

# LOW OVERNIGHT TEMPERATURES ASSOCIATED WITH A DELAY IN 'HASS' AVOCADO (*PERSEA AMERICANA*) FEMALE FLOWER OPENING, LEADING TO NOCTURNAL FLOWERING

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Our research into the flowering cycle of avocado trees has found that the timing of flower opening is associated with temperature; colder temperatures are linked with a delay in flower opening which results in flowers remaining open at night.

Each avocado flower opens once in a female-phase and then closes before opening again in a male-phase. Pollination (and therefore fertilisation) occurs when pollen is deposited on the receptive stigmas while flowers are in the female-phase.

In the common 'Hass' cultivar flowers typically open in female-phase in the morning for several hours before closing and then reopening in the afternoon of the next day in male-phase. This cycle means that avocado flowers are believed to be closed at night and thus only pollinated during the day. However, it has been noted that at colder temperatures, 'Hass' may open in female-phase in the afternoon.

To understand this relationship between temperatures and flower opening time, we used a system of time-lapse cameras to follow the opening cycle of 'Hass' flowers over three seasons.

We found that the opening time of female-phase 'Hass' flowers was correlated with the

minimum overnight temperatures from the previous night. The colder the night, the later the flowers opened. As a result, after cold nights, female flowers were open in the afternoon, evening, and even sometimes remained open overnight.



*One of the time lapse cameras in the study captures a honey bee visiting a female-phase 'Hass' avocado flower.*

This finding suggests that it is necessary to consider the role of crepuscular and nocturnal flower-visiting insects as potentially important pollinators in colder climates. Where avocado used to be considered a crop whose flowers were closed overnight, our study demonstrates that nocturnal pollination may need to be considered for this crop in some growing regions.