First report of eyespot [*Pseudocercosporella herpotrichoides]* in wheat in the Prairie Provinces

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This is the first report of Pseudocercosporella herpotrichoides ((Fron) Deighton), the causal agent of eyespot, infecting wheat in the Prairie Provinces. The fungus was first found in a field of Katepwa wheat near Smoky Lake, Alberta. In subsequent investigations eyespot was found in both spring (hard red and soft white) and winter wheat crops at several locations in Alberta in 1989. In a survey of ten wheat fields near Olds, Alberta, eyespot was found in all of the fields and on average, 41 percent of stems examined had one or more lesions. In a field of winter wheat near Innisfail, 74 percent of the stems examined had eyespot lesions and of these approximately 25 percent were severe enough to cause lodging.

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C'est le premier signalement de Pseudocercosporella herpotrichoides ((Fron) Deighton), l'agent responsable de la tache ocellee qui infecte le ble dans les Prairies. On a decouvert le champignon pour la premiere fois dans un champ de ble Katepwa pres de Smoky Lake en Alberta. Lors d'enquêtes subsequentes, on a signalé la presence du champignon dans les cultures de ble de printemps (roux vitreux et blanc tendre) et d'hiver a plusieurs endroits de la province en 1989. Dans une enquête sur dix champs de ble pres de Olds (Alberta), on a trouve de la tache ocellee dans tous les champs et en moyenne, 41% des tiges examinees affichaient une ou plusieurs lesions. Dans un champ de ble d'hiver pres d'Innisfail, 74% des tiges examinees comportaient des lesions dues a la maladie dont environ 25% etaient assez graves pour causer la verse.

Eyespot [*Pseudocercosporella herpotrichoides* ((Fron) Deighton)), also known as foot rot or strawbreaker, is a widespread disease of wheat, barley, oats and rye. It has been reported from Europe, the USSR, South Africa, parts of North America and Australasia (Anon. 1981). In Canada, eyespot has been reported on wheat in Ontario, Quebec, British Columbia (Conners 1967, Ginns 1986) and the Maritime Provinces (Martin 1989) and on barley in Alberta (Slopek 1989). In 1989, eyespot was discovered in a field of Katepwa wheat near Smoky Lake, Alberta. This is the first report of this disease on wheat in the Prairie Provinces.

P. herpotrichoides appears to be widely distributed in Alberta. Slopek & Labun (1990) found eyespot present in ninety percent of the 54 barley fields that they surveyed in Alberta, with an average incidence per field of 24.6 percent. In a survey of ten hard red spring wheat fields near Olds in 1989 eyespot lesions were found in each of the fields. Fifty randomly selected stems were examined per field and an average of 41 percent of these had one or more eyespot lesions present. The highest incidence of eyespot in any one field was 72 percent. Most of the stems examined in the spring wheat that was surveyed had slight to moderate infections, although there were also some severe infections. Maximum yield losses due to eyespot in the spring wheat surveyed were estimated at approximately five percent. Square meter samples were taken in one field of Katepwa spring wheat near Smoky Lake in an attempt to determine the amount of yield loss resulting from eyespot. Samples were taken from a lodged part of the crop and the adjacent standing crop. In the standing crop, the yield was 5.31 tlha and the thousand kernel weight was 35.8 g. The yield and thousand kernel weight in the lodged area were 4.74 t/ha and 33.3 g, respectively. It is felt that the eyespot was the primary factor responsible for the lodging and yield loss in this crop. Four soft white spring wheat fields in southern Alberta were also surveyed. Eyespot was found in two of these fields but disease incidence averaged only 3 percent.

In addition, an intensive survey of a field of Norstar winter wheat in the Innisfail area was conducted. The crop was severely lodged (Figure 1) and it was suspected that this might be due to eyespot. Plants were collected along two transects through the field and examined for eyespot lesions. A total of 481 stems were examined, of which 72 percent had one or more eyespot lesions; approximately, one quarter of these were severe. The expected yield for this field of winter wheat was 4.0 tlha but the actual yield obtained was only 2.6 tlha and was graded as No. 3 Canada Western Red Winter, with high levels of shrivelled grain. It is suspected that eyespot was a major yield loss factor in this winter wheat crop.

Yield reductions due to eyespot infections occur as a result of the direct effects on the movement of water and nutrients in the host and through indirect effects resulting from lodging (Figure 2). In winter wheat, yield losses of up to 50% have been reported (Bruehl et al. 1968). Scott & Hollins (1974) have found that severe infections (stem completely girdled by lesions; tissue softened so that lodging would readily occur (Figure 3)) reduces both grain number per head and the thousand kernel weight. Whereas, slight lesions do not cause

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any yield loss and moderate lesions (one or more lesions occupying at least half the circumference of the stem) only reduce the thousand kernel weight.

Eyespot is not normally considered to be an important disease in spring cereals (Hollins 1989, Wiese 1977). This disease, however, has the potential to cause significant economic yield losses in winter wheat. At present, very little winter wheat is grown in the Parkland areas of Alberta. With the development of winter wheat cultivars adapted to this area we will undoubtedly see more situations of significant yield losses due to eyespot. At present, there is no active attempt to incorporate eyespot resistance in winter wheat being developed for this area.

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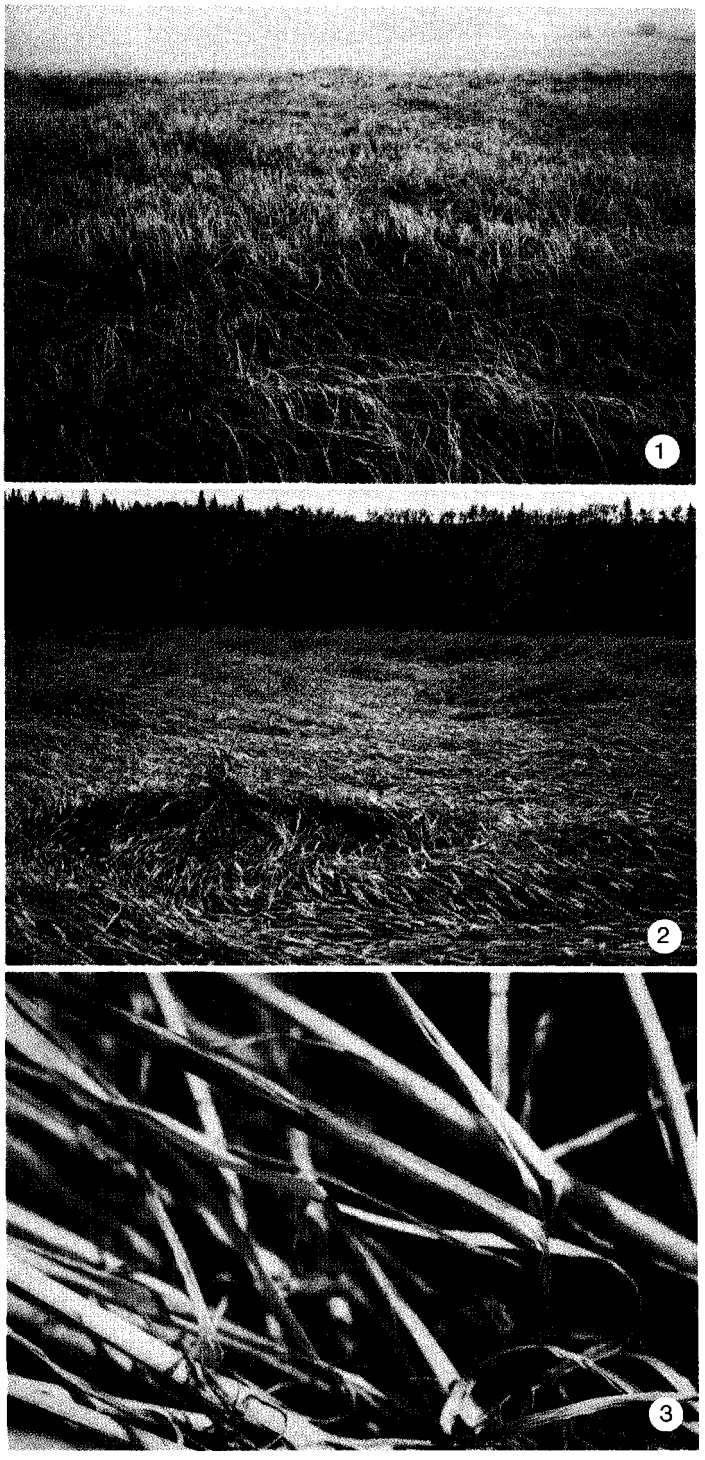

Fig. 1. Lodged crop of winter wheat, cv. Norstar, near Innisfail, Alberta. Seventy-two percent of the stems that were examined had one or more eyespot lesions.

Fig. 2. Lodging in a crop of Katepwa spring wheat near Smoky Lake, Alberta.

Fig. 3. Katepwa spring wheat stem with several eyespot lesions. The lowest lesion causing softening of the stem tissue and lodging.