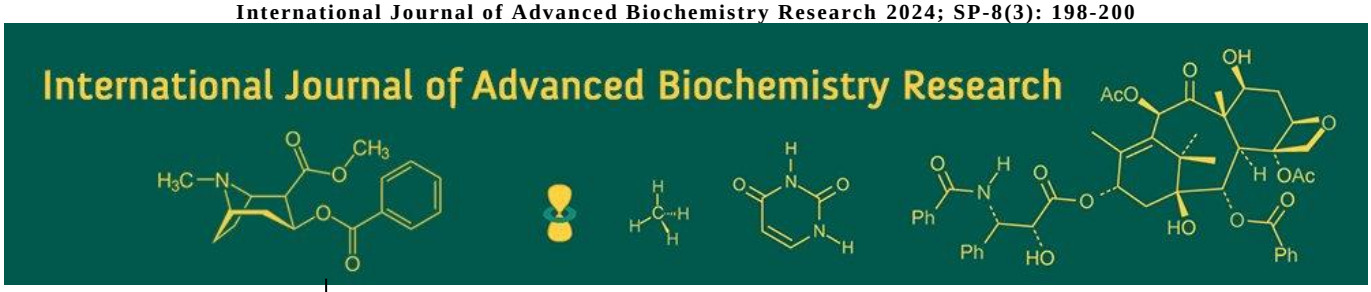

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Role of planting patterns and weed control methods on quality of transplanted African Sarson (*Brassica carinata* A.)

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Abstract
The experiment was conducted at Lovely Professional University, Phagwara on "Role of Planting Patterns and Weed Control Methods on quality of Transplanted African Sarson". The field study was conducted in Split Plot Design with three planting patterns in main plot (Flat bed, Raised bed one row, raised bed two row) and five weed control treatments in sub plot (T_1= Straw mulch 8 ton/ha, T_2= Plastic mulch black, T_3= Plastic mulch white, T_4= Hand weeding 30 DAT, T_5 = Weedy check). The crop gave significantly higher yield with bed one row 1520.6 kg/ha and quality parameters also increased with bed one row. The chlorophyll content recorded at 45 and 75 DAT was higher in bed one row. The oil yield and protein content was significantly more with use of black mulch weed control treatment and also higher in bed one row planting method than flat and bed two row. The oil yield, chlorophyll content, oil content and protein content was recorded significantly higher in black mulch than all weed control treatments as compared to unweeded (control).

Keywords: Mulch, Sarson, weed, quality, patterns

Introduction
Oilseed crops play a crucial role in the world economy. The various oil seeds which boost agriculture economy are groundnut, soybean, safflower, castor, mustard-rapeseed, linseed, sesamum, sunflower. The yellow revolution is related to oilseed crops during early 1990. The country experienced a yellow revolution, with increased productivity and average yield from 2.68 MT and 650 kg/ha in 1985-86 to 6.96 MT and 1022 kg/ha during 1996-1997. Despite these accomplishments, there is a difference between future output and actual production. Rapeseed-mustard is grown on 5.53 M /ha in India, with a production of 6.41 MT per hectare. Among the world oil producing countries India is fifth largest producer and importer of oilseeds (NMOOP, 2018).

Among oil seed crops, the rapeseed-mustard is the first domesticated crop. Among all oil seed crops the mustard-rapeseed is most important after soybean and groundnut. The highest production is of soybean was 39% followed by groundnut 26%, rapeseed 23% (Development of Oil, 2017). India accounts for 28.3% of global acreage and 19.8% of global production, respectively. India produces about 6.7 million tonnes of rapeseed-mustard, second only to China (11-12 million tonnes) and the European Union (10–13 million tonnes) and makes a major contribution to the global rapeseed-mustard industry.

Among 5 genera of *Brassica* family, the different species of rapeseed-mustard like *Brassica juncea* (Brown mustard), *Brassica rapa* (toria), *Brassica carinata* (Ethiopian mustard), *Brassica napus* (Gobhi sarson), *Brassica campestris* (Bhoori sarson) (Anonymous 2020) [1]. They were introduced from Ethiopia and prefer low temperatures. It has large seed size, less pod shattering, drought tolerant, less lodging, more oil content, 5-6 feet height, highly branched than other species (Seepaul *et al*. 2018-19) [6]. It is crossed between *Brassica nigra* and *Brassica oleracea* (Dhaliwal *et al*. 1997) [3]. The main aim of increasing crop production is by choosing the proper planting pattern. Selection of efficient planting patterns is very important to increase crop productivity. The planting pattern is most important for obtaining a high return and high crop yield.

The mustard is mainly infested with *Chenopodium album, Spergula arvensis, Medicago sativa, Portulaca oleracea, Amaranthus viridis, Asphodelus tenuifolius, Phalaris minor,*

Rumex denticulatus, Cleome viscosa etc. Weeds cause yield reduction to 10-58% depending upon type and intensity (Yadav 2001) [8]. Weed competition in mustard is particularly severe in the early stage because crop development is slow during first 4-6 weeks after sowing.

Materials and Methods

The investigation of field study conducted at research farm, Department of Agronomy, Lovely Professional University, Phagwara during Rabi season 2019-2021. The soil was clay loam and alkaline nature having medium organic carbon (0.64%), available nitrogen (226 kg/ha), available phosphorus (22.3 kg/ha), available potassium (121.4 kg/ha) with pH 8.02. The field study was managed in Split Plot Design with three replications. The four different nitrogen levels in main plots (N1= no nitrogen, N2= 75 kg, N3= 100 kg, N4= 125 kg) and four different weed control treatments in sub plots (T_1= Pendimethalin 0.375 kg/ha followed by H.W. 40 DAT, T_2= Straw mulching 8 t/ha, T_3= H.W. 40 DAT, T4= Weedy check). The pendimethalin was applied as pre-emergence of crop. The variety PC-6 developed by Punjab Agriculture University, Ludhiana was sown. The main character of this variety is less pod shattering than other species. The nursery was sown on 25 Oct. 2019 and germinate after 4-5 days. After, 25-30 days the nursery was ready for transplanting. The crop was transplanted on 27 Nov. 2019. The row to row and plant to plant spacing was 45cm and 10 cm. Fertilizers were applied according to the treatments. The nitrogen was applied in three split doses. The first dose was applied on 2 December 2019, second on 11 Dec. 2019 and third was applied on 2 Jan. 2020. The hand weeding was done after 40 days of transplanting with use of *Khurpa*. The first irrigation was applied immediately after transplanting and second after 30 days of transplanting and other was applied at time of flowering.

All plant protective measures were applied. The crop was sprayed with chlorpyriphos 20 EC at the rate 200 ml/acre to avoid the attack of aphids and jassids. The crop was harvested 140-145 DAT. The harvesting was done with sickles after judging the observations like golden-brownish colour of stem, seed colour, change siliqua colour branches. Then harvested crop tied in bundles and kept for sun drying. After loss of moisture the crop was threshed with sticks and seeds were collected and obtained the seed yield. The seeds were weighed and expressed in q/ha. Randomly five plant were selected from each plot and chlorophyll content was measured with SPAD at 45 and 75 DAT. Then calculate the average values of chlorophyll content. The oil content was determined with oil expeller or oil extractor machine and calculated by giving constant weight. For estimation of protein content firstly N extract was estimated from the seeds with Kjeldhal method, then N values multiply with constant (6.2) and calculated the protein content. The statistical data was determined with OPSTAT.

Results and Discussion

The planting pattern and weed control methods influenced the seed yield and quality parameters in (Table 1 and 2). The planting pattern with one row per bed produced significantly higher seed yield than two rows per bed and it was significantly better than flat planting techniques. Highest seed yield of (1520.6 kg/ha) was recorded in one row per bed which was followed by two rows per bed (1418.1 kg/ha) and flat planting technique (1219.6 kg/ha). One row per bed and two row per bed treatments increased seed yield by 24.7% and 16.3% then and flat planting pattern respectively. Chlorophyll content was at par in bed one row and bed two row techniques which was significantly more than flat planting method when determined 45 and 75 days after transplanting. Like seed yield, oil yield was significantly higher in one row per bed than other planting patterns. Oil content was significantly higher in bed one row technology 38.7% than other used methods. Oil content in bed with two rows 36.9% was significantly more than flat planting method (34.5%). The difference in protein content (%) in planting pattern was non-significant.

Among weed control treatments, highest seed yield of 1547.7 kg/ha and 1489.2 kg/ha was recorded in black and white plastic mulch treatment respectively and these were at par among each other and significantly higher than all other weed control treatments. Chlorophyll content recorded 45 and 75 days after transplanting was at par in black mulch, white mulch and hand weeding treatments which was significantly more than straw mulching treatment. Significantly higher oil yield was recorded in black plastic mulch as compared to all other treatments, may be due to better growth and yield attributes in this treatment. The black plastic mulch recorded significantly more oil content than all other treatments. Oil content in white mulch was significantly less than black mulch but it was significantly more than other weed control techniques. Oil content in straw mulch crops was significantly higher than one hand weeding crop. Protein content in black mulch treatment was found to be significantly higher than other treatments. White mulch and straw mulching recorded at par protein content (%) than unweeded (control). Kumar *et al*. 2018 [5], Choudhary *et al*. 2019 [2] also reported these findings.

Table 1: Role of Planting Patterns and Weed Control Methods on seed yield, chlorophyll content at 45 and 75 days of Transplanted African Sarson

Treatments	Seed yield kg/ha	Chlorophyll index 45DAT	Chlorophyll index 75 DAT
Main plot (planting pattern)			
M1-Flat bed	1219.6	40.9	35.5
M2-Bed one row	1520.6	44.0	38.4
M3-Bed two row	1418.1	43.2	37.0
C.D at 5%	54.5	1.7	1.4
Sub Plot (weed control methods)			
T_1-Straw mulch (8ton/ha)	1437.3	39.1	37.1
T_2-Black mulch	1547.7	45.0	38.4
T_3-White mulch	1489.2	43.7	38.8
T_4-Hand weeding	1379.6	43.0	36.8
T_5-Unweeded(control)	1076.3	42.1	34.0
C.D at 5%	55.3	2.2	0.9
C.D of interaction	NS	NS	NS

Table 2: Role of Planting Patterns and Weed Control Methods on oil yield, oil content and protein content of Transplanted African Sarson

Treatments	Oil yield Kg/ha	Oil content (%)	Protein content (%)
Main plot (planting pattern)			
M1-Flat bed	425.2	34.5	27.1
M2-Bed one row	595.6	38.7	28.5
M3-Bed two row	529.5	36.9	28.1
C.D at 5%	29.7	0.8	N/S
Sub Plot (weed control methods)			
T_1-Straw mulch (8ton/ha)	518.8	36.0	28.3
T_2-Black mulch	652.7	42.0	30.2
T_3-White mulch	593.6	39.6	28.6
T_4-Hand weeding	472.2	34.1	27.4
T_5-Unweeded(control)	346.4	32.1	25.1
C.D at 5 %	25.1	0.9	0.9
C.D of interaction	NS	NS	NS

Conclusion

From above findings, the seed yield significantly higher in bed two row but chlorophyll index higher recorded in bed one row and oil yield, oil content and protein higher recorded in bed one row method. In weed control methods black mulch is best treatment than other weed control treatments and significantly gave higher returns. So bed two row is best for yield attributing character while bed one row is best for growth parameters.

References

1. Anonymous. Department of agriculture, Ministry of agriculture and farmer welfare, government of India, New Delhi. Oilseeds: World market and trade, USDA (United States department of agriculture), 2020, 39.
2. Choudhary VK, Bhagwati R. Planting methods, row arrangement and crop residue mulch influence on weed dynamics and productivity of toria mustard. Indian Journal of Weed Science. 2019;51(3):298-301.
3. Dhaliwal SG, Arora R, Randhwa NS, Dhawan AK. Effect of nitrogen and spacing on growth and quality of transplanted Gobhi sarson (*Brassica napus* L.). Ecological Agriculture and Sustainable Development. 1997;1:387-393.
4. Jangir R, Arvadia LK, Kumar S. Growth and yield of mustard (*Brassica juncea* L.), dry weight of weeds and weed control efficiency by different planting methods and weed management. International Journal of Microbiology and Applied Sciences. 2018;6(7):2586-2593.
5. Kumar K, Kumar Y, Katiyar NK. Effect of plant geometry, nitrogen level and antitranspirants on physiological growth yield attributes, WUE and economics of mustard (*Brassica juncea* L.) under semiarid conditions of Western Uttar Pradesh. Journal of Pharmacognosy and Phytochemistry. 2018;7(2):226-229.
6. Seepaul George RS, Wright DL. Comparative response of carinata and napus vegetable growth, development and photosynthesis to N nutrition. Industrial crops and products. 2018-19;94:872-883.
7. Singh H, Meena MK, Choudhary RL, Dotaniya ML, Meena MD, Jat RS, *et al*. Effect of direct sowing and transplanting on yield performance of Indian mustard. International Journal of Current Microbiology and Applied Sciences. 2019;8(2):509-515.
8. Yadav A, Singh AK, Chaudhari R, Mishra SR. Effect of planting geometry on growth and yield of mustard (*Brassica juncea* L.) varieties. Journal of Pharmacognosy and Phytochemistry. 2001;7(3):2624-2627.