

Residue effects of animal manures on forage production and soil fertility after receiving long term of manure application

Fu-Hsing Hsu*, KuoYuan Hong and ChiHsin Lu

Livestock Research Institute, Council of Agriculture, Hsinhua, Tainan, Taiwan. * E-mail: fhhsu@mail.tlri.gov.tw

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Introduction Application of animal manures in soil is important to improve soil fertility and maintain forage productivity. The objectives of this study were to determine the residue effects of animal manures on forage yield and quality of pangolagrass (*Digitaria decumbens* Stent.) and soil fertility after receiving long term of manure application.

Materials and methods An experimental field of pangolagrass receiving 7 years of cattle and hog manure application was used. Six fertilizer treatments were applied, i.e., no fertilizer, chemical fertilizer applied yearly with N : P₂O₅ : K₂O = 400 : 144 : 150 kg/ha, cattle or hog manure equivalent to N 400 kg/ha, and one half of N replaced by cattle or hog manure. The plots were applied with the same amount of chemical fertilizer after receiving 7 years of different fertilizer treatments. Dry matter yields, the chemical contents of plant and soil of pangolagrass were determined.

Results and discussion Dry matter yields, the uptakes of N, Cu, and Zn of pangolagrass were higher in the plots received cattle or hog manure. The plot receiving only hog manure had the highest uptakes of N and Zn. The pH values, the electric conductivity and the contents of organic matter in soil for the plots with manure were higher than those with chemical fertilizer and no fertilizer (Table 1). Hsu et al. (1999) indicated that manure increased in pH values in soil. This study also confirmed that the residue of manure application could prevent acidifying in soil. Hsu et al. (2005) reported that the mineral uptakes of plant increased with applying composts of animal wastes in pangolagrass pasture.

Table 1 Residue effects of animal manures on forage yield and soil fertility of pangolagrass after receiving long term of manure application.

Treatment	Dry matter yield	Mineral uptake of plant			Soil fertility		
		N	Cu	Zn	pH	Electric conductivity	Organic matter
	Mg/ha/year	kg/ha	-----g/ha-----			dS/m	%
No fertilizer (0)	20.7b*	49.7c	0.60d	4.02d	4.82cd	0.160b	1.25b
Chemical fertilizer (1)	22.9a	204.1b	0.75d	4.32d	4.75d	0.170b	1.17b
Cattle manure (1)	23.3a	215.5b	1.05c	6.09c	5.74a	0.265a	1.96a
Cattle manure (1/2) + Chemical fertilizer (1/2)	21.7a	214.9b	1.39ab	5.02cd	5.37b	0.263a	1.79a
Hog manure (1)	23.9a	300.9a	1.21bc	9.66a	5.09bc	0.230ab	1.40b
Hog manure (1/2) + Chemical fertilizer (1/2)	21.7a	218.8b	1.63a	7.91b	5.03b	0.258a	1.41b

* Means with the same letter in the same column are not significantly different at 5% level by MRT.

Conclusions The results showed that the residue effects of long term manure application could improve soil fertility and maintain forage productivity. It was helpful for the management of sustainable agriculture.

References

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