

EVALUATION OF SOME FORAGE CROPS IN SMALLHOLDER OF VIETNAM

Nguyen Ngoc Ha¹, Dinh Huynh², Do Thi Ty¹ and Phan Thi Phan¹

INTRODUCTION

Rice production has always been the most important cropping activity in Vietnam. Up to now, livestock production has not yet become a main sector in the farming system. At the present time, however, the people's living standard is rising; requirement of people for fresh milk and beef is also increasing. But the growth rate of cattle herd is low. It may be due to the main fodder resource for ruminant animals being native forage and by-products which are relatively low in biomass and nutritive value. The other factor is the very small in proportion to arable land area available for pasture and fodder development.

The solution for the present situation is through planting intensive forage crops to give high yield and good quality fodder. Although planting forage crops for livestock production is not a traditional work for smallholders, in recent years, they have grown grasses and leguminous trees and used these forage and by-products as the basic feed with concentrates as supplements. The main perennial forages crops in use through out the country is Napier grass (*Pennisetum purpureum*), some farmers in Central and Southern Vietnam also use Guinea grass (*Panicum maximum*). Of the promising leguminous trees, Leucaena (*Leucaena leucocephala*) is the more common in some places.

This paper presents the result of evaluation on Napier/Hamil grass and Leucaena in smallholders as a present solution for livestock production.

MATERIALS AND METHODS

Two grass varieties and one cultivar of Leucaena were distributed for evaluation in several locations, in South and North Vietnam.

They species were Napier grass (*Pennisetum purpureum* cv. Taiwan), Hamil grass (*Panicum maximum* cv. Hamil) and Leucaena (*Leucaena leucocephala* cv. Cunningham). All of them were established and looked after by farmers. Napier grass was evaluated in Tuliem District - Hanoi City (lowland Northern Vietnam), Go Vap District - Ho Chi Minh City (low land Southern Vietnam), Ba Vi District - Ha Tay province (hilly land Northern Vietnam) and Long Thanh District - Dong Nai province (Hilly land Southern Vietnam). Both Napier grass and Hamil grass were planted in Go Vap and Long Thanh and watered well in dry season once for every two days. But in Northern Vietnam, Napier grass and Hamil grass were fertilised with 80 kg of P₂O₅; 80 kg of K₂O, 20 tons of farm yard manure per hectare, top dressing of 45 kg nitrogen was carried out two weeks after every cutting. The exception was Leucaena, which was only supplied with 80 kg P₂O₅ and 80 kg K₂O for 1 hectare

¹National Institute of Animal Husbandry, Chem, Thuy Phuong, Tu Liem, Hanoi, Vietnam

²Dept. Feedstuffs and Animal Nutrition, Institute of Agricultural Science South Vietnam, 121, Nguyen Binh Khien Street, Ho Chi Minh City, Vietnam

per year. After every harvest fodder samples were taken for analyses. The periods of rainy season and dry season are shown in the figure with date of the rainfall during the time of this evaluation 1990-1994.

RESULTS AND DISCUSSION

Napier and Hamil grasses

The climate is different from North to South Vietnam especially with regards to temperature. North Vietnam, temperature is always coming down below 20°C in winter/dry season, it is sometime 10°C or lower, while South Vietnam, including Ho Chi Minh City and around its mean temperature is often over 20°C (figure 1). That temperature is optimum for growth of Napier and Hamil grasses (Skerman and Riveros 1990). So Napier grass in Dong Nai Province or in Ho Chi Minh City gave the dry matter and crude protein yield two times higher than in Hanoi and Ha Tay Province, when it was watered in dry season (Table 1). Although Napier grass was irrigated in dry matter yield in rainy season, the dry matter yield in rainy season for one cut is always higher than that in dry season (Figure 1).

For Guinea grass, normally, everybody thought that it produces a biomass less than Napier. But in fact, in this evaluation Hamil grass gave the yield of dry matter and crude protein higher than Napier (Figure 1 and Table 2). Though both Napier- grass and Hamil grass gave got high matter as well as crude protein their yielding capacity is greater when nitrogen supply is increased (Middleton and McCosker, 1975).

Table 1. Dry matter (DM) and crude protein (CP) yields of Napier grass (*Pennisetum purpureum* cv. Taiwan) in smallholders

Items	Rainy season		Dry season		Total ton/ha
	(ton/ha)	(%)	(Ton/ha)	(%)	
Hanoi City (lowland)**					
DM	20.2	73.5	7.34	26.5	27.5
CP	2.02	74.8	0.68	25.2	2.70
Ho Chi Minh City (lowland)*					
DM	24.6	60.7	15.9	39.3	40.5
CP	2.46	62.0	1.51	38.0	3.97
Ha Tay Province (hill land)**					
DM	16.3	75.1	5.43	24.9	21.7
CP	1.54	75.9	0.49	24.1	2.03
Dong Nai Province (hill land)*					
DM	25.0	57.2	18.7	42.8	43.7
CP	2.78	58.6	1.96	41.4	4.74

* With and ** Without watering in dry season

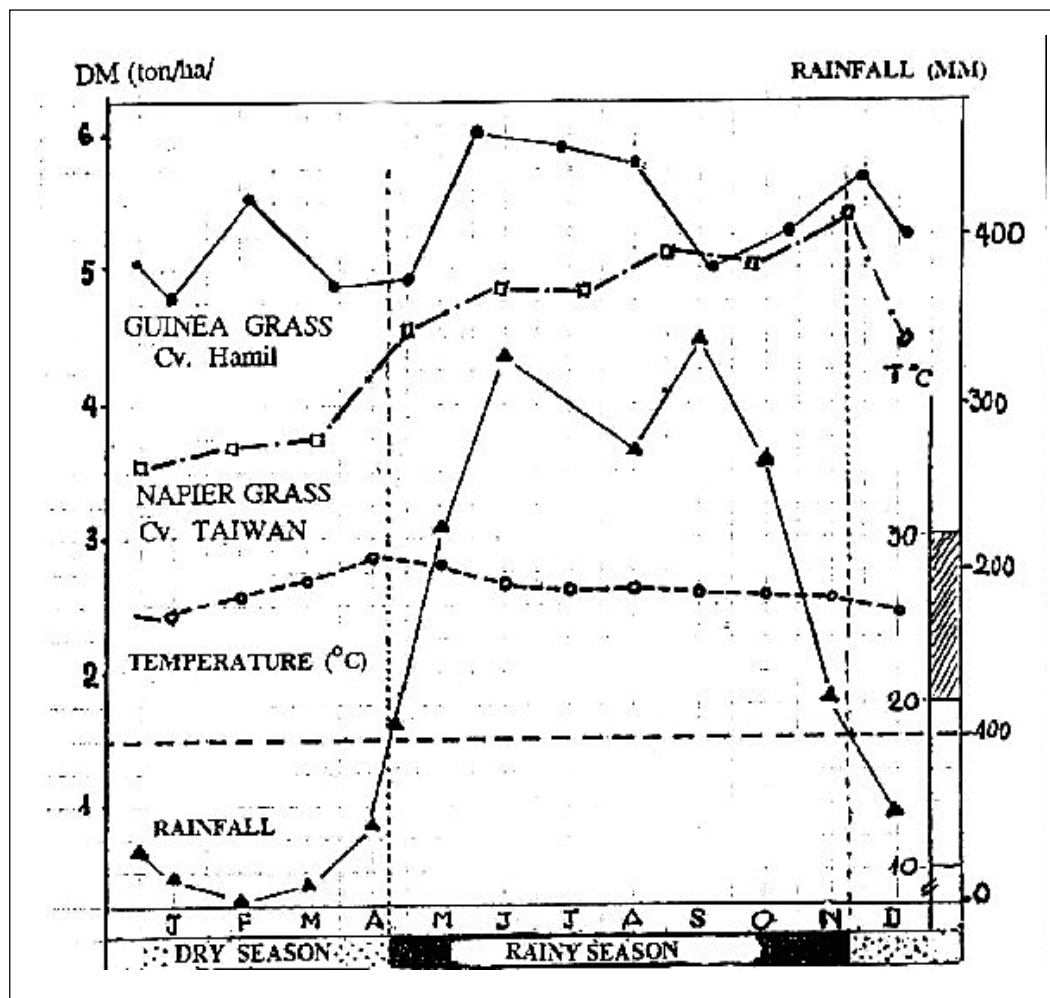


Figure 1. The yield of Napier grass (*Pennisetum purpureum*) and guinea grass (*Panicum maximum*) under the rain-fed condition in dry season to Go VAP district, Ho Chi Minh City

Table 2. Dry matter (DM) and crude protein (CP) yields of Napier grass (*Pennisetum purpureum* cv. Taiwan) in smallholders

Items	Rainy season		Dry season		Total ton/ha
	(ton/ha)	(%)	(Ton/ha)	(%)	
Ho Chi Minh City (lowland)*					
DM	31.6	59.2	21.8	40.8	53.4
CP	3.65	63.5	2.10	36.5	5.75
Dong Nai Province (low land)*					
DM	29.2	60.2	19.3	39.8	48.5
CP	2.98	60.1	1.98	39.9	4.97

* With watering in dry season

The chemical analyses of Napier grass and Hamil guinea are given in Table 3. These data showed that the contents of crude protein and crude fibre were normal and as it were in Thailand (Skerman and Riveros 1990).

Table 3. Composition of dry matter (CM), crude protein (CP) and crube fibre of Napier grass and Hamil grass in rainy season and dry season

Places	Rainy season			Dry season		
	DM(%)	CP(%)	CF(%)	DM(%)	CP(%)	CF(%)
Napier grass (<i>Pannisetum purpureum</i> Cv. Taiwan)						
HCM City (lowland)*	14.22	10.05	30.23	14.41	9.47	30.15
Ha Noi (lowland)**	16.10	10.00	29.70	17.45	9.49	30.88
Dong Nai Pro. (hill land)*	15.82	11.11	28.56	16.11	10.47	29.81
Ha Tay Pro. (hill land)*	17.21	9.45	31.14	17.55	9.05	31.52
Hamil guinea (<i>Panicum maximum</i> Cv. Hamil)						
HCM. City (lowland)*	17.11	11.19	30.26	17.46	10.01	33.79
Dong Nai Pro. (hill land)*	18.46	10.20	31.10	18.85	10.28	29.95

*With and ** Without watering in dry season

Leucaena (*Leucaena leucocephala* cv. Cunningham)

Leucaena is a popular leguminous tree in Vietnam with a variety of Hawaiian type. Recently, some varieties or accessions of Leucaena from CSIRO (Australia) have evaluated as the best Leucaena cultivar - That is cv.Cunningham (Ha et al. 1995). Up to now Leucaena-Cunningham has been used as fodder tree in smallholders for ruminant animals in some places, especially around Hanoi. The farmers sow Leucaena with thick density, about 130 thousands of young plants per hectare with five cutting times in a year,

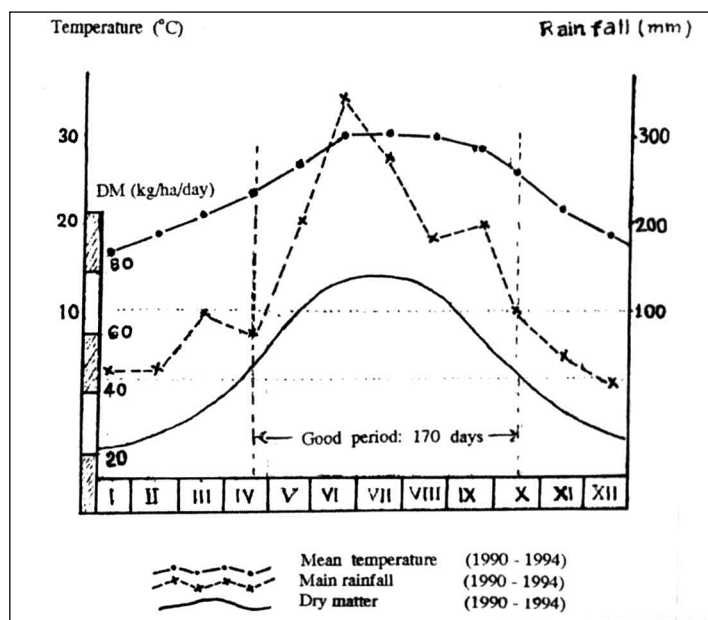


Figure 2. The good period for Leucaena in North Vietnam

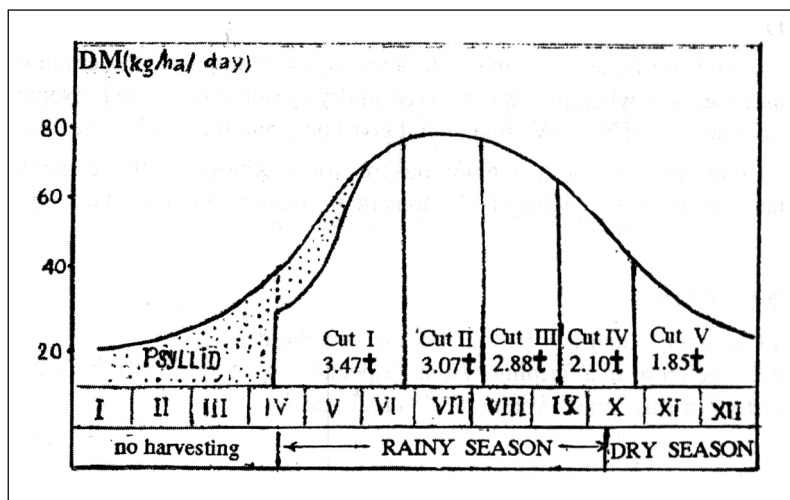


Figure 3. The dry matter yield of Leucaena - Cv. Cunningham (average of 5 years: 1990 - 1994)

The mean of dry matter yield for 5 years was of 13.3 ton/ha/year (Figure 2 and Figure 3) of which 1st cut: 3.47 ton, 2nd cut: 3.07 ton, 3rd cut: 2.88 ton, 4th cut: 2.10 ton and 5th cut: 1.85 ton/ha. During the period from January to May, Leucaena was not harvested, because the Psyllid always attacked Leucaena. Thus, Leucaena stopped growing. Partly, it was due to low temperature in the North Vietnam in winter (10°C). If Leucaena was not damaged by psyllid (*Heteropsylla cubana*), it could be estimated that the yield to be 17 ton/ha/year. This yield showed that Leucaena in North Vietnam was comparable to the yields of Leucaena in India and some other countries.

The most suitable period for the growth of Leucaena in north Vietnam will be from late April to middle of October. It is about 170 days (Figure 2) with the temperature about 23°C to 25°C and rainfall of 90 to 100mm/month. Hutton and Gray (1959) said that the optimum temperature for Leucaena is of 22°C to 30°C in the Australian tropics.

For the Leucaena quality, in Table 5 showed that Leucaena in North Vietnam was high in crude protein and low in crude fibre. Of which the fodder of Leucaena in dry season was better than in rainy season. It could be due to that in dry season Leucaena grows slowly, they have more leaves than in rainy season. But the dry matter yield and also crude protein were low (Table 5).

Table 5. Chemical composition of Leucaena in rainy season and dry season in lowland of Hanoi City

Items	Rainy season	Dry season	Whole year
Dry matter (%)*	21.20±1.51	26.49±2.23	22.78±0.96
Crude protein (%)	19.63±1.72	20.79±1.19	20.02±0.94
Crude fibre (%)	27.55±2.07	20.91±1.58	25.34 ±1.71
Ether extract (%)	4.79±0.37	5.59±0.42	5.00±0.45
Nitrogen Fee Extract (%)	39.9±3.64	45.2±3.87	41.7±3.92
Ash (%)	8.21±0.16	7.49±0.21	7.99±0.28

* fresh fodder

CONCLUSION

Napier grass and Hamil grass are suitable forage crops with intensive system in smallholders in South Vietnam, especially when they are watered in dry season on lowland. Napier grass is also high yield in smallholders of North Vietnam but it gives only half the yield of that in South Vietnam.

Leucaena - Cunningham is a good leguminous tree for smallholders. It withstands for long time in North Vietnam and gives the yields of 13.3 tons in dry matter with a good quality.

RECOMMENDATION

1. Studying some other fodder leguminous trees in smallholders.
2. Evaluation forage crops in a farming system, especially in winter in North Vietnam.
3. Seed production of Ruzi grass, Verano Stylo and Leucaena.

REFERENCE

- Ha, Nguyen Ngoc, Le Hoa Binh, Nguyen Thi Mui, Phan Thi Phan, Doan Thi Khang. 1995 Evaluation of forage in some ecological regions of Vietnam in selection of scientific works on Animal Production (1969-1995). Agr. Pub. House Hanoi, 1995, P. 315.
- Hutton, E.M and Gray, S.G.V. 1959: Problems in adapting *Leucaena glauca* as a forage for the Australian tropic. *Emp. J. Exp. Agric*, 27: 187-196
- Middleton, C.H and McCosker. T.H. 1975: *Matueni*, a New Guinea grass for North Queensland. *Queensland Agric. J.* 101: 315-355
- Skerman, P.J. and F. Riveros, 1990. *Tropical grasses*, FAO Rome, p. 26.