Objectives & Rationale

Moisture loss often manifest as shrivel, as well as decay, are problems that may occur with late season plum cultivars cold stored in bins for up to 6 weeks prior to packing and export. The objective of this trial was to develop a protocol for plums stored in bins with the focus on reducing moisture loss and controlling shrivel, without negative consequential fruit quality effects such as decay.

Methods

Angeleno plums were harvested into bins and then subjected to a SmartFreshSM treatment. Bins were placed in cold rooms either with or without relative humidity (RH) control, with and without a fungicide drench containing Fludioxonil in each instance. The cold room without humidity control had an average RH of 83.7%, while the cold room with humidity control had an average RH of 97.1%. Sub samples were weighed and placed with other fruit in the bins for 6 weeks regular atmosphere cold storage at -0.5 °C. Plums were then re-weighed after bin storage to determine mass loss over bin storage time. Fruit from these bins were again weighed and packed in cartons as for commercial export and cold stored for another 3 weeks at -0.5oC to simulate shipping and distribution. Fruit were weighed after cold storage and subsequent shelf life. Fruit quality was also assessed after shelf life.

Key Results

Humidity control during prolonged bin storage reduced mass loss and shrivel significantly, compared to plums cold stored without humidity control. Moisture loss during 2018 and 2019, measured as the mass loss percentage from fruit during cold storage, was significantly higher in fruit drenched with Fludioxonil and cold stored in bins, compared to plums in bins that did not receive the drench. By contrast, during 2020 the drench moisture loss and shrivel, although to a lesser extent than high humidity control. During the three trials low or no decay was recorded. However, due to the previous dry seasons of 2018 and 2019, as well a low spore inoculum during 2020, the decay potential might have been very low. It is likely that decay risk potential might change with changing seasons; hence, post-harvest fungicide application is probably essential.

Conclusion and Discussion / Recommendation

Humidity control during prolonged bin storage is crucial to reduce mass loss from Angeleno plums due to moisture loss, and to reduce shrivel levels after subsequent in-carton storage. This was consistently proven in the three years of trialing.

Decay risk potential might change with changing seasons; hence, post-harvest fungicide application is probably essential to assist fruit quality maintenance for Angeleno plums stored for 6 weeks in bins. The aspect requires further research.