

Flemingia as a Fodder and Soil Conservation Species in the Hillyland of Central Visayas

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ABSTRACT

The paper describes the significance of using leguminous shrub and tree species for soil erosion control and as source of forage. The study was conducted in the marginal area of Central Visayas, Philippines whereby 70% of the total land area is geographically characterized as rolling to hilly. There are ten species used and the performance varies from wet season to dry season. Species like *Desmodium gyroides*, *Calliandra calothyrsus* and *Sesbania grandiflora* showed poor recovery after transplanting, while *Cassia spectabilis* died after a series of cuttings during summer. Among the ten species *Flemingia congesta* turned out as the best alternative to *Leucaena leucocephala*.

INTRODUCTION

Traditional hilly land farming practices in the Central Visayas Region is described as soil depleting system whereby slash and burn is practiced causing severe erosion in sloping and hilly lands. This resulted to very low farm yield ranging from 0.9 to 1.3 tons of corn per hectare per cropping attributing to a continuous deficit in regional corn requirement.

Prior to the *Heteropsylla cubana*, psyllid, infestation, *Leucaena leucocephala* has been the predominant species used in the Visayas and Mindanao regions as contour hedgerow at the same time utilized as forage crop, source of fertilizer and fuel wood. However, there is also a need to find other alternatives to *Leucaena leucocephala* that would provide similar volume of forage and

could help sustain the farming activities of the majority of the marginal farmers particularly in the hillsides.

Tree and shrub species which are seemingly adopted, exhibited potential and are locally available hedgerows species in the Philippines particularly the Central Visayas Region are *Gliricidia sepium* (Madre de cacao) *Sesbania grandiflora* (Katuray, Gaway gaway) *Leucaena leucocephala* (Ipil-ipil) *Cassia spectabilis* (Robles) and *Acacia auriculiformis*. The above mentioned species were considered in the study while the rest were sourced out from the Southern Philippine regions to include *Leucaena leucocephala* (acid ipil-ipil), *Desmodium gyroides*, *Casia villosa*, *Calliandra calothyrsus* and *Flemingia congesta* (Flemingia)

Hence, this study was conducted to evaluate the best alternative to *Leucaena leucocephala* as contour hedgerow that will provide good herbage volume and comparable amount of nutrient.

Materials and Methods

Soil from five farms were analyzed to determine lime requirements.

Two month old seedlings of ten fodder tree species were transplanted in double rows (rows 0.5 m apart) replicated five times across farms following the Randomized Complete Block

Design (RCBD). Planting distance used was 50 cm x 30 cm (double row). The plants were first cut at 50 cm height when 50% of the population reached 1.5m height. Herbage yield was determined five times throughout the period of study. Complete proximate analysis of the leaf samples was conducted at the Regional Feed Laboratory, Cebu City.

RESULTS

Soil Analysis. Generally, all the farms were acidic with a mean pH of 4.72 (Table 1). The amount of organic matter ranged from 1.0 (2.0-10.0) to 4.0 with an average of 2.6. A wide range (2.0-10.0) of P available in the soil was observed. On the other hand, the amount of K was relatively high ranging from 34.0 to 114.0. Lime applications was established depending on the soil pH, amount of OM, P and K available in the soil. It ranged from 1.0 ton to 3.0 tons per hectare.

Herbage Yield. Table 2 shows the performance of the different species in terms of fresh herbage yield. Among the species, *F. congesta* gave the total yield (44.09 kg) per five linear meter while, *Sesbania grandiflora* gave the lowest (6.04 kg).

Table 1. Soil analysis of five farms and represents as a replication.

	FARM					MEAN
	1	2	3	4	5	
pH	4.4	5.5	4.0	4.6	5.1	4.72
OM	4.0	3.5	2.0	1.0	3.5	2.60
P	6.0	10.0	2.0	6.0	6.0	5.80
K	72.0	34.0	116.0	114.0	114.0	112.0
Lime Req.	3T/ha	1T/ha	3T/ha	1T/ha	1T/ha	2T/ha

Table 2. Total fresh herbage yield (kg.) per five linear meter in double rows for five consecutive cuttings.

SPECIES	Cutting					TOTAL	MEAN	RANK
	1	2	3	4	5			
<i>Flemigia congesta</i>	85.85	13.75	25.35	54.2	41.3	220.45	44.09	1a
<i>Acacia auriculiformis</i>	12.25	4.57	29.45	20.9	35.45	102.62	20.52	2b
<i>Gliricidia sepium</i>	12.91	21.15	10.25	35.1	19.55	98.96	19.79	3b
<i>Cassia spectabilis</i>	34	18.9	11.95	12.3	20.3	98.8	19.76	4b
<i>Leucaena diversifolia</i>	42.9	30.75	1.6	2.1	2.1	81.3	16.26	5b
<i>Leucaena Leucocephala</i>	7.4	27.3	4.75	1.4	1.4	51.8	10.36	6b
<i>Acacia villosa</i>	23.2	0	2.93	21.85	21.85	51.8	10.36	6b
<i>Calliandra calothyrsus</i>	12.55	14.6	4.9	9.45	9.45	41.65	8.33	7b
<i>Desmodium gyroides</i>	8.6	23.5	2.2	7.05	7.05	41.45	8.29	8b
<i>Sesbania grandiflora</i>	2.65	20.95	3.4	0	0	30.2	6.04	9b
Total	242.46	175.47	96.78	158.45	158.45	819.03		

Table 3. Proximate nutrient analysis of the ten species studied for forage.

Species	Crude Protein	Crude Fat	Crude Fiber	Moisture	Ash (%)
<i>Flemigia congesta</i>	16.6	3.0	27.4	4.0	5.4
<i>Acacia auriculiformis</i>	11.0	3.5	29.5	7.7	4.8
<i>Gliricidia sepium</i>	18.6	3.8	16.2	3.0	12.3
<i>Cassia spectabilis</i>	13.6	6.2	23.7	4.7	9.0
<i>Leucaena diversifolia</i>	19.7	3.2	15.7	9.3	7.5
<i>Leucaena leucocephala</i>	16.6	4.2	20.0	8.8	9.9
<i>Acacia villosa</i>	17.0	4.9	17.2	8.9	7.7
<i>Calliandra calothyrsus</i>	12.6	2.7	23.8	3.9	4.9
<i>Desmodium gyroides</i>	17.0	0	26.0	5.0	7.7
<i>Sesbania gradiflora</i>	20.0	3.7	18.2	3.2	9.9

Nutrient Content. *Sesbania grandiflora* exhibited the highest % protein (20.0%) followed by *L. diversifolia* (19.7%) and *G. sepium* (18.6%). In terms of % crude fiber *L. diversifolia* has the lowest (15.7%) followed by *G. sepium*. It is interesting to note that *Flemingia* has a very high crude fiber content. *G. sepium* gave the highest % ash (12.3%) while *A. auriculiformis* has the lowest (4.8%).

DISCUSSIONS

Result showed that among the ten species evaluated, *F. congesta* ranks first with the highest volume of biomass that serves as the best alternative to *L. leucocephala* (Ipil-ipil). It could provide more forage and comparable amount of nutrients particularly crude protein (Table 2 and 3). Even after the 2 year experimental period

the fodder crop/hedgerow showed good coppicing ability, with new vigorous stems emerging at the base of the plant making it more efficient material for soil erosion control. Furthermore, it was found that *F. congesta* has more primary and capillary roots compared to the rest of the species and they are not so big to disturb the tillage operation.

It was noticed that *F. congesta* showed very slow growth during the first three months but its later growth proves that the species is the highest provider of forage and is a good source of fertilizer/mulching material considering its high fiber content.

Integration of *F. congesta* in uncontrolled pasture may never yield positive result because stray animals like goat and sheep prefer *F. congesta* over the grasses effecting depletion of the said species. *Flemingia* is much preferred than grasses. In small hold livestock raisers, *F. congesta* are planted as fodder crop for cut and carry or zero grazing systems.

REFERENCES

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