Indian Journal of Agricultural Sciences 69 (1) : 8–9, January 1999

Effect of different organic manures and nitrogen levels on growth and yield of sunflower (*Helianthus annuus*)

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Received: 4 November 1997

ABSTRACT

A field experiment was conducted at Udaipur during winter season (*rabi*) of 1993–94 to study the effect of different organic manures and nitrogen levels on growth and yield of sunflower (*Helianthus annuus* L.). Results indicated that gobar gas slurry applied @ 1.66 tonnes/ha gave significantly higher seed yield (53.60%) over no manuring. Nitrogen application @ 80 kg/ha resulted in significantly higher seed yield by 49.75% over the control.

Key words : manures, nitrogen, growth, sunflower, *Helianthus annuus*

Sunflower (*Helianthus annuus* L.) is a newly introduced oilseed crop in Rajasthan and it holds great promise because of its short duration, high oil content, photo-insensitiveness, drought tolerance and wide adaptability. To attain the high level of production, growing of sunflower can be good preposition in Rajasthan, since sunflower is grown for oil and protein. Hence, a study was conducted to investigate the effect of different organic manures and nitrogen levels on growth and yield of sunflower.

MATERIALS AND METHODS

A field experiment was conducted during winter season (*rabi*) of 1993–94 at agronomy farm of the College at Udaipur. The experiment was laid out in factorial randomized block design with 3 replication and 16 treatment combinat-ions of organic manures (control, farmyard manure @ 5.0 tonnes/ha, gobar gas slurry @ 1.66 tonnes/ha and celrich @ 2.5 tonnes/ha) and 4 nitrogen levels (0, 40, 80 and 120 kg N/ha). The soil was clay loam in texture, medium in available nitrogen (278.34 kg/ha) and available phosphorus (16.75 kg/ha), rich in available potassium (386.10 kg/ha) with alkaline soil reaction (pH 8.10). Nitrogen was applied as per treatment in 2 splits through urea at sowing and remaining at first irrigation. Morden sunflower was sown in rows 45 cm apart at 2–3 cm depth.In all, 4 irrigations were applied. Celrich is a synthetic organic manure manufactured by Excel Industries Ltd., Mumbai contains 17% organic carbon, 1.1% N, 1.2% P and 1.0% K.

RESULTS AND DISCUSSION

Effect of organic manures

The crop under the influence of organic manures supplied through gobar gas slurry and farmyard manure produced significantly higher seed yield by 53.60 and 30.80% over no manuring. Among the sources, gobar gas slurry produced significantly higher seed yield over all the other sources. The positive response of seed yield to organic manures could be ascribed to improvement in growth and yield attributing characters. Further, superiority of gobar gas slurry in increasing the yield over farmyard manure and celrich on equal nitrogen basis seems to be on account of higher nutrient contents and better physical conditions of slurry when dried it can be finely divided and more easily incorporated with the soil particles than conventional farmyard manure. The composition of digested slurry used contains reduced quantity of carbon compounds which hasten the process of nutrient release by way of increase in rate of mineralization resulting into higher availability of nitrogen. This is in complete agreement with the work of Laura and Idnani (1972) and Udayasoorian *et al.* (1991).

Effect of nitrogen

Sunflower crop fertilized with 80 kg N/ha produced significantly higher seed yield to the extent of 49.75% over control yield of 1.40 tonnes/ha. Increase in N level from 80 to 120 kg N/ha did not prove significant superiority. The significant increase in seed yield due to nitrogen seems to be due to improvement in reproductive (head diameter, number of seeds/head and seed weight/head) and vegetative growth of the crop as a result of improved source and sink relationship. These results are in close agreement with the findings of Vivek and Chakor (1992).

Interaction effect of organic manures and nitrogen on seed yield was found non significant. It may be concluded that application of gobar gas slurry @ 1.66 tonnes/ha and 80 kg N/ha results in realization of significantly higher seed

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Table 1 Effect of organic manures and nitrogen levels on growth, yield attributes and yield of sunflower

Treatment	Plant height (cm)	LAI at 60 DAS	Diameter of head (cm)	Filled seeds/ head	Seed weight/ head	1 000-seed weight (g)	Seed yield (tonnes/ha)
Organic manure							
Control	100.7	1.90	11.4	545.4	21.1	44.1	1.50
FYM (5 tonnes/ha)	112.1	1.90	14.6	602.1	29.3	46.6	1.96
GG Slurry (1.66 tonnes/ha)	121.0	2.27	15.9	637.2	31.1	48.1	2.30
Celrich (2.5 tonnes/ha)	109.5	1.95	13.0	588.6	27.9	45.3	1.75
SEm ±	3.83	0.071	0.50	18.60	1.11	0.63	0.104
CD ($P = 0.05$)	11.07	0.206	1.45	53.72	3.22	1.83	0.302
Nitrogen (kg/ha)							
0	98.3	1.84	10.5	457.6	22.4	39.8	1.40
40	103.1	1.92	12.2	555.5	25.5	43.1	1.74
80	115.3	2.08	15.1	642.4	27.4	46.8	2.10
120	126.6	2.17	17.1	717.9	34.0	54.5	2.27
SEm ±	*3.83*	*0.071*	*0.50*	*18.60*	*1.11*	*0.63*	*0.104*
CD ($P = 0.05$)	11.07	0.206	1.45	53.72	3.22	1.83	0.302

LAI, Leaf area index; DAS, days after sowing

yield of sunflower by 53.60 and 49.75% over their respective control.

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