Indian Journal of Agronomy 47 (1) : 105–108 (March 2002)

Effect of nitrogen levels and varieties on production potential of yellow sarson (*Brassica campestris* L. var. yellow sarson)

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Received: December 2000

ABSTRACT

A field experiment carried out during the winter (*rabi*) seasons of 1996-97 and 1997-98 at Kumarganj, Faizabad, revealed that there was significant increase in all growth and yield attributes up to 60 kg N/ha. Similar was the trend with grain and stover yields. Yields obtained at 60 kg N (i.e. 13.67 q/ha of seed and 50.26 q/ha of stover) and 75 kg N/ha (i.e. 14.00 q/ha of seed and 50.63 q/ha of stover) were at par with each other. Similar was the trend for economics except in case of net return/rupee of investment where 45 kg and 60 kg N/ha were at par with each other. Among the varieties of yellow sarson, 'NDYS 921' registered higher values of growth and yield attributes as well as yields but the values were at par with those of 'Bio-YS 1'. Regarding economics, highest values were obtained with 'NDYS 921' and lowest with 'Binoy'.

Key words : Nitrogen levels, Varieties, Yellow sarson

Rapeseed and mustard are most important winter reason (*rabi*) oilseed crops and there is great scope to exploit the potential yield with agronomic manipulation. Amongst the agronomic factors, fertilizer stands first and is one of the most productive inputs in agriculture. Among the major nutrient elements, nitrogen, which is insufficient in most of the Indian soils, plays an important role in *Brassica* crops. Besides this, selecting a suitable variety for a specific agro-ecological region is also important for increasing production of this crop. Keeping these points in view, the present experiment was laid out to find suitable dose of N and variety of yellow sarson in eastern U.P.

MATERIALS AND METHODS

The field experiment was conducted during the winter season of 1996-97 and 1997-98 at Agronomy Research Farm of the NDUAT, Kumarganj, Faizabad, Uttar Pradesh. Sixteen treatments consisting of 4 levels of N, viz. N_1, 50 % of recommended dose, i.e. 30 kg N/ha; N_2, 75% of

recommended dose, i.e. 45 kg N/ha; N_3, 100 % of recommended dose, i.e. 60 kg N/ha; and N_4, 125 % of recommended dose, i.e. 75 kg N/ha; and 4 yellow sarson varieties, viz. V_1, Bio-YS 1; V_2 'YST 151'; V_3, 'NDYS 921'; and V_4, Binoy, was replicated thrice in factorial randomised block design. The soil was silty loam and slightly alkaline in reaction (pH 8.0) with organic carbon 0.39%, available N 138.7 kg/ha, available P 18.7 kg/ha and available K 268.9 kg/ha. Besides N, the common doses of P and K were applied as basal. The crop was sown on 10 and 12 November in 1996 and 1997 respectively. Other agronomic management practices and plant-protection measures were followed uniformly. The growth and yield parameters were recorded and final yields were registered. The economics of the yellow sarson cultivation was worked out.

RESULTS AND DISCUSSION

Growth and yield attributes

Growth and yield attributes of yellow sarson were influenced significantly due to different levels of N (Table 1). The highest values of these attributes like plant height, number of leaves, dry-matter accumulation, siliquae/plant, length of siliqua, seeds/siliqua, and test weight were obtained at 75 kg N/ha (i.e. 125% of recommended dose) but the values were a par with that obtained at 60 kg N/ha (i.e. 100% of recommended dose). Both these doses were significantly superior to lower doses, i.e. 75% (45 kg N) and 50% (30 kg N). Increase in growth and yield attributes of yellow sarson with the increase in levels was also reported by Mohan and Sharma (1992).

Among the varieties, the highest values of these parameters were observed in case of 'NDYS 921', while the lowest in case of 'Binoy' except in case of length of siliqua and test weight. Further, 'NDYS 921' was also at par with 'Bio-YS 1' in case of many of the attributes except plant height, dry-matter accumulation and siliquae/plant.

Yield and oil content

Incremental doses of N increased seed and stover yields significantly up to 60 kg N/ha (100% of recommended dose). Increase in growth and yield attributes with increment of N level contributed to yield increment. Both the lower doses resulted in significantly lowest yields due to poor growth and development of crop. In higher doses crop received the N in adequate amount and crop efficiency was enhanced, hence the yield was higher. The results are in conformity with those of Khanpara *et al.* (1993) and Singh *et al.* (1994). However, the response to N level was non-significant on oil content of yellow sarson, the lower doses exhibited higher oil content at 45 kg N/ha.

With similar performance, 'NDYS 921' and 'Bio-YS 1' gave significantly highest seed and stover yields than 'YST 151' and 'Binoy' (Table 2). The seed and stover yields of 14.0 q/ha and 53.31 q/ha, respectively, were given by 'NDYS 921', followed by 'Bio YS 1' (13.53 q/ha of seed and 52.18 q/ha of stover yield). The lowest values were obtained with the variety 'Binoy'. The seed and stover yields depend mainly upon yields and growth attributes, respectively (Singh, 1989) which were higher in case of 'NDYS 921' and 'Bio -

YS 1'; hence the yields were higher in both the varieties. Oil content of varieties did not differ significantly, but higher values were registered by 'NDYS 921' (45.9%) and 'Bio-YS 1' (45.3%).

Economics

Economic analysis revealed that incremental doses of N increased gross and net returns significantly up to 60 kg N/ha only. Further increase up to 75 kg N/ha,

Table 1. Effect of nitrogen levels and varieties on growth and yield attributes of yellow sarson (mean data of 2 years)

Treatment	Plant height (cm)	Leaves/ plant	Dry-matter accumulation (g/plant)	Siliquae/ plant	Length of siliqua (cm)	Seeds/ siliqua	1,000-grain weight (g)
Nitrogen (kg/ha)							
30	131.5	21.5	102.8	126.7	2.67	29.3	2.34
45	139.4	24.6	108.9	130.4	3.53	31.7	3.16
60	152.4	27.1	112.6	133.2	4.24	33.7	3.89
75	153.6	27.5	112.9	134.1	4.28	34.6	3.94
CD (P=0.05)	2.00	1.88	1.95	1.84	1.12	1.83	0.98
Variety							
'Bio-YS 1'	144.3	29.1	113.8	135.5	3.71	36.8	3.64
'YST 151'	137.4	22.7	107.3	128.1	3.54	29.9	2.95
'NDYS 921'	156.3	30.4	116.5	137.7	3.70	37.6	3.64
'Binoy'	131.2	18.5	99.5	123.3	3.55	25.8	3.03
CD (P=0.05)	2.00	1.88	1.95	1.84	1.12	1.83	0.98

Table 2. Effect of nitrogen levels and varieties on yield, oil content and economics of yellow sarson (mean data of 2 years)

Treatment	Seed yield (q/ha)	Stover yield (q/ha)	Oil content (%)	Gross return (Rs/ha)	Net return (Rs/ha)	Net return/ rupee of investment (Rs)
Nitrogen (kg/ha)						
30	9.68	44.30	45.2	15,487	5,554	0.62
45	11.79	47.42	45.7	18,692	8,979	1.06
60	13.67	50.26	43.6	21,378	11,732	1.29
75	14.00	50.63	42.3	21,911	12,049	1.30
CD (P=0.05)	1.68	1.87	NS	2,648	1,310	0.41
Variety						
'Bio-YS 1'	13.53	52.18	45.3	21,365	11,674	1.28
'YST 151'	11.82	47.39	44.8	18,549	8,626	0.95
'NDYS 921'	14.00	53.31	45.9	22,081	12,362	1.36
'Binoy'	10.18	40.58	44.8	15,985	5,950	0.65
CD (P=0.05)	1.68	1.87	NS	2,648	1,310	0.41

however, produced higher values but increase was non-significant. Both the levels produced almost similar net return/ rupee of investment (Rs 1.29 and 1.30) and were statistically at par with its lower dose i.e. 45 kg N/ha (Rs 1.06). The lowest value (Re 0.62) was registered with 30 kg N/ha.

Although higher values of gross and net returns as well as net return/rupee of investment were obtained from 'NDS 921', it was statistically at par with 'Bio-YS 1' variety. Variety is also most important factor responsible for lower and higher yield which ultimately reflects he economics of the crop.

Thus 'NDYS 921' yellow sarson fertilized with 60 kg N/ha (100% recommended dose) proved to be more remunerative and economical and may be recommended for the cultivation in eastern Uttar Pradesh.

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