

**EFFECT OF LIQUID CATTLE MANURE APPLICATION ON THE BOTANICAL
COMPOSITION FORAGE DRY YIELD AND SOIL CHEMICAL
CHARACTERISTICS IN MIXED PASTURES**

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Abstract

Many farmers apply liquid cattle manure on grassland, often in excess of crop N requirement, resulting in groundwater contamination. Our experiment was carried out to determine the effect of liquid cattle manure application on the botanical composition, forage dry yield and soil chemical characteristics in mixed pastures at the forage experimental field, National Livestock Research Institute, RDA, Korea. Five treatments consisting of no fertilizer, chemical fertilizer (210kg N/ ha), liquid cattle manure (40, 60 and 80ton N/ ha) were arranged in a randomized complete block design with three replicates. No fertilizer treatment consistently had lower botanical composition rate of grass than the liquid cattle manure and the chemical fertilizer ones. The botanical composition rate of grasses and legumes differ when liquid cattle manure was applied and cut frequent(1, 2, 3 cut time) were compared, but time of 4 cut were no differences among all treatment. The dry matter yields of the mixed pasture were ranged between 9,765 and 9,860MT in liquid cattle manure, 10,110MT in chemical fertilizer, and 5,497MT without fertilizer. The content of available P₂O₅ in soil decreased with increasing application of liquid cattle manure. The results of this study indicate that liquid cattle manure can be effectively used to produce yields comparable

to those obtained with chemical fertilizer.

Keywords: Mixture pasture, liquid cattle manure, botanical composition, forage yield, soil characteristics

Introduction

Good management of manure on cattle farms prevents pollution of the environment, minimize the requirement for crop fertilizers and helps to maintain a good relationship between the farmer and his neighbours. Daliparthy and Herbert (1994) observed that application of liquid dairy manure at low rates (37 Mg ha/year) to alfalfa had no significant effect on forage yield and weed population. They concluded that dairy manure can be applied to alfalfa at 112kg N ha/year without detrimental effects. This research was conducted to evaluate the effect of liquid cattle manure application on the botanical composition, forage yield and soil chemical characteristics in mixed pastures.

Material and Methods

The experiment was conducted at the Grassland and Forage Crops Division, National Livestock Research Institute, RDA, Suwon, Korea in 1994, and the treatments were : no fertilizer, chemical fertilizer(210kg N) and liquid cattle manure 40, 60, 80ton N/ha.

The mixed pasture was sown with orchardgrass(12kg/ha), tall fescue(12kg/ha) red clover(6kg/ha) and alfalfa(3kg/ha), respectively. The botanical composition rate was accounted after every harvest and as well forage yield in harvest effected at 15 May (first cut), 26 June (second cut), and 8 August (third cut) and 9 October(fourth cut). Soil chemical characteristics were analyzed by AOAC with soil sampling after the final harvest.

Results and Discussion

Dry yield of forage and soil properties

As shown in the table 1, dry matter yield was not affected by cut frequency and level of liquid cattle manure applied. Total dry matter yields of the mixed pasture ranged from 5,497 kg/ha to 10,110 kg/ha according to treatments, which were orderly ranked as no fertilizer<liquid cattle manure<chemical fertilizer. The grasses used in this study demonstrated a good potential to increase dry matter yield with liquid cattle manure. The content of available P_2O_5 in soil decreased with increasing application of liquid cattle Manure (Table 2), the plots of 40 ton/ha it was higher than that of the plots of 80 ton/ha. The content of exchangeable cations in the soil was not remarkably variable during the experimental period.

References

Daliparthi, J. and S. J. Herbert (1994). Application of liquid daily manure on alfalfa : Effects on groundwater, forage yield, and weed population. Digest. **8**:7-9. Univ. of Mass. Coop. Ext.

Table 1 - Total forage dry matter yield as affected by the application of different fertilizer at a mixed pasture(kg/ha).

Treatment	First cut	Second cut	Third cut	Four cut	Total
NF+	1,782	871	1,648	1,196	5,497
CF++	2,994	1,723	2,651	2,742	10,110
40 ton	2,809	1,741	2,724	2,492	9,766
60 ton	2,845	1,799	2,637	2,484	9,765
80 ton	2,944	1,907	2,688	2,321	9,860
LSD(P>0.05)	840	892	705	644	2,062

NF+ : No fertilizer, CF++ : chemical fertilizer, 40ton+++ : liquid cattle manure

Table 2 - Chemical concentration of the Soil before and after the experiment.

Item	Treatment	PH (125)	OM (%)	Avail.. P ₂ O ₅ (ppm)	Exch. Cation(cmol+/kg)				CEC (cmol+/kg)
					Ca	K	Mg	Na	
Before Expt.	All plots	5.7	2.2	135	3.46	0.19	1.06	0.08	10.07
After Expt.	NF	5.8	2.1	75	3.59	0.08	1.10	0.10	9.49
	CF	5.7	1.9	76	3.27	0.21	0.95	0.04	8.65
	40 ton	5.3	2.4	223	2.31	0.34	0.70	0.09	9.81
	60	5.4	2.1	133	2.86	0.22	0.92	0.04	9.32
	80	5.4	2.4	123	2.29	0.29	0.77	0.04	9.33