

Kiwifruit Quality Related to Position on the Plant

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Abstract

Although kiwifruit have been grown and exported since decades in Chile, early fruit softening is still an important problem. Some studies relate fruit quality problems to climate, orchard and fruit management and high variability between shoots and fruit within a vine. The aim of this study was to evaluate the quality of kiwifruit at harvest and during cold storage in relation to the position on the plant. The study was carried out in the 2005-2006 season in two different orchards located in the central zone of Chile, between 34°32' and 34°59'S, with two trials in each orchard. The first trial was performed to determine the effect of different fruit positions within the shoot (proximal, middle and distal). The second one was carried out to assess the effect of shoot position along the cane on fruit quality. The evaluations were performed at harvest and after cold storage. Every trial was laid out as a randomised complete block design with 6 single plant replications. Fruits in the proximal position on the shoot and those developed on shoots at the base of canes tended to have higher calcium and soluble solids concentration than those in distal position. A treatment effect was detected regarding fruit softening in one orchard only; fruits from basal shoots had higher firmness than those from distal shoots, when evaluated after 63 days cold storage. In both trials fruit from the less vigorous orchard had better quality at harvest as well as after cold storage.

INTRODUCTION

Early fruit softening is the main quality problem of Chilean kiwifruit exported to the international market (Cooper et al., 2010). The kiwifruit plant (*Actinidia deliciosa* (A. Chev) C.F. Liang & A.R. Ferguson), is a vine with high variability in the fruiting potential of the different canes within the same plant. This is observed in the canes and shoots, resulting in leaves and fruits that are highly uneven (Zucherelli and Zucherelli, 1990). Crops such as apple, with relatively sophisticated management systems directed at reducing variability show similar problems (Tustin et al., 2001). In kiwifruit, it has been reported that fruit harvested from different positions on a vine have different soluble solid concentration (SSC) at harvest (Hopkirk et al., 1986; Pyke et al., 1996). Fruit close to the leader on canes originating at a distance from the trunk have higher SSC than fruit located closer to the distal end in canes originating closer to the trunk. Other studies have determined that for fruit near the leader, those fruit originating on canes contained higher SSC than fruit from spurs, particularly in the pergola system (Hopkirk et al., 1986).

SSC is relevant for fruit quality and cold storage potential. A high SSC is strongly associated with high dry matter and calcium concentration and also with characteristics of the plants that correlate with lower susceptibility to early fruit softening (Cooper et al., 2007). The skin pitting disorder is also linked to fruit mineral concentration (Ferguson et al., 2003). Fruit from short shoots near the tips of canes, in an area of the vine with low leaf to fruit ratio, had low fruit calcium concentrations and high pitting (Thorp et al., 2003).

To test the hypothesis that susceptibility to early fruit softening is higher in fruit located either near the tip of the canes or borne at the tip of the shoots, a trial was set-up in a pergola training system.