Abstract:

The South African plum industry is an important supplier of fresh fruit to the northern hemisphere from December to April. Extensive use is made of a dual-temperature shipping regime, which is a form of intermittent warming, in order to limit the occurrence of chilling-related internal defects like gel breakdown (GB) and internal browning (IB). The perception in industry is that use of the 12 m integral reefer containers leads to more quality defects than are experienced in conventional reefer vessels using the same temperature regimes. It was hypothesised that there are significant temperature variances in the integral reefers and three pallets of Sapphire plums were therefore wired with thermocouples to log pulp and air temperatures during commercial shipping to the United Kingdom. Results indicated that the delivery air temperature (DAT) was very close to the set point, and that the container therefore had the refrigeration capacity to maintain the DAT within acceptable tolerances. Air temperatures within the pallets, however, varied significantly, with peaks of up to 12° C at a set point of 7.5°C. The fruit pulp temperatures showed similar deviations. As expected, fruit in the pallet closest to the doors showed the slowest reaction to changes in temperature, and those in the pallet closest to the cooling unit, the most rapid. Fruit in the 4th layer on the pallet, closest to the base of the pallet, reacted fastest to changes in set point, and fruit in the 10th layer, close to the middle of the pallet, generally reacted the slowest. All fruit were deemed 'ripe and ready to eat' upon arrival, and no IB ir GB were found. Mention was made, however, of significant levels of shrivel, which may have been aggravated by the fairly low relative humidity in the container. Further trials are underway to investigate the relationship between fruit quality and the temperature gradients in reefer containers, using cultivars with differing metabolic rates.