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Short Communication

Effect of Time of Sowing and Crop Thinning on Productivity of Gobhi Sarson (*Brassica napus)*

H Kaur#, P Suryavanshi and Y Singh

Krishi Vigyan Kendra, SAS Nagar (Mohali), Punjab
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141 004 (Punjab)

ABSTRACT

The cluster frontline demonstrations on canola type variety of gobhi sarson (*Brassica napus*) GSC 7 were conducted on 30 ha area by Krishi Vigyan Kendra, S.A.S. Nagar (Mohali) in three blocks of district namely Kharar, Majri and Dera Bassi during *rabi* season of 2017-18. The results revealed that timely sown demonstration plots where proper thinning and gap filling practices were followed, recorded higher average yield (20.86 q/ha) over control plots (17 q/ha). Benefit cost ratio for demonstration and control plots was 3.05 and 2.42, respectively. Timely sown gobhi sarson variety not only improves the crop yield but also lowers its cost of production.

Key Words: Cluster frontline demonstrations, Gap filling, Gobhi sarson, Thinning, Yield.

INTRODUCTION

Oilseed crops play an important role in Indian agrarian economy. A wide variety of agro-climatic zones and soil types persists in India that support cultivation of various kinds of oilseed crops. In India, the area under rapeseed and mustard crop was 5.76 m ha with production of 6.82 m tones and yield of 11.84 q/ha during 2015-16 (Anon, 2016). In Punjab state, rapeseed and mustard were grown on 31.6 thousand hectare area with production of 36.7 thousand tones and average yield of 13.48 q/ha during 2015-16 (Anon, 2017). Rapeseed is one of the major oilseed crop from which edible oil is produced. The oil content varies from 36-39 per cent (Yadav *et al*, 2013). Canola crop (low-glucosinolate, low-erucic acid) originally derived from the breeding of rapeseed which has gained worldwide acceptance as healthy edible oil.

Gobhi sarson (*Brassica napus* L.) is an important rapeseed crop which is grown under irrigated conditions in Himachal Pradesh, Jammu & Kashmir and Punjab. This crop grows best on well-drained, light to medium textured soils. Sharma *et al* (2018) found that it was more economical to cultivate gobhi sarson along with 10 honey bee hives on 1 ha area compared to cultivation of 1 ha wheat crop. Similarly, gobhi sarson provides sufficient flora during *rabi* season, hence this practice will help bee keepers to avoid migration to other areas in search of bee flora. Planting time is one of the most important factors for maximizing canola yield especially in those areas where temperature, day length, rainfall and humidity vary throughout the year. The late planting of canola adversely affect yield and yield components due to its harmful effects on plant growth. In addition, such crops are severely affected by aphid attack as compared to the early planted canola that results in heavy loss of yield (Yousaf *et al*, 2002). Late sowings not only reduce seed yield, but also decrease oil levels in winter rapeseed (Ozer, 2003). In addition, crop thinning practice after three weeks of sowing is very important to maintain plant population which contributes to improve crop yield (Anon, 2017). Therefore, front line demonstrations were conducted to highlight the effect of sowing time and thinning practices on crop productivity.

MATERIALS AND METHODS

The present investigation on cluster frontline

#Corresponding Author's Email:harmeetkaur@pau.edu

demonstrations (CFLDs) was conducted over 30 ha area, divided into seven clusters during *rabi* season 2017-18. A total of 75 farmers from three blocks namely Majri, Kharar and Dera Bassi of district S.A.S. Nagar were selected for this project. Farmers were guided to sow the crop from 10th October to 30th October. The farmers were also advised to go for crop thinning and gap filling three weeks after sowing to maintain plant to plant distance of 10 cm in demonstration plots. Need based inputs such as seed of improved variety of gobhi sarson (GSC 7), insecticides: Actara 25 WG (Thiamethoxam) and Rogor 30 EC (Dimethoate) were provided to the farmers for management of aphid. Farmers followed the instructions given by KVK, S.A.S. Nagar for gobhi sarson cultivation from sowing till harvesting. For demonstration plots, timely advisories on soil test based nutrient management, integrated crop management (ICM) and integrated pest management (IPM) were also given to the farmers. In case of control plots, traditional practices were followed with existing varieties like GSC 6, Hyola PAC 401 and other local varieties by the farmers. Yield data was collected from both plots (demonstration and control) and results were compiled and analysed by t-test at 5% level of probability ($p \leq 0.05$) using least significant difference (LSD) test through SAS analysis (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

The data (Table 1 ,2) revealed that average yield in demonstration plots was 20.86 q/ha which was significantly higher than the average yield of control plots (17q/ha). In case of demonstration plots, the gross and net returns were Rs. 70,946/ha and Rs. 47,986/ha, respectively whereas for control the gross returns were Rs. 57,800/ha and the net returns were Rs. 33,916/ha. The increase in yield was found to be 22.7 per cent in demonstration plot over control plots. The benefit cost ratio for demonstration and control plots was 3.08 and 2.42, respectively. This increase in yield under demonstration plots might be due to selecting the right planting time, adopting crop thinning and gap filling practices.

These results corroborated with the earlier studies conducted under Punjab conditions. Under a field experiment conducted at Punjab Agricultural University (PAU), Ludhiana consisting of 5 different dates of sowing (October 1st , 10th , 20th , 30th and November 9th) with three gobhi sarson varieties (GSL 1, GSL 2 and PGSH 51), it was

Table 1. Effect of time of sowing and crop thinning on yield and economics of GSC 7

Treatment	Yield (q/ha)	Gross cost (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	B:C ratio
T1: Farmers practice (late sowing + no crop thinning)	17	23884	57800	33916	2.42
T2: (Sowing time 10-30 October + crop thinning)	20.86	22960	70946	47986	3.08

Table 2. t-test comparing yield of demonstration and control plots

Treatment	Number of demonstrations	Mean Yield (q/ha)	Standard Deviation	Standard Error	Minimum	Maximum	p-value
T1	75	20.86	1.1900	0.1374	17.7500	23.7500	<0.0001*
T2	75	17.00	1.0118	0.1168	15.0000	19.0000	

T1-Demonstration Plots; T2-Control plots; *$p \leq 0.05$ = significant

found that crop sown on October 20th gave the highest seed yield. This crop yield was statistically at par with October 1st and October 10th sowings but was significantly superior to October 30th and November 9th dates of sowing (Anon, 1994). Later, effect of four different dates of sowing on African sarson (*Brassica carinata*) at Ludhiana, Punjab was studied and concluded that crop sown on October 10th attained the maximum plant height, higher siliquae per plant, more seeds per siliqua, greater 1000 seed-weight and higher seed yield than the later dates of sowing *viz.,* October 30th , November 20th and December 10th . The reduction in seed yield was to the tune of 21.2, 23.9 and 36.3 per cent when sowing was delayed to October 30th , November 20th and December 10th respectively (Singh, 2000). Under Punjab conditions, late sown gobhi sarson crop got shorter time to utilize available resources such as light, nutrients, moisture etc. Such crops are more prone to attack by mustard aphid (*Lipaphis erysimi*) which not only increase the cost of production but also lowers the crop yield.

Another practice which contributes to enhanced crop yield under demonstration plots is plant thinning and gap filling which helps in uniform plant growth. Earlier at Bharatpur, thinning practices were introduced under agro techniques to enhance seed yield of mustard. During experiments, it was observed that with the application of recommended practice (RP) along with thinning at 15 and 25 DAS and detopping at bud-initiation stage, highest seed yield in mustard (1464 kg/ha) was recorded. In another treatment of recommended practices along with thinning at 15 and 25 days after sowing, seed yield was found to be 1407 kg/ha. In both these treatments, mustard yield was higher than other eight treatments where no thinning practices were performed (AICRP-RM, 1998).

Constraints faced by farmers

The yield of control plots of farmers was affected by various factors like improper seed selection, delayed sowing, no crop thinning, unawareness of integrated crop management and integrated pest management (ICM and IPM) techniques etc. Heavy losses in yield were observed due to late sowing of seed. Due to improper selection of insecticides and lack of awareness regarding time of insecticide application, natural enemies (honey bees and other pollinators) also got adversely affected. Earlier studies by Abrol (2007a,b) proved that bee pollination not only improved the yield of the crop, but also contributed to uniform and early pod setting. Farmers who did not practiced plant thinning, their plants' growth was adversely effected due to heavy crop density. Therefore, low average yield was observed in control plots as compared to demonstration plots.

CONCLUSION

Results revealed that sowing time and crop thinning contributed to a great extent for achieving potential yield of gobhi sarson. Timely sown demonstration plots were not attacked by mustard aphid. Aphid attack was noticed under some demonstration plots but below economic threshold level (ETL). Maintaining plant population through thinning and gap filling also provided good results in terms of yield. Successful implementation of CFLDs and dissemination of improved technology were achieved through various extension activities like training programme, kisan goshties, field days, exposure visits, Canola Day, harvesting day organized for farmers. KVK staff also created awareness regarding good quality of canola sarson among farmers in district S.A.S. Nagar. The farmers were satisfied in terms of quality as well as quantity of produce. Performance of demonstration plots was very good. The demand of GSC 7 variety among farmers has increased many folds for the next season. The farmers also got very good price by selling their produce, Rs. @ 4200/q through self marketing.

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