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Theme 2. Grassland production and utilization

Sub-theme 2.6. Interdependence of grassland and arable lands for sustainable cereal, forage and livestock production

Effect of plant spacing on yield and quality of *Leucaena leucocephala* subsp.**Wattanawan Srisomporn*, Kharuthai Jantipbadee, Ganda Nakamane, Sukanya Kampayae**

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*Corresponding author e-mail: nsno_nok@dld.go.th**Keywords:** *Leucaena leucocephala*, Plant spacing, Quality, Yield**Introduction**

Leucaena leucocephala (Lam.) de Wit commonly known as leucaena, is one of the most productive tree legumes available to tropical agriculture. *Leucaena leucocephala* subsp. *glabrata* 34/92 was introduced to Thailand from Oxford Forestry Institute in the year 1996 with another 16 lines and evaluated in Thailand. It was chosen as a potential psyllid resistance and high forage edible yield (Phaikaew *et al.*, 2005). Seed lot 34/92 is derived from K636 through selfing (Hughes, 1993). This report is a part of 'research and development of *Leucaena leucocephala* subsp. *glabrata* production as protein source in commercial feed project' which contain a set of experiment on management of *Leucaena* for forage production, seed production and pilot project on produce leaf meal and *Leucaena* seed by small holder farmers aim to commercialize leucaena leaf meal by smallholder farmers.

Materials and Methods

The experiment was located on fertile clays at Nakhonratchasima Animal Nutrition Research and Development Center, where long-term annual rainfall is 1,100 mm. The experiment was conducted from March 2011 to March 2014. The experimental design was randomized complete block design with 5 replications, treatment were 3 row spacing of *Leucaena leucocephala* 34/92 viz 0.5, 1.0 and 1.5 m. The plot size were 3m x 9 m. Seedlings of *Leucaena* were transplanted 1 month after seedling at different row spacing according to treatments and distance between plants within row were 0.25 m. Dry matter yield was measure. The first cut was done 6 months after planted and 8 weeks interval after the first cut at 50 cm. height. Legume biomass was separate into edible (stem diameter less than 5 mm.) and stem fractions. Harvested subsamples were oven dried at 65o C to constant weight for dry matter (DM) determination. Dried subsamples were ground to pass a 1 mm mesh screen and analyzed for crude protein (CP), ADF, NDF and ADL. The data for forage yield and quality were subjected to statistical analyze of variance. For significant treatment effects, means were separated by Duncan New's Multiple Range Test (Steel and Torrie, 1980)

Results and Discussion

Table 1 shows that the edible dry matter yield of leucaena at different row spacing were 9.3 and 9.6 t/ha/year. Dry matter in the second year were higher than in the first year because only 3 cut in the establishment year and 5 cut in the second year. The proportion of leaf and stem was 0.8 for all row spacing. Crude protein concentration of 0.5, 1.0 and 1.5 row spacing were not significantly different (24.8 24.6 and 24.6 %, respectively). The crude protein of all treatments was considerably higher than the 11% CP requirement of young ruminants. There were not significant effect of row spacing on edible yield and forage quality characteristics of edible fraction. Because edible fraction of the three treatments were the same character, from the same accession and edible fraction characteristic was the fraction of leave and small branch (diameter less than 5 mm). Lignin concentration were 8.2, 8.6 and 8.2 %, respectively. Lignin concentration from this experiment was low when compare to the other experiment may be due to spacing of inter row was narrow and cutting interval were 8 weeks which less than the other experiment.

Table 1: Dry matter production (t/ha/year) and forage quality characteristics (on DM basis) of edible fraction of leucaena at different row spacing.

row spacing (m)	Dry matter yield			Leaf: stem	CP %	NDF %	ADF %	ADL %
	Year 1	Year 2	Average 2 year					
0.5	7.4	11.1	9.3	0.8	24.8	33.9	22.6	8.2
1.0	7.5	11.7	9.6	0.8	24.8	30.4	21.8	8.6
1.5	7.0	11.6	9.3	0.8	24.6	31.5	21.4	8.2
significant	ns	ns	ns		ns	ns	ns	ns
cv., %	8.3	7.2	5.5		4.2	4.2	2.2	7.2

Conclusion

The experiment reported indicates that spacing between row of leucaena can be range from 0.5 – 1.5 m with 0.25 m inter row. From the report indicates that leucaena has the potential for producing moderately high yields of very high protein forage under intensive management.

References

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