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**Evaluation of yield potential and suitability of
Radish (*Raphanus sativus* L.) varieties under
Hadauti region of Rajasthan**

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Atul Yadav**

Abstract

An experiment was conducted during *rabi season* 2016-2017 at the field of Horticulture department, School of Agricultural Sciences, Career Point University- Kota, Rajasthan, India. The site is situated in *Hadauti Region Kota*, which falls in south eastern part of Rajasthan and covers geographical area of 26.43 lakh ha and represents 7.71 per cent of the total geographical area of the state. The 22 treatment 3 replication and comparative study of 22 genotype of radish. On the basis of present study, it may be concluded that Ever Green variety of radish was found superior variety for Hadauti Region on the basis of growth parameters followed by Snow White and higher root yield was obtained in variety Ever Green. Further study may be needed for the recommendation of these varieties of radish for cultivation under Hadauti Region.

Keywords: radish, varieties, growth, yield

Introduction

Radish (*Raphanus sativus* L.) belongs to genus *Raphanus* of family Cruciferous originated from the Europe and Asia (Thompson and Kelly, 1957) [12]. Radish is one of the most ancient vegetables. Inscriptions on the inner wall of pyramids show that radish was an important vegetable in Egypt about 2000B.C. certain remarks of Herodotus reveal that it was cultivated about 27 B.C. (Becker, 1962) [4]. Vegetable crops in India occupy only 2.8 per cent of the total cultivated area and contribute 14 per cent of world production of vegetables. Area under vegetable crops in India is 9396000 ha with annual production of 162897000 MT. The productivity of vegetables in India is 17.3 t/ha. (N.H.B., 2013-2014). It has spread to China in about 500 B.C. and Japan in 700 A.D. (Sirks, 1957) [11]. Vitamin C content of radish roots is greatly influence by light condition. Sid'ko *et al.*, (1975) [10] found that root vitamin content was higher in plants grown under blue light, while Lichtenthaler (1975) [7] noted enhanced synthesis of β carotene under red light. The vegetable consumption as per the recommendation of the dieticians should be 300 g per day per capita and out of 300 g of vegetables, 125 g of green leafy vegetables, 100 g of roots and 75 g of other vegetables (Gupta, 2012) [6]. In India radish is most important common root vegetable.

There are some specific Review of the related work

Chowdhury (2004) [5] noted that the carrot germplasm Sufala – 11 gave maximum number of leaves per plant (12.93) at 90 DAS, followed by 5280 A (12.85) whereas, the lowest was recorded in the genotype 6274 A (4.29).

Mapari *et al.* (2009) [8] conducted that the radish cultivars IC-144489 was observed the highest fresh weight of leaves (245.82 g), highest root length was observed in EXL- 11 (27.43 cm), root diameter (4.34 cm) in IC-143946 and root yield per plant (130.22 g) in Japanese White.

Alam *et al.* (2010) [2] reported that the radish varieties SAU line-1 gave highest leaf length per plant (68.9 cm) and shortest leaf (43.8 cm) was obtained from Tasakistan. The maximum root length (25.8 cm) was found from Tasakistan variety and minimum root length per plant (23.1cm) was found in Red Bombay. The highest fresh weight of root per plant was obtained from the SAU line-1 (4688.9 g), SAU line-1 produce the highest yield (42.02 kg/plot) per plot, and Red Bombay produced lowest root yield which was (36.4 kg/plot). Ahmad *et al.* (2012) [1] noted that the sugar beet varieties California gave highest beet root yield (74.2 t/ha). The variety Mirabella gave minimum lowest beet yield (40.33 t/ha).

Andrai (2012) [3] observed that the radish variety Nokguk recorded significantly maximum plant height (41.69 cm) while Early You variety recorded the minimum (30.78 cm). The maximum number of leaves per plant was recorded as (20.20) in variety Fiesta and The lowest number of leaves was noticed in the variety Puspa (11.33).

Thorat *et al.* (2013) [13] observed that the radish variety Ankur Naveen recorded significantly highest weight of whole plant (301.33 g), while the minimum weight of whole plant (154.67 g) was recorded in variety Solapur Local. It was observed maximum weight of root (255.33g) in variety Ankur Naveen which was statistically at par with Radish J.W. (218.67g) and Pune Local (208.67g), while the minimum weight of root (130.67g) was recorded in variety Solapur Local. The maximum weight of shoot (46 g) was recorded in variety Ankur Naveen and the minimum (24 g) in variety Solapur Local. Maximum root length was recorded in variety Ankur Naveen (30.13 cm), while the minimum length of root (24.17 cm) was recorded in variety Solapur Local. The maximum root yield (38.22 kg/plot) was recorded in variety Indem Sweta which was followed by varieties Pusa Reshmi (33.39 kg/plot) and Ketaki Long (33.33 kg/plot) the minimum (17.68 kg/plot) was recorded in variety Solapur Local. The maximum (37.75 t/ha) yield was recorded in variety Indem Sweta which was followed by Pusa Reshmi (32.97 t/ha) and Ketki Long (32.92 t/ha). The minimum (17.47 t/ha) was recorded in Solapur Local.

Naseeruddin *et al.* (2014) [9] reported that the radish variety Evergreen Farm gave maximum total plant weight (444.90g) was recorded, followed by Snow White (416.33g) and the minimum was recorded by Chetki Long (76.12g). The highest leaf weight (131.34g) was in Evergreen Farm and lowest in Radish Scarlet Globe (15.02g). The highest root yield per plant (326.77g) was recorded for Evergreen Farm followed by Local 1 (306.86g) and Pusa Chetki (66.90g) had the lowest root yield per plant. The maximum leaf length of (37.23cm) was recorded in Pusa Desi and minimum (17.01cm) was in Radish Scarlet Globe. Significantly higher root length (36.90cm) was recorded in Long White. The minimum of (17.26cm) was in Pusa Mirdula followed by Radish Scarlet

Globe (17.54cm). The maximum root diameter of (5.79cm) was observed in Pusa Mirdula followed by Radish Scarlet Globe. (4.90cm) and minimum of (2.48cm) observed in Chetki Long. The highest TSS (5.96 °Brix) was recorded for Pusa Mirdula and lowest (4.03 °Brix) were recorded for Radish Scarlet Globe, Radish. The highest Vitamin C of (35.70 mg/100g) was recorded in Local 2 followed by Long White (25.66 mg/100g), while the minimum vitamin C of (8.16 mg/100g) was recorded in Full Red followed by Local 3 (8.40mg/100g). The maximum acidity (0.49mg/100g) was recorded in Local 5 and minimum (0.12mg/100g) in Pusa Desi.

3. Methods and Materials

The site is situated in *Hadauti Region Kota*, which falls in south eastern part of Rajasthan and covers geographical area of 26.43 lakh ha and represents 7.71 per cent of the total geographical area of the state. The zone is located between 23°45' and 26°33' North latitudes and 75°27' and 77°26' East longitudes. The area under cultivation is 18.0 lakh hectares, out of which approximately 26% is irrigated and remaining is under rain fed and dry land conditions. It includes all tehsils of Kota, Bundi, Baran, Jhalawar districts and 22 genotype of radish are given below:

Table 1: Radish strain/variety with their sources

S. No.	Name of strain/variety	Source
1	Arka Nishant	Jaipur
2	Baramasi	Jobner
3	Bharsar Local-2	Kota
4	Delhi White	Udaipur
5	Dunagri	Pantnagar
6	Ever Green	Udaipur
7	Hill Queen	Srinagar
8	J.U.	Jhalawar
9	Japanese White	Jhalawar
10	Local 1	Varansi
11	Local 2	Udaipur
12	Local 3	Jobner
13	Local 4	Amritsar
14	Local 5	Ajmer
15	Local 6	Udaipur
16	Local 7	Amritsar
17	Local 8	Bhilwara
18	M.E.L.W	Jobner
19	Pusa Mirdula	Ajmer
20	Snow White	Agra
21	Sonali White	Varansi
22	Pusa Chetki (Check)	Udaipur

4. Results and Discussion

This zone possesses typically sub-tropical climatic conditions characterized by mild winters and moderate summers associated with high relative humidity during the months of July to September. The annual rainfall of the region is 650 – 1000 mm, most of which is contributed by south west monsoon from July to September, 2017

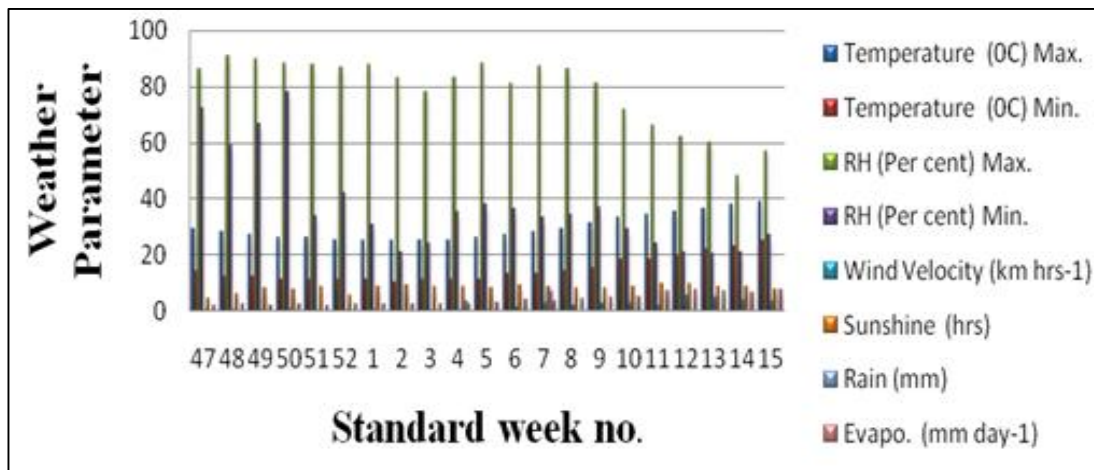


Fig 1: Weather parameter of study area (2017). Growth parameters

4.1.1 Plant height

There were significant variation regarding the plant height *i.e.*

30 DAS and at harvest between the 22 varieties. The results have been produced in Table 2.

Table 2: Mean performance of radish varieties for plant height (cm) at different days after sowing

S. No.	Name of varieties	Plant height (cm)	
		30 DAS	at harvest
1.	Arka Nishant	28.55	60.66
2.	Baramasi	26.45	58.12
3.	Bharsar Local-2	24.27	52.75
4.	Delhi White	19.54	53.62
5.	Dunagri	26.83	50.83
6.	Ever Green	27.24	64.02
7.	Hill Queen	22.43	59.95
8.	J.U.	25.97	50.02
9.	Japanese White	23.36	51.01
10.	Local 1	25.45	51.22
11.	Local 2	21.78	47.71
12.	Local 3	23.42	53.61
13.	Local 4	27.48	57.98
14.	Local 5	23.27	51.57
15.	Local 6	18.68	56.63
16.	Local 7	23.81	58.00
17.	Local 8	24.66	54.43
18.	M.E.L.W	21.86	59.23
19.	Pusa Mridula	12.49	31.92
20.	Snow White	31.82	66.33
21.	Sonali White	24.46	61.88
22.	Pusa Chetki (check)	25.66	52.25
S.Em±		00.94	01.26
CD at 5%		02.68	03.61

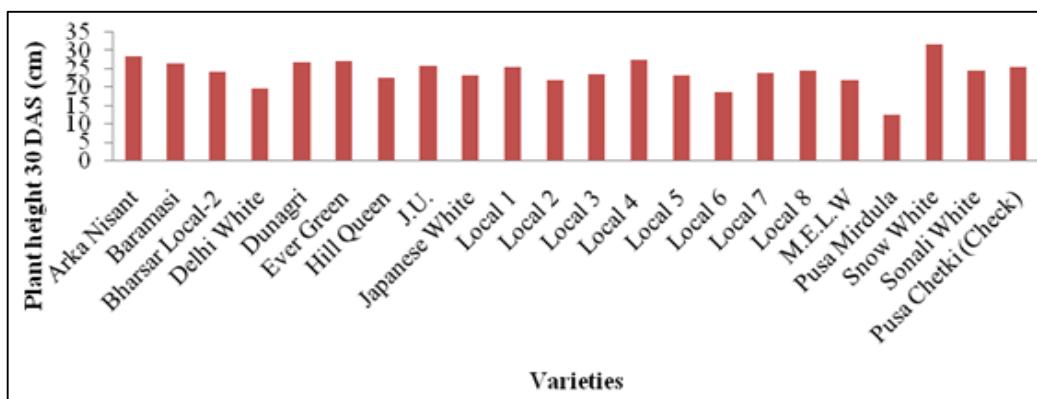


Fig 2: Mean performance of radish varieties for plant height at 30 DAS

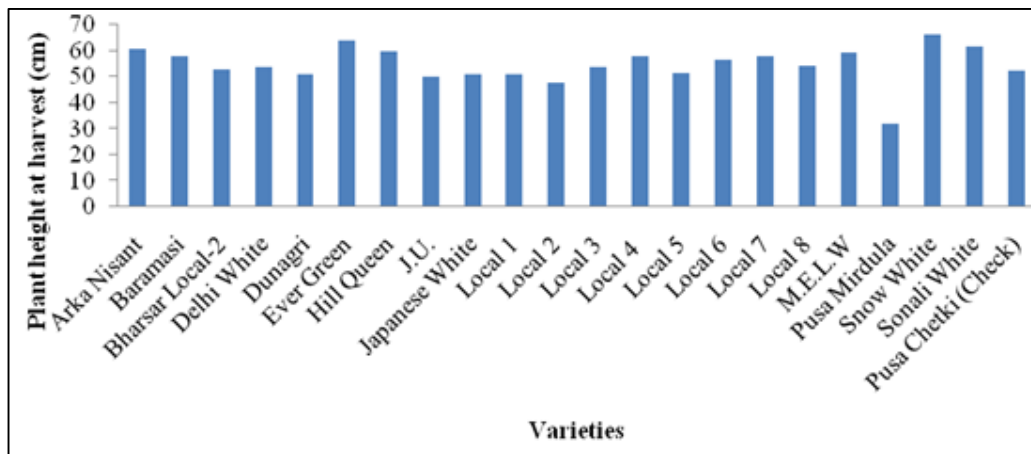


Fig 3: Mean performance of radish varieties for plant height at harvest

For plant height at 30 DAS, the variety Snow White (T_{20}) was recorded maximum plant height (31.82 cm) and plant height at harvest, the variety Snow White (T_{20}) was recorded significantly maximum plant height (66.33 cm).

Number of leaves per plant

There were significant variation regarding the number of leaves per plant *i.e.* 30 DAS and at harvest between the 22 varieties. The results have been produced in Table 3.

Table 3: Mean performance of radish varieties for number of leaves at different days after sowing

S. No.	Name of varieties	No. of Leaves	
		30days	At harvest
1.	Arka Nishant	07.85	11.94
2.	Baramasi	09.92	15.18
3.	Bharsar Local-2	10.03	14.49
4.	Delhi White	08.11	12.28
5.	Dunagri	12.03	15.45
6.	Ever Green	13.57	20.74
7.	Hill Queen	12.13	18.66
8.	J.U.	10.51	16.61
9.	Japanese White	11.66	14.76
10.	Local 1	08.55	12.62
11.	Local 2	07.33	14.33
12.	Local 3	09.29	16.10
13.	Local 4	10.66	14.61
14.	Local 5	08.99	16.57
15.	Local 6	10.58	15.67
16.	Local 7	08.25	13.73
17.	Local 8	09.07	14.24
18.	M.E.L.W	11.11	17.10
19.	Pusa Mridula	07.31	10.29
20.	Snow White	15.35	23.70
21.	Sonali White	13.47	19.49
22.	Pusa Chetki (check)	09.51	18.33
S.Em±		00.49	00.58
CD at 5%		01.40	01.65

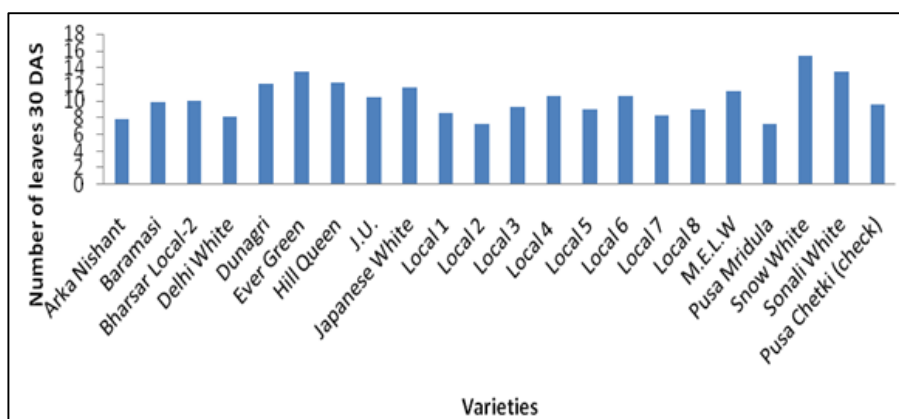


Fig 4: Mean performance of radish varieties for number of leaves at 30 DAS

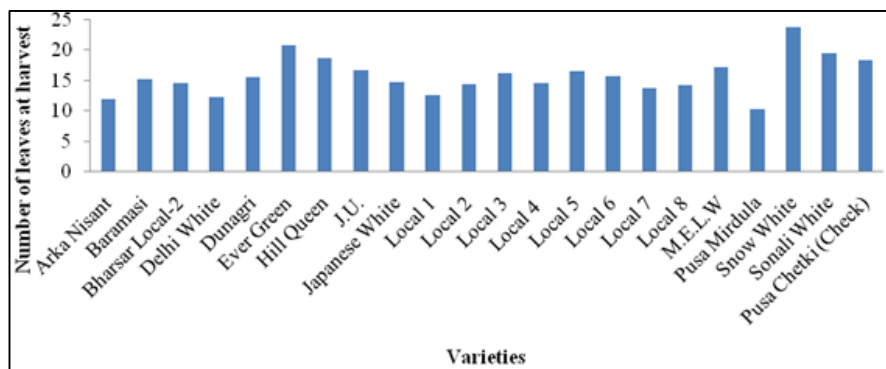


Fig 5: Mean performance of radish varieties for number of leaves at harvest

Number of leaves at 30 DAS, the variety Snow White (T_{20}) was recorded significantly maximum number of leaves per plant (15.35) and at harvest, the variety Snow White (T_{20}) was recorded significantly maximum number of leaves per plant (23.70).

Yield parameters

4.2.1 Length of root and Length of leaves (cm)

The significant differences were observed in root length under different varieties which are presented in Appendix IX, Table 4 and graphically depicted in Fig. 9.

Table 4: Mean performance of radish varieties for length of root and length of leaf (cm)

S. No.	Name of varieties	Length of root (cm)	Length of leaf (cm)
1.	Arka Nishant	18.66	42.00
2.	Baramasi	23.77	34.35
3.	Bharsar Local-2	16.33	36.42
4.	Delhi White	24.48	29.14
5.	Dunagri	18.15	32.68
6.	Ever Green	30.72	33.30
7.	Hill Queen	26.05	33.90
8.	J.U.	20.90	29.12
9.	Japanese White	24.00	27.01
10.	Local 1	22.34	28.88
11.	Local 2	17.87	29.84
12.	Local 3	18.60	35.00
13.	Local 4	23.44	34.54
14.	Local 5	21.03	30.54
15.	Local 6	23.30	33.33
16.	Local 7	22.73	35.27
17.	Local 8	20.14	34.29
18.	M.E.L.W	22.66	36.57
19.	Pusa Mridula	14.10	17.82
20.	Snow White	36.70	29.63
21.	Sonali White	26.68	35.19
22.	Pusa Chetki (check)	24.21	28.04
S. Em±		00.53	00.42
CD at 5%		01.52	01.20

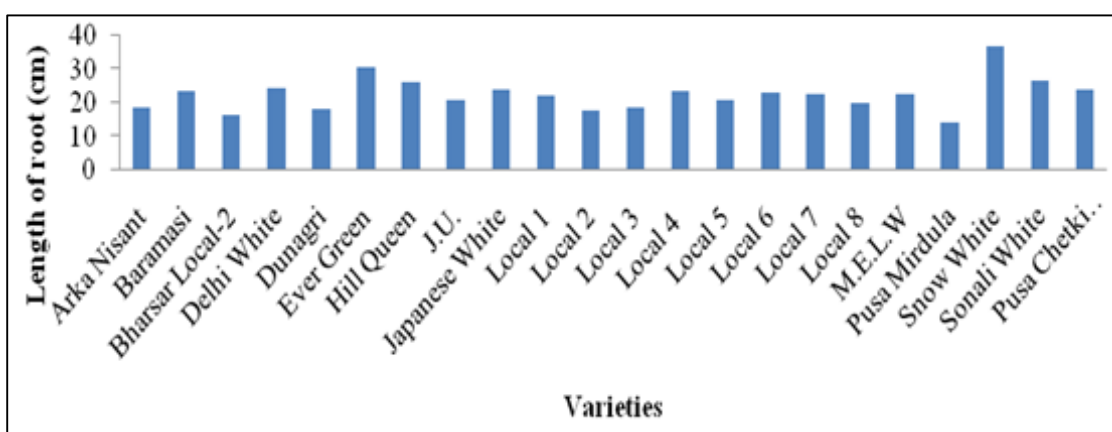


Fig 6: Mean performance of radish varieties for length of root (cm)

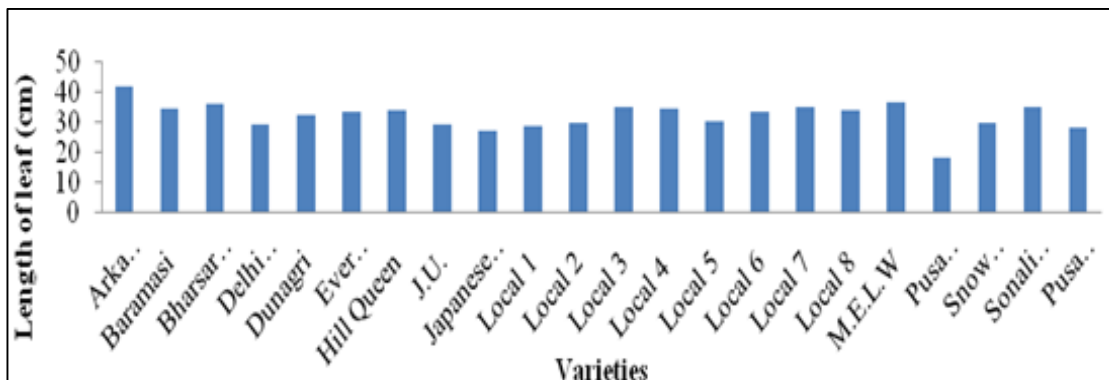


Fig 7: Mean performance of radish varieties for length of leaf (cm)

The maximum root length (36.70 cm) was recorded in variety Snow White (T₂₀) and the maximum leaf length (42.00 cm) was recorded in variety Arka Nishant (T₁).

4.2.3 Diameter of root (cm)

The significant differences were observed in diameter of root under different varieties, which are presented in Appendix XI, Table 5 and graphically depicted in Fig. 11.

Table 5: Mean performances of radish varieties for root diameter (cm)

S. N.	Name of varieties	Diameter of root (cm)
1.	Arka Nishant	3.61
2.	Baramasi	3.63
3.	Bharsar Local-2	4.03
4.	Delhi White	3.67
5.	Dunagri	4.88
6.	Ever Green	4.51
7.	Hill Queen	3.31
8.	J.U.	3.36
9.	Japanese White	3.96
10.	Local 1	4.20
11.	Local 2	2.72
12.	Local 3	3.58
13.	Local 4	3.03
14.	Local 5	3.82
15.	Local 6	3.65
16.	Local 7	3.70
17.	Local 8	3.07
18.	M.E.L.W	3.42
19.	Pusa Mridula	5.91
20.	Snow White	3.98
21.	Sonali White	4.10
22.	Pusa Chetki (check)	3.67
S.Em±		0.05
CD at 5%		0.14

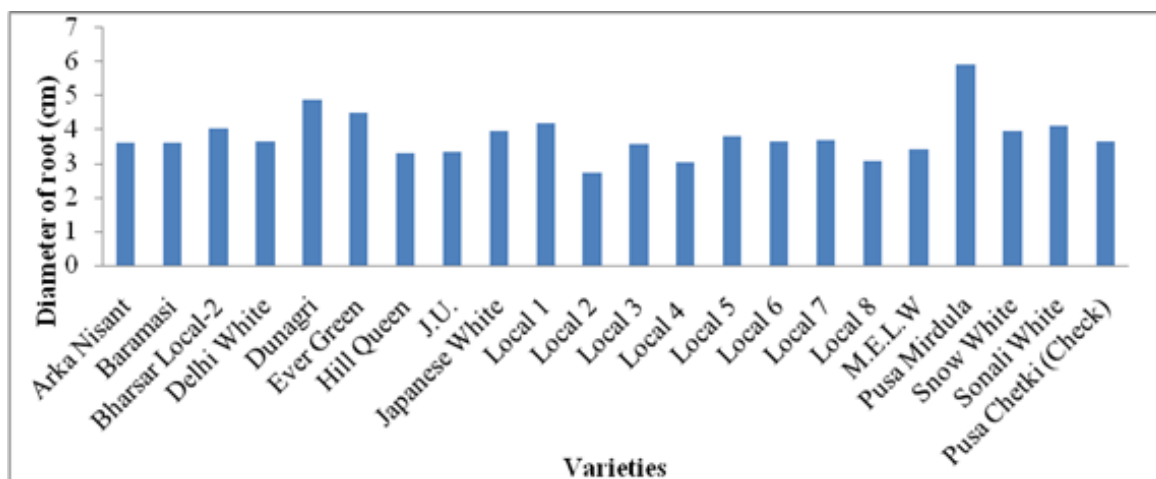


Fig 8: Mean performances of radish varieties for diameter of root (cm)

The maximum root diameter (5.91 cm) was recorded in variety Pusa Mridula (T₁₉),

in root yield per plot among different varieties which are presented in Appendix XV, Table 6 and graphically depicted in fig. 15.

5. Root yield per plot (kg/ plot)

The data clearly showed that, there were significant differences

Table 6: Mean performance of radish varieties for root yield per plot (kg)

S. N.	Name of varieties	Root yield per plot (kg)
1.	Arka Nishant	20.37
2.	Baramasi	21.14
3.	Bharsar Local-2	22.15
4.	Delhi White	21.92
5.	Dunagri	24.08
6.	Ever Green	30.56
7.	Hill Queen	24.77
8.	J.U.	20.93
9.	Japanese White	22.86
10.	Local 1	23.13
11.	Local 2	17.43
12.	Local 3	18.10
13.	Local 4	17.77
14.	Local 5	20.17
15.	Local 6	19.86
16.	Local 7	21.27
17.	Local 8	16.44
18.	M.E.L.W	19.17
19.	Pusa Mridula	15.00
20.	Snow White	28.45
21.	Sonali White	22.00
22.	Pusa Chetki (check)	26.64
S.Em±		00.40
CD at 5%		01.14

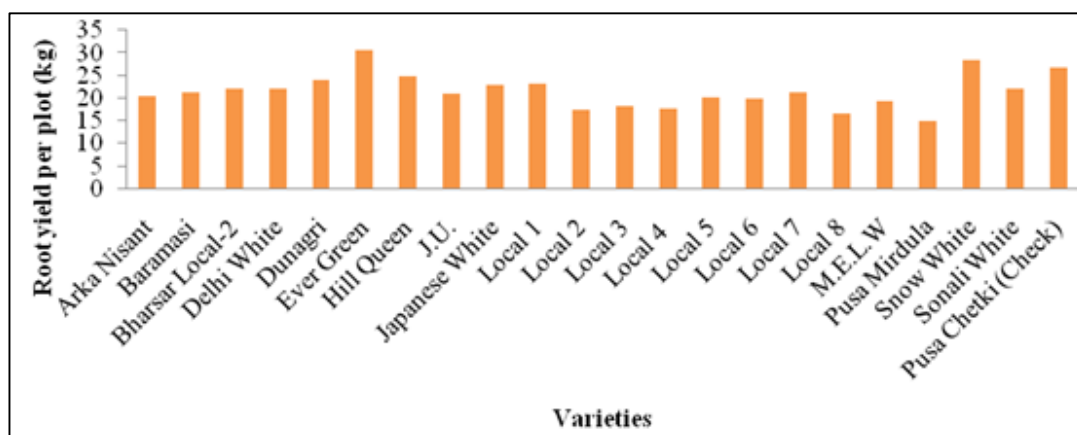


Fig 9: Mean performance of radish varieties for root yield per plot (kg)

The higher root yield (30.56 kg/plot) was obtained in variety Ever Green (T₆) followed by Snow White (T₂₀)

6. Conclusion

On growth parameters like plant height, number of leaves, length of root the variety Snow White (T₂₀) showed significantly maximum plant height number of leaves, length of root while The maximum leaf length was recorded in variety Arka Nishant (T₁), The minimum days taken to harvest was observed under the variety Delhi White (T₄), The maximum diameter of root was recorded in variety Pusa Mirdula (T₁₉), The higher root yield was obtained in variety Ever Green (T₆).

7. References

- Ahmad S, Zubair M, Iqbal N, Cheema NM, Mahmood K. Evaluation of sugar beet hybrid varieties under thal-

kumbi soil series of Pakistan, Int. J Agri. Bio. 2012; 14(4):605-608.

- Alam MK, Farooque AM, Nuruzzaman M, Uddin AJ. Effect of sowing time on growth and yield of three radish (*Raphanus sativus* L.) varieties, Bangladesh, Res. Pub. J. 2010; 3(3):998-1006.
- Andrai VK. Evaluation of radish cultivars for yield and its parameters during the spring season. The Punjab Veg. Grower. 2012; 30:62-63.
- Becker G. Handbuch Die Kulturpflanze. 1962; 6:23-78.
- Chowdhury JM. Performance of some advanced line of carrot under mymensing condition. M. Sc. Thesis, Department of Horticulture Bangladesh Agriculture University, Mymensing, 2004.
- Gupta SN. Instant horticulture. Jain Brothers (New Delhi). 2012; 10:71.
- Lichtenthaler HK. Plant Physiology. 1975; 34(33):7-8.

8. Maparia MK, Kharuna DS, Mishra GM. Evaluation of radish (*Raphanus sativus* L.) genotypes for growth, yield and quality. Int. J Agri. Sci. 2009; 4:284-286.
9. Naseeruddin KH, Singh V, Rana DK. Performance of different radish (*Raphanus sativus* L.) varieties suitable under garhwal himalaya region. Weekly Sci. Res. J., 2014; 2(12):2321-7871.
10. Sid'ko FY, Tikhomirov AA, Zolotukhin IG, Polonsskii VI. Fizziologiya biokhimiya kul turnykh rastinii. 1975; 7:181-184.
11. Sirks MJ. Genen on phaenen. 1957; 2:2-10.
12. Thompson CH, Kelly CW. Vegetable Crops, McGraw book Co. inc., U. S. A, 1957.
13. Thorat AR, Kadam AS, Sarvad SA. Performance of some improved and local varieties of radish (*Raphanus sativus* L.), Int. J. Agri. Allied. Sci., 2013; 1(1, 2):17-21.