Abstract

Prediction of harvest date of 'William's Bon Chretien' pears in South Africa is based on long term averages of various parameters, i.e., days after full bloom (DAFB) and/or changes in fruit firmness and combinations thereof. Over the past seasons these results were unsatisfactory and unexpected early deterioration of internal fruit quality and physiological defects were observed. Therefore we investigated alternative ways to improve maturity prediction using the relationship between temperature variables and maturity. Weekly values from a historical data set of maturity parameters were plotted over the corresponding DAFB for each season. A linear function was fitted over the time interval in which the optimum fruit firmness was situated. The equation of the fitted line was used to estimate the number of days to the optimum firmness. The gradient of every fitted line was used to quantify the rate at which firmness changed over the number of DAFB, as well as the rate at which each variable changed per heat unit (HU) during the period of sampling. Finally a CP selection was used to determine the combination of temperature variables that explained the greatest variation between the years in i) number of DAFB or HU to optimum level of firmness and ii) the rate of change.day^{-1} or change.HU^{-1}. A negative correlation was found between the full bloom (FB) date and length of the growing season from FB to optimum fruit firmness as expressed in HU. There was a positive correlation between the FB date and length of the growing season from FB to optimum fruit firmness as expressed in HU. A rapid decrease in fruit firmness was correlated with a relative cool summer. Prediction equations were developed for the number of days from FB to optimum firmness and rate of change in firmness and validated over two consecutive seasons. A high level of accuracy was achieved in most cases, even though regional differences existed.