

# Maintaining Quality of Oregon Late-crop Potatoes in Retail Markets

D. B. DELOACH, Agricultural Economist  
Oregon Agricultural Experiment Station



Oregon State System of Higher Education  
Oregon Agricultural Experiment Station  
Oregon State College  
Corvallis

In cooperation with the Division of Plant Industry,  
Oregon State Department of Agriculture

## FOREWORD

Since the quality of potatoes grown on the farms of Oregon is well established and is certified at the shipping point by the inspection procedure of the Oregon State Department of Agriculture, the primary problem of those engaged in the potato industry is to see that this established quality is carried through to the ultimate consumer.

The maintenance of quality implies the prevention of deterioration. In issuing this report it is the purpose of the Oregon Agricultural Experiment Station to call attention to some of the trade practices and methods of handling the crop that contribute to a breakdown in the quality of potatoes, and to point out the few simple measures that will reduce this deterioration to a minimum.

WM. A. SCHOENFELD  
Dean and Director

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By

D. B. DeLoach, Agricultural Economist  
Oregon Agricultural Experiment Station

## GROWER AND DEALER INTEREST IN QUALITY MAINTENANCE

There is no purpose in producing a quality potato unless the same quality product can be delivered to the consumer. If the Oregon growers are to hold their markets in face of the competition from other producing areas, therefore, the maintenance of quality is essential. As a means of reducing marketing costs, it is also important to wholesale and retail dealers that potatoes be kept free from quality defects due to handling and displaying.

The Oregon Agricultural Experiment Station, working in cooperation with the State Department of Agriculture, undertook to study the problem of maintaining the quality of potatoes from shipping point to consumer. The Station project included a survey and sampling of the 1941 crop year potatoes found in 200 retail stores selected at random in Portland, Oregon, and in the cities of the San Francisco Bay area. The investigators took a representative sample of the Oregon potatoes offered for sale in each store, graded the potatoes, compared the actual grade with the stated grade, classified the defects, and attempted to establish the cause of specific types of defects that were found in the individual samples. In other words an attempt was made to determine the cause or causes for the deterioration in the quality of the potato sample below the grade established at the shipping point. A similar survey was conducted by the Station relating to the marketing of the 1940 crop year potatoes. The results of the 1940 crop survey were reported in Station Bulletin 400. A brief statement of the findings of the 1941 crop survey, together with certain comparisons with the first survey, is the subject of this report.

## DETERIORATION CAUSED BY IMPROPER HANDLING AND MERCHANDISING

Quality defects resulting from improper handling by truckers and by wholesale and retail store workers contributed heavily to the damage found in the samples of potatoes inspected in the retail stores. Exposure to light in the storerooms and on the display counters and improper ventilation in storage

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rooms were the causes for many samples falling below the grade stamped on the shipping container.

The Oregon-grown potatoes sampled in the 200 retail markets in Portland and the San Francisco Bay area during the 1941 crop marketing season disclosed that 38.8 per cent and 26.3 per cent respectively of the samples fell below the grade marked on the container in which they were being sold. A similar sampling conducted in these markets during the 1940 crop marketing season showed that 47.6 per cent of the Portland offerings and 65.1 per cent of the San Francisco Bay offerings were below the stated grade. The improvement in quality in the San Francisco Bay area markets appeared to be due mainly to better handling that came with the increase in the unit value of the product during 1941. The material decrease in the percentage of light greening, dry rot, and soft rot may be attributed to better handling, but the fact that the 1941 crop samples in the Bay area were taken 60 days earlier in the season than the samples from the 1940 crop appears significant. More weight would be given to the seasonal factor were it not for the fact that grading and sacking for shipment is done immediately before loading. The average length of time the potatoes are held in the retail and wholesale markets after grading at the shipping point does not vary noticeably through the marketing season.

**Broken potatoes cause much loss.** Rough handling is one of the main causes for the high unit cost of distributing potatoes. Over one-half of the containers sampled in the Bay markets contained broken potatoes, while slightly less than one-half of the samples taken in the Portland market showed broken potatoes (Table 1). This type of loss is especially important to the retail merchant who buys 100-pound containers for repacking into small consumer packages. Carelessness of the store clerks in moving sacks of potatoes from place to place in the store and improper stacking on hard surface floors are correctable faults, if the merchant chooses to act.

**Light greening due to merchandising methods.** The excessive amount of light greening found in the samples showed very clearly that the majority of retail merchants are not familiar with the effect that exposure to light has on potato quality. Consumer size packages suitable for displays showed the effect of light greening more than the 100-pound burlap sacks. It is significant too that the percentage of light greening found in the cotton containers sampled was far greater than that obtaining in burlap or paper (Tables 2 and 3). The

Table 1. OREGON POTATOES. PERCENTAGE OF SAMPLES SHOWING DEFECTS DEVELOPED AFTER SHIPPING POINT INSPECTION

Type of container	Broken		Light greening		Dry rot		Soft rot	
	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent
<i>San Francisco Bay Area</i>								
Burlap .....	51.6	51.2	16.1	11.8	38.7	41.7	19.4	16.5
Cotton .....	40.9	36.4	27.3	54.5	63.6	90.9	22.7	0.0
Solid paper..	0.0	22.7	0.0	0.0	33.3	18.2	66.7	4.5
<i>Portland, Oregon</i>								
Burlap .....	61.5	44.2	12.8	18.6	46.2	26.7	33.3	15.1
Cotton .....	47.1	21.4	52.9	50.0	17.6	7.1	17.6	14.3
Solid paper..	26.3	39.4	0.0	0.0	31.6	21.2	31.6	12.1

occurrence of light greening in cotton containers showed up in excessive amounts in the 1940 crop survey also. Although a smaller number of cotton sacks have been used by Oregon potato shippers than either burlap or solid paper, there is some indication that the use of these containers will increase as a result of shortages of burlap sacks.

Table 2. OREGON POTATOES. PERCENTAGE OF SAMPLES FOUND TO BE OFFGRADE BECAUSE OF SPECIFIC DEFECTS DEVELOPED AFTER SHIPPING POINT INSPECTION

Type of container	Broken		Greening		Dry rot		Soft rot	
	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent
<i>San Francisco Bay Area</i>								
Burlap .....	16.1	4.7	16.1	3.9	16.1	4.7	19.4	2.4
Cotton .....	4.5	0.0	27.3	36.4	22.7	0.0	13.6	0.0
Solid paper..	0.0	9.1	0.0	0.0	33.3	0.0	66.7	0.0
<i>Portland, Oregon</i>								
Burlap .....	23.1	8.1	10.2	11.6	15.4	1.2	61.5	7.0
Cotton .....	5.9	7.1	41.2	35.7	5.9	0.0	66.7	0.0
Solid paper..	0.0	6.1	0.0	0.0	5.3	0.0	100.0	0.0

Table 3. PERCENTAGE OF SAMPLES OF U. S. No. 1 POTATOES SHOWING LIGHT GREENING BY TYPE OF CONTAINER AND BY MARKET AREA, BY CROP MARKETING SEASON

Type of container	Oregon		California	
	1940 Per cent	1941 Per cent	1940 Per cent	1941 Per cent
Cotton sacks .....	40.0	50.0	28.6	54.5
Burlap sacks .....	9.1	18.6	11.8	11.7
Solid paper sacks .....	0.0	0.0	0.0	0.0

Dry rot and soft rot cause of loss. The percentage of dry rot and soft rot found in the samples of the 1941 crop of potatoes taken in the retail markets was much less than was found in the course of the 1940 crop survey. A considerable part of the loss from these two defects is a result of handling and storage practices.

### RULES FOR PROPER CARE OF POTATOES

The observations made by the investigators in the course of the survey show that highly porous containers are needed to keep down damage from dry rot and soft rot (Table 2). On the other hand solid paper containers protect the potatoes from light, thereby reducing the loss from light greening. Based on these observations two general rules should be observed:

1. Displays of large quantities of potatoes in cotton sacks or other porous containers in open bins or in windows must be avoided to prevent loss from light greening and to preserve quality. If this rule is followed cotton containers should prove entirely satisfactory for packaging potatoes.
2. Supplies of potatoes beyond the daily trade requirements of the store should be kept in a dark, cool, well ventilated storeroom regardless of the type

of container used. This practice will reduce considerably the merchant's loss from shrinkage in weight, dry rot, soft rot, and light greening. If proper storage and display methods are observed, solid containers are not necessary to protect the potatoes from light. In spite of the fact that these are simple requirements, the investigators fear that rising labor costs and labor shortages will cause the merchants to neglect the precautionary measures necessary to insure the quality of the potatoes.

## SHORT WEIGHT CONTAINERS PROBLEM OF INDUSTRY

The shrinkage in the weight of potatoes after sacking and loading at the shipping point is a factor of considerable importance to the retail merchant. The extent to which shrinkage in weight below the net weight stamped on the container is a factor in the cost of marketing is indicated by the quantity of potatoes required to refill short weight sacks received in the Oakland, California, market over a three-year period. The figures follow:

Year	Number of sacks inspected	Number short weight sacks	Number pounds to refill
1938 .....	555,242	62,138	170,833
1939 .....	605,085	41,012	106,545
1940 .....	655,894	62,701	155,485

These data are from the records of the Sealer of Weights and Measures of Alameda County, California. This office has been quite insistent that potatoes delivered to that market be equal to the net weight specified on the container. Checking of net weights on arrival in the consuming markets is less rigid in most places with the result that sales are made on the basis of the stated weight rather than the actual weight of the contents of the package. While the average decrease in weight caused by shrinkage is small, the investigators found samples in the retail stores in the Bay area that weighed as much as 9 pounds less than the 100 pounds net weight stamped on the container. Obviously excessive shortages of this type were not caused by weight shrinkage but were caused by a failure to fill at the shipping point. In a competitive market it is important that full weights be delivered to retail establishments. This is especially true in the Bay area markets, where competition from potato producing areas is keen and the buyer has a choice of source of supply.

## SIZE OF CONSUMER PURCHASE INFLUENCED BY PRICES

The quantity of potatoes purchased by consumers in the Bay area markets at one time depends on the amount that can be bought for 25 cents. It is estimated that at least 75 per cent of the sales made at retail to consumers will be the amount in weight that can be bought for 25 cents. During the 1941 crop marketing season the consumer package on U. S. No. 1 Oregon potatoes varied from 6 to 8 pounds. Portland merchants adhere less rigidly to the policy of selling on the basis of given monetary units. The policy is more or less one of adjusting the price to the quantity of potatoes that will go into a

given size sack. Higher retail prices during 1941 and 1942 appeared to have increased the sale of small size packages. In the Bay cities approximately 88 per cent of the retail sales during the 1941-42 marketing season were in packages of 10 pounds or less; during the 1940 crop marketing season only 77 per cent of the potatoes were in lots of 10 pounds or less.

### UNIFORM SIZE POTATO DEMANDED

Retailers were faced with a consumer demand for a medium and uniformly sized potato as prices increased. This type of demand had gone to such extremes in certain areas in the San Francisco markets that a few retail stores were sorting the potatoes received from the jobbing houses in order to get a uniform sized product. The small and large specimens were returned to the jobbing dealers to be resold to a less discriminating trade. Such a practice has a material influence on the cost of marketing this food product. It would seem, therefore, that the premium price that would be offered for a specially sized product would be sufficient to warrant uniform sizing, provided the labor supply is available.

### EDUCATIONAL PROGRAM NEEDED

A simple educational program relating to the proper handling and merchandising of Oregon potatoes is badly needed. This program should give consideration to the following:

1. Exposure of potatoes to light causes them to turn green and to take on an objectionable flavor.
2. Stocks of potatoes stored in a cool, dark, well ventilated storage space will show less loss from dry rot, soft rot, and light greening.
3. Proper care in handling potatoes in the wholesale and retail markets will reduce loss from breakage and bruising.

Dealer trade associations could do much to aid their members by issuing educational literature on the foregoing items. These dealer associations could also provide an excellent means for disseminating information originating among potato grower and shipper groups.