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Evaluation of different onion varieties and genotypes

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Abstract
The present investigation on study of "Evaluation of different onion varieties and genotypes" was carried out during rabi season in the year 2018-2019. The study was under taken on 23 varieties and genotypes of onion using randomized block design with three replications. The variety and genotypes for growth, yield and quality parameters. Among these maximum plant heights was recorded in MLO-1-1 (80.203 cm) whereas minimum plant height was recorded in AKON-3 (66.27 cm). Maximum number of leaves was recorded in AKON-3 (9.1), whereas the minimum number of leaves was recorded in AKON-14 (6.4). Maximum leaf length was recorded in MLO-1-1 (69.97 cm) and minimum was recorded AKON-2 (57.49 cm). Maximum leaf area was recorded in MLO-1-1 (309.867 cm^2) and minimum was recorded in AKON-2 (280.88 cm^2). Neck thickness maximum was recorded in MLO-4 (31.30 cm), whereas minimum was recorded in Arka kirtiman (1.04 cm). Maximum bulb diameter was recorded in AKON-4 (5.34 cm) and minimum was recorded AKON-14 (3.16 cm). Maximum bulb weight was recorded in AKON-3 (85.74 g) and minimum was recorded in AKON-11 (63.21 g). Maximum yield per plot was recorded in AKON-3 (7.776 kg), whereas minimum was recorded in AKON-14 (2.597 kg). Maximum TSS content was recorded in Akola safed (14.22ºB) and minimum was recorded in Arka kirtiman (10.92 ºB). Maximum yield per hectare was recorded in AKON-3 (28.8 tonnes) and minimum was recorded in AKON-14 (9.623 tonnes).

Keywords: Onion, Genotypes, Varieties, Yield.

Introduction
Onion (*Allium cepa* L.) is one of the most important bulb crops cultivated all over the world on commercial scale both for local consumption and export. It belongs to family 'Alliaceae' and it has chromosome number 2n=2x=16. The pungency in onion is due to Sulphur- bearing compound in very small quantity (about 0.005%) in the volatile oil allyl propyl disulphide ($C_6H_{12}O_2$). Onion has got good medicinal value and therapeutic properties it is effective against common cold, diabetes, heart disease, osteoporosis and other diseases. Onion is known for antiplatelet aggregation, anti-rheumatic, diuretic and fibrinolytic effects as well as it lower the blood sugar. India is the second largest producer of vegetables after China in the world. Total area, production and productivity of vegetable crops in India is 10.26 million ha, 184.40 MT and 17.97 MT/ha respectively. In the world, India ranks first in total area i.e. 1285 in '000 Ha and second in production i.e. 23262 '000MT for onion production after China (Anonymous. 2018) [1]. Indian onion is being exported to Malaysia, Singapore, Gulf Countries, Sri Lanka, Bangladesh, Pakistan and Nepal. To breed for higher yield and quality it is important to have desirable genotype collection.

Material and methods
The present investigation was carried out at Instructional farm Department of Vegetable Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS.) during *rabi* season of year 2018-2019. The study was under taken on 23 genotypes of onion using randomized block design with three replications, keeping a plot size of 1.8 m x 1.5 m. The material under study was constituted of 23 genotypes of onion collected from different institutes as listed below.

Table 1: Genotypes under study

Sr. No.	Name of the genotypes	Source
1	T1- AKON-1	Department of vegetable science, Akola
2	T2- AKON-2	
3	T3- AKON-3	
4	T4- AKON-4	
5	T5- AKON-5	
6	T6- AKON-6	
7	T7- AKON-7	
8	T8- AKON-8	
9	T9- AKON-9	
10	T10- AKON-10	
11	T11- AKON-11	
12	T12- AKON-12	
13	T13- AKON-13	
14	T14- AKON-14	
15	T15- MLO-1	
16	T16- MLO-1-1	
17	T17- MLO-2	
18	T18- MLO-4	
19	T19- MLO-4-1	
20	T20- Selection-1	
21	T21- Arka Kalyan	IIHR, Banglore
22	T22- Arka Kirtiman	
23	T23- Akola Safed	Dr. PDKV, Akola

Observation were recorded on five randomly selected plants from each genotype. The data was recorded on quantitative as well as qualitative parameters like number of leaves per plant, plant height, leaf length, leaf area, neck thickness, bulb diameter, bulb weight, TSS, yield per plot and yield per hectare.

Result and discussion

The range for number of leaves per plant was recorded from 6.4 to 9.1. The mean number of leaves per plant was recorded 7.767. Highest number of leaves was recorded in the AKON-3 (9.1). While the genotype AKON-14 was recorded lowest number of leaves per plant (6.4). Plant height was varied from 66.27 cm to 80.203 cm. The mean plant height recorded was 74.232 cm. Genotype MLO-1-1 was observed to be tallest one (80.203 cm). While genotype AKON-14 was observed to be the smallest one (66.27 cm). Leaf length was recorded in the range from 57.49-69.97 cm. The mean leaf length was recorded 64.076 cm. The genotype MLO-1-1 recorded maximum leaf length 69.97 cm. While the genotype AKON-2 was recorded minimum leaf length 57.49 cm. Leaf area varied from 280.88 cm^2 to 309.867 cm^2. The mean leaf area was 292.946 cm^2. Genotype MLO-1-1 was observed to be tallest one (309.867 cm^2). While genotype AKON-2 was observed to be the smallest one (280.88 cm^2). The range for neck thickness was ranged from 1.04 cm to 1.30 cm. Mean for the neck thickness was recorded 1.173 cm. Genotype MLO-4 was recorded maximum neck thickness (1.30 cm). While Arka Kirtman minimum neck thickness (1.04 cm). Bulb diameter was ranged from 3.16 cm to 5.34 cm. Mean for bulb diameter was recorded 4.311 cm. Bulb diameter was recorded maximum in AKON-4 (5.34 cm). While the minimum was recorded in AKON-14 (3.16 cm). Bulb weight was ranged observed from 63.21 g to 85.74 g. The mean bulb weight was observed was 73.464 g. It was maximum in AKON-3 (85.74 g). While minimum was recorded in AKON-11 (63.21 g). Yield per plot was ranged from 2.597 to 7.776 kg. The mean value for yield per plot was recorded during this investigation 4.647 kg. The maximum yield per plot was recorded in AKON-3 (7.776 kg) and minimum yield per plot was recorded AKON-14 (2.597 kg). TSS was ranged 10.92 to 14.22 ^{0}B. Highest TSS was recorded in Akola safed (14.22 ^{0}B) and minimum TSS was recorded Arka Kirtman (10.92 ^{0}B). The mean value of TSS was observed 12.270 ^{0}B. Yield per hectare was ranged from 9.623 tonnes to 28.8 tonnes per hectare. The highest yield per hectare was recorded in AKON-3 (28.8 tonnes). While lowest yield was recorded in AKON-14 (9.623 tonnes). The mean of yield per hectare recorded during this investigation was 17.217 tonnes per hectare.

Hence wide range of variability for these traits was observed in the present investigation. This result is encouraging because the presence of high variability, among the traits has been an indication of better chance for improvement. Significant variability for various characters in onion have been reported by various workers *viz.* Hosamani *et al*. (2010) [3], Singh *et al.* (2011) [6], Singh *et al.* (2017) [5], Basha D. R. *et al*. (2018) [2] and Parmar VK *et al.* (2018) [4]. The above findings were in broad conformity with the reports of these workers.

Conclusion

On the basis of findings reported in present investigation the following conclusions could be drawn. The mean sum of squares for all the characters studied was found to be significant, indicating the variation for the characters under study. The genotypes *viz*., AKON-3, AKON-4 and MLO-1 on the basis of yield and yield contributing characters are found promising for future improvement programme. Hence, these genotypes may be given consideration while formulating selection indices for the improvement of yield in onion

Table 2: Mean performance of all genotype

Genotype	No. of leaves	Plant height (cm)	Leaf length (cm)	Leaf area (cm^2)	Neck thickness (cm)	Bulb diameter (cm)	Weight of bulb (gm)	Yield per plot (kg)	TSS ^{0}Brix	Yield per hectare (ton)
AKON-1	6.950	69.280	58.470	282.640	1.180	3.950	64.080	2.932	11.650	10.865
AKON-2	7.080	67.500	57.490	280.880	1.150	3.350	67.330	2.900	12.250	10.747
AKON-3	9.100	78.470	68.280	295.200	1.090	5.250	85.740	7.776	11.110	28.800
AKON-4	8.900	78.110	68.450	291.740	1.070	5.340	82.790	7.079	12.420	26.223
AKON-5	7.620	76.930	67.270	296.220	1.130	4.650	73.670	4.185	11.530	15.500
AKON-6	7.150	76.770	66.240	293.280	1.170	4.350	71.570	4.031	12.210	14.930
AKON-7	7.950	69.650	59.340	281.900	1.100	3.890	78.010	4.268	11.650	15.816
AKON-8	7.700	73.250	63.950	287.420	1.160	4.140	76.660	5.502	12.330	20.381
AKON-9	7.860	75.970	64.200	288.270	1.210	4.110	71.560	4.663	11.050	17.273
AKON-10	8.180	74.690	58.500	283.170	1.150	4.450	81.440	5.432	11.810	20.126
AKON-11	7.080	68.600	60.140	282.240	1.200	4.080	63.210	2.900	11.150	10.747
AKON-12	6.850	70.950	62.970	289.480	1.160	3.570	69.610	3.132	11.890	11.601
AKON-13	7.600	72.240	63.770	290.780	1.120	4.750	70.140	3.891	12.550	14.413
AKON-14	6.400	66.270	57.930	281.360	1.110	3.160	65.250	2.597	11.710	9.623

MLO-1	8.333	75.970	65.950	301.440	1.270	4.420	77.370	5.340	13.110	19.789
MLO-1-1	8.000	80.203	69.970	309.867	1.280	4.590	78.730	6.626	13.330	24.546
MLO-2	8.267	76.140	67.600	303.240	1.290	4.620	74.200	4.895	13.150	18.134
MLO-4	8.933	77.500	68.690	308.320	1.300	5.140	76.500	4.798	13.920	17.776
MLO-4-1	8.400	78.440	69.770	307.550	1.260	3.970	74.200	4.984	13.950	18.466
Selection-1	7.200	75.450	64.110	304.040	1.240	4.160	71.560	5.538	13.000	20.515
Arka kalyan	7.110	71.240	61.110	285.100	1.060	4.220	66.800	3.871	11.310	14.343
Arka Kirtiman	7.570	73.770	61.440	286.210	1.040	4.100	69.930	3.464	10.920	12.833
Akola Safed	8.400	79.950	68.103	307.400	1.250	4.890	79.330	6.088	14.220	22.550
F test	Sig	sig	sig	sig	sig	sig	Sig	sig	sig	sig
SE(m)	0.24868	2.3836	2.28789	6.43172	0.0352	0.20876	3.01478	0.21409	0.14151	0.78733
C.D.	0.71	6.77	6.50	18.26	0.1	0.59	8.56	0.61	0.40	2.23
C.V	5.5459	5.5616	6.18445	3.80278	5.1996	8.38758	7.11209	7.97869	1.99752	7.92054

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