

GROWTH AND YIELD PERFORMANCE OF SAFFLOWER UNDER DIFFERENT NITROGEN LEVELS IN SEMI-ARID TROPICS

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Safflower (*Carthamus tinctorius* L.), an annual oilseed can be grown in drought prone tract of West Bengal during rabi season after the harvest of kharif crop (s). Application of nitrogen increases the seed yield and improves all growth and yield attributes (Singh and Singh 1984; Ahmed et al. 1985). Information on the response of safflower to nitrogen in lateritic tract under semi-arid-climates is rather limited. Hence, a study was conducted with three elite safflower cultivars to find out suitable nitrogen responsive cultivar for irrigated conditions in semi-arid tropics of West Bengal.

Field experiment was conducted at the Regional Research Farm of Bidhan Chandra Krishi Viswavidyalaya located at Jhargram in laterite soil with three cultivars (A 300, 116-4-5 and 340092) and four levels of nitrogen (0, 40, 80 and 120 kg N/ha) in a Randomised block design with three replications during rabi 1983-84 and 1984-85. The soil of the experimental area was sandy loam in texture, with pH 5.6, organic carbon 0.32%, total N 65 kg available P₂O₅ 31 kg/ha and exchangeable K₂O 110 kg/ha. Infiltration rate, bulk density and moisture holding capacity were 120 cm/hr, 1.56 g/cc and 17.3 cm upto 90 cm soil depth, respectively.

The crop was sown on 29 and 19 October in respective years after harvest of rice. Seed rate was 20 kg/ha with a spacing 50 cm in between rows and 20 cm in between plants. The crop received three irrigations each of 75 mm depth applied at branching, flowering and seed development stages occurring at 40, 100 and 130 days after sowing. Seasonal rainfall during crop growing period was 30.6 and 10.0 mm in the respective years.

Out of three cultivars 'A 300' produced highest seed yield and crop residue with significant response to N-application upto 120 kg/ha during both the years. Harvest index differed significantly between the cultivars and cultivar A 300 gave highest values during both the years. At lower levels of applied nitrogen (40 and 80 kg N/ha), the harvest index did not increase compared to control (Table 1). This might be due to the

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Table 1. Effect of cultivars and nitrogen levels on seed yield, stalk yield and harvest index of safflower

Treatment	Seed yield (kg/ha)			Stalk yield (kg/ha)			Harvest index (%)		
	1983-84	1984-85	Pooled	1983-84	1984-85	Pooled	1983-84	1984-85	Pooled
	Cultivars								
'A 300'	1312	1488	1401	4208	4597	4403	23.4	24.3	23.9
'116-4-5'	793	1044	918	3084	3480	3282	20.6	23.2	21.9
'340092'	283	354	319	2185	2465	2325	11.4	12.5	12.0
CD (0.05)	11.3	27.9	21.2	79.4	63.2	68.0	0.79	0.50	0.62
N-levels (kg/ha)									
0	492	603	548	1981	2217	2099	18.5	19.8	19.2
40	527	774	681	2457	2790	2624	18.0	20.2	19.1
80	892	1044	970	3707	4099	3903	17.6	19.1	18.4
120	1212	1424	1319	4491	4948	4720	19.7	20.9	20.3
CD (0.05)	13.0	32.2	24.4	91.7	73.0	78.5	0.91	0.58	0.72

Table 2. Interaction between cultivars and nitrogen levels for seed yield (kg/ha) of safflower

Cultivars	1983-84			1984-85			Pooled					
	N-levels (kg/ha)			N-levels (kg/ha)			N-levels (kg/ha)					
	0	40	120	0	40	120	0	40	120			
'A 300'	767	947	1556	1978	975	1228	1633	2117	831	1088	1595	2048
'116-4-5'	532	606	831	1201	638	812	1101	1624	585	709	866	1413
'340092'	178	208	289	458	197	281	408	531	188	245	349	495
CD (0.05)			22.5			39.5						42.2

fact that N-application at low doses increased the vegetative growth but did not influence the seed production to a great extent. However, the result showed that the harvest index was influenced more by the cultivars than by application of nitrogen. Interaction between cultivars and N-levels revealed that all the three cultivars gave similar response to nitrogen with significant increase in seed yield under increasing N-levels upto 120 kg/ha. At all levels of nitrogen, 'CV A 300' gave highest seed yield and the maximum seed yield of 20.48 q/ha was obtained with 120 kg N/ha (Table 2).

Increasing nitrogen levels increased the plant height as well as primary and secondary branches significantly in all the three cultivars. Amongst the cultivar 'CV 340092' was tallest (78.7 cm) and at par with 'CV 116-4-5'. The effect of lower levels of N-application (0 to 40 kg/ha) was pronounced to increase the plant height. 'CV A 300' appeared to be short and bushy as compared to others and produced maximum numbers of primary and secondary branches. Veeranna (1977) working with different cultivars of safflower reported that secondary branches were primarily responsible to give rise in seed yield of safflower. 'CV A 300' produced maximum effective flower heads and seeds/flower head but gave lowest 100-seed weight as compared to other cultivars during both the years of experimentation. All these yield attributes increased significantly with increased levels of N-application and maximum number of flower heads, seeds and 100-seed weight were obtained with 120 kg N/ha during both the years. Similar responses of N-application on growth and yield attributes have also been reported by Ashri et al. (1974) and Rao et al. (1977)

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