Influence of Boron in Agriculture

BORON IN RELATION TO SOIL FERTILITY IN THE PACIFIC NORTHWEST

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The Pacific Northwest as used herein corresponds very closely to the Columbia River Drainage basin and includes British Columbia, Washington, Idaho, Montana, and Oregon. Boric acid has been used in experimental culture solutions at the Oregon Experiment Station for a dozen years to overcome a certain type of chlorosis. One p.p.m. corrected so-called “yellow top” of alfalfa in soil cultures in experiments made early in 1936 (11). In that year McLarty (6) reported experiments in which tree injections with boron and boron compounds had been found effective for control of “drouth spot” and “corky core” of apples. Greenhouse experiments started at the Oregon Station in 1937 led to control of beet “canker” with boric acid perhaps for the first time. These experiments were followed by successful field trials the following year. Boron was used by Bouquet (2) in field trials in Oregon for the control of celery stem “crack” following reports of its successful use for this purpose by the Florida Experiment Station. McWhorter and others (9) and Schuster, et al. (13) applied boron sprays to cherry, peach and apricot trees in the vicinity of The Dalles, Oregon, in 1937. Combinations of zinc and boron which have proven effective in control of “little leaf” of stone fruits were used in this work. On stony, gravelly, sandy loam in the Milton area boron was reported by McWhorter to have improved keeping quality of apples and prunes. Kienholz and Brown (5) reported control of corky core in apples from the use of boron in Hood River Valley. Recently response has been observed from the use of boron in the Pacific Northwest on numerous soils.

BRITISH COLUMBIAN EXPERIMENTS

In 1936 boric acid was broadcast under affected apple trees with such good results to both fruit and leaves of apple trees, and concluded that healthy trees should have in their leaves 10 to 14 p.p.m. boron. Leaves containing only 4 to 6 p.p.m. became diseased. Boron recovered from soil was from 0.2 to 2.0 parts per million. Four years’ experiments showed that the boron content of the tissues of the trees on the plat first treated is gradually falling off. Four years after treatment the soil in most cases had a good supply. In the 1939 crop a slight amount of corky core and drouth spot of apples was reported with trees that received two pounds of boric acid in 1937 (8).

EXPERIMENTS IN WASHINGTON

In 1937, Campbell, Heald and Jones (3) reported symptoms of boron deficiency in 67 of 90 sugar beet fields examined in the Bellingham district, and that five per cent. of the plants of affected fields were diseased. Yield of roots was increased approximately 100% and the sugar content raised about 2%. As a result of boron applications. Overholzer and Clore (10) reported 6 years’ records of cork spot on individual d’Anjou pear trees in Central Washington. Positive results were secured in yield of pears from use of boric acid though good results were secured for control of drouth spot and corky core in Washington orchards. Blodgett and Colwell (1) reported a relation between low boron content of stone fruit and drouth spot on the fruits. This condition is reported to be more severe in soils which do not respond to boron. The low boron content of apple tissues was found to be correlated with drouth spot and corky core.

EXPERIMENTS IN IDAHO

In the Idaho work Colwell and Baker (4) conducted greenhouse tests and field experiments with boron on Northern Idaho soils. Marked response from the use of boron on alfalfa is reported. Preliminary tests showed that fall applications of 40 to 60 pounds of borax per acre were satisfactory for the control of “yellow top” of alfalfa in soil cultures.