

LOSSES FROM FOLIAGE DISEASES OF FORAGE CROPS IN CENTRAL AND NORTHERN ALBERTA, 1973

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Abstract

The fourth annual survey of diseases of red, alsike, sweet clover and white clover, alfalfa, timothy, and brome in central and northern Alberta was carried out in 1973. Methods devised in 1970 to estimate loss were used to compare the data over the four year period 1970 - 73. The loss in 1973 due to foliar diseases of forage was 5.72% or \$9.4 million.

Résumé

En 1973, on a effectué le quatrième relevé annuel des maladies du trèfle rouge, blanc, d'alsike, du méliilot, de la luzerne, de la fléole et du brome dans le centre et le nord de l'Alberta. Les méthodes mises au point en 1970 pour évaluer les pertes ont été utilisées pour comparer les données durant la période de 4 ans de 1970 à 1973. En 1973, les pertes attribuables aux maladies foliaires des plantes fourragères ont été de 5.72%, soit 9.4 millions de dollars.

An extensive examination of 307 fields of forage crops in central and northern Alberta in 1973 completed a 4-year survey of foliage diseases (1,2,3). Methods used to estimate severity, distribution, and loss were described previously (1). One percent of the farms reporting forage were sampled in census divisions (CD) 8 through 15, excluding 9, from July 5th to August 29th, 1973. The percent area diseased on 10 shoots of each species in each field was used to determine a disease index for each disease. This figure was multiplied by 0.25 to give an approximate percent loss (4).

Results

The disease index for each disease of each species, the number of fields sampled and the number of fields affected are shown for each census division in Table 1. The figures for acreage of each species grown were obtained by multiplying the acres of

forage in each CD by the average percentage of that species in the CD. Fescue and white clover were not shown in Table 1 in 1973, since fescue was harvested before CD 15 was sampled, and only one field of white clover was encountered this year. The percentage of each species over the area surveyed is shown in Table 2, with an overall average for the four years. Changes in the percentage loss from diseases from 1970 through 1973 can be compared with the four year average. Using data from the Alberta Marketing and Statistics Branch, the loss of forage in tons and the dollar value of this loss was computed for each CD (Table 3). Although the percentage loss was slightly less than in 1972, an increase in forage production and an increase of the value of hay to \$27.50/ton caused the loss to rise to \$9,366,300 from \$5,526,700 in 1972.

Literature cited

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Table 1. Incidence and severity of foliage diseases of forage crops in central and northern Alberta, 1973

Census Division	Acres grown ('000)	No. fields sampled	Diseases assessed					
			Yellow leaf blotch	Black stem	Stagonospora	Pepper spot	Downy mildew	Common leaf spot
8	92.8	23	23/14.77	23/3.31	4/0.04	0/0	0/0	23/ 2.66
10	109.9	38	33/ 9.56	38/4.21	16/0.47	1/0.03	1/0	36/ 7.82
11	134.3	31	31/16.13	31/4.22	17/0.39	0/0	0/0	31/ 5.79
12	155.5	22	16/ 3.10	22/6.32	13/1.14	0/0	0/0	22/14.21
13	108.7	20	20/14.49	20/4.92	6/0.28	0/0	1/0	20/ 7.42
14	16.3	2	2/12.20	2/2.95	0/0	0/0	0/0	2/ 1.65
15	182.2	16	16/ 8.02	14/3.80	3/0.38	1/0.13	0/0	16/ 7.27
Total	799.7	152	141/11.28	150/4.42	59/0.45	2/0.02	2/0	150/ 7.36

* Causal fungi: Yellow leaf blotch, *Leptotrochila medicaginis* (Fckl.) Schuepp; black stem, *Ascochyta imperfecta* Pk.; stagonospora, *Leptosphaeria pratensis* Sacc. and Briard; pepper spot, *Pseudopeziza trifolii* (Rostr.) Petr.; downy mildew, *Peronospora trifoliorum* de Bary; common leaf spot, *Pseudopeziza trifolii* f. sp. *medicaginis-sativae* Schmiedeknecht.

** Number of fields affected/disease index.

2. RED CLOVER (*Trifolium pratense* L.)

Census Division	Acres grown ('000)	No. fields sampled	Diseases assessed				
			Powdery mildew	Northern anthracnose	Black stem	Black-stem leaf-spot	Stagonospora
8	56.4	11	2/ 1.67	6/3.63	7/6.69	5/ 7.05	8/12.98
10	8.9	3	1/ 3.53	0/0	2/0.87	1/ 4.03	3/26.67
11	59.9	12	2/ 1.06	9/8.10	12/3.27	11/25.42	12/32.98
12	16.2	2	1/ 5.25	2/4.40	1/4.00	0/ 0	2/56.75
13	88.1	13	4/ 2.47	4/2.65	10/1.30	4/ 9.55	12/32.56
14	9.2	3	0/ 0	3/6.20	3/1.73	3/10.13	3/11.70
15	128.8	11	8/10.41	5/7.32	11/6.35	7/12.90	10/31.01
Total	367.5	55	18/ 3.61	29/5.08	46/3.92	31/12.57	50/27.85

* Causal fungi: Powdery mildew, *Erysiphe polygoni* DC. ex Mérat; northern anthracnose, *Kabatiella caulivora* (Kirchn.) Karak.; black stem, *Ascochyta meliloti* (Trel.) Davis; stagonospora, *Stagonospora recedens* (O. Massal.) Jones and Weimer.

Table 1 (Cont'd)

3. ALSIKE CLOVER (*Trifolium hybridum* L.)

Census Division	Acres grown ('000)	No. fields sampled	Diseases assessed					
			Powdery mildew	Black stem	Stagonospora	Pepper spot	Rust	sooty blotch
8	46.6	13	3/ 1.75	3/3.65	12/18.44	0/0	0/0	2/2.77
10	9.3	5	1/ 0.60	1/0.04	3/10.74	1/0.94	0/0	1/0.72
11	56.8	16	5/ 4.12	10/0.74	16/28.90	0/0	1/0.09	3/5.52
12	12.1	2	0/ 0	1/3.65	2/37.70	0/0	0/0	0/0
13	77.1	13	1/ 0.12	5/0.94	13/41.00	1/0.01	0/0	2/4.24
14	11.9	2	0/ 0	0/0	2/19.20	0/0	0/0	0/0
15	179.8	17	14/20.82	10/0.99	16/30.56	0/0	1/3.15	4/6.35
Total	393.6	68	24/ 6.57	30/1.41	64/28.27	2/0.07	2/0.81	12/4.28

* Causal fungi: Powdery mildew, *Erysiphe polygoni* DC. ex Mérat; black stem, *Ascochyta meliloti* (Trel.) Davis; stagonospora, *Leptosphaeria pratensis* Sacc. and Briard; pepper spot, *Pseudopeziza trifolii* (Rostr.) Petr.; rust, *Uromyces trifolii* (Hedw. f. ex DC.) Lev.; sooty blotch, *Cymadothea trifolii* (Pers. ex Fr.) Wolf.

4. SWEET CLOVER (*Melilotus alba* and *M. officinalis* L.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases assessed	
			Black stem	Stagonospora
8	0.0	0	0/0	0/0
10	0.0	0	0/0	0/0
11	20.2	3	1/0.13	3/1.27
12	8.1	1	0/0	1/2.00
13	0.0	0	0/0	0/0
14	0.0	0	0/0	0/0
15	0.0	0	0/0	0/0
Total	28.3	4	1/0.10	4/1.45

* Causal fungi: Black stem, *Ascochyta meliloti* (Trel.) Davis; stagonospora, *Leptosphaeria pratensis* Sacc. and Briard.

5. BROME (*Bromus inermis* Leyss.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases assessed			
			Brown leaf spot	Selenophoma	Scald	White-head
8	82.3	22	22/ 6.72	10/0.39	2/0.08	2/0.46
10	76.2	30	30/ 8.05	20/0.91	7/0.17	1/0.33
11	58.5	19	19/ 6.16	7/0.32	5/0.14	3/1.58
12	32.4	7	7/16.90	0/0	3/0.81	0/0
13	50.9	11	11/ 7.67	3/0.12	1/0.05	0/0
14	22.2	3	3/ 6.43	1/0.20	1/0.17	0/0
15	115.4	11	11/ 6.61	7/0.75	0/0	0/0
Total	438.2	103	103/ 7.78	48/0.50	19/0.16	6/0.49

* Causal fungi: Brown leaf spot, *Drechslera bromi* (Died.) Shoem.; selenophoma, *Selenophoma bromigena* (Sacc.) Sprague and Johnson; scald, *Rhynchosporium secalis* (Oud.) J.J. Davis.; whitehead, *Fusarium poae* (Pk.) Wf.

6. TIMOTHY (*Phleum pratense* L.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases* assessed**	
			Purple spot	Leaf streak
8	90.9	27	17/0.18	27/ 4.15
10	12.2	8	3/0.05	8/ 1.49
11	80.8	31	22/0.17	31/ 5.54
12	18.6	5	5/0.40	5/21.50
13	95.4	20	19/0.40	20/ 7.89
14	16.3	2	2/0.15	2/ 2.70
15	81.4	9	5/0.40	9/17.70
Total	395.6	102	73/0.24	102/ 7.11

* Causal fungi: Purple spot, *Heterosporium phlei* Gregory; leaf streak, *Drechslera phlei* (Graham) Shoem.

Table 2. Percent losses from foliage diseases of forage crops in central and northern Alberta, 1970-73

Forage species	% of forage crops grown					Disease	Loss (%)				
	1970	1971	1972	1973	4 yr avg		1970	1971	1972	1973	4 yr avg
Alfalfa (<i>Medicago sativa</i>)	45.5	38.3	45.2	34.5	40.9	Yellow leaf blotch	2.87	2.81	4.07	2.82	3.14
						Black stem	1.45	0.83	0.90	1.11	1.07
						Stagonospora	0.11	0.10	0.07	0.11	0.10
						Pepper spot	0.06	0.09	0.46	0.01	0.15
						Downy mildew	0.02	0.01			0.01
						Common leaf spot	1.30	2.13	1.94	1.84	1.80
TOTAL	5.81	5.97	7.41	5.89	6.27						
Red clover (<i>Trifolium pratense</i>)	16.5	14.5	11.8	13.4	14.1	Powdery mildew	3.04	1.00	0.75	0.90	1.42
						Northern anthracnose	1.11	2.63	1.69	1.27	1.67
						Black stem	0.64	0.65	0.53	0.98	0.70
						Stagonospora	2.17	8.23	9.12	6.96	6.62
						Black stem leaf spot	0.32	0.61	1.41	3.14	1.37
						Pepper spot		0.10			0.02
TOTAL	7.28	13.22	13.50	13.25	11.80						
Alsike clover (<i>Trifolium hybridum</i>)	8.7	13.1	8.1	13.8	10.9	Powdery mildew	3.54	3.24	1.21	1.64	2.41
						Black stem	0.18	0.10	0.05	0.35	0.17
						Stagonospora	2.83	7.82	7.54	7.07	6.31
						Pepper spot	0.06	0.39	1.51	0.02	0.49
						Rust	0.24	0.02	0.12	0.20	0.14
						Sooty blotch	0.18	0.67	0.67	1.07	0.65
TOTAL	7.03	12.24	11.11	10.35	10.17						
Sweet clover (<i>Melilotus alba</i> and <i>M. officinalis</i>)	3.0	2.4	0.7	1.3	1.9	Black stem	0.28	0.05	0.01	0.02	0.09
						Downy mildew	0.01				
						Stagonospora	0.06	0.41	0.04	0.36	0.22
						Gray stem canker		0.01			
TOTAL	0.35	0.47	0.05	0.38	0.31						
White clover (<i>Trifolium repens</i>)	0.2	0.5	0.6	0.2	0.4	Pepper spot		4.12	2.08	2.25	2.11
						Stagonospora	0.01	1.25	5.67		1.73
						Rust	0.01	4.50	5.50	8.00	4.50
						Sooty blotch		4.00	0.17	8.00	3.04
TOTAL	0.02	13.87	13.42	18.25	11.38						
Brome (<i>Bromus inermis</i>)	11.0	14.5	18.1	19.1	15.7	Brown leaf spot	2.56	2.07	1.16	1.94	1.93
						Selenophoma leaf spot	0.02	0.12	0.04	0.12	0.07
						Scald	0.02	0.02	0.02	0.04	0.02
						Whitehead		0.13	0.20	0.12	0.11
TOTAL	2.60	2.34	1.42	2.22	2.13						
Timothy (<i>Phleum pratense</i>)	9.5	12.0	9.9	15.5	11.7	Purple spot	0.11	0.10	0.09	0.06	0.09
						Leaf streak	1.46	1.55	0.93	1.78	1.43
						TOTAL	1.57	1.65	1.02	1.84	1.52
Fescue (<i>Festuca rubra</i>)	3.2	3.4	3.4	0.0	2.5	Brown stripe	0.24	6.03	5.75		4.00
						Stem eyespot	0.91	7.42	1.41		3.24
						TOTAL	1.15	13.45	7.16		7.24
Other	2.3	1.1	2.1	2.2	1.9						

Table 3. Losses from foliage diseases of Forage crops in Alberta Census Divisions 8 to 15, 1973

Census Division	No. of fields sampled	Acreage of forage crops ('000)	Yield (tons/acre)	Loss (%)	Actual production ('000 tons)	Potential production ('000 tons)	Loss ('000 tons)	* Loss (\$'000)
8	48	376	1.98	4.32	742.1	776.2	33.5	921.2
10	53	219	1.77	4.05	388.1	404.5	16.4	451.0
11	63	424	1.98	6.76	839.5	900.3	60.8	1,672.0
12	30	243	1.89	6.52	459.0	491.0	32.0	880.0
13	48	440	1.89	6.68	831.2	890.7	59.5	1,636.2
14	7	76	1.89	2.52	143.3	147.0	3.7	101.7
15	58	705	1.89	9.19	1,330.4	1,465.1	134.7	3,704.2
Total	307	2,483	1.90	5.72	4,734.2	5,074.8	340.6	9,366.3

* Based on a farm value of \$27.50 per ton of forage.