

Thesis Title Boron Requirement of Sunflower (Helianthus annuus L.)
Grown on Upland Soil in Chiang Mai Province

Author Mr.Prasart Lomlai

M.S. (Agriculture) Soil Science

Examining Committee :

Assist.Prof.Dr. Manas	Sanmaneechai	Chairman
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Abstract

Field trial was conducted to determine the boron requirement of sunflower grown on Korat soil series at Mae Hia Agricultural Research and Training Center, Faculty of Agriculture, Chiang Mai University during October 1989 to March 1990. Six rates of borax (0 to 3 kg/rai) were applied to two sunflower cultivars namely : Hysun 33 and Composite.

The cultivars differed in visual growth development. Generally, Composite had more progressive in growth than Hysun 33 about two weeks. The height, stem and head size of Composite were not uniform. The characteristics of wild type were also observed in Composite

cultivar. Hysun 33 produced on average seed yield of 371 kg/rai which was about 18 % higher than that of Composite. Both cultivars had similar oil and protein contents in the seed.

Boron content of Korat soil series with a range from 0.15 to 0.17 ppm was inadequate for sunflower. Boron deficiency was observed during the reproductive stage. Although the boron deficiency symptoms were not severe, the sunflower seed yield was affected. It was found that the critical boron concentrations of surface soil (0-15 cm) for both cultivars were different and being 0.30 and 0.48 ppm B for Hysun 33 and Composite, respectively.

Boron application markedly increased oil, seed yield and yield components of both cultivars. The responses of these cultivars to borax were different. The application of borax at the rates higher than 1.8 kg/rai significantly decreased the seed yield of Hysun 33 while the yield of Composite tended to increase with increasing rates of borax application up to 3 kg/rai. However, the optimum rate of borax applied as broadcast for both cultivars was about 1.8 kg/rai.

The boron concentrations in one-month old seedlings and the first to the fifth leaves at R₂ stage increased by increasing rates of applied borax. About 52 % of leaf boron content was increased when the 3 kg borax/rai was made. The result indicated that boron contents in the third leaves of both cultivars at R₂ stage were significantly correlated with seed yields. The critical boron concentration in such leaf were 46 to 47 ppm. In contrast, the critical boron in one-month old seedlings varied among the cultivars and stage of plant development.