

Wipapan Chanapug 2011: Effects of Sowing Dates and Temperature on Physiological Characteristics and Growth of Elite Soybean Lines. Master of Science (Botany), Major Field: Botany, Department of Botany. Thesis Advisor: Associate Professor Lily Kaveeta, Ph.D. 115 pages.

The objective of this study was to determine for the effects of the environmental factors of the sowing date and temperature on growth, development and yield of elite soybean lines and to understand the physiological characteristics that are related with yield. Seven soybean elite lines from the Soybean and Mungbean Breeding Project of Kasetsart University *i.e.*, KUSL 3802-1, KUSL 3802-4, KUSL 3802-6, KUSL 20004, NS 1 4-6, NS 1 1-12 and ST 2 34-1 and 3 recommended varieties *i.e.*, ST 2, CM 60 and Chakkrabhandhu 1 were planted in randomized complete block (RCB) with 3 replications during the rainy season (July 2009) and the dry season (December 2009). The experiment were conducted at Kasetsart University Kamphaengsaen campus, Nakornphathom province. The results showed that there were differences in growth, physiological characteristics, yield and yield components among elite lines and sowing dates. Soybean planting in the late rainy season showed higher yield and yield components than in the dry season. The relationship between seed weight per plant to growth, physiological characteristics and yield component in the late rainy season and dry season were investigated. It was found that total dry weight per plant, leaf area index at R3, number of pods per plant and number of seeds per plant were positive correlated with seed yield in both sowing dates. Stepwise regression analysis showed that leaf area index at R3, numbers of seed per plant and 100 seed weight were yield determinants. Therefore, the physiological characteristics and yield components to be used as selection criteria to increase productivity. Among the elite lines, NS 1 4-6 and KUSL 3802-1 gave higher yield in both sowing dates than other lines. The effect of temperatures on physiological characteristics was also investigated under growth chamber conditions. The results showed that there were differences in physiological characteristics among elite lines. Under higher temperatures of 38/26⁰ C day/night result in increased malondialdehyde (MDA) content in leaf at V5 and R1; chlorophyll content at V5 and stomatal size at V5 and R1. Therefore, temperature is another factor influencing the physiological characteristics of soybean. Elite soybean lines exhibited tolerant to high temperatures were KUSL 3802-6, KUSL 20004, NS 1 1-12 and CM 60.

Student's signature

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