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Performance studies of Garlic genotypes under the dry zone of Karnataka

Konedena Rajyalakshmi[1], Prakash Kerure[2*], Srinivasa V.[3], Kumara O.[4] and Kanthraju Y.[5]

[1&3]Department of Vegetable Science, College of Horticulture, Mudigere, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga 577132, Karnataka, India
[2]Department of Vegetable Science, College of Horticulture, Hiriyur, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga 577 132, Karnataka, India
[4]Department of Agronomy, Krishi Vigyan Kendra, Babbur farm, Hiriyur, Karnataka, India
[5]Department of Post-harvest Technology, College of Horticulture, Mudigere, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga 577 132, Karnataka, India

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ABSTRACT

The current experiment was conducted at the Zonal Agricultural and Horticulture Research Station in Hiriyur, Karnataka during the *Rabi* season of 2022–2023 to evaluate the best performing genotypes in dry zone of Karnataka with twenty- seven different genotypes of garlic. The experiment had two replications and was set up using a randomized complete block design. Analysis of variance showed that existence of high degree of variability among the genotypes. On basis of mean performance, Thandigudi local performed better for vegetative and yield parameters with highest yield of 13.85 t/ha and for quality parameters DOGR- 157 and DOGR- 336 performed better.

Key words : *Garlic, Genotypes, Karnataka*

Introduction

A vital bulb crop, garlic is also a popular spice and condiment. It is a significant crop that is grown commercially and provides India with considerable foreign exchange earnings. Many different veggies and meat dishes use garlic as a condiment and flavoring. Recent studies on garlic have emphasized its usage as a beneficial condiment in meal preparation. It contains significant amounts of protein, phosphate, potassium, calcium, magnesium, and carbohydrates. According to Ayurveda, garlic is considered as nectar of life and has been used for both culinary and medicinal purposes throughout history (Butt *et al.,* 2009). According to several studies (Pal *et al*., 2006; Shinkawa *et al*., 2009) it exhibits anti-bacterial, anti-fungal, anti-atherosclerotic, hypoglycemia, detoxifying, and anti-carcinogenic activities**.** However, despite all the advantages and health benefits, farmers are less interested in garlic cultivation due to the non-availability of specific varieties or genotypes for suitable regions, as the performance of genotypes varies with region, season and other growing conditions due to developmental variations. Hence, there is a prime need to evaluate some of the available genotypes to find their suitability, and this intern could have great potential for the commercial production of garlic. Numerous variet-

([1]PG scholar, [2]Assistant Professor, [3]Head (HOD), [4]Professor and [5]Assistant Professor)

ies are developed in garlic, but more information is needed regarding their performance in the dry zone of Karnataka. Therefore, identifying high-yielding genotypes is a continuous process for recommending cultivation in a specific region, which can be used in varietal improvement. Hence, the evaluation of garlic genotypes is essential to see the performance genotypes for their adaptability and agronomic performance, like morphological and yield traits, to identify the potential genotypes.

Materials and Methods

The present investigation was carried out at Zonal Agricultural and Horticultural Research Station, Babbur Farm, Hiriyur, Karnataka. Twenty- seven genotypes were used in this experiment with two replications in randomized block design during *rabi* season of 2022- 23. The cloves of garlic genotypes were dibbled in flat beds at a spacing of 15 cm × 10 cm in a plot size 1.5 m 1.2 m. The recommended cultural practices were followed for raising good crop. Five plants from each plot were selected randomly to record the observations for plant height (cm), leaf length (cm), number of leaves, leaf width (cm) and collar thickness (cm) at 90 DAS, days to harvest, bulb yield per hectare (t), equatorial and polar diameter (cm), fresh weight and dry weight of bulb (g), total soluble sugars (%). The cloves of ten randomly selected garlic bulbs were crushed and the paste was used to find the total soluble solids in samples (Nieuwhof *et al*., 1973) and total soluble solids values were recorded with the help of digital refractometer and expressed in per cent.

Table 1. Mean performance of garlic genotypes for growth characters

Treatment details	Plant height (90 DAS) (cm)	Number of Leaves (90 DAS) (cm)	Leaf Length (90 DAS)	Leaf width (90 DAS) (cm)	Collar thickness (90 DAS) (mm)	Days to harvest
DOGR- 390	42.51	8.80	37.54	1.63	7.90	140.04
DOGR- 178	40.26	7.88	35.78	1.53	6.50	138.12
DOGR- 596	41.28	7.76	38.55	1.60	6.43	139.03
DOGR- 545	39.79	8.01	34.97	1.51	5.49	135.59
DOGR- 305	40.94	8.50	38.96	1.46	5.20	133.39
DOGR- 212	38.83	7.63	37.89	1.84	4.54	135.01
DOGR- 157	42.70	8.56	37.67	1.58	7.14	138.56
DOGR- 610	38.93	7.78	37.42	1.70	6.33	134.46
DOGR- 204	42.69	8.88	39.18	1.43	6.08	137.67
DOGR- 396	40.66	8.43	38.46	1.48	4.98	131.90
DOGR- 540	41.53	7.57	35.46	1.63	7.13	133.42
DOGR- 548	41.40	8.83	36.92	1.61	6.45	131.93
DOGR- 279	42.54	7.94	38.83	1.76	6.22	133.42
DOGR- 528	43.15	8.31	40.68	1.64	5.33	132.00
DOGR- 409	44.35	9.55	40.69	1.65	6.34	140.03
DOGR- 194	42.87	8.08	40.16	1.60	7.46	138.91
DOGR- 666	43.96	7.86	42.14	1.69	6.68	137.93
DOGR- 327	39.58	7.27	37.89	1.82	7.48	133.08
DOGR- 310	39.77	8.20	39.69	1.57	5.86	138.12
DOGR- 260	39.59	8.47	37.27	1.58	5.10	140.08
DOGR- 50	39.62	8.52	37.13	1.53	4.37	141.53
DOGR- 56	42.03	8.19	37.89	1.63	5.59	132.19
DOGR-284	42.43	8.04	38.66	1.60	5.41	136.66
DOGR- 205	45.27	8.02	41.74	1.60	7.20	139.73
DOGR- 336	40.64	8.14	39.32	1.68	6.20	141.01
Belagavi local	35.13	6.44	31.63	1.19	5.28	129.34
Thandigudi local	54.14	10.99	49.59	2.50	8.65	150.68
Mean	41.72	8.24	38.59	1.63	6.2	136.81
S. Em±	1.37	0.26	0.88	0.05	0.25	2.74
CD at 5%	3.99	0.75	2.57	0.13	0.74	7.95

Results and Discussion

The results obtained in the present investigation of evaluation of garlic (*Allium sativum* L.) genotypes for their growth and yield parameters under dry zone of Karnataka during *rabi* of 2022-2023 are discussed and presented in Table 1 and 2.

Results revealed that, differences among the genotypes for all the parameters were found to be highly significant. Among all the genotypes Thandigudi local recorded highest for all the vegetative parameters like plant height (54.14 cm), number of leaves (11 leaves), leaf width (2.50 cm), leaf length (49.59 cm) and collar thickness (8.65 mm) whereas less days takenfor harvest were recorded in Belagavi local (129 days). Least collar thickness indicates the early maturity this might be reason for early maturity in this genotype. These are similar with Sharma *et al*. (2015), Prajapati *et al*. (2015). Highest yield was recorded in Thandigudi local (13.85 t/ha) followed by DOGR- 205 (12.31 t/ha). Equatorial diameter of bulb recorded high for DOGR- 336 (3.80 cm) followed by DOGR- 205 (3.62 cm). Polar diameter recorded high for D0GR- 157 (3.98 cm) followed by DOGR- 336 and DOGR- 212 (8.89 cm). For fresh and dry weight of individual bulbs recorded high in Thandigudi local (11.31 g and 3.97 g) respectively. The highest yield of bulbs from these genotypes can be attributed to maximum plant height, leaf number and leaf length as they have physiological capacity to mobilize and translocate photosynthates to economic part i.e., bulb which in turn might have increased the bulb yield. Total soluble sugars recorded more in DOGR- 390 (38.58 %) followed DOGR- 596 (38.24%). This might be due to genetic makeup of genotypes caused the variation. These results agree-

Table 2. Mean performance of garlic genotypes for quality parameters

Treatment details	Fresh weight of Bulb (g)	Dry weight (g)	Bulb yield (t/ha)	Equatorial diameter of Bulb (cm)	Polar diameter of Bulb (cm)	Total soluble sugars (%)
DOGR- 390	4.39	1.44	7.25	2.90	2.96	38.58
DOGR- 178	4.33	1.45	6.47	2.80	3.33	35.07
DOGR- 596	3.30	0.97	5.56	2.85	3.24	38.24
DOGR- 545	1.99	0.55	2.93	2.34	2.58	36.40
DOGR- 305	3.60	1.27	5.74	2.63	2.91	27.89
DOGR- 212	5.79	2.39	9.24	3.43	3.89	34.44
DOGR- 157	7.88	2.80	10.85	3.42	3.98	35.73
DOGR- 610	5.20	1.87	7.65	3.04	3.38	37.17
DOGR- 204	6.08	2.18	9.88	3.49	3.39	32.41
DOGR- 396	2.51	1.03	3.32	2.22	2.63	36.20
DOGR- 540	7.28	2.56	10.91	3.59	3.80	33.07
DOGR- 548	6.85	2.33	8.89	3.14	3.05	31.74
DOGR- 279	3.90	1.23	5.68	3.10	3.47	31.42
DOGR- 528	2.39	0.76	4.81	2.67	2.81	32.89
DOGR- 409	4.31	1.58	7.26	3.02	3.43	34.25
DOGR- 194	3.70	1.17	6.90	3.29	3.58	34.89
DOGR- 666	4.97	1.73	8.67	3.31	3.58	30.52
DOGR- 327	4.22	1.32	6.14	3.12	2.99	37.87
DOGR- 310	5.31	1.65	8.50	3.08	3.24	34.01
DOGR- 260	3.52	1.24	5.45	3.00	3.50	37.00
DOGR- 50	4.72	1.50	7.35	3.26	3.79	36.97
DOGR- 56	4.36	1.38	6.48	2.90	3.63	31.74
DOGR-284	5.85	1.77	9.41	3.59	3.78	31.88
DOGR- 205	7.94	2.86	12.31	3.62	3.66	34.68
DOGR- 336	5.64	1.85	9.52	3.80	3.89	33.74
Belagavi local	4.21	1.55	6.45	2.60	2.92	34.25
Thandigudilocal	11.31	3.97	13.85	3.58	3.90	28.72
Mean	5.02	1.72	7.68	3.08	3.38	34.14
S. Em±	0.31	0.22	0.46	0.14	0.14	0.64
CD at 5%	0.91	0.65	1.33	0.42	0.40	1.86

ment with findings of Nandini *et al*. (2018), Umamaheswarappa *et al*. (2014), Raj *et al.* (2019) and Balvir *et al.* (2020).

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Conflict of Interest : None

The authors declared that no conflicts of interest exist.

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