

## DISEASE ASSESSMENT AND LOSSES IN FORAGE CROPS IN CENTRAL AND NORTHERN ALBERTA, 1972

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### Abstract

In 1972, for the third successive year, forage crops in central and northern Alberta were surveyed for foliar diseases. A total of thirty diseases on alfalfa (*Medicago sativa*), clover (red, alsike, sweet, and white), brome, timothy, and fescue were observed. The estimated loss due to disease was 6.2% or \$5.5 million as compared with 6.8% or \$5.9 million in 1971 and 5.6% or \$4.6 million in 1970.

### Methods

The third annual forage disease survey in central and northern Alberta was carried out between June 30 and August 23, 1972. Samples were collected in census divisions (C.D.) 8 through 15 (excluding C.D. 9 because of limited cultivation). Methods of sampling, estimation of disease severity, and estimation of losses have been described in detail (1). The Disease Index was based on percent area of the leaves or stems affected and was multiplied by 0.25 to give percent loss (3). One percent of the farms reporting forage were sampled in each C.D. This totalled 312 fields. The percentage of each species in each field was estimated, and 10 shoots of each were sampled for detailed examination.

### Results and discussion

The index for each disease of each forage species, the number of acres grown, and the number of fields affected out of the total number sampled in each census division are shown in Table 1. The total acreage of each species indicates its relative contribution to forage production.

Percent loss of each forage species caused by individual diseases in 1970 (1), 1971 (2) and 1972 for the entire district surveyed is shown in Table 2. Variations in the severity of diseases from year to year are shown as well as the average level over the 3-year period. In 1972, only a trace of downy mildew was found on alfalfa, and sweet clover was free of downy mildew (*Peronospora trifoliorum* de Barv) and gray stem canker (*Ascochyta caulicola* Laub.). A trace of

pepper spot on red clover was seen only in 1971. The figures in Table 2 for the percentage of each species in the surveyed area were derived from the average percent of the species in all fields.

Acreage, yield, and production figures in Table 3, as well as the estimated value of \$17 per ton of hay in Alberta in 1972 were supplied by the Statistics Branch, Alberta Department of Agriculture. The percent loss was calculated for each C.D. and these figures used to determine loss in tons and value. In 1972, the loss was 6.24%, a decrease from 1971 (6.80%) and an increase over 1970 (5.65%), resulting in a 3-year average of 6.23%. The average yield over the three years was 1.81 tons/acre and loss in value was 5.4 million dollars.

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### Literature cited

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Table 1. Incidence and severity of foliage diseases of forage crops in central and northern Alberta, 1972

Census Division	Acres grown ('000)	No. fields sampled	Diseases assessed					
			Yellow leaf blotch	Black stem	Stagonospora	Pepper spot	Downy mildew	Common leaf spot
8	184.4	35	35/15.69	34/4.53	17/0.28	5/0.75	2/0.04	35/ 3.59
10	100.0	49	47/ 9.60	48/2.72	21/0.22	9/1.15	0/0	49/ 7.59
11	208.0	43	43/14.78	42/3.21	29/0.50	7/2.37	0/0	42/ 6.76
12	98.6	23	22/ 9.79	21/1.29	3/0.19	5/1.05	0/0	23/ 8.20
13	177.7	22	22/32.25	22/4.22	9/0.25	13/6.18	0/0	22/13.90
14	28.6	3	3/13.20	3/2.83	1/0.27	2/4.00	0/0	3/ 5.03
15	309.9	22	22/26.14	20/6.81	7/0.08	1/0.27	0/0	21/10.38
Total	1107.2	197	194/16.27	190/3.61	86/0.28	42/1.84	2/0.01	195/ 7.75

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

\*\* 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	48.1	7	0/ 0	3/10.19	5/1.06	2/ 9.14	4/15.51
10	26.1	0	0/ 0	0/ 0	0/0	0/ 0	0/ 0
11	54.3	7	0/ 0	4/ 8.47	5/2.80	4/18.69	7/32.36
12	25.7	4	3/15.70	0/ 0	1/0.03	0/ 0	3/11.02
13	46.4	16	5/ 5.15	8/ 5.22	15/3.77	0/ 0	15/62.15
14	7.5	3	0/ 0	2/29.33	3/1.53	2/32.77	0/ 0
15	80.9	15	3/ 0.73	3/ 3.29	7/1.29	0/ 0	14/37.11
Total	289.0	52	11/ 3.00	20/ 6.76	36/2.14	8/ 5.64	43/37.12

\* 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.

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

Census Division	Acres grown ('000)	NO. fields sampled	Disease assessed					
			Powdery mildew	Black stem	Stagonospora	Pepper spot	Rust	sooty blotch
8	33.0	12	1/ 1.52	4/0.22	11/29.01	1/ 0.68	2/1.83	2/ 2.98
10	17.9	2	1/15.30	0/0	1/ 2.05	0/ 0	0/0	1/14.30
11	37.3	5	0/ 0	3/0.36	5/15.96	1/ 1.10	0/0	1/ 0.17
12	17.7	0	0/ 0	0/0	0/ 0	0/ 0	0/0	0/ 0
13	31.8	16	5/ 4.84	7/0.30	16/41.65	10/16.18	0/0	2/ 3.50
14	5.1	1	0/ 0	0/0	1/34.30	0/ 0	0/0	0/ 0
15	55.5	9	2/10.26	0/0	9/25.00	0/ 0	0/0	0/ 0
Total	198.3	45	9/ 4.86	14/0.20	43/30.17	12/ 6.06	2/0.49	6/ 2.69

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

Table 1 (ctd.)

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

C.D.	Acres grown ('000)	No. fields sampled	Diseases * assessed **	
			Black stem	Stagonospora
8	2.9	0	0/0	0/0
10	1.5	1	1/0.20	1/0.10
11	3.2	0	0/0	0/0
12	1.5	2	0/0	1/0.25
13	2.8	0	0/0	0/0
14	0.4	0	0/0	0/0
15	4.8	1	0/0	0/0
Total	17.1	4	1/0.05	2/0.15

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

5. WHITE CLOVER (*Trifolium repens* L.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases * assessed **		
			Pepper spot	Stagonospora	Rust sooty blotch
8	2.4	0	0/0	0/0	0/0
10	1.3	0	0/0	0/0	0/0
11	2.8	2	1/12.50	2/12.00	1/33
12	1.3	0	0/0	0/0	0/0
13	2.4	0	0/0	0/0	0/0
14	0.4	1	0/0	1/44.00	0/0
15	4.1	0	0/0	0/0	0/0
Total	14.7	3	1/8.33	3/22.67	1/22

\* Causal fungi: Pepper spot, *Pseudoplea trifolii* (Rostr.) Petr.; stagonospora, *Leptosphaeria pratensis* Sacc. and Briard; rust, *Vromyces trifolii* (Hedw. f. ex DC.) Lévl.; sooty blotch, *Cymadothea trifolii* (Pers. ex Fr.) Wolf.

6. BROME (*Bromus inermis* Leyss.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases * assessed **			
			Brown leaf spot	Selenophoma	Scald	White-head
8	73.8	25	24/3.49	19/0.37	2/0.02	1/0.40
10	40.0	24	24/5.42	14/0.23	4/0.36	4/2.08
11	83.3	17	16/3.62	5/0.12	0/0	0/0
12	39.5	16	16/6.16	2/0.01	2/0.02	0/0
13	71.2	18	18/4.08	5/0.05	1/0.01	1/0.56
14	11.5	2	2/3.50	0/0	0/0	0/0
15	124.1	11	11/6.03	4/0.07	0/0	1/1.82
Total	443.4	113	111/4.64	49/0.16	9/0.08	7/0.80

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

7. TIMOTHY (*Phleum pratense* L.)

C.D.	Acres grown ('000)	No. fields sampled	Diseases * assessed **	
			Eyespot	Leaf streak
8	40.4	25	19/0.31	25/3.38
10	21.9	3	3/0.17	3/1.53
11	45.5	15	14/0.58	14/6.89
12	21.6	5	3/0.10	5/2.46
13	38.9	19	19/0.48	18/2.98
14	6.3	6	6/0.13	4/1.03
15	67.9	6	3/0.08	6/4.22
Total	242.5	79	67/0.36	75/3.71

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

8. FESCUE (*Festuca rubra* L.)

Census Division	Acres grown ('000)	No. fields sampled	Diseases * assessed **	
			Brown stripe	Stem eyespot
8	13.9	0	0/0	0/0
10	7.5	0	0/0	0/0
11	15.6	0	0/0	0/0
12	7.4	0	0/0	0/0
13	13.4	0	0/0	0/0
14	2.2	0	0/0	0/0
15	23.3	11	9/23.01	7/5.65
Total	83.3	11	9/23.01	7/5.65

\* Causal fungi: Brown stripe, *Passalora graminis* (Fckl.) Höhn; stem eyespot, *Phleospora idahoensis* Sprague.

Table 2. Percent losses from diseases of forage crops in central and northern Alberta, 1970, 1971 and 1972

Forage species	% of forage crops grown				Disease	LOSS (%)			
	1970	1971	1972	Avg		1970	1971	1972	Avg
Alfalfa ( <i>Medicago sativa</i> )	45.5	38.3	45.2	43.0	Yellow leaf blotch	2.87	2.81	4.07	3.25
					Black stem	1.45	0.83	0.90	1.06
					Stagonospora	0.11	0.10	0.07	0.09
					Pepper spot	0.06	0.09	0.46	0.20
					Downy mildew	0.02	0.01		0.01
					Common leaf spot	1.30	2.13	1.94	1.79
					TOTAL	5.81	5.97	7.41	6.40
Red clover ( <i>Trifolium pratense</i> )	16.5	14.5	11.8	14.3	Powdery mildew	3.04	1.00	0.75	1.59
					Northern anthracnose	1.11	2.63	1.69	1.81
					Black stem	0.64	0.65	0.53	0.60
					Stagonospora	2.17	8.23	9.12	6.50
					Black stem leaf spot	0.32	0.61	1.41	0.78
					Pepper spot		0.10		0.03
					TOTAL	7.28	13.22	13.50	11.31
Alsike clover ( <i>Trifolium hybridum</i> )	8.7	13.1	8.1	10.0	Powdery mildew	3.54	3.24	1.21	2.66
					Black stem	0.18	0.10	0.05	0.11
					Stagonospora	2.83	7.82	7.54	6.06
					Pepper spot	0.06	0.39	1.51	0.65
					Rust	0.24	0.02	0.12	0.13
					Sooty blotch	0.18	0.67	0.67	0.51
					TOTAL	7.03	12.24	11.11	10.12
Sweet Clover ( <i>Melilotus alba</i> and <i>M. officinalis</i> )	3.0	2.4	0.7	2.0	Black stem	0.28	0.05	0.01	0.11
					Downy mildew	0.01			
					Stagonospora	0.06	0.41	0.04	0.17
					Gray stem canker		0.01		
					TOTAL	0.35	0.47	0.05	0.28
White clover ( <i>Trifolium repens</i> )	0.2	0.5	0.6	0.4	Pepper spot		4.12	2.08	3.10
					Stagonospora	0.01	1.25	5.67	2.31
					Rust	0.01	4.50	5.50	3.33
					Sooty blotch		4.00	0.17	2.08
					TOTAL	0.02	13.87	13.42	10.82

Table 2 (Cont'd)

Forage species	% of forage crops grown				Disease	LOSS (%)			
	1970	1971	1972	Avg		1970	1971	1972	19
Brome ( <i>Bromus inermis</i> )	11.0	14.5	18.1	14.5	Brown leaf blotch	2.56	2.07	1.16	1.93
					Selenophoma leaf spot	0.02	0.12	0.04	0.06
					Scald	0.02	0.02	0.02	0.02
					Whitehead		0.13	0.20	0.16
					TOTAL	2.60	2.34	1.42	2.17
Timothy ( <i>Phleum pratense</i> )	9.5	12.0	9.9	10.5	Purple spot	0.11	0.10	0.09	0.10
					Leaf streak	1.46	1.55	0.93	1.31
					TOTAL	1.57	1.65	1.02	1.41
Fescue ( <i>Festuca rubra</i> )	3.2	3.4	3.4	3.3	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	1.8					

Table 3. Losses from foliage diseases of forage crops in Alberta Census Divisions 8 to 15, 1972

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	47	408	1.95	4.42	795.6	832.4	36.8	625.6
10	56	221	1.66	4.59	367.2	384.9	17.7	300.9
11	61	460	1.95	5.74	897.2	951.8	54.6	928.2
12	29	218	1.74	4.13	379.7	396.0	16.3	277.1
13	49	393	1.74	11.27	684.0	770.8	86.8	1475.6
14	8	63	1.74	5.15	110.3	116.3	6.0	102.0
15	62	686	1.71	8.38	1169.3	1276.2	106.9	1817.3
Total	312	2449	1.78	6.24	4403.3	4728.4	325.1	5526.7

\* Based on a farm value of \$17 per ton of forage.