# CHLOROTIC LEAFSPOT AND STIPPLE SPOT, NEWLY DESCRIBED DISEASES OF BUCKWHEAT IN MANITOBA[1]

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## Abstract

Large, mostly circular chlorotic lesions were observed on the upper leaves of buckwheat (Fagopyrum esculentum) plants in plots at the Morden Research Station and in commercial fields in 1972 and 1973. They were present on plants by the beginning of flowering. Another lesion type, a tan stipple-like necrotic spotting, was observed also in several commercial plantings in 1973. Isolates of Alternaria alternata and Bipolaris sorokiniana were obtained from diseased foliage as well as from seed. The Alternaria isolates were not pathogenic but the Bipolaris isolates from both seed and foliage caused a tan stipple-like necrotic spotting on inoculated buckwheat leaves. The chlorotic leafspot symptoms were not observed in any of the inoculation tests.

## Resume

On a constaté en 1972 et 1973 de grandes lesions chlorotiques, généralement circulaires, sur les feuilles supérieures de plants de sarrasin (Fagopyrum esculentum) à la Station de recherches de Morden et dans des cultures commerciales. Ces lesions étaient apparues dès le début de la floraison. On a aussi observé, en 1973, dans plusieurs plantations commerciales, un autre genre de lésion en forme de tachetures nécrotiques brunes pointilliées. On a obtenu des isolats d'Alternaria alternata et de Bipolaris sorokiniana sur feuillage et des semences atteintes. Les isolats d'Alternaria n'étaient pas pathogènes mais ceux de Bipolaris inoculées sur sarrasin ont produit des taches nécrotiques brunes pointilliées sur les feuilles. On n'a observe aucun symptôme de taches chlorotiques dans les essais d'inoculation.

Russian investigators (3) have observed considerable yield reduction in buckwheat caused by botrytis rot (Botrytis cinerea Pers.), downy mildew (Peronospora fagopyri Elen.), fusarium wilt (Fusarium sp.), and blight (Phytophthora parasitica Dost.). Other less destructive diseases of buckwheat have been reported (1,2,3,4). This is apparently the first reference to a chlorotic leafspot, and to a tan stipple-like necrotic spotting caused by Bipolaris sorokiniana (Sacc. in Sorok.) Shoem., perf. stat. Cochliobolus sativus (Ito. & Kurib.) Drechsler. ex Dastur.

## Observations and results

In August 1972 chlorotic lesions were observed on leaves of 6- to 8-week-old buckwheat (Fagopyrum esculentum Mill.) plants, which were beginning to flower or were in full flower in field plots at the Agriculture Canada Research Station, Morden, Manitoba. Similar symptoms were observed in several commercial buckwheat fields in Manitoba. Approximately 50% of the leaves on the upper half of the plants were affected. The lesions were randomly located on the leaf blade and were mostly circular, ranging in diameter from 12-26 mm with an average of 20 mm. They were categorized into three types: type 1 - spreading, uniformly chlorotic (Fig. 1); type 2 - spreading, with concentric chlorotic bands alternating with normal dark-green tissue (Fig. 2): type 3 - small restricted lesions (Fig. 1) with borders more sharply defined than in the spreading type. Necrosis occurred in the more advanced lesions and in the older chlorotic rings of Type 2 lesions.

Investigations into the etiology of the chlorotic leafspot disease did not suggest that the disease was caused by a bacterium. To test for virus infection, healthy buckwheat and cucumber plants in the first true leaf were inoculated by rubbing with juice expressed from diseased leaves. Also, aphids were allowed to feed on diseased leaves for 48 hours before being transferred to healthy buckwheat and cucumber plants. None of the test plants developed symptoms of the disease.

Since many phytopathogenic fungi are seedborne, remnant seed, from the lots used to plant the plots at the Research Station, was examined for internal fungi. One hundred seeds of each of the cultivars, Tokyo and Tempest were surface-sterilized for 1 minute in a 1:1 mixture of 2N Javex and 70% ethanol

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and plated on potato dextrose agar. Alternaria alternata (Fr.) Keissler, syn. Alternaria tenuis, was isolated from 38% of the Tokyo seed and from 41% of the Tempest seed. Another fungus, Bipolaris sorokiniana, was isolated from 6% of the Tokyo seed and from 2% of the Tempest seed.

During the 1973 growing season buckwheat plots at the Morden Station, the Portage la Prairie Sub-station, and 18 commercial buckwheat fields were observed for disease. In the plots as well as in many of the commercial fields the chlorotic leaf lesion (Type 1) was observed again. Another lesion type, a tan stipple-like necrotic spotting, was also observed (Fig. 3).

Of 61 isolations made from diseased foliage in 1973, 59 resembled A. alternata and two were B. sorokiniana. The Alternaria isolates were obtained from the lesion types illustrated in Figures 1 and 2. The Bipolaris isolates were obtained from the tan stipple-like lesions illustrated in Figure 3.

Pathogenicity tests were carried out with isolates from seed as well as with foliage isolates. In these tests the Alternaria isolates were not pathogenic. The Bipolaris isolates caused a tan stipple-like necrotic spotting similar to that observed in the field (Fiq. 3). A re-isolate of B. sorokiniana resembled the original inoculum and caused a similar tan stipple-like spotting.

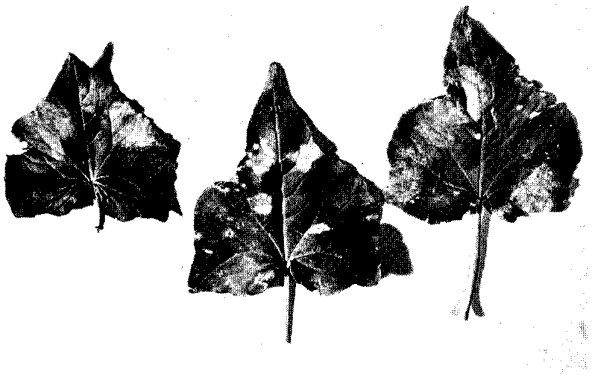

Figure 1. Center leaf illustrates restricted lesions (type 3); the two outside leaves illustrate the spreading, continuous chlorotic lesions (type 1).

No evidence of the chlorotic type leafspot was observed during these pathogenicity tests.

From observations made during the past 2 years these diseases do not appear to be of economic importance. The fungi studied were identified at the Biosystematics Research Institute, Agriculture Canada, Ottawa, Ont., and representative isolates have been deposited in the mycological herbarium as DAOM 145824, Alternaria alternata; and DAOM 145801, Cochliobolus sativus.

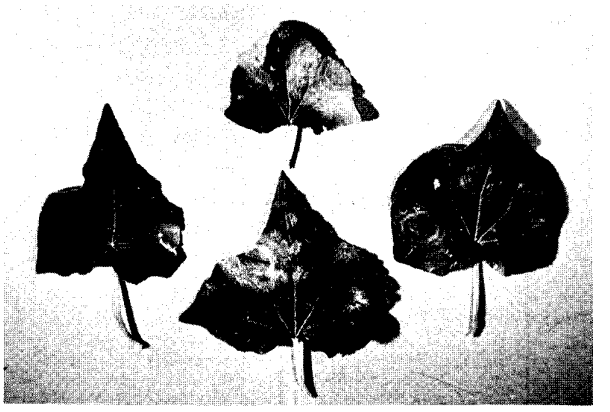

Figure 2. Spreading type lesions with concentric chlorotic bands alternating with normal dark-green tissue (type 2).

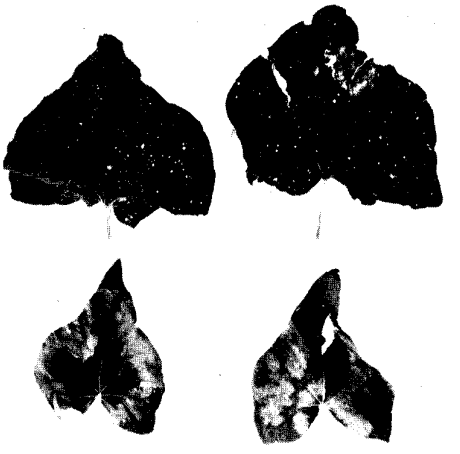

Figure 3. Stipple spot predominates on the upper leaves. Chlorotic leafspot is present on the lower leaves and one lesion is present on the upper right leaf. These leaves were collected from a commercial field August 21, 1973.

## Literature cited

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