

## **Workshop 2**

### **"Is a Pollinator Required to Maximize Avocado Production?"**

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The workshop on avocado pollination convened to ask the question "Is a pollinator required to maximize production"? An initial poll was taken with generally mixed opinions on the subject. The historical background of research was reviewed. Important features included the synchronously dichogamous and dianthesis nature of floral openings, the loss of stigma receptivity by the second opening, and the observed adhesive nature of pollen. These early observations led to the conclusion that pollen transfer was mediated only by flying insects. Pollinating insects include bees in the drier climates and other flying insects such as wasps in the humid tropics. Good yields in large, solid-block plantings was explained by the occurrence of overlap of floral openings during periods of low night temperature, thus facilitating pollen transfer from stage II (male) to stage I (female) flowers.

Discussion turned to specific evidence supporting either side of the posed question. Examples of the necessity for cross-pollination included the early blooming cultivar, Pinkerton, which was stated to be self-incompatible in Israel. It sets fruit only as a result of cross-pollination during the latter portion of the blooming period when flowers of other cultivars become available. It was noted, however, that 'Pinkerton' sets fruit when no complementary pollen parent is available in North Queensland, Australia. An old Florida cultivar, Collinson, has no pollen, thus requires cross-pollinators.

On the other hand, large, solid-block plantings of a single cultivar with little bee activity were reported to produce as well as orchards inter-planted with complementary cultivars. Workers have noted yield improvement when bees were active on flowers. Evidence collected over the past several years was presented which demonstrated that, in Florida, most pollen transfer occurs during the second floral opening and not during the first opening. It was also noted that a substantial proportion of stigmas remain white throughout the second floral opening. Results of experiments in which pollination and fruit set were monitored on branches enclosed in cheesecloth bags indicated that pollen transfer did not require large, flying insects or small, crawling insects to affect pollen transfer. Pollen deposition inside protective bags was the same as outside bags. Wind appears to be the primary pollinating agent in Florida. This conclusion was supported by

the discovery that pollen from six cultivars tested in Florida is not adhesive but is cohesive due to wetness at dehiscence, soon dries, and is dispersed. This pollen is transferred onto the adjacent stigma within the flower. Thus, self-pollination appears to be the primary means of pollination under these conditions. This conclusion is further supported by the observation that most fruit set occurs in those portions of trees exposed to wind during the flowering period.

Bear in mind, however, that lack of pollen tube growth, failure to fertilize the egg, or other intrinsic and extrinsic factors may reduce potential productivity. For example, all cultivars lose flowers and developing fruitlets regardless of successful pollination. Fruit set is not a good measure of pollination. The pollination question may not be important if one is getting substantial initial fruit set.

An opposing viewpoint was presented which indicated that although self-pollination within stage II flowers does occur in Israel; pollen tubes do not grow under prevailing conditions. Evidence was presented that some cultivars are better pollen donors than others. An outstanding example is the Israeli cultivar, 'Ettinger', which has been demonstrated to be a superior pollen donor for 'Hass' and several other cultivars. Moreover, cross-pollinated fruits of 'Hass' pollinated with 'Ettinger' have been demonstrated to survive to maturity better than selfs. Cross-pollination in this case becomes an important factor to maximize productivity.

The session closed with continued mixed opinions on the necessity for pollinators to maximize production. A complaint was voiced that after all these years; we still cannot give growers a consistent answer whether or not to provide complimentary cultivars and/or bees to the orchards. The answers perhaps lie in the specific conditions to which each orchard is typically exposed during the flowering period. Attention to flowering behavior, insect activity, availability of complementary cultivars, and noting of pollen deposition times with a microscope or 20x magnifying loop is necessary to make such a decision.