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PERFORMANCE OF SESAME (*Sesamum indicum* L.) CULTIVARS TO DIFFERENT SOWING DATES

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ABSTRACT

A field experiment was carried out at the Students' Research Farm, Khalsa College, Amritsar during *kharif* season of 2022. The experiment consisted five sowing dates (30 June, 07 July, 14 July, 21 July and 28 July) and two varieties (Punjab Til No. 2 and RT 346) making combination of 10 treatments. Results showed that sowing of sesame on 07th July remained at par with 14th July and gave significantly higher plant height, dry matter accumulation, number of branches plant^{-1} (4.65), number of capsules plant^{-1} (49.52), seed yield (8.98 q ha^{-1}), straw yield (44.55 q ha^{-1}) and biological yield (53.54 q ha^{-1}) over 28th July. Among cultivars sesame cultivar RT 346 gave significantly better performance than Punjab Til No. 2. Therefore, it can be concluded that sowing of sesame from 07th to 14th July is the optimum time to have better yield. Further, variety RT 346 could be adopted under these conditions because of its high yielding ability.

(Key words: Sesame, biological, dry matter, sowing date, cultivars)

INTRODUCTION

Sesame (*Sesamum indicum* L.) is an ancient oilseed crop renowned for its nutritional significance, grown in tropical and subtropical regions (Oyinloye *et al*., 2016). It is cultivated primarily for its petite edible seeds, which boast a high oil content of approximately 50% and a protein content of around 25% (Langham *et al*., 2006). The seeds are used in a variety of food goods, both raw and roasted, as well as industrial applications such as soaps, lubricants, pharmaceuticals, and animal feed (Bedigian, 2010). The demand for sesame seeds has surged, driven by their nutritional properties encompassing vitamins, minerals, fiber, and beneficial fats. This annual flowering plant from the "Pedaliaceae" family has its resilience to drought and ability to thrive in diverse agroclimatic conditions. Despite prolonged efforts in crop improvement for sesame, a significant advancement has not been achieved in obtaining high yields from sesame crop. One of the contributing factor to this challenge is the restricted genetic diversity in the source material. Additionally, sesame is influenced by seasonal variations and specific geographical locations. As a result, a particular variety does not exhibit consistent performance across all locations and throughout all seasons. In light of the increasing demand for nutrient-rich edible oil to meet the needs of a growing population and the heightened awareness among consumers in an evolving environmental context, it is crucial to evaluate those sesame cultivars that may perform well under varied conditions. Moreover, the yield potential of sesame crop is also determined by various components, each of which is significantly impacted by factors such as variety, environmental conditions, and agronomic practices (Chongdar *et al*., 2015). The success of its productivity is intricately linked to the complex interaction of various agronomic factors. One of the most crucial non-monetary inputs that significantly affects the productivity of seed and oil is the time of sowing (Shekhawat *et al*., 2012). The choice of the sowing date profoundly influences the crop's growth, development, and ultimately, its yield. Sesame is typically a short-day plant although it may thrive in long day conditions. Therefore, light intensity has a significant morphogenic effect influencing yield and oil content with respect to distinct growth and development stages resulted from change in sowing dates (Sharma *et al*., 2005). Therefore, grain yield of sesame is significantly influenced by both sowing date and cultivars. Furthermore, seed yield variation significantly influenced by temperature and variety, accounting for 69% and 39%, respectively. Delaying sesame sowing enhances the occurrence of pests and diseases. Therefore, achieving successful crop production necessitates the use of the most optimal sowing time and cultivars (Jiotode *et al.,* 2015). Given the global importance of sesame as a cash crop, understanding the nuanced relationships between (*Sesamum indicum* L.) cultivars and different sowing dates becomes imperative for optimizing agricultural practices. Therefore, the present research aims to delve into the performance dynamics of (*Sesamum indicum* L.) cultivars under varying dates of sowing, seeking to elucidate the impact of temporal considerations on yield outcomes. As climate patterns evolve and agricultural landscapes undergo transformations, it is crucial to adapt

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cultivation practices to enhance both the quality and quantity of sesame production. By systematically investigating how different cultivars respond to distinct sowing timelines, this study aspires to contribute valuable insights that can inform agricultural decision-making and foster sustainable sesame cultivation.

MATERIALS AND METHODS

The field experiment entitled "Evaluating sesame (*Sesamum indicum* L.) cultivar performance across varied sowing dates" was conducted at Student's Research Farm, Khalsa College, and Amritsar during *kharif* season 2022. The experiment was laid out in a factorial randomized complete block design having three replications. Experiment consisted of five sowing dates (30 June, 7 July, 14 July, 21 July and 28 July) and two cultivars (Punjab Til No. 2 and RT 346) making combination of 10 treatments. Sowing was done as per treatment. Fertilizer nitrogen was drilled at 42.5 kg ha^{-1}. Irrigation was applied three days before sowing of seeds and thereafter one more irrigation was applied at time of flowering. For plant protection, neem oil @ 200 ml ha^{-1} by mixing in 500 litre water and 100 ml liquid soap detergent was applied at 7 days interval. Observations on different parameters like, growth parameters and yield attributes of sesame were recorded. Growth parameters includes periodic plant height (cm at 30, 60 and 90 DAS), number of branches $plant^{-1}$ and dry matter accumulation (at 30, 60 and 90 DAS), yield and yield attributes includes number of capsules $plant^{-1}$, number of seeds $capsule^{-1}$, seed and stover yield and biological yield were recorded and further analysed. HI was also calculated. Data recorded were subjected to analysis of variance (ANOVA) using factorial RBD, only characters that were deemed significant at the 5% level of significance were used to determine the CD value (Pange and Sukhatme 1985).

RESULTS AND DISCUSSION

Effect on sesame cultivars under different sowing dates on growth parameters

It is evident from the data shown in Table 1 that plant height of sesame was influenced significantly by different sowing dates. Sowing of crop on 07th July gave numerically maximum plant height (22.43, 104.96 and 138.97 cm) at 30, 60 and 90 DAS, respectively, however it was at par with 30th June and 14th July. Minimum plant height was recorded at 28th July (17.99, 83.85 and 109.32 cm) at 30, 60 and 90 DAS. The plant height increased with the advancement of the crop age due to its growth and reached its maximum at harvest irrespective of the treatments tried (Chongdar *et al.,* 2015). Among different cultivars, statistically at par plant height at 30, 60 DAS and harvest, respectively recorded by variety RT 346 and Punjab Til No. 2. Significantly maximum number of branches $plant^{-1}$ (4.65) recorded with crop sown on 07th July over 28th July whereas varietal performance was insignificant in terms of number of branches $plant^{-1}$. The dry matter accumulation of sesame was influenced significantly by different sowing dates. Sowing of crop on 07th July gave maximum dry matter accumulation i.e. 2.79, 15.05 and 30.50 g $plant^{-1}$ at 30, 60 DAS and harvest, respectively. It was significantly higher over sowing on 30th June, 21th July and 28th July but remained at par with sowing on 14th July. Variety RT 346 recoded significantly higher dry matter accumulation i.e. 2.65, 14.19 and 28.59 g $plant^{-1}$ at 30, 60 DAS and harvest as compared to Punjab Til No. 2. This might be due to better sink capacity attributed to the better dry matter production owing to better photosynthetic capacity of plant. Gopale *et al.* (2021) recorded maximum number of capsules $plant^{-1}$ (49.52) with crop sown on 7th July and it was remained at par with sowing on 14th July and found significantly higher over sowing on 30th June, 21st July and 28th July. This might be due to improved crop duration, availability of soil moisture and absorption of nutrients by crops which increased the crop growth leading to increase in number of branches and capsule $plant^{-1}$. Usha Rani *et al.* (2013) recorded that variety RT-346 produced signicantly higher number of capsules $plant^{-1}$ (47.59) as compared to Punjab Till No. 2. Variety RT - 346 increased number of capsules $plant^{-1}$ to the tune of 15.57% as compared to Punjab Till No. 2.

Effect on sesame cultivars under different sowing dates on yield and yield attributes

Maximum number of capsules $plant^{-1}$ (49.52) recorded with crop sown on 07th July and it was remained at par with sowing on 14th July and found significantly higher over sowing on 30th June, 21st July and 28th July. This might be due to improved crop growth duration, availability of soil moisture and absorption of nutrients by crops which increased the crop growth leading to increase in number of branches and number of capsules $plant^{-1}$. It was recorded that variety RT 346 produced significantly higher number of capsules $plant^{-1}$ (47.59) as compared to Punjab till no 2. Variety RT 346 increased number of capsules $plant^{-1}$ to the tune of 15.57 per cent as compared to Punjab Til No. 2.

It is clear from the data presented in Table 2 that number of seeds $capsule^{-1}$ were not significantly influenced by various date of sowing and cultivars. However, numerically maximum number of seeds $capsule^{-1}$ (37.53) recorded with crop sown on 07th July and variety RT 346 (Karhale *et al*., 2021). The numerically increment in number of capsule $plant^{-1}$ might be due to the environment and length of growth period (Abdel *et al.,* 2007). Further, test weight were also not significantly affected by date of sowing and cultivars. Test weight was not influenced by environment particularly that of temperature prevailed during the time of reproductive stages. Variety RT 346 obtained numerically higher test weight as compared to Punjab Til No. 2. The higher seed yield of (8.98 q ha^{-1}) produced with sowing of crop on 07th July. It was significantly higher over sowing on 30th June, 21st July and 28th July but remained at par with sowing on 14th July. Variety RT 346 produced

Table 1. Effect of sesame cultivars under different date of sowing on various growth parameters

Treatments	Plant height (cm)			Number of branches plant^{-1}	Dry matter accumulation (g plant^{-1})		
	30 DAS	60 DAS	90 DAS		30 DAS	60 DAS	90 DAS
Sowing dates							
30-Jun	21.26	99.41	130.96	4.42	2.65	14.21	28.63
07-Jul	22.43	104.96	138.97	4.65	2.79	15.05	30.50
14-Jul	21.80	102.04	135.06	4.50	2.71	14.58	29.59
21-Jul	19.65	91.74	121.26	4.10	2.45	13.09	26.36
28-Jul	17.99	83.85	109.32	3.54	2.24	11.94	23.68
SE (m) ±	**0.70**	**3.36**	**4.17**	**0.17**	**0.08**	**0.49**	**0.4**
CD (p=0.05)	**2.10**	**10.08**	**12.51**	**0.51**	**0.24**	**1.47**	**1.2**
Varieties							
Punjab TilNo. 2	20.00	93.49	123.60	4.15	2.49	13.35	26.89
RT 346	21.24	99.31	130.83	4.34	2.65	14.19	28.59
SE (m) ±	**0.12**	**0.55**	**0.69**	**0.03**	**0.01**	**0.08**	**0.16**
CD (p=0.05)	**0.36**	**1.65**	**2.07**	**0.09**	**0.03**	**0.24**	**0.48**

Table 2. Effect of sesame cultivars under different date of sowing on various yield attributes, yield and harvest index

Treatments	Number of capsules plant^{-1}	Number of seeds capsule^{-1}	Test weight (g)	Seed yield (q ha^{-1})	Straw yield (q ha^{-1})	Biological yield (q ha^{-1})	Harvest index (%)
Sowing dates							
30-Jun	43.78	35.46	2.76	8.18	42.87	51.06	15.97
07-Jul	49.52	37.53	2.82	8.98	44.55	53.54	16.71
14-Jul	48.95	36.98	2.80	8.58	44.23	52.82	16.20
21-Jul	42.82	33.93	2.68	7.06	39.65	46.72	15.02
28-Jul	36.82	31.95	2.63	5.81	35.85	41.67	13.92
SE (m) ±	**1.48**	**0.60**	**0.03**	**0.48**	**0.61**	**0.82**	**0.30**
CD (p=0.05)	**4.44**	**1.80**	**0.09**	**1.44**	**1.83**	**2.46**	**0.90**
Varieties							
Punjab Til No. 2	41.17	34.17	2.7	6.92	40.83	47.76	14.42
RT 346	47.59	35.85	2.71	8.52	42.03	50.56	16.71
SE (m) ±	**0.93**	**0.30**	**0.01**	**0.26**	**0.39**	**0.51**	**0.45**
CD (p=0.05)	**2.79**	**0.90**	**0.03**	**0.78**	**1.17**	**1.53**	**1.35**

significantly higher seed yield (8.52 q ha^{-1}) as compared to Punjab Til No. 2. The higher yield might be associated with higher yield attributes obtained under 07th July and Variety RT 346. The results were reported that delaying in sowing reduced seed yields of sesame. Additionally, sowing of crop on 07th July produced maximum straw and biological yield of (44.55 q ha^{1}) and (53.54 q ha^{-1}), respectively and was significantly higher over 30th June, 21st July and 28th July but remained at par with 14th July. Variety RT 346 also performed better in terms of straw yield and biological yield compared to Punjab Til No. 2. Table 2 further indicates that harvest index of sesame was not influenced significantly by different sowing dates. Harvest index (HI) is another vital parameter to assess the translocation efficiency of a plant. Numerically higher harvest index of (16.71%) was recorded under 07th July over other sowing dates Among varieties, significantly higher harvest index (16.71%) produced by variety RT 346 as compared to Punjab Til No. 2 (14.43%).

Keeping in view the results obtained after experimental period, certain conclusions may be drawn. Sowing of crop on 07th July to 14th July gave maximum plant height, number of capsules $plant^{-1}$, number of seeds $capsule^{-1}$ and dry matter accumulation. Further, statistically at par seed yield, straw yield and biological yield obtained under 07th and 14 July. Therefore, this is the best window period for sowing of sesame crop. Among the both cultivars Punjab Til No. 2 and RT 346, the maximum seed yield, straw yield and biological yield was recorded under cultivar RT 346, hence this cultivar can be recommended.

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