Suspected boron deficiency in birdsfoot trefoil in field plots

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Abortion and dropping of flowers, shortened internodes, and discolored and deformed young leaves of birdsfoot trefoil *(Lotus corniculatus)* in field grown plants resembled boron deficiency symptoms in alfalfa. Foliar application of soluble boron corrected the symptoms; seed yield was good. Boron deficiency, previously unreported on field-grown birdsfoot trefoil, apparently was induced by intermittent drought conditions in May, June, and July.

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Des symptômes observés sur des plants de lotier corniculb (*Lotus corniculatus*) en champ, avortement et pertes des fleurs, racourcissement des entre-noeuds, jeunes feuilles décolorées et dbformbes, ne sont pas sans rappeler ceux de la carence en bore chez la luzerne. Une application foliaire de bore soluble corrige ces symptômes et permet une bonne production de semence. Il semble que cette carence en bore, signalée pour la première fois sur le lotier corniculb en champ, ait été induite par des conditions intermittentes de sécheresse en mai, juin et juillet.

Birdsfoot trefoil (*Lotus corniculata* L.) has been a subject of research at the Macdonald Campus of McGill University for many years. Current work, in addition to the cytogenetic and taxonomic studies of Dr. W.F. Grant, involves production of breeder seed of the cultivars Leo and Mirabel, and control of perennial grass weeds in seed production fields.

Seed increase plots with spaced plants of Mirabel seeded in 1979 and plots solid-seeded in 1981 were located on the E.A. Lods Agronomy Research Station on the campus. Plots of Leo solid-seeded in 1979, and spaced plants started in the greenhouse and transplanted in spring of 1982, were located in isolated fields in the Morgan Arboretum, also on the campus.

Flowering usually starts in established trefoil plots about mid June. Mirabel plots flowered normally, although abortion of bloom and discoloration of leaves was observed on scattered plants in the solid-seeded plots.

Flowering started about mid July in the spaced planting of Leo set out in the spring. The plants developed well, and a very satisfactory yield of about 200 kg seed per ha was harvested.

No bloom had appeared in the solid-seeded Leo by the end of June. On examination it was observed that flower buds had formed, but failed to develop. Anthers and stigmas turned brown, and the buds abscissed. There was a reddish discoloration along the veins of some leaves, and yellowing of entire leaves. Internode growth was restricted, producing a rosette effect. New leaves were deformed. Flower symptoms similar to those present in early July were observed again in mid August in the solid-seeded Leo.

These symptoms were similar to those described for boron deficiency in alfalfa in Quebec (Ouellette and Lachance 1954).

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As it was essential to harvest as much seed as possible from the plot, the plants were sprayed with a soluble boron preparation (SOLUBOR) at the rate of 10 kg borax per ha on July 12. No untreated area was left as a control. Flowering began in the sprayed plot about July 19, and continued until late August. Approximately 100 kg/ha of seed was harvested late in September.

Boron deficiency is likely to occur in alfalfa growing on light soils containing less than 0.3 ppm of water-soluble boron, and on heavy soils with less than 0.5 ppm (Ouellette and Lachance 1954). Soil analyses were made early in July. The pH was 5.7 to 5.6. Boron content was 0.77 ppm from 0 to 15 cm deep, and 0.47 ppm in samples from 15 to 30 cm deep. The soil in the affected plots is classified as a Dalhousie clay.

Flower abortion symptoms were apparent in August in solid-seeded plots of Leo heavily infested with couch grass (*Agropyron repens* (L.) Beauv.) which were being used in a weed-control study. An experiment was made to determine the effects of top dressing with soluble boron, using a split plot design, with applications of 0, 10, and 20 kg/ha of borax on August 31. As no new flowers formed in any plots, including the apparently healthy spaced planting, and no symptoms developed on new growth in any plots after the end of August, no results were obtained.

Availability of boron to plants is affected by water supply as well as by boron content of the soil; repeated cycles of drought may result in apparent boron deficiency even in soils with adequate boron levels (Dionne and Pesant 1978). Five year average rainfall for May, June, July, and August, and the values for 1982 at the Agronomy station were as follows:

	Average monthly rainfall (cms) 1977-1981	Monthly rainfall 1982
May	51	24
June	76	115
July	84	79
August	105	122

The monthly figures indicate drought in May and average or above-average rainfall in June, July, and August of **1982.** It was irregular, however. The disease forecasting service of the Quebec Ministry of Agriculture emphasized in its regular releases that the May drought continued for the first half of June. June 1 to **14,** precipitation totalled **16** mm at the Agronomy station. From June **26** to July **27,** the total was **32.5** mm. Rains were more frequent in late summer, with **59** mm in the last days of July; from **1** to **9** mm on **9** days, and **17, 22,** and **67** mm in showers on **3** days in August.

Plots of timothy (*Phleum pratense* L.) near the trefoil showed severe drought symptoms in early June and again in mid July. Although drought symptoms were not conspicious on the trefoil, the plants were certainly subjected to water stress in the solid-seeded plots.

No analyses were made of boron content of tissues of affected and apparently healthy plants. Even without such confirmatory data, it appears most probable that the symptoms observed were caused by a temporary deficiency of available boron, induced by the local drought conditions during May, part of June, and part of July. As far as we can determine, boron deficiency in field grown birdsfoot trefoil has not been reported previously. We plan to study the effect of boron applications on the trefoil plots in the summer of **1983.**

Literature cited

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