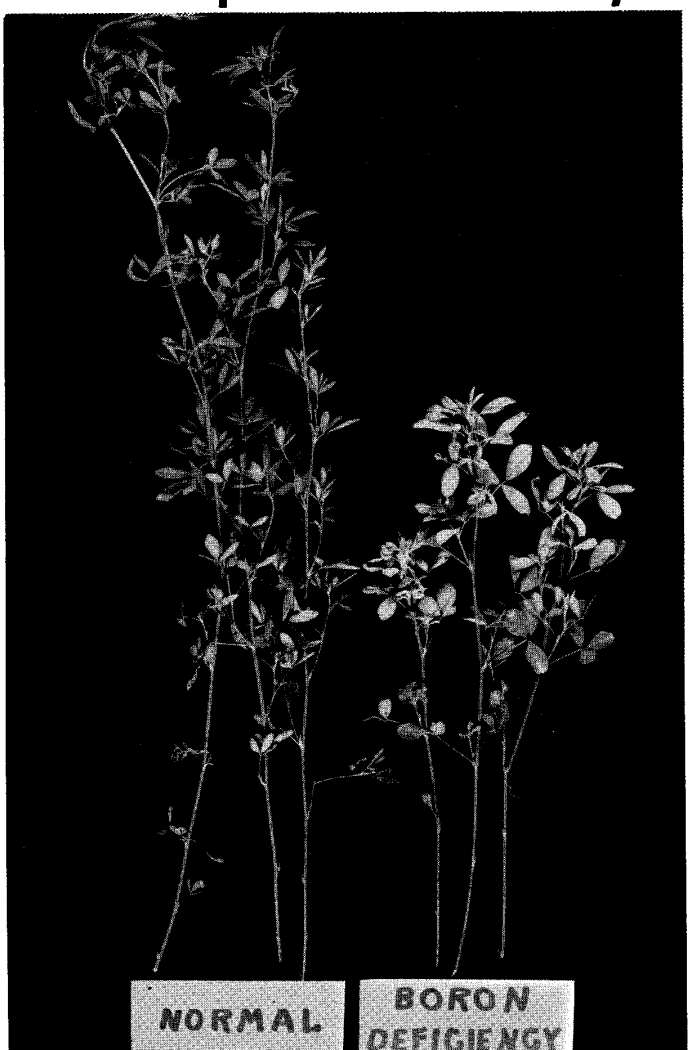
Boron Improves Alfalfa Quality



Plants, like alfalfa, which make higher nutritional values for feeding young livestock, require higher fertility levels in the soil. The trace elements are included in the requirements as suggested by the crop improvement, left, from boron application.

Yellowing of top leaves preceded by insufficient delivery of boron by the dwarfed stem growth tells that alfalfa soil, says V. L. Sheldon of the Uni-stands may be in trouble because of versity of Missouri soils department.

Upper leaves often turn red before the typical "yellow top" shows up. The internodes of the terminal shoots become shortened, forming a rosette. Death of the terminal bud follows.

Boron troubles appear most strikingly in the late summer—especially during prolonged dry periods. At such times, plant roots must obtain water and nutrients at depths below surface soil layers.

Frequently this moist zone is beneath the level of the soil organic matter from which most of the boron seems to come. Testing the soil for available boron is complicated because in the spring when surface soil is moist, the soil usually supplies boron. Alfalfa can make a vigorous normal growth. Later in the summer the characteristic "yellow-top" appears, Sheldon says.

Under boron deficiencies, nitrogen-fixing nodules fail to form on alfalfa roots. Galls sometimes develop there but these become black, shriveled masses before the plant matures. Such abnormal legumes do not take nitrogen from the air.

Compared with healthy plants, they appear lighter in color, ripen at an earlier date, give lower yields and are of poor quality as feed. Under severe conditions, the plants may die from boron-induced nitrogen deficiency. This trace element, boron, is needed so that the plant can take on nitrogen-fixing microbes.

According to Sheldon, boron is needed for other plant processes, too. The transport of materials within the plant has frequently been associated with this element. Tests at the Missouri Agriculture Experiment Station show that concentrations of tryptophane—a part of plant proteins often deficient—may be increased by as much as 54 percent in alfalfa hay by applying boron to Putnam Silt Loam.

When studied under green house conditions, the amounts of this compound, as parts per thousand of dry matter, dropped from 2.8 for full soil treatment to 1.1 where only boron was withheld. Similar results were found with soybean hays, Sheldon says. Usual methods of nitrogen analysis for protein were too crude to reveal boron effects on the quality of alfalfa hay.

While further research is necessary in order to discover functions of boron in life processes of alfalfa and in the soil, there is evidence that boron, a trace element, improves the nutritional quality of alfalfa as hay. Many Missouri farmers are cooperating with the department of soils in an effort to further evaluate the effects of added boron on maintenance and improvement of alfalfa stands, he adds.

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