Effect of animal manure on forage yield and quality of pangolagrass and soil fertility

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Keywords: *Digitaria decumbens,* manure, forage yield, quality

Introduction Animal wastes may cause environmental pollution. Lu & Hsu (2004) reported that N utilisation in the manure by pangolagrass was 10-28%. Objectives of this study were to determine the effect of animal manure on forage yield and quality of pangolagrass and soil fertility.

Materials and methods Pangolagrass pasture received 9 treatments (annual application per ha): CK: no fertiliser, CF_1: chemical fertiliser N : P_2O_5 : K_2O=200 : 72 : 75 kg, CF_2: twice of CF_1, CA_1: cattle manure with N 600 kg, CA_2: twice of CA_1, HO_1: hog manure with N 600 kg, HO_2: twice of HO_1, CH_1: chicken manure with N 600 kg, CH_2: twice of CH_1. Dry matter yield (DMY) was measured. The contents of crude protein (CP), Cu and Zn in plant and pH, electric conductivity (EC), organic matter content (OM), Cu and Zn in the soil were determined. The experiment was carried out from April 9, 1997 till October 16, 2001.

Results Pangolagrass applied with CH_1, CH_2 and CA_2 produced the highest DMY (Table 1). The highest CP contents were observed for HO_2, CA_2, CH_2 and CF_2. The treatments applied with more manure had higher CP contents. The Cu contents of pangolagrass applied with manure were higher than the other treatments. The Zn contents of pangolagrass were highest for HO_1, HO_2 and CA_1. The pH values, EC, the contents of OM, Cu and Zn in soil increased with manure application except Cu contents for CH_1 and CH_2. Both contents of Cu and Zn in the soil were highest in HO_2. Similar results were also observed with pangolagrass (Hsu *et al.,* 1999) and napiergrass (*Pennisetum purpureum*) (Hong *et al.,* 2000).

Table 1 Effect of manure on DMY and chemical compositions in plant and soil of pangolagrass pasture

Treatment	DMY	Plant				Soil			
		CP	Cu	Zn	pH	EC	OM	Cu	Zn
	Mg/ha	%	----------mg/kg------			dS/m	%	--------- mg/kg------	
CK	12.6^{e}	5.6^{f}	7.9^{e}	53.9^{bc}	4.99^{d}	0.077^{d}	2.26^{e}	2.05^{de}	8.7^{d}
CF_1	16.9^{cde}	6.6^{e}	8.8^{de}	59.7^{abc}	4.65^{e}	0.113^{bcd}	2.47^{de}	1.32^{efg}	7.6^{d}
CF_2	15.6^{de}	8.2^{abc}	9.4^{cd}	48.0^{c}	4.55^{e}	0.103^{cd}	2.54^{de}	0.97^{fg}	7.7^{d}
CA_1	19.4^{bcd}	7.4^{cde}	10.5^{abc}	64.5^{ab}	6.10^{b}	0.153^{bc}	3.42^{bc}	2.43^{cd}	23.0^{c}
CA_2	24.1^{ab}	8.5^{ab}	10.1^{abc}	54.3^{bc}	6.13^{b}	0.293^{a}	5.57^{a}	3.74^{ab}	47.4^{a}
HO_1	18.0^{cd}	7.6^{bcd}	10.8^{ab}	71.3^{a}	5.66^{c}	0.167^{b}	3.13^{cd}	3.22^{bc}	31.4^{b}
HO_2	21.3^{bc}	8.8^{a}	9.7^{bcd}	70.6^{a}	5.70^{c}	0.260^{a}	3.75^{bc}	4.48^{a}	49.2^{a}
CH_1	26.3^{a}	6.9^{de}	10.3^{abc}	48.0^{c}	7.49^{a}	0.257^{a}	3.42^{bc}	1.56^{def}	33.3^{b}
CH_2	24.1^{ab}	8.2^{abc}	11.3^{a}	57.4^{bc}	7.58^{a}	0.293^{a}	4.05^{b}	0.47^{g}	46.0^{a}

$^{a, b, c}$Means with the same letters in the same column are not significantly different at 5% level by multiple range test

Conclusion The results showed that forage yield and quality of pangolagrass increased with manure application. The manure could prevent soil acidification. The OM content in the soil increased and soil fertility improved after manure application. However, higher contents of Cu were observed in soil with pig manure applied and higher contents of Zn in soil with all types of animal manure.

References

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