

NOTES ON FORAGING ACTIVITY OF HONEYBEES IN AN AVOCADO ORCHARD

A.P. DU TOIT AND D. SWART

Apicultural Unit, Plant Protection Research Institute Private Bag X134, Pretoria 0001, RSA

INTRODUCTION

Little is known about the pollination ecology, in the broadest sense, of cultivated avocado in South Africa. The transfer of pollen requires an active agent, as the flowers are protogynous. Type A & Type B flowers occur in avocados. Successful pollination is furthermore restricted as the stigmas of flowers are receptive for pollen for less than 12 hours.

During a survey conducted in 1986, it was determined that honey-producing beef farmers rendered limited accidental pollination services to subtropical fruit farmers. Less than 2,000 beehives were placed in subtropical fruit orchards (excluding citrus) (Du Toit, 1990). Avocado is produced on 9,000 ha. Crane & Walker (1984) and McGregor (1976) specify that three beehives per hectare are required for satisfactory pollination.

In this study a survey was conducted of the types of honeybee foragers returning from a flowering avocado orchard.

METHODS

The study was conducted at Vergelegen Estate, Politsi, in a 50 ha avocado orchard. Ten beehives were placed in the centre of the orchard, while a second apiary with 20 hives was located at the eastern end of the orchard. Honeybee activity was monitored by sampling returning foragers at hive entrances. Samples of ± 60 foragers per hive were taken from two hives at 2-hourly intervals (08h00; 10h00; 12h00; 14h00 and 16h00) on seven days during the flowering period. Foragers were collected at the hive entrance, after closure of the entrance, by scooping them into a 500 ml glass killing bottle containing ethyl acetate.

The foraging loads were then investigated. Pollen and propolis (bee-glue) are carried in pollen baskets on the hind legs. Honey stomachs were removed with a pair of forceps and examined for nectar or water, using an Atago 500 refractometer. Dissolved solids in nectar gave readings of 10% or higher, while water gave readings of 0-5%. All foraging loads were sized on a 0-5 scale, 5 being very large and 0 indicating a zero load.

RESULTS AND DISCUSSION

Daily activity of returning foragers

Foraging for nectar and pollen on avocado is characterised by very high Standard Deviations in all samples for any one activity. No one activity dominated during any part of the day, indicating that no mass quantities of pollen are released nor large volumes of nectar secreted.

The average number of pollen collectors ranged between 20-30% of the total number of foragers, with only one definite foraging peak at 10h00 (Fig. 1). Nectar foraging frequency remained low and rather constant between 15-25%. Foraging for both nectar and pollen showed a gradual decline from 33% in the early morning to 7% in the late afternoon. Water foraging increased steadily from an early morning low of 2% to 16% in the late afternoon. The number of unsuccessful foragers, i.e. without any loads, declined from 21% in the early morning to 13% at noon (more foragers were presumably involved in scouting early in the morning). Their numbers then increased to a late afternoon peak of 32%. This is probably due to the nectar and pollen source becoming exhausted.

Activity of returning foragers in relation to the seasonal pattern of avocado bloom

As a result of the cyclic flashing nature of flowering it was very difficult to establish any pattern in honeybee foraging activity. Pollen foraging dominated through the entire flowering period (Fig. 2).

CONCLUSION

This investigation revealed that honeybees visited avocado florets throughout the flowering period. They collected both nectar and pollen, though the quantities were rather small. It would be inappropriate to make any recommendations on the number of beehives required for satisfactory pollination at this stage of the study.

REFERENCES

- CRANE, E. & WALKER, P. 1984. Pollination directory for world crops. *International Bee Research Association*, London. 183 pages.
- DU TOIT, A.P. 1990. Pollination research: a missing link in subtropical fruit production. *Acta Horticulturae* 275: 239 - 243.
- McGREGOR, S.E. 1976. Insect pollination of cultivated crop plants. *Agriculture Handbook* 496. USDA, Washington, D.C. 411 pages.

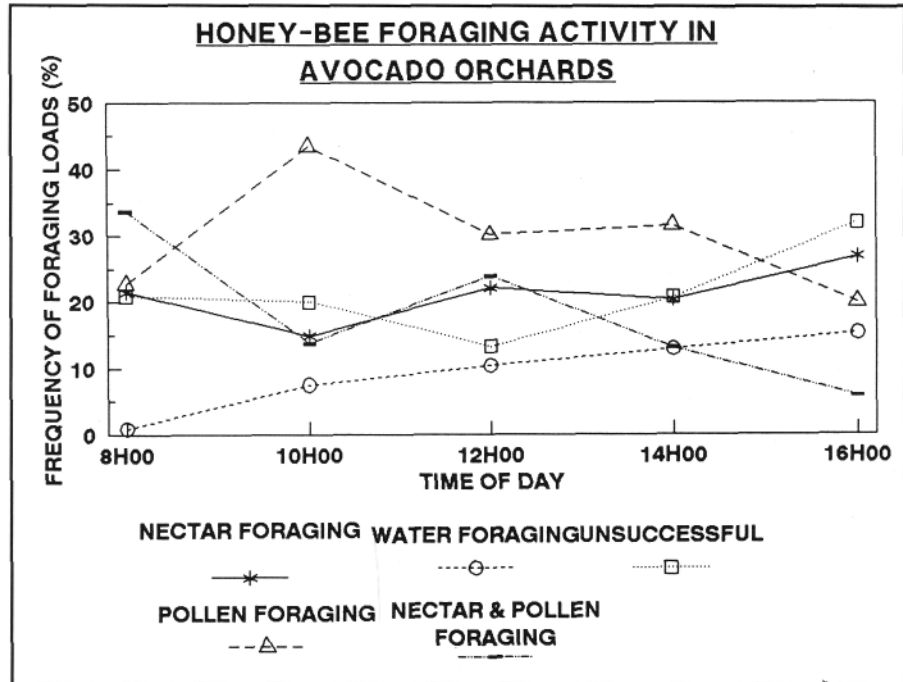


FIG. 1 Honeybee foraging activity in avocado orchards.

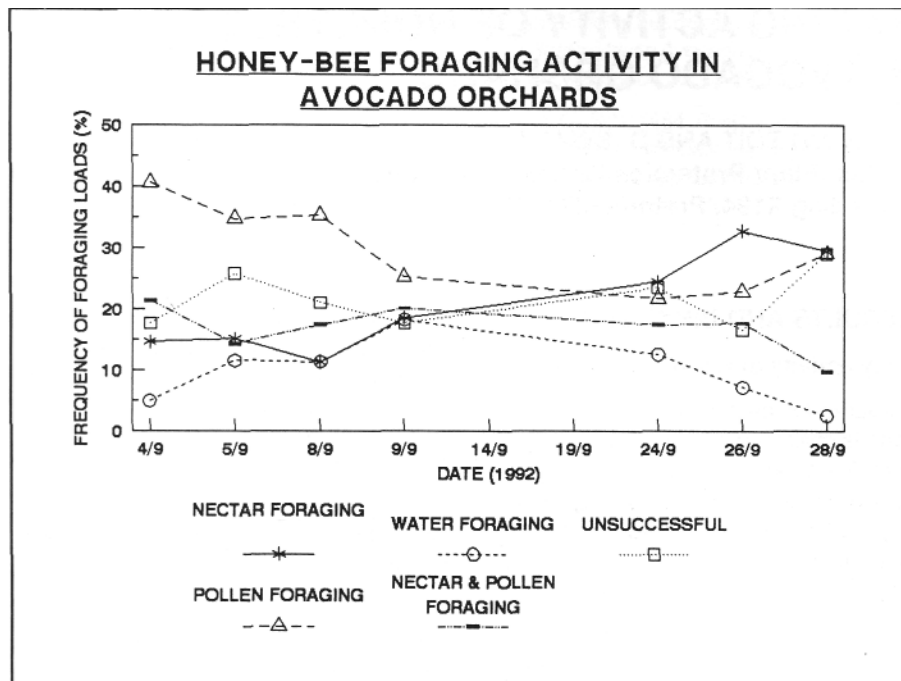


FIG. 2 Honeybee foraging activity in avocado orchards.