

SEED POTATO MARKET DEVELOPMENT**I. Introduction**

The objectives of the Seed Potato Market Development Program are three-fold:

1. To maintain liaison with existing seed markets;
2. To develop new seed markets; and,
3. To evaluate promising potato clones in existing and/or new seed market areas.

II. Procedure

1. To visit existing and potential seed market areas while acquainting them with Colorado seed production methods and/or follow-up with customers about matters of concern.
2. To visit seed market areas during the growing season and/or at harvest to evaluate numbered clones being tested and confer with growers and University personnel about test plot results.
3. To visit various areas or facilities to learn about new or improved seed production methods.

III. Additional Considerations

1. It is recommended that the funds be assigned to the Program Leader of the Potato Cultivar Development Project, who will coordinate travel plans with other participating CSU personnel.
2. CSU personnel will provide a written report to the San Luis Valley Potato Administrative Committee on each trip taken, and they will also confer with others who could benefit from information gathered.

1987-88 Budget Request

Travel Expenses

\$3000.00

CSU personnel involved - Potato Certification Service officials and researchers involved with the Potato Cultivar Development Program.

1986 SLV WAREHOUSE SURVEY

M.K. Thornton and R.D. Davidson
Research Horticulturist and Asst. Manager, Seed Certification
SLV Research Center

A survey of 16 fresh pack warehouses in the San Luis Valley was conducted between October 21 and November 20, 1986. The purpose of the survey was to identify factors associated with bruise during the packing operation, and to help make warehouse managers more aware of how bruise affects potato quality. Samples were collected at 5 to 7 sites along each packing line, beginning at the storage or truck from which potatoes were being packed. The samples were evaluated after 3 days using the Catechol test to separate bruises into slight, moderate and severe categories. Severe bruises were the only category considered to affect grade. The results of the survey were taken back to each warehouse within one week of sampling. Areas considered to be causing bruise in the warehouse were pointed out to the manager.

Most of the bruise found in the warehouses was in the slight and moderate categories, which would not directly affect grade, but does affect quality, shelf life, consumer acceptance and demand. The percentage of unbruised potatoes decreased by 16% during the packing operation (Figure 1). Slight and moderate bruise increased an average of 12% and severe bruise by 4% during packing. The majority of the 16 warehouses sampled had no significant increase in severe bruise during the packing operation.

A bruise score was also calculated for each location sampled based on the percentage of slight and moderate bruise, and the total number of severe bruises present. This score allows a comparison of the relative amount and severity of bruise occurring at each location. The bruise score gradually increased at the 5 common sites sampled in each warehouse (Table 1). It should be noted that the largest portion of the bruise score could be attributed to bruises already present on the potatoes before the packing operation begins. This is due to bruises incurred in the harvesting, bin filling, and in the case of the loads coming into the warehouses in trucks, the bin unloading operations.

The factors listed below were the most common causes of bruise in the warehouses surveyed.

EXCESSIVE BELT SPEED: Belt and chain speeds were measured in all warehouses. Speeds ranged from less than 0.5 mph to 3.6 mph. Increases in bruise during the packing operation were often associated with belt or chain speeds in excess of 1 mph. One of the warehouses with the lowest bruise levels did not have a

single belt or chain traveling over 1 mph, and yet was packing 5000 to 6000 cwt per day at peak capacity. This indicates that belt speeds can be slowed down to reduce bruising and still move potatoes to the packing equipment, provided the belts are filled to capacity. Elevators with flights were especially damaging when running over 1 mph. At these higher speeds the flights threw the potatoes onto the next belt, causing considerable bruising. Loading potatoes from a slow belt onto a fast moving belt also causes bruising. Because of the difference in speed the potatoes tumble and bounce as they off-load onto the faster belt. Sizing rollers were often running at speeds in excess of 2 mph. At these speeds the potatoes tend to bounce across the rollers before being dropped onto the next belt. Sizing rollers should be run at speeds which allow a gradual flow of potatoes across the rollers.

EXCESSIVE DROPS: Drops over 6 inches in height are areas where considerable bruising can occur. Loading potatoes into an evenflow bin was one of the primary areas where bruise was identified in this survey. The only methods observed which reduced bruising in evenflow bins were to keep them full at all times and to use a stair-step arrangement of padding to reduce the drop into the bin. Many warehouses had excessive drops at the main elevator into the warehouse. These drops could be reduced by moving the drive sprocket down into a dog-leg arrangement or using something other than flighted chain, such as a V-belt or hugger belt, to elevate the potatoes.

WORN OR MISSING PADDING AND FLIGHTS: Many warehouses had placed padding on metal deflectors and other areas where potatoes can strike a metal surface. In some instances this padding was worn and was no longer protecting the potatoes from injury. All areas of the packing line where potatoes can strike bare metal should be protected with padding affixed with rounded bolts. Broken flights and finger links on elevators were other areas where bruise was occurring. Broken flights and finger links allow excessive rollback to occur, resulting in high bruise levels.

LOW PULP TEMPERATURE: Cold potatoes are significantly more susceptible to all types of bruise. Pulp temperatures of potatoes moved out of storage should be at least 45°F. The average pulp temperature of potatoes coming out of storages or trucks into the packing line was 47°F. However some lots were as cold as 40 °F. Most lots were warmed by about 2°F as they moved through the warehouse.

OPERATOR AWARENESS: Everyone from the manager to the forklift driver needs to be aware that bruising affects quality. Potatoes can be bruised just as easily by people as by machinery. Potatoes can still be bruised after they are placed in the sacks or cartons.

The factors causing bruise in most warehouses could be easily modified. One of the warehouses made some of these suggested changes in their line after an initial visit. A survey taken after the changes were made indicated a significant reduction in bruise (Table 2). Even though there was more bruise initially in storage in the lot of potatoes packed on November 14 there was less bruise occurring on the packing line after the changes were made.

Although some warehouses appeared to have less bruise occurring during their packing operations than others, all warehouses had some areas where bruise could be reduced. The warehouses are not being singled out as a particular area in which bruise is a major problem. Potatoes can be bruised anytime they are handled, sorted or moved and both warehouse managers and growers need to work together to minimize bruising and enhance the reputation of the San Luis Valley as an area that supplies quality potatoes. Most of the modifications recommended for bruise reduction involve simple techniques which are already used to reduce bruising during harvest. The cooperators in this survey have taken the first step in improving quality by becoming more aware of bruise on their packing lines.

Figure 1. Change in percentage of tubers in each of three bruise categories during the packing operation (ave. for 16 warehouses).

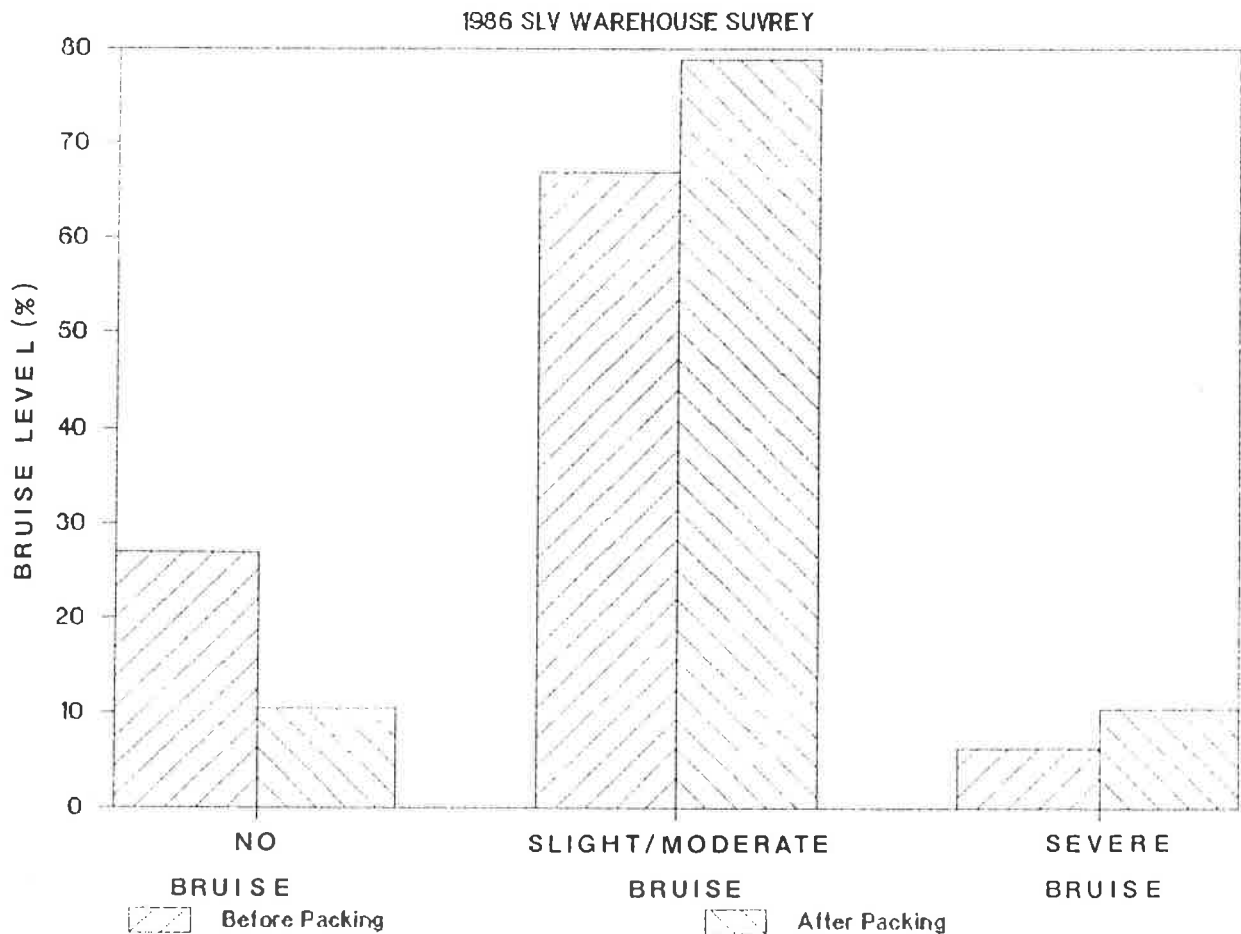


Table 1. Average bruise score for 16 San Luis Valley potato warehouses at 5 common sampling sites.

Sampling Location	Bruise ¹ Score	% Increase From Previous Site
Storage or Truck	102	----
First Elevator	117	14.7
Picking Table	131	12.0
Sizing Rollers	139	6.1
Carton or Sack	142	2.0

¹ Bruise score calculated as 1 X %tubers w/ slight bruises + 2 X %tubers w/ moderate bruises + 3 X no. of tubers w/ severe bruises.

Table 2. Effect of equipment modification on bruise damage during packing in one warehouse.

Date: 9-24 Location	No Bruise	Slight/Moderate Bruise %	Severe Bruise
Storage	40	50	10
Carton	0	70	30
Date: 11-14			
Storage	20	70	10
Carton	10	80	10