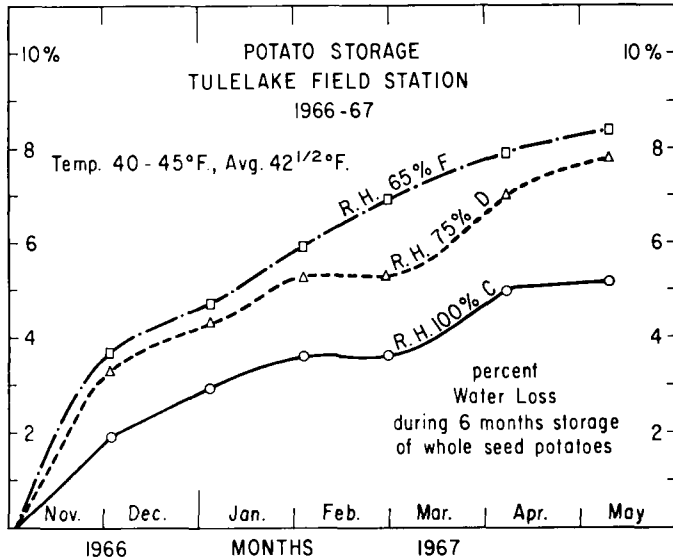


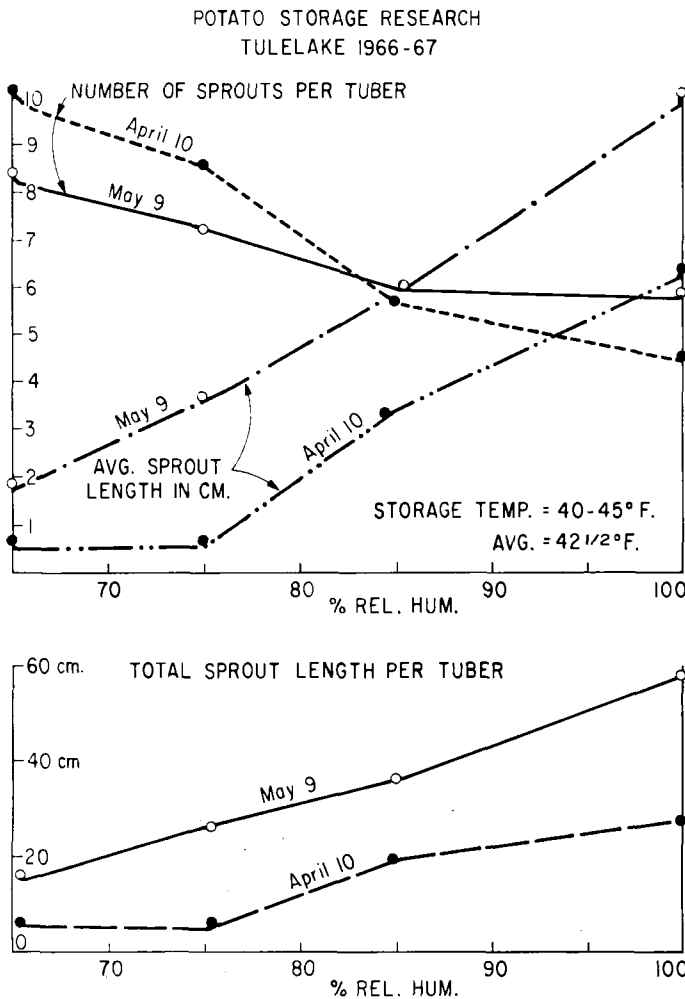
Effects of relative humidity on Irish potatoes in storage

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Graph 1. Water losses from the tubers continued throughout the storage period, but at a decreasing rate in later months. As expected, low humidity in bin F caused greatest water losses, although losses in bin C at near 100% RH were about two-thirds as much.

Graph 2. Length of sprouts increased considerably in April and May. Sprout lengths were much greater in the humid bins, although the number of short sprouts was greater in the dry bins. However, at the bottom of the graph, the total sprout length per tuber is seen to be greatest in the high-humidity bins.

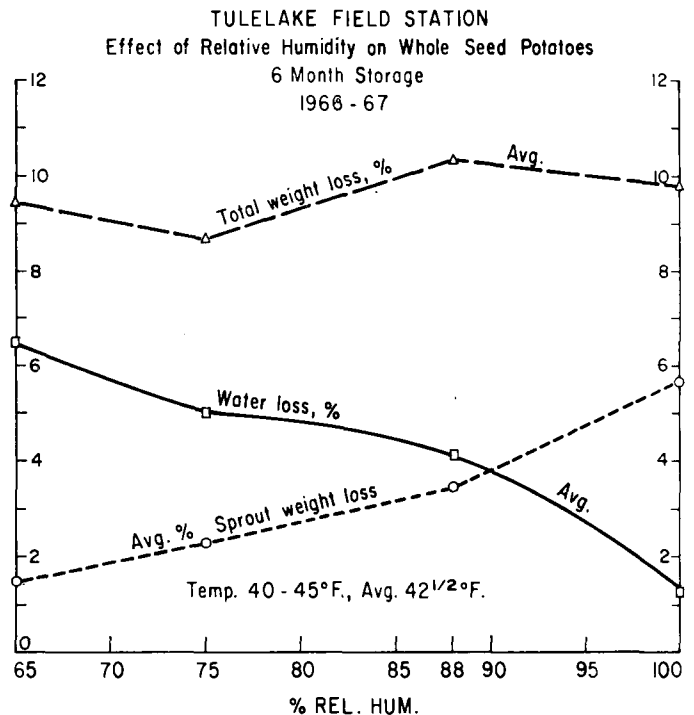


STUDIES OF POTATO STORAGE have continued for several years at Tulelake Field Station. In the fall of 1966 this research program was directed at an investigation of the storage behavior of russet potatoes (netted gems) when held at differing levels of relative humidity. Past experience in the Tulelake region had suggested that humidity might be a critical factor.

The tests were made in separate bins in a well-insulated small storage building constructed several years before. Earlier records showed that temperature and rate of air-flow for ventilation also affected quality of storage, so these factors were kept nearly alike and constant in the four test bins. Temperatures during the storage period of November 1966 to May 1967 were kept between 40° and 45°F, averaging 42½°F. The continuous air rate varied only slightly in the four sections, by the use of four separate fans averaging 0.41 cfm (cubic feet per minute) per sack of 100 # (or one cwt).

Bin F was kept fairly dry, at 65% RH (relative humidity), by the use of silica gel. Bin D was allowed to maintain

Graph 3. Weight losses due to evaporation of water were greatest in the dry bins, and much less in the humid bins. But weight loss from sprouting was so great in the humid bins that total weight losses were more than equalized, being somewhat greater in storage at high humidity.



a typical moisture content averaging 75%. Bin B was humidified by use of a small evaporative cooler which held the RH near 85 to 88%. Bin C was raised to nearly 100% RH by use of a large evaporator.

Storage data

Under these arrangements, all potatoes were kept in good condition for over two months although bin C (100% RH) showed some sprouting in January, as shown in photo 1. Some deterioration occurred during the next three months, and by early April many of the tubers had sprouted badly. The dry-stored potatoes developed only small sprouts but the humid and wet storage permitted very long sprouts to develop (photo 2). This trend in sprouting is taken as an indication of deterioration or defective storage.

During the total six months' storage, considerable weight loss resulted. This appeared to be due primarily to evaporation of water which continued at irregular rates during the storage period as shown in graph 1. Even bin C at 100% humidity suffered a weight loss of 5%, while *cut* seed potatoes in bin F (65% RH) lost as much as 64% (*whole* seed potato losses are shown in graph 1).

Sprout growth is described in graph 2. Here it can be seen that while the dry potatoes grew the most numerous short sprouts, the humidified tubers grew much longer (and fewer) sprouts (as shown in photo 2), and also much greater total sprout length and weight per tuber.

These conditions are combined in graph 3, where average water losses are shown, together with average sprout weight losses—giving total weight losses of similar amounts for all values of relative humidities, although the humid-bin losses were slightly greater.

Although it is often recommended that potatoes in storage be kept at 85 to 95% (or higher) RH, these data suggest that a lower relative humidity may be preferable. While it is usually shown that temperature of storage and rate of ventilation can also be of great consequence, in these tests where they were held fairly constant, relative humidities of 70 to 80% appeared to be optimum.

Related tests of similar conditions but with greater refinement and wider ranges are under way in the current period.

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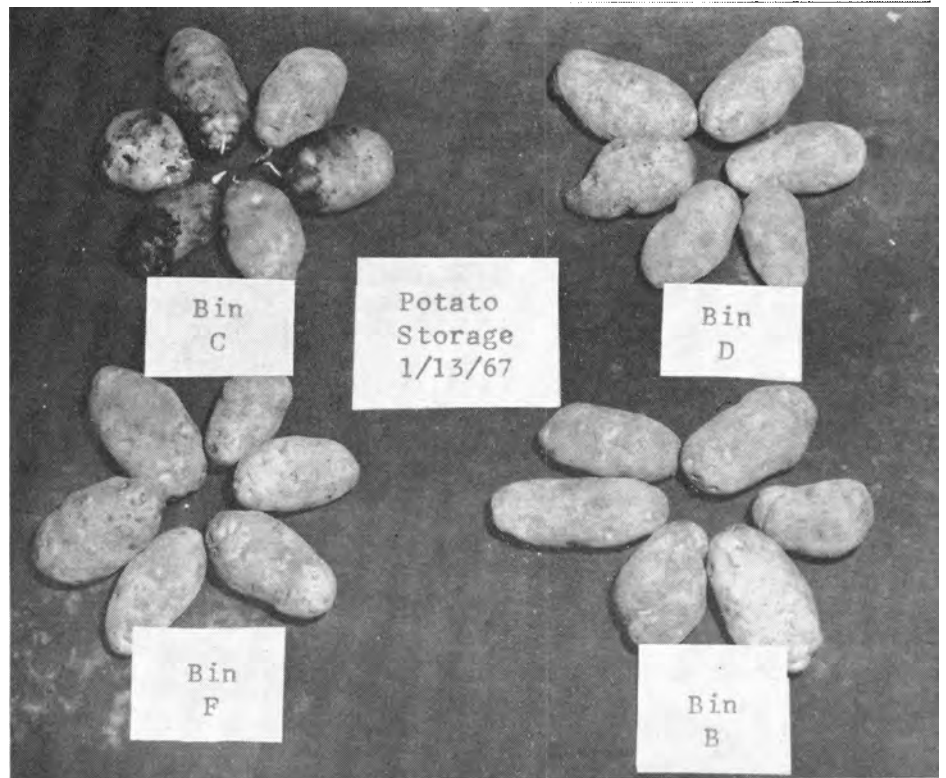


Photo 1. Potatoes were all in good condition in January, after more than two months' storage. Tubers in bin C, at 98–100% relative humidity, were partly wet, and showed small sprouts, which were absent in the other drier storages.

Photo 2. In April, sprouts were developing rapidly. Very short sprouts were found in the dry storage at 65% RH (upper left), but sprouts became much longer in the more humid storages, especially at 88% and 100% relative humidity (lower left and right).

