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## Comparative study of different garlic (*Allium sativum* L.) varieties for rabi season under Telangana

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**Abstract**

An investigation was conducted to ascertain the Garlic (*Allium sativum* L.) production depends on the performance of various varieties that are suitable to different conditions imposed by specific environment. Production of Garlic in Rabi season is more important to have continuous supply round the year. So evaluation of Garlic varieties is basic step towards its popularization for successful cultivation under Telangana conditions. Keeping this in view, field experiment was conducted at Vegetable research station, SKLTSHU, Rajendranagar. The Eight varieties viz., G – 304, G – 384 (c), JG-12-02, DG-08-12, Bhima Purple (c), G-363, G-189 (c), UHF G-12-2 were supplied by AINRP on Onion and Garlic. The experiment was laid out in a randomized block design with three replications for Rabi season of 2018-19. The characters studied were Average Bulb weight (g), Average number of cloves per compound Bulb, Average weight of 10 cloves (g) and Marketable yield per ha (q). Among the varieties tested, significantly the highest marketable yield was observed in the variety UHF G-12-2 (111.75 q) followed by G-304 (86.38 q), Bhima Purple (c) (84.64 q), G – 363 (83.76 q) are on par with each other and minimum yield was recorded for G-384 (c) (46.38 q). Thus, the high yielding variety from this study may be used for commercial cultivation.

**Keywords:** *Allium sativum* L., varieties, bulb weight, yield, purple blotch

**Introduction**

Garlic (*Allium sativum* L.) is the second most widely cultivated vegetable cum spice crop after onion, under the genus *Allium* and belongs to the family Alliaceae having chromosome number  $2n (2X) = 16$ . The genus *Allium* is one of the largest genera of the Alliaceae family, it comprises of 450 species and most of them are biannual plants bearing underground storage bulb and bulbils. Garlic is believed to have originated from semi-arid areas of Central Asia. India ranks second in the world in area and production after China. In India, Maharashtra, Gujarat, Karnataka, Orissa, Uttar Pradesh, Madhya Pradesh, Rajasthan and Assam are major onion growing states. Because of its high export potential it comes under cash crop apart from Spices. Garlic varieties shows wide variation in their yielding ability when grown over varied agro-climatic condition. Different cultivars have different soils and climatic requirements for their optimum performance. India being a vast country with varied agro-climatic regions, single variety or hybrid may not suitable for all the agro-climatic conditions. Hence, new varieties and hybrids need to be introduced or evolved for specific regions/zones. Lack of recommended or released variety of high yielding in the country. It creates shortage during off season arrival period. To meet out the domestic requirement and also fulfill the export demand, selection of suitable cultivars for growing under different agro-climatic conditions is required. Therefore, keeping this in view, the different constraints cited above and realizing the need of comprehensive study to select the most suitable high yielding cultivars with better growth and yield traits by screening the cultivars of Garlic under Telangana conditions.

**Materials and methods**

The present experiment was conducted at Vegetable Research Station under All India Network Research Project on Onion and Garlic operating at SKLTSHU, Hyderabad during Rabi 2018-19 with eight varieties supplied by Directorate of Onion and Garlic Research (ICAR), Rajgurunagar, Maharashtra. The experiment was laid out in a Randomized Block design with three replications and eight treatments/varieties. The cloves of different varieties were planted in a 3 x 3 meter plot size. The recommended package of practices were followed for raising the successful crop. Randomly ten plants from each plot were selected to record the observations on

Average Bulb weight (g), Average number of cloves per compound Bulb, Average weight of 10 cloves, Shape of the Mature Bulb, Bulb skin colour, Clove skin colour, Ability to flower, formation of Bulbs and Marketable yield per ha (q).

The data of different characters were statistically analyzed by using ANOVA- Analysis of Variance and presented in Tables below. The varieties tested in the experiment were G – 304, G – 384 (c), JG-12-02, DG-08-12, Bhima Purple (c), G-363, G-189 (c), UHF G-12-2.

Data on purple blotch was recorded following the scale mentioned below (Table 1.)

#### Disease scale

##### Rating scale Description of symptom

0. No disease symptom
1. A few spots towards tip covering 10 percent leaf area

2. Several purplish brown patches covering up to 20 percent of leaf area
3. Several patches with paler outer zone covering up to 40 percent leaf area
4. Leaf streaks covering up to 75 percent leaf area or breaking of the leaves from centre
5. Complete drying of the leaves or breaking of leaves from centre

The per cent disease index was calculated by the following formula given by Wheeler (1969)<sup>[1]</sup>.

$$\text{PDI} = \frac{\text{Total sum of numerical ratings}}{\text{Number of observations} \times \text{Maximum disease rating}} \times 100$$

Further, the varieties were categorized based on disease severity scale as given by Pathak *et al.* (1986)<sup>[2]</sup>.

**Table 1:** Scale adopted to indicate degree of resistance against purple blotch of onion.

S. No	Disease severity	Category	Reaction
1	<5	0	Immune
2	5-10	1	Resistant
3	11-20	2	Moderately resistant
4	21-40	3	Moderately susceptible
5	41-60	4	Susceptible
6	>61	5	Highly susceptible

Thrips data was also recorded on the basis of number of thrips per plant. Five plants were selected randomly in each plot and absolute population of thrips was recorded by examining the plant. The observations were taken at weekly interval from third week after transplanting till to the harvest of the crop. Mean pest population was worked out and the data, thus obtained were transformed in to square root transformation and then statistical analysis done for assessing the relative susceptibility to *Thrips tabaci*.

#### Results and Discussions

The results of the present investigation on the Comparative study of different Garlic (*Allium sativum* L.) varieties for Rabi season under Telangana during 2018-19 are discussed and presented below.

**Average Bulb weight (g):** Average weight of single marketable bulb is worked out at the time of harvesting and results shows that maximum average weight of single bulb was recorded in UHF G-12-2 (2.67 g) is on par with G – 304 (17.67 g), Bhima Purple (c) (17.00 g), G- 363 (17.00 g) where as the minimum bulb weight was recorded in G – 189 (C) and G – 384 (c) is (9.67 g).

**Average number of cloves per compound bulb:** average number of cloves per bulb was recorded high in the variety DG-08-12 (17.33) is on par with UHF G-12-2 (17.00), JG-12-02 (15.00), G – 363 (14.67) while the less number of cloves was recorded for G – 304(c) (7.00) (Table 2.). This might be due to the fact that varieties had a good genetic potential which enhanced the more cell division and cell elongation. Similar results was observed in Yeshiwas *et al.* (2018)<sup>[3]</sup>.

**Average weight of 10 cloves (g):** Average weight of 10 cloves was recorded based on the average of 50 cloves of 5-10 plants from outer whorl. The maximum weight of 10 cloves was recorded for DG-08-12 (12.33 g) is on par with UHF G-12-2 (11.33 g), Bhima Purple (c) (11.00 g), JG-12-02 (10.00 g), G-304 (10.00 g). This component influence the bulb size which ultimately contributes to the bulb yield Anil Khar *et al.* (2007)<sup>[4]</sup> are in support of the present findings (Table 2.).

**Marketable yield (q/ha):** Bulb size of atleast 1.5 cm diameter and above are recorded for Marketable yield. The maximum yield was recorded for the variety UHF G-12-2 (111.75 q) followed by G-304 (86.38 q), Bhima Purple (c) (84.64 q), G – 363 (83.76 q) are on par with each other and minimum yield was recorded for G-384 (c) (46.38 q) (Table 2.). Yield parameter is mainly dependent on weight of the Bulb and number of cloves. This type of differences might be due to their genetical behavior and also suitability of climate and soil for specific variety. The variation in the yields of different cultivars grown under similar conditions has been obtained from several reporters like Hanuman Naik *et al.* (2012)<sup>[5]</sup>, Meshram *et al.* (2011)<sup>[6]</sup>, Singh and Bhonde (2011)<sup>[7]</sup>, Patil *et al.* (2013)<sup>[8]</sup>.

**Reaction to Thrips and Purple Blotch:** The same varieties were tested for pest and disease incidence. Purple blotch incidence was minimum recorded in Bhima Purple (c) (16.80%) showed medium resistance, which was followed by G-363 (18.40%) and maximum incidence was recorded in G-3804(C) (35.20%) which shows susceptible to purple blotch incidence (Table 3.). Incidence of thrips was minimum in Bhima Purple (c) (13.33) & G-384 (c) (13.33) and maximum incidence was noticed in G-304 (22.33).

**Table 2:** Mean performance of Garlic varieties for growth and yield parameters during 2018-19.

Sl. No.	List of the Varieties/ Treatments	Average Bulb weight (g) (Average weight of marketable based on MY/Mrk. No. of bulbs)	Average number of Cloves per compound bulb (Observe in at least 5 bulbs)	Average weight of 10 cloves (Based on average of 50 cloves of 5-10 plants from outer whorl only)	Marketable Yield (q/ha) (bulb size at least 1.5cm diameter and above).	Shape of mature bulb	Bulb Skin Colour (White, Violet Stripes, Violet)	Clove Skin colour (White, Violet Stripes, Violet)	Ability to flower* (Yes / No)	Formation of Bulbils (Yes/ No)
1	G-304	17.67	12.00	10.00	86.38	Hart shape	White	White	No	No
2	G-384 (c)	9.67	7.00	4.33	46.38	Ovate	White	White	No	No
3	JG-12-02	11.33	15.00	10.00	54.24	Ovate	White	White	No	No
4	DG-08-12	13.33	17.33	12.33	43.50	Hart shape	White	White	No	No
5	Bhima Purple (C)	17.00	10.00	11.00	84.64	Hart shape	Purple stripes	Purple stripes	No	No
6	G-363	17.00	14.67	7.67	83.76	Hart shape	Purple stripes	White	No	No
7	G-189 (C)	9.67	9.33	6.27	47.08	Ovate	Light purple	Purple stripes	No	No
8	UHF G12-2	22.67	17.00	11.33	111.75	Round	Purple stripes	Purple	No	No
CD(5%)		6.37	6.15	3.23	11.78					
SEm±		2.10	2.03	1.07	3.88					

**Table 3:** Screening of varieties for thrips and Purple blotch during 2018-19.

S. No	List of the Varieties/ Treatments	Thrips population	Score	Purple blotch PDI (%)
1	G-304	22.33(4.73)	2	35.20(36.38)
2	G-384 (c)	13.33(3.65)	1	20.80(27.12)
3	JG-12-02	16.33(4.04)	2	23.20(28.78)
4	DG-08-12	15.33(3.92)	2	22.40(28.23)
5	Bhima Purple (C)	13.33(3.65)	2	16.80(24.19)
6	G-363	14.33(3.79)	2	18.40(25.39)
7	G-189 (C)	15.00(3.87)	2	20.40(26.84)
8	UHF G12-2	14.33(3.79)	2	20.80(27.12)
	CD	3.51		0.8
	CV	1.16		1.61
	SE(m)	12.88		0.26

### Conclusion

Based on the results of the study it is concluded that among all the varieties UHF G-12-2 (111.75 q), G-304 (86.38 q) and Bhima Purple (84.64 q) are well adapted to Telangana condition by exhibiting maximum yield and recorded less number of thrips and moderately susceptible to purple blotch disease during Rabi season. Hence, these varieties can be recommended in place of local varieties for increased production of garlic crop under Telangana condition.

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