

Karnrawee Sripongpakapun 2011: Growth and Biomass Production of Five Varieties/  
Lines of *Leucaena* (*Leucaena leucocephala* (Lam.) de Wit) after Three Years of  
Establishment for Sustainable Energy Application. Master of Science (Agronomy),  
Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Professor  
Sayan Tudsri, Ph.D. 115 pages.

From the energy situation in Thailand, it showed that the imported value of energy is increasing every year. The government has promoted the biological fuel for electricity production especially energy from plant production. The objectives of this study were to compare the wood productivity, chemical composition of wood, wood density, heat value, ash and plant regrowth after 1 year-cut in 3 years old of the 5 varieties/lines of *Leucaena leucocephala* (Lam.) de Wit (Tarramba, Peru, Cunningham, 5/7 and 4/14). A randomized complete block design was used with 5 replications. The spacing was done at 1x0.5 m. The experiment was conducted at the National Corn and Sorghum Research Center, Pakchong district, Nakhon Ratchasima province. The results showed that at 3 years old, the plant height and stem diameter (at 130 cm height level from the ground) of Tarramba were the highest (1,043 and 4.9 cm, respectively). While the lowest plant height and stem diameter (at 130 cm. height level from the ground) were of Cunningham (835 and 3.7 cm, respectively). For the wood production, Tarramba achieved the highest fresh wood productivity (22,981 kg/rai) whereas Cunningham gave the lowest (8,896 kg/rai). However, there were not statistically different in wood density, heat value and ash content among the tested varieties/lines. The chemical composition (oxygen, nitrogen, sulfur, ADF, NDF, lignin, cellulose and hemicellulose) in the stem were also not statistically different among the tested varieties/lines. There were statistically different in carbon and hydrogen content in the stem of all 5 varieties/lines. For plant regrowth, there were not statistically different in fresh wood weight and total biomass production of all 5 varieties/lines, but Tarramba exhibited the highest dry wood weight and total biomass production.

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Student's signature

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Thesis Advisor's signature