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STUDIES ON THE ASSOCIATION OF PERENNIAL GRASS (NB-21) LEGUME (LUCERNE) MIXTURE I - GREEN MATTER YIELD IN RELATION TO SEASON

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A field experiment was carried out to study the efficacy of perennial grass-legume mixture under irrigated condition. The treatments comprised of pure lucerne[R_1], pure grass [R_2], grass + Lucerne 1:1 ratio [R_3] and grass + Lucerne 2:1 ratio [R_4] for a continuous period of 2 years. It was found that grass-legume mixture was found to be superior in yield than pure crop of grass. Seasonal variation in green yield was observed, in 1:1 and 2:1 ratios of grass legume mixture.

INTRODUCTION

The artificial association of grass-legume and cereal legume mixture is found to improve the yield and quality characteristics of the herbage without the use of expensive nitrogeneous fertilizers. Patel and Shukla (1973) reported that high milk production was noticed by feeding the animal with hybrid napier and lucerne. Teakle (1954) observed that by growing a single row of lucerne in between the rows of blue panic recorded higher dry matter with higher protein content.

MATERIALS AND METHODS

In order to study the efficiency of grass-legume mixture of different proportions, a field experiment was taken up at the Tamil Nadu Agricultural University farm, Coimbatore, for two years. The treatment consisted of pure crop of grass (NB-21), lucerne (Co.1) and grass-lucerne mixture with nitrogen and phosphorus levels. There were twenty treatment combinations as detailed below

R_1 Pure Lucerne
R_2 Pure grass
R_3 One row grass + one row lucerne (1:1)
R_4 Two row grass + one row lucerne (2:1)

R_3 and R_4 of crop pattern were given 9 fertilizer treatment combinations of N and P as below:

N_0 - 0 kg N/ha/cut
N_1 - 20 kg N/ha/cut
N_2 - 40 kg N/ha/cut
P_0 - 0 kg P_2O_5 /ha/year
P_1 - 50 kg P_2O_5 /ha/year
P_2 - 100 kg P_2O_5 /ha/year
$R_1 + R_2 + R_3$ (9 fertilizer treatments) + R_4 (9 fertilizer teartments).

Pure crop of lucerne (R_1) received one single basal application of 20, 100, and 40 kg/ha of N, P and K and pure crop of grass (R_2) received

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40, 50 and 40 kg/ha of N, P and K followed by 40 kg N/ha top dressing after each harvest. Randomised block design was adopted with three replications. The spacing adopted for grass R_1 was 60 cm between rows and 40 cm within rows. Lucerne was sown as intercrop in 1:1 and 2:1 ratio in between grass rows as solid rows. For grass the seed rate adopted was 40,000 slips/ha.

RESULTS AND DISCUSSIONS

The data on the green fodder yield of grass-lucerne mixture along with pure stand of lucerne and grass at different months for the two years are presented in the Table.

Table: Season and monthly green matter yield of grass-legume mixture (t/ha/cut)

Season	Month	R_1	R_2	R_3	R_4	S.Ed/C.D.
First year						
1. Dry weather	Dec. '76	8.87	10.80	13.37	13.21	07.8/1.59
	Jan. '77	12.14	13.58	21.68	20.55	1.04/2.12
	Feb. '77	10.61	15.84	22.83	21.63	0.97/1.83
2. Hot weather	Mar. '77	13.31	24.27	24.98	24.95	1.16/2.35
	Apr. '77	11.51	26.85	26.65	25.95	0.82/1.62
	May. '77	9.36	22.39	28.25	26.41	2.53/5.12
3. South West Monsoon	Jun. '77	10.74	20.52	20.98	21.76	1.02/2.19
	Jul. '77	11.00	26.28	24.96	25.43	0.64/1.35
	Aug. '77	12.24	23.42	26.97	28.84	1.36/2.74
	Sep. '77	11.80	25.49	28.80	29.77	2.83/5.80
4. North East Monsoon	Oct. '77	9.36	24.38	26.38	26.40	1.04/2.16
	Nov. '77	10.90	21.08	26.51	25.26	1.08/2.18
	Dec. '77	10.12	16.39	19.96	19.43	0.89/1.83
Second year						
1. Dry weather	Jan. '78	8.43	15.43	15.53	17.88	0.98/2.03
	Feb. '78	9.56	22.94	24.08	22.83	2.25/4.56
2. Hot weather	Mar. '78	6.25	17.82	15.67	16.06	0.70/1.45
	Apr. '78	5.45	15.86	16.64	16.85	0.74/1.48
	May. '78	4.42	12.54	13.88	14.76	0.92/1.91

In the case of pure stand of lucerne maximum green, yield of 13.31 t ha/cut was recorded in March, 1977 followed by August, '77 (12.24 t/ha/cut) and January '77 (12.14 t/ha/cut). In the second year, it was highest in November '77 (10 90 t/ha/cut) followed by December '77 (10.12 t/ha/cut) and October '77 (9 36 t/ha/cut).

However in mixed stand R_3 (1:1) maximum production of 28.80 t/ha/cut was recorded in September '77 followed by May '77 (28.25 t/ha/cut). In the second year November '77 recorded maximum yield of 26.51 t/ha/cut. In general, the yield variation between monthly cuttings was marginal in the first year compared to second year.

In R_2 (2:1 ratio) also similar trend was noticed. The variation in yield in different treatments in general can be accounted to the weather conditions prevailed during the growth period of the grass and legume.

SEASON AND TOTAL GREEN MATTER YIELD

In first year the growth of the grass-legume mixture dominates compared to pure grass. During April, May and June, because of higher rainfall, higher green fodder yield was recorded and further increase was noticed in August 77' and September '77 cuttings. The increase in yield was attributed mainly to the seasonal effect in the grass-legume mixture. The trend increased upto November '77 and the decline in the second year. The effects of grass-legume association differed by season and by year also. Greater compatability of grass-legume association was inferred in first year compared to second year. This may be attributed to the longivity of both the species.

In the present study, the minimum temperature did not fall below the normal critical level for growth The range was 16°C to 35°C which is not limiting one. Gist and Motto (1957) reported that the interaction of light intensity with soil moisture and temperature were important in deferring the growth of grass. Blackman and Black [1959] reported that physiological and ecological aspect and plant environment with special reference to light factor limited the growth in mixture. The present study shows that climatic parameters plays major role in increasing the yield of grass-legume mixtures. The longivity also a factor which affects the yield of perennial crops.

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