Occurrence of *Peronospora farinosa* f. sp. *chenopodii* on quinoa in Canada

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Peronospora farinosa f. sp. *chenopodiiis* described for the first time on quinoa *(Chenopodiumquinoa)* in Canada.

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Les auteurs decrivent *Peronospora farinosa* f. sp. *chenopodii* pour la premiere fois sur l'anserine quinoa *(Chenopodium quinoa)* au Canada.

Quinoa *(Chenopodium quinoa* Willd) is a pseudocereal crop of the Andes where it was first domesticated and cultivated (6). The grain of quinoa contains about 10-17% protein which is higher than in wheat (6). A recent review concluded that quinoa will be a suitable break crop for use in rotation with cereals (6).

A few farmers in Alberta grew quinoa in small fields in 1989. This paper reports on a downy mildew disease of this crop that was observed in one of these fields.

Diseased leaves of quinoa were collected from the Barrhead area on August 30, 1989. Lactophenol cotton blue mounts of the spore-producing structures were prepared and examined by light microscopy. A few diseased leaves have been deposited at the Mycological Herbarium, Biosystematics Research Centre as DAOM 211565.

The diseased leaves showed chlorotic lesions (Fig. 1). The dichotomously branched conidiophores culminated in pointed, slightly curved branches which produced conidia (Figs. 2, 3). The conidiophores ranged from 175-425 µm (average 305 µm) in height and were 8-14 µm (average 11 µm) wide at the bases. The conidia were pyriform and 28.6-36.7 (average 32.2) X 16.3-26.5 (average 20.6) µm in size.

The pathogen was identified as *Peronospora farinosa* (Fr.) Fr. (7). The downy mildew disease of quinoa was first reported from Peru in 1947 (4) and is the most widespread disease of this crop (6). In view of the intergeneric host non-infectivity of *P. farinosa* strains, those on *Chenopodium* spp. were classified as *P. farinosa* f. sp. *chenopodii* (2) to which the present collection belongs. Risi and Galwey (6) indicated that a further subdivision may be necessary as quinoa mildew does not infect C. *pallidicaule* Aellen and that C. *album* L. mildew does not infect some other species of *Chenopodium* L.

This appears to be the first report of *P. farinosa* on quinoa, not only from Canada (3, 5), but also from the whole of North America (Dr. J. Ginns, personal communication). The source of inoculum for this downy mildew disease in Alberta is not certain at this time. *Peronospora* Corda is reported on some *Chenopodium* spp. in the Canadian prairies (3,5). However, due to interspecific host non-infectivity, these are not likely to be the source of inoculum for infection on quinoa. The pathogen is known to be seed-borne (1) and this was probably the source of inoculum of the pathogen in Alberta. A similar conclusion was reached in a study from Britain (6).

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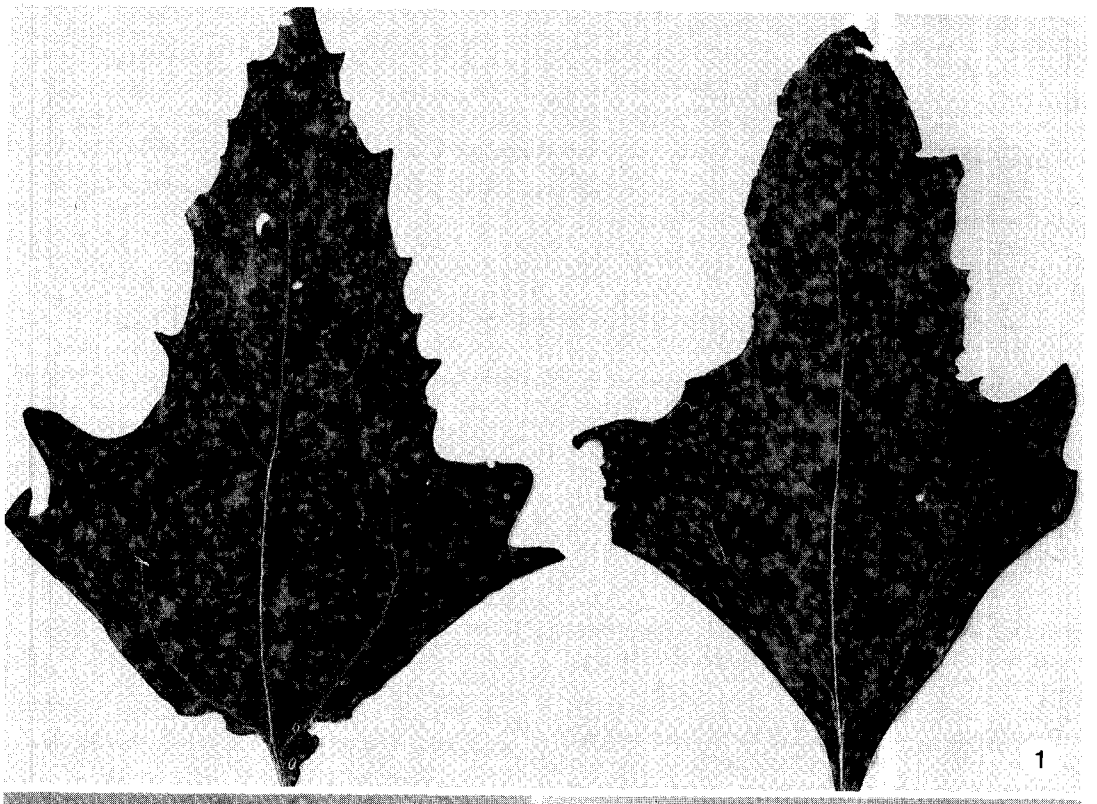

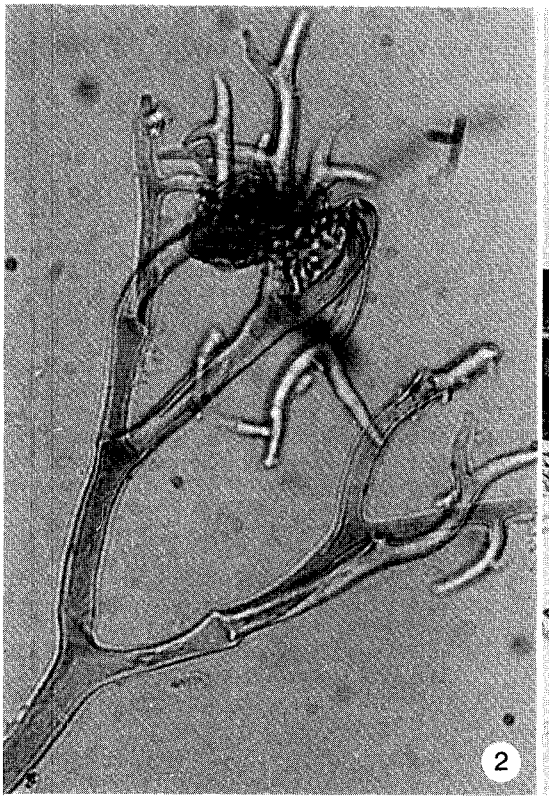

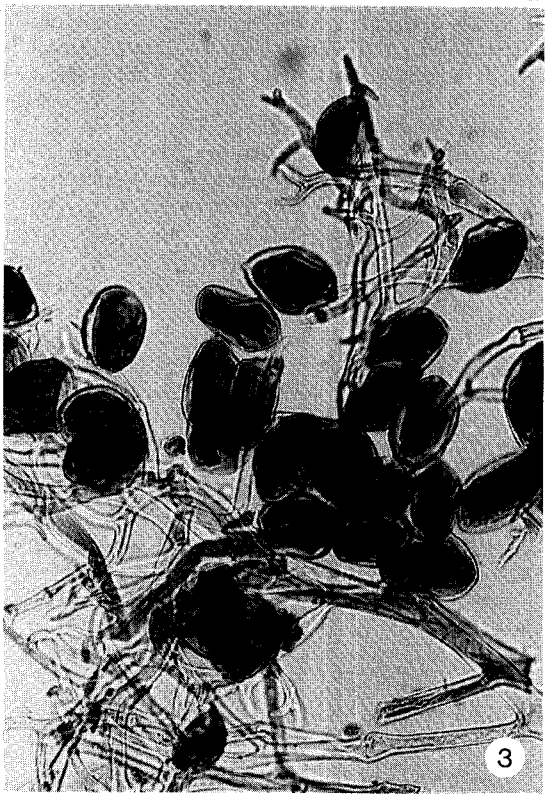

Fig. 1. Chlorotic lesions on the upper leaf surfaces. x **1.4**

Fig. 2. Dichotomously branched conidiophore of *P. farinosa* with slightly curved sterigamata (arrowheads). x **770.**

Fig. 3. Branches of conidiophore and pyriform conidia of *P. farinosa.* x **520.**