

RESEARCH PAPER

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Influence of different onion cultivars on storage life under central dry zone of Karnataka

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SUMMARY :

Twenty cultivars of onion were studied for storage life under ambient conditions for four months. The minimum per cent of sprouting was observed in Arka Bindu (0.61 % and 2.06 %), whereas, the Agrifound dark red recorded the maximum per cent of sprouting (6.23 % and 17.28 %) after three and four months of storage, respectively. The minimum per cent of rotten bulbs was observed in Arka Bindu (1.84 % and 3.28 %), whereas, the agrifound dark red recorded the maximum rotten bulbs (3.78 % and 17.28 %) after three and four months of storage, respectively. After one month of storage the minimum storage loss in weight observed in Arka Bindu (1.60 %), whereas, maximum recorded in Agrifound dark red (6.03 %). While, after two months of storage the minimum storage loss in weight was observed in Bhima Kiran and Bhima red (5.50 % each), whereas, the maximum was recorded in Arka Kalyan (6.03 %). After three months of storage the minimum total loss in weight was observed in Bhima Kiran (7.73 %), whereas, maximum was recorded in Agrifound dark red (28.50 %). While, during four months of storage the minimum total loss in weight was observed in cultivar Arka Bindu (12.80 %).

KEY WORDS : Bulb weight, Equatorial diameter of bulb, Marketable bulb yield, Neck thickness, Polar diameter of bulb

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Onion is considered as to be the second most important vegetable crop grown in the world after tomatoes. In Karnataka, the crop is cultivated in an area of 1.03 lakh hectares with annual production of 12.27 lakh tonnes. Average yield is very low (11.91 t/ha) compared to national and world average productivity (Anonymous, 2001). In Karnataka, onion is mainly grown in Dharwad, Bijapur, Gulbarga, Belgaum, Raichur, Bellary,

Chitradurga, Shimoga and Chikmaglore districts. The dry matter production and yield of onion is mainly dependent on the use of high yielding varieties, optimum use of fertilizers, plant protection measures and adaptability of a variety to a particular region. Onion being semi-perishable crop gets deteriorated during storage, transportation and marketing. Due to the storage losses, it cannot be guaranteed that whole amount of the total

production is consumed by the people. The post-harvest losses, viz., sprouting, rotting and physiological loss in weight pose a great problem. It is reported that annual storage losses were over 40 per cent and between 40 to 60 per cent in India. Storage losses of onion range from 30 per cent to 60 per cent due various factors. Physiological loss of weight (25-30%) is a major followed by sprouting of bulbs is to the tune of 10-15 per cent and microbial decay or rotting due to fungal diseases is up to 10-15 per cent (Anonymous, 2012). In this regard it becomes essential to study the performances of onion cultivars for storage characteristics during late *Kharif* season.

EXPERIMENTAL METHODS

The present study was conducted at the Regional Horticulture Research and Extension Centre, Hiriyyur in Central Dry Zone of Karnataka during late *Kharif* season of 2012 using 20 cultivars of onion. The experiment was laid out in Randomized Complete Block Design (RCBD) and replicated three times. The seeds of different cultivars were sown during last week of July 2012. The bulbs were harvested and field cured for a week. In each replication 5 kg of bulbs were randomly selected and initial number of bulbs of all cultivars per 5 kg was recorded replication wise followed by storage in plastic crates at room temperature for four months (Jan.-April, 2012). Observation on storage characters were recorded on per cent sprouting bulbs, per cent rotten bulbs and total loss in weight were recorded at 15 days intervals. To get the total loss in bulb weight, the weight of healthy bulbs was subtracted from initial weight of the sample. The per cent loss due to sprouting was calculated by separating and weighing the sprouted bulbs. Per cent loss due to rotting was calculated by weighing the rotten bulbs. The data on meteorological observation recorded during the period is presented in Table 2 and there were no significant variations in the weather condition during storage period.

Statistical analysis:

The obtained data was analyzed by statistical significant at $P < 0.05$ level, S.E. and C.D. at 5 per cent level by the procedure given by (Panse and Sukhatame, 1962).

EXPERIMENTAL FINDINGS AND ANALYSIS

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 cultivars.

Among the cultivars the significant difference was observed for per cent loss due to sprouting of bulbs after three and four months of storage (Table 2). The minimum per cent of sprouting was observed in Arka Bindu (0.61 % and 2.06 %), whereas the Agrifound dark red recorded the maximum per cent of sprouting (6.23 % and 17.28 %) after three and four months of storage, respectively. Satodiya and Singh, 1993; Shanmugasundaram, 1999; Singh *et al.*, 1992; Somkumar *et al.*, 1994 and Trivedi and Dhumal, 2010 also observed significant difference in per cent of sprouting in onion bulbs among onion cultivars. The results revealed that, first and second months after storage the per cent loss due to rotten bulbs was not observed in any of the cultivars (Table 1).

Among the cultivars the significant difference was observed for per cent loss due to rotten bulb loss after three and four months of storage. The minimum per cent of rotten bulbs was observed in Arka Bindu (1.84 % and 3.28 %), whereas, the Agrifound dark red recorded the maximum rotten bulbs (3.78 % and 17.99 %) after three and four months of storage, respectively. Satodiya and Singh, 1993; Shanmugasundaram, 1999; Singh *et al.*, 1992; Somkumar *et al.*, 1994 and Trivedi and Dhumal, 2010 also observed significant difference with respect to per cent rotten bulbs in onion bulbs among the different cultivars of onion (Table 2).

The significant differences were observed among the cultivars in respect of total loss in weight (Table 1). After one month of storage the minimum storage loss in weight observed in Arka Bindu (1.60 %) which was on par with Bhima super (1.87 %), followed by Super Flare (2.22%) and Bhima Kiran (2.22 %), whereas maximum recorded in Agrifound dark red (6.03 %). While, after two months of storage the minimum storage loss in weight was observed in Bhima Kiran and Bhima red (5.50 % each) which was followed by Bhima Shakti (5.90 %), whereas the maximum was recorded in Arka Kalyan (14.21 %).

After three months of storage the minimum total loss in weight was observed in Bhima Kiran (7.73 %) which was on par with Bhima Shakti (7.98 %), which was followed by Satara Garva (10.47 %), whereas, maximum was recorded in Agrifound dark red (28.50 %) (Table 1). While, during four months of storage the minimum total loss in weight was observed in cultivar Arka Bindu (12.80 %), followed by Bhima Shakti (14.33

Table 1: Storage behaviour and keeping quality of onion bulbs in different cultivars during storage

Sr. No.	Treatments /cultivars	Initial weight of bulbs (kg)	Total number of bulbs per 5 kg	Per cent loss one month after storage		Per cent loss two month after storage		Total loss in weight (%)
				Per cent of sprouting bulbs	Per cent of rotten bulbs	Per cent of sprouting bulbs	Per cent of rotten bulbs	
1.	Agrifound dark red	5.0	97.33	0	0	0	0	14.00
2.	Agrifound light red	5.0	93.67	0	0	0	0	7.82
3.	Bellary red	5.0	132.67	0	0	0	0	11.21
4.	Satara garva	5.0	84.00	0	0	0	0	7.72
5.	Arka bindu	5.0	163.00	0	0	0	0	7.86
6.	Arka kalyan	5.0	129.00	0	0	0	0	14.21
7.	Arka pragati	5.0	102.00	0	0	0	0	10.87
8.	Arka nicketan	5.0	105.00	0	0	0	0	6.54
9.	Super flare	5.0	106.00	0	0	0	0	8.26
10.	N-53	5.0	106.67	0	0	0	0	13.66
11.	Bhima super	5.0	80.67	0	0	0	0	6.88
12.	Light red	5.0	94.33	0	0	0	0	7.35
13.	Bhima shubra	5.0	86.67	0	0	0	0	8.13
14.	Bhima shakti	5.0	91.00	0	0	0	0	5.90
15.	Bhima kiran	5.0	96.33	0	0	0	0	5.50
16.	Bhima red	5.0	84.00	0	0	0	0	5.50
17.	Bhima shweta	5.0	84.00	0	0	0	0	7.25
18.	Bhima raj	5.0	94.33	0	0	0	0	7.07
19.	Prema-178	5.0	97.00	0	0	0	0	10.08
20.	Mahalakshmi	5.0	110.67	0	0	0	0	8.79
	S.E. ±			-	-	-	-	0.12
	C.D. (P=0.05)			-	-	-	-	0.35
	C.V. (%)			-	-	-	-	6.47

Table 2 : Storage behaviour and keeping quality of onion bulbs in different cultivars during storage

Sr. No.	Treatments /cultivars	Initial weight of bulbs (kg)	Total number of bulbs per 5 kg	Per cent loss three month after storage		Per cent loss four month after storage		Total loss in weight (%)
				Per cent of sprouting bulbs	Per cent of rotten bulbs	Per cent of sprouting bulbs	Per cent of rotten bulbs	
1.	Agrifound dark red	5.0	97.33	6.23	3.78	17.28	15.80	46.78
2.	Agrifound light red	5.0	93.67	3.55	2.52	6.42	13.26	24.11
3.	Bellary red	5.0	132.67	4.60	3.76	9.07	11.87	21.60
4.	Satara garva	5.0	84.00	3.59	2.40	15.21	9.15	18.06
5.	Arka bindu	5.0	163.00	0.61	1.84	2.06	3.28	12.80
6.	Arka kalyan	5.0	129.00	2.06	2.33	10.05	12.92	23.87
7.	Arka pragati	5.0	102.00	2.30	3.25	7.18	17.99	44.77
8.	Arka nicketan	5.0	105.00	1.90	2.54	9.20	6.67	19.53
9.	Super flare	5.0	106.00	1.82	2.78	9.15	6.04	16.54
10.	N-53	5.0	106.67	2.49	2.17	11.90	13.84	30.48
11.	Bhima super	5.0	80.67	2.92	2.87	10.80	10.33	27.98
12.	Light red	5.0	94.33	1.74	2.05	9.11	14.85	32.11
13.	Bhima shubra	5.0	86.67	2.34	2.67	11.14	14.30	33.14
14.	Bhima shakti	5.0	91.00	2.92	2.54	6.89	4.77	14.33
15.	Bhima kiran	5.0	96.33	2.09	2.41	6.56	11.76	16.47
16.	Bhima red	5.0	84.00	2.40	2.40	13.61	12.76	23.77
17.	Bhima shweta	5.0	84.00	2.38	1.98	10.71	14.29	21.75
18.	Bhima raj	5.0	94.33	1.38	2.46	12.82	13.79	26.31
19.	Prema-178	5.0	97.00	2.41	2.76	13.75	10.61	24.28
20.	Mahalakshmi	5.0	110.67	1.81	2.72	13.30	11.74	33.10
	S.E. \pm			0.25	0.25	1.06	0.36	0.41
	C.D. (P=0.05)			0.72	0.73	3.04	1.03	1.17
	C.V. (%)		17.00	17.00	17.83	5.41	2.76	

%) and Bhima Kiran (16.47 %), whereas, the Agrifound dark red recorded the maximum (46.78 %). The results are in agreement with the findings of (Mahanthesh *et al.*, 2009 a & b). Poor quality was found in varieties with large bulbs and variety Arka Bindu found to be more suitable for long term storage (Somkumar *et al.*, 1994). The minimum storage losses in Arka Bindu is may also due

high TSS and high dry matter content of the bulbs as reported by (Trivedi and Dhumal, 2010). Earlier studies also reported the significant difference with respect to storage loss in weight among the different onion cultivars by Satodiya and Singh, 1993; Shanmugasundaram, 1999; Singh *et al.*, 1992; Somkumar *et al.*, 1994; Trivedi and Dhumal, 2010 and Jamali *et al.*, 2012.

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