

## WEIGHT LOSS POTENTIAL OF NEW VARIETIES

Tina Brandt and Nora Olsen

Variety, tuber maturity, storage temperature and relative humidity can affect tuber weight loss in storage. In general, tubers lose approximately 1.5% in weight due to respiration alone during an eight- to ten-month storage period. The remainder of the total season-long weight loss comes from transpirational (water) loss. Respiration rate varies with variety and response to storage temperature. In general, tuber respiration is relatively high at low storage temperatures, decreases as storage temperatures increase, and then increases again as storage temperatures are elevated. Weight loss is greater during the early part of the storage season due to higher tuber respiration rates, higher storage temperatures for wound healing, and greater transpiration. The relative humidity of the storage will greatly affect transpirational weight loss and consequently relative humidity should be kept at 95% or above.

The University of Idaho Potato Storage Research Facility began to evaluate new cultivars for storage weight loss potential in 2004-05 and continues to this day. These additional evaluations complimented the current research program evaluating storage characteristics, such as sprouting and processing quality of potential new varieties. In this study, relatively small sample bags of each variety are weighed each month in storage to calculate monthly weight loss. These samples are stored at three storage temperatures of 42, 45 and 48°F. In 2004-05, the weight loss measurements were initiated in December of 2004 and taken monthly through June 2005. Although the 2004-

Table 1. Total weight loss (percent) in 6 potato cultivars at 3 storage temperatures from Dec 2004 to June 2005. Values in the same column followed by the same letter are not significantly different at  $p=0.05$ .

Cultivar	Percent Weight Loss (%)		
	42 °F	45 °F	48 °F
Russet Burbank	1.9 c	2.1 b	3.0 b
A9305-10	2.4 bc	3.8 ab	7.2 ab
A95109-1	4.0 b	3.4 b	4.0 ab
Defender	3.6 b	3.6 ab	4.9 ab
Western Russet	2.9 bc	2.9 b	5.5 ab
A93157-6LS*	6.9 a	9.3 a	7.8 a

\*some weight loss due to rot

05 weight loss data does not factor in the higher initial weight loss that can occur, it does provide some insight on how varieties respond through the holding phase. In 2005-06, the measurements began at harvest (September 2005) and continued through June 2006.

Table 1 shows percent weight loss for six cultivars during December through June at the three storage temperatures.

There were significant differences in weight loss among the varieties. In general, Russet Burbank had the lowest weight loss at 45°F and 48°F, however it was not significantly different from A9305-10, A95109-1, Defender, or Western Russet. Premier Russet (A93157-6LS) had higher weight loss than Russet Burbank at 48°F and Russet Burbank,

A95109-1, and Western Russet at 45°F. At 42°F, weight loss was lowest in Russet Burbank and highest in A93157-6LS. In general for the 2004-05 season, weight loss was higher at 48°F storage temperature compared to the cooler storage temperatures. In this first attempt at evaluating varietal weight loss potential, dry rot occurred in some of the tubers and may have contributed to greater weight loss. In particular, this was a concern with the A93157-6LS samples.

In 2005-06, rotted tubers were avoided in the study and did not contribute to the weight loss values reported. The 2005-06 data is shown in Table 2. Percent weight loss was highest in A93157-6LS at all three storage temperatures. In general, weight loss was lowest at 45°F in all varieties. Because each storage temperature is a separate bin, small differences in relative humidity may have occurred although average bin relative

Table 2. Mean percent total weight loss from October 2005 through June 2006 on six potato varieties stored at three temperatures. Values in the same column followed by the same letter are not significantly different at p=0.05.

Cultivar	Percent Weight Loss		
	42 °F	45 °F	48 °F
Russet Burbank	5.5 d	4.2 c	5.8 e
A9305	6.8 c	4.8 c	7.2 cd
A95109	7.2 c	6.6 bc	8.2 bc
Western Russet	6.5 c	4.6 c	6.6 de
A93157-6LS	11.1 a	8.0 ab	11.0 a

humidities were at least 95%. All varieties had greater weight loss compared to Russet Burbank at 42°F. Weight loss was minimized at the 45°F storage temperature compared to 42°F and 48°F. This may be a function of lower respiration at 45°F, and therefore, less weight loss.

In Figure 1, weight loss of each variety at three storage temperatures for 2005-06 is shown. This is a graphical representation of the same data shown in Table 2. It is highly apparent that A93157-6LS (Premier Russet) has a greater potential for weight loss compared with the other varieties in the study. Management of this variety may need to be altered to minimize this potential concern.

In Figure 2, weight loss was averaged across the six varieties for each month at each temperature. The data in Figure 2 shows that about half of the weight loss occurring in storage happens in the first two months, October and November, in our study. This may be attributed to conditions of higher tuber respiration rates, higher storage temperatures for wound healing, greater transpiration, and incomplete skin set.

## **SUMMARY**

Differences in weight loss were observed among the varieties of potatoes studied. When selecting a storage temperature for these new varieties weight loss is another factor that must be considered. Russet Burbank typically had the lowest weight loss, while Premier Russet (A93157-6LS) had the greatest weight loss potential. Several other varieties have a greater weight loss potential compared to Russet Burbank but this varied with storage temperature. Further studies need to be initiated to determine the major factors for weight loss for each variety and means to minimize that weight loss potential.

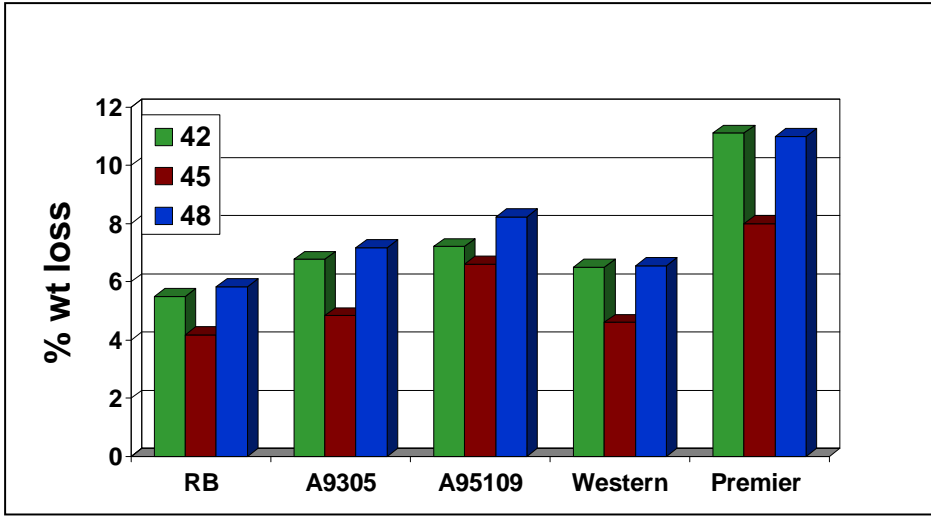


Figure 1. Mean weight loss by variety from Oct 05 – Jun 06 at three temperatures.

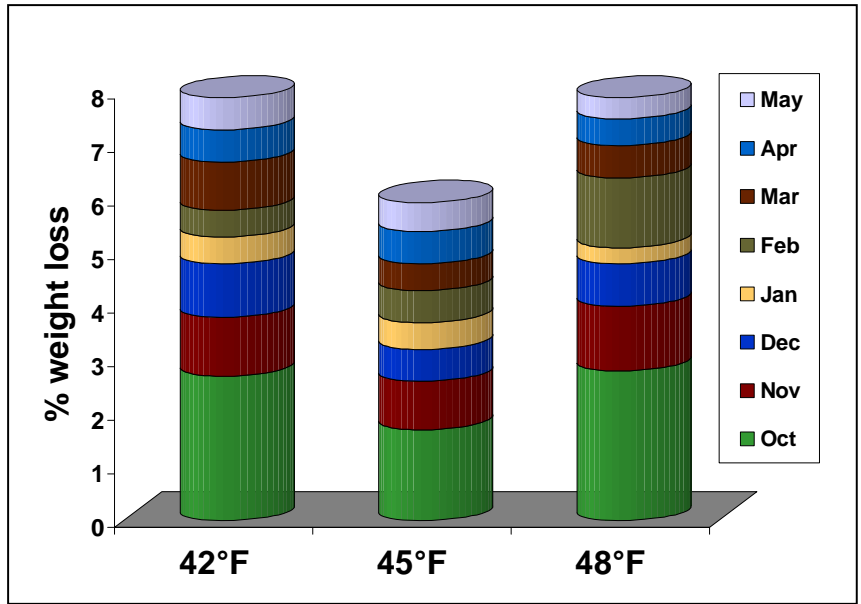


Figure 2. Mean weight loss of six potato varieties by month for three temperatures from Oct '05 to Jun '06.