

## Low boron in seed depresses soybean seed yield

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Previous studies with another legume, black gram (*Vigna mungo* L. Hepper) showed that seed with <6 mgB/kg dry matter (DM) had depressed germination % in the laboratory(1), and seed with <10 mgB/kg produced abnormal seedlings when planted in the field(2). In the present study at Chiangmai, Thailand on a low B soil (Typic Tropaqualf), we examined the effect of B levels in soybean seed and B levels in the soil on seedling establishment, crop growth and final seed yield.

### Methods

Four lots of soybean (*Glycine max* cv. Nakhon Sawan 1) seed with B concentrations of 10.5, 14.1, 15.9, and 20.5 mgB/kg DM were obtained from a B rates experiment. Seed was sown in 5 soil B treatments (B0, B1, B2, B3, B4) with hot water soluble B levels of 0.06, 0.11, 0.15, 0.23, and 0.67 mgB/kg soil, respectively, and grown to maturity when seed DM and yield determining components were measured. The experiment was laid out in a split plot design with soil B treatments in main plots, and seed B treatments in sub-plots.

### Results and discussion

Twenty days after sowing, 84% of seedlings from low B soybean seed were abnormal when sown at B0: of these about 1/3 remained severely stunted by day 52. Increasing either seed B to 20.5 mgB/kg, or soil B to B4 corrected stunting of plants, but only high seed B sown at B4 completely alleviated abnormal seedling development at 20 days after sowing (Table 1).

**Table 1. Effects of seed and soil B levels on early growth, and on seed dry matter and yield determining components of soybean at maturity. Values are means of four replicates.**

Soil B	B0		B4		LSD
Seed B (mg B/kg)	10.5	20.5	10.5	20.5	(p<.05)
% abnormal plants at 20 days	84	18	10	2	15
% Stunted plants at 52 days	24	2	0	0	10
Pod-bearing nodes per plant	4.1	5.2	6.2	6.7	0.8
Pods per plant	6.5	12.3	12.0	14.6	3.1
% Unfilled pods	24	10	3	3	6
Seed dry matter (kg/ha)	283	668	1380	1584	369

At maturity, seed DM was depressed by low seed B and low soil B by the combined effects of decreased number of normal plants, and in the normal plants, by decreased number of pod-bearing nodes, pods per plant, and percentage of unfilled pods (Table 1). The results show that low B levels in soybean seed can depress final seed yields when planted on soils with low levels of hot water soluble B.

1. Bell, R.N., McLay, L., Plaskett, D., Dell, B., and Loneragan, J.F. (1989). Aust. J. Agric. Res. 40: 273-279.

2. Rerkasem, B., Bell, R.W., and Loneragan, J. F. (1989). J. Plant Nutr. (submitted).