

Nyi Nyi 2012: Description of Growth Stages and Effect of Mineral and Organic Fertilizers on *Jatropha (Jathopha curcas L.)*. Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor: Mr. Weeraphan Sridokchan, Ph.D. 62 pages.

Jatropha is a deciduous plant and grown in tropical regions for producing biodiesel. The plant is newly cultivated and not much about the crop is known. This research was done with the objectives of (1) to describe the growth stages of *jatropha* and (2) to evaluate the effect of mineral fertilizers and pig manure foliar fertilizer on *jatropha* plants established by seedling and stem cutting, and (3) to determine relationships between chlorophyll meter reading, nitrogen content, photosynthetic pigments and chlorophyll fluorescence in leaves.

Phenological growth stages of *jatropha* plant can be described using BBCH scale; 7 principal growth stages comprise of 21 secondary growth stages.

Three-years old *jatropha* plants of Korat variety grown by seedlings and cuttings were applied by six fertilizer treatments viz. urea (N), N+triple super phosphate (N+TSP), N+muriate of potash (N+K), N+TSP+K, organic fertilizer of pig manure foliar fertilizer (PMF), and control (no fertilisation). Plants grown from seedlings were higher in height, canopy diameter, total number of branch (Tbr) and branch diameter (Dia) than grown from cuttings, except leaf greenness by SPAD reading. Plants treated with mineral fertilizers were higher in SPAD reading, height, canopy diameter, Tbr, and Dia than pig manure foliar fertilizer. Plants from cutting were higher in inflorescence bearing branches (Bbr), total number of fruits (Tfr), total number of seeds (Tsd), and seed weight (Swt) than seedlings. N:P ratio in mineral fertilizer treatments were higher than that of pig manure foliar fertilizer treatment. N treatment showed the highest yield of 109.68 g. There was no difference in kernel oil percentage, and seed cake N content.

There were good relationships between SPAD reading with total N concentration ($R^2=0.99$), as well as with content of chlorophyll *a* ($R^2=0.97$), chlorophyll *b* ($R^2=0.96$) and carotenoid ($R^2=0.75$). Maximum fluorescence variable (F_m) and maximum quantum efficiency (F_v/F_m) were linearly increased with SPAD value and became stable when the SPAD value was higher than 20 until 60. The sharp decrease in F_v/F_m when SPAD value was less than 20 refers to the critical point of photosynthesis efficiency in *jatropha* leaf.

Student's signature

Thesis Advisor's signature