



AVOCADO CHARACTERIZED BY LOW FRUIT SET

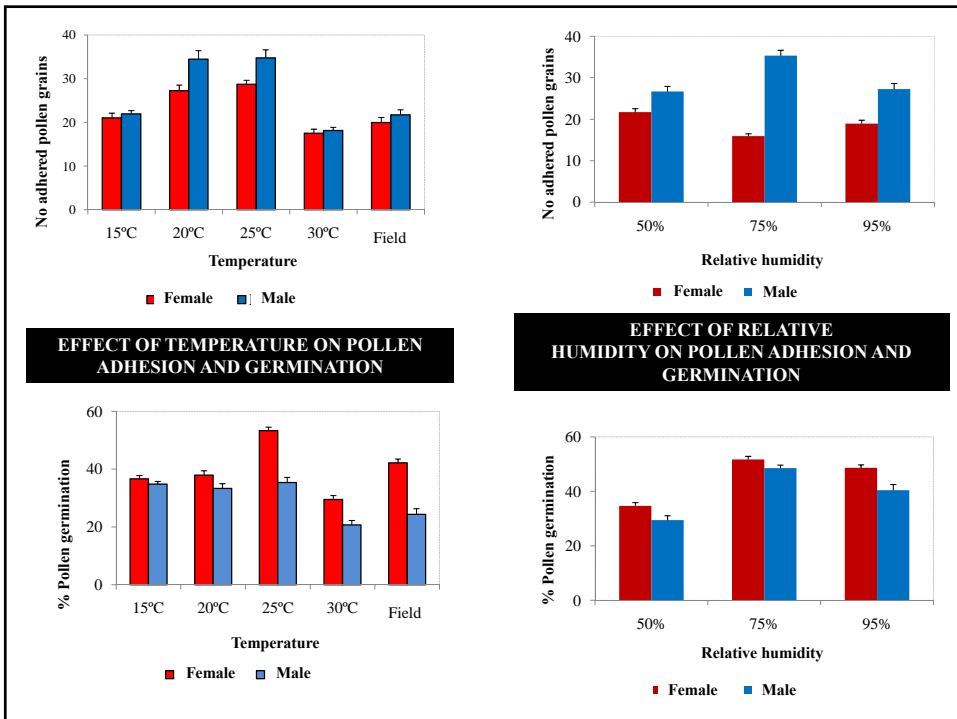
- ➔ Massive drop of flowers and developing fruitlets

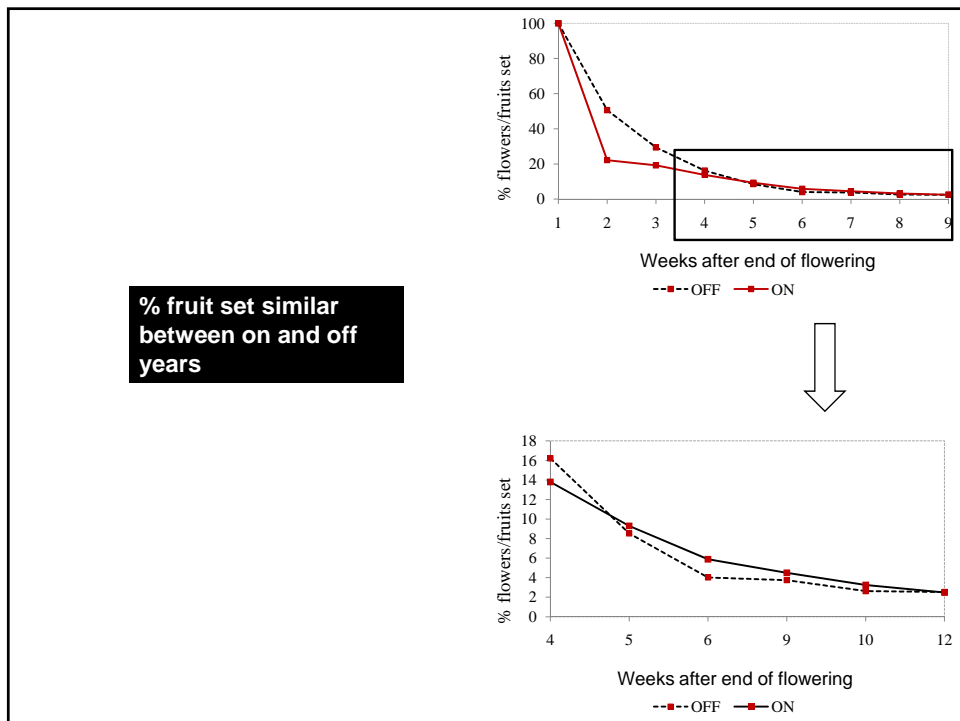
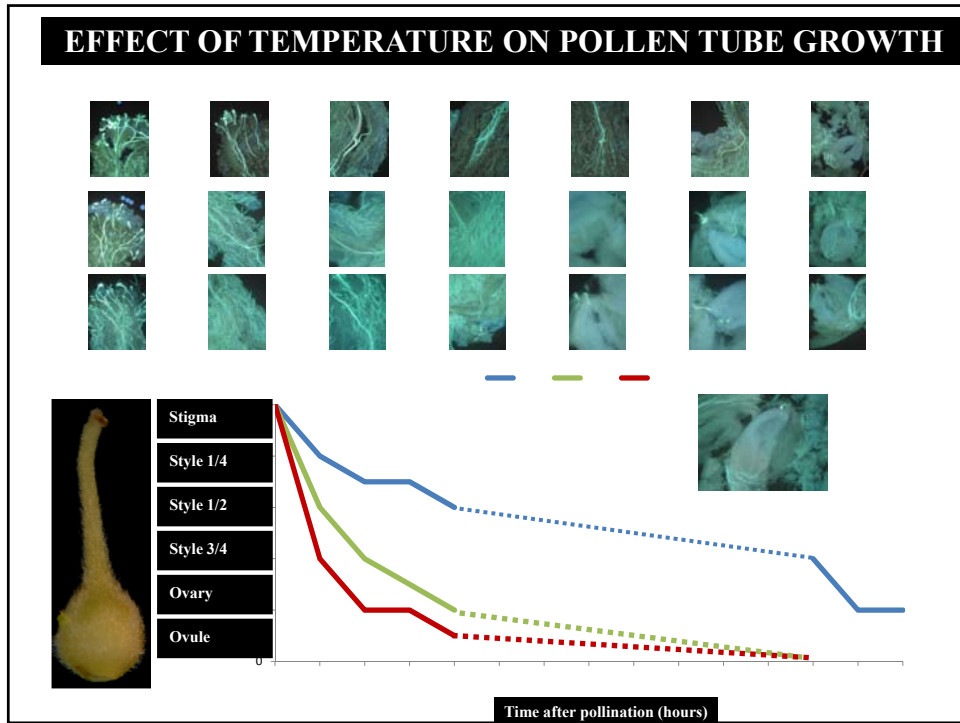
- ➔ Some unpollinated flowers ➔ Inadequate pollination
- ➔ Other factors must be involved

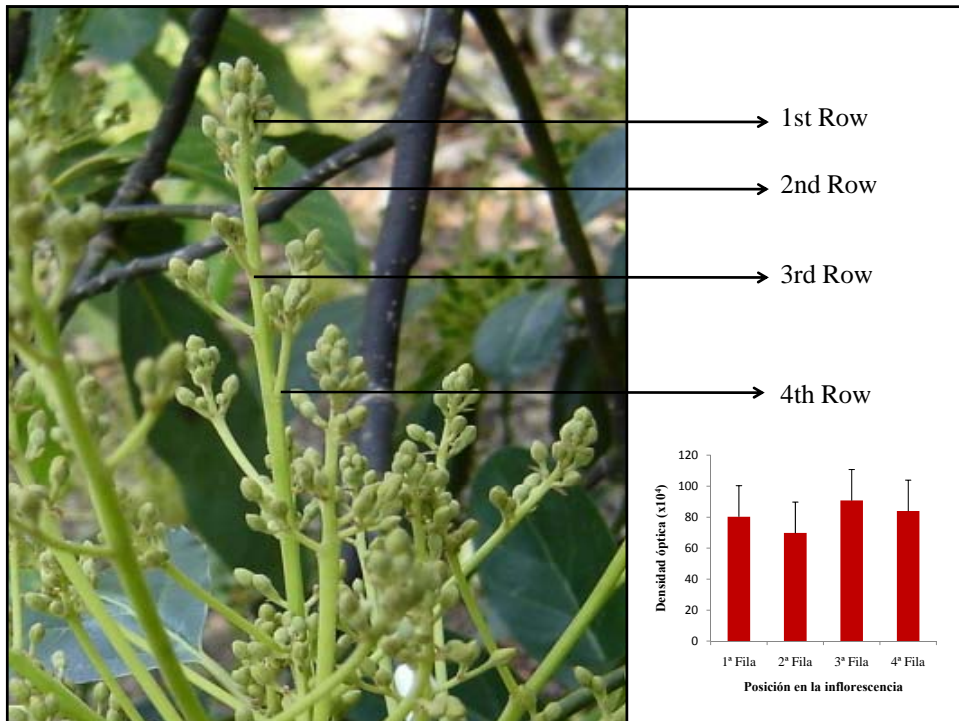
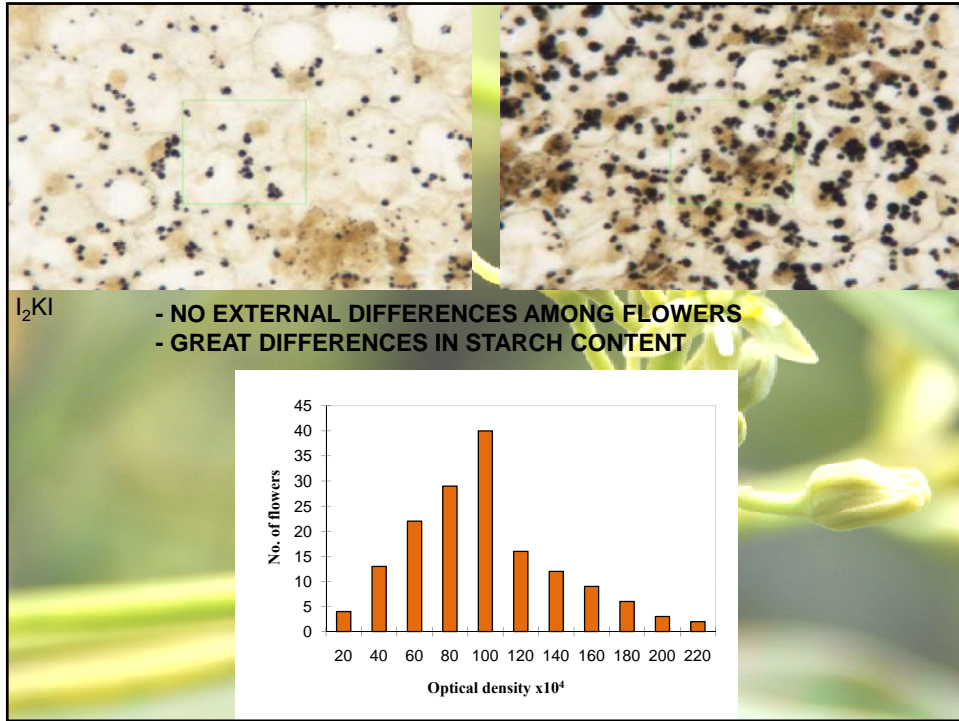
## OBJECTIVES

- 1. ENVIRONMENTAL FACTORS AFFECTING THE PROGAMIC PHASE**
- 2. NUTRITIVE STATUS OF THE FLOWERS AT ANTHESIS**
- 3. EFFECT OF CROSS-POLLINATION ON YIELD AND OUTCROSSING**
- 4. OPTIMIZING THE CHOICE OF POLLINIZERS**

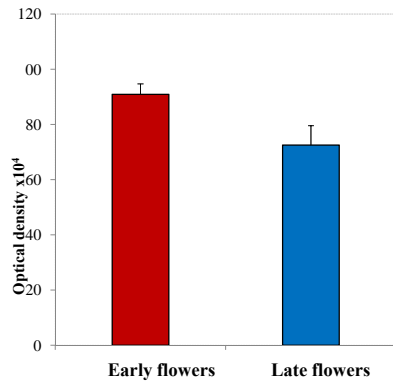




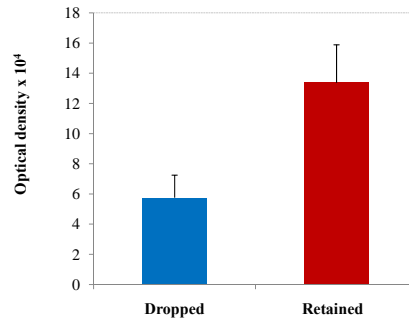




Differences in starch content between two populations of flowers with different capacity to set fruits



Starch content in individual flowers and fruit set



### Background

Increase distance to the pollen donor source



**Outcrossing rate**

(Vrecenas-Gadus and Ellstrans, 1985  
Goldring et al., 1987)

**Contradictory results**

**Selective fruit drop**

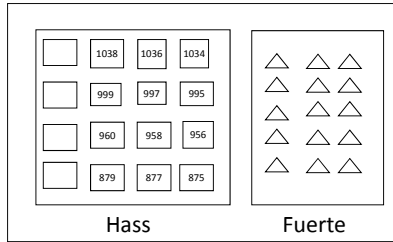
**Yield**

(Bergh and Gustafson, 1958  
Bergh and Garber, 1964  
Bergh et al., 1966  
Bergh, 1968)

Goldring et al., 1987  
Johannsmeier et al., 1989  
Garner et al., 2008

Most fruits in the tree result of cross-pollination

**OUTCROSSING RATE IN AN SOLID HASS BLOCK OPPOSITE TO A SOLID FUERTE BLOCK**



20-30 fruits per tree: DNA extraction from the embryos

SSR analysis

AVAG21

Hass  
186/201

Fuerte  
183/203

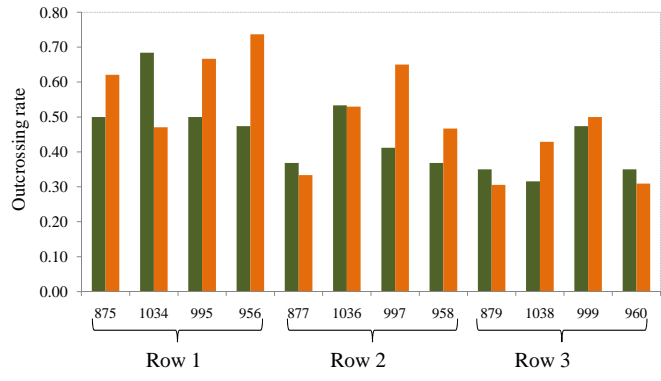
Pearson correlation coefficient

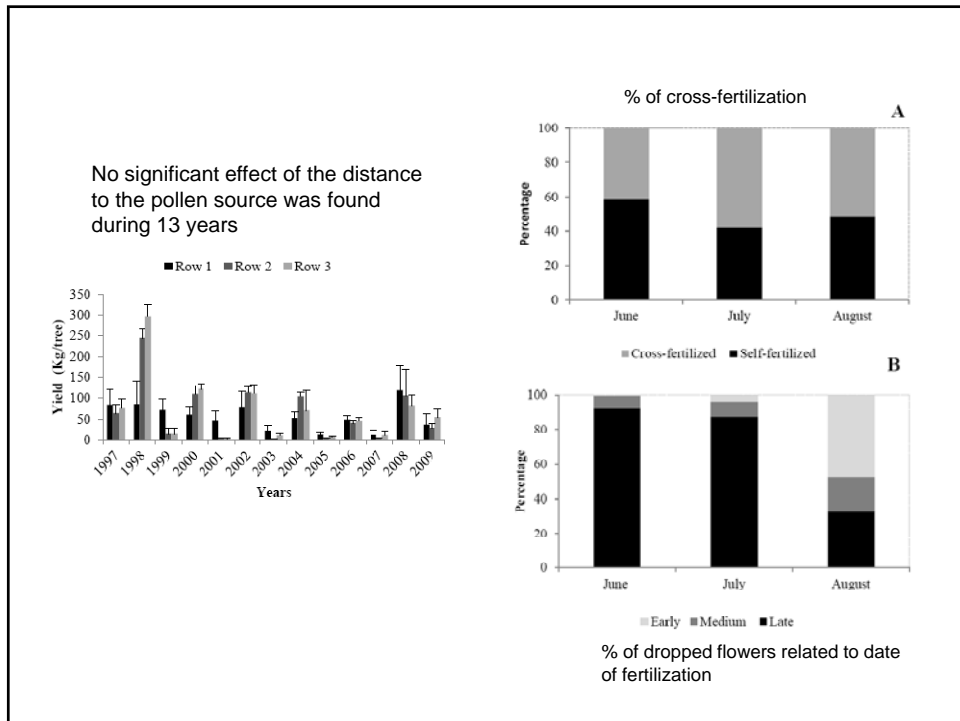
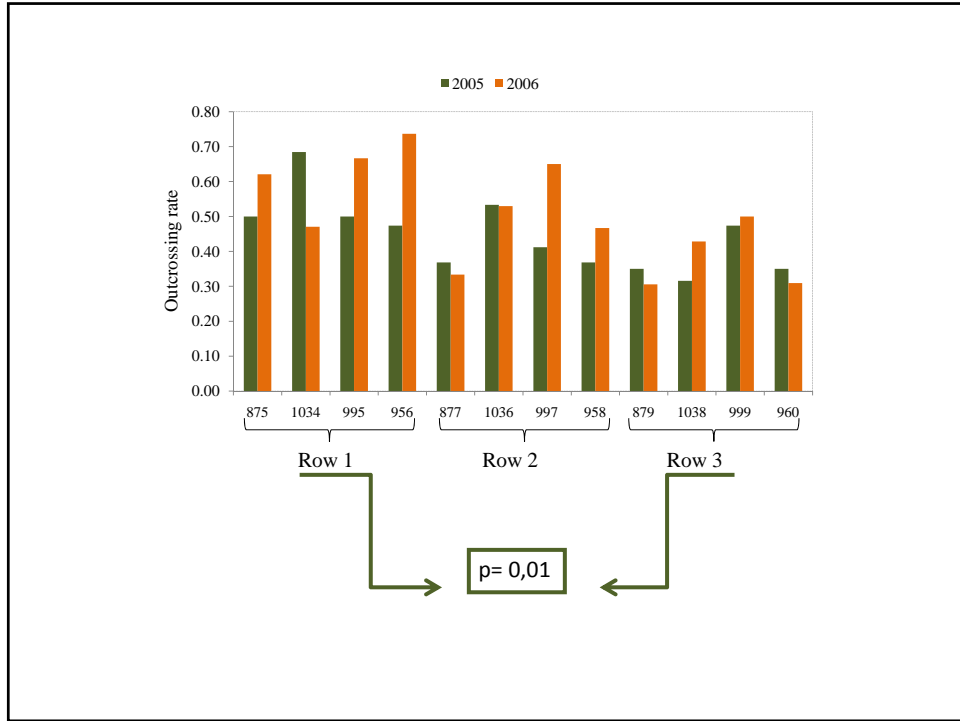
Cross-fertilization

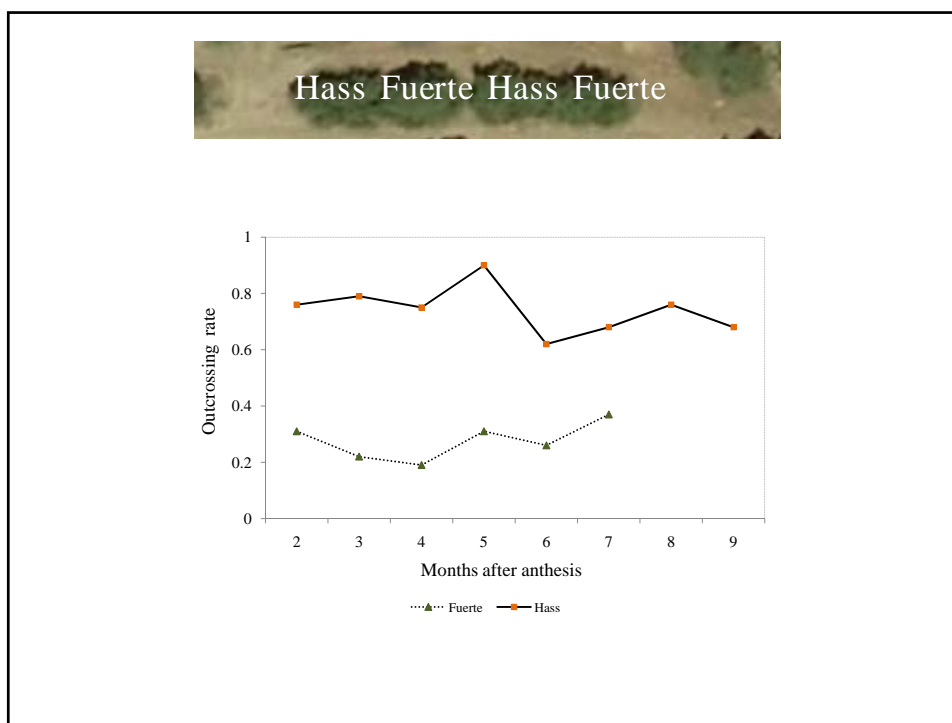
Distance to the pollen source

-0.7 (p= 0,014)

■ 2005 ■ 2006







SEARCHING FOR A POLLINIZER FOR HASS

**Requeriments**

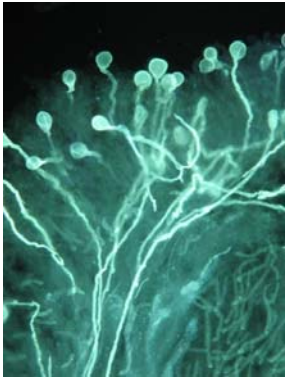
- ➡ Type B
- ➡ Overlap in flowering time with Hass

Currently in Spain Fuerte is used

↓

Not enough overlap

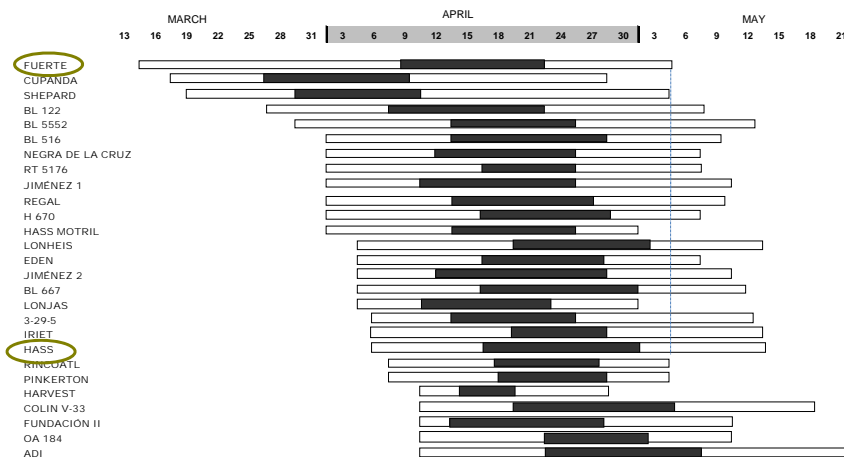
- ➡ If possible: Hass-like fruits

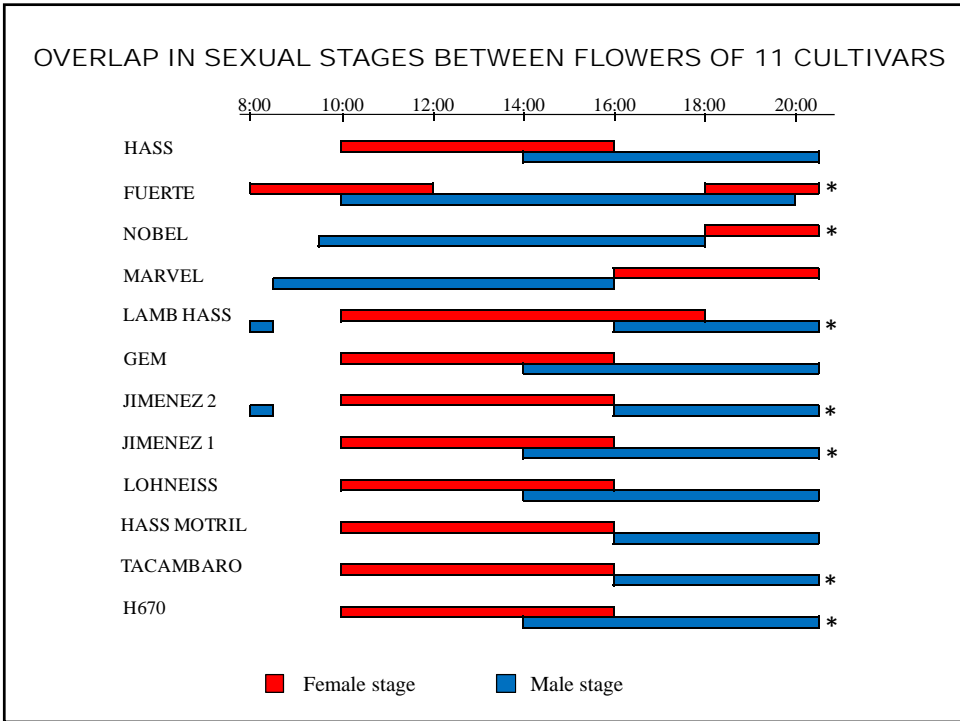
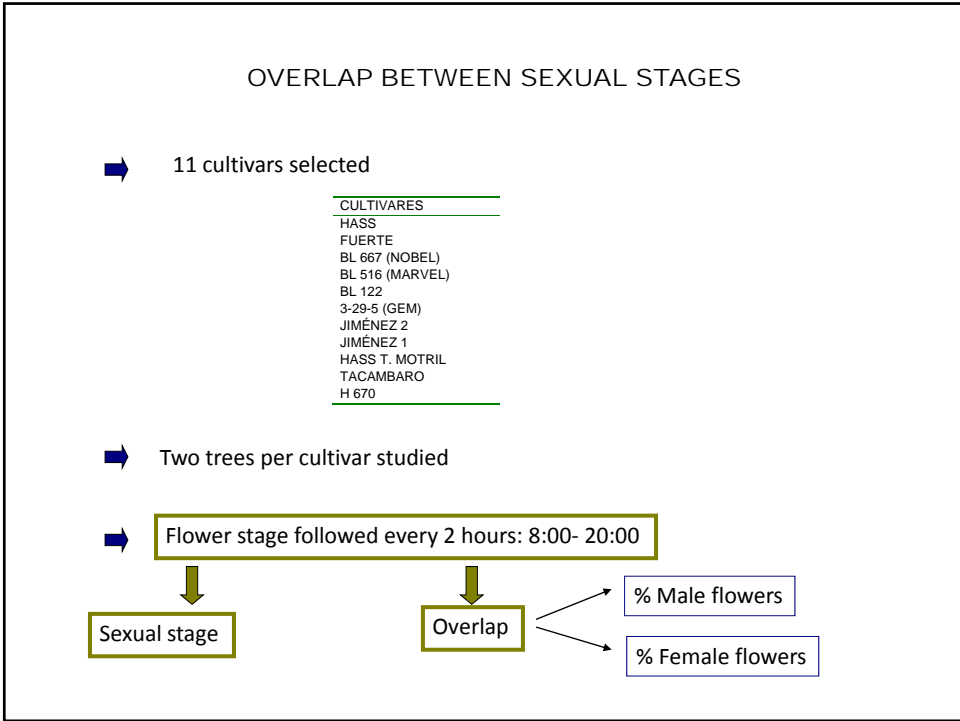


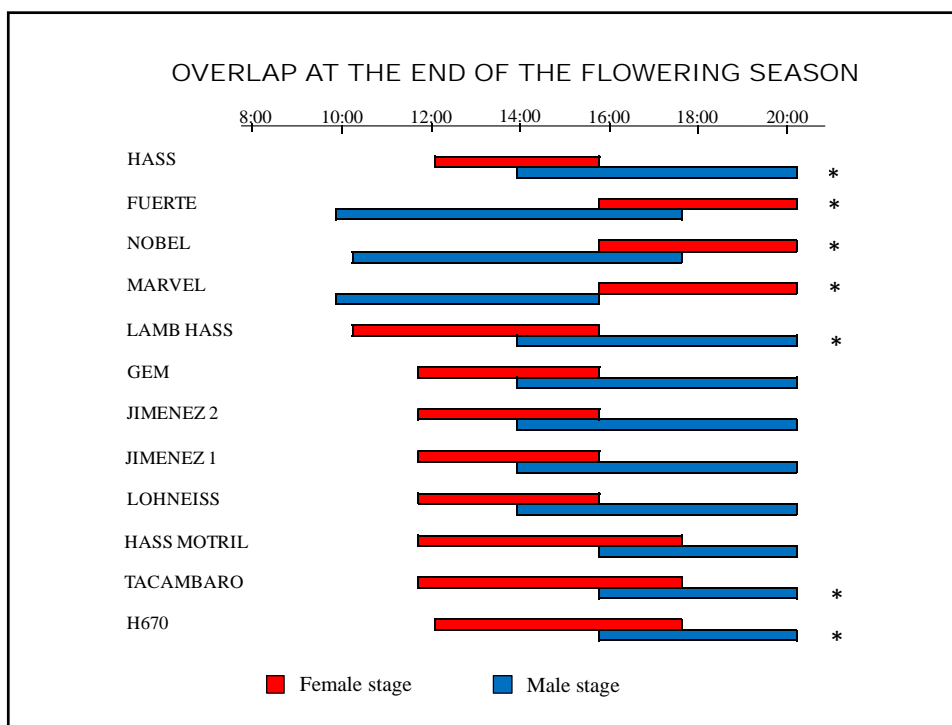
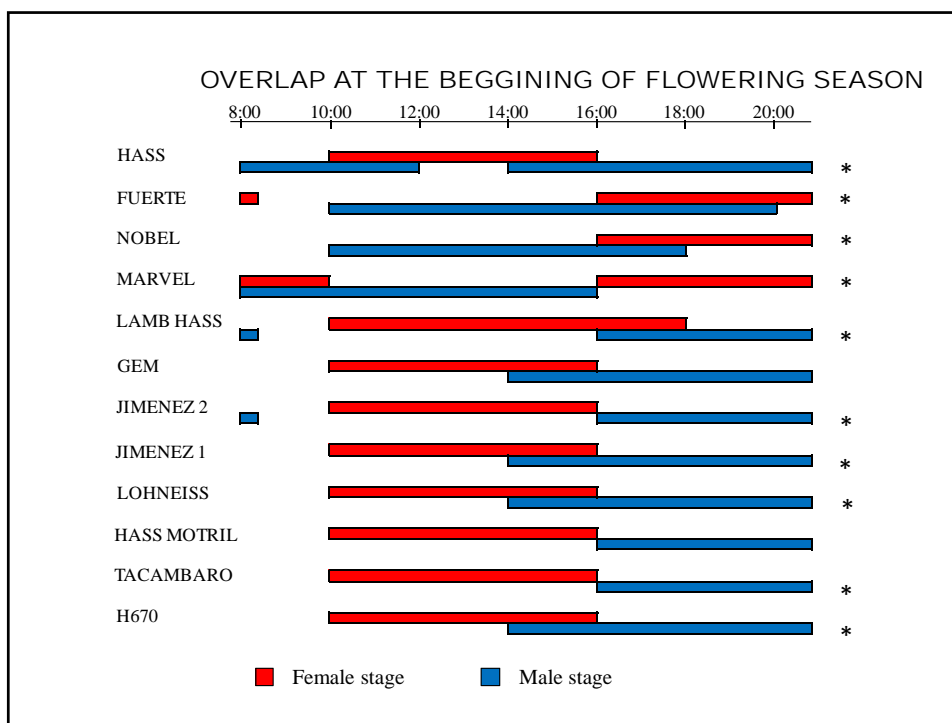
Study of the flowering season of 27 cultivars

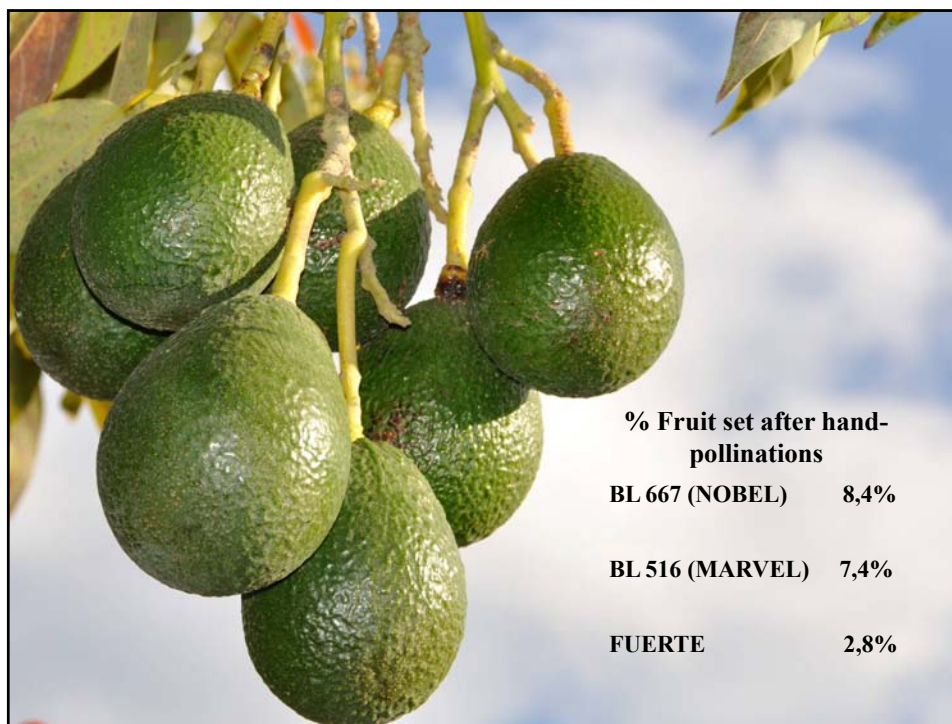
ADI	HASS MOTRIL
BL 5552	IRIET
BL122	JIMENEZ I
BL516	JIMENEZ II
BL667	LONHEISS
COLIN V-33	LONJAS
EDEN	NEGRA DE LA CRUZ
FUERTE	OA 184
FUNDACIÓN II	PINKERTON
H670	REGAL
GEM (3-29-5)	RINCOATL
HARVEST	RT 5176
HASS	SHEPARD
CUPANDA	

FLOWERING TIME









## Conclusions

- Avocado shows a fast progamic phase. This phase is clearly affect by environmental conditions: high temperatures increase pollen tube growth and low temperatures increase the time required for fertilization
- Under conditions of 20-25°C and high relative humidity, the estigma conserves the capacity to allow germination and pollen tube growth in the male stage, favoring self-pollination
- Differences in yield between on and off years are due to the intensity of flowering since fruit set % is not significantly different
- The nutritive status of the pistil is related to the reproductive success of the flower, since differences are observed in starch content among flowers at anthesis. Starch content is higher in flowers that will set fruit. Thus, the nutritive status of the flower seems to be a necessary condition, but not the only one, for fruit set
- The distance between two complementary cultivars ('Hass' and 'Fuerte') has an effect on cross fertilization; however, there are no differences in yield with increasing distanceThe genotype of the embryo does not seem to be determinant in selective fruit drop during the months following anthesis; the fruits that drop are preferently those fertilized at the end of the 'Hass' flowering season. Those fruits are mainly the result of self-fertilization since no flowers of 'Fuerte' are present at the end of the 'Hass' flowering season
- Taking into account the length of the flowering season, the overlap between sexual stages and yield, 'Marvel' (BL516) and 'Nobel' (BL667) could be interesting pollinizers for 'Hass' under our growing conditions