Analysis of the effect of heat stress during flowering on the yield of avocado under Mediterranean climatic conditions

J. Lomas

Meteorological Institute, P.O.B. 25, Bet Dagan, Israel

(Received 8 March 1991; accepted 2 January 1992)

ABSTRACT


The effect of heat stress on 20–25 years of commercial avocado yields of the Fuerte, Ettinger, Hass, and Nabel varieties was analyzed, using a heat stress model. The negative effect of heat stress was clearly demonstrated on all four varieties and at all the locations. Half of the interannual variance in yield was explained by this model for the Hass variety, and a third of the interannual variance for the Fuerte, Ettinger and Nabel varieties. The scatter of the annual yields, especially at lower Heat Stress Index values, is due to alternation of the fruit trees associated with heavy crops and other non-climatic factors.

The varietal sensitivity to heat stress was determined by the regression slopes indicating the expected yield loss per unit heat stress. Fuerte is the most sensitive variety to heat stress. Among the three less sensitive varieties to heat stress, Ettinger, Hass and Nabel, there is no significant difference in their sensitivity.

INTRODUCTION

The avocado is a relatively new crop in Israel, whose economic importance has increased mainly owing to exports to Europe. Plantations expanded rapidly at the end of the 1950s and in the early 1960s and now account for approximately 12 000 ha. The average yield of avocado ranges from approximately 9 t ha⁻¹ to 13 t ha⁻¹ depending on the variety. Considerable yield fluctuations occur from year to year and the coefficient of variation of the yield is about 40–60% depending on the cultivar, climate and site-specific factors. Such large interannual fluctuations in yield impose many restraints on farmers, agribusiness and planners alike.

In view of the experience in California (Hodgson, 1947), great care was