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Effect of Nitrogen and Phosphorus on Growth and Yield of Forage Sorghum in Clayey Soil

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A field experiment was conducted on clayey soil of College Farm, Gujarat Agricultural University, Navsari campus, Navsari during *rabi* season of 1986 to study the effect of nitrogen and phosphorus on growth and yield of forage soughum. Sixteen treatments comprising of four levels of each nitrogen (0, 40, 80 and 120 kg N/ha) and phosphorus (0, 20, 40 and 60 kg P_2O_5/ha) were tried in a factorial randomized block design with four replications. Urea and single superphosphate were used as the source of nitrogen and phosphorus. The variety Sundhia Jowar (S-1049) was selected for the experiment. The soil was clayey in texture having pH 7.8. It had 0.72% organic carbon, 0.063% total nitrogen, 30 kg/ha available phosphorus and 356 kg/ha available potash. The crop was sown on October 10, 1986 and harvested on Decemebr 10, 1986.

Nitrogen fertili tion significantly increased the plant height, girth, leaf area, leafiness percentage, fresh plant weight, dry

TABLE 1

Effect of nitrogen and phosphorus on growth and yield of forage sorghum.

Treatments	*Plant height (cm)*	*Girth (cm)*	*Leaf area (cm2)*	*Leafiness percentage*	*Fresh weight per plant (gm)*	*Dry weight per plant (gm)*	*Yield (q/ha)*	
							Green forage	*Dry matter*
Nitrogen (kg/ha)								
0	123.73	1.50	343	30.09	18.71	7.45	125.66	49.60
40	149.68	2.19	448	32.60	34.93	13.46	163.88	57.52
80	161.00	2.38	567	35.85	43.88	17.80	193.15	77.82
120	167.71	2.64	595	35.96	47.56	18.25	200.64	80.20
CD at 5%	2.56	0.04	36	0.78	5.05	0.55	12.70	4.70
Phosphorus (kg/ha)								
0	151.60	2.15	485	33.67	34.78	12.82	167.25	66.33
20	152.76	2.17	489	33.62	35.03	13.63	169.70	64.47
40	150.50	2.12	479	33.55	36.25	14.25	169.11	65.35
60	153.23	2.18	474	33.75	36.87	13.96	176.74	69.05
CD at 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

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plant weight and eventually the green forage and dry matter yield per hactare (Table 1). The magnitude of increase over control was 30.42, 53.71 and 59.67 per cent in terms of green forage yield and 15.97, 56.90 and 61.69 per cent in terms of dry matter yield under 40, 80 and 120 kg N/ha, respectively. Fodder yield both in terms of green forage and dry matter is mainly due to increased plant height, girth and follage. These findings are in agreement with those of Gill *et al.*, (1972) and Vijaykumar (1974). Among the yield attributing characters, height and girth appeared to be more closely related to the fodder yield which showed the linear response upto 120 kg N/ha. Whereas, leaf area and leafiness percentage showed a quadratic response but it was only upto 80 kg N/ha. Higher growth and yield with nitrogen fertilization can be attributed to rapid expansion of dark green foliage which could intercept and utilize the incident light in the production of photosyntheses and eventually resulted in higher meristemmatic activity and increased growth of plant (Singh and Gill 1976).

Different levels of phosphorus did not influence green forage yield and dry matter production which may be ascribed to sufficient quantity of available phophorus in soil. Similar results were obtained by Singh and Gill (1976) on soil rated as medium to high in phosphorus. The interaction between nitrogen and phosphorus in all characters found non-significant. From the above discussion, it can be concluded that sorghum as forage in clayey soil of South Gujarat responds to nitrogen but not to phosphorus. Therefore, growing sorghum with 80 kg N/ha proved better for achieving higher forage yield.

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