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Effect of Different Sowing Dates and Application of Pesticides on Growth and Yield of Mustard Crop (*Brassica juncea*)

Nagaraju Dharavath, Biswarup Mehera, Satyendra Nath, Sitanshu Sekhar Patra and Sandeep Rout*

School of Forestry & Environment, Sam Higginbottom University of Agriculture Technology & Sciences, Allahabad-211007 (Uttar Pradesh) India

*Corresponding Author E-mail: sandeeprout1988@gmail.com

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ABSTRACT

A field experiment was conducted to evaluate the "effect of different sowing dates and application of pesticides on growth and yield of Mustard (B. juncea) during the rabi season of 2014-2015. The experiment was conducted in Randomised Block Design with three replications. The maximum height (187.87 cm) at 120 DAS, maximum number of branches (10.93) at 60 DAS, maximum percentage of flowering (29.22%) at 90 DAS, maximum length of silique (6.73 cm), maximum number of seeds per silique (17.35), maximum test weight (5.94 g) and maximum seed yield (16.32 q/ha) was recorded in T_3 (First date of sowing/Acephate 50 WG). Therefore it may be concluded that 9th October can be recommended for the Mustard (Parasmani-8 Variety) grower.

Key words: *Growth, sowing, pesticides, yield.*

INTRODUCTION

The abiotic factors *i.e.*, climatic and weather variables are causative agents for population fluctuations in insect pests and diseases causing heavy losses. In addition to the weather influence at a location on insect pests and diseases, the macroclimatic conditions over larger space and time influence the regional level movement of desert locust and movement of mustard aphids with western disturbances[1].

Indian mustard (*Brassica juncea*) commonly known as raya, rai or laha is an important oilseed crop, among the brassica group of oilseeds in India. It possesses a higher potential of production per unit area than other oleiferous members of the family cruciferae. It is an annual plant or biennial herb. Mustard is the major rabi oil seed crops of India. The origin of Indian mustard has been reported to be in China, it made its way into India through north eastern route.

The area, production, and productivity of rape seed mustard in the world was 34.19 m. ha, 63.09 m. t, and 1850 kg. ha^{-1} respectively, during the year 2012-2013. Globally India accounts for 19.29 % and 11.127 % of the total acreage and production.

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During the last seven years, there has been a considerable increase in productivity from 1750 kg. ha^{-1} in 2006-07 to 1850 kg. ha^{-1} in 2012-13 and production has also increased from 46.27 m. t. in 2006-07 to 63.09 m. t. in 2012-2013[2].

In India, *Brassica* oil seeds are next to groundnuts in importance. Jammu and Kashmir, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Odisha, West Bengal, Bihar and Assam are the important states growing mustard. Among these states, Rajasthan and Uttar Pradesh contribute the major share of the total rapeseed and mustard production in India[3].

Mustard plays an important role in the oil seed economy of the country. It has 38 to 42% oil and 24% protein[4]. Mustard is rich in minerals like Calcium, Manganese, Copper, Iron, Selenium, Zinc, Vitamin (A, B and C) and proteins. 1000 g mustard seed contains 508 k. cal. energy, 28.09 g carbohydrates, 26.08 gm proteins, 26.08 g total fat and 12.2 gm. dietary fiber, 311.U. Vitamin A, 4.733 mg Niacin, 7.1 mg. Vitamin C, 266mg Calcium, 9.21 mg Iron, 370 mg Magnesium, 13 mg, Sodium and 738 mg Potassium[5]. The sowing time is the most important factor determining the yield. The nutrient content in grain and straw has been reported to be increased with the delay in sowing in the case of wheat whereas, uptake of these nutrients decreased as the sowing of gets delayed[6]. There are many factors responsible for low yield, in which sowing time is the crucial factor for obtaining desirable yield. Every crop has its own definite requirements for particular environmental conditions for its proper growth and yield[7]. Keeping in the view the above scenario, the investigation was carried out with the objective to evaluate effects of different sowing dates and application of pesticides on growth and yield of Mustard (*B. juncea*) crop under climatic conditions of Allahabad.

MATERIALS AND METHODS

The present investigation was carried out in the research field of the School of Forestry and Environment, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, during the period from October 2014 to March 2015, Rabi season. Allahabad is located in the South-East part of Uttar Pradesh India. The experimental site (Research field) is at an elevation of 98 MSL, at 25.57º N latitude, 81.51º E longitude. All the required materials and facilities necessary for the cultivation readily available in the Department. This region has a subtropical climate with extreme of summer and winter. These locations receive the mean annual rainfall ranges from 500 mm to 1500 mm. More than 70 per cent rains are received during S-W monsoon season 5 to 10 per cent rains are received in winter, 10-15 per cent in summer and 5-10 per cent during post monsoon season. Normal rainy days exceed 40 per annum. Summer monsoonal rainfall comes in downpours while winter rainfall comes in light drizzles and is easily absorbed in soils. Temperatures vary greatly in these regions. May and June are the hottest and December and January is the coldest. Monthly mean temperature more than 25 °C prevails during 8-10 months of the year. During May and June maximum temperature rises above 40 °C and hot dry winds are common features. In January, the normal mean minimum temperature remains around 8 to 10 °C. Frost for one or two days may also occur during winter months[8]. Pre-sowing operations i.e., the experimental field was prepared by cleaning and ploughing with the help of casual labours. The weeds were picked up in order to get clean and after that, it was levelled. For fertilizer application, the uniform dose of phosphorus and potash at 60, 40 kg ha^{-1} through DAP, MOP respectively and 40 kg N ha^{-1} through urea, were applied at the sowing time. The remaining amount of nitrogen (40 kg ha^{-1}) was applied at 41st day after each date sowing in all plots. The Mustard variety used was Parasamani-8, seeds were sown in rows at 30 cm apart at a depth of 2.5 -3 cm in the soil. The seed rate taken was 4.5 kg ha^{-1}. Post sowing operation i.e. Gap Filling were done after seed germination was observed on the 6th, 7th, 8th day of 1st, 2nd, 3rd sowing date

respectively. Seeds were re-sown in the gaps where the previous seeds failed to germinate. Thinning was done at 25 days after every sowing when the crop has attained of 6 - 8 leaves. This operation was done for maintaining a proper plant to plant distance and standard plant population. Weeding was done by labours over on at 24th November, 5th and 22 December, 2014. This was done to maintain weed free environment during the initial crop growth stages. Inter- cultivation was done by loosening the soil and earthing up was done while weeding for soil aeration for proper growth and development of plants and to protect from lodging. Irrigation was done on 45 days after the date of sowing for proper growth of plants. Second irrigation was done 75 days before pre-flowering of each sowing dates. The top dressing was done with the remaining half dose of nitrogen as urea at 47 days after sowing. Nitrogen was applied by furrow placement method at a distance of about 10 cm from the crop rows. The crop was harvested with the help of sickle when more than 80% of the crops were fully ripened. The weather data were collected from the Meteorological observatory, SHIATS, Allahabad during the experimental period (Table.2). The experiment was carried out in a factorial design laid out as a randomized block design with three replications[9]. Each replication was divided into sixteen plots in the lengthwise direction, and the different treatments were allocated randomly in each replication. The experiment has two factors (1). Date of sowing- D_1 -First sowing date: 9th October, D_2- Second sowing date: 19th October, D_3- Third sowing date: 29th October; (2). Insecticide- C_1- Control, C_{2-} Imidacloprid 200 SC @ (300 ml / ha.), C_3- Acetamiprid 20 % SP (100 gm / ha.), C_{4-} Acephate 50 WG (700 gm / ha.).The treatments details as follows (Table.1):

Table 1: Treatment combinations of the experiment

S. No.	Treatment	Treatment Combination	Code
1	T_0	First sowing date / Control	$D_1 C_1$
2.	T_1	First sowing date / Imidacloprid 200 SC	D_1C_2
3.	T_2	First sowing date / Acetamiprid 20 % SP	D_1C_3
4.	T_3	First sowing date / Acephate 50 WG	D_1C_4
5.	T_4	Second sowing date / Control	D_2C_1
6.	T_5	Second sowing date / Imidacloprid 200 SC	D_2C_2
7.	T_6	Second sowing date / Acetamiprid 20 % SP	D_2C_3
8.	T_7	Second sowing date / Acephate 50 WG	D_2C_4
9.	T_8	Third sowing date / Control	D_3C_1
10.	T_9	Third sowing date / Imidacloprid 200 SC	D_3C_2
11.	T_{10}	Third sowing date / Acetamiprid 20 % SP	D_3C_3
12.	T_{11}	Third sowing date / Acephate 50 WG	D_3C_4

The observations were recorded on five randomly selected competitive plants in each treatment and replication for all the characters were recorded on plot basis. The data were recorded for following traits; five plants from each plot were randomly selected and tagged for recording a representative sample of the entire population. Pre-harvest observations i.e. Plant height (cm) at different growing stages viz., 60, 75, 90, 105 and 120 Days after sowing (DAS), Number of Branches per Plant at 60 DAS, percentage of flowering at 60 and 90 DAS, Silique plant^{-1}, Length of silique and Post-harvest observations i.e. Number of seed per silique, Test weight (g) and yield (q ha^{-1}) were recorded.

RESULTS AND DISCUSSION

The data of plant height (cm) presented in the table. 3(a) and (b) reveal that at 60 days, it was

found that there was a significant difference between the treatments. The maximum height of plant was found in T_3 (First sowing date / Acephate 50 WG) with 101.97 cm and the minimum height of plant was observed in T_8 (3^{rd} sowing date / Control) with 65.98 cm. At 75 days, the maximum height of plant was found in T_3 (First sowing date / Acephate 50 WG) with 128.87 cm and the minimum height of plant was observed in T_8 (3^{rd} sowing date / Control) with 82.13 cm. At 90 days, it was found that the maximum height of plant was found in T_3 (First sowing date / Acephate 50 WG) with 140.20 cm and the minimum height of plant was observed in T_8 (3^{rd} sowing date / Control) with 97.07 cm. At 105 days, the maximum height of plant was found in T_3 (First sowing date / Acephate 50 WG) with 168.13 cm and minimum height plant was observed in T_8 (3^{rd} date of sowing / Control) with 103.00 cm. At 120 days, it was found that in T_3 (First sowing date / Acephate 50 WG) with 187.87 cm and the minimum height of plant was observed in T_8 (3^{rd} sowing date / Control) with 115.60 cm. The plant height was increased due to the availability of the optimum temperature, sun-shine hours, long time active evaporation per day and suitable rainfall during crop growth. Similar reports have been reported by Shahzad *et al*[10]. Similar results for the date of sowing for plant height were given by Sonkar and Desai[11].

The data of the number of branches per plant presented in table 4 the shows maximum number of branches per plant recorded in treatment T_3 (First sowing date / Acephate 50 WG) with 10.93 branches and the minimum was recorded with in treatment T_8 (third sowing date / Control) with 4.73 branches. The number of branches per plant was significant among the sowing date and interaction of pesticides. The first sowing date on 9^{th} October 2014 recorded significantly higher number of branches per plant (10.93) as compared to second and third sowing date with 10.40 and 7.89 number of branches respectively. The data of percentage of flowering presented in table 5 reveal that at 60 days after sowing, the maximum number of percentage of flowering was found in T_3 (First date of sowing / Acephate 50 WG) with 60.87 and minimum number of percentage of flowering was observed in T_8 (Third sowing / Control) with 30.87. At 90 days after sowing, the maximum percentage of flowering was found in T_3 (First date of sowing / Acephate 50 WG) with 29.22 and minimum percentage of flowering was observed in T_8 (Third sowing / Control) with 7.98.

At the 60 days after sowing the percentage of flowering per plant were significant among the sowing date and interaction of pesticides (table.5). The first sowing date on 9^{th} October 2014 recorded significantly higher mean percentage of flowering per plant 60.87 as compared to second and third sowing date with 51.03 and 48.80 % respectively. At the 60 DAS, the application of pesticide in addition to enhance plant resistance has proven to be better for controlling aphids pest. Acephate 50 WG revealed that maximum number of flowering 60.87 % compared to Acetamiprid 20% SP and Imidacloprid 200 SC with 51.03 and 48.80 % respectively. Singh *et al*[12]., reported that late sowing influenced on the various growth parameters and yield attributing character leading to less number of flowering as compared to early sowing dates.

The number of siliques per plant presented in table 6 shows the maximum number of siliques per plant recorded in treatment T_3 (First sowing date / Acephate 50 WG) with 265.60 siliques and the minimum was recorded with in treatment T_8 (Third sowing date / Control) with 98.36 siliques respectively. Bakhtia[13] reported that insectides influenced on the various growth parameters and yield attributing character leading to more number of silique per plant as compared to control.

The data of the length of silique (cm) per plant presented in table 7 reveal that the maximum length per plant recorded in T_3 (First sowing date / Acephate 50 WG) with 6.73 cm and the minimum was recorded in treatment T_8 (Third sowing date / Control) with 4.47 cm. The application of the pesticide in addition to enhance plant resistance has proven to be better for controlling pest of the mustard crop. Malik *et al*[14]., found that insecticides influenced on the various growth

parameters and yield attributing character leading to the maximum length of siliqua per plant as compared to control. The data of number of seeds per silique presented in table 8 shows the maximum number of silique per plant recorded in treatment T_3 (First sowing date / Acephate 50 WG) with 17.35 and the minimum was recorded with in treatment T_8 (third sowing date / Control) with 8.91. Nanda *et al*[15]., also found that decrease in the number of seeds per silique with an interaction of late sowing and attack of aphids.

The data of test weight (g) presented in table 9 shows the maximum test weight recorded in treatment T_3 (First sowing date / Acephate 50 WG) 5.94 g and the minimum was recorded in treatment T_9 (Third sowing date/ Control) with 4.37 g. Islam and Choudary[16] also found that decrease in weight of test weight with the interaction of late sowing and due to attack of pest.

The data of seed yield (q. ha^{-1}) presented in table 10 shows the maximum seed yield recorded in treatment T_3 (First sowing date / Acephate 50 WG) 16.32 q. ha^{-1} and the minimum was recorded in treatment T_8 (Third sowing date / control) with 7.08 q. ha^{-1}. Guptha[17], found that seed yield was highest for early sowing combined with the application of pesticide and lowest for late sowing with combinations of treatments.

Table 2: Mean weekly weather parameters during crop growing season (Rabi 2014-2015)

Standard week	Temperature		Relative humidity		Rainfall (mm)	Sun shine hours (hrs)	Wind speed (km/hr)
	T_{max}	T_{min}	7 a.m	2 p.m			
October							
41	30.63	25.82	84.14	49.42	0	7.6	1.07
42	32.01	21.81	87	62.42	15.8	6.08	1.91
43	33.24	20.14	87	53.28	0	8.42	0.69
44	32.6	20.31	85.71	52.57	0	8.28	0.55
November							
45	33.17	19.57	86.28	45.71	0	8.18	0.81
46	32.25	16.57	87	46.71	0	8.25	0.6
47	29.71	12.02	85	45.28	0	8	0.66
48	30.57	11.14	82.28	43.14	0	8.1	0.55
December							
49	30.54	12.37	82.85	44	0	8.38	0.6
50	29.08	8.2	86	47.28	0	8.21	0.7
51	24.68	9.45	89	60.42	1.2	5.08	1.28
52	19.17	7.9	94.57	58.71	0	0.64	1.15
January							
1	17.62	10.85	93.42	64	4.71	0	1.31
2	22.62	11.82	91	57.42	0	0	1.47
3	15	7.7	93.71	72.14	0	0	1.34
4	18.82	9.24	93.71	64.85	1.16	0	0.28
5	19.65	13.04	91.14	63.14	1.76	1.2	4.57
February							
6	27.22	12.37	89.57	54.28	1.85	3.4	0.28
7	26.48	11.31	89.14	49.57	1.44	4.54	0.45
8	30.54	12.62	86.28	47.42	1.25	6.82	0
9	30.81	14.65	87.28	50.71	1.92	6.86	0
March							
10	28.62	14.68	93.57	62	2.26	4.61	4.17
11	31.6	15.8	85.42	45.14	1.25	7.74	0

Table 3: Effect of different sowing dates and application of pesticides on plant height (cm) after 60, 75 and 90 DAS

Date of sowing (D)	60 after sowing				Mean (D)	75 after sowing				Mean (D)	90 after sowing				Mean (D)
	Name of Pesticide (C)					Name of Pesticide (C)					Name of Pesticide (C)				
	Control (C_1)	Confidor 200SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)		Control (C_1)	Confidor 200SC (C_2)	Acetamiprid 20% SP(C_3)	Acephate 50 WG (C_4)		Control (C_1)	Confidor 200SC (C_2)	Acetamiprid 20% SP (C_3))	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	79.04	91.37	99.38	101.97	**92.94**	98.93	122.80	125.67	128.87	**119.07**	123.40	140.20	141.87	140.20	**136.42**
2nd date of sowing(D_2)	69.03	86.77	91.78	97.80	**86.35**	88.40	103.60	108.47	112.20	**103.17**	106.87	128..60	129.64	134.13	**123.55**
3rd d ate of sowing (D_3)	65.98	72.11	76.91	83.69	**74.67**	82.13	97.20	97.67	102.53	**94.88**	97.07	113.27	114.93	117.27	**110.64**
Mean (C)	**71.35**	**83.42**	**89.36**	**94.49**		**89.82**	**107.87**	**110.60**	**114.53**		**109.11**	**126.74**	**128.81**	**130.53**	
		F-test	S. Em. (±)	C.D. at 5%			F-test	S. Em. (±)	C.D. at 5%			F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	1.475	3.187			S	1.358	2.945			S	0.816	1.821	
Pesticide (C)		S	1.721	3.699			S	1.587	3.419			S	0.961	2.121	
Int. (D x C)		S	3.069	6.494			NS	2.836	6.01			S	1.752	3.762	

Table 3.a) Effect of different sowing dates and application of pesticides on Plant height (cm) after 105 and 120 days

Date of sowing (D)	105 after sowing				Mean (D)	120 after sowing				Mean (D)
	Name of Pesticide (C)					Name of Pesticide (C)				
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)		Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4))	
1st date of sowing (D_1)	135.40	163.60	166.40	168.13	**158.38**	147.60	181.40	186.00	187.87	**175.72**
2nd date of sowing(D_2)	124.27	146.47	148.60	152.07	**142.85**	140.93	166.00	167.53	175.33	**162.45**
3rd date of sowing (D_3)	103.00	128.47	129.73	131.60	**123.20**	115.60	144.53	146.93	149.33	**139.10**
Mean (C)	**120.89**	**146.18**	**148.24**	**150.60**		**134.71**	**163.98**	**166.82**	**170.84**	
		F-test	S. Em. (±)	C.D. at 5%			F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	1.193	2.602			S	1.644	3.539	
Pesticide (C)		S	1.396	3.024			S	1.917	4.105	
Int. (D x C)		NS	2.505	5.325			NS	3.409	7.199	

Table 4: Effect of different sowing dates and application of pesticides on number of branches

Date of sowing (D)	Name of Pesticide (C)				Mean (D)
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	8.60	10.00	10.27	10.93	**9.95**
2nd date of sowing(D_2)	7.27	9.53	9.87	10.40	**9.27**
3rd date of sowing (D_3)	4.73	6.50	7.23	7.89	**6.59**
Mean (C)	**6.87**	**8.68**	**9.12**	**9.74**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.216	0.318	
Pesticide (C)		S	0.23	0.349	
Int. (D x C)		S	0.311	0.517	

Table 5: Effect of different sowing dates and application of pesticides 60 and 90 DAS on percentage of flowering

	60 days after sowing					Flowering 90 days after sowing				
	Name of Pesticide (C)					Name of Pesticide (C)				
Date of sowing (D)	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP(C_3)	Acephate 50 WG (C_4)	Mean (D)	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	Mean (D)
1st date of sowing (D_1)	48.4	54.33	57.47	60.87	**55.27**	18.91	22.63	26.31	29.22	**24.27**
2nd date of sowing(D_2)	43.73	45.07	49.87	51.03	**47.43**	13.16	19.1	20.27	24.5	**19.26**
3rd date of sowing (D_3)	30.87	41.53	44.47	48.8	**41.42**	7.98	15.11	19.66	20.25	**15.75**
Mean (C)	**41**	**46.98**	**50.6**	**53.57**		**13.35**	**18.95**	**22.08**	**24.66**	
		F-test	S. Em. (±)	C.D. at 5%			F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.3	0.75			NS	0.92	1.78	
Pesticide (C)		S	0.364	0.885			S	1.044	2.037	
Int. (D x C)		S	0.719	1.62			S	1.721	3.439	

Table 6: Effect of different sowing dates and application of pesticides number of silique Plant^{-1}

Date of sowing (D)	Name of Pesticide (C)				Mean (D)
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	158.87	239.07	245.33	265.60	**227.22**
2nd date of sowing(D_2)	132.33	221.40	232.40	246.13	**208.07**
3rd date of sowing (D_3)	98.36	159.45	167.34	189.40	**153.64**
Mean (C)	**129.85**	**206.64**	**215.02**	**233.71**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	8.387	17.524	
Pesticide (C)		S	9.704	20.254	
Int. (D x C)		NS	16.895	35.169	

Table 7: Effect of different sowing dates and application of pesticides on length of silique

Date of sowing (D)	Name of Pesticide (C)				Mean (D)
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	5.85	6.54	6.65	6.73	**6.44**
2nd date of sowing(D_2)	5.06	5.92	5.96	6.09	**5.76**
3rd d ate of sowing (D_3)	4.47	5.37	5.47	5.59	**5.23**
Mean (C)	**5.13**	**5.94**	**6.03**	**6.14**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.195	0.275	
Pesticide (C)		S	0.206	0.299	
Int. (D x C)		NS	0.27	0.43	

Table 8: Effect of different sowing dates and application of pesticides number of seeds siliqua^{-1}

Date of sowing (D)	Name of Pesticide (C)				Mean (D)
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	14.23	16.53	16.92	17.35	**16.26**
2nd date of sowing(D_2)	11.87	14.93	15.20	15.73	**14.43**
3rd date of sowing (D_3)	8.91	13.13	13.67	14.33	**12.51**
Mean (C)	**11.67**	**14.86**	**15.26**	**15.80**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.048	0.228	
Pesticide (C)		S	0.074	0.282	
Int. (D x C)		S	0.216	0.577	

Table 9: Effect of different sowing dates and application of pesticides on test weight (gm)

Date of sowing (D)	Name of Pesticide (C)				Mean (D)
	Control (C_1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	4.65	5.61	5.82	5.94	**5.51**
2nd date of sowing(D_2)	4.51	5.46	5.74	5.81	**5.38**
3rd date of sowing (D_3)	4.37	5.24	5.42	5.61	**5.16**
Mean (C)	**4.51**	**5.44**	**5.66**	**5.79**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.017	0.164	
Pesticide (C)		S	0.038	0.208	
Int. (D x C)		NS	0.154	0.448	

Table 10: Effect of different sowing dates and application of pesticides on yield (q. ha^{-1})

Name of Date (D)	Name of Pesticide (C)				Mean (D)
	Control (C1)	Imidacloprid 200 SC (C_2)	Acetamiprid 20% SP (C_3)	Acephate 50 WG (C_4)	
1st date of sowing (D_1)	11.45	15.27	15.78	16.32	**14.71**
2nd date of sowing(D_2)	9.64	14.07	14.83	15.45	**13.50**
3rd ate of sowing (D_3)	7.08	10.28	10.82	11.45	**9.91**
Mean (C)	**9.39**	**13.21**	**13.81**	**14.41**	
		F-test	S. Em. (±)	C.D. at 5%	
Date (D)		S	0.058	0.249	
Pesticide (C)		S	0.085	0.306	
Int. (D x C)		NS	0.236	0.618	

CONCLUSION

The results of this study shows increased in plant height, number of branches, flowering percentage, number of silique per plant, length of silique, number of seeds per silique, test weight and seed yield among different treatments were recorded in 9th October date of sowing. Therefore it is recommended that for good growth and yield of Mustard (Parasmani-8 variety) to the grower under Allahabad climatic condition.

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