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PJ Karande
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

VS Kale
Professor of Horticulture, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

NV Mane
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

AM Sonkamble
Head Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

AP Wagh
Professor of Horticulture, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

YV Ingle
Assistant Professor Department of Plant Pathology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

Corresponding Author:
PJ Karande
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

Performance of different garlic mutants

PJ Karande, VS Kale, NV Mane, AM Sonkamble, AP Wagh and YV Ingle

Abstract
The present investigation on "Performance of different garlic mutants" was carried out during *rabi* season of 2019-2020 at Instructional farm, Department of Vegetable Science, Dr. P.D.K.V., Akola. The experiment was laid out in randomized block design with three replications, fourteen mutants of M_3 generation such as GM-1, GM-2, GM-3, GM-4, GM-5, GM-6, GM-7, GM-8, GM-9, GM-10, GM-11, GM-12, GM-13 and Check (Buldhana Local) were used for study. The results indicated that the garlic mutants differed significantly as to the different growth characters. Among the tested mutants, GM-8 performed better for most of the growth characters like sprouting percentage, plant height, leaf area, and chlorophyll content index. GM-5, GM-13 and GM-14 required minimum days to sprouting. GM-7 produced maximum number of leaves per plant. Whereas, the mutant GM-11 recorded minimum neck thickness. The mutant GM-6 took minimum period for maturity of bulb crop. Weight of fresh bulb were maximum in the mutants GM-11.

Keywords: Garlic, Mutation, Growth, Sprouting.

Introduction
Garlic (*Allium sativum*) is a species in the onion genus, Allium. Its close relatives include the onion, Chinese onion, chive, shallot, and leek. Garlic is native to northeastern Iran and Central Asia, and has long been a common seasoning worldwide, with a history of several thousand years of human consumption and use. Garlic has been used both as a food flavoring and as a traditional medicine and it was known to ancient Egyptians. In Ancient Rome, it was "much used for food among the poor". China produces some 80% of the world's supply of garlic. Garlic (*Allium sativum* L.) belongs to Alliacae family is second most important spice bulb crop next onion. The garlic bulb is a compound bulb consisting of segments or small bulblets called cloves. Garlic is propagated by vegetative methods. Garlic has higher nutritive value than other bulb crops. It is rich source of phosphorus, proteins, carbohydrate and ascorbic acid content. Garlic contains amino acid "Allin", which is odorless and colorless. However, when cloves are crushed, due to enzymatic reaction of allicin, allinase is converted in to diallyl disulphide, gives true garlic oduor. China, India, Spain, Korea and USA are the most important garlic growing countries. China ranks second in area and first in production, India ranks first in area occupies 3,19,000 hectares under garlic and production of 18,62,000 MT. and in productivity 5.08 MT/Ha. The important garlic growing states are Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, Uttar Pradesh, Andhra Pradesh, Orissa and Tamil Nadu. Rajsthan is leading state to grow this crop in area nearly 112.89 thousand hectares, whereas production is highest in Rajsthan 582.08 thousand MT and productivity is highest in Punjab 11.42MT/ha

Material and Methods
The present investigation "Performance of different garlic mutants" was carried out at Instructional Farm, Department of Vegetable Science, Dr. PDKV, Akola (MS.) during *rabi* season of the year 2019-2020. The study was under on 14 treatments of garlic mutant using randomized block design with three replications, keeping a plot size of 2 m x 1 m and spacing 10 cm x 10 cm. The material under study was constituted of 14 garlic mutants which were collected from Instructional Farm, Department of Vegetable Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola as listed below in table.

Table 1: Name of the garlic mutants under study

Sr. No.	Name of garlic mutant	Source
1	GM-1	Department of Vegetable Science, Dr. P.D.K.V., Akola
2	GM-2	
3	GM-3	
4	GM-4	
5	GM-5	
6	GM-6	
7	GM-7	
8	GM-8	
9	GM-9	
10	GM-10	
11	GM-11	
12	GM-12	
13	GM-13	
14	Check (Buldhana Local)	

Results and Discussion

Minimum days to sprouting was recorded in the mutants GM-5 (5 days), GM-13 (5 days) and Check (Buldhana Local) (5 days) whereas, maximum days to sprouting was recorded under mutants GM-4 (7.33 days). Maximum sprouting percentage was recorded under mutants GM-8 (91.33%) whereas, minimum Sprouting percentage was recorded under mutants Check (Buldhana Local) (83.00%). These results are confirmed with the findings of Agrawal and Tiwari (2004) [1]. Among all the garlic mutants, at 120 days after planting plant height was maximum in GM-8 (70.06cm). Whereas, minimum plant height was recorded in mutants GM-5 (53.86cm). These results are confirmed with the findings of Agrawal and Tiwari (2004) [1], Mishra *et al*., (2013) [4], Pervin *et al*., (2014) [6], and Umamaheswarappa *et al*., (2018) [9]. Among all the garlic mutants, at 120 days after planting number of leaves per plant was maximum in GM-1 (8.93) and GM-7 (8.93). Whereas, minimum plant height was recorded in mutants Check (Buldhana Local) (8.13). The activity of physiological process by stimulating factors in the metabolism and growth of the plant might be the reason for enhanced number of leaves. Similar results were found in, Yadav *et al*. (2012) [10], Mishra *et al*., (2013) [4] and Umamaheswarappa *et al*., (2018) [9]. Among all the garlic mutants, at 120 days after planting stem girth was minimum in GM-11 (0.96cm). Whereas, maximum stem girth was recorded in mutants GM-10 (1.78cm). The better performance of these mutants may be due to its genetic makeup and its better adaptability to the prevailing environmental conditions. These results are confirmed with the findings of Patil *et al*., (2012) [5] Mishra *et al*., (2013) [4] and Prajapati *et al*., (2016) [7]. Leaf area was maximum in GM-8 (30.66cm^2) and minimum leaf area was recorded in mutants GM-2 (22.24cm^2). These results are confirmed with the findings of Prajapati *et al*., (2016) [7]. Among all the garlic mutants, chlorophyll content index (cci) was maximum in GM-8 (60.40) and minimum chlorophyll content index was recorded in mutants GM-6 (48.28). Among all the garlic mutants, weight of clove was maximum in GM-8 (2.03g). Whereas, minimum weight of clove was recorded in mutants GM-1 (0.47g). These results are confirmed with the findings of Agrawal and Tiwari (2004) [1], Chatoo *et al*., (2017) [3]. Among all the garlic mutants, yield of fresh bulb per plot was maximum in GM-8 (8.26kg) and minimum yield of fresh bulb per plot was recorded in mutants GM-6 (1.42kg). This was in accordance as revealed by and Sandhu *et al*. (2015) [8]. Among all the garlic mutants, yield of fresh bulb per hectare was maximum in GM-8 (131.66 q) and minimum yield of fresh bulb per hectare was recorded in mutants GM-6 (72.23 q). This may be due to improvement in plant height, number of leaves and stem girth as they have physiological capacity to mobilize and translocate photosynthetic to organ of economic value which in turn might have increased bulb yield as observed in this study. These results are confirmed with the findings of Patil *et al*., (2012) [5], Chatoo *et al*., (2017) [3].

Table 2: Performance of Garlic Mutants

Mutants	DTS	SP	PH (cm)	NLP	SG (cm)	LA (cm^2)	CCI	DRMB	WC (g)	YFBP (kg)	YFBH (q)
GM-1	6.00	90.33	62.76	8.93	1.23	26.27	57.33	133.66	0.47	2.55	83.83
GM-2	6.00	90.00	64.56	8.73	1.49	22.24	55.09	131.33	0.94	6.08	108.50
GM-3	6.33	87.66	63.20	8.40	1.73	23.51	55.81	129.66	1.16	5.28	110.00
GM-4	7.33	87.33	59.06	8.66	1.72	25.66	57.59	131.66	0.81	5.75	103.33
GM-5	5.00	85.00	53.86	8.33	1.13	24.28	55.90	135.00	1.08	6.58	107.16
GM-6	7.00	88.00	57.26	8.53	1.01	23.84	48.28	137.00	0.54	1.42	72.23
GM-7	5.33	89.66	62.20	8.93	1.61	23.44	52.96	131.00	1.06	5.53	96.83
GM-8	5.66	91.33	70.06	8.40	1.32	30.66	60.40	133.66	2.03	8.26	131.66
GM-9	6.66	87.33	56.80	8.20	1.61	26.17	55.06	134.66	0.78	6.53	116.66
GM-10	5.66	83.66	54.80	8.20	1.78	26.06	52.24	136.00	1.10	6.45	97.16
GM-11	6.66	87.66	57.40	8.46	0.96	26.20	55.23	137.33	1.04	7.04	130.16
GM-12	5.33	87.66	63.36	8.86	1.67	23.70	54.80	139.66	1.02	6.69	118.66
GM-13	5.00	84.66	60.73	8.26	1.18	22.68	50.73	136.00	1.10	5.64	93.33
Check (Buldhana Local)	5.00	83.00	54.53	8.13	1.72	26.94	59.53	137.66	0.97	4.83	87.50
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	0.25	1.20	1.13	0.16	0.16	1.50	1.81	1.49	0.09	0.45	8.37
CD @ 5%	0.72	3.49	3.30	0.46	0.48	4.35	5.27	4.34	0.28	1.31	24.26

Where,

DTS – Days to Sprouting
SP – Sprouting percentage
PH (cm) – Plant height
NLP – Number of leaves per plant
SG (cm) – Stem girth
LA (cm^2) – Leaf area
CCI – Chlorophyll content index
DRMB – Days required to maturity of bulb
WC (g) – Weight of clove
YFBP (kg) - Yield of fresh bulb per plot
YFBH (q) – Yield of fresh bulb per hectare

Conclusion

From the present investigation, it can be concluded that, the mutant GM-8 was recorded the growth characters like maximum plant height, maximum sprouting percentage and maximum leaf area, chlorophyll content index was maximum. Regarding the number of leaves per plant was maximum in

the mutant GM-7. While stem girth was minimum and weight of fresh bulb was maximum in the mutant GM-11. Whereas, the mutant GM-3 took minimum period for maturity of bulb.

Reference

1. Agrawal A, Tiwari RS. Genetic variability in garlic. Indian Journal of Agriculture Science 2004;74:164-165.
2. Bhatt R, Soni AK, Jangid K, Kumar S. A study on genetic variability, character association and path coefficient analysis in promising indigenous genotypes of garlic (*Allium sativum* L.). International Journal of Pure and Applied Bioscience 2017;5:679-687.
3. Chatoo MA, Rizwan Rashid, Angrej Ali, Kamaluddin, Bhat FN. Variability, Heritability and Genetic Advance in Garlic (Allium sativum L.). *ISSN: 2320 – 7051* Int J Pure App Biosci 2017;6(2):793-796.
4. Mishra RK, Prasad K, Pandey S, Gupta RP. Evaluation of Garlic Accessions for Growth, Yield, Quality and Resistance to Stemphylium Blight Disease in Northern India 2013;26(2):291-296.
5. Patil BT, Gidmare PP, Bhalekar MN, Shinde KG. Correlation and path coefficient studies in garlic (*Allium sativum* L.). Vegetable Science 2012;39:98-100.
6. Pervin MM, Hassan K, Hassan K, Hoque AK. Genetic variation of indigenous, improved and exotic *Allium sativum* L. germplasm. Advances in Plants and Agriculture Research 2014;1:00011
7. Prajapati SK, Tiwari AS, Prajapati Y, Singh, Verma NR. Character association and path coefficient analysis in garlic (*Allium sativum* L.). Hortflora Research Spectrum 2016;5:183-188.
8. Sandhu SS, Brar PS, Dhall RK. Variability of agronomic and quality characteristics of garlic (*Allium sativum* L.) ecotypes. SABRAO Journal of Plant Breeding and Genetics 2015;47:133-142.
9. Umamaheswarappa P, Chandrappa D, Parashuram Chandravamshi. Evaluation of Garlic (*Allium sativum* L.) genotypes for growth and yield parameters under central dry zone of Karnataka. Journal of Pharmacognosy and Phytochemistry 2018, SP3.
10. Yadav NK, Singh KP, Naidu AK, Nair B. Estimation of genetic variability for yield and its components in garlic (*Allium Sativum* L.). Progressive Agriculture 2012;12:26.