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Influence of Date of Sowing on Growth and Yield of Different Varieties of Radish (*Raphanus Sativus Linn.)* Under Allahabad Agro Climatic Conditions

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Abstract: ***An experiment was conducted at the Research farm, School of Forestry and Environment, SHIATS, Allahabad during Rabi season 2014-2015 to study the effect of sowing dates on three different varieties of radish. The experiment was laid out in Randomized Block Design (3x3 factorial) and replicated thrice. Seeds of the cultivars viz., hill queen; Mino early and S.S11 were sown on three different dates i.e. Oct 7, Oct 17 and Oct 27. Maximum plant height, leaf length, number of leaves, root length and root yield was obtained by 3rd sowing i.e. Oct 27. While root diameter and root weight were obtained by 1st sowing i.e. Oct 7. It was observed that Mino early recorded the highest root yield about 13.10 t/ha. The combined effect of sowing dates and varieties showed that sowing on Oct 27, all varieties performed well in respect of yield and yield components. Mino early was found to be the best in respect of quality judging.***

Keywords: Radish spp., root yield, Mino early, sowing time

1. Introduction

Radish (Raphanus sativus Linn.) is an annual or biennial herb depending on types. It is a fast-maturing, easy-to-grow root vegetable crop grown in both tropical and temperate regions. Radish is a good source of vitamin C (ascorbic acid), containing 15-40mg/100g of edible portion and contains a variety of minerals. It is very difficult to raise the good quality radish roots because of excessive forking, splitting, cracking and pithiness, which is highly influenced by varieties and time of sowing. Hence, selection of optimum sowing time, good quality varieties and spacing's are key factors for successful radish production

Arora and Pandey (1969) reported that radish sown between the end of September and mid-November yielded more than that sown later. The best sowing time in South India is from April–June in the hills and October-December in the plains **(Purewal, 1957).** The average yield of Indian cultivars varies from 150-200 quintals/ha.

Proper sowing time depend on the varieties and prevailing environment. Therefore the selection of right type of varieties for sowing at optimum time is the key factor for successful radish production. Growers tend to manipulate sowing time in order to obtain better growth and higher quality yield. The time of sowing is also adjusted so as to synchronize the time of harvest with market demand.

Under this circumstance, the present study was undertaken with the aim of investigating the effects of sowing date on growth and yield of three varieties of radish. It is anticipated that the information gathered from the results of the present experiment would help the growers to increase the production of radish with favorable weather conditions and proper sowing time.

2. Material and methods

The field experiment was carried out at the Research farm, School of Forestry and Environment, SHIATS-Deemed University, Allahabad during the period from October 2014-December 2014. The soil of the experiment was sandy loam in texture. The land was well drained with good irrigation facilities. The experiment was designed to study the influence of sowing date (D_1, 0ctober 7th; D_2, 0ctober 17th and D_3, October 27th) on growth and yield of three varieties (V_1, hill queen; V_2, Mino early; V_3, S.S11) of radish. Two factorial experiment was laid out following a Randomized block design (R.B.D) with three replications. The whole experimental area was 144m2 each block was divided into nine plots where nine treatments were allotted at random. The size of the plot was 2m x 2m, with the spacing of 30cm x 10cm. Well decomposed FYM and a basal dose of fertilizer were applied during final preparation. Irrigation and drainage channel were prepared around the plot before sowing the seeds. Seeds were sown on different sowing times with 10 days interval, in about 1.5cm depths, and in lines continuously and covered by loose soil. Seedling emergence was completed within 7 days after sowing. Seedlings were thinned out and it was done after 15 days of sowing. Weeding was done as or when required to keep the plot free from weed and to pulverize soil. General irrigation was done by twice in a week. The crop was harvested periodically and harvesting was done at 45 days after each sowing date. To evaluate the effect of sowing time on three selected varieties, following observations were made to get information related to plant growth as well as yield. Data were collected from experimental plots on different growth and yield components and yield were statistically analyzed.

3. Results and Discussion

The observation recorded on growth and yield of radish vegetable crop is influenced by variety and dates of sowing and observed that the 3rd sowing i.e. 27th October proved to

be most superior with respect to early germination and among the three dates of sowing maximum time taken to germinate was observed in the first sowing i.e. 7th October whereas among the varieties the 2nd variety i.e. mino early observed minimum time taken to germination and found maximum in the 3rd variety i.e. the delayed in germination might be due to the increased in minimum temperature in the first sowing since radish is a cool season crop that required a minimum temperature of 18^0C during germination. A number of days taken to maturity were highest in the 1st sowing, the increased in days to maturity might be due to longer duration of crop period and lowest in third sowing due to forced maturity caused by an increase in temperature. Seeds sown earlier took more time for the maturity of roots. Among the yield attributes, root length and root yield was observed maximum in the 3rd sowing and minimum in the 1st sowing whereas among the varieties maximum root length was observed in the 1st variety and minimum in 3rd variety and maximum root yield was observed in the 2nd variety i.e. mino early and minimum root yield was found in the 1st variety i.e. hill queen. **(Alam et al, 2010)** he suggested that sowing of radish variety from the first fortnight of October to November gave the longest root length. The higher yield in above treatments is due to better plant survival owing to the favorable environmental conditions for growth and development of roots and the closer spacing accommodates a number of plants per unit area. Similar results were reported by **Rehman and Nawab Ali (2000).**

And the effect of interaction between dates of sowing and varieties differed significantly for all the yield and growth parameters with a p-value ($p \geq 0.05$) as shown in Tables 1&2. It shows that maximum root yield was obtained by mino early sown during the late October i.e. 27th

Table 1: Effect of sowing dates and varieties on days to germination and days to maturity

Date of sowing	Days to germination				Days to maturity			
	Variety							
	V_1	V_2	V_3	Mean	V_1	V_2	V_3	Mean
D_1	7.133	6.667	7.133	6.977	54.333	55.333	57.000	55.556
D_2	6.100	6.300	6.200	6.200	53.000	48.637	50.067	50.578
D_3	5.967	5.700	5.933	5.866	45.733	46.111	40.000	43.956
Mean	6.400	6.222	6.422		51.022	50.044	49.022	
Interaction effect								
Source	D	V	DV		D	V	DV	
S.E(d)	0.181	0.181	0.314		1.955	1.955	3.387	
C.D	0.384	0.384	0.666		4.146	4.146	7.181	

Table 2: Effect of sowing dates and varieties on root length (cm) and root yield (t/ha)

Date of sowing	Root length (cm)				Root yield (t/ha)			
	Variety							
	V_1	**V_2**	**V_3**	**Mean**	**V_1**	**V_2**	**V_3**	**Mean**
D_1	22.333	20.333	18.667	**20.444**	9.797	12.00	11.183	**10.993**
D_2	22.900	20.567	19.567	**21.011**	10.810	11.733	10.533	**11.026**
D_3	24.133	22.500	20.067	**22.233**	10.133	13.100	10.680	**11.301**
Mean	**23.122**	**21.133**	**19.433**		**10.240**	**12.281**	**10.799**	
Interaction effect								
Source	**D**	**V**	**DV**		**D**	**V**	**DV**	
S.E(m)	1.376	1.376	2.383		0.643	0.643	1.114	
C.D	1.180	1.180	2.044		1.364	1.364	2.363	

4. Conclusion

The experimental results were observed maximum root yield (13.10t/ha) in treatment combination D_3V_2 (October 27 and Mino early) due to maximum plant survival and maximum plant population per unit area. Therefore based on the experiment performed we can be concluded that sowing of radish between late of October and the first week of November gave maximum root yield.

Hence, the radish variety Mino early and sowing date October 27th was most suitable for Allahabad Agro-climatic conditions.

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