



## PERFORMANCE OF DIFFERENT PROMISING LINES OF GARLIC (*ALLIUM SATIVUM* L.) UNDER CENTRAL PLAIN ZONE OF UTTAR PRADESH

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### ABSTRACT

The present study entitled “Performance of different promising lines of garlic (*Allium sativum* L.) under Central plain zone of Uttar Pradesh” was conducted at the Vegetable Research Farm of CSAUA&T, Kalyanpur, Kanpur during the year 2013 - 2014 in a randomized block design with two replications. The data exhibited significant variation in 22 promising lines along with one prominent check variety (G-50) for different traits. The observation of plant growth characters were recorded from the ten randomly selected plants of each replication. The maximum average bulb weight (39.2 g) was exhibited by KLG-14 followed by KLG-21 (38.3 g) and KLG-23 (36.5 g) and minimum was found in KLG-2 (19.5 g). The maximum number of cloves per bulb (42.87) was recorded in the line KLG-16 followed by KLG-17 (42.66) and KLG-21 (39.22). The minimum value (18.89) for this character was observed in KLG-15. The highest total yield (148.86q/h<sup>-1</sup>) and marketable yield (137.80q/h<sup>-1</sup>) was recorded in KLG-14 for superior over the check variety G-50. On the basis yield attributing characters, it can be said that KLG-14 may be a promising lines for this region.

**KEYWORDS:** Garlic, lines, performance, yield

### INTRODUCTION

Garlic (*Allium sativum* L.), a member of the Alliaceae family, is one of the most aromatic herbaceous annual spices (Kurian, 1995). It is the second most widely spice crop of the cultivated Allium crops, next to onion in the world (Purseglove, 1975) with a characteristic pungent smell. The cloves of garlic bulb are used in flavoring of various vegetarian and non-vegetarian dishes. The significance of this spice is increasing owing to its wide range of medicinal properties (Chanchan *et al.*, 2014). As this crop is propagated only vegetatively by division of the ground bulbs into bulblets called cloves, it is inevitable to have maximum number of clones and their thorough evaluation of different traits. India, being one of the major garlic producing country have diverse ecological environment for farming a rich garlic germplasm resource. The production and productivity not only depend on area and cultural practices but also depend on improved high yielding genotypes and environmental conditions (Lawande *et al.*, 2009). The lack of genotypes with high yield with better storage potential is the main constraint limiting the productivity in India, which is why, the average productivity of garlic in India, is very low compared to other countries. The present investigation was therefore, undertaken to evaluate the performance of the Twenty-two garlic lines in respect of yield and other desirable traits.

### MATERIALS & METHODS

The investigation was carried out at the Vegetable Research Farm of CSAUA&T, Kalyanpur, and Kanpur

during the period from October 22, 2013 to April 10, 2014. Twenty-two garlic genotypes obtained from different parts of Uttar Pradesh. The genotypes *viz.*, KLG-1 to KLG-22 along with one prominent check variety (G-50) were grown in randomized block design with two replications. The plot size was 1×1 m with 15×10 cm spacing. Fertilizer application of 100:50:50:45 kg NPKS ha<sup>-1</sup> in the form of urea, diammonium phosphate, muriate of potash and elemental sulphur, respectively was applied. Half of nitrogen, whole of P, K and S were applied at the time of sowing during the October and rest amount of nitrogen was top dressed in two equal splits 30 and 45 days after planting when hand weeding was carried out in the experimental plots. Recommended cultural and plant protection practices were followed equally in all the plots as and when required. A random sample of ten plants of each genotypes was collected from each plot to estimate the plant height (cm), number of leaves, leaf length (4<sup>th</sup> leaf cm), leaf width (4<sup>th</sup> leaf cm), and pseudostem length (cm) per plant at 75 to 90 days after planting. While other observations *i.e.* polar and equatorial diameter, number of cloves per bulb, bulb weight, weight of 10 cloves, marketable and total yield were recorded after harvesting. The mean data over the year was subjected to statistical analysis according to standard procedure.

### RESULTS & DISCUSSION

Significant variations were observed for different characters. The performances of different lines for morpho-agronomic characters are presented in (Table 1).

**TABLE -1:** Morpho- agronomic characteristics of twenty - three garlic lines

Genotypes/lines	FC	BSC	CSC
KLG-1	Dark	White	White
KLG-2	Light	White	White
KLG-3	Dark	White	White
KLG-4	Light	White	White
KLG-5	Dark	White	White
KLG-6	Light	White	White
KLG-7	Dark	White	White
KLG-8	Dark	White	White
KLG-9	Dark	White	White
KLG-10	Light	White	White
KLG-11	Dark	White	White
KLG-12	Dark	White	White
KLG-13	Dark	White	White
KLG-14	Light	White	White
KLG-15	Dark	White	White
KLG-16	Dark	White	White
KLG-17	Dark	White	White
KLG-18	Dark	White	White
KLG-19	Dark	White	White
KLG-20	Light	White	White
KLG-21	Dark	White	White
KLG-22	Dark	White	White
G-50 (C)	Light	White	White

FC-Foliage Colour, BSC-Bulb Skin Colour, CSC-Clove Skin Colour

The variability of indicated that the foliage colour of the genotypes were light green, medium green and dark green. Foliage colour of seven genotypes was light green while others were dark green. All the lines were found white colour in the entire bulb and clove skin colour. The plant height (66.10 cm) was recorded in KLG-21 whereas the lowest value (52.30 cm) for the same traits was found in KLG-15 and KLG-20. The present findings are in accordance with reports of Kohali and Prabal (2000) and Jogdande *et al.* (2004). There were also significant variation for number of leaves per plant of the two genotypes for the same value and leaf length which were observed highest (8.5 and 46.85 cm) respectively in KLG-20, G-50(Check) and KLG-9 whereas lowest number of leaves were recorded in seven lines of value (6.5 cm) while lowest value (36.90 cm) of leaf length in KLG-14. The findings are consistent with observations of Sengupta *et al.* (2007) and Panse *et al.* (2013). For leaf width KLG-6 had the widest leaf (1.85 cm) and the check variety G-50 was found with lowest value (1.25 cm) for the same trait. The genotype KLG-3 had the highest pseudostem length (27.35cm), while the lowest pseudostem length was registered with the genotype KLG-19 (19.65 cm).

All the garlic lines under study also showed significant variation in different yield attributing characters (Table 2). Significant variations were noticed among the lines pertaining to the polar and equatorial diameter of the individual bulbs which varied from 1.90-3.10 and 2.10 - 3.30 cm respectively. In both the cases the line KLG-7 performed better as compared to other lines and results at par with the check cultivar G-50. The bulb diameter with respect to polar side was lowest (1.90 cm) in case of KLG-1 and in case of equatorial were for KLG-1 and KLG-20 (2.10 cm). Umamaheswarappa *et al.*, (2014) also reported variation in bulb size in their study. The length and width

of the garlic bulb as provisionally indicated as polar and equatorial diameter of the bulb decides the economic size and an important parameter to study for various genotypes in garlic pertaining to crop improvement. Average bulb weight of different lines differed from as highest as 39.2 g in KLG-14 to lowest as 19.5 g in KLG-2 (Fig.1). The lines of garlic under investigation produced bulbs in which the number of cloves per bulb and 10 clove weight were observed to heighst value (42.87) and (14.6 g) in KLG-16 and KLG-5 respectiviely. The different lines of garlic under studied had different yield potential pertaining to marketable yield as well as total yield and were observed to vary from 16.35-137.80 and 26.20- 148.86 q ha<sup>-1</sup>. In both the parameters *i.e.*, marketable yield and total yield the genotype KLG-14 performed better 137.80 and 148.86 q ha<sup>-1</sup> respectively over other lines and results were at par with KLG-12 (107.90 qha<sup>-1</sup>) and KLG-17 (99.80 qha<sup>-1</sup>) for marketable yield (Table 2 and Fig 2). However, the significantly lowest value for both the traits 16.35 and 26.20 q ha<sup>-1</sup> respectively was observed for genotype KLG-4. These results are in accordance with the findings of Aslam *et al.* (2016), Futane *et al.* (2006) and Singh and Chand (2003) who reported significant differences for bulb yield in different garlic varieties. Significant variations among the lines also recorded for both diseases. However, the research results indicated that lowest incidence of purple blotch (6.10 %) and stemphylium blight (7.65 %) was found in KLG-14. Similarly, the highest incidence of purple blotch (18.06 %) and stemphylium blight (22.11 %) was noted in KLG-4. Furthermore, the infestation of thrips varies from 1.95 to 3.37 thrips plant<sup>-1</sup>. The present study also indicated that lines like KLG-14 and KLG-17 showed tolerance to both diseases as well as thrips infestation under this region.

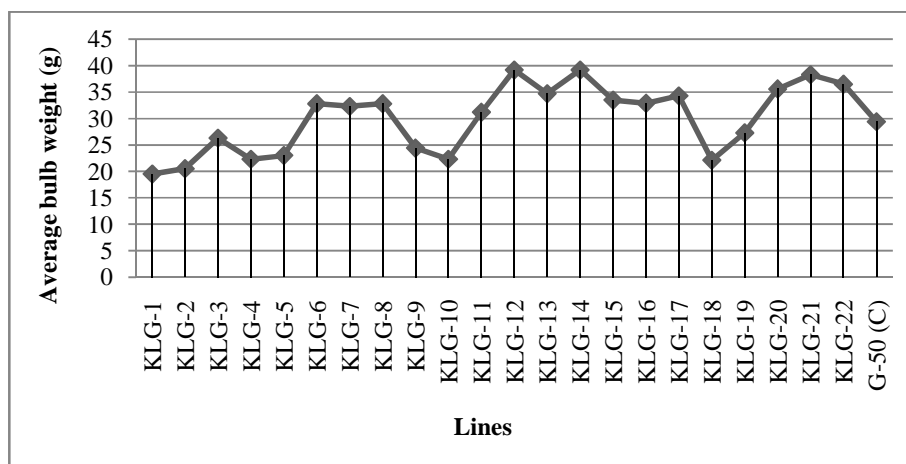


FIGURE 1: Average bulb weight of different garlic lines

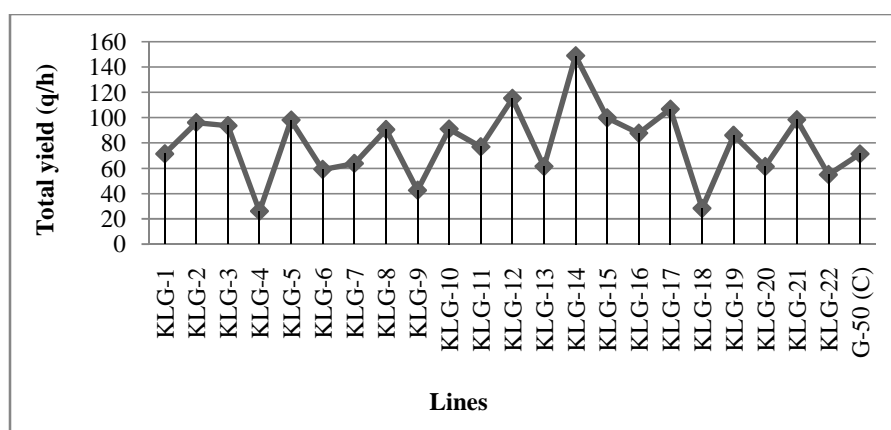
FIGURE 2: Total yield (qha<sup>-1</sup>) of different garlic lines

TABLE 2: Mean performance of growth, yield and its components in different garlic lines

Genotypes/lines	PH	NL/P	LL	LW	PL	P	E	ABW	NOC	AWC	MY	TY	PDI		TI
													PB	SB	
KLG-1	61.60	7.5	41.35	1.55	25.30	1.90	2.10	22.5	32.34	11.6	59.10	71.40	14.76	18.13	3.12
KLG-2	58.10	7.0	41.60	1.55	21.90	2.10	2.20	19.5	30.37	13.3	88.80	96.10	9.39	12.76	2.86
KLG-3	52.50	6.5	46.10	1.65	27.35	2.30	2.50	20.5	36.08	10.0	77.75	93.60	12.78	16.75	2.76
KLG-4	63.60	7.0	42.50	1.60	24.90	2.30	2.20	26.3	28.80	13.6	16.35	26.20	18.06	22.11	3.06
KLG-5	55.10	6.5	37.00	1.70	25.50	2.10	2.30	22.3	33.20	14.6	86.00	98.00	10.72	15.51	2.96
KLG-6	52.90	7.0	40.00	1.85	21.30	2.25	2.30	23.0	32.30	13.3	49.40	59.10	15.27	18.05	2.48
KLG-7	62.20	7.0	44.00	1.75	22.75	3.10	3.30	32.8	30.52	11.7	59.90	63.80	16.14	18.39	3.15
KLG-8	59.30	6.5	37.70	1.55	21.30	2.80	2.45	32.3	34.02	9.4	80.95	90.60	11.16	16.78	2.63
KLG-9	55.80	6.5	46.85	1.80	21.40	2.80	3.10	32.8	22.20	9.0	29.00	42.65	16.81	20.48	2.62
KLG-10	57.60	7.0	45.00	1.75	22.40	2.90	3.10	24.4	33.29	9.8	80.25	91.05	11.28	14.23	3.36
KLG-11	57.30	6.5	42.50	1.55	25.20	2.95	3.05	22.3	21.31	10.1	70.80	76.95	13.28	16.26	2.58
KLG-12	63.60	8.0	41.40	1.65	22.60	2.55	3.10	31.2	20.39	11.3	107.90	115.20	7.09	10.38	2.57
KLG-13	56.10	7.5	45.00	1.60	24.50	2.65	2.70	34.7	26.31	12.4	51.80	61.40	11.84	16.26	3.37
KLG-14	59.30	7.5	36.90	1.65	25.80	2.30	2.80	39.2	24.54	11.7	137.80	148.86	6.10	7.65	3.13
KLG-15	52.30	7.5	42.45	1.55	24.20	2.70	2.50	33.5	18.89	12.4	85.20	99.80	11.06	15.20	2.89
KLG-16	61.60	6.5	48.05	1.45	22.20	2.50	2.70	32.9	42.87	9.6	80.90	87.70	11.31	16.72	2.17
KLG-17	57.50	7.5	41.10	1.45	24.30	1.90	2.50	34.3	42.66	10.0	99.80	106.70	7.78	12.13	1.95
KLG-18	62.30	7.5	43.05	1.60	20.00	2.10	2.30	22.1	38.52	8.3	21.60	28.35	18.01	21.16	3.19
KLG-19	59.30	8.0	43.75	1.60	19.65	2.15	2.50	27.3	35.51	9.0	75.20	86.05	13.53	17.35	2.26
KLG-20	52.30	8.5	39.05	1.50	20.10	2.00	2.10	35.6	32.80	9.7	51.10	61.30	15.40	17.46	3.32
KLG-21	66.10	8.0	41.30	1.60	21.45	2.50	2.30	38.3	39.22	9.3	89.60	98.30	8.59	13.28	2.59
KLG-22	58.30	7.5	41.50	1.80	26.80	2.70	2.50	36.5	30.37	10.7	43.70	55.00	15.21	18.92	2.71
G-50 (C)	58.60	8.5	37.40	1.25	20.80	2.80	2.95	29.4	31.43	11.6	65.85	71.35	12.78	14.67	2.87
(p=0.05)	5.56	1.61	4.08	0.19	4.07	0.32	0.46	6.36	5.98	2.38	0.47	0.50	1.95	1.86	0.53
C.V.%	4.59	10.67	4.69	5.95	8.49	6.32	8.74	10.47	9.25	10.48	32.47	30.33	9.48	7.00	11.66

PH=Plant Height (cm); NL/P= Number of Leaves/plant; LL=Leaf Length (cm); LW=Leaf Width (cm); PL=Pseudo stem length (cm); P=Polar Diameter (cm); E=Equatorial Diameter (cm); ABW= Average Bulb Weight (g); NOC=Number of cloves/bulbs; AWC= Average Weight of 10 Cloves; MY=Marketable Yield (q/ha); TY= Total Yield (q/ha); PDI =Plant disease index(%); PB = Purple blotch (%); SB = Stemphyllium blight (%); TI = Thrips incidence.

## CONCLUSION

Based on the results obtained, it may be concluded that from the findings of present investigation of various lines under study exhibited a differential response of quantitative traits and finally the yield. It was observed that KLG-14, followed by KLG-12 and KLG-17 for good performance of high yielding with disease and thrips tolerance lines under central plain zone of Uttar Pradesh.

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