

Performance of different varieties and sowing methods on growth, yield and quality of radish (*Raphanus Sativus* L.)

Y.D. Pawar*, L.R. Varma² and K.S. Gadave¹

^{1,2&}Department of Vegetable Science, College of Horticulture, S. D. Agricultural University, Sardarkrushinagar 385 506 (Gujarat) India

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ABSTRACT

The experiment was carried out at Horticulture Instructional Farm, C. P. College of Agriculture, S.D. Agricultural University, Sardarkrushinagar (Gujarat) India during *Rabi* season 2011, to evaluate the growth, yield and quality parameters of seven radish varieties *viz.*, V₁ (Pusa Chetki), V₂ (Pusa Mrudula), V₃ (Pusa Rashmi), V₄ (Pusa Himani), V₅ (Japanese White), V₆ (American White), V₇ (Arka Nishant) along with different sowing methods *viz.*, M₁ (Broad casting in flat bed), M₂ (Line sowing in flat bed) and M₃ (Line sowing in ridge bed). The results revealed that, Pusa Rashmi was most excellent variety in line sowing in flat bed with respect of growth, yield and quality attributes and ultimately it revolutionize the eminence of radish growers.

Key words: Flat bed, Radish, Sowing method.

Introduction

Radish (*Raphanus sativus* L.) is a popular root vegetable throughout India and abroad, grown for its edible fleshy roots which are eaten raw as salad or cooked as vegetable and it is rich in Ca, K, P and vitamin C. It is relished for its pungent flavor and considered as an appetizer; the young leaves are also cooked as vegetable and eaten. Radish preparations are useful in liver and gall bladder troubles. Radish has refreshing depurative properties. Roots, leaves, flowers and pods are active against gram positive bacteria. It has a cooling effect and considered especially suitable for patients suffering from piles, gastrodyria, enlarge sleeping, jaundice, urinary complaints and stomach troubles.

There are many cultivars of radish having diverse characters in different parts of the country. Those genotypes were collected from different parts of the

country. The detailed quantitative and qualitative characters of those genotypes are necessary to know. For the improvement of the yield and other desirable characters, there is urgent need to specific search and made a certain recommendation to generate research evidences with respect to most suitability of certain variety in specific sowing method. Therefore, the present study was conducted to assess the performance of different varieties and sowing methods of radish with keeping a view that such information would help in selecting genotypes for new variety and planning effective breeding programme for improvement of the crop.

Materials and Methods

The study was conducted at the Horticulture Instructional Farm, C. P. College of Agriculture, S.D.

*Ph.D. Scholar, ²Professor and Head

*Corresponding author's email: yogesh517.pawar@gmail.com

Agricultural University, Sardarkrushinagar during Rabi season 2011. The experiment was laid out in a Randomized Block Design with three replications. The study was conducted on seven varieties viz., V_1 (Pusa Chetki), V_2 (Pusa Mrudula), V_3 (Pusa Rashmi), V_4 (Pusa Himani), V_5 (Japanese White), V_6 (American White), V_7 (Arka Nishant) and three sowing methods M_1 (Broad casting in flat bed), M_2 (Line sowing in flat bed) and M_3 (Line sowing in ridge bed) were purposively selected for the present investigation because it able to generate the beneficial outcome. The seeds of these varieties were procured from Indian Institute of Agriculture Research, New Delhi and Indian Institute of Horticulture Research, Bangalore.

Recommended package of practices were adopted to raise the crop successfully. A number of growth parameters viz., days taken for germination, germination percentage, number of leaf at 15 and 30 DAS, length of leaf at 15 and 30 DAS and days taken for edible harvesting. Whereas yield attributes viz., weight of edible root with leaves per plant, weight of edible root per plant, weight of leaves per plant, yield of radish (edible root with leaves) per plot, yield of radish (edible root with leaves) per hectare, root leaf ratio on the weight basis, chlorophyll index, length of edible root, diameter of edible root and organoleptic test were recorded from five tagged plants. The mean data were subjected to statistical analysis following standard procedure (Gomez and Gomez, 1984).

Results and Discussion

Considerable variability among the genotypes and sowing methods existed in respect of qualitative and quantitative characters of radish (Table 1 and Table 2).

Growth parameters

Variety V_1 (Pusa Chetki), V_3 (Pusa Rashmi), V_5 (Japanese white) was recorded minimum time taken for germination *i.e.* 2.33 days. Variety V_3 (Pusa Rashmi) were recorded highest germination percentage (92.22 %) than other varieties of radish. The significantly maximum number of leaves at 15 DAS (5.83) was observed with variety V_5 (Japanese white). Significantly maximum length of leaf at 15 DAS (8.99 cm) was recorded with variety V_3 (Pusa Rashmi). The significantly minimum days taken for edible harvesting (40.00 days) was recorded with

variety V_1 (Pusa Chetki).

In case of sowing methods, the minimum days taken for germination of seed was recorded with treatment M_2 (Line sowing in flat bed) *i.e.* 2.42 days and it was significantly at par with treatment M_1 (Broad casting in flat bed). Among different sowing methods treatment M_2 (Line sowing in flat bed) was significantly superior (88.09 %) over treatment M_3 (Line sowing in ridge bed) *i.e.* 79.42 %. In case of sowing methods, maximum number of leaves was recorded with treatment M_2 (Line sowing in flat bed) at 15 and 30 DAS *i.e.* 5.90 and 9.58, respectively. Among different sowing methods, the significantly maximum length of leaf was recorded with treatment M_2 (Line sowing in flat bed) at 15 (8.66 cm) and 30 (23.86 cm) DAS. The significantly minimum days taken for edible harvesting (40.38 days) was recorded with treatment M_2 (Line sowing in flat bed). Interaction effect between $V \times M$ (varieties \times sowing methods) on days taken for edible harvesting was found significant variation. The significantly minimum days taken for edible harvesting (39.33 days) was observed with treatment combination V_1M_2 .

Pusa Rashmi has an upright growth, while the other varieties have a spreading type of growth. It may be due to the fact that upright type of plant growth gets sufficient space without shading, resulting probably in an increase in photosynthetic assimilation. The high accumulation of photosynthate is being translocated to root for its better development (Meyer and Anderson, 1950).

Yield attributes

The significantly maximum weight of edible root with leaves per plant (341.67 g), maximum weight of edible root per plant (229.11 g), maximum weight of leaves per plant (112.56 g) and maximum yield per hectare of edible roots with leaves was recorded (556.58 q/ha) with variety V_3 (Pusa Rashmi). Variety V_1 (Pusa Chetki) was significantly superior (2.80) than other varieties of radish with respect of root leaf ratio on the weight basis. Variety V_3 (Pusa Rashmi) was recorded significantly maximum chlorophyll index (27.93) in comparison to other varieties of radish. Variety V_3 (Pusa Rashmi) was recorded significantly maximum length of edible root (27.04 cm) in comparison to other varieties of radish. Significantly maximum diameter of edible root (4.65 cm) was obtained with variety V_2 (Pusa Mrudula). Variety V_3 (Pusa Rashmi) was recorded significantly

Table 1. Performance of different varieties and sowing methods on growth parameters of radish

Variety	Days taken for germination	Germination percentage	Number of leaves at 15 DAS	Number of leaves at 30 DAS	Length of leaf at 15 DAS (cm)	Length of leaf at 30 DAS (cm)	Days taken for edible harvesting
V ₁	2.33	90.44	4.94	8.24	8.38	22.69	40.00
V ₂	2.44	84.89	5.07	8.60	6.80	16.32	41.00
V ₃	2.33	92.22	5.78	9.67	8.99	26.96	41.00
V ₄	3.22	74.44	5.22	8.96	8.21	18.03	45.22
V ₅	2.33	88.67	5.83	9.73	8.64	23.38	40.67
V ₆	3.11	73.33	5.22	8.34	7.39	19.80	45.00
V ₇	3.11	84.00	5.54	8.96	8.24	24.52	43.89
S.Em.±	0.08	2.00	0.14	0.21	0.19	0.78	1.00
C.D. at 5 %	0.24	5.74	0.40	0.60	0.56	2.23	2.86
Sowing Methods							
M ₁	2.47	84.47	5.33	8.86	8.00	21.44	42.38
M ₂	2.42	88.09	5.90	9.58	8.66	23.86	40.38
M ₃	3.19	79.42	4.87	8.33	7.61	19.70	44.42
S.Em.±	0.05	1.31	0.09	0.13	0.12	0.51	0.65
C.D. at 5 %	0.16	3.76	0.26	0.39	0.37	1.46	1.87
Interaction (V X M)							
S.Em.±	0.14	3.48	0.24	0.36	0.34	1.35	1.73
C.D.at 5 %	NS	NS	NS	NS	NS	NS	4.95

DAS-Days after sowing

Table 2. Performance of different varieties and sowing methods on yield and quality of radish

Variety	Weight of edible root with leaves per plant (g)	Weight of edible root per plant (g)	Weight of leaves per plant (g)	Yield (edible root with leaves) per hectare (q/ha)	Root leaf Ratio on the weight basis	Chlorophyll index	Length of edible root (cm)	Diameter of edible root (cm)	Organ-ptic score
V ₁	260.67	191.22	69.44	458.84	2.80	21.47	15.39	3.32	6.10
V ₂	183.11	113.11	70.00	307.61	1.64	17.43	8.27	4.65	5.08
V ₃	341.67	229.11	112.56	556.58	2.03	27.93	27.04	2.64	6.32
V ₄	239.00	150.00	89.00	345.68	1.69	20.27	20.28	2.08	5.80
V ₅	307.00	197.67	109.11	488.68	1.83	27.18	24.69	2.49	6.16
V ₆	272.00	165.33	106.67	336.42	1.54	20.21	21.82	2.26	6.23
V ₇	317.78	207.33	110.44	541.15	1.89	27.51	23.08	2.57	6.06
S.Em.±	8.46	7.51	2.47	10.27	0.11	0.54	0.49	0.03	0.14
C.D. at 5 %	24.20	21.49	7.06	29.37	0.32	1.54	1.41	0.10	0.42
Sowing Methods									
M ₁	262.38	170.00	92.38	425.48	1.86	23.06	19.86	2.82	5.89
M ₂	302.71	200.00	102.71	482.80	1.98	24.46	21.76	3.01	6.19
M ₃	258.28	167.33	90.85	392.41	1.89	21.90	18.61	2.72	5.80
S.Em.±	5.54	4.92	1.61	6.72	0.07	0.35	0.32	0.02	0.09
C.D. at 5 %	15.84	14.07	4.62	19.23	NS	1.01	0.92	0.07	0.27
Interaction (V X M)									
S.Em.±	14.66	13.02	4.28	17.79	0.19	0.93	0.85	0.06	0.25
C.D.at 5 %	NS	37.22	12.24	50.87	NS	NS	2.43	0.17	NS

maximum organoleptic score (6.32) in comparison to other varieties of radish.

In case of sowing methods, the significantly maximum weight of edible root with leaves per plant (302.71 g) and maximum weight of edible root per plant (200.00 g) was recorded with treatment M_2 (Line sowing in flat bed). Interaction effect between V X M (varieties X sowing methods) on weight of edible root per plant was found significant variation. The significantly maximum weight of edible root per plant (284.00 g) was recorded with treatment combination V_3M_2 . Among different sowing methods, the significantly maximum weight of leaves per plant (102.71 g) was recorded with treatment M_2 (Line sowing in flat bed). Interaction effect between V X M (varieties X sowing methods) on weight of leaves per plant showed that maximum weight of leaves per plant (125.33 g) was recorded with treatment combination V_7M_2 . Among different sowing methods, significantly maximum yield of radish (edible root with leaves) per hectare (482.80 q/ha) was recorded with treatment M_2 (Line sowing in flat bed). Interaction effect between V X M (varieties X sowing methods) on yield of radish (edible root with leaves) per hectare (q/ha) found that significantly maximum yield of radish (edible root with leaves) per hectare (598.77 q/ha) was observed with treatment combination V_3M_2 . The present findings were in agreement with the results of Langthasa, *et al.*, (2000); Ahmad, *et al.*, (2003); Singh, *et al.*, (2005); Yadav, *et al.*, (2005) and Pattani, (2006) in radish.

Among different sowing methods, significantly maximum chlorophyll index (24.46) was recorded with treatment M_2 (Line sowing in flat bed). Among different sowing methods, significantly maximum length of edible root (21.76 cm), maximum diameter

of edible root (3.01 cm) and maximum organoleptic score (6.19) was recorded with treatment M_2 (Line sowing in flat bed). The significantly maximum length of edible root (29.83 cm) was obtained with treatment combination V_3M_2 . Whereas, the significantly maximum diameter of edible root (5.02 cm) was obtained with treatment combination V_2M_2 . Present findings are in close accordance with that of Kanwar, *et al.*, (2008) in radish.

References

- Ahmad, F., Ahmed S., Faridllah and Mehmood S. 2003. Performance of radish cultivars at Juglote, Northern areas Pakistan, NWFP Agriculture University, Peshawar, Pakistan. *Sarhad J. Agri.*, 19(4): 489-491.
- Gomez, K.A. and Gomez A.A. 1984. *Statistical Procedures for Agricultural Research*. Second Edition. John Wiley and Sons, NY.
- Kanwar, M.S., Sharma O.C. and Akbar, P.I. 2008. *Response of sowing systems and sowing time on yield and Horticultural traits of Radish (Raphanus Sativus L.) in cold arid*. M.Sc. Diss., Sher-e-Kashmir University of Agriculture Sciences and Technology.
- Langthasa, S. and Barah, P. 2000. Varietal performance of radish under hill conditions of Assam. Indian Association of hill farming, Barapani, India, *Indian J. Hort.*, 13(1/2): 85-86.
- Meyer, B.S. and Anderson, D.B. 1950. N.J., p 78. *Plant Physiology*. Van Nostrand, Princeton.
- Pattani, Vishalkumar, 2006. *Evaluation of different radish (Raphanus sativus L.) cultivars under North Gujarat Condition*. M.Sc. Diss., S.D. Agricultural University, Gujarat.
- Singh, V.B. and Taj, R.K. 2005. Evaluation of radish cultivars under rainfed condition of Nagaland. *Progressive Horticulture*. 37(1): 72-74.
- Yadav, S.K. and Singh, V.P. 2005. Varietal Performance of Radish. *Progressive Hort*. 37(1): 166-168.