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Yield And Yield Parameters of Radish (*Raphanus sativus* L.) Affected by Interaction of Varieties and Dates of Sowing

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ABSTRACT

This experiment was conducted during kharif season of 2014-15 at Horticulture College and Research Institute, Dr.Y.S.R. Horticultural University, Anantharajupet, Y.S.R. District of Andhra Pradesh to study the "Relative performance of radish (Raphanus sativus L.) Varieties under different dates of sowing in southern agro climatic zone of Andhra Pradesh" consisting of sixteen treatments combination with three replications was laid out in factorial randomized block design. Results indicated that maximum root length (25.62 cm), diameter (7.77 cm), root weight (358.13 g), fresh weight of the plant (484.93 g) and root yield (4.27 kg plot^{-1} and 94.80 q ha^{-1}) was recorded with Japanese White sowing on first fortnight of September.

Key words: *Varieties, Sowing dates, Radish and Yield.*

INTRODUCTION

Among the root vegetables, radish (*Raphanus sativus* L.) is one of the most ancient and popular root vegetable and predominantly a cool season vegetable. Asiatic types can tolerate higher temperatures than European varieties. Radish is grown for its young tender tuberous roots where even leaves and shoots are used as vegetable and consumed as either cooked or raw. It is a good source of vitamin C (ascorbic acid 15-40 mg/100 g) and minerals like calcium, potassium and phosphorus and vitamin C content is high in early varieties. The leaves are also a good source for extraction of proteins on commercial scale. The characteristic pungent flavor in radish is due to the presence of volatile isothiocyanates (4-methy thio-3-butenyl isothiocyanate), which is high in leaves of all cultivars[1], the seeds are said to be peptic, expectorant, diuretic and carminative[6]. A salt extracted from roots, dried and burnt to white ash is said to be in stomach trouble. Roots are also rich in carbohydrates and proteins[2] and have got refreshing and diuretic properties. Interaction of superior varieties and sowing dates are the most important factor in achieving economic yield.

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Under this circumstance, the present study was undertaken with the aim of investigating Relative performance of radish (*Raphanus sativus* L.) Varieties under different dates of sowing in southern agro climatic zone of Andhra Pradesh. 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 favourable weather conditions and proper sowing time.

MATERIAL AND METHODS

The field experiment was carried out at the HCRI, Anantharajpet, Dr YSR Horicultural University, West Godavari Dt. during the period from July 2014 to September 2014. The soil of the experiment was sandy loam in texture. The land was well drained with good irrigation facilities. The whole experimental area was 240 m2 each block was divided into sixteen plots where sixteen treatments were allotted at random. The size of the plot was 1.5 m x 3 m, 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 15 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.

Table 1: Interaction effect of varieties and sowing dates on yield parameters of radish

Cultivar X Dates of sowing	Shoot weight (g)	Root weight (g)	Root length (cm)	Root diameter (mm)	Root to shoot ratio	Fresh weight of the plant (g)	Days to maturity
V_1S_1	45.92	85.40	14.13	3.02	2.12	114.00	60.53
V_1S_2	50.20	69.53	13.45	3.18	2.24	135.33	59.27
V_1S_3	46.15	94.87	12.80	3.60	1.60	177.00	58.53
V_1S_4	130.50	167.05	16.20	4.16	1.93	380.73	61.67
V_2S_1	70.83	82.73	14.29	3.20	1.60	135.07	59.67
V_2S_2	57.83	69.27	15.59	3.43	1.64	152.93	59.13
V_2S_3	49.73	141.00	18.07	3.61	1.29	105.40	59.93
V_2S_4	171.89	228.07	19.13	4.96	1.40	432.86	62.00
V_3S_1	97.83	94.20	16.75	3.26	1.59	192.00	45.33
V_3S_2	84.00	111.60	16.67	3.39	1.52	189.80	45.67
V_3S_3	74.03	180.67	22.57	4.39	1.61	239.00	44.67
V_3S_4	211.14	358.13	25.62	7.77	1.54	484.93	50.33
V_4S_1	50.83	59.60	7.09	3.64	2.44	134.00	47.33
V_4S_2	34.12	77.73	7.55	3.36	1.77	95.53	46.67
V_4S_3	57.45	94.73	7.86	3.81	1.63	155.00	48.33
V_4S_4	78.77	156.93	9.47	4.56	1.71	240.80	50.67
S.Em±	12.93	14.47	0.84	0.28	0.14	12.78	0.51
CD at 5%	37.34	41.77	2.43	0.80	0.39	36.89	1.48

RESULTS AND DISCUSSION

Significant differences were observed among the interaction of varieties and sowing dates pertaining to all the parameters. Highest root length (25.62 cm), root diameter (7.77 cm), root weight (358.13 g), fresh weight of the plant (484.93 g), root yield (4.27 kg $plot^{-1}$ and 94.80 q ha^{-1}) and shoot weight (211.14 g) was recorded by Japanese white sown during first fortnight of September (V_3S_4). Cv. Pusa Chetki recorded maximum root shoot ratio (2.44) with second fortnight of July (V_4S_1) sowing. With regards to maturity Japanese white sown on second fortnight of August (V_3S_3) took less number of days (44.67).

The results of the present study indicated that root parameters were significantly affected by varieties and sowing dates. Root length and weight has gradually increased from second fortnight of July to first fort night of September. The climate prevailed during delayed sowings i.e., second fortnight of August and first fortnight of September was perhaps favourable for better vegetative growth of plant and lead to formation of higher photosynthates which ultimately resulted in higher root yield in radish. Root weight has decreased in early sowing. The reduction in root weight under early sown conditions could be poor development of roots due to higher temperatures prevailed during reproductive phase of the crop. Karbalaei *et al*.[5] in sugar beet and Hussain *et al*.[3] in carrot opined similar results with respect to this trait. Gradual decrease in root to shoot ratio in early sown crop might be due to more production of vegetative tops as compared to the development of roots. This is in conformity with the findings of Kabir *et al*[4]. Fresh weight of the plant depends upon the root and shoot weight. Maximum fresh weight of the plant was recorded during first fortnight of September might be due to optimum temperature and soil moisture that might have led to profuse vegetative growth and higher root yield. These findings are in agreement with Panwar *et al*[8]. Lowest fresh weight of the plant during early sowing is due to higher temperature prevailed (31.1^0C) during early growth period that might reduce the leaf yield and subsequently the root yield. The results showed that sowing dates and days to maturity were positively correlated. Delayed sowing took more period for maturity of roots which was due to lower temperatures, higher photosynthesis and higher dry matter assimilation during vegetative growth for longer period that might have led to delayed harvesting. The findings are in line with the results of Lavanya *et al*[7]. The higher yield in first fortnight of September might be due to its vigor and denser leaves which intercept more sunlight, consequently more photosynthesis and compensate photosynthates, which in turn lead to higher yield. Sunny days and cool nights are the best conditions during crop growth period that lead to delay at the time of harvest might have helped in better photosynthesis and translocation of metabolites reflecting to increase in vegetative growth and consequently root yield. Similar observations were reported by Rajanna and Shivashankar[9].

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