

IMPROVED PASTURES IN THE THAI HIGHLANDS

L. FALVEY* AND A. ANDREWS*

ABSTRACT

*Improved pastures in the highlands of north Thailand were studied under grazing for more than two years. Dry matter on offer decreased with time and the most productive legumes were *Desmodium intortum* initially and later, *Macrotyloma axillare*. Liveweight gains of cattle were higher than those recorded for cattle grazing native pastures. Sown grasses failed to persist and there was marked weed invasion. Some suggestions for future research are presented.*

INTRODUCTION

Cattle in the highlands of north Thailand graze largely on *Imperata cylindrica*, a fire-climax vegetation resulting from the activities of slash-and-burn cultivation. The low productivity of cattle grazing these pastures (16 kg liveweight gain per head per year) is probably due to low nutritive value at some times of the year and to limiting feed intake at other times (Falvey *et al.* 1979).

Replacing native pastures with improved pastures is one potential means of increasing cattle productivity and some suitable species have been determined by Gibson and Andrews (1978). The following study reports some preliminary information on pasture and animal production from improved pastures in the highlands.

METHODS

The study was conducted in Chiang Mai province, Thailand (19°N, 99°E) at an elevation of 1500 metres. The climate is tropical monsoonal modified by altitude with a mean annual rainfall of 1630 mm, of which ninety per cent falls within the six months period from May to October.

Two areas of pasture were established; one in June 1974 (paddock 1) based on *Desmodium intortum* cv. Greenleaf, *Stylosanthes guianensis* cv. Schofield, *Macrotyloma axillare* cv. Archer, and *Setaria anceps* cv. Nandi, and the other in June 1976 (paddock 2) based on *D. intortum*, *M. axillare*, *Trifolium repens* cv. Ladino, *S. anceps* and *Brachiaria decumbens* cv. Basilisk. Pasture seed was hand broadcast after burning of the native pasture. Gypsum (100 kg ha⁻¹) and either triple superphosphate (180 kg ha⁻¹) or rock phosphate (400 kg ha⁻¹) were applied at sowing. In July 1978, additional rock phosphate (200 kg ha⁻¹) and gypsum (50 kg ha⁻¹) were applied to the second pasture area. Pastures were slashed by hand one to two times per year to control weeds.

From November 1976 until August 1978 Brahman-cross heifers grazed the pastures alternately on a six to eight week rotation at a stocking rate of 1.04 beasts ha⁻¹ for an average of eight and a half hours each day. An equivalent group of heifers were released to graze native pasture for a similar period of time each day at an estimated stocking rate of 0.07 beasts ha⁻¹ in accordance with the traditional system.

Yield and botanical composition of the improved pasture were measured at the beginning and end of each grazing period by cutting ten, one square metre quadrats per pasture and separating into legumes, grass and weeds. Cattle were weighed every four weeks after overnight fasting.

* Department of Agriculture, University of Queensland, St. Lucia, Qld. 4067. Located at the Thai-Australian Highland Agricultural Project, Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand.

RESULTS AND DISCUSSION

Changes in the total presentation yield and yields of various components of both improved pasture areas are presented in Table 1. There was a general decrease in total yield over the period of study. In the second pasture the proportion of *D. intortum* remained fairly constant over the period of the study and the proportion of *M. axillare* increased during the second year, probably in response to its lower relative palatability (Gibson 1976). However the total legume content of the first pasture declined with time. *T. repens* failed to persist, despite excellent establishment, probably due to shading by taller species. *S. guianensis* also failed to persist and appears better suited to lower altitudes (Gibson and Andrews 1978).

Invasion by weeds (*Eupatorium adenophorum* and *Pteridium esculentum*) increased over the period of study. Invasion in the first pasture was worse than that in the second; this may be related to differences in age, fertilizer or management inputs. Slashing controlled *P. esculentum* but was less effective in controlling *E. adenophorum*.

Liveweight gains of cattle grazing the improved pasture exceeded those of cattle grazing native pasture (Table 2). Differences in liveweight change between groups were significant ($P < 0.05$) during the late dry season and the wet season of 1977 in favour of the cattle grazing improved pasture. No significant differences were recorded during the 1978 dry or wet seasons probably because heifers on this improved pasture had reached maximum weight and two calved during May 1978. Heifers grazing native pasture continued to grow during the wet season of 1978 but did not conceive during the period of study.

TABLE 2

Seasonal liveweight changes (kg head⁻¹) of cattle grazing improved or native pasture.

Pasture	Early dry season (9/12/76- 2/3/77)	Late dry season (2/3/77- 26/5/77)	Wet season (26/5/77- 10/11/77)	Dry season (10/11/77- 26/4/78)	Wet season (26/4/78- 31/8/78)
Improved	11.2	2.6	73.6	1.1	33.6
Native	9.6	-3.6	11.8	-6.6	22.7

The higher liveweight gains indicate the potential advantage of improved pastures over native highland pastures. Some of the species selected from plot studies persisted under grazing although the failure of the sown grasses and associated weed invasion point to the need for further investigations of pasture stability.

REFERENCES

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