

Growth and Yield Response of Various Radish (*Raphanus sativus L.*) Cultivars under Faisalabad Conditions

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Abstract

Various radish cultivars were grown during the years 2001 and 2002 to compare their yield potential and to find out high yielding better cultivar. The data suggested that the cultivar “Sixty days” superceded all the cultivars in relation to yield potential whereas, Mino Early Long White and Green Neck appeared to be promising for adoption in future.

Key words: Radish, Cultivars, Growth and Yield.

Introduction

Plant introduction has played an important role in the development of agriculture in many countries of the world. The plant material is imported and grown under local conditions for adoption and the best yielding material is evaluated to obtain better production (Cools and Straatsma 1985)

Radish is grown practically by all home and commercial gardeners. Radish roots and leaves are cooked as vegetable in different forms and are good source of vitamin A & C (Antonova 1991). Scientists have preferred to introduce new imported cultivars by growing them under local conditions and evaluating the best performing cultivar. Jorgensen (1990) compared 6 cultivars at two sites with different sowing dates between early May and early September. Better results were obtained from crop sown in September as compared to July sown crop. Similarly, Deolate *et al.*, (1994) studied radish cultivars, Pusa Rashmi, Pusa Hemani, Japanese white, Baramasi vijay and Pusa Chekti etc. in India during Rabi season. Pusa Rashmi was found to be the best cultivar in respect to root length, diameter, Wt. /plant and yield as compared to other cultivars. Verma *et al* (1989) harvested roots of 5 cultivars from 8 different sowings. (5 March-22September). The parameters studied were average number of leaves/plant, leaf development pattern and leaf & root length etc. Generally, sowing in June and thereafter resulted in to higher production. Therefore, the best yielding varieties can be found out by introducing the varieties from abroad.

The present studies were conducted therefore, to evaluate the best performing cultivars to get higher yields and better returns for farmers in which six Radish cultivars were compared under Faisalabad conditions.

Materials and Methods

A field study was conducted at Vegetable Research Area, Institute of Horticultural Sciences, University of Agriculture, Faisalabad during the year 2001 & 2002. The experiment was laid out in randomized complete block design (RCBD) with 4 replications. Six Radish cultivars were sown to study their growth & yield response. The cultivars used were Mino early long white, Minowase, Sixty days, Green neck, April Cross and All season. The seeds were sown on ridges made 75 cm apart with 10 cm plant to plant distance. The net plot size measured was 54 meters having six ridges. The parameters studied were final plant height, No of leaves per plant, fresh root weight / plant, root length, root diameter, total biomass, root yield / plot and per hectare. The usual methods and devices were used to take plant height, root diameter, root length, root weight / plant and root yield etc. Experiment was repeated second year, means were computed and data were analysed using analysis of variance techniques and differences among various treatments means were determined by using New Duncan’s Multiple Range Test at 5% probability level (Steel & Torrie 1984)

Results and Discussion

Plant height

Maximum plant height was observed in case of Mino early long white (77.94 cm) followed by Sixty days (77.22 cm) whereas, minimum plant height was observed in case of all season cultivar while, remaining three cultivars showed intermediate height. Plant height can be considered as one of the indices of plant vigour ordinarily. These variations in relation to height of plants for various radish cultivars might be affected by the environment to the great extent besides genetic potential. Similar results were reported by Bashir (1981).

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Table 1: Growth and Yield Response of Six Radish Cultivars (Mean of Two Years Data)

| Observations | Cultivars | | | | | |
|-------------------------------|--------------------------|---------------|---------------|----------------|-------------|---------------|
| | Mino early long white V1 | All season V2 | Green Neck V3 | April cross V4 | Minowase V5 | Sixty Days V6 |
| Plant Height (cm) | 77.94 a | 53.78 e | 71.10 b | 57.45 d | 60.30 c | 77.22 a |
| No of leaves | 23.45 a | 16.55 b | 27.00 | 16.55 b | 14.85 b | 24.35 a |
| Root length (cm) | 36.16 b | 26.52 b | 31.90 c | 28.70 d | 27.48 de | 38.95 a |
| Root Diameter (cm) | 3.21 a | 2.245 d | 2.852 b | 2.548 c | 2.795 b | 3.287 a |
| Fresh Wt. of root / plant (g) | 182.1 a | 97.08 e | 155.4 b | 11.8 d | 144.7 c | 186.9 a |
| Total Biomass / plant (g) | 32.10 c | 16.25 e | 33.97 b | 22.58 d | 16.00 e | 38.30 a |
| Root yield /plot (kgs) | 11.18 b | 4.440 e | 8.925 c | 6.188 d | 8.505 c | 11.91 a |
| Root yield per ha. (kgs) | 6684 b | 2654 e | 5335 c | 3699 d | 5084 c | 7119 a |

No of leaves

Maximum number of leaves were observed for Green neck (27) which remained statistically at par with sixty days (24.15) and Mino early long white (23.45) whereas, minimum number of leaves were recorded in case of Minowase (14.85) which was statistically similar with other cultivars like April cross (16.55) and All season (16.55). The number of leaves is an important character as the leaves are the plant factories, manufacturing carbohydrates. Therefore, the cultivar with more number of leaves generally gives high yields. These results are in agreement with the findings of Tariq (1975) and Verma *et al.*, (1989)

Length of roots (cm)

Cultivar Sixty days produced significantly the longest roots (38.95 cm) than other cultivars while, second position was occupied by cultivar Mino early long white which produced 36.16 cm long roots. The cultivars all season and Minowase had minimum root length of 26.52 cm and 27.48 cm respectively which were statistically at par with each other. Environmental and genetic factors strongly effect on root length. So cultivars with more number of leaves have more root length. Similarly soil conditions might have an effect on root length. So, different cultivars have different root length according to their behaviour. Similar results were also reported by Banga (1964)

Root diameter (cm)

Cultivar Sixty days had greater root diameter (3.28 cm) followed by cultivar Mino early long white (3.21 cm). Next in order were cultivars green neck (2.85 cm) and Minowase (2.79 cm) which were statistically similar whereas, all season produced least diameter (2.24 cm). Root diameter depends upon environmental factors, soil conditions and genetic make up and root length which increases root diameter also. So Sixty days and Mino early Long White produced greater root diameter

because of their increased root length and potential. The results are in line with the findings of deolate *et al.*, (1994).

Fresh root Wt. (g)

More weight (186.9 g) of fresh roots / plant was produced by cultivar Sixty days followed by Mino early long white (182.1 g) which are statistically at par with each other. Cultivar Green neck produced 155.4 g fresh root Wt. and securing second position whereas, minimum fresh root weight was observed in case of All season (97.08 g). It is fact that yield is related to number of leaves, root length and root diameter. Therefore, cultivar Mino early long white and Sixty days produced more weight of fresh roots per plant than other cultivars as they have more number of leaves, plant height and root shoot growth.

Total biomass /plant

The analysis of variance showed highly significant results in relation to total biomass per plant for various radish cultivars. The comparison of means indicated that cultivar Sixty days gained the maximum total biomass per plant (38.30 g), closely followed by cultivar Green neck (33.97 g) whereas, minimum total bio mass was produced by the cultivars all season, (16.25 g) and Minowase (16.00 g). remaining statistically at par with each other. It is evident that cultivars having more height, number of leaves and root size had maximum biomass.

Root yield (kg)

The cultivar Sixty days produced maximum root yield per plot (11.9 kg) i.e. 7119 kg/ha. The cultivar Mino early long white secured second position producing roots of 11.18 kg / plot i.e. 6684 kg / ha; both the cultivars remained statistically at par. While All season produced minimum yield of 4.44 kg/plot i.e. 2854 kg/ha. Comparison of different cultivars showed a great variation for yield potential which can be

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attributed to different aspects as discussed earlier alongwith differences in case of germplasm of the cultivars. These results are in line with the findings of Sarwar (1972) Tariq (1975) and Limin *et al.*, (1997). The study concluded that the cultivar Sixty days superceded all the cultivars in relation to yield potential whereas, cultivars Mino early long white and Green neck appeared to be promising for adoption in future.

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