

Response of upland cotton (*Gossypium hirsutum*) hybrids to varying levels of nitrogen with and without neemcake under irrigated condition of Malwa tract of Madhya Pradesh

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An information on hybrid upland cotton (*Gossypium hirsutum* L.) to balanced fertilizer is meagre. Therefore an attempt was made to determine the agronomic requirement of cotton hybrids for nitrogen and neemcake (organic matter) under irrigated conditions of Malwa tract of Madhya Pradesh.

A field experiment was conducted under All-India Co-ordinated Cotton Improvement Project, College of Agriculture, Indore, during the rainy season of 1988 and 1989. The experiment was laid out in split-plot design, keeping levels of nitrogen (100, 150 and 200 kg/ha with and without neemcake) in main plots and hybrids ('JHKy 1', 'JKHy 2' 'JICH 4' and 'Hy 4') in subplots. The treatments (Table 1) were replicated 3 times. The soil of experiment was medium black having organic carbon 0.32%, available N 150 kg/ha, P 237 kg/ha and K 450 kg/ha, with pH 7.9. A uniform dose of 70 kg P₂O₅ and 40 kg K₂O/ha in the form of superphosphate and muriate of potash respectively was applied. The application of neemcake @ 4 q/ha was done at the time of sowing along with 15% N and 50% of both P and K. The remaining quantity of P and K was applied at 30 days

after sowing. The rest of nitrogen (85%) was given in subsequent 4 splits. Sowing was done by dibbling method using acid delinted 3–4 seeds/hill on 4 July 1988 and 7 July 1989. The rainfall of 689 and 1,043 mm was recorded during 1988 and 1989 respectively.

The yield level in the first year was higher than that in second year due to better distribution of rainfall in former than that in latter.

Application of neemcake alone or in combination with different levels of N did not produce any significant effect on cotton yield (Table 1). Each successive increase in level of N greatly increased the seed-cotton yield. All the yield components were also improved. Though yield enhanced with subsequent increase in N level, the differences were significant up to 150 and 100 kg N/ha during 1988 and 1989 respectively. At these levels the magnitude of increase in yield over the unfertilized plots was 93 and 102% respectively. Similar observations were reported by Jain *et al.* (1983). The economic analysis (Table 2) indicated that maximum net profit per rupee investment was higher at 100 kg N/ha whether applied alone or in combination with neemcake.

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Table 1. Yield and yield-attributing characters of cotton as influenced by fertilizer treatments

Treatment	Plant height (cm)*	Bolls/ plant		Boll weight (g)		Yield/plant (g)		Seed-cotton yield (kg/ha)	
		A	B	A	B	A	B	A	B
<i>Fertilizer</i>									
Control	55.15	11.65	8.50	3.10	2.53	35.00	22.03	664	447
Neemcake @ 4 q/ha (NC)	55.42	12.41	9.98	3.13	2.54	38.50	24.05	665	496
100 kg N/ha	69.82	14.66	12.22	3.26	2.78	48.33	34.16	1,003	903
150 kg N/ha	73.45	19.95	14.04	3.51	2.93	70.33	40.46	1,284	989
200 kg N/ha	73.98	17.21	15.65	3.26	2.98	63.91	40.75	1,312	1,092
100 kg N/ha + NC @ 0.4 tonne/ha	68.17	14.50	14.98	2.94	2.77	39.33	35.23	1,071	969
150 kg N/ha + NC @ 0.4 tonne/ha	75.15	15.70	15.75	3.06	3.02	57.25	42.96	1,162	1,075
200 kg N/ha + NC @ 0.4 tonne/ha	77.63	17.41	17.17	3.01	2.97	52.50	47.86	1,486	1,171
CD (P = 0.05)	4.040	4.804	2.836		0.507	13.94	9.351	220	285
<i>Hybrid</i>									
'JKHy 1'	72.43	18.70	15.15	3.32	3.33	63.95	46.74	1,545	1,254
'JKHy 2'	73.05	16.60	14.96	3.29	3.29	62.25	45.70	1,316	1,144
'JICH 4'	50.87	12.63	10.53	3.13	2.50	38.29	25.60	696	677
'Hy 4'	58.03	13.81	13.00	2.89	2.12	38.08	25.70	766	497
CD (P = 0.05)	4.287	2.417	1.361	0.302	0.228	8.760	3.666	106	111

A, 1988-89; B, 1989-90

*Data of 1989

Table 2. Economic returns of hybrid cotton as influenced by levels of nitrogen with or without neemcake

Particulars	Nitrogen with neemcake (kg/ha)			Nitrogen without neemcake (kg/ha)		
	100 + 400	150 + 400	200 + 400	100	150	200
Cost of fertilizer (Rs/ha)	740	990	1,240	500	750	1,000
Increase in seed-cotton yield over control (kg/ha)	464	563	773	397	581	646
Increased value (Rs/ha)	4,060	4,929	6,764	3,474	5,084	5,653
Net profit (Rs/ha)	3,320	3,936	5,524	2,974	4,334	4,653
Profit/rupee invested (Rs)	4.49	3.98	4.45	5.95	5.78	4.65

Market values for seed-cotton, nitrogen and neemcake were Rs 8.75, 5.00 and 0.60/kg respectively

'JKHy 1' outyielded all other hybrids during both the years. In the first year, it yielded significantly higher than the rest, whereas in the second year it was at par with 'JKHY 2' and significantly superior to 'JICH 4' and 'Hy 4'. On an average 'JKHy 1' gave 14, 103, and 122% higher yield over 'JKHy 2' 'JICH 4' and 'Hy 4' respectively. 'JKHy 1' significantly influenced yield com-

ponents and gave higher bolls/plant, boll weight, and yield/plant than 'JICH 4' and 'Hy 4' and at par with 'JKHy 2'. Higher yield of 'JKHy 1' also reported by Jain *et al.* (1983).

REFERENCE

- Jain, S. C., Jain, H. C. and Iyer, B. G. 1983. Effect of nitrogen and plant density on nutrient utilization and yield of cotton. *Indian Journal of Agronomy* 28 (1) : 59-64.