Impact of Forage Management on Yield and Nutritional Quality of Cultivated Forages in North-Eastern Cambodia

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Background

Challenge: Low productivity of cattle[1] and changes in agricultural land tenure and land use in Ratanakiri Province, Cambodia[2]

Potential solution: Cultivate productive and nutritious forages[3]

Objective

To compare the the **above-ground biomass** and the **nutrient concentration** of non-managed and managed (manured and weeded) farm-grown forages

Research Design

Fig. 1. Map of Northeast Cambodia with the target sites Au Toteng, Pruok, Chey Odom and Dei Lou.

Study site: Northeast Cambodia, Lumphat district in Ratanakiri Province

Field study period: June to September (rainy season) 2015

Study size: Each smallholding (n = 20) managed 0.01 ha (manured with on average 0.24 t N/ha/month and weeded monthly) and non-managed 0.01 ha forages, and was surveyed

Cattle husbandry: 5 – 30 cattle/smallholding; June to November no supplementary feeding, remaining months mainly rice straw

Forage species: *Stylosanthes guianensis, Panicum maximum*, *Brachiaria ruziziensis*, *B. ruziziensis* × *B. decumbens* × *B. brizantha* (*B.* hybrid), and *Paspalum atratum*

Proximate forage analyses: Crude protein and fibre concentrations (n = 41)

Fig. 2. Managed forages.

Fig. 3. Non-managed forages.

Results

Forage growth was mainly influenced by water shortages during the dry season and water logging during the rainy season

High **amount of labour** involved in managing and using the forages

Table 1. Above-ground biomass (t dry matter (DM)/ha/month) and chemical composition (g/kg DM) of forages.

		Treatment	
Forage species	Parameter	Non-managed	Managed
Paspalum atratum (n = 11)	Biomass	3.4 ± 1.7	3.6 ± 1.5
	Crude protein	63 ± 5	65 ± 8
	Neutral detergent fibre	661 ± 63	620 ± 42
	Acid detergent fibre	398 ± 39	400 ± 55
Brachiaria ruziziensis (n = 5)	Biomass	1.0 ± 0.8	1.1 ± 0.6
	Crude protein	68 ± 15	75 ± 26
	Neutral detergent fibre	677 ± 19	668 ± 16
	Acid detergent fibre	350 ± 36	357 ± 29
Stylosanthes guianensis (n = 11)	Biomass	1.4 ± 1.1	1.4 ± 1.0
	Crude protein	**117 ± 14**	**128 ± 8**
	Neutral detergent fibre	656 ± 38	625 ± 53
	Acid detergent fibre	417 ± 21	424 ± 69
Panicum maximum (n = 7)	Biomass	**2.8 ± 1.6**	**3.6 ± 1.5**
	Crude protein	81 ± 34	86 ± 25
	Neutral detergent fibre	656 ± 63	646 ± 53
	Acid detergent fibre	384 ± 34	388 ± 67
B. ruziziensis x B. decumbens x B. brizantha (n = 7)	Biomass	**1.9 ± 0.4**	**2.7 ± 1.3**
	Crude protein	**87 ± 17**	**98 ± 12**
	Neutral detergent fibre	627 ± 68	621 ± 43
	Acid detergent fibre	338 ± 67	356 ± 73

Within a row, arithmetic means ± standard deviations in bold are significantly different (mixed linear model, n = 41, Kenward-Roger's adjusted F-tests, $P < 0.05$).

Weeding and manuring of forages affected their yields more than their nutritional quality

Fig. 4. Managing forages.

Fig. 5. Determining biomass.

Conclusions

S. guianensis and *B.* hybrid provided **high-quality feed**

Weeding and manuring of forages did not increase their **nutrient content** sufficiently; smallholders rarely considered planted forages as worth their benefit

Outlook and Recommendations

Selecting adapted forage species to improve livestock productivity

Improving water-stress **tolerance** and water-use **efficiency** in forages, leguminous shrubs and trees in order to provide better productivity during often fluctuating water regimes

Reinforcing privately or communally owned fenced **pastures** or agricultural **cooperatives** to reduce workload

References

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