NOTES ON STORAGE OF ONION BULBS GROWN IN CENTRAL OREGON

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ABSTRACT

A small field each of Simcoe and Progress onions was sampled October 5, 1984, after several frosts. Bulbs protected by other bulbs, leaves, and soil within the swath were selected for comparison with bulbs on top of the swath that had been frosted. All onions in mesh bags were stored in an onion barn with forced air ventilation near Brooks, Oregon, until May 2, 1985. The protected bulbs of both varieties stored very well for the nearly seven-month period. There were only four and zero percent internally rotted bulbs from Simcoe and Progress, respectively, when protected from frost. This compares to 19% internal rot for frosted bulbs of Simcoe and 11% for Progress. More marketable bulbs can be obtained by avoidance of frost.

Growers in Central Oregon have experienced losses of onion bulbs in storage. During the fall of 1984, temperatures in the twenties occurred with severe frost on onion bulbs drying and curing in the swath. Subsequently, growers wondered what effect such conditions would have on the storability of bulbs. A Simcoe and Progress field of Pete Read and Errol Ohlde, Culver, Oregon, was sampled to determine effect of frost on onion bulb storability.

MATERIALS AND METHODS

Eight samples each of Simcoe and Progress were selected randomly on the afternoon of October 5, 1984, from the swaths. Each swath was formed from onions grown in three-rows on 40-inch beds. They were lifted on September 16. Maleic Hydrazide (MH-30) had been applied as a sprout inhibitor. Ten to 15 bulbs were selected from four different areas of each variety within and outside the swath. Bulbs in the swath were

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protected outside the swath. Bulbs within the swath were protected from the frost by other bulbs, tops and/or soil. Bulbs on top of the swath were labeled as unprotected. All bulbs were hand-topped and enclosed in mesh bags for storage in an onion storage shed at Brooks, Oregon. Bags were placed one layer deep on a pallet with adequate air circulation beneath and around the pallet.

All samples were examined on May 2, 1985, after about seven months of storage, for number of soft and firm bulbs. External and internal rot was determined for each bulb. All bulbs were cross-sectioned to examine for internal decay. Bulb sprouting, dehydration, greening, and scale retention were also noted.

The data were not analyzed statistically, therefore, caution must be exercised in its interpretation.

RESULTS AND DISCUSSION

By September 1, 1984, approximately 50 and 25 percent of the tops had fallen over on Progress and Simcoe, respectively. There was greater variation in neck diameter among Simcoe than Progress. However, bulbs of Simcoe were larger than Progress. Swaths of Simcoe contained considerably more green top growth on September 29 and were larger than the Progress swaths. The swaths of Progress seemed to be much drier at sampling time than Simcoe because Progress is earlier and had small refined necks. Bulb drying and curing could have been aided by turning or lifting the swaths for aeration. Low night temperatures in September and October coupled with severe frosts (Table 1) contributed to slow drying. No temperature readings were available at Read-Ohlde field but the bulbs were probably subjected to temperatures within the range shown in Table 1. Mr. Ohlde recorded a 22°F reading at his home on September 24, about two miles from the field. The same temperature was recorded at Redmond.

There was more internal rot in frosted (UP) bulbs than in bulbs within the swath which were protected (P) (Table 2). No difference in external rot was found between UP and P bulbs of Simcoe. A somewhat lower incidence (2 1/2%) of external rot existed for the protected Progress bulbs. The number of soft and firm bulbs were similar for Simcoe regardless of position in the swath although there was less internal rot for protected bulbs.

The protected bulbs of Progress had no internal rot compared to the unprotected bulbs. There were more sprouted bulbs in the protected bulbs of Progress.

No Simcoe bulbs were classified as sprouted. There were more multiple centers in Progress bulbs.

Table 1. Minimum air temperatures 32°F and below in September and October 1-5, 1984 at Redmond and Madras, Oregon

REDMOND		MADRAS	
Date	°F	Date	°F
Sept. 10	32	Sept. 24	28
12	26	25	29
13	27		
14	29		
24	22		
25	27		
26	27		
27	26		
28	24		
29	26		
30	30		
Oct. 1	28		
2	29		
5	26		

There was a marked difference in degree of firmness between Simcoe and Progress, with Progress bulbs being softer. Also, scale retention was much poorer on Progress bulbs compared to those of Simcoe which probably affected bulb dehydration. The soft tissue in the Progress bulbs was more dehydrated. Frosts may have also been a contributing factor. To lessen tissue injury from ice crystals within frosted bulbs, bulbs should not be handled while frozen.

The Oregon Danver (Leedy Strain) data were obtained on all bulbs in a 50-pound mesh bag taken from Oregon Onions' packing line May 2, 1985. These onions with tops had been placed in tote bins with slatted bottoms in the grower's field and stored at about 40°F in Oregon Onions' cold storage building. Bulbs were topped mechanically before packing on May 2, 1985. The external rotted bulbs had been removed on the packing line so none was in the sack. The protected bulbs of Simcoe and Progress were similar to Oregon Danver onions. All Simcoe and Progress samples were handled by hand. Growers would have used machines from which additional bulb injury besides frost may have occurred. Therefore, a grower may not get as good a result after seven months storage.

Table 2. Percent soft, firm, and rotted bulbs of Simcoe and Progress onions after seven months storage at Brooks, Oregon

Variety	Bulb Status[1]	Bulbs Stored	Percent Bulbs				
			Soft	Firm	Ext. Rot	Int. Rot	Sprouted
Simcoe	UP	49	11	89	9	19	0
	P[2]	55	9	91	9	4	0
Progress	UP	51	32	68[2]	9	11	2
	P	76	5	95[2]	2	0	12
Danver		122	16	84	0	3	16

[1] UP and P = unprotected and protected bulbs, respectively.

[2] Progress bulbs were only medium firm.

GUIDELINES FOR CENTRAL OREGON GROWERS TO ASSURE GOOD RESULTS FROM LONG-TERM ONION STORAGE.

1. **Select an early maturing variety.**

2. **Apply maleic hydrozide (MH-30) when 50% of tops are down and tops are still green.**

3. **Lift onions by September 5-10.**

4. **Remove bulbs from field by September 24 to avoid frosts or when scales are dry and brittle and juice cannot be felt in the neck where the leaves break over. DO NOT HANDLE FROSTED BULBS.**

5. **Store onions in bulk or bags on slatted floor or in tote boxes with forced air ventilation beneath. Air may be heated to properly cure onions.**

6. **Maintain temperature of about 32°F and 50-75 percent relative humidity in storage building.**

References

Mansour, N.S., H. Mack, and James Hay. 1979. Commercial Onion Production in Oregon. Oregon State University Extension Circular 817.

Matson, W.E., Mansour, N.S., and Richardson, D.G. 1985. Onion Storage, Guidelines for Commercial Growers, Oregon State University Extension Circular 948.