row leaving the other exposed to natural infection. The initial fungicde application was appli July 11 and then every 10 days or following TOM-CAST. TOM-CAST called fo sprays on July 11, 18, 31 and Aug. 17. The 10-day spray schedule was Jul 21, 31, Aug. 10 and 20. Foliar disease assessments were taken on Sept. 1 11. Anthracnose counts of 100 red fruit per plot, were taken at harvest c Sept. 15.

RESULTS: As presented in the tables below.

CONCLUSIONS: There were no significant differences in disease control bet applying fungicides on a weather-timed scheme using TOM-CAST versus apply fungicides every 10 days. TOM-CAST called for one fewer spray applicati than spraying every 10 days. There did not appear to be any difference between the BRAVO formulations. BRAVO 82.5DG performed equal to BRAVO 5(Disease control was similar within the rate ranged used. BRAVO formulati were slightly more effective than DITHANE 75 DG. Yields in the twin row were high averaging 102 T/ha but were not significantly different amongst treatments. Each treatment was, however, significantly higher than the unsprayed control plot which yielded 76.6 T/ha.

RESULTS: As presented in the table.

Treatments	Rate	Spray Interval	Foliar Disease Rating (0-10)** Sept. 1	Sept. 11	% Anthracnos
BRAVO 500	2.4 L pr/ha	TOM-CAST	8.8ab*	8.4ab	0.3c
BRAVO 500	3.0 L pr/ha	TOM-CAST	8.1bc	7.1bc	0.5c
BRAVO 82.5DG	1.5 kg pr/ha	TOM-CAST	8.1bc	9.0a	0.3c
BRAVO 82.5DG	1.8 kg pr/ha	TOM-CAST	8.8ab	9.0a	0.6c
DITHANE 75 DG	3.2 kg pr/ha	TOM-CAST	7.5C	6.1C	1.4bc
BRAVO 500	2.4 L pr/ha	10 DAYS	9.0a	7.4b	0.2c
BRAVO 500	3.0 L pr/ha	10 DAYS	8.8ab	9.0a	0.3c
BRAVO 82.5DG	1.5 kg pr/ha	10 DAYS	8.6ab	8.4ab	0.2c
BRAVO 82.5DG	1.8 kg pr/ha	10 DAYS	8.9ab	9.0a	0.4c
DITHANE 75 DG	3.2 kg pr/ha	10 DAYS	7.9c	6.1c	0.3c
Control			2.0d	1.0d	4.6a

* Means followed by the same letter are not significantly different (P<(
Duncan's multiple range test).
** Foliar Disease Rating (0-10) - 0, no control, foliage severely damagec
complete control.

#139

ICAR: 61002036

CROP: Field Tomato, cv HY 9478

PEST: Early Blight, *Alternaria solani* (Ell. & Mart.) L.R. Jones & Grout

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TITLE: **THE USE OF SILICON AND SODIUM BICARBONATE IN THE CONTROL OF TOMATC DISEASES**

MATERIALS: Potassium Silicate, Sodium Bicarbonate

METHODS: Tomatoes were transplanted on May 15 in single row plots spaced apart. Plots were 8m in length, replicated 4 times in a randomized compl block design. Spray applications were made with a back pack airblast spr at 240 L/ha of water. Fungicides were applied every 10 days. Dates of applications were July 11, 21, 31 and Aug. 10. Foliar disease assessment were taken on July 22, Aug. 4 and 17.

RESULTS: As presented in the tables below.

CONCLUSIONS: Potassium Silicate and Sodium Bicarbonate did not provide ar measure of foliar fungal disease control in tomatoes. Foliage was unifor affected with plants severely defoliated by mid August. Fruits were seve diseased with anthracnose and foliage was severely blighted to a level tł yields were not worth harvesting.

Treatments	Rate	Foliar Disease Ratings (0-10)** July 22	Aug. 4	Aug.
POTASSIUM SILICATE	50 ppm	7.0a*	4.5a	3.0ε
POTASSIUM SILICATE	100 ppm	7.0a	4.3a	2.0ε
POTASSIUM SILICATE	200 ppm	7.0a	4.8a	2.0ε
SODIUM BICARBONATE	100 ppm	7.0a	4.3a	2.5ε
SODIUM BICARBONATE	500 ppm	7.0a	4.5a	2.5ε
SODIUM BICARBONATE	1000 ppm	6.8a	4.5a	2.0ε
Control		6.8a	3.8a	1.8ε

Applications to include a 0.1% AGRAL 90
* Means followed by the same letter are not significantly different (P<(Duncan's multiple range test)
** Foliar Disease Ratings (0-10) - 0, no control, foliage severely damage complete control.

#140

STUDY DATA BASE: 303-1451-9002

CROP: Potatoes, cv. Green Mountain

PEST: *Alternaria solani* Sor.

NAME AND AGENCY:
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Tel: (902) 566-6839 Fax: (902) 566-6821

TITLE: **EFFICACY OF CHEMICAL CONTROL OF POTATO EARLY BLIGHT - 1991**

MATERIALS: Chlorothalonil (BRAVO 500; 40 F: 1.2, 1.6, or 2.0 L/ha; 82.5 DG: 0.75, 1.0, or 1.3 kg/ha), Mancozeb (DITHANE M-45; 80 WP: 2.3 kg/ha) and Gaozhimo (MASBRANE; 1 L/250 L water, 1 L/500 L water).

METHODS: For each treatment, four replicate plots consisting of five rows m in length, spaced 0.9 m apart) were established in a randomized complet block design. All five-row plots were separated by two buffer rows for tractor operations. Whole (35-55 mm), greensprouted, Elite 3 seed tubers hand-planted 30 cm apart on 27 May, 1991 and the recommended crop managem practices were followed (fertilizer 17-17-17 at 800 kg/ha; herbicides-metribuzin 75 DF, 0.73 kg/ha; insecticides-endosulfan 400 EC, L/ha and deltamethrin 2.5 EC, 0.25 L/ha; top desiccant-diquat 20SN, 2.25 L/ha).

Plant emergence counts on the center row of each five-row plot were made July 22. Plots were mist irrigated (3-5 mm/hr for 2-4 hr periods) during August to maintain the disease in the inoculated rows. Disease determina (incidence of diseased plants rated as a percent of total number of plant severity rated as 0=none, 1=slight, 2=moderate and 3=many large foliar lesions) of plants in the center row of each five-row plot were made throughout August and September.

Fungicide applications (tractor-mounted sprayer modified to spray only th center three rows with three hollow-cone nozzles/row, 780 L/ha volume, 86 kPa) were first made on July 25 and then every week or 10 days. For fung combination treatments, the first spray was applied at a 14 day interval the second fungicide applied every 10 days during the remainder of the sp season. Top desiccant was applied on September 19 and plots were harveste October 8.

RESULTS: All data was subjected to analysis of variance and mean separati tests (see table below). All plots had 100% emergence and disease incide and severity increased during the course of the season.

CONCLUSIONS: Disease incidence was significantly reduced by all treatment 22 August and all but the plant additive, gaozhimo, on 29 August as compa to the non-treated plots. Chlorothalonil 2.0 F had the least early bligh incidence on 22 August while the 1.3G and 1.2/1.6F combination were most efficacious on 29 August. Almost all treatments significantly reduced ear blight severity compared to the untreated plots but specific treatment differences varied over the different assessment dates indicating further study requirements for accurate efficacy determination. Use of chlorotha with the plant additive, gaozhimo, reduced the severity of early blight relative to the use of gaozhimo alone and to some extent, use of the fung alone.

Effects of foliar fungicide treatment on potato early blight development 1991.

	INCIDENCE		SEVERITY				
	EB228	EB298	EB228	EB298	EB049	EB159	EB199
Non-treated control	62.5	100.0	0.67	1.47	1.55	3.00**	3.0(
Mancozeb 2.3W7*	32.5	50.0	0.37	0.57	1.07	1.27	1.5!
Chlorothalonil 1.2F10*	30.0	75.0	0.30	0.95	1.92	2.55	2.7!
Chlorothalonil 1.6F10*	25.0	45.0	0.25	0.45	1.27	1.92	2.1
Chlorothalonil 2.0F10*	15.0	42.5	0.15	0.47	1.90	2.22	2.5
Chlorothalonil .75G10*	30.0	60.0	0.42	0.75	1.82	2.47	2.7
Chlorothalonil 1.0G10*	30.0	55.0	0.30	0.62	1.35	2.02	2.4
Chlorothalonil 1.3G10*	27.5	27.5	0.30	0.47	1.37	2.32	2.5!
Chlorothalonil1.2+1.6F	27.5	27.5	0.27	0.27	1.50	1.80	2.0
Gaozhimo 1/250L7*	45.0	100.0	0.50	1.42	1.97	NA	NA
Gaozhimo 1/250L14*	NA	NA	0.50	1.40	1.87	1.50	NA
Gaozhimo 1/250L + Chlorothalonil 2.0F7**	NA	NA	0.50	0.80	1.17	1.52	1.6
Gaozhimo 1/250L + Chlorothalonil 2.0F14**	NA	NA	0.50	0.92	1.42	1.80	2.2!
Gaozhimo 1/500L7**	NA	NA	0.50	1.50	2.20	2.80	NA
LSD					(10%)		
(P=0.05)	12.32	16.49	0.13	0.26	0.74	0.70	0.7(

* Spray interval in days;
** Estimated value due to excessive damage from late blight;
*** F = Formulation.
NA Data not available; column headings refer to assessment dates - early blight day month.

#141

STUDY DATA BASE: 303-1451-9002

CROP: Potatoes, cv. Green Mountain

PEST: *Botrytis cinerea* Pers.

NAME AND AGENCY:
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TITLE: **EFFICACY OF CHEMICAL CONTROL OF POTATO GRAY MOLD - 1991**

MATERIALS: Chlorothalonil (BRAVO 500; 40 F: 1.2, 1.6, or 2.0 L/ha; 82.5 DG: 0.75, 1.0, or 1.3 kg/ha), Mancozeb (DITHANE M-45; 80 WP: 2.3 kg/ha) and Gaozhimo (MASBRANE; 1 L/250 L water, 1 L/500 L water).

METHODS: For each treatment, four replicate plots consisting of five rows m in length, spaced 0.9 m apart) were established in a randomized complet block design. All five-row plots were separated by two buffer rows for tractor operations. Whole (35-55 mm), greensprouted, Elite 3 seed tubers hand-planted 30 cm apart on 27 May, 1991 and the recommended crop managem practices were followed (fertilizer 17-17-17 at 800 kg/ha; herbicides-metribuzin 75 DF, 0.73 kg/ha; insecticides-endosulfan 400 EC, L/ha and deltamethrin 2.5 EC, 0.25 L/ha; top desiccant-diquat 20SN, 2.25 L/ha).

Plant emergence counts on the center row of each five-row plot were made July 22. Plots were mist irrigated (3-5 mm/hr for 2-4 hr periods) durin August to maintain the disease in the inoculated rows. Disease determina (incidence of diseased plants rated as a percent of total number of plant severity rated as 0=none, 1=slight, 2=moderate and 3=many large foliar lesions) of plants in the center row of each five-row plot were made throughout August and September.

Fungicide applications (tractor-mounted sprayer modified to spray only th center three rows with three hollow-cone nozzles/row, 780 L/ha volume, 86 kPa) were first made on July 25 and then every week or 10 days. For fung combination treatments, the first spray was applied at a 14 day interval the second fungicide applied every 10 days during the remainder of the sp season. Top desiccant was applied on September 19 and plots were harveste October 8.

RESULTS: All data was subjected to analysis of variance and mean separati tests (see table below). All plots had 100% emergence and disease incide and severity increased during the course of the season.

CONCLUSIONS: Gray mold incidence was significantly greater in untreated p than all treated plots on 22 August and all but mancozeb and gaozhimo tre plots on 29 August. Of the chlorothalonil treatments, 2.0F, 1.0G and 1.3 significant disease incidence reductions. Disease severity was almost al reduced with fungicide and/or plant additive (gaozhimo) treatment.

Chlorothalonil 2.0F, 1.0G and 1.3G plots had significant disease severity reductions in August while in September mancozeb and chlorothalonil treat resulted in less disease damage. Chlorothalonil/gaozhimo combinations (particularly with weekly application) had lower disease severity ratings when the fungicide and plant additive were used alone.
Effects of foliar fungicide treatment on potato gray mold development - 1

	INCIDENCE		SEVERITY			
	GM228	GM298	GM228	GM298	GM159	GM199
Non-treated control	47.5	75.0	0.47	0.82	3.00**	3.00**
Mancozeb 2.3W7*	30.0	62.5	0.30	0.62	1.20	1.37
Chlorothalonil 1.2F10*	30.0	50.0	0.30	0.50	2.27	2.57
Chlorothalonil 1.6F10*	17.5	40.0	0.17	0.40	1.77	1.90
Chlorothalonil 2.0F10*	12.5	35.0	0.12	0.35	1.87	2.02
Chlorothalonil .75G10*	15.0	47.5	0.22	0.47	1.55	1.95
Chlorothalonil 1.0G10*	12.5	40.0	0.12	0.40	1.30	1.70
Chlorothalonil 1.3G10*	17.5	27.5	0.17	0.27	1.82	2.00
Chlorothalonil1.2+1.6F	20.0	52.5	0.20	0.52	1.65	1.82
Gaozhimo 1/250L7*	30.0	77.5	0.27	0.90	1.10	NA
Gaozhimo 1/250L14*	NA	NA	0.30	0.80	1.90	NA
Gaozhimo 1/250L + Chlorothalonil 2.0F7*	NA	NA	0.30	0.47	1.00	1.17
Gaozhimo 1/250L + Chlorothalonil 2.0F14*	NA	NA	0.30	0.57	1.32	1.75
Gaozhimo 1/500L7*	NA	NA	0.30	0.80	NA	NA
LSD (P=0.05)	8.95	14.63	0.07	0.16	0.61	0.52

* Spray interval in days;
** Estimated value due to excessive damage from late blight;
*** F = Formulation.
NA Data not available; column headings refer to assessment dates - early blight day month.

#142

STUDY DATA BASE: 303-1451-9002

CROP: Potatoes, cv. Green Mountain

PEST: *Phytophthora infestans* (Mont) de Bary

NAME AND AGENCY:
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Agriculture Canada, Research Station, Charlottetown
Prince Edward Island, C1A 7M8
Tel: (902) 566-6839 Fax: (902) 566-6821

TITLE: **EFFICACY OF CHEMICAL CONTROL OF POTATO LATE BLIGHT - 1991**

MATERIALS: Chlorothalonil (BRAVO 500; 40 F: 1.2, 1.6, or 2.0 L/ha; 82.5 DG: 0.75, 1.0, or 1.3 kg/ha), Mancozeb (DITHANE M-45; 80 WP: 2.3 kg/ha) and Gaozhimo (MASBRANE; 1 L/250 L water, 1 L/500 L water).

METHODS: For each treatment, four replicate plots consisting of five rows m in length, spaced 0.9 m apart) were established in a randomized complet block design. All five-row plots were separated by two buffer rows for tractor operations. Whole (35-55 mm), greensprouted, Elite 3 seed tubers hand-planted 30 cm apart on 27 May, 1991 and the recommended crop managem practices were followed (fertilizer 17-17-17 at 800 kg/ha; herbicides-metribuzin 75 DF, 0.73 kg/ha; insecticides-endosulfan 400 EC, L/ha and deltamethrin 2.5 EC, 0.25 L/ha; top desiccant-diquat 20SN, 2.25 L/ha).

Plant emergence counts on the center row of each five-row plot were made July 22. To the foliage of plants in the two outer rows of each five-row plot, a sporangial suspension (pathogen, Phytophthora infestans (races 1, cultured on leaves of Green Mountain) of approx. 5 * 10**3 spores/ml was applied on August 8 and 14. Plots were mist irrigated (3-5 mm/hr for 2-4 periods) during August to maintain the disease in the inoculated rows. Disease determinations (amount of disease foliar tissue as a percent of t plant foliage) of plants in the center row of each five-row plot were mad throughout August and September.

Fungicide applications (tractor-mounted sprayer modified to spray only th center three rows with three hollow-cone nozzles/row, 780 L/ha volume, 86 KPa) were first made on July 25 and then every week or 10 days. For fung combination treatments, the first spray was applied at a 14 day interval the second fungicide applied every 10 days during the remainder of the sp season. Top desiccant was applied on September 19 and plots were harveste rated for late blight tuber rot (% by tuber weight) on October 8.

RESULTS: All data was subjected to analysis of variance and mean separati tests (see table below). All plots had 100% emergence and foliar disease damage increased during the course of the season.

CONCLUSIONS: All fungicide and combination treatments significantly reduc late blight foliar damage compared to untreated plots on all assessment d while significant reductions with the plant additive, gaozhimo, were obse only on the earlier dates. All fungicide only treatments provided simila efficacies except the chlorothalonil 1.2/1.6F combination which had significantly greater foliar disease on the last three dates. Chlorothalonil/gaozhimo combinations significantly reduced foliar damage compared to use of the plant additive alone. Late blight tuber rot was significantly reduced by chlorothalonil 1.2F, 1.0G, 1.3G and gaozhimo/chlorothalonil 2.0F/7* treatments relative to untreated plots. chlorothalonil was applied with gaozhimo, tuber rot levels were significa less than when gaozhimo was used alone.

Effects of foliar fungicide treatment on potato late blight development a tuber rot - 1991.

TREATMENT/SPRAY SCHEDULE-INTERVAL	FOLIAR DISEASE DAMAGE (%) (Day/Month) 22/8	29/8	04/9	09/9	15/9	19/9	LATE BLIGHT TUBER ROT (%)
Non-treated control	1.0	5.0	16.0	38.0	94	100	5.6
Mancozeb 2.3W/7*	0.0	0.2	1.0	1.0	3	5	3.1
Chlorothalonil 1.2F/10*	0.0	0.1	0.3	1.0	4	7	3.1
Chlorothalonil 1.6F/10*	0.0	0.0	0.1	0.3	2	4	2.1
Chlorothalonil 2.0F/10*	0.0	0.1	0.1	0.1	1	3	3.1
Chlorothalonil .75G/10*	0.0	0.3	0.3	0.3	3	6	4.2
Chlorothalonil 1.0G/10*	0.0	0.0	0.0	0.0	3	4	2.7
Chlorothalonil 1.3G/10*	0.0	0.0	0.0	0.1	1	2	0.9
Chlorothalonil 1.2+1.6F	0.0	0.1	2.0	9.0	15	27	2.0
Gaozhimo 1/250L/7*	0.5	3.0	12.0	26.0	62	82	8.4
Gaozhimo 1/250L/14*	0.2	3.0	11.0	30.0	73	88	6.1
Gaozhimo 1/250L + Chlorothalonil 2.0F/7*	0.0	0.0	0.1	0.1	1	2	1.6
Gaozhimo 1/250L + Chlorothalonil 2.0F/14*	0.0	0.0	0.5	0.5	2	3	3.3
Gaozhimo 1/500L/7*	0.0	1.0	5.0	19.0	83	90	8.2
LSD (P=0.05)	0.19	1.08	5.23	6.71	6.2	5.3	2.93

* Spray interval in days;
** Estimated value due to excessive damage from late blight;
*** F= Formulation.
NA Data not available; column headings refer to assessment dates - early blight day month.

#143

STUDY DATA BASE: 303-1451-9002

CROP: Potatoes, cv. Green Mountain

PEST: *Phytophthora infestans* (Mont) de Bary

NAME AND AGENCY:
PLATT H.W. and REDDIN, R.R.
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Tel: (902) 566-6839 Fax: (902) 566-6821

TITLE: **EFFICACY OF CHEMICAL CONTROL OF POTATO LATE BLIGHT - 1991**

MATERIALS: Chlorothalonil (BRAVO 500; 40 F: 1.2, 1.6, or 2.0 L/ha; 82.5 DG: 0.75, 1.0, or 1.3 kg/ha), Mancozeb (DITHANE M-45; 80 WP: 2.3 kg/ha) and Gaozhimo (MASBRANE; 1 L/250 L water, 1 L/500 L water).

METHODS: For each treatment, four replicate plots consisting of five rows m in length, spaced 0.9 m apart) were established in a randomized complet block design. All five-row plots were separated by two buffer rows for tractor operations. Whole (35-55 mm), greensprouted, Elite 3 seed tubers hand-planted 30 cm apart on 27 May, 1991 and the recommended crop managem practices were followed (fertilizer 17-17-17 at 800 kg/ha; herbicides-metribuzin 75 DF, 0.73 kg/ha; insecticides-endosulfan 400 EC, L/ha and deltamethrin 2.5 EC, 0.25 L/ha; top desiccant-diquat 20SN, 2.25

Plant emergence counts on the center row of each five-row plot were made July 22. To the foliage of plants in the two outer rows of each five-row plot, a sporangial suspension (pathogen, Phytophthora infestans (races 1, cultured on leaves of Green Mountain) of approx. 5 x 10^3 spores/ml was applied on August 8 and 14. Plots were mist irrigated (3-5 mm/hr for 2-4 periods) during August to maintain the disease in the inoculated rows. Disease determinations (amount of disease foliar tissue as a percent of t plant foliage) of plants in the center row of each five-row plot were mac throughout August and September.

Fungicide applications (tractor-mounted sprayer modified to spray only th center three rows with three hollow-cone nozzles/row, 780 L/ha volume, 86 kPa) were first made on July 25 and then every week or 10 days. For fung combination treatments, the first spray was applied at a 14 day interval the second fungicide applied every 10 days during the remainder of the sp season. Top desiccant was applied on September 19 and plots were harveste rated for late blight tuber rot (% by tuber weight) on October 8.

RESULTS: All data was subjected to analysis of variance and mean separati tests (see table below). All plots had 100% emergence.

CONCLUSIONS: Most treatments yielded similar seed-sized tubers (0-55 mm) except chlorothalonil 1.6F and 0.75G treated plots which were significant lower. However, for these two treatments, yields of 56-85 mm sized tuber were higher particularly with the 1.6F which had the greatest yield of 56 mm tubers. Yield of 55-85 mm tubers from treated plots were significantl greater than untreated except from gaozhimo only treatments. Similar res were obtained for total yield. For most treatments, yields appeared rela to late blight incidences reported elsewhere in this document. However, yields were slightly greater in gaozhimo than untreated plots despite sev late blight damage in gaozhimo treatments but these increases were not significant. No major differences among most of the chlorothalonil treat and between mancozeb and chlorothalonil treatments were observed. Gaozhim only treated plots had lower yields than treatments combining this plant additive with chlorothalonil particularly when the combined treatments we applied weekly.

Effects of foliar fungicide treatment on potato yields - 1991.

TREATMENT/SPRAY SCHEDULE-INTERVAL	TUBER YIELDS (T/Ha) 0-55 mm	56-85 mm	TOTAL
Non-treated control	9.9	17.9	29.0
Mancozeb 2.3W/7*	9.6	26.4	36.9
Chlorothalonil 1.2F/10*	10.1	24.4	35.4
Chlorothalonil 1.6F/10*	7.6	29.4	37.5
Chlorothalonil 2.0F/10*	10.7	23.9	35.4
Chlorothalonil .75G/10*	7.6	26.5	35.2
Chlorothalonil 1.0G/10*	9.3	27.6	37.6
Chlorothalonil 1.3G/10*	8.3	26.8	35.3
Chlorothalonil 1.2+1.6F	9.3	26.6	36.5
Gaozhimo 1/250L/7d	10.0	19.5	31.2
Gaozhimo 1/250L/14d	9.5	19.2	29.9
Gaozhimo 1/250L + Chlorothalonil 2.0F/7*	12.0	26.7	39.1
Gaozhimo 1/250L + Chlorothalonil 2.0F/14*	9.7	25.5	36.0
Gaozhimo 1/500L/7*	10.1	20.9	32.8
LSD (P=0.05)	2.17	4.08	3.61

* Spray interval in days;
** Estimated value due to excessive damage from late blight;
*** F= Formulation.
NA Data not available; column headings refer to assessment dates - early blight day month.

#144

STUDY DATA BASE: 375-1431-7631

CROP: Alfalfa cv. Beaver

PEST: Damping-off, *Pythium* spp. and others
Crown rot, *Fusarium* spp.

NAME AND AGENCY:
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Saskatoon, Saskatchewan, S7N 0X2

TITLE: **EFFECT OF FUNGICIDE SEED TREATMENTS ON PLANT ESTABLISHMENT AND CROWN ROT OF ALFALFA, 1987-88**

MATERIALS: UBI-2233 (thiram 36%), UBI-2359-2 (carbathiin 7%, thiram 7%), UBI-2457 (metalaxyl 5%, thiabendazole 3%) and UBI-2509 (metalaxyl 4%, thiram 33%)
In 1988, UBI-2457 was dropped, and a treatment with UBI-2509 + *Rhizobium inoculum* was added to the study

METHODS: Field trials were seeded on June 22, 1987 and June 1, 1988 on a sandy-loam soil under irrigation at Outlook, Saskatchewan and on a rainfe with clay-loam soil at Saskatoon, Sk. on June 24, 1987, in a randomized complete block design replicated four times. Each plot was a single row, long, with 0.3 m between rows. Plant establishment was assessed on the w plot approximately 1 month after seeding. Plants from the 1987 seeding w dug on September 19, 1988 and rated for crown rot incidence and severity no crown rot, 1 = 1-25% crown area affected, 2 = 26-50%, 3 > 50%). No cr ratings were made on the 1988 seeding.

RESULTS: Damping-off injury was not observed in these trials. Crown rot incidence was high (>95%) for all treatments at both locations. The resu are summarized in the table below.

CONCLUSION: Plant establishment was generally higher in the controls thar the other treatments. Young seedlings are susceptible to infection by Fu spp., resulting in colonization of the root cortex without visible sympto (Phytopathology 54: 434-437). Protecting seedlings from infection might crown rot severity, because crown rot is also associated with infection b Fusarium spp. However, there was no consistent association between crowr severity and seed treatment.

Treatment	Rate (g ai per kg)	Establishment (plants/m row) Saskatoon 1987	Outlook 1987	Outlook 1988	Crown Rot Severity Saskatoon	(
Control	0	14.6a	15.5a	24.4a	0.22a	
UBI-2233	260	14.7a	13.6a	17.7 b	0.19a	
UBI-2359	80	14.9a	14.2a	---	0.19a	
UBI-2457	55	14.0a	13.6a	19.3ab	0.21a	
UBI-2509	295	14.4a	11.6a	17.1 b	0.18a	
UBI-2509	590	15.1a	13.7a	---	0.15a	
UBI-2509 + *Rhizobium*	295	---	---	15.6 b	---	

Values within a column that are followed by the same letter are not significantly different (P < 0.05) based on Duncan's Multiple Range Test.

#145

STUDY DATA BASE: 385-1412-8203

CROP: Barley, cv, Abee, Argyle, Bonanza, Ellice, Empress, Galt, Harringto
Heartland, Jackson, Johnston, Leduc, Samson.

PEST: Naturally occurring foliar diseases

NAME AND AGENCY:
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Lacombe, Alberta T0C 1S0

TITLE: **EFFECT OF TILT ON BARLEY CULTIVARS - 1992**

MATERIALS: TILT (25% propiconazole)

METHODS: Twelve barley cultivars were seeded into barley stubble in 4 row plots, 5.5 m long with wheat seeded between each plot to limit disease sp The test was arranged as a 4 rep split plot with cultivars blocked. Barl straw infested with scald (*Rhyncosporium secalis*) was scattered over eac to increase the inoculum levels. TILT was applied at GS 37-41 at the rate 125 g ai/ha. Four weeks after spraying, 20 flag and 20 penultimate leave collected at random from each plot and rated for percent leaf area diseas The plot was also scored on a scale of 0-9 with 0=no leaf disease and 9=s leaf disease. The entire plot was combined for yield and the seed used t determine 1000 kernel weights.

RESULTS: The results are presented in the table below. Weather condition conducive to the low to moderate spread of both scald and net blotch (*Pyrenophora teres*).

CONCLUSIONS: The application of TILT significantly reduced the leaf disea score, the percent disease rated on the flag and penultimate leaves and significantly increased yield and 1000 kernel weights. There were signif differences between cultivars for disease score, percent leaf area diseas both the flag and penultimate, and 1000 kernel weights but not for kg/ha. There were significant interactions between TILT and the cultivars for pe disease rated on the flag and penultimate leaves. Some cultivars show li disease control although they register 10% yield increases (Leduc and Johnston) while others have little or no yield increase despite 50% disea control (Jackson and Ellice).

CULTIVAR	CHEMICAL	% DISEASE FLAG	PENULTIMATE	SCORE	KG/HA	1000 KERNE
Abee	No Tilt	16	37	5.25	3960	40.5
	Tilt	11	18	3.75	3998	41.4
Argyle	No Tilt	12	19	4.00	3832	32.4
	Tilt	13	14	3.25	3952	32.8
Bonanza	No Tilt	11	12	3.00	3668	34.8
	Tilt	10	11	2.38	3856	35.4
Ellice	No Tilt	19	45	5.25	3799	39.9
	Tilt	12	23	4.00	3924	40.4
Empress	No Tilt	10	15	4.00	4374	34.6
	Tilt	9	11	3.75	4178	34.6
Galt	No Tilt	17	24	4.00	3844	33.4
	Tilt	12	21	3.25	4058	34.8
Harrington	No Tilt	22	46	5.75	3836	39.1
	Tilt	16	22	4.75	3840	39.6
Heartland	No Tilt	16	21	3.25	3445	33.7
	Tilt	11	14	2.75	3823	34.0
Jackson	No Tilt	28	37	5.00	4451	38.1
	Tilt	14	19	3.75	4459	38.7
Johnston	No Tilt	9	12	3.00	4005	31.1
	Tilt	8	10	2.63	4388	31.4
Leduc	No Tilt	13	17	3.75	3852	34.5
	Tilt	11	16	3.00	4234	35.0
Samson	No Tilt	14	18	4.50	4061	32.6
	Tilt	11	13	3.75	3982	31.8
	LSD .05	4	8	n.s.	n.s.	n.s.

#146

STUDY DATA BASE: 385-1412-8203

CROP: Barley, cv. Harrington

PEST: Naturally occurring foliar diseases

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TITLE: **EVALUATION OF FUNGICIDES FOR FOLIAR DISEASE CONTROL IN HARRINGTON - 1992**

MATERIALS: BAYLETON (50% triadimenol); BENLATE (50% benomyl); DITHANE M-45 (80% mancozeb); DPX-H6573 (40% fusilazole); EASOUT (50% thiophanate-methyl); HWG-1608 3.6 FL (38% ethyltrianol); HWG-1608 45 DF (45% ethyltrianol); SAN-619F (10% cyproconazole SPORTAK (40% prochloraz); TILT (25% propiconazole); XE-779 (25% diniconazole). Surfactants - AGRAL 90; CANPLUS

METHODS: Harrington barley was seeded into barley stubble in 4 row plots, long with wheat seeded between each plot to limit disease spread. The treatments were applied with a back pack carbon dioxide sprayer at the ra below. The trial design was a randomized complete block with 4 replicati Barley straw infested with scald (*Rhyncosporium secalis*) was scattered ov entire plot area. The treatments were applied at GS 37-41 with the excep of the early application of TILT (GS 32-37), DITHANE M-45 which had an additional application 7 days later and the late application of TILT (GS HWG-1608 3.6 FL and HWG-1608 45 DF were applied with the addition of 0.5% 90 and XE-779 was applied with 1% CANPLUS.

Four weeks after spraying, 20 flag and 20 penultimate leaves were collect random from each plot and rated for percent leaf area diseased. The plot also scored on a scale of 0-9 with 0=no leaf disease and 9=severe leaf di The entire plot was combined for yield and the seed used to determine 10 kernel weights.

RESULTS: The results are presented in the table below. Weather condition conducive to the spread of net blotch (*Pyrenophora teres*) as well as scal

CONCLUSIONS: All chemical treatments significantly reduced disease score percent leaf area diseased and increased, but not significantly, yields a 1000 kernel weights. The least efficient treatments at reducing leaf dis (BENLATE and EASOUT) still resulted in 9-10% yield increases. The most efficient treatments at increasing yield as well as 1000 kernel weights w DPX-H6573 and the early application of TILT. The application of DITHANE M resulted in a 21% yield increase with only a 1% increase in 1000 kernel w

TREATMENT	RATE (gai/ha)	% DISEASE FLAG	PENULTIMATE	SCORE	KG/HA	1000 KERN
BAYLETON	125	16	39	5.75	3572	37.
BENLATE	250	18	45	6.25	3443	37.
DITHANE M-45	1800	16	38	6.50	3763	36.
DPX-H6573	160	12	23	4.75	3689	37.
EASOUT	500	23	48	6.50	3389	37.
HWG-1608 - 3.6 FL	125	14	29	5.25	3643	37.
HWG-1608 - 45 DF	125	16	27	4.75	3409	36.
SAN-619F	100	17	24	5.75	3614	36.
SAN-619F	120	13	22	5.50	3519	37.
SPORTAK	350	14	25	5.25	3519	37.
SPORTAK	400	15	26	5.00	3685	37.
TILT - Early	125	15	34	5.75	3757	38.
TILT - Late	125	14	24	5.50	3645	38.
XE-779	120	14	27	5.50	3567	37.
Untreated	--	30	56	7.00	3117	36.
LSD	.05	5.4	12.1	1.2	n.s.	n.s

#147

STUDY DATA BASE: 303-1412-8907

CROP: Barley cv. Albany

PEST: Net Blotch, *Pyrenophora teres*, Scald, *Rhynchosporium secalis*

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TITLE: **INFLUENCE OF FOLIAR FUNGICIDES WITH SURFACTANTS ON DISEASE AND YIE BARLEY, 1992**

MATERIALS: TILT (propiconazole 250 EC),
BAY-HWG-1608 1.2 EC (tebuconazole 143.8 g ai/L),
ELITE 45DF (tebuconazole 450 g/L),
BAY-HWG 3.6F (tebuconazole 432 g/L) and the surfactants

RENEX 36, AGRAL 90, ENHANCE, ASSIST OIL CONCENTRATE

METHODS: Barley plots, cv. Albany, were established May 16, 1992 at a see rate of 300 viable seeds per m^2. Each plot was 10 rows wide by 5.0 meter with 17.8 cm between each row. Foliar fungicide treatments were replicat a complete randomized block design. At Zadok's Growth Stage 49, treatmen were applied at the rates listed in the table below, using a CO_2 backpack sprayer. Disease ratings for net blotch and scald were taken on the seco leaf at Zadok's Growth Stage 65. Yield and thousand kernel weights were determined from the harvest of the center seven rows of each plot, using small plot combine.

RESULTS: Effects of the foliar fungicide treatments on disease and yield barley are listed in the table below. Disease appeared late in the seaso

CONCLUSIONS: All treatments resulted in significant reductions in both ne blotch and scald. Particularly with net blotch, disease control activity appeared to be enhanced with the addition of a surfactant, even if not significantly. Activity of surfactants was very evident in yield respons the treatments. With the exception of TILT and BAY-HWG-1608 3.6F, all treatments resulted in significant yield increases. Maximum yield benefi 1214 kg/ha (24%) with ELITE 45DF + RENEX 36. There was no significant difference between AGRAL 90, RENEX 36 or ENHANCE when applied with ELITE The highest yield associated with BAY-HWG-1608 3.6F was when it was appli with ASSIST OIL CONCENTRATE. Thousand kernel weights were significantly with the use of the surfactants AGRAL 90 and ENHANCE with ELITE 45DF and ASSIST OIL CONCENTRATE added to BAY-HWG-1608. The use of surfactants ger increased the effectiveness of the foliar fungicides.

TREATMENT	RATE G AI/HA SEED	NET BLOTCH (%)	SCALD (%)	YIELD KG/HA	TH KE WE
UNTREATED	0	29.3	14.8	5043	
TILT	125	11.4	4.7	5372	
BAY-HWG-1608 1.2EC	125	10.0	1.6	5795	
ELITE 45DF	125	13.4	0.4	5767	
ELITE 45DF + RENEX 36	125+0.25% v/v	5.0	0.4	6257	
ELITE 45DF + AGRAL 90	125+0.25% v/v	8.6	0.7	6206	
ELITE 45DF ENHANCE	125+0.5 L/ha	6.8	1.5	6225	
BAY-HWG-1608 3.6F	125	16.2	3.5	5356	
BAY-HWG-1608 3.6F+ RENEX 36	125+0.25% v/v	7.4	0.6	5770	
BAY-HWG-1608 3.6F+ ASSIST OIL CONCENTRATE	125+1%	10.4	0.8	6234	
SEM*		3.2	1.4	193.3	
LSD (0.05)**		9.23	4.19	562.0	

* SEM = Standard Error of Mean
** LSD = Value at 0.05 Level of Probability

#148

STUDY DATA BASE: 303-1412-8907

CROP: Barley cv. Albany

PEST: Scald, *Rhynchosporium secalis*

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TITLE: **EFFECTS OF FUNGICIDE SEED TREATMENTS ON DISEASE AND YIELD IN BARLE 1992**

MATERIALS: VITAFLO 280 (carbathiin, 167 g ai/L; thiram, 148 g ai/L), UBI- (baytan 30, triadimenol 317 g ai/L), UBI-2568 (baytan, triadimenol 60 g a UBI-2454 (RH3866, myclobutanil 50 g ai/L), VITAFLO 250 (carbathiin, 167 g TF3770 (hexaconazole, 10 g/L; tefluthrin, 200 g/L), UBI-2584-1 (tebuconaz g ai/L).

METHODS: Albany barley seed was treated in a small plot seed treater with above materials at the rates listed in the table below. The seed was pla on May 16, 1992 at a seeding rate of 300 viable seeds per m^2. Each plot rows wide by 5 meters long with 17.8 cm between each row. Treatments wer replicated four times in a complete randomized block design. Emergence c were taken on 2 meters of row per plot. Disease ratings were taken on th second leaf at ZGS 65. Yield and thousand kernel weights were determined the harvest of the center seven rows of each plot, using a small plot com

RESULTS: Listed in the table below.

CONCLUSIONS: Emergence, yield and thousand kernel weights were not significantly different. There was a significant difference in scald, wi UBI-2568 and UBI-2383 giving the best control. The least effective were 250 and UBI-2584 at the lowest rate. Although not significantly different UBI-2383 had the highest plants/m^2 emerged, highest yield and heaviest th kernel weight.

TREATMENT	RATE G AI/KG SEED	EMERGENCE PLANTS/M^2	SCALD (%)	YIELD KG/HA	THOUSAND WEIGHT (G
UNTREATED	0	177	21.2	5055	44.04
VITAFLO 280	1.03	170	22.0	4723	42.95
UBI-2383+ H2O	0.15+4.53	207	6.4	5602	47.06
UBI-2568	0.15	191	4.9	5337	45.73
UBI-2454	0.12	172	10.1	4951	45.69
UBI-2454	0.10	188	19.3	5174	44.03
UBI-2454	0.08	163	17.5	4782	43.09
UBI-2454	0.06	201	9.3	5203	45.38
UBI-2454+ VITALFO 250	0.06+0.55	189	19.9	4869	44.90
UBI-2454+ VITALFO 250	0.08+0.55	156	25.0	4776	45.29
VITAFLO 250	0.55	167	36.1	4856	43.02
TF-3770	0.02	166	17.6	4796	45.10
TF-3770	0.025	167	20.2	4923	44.83
TF-3770	0.038	187	18.2	5032	44.09
TF-3770	0.1	191	17.3	4857	44.47
TF-3790	0.025	176	31.2	4754	44.90
TF-3790	0.1	169	21.3	5058	44.42
UBI-2584	0.02	202	24.3	4993	44.83
UBI-2584	0.04	177	36.2	4769	44.50
SEM*		NS	139.5	NS	NS
LSD**			2.19		

* Standard Error Mean.
** Value at a 0.05 Level of Probability.
NS Not significant at P<0.05.

#149

STUDY DATA BASE: 303-1120-8805

CROP: Oats cv. Nova

PEST: Speckled leaf blotch, *Septoria avenae*

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TITLE: **EFFICACY OF SEED TREATMENTS FOR OAT DISEASE CONTROL, 1992**

MATERIALS: TF-3770 (hexaconazole, 12.5 g/L),
TF-3787 (hexaconazole 10 g/L),
TF-3790 (hexaconazole 10g/L plus tefluthrin 200 g/L),
PP-333 (paclobutrazole, 2.0 g/L),
VITAFLO 280 (carbathiin 167 g/L + thiram, 148 g/L),
BAYTAN (triadimenol, 317 g/L)

METHODS: Certified seed was treated with the fungicides listed in the tak below using a small batch rotary seed treater. This seed was then used t establish field plots on 19 May 1992 using a randomized block design with replicates. Plots, 2 x 5 m, were seeded at a row spacing of 17.5 cm, anc separated from adjacent plots by 2 rows of barley. Severity of speckled blotch, caused by Septoria avenae, was rated on a 1-9 scale at Zadok's Gr Stage 60. Plots were combined at maturity using a Hege plot combine and drying, yield data recorded at 14% moisture.

RESULTS: See table below.

CONCLUSIONS: Grain yields were higher than normal reflecting the unusual favourable growing conditions experienced in 1992. Yields were depressec TF3787 at both the 0.15 and 0.20 g a.i. rate but this was not correlated other assessed factors. The yield depression with FT 3787 containing hexaconazole as an active ingredient was probably formulation related as 3770 and FT 3790, also containing this active ingredient, did not depress yields. No treatment improved performance of Nova oats above that of the untreated check.

Treatment and rate g a.i./ kg		Emergence plants/m^2	Septoria leaf disease severity (1-9)	1000-K wt (g)	Yield kg/ha
TF-3770	0.15	402	3.5	36.88	5323
TF-3770	0.20	356	3.8	36.88	5304
TF-3787	0.15	361	2.8	37.14	3722
TF-3787	0.20	412	3.0	37.43	4278
TF-3790	0.15	347	3.0	36.74	5277
TF-3790	0.20	306	3.8	37.32	5371
PP-333	0.002	306	3.3	37.82	5385
PP-333	0.004	328	3.5	37.31	5317
PP-333	0.008	387	2.5	37.61	5309
Vitaflo 280	1.03	280	3.5	37.00	5464
Baytan	0.15	299	3.3	37.57	5379
Untreated	-	444	3.5	37.18	5295
LSD 0.05		ns	ns	ns	574.3
CV%		21	22	3.1	7.8

#150

STUDY DATA BASE NUMBER: 375-1411-8719

CROPS: Bread wheat, cv. Katepwa
Canadian prairie spring wheat, cv. Biggar
Durum wheat, cv. Arcola
Soft white spring wheat, cv. Fielder

PEST: Naturally occurring foliar diseases

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TITLE: **EFFECT OF APPLICATION OF TILT ON FOLIAR DISEASE AND YIELD OF SEVEF CLASSES OF SPRING WHEAT, 1992**

(This study was supported by the Irrigation Based Economic Development Fu
and the assistance of personnel at the Saskatchewan Irrigation Developmer

Centre is gratefully acknowledged.)

MATERIALS: TILT (propiconazole 250g/L)

METHODS: The test was performed at the Irrigation Development Centre, Out Saskatchewan. In the spring 100 kg/ha of 34-0-0 was broadcast before see During the growing season, water was applied when tensiometer readings me -0.5 bar. A split-plot design was used with cultivars as main plots and treatments as subplots. Each subplot was made up of four rows. Two rows barley were planted between subplots. Seeding and seed placement with 50 of 11-55-0 fertilizer took place on May 7. Treatments were sprayed using hand-held, CO_2 pressurized, 4 nozzle boom sprayer (nozzle size 0.01) that delivered 225 L/ha at 240 kPa. The foliage of 4 rows was sprayed with Ti a rate of 125 g a.i./ha. Control subplots were sprayed with water. Spra took place June 30 (G.S. 37-42, flag leaf emerging to fully extended). T penultimate leaves were collected August 11 (Fielder and Katepwa G.S. 85 dough; Arcola G.S. 80-85, late milk to soft dough; Biggar G.S. 79-83, lat to early dough) from randomly selected plants in the center two rows of e subplot and were stored at 5 °C until actual percent disease coverage was rated. Leaves from the control subplots were pressed and dried. They wer scanned to determine the presence of obligate pathogens. Dried leaf piec (4-6 cm) containing lesions were prepared and plated on water agar contai antibiotics. Sporulation was observed after about one week. Harvesting o rows x 5m long occurred September 16 with yield recorded as grams per sub

RESULTS: Results are summarized in the table below. Cultivars were significantly (P=0.01) different for yield with Fielder averaging 2707 g/subplot, Biggar 2245, Arcola 2225, and Katepwa 1864. The cultivar treatment interaction was not significant for foliar disease, but it was significant for yield because yield decreased by 4% in Arcola after spray but increased in Katepwa by 17%, in Fielder by 9%, and in Biggar by 6%. Arcola, 60% of the leaf disease was caused by *Septoria nodorum*, 40% by *Pyrenophora tritici-repentis* (tan spot). The major cause of leaf disease Biggar was *S. nodorum* 24 at 70% while *P. tritici-repentis* caused 20%, *Sep tritici* caused 10%. In Fielder 80% of the leaf disease was caused by *Sep nodorum*, 20% by *Pyrenophora tritici-repentis* (tan spot), and in Katepwa *S. nodorum* caused 55%, while *Septoria tritici* 35%, and *P. tritici-repenti*

CONCLUSIONS: Treatment with Tilt showed a significant (P=0.01) reduction foliar disease levels over the control. Yield was also significantly (P= improved by treatment with Tilt with an average yield increase of 7% over control.

	FOLIAR DISEASE(%)		YIELD (g/subplot)	
CULTIVAR	CONTROL	TILT	CONTROL	TILT
Arcola	29	11	2270	2179
Biggar	37	8	2176	2314
Fielder	34	7	2593	2892
Katepwa	39	15	1715	2013
Mean*	34 a	10 b	2188 b	2332 a

* Mean values for each variable in the same column which are not followed the same letter are significantly different at the 1% level of probabil according to Duncan's Multiple Range Test.

#151

STUDY DATA BASE NUMBER: 375-1411-8719

CROP: Spring wheat, cultivar Leader

PEST: Common root rot, *Cochliobolus sativus*

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TITLE: **EFFECT OF SEED TREATMENT FUNGICIDES ON EMERGENCE, COMMON ROOT ROT YIELD OF LEADER SPRING WHEAT, 1992**

MATERIALS: AGROX FLOWABLE (maneb 300g/L),
TF-3790 (hexaconazole 10g/L, tefluthrin 200g/L);
UBI-2100-4 (carbathiin 230g/L),
UBI-2454-1 (sisthane 50g/L, carbathiin 230g/L),
UBI-2568 (triadimenol 30g/L), UBI-2584-1 (tebuconazole 8g/L);
MON-24015 (150g/L)

METHODS: The test was done at Saskatoon, Saskatchewan in 1992. Naturally occurring inoculum of *C. sativus* was relied upon for infection. Seed was treated in 1000 ml glass jars. Chemical treatments were dispersed over th glass surface, then 275g of seed was added and shaken. To ensure uniform coverage of the seed, the first treated lot of seed was discarded and a s lot was packaged for seeding. Seed was treated on April 29 except for TF which was treated by the company. A randomized complete block design with replicates made up the test. Each plot was 4 rows; each row was 6 m long Rows were 23 cm apart with 350 seeds planted in each row. Seeding and fertilizing (40 kg/ha with 11-55-0) took place May 27; emergence was reco June 10 on 2 m of one of the center rows; harvesting (3 rows x 5 m long) done October 1 with yield recorded as grams per plot. Common root rot wa recorded at the early milk stage on August 10 by rating 50 plants, random selected from one row. Common root rot was determined by counting the nu of plants with lesions covering greater than 25% of the subcrown internoc Percent common root rot was calculated by multiplying the field score by

RESULTS: The results are summarized in the table below.

CONCLUSIONS: Four treatments had significantly (P=0.01) lower disease rat than the control: UBI-2568, TF-3790, UBI-2454-1, and UBI-2584-1. Disease ratings significantly increased over that of the control with the MON-240 treatments. There was no difference between the control and any of the treatments in yield or emergence. Treatment with TF-3790, UBI-2454-1, UE 2568, and UBI-2584-1 thickened subcrown internodes and increased the numb subcrown internode tillers.

PRODUCT	RATE (g a.i./kg seed)	EMERGENCE (plants/2m)	COMMON ROOT ROT (%)	YIELD (g/plot
Control	---	95 ab*	23 c*	1419 ab
AGROX FLOWABLE	0.45	102 ab	28 bc	1433 ab
MON-24015	0.30	95 ab	45 a	1445 ab
MON-24015	0.45	105 ab	45 a	1454 ab
MON-24015	0.60	99 ab	53 a	1432 ab
MON-24015	0.75	99 ab	41 ab	1372 b
TF-3790	0.02/0.4	100 ab	3 d	1514 a
UBI-2100-4	0.55	111 a	24 c	1451 ab
UBI-2454-1 + UBI-2100-4	0.06 0.55	84 b	3 d	1417 ab
UBI-2568	0.15	91 ab	1 d	1434 ab
UBI-2584-1	0.02	99 ab	6 d	1417 ab

* Values in the same column which are not followed by the same letter ar significantly different at the 1% level of probability according to Du Multiple Range Test.

#152

ICAR/IRAC: 89110061

CROP: Spring wheat, cv. Manitou/Tobari 66//Kitt

PEST: Loose smut, *Ustilago tritici*

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TITLE: **EFFECTS OF FUNGICIDE SEED TREATMENTS ON EMERGENCE, PLANT HEIGHT AN LOOSE SMUT OF SPRING WHEAT**

MATERIALS: TF-3770 (12.5 g/l hexaconazole),
CULTAR (25% paclobutrazol),
VITAFLO 280 (carbathiin plus thiram)

METHODS: Wheat seeds were treated with VITAFLO 280 (0.55 g ai/kg seed) ar 3770 (0.02 g ai/kg seed) using a mini-rotostat treater. For pulse treatm (P), seeds were shaken for one minute in acetone containing either 150 or mg/l paclobutrazol and then air-dried. For long term treatments, seeds w imbibed for 18 h in water containing 75 mg/l paclobutrazol (LT) and for hardening another set of seeds were exposed to 40 °C during the last 2 h imbibition (LT+H) and then both sets were air-dried. The wheat was sown May, 1992 in double 4 m row plots at the Arkell Research Station, near Gu The plots were spaced 2 m apart. The seeding rate was 200 seeds per row the untreated check, VITAFLO 280 and TF-3770 treatments and 100 seeds/hal for the imbibed-water check and paclobutrazol treatments. The seeds were by hand at a depth of 3-4 cm. Each treatment was replicated four times i randomized complete block design. Ammonium nitrate (34-0-0) was applied immediately after sowing at approximately 150 kg/ha. The previous crop i plot area was winter wheat grown in 1990-1991. Broad-leaved weeds were controlled by periodic hand-weeding. Wheat emergence was assessed on 20 1992 (GS 10-11*) and again on 26 May, 1992 (GS 12-13). The height of 10 randomly-selected plants/plot was measured on 3 June, 1992 (GS 14-15) and 10 June, 1992 (GS 22-23). Loose smut was assessed on 10 July, 1992 (GS 5 by counting the number of smutted and healthy wheat spikes in each plot. Owing to their Poisson-type distribution, the loose smut data were transf to square root+0.5 values for analysis. Untransformed means are reported the tables.

RESULTS: The wheat emergence, plant height and loose smut data are report the tables.

CONCLUSIONS: Emergence of the wheat was poor in all of the treatments, possibly because of the condition of the seed combined with a dry spring the Guelph area. Significantly lower emergence of some seed treated with paclobutrazol was related to planting depth. The growth-suppressive acti of paclobutrazol resulted in a very short coeloptile, hence reduced emerg This suggests that a planting depth of 2 cm would be optimal for wheat se treated with paclobutrazol rather than the 3-4 cm depth used in this stud statistically significant suppression of wheat height occurred in the imbibed-water check and paclobutrazol treatments compared to VITAFLO 280 TF-3770, but the height differences were less than 4 cm. All of the fung seed treatments significantly reduced incidence of loose smut compared to checks. The best control was given by VITAFLO 280, TF-3770 and paclobutr (75 mg/l) long-term imbibed into heat-hardened seed.

Note: Growth stage on a scale of Zadoks, Chang and Konzak.

Fungicide	Emergence (%)		Plant height	
	GS 10-11	GS 12-13	GS 14-15	GS 22
Untreated check	45 b*	45 b	15.7 bc	23.
Imbibed-water check	49 b	44 b	15.5 bc	22.
VITAFLO 280	61 a	60 a	16.7 a	25.
Paclobutrazol 75 mg/l (LT)	41 b	43 b	15.4 bc	22.
Paclobutrazol 75 mg/l (LT+H)	28 d	29 d	13.9 e	21.
Paclobutrazol 150 mg/l (P)	40 bc	40 bc	15.2 cd	22.
Paclobutrazol 300 mg/l (P)	29 cd	33 cd	14.5 de	21.
TF-3770	45 b	47 b	16.2 ab	24.

Fungicide	Concentration (mg/l)	% loose smut
Untreated check	--	6.8 a*
Imbibed-water check	--	8.9 a
VITAFLO	280	0.7 bc
Paclobutrazol (LT)	75	0.6 bc
Paclobutrazol (LT+H)	75	0.0 c
Paclobutrazol (P)	150	2.6 b
Paclobutrazol (P)	300	0.9 bc
TF-3770 (hexaconazole)	125	0.1 c

* Numbers in a column followed by the same letter are not significantly different according to the Waller-Duncan Bayesian K-ratio t-test.

#153

STUDY DATA BASE: 303-1120-8805

CROP: Spring wheat cv. Belvedere

PEST: Naturally occuring foliar diseases

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TITLE: **FOLIAR FUNGICIDE EVALUATIONS ON SPRING WHEAT, 1992**

MATERIALS: Fungicides - FOLICURE (hexaconazole), TILT (propiconazole), BAYLETON (triadimefon), BRAVO (chlorothanol); Surfactants - RENEX, AGRAL, ENHANCE

METHODS: Field plots of Belvedere spring wheat were established on 22 May using certified seed treated with Vitaflo 280 at the recommended rate. T trial was arranged in a complete randomized block design. Each plot was m and separated from adjacent plots by 2 rows of barley, all plantings at cm row spacings. Production practices were as recommended for spring whea the region. Fungicide and adjuvant treatments were applied with a tracto driven direct injection sprayer delivering 280 L/ha water at 267 kPa pres Plots were examined for diseases at Zadok's Growth Stage 60. Yield respo to treatments were determined at maturity by harvesting the centre 6 rows each plot using a Hege 125 plot combine and after drying recording data a % moisture.

RESULTS: See Table below.

CONCLUSIONS: The 1992 year was very favourable for cereal production and foliar disease levels did not develop to their usual severity and were no recorded as differences were not obvious. Application of FOLICURE 45DF + RENEX 36 and FOLICURE 432F significantly increased grain yield of Belvede wheat. Seed weights were increased by these two materials and by FOLICUR 45DF, FOLICURE 45DF + ENHANCE and BAYLETON. FOLICURE 432F + ASSIST decre grain yield. Addition of surfactants to FOLICURE 45DF did not significan alter yield performance whereas addition of either REMEX 36 or ASSIST to FOLICURE 432F decreased yields. FOLICURE 432F applied without surfactant gave the highest yield and greatest seed weight. Hectolitre weights were significantly influenced by foliar sprays.

Treatment	Rate g a.i./ha	1000-K (g)	Yield (kg/ha)
Folicure 144EC	125	36.21 de*	4791 de
Folicure 45DF	125	39.56 ab	5382 abc
Folicure 45DF + Renex 36	125 + 0.25%v/v	40.22 a	5524 ab
Folicure 45DF + Agral 90	125 + 0.25%v/v	37.79 bcde	5414 abc
Folicure 45DF + Enhance	125 + 0.25%v/v	38.47 abcd	5347 abc
Folicure 432F	125	40.19 a	5760 a
Folicure 432F + Renex 36	125 + 0.25%v/v	35.92 e	4996 cd
Folicure 432F + Assist	125 + 1.0%v/v	36.25 de	4358 e
Tilt	125	36.48 cde	5268 bcd
Bayleton	125	38.67 abc	5086 bcd
Bravo	1000	37.29 bcde	4932 cd
Unsprayed	Nil	35.78 e	4966 cd
	CV%	4.3	6.6

* Values followed by the same letter are not significantly different, P=0.05

#154

STUDY DATA BASE: 303-1120-8805

CROP: Spring wheat cv. Katepwa and Max

PEST: Naturally occuring foliar diseases

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TITLE: **SEED TREATMENT EVALUATIONS ON SPRING WHEAT, 1992**

MATERIALS: TF-3770 (hexaconazole, 12.5 g/L),
TF-3787 (hexaconazole 10 g/L),
TF-3790 (hexaconazole 10 g/L plus tefluthrin 200 g/L),
PP-333 (paclobutrazole 2.0 g/L),
VITAFLO 280 (carbathiin 167 g/L plus thiram 148 g/L),

BAYTAN (triadimenol 317 g/L)

METHODS: Certified seed of Katepwa and Max spring wheat was treated with fungicides using a small batch rotary seed treater. Field plots were established on 21 May 1992 in a randomized split-plot design using 4 replicates, treatments as main plots and cultivars sub-plots. Each sub-p was 2 x 5 m, separated from adjacent sub-plots by 2 rows of barley, 17.5 row spacing. Plots were fertilized with 60 kg N/ha prior to seeding. Emergence was recorded at Zadok's Growth Stage (ZGS) 10 by determining th number of plants emerged from 1 m of the centre of two rows from each plo Powdery mildew assessments were completed at ZGS 37 and leaf blotch recor at ZGS 70 on a 1-9 scale. Grain yield was determined at crop maturity by harvesting 1.25 m from the centre of each plot using a Hege small plot combine. Harvested seed was dried for moisture determinations and reporte 14% moisture.

RESULTS: See table. Katepwa is more susceptible to powdery mildew than Belvedere but both cultivars are equally susceptible to septoria leaf and glume blotch. Treatment x cultivar interactions were not significantly different and all results reported are means of the two cultivars.

CONCLUSIONS: Foliar disease levels were not influenced by the seed treatm used in the trial. Significant improvements in emergence occurred with T 3787 at the 0.20 g rate compared to the untreated check. Seed weights ar grain yields were not improved by use of the treatments; however, TF 3878 while improving emergence at the high application rate, was detrimental t both seed weight and total yield. The decrease in yield with TF-3787 was probably formulation related as TF-3770 and TF-3790, both also containing hexaconazole did not decrease yields.

Treatment and rate g a.i./kg seed		Emergence plants/m^2	Disease severity (0-9) Powdery mildew	Blotch	1000-K g	Y kg
TF-3770	0.15	269 d*	1.9 a	1.6 a	36.96 ab	3
TF-3770	0.20	256 d	1.9 a	2.3 a	36.80 ab	4
TF-3787	0.15	363 ab	2.2 a	2.3 a	34.60 c	2
TF-3787	0.20	410 a	2.3 a	2.1 a	35.26 bc	2
TF-3790	0.15	306 bcd	2.5 a	2.1 a	37.42 a	4
TF-3790	0.20	313 bcd	2.5 a	2.3 a	38.27 a	4
PP-333	0.02	300 bcd	2.5 a	2.1 a	37.37 a	3
PP-333	0.04	288 bcd	2.4 a	1.9 a	37.75 a	4
PP-333	0.08	293 bcd	2.1 a	1.8 a	37.60 a	3
Vitaflo 280	1.03	346 abc	2.5 a	2.4 a	37.71 a	3
Baytan	0.03	302 bcd	2.1 a	2.1 a	38.00 a	3
Untreated	--	291 bcd	2.5 a	2.3 a	38.30 a	3
	CV%	14.8	41.0	28.3	3.4	

* Values followed by the same letter are not different at P=0.05, Duncan's Multiple Range Test.

#155

STUDY DATA BASE NUMBER: 375-1411-8719

CROP: Spring wheat, cv. Katepwa, Fielder

PEST: Naturally occurring foliar diseases

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TITLE: **EFFECT OF APPLICATION TIMING OF TILT ON FOLIAR DISEASE AND YIELD O IRRIGATED SPRING WHEAT, 1992**

(This study was supported by the Irrigation Based Economic Development Fu the assistance of personnel at the Saskatchewan Irrigation Development Ce is gratefully acknowledged.)

MATERIALS: TILT (propiconazole 250g/L)

METHODS: The test was performed at the Irrigation Development Centre, Out Saskatchewan. In the spring 100 kg/ha of 34-0-0 fertilizer was broadcast before seeding. During the growing season, water was applied when tensio readings measured -0.5 bar. A split-plot design was used with cultivars main plots and treatments as subplots. Each subplot was made up of eight Four rows of barley were planted between subplots. Seeding and seed plac with 50 kg/ha of 11-55-0 fertilizer took place on May 7. Treatments were sprayed using a hand-held, CO_2 pressurized, 4 nozzle boom sprayer (nozzle 0.01) that delivered 225 L/ha at 240 kPa. Tilt was applied to the foliag rows for each subplot at a rate of 125 g a.i./ha. Growth stages and spra dates are listed in the table below. The control subplots were sprayed w water once during the growing season. Ten penultimate leaves were collect August 11 (G.S. 85, soft dough) from randomly selected plants in the cent rows of each subplot and were stored at 5 °C until actual percent disease coverage was rated. Leaves from the control subplots were pressed and dr then scanned to determine the presence of obligate pathogens. Dried leaf pieces containing lesions were prepared and plated on water agar containi antibiotics. Plates were incubated for about a week and sporulation was observed. Harvesting of 5 rows x 5 m long occurred September 16 with yie recorded as grams per subplot.

RESULTS: Results are summarized in the table below. Cultivars differed significantly (P=0.01) for yield (Katepwa 2053 g/subplot, Fielder 3118) not for foliar disease. The cultivar by treatment interaction was not significant for either variable so the data for cultivars was combined in table. In Katepwa, 50% of the disease on the leaves was caused by *Septor tritici*, 45% by *Septoria nodorum* and 5% by *Pyrenophora tritici-repentis* (spot), while in Fielder, *S. nodorum* caused 60% of the leaf spots and *P. tritici-repentis* 40%.

CONCLUSIONS: Percent disease was significantly (P=0.01) reduced from that the control for five spray dates: Tilt-4 to Tilt-8. Growth stages for th spray dates ranged from stem elongation (G.S. 31) to completion of anthes (G.S. 69). Although differences were not significant, these spray dates had higher yields than the control.

TREATMENT	SPRAY DATE	GROWTH STAGE	FOLIAR DISEASE(%)	YIELD (g/subplot)
Control	July 7	G.S. 49-59 Booting to completion of inflorecence	59 a*	2485 a*
TILT-1	June 1	G.S. 13 3 leaves unfolded	49 abc	2435 a
TILT-2	June 9	20-21 Tillering	59 a	2460 a
TILT-3	June 16	22-23 Tillering	55 ab	2571 a
TILT-4	June 23	G.S. 31 Stem elongation	41 bcd	2699 a
TILT-5	June 30	G.S. 39-44 Booting	37 cd	2606 a
TILT-6	July 7	G.S. 49-59 Booting to completion of inflorescence	28 de	2684 a
TILT-7	July 13	G.S. 61-65 Anthesis	14 e	2707 a
TILT-8	July 20	G.S. 69 Anthesis complete	30 de	2620 a

* Values in the same column which are not followed by the same letter are significantly different at the 1% level of probability according to Dur Multiple Range Test.

#156

STUDY DATA BASE NUMBER: 375-1411-8719

CROP: Spring wheat, cv. Katepwa, Fielder

PEST: Naturally occurring foliar diseases

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TITLE: **EFFECT OF FOLIAR FUNGICIDE TREATMENTS ON FOLIAR DISEASE AND YIELD IRRIGATED SPRING WHEAT, 1992**

(This study was supported by the Irrigation Based Economic Development Fu and the assistance of personnel at the Saskatchewan Irrigation Developmen Centre is gratefully acknowledged.)

MATERIALS: TILT (propiconazole 250g/L);
DITHANE DG (mancozeb 75% WP)

METHODS: The test was performed at the Irrigation Development Centre, Out Saskatchewan. In the spring 100 kg/ha of 34-0-0 was broadcast before see During the growing season, water was applied when tensiometer readings me -0.5 bar. A split-plot design was used with cultivars as main plots and treatments as subplots. There were four replicates. Each subplot was ma of four rows. Rows contained 350 seeds, were 6 m long and 23 cm apart. rows of barley were planted between subplots. Seeding and seed placement 50 kg/ha of 11-55-0 fertilizer took place on May 7. Fungicide treatments sprayed using a hand-held, CO_2 pressurized, 4 nozzle boom sprayer (nozzle 0.01) that delivered 225 L/ha at 240 kPa. Control subplots were sprayed water. Spray rates are indicated in the table below. Spraying took place 30 (G.S. 37-42, flag leaf emerging to fully extended) and July 7 (G.S. 49 booting to completion of inflorescence emergence). Ten penultimate leave collected August 11 (G.S. 85, soft dough) from randomly selected plants i center two rows of each subplot and were stored at 5 °C until actual percent disease coverage was rated. Leaves from the control subplots were pressed and dried. They were scanned to determine the presence of obliga pathogens. Dried leaf pieces (4-6 cm) containing lesions were prepared an plated on water agar containing antibiotics. Sporulation was observed af about one week. Harvesting of 4 rows x 5m long occurred September 16 with recorded as grams per subplot.

RESULTS: Results are summarized in the table below. Cultivars were significantly (P=0.01) different for yield with Fielder averaging 2738g/s and Katepwa 1920 and they were significantly different (P=0.05) for folia disease (Fielder 14%, Katepwa 21%). The cultivar x treatment interactio not significant for either variable so the data for cultivars was combine the table. In Katepwa, 55% of the leaf disease was caused by *Septoria no* 35% by *Septoria tritici*, and 10% by *Pyrenophora tritici-repentis* (tan sp The major cause of leaf disease in Fielder was *S. nodorum* at 80% while *P. tritici-repentis* caused 20%.

CONCLUSIONS: All treatments showed a significant (P=0.01) reduction in pe foliar disease over the control. Yield was also significantly (P=0.01) improved in three of the treatments (Tilt-1, Tilt-2 and Dithane-2) with a average yield increase of 11% over the control.

TREATMENT	RATE (g a.i./ha)	SPRAY SCHEDULE June 30	July 7	FOLIAR DISEASE(%)	YIELD (g/subplot)
Control	---	spray	spray	36 a*	2154b*
TILT-1 spray	125	---	spray	11 b	2418 a
TILT-2 sprays	125	spray	spray	8 b	2405 a
DITHANE DG, 1 spray	1800	spray	spray	19 b	2271 ab
DITHANE DG, 2 sprays	1800	---	spray	14 b	2398 a

* Values in the same column which are not followed by the same letter are significantly different at the 1% level of probability according to Dun Multiple Range Test.

#157

CROP: Roses, container grown

PEST: Black spot, *Diplocarpon rosae* (Wallr, ex Fr.) Lev.;
Powdery mildew, *Sphaerotheca pannosa* Wolf

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TITLE: **THE EVALUATION OF FUNGICIDES FOR THE CONTROL OF BLACK SPOT AND POW MILDEW ON CONTAINER GROWN ROSES**

MATERIALS: CAPTAN 50 WP (captan);
CAPTAN 80 WDG (captan);
NOVA 40 WP (myclobutanil);
PENTAC AQUAFLOW (dienochlor); THIODAN (endosulfan)

METHODS: Black spot and powdery mildew control was evaluated in a randomi complete block design replicated four times. Each treatment was comprise two or more plants of nine varieties for a total of twenty-eight plants. Plants were spaced to allow maximum growth, adequate spray coverage and m spray drift. The two year old rose varieties received the same fertilizat schedule and irrigation program throughout the trial. The materials were sprayed to run off using a hydraulic handgun attached to a Briggs and Str sprayer operating at 133 kPa.

Treatments 2,3 and 4 were allotted at approximately 7-10 day intervals or 23, 30, July 13, 20, 29, and August 11, 25, and September 1. Treatment 4 CAPTAN 80 WDG PLUS, was applied on the following dates with an insecticic miticide - June 30 (PENTAC AQUAFLOW), July 20 (THIODAN), August 11 (PENTA AQUAFLOW), and September 1 (PENTAC AQUAFLOW). Treatment 5 was applied at day intervals on June 23, July 5, 16, August 11, 25 and September 1.

The incidence of black spot and powdery mildew was assessed on July 10, 2 August 17, 27 and September 8. All leaves and blossoms were examined for presence of acervuli and mycelium. The severity of the disease was evalu on a scale of 0 to 5. A zero rating indicated little or no disease prese while a rating of 5 was indicative of severe leaf defoliation and extensi powdery mildew lesions. Phytotoxicity was assessed for stunting of leave elongation of internodes and blossom distortion.

RESULTS: The results are summarized in the table below.

CONCLUSION: All fungicides provided control against black spot as compare the unsprayed check. CAPTAN 50 WP AND NOVA 40 WP were not significantly different using Duncan's multiple range test. However, visual inspection end of the season indicated plants treated with NOVA exhibited fewer dise symptoms. This may be explained by the close range of numbers determinec the rating system. The NOVA treatment provided good control of powdery m on both the leaves and blossoms relative to the unsprayed check. Phytotoxicity was absent in all treatment, including CAPTAN 80 WDG PLUS w insecticide or miticide addition. There was heavy disease pressure over growing season and treatment intervals were extended during August. These treatment intervals, plus marked differences in disease susceptibilities rose varieties may have contributed to the poor distinction in black spot disease rating between fungicide treatments.

Treatment	Rate of product/L	MEAN RATING Black spot	Powde milde
Check	-	1.7a*	0.8a
CAPTAN 50 WP	2.0 g	1.2bc	0.6a
CAPTAN 80 WDG	1.25 g	1.3b	0.7a
CAPTAN 80 WDG PLUS	1.25 g	1.3b	0.7a
NOVA 40 WP	0.3 g	1.0c	0.2b

* Means followed by the same letter within each column are not significar different using Duncan's Multiple Range Test (P=0.05).

#158

STUDY DATA BASE: 387-1431-8312

CROP: Alfalfa, cv. Maxim

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TITLE: **PERSISTENCE OF DELTAMETHRIN RESIDUES IN BALED ALFALFA**

MATERIALS: DECIS 5.0 EC (deltamethrin)

METHODS: A producer's field near Lethbridge, AB was used with a 10.1 x 425 treated area adjacent to a 10.1 x 425 m untreated control area. Deltamet was applied at 12.5 g ai/ha on June 8, 1990 when the alfalfa was 2 weeks to bloom. The standing crop was sampled 2 h, 7, and 14 d after spraying cutting, at ground level, all the crop within a 12.5 x 12.5-cm square. T squares were taken at each of four random locations in the treated and untreated areas and all eight subsamples combined to form one composite sample. Four such composites were collected from the treated area on eac sample date and two composites per date from the control area. Fifteen c after spraying, the standing alfalfa was cut (2.44-m swaths) and rolled i wind-rows using a mower conditioner. Four days after cutting, the wind-r were baled into conventional 'small square' bales (40.6 x 45.7 x 91.4 cm, 30-35 kg). The bales were moved to the Lethbridge Research Station and stacked 1 d after baling. The bales from the treated area were randomly assigned to four replicate stacks, each stack consisting of four rows of bales. Bales from the control area were similarly arranged in two replic stacks. The stacks were located outdoors and were unsheltered except for plastic and plywood sheets placed on top of the stacks. The stacks were sampled 2 d, 4, 12, 16, 37, and 52 weeks after baling using a stainless s hollow-core, sample probe (40.6 cm x 2.22 cm i.d.) attached to an electri drill. A sample consisted of a composite of 16 cores per stack, one core from one of the ends of each bale. The standing crop and bale samples we analyzed using an ECD-GC residue method. Residues were determined on a t isomer basis with a minimum detectable limit of 0.02-0.03 ppmd (ppm dry w basis). Method recoveries from standing crop samples fortified at 0.03-1 ppmd were 88-97%; recoveries from bale samples fortified at 0.02-2 ppmd w 85-103%.

RESULTS: See Table below. Residues in the standing crop declined rapidly (half-life = 9.0 d) until the alfalfa was cut. Two days after baling, deltamethrin residues were 0.64 ppmd compared with 0.71 ppmd in the stanc crop just before cutting. Once baled, residues in the alfalfa declined v slowly with a projected half-life of 77 weeks. Sixteen weeks after balin residue levels were still 0.55 ppmd. The environment within the bales represented a typical, low moisture, stacked bale situation. During the 6 weeks, moisture levels in the bales decreased from 11.2% to 10.0%, there 6.5% loss of dry matter, and temperatures within the bales were 21-24 °C compared with daily max/min air temperatures of 24-30/11-18 °C. We founc excessive heating (40-60 °C) within the bales.

CONCLUSIONS: Deltamethrin dissipates rapidly in a standing alfalfa crop, however, once baled, residues dissipate extremely slowly in the bales. T feed treated bales to livestock, residues would have to be below a given tolerance level at the time of baling.

Weeks after spraying	Weeks after baling	Deltamethrin residues, ppmd +/- sd*	
0	-	2.04	0.09
1	-	1.13	0.11
2	-	0.71	0.12
2.1	-	cut standing crop	
2.7	0	baled cut alfalfa	
3	0.22	0.64	0.04
7	4	0.61	0.04
15	12	0.57	0.03
19	16	0.55	0.03
40	37	0.53	0.04
55	52	0.54	0.01

* Each value is a mean of four replicate samples, ppmd (dry wt basis) +/- standard deviation.

#159

ICAR NUMBER: 61006457

CROP: Chinese broccoli var. Guy Lon

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TITLE: **PESTICIDE RESIDUE IN CHINESE BROCCOLI**

MATERIALS: THIODAN(R) 4 EC (endosulfan), CYGON(R) 480 E (dimethoate), PIRIMOR(R) 50 WP (pirimicarb), MALATHION(R) 500 EC (malathion), IMIDAN(R) WP 50% (phosmet), BELMARK(R) 300 EC (fenvalerate), AMBUSH(R) 500 EC (permethrin), ROVRAL(R) 50 WP (iprodione)

METHODS: Chinese broccoli was seeded at the Holland Marsh on muck soil. plots consisted of four rows, 7.5 metres long, replicated four times. Th treatment was applied at a rate of 400 litres of liquid per hectare with tractor-mounted sprayer. The eight pesticides were applied as a tank mix Chinese broccoli on August 27, 1991. The crop was treated prior to harve and sampled at various intervals during harvest maturity. Samples were analyzed for residue (methods of analysis on request).

RESULTS: Residue data are presented in Table 1.

CONCLUSIONS: Dimethoate, malathion, endosulfan and permethrin were below maximum residue limit by the pre-harvest interval for broccoli. By day 3 pirimicarb, and by day 13 phosmet, fenvalerate, and iprodione were less t 0.1 mg/kg ("negligible" residue).

Table 1: Residue of eight pesticides in Chinese broccoli when the insecti and fungicide were applied prior to harvest*.

Treatment	Rate (kg ai/ha)	Residue in Chinese broccoli(mg/kg) Days after application: 0	3	7	13	MRL**	PHI*** days
dimethoate	0.48	3.48	0.250	0.056	ND****	2.0	4
malathion	1.13	4.38	0.123	0.019	ND	0.5	3
phosmet	1.13	7.95	0.605	0.196	ND		
endosulfan 1	0.80	1.98	0.205	0.053	0.009	2.0	7
endosulfan 2		1.45	0.318	0.102	0.007		
endosulfan sulfate		0.10	0.280	0.195	0.038		
permethrin	0.07	0.48	0.168	0.089	ND	0.5	3
fenvalerate	0.10	1.27	0.320	0.180	ND		
pirimicarb	0.25	0.903	0.024	ND	ND		
desmethyl pirimicarb		0.220	0.035	ND	ND		
iprodione	0.75	3.38	1.110	0.505	ND		
32280*****		ND	ND	ND	ND		
32490*****	0.735	0.208	0.15	ND			

* Treated August 27, 1991.
** MRL = maximum residue limit for broccoli.
*** PHI = pre-harvest interval.
**** ND = not detected.
***** Iprodione metabolite.

#160

ICAR NUMBER: 61006457

CROP: Thick mustard cabbage var. Bok Choi

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TITLE: **PESTICIDE RESIDUE IN BOK CHOI**

MATERIALS: THIODAN(R) 4 EC (endosulfan), CYGON(R) 480 E (dimethoate), PIRIMOR(R) 50 WP (pirimicarb), MALATHION(R) 500 EC (malathion), IMIDAN(R) WP 50% (phosmet), BELMARK(R) 300 EC (fenvalerate), AMBUSH(R) 500 EC (permethrin), ROVRAL(R) 50 WP (iprodione)

METHODS: Bok Choi was seeded at the Holland Marsh on muck soil. The plot consisted of eight rows, 7.5 metres long, replicated four times. The treatment was applied at a rate of 400 litres of liquid per hectare with tractor-mounted sprayer. The eight pesticides were applied as a tank mix Bok Choi on August 19, 1991. The crop was treated prior to harvest and sampled at various intervals during harvest maturity. Samples were analy for residue (methods of analysis on request).

RESULTS: Residue data are presented in Table 1.

CONCLUSIONS: Dimethoate, malathion, endosulfan, and permethrin were below their permitted maximum residue limits by the recommended pre-harvest intervals for cabbage. By day 7 pirimicarb, day 15 phosmet and fenvalera and day 21 iprodione were less than 0.1 mg/kg ("negligible" residue).

Table 1.Residue of eight pesticides in Bok Choi when the insecticides and fungicide were applied prior to harvest.*

Treatment	Rate (kg ai/ha)	Residue in Bok Choi (mg/kg) Days after application 0	1	3	7	10	15	21	MRL**
dimethoate	0.48	3.050	1.98	1.02	0.220	0.121	0.030	ND****	2.0
malathion	1.13	9.450	4.98	0.32	0.039	0.010	0.004	ND	6.0
phosmet	1.13	10.150	6.85	1.85	0.380	0.170	0.070	ND	
endosulfan 1	0.80	3.400	1.73	0.83	0.250	0.100	0.045	0.003	2.0
endosulfan 2	2.380	1.73	0.94	0.380	0.180	0.091	0.001		
endosulfan sulfate	0.122	0.25	0.60	0.650	0.520	0.410	0.070		
permethrin	0.07	0.670	0.56	0.32	0.150	0.070	0.064	ND	0.5
fenvalerate	0.10	1.550	1.19	0.81	0.330	0.150	0.074	0.006	0.1
pirimicarb	0.25	1.433	0.67	0.28	0.064	0.030	ND	ND	
iprodione	0.75	4.230	3.53	1.50	0.480	0.300	0.200	ND	
32280*****	0.550	0.62	0.40	0.153	0.145	0.072			

* Treated August 19, 1991.
** MRL = maximum residue limit for cabbage.
*** PHI = pre-harvest interval.
**** ND = not detected.
***** Iprodione metabolite.

#161

ICAR NUMBER: 61006457

CROP: Fuzzy squash var. Mao Gwa

TITLE: **PESTICIDE RESIDUE IN FUZZY SQUASH**

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MATERIALS: THIODAN(R) 4 EC (endosulfan), CYGON(R) 480 E (dimethoate), PIRIMOR(R) 50 WP (pirimicarb), MALATHION(R) 500 EC (malathion), IMIDAN(R) WP 50% (phosmet), BELMARK(R) 300 EC (fenvalerate), AMBUSH(R) 500 EC (permethrin), ROVRAL(R) 50 WP (iprodione)

METHODS: The tests were done at the Holland Marsh on muck soil. Fuzzy sq was transplanted in four-row plots, 6 metres long, replicated four times. treatment was applied at a rate of 400 litres of liquid per hectare with tractor-mounted sprayer. The eight pesticides were applied as a tank mix fuzzy squash on August 27, 1991. The crop was treated prior to harvest a sampled at various intervals during harvest maturity. Samples were analy for residue (methods of analysis on request).

RESULTS: Residue data are presented in Table 1.

CONCLUSIONS: Endosulfan was below the maximum residue limit by the pre-harvest interval for squash. The remaining insecticides that were ap on fuzzy squash were below 0.1 mg/kg ("negligible" residue) on day of application. By day 7 residue of iprodione was below 0.1 mg/kg ("negigib residue).

Table 1. Residue of eight pesticides in fuzzy squash when the insecticide
fungicide were applied prior to harvest.*

Treatment	Rate (kg ai/ha) days	Residue in fuzzy squash (mg/kg) Days after application 0	3	7	13	MRL**	PH
dimethoate	0.48	0.076	0.035	0.011		ND****	
malathion	1.13	0.070	0.007	0.002	ND	8	
phosmet	1.13	0.097	0.030	0.010	ND		
endosulfan 1	0.80	0.115	0.036	0.026	0.010	1.0	
endosulfan 2	0.056	0.035	0.030	0.015			
endosulfan sulfate		0.007	0.016	0.023	0.024		
permethrin	0.07	ND	ND	ND	ND		
fenvalerate	0.10	ND	ND	ND	ND		
pirimicarb	0.25	0.038	0.038	ND	ND		
iprodione	0.75	0.155	0.150	0.065	0.079		

* Treated August 27, 1991.
** MRL = maximum residue limit.
*** PHI = pre-harvest interval.
**** ND = not detected.

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STUDY DATA BASE: 387-1431-8312

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TITLE: **1991 MONITORING STUDY FOR HERBICIDES IN SOUTHERN ALBERTA GROUNDWA**

MATERIALS: 2,4-D, MCPA, bromoxynil, dicamba, diclofop-methyl, trifluralin
triallate, picloram.

METHODS: The study was conducted on a partially irrigated, continuously
cropped (barley), 1-ha field at the Lethbridge Research Station. The so
a clay loam. Because different rates of feedlot manure have been applie

annually since 1973, the 0-15 cm organic matter content is 2-13%. Bromox diclofop-methyl and triallate had been applied at recommended rates over previous 5 years. 2,4-D had been applied to adjacent irrigated fields. water table is at 0.5-3 m depth on the irrigated half of the field, and 3 on the non-irrigated half. The mean annual rainfall is 405 mm; mean annu irrigation is 100 mm. In 1991, the groundwater (pH 7.8) was sampled from existing grid of twenty-two 6-m PVC wells and from stainless steel (SS) w installed adjacent to the PVC wells at 3 sites. The wells were purged an allowed to recharge with 'fresh' groundwater for 24-48 h before sampling a baler. One liter samples were collected from 3 sites on May 28, 22 sit July 3, and 3 sites on August 20. Samples were held in glass bottles at until analysis 1-2 weeks later by Enviro-Test Labs, Edmonton, AB, using a MSD-GC with selected ion monitoring. The minimum quantifiable limits wer 0.1-0.2 ppb with 70-132% method recovery.

RESULTS: See Table below. In the July 3 sampling, herbicides were detect at 11 of the 22 sites; 6 detections on the irrigated half of the field, 5 the non-irrigated half. Levels detected were all below the Environment C drinking water guidelines of 5-230 ppb. Temporal variation is evident in results. Herbicide levels were consistently higher in the SS wells compa with adjacent PVC wells.

CONCLUSIONS: This study represents a 'snap shot' of groundwater quality i small, controlled area. The fact that herbicides were detected at all suggests that leaching losses of herbicides on agricultural land in south Alberta should be a concern.
Herbicides Detected in Groundwater in PVC and SS wells.*

Date well-type	Detections no. & levels**	2,4-D	Bromoxynil	Diclofop***	Tria
May 28					
PVC	No. detections	0/3	0/3	0/3	0/3
	Levels (ppb)	nd	nd	nd	nd
July 3					
PVC	No. detections	3/22	7/22	4/22	2/2
	Levels (ppb)	0.1-0.2	0.1-0.9	0.3-1.1	0.1
SS	No. detections	0/3	1/3	2/3	2/3
	Levels (ppb)	nd	0.1	1.1-2.0	0.3
August 20					
PVC	No. detections	0/3	0/3	0/3	0/3
	Levels (ppb)	nd	nd	nd	nd
SS	No. detections	0/3	0/3	0/3	1/3
	Levels (ppb)	nd	nd	nd	0.2

* MCPA, dicamba, trifluralin and picloram had never been previously app on or around the site and were not detected (nd) in any samples.
** No. detections expressed as no. sites with herbicide detected/total n sites sampled.
*** Diclofop-methyl was detected as the acid form, diclofop.

PESTICIDE AND CHEMICAL DEFINITION
PESTICIDES ET DÉFINITIONS DES PRODUITS CHIMIQUES

PESTICIDE AND CHEMICAL DEFINITIONS

PESTICIDE	ALTERNATIVE DESIGNATION(S)
1,3-dichloropropene	TELONE; TELONE II-B
2,4-D	2,4-D ACID; 2,4-D ACIDE; 2,4-D-ACID; 2,4-DICHLOROPHENOXYACETIC ACID; DESORMONE; DRIAMINE; FORMULA 40; UBI-2323
2,4-D dimethylamine	2,4-D-DIMETHYLAMINE
ABAMECTIN	avermectin b1
ABG-6263	*B. thuringiensis tenebrionis*
ABG-6271	*B. thuringiensis tenebrionis*
ABG-6275	*B. thuringiensis tenebrionis*
AC 303,630	confidential
AC-301467	terbufos
ACECAP	acephate
acephate	ACECAP; ORTHENE; ORTHO-12-420
ACR-3675	pyrifenox
ACR-3815	mancozeb + pyrifenox
acrinathrin	RU-38702; RUFAST
AFUGAN	pyrazophos
AGRAL 90	nonylphenolethylene oxide
AGRI-MYCIN	streptomycin
AGRIKELP	unknown
AGRISTREP	streptomycin
AGROSOL	captan + thiabendazole
AGROSOL POUR-ON	thiram + thiabendazole; AGROSOL T
AGROSOL T	thiram + thiabendazole
AGROX	maneb
AGROX B-3	B-3; captan + diazinon + lindane
AGROX D-L PLUS	captan + diazinon + lindane; AGROX DL PLUS
AGROX DB	maneb
AGROX DL PLUS	captan + diazinon + lindane
AGROX FLOWABLE	maneb
aldicarb	TEMIK

ALDRIN	HHDN
ALIETTE	fosetyl-al
allidochlor	RANDOX
ALPHA-CYPERMETHRIN	cypermethrin-alpha
AMAZE	isofenphos
AMBUSH	permethrin
amitraz	MITAC
ANCHOR	carbathiin + thiram; UBI-2359-2
anilazine	DYRENE
ANVIL	hexaconazole
APM	azinphos-methyl
APOLLO	clofentezine
APRON	metalaxyl
APRON-T	APRON-T 69
APRON-T 69	metalaxyl + thiabendazole; APRON-T
ARREST	carbathiin + oxycarboxin + thiram
Ascophyllum nodosum extract	MICRO-MIST
ASIMICIN	Paw Paw bark extract
Asimina triloba extract	Paw Paw bark extract
ASSIST	adjuvant; ASSIST OIL; ASSIST OIL CONCENTRATE
ASSIST OIL	adjuvant
ASSIST OIL CONCENTRATE	adjuvant
atrazine	AATREX; ATRAMIX
ATROBAN	permethrin
ATROBAN DELICE POUR-ON	permethrin
avermectin b1	ABAMECTIN; AVID
AVID	avermectin b1
Azadirachta indica EXTRACT	azadirachtin
azadirachtin	*Azadirachta indica* EXTRACT; AZADIRACHTIN SOLUTION 1; AZADIRACHTIN SOLUTION 2; MARGOSAN-O; NEEM; NEEM SOLUTION 1; NEEM SOLUTION 2; NEEMIX; SAFERS NEEM INSECTICIDE; SNI OIL
AZADIRACHTIN SOLUTION 1	azadirachtin
AZADIRACHTIN SOLUTION 2	azadirachtin
azinphos-methyl	APM; GUTHION
AZTEC	cyfluthrin + phostebupirim
B-3	captan + diazinon + lindane; AGROX B-3; CHIPMAN B-3
B. thuringiensis Berliner	*BACILLUS THURINGIENSIS*
B. thuringiensis israelensis	VECTOBAC
B. thuringiensis kurstaki	*BACILLUS THURINGIENSIS KURSTAKI*; BACTOSPEINE; CGA-237218; CONDOR; CUTLASS; DIPEL; EG-2371; FORAY; FUTURA; FUTURA XLV; JAVELIN; MYX-2284; ORGANIC INSECT KILLER LIQUID; THURICIDE; THURICIDE-HPC
B. thuringiensis san diego	M-ONE; M-ONE MYD; M-TRAK; MYX-9858

B. thuringiensis tenebrionis	ABG-6263; ABG-6271; ABG-6275; DITERA; NOVODOR; SAN-418; TRIDENT; TRIDENT II
BACILLUS THURINGIENSIS	*B. thuringiensis* Berliner
BACILLUS THURINGIENSIS KURSTAKI	*B. thuringiensis kurstaki*
BACTOSPEINE	*B. thuringiensis kurstaki*
BANISECT	chlorpyrifos
BANNER	propiconazole
BANVEL	dicamba
BAS-152	dimethoate
BAS-152-47	dimethoate
BAS-9082	fenpropathrin
BAS-9102	benfuracarb
BASF-152	dimethoate
BASUDIN	diazinon
BAY-HWG-1608	tebuconazole
BAY-MAT-7484	phostebupirim
BAY-NTN-19701	MONCEREN; pencycuron
BAY-NTN-33893	imidacloprid
BAYCOR	bitertanol
BAYLETON	triadimefon
BAYTAN	triadimenol
BAYTHROID	cyfluthrin
BELMARK	fenvalerate
benalaxyl	GALBEN; TF-3651; TF-3772; TF-3773
bendiocarb	TRUMPET
benfuracarb	BAS-9102; ONCOL
BENLATE	benomyl
benodanil	CALIRUS
BENOLIN R	benomyl + lindane + thiram
benomyl	BENLATE
bentazon	BAS-501-06; BASAGRAN; LADDOCK
BERET	CGA-142705
BERET MLX	CGA-142705 + metalaxyl
BHC	lindane
bifenthrin	BRIGADE; CAPTURE; TALSTAR
binderdispersion V-406	BINDERDISPERSION
BIRLANE	chlorfenvinphos
bitertanol	BAYCOR
BORDEAUX MIXTURE	calcium hydroxide + copper sulphate
BOTRAN	dichloran
BOVAID	fenvalerate
BOVITECT	permethrin
BRAVO	chlorothalonil
BRAVO 500	chlorothalonil
BRAVO 90DG	chlorothalonil
BRAVO C/M	chlorothalonil + copper oxychloride + maneb
BRIGADE	bifenthrin
brodifacoum	VOLID
BROMINAL M	bromoxynil + MCPA; BUCTRIL M
bromoxynil	PARDNER

BUCTRIL M	bromoxynil + MCPA
BUTACIDE	piperonyl butoxide
butylate	SUTAN
calcium sulfate	GYPSUM
CALIRUS	benodanil
CANPLUS	CANPLUS 411; adjuvant
captafol	DIFOLATAN; SPRILLS; SULFONIMIDE
captan	ORTHOCIDE
CAPTURE	bifenthrin
carbaryl	SEVIMOL; SEVIN; SEVIN XLR; SEVIN XLR PLUS
carbathiin	CARBOXIN; UBI-2092; UBI-2100; UBI-2100-2; UBI-2100-4; VITAFLO 250; VITAVAX; VITAVAX SINGLE SOLUTION; VITAVAX SOLUTION
carbendazim	BAS-3460; BAVISTIN; BCM; DELSENE; DEROSAL; DPX-10; DPX-965; GRANANIT; HOE-17411; LIGNASAN-P; MBC; MCAB
carbofuran	FURADAN; FURADAN CR-10; UBI-2501
CARBOXIN	carbathiin
CARPOVIRUSINE	granulosis virus
CARZOL	formetanate
CASCADE	flufenoxuron; WL-115110
CATALYST	citric acid + fertilizers + molasses
CC-16238B	diniconazole
CC-16239	diniconazole
CC-16239A	diniconazole
CC-16348	diniconazole
CC-16359	diniconazole
CC-16378	diniconazole
CC-16394	diniconazole
CC-16395	diniconazole
CC-16461	diniconazole
CC-16462	diniconazole
CC-16464	diniconazole
CC-16481	diniconazole
CC-16488	diniconazole
CC-16553	diniconazole
CC-16555	diniconazole
CC-16557	diniconazole
CC-16558	diniconazole
CC-16681	diniconazole
CC-16683	diniconazole
CC-16685	diniconazole
CC-16687	diniconazole
CC-16688	diniconazole
CC-16696	diniconazole
CC-16697	diniconazole
CC-16698	diniconazole
CC-16699	diniconazole
CC-16700	diniconazole

CC-16859	diniconazole
CC-16860	diniconazole
CC-16862	diniconazole
CC-16864	diniconazole
CC-16865	diniconazole
CC-16866	diniconazole
CC-16867	diniconazole
CC-16882	diniconazole
CC-16896	diniconazole
CERONE	ethephon
CGA-12223	isazofos
CGA-142705	BERET
CGA-169374	DRAGAN
CGA-237218	*B. thuringiensis kurstaki*
CGA-453	A-7924-B
CGF-4280	flutolanil; NNF-136
CHARGE	cyhalothrin-lambda
chinomethionat	MORESTAN
CHIPMAN B-3	B-3; captan + diazinon + lindane
CHITOSAN	poly-d-glucosamine
chloranil	SPERGON
chlorbromuron	CHLOROBROMURON; MALORAN
chlordane	ASPON; BELT; CHLORDAN
chlorethoxyfos	DPX-42989; FORTRESS
chlorfenvinphos	BIRLANE
chlormequat	CYCOCEL
chloroneb	DEMOSAN; DPX-1823; PROTURF FII; SCOTTS PROTURF; TERSAN; TERSAN SP
chlorophacinone	ROZOL
chlorothalonil	BRAVO; BRAVO 500; BRAVO 90DG; DACONIL; DACONIL 2787
chlorpyrifos	BANISECT; DURSBAN; LORSBAN
CITOWETT	CITOWETT PLUS; adjuvant
cloak	carbathiin + lindane + thiram
cloethocarb	LANCE; UBI-2559; UBI-2562
clofentezine	APOLLO
codlemone	CODLING MOTH PHEROMONES
CODLING MOTH GRANULOSIS VIRUS	granulosis virus
CODLING MOTH PHEROMONES	codlemone
COMPANION	octylphenoxypolyethoxyethanol n-butanol
CONDOR	*B. thuringiensis kurstaki*
copper	COPAC
copper oxides	PERECOT
copper oxychloride	NIAGARA FIXED COPPER
copper salts of rosin and fatty acids	TENN-COP
copper sulphate	COPPER SULFATE
CORBEL	fenpropimorph
COUNTER	terbufos
CPGV	granulosis virus
cresol	M-CRESOL; META-CRESOL

CULTAR	paclobutrazol
cupric hydroxide	COPPER HYDROXIDE; KOCIDE
CUTLASS	*B. thuringiensis kurstaki*
CYCOCEL	chlormequat
cyfluthrin	BAYTHROID
CYGON	dimethoate
CYGUARD	phorate + terbufos
cyhalothrin	GRENADE; PP-563
cyhalothrin-lambda	CHARGE; ICIA-0321; KARATE; LAMBDA-CYHALOTHRIN; PP-321
CYMBUSH	cypermethrin
cypermethrin	CYMBUSH; RIPCORD
cypermethrin-alpha	ALPHA-CYPERMETHRIN; FASTAC
CYPREX	dodine
cyproconazole	SAN-619; UBI-2565; UBI-2575
cyromazine	TRIGARD
CYTHION	malathion
D-D	1,2-dichloropropane + 1,3-dichloro-propene
DACONIL	chlorothalonil
DACONIL 2787	chlorothalonil
DANITOL	fenpropathrin
DASANIT	fensulfothion
DDT	ZEIDANE
DECIS	deltamethrin
deet	NERO INSECT REPELLENT SOLUTION; SKINTASTIK; ULTRATHON
delta-endotoxin of *B.t. kurstaki*	M-CAP; MVP BIOINSECTICIDE
delta-endotoxin of *B.t. kurstaki-teneb.*	FOIL
delta-endotoxin of *B.t. san diego*	M-ONE PLUS; MYX-1806; SPUD-CAP
deltamethrin	DECIS
DERITOX	rotenone
DEVRINOL	napropamide
DEXON	fenaminosulf
DI-SYSTON	disulfoton
diatomaceous earth	INSECTAWAY; SHELLSHOCK
diazinon	BASUDIN; UBI-2291
DIBROM	naled
dicamba	BANVEL
dichlone	PHYGON
dichloran	BOTRAN
dichlorvos	VAPO
diclofop-methyl	CHOE-190Q; DICHLOFOP METH; DICLOFOP; HOE-GRASS; HOELON; ILLOXAN
dicofol	KELTHANE
dieldrin	HEOD
dienochlor	PENTAC AQUAFLOW
diflubenzuron	DIMILIN
DIKAR	dinocap + mancozeb
dimethoate	BAS-152; BAS-152-47; BASF-152; CYGON;

	HOPPER-STOPPER; LAGON; SYSTEM
DIMILIN	diflubenzuron
diniconazole	CC-16238B; CC-16239; CC-16239A; CC-16348; CC-16359; CC-16378; CC-16394; CC-16395; CC-16461; CC-16462; CC-16464; CC-16481; CC-16488; CC-16553; CC-16555; CC-16557; CC-16558; CC-16681; CC-16683; CC-16685; CC-16687; CC-16688; CC-16696; CC-16697; CC-16698; CC-16699; CC-16700; CC-16859; CC-16860; CC-16862; CC-16864; CC-16865; CC-16866; CC-16867; CC-16882; CC-16896; SPOTLESS; XE-779
DINITRO	dinoseb
dinocap	KARATHANE
dinoseb	DINITRO
DIPEL	*B. thuringiensis kurstaki*
diphacinone	RAMIK BRUN
diquat	REGLONE
disulfoton	DI-SYSTON
DITERA	*B. thuringiensis tenebrionis*
DITHANE 480F	mancozeb
DITHANE DF	mancozeb
DITHANE DG	mancozeb
DITHANE F-45	mancozeb
DITHANE M-22	maneb
DITHANE M-45	mancozeb
DITHANE M45	mancozeb
diuron	DMU; KARMEX
dodine	CYPREX; EQUAL
DOWCO-429	DOWCO-429X; unknown
DOWCO-473	unknown; XRD-473
DPX-H6573	flusilazole
DRAGAN	CGA-169374
DUAL	metolachlor
DURSBAN	chlorpyrifos
DYFONATE	fonofos
DYFONATE II	fonofos
DYFONATE ST	fonofos
DYLOX	trichlorfon
DYRENE	anilazine
EASOUT	thiophanate-methyl
ECTIBAN	permethrin
EG-2371	*B. thuringiensis kurstaki*
EL-228	nuarimol
ELITE	tebuconazole
EMBARK	mefluidide
emulsifiable spray oil	SUNSPRAY
endosulfan	THIODAN
EPIC	furmecyclox
EPTC	EPTAM
EQUAL	dodine

esfenvalerate	HALMARK
ethalfluralin	EDGE; EL-161; SONALAN
ethephon	CERONE
ethion	DIETHION; NIALATE
ETHOPROP	ethoprophos
ethoprophos	ETHOPROP
ETHYLTRIANOL	tebuconazole
etridiazole	TRUBAN
EVISECT	thiocyclam-hydrogenoxalate
EXP-2022C	copper oxychloride + fosetyl-al
EXP-2164B	iprodione
EXP-80318A	triticonazole
F020	Paw Paw bark extract
FASTAC	cypermethrin-alpha
fenaminosulf	DEXON; LESAN
fenamiphos	NEMACUR
fenapanil	SISTHANE
fenbutatin oxide	TORQUE; VENDEX
fenitrothion	SUMITHION
fenpropathrin	BAS-9082; DANITOL; S-3206
fenpropimorph	CORBEL; MISTRAL
fensulfothion	DASANIT
fenthion	PVC EAR TAG
fenvalerate	BELMARK; BOVAID
ferbam	FERMATE
fertilizers	FERTILIZER
fluazinam	B-1216; IKF-1216
flucythrinate	GUARDIAN
flufenoxuron	CASCADE; WL-115110
flusilazole	DPX-H6573; NUSTAR
flutolanil	CGF-4280; MONCUT; NNF-136
flutriafol	ICIA-0450; MINTECH; TF-3673; TF-3675; TF-3753; TF-3765; TF-3775
FOIL	delta-endotoxin of *B.t. kurstaki-teneb.*
FOLICOTE	tebuconazole
FOLICUR	tebuconazole
folpet	PHALTAN
fonofos	DYFONATE; DYFONATE II; DYFONATE ST
FORAY	*B. thuringiensis kurstaki*
FORCE	tefluthrin
formetanate	CARZOL
fosetyl-al	ALIETTE
FRANIXQUERRA	sodium dioctyl sulfosuccinate
FRIGATE	mineral oil
FUNGAFLOR	imazalil
FUNGINEX	triforine
FURADAN	carbofuran
FURADAN CR-10	carbofuran
furathiocarb	PROMET
furmecyclox	EPIC

FUTURA	*B. thuringiensis kurstaki*
FUTURA XLV	*B. thuringiensis kurstaki*
G-696	UBI-2563
GALBEN	benalaxyl
GALLEX	2,4-xylenol + cresol
GAMMA-BHC	lindane
GAOZHIMO	masbrane
GAUCHO	imidacloprid
glyphosate	ROUNDUP
granulosis virus	CARPOVIRUSINE; CODLING MOTH GRANULOSIS VIRUS; CPGV; UCB-87
GSX-8743	GXS-8743
GUARDIAN	flucythrinate
GUTHION	azinphos-methyl
GXS-8743	GSX-8743
GYPSUM	calcium sulfate
HALMARK	esfenvalerate
hexaconazole	ANVIL; ICIA-0523; JF-9480; TF-3770; TF-9480
hexythiazox	SAVEY
HHDN	ALDRIN
HOE-000522	teflubenzuron
HOE-00522	teflubenzuron
HOLLYSUL MICRO-SULPHUR	sulphur
HOPPER-STOPPER	dimethoate
HWG-1608	tebuconazole
hymexazol	TACHIGAREN; UBI-2631
ICIA-0321	cyhalothrin-lambda
ICIA-0450	flutriafol
ICIA-0523	hexaconazole
ICIA-0993	tefluthrin
imazalil	FUNGAFLOR; UBI-2420
imazethapyr	AC 263,499; AC-263499; PURSUIT
imidacloprid	BAY-NTN-33893; GAUCHO; NTN-33893; UBI-2627
IMIDAN	phosmet
INCITE	piperonyl butoxide
INSECOLO	silicon dioxide
INSECTAWAY	diatomaceous earth
INSEGAR	RO-13-5223
ioxynil	ACTRIL; CERTOL; CERTROL; TORTRIL; TOTRIL
iprodione	EXP-2164B; ROVRAL; ROVRAL FLO; ROVRAL GREEN
isazofos	CGA-12223; TRIUMPH
isofenphos	AMAZE
ivermectin	IVOMEC
IVOMEC	ivermectin
IVORY LIQUID	soap
JAVELIN	*B. thuringiensis kurstaki*

JAVEX	sodium hypochlorite
JF-9480	hexaconazole
JOY DISHWASHING LIQUID	soap
KARATE	cyhalothrin-lambda
KARATHANE	dinocap
KELTHANE	dicofol
KILLEX TURF HERBICIDE	2,4-D dimethylamine + dicamba-dimethyl-amine + mecoprop dimethylamine KILMOR
KILMOR	KILLEX TURF HERBICIDE
KOCIDE 101	copper + cupric hydroxide
korn oil	KORN OIL CONCENTRATE
KORN OIL CONCENTRATE	korn oil
KORNTROL OIL	mineral oil
KRYOCIDE	sodium aluminum fluoride
KUMULUS	sulphur
KUMULUS S	sulphur
LAGON	dimethoate
LAMBDA-CYHALOTHRIN	cyhalothrin-lambda
LANCE	cloethocarb
LANNATE	methomyl
LATRON	adjuvant; LATRON B-1956
LATRON B-1956	adjuvant; LATRON
leptophos	ABAR; PHOSVEL
LESAN	fenaminosulf
lindane	BHC; GAMMA-BHC; UBI-2599
linuron	AFALON; AFOLAN; LOROX
LIQUIDUSTER	permethrin
LORSBAN	chlorpyrifos
M-CAP	delta-endotoxin of *B.t. kurstaki*
M-ONE	*B. thuringiensis san diego*
M-ONE MYD	*B. thuringiensis san diego*
M-ONE PLUS	delta-endotoxin of *B.t. san diego*
M-TRAK	*B. thuringiensis san diego*
MAINTAIN	maleic hydrazide
malathion	CYTHION
maleic hydrazide	MAINTAIN; ROYAL MH
mancozeb	DITHANE 480F; DITHANE DF; DITHANE DG; DITHANE F-45; DITHANE M-45; DITHANE M45; MANZATE 200; MANZATE DF; TF-3710
maneb	AGROX; AGROX DB; AGROX FLOWABLE; DITHANE M-22; MANZATE; POOL NM; TF-3767; TF-3767B
MANZATE	maneb
MANZATE 200	mancozeb
MANZATE DF	mancozeb
MARGOSAN-O	azadirachtin
masbrane	GAOZHIMO
MAT-7484	phostebupirim
MCPA	AGRITOX; AGROXONE; CORNOX M; MCP
mefluidide	EMBARK

MERCURIC BICHLORIDE	mercuric chloride
mercuric chloride	MERCURIC BICHLORIDE
MERGAMMA FL	TF-3769
MERGAMMA NM	lindane + maneb
MERSIL	mercuric chloride + mercurous chloride
MERTECT	thiabendazole
MESUROL	methiocarb
metalaxyl	APRON; RIDOMIL; SUBDUE; UBI-2379
METASYSTOX-R	oxydemeton-methyl
methamidophos	MONITOR
methidathion	SUPRACIDE
methiocarb	MESUROL
methomyl	LANNATE
methoxychlor	MARLATE; METHOXY-DDT
methyl cellulose	CANOCOTE COMMERCIAL COAT; CANOCOTE MICROPELLET; HILLESHOG COMMERCIAL COAT; HILLESHOG MICROPELLET; METHOCEL A 15LV
metiram	POLYRAM
metolachlor	DUAL
metribuzin	LEXONE; SENCOR; SENCOR 500; SENCOR 75DF
MICRO-MIST	*Ascophyllum nodosum* extract
MICRO-NIASUL	sulphur
MICROTHIOL SPECIAL	sulphur
mineral oil	FRIGATE; KORNTROL OIL; MINERAL SEAL OIL
MINERAL SEAL OIL	mineral oil
MINTECH	flutriafol
MISTRAL	fenpropimorph
MITAC	amitraz
MO-BAIT	molasses
molasses	MO-BAIT
MONCEREN	BAY-NTN-19701; pencycuron
MONCUT	flutolanil; NNF-136
MONITOR	methamidophos
monolinuron	AFESIN; ARESIN
MORESTAN	chinomethionat
MVP BIOINSECTICIDE	delta-endotoxin of *B.t. kurstaki*
myclobutanil	NOVA; RALLY; RH-3866; UBI-2454; UBI-2454-1; UBI-2454-2; UBI-2561
MYX-1806	delta-endotoxin of *B.t. san diego*
MYX-2284	*B. thuringiensis kurstaki*
MYX-9858	*B. thuringiensis san diego*
nabam	DITHANE D-14; PARZATE LIQUID
naled	DIBROM
napropamide	DEVRINOL
NEEM	azadirachtin
NEEM FORMULATED	azadirachtin + pyrethrum
NEEM SOLUTION 1	azadirachtin
NEEM SOLUTION 2	azadirachtin
NEEMIX	azadirachtin
NEMACUR	fenamiphos

NERO INSECT REPELLENT SOLUTION	deet
NIAGARA FIXED COPPER	copper oxychloride
nitrapyrin	DOWCO-163; N-SERVE
NNF-136	CGF-4280; flutolanil; MONCUT
nonylphenolethylene oxide	AGRAL 90
NOVA	myclobutanil
NOVODOR	*B. thuringiensis tenebrionis*
NTN-33893	imidacloprid
nuarimol	EL-228
NUSTAR	flusilazole
octylphenoxypolyethoxyethanol n-butanol	COMPANION
ofurace	RE-20615; VAMIN
OKANAGAN DORMANT OIL	okanagan oil
okanagan oil	OKANAGAN DORMANT OIL
OMITE	propargite
ONCOL	benfuracarb
ORBIT	propiconazole
ORGANIC INSECT KILLER LIQUID	*B. thuringiensis kurstaki*
ORTHENE	acephate
ORTHO-12-420	acephate
oxamyl	VYDATE
oxycarboxin	HRC; PLANTVAX; UB-I2125; UB-I2216
oxydemeton-methyl	METASYSTOX-R
paclobutrazol	CULTAR; PP-333
paraformaldehyde	PARAFORM F POWDERED FUMIGANT
paraquat	GRAMOXONE; WEEDOL
parathion	AQUA; FOLIDOL; NIRAN; PENCAP E
PARDNER	bromoxynil
Paw Paw bark extract	ASIMICIN; *Asimina triloba* BARK EXTRACT; F020
PCNB	quintozene
penconazole	TOPAS
pencycuron	BAY-NTN-19701; MONCEREN
PENTAC AQUAFLOW	dienochlor
PENTACHLORONITROBENZENE	quintozene
PERECOT	copper oxides
permethrin	AMBUSH; ATROBAN; ATROBAN DELICE POUR-ON; BOVITECT; ECTIBAN; LIQUIDUSTER; POUNCE; SANBAR
petroleum oil	SAF-T-SIDE; SAFERS ULTRAFINE SPRAY OIL; SUNSPRAY OIL; SUPERIOR OIL; SUPERIOR OIL 70; SUPERIOR OIL CONCENTRATE; VOLCK DORMANT OIL; VOLCK OIL; VOLCK SUPREME OIL
phagostimulant	PHEAST
PHALTAN	folpet
PHEAST	phagostimulant
phorate	THIMET
phosalone	ZOLONE

phosmet	IMIDAN
phostebupirim	BAY-MAT-7484; MAT-7484
PHYGON	dichlone
PHYTOSOL	trichloronat
picloram	ACIDE PICLORAM; AMDON; PICLORAM ACID; TORDON; TORDON 10K
piperonyl butoxide	BUTACIDE; INCITE
pirimicarb	PIRIMOR
PIRIMOR	pirimicarb
poly-d-glucosamine	CHITOSAN
POLYRAM	metiram
POOL NM	maneb
potassium oleate	SAFERS INSECTICIDAL SOAP; SAFERS SOAP
POUNCE	permethrin
PP-321	cyhalothrin-lambda
PP-333	paclobutrazol
PREMIERE	lindane + thiabendazole + thiram
PRO GRO	PRO GRO SYSTEMIC SEED PROTECTANT
PRO GRO SYSTEMIC SEED PROTECTANT	carbathiin + thiram; PRO GRO
prochloraz	SPORTAK
PROMET	furathiocarb
propargite	OMITE
propiconazole	BANNER; ORBIT; TILT
PVC EAR TAG	fenthion
pyrazophos	AFUGAN
pyrifenox	ACR-3675
quintozene	PCNB; PENTACHLORONITROBENZENE; SCOTTS LAWN DISEASE PREVENTER; TERRACHLOR
RALLY	myclobutanil
RAMIK BRUN	diphacinone
RAPCOL TZ	furathiocarb + metalaxyl + thiabendazole
RAXIL	tebuconazole
RE-20615	ofurace
REGLONE	diquat
RENEX	adjuvant; RENEX 36
RH-3866	myclobutanil
RH-5849	1,2-DIBENZOYL-1-TERT-BUTYLHYDRAZINE; TERT-BUTYLBENZOHYDRAZIDE
RIDOMIL	metalaxyl
RIDOMIL MZ	mancozeb + metalaxyl
RIPCORD	cypermethrin
RIZOLEX	tolclofos-methyl
RO-13-5223	INSEGAR
RONILAN	vinclozolin
ROTACIDE	rotenone
rotenone	DERITOX; ROTACIDE
ROUNDUP	glyphosate
ROVRAL	iprodione
ROVRAL FLO	iprodione
ROVRAL GREEN	iprodione

ROVRAL ST	iprodione + lindane
ROYAL MH	maleic hydrazide
ROZOL	chlorophacinone
RU-38702	acrinathrin
S-3206	fenpropathrin
SAF-T-SIDE	petroleum oil
SAFERS INSECTICIDAL SOAP	potassium oleate
SAFERS NEEM INSECTICIDE	azadirachtin
SAFERS SOAP	potassium oleate
SAFERS ULTRAFINE SPRAY OIL	petroleum oil
SAN-418	*B. thuringiensis tenebrionis*
SAN-619	cyproconazole
SAN-658	captan + cyproconazole
SAN-683	cyproconazole + mancozeb
SANBAR	permethrin
SAVEY	hexythiazox
SCOTTS LAWN DISEASE PREVENTER	quintozene
SD-208304	DPX-43898
SEVIMOL	carbaryl
SEVIN	carbaryl
SEVIN XLR	carbaryl
SEVIN XLR PLUS	carbaryl
SHELLSHOCK	diatomaceous earth
silicon dioxide	INSECOLO
simazine	GESATOP; PRIMATOL S; PRINCEP; PRINCEP NINE-T
SISTHANE	fenapanil
skim milk powder	POWDERED SKIM MILK
SKINTASTIK	deet
SNI OIL	azadirachtin
soap	IVORY LIQUID; JOY DISHWASHING LIQUID; SUNLIGHT DISHWASHING LIQUID
sodium aluminum fluoride	KRYOCIDE
sodium dioctyl sulfosuccinate	FRANIXQUERRA
sodium hypochlorite	JAVEX
SOLACOL	validamycin a
SPORTAK	prochloraz
SPOTLESS	diniconazole
SPUD-CAP	delta-endotoxin of *B.t. san diego*
streptomycin	AGRI-MYCIN; AGRISTREP
SUBDUE	metalaxyl
SULFUR	sulphur
sulphur	HOLLYSUL MICRO-SULPHUR; KUMULUS; KUMULUS S; MICRO-NIASUL; MICROTHIOL SPECIAL; SULFUR
SUMITHION	fenitrothion
SUNLIGHT DISHWASHING LIQUID	soap
SUNSPRAY	emulsifiable spray oil
SUNSPRAY OIL	petroleum oil
SUPERIOR OIL	petroleum oil
SUPERIOR OIL 70	petroleum oil

SUPERIOR OIL CONCENTRATE	petroleum oil
SUPRACIDE	methidathion
SYSTEM	dimethoate
TACHIGAREN	hymexazol; UBI-2631
TALSTAR	bifenthrin
tebuconazole	BAY-HWG-1608; ELITE; ETHYLTRIANOL; FOLICOTE; FOLICUR; HWG-1608; RAXIL; UBI-2584; UBI-2584-1; UBI-2611
teflubenzuron	HOE-000522; HOE-00522
tefluthrin	FORCE; ICIA-0993; TF-3754; TF-3755
TELONE	1,3-dichloropropene
TELONE II-B	1,3-dichloropropene
TEMIK	aldicarb
TENN-COP	copper salts of rosin and fatty acids
terbufos	AC-301467; COUNTER
TERRACHLOR	quintozene
TF-3480	triadimenol
TF-3607	lindane + thiabendazole + thiram
TF-3651	benalaxyl
TF-3656	imazalil + triadimenol
TF-3673	flutriafol
TF-3675	flutriafol
TF-3710	mancozeb
TF-3720	flutriafol + lindane
TF-3753	flutriafol
TF-3754	tefluthrin
TF-3755	tefluthrin
TF-3765	flutriafol
TF-3767	maneb
TF-3767B	maneb
TF-3769	lindane + maneb; MERGAMMA FL
TF-3770	hexaconazole
TF-3772	benalaxyl
TF-3773	benalaxyl
TF-3775	flutriafol
TF-3790	hexaconazole + tefluthrin
TF-3791	tefluthrin + thiabendazole + thiram
TF-9480	hexaconazole
thiabendazole	MERTECT; UBI-2395-1; UBI-2531
THIMET	phorate
thiocyclam-hydrogenoxalate	EVISECT
THIODAN	endosulfan
thiodicarb	GUS-80502; LARVIN
thionazin	NEMAFOS; ZINOPHOS
thiophanate-methyl	EASOUT
thiram	UBI-2215; UBI-2233
THURICIDE	*B. thuringiensis kurstaki*
THURICIDE-HPC	*B. thuringiensis kurstaki*
TILT	propiconazole
TILT MZ	mancozeb + propiconazole

tolclofos-methyl	RIZOLEX
TOPAS MZ	mancozeb + penconazole
TORQUE	fenbutatin oxide
triadimefon	BAYLETON
triadimenol	BAYTAN; TF-3480; UBI-2383; UBI-2383-1; UBI-2541; UBI-2556; UBI-2568
trichlorfon	DYLOX
trichloronat	PHYTOSOL
TRIDENT	*B. thuringiensis tenebrionis*
TRIDENT II	*B. thuringiensis tenebrionis*
triflumizole	UBI-2342
trifluralin	HERITAGE; HOE-FLURAN; JF-8679; RIVAL; TREFLAN; UBI-2309; UBI-2340
triforine	FUNGINEX
TRIGARD	cyromazine
trimethacarb	BROOT; LANDRIN; SD-8530; SD-8736; TF-3627; UC27-BF-32
triticonazole	EXP-80318A
TRITON B-1956	adjuvant; TRITON B 1956
TRIUMPH	isazofos
TROUNCE	potassium salts of fatty acids + pyrethrins
TRUBAN	etridiazole
TRUMPET	bendiocarb
UAN	urea ammonium nitrate
UBI-2051	VITAFLO 280
UBI-2051-1	carbathiin + thiram
UBI-2092	carbathiin
UBI-2100	carbathiin
UBI-2100-2	carbathiin
UBI-2100-4	carbathiin
UBI-2106-1	carbathiin + lindane
UBI-2155	carbathiin + thiram
UBI-2215	thiram
UBI-2233	thiram
UBI-2236	carbathiin + lindane + thiram
UBI-2291	diazinon
UBI-2342	triflumizole
UBI-2359	carbathiin + thiram
UBI-2359-2	ANCHOR; carbathiin + thiram
UBI-2369-1	VITAVAX RS; carbathiin + lindane + thiram
UBI-2379	metalaxyl
UBI-2383	triadimenol
UBI-2383-1	triadimenol
UBI-2389	carbathiin + isofenphos
UBI-2390	carbathiin + thiram; UBI-2390-1
UBI-2390-1	UBI-2390
UBI-2393	carbathiin + thiabendazole; UBI-2393-2

UBI-2393-2	UBI-2393
UBI-2394	carbathiin + imazalil + thiabendazole; UBI-2394-2
UBI-2394-2	UBI-2394
UBI-2395-1	thiabendazole
UBI-2401	carbathiin + imazalil
UBI-2402	carbathiin + lindane + thiabendazole; UBI-2402-1
UBI-2402-1	UBI-2402
UBI-2413	carbathiin + isofenphos + thiram; UBI-2413-1
UBI-2413-1	UBI-2413
UBI-2417	carbathiin + lindane + metalaxyl; UBI-2417-1
UBI-2417-1	UBI-2417
UBI-2420	imazalil
UBI-2424	carbathiin + imazalil; UBI-2424-1
UBI-2424-1	UBI-2424
UBI-2450	metalaxyl + thiabendazole
UBI-2454	myclobutanil
UBI-2454-1	myclobutanil
UBI-2454-2	myclobutanil
UBI-2457	metalaxyl + thiabendazole
UBI-2501	carbofuran
UBI-2509	UBI-2509-1
UBI-2509-1	metalaxyl + thiram; UBI-2509
UBI-2511	carbathiin + cloethocarb + thiram; UBI-2511-1
UBI-2511-1	UBI-2511
UBI-2521	UBI-2521-1
UBI-2521-1	carbathiin + thiabendazole; UBI-2521
UBI-2529	carbathiin + cloethocarb
UBI-2530	carbathiin + isofenphos
UBI-2531	thiabendazole
UBI-2541	triadimenol
UBI-2550	G-696 + lindane + thiram
UBI-2554	carbathiin + cloethocarb + thiram; UBI-2554-1
UBI-2554-1	UBI-2554
UBI-2555	carbathiin + cloethocarb + thiram; UBI-2555-1
UBI-2555-1	UBI-2555
UBI-2556	triadimenol
UBI-2557	carbathiin + cloethocarb + thiram
UBI-2559	cloethocarb
UBI-2561	myclobutanil
UBI-2562	cloethocarb
UBI-2563	G-696
UBI-2564	carbathiin + G-696
UBI-2565	cyproconazole

UBI-2568	triadimenol
UBI-2573	G-696 + thiram
UBI-2575	cyproconazole
UBI-2584	tebuconazole
UBI-2584-1	tebuconazole
UBI-2599	lindane
UBI-2599-2	carbathiin + lindane + thiram
UBI-2608-1	carbathiin + imidacloprid + thiram
UBI-2611	tebuconazole
UBI-2617	carbathiin + lindane + thiram
UBI-2627	imidacloprid
UBI-2631	hymexazol; TACHIGAREN
UCB-87	granulosis virus
ULTRATHON	deet
urea ammonium nitrate	UAN
validamycin a	SOLACOL
VAMIN	ofurace
VAPO	dichlorvos
VECTOBAC	*B. thuringiensis israelensis*
VENDEX	fenbutatin oxide
vinclozolin	RONILAN
VITAFLO 250	carbathiin
VITAFLO 280	carbathiin + thiram; UBI-2051
VITAVAX	carbathiin
VITAVAX 200	carbathiin + thiram
VITAVAX DUAL SOLUTION	carbathiin + lindane
VITAVAX RS	carbathiin + lindane + thiram; UBI-2369-1
VITAVAX SINGLE SOLUTION	carbathiin
VITAVAX SOLUTION	carbathiin
VOLCK DORMANT OIL	petroleum oil
VOLCK OIL	petroleum oil
VOLCK SUPREME OIL	petroleum oil
VOLID	brodifacoum
VORLEX	1,3-dichloropropene + methyl isothio-cyanate
VYDATE	oxamyl
water	COLD WATER; HOT WATER; WARM WATER
WL-115110	CASCADE; flufenoxuron
XE-779	diniconazole
XRD-473	DOWCO-473; unknown
zineb	DITHANE Z-78; PARZATE; PARZATE C; PARZATE-C
ziram	ZERLATE
ZOLONE	phosalone

INDICES

Note: Numbers in the indices refer to report numbers and not p
numbers.

Note: Les numéros des indices réfèrent aux numéros de rapport
et non aux numéros de page.

CHEMICALS

BIOCONTROL AGENTS

HOST

PEST

NON-TARGET ORGANISMS

RESIDUE

AUTHORS

ESTABLISHMENTS