

Thesis Title Effects of Planting Date on Nitrogen
Fixation, Growth, and Yield of Soybean
[Glycine max (L.) Merrill.]

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Abstract

A study of the effect of planting date on nitrogen fixation, growth and yield of soybean (Glycine max L.) was carried out at the Multiple Cropping Center field station, Chiang Mai University. Two soybean varieties, SJ 5 and CM 60 were on November 25, December 15 and January 30. The xylem-solute technique was used to measure nitrogen fixation.

Results showed that there was an interaction effect of genotype and sowing date on above ground biomass, nodule dry weight and the amount of nitrogen fixed during V_6 to R_5 stages.

For example, at R_1 , SJ 5 showed more sensitive response to planting date than CM 60. The above ground biomass, nodule dry weight, total plant nitrogen, and amount of nitrogen fixed of SJ 5 were greater when it was planted on January 30 and November 25 than when it was planted on December 15. There was a significant difference in leaf area index of SJ 5 planted on January 30 and November 25, December 15. The leaf area index of SJ 5 planted on January 30 was greater than SJ 5 planted on November 15 and December 15. The SJ 5 planted on January 30 gave higher nodule weight than SJ 5 planted on December 15, however it had lower percentage of relative ureide index. The above ground biomass, total plant nitrogen, relative Ureide index and amount of nitrogen fixed of CM 60 showed no significant difference between planting dates. However, the nodule weight and leaf area index of CM 60 planted on were January 30 significantly greater than that was planted on November 25 and December 15.

Growth and development of both SJ 5 and CM 60 showed significant response to planting dates at early stages of growth. However, during the late growth stages (R_6 - R_7) there was no significant difference between planting dates of above ground biomass, total plant nitrogen and amount nitrogen fixed. SJ 5 averaged above ground biomass of $330-340 \text{ gm/m}^2$, where as CM 60 gave $300-380 \text{ gm/m}^2$. SJ 5 and CM 60 both fixed an average of 90 kg N/ha which is equivalent to 80 percent of total plant nitrogen.

There was clear interaction effect of planting dates and varieties on grain yield. CM 60 planted on November 25 gave highest grain yield (2,415 kg/ha), which was 34% greater than CM 60 planted on December 15. SJ 5 planted on November 25 and December 15 yielded about the same, at about 1,800 kg/ha. Grain yield of both varieties planted on January 30 was lowest (800-840 kg/ha).

These data indicated that, for the purpose of nitrogen management SJ 5 and CM 60 can be sown from November 25 to January 30. However, late sowing should be avoided since grain yield can be drastically reduced.