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To study about the better performance of Rabi onion genotype under storage condition

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Abstract

Twenty-one genotypes were evaluated for different characters of storage behaviour of onion crop was carried out during rabi season of the year 2019-20 at Vegetable Research Farm, Department of Vegetable Science, Chandra Shekhar Azad University of Agriculture and Technology, Kalyanpur; Kanpur. The experiment was laid out in randomised complete block design with three replications. The experimental material consisting of twenty-one genotypes of onion maintained at the DOGR Nasik Maharashtra were utilized. Storage study revealed that OC 18-68 has recorded minimum total loss in weight (16.06 %), minimum rotting of bulbs (7.49 %) and minimum sprouting of bulbs was recorded in OC 18-61 (1.30%) after four months storage was found outstanding in overall storage quality viz. (total loss in weight; % of sprouting bulb; % of rotten bulbs) genotype are most suitable and considerable genotype of onion under regional climatic condition of Central Uttar Pradesh.

Keywords: genotype, onion, storage, weight loss and bulbs

Introduction

The onion (*Allium cepa*. L from Latin "onion") also known as the bulb or common onion is one of the most important vegetable crops grown throughout the world and is said to be native of Central Asian and Mediterranean Region (McCollum, 1976) [2]. It is a monocot and belong to economically important family Alliaceae, sub-family, Allioideae and order Asparagels having basic chromosome number of X. =8 (2n =16). The most important species are onion (*Allium cepa*. L) Japanese bunching onion (*A. fistulosum* L), Leek (*A. porum* L), Rakkyo (*A. schenoprasum* L) & Shallot (*A. cepa* L). Post-harvest losses are assumed to be 10% of fresh arrivals and 2% monthly of stored onions. This result in fluctuations of onion prices and availability in market. Onion being semi- perishable agricultural commodity, which requires well storage and post-harvest practices to remain the quality of onion bulbs, so that its need to store in a well-ventilated place with lot of aeration and sunlight to keep the quality and avoid spoilage due to moulds under storage condition in Central part of Uttar Pradesh, Storage of onion in well-ventilated structures prolong storage life and availability of bulbs is the consumers.

Material and Method

Experimental site: The present field experiment was laid out at Vegetable Research Farm, Kalyanpur, Department of Vegetable Science of C. S. Azad University of Agriculture & Technology, Kanpur during Rabi season 2019.

Location and prevailing climatic conditions: Geographically, Kanpur is situated in the alluvial belt of Gangetic Plains of Central Zone of Uttar Pradesh at an altitude of 127.00 meters above mean sea level (MSL). It is located at latitude 25.26 to 26.28o N and longitude of 79.30 to 84.34o E. It has subtropical climate having a temperature range of 23o C to 45o C and 6o C to 31o C in summer and winter seasons, respectively.

Experimental Materials: The experimental material for the present study comprised of 21 diverse genotypes of onion maintained at the DOGR Nasik Maharashtra were used as experimental material. The seedling of all 21 genotypes of onion were planted in randomized block design (RBD) with three replications. The planting of experimental material was done on 12th January 2019. Recommended doses of fertilizer and other cultural practices were adopted for better crop development and growth.

Table 1: List of genotypes along with their sources

Sl. No.	Name of genotypes	Sources
1	OC 18-59	DOGR Nasik, Maharashtra
2	OC 18-61	DOGR Nasik, Maharashtra
3	OC 18-63	DOGR Nasik, Maharashtra
4	OC 18-65	DOGR Nasik, Maharashtra
5	OC 18-68	DOGR Nasik, Maharashtra
6	OC 18-71	DOGR Nasik, Maharashtra
7	OC 18-73	DOGR Nasik, Maharashtra
8	OC 18-75	DOGR Nasik, Maharashtra
9	OC 18-77	DOGR Nasik, Maharashtra
10	OC 18-79	DOGR Nasik, Maharashtra
11	OC 18-81	DOGR Nasik, Maharashtra
12	OC 18-83	DOGR Nasik, Maharashtra
13	OC 18-85	DOGR Nasik, Maharashtra
14	OC 18-87	DOGR Nasik, Maharashtra
15	OC 18-89	DOGR Nasik, Maharashtra
16	OC 18-91	DOGR Nasik, Maharashtra
17	OC 18-92	DOGR Nasik, Maharashtra
18	OC 18-94	DOGR Nasik, Maharashtra
19	OC 18-96	DOGR Nasik, Maharashtra
20	OC 18-97	DOGR Nasik, Maharashtra
21	OC 18-99	DOGR Nasik, Maharashtra

Result and Discussion

There were significant differences among the genotypes for all storage characteristic under study. The mean performance for evaluation of genotypes and explanation of different characters were recorded during experimentation given below:

a. Total loss in weight (%): The significant differences were observed among the genotypes in respect of total loss in weight. After one month of storage the minimum storage loss in weight observed OC 18-68 (2.94%), whereas maximum loss recorded in OC 18-89 (9.44%). While, after two months of storage the minimum storage loss in weight was observed in in OC 18-68 (6.93%), whereas the maximum was recorded in OC 18-83 (19.63%), which was followed OC 18-73 (18.94%). After three months of storage the minimum total loss in weight was observed in OC 18-68 (11.87 %), whereas maximum

was recorded in OC 18-83 (27.75 %) which was followed by 18-73 (26.87%). While, during four months of storage the minimum total loss in weight was observed in cultivar OC 18-68 (16.01 %), whereas the OC 18-83 (34.69 %) recorded the maximum (32.90%), which was followed by OC 18-92 (34.31 %). Earlier studies also reported the significant difference with respect to storage loss in weight among the different onion genotypes by Shanmugasundaram (1999) ^[3], Shanmugasundaram (2000) ^[4], Shanmugasundaram (2003) ^[6], Trivedi and Dhupal (2010) ^[7] and Jamali *et al.* (2012) ^[11].

b. Per cent of sprouting bulbs: The results revealed that, first and second months after storage the per cent loss due to sprouting of bulbs was not observed in any of the genotypes. Among the genotypes the significant difference was observed for per cent loss due to sprouting of bulbs after three and four months of storage. The minimum per cent of sprouting was observed in OC 18-68 (1.24%) and OC 18-61 (1.30%), whereas the OC 18-73 (6.32%) and OC18-73 (10.58%) recorded the maximum per cent of sprouting after three and four months of storage respectively similar findings were also reported by Shanmugasundaram (1999) ^[3], Trivedi and Dhupal (2010) ^[7] observed significant difference in per cent of sprouting in onion bulbs among onion genotypes.

c. Per cent of rotten bulbs: Among the genotypes the significant difference was observed for per cent loss due to rotten bulb loss after first, second, third and fourth months of storage. The minimum per cent of rotten bulbs was observed in OC 18-68 (1.20%), OC 18-68 (2.87 %), OC 18-68 (7.36 %) and OC 18-68 (7.49 %) respectively whereas the OC 18-81 (5.93 %), OC 18-81 (11.32 %), OC 18-81(15.69 %) and OC 18-63 (17.93 %) recorded the maximum rotten bulbs after first, second, third and fourth months of storage respectively similar findings were also reported by Shanmugasundaram (1999) ^[3], Shanmugasundaram (2000) ^[4], Trivedi and Dhupal (2010) ^[7] observed significant difference with respect to per cent rotten bulbs in onion bulbs among the different genotypes of onion.

Table 2: Mean performance of Storage characteristics of onion bulbs in different genotypes (After 1 and 2 month)

Genotypes	Initial Wt. (Kg)	Initial number of bulbs	% loss 1 Month after storage			% loss 2 Month after storage		
			Total loss by weight	Sprout. Loss by number	Rot. loss by number	Total loss by weight	Sprout. Loss by number	Rot. loss by number
OC 18-59	5.00	89.33	4.00	0.00	2.71	9.03	0.00	7.46
OC 18-61	5.00	85.66	3.69	0.00	3.03	10.55	0.00	6.87
OC 18-63	5.00	87.67	4.76	0.00	5.19	10.62	0.00	10.02
OC 18-65	5.00	76.33	8.64	0.00	2.12	16.26	0.00	6.08
OC 18-68	5.00	78.67	2.94	0.00	1.20	6.93	0.00	2.87
OC 18-71	5.00	73.33	4.88	0.00	4.71	10.69	0.00	9.00
OC 18-73	5.00	79.00	8.15	0.00	5.25	18.94	0.00	10.16
OC 18-75	5.00	68.33	3.96	0.00	0.00	10.17	0.00	3.15
OC 18-77	5.00	82.67	4.79	0.00	0.00	11.99	0.00	3.25
OC 18-79	5.00	81.33	6.50	0.00	1.77	14.59	0.00	5.95
OC 18-81	5.00	94.67	5.20	0.00	5.93	10.08	0.00	11.32
OC 18-83	5.00	83.67	9.37	0.00	2.73	19.63	0.00	8.79
OC 18-85	5.00	95.67	7.02	0.00	4.69	13.79	0.00	8.59
OC 18-87	5.00	103.33	7.29	0.00	2.76	16.62	0.00	7.51
OC 18-89	5.00	96.67	9.44	0.00	3.60	17.46	0.00	6.60
OC 18-91	5.00	79.33	8.35	0.00	0.00	14.54	0.00	3.61
OC 18-92	5.00	84.00	8.30	0.00	2.82	17.31	0.00	7.29
OC 18-94	5.00	90.67	5.89	0.00	5.84	12.87	0.00	10.41
OC 18-96	5.00	101.67	4.10	0.00	1.77	9.43	0.00	5.77
OC 18-97	5.00	94.33	5.20	0.00	2.87	10.99	0.00	8.24
OC 18-99	5.00	118.33	6.79	0.00	3.12	11.17	0.00	6.27
SE(m)	-	-	0.5040	-	0.2517	0.3777	-	0.6298
CD at 5%	-	-	1.4408	-	0.7204	1.0804	-	1.8010
CV%	-	-	13.85	-	14.73	4.91	-	15.35

Table 3: Storage characteristics of onion bulbs in different genotypes (After 3 and 4 month)

Genotypes	Initial Wt. (Kg)	Initial number of bulbs	% loss 3 Month after storage			% loss 4 Month after storage		
			Total loss by weight	Sprout. Loss by number	Rot. loss by number	Total loss by weight	Sprout. Loss by number	Rot. loss by number
OC 18-59	5.00	89.33	15.19	2.35	12.72	20.58	5.63	14.69
OC 18-61	5.00	85.66	18.65	1.30	11.53	22.92	1.30	16.29
OC 18-63	5.00	87.67	16.56	2.36	13.83	25.02	6.65	17.93
OC 18-65	5.00	76.33	20.07	3.82	10.15	25.98	7.85	14.69
OC 18-68	5.00	78.67	11.87	1.24	7.36	16.01	4.09	7.49
OC 18-71	5.00	73.33	17.67	0.00	12.88	24.99	5.94	16.72
OC 18-73	5.00	79.00	26.87	6.32	14.63	33.84	10.58	17.45
OC 18-75	5.00	68.33	17.15	3.54	8.03	26.26	6.61	10.89
OC 18-77	5.00	82.67	20.81	2.89	7.98	29.64	6.39	11.61
OC 18-79	5.00	81.33	19.87	0.00	10.00	26.79	3.58	13.25
OC 18-81	5.00	94.67	18.26	0.00	15.69	23.33	4.17	21.79
OC 18-83	5.00	83.67	27.75	3.89	13.56	34.69	8.18	15.21
OC 18-85	5.00	95.67	22.91	2.70	12.66	27.88	8.36	16.72
OC 18-87	5.00	103.33	22.31	4.10	11.63	30.27	6.82	13.86
OC 18-89	5.00	96.67	25.49	1.89	11.14	30.92	6.01	14.85
OC 18-91	5.00	79.33	22.75	3.72	8.31	30.97	6.87	12.55
OC 18-92	5.00	84.00	25.08	2.79	11.40	34.31	5.85	12.90
OC 18-94	5.00	90.67	19.33	0.00	15.05	26.08	2.70	17.66
OC 18-96	5.00	101.67	15.12	3.96	10.39	22.01	3.96	13.79
OC 18-97	5.00	94.33	17.84	4.05	12.25	25.10	6.73	15.85
OC 18-99	5.00	118.33	16.21	2.85	8.14	20.22	6.54	10.69
SE(m)	-	-	0.8819	0.1390	0.4648	0.8556	0.4409	0.9386
CD at 5%	-	-	2.5213	0.3962	1.3292	2.446	1.2751	2.6834

Conclusion

The results concluded that present investigation revealed that genotype OC 18-68 was found outstanding in overall storage quality viz. (total loss in weight; % of sprouting bulb; % of rotten bulbs) genotype are most suitable and considerable genotype of onion under regional climatic condition of Central Uttar Pradesh.

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