Observations on silvertop of grasses in Alberta

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Silvertop, a blasting of the heads of grasses, was examined in Alberta. Mites, thrips, and Fusarium poae were regularly but not consistently associated with the disease, and a causal agent could not be specified. Poa *pratensis* and Festuca rubra were very susceptible. Bromus *inermus, Elymus* junceus, *E.* angustus and *E.* sibiricus are less susceptible. Varietal differences were found in Agropyron cristatum and A. desertorum.

Can. ***Plant Dis. Surv. 55:83–84. 1975***

La coulure des graminees a fait l'objet d'une etude en Alberta. Bien que les tetranyques, les thrips et *Fusarium* poae aient ete frequemment, mais pas toujours. associés a cette maladie on n'a pas pu determiner l'agent causal spécifique. Poa pratensis et Festuca rubra sont tres sensibles a la maladie. Bromus *inermis, Elymus* junceus, *E.* angustus, et *E. sibiricus* l'y sont moins et on a observe des differences variétales de sensibilité chez Agropyron cristatum et A. desertorum.

Silvertop, a disease of grasses, is characterized by a bleached, dead seed head and stem above the last node and a healthy flag leaf, sheath, and lower stem. These symptoms appear soon after head emergence, usually before the seed head has fully expanded. The panicle can be pulled out of the flag leaf sheath and the lower end is usually shrunken, darkened and necrotic. This disease has been known since 1875 in the United States and was first attributed to injury by mites. Hardison (3) reviewed the early literature and discussed mites, thrips, and *Fusarium poae* (Peck) Wollenweber as causal agents singly and in combinations. He could not find evidence, in an examination of the disease in Oregon, that mites or *F. poae* were the primary cause of the disease and suggested that other insects may be responsible. Surveys in Alberta have shown (1) that the average incidence of whitehead on brome was 0.44% over the years 1970-1973.

Materials and methods

In 1973 at Lacombe, a 3-year-old test of crested wheatgrass *(Agropyron cristatum* (L.) Gaertn. and ***A. desertorum*** (Fisch.) Schutt.) cultivars was examined for silvertop in late June and the number of affected heads was counted in a total of 100 heads selected at random from each plot. The four-variety, six-replicate test was analyzed as a randomized block and the shortest significant range calculated. Necrotic basal portions of affected panicles were plated on potato dextrose agar by pulling the panicles out of the flag leaf sheath and cutting off the basal portions aseptically or after surface sterilizing them with a 10% aqueous solution of commercial bleach. The plates were incubated and examined for *Fusarium* spp.

In 1974, culms of various grass species showing silvertop were collected from experimental plots along with comparable culms of healthy plants. These were dissected in the laboratory with the aid of a low-power microscope. The number of plants containing mites and thrips was recorded.

Results and discussion

In the varietal test, highly significant differences in number of silvertop heads were found among varieties of crested wheatgrass. Fairway with 2.3% silvertop and Parkway with 2.5% were not significantly different at the 1% level; however Nordan with 13.7% and Summit with 20.0% were significantly different from each other and from Fairway and Parkway. Differences in silvertop and in insect infestation (Table 1) could not be accounted for by differences in the morphology of the flag leaf sheath or panicle. This demonstration of varietal differences does not assist in defining the cause of the disease, nor do the differences reported between species (5,6). Our observations in Alberta indicate that Kentucky bluegrass *(Poa pratensis* L.) and creeping red fescue *(Festuca rubra* L.) are very susceptible; brome *(Bromus inermis* Leyss.), crested wheatgrass, Russian wild rye *(Elymus junceus* Fisch.), Altai wild rye *(E. angustus* Trin.) and Siberian wild rye ***(E. sibiricus*** L.) are less susceptible. Timothy *(Phleum pratense* L.) has been reported to be affected by silvertop (6), but the disease has not been observed on this host here.

The frequency with which mites and thrips were found in the flag leaf sheaths of grasses collected from experimental plots at Lacombe is shown in Table 1. A slightly greater percentage of affected than healthy plants were free of infestation. It is possible that on the death of the heads, mites and thrips would leave the sheath; thrips, however, are much more mobile than mites. In several cases, small holes that appeared to

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Table 1. Occurrence of mites and thrips in grasses in 1974

Host	Silvertop affected				Healthy (symptomless)			
	Number of heads examined	% with thrips	% with mites	% not infested	Number of heads examined	% with thrips	% with mites	% not infested
Crested wheatgrass	18	16.7	5.5	77.8	9	33.3	0	66.6
Brome	30	3.3	6.6	90.0	21	4.8	0	95.2
Russian wild rye	33	3.0	0	97.0	3	0	33.3	66.6
Siberian wild rye	6	16.7	0	83.3	3	0	0	100.0
Kentucky bluegrass	85	38.8	45.9	32.9	18	83.3	72.2	5.6
Total or average	172	22.5	24.3	67.6	54	35.2	25.9	59.2

have been made by insects were found in affected sheaths.

Fusarium poae has been generally accepted as the cause of silvertop in Canada and the United States (5); however our isolations, made by placing the lower end of affected panicles on potato dextrose agar, did not support this conclusion. Less than half of the stems yielded ***Fusarium*** spp. and some were sterile. This is in close agreement with the findings in Oregon (3).

Losses to forage yield from silvertop are probably negligible, but seed production has been reduced up to 95% in the United States (3) and 12-14% in Canada (2). Insecticides, as well as spring and fall burning of dormant grasses (4), have been shown to reduce losses to silvertop.

Literature cited

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