Fungi associated with the roots of clover in Alberta. I. *Olpidium brassicae* and *Ligniera* sp.

J.P. Tewari and P. Bains[1]

Olpidium brassicae and ***Ligniera*** sp. are described on the roots of ***Trifolium hybridurn*** from Alberta. Both are new disease records for Canada.

Can. Plant Dis. Surv. 63:2, 35-37, 1983.

Olpidium brassicae et ***Ligniera*** sp. sont dbcrits sur des racines de Trifolium ***hybridum*** en provenance d'Alberta. Tous deux sont mentionnbs pour la première fois sur cet hôte au Canada.

Introduction

This communication is the first of a series on fungi associated with the roots of clover and reports the occurrence of two zoosporic fungi.

Materials and methods

Roots of ***Trifolium hybridum*** (alsike clover) were collected from the fields and roadside from Alsike, Alberta during August and early September, 1982. The roots were cleared and stained according to the method of Phillips and Hayman (9), 'mounted in lactophenol and examined by light microscopy.

Results and discussion

Olpidium brassicae

In the material examined both the root hairs and the superficial root cells (Fig. 1) had zoosporangia and resting sporangia. The zoosporangia were spherical to elongate and had single or multiple discharge tubes (Figs. 2,3). In some cases only perforations were evident in place of the discharge tubes. The resting sporangia were stellate in shape and were often surrounded by a vesicle (Figs. 3,4). In general the fungus conformed to the descriptions given by Barr (2) and Karling (7).

In Canada, on different clovers, O. ***brassicae*** is known to occur on ***T. prətense*** and ***T. procumbens*** (2; Dr. D.J.S. Barr, personal communication) and its occurence on ***T. hybridum*** in Alberta is a new disease record at least for Canada. In future, it is proposed to study the distribution of this fungus in Alberta as it is known to be a vector of certain plant viruses (2,5).

Ligniera ***sp.***

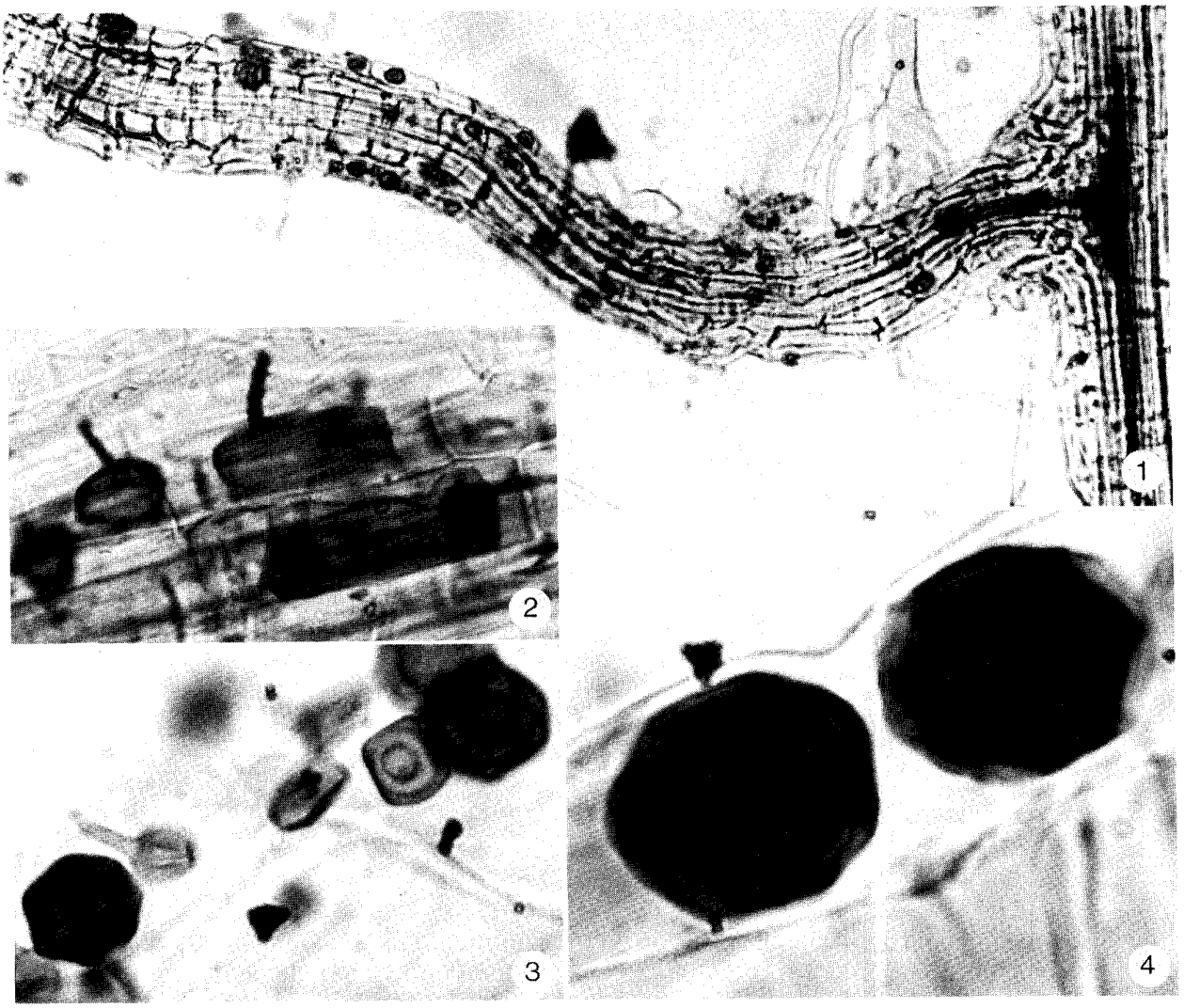
Many apparently normal looking roots were found to be infected with a plasmodiophorid and had cells with cystosori. The cystosori were globose to highly irregular in shape and had a few to numerous cysts which did not appear to be arranged in a single layer (Figs. 5-7). The cysts often had verrucose walls (Fig. 6). Several stages showing the development of cystosori from plasmodia were seen. Many root nodules also had cystosori (Fig. 8). Despite extensive search the zoosporangia were not found. According to Karling (6) and Barr (1,3) both ***Ligniera*** and the closely related genus ***Fblymyxa*** have cystosori that are indistinguishable from each other and that these genera can only be distinguished on the basis of their zoosporangial states. However, the cystosori of ***Fblymyxa*** are reported to consist usually of a single layer of cysts (1,3). In the fungus under study the cystosori are usually a few cysts thick. ***"Ligniera*** appears to be scarcely more than a convenient dumping ground for species which cause little or no hypertrophy and develop cystosori of indefinite size, shape and structure" (6).

Dr. J.S. Karling to whom photographs of the fungus under study were sent for comments, confirmed (personal communication) that it should be classified "as a species of ***Ligniera*** until the time the zoosporangia and zoospores are discovered. The occasional occurrence of verrucose resting spores suggests that it might be ***L. verrucosa,*** but this characteristic may occur rarely in other species."

Ligniera or ***Polymyxa*** are, so far, not reported on clovers from Canada (1,3,4; Dr. D.J.S. Barr, personal communication). It should be mentioned that in contrast to ***Fblymyxa. Ligniera*** is not known to be a vector of plant viruses (1,8).

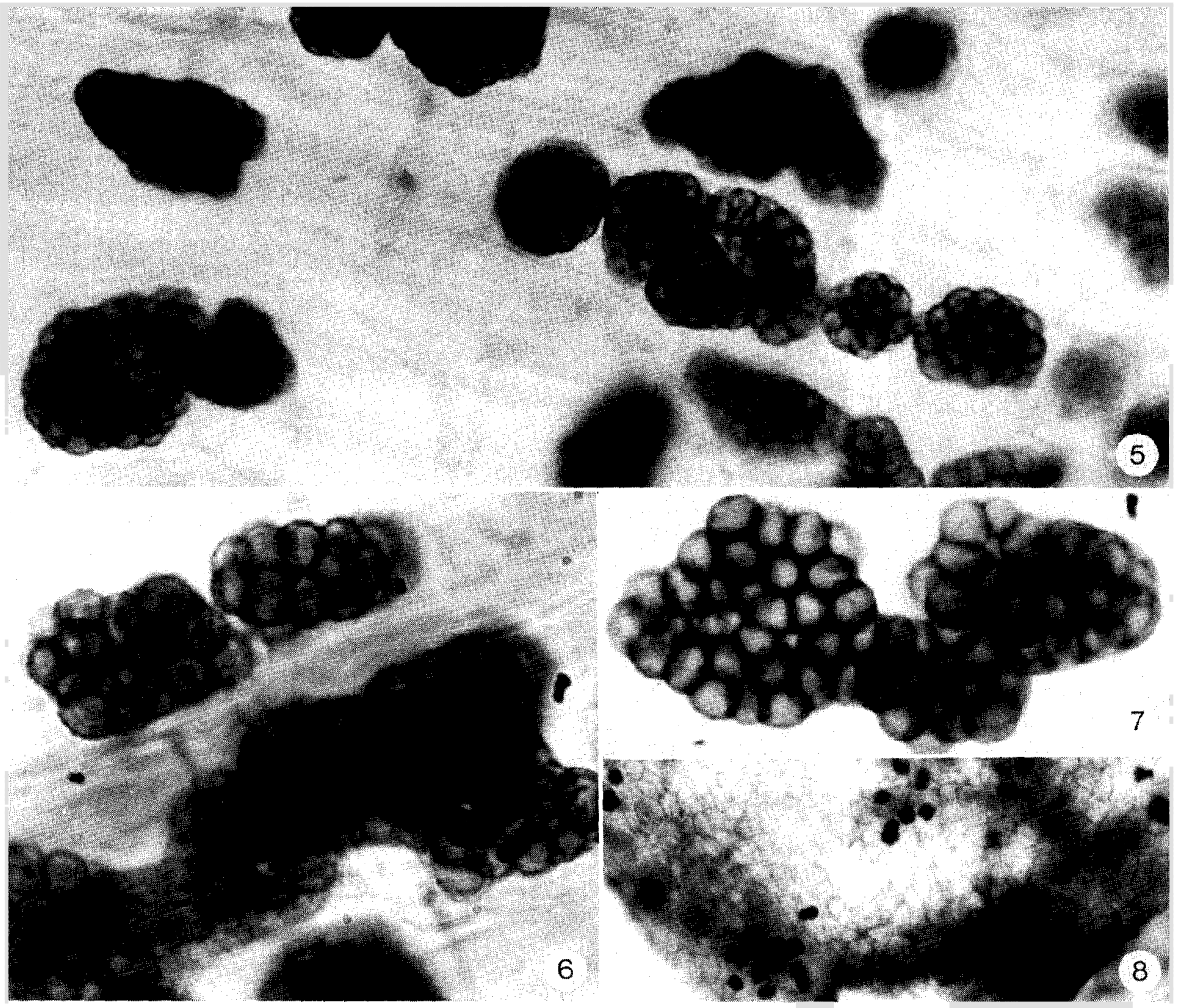
[1] *Department of Plant Science, University of Alberta, Edmonton, Alberta T6G 2P5*

Accepted for publication February 4, 1983



Figs. 1-4. *Olpidium brassicae*

1. An infected rootlet. × 250.
2. Zoosporangia. × 700.
3. Zoosporangia and resting sporangia. × 1700.
4. Resting sporangia. × 2000.



Figs. 5-8. ***Ligniera*** sp.

5-7. Cystosori in the root cells. 5 × 850; 6,7 × 1400. **8.** Cystosori in the root nodule. x 150.

Acknowledgement

Thanks are greatfully acknowledged to Dr. J.S. Karling for his comments on the identity of the two fungi and to Dr. D.J.S. Barr for information on the records of O. ***brassicae, Ligniera*** **sp.** and ***Polymyxa*** **sp.** from Canada.

Literature Cited

1. Barr, D.J.S. 1979. Morphology and host range of ***Polymyxa graminis. Polymyxa befae,*** and ***Ligniera pilorum*** from Ontario and some other areas. Can. J. Plant Path. 1:85-94.
2. Barr, D.J.S. 1980. ***Olpidium brassicae.*** Fungi Canadenses No. 176. Biosystematics Research Institute, Ottawa.
3. Barr, D.J.S. 1981. ***Polymyxa graminis.*** Fungi Canadenses No. 199. Biosystematics Research Institute, Ottawa.
4. Barr, D.J.S. 1981. ***Polymyxa befae.*** Fungi Canadenses No. 200. Bisystematics Research Institute, Ottawa.
5. Barr, D.J.S. and W.G. Kemp. 1875. Olpidium ***brassicae.*** tobacco necrosis virus, and ***Pythium*** spp. in relation to rusty root of carrots in Ontario and Quebec. Can. Plant Dis. Surv. 55:77-82.
6. Karling, J.S. 1968. The Plasmodiophorales. Hafner Publishing Co., New York.
7. Karling, J.S. 1977. Chytridiomycetarum Iconographi. J. Cramer, Monticello.
8. Langenberg, W.G. and L. Giunchedi. 1982. Ultrastructure of fungal plant virus vectors ***Polymyxa graminis*** in soilbome wheat mosaic virus-infected wheat and ***P. befae*** in beet necrotic yellow vein virus-infected sugar beet. Phytopathology 9:1152-1158.
9. Phillips. J.M. and D.S. Hayman. 1970. Improved procedures for clearing roots and staining parasitic and vesicular - arbuscular mycorrhizal fungi for rapid assessment of infection. Trans. Brit. Mycol. Soc. 55:158-163.