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CHARACTERIZATION OF PERSISTING VERSUS ABSCISING FLOWERS AND FRUIT OF THE 'HASS' AVOCADO

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The 'Hass' avocado is notorious for profuse flowering and low fruit set. To develop strategies to increase yield and grower income, physiological differences between fruit persisting on the tree and those abscising during critical developmental periods were determined. Major periods of abscission were first determined by collecting and quantifying flowers and fruit that abscised from individual trees during two crop years by placing nets under ten trees in a commercial 'Hass' orchard in Carpinteria, California. Consistent, distinct periods of abscission were observed each year. Several techniques were utilized to identify physiological differences between persisting and abscising flowers and fruit for each period of abscission. Abscised flowers were evaluated microscopically to quantify pollen grains, pollen tube growth and ovule viability to estimate the proportion of flowers that were unpollinated and unfertilized. A significant proportion of fruit set by persisting flowers abscised subsequently. Embryo and seed deterioration at the time of fruitlet abscission were contrasted with those of persisting fruitlets using Evan's blue dye. In addition, radioimmunoassay was used to measure differences between the hormone titers of abscised fruit and those that persisted on the tree. Microsatellite markers were used to identify the pollen parent of fruit persisting to harvest. Outcrossing rates and their relationship to yield were then calculated. From these results, significant differences in key physiological and genetic factors affecting persistence during critical periods of fruit development were identified. These results add to the body of knowledge regarding avocado fruit development and provide basic information essential for increasing fruit retention and yield.