



An Experimental Studies on Performance of Various Onion Genotypes for Yield Behavior, Diseases, Insect Attack and Storage Losses

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Abstract

The present investigation was carried out during *kharif* season 2012-13 at the Horticulture Complex, Department of Horticulture, College of Agriculture, JNKVV, Jabalpur (M.P.). The experimental material for the present investigation was comprised of 33 genotypes of onion. These genotypes were sown in randomised complete Block design with three replication to estimate the yield, disease & insect and storage losses. Genotypes BSKO-1256 performed best in terms of yield and gave marketable yield of 296.90 q/ha followed by genotype ASKO-1231, 291.90 q/ha and genotype CSKO-1266, 230.50 q/ha. Genotype ASKO-1213 was minimum affected by incidence of stemphyllium blight 8.68% at 60 DAT whereas genotype BSKO-1231 had shown lowest thrips count per plant 12.00 at 60 DAT. So these genotypes can be further exploited in selection programmes of disease & insect resistance.

Keywords: *Genotypes, sprouting % and rotting % , stemphyllium blight, thrips.*

Introduction

Onion (*Allium cepa* L.) belongs to the family Amyrillidaceae is important bulb vegetable cultivated in more than hundred countries. Onion is grown worldwide throughout the year under various Agro climatic conditions. The pungency in onion is due to sulphur bearing compound allyl propyl disulphide ($C_6H_{12}O_2$) in a very small quantity (0.005%) in form of volatile oil. The quality of onion depends on shape, size, colour and pungency of bulbs. Highly pungent Red colour onions are preferred in India, while less pungent yellow or white skinned ones are demanded in European and Japanese market. Shape, size and colour of bulb also determine its market value.

Materials and Methods

The present investigation was carried out during *kharif* season 2012-13 at the Horticulture Complex, Department of Horticulture, College of Agriculture, JNKVV, and Jabalpur (M.P.). The soil of the experimental field was medium black with good drainage and uniform texture with

medium NPK status. Jabalpur is situated on 'Kymore Plateau' agro-climatic region of Madhya Pradesh at 23.91° North latitude, 79.5° East longitudes and on an altitude of 411.78 meters above the mean sea level. The experimental material for the present investigation was comprised of 33 genotypes of onion. These genotypes were sown in randomised complete Block design with three replication to estimate the morphological, yield, disease, insect and storage losses. The evaluation was done as per standard procedures.

Results and Discussion

Percentage 'A' Grade Bulbs

The overall mean value of all genotypes for 'A' grade bulbs was 5.70%. Genotype ASKO-1231 was recorded with maximum 26.83 percentages of a grade bulb. However, there were certain genotypes in which 'A' grade bulbs were not found these are ASKO-1201, ASKO-1203, ASKO-1207, ASKO-1238, ASKO-1271, BSKO-1249 etc.

Percentage 'B' Grade Bulbs

It ranged from 24.3 to 44.3 percentage, with an overall mean of 32.31 percentage. Maximum 'B' grade bulbs 44.3 percentage were obtained in genotype BSKO-1227 whereas, minimum 24.3 percentage were obtained in genotype BSKO-1233.

Percentage Bolters

It varied from 0 to 7.7 percentage percent, with an overall mean performance of 1.920 %. Maximum % bolters 7.7 were observed in genotype ASKO-1222, whereas, there were many genotypes in which bolting was not found such as ASKO-1203, ASKO-1207, BSKO-1233, BSKO-1259, CSKO-1233 etc.

Marketable Yield (Q/Ha)

Marketable yield varied from 115.67 to 296.9 q/ha, with an overall mean performance of 189.17 q/ha. Genotype BSKO-1256 was recorded with the maximum marketable yield of 296.9 q/ha followed by genotype ASKO-1231 i.e. 291.1q/ha. Whereas, genotype ASKO-1271 was recorded with minimum marketable yield i.e. 115.67 q/ha.

These above findings were in close proximity to results of (Mohanty. 2004); (Shrivastava. *et al.*, 2004); (Gurjar and Singhania. 2006); (Trivedi. *et al.*, 2006); (Hayder. *et al.*, 2007); (Singh and Bhonde. 2009); (Singh. *et al.*, 2011).

Table-1: Mean performance of Morphological parameters in onion

Treatment	% A grade bulbs	% B grade bulbs	% C grade bulbs	% Marketable bulbs	% Bolters	T.S.S%
ASKO-1201	0.000	33.267	38.067	71.067	3.033	10.567
ASKO-1203	0.000	28.167	30.000	57.933	0.000	13.033
ASKO-1207	0.000	41.667	30.233	71.900	0.000	13.833
ASKO-1210	0.000	43.267	27.867	71.133	6.500	12.167
ASKO-1213	0.000	41.567	29.567	71.133	2.133	12.500
ASKO-1215	0.000	34.900	35.600	70.500	4.067	12.233
ASKO-1217	0.000	35.000	37.767	72.767	0.533	11.367
ASKO-1220	0.000	27.667	33.667	61.333	2.767	14.100
ASKO-1222	0.000	12.800	46.900	62.233	7.700	13.467
ASKO-1224	0.000	27.800	37.067	64.867	0.000	12.700
ASKO-1227	25.133	30.667	25.333	77.633	1.433	12.733
ASKO-1231	26.833	31.200	29.700	87.733	1.367	14.033
ASKO-1233	1.667	31.200	37.767	70.600	12.167	13.400
ASKO-1236	11.000	29.467	41.200	81.667	3.067	11.533
ASKO-1238	0.000	0.000	60.700	60.700	0.000	12.967
ASKO-1271	0.000	0.000	55.533	55.533	1.800	10.600
ASKO-1273	0.000	36.067	34.700	70.767	1.567	10.933
BSKO-1227	0.000	44.300	35.467	79.767	2.200	12.200
BSKO-1231	15.500	24.600	38.633	78.733	2.400	14.233
BSKO-1233	0.000	24.333	43.933	68.267	0.000	14.167
BSKO-1246	0.000	20.000	37.667	53.433	1.333	11.500
BSKO-1249	0.000	34.400	35.033	63.733	2.100	11.667
BSKO-1251	16.800	32.267	24.800	73.867	1.733	12.100
BSKO-1256	9.667	29.533	42.433	81.633	0.733	13.933
BSKO-1259	0.000	24.533	41.867	66.400	0.000	12.167
CSKO-1227	0.000	26.167	36.633	61.100	4.167	12.300
CSKO-1231	18.967	30.167	29.767	78.767	1.700	14.600
CSKO-1233	5.333	32.600	39.600	77.533	0.000	15.000
CSKO-1261	0.000	30.333	45.367	75.700	0.967	13.100

CSKO-1264	17.667	33.667	29.433	80.733	0.900	12.867
CSKO-1266	6.167	31.367	37.767	75.300	0.000	12.433
CSKO-1269	15.567	35.533	28.067	79.167	4.600	13.000
A.D.R (SC)	17.867	27.567	29.667	75.100	2.700	14.300
Mean	5.700	32.310	36.600	71.170	1.920	12.730
C.D.	7.920	13.615	13.977	12.060	3.523	1.585
SE(m)	2.797	4.808	4.936	4.259	1.244	0.560
C.V.	84.955	28.445	23.357	10.364	107.363	7.613

Incidence of Stemphyllium Blight & Incidence of Purple Blotch (Table-2)

Incidence of Stemphyllium blight disease varied from 3.3 to 6.5, 5.73 to 22.5, & 8.60 to 25.76 percentages with an overall mean performance of 4.93, 13.01 & 16.94 percentage at 30, 45 & 60 DAT respectively. Maximum occurrence of Stemphyllium blight was found in genotype ASKO-1236 (6.5, 22.5, & 25.76 percentage). However, it was minimum in genotype ASKO-1213 (3.3, 5.7 & 8.60 percentage) at 30, 45, 60 DAT respectively. Whereas, incidence of Purple blotch disease was not found.

Incidence of Thrips

Thrips incidence ranged from 2.00 to 7.83, 8.76 to 14.13, 12.6 to 18.06 per plant with overall mean performance of 4.65, 10.89 & 15.90 at 30, 45 & 60 DAT. Highest Thrips count per plant 7.83, 14.13 & 18.06 was found in genotype ASKO-1220. However, Minimum 7.83, 14.13 & 18.06 was found in genotype BSKO-1231 at 30, 45 & 60 DAT respectively.

Storage Losses in Onion Bulbs (Table-3)

Sprouting Percentage in Bulbs

Sprouting percentage in bulbs during storage period varied from 3.6 to 6.2, 6.7 to 9.7, 7.46 to 11.4 & 8.6 to 17.6 percentage, with a grand mean of 5.16, 8.43, 9.40 & 13.53 at 15, 30, 45 & 60 days after storage. Agrifound Dark Red was noticed with minimum sprouting percentage i.e. 3.66, 6.70, 7.40 & 8.60. Whereas genotype ASKO-1271 showed

maximum sprouting i.e. 6.2, 9.7, 11.4 & 17.6 percent at 30, 45 & 60 days after storage, respectively.

Rotting Percent in Bulbs

During storage it was observed that rotting percent varied from 3.93 to 6.96, 6.03 to 10.40, 7.60 to 11.90 & 9.16 to 16.96 with an overall mean performance of 5.50, 8.18, 10.02 & 14.02 at 15, 30, 45 & 60 days after storage. Minimum rotting percent was found in genotype ASKO-1201 i.e. 3.93, 6.03, 7.6 & 9.16, whereas maximum rotting was noticed in genotype BSKO-1251 i.e. 6.96, 10.40, 11.9 & 16.96 at 15, 30, 45 & 60 days after storage, respectively.

Physiological Weight Loss Percent

It varied from 2.03 to 7.5 & 5.16 to 10.06 percent with an overall mean performance of 3.39 & 7.47 percent at 30 & 60 days after storage. Minimum weight loss percent was observed in genotype ASKO-1207 i.e. 2.03 & 5.16 percent. Whereas, maximum was observed in genotype ASKO-1217 i.e. 7.5 & 10.06 percent at 30 & 60 days after storage, respectively.

These findings were relevant to results obtained by (Mohanty. 2001); (Rahman. *et al.*, 2002); (Mohanty. 2002); (Hayder. *et al.*, 2007); (Hosmani. *et al.*, 2010); (Singh. *et al.*, 2010); (Trivedi. *et al.*, 2006); (Gowda. *et al.*, 2004).

Table-2: Mean Performance of Disease and Insect in Onion

Treatment	Stemphyllium blight % 30 DAT	Stemphyllium blight % 45 DAT	Stemphyllium blight % 60 DAT	Thrips count per plant 30 DAT	Thrips count per plant 45 DAT	Thrips count per plant 60 DAT
ASKO-1201	3.733	13.967	18.500	5.567	10.867	14.500

ASKO-1203	4.167	10.533	13.900	5.633	10.167	14.367
ASKO-1207	4.033	10.000	11.467	3.633	11.633	15.333
ASKO-1210	4.400	8.767	13.833	2.433	10.600	16.233
ASKO-1213	3.300	5.733	8.600	5.633	11.500	16.833
ASKO-1215	5.167	13.233	17.433	4.967	13.900	16.767
ASKO-1217	4.800	14.000	16.900	4.200	14.033	17.933
ASKO-1220	6.200	16.400	21.067	7.833	14.133	18.060
ASKO-1222	3.333	16.200	20.167	6.433	10.333	17.233
ASKO-1224	5.367	15.167	19.967	4.533	10.133	17.433
ASKO-1227	3.767	14.500	17.300	5.733	9.667	16.033
ASKO-1231	5.933	15.400	19.867	5.467	9.367	16.633
ASKO-1233	5.533	16.333	25.433	5.067	9.567	15.900
ASKO-1236	6.500	22.500	25.767	7.500	12.160	16.533
ASKO1238	4.367	7.033	13.400	6.367	8.900	14.933
ASKO-1271	4.500	10.500	19.000	4.567	10.200	12.900
ASKO-1273	5.767	11.300	13.700	3.333	9.733	14.400
BSKO-1227	5.033	10.867	14.933	2.267	10.433	16.400
BSKO-1231	5.200	20.333	22.600	2.000	8.767	12.6
BSKO-1233	5.167	15.233	18.733	2.967	10.067	14.933
BSKO-1246	5.433	12.400	14.200	4.133	10.100	14.367
BSKO-1249	5.333	18.167	22.000	3.433	12.133	16.200
BSKO-1251	6.400	17.567	21.000	5.333	10.033	17.433
BSKO-1256	5.467	6.333	8.867	5.400	9.133	15.800
BSKO-1259	3.700	8.767	11.600	5.600	11.167	15.933
CSKO-1227	6.067	10.833	14.867	6.133	11.267	17.267
CSKO-1231	5.700	12.500	15.100	5.600	12.400	15.233
CSKO-1233	3.900	12.000	16.133	3.467	11.100	15.600
CSKO-1261	4.267	11.300	15.400	2.633	12.900	16.000
CSKO-1264	5.167	12.800	16.933	3.667	9.767	15.900
CSKO-1266	4.733	17.133	20.267	3.233	10.133	17.333
CSKO-1269	5.267	11.600	14.567	5.167	11.767	16.567
A.D.R (SC)	5.000	12.200	15.633	3.533	11.433	15.833
Mean	4.93	13.01	16.94	4.65	10.89	15.90
C.D.	1.567	6.366	6.912	1.519	1.793	1.533
SE(m)	0.553	2.248	2.441	0.537	0.633	0.541
C.V.	19.435	29.772	24.952	19.983	10.068	5.897

Table-3: Mean Performance of Storage Losses in Onion

Treatment	Spro uting % 15 DAT	Sprou ting % 30 DAT	Sprou ting % 45 DAT	Sprou ting %60 DAT	Rotti ng % 15 DAT	Rotti ng %30 DAT	Rotti ng %45 DAT	Rottin g %60 DAT	Physio logical weight loss % 30 DAT	Physiol ogical weight loss % 60 DAT
ASKO-1201	5.600	7.167	7.700	10.80	3.933	6.033	7.600	9.167	2.667	5.567
ASKO-1203	4.100	6.900	7.867	10.667	5.233	7.167	8.500	11.633	4.533	7.767
ASKO-1207	5.333	8.333	9.733	10.833	6.300	7.133	7.833	13.600	2.033	5.167
ASKO-1210	6.200	8.700	10.400	12.533	6.433	8.300	9.000	15.600	2.400	6.967
ASKO-1213	4.033	8.700	9.267	14.967	4.500	6.733	8.400	14.567	2.233	7.367
ASKO-1215	3.900	7.933	8.433	13.633	4.000	7.267	9.333	13.167	3.400	6.700

ASKO-1217	4.567	8.300	9.167	14.000	5.100	8.800	9.800	15.100	7.500	10.067
ASKO-1220	5.067	8.533	9.100	13.700	6.533	8.900	10.767	14.367	4.200	6.367
ASKO-1222	5.567	8.067	8.900	15.500	6.667	9.067	10.967	16.400	4.933	6.800
ASKO-1224	4.700	7.033	7.867	13.367	6.000	6.367	8.733	13.300	3.400	8.033
ASKO-1227	4.733	8.567	10.733	12.200	5.900	9.933	9.833	12.733	4.200	8.600
ASKO-1231	4.133	8.867	7.867	12.667	6.567	8.767	10.800	11.500	3.133	6.200
ASKO-1233	5.167	9.600	10.167	16.300	6.167	7.433	11.433	13.933	3.267	5.933
ASKO-1236	4.667	8.43	10.633	15.700	5.033	7.433	10.567	13.500	3.933	8.233
ASKO-1238	5.733	9.267	10.967	14.667	5.333	8.200	9.800	16.367	3.567	9.233
ASKO-1271	6.200	9.700	11.400	17.600	5.233	9.833	11.000	15.633	3.200	5.600
ASKO-1273	6.100	9.100	9.800	15.533	6.000	7.700	9.767	13.300	3.833	7.900
BSKO-1227	5.467	9.467	10.867	16.000	6.033	9.500	11.300	15.000	5.800	9.400
BSKO-1231	6.000	9.200	9.967	16.167	5.067	8.967	10.533	14.700	5.300	6.700
BSKO-1233	6.067	8.600	10.167	12.033	5.233	9.133	11.267	13.533	4.267	8.700
BSKO-1246	6.133	8.500	9.333	14.067	4.767	8.767	10.333	15.000	5.433	7.600
BSKO-1249	5.200	8.900	10.300	15.567	5.700	9.567	11.133	15.100	2.933	5.967
BSKO-1251	6.167	8.833	10.133	14.233	6.967	10.400	11.900	16.967	3.433	8.200
BSKO-1256	4.500	8.633	10.567	12.633	5.567	9.667	11.533	14.200	6.000	9.167
BSKO-1259	5.533	9.133	9.800	15.567	6.333	7.767	10.567	15.400	3.433	5.733
CSKO-1227	4.933	7.700	8.633	14.100	5.733	7.533	11.267	14.600	4.867	7.667
CSKO-1231	5.400	8.133	8.833	11.533	4.500	7.600	9.967	13.533	5.033	7.533
CSKO-1233	5.633	9.200	9.667	11.867	4.133	7.933	10.333	14.767	3.767	9.233
CSKO-1261	4.033	7.833	8.033	12.033	5.200	6.767	9.033	11.833	3.700	9.067
CSKO-1264	5.100	7.800	8.367	11.033	5.033	7.500	9.867	13.200	4.133	5.800
CSKO-1266	5.167	7.967	9.000	14.433	5.833	8.200	9.500	15.800	3.833	8.867
CSKO-1269	5.767	8.533	9.100	12.033	5.733	9.000	9.267	14.400	2.767	8.133
A.D.R (SC)	3.667	6.700	7.467	8.600	4.833	6.667	8.967	10.967	2.833	5.733
Mean	5.160	8.430	9.400	13.53	5.500	8.180	10.020	14.020	3.390	7.470
C.D.	1.238	0.963	1.306	2.211	1.108	1.101	1.872	2.017	0.677	1.034
SE(m)	0.437	0.340	0.461	0.781	0.391	0.389	0.661	0.712	0.239	0.365
C.V.	14.64 8	6.980	8.498	9.995	12.311	8.230	11.421	8.797	10.507	8.464

Conclusion

Genotypes BSKO-1256 performed best in terms of yield and gave marketable yield of 296.90 q/ha followed by genotype ASKO-1231, 291.90 q/ha and genotype CSKO-1266, 230.50 q/ha. Whereas genotypes ASKO-1231 & CSKO-1266 also gave highest average weight of marketable bulb of 49.00 & 48.03g respectively. Genotype ASKO-1213 was minimum affected by incidence of stemphyllium blight 8.68% at 60 DAT whereas genotype BSKO-1231 had shown lowest thrips count per plant 12.00 at 60 DAT.

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Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Pyasi, R. "An Experimental Studies on Performance of Various Onion Genotypes for Yield Behavior, Diseases, Insect Attack and Storage Losses Abstract." *Annals of Plant Sciences*.11.1 (2022): pp. 4548-4553.

DOI: <http://dx.doi.org/10.21746/aps.2022.11.1.3>