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COMPARATIVE STUDY OF GROWTH AND YIELD PERFORMANCE OF VARIOUS CARROT CULTIVARS UNDER CLIMATIC CONDITIONS OF BALOCHISTAN

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Abstract

Purpose: Comparative study of growth and yield performance of various carrot cultivars under climatic conditions of Balochistan

Methodology: An experimental trial was conducted at Agriculture Research Vegetable Seed Production situated at Quetta, Balochistan. In order to determine the growth and yield of different carrot cultivars were collected throughout the country and planted during the year 2018 in three replicated randomized complete block design (RCBD) having a plot size of 6 m x 6 m (36 m^2).

Finding: Out of 10 cultivars of carrot for higher productivity, all the growth traits was statistically significant except no of leaves, the cultivar Faisalabad T-29 was recorded high yielding (54.47 tons/ha) root yield of carrot, followed by Long Red India (48.49 tons/ha), T29 (VSF)(44.91 tons/ha), Amech (41.69 tons/ha),New Croda (32.87 tons/ha), D-C-3 (30.64 tons/ha),D-C96 (27.65 tons/ha), MP- 4(25.42 tons/ha) and Orange(23.05 tons/ha) root yield of carrot, respectively. However, minimum root yield (18.20 tons/ha) of carrot was recorded in D-C-W.

Unique contribution to theory and practice: Main aim of this study was to reveal the potential existing germplasm of carrots regarding their morphological aspect. Also this study has deep impact on growing communities of province.

Keywords: *Carrot, Cultivars, Yield, Climatic conditions, Balochistan*

INTRODUCTION

Carrot is one of the most valuable vegetable crop of winter season and its origin is Asia and Europe [1]. Growth cycle of Carrot comprises on biennial patterns and belongs to umbellifer family Apiaceae [2]. Carrot also played its significant role in nutritious aspects of human diet, and provide strength in juveniles against blindness through production of Vitamin A [3]. Carrot Root also hoard multi-bio active phytochemicals such as phenolic, carotenoids, polyacetylenes and ascorbic acid which impose positive impact on reducing the hazards of cardio vascular diseases and cancer in humans [4]. Carrot seeds also hold many medicinal values[1]. According to farming and consumers the attractive root part of crop is more productive for high market value [1,5]. Carrot also hold the low sensitivity in cropping system which give the edges toward the organic production on mass level [6]. Climate change impact the Agriculture Sector directly and limiting the efficiency factors of crops on large scale globally[7].

In Balochistan carrot is grown on an area of 3030 Hectares with the annual production of 52473 tons, however its average yield is 52473 ton ha-[8], which lower than average yield of other carrot growing countries. The high production of carrot can be achieved through the adoption of improve production technology of carrot especially growing the suitable varieties according to the environmental conditions. The present study was designed to find out carrot cultivars with high yield potential under the agro-ecological condition of Quetta-Balochistan (Pakistan).

MATERIALS AND METHOD

An experimental trial was conducted at Agriculture Research Vegetable Seed Production situated at Quetta, Balochistan. In order to determine the growth and yield of different carrot cultivars were collected throughout the country and planted during the year 2018 in three replicated randomized complete block design (RCBD) having a plot size of 6 m x 6 m (36 m^2). The following ten carrot cultivars were included experimental trial. V_1 = New Croda, V_2 = Amech, V_3 = Faisalabad T-29,V_4 = T29 (VSF), V_5 = D-C-3, V_6 = D-C-W, V_7 = Long Red India, V_8 = D-C96, V_9 = MP- 4 and V_{10} = Orange. Data regarding Plant height (cm), No of leaves, Leaves weight (g), Root length (cm), Root Weight (g), Root diameter (cm), Biological yield /t/ha and Root yield /t/ha were recorded during field study. The data collected were analyzed statistically using Statistix 8.1 (Statistix, 2006) and difference between means were compared by using least significant difference (LSD) test at P = 5% [9]

RESULT AND DISCUSSION

Plant height(cm). The data indicated that Faisalabad T-29 resulted in maximum plant height (51 cm) of carrot, followed by Long Red India (42 cm), T29 (VSF) (39.3 cm), Amech (36.7 cm), New Croda (35 cm), D-C-3 (35 cm), D-C96 (29 cm), MP- 4 (26.7 cm) and Orange (23.3 cm) plant height of carrot, respectively. However, minimum plant height (19.3 cm) of carrot was recorded in D-C-W.LSD suggested non-significant differences ($P>0.05$) in plant height among V5-V2-V1 and among V9-V8; while significant ($P<0.05$) when All Varietal groups were compared with each other.

No of leaves of leaves per plant. The data indicated that V_3 = Faisalabad T-29 resulted in maximum No of leaves (7.7) of carrot, closely followed by V_2 = Amech(7.3), V_7 = Long Red India(7.3), V_1 = New Croda (7), V_5 = D-C-3(7), V_4 = T29 (VSF) (6.7), V_9 = MP- 4 (6.7), V_{10} = Orange(6.7) and V_8 = D-C96 (6.3) no of leaves of carrot, respectively. However, minimum no of leaves (6) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in no of leaves among V_{10}-V_9-V_7-V_5-V_4-V_2-V_1; while significant ($P<0.05$) when V_6-V_3 varietal groups were compared with each other.

Leaves weight (g). The data indicated that V_3 =Faisalabad T-29 resulted in maximum leaves weight (43.7g) of carrot, followed by V_7 = Long Red India (37.3g), V_4 = T29 (VSF) (33.7g),V_2 = Amech (32.3g),V_1 = New Croda (31.3g), V_5 = D-C-3 (29.3g), V_8 = D-C96 (29.3g), V_9 = MP- 4 (27.7g) andV_{10} = Orange(27g) leaves weight of carrot, respectively. However, minimum leaves weight (23g) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in leaves weight among V_5-V_4-V_2-V_1andV_{10}-V_9-V_8; while significant ($P<0.05$) when V_9-V_7-V_6-V_5-V_4-V_3 varietal groups were compared with each other.

Root length (cm). The data indicated that V_3 =Faisalabad T-29 resulted in maximum root length (25 cm) of carrot, followed by V_7 = Long Red India (20.1 cm), V_4 = T29 (VSF) (19.1cm),V_2 = Amech (18.2cm),V_8 = D-C96 (17.5 cm), V_1 = New Croda (15.3 cm), V_5 = D-C-3 (15.3 cm), V_9 = MP- 4 (15.3 cm) andV_{10} = Orange(13.8 cm) root length of carrot, respectively. However, minimum root length (15.5 cm) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in root length among V_7-V_4; V_4-V_2; V_8-V_2 andV_9-V_5-V_1; while significant ($P<0.05$) when V_{10}-V_8-V_7-V_6-V_3-V_1 varietal groups were compared with each other.

Root Weight (g). The data indicated that V_3 =Faisalabad T-29 resulted in maximum root weight (185g) of carrot, followed by V_7 = Long Red India (172g), V_4 = T29 (VSF) (167g),V_2 = Amech (158g),V_1 = New Croda (147g), V_5 = D-C-3 (137g),V_8 = D-C96 (124g),V_9 = MP- 4 (114g) andV_{10} = Orange(114g) root weight of carrot, respectively. However, minimum root weight (104g) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in root weight among V_7-V_4andV_{10}-V_9; while significant ($P<0.05$) when V_9-V_8-V_7-V_6-V_5-V_3-V_2-V_1 varietal groups were compared with each other.

Root diameter (cm). The data indicated that V_3 =Faisalabad T-29 resulted in maximum root diameter (3.24 cm) of carrot followed by V_7 = Long Red India (2.87 cm), V_4 = T29 (VSF) (2.63 cm),V_2 = Amech (2.53 cm),V_1 = New Croda (2.53 cm), V_5 = D-C-3 (2.45 cm),V_9 = MP- 4 (2.45 cm), V_8 = D-C96 (2.25 cm) andV_{10} = Orange(2.06 cm) root diameter of carrot, respectively. However, minimum root diameter (1.74 cm) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in root diameter among V_9-V_5-V_4-V_2-V_1; while significant ($P<0.05$) when V_{10}-V_9-V_8-V_7-V_6-V_5-V_4-V_3 varietal groups were compared with each other.

Biological yield /t/ha. The data indicated that V_3 =Faisalabad T-29 resulted in maximum (69.24 tons/ha) biological yield of carrot, followed by V_7 = Long Red India (59.31tons/ha), V_4 = T29 (VSF)(54.09 tons/ha),V_2 = Amech (50.33 tons/ha),V_1 = New Croda (40.33 tons/ha), V_5 = D-C-3 (37.61 tons/ha),V_8 = D-C96 (34.60 tons/ha), V_9 = MP- 4(31.96 tons/ha) andV_{10} = Orange(31.26 tons/ha) biological yield of carrot, respectively. However, minimum biological yield (24.69 tons/ha) of carrot was recorded in V_6 = D-C-W.LSD suggested non-significant differences ($P>0.05$) in biological yield among V_{10}-V_9; while significant ($P<0.05$) when all varietal groups were compared with each other.

Root yield /t/ha. The data indicated that V_3 =Faisalabad T-29 resulted in maximum (54.47 tons/ha) root yield of carrot, followed by V_7 = Long Red India (48.49 tons/ha), V_4 = T29 (VSF)(44.91 tons/ha),V_2 = Amech (41.69 tons/ha),V_1 = New Croda (32.87 tons/ha), V_5 = D-C-3 (30.64 tons/ha),V_8 = D-C96 (27.65 tons/ha), V_9 = MP- 4(25.42 tons/ha) andV_{10} = Orange(23.05 tons/ha) root yield of carrot, respectively. However, minimum root yield (18.20 tons/ha) of carrot was recorded in V_6 = D-C-W.LSD suggested significant ($P<0.05$) when all varietal groups were compared with each other.

Table-1: Mean Data of Growth and Yield Performance of Different Carrot Cultivars.

Varieties	Plant height (cm)	No of leaves	Leaves weight (g)	Root length (cm)	Root Weight (g)	Root diameter (cm)	Biological yield /t/ha	Root yield /t/ha
NEW								
CRODA	35 d	7 abc	31.3 cd	15.3 e	147 d	2.53 cd	40.32 e	32.87 e
AMECH	36.7 d	7.3 ab	32.3 c	18.2 cd	158 c	2.53 cd	50.33 d	41.69 d
FAISLABAD								
T-29	51 a	7.7 a	43. 7 a	25 a	185 a	3.24 a	69.24 a	54.47 a
T29 (VSF)	39.3 c	6.7 abc	33.7 c	19.1 bd	166 b	2.63 c	54.09 c	44.91 c
D-C-3	35 d	7 abc	29.3 de	15.3 e	137 e	2.45 d	37.61 f	30.63 f
D-C-W	19.3 g	6 c	23 f	12.5 g	104 h	1.74 g	24.69 i	18.20 j
LONG RED								
INDIA	42 b	7.3 ab	37.3 b	20.1 b	172 b	2.87 b	59.31 b	48.49 b
D-C96	29 e	6.3 bc	29.3 de	17.5 d	123 f	2.25 e	34.60 g	27.65 g
MP-4	26.7 e	6.7 abc	27.7 e	15.3 e	114 g	2.45 d	31.96 h	25.42 h
ORANGE	23.3 f	6.7 abc	27 e	13.8 f	114 g	2.06 f	31.26 h	23.05 i
SE±	1.1233	0.4869	1.2804	0.6075	3.2671	0.0676	0.9945	0.8556
LSD 0.05	2.3599	N.S	2.6901	1.2764	6.864	0.142	2.0894	1.7976
CV	4.08	8.68	4.98	4.32	2.82	3.34	2.81	3.02

CONCLUSION

Carrot has one of the most prominent vegetable crop of Rabi season in temperate zones of Balochistan. Farmers relay on high yielding cultivars for more economic returns each year. In this context this study had carried out at ARI Sariab Quetta. This study unfold the potential of various germplasm and consolidate the data of yield for growers of Balochistan. Faisalabad T-29 is most prominent cultivar among this lot. Faisalabad T-29 is most suitable carrot cultivars for Temperate zones of Province. Long red India has also best results for general cultivation in Balochistan overall.

REFERENCES

[1] G. Bosekeng, “The Critical Period for Thinning Carrot (*Daucus carota* L.),” *World J. Agric. Res.*,

vol. 7, no. 1, pp. 8–13, 2019, doi: 10.12691/wjar-7-1-2.

[2] S. Hailu, T. Seyoum, and N. Dechassa, "Effect of combined application of organic P and inorganic N fertilizers on post harvest quality of carrot," *African J. Biotechnol.*, vol. 7, no. 13, pp. 2187–2196, 2008, doi: 10.5897/AJB08.061.

[3] M. Malek, D. Mohammed, M. Sikdar, and M. Rahman, "Effects of Variety and Growing Condition on Yield and Quality of Carrot Seed," *J. Environ. Sci. Nat. Resour.*, vol. 5, no. 2, pp. 301–306, 2013, doi: 10.3329/jesnr.v5i2.14834.

[4] Ahmad *et al.*, "Phytochemicals in Daucus carota and Their Health Benefits—Review Article," *Foods*, vol. 8, no. 9, p. 424, 2019, doi: 10.3390/foods8090424.

[5] A. Report, "Horticulture Australia Limited Contents," 2006.

[6] V. Bach, U. Kidmose, H. L. Kristensen, and M. Edelenbos, "Eating Quality of Carrots (Daucus carota L.) Grown in One Conventional and Three Organic Cropping Systems over Three Years," *J. Agric. Food Chem.*, vol. 63, no. 44, pp. 9803–9811, 2015, doi: 10.1021/acs.jafc.5b03161.

[7] R. M. Adams, B. H. Hurd, S. Lenhart, and N. Leary, "Effects of global climate change on agriculture: An interpretative review," *Clim. Res.*, vol. 11, no. 1, pp. 19–30, 1999, doi: 10.3354/cr011019.

[8] Agriculture Marketing Information Service, "A . Area and Production of Fruit , Vegetables and Condiments B . Export / Import of Fruit , Vegetables & Condiments," pp. 1–111, 2015.

[9] Z. Ali and S. B. Bhaskar, "Basic statistical tools in research and data analysis," *Indian J. Anaesth.*, vol. 60, no. 9, pp. 662–669, 2016, doi: 10.4103/0019-5049.190623.