Avocado pollination and pollinizers

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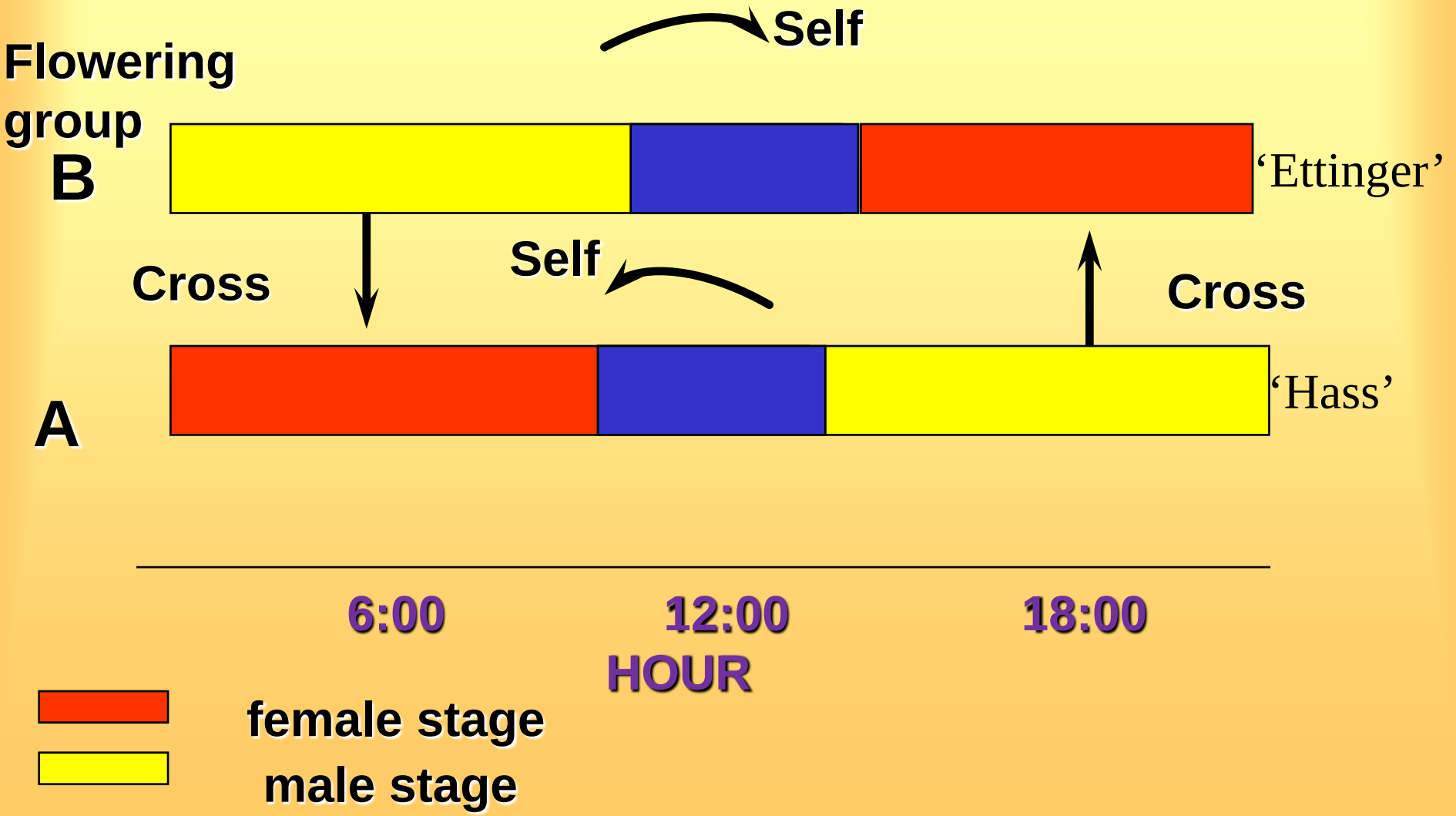
Flower at first opening (female stage)

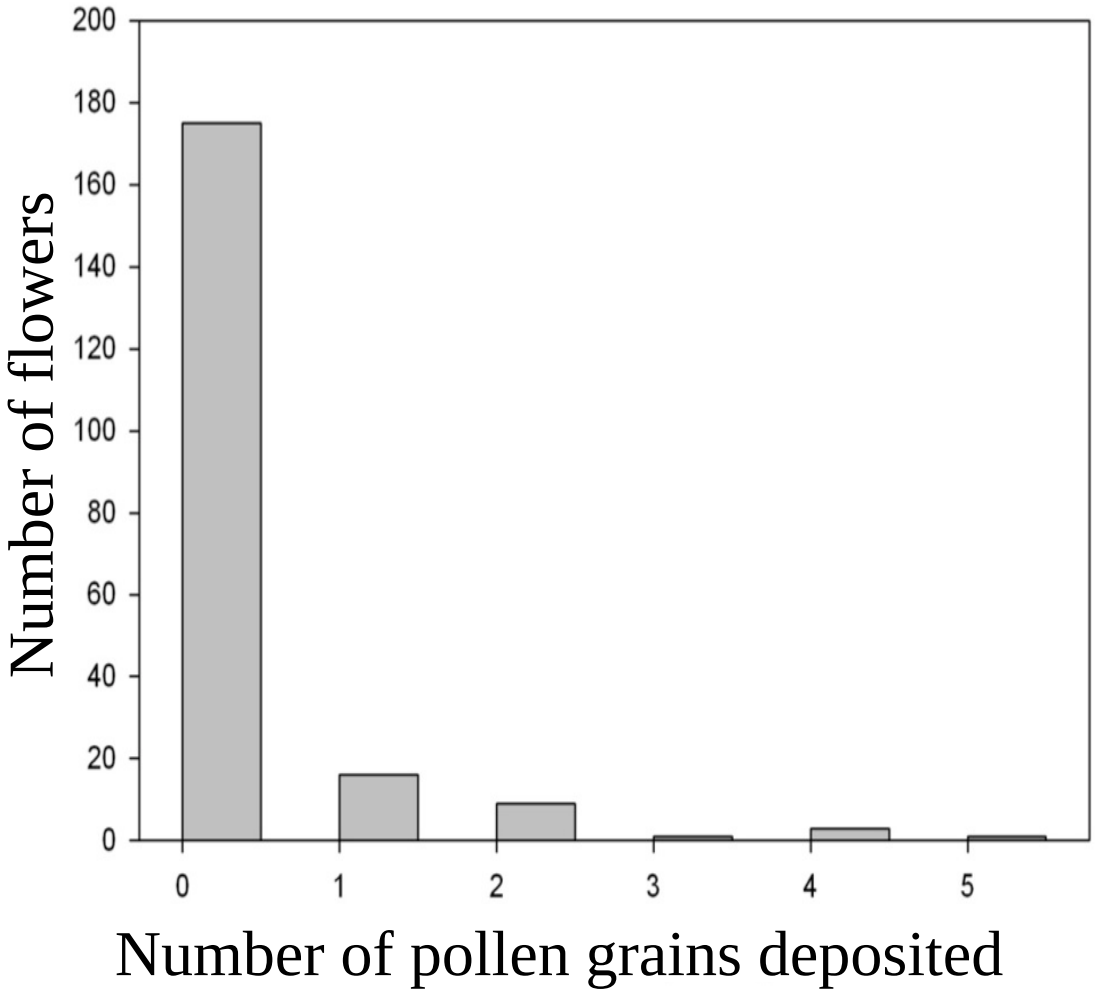
E. Shuv

Avocado pollination



Pollen grains per stigma

Australia and New Zealand, 2011



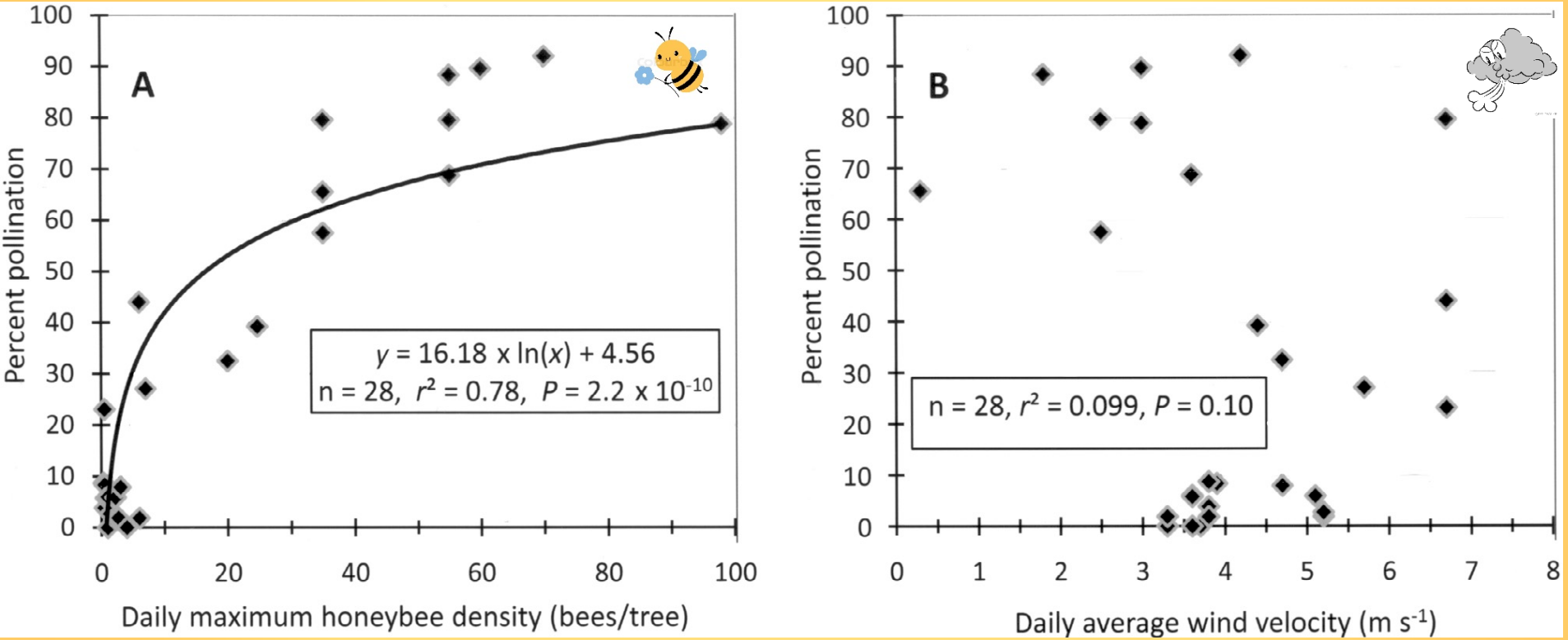
Pattemore et al., 2014

Israel, 2018

Only 7 out of 1,200 flowers (0.58%) examined, were pollinated. Out of the 7 pollinated flowers, only on 2, the number of pollen grains was > 5.

Lazare et al., 2022

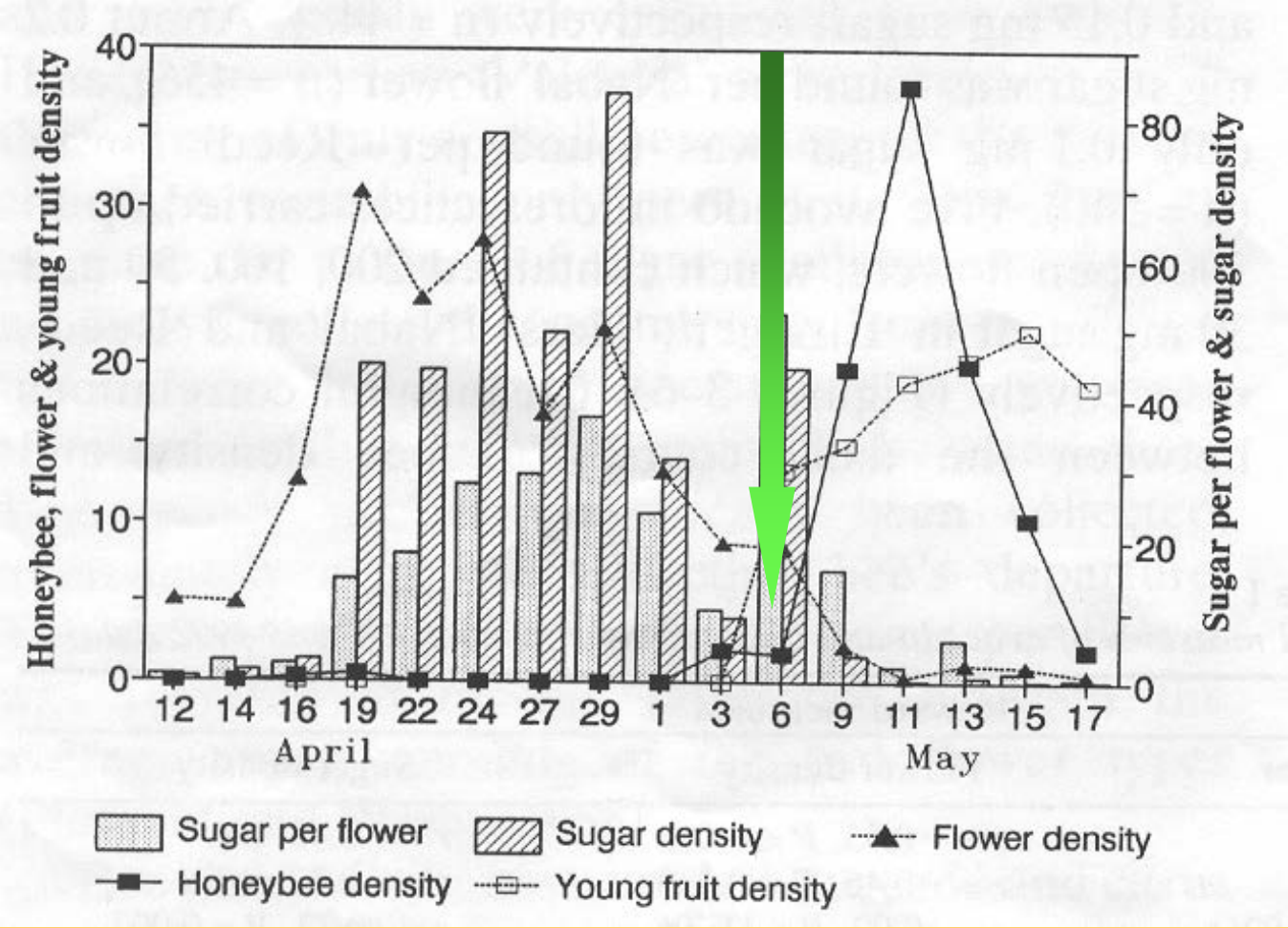
Correlations of daily maximum "percent pollination" of 'Hass' avocado trees close to a pollenizer cultivar with daily maximum honeybee density (Panel A), or with daily average wind velocity (Panel B)



Ish-Am and Lahav (2011) J. Hort. Sci. Biotech. 86: 589-594.

Seasonal course of rewards measures, bee and young fruit density of ‘Hass’ avocado

End of the
Citrus flowering

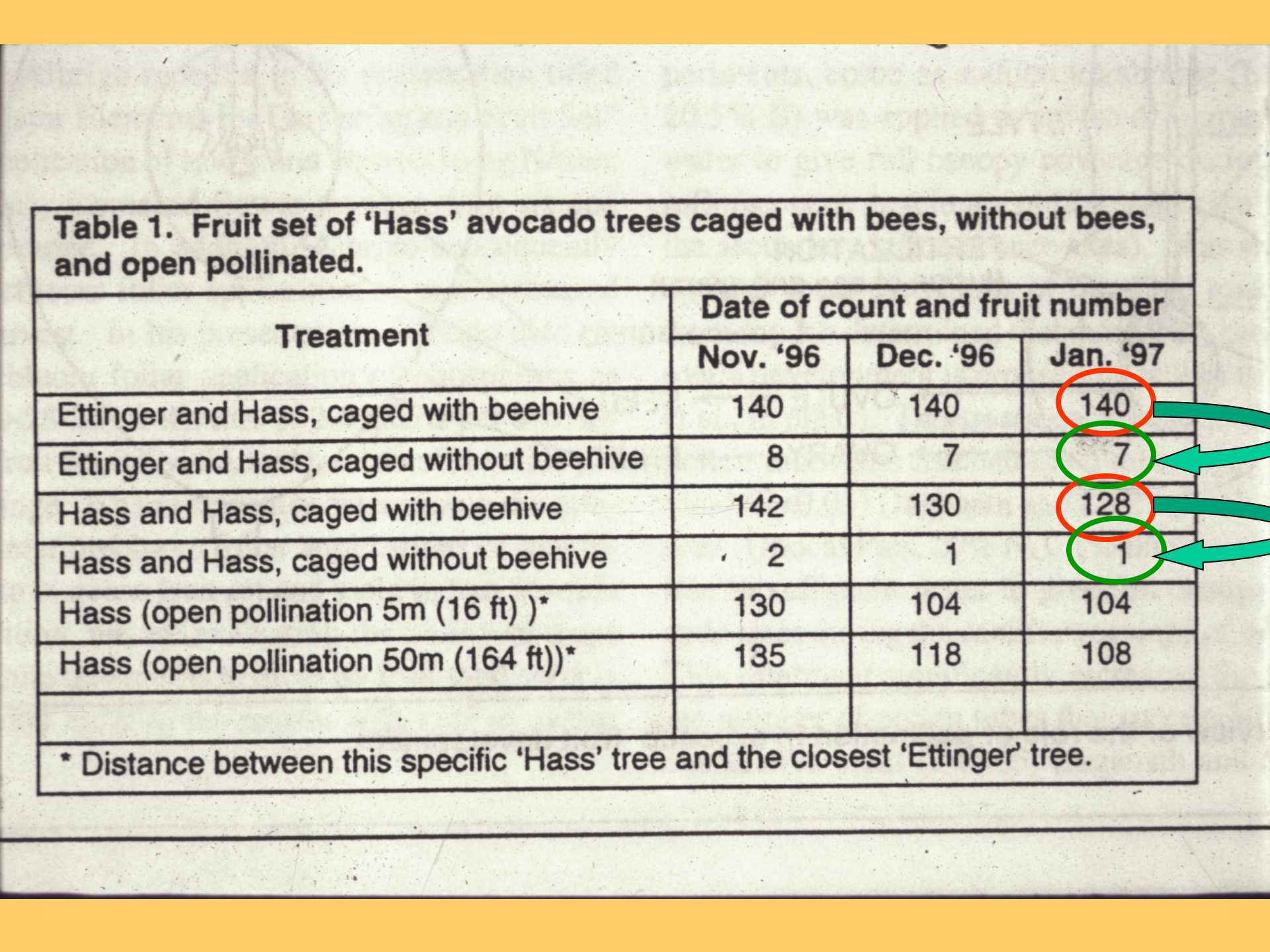


Ish-Am & Eisikowitch (1998) J. Hort. Sci. Biotech. 73: 195-204

Table 1. Fruit set of 'Hass' avocado trees caged with bees, without bees, and open pollinated.

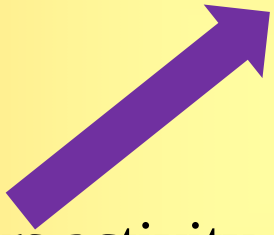
Treatment	Date of count and fruit number		
	Nov. '96	Dec. '96	Jan. '97
Ettinger and Hass, caged with beehive	140	140	140
Ettinger and Hass, caged without beehive	8	7	7
Hass and Hass, caged with beehive	142	130	128
Hass and Hass, caged without beehive	2	1	1
Hass (open pollination 5m (16 ft))*	130	104	104
Hass (open pollination 50m (164 ft))*	135	118	108

* Distance between this specific 'Hass' tree and the closest 'Ettinger' tree.



High productivity

Sufficient pollination level



Sufficient pollinators activity

Pollinizers

Low attractiveness of avocado flowers to pollinators
(high level of K in nectar, small volume of nectar)

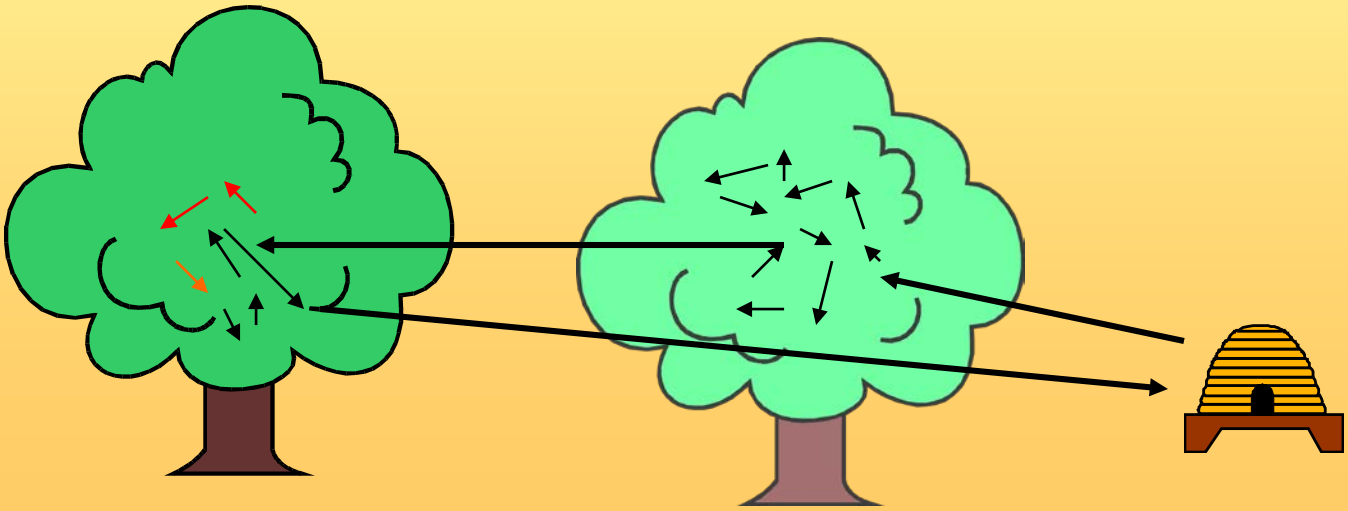
- **Increase pollinators population**
- **Combine pollinizers**

Pollinizers

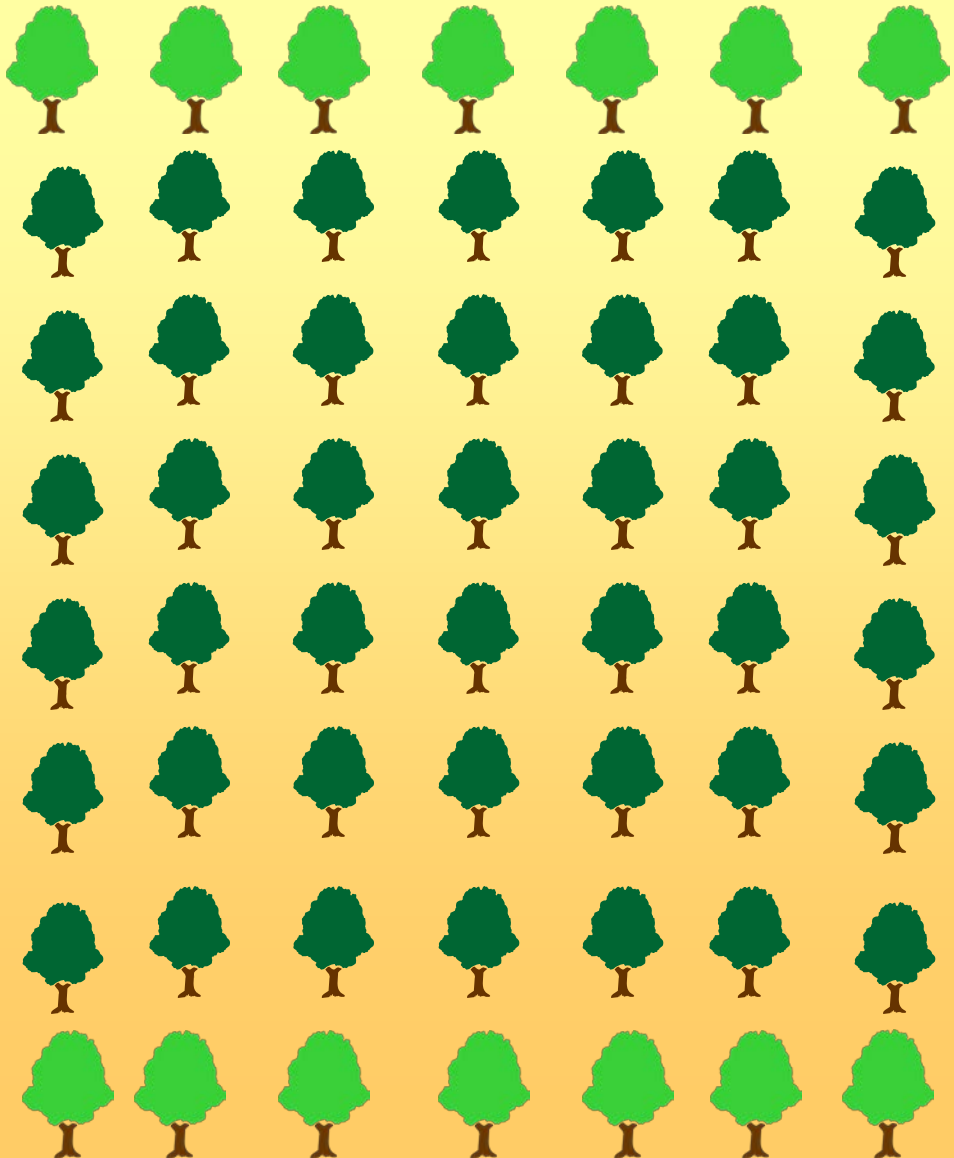
Cross-pollination-
Bee movement

♀ ♂

‘Hass’ **Pollinizer**



Combining pollenizers; end of the rows



Row direction

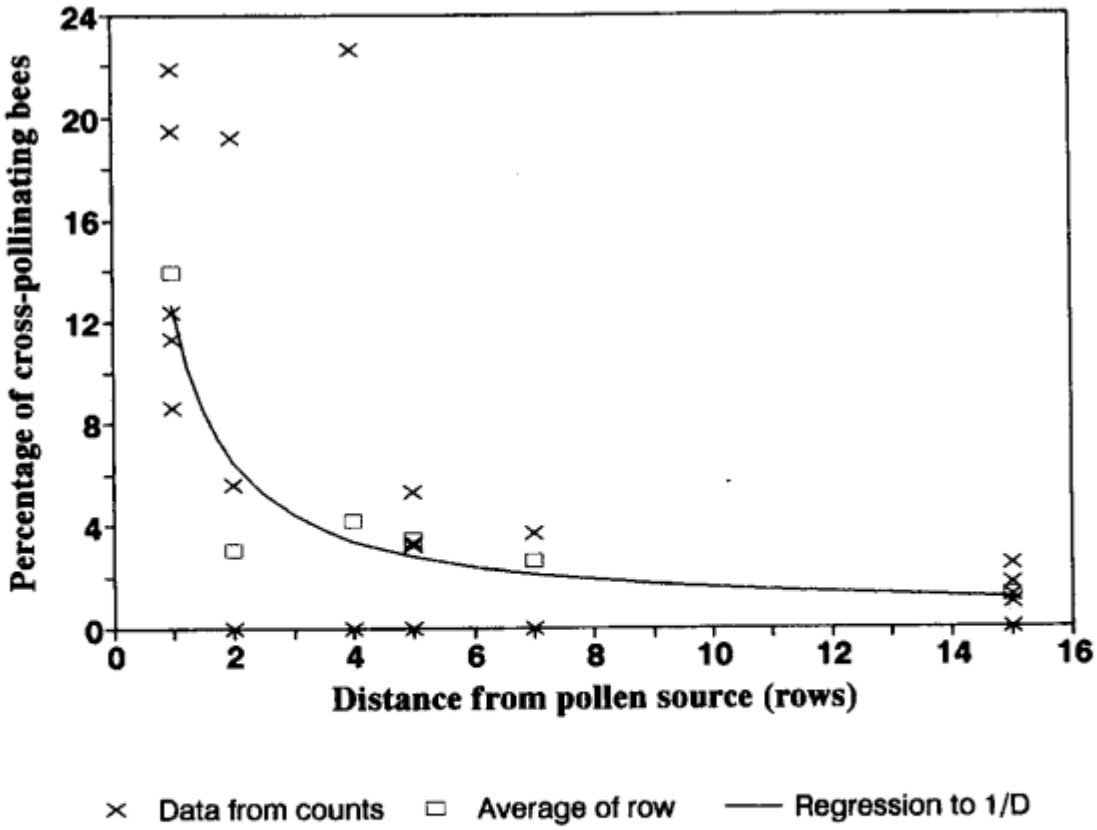
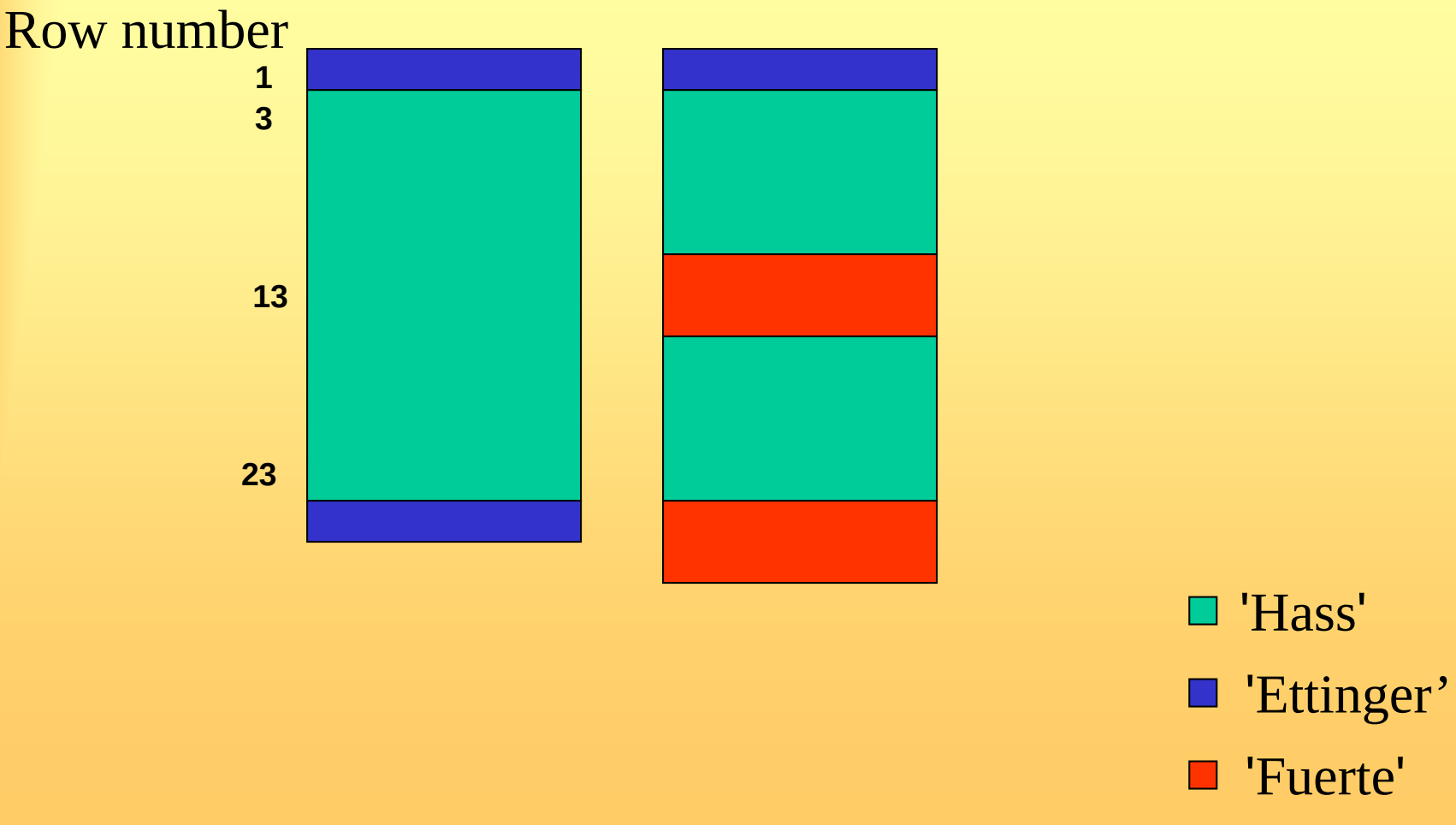


Figure 4. Percentage of cross-pollinating bees on female-stage blooming trees (PCrBee), as a function of distance (D, in rows) from the male-stage trees. Honey bees carrying pollen loads and non-loaded bees were simultaneously counted on trees in male-stage and on trees in female-stage bloom. The counts of each row were pooled to calculate the average PCrBee per row (see Materials and methods). The best-fit function of regression of the averages to D is: PCrBee = 12.3/D + 0.323, $r = 0.93$, $P = 0.0079$, $n = 6$.

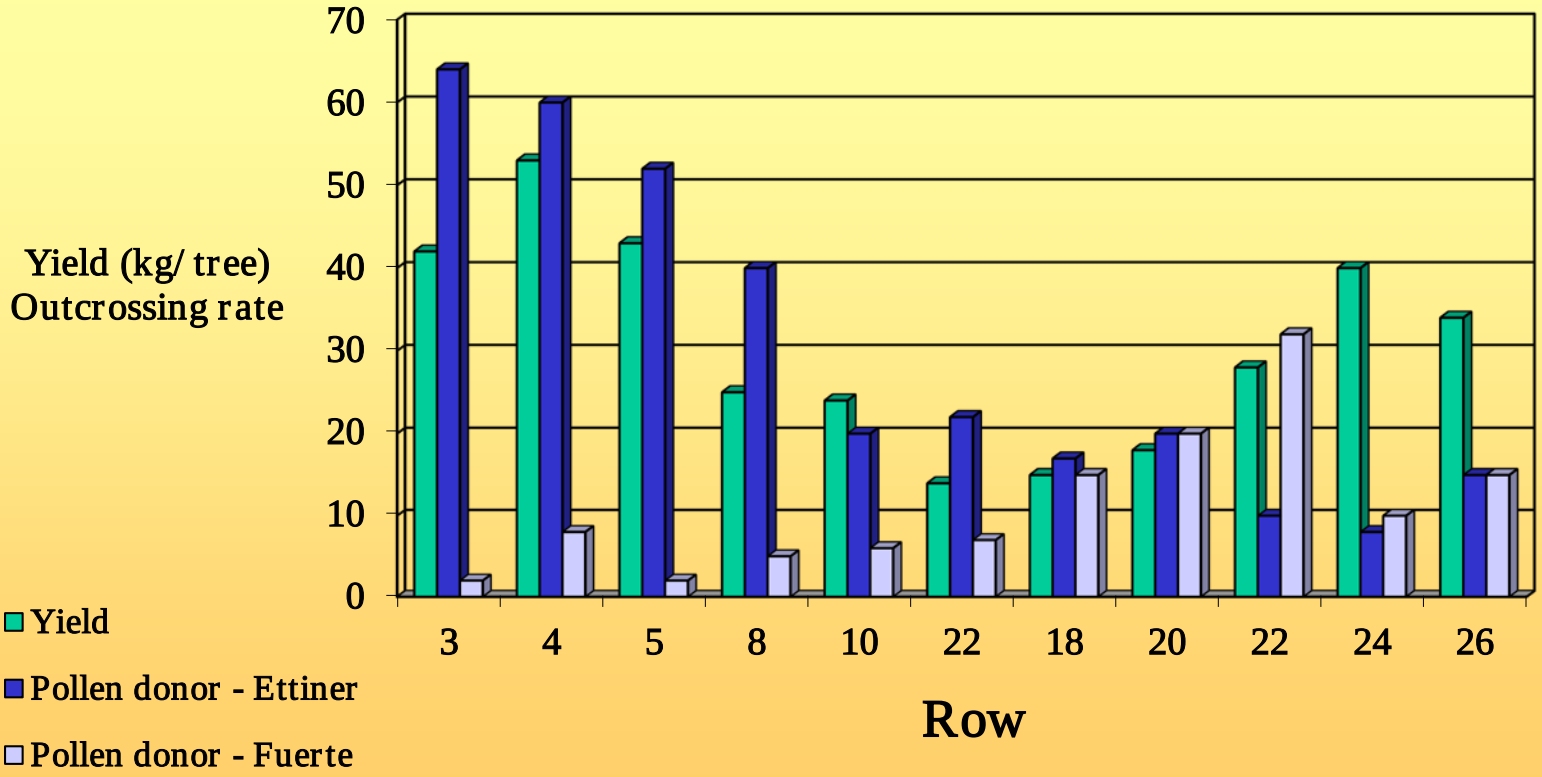
Ish Am and Eisikowich, 1998. Apidologie 29; 209-219.

Israel

The effect of pollinizer on avocado productivity, Givat Brener, 1984



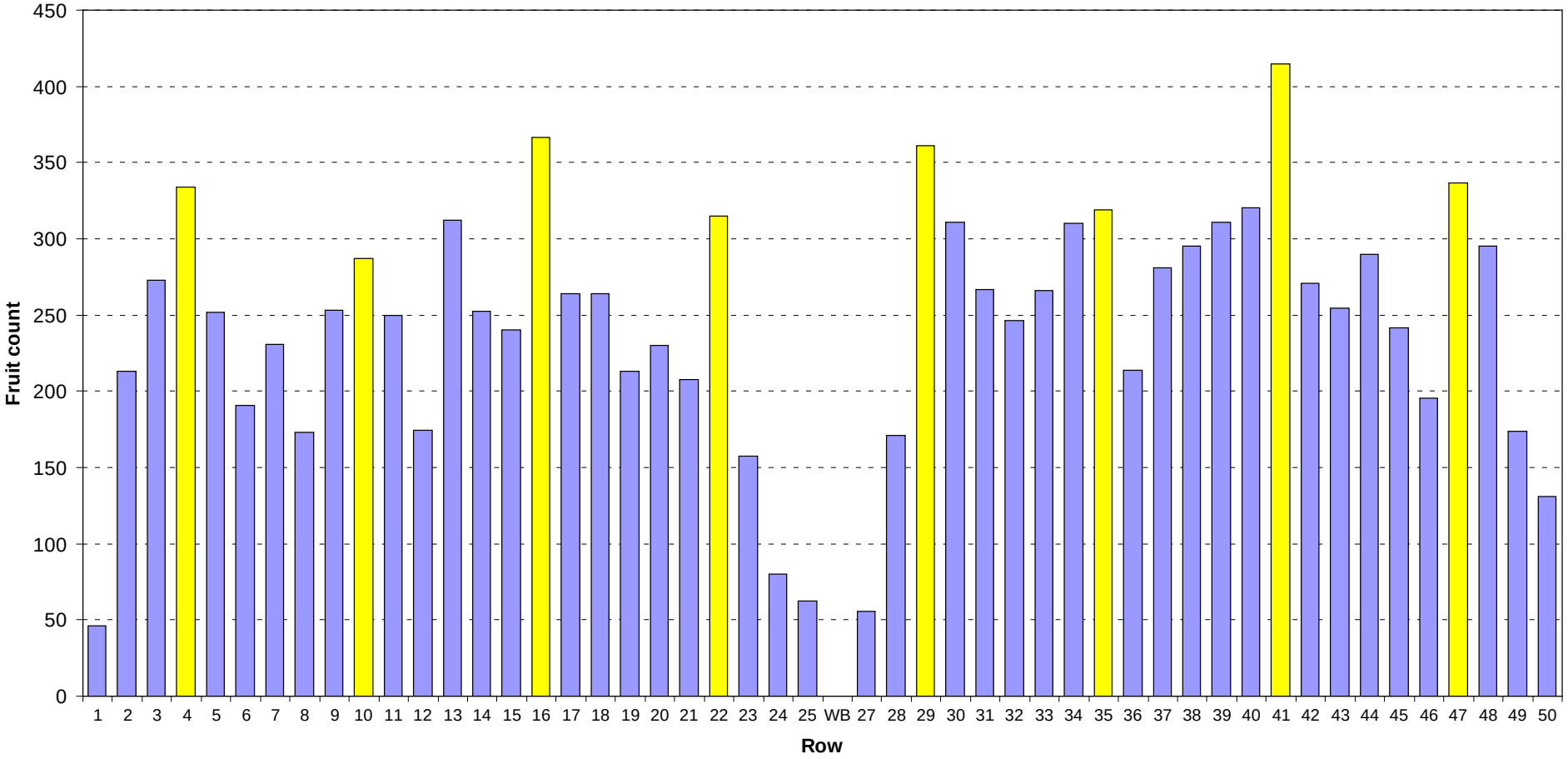
The effect of pollinizer proximity on yield and outcrossing rate, Givat Brener 1984



Degani et al., 1989

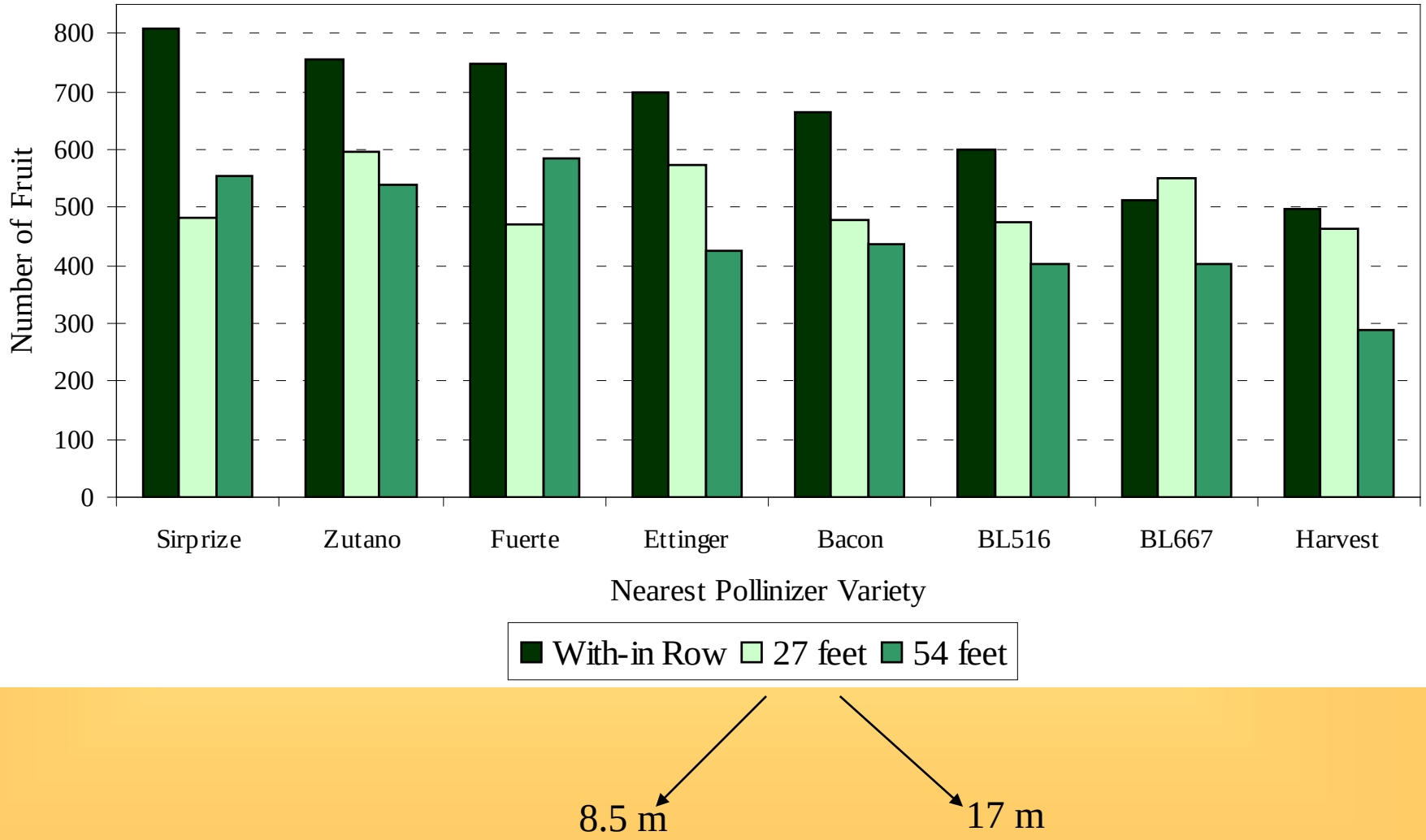
California

Figure 3. The impact of windbreaks and pollinizers on 'Hass' fruit counts for the April 2004 harvest of the DeBusschere Pollinizer Plot in Oxnard, California. (Yellow bars are fruit counts for 'Hass' in the pollinizer rows)



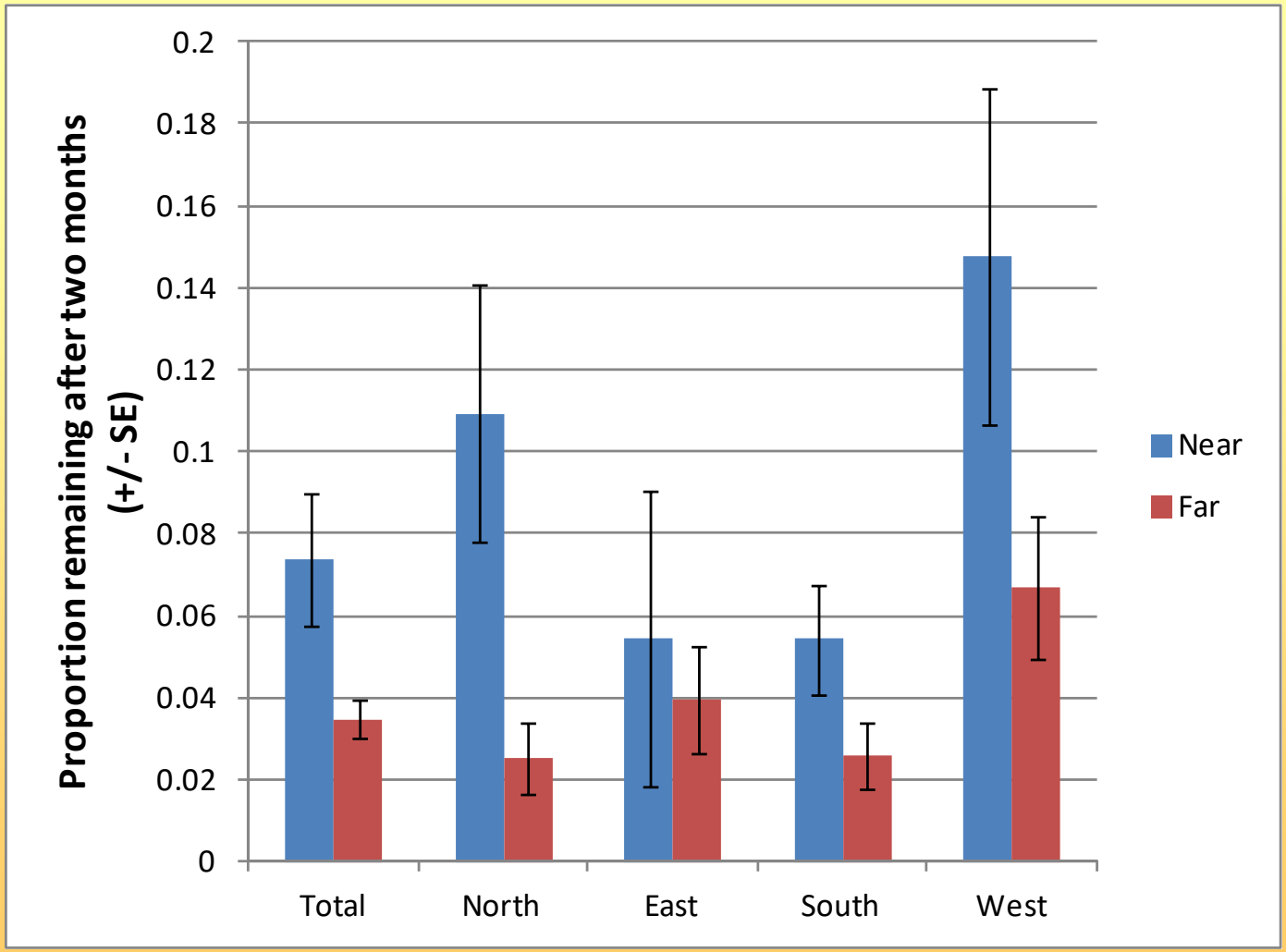
California

Figure 1. Cumulative 'Hass' Fruit Count, 2001-2004. DeBusschere Pollinizer Plot, Oxnard, CA.



New Zealand

Fruitlet retention decreases with distance from pollenizer



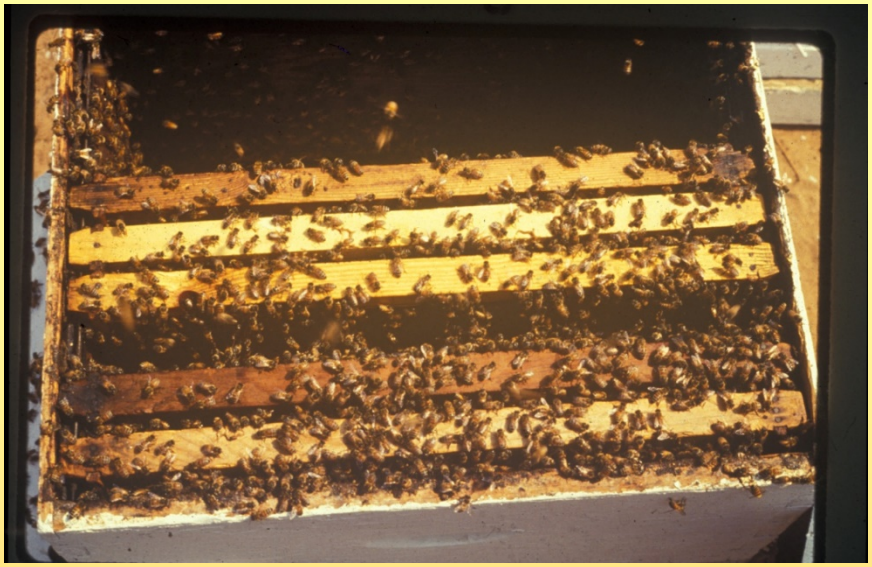
Pattemore et al., 2014

Pollinators- Honeybee

Beehive suitable for pollination

Colony strength

Adult population

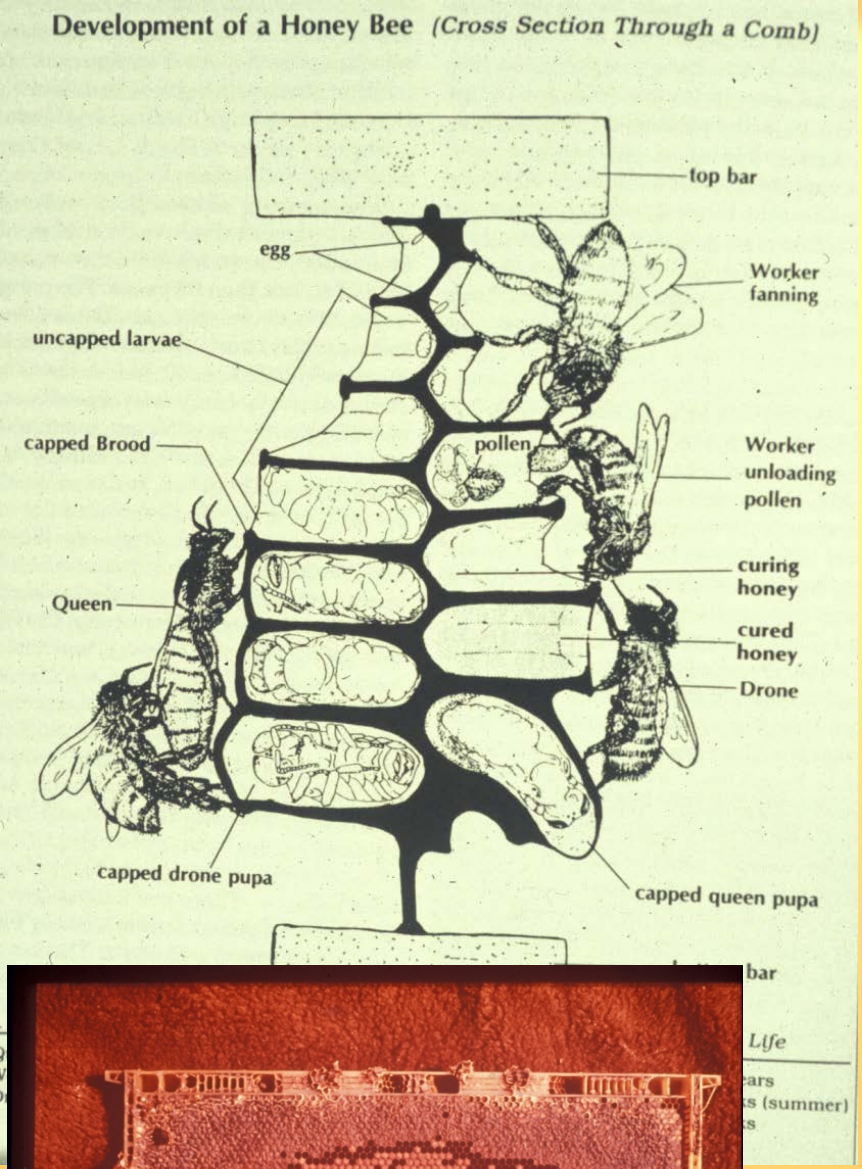


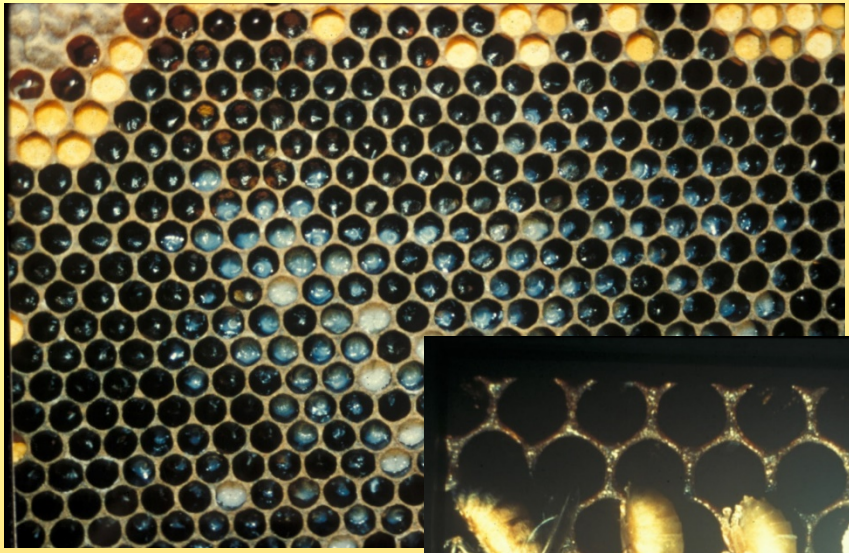
Average weight of pollen collected by colonies of 5 population strength groups

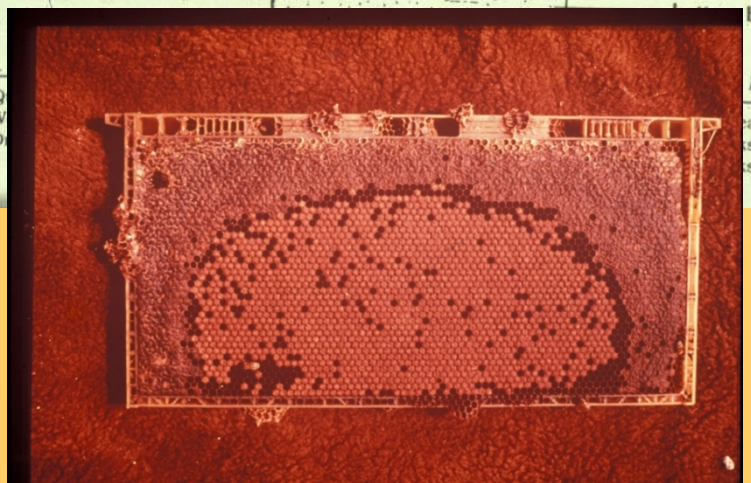
	0-2 Frames (%)	3 Frames (%)	4-5 Frames (%)	6-7 Frames (%)	8 < Frames (%)
1969	6	64	100	199	286
1970	5	42	100	164	292
1970	16	54	100	148	304

Sheesley and Poduska,1970

Brood


Development of a Honey Bee (Cross Section Through a Comb)
top bar
egg
Worker fanning
uncapped larvae
capped Brood
pollen
Worker unloading pollen
curing honey
Queen
cured honey
Drone
capped drone pupa
capped queen pupa
bar
Life
ars
s (summer)
s

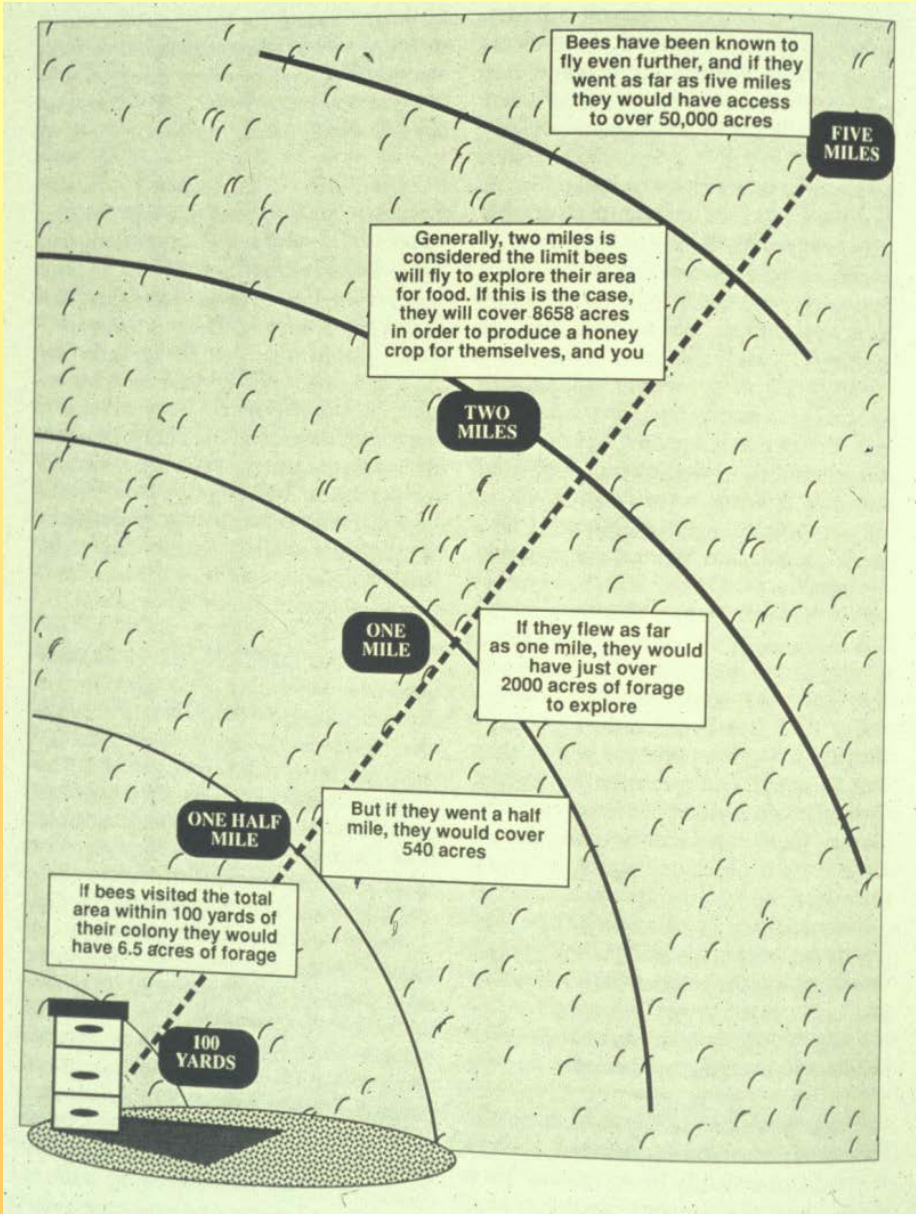




Minimum standards for pollinating beehives (Israel)

Month	Brood frames	Adult population frames
1-2	4	7
3-12	7	10

Foraging area



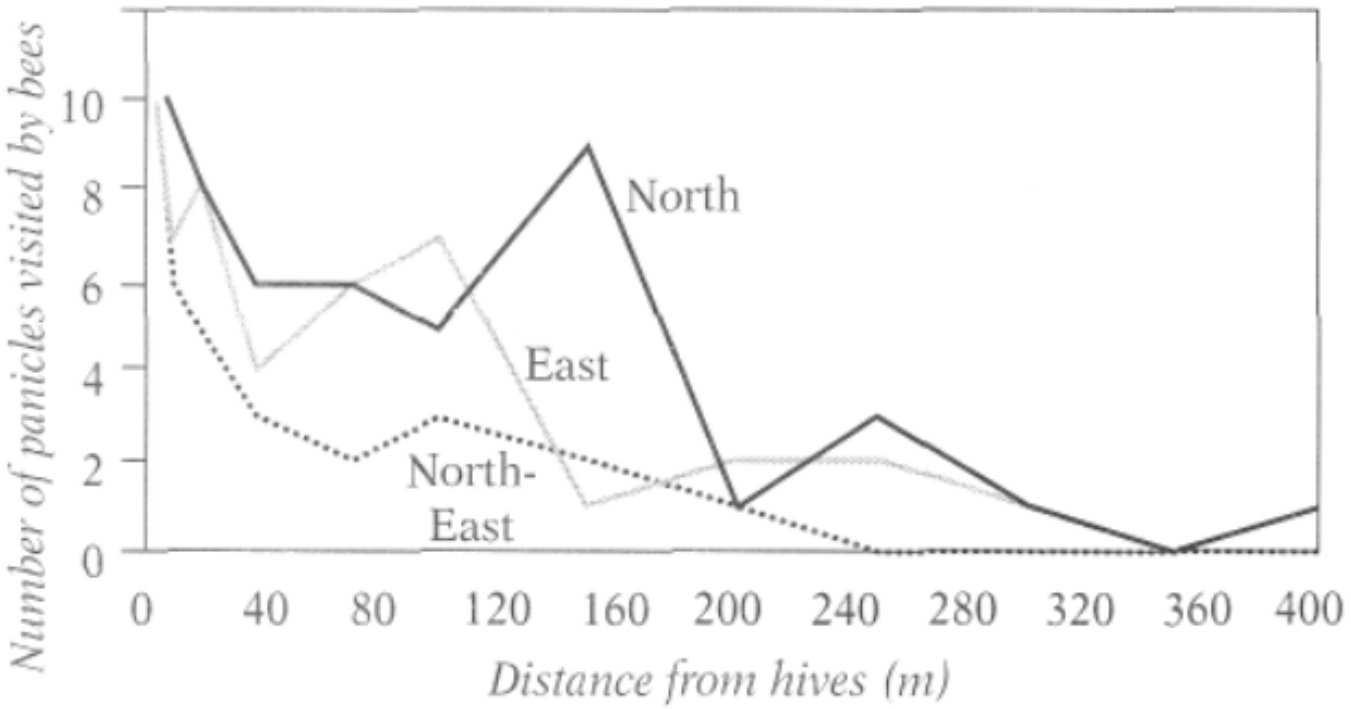
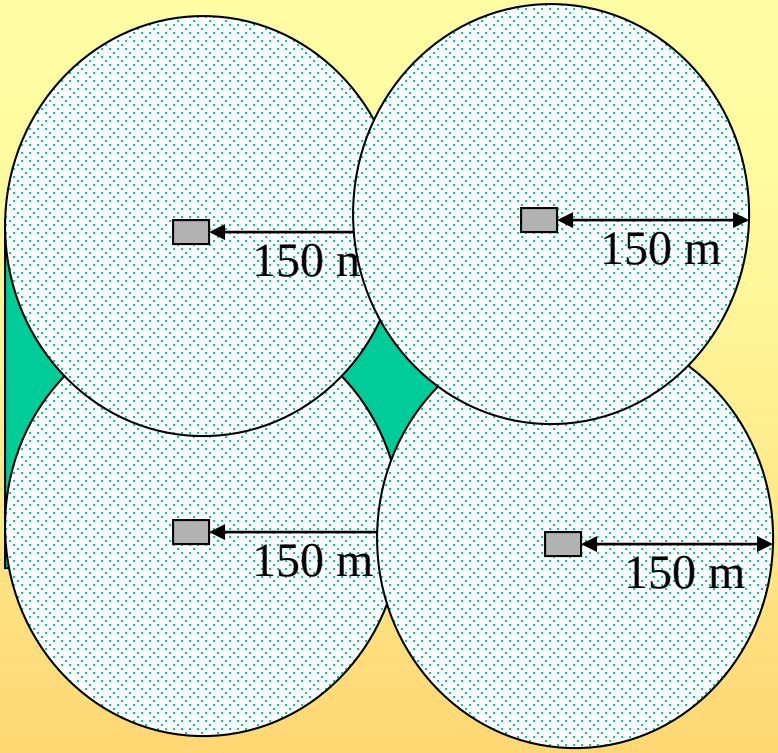


Figure 1

Number of Hass panicles per tree visited by bees at various distances and in different directions from hives

Johannsmeier et al., 1997. South African Avoc. Growers Asso. Yearbook; 20: 39-41.

Placement of beehives



Density; 2.5-5 hives/ ha.

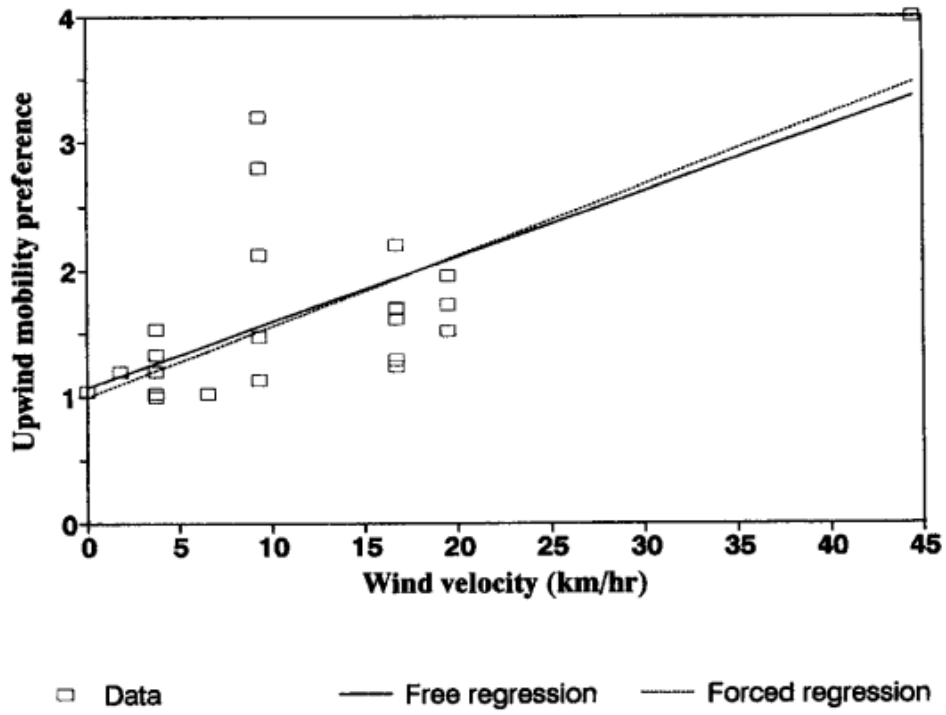
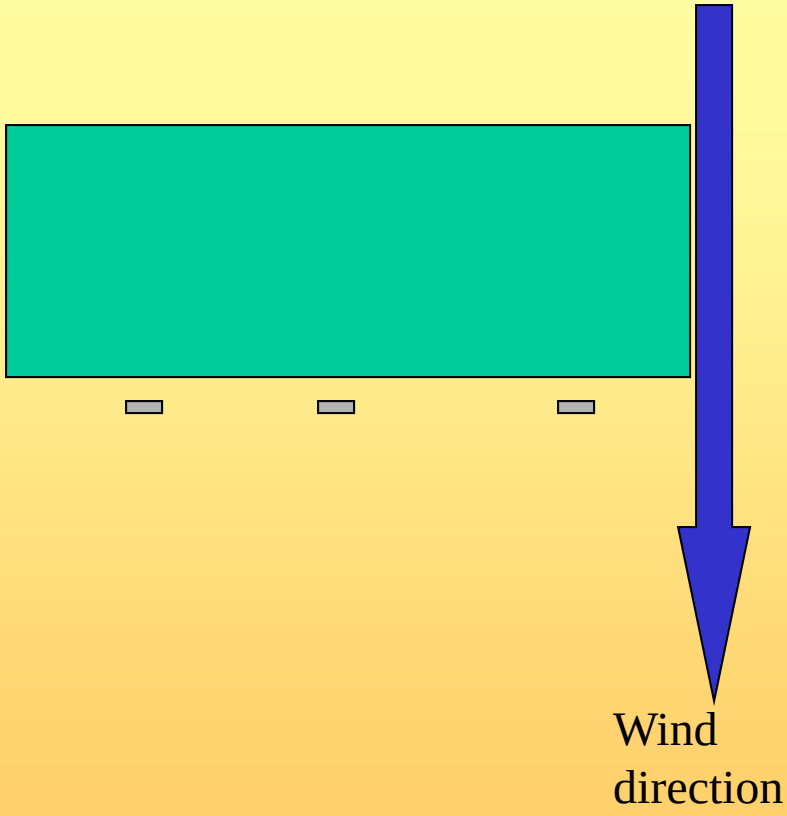


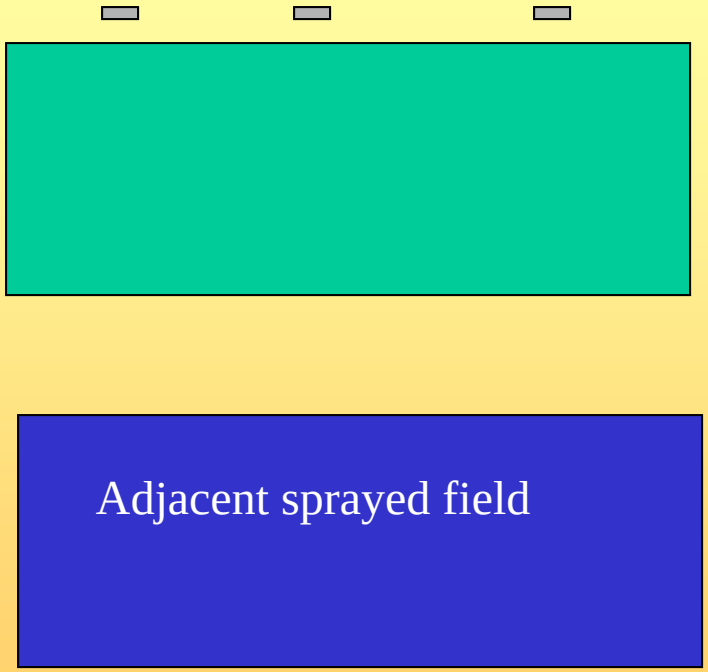
Figure 3. Honey bee preference of upwind direction (UWMP = upwind mobility preference), which is the ratio between the number of honey bees crossing to the nearest tree in the upwind direction and the corresponding number in the downwind direction, as a function of wind velocity (WindVel, in km/h). The free linear regression is: UWMP = 0.052*WindVel + 1.08, $r = 0.65$, $P = 0.0007$, $n = 23$, and the forced to [0,1] linear regression is: UWMP = 0.056*WindVel + 1.00, $r = 0.65$, $P = 0.0006$, $n = 23$.

Ish Am and Eisikowich, 1998. Apidologie 29; 209-219.

Placement of beehives



Placement of beehives



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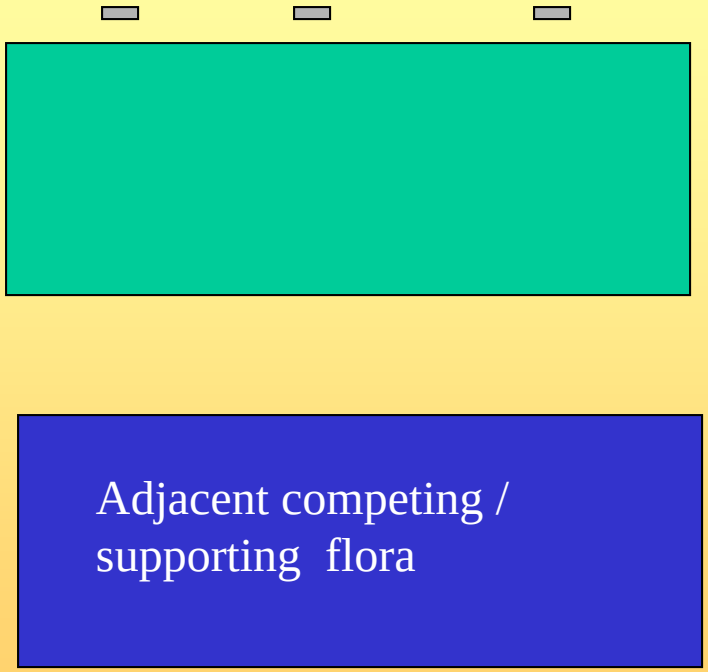
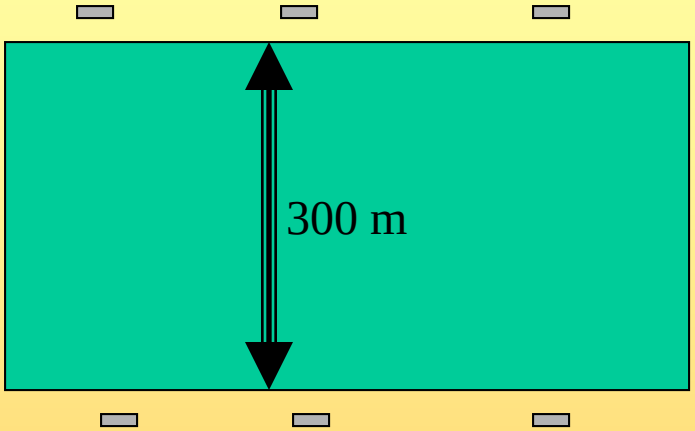
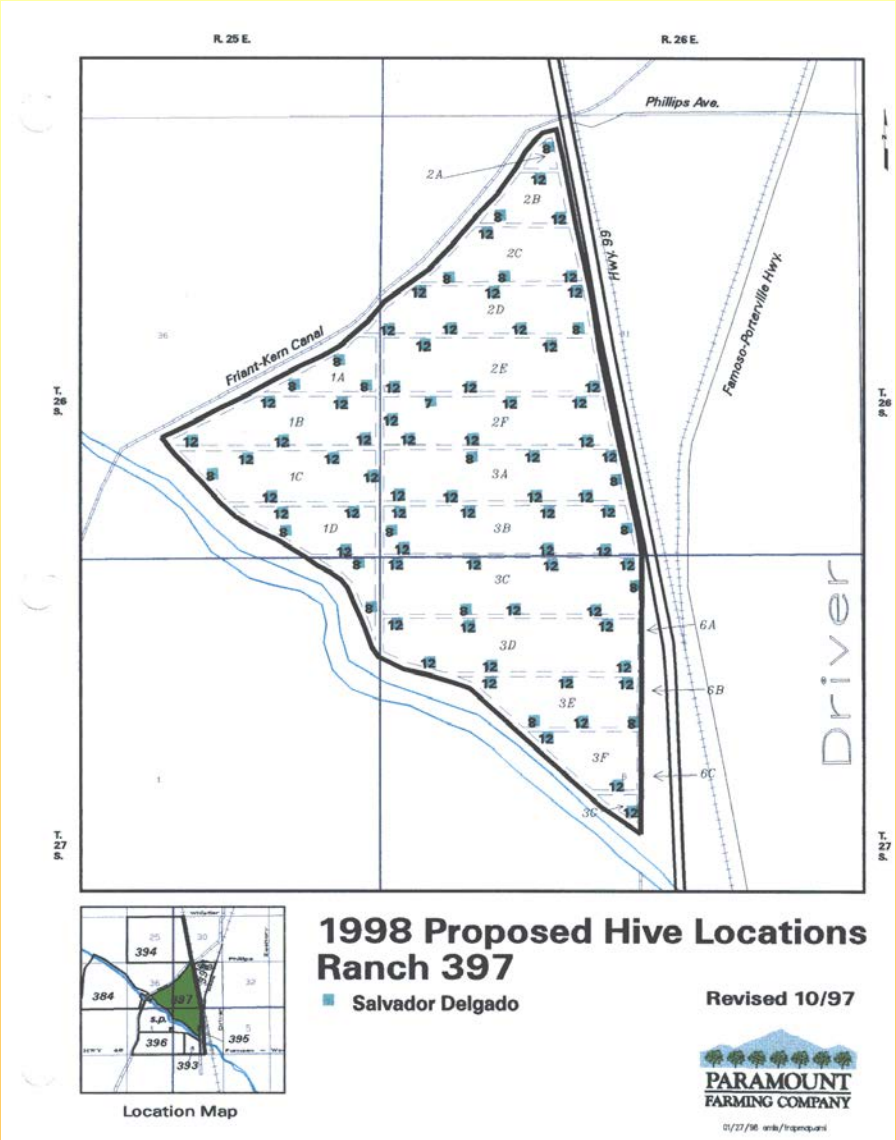


Accessibility

Placement of beehives



Map


R. 25 E.
R. 26 E.
Phillips Ave.
Friant-Kern Canal
HWY 99
Famoso-Porterville Hwy.
Driver
T. 26 S.
T. 27 S.
2A
2B
2C
2D
2E
2F
1A
1B
1C
1D
3A
3B
3C
3D
3E
3F
6A
6B
6C
1998 Proposed Hive Locations
Ranch 397
Salvador Delgado
Revised 10/97
PARAMOUNT
FARMING COMPANY
394
384
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396
395
393
Location Map

Thank you

The effect of the Hamas terrorist attack on October 7th on avocado cultivation in the Israeli communities surrounding the Gaza Strip

The detailed description of the story; Avocadosorce.com