

REPORT ON THE NATURAL OCCURRENCE OF INSECT POLLINATORS IN AN AVOCADO ORCHARD: SECOND REPORT

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1. INTRODUCTION

The directives were to undertake:

1. A qualitative and quantitative assessment of the potential insect-pollinators that occur naturally in an avocado orchard in the Tzaneen area during the peak flowering period.
2. The determination of the daily activity of the insects that visited the flowers.
3. The assessment of the possible effect of the insect visitors as pollinators.
4. A survey of the surrounding vegetation to determine whether it had any effect on the pollination of avocado.

2. METHODS

Sampling was carried out in two orchards on the Westfalia Estate during a two-day period from 7-8 September 1993. The same orchard that was sampled during 1992 was sampled for two days and a second orchard was sampled by a different researcher for one day. Three sampling sites were selected in each orchard and each site constituted all the blossoms within one square metre. The three sites were each monitored for ten minutes every hour, with a further ten minutes each hour being allocated to a survey of the surrounding vegetation to determine its effect in the distraction of possible pollinators. Sampling commenced at 08h00 and continued until 16h00, resulting in a period of observation of twenty-four man-hours. Temperature and wind conditions were recorded hourly.

At each site all the insects that visited the flowers were recorded, and tentatively identified on site to at least family level. Care was taken not to disturb the flowers during observation periods. Representatives of each species were collected on other trees between periods of observation and recording. At the conclusion of the survey the material collected was identified and examined for traces of pollen (Table 1). The data on each species were collated to determine the daily activity and relative abundance of all the insects that visited the flowers that were monitored.

3. RESULTS

All the insects that visited the flowers and the total number of visits of each species are recorded in Table 1. The daily activity of the insects has not been given because there is as yet insufficient data to determine the daily pattern of their activities. The daily activity of those insects that are potentially suitable as pollinators of avocado will be

presented in the final report.

There were few flowering plants in the vicinity which could have significantly diluted the effect of the pollinators. However, the intense cultivation of the area apparently has an effect in excluding natural pollinators which require natural vegetation for their survival.

4. CONCLUSION

As for the previous year, the survey revealed that many different insects visited the avocado blossoms. Most of these were present in such low numbers that, even if they were to pollinate the flowers, their influence as pollinators of the avocado flowers can be assumed to have been negligible on the Westfalia Estate. The only insect whose numbers were sufficiently high to influence the pollination of the avocados was the honey bee (*Apis mellifera*). The comparison of the number of visits of the alternate pollinators in 1992 and 1993 indicates that their relative abundance varies from season to season.

Observations on the behaviour of the insects on the flowers, and an examination of captured specimens for traces of pollen revealed that most of the insects carry very little or no pollen and simply rob the flower of nectar. Certain species, however, have the potential to be pollinators of significance, should their numbers increase.

As mentioned in the previous report, some of the insects other than the honey bee, have potential as pollinators and the population density of some of these insects, such as the small carpenter bee (*Allodape microsticta*), can be artificially increased. Although small carpenter bees have never been commercially exploited, they are known to exploit suitable nesting sites in the building materials of human dwellings. It should therefore be possible to artificially increase and maintain their population density in avocado orchards for pollination purposes.

A casual observation in other orchards and on isolated avocado trees suggests that the insect guild of the avocado flowers depends on the surrounding vegetation. We, therefore, propose that during the forthcoming season a different orchard in the Tzaneen area be sampled and that the orchard should be near indigenous vegetation. This would give a better indication of the natural pollinators in the Tzaneen area and indicate the effect of intense cultivation on the natural pollinators.

TABLE 1
Insects recorded on the blossoms of avocado and their relative abundance. The relative abundance is the total of each species recorded during the study.

FAMILY, ORDER & SCIENTIFIC NAME	COMMON NAME	RELATIVE ABUNDANCE
HYMENOPTERA		
Apidae <i>Apis mellifera</i> Linnaeus	Honey-bee	569
Anthophoridae <i>Allodape microsticta</i> Cockerell	Small carpenter bee	13
Halictidae <i>Lasiglossum</i> sp. <i>Halictus (Seladonia)</i> sp.	Halictine bee Halictine bee	4 1
Megachilidae <i>Megachile prob. semiflava</i> Cockerell	Leaf cutter bee	3
Sphecidae <i>Larra</i> sp.	Sphecid wasp	2
Formicidae <i>Camponotus cinctellus</i> (Gerstaecker)	Ant	1
Vespidae <i>Belonogaster</i> sp. <i>Polistes prob. spilophorus</i> Schletterer	Paper wasp Paper wasp	1 1
Chrysididae <i>Stilbum</i> sp.	Cuckoo wasp	1
LEPIDOPTERA		
Nymphalidae <i>Pseudacraea lucretia tarquinia</i> (Trimen)	False chief	1
DIPTERA		
Calliphoridae <i>Chrysomya regalis</i> Robineau-Desvoidy <i>Lucilia</i> sp. <i>Stomorphina rugosa</i> (Bigot) <i>Stomorphina lunata</i> (Fabricius) <i>Stomorphina cribrata</i> (Bigot)	Blow fly Blow fly Blow fly Blow fly Blow fly	3 1 11 2 4
Muscidae <i>Musca domestica</i> Linnaeus <i>Musca</i> sp.	House fly Muscid fly	7 19
Syrphidae <i>Ischiodon aegyptius</i> (Wiedemann) <i>Phytomyia incisa</i> (Wiedemann) <i>Asarkina</i> sp. <i>Allograpta calopus</i> (Loew) <i>Paragus</i> sp. <i>Allograpta fuscotibialis</i> (Macquart) <i>Syrirta fasciata</i> (Wiedemann) <i>Eristalinus taeniops</i> (Wiedemann) <i>Eumerus axinecerus</i> Speiser <i>Allobaccha</i> sp.	Hover fly Hover fly Hover fly Hover fly Hover fly Hover fly Hover fly Hover fly Hover fly Hover fly	1 8 2 2 1 3 1 9 8 2
Tephritidae <i>Metasphenisca longulior</i> (Munro)	Fruit fly	2
HEMIPTERA		
Reduviidae <i>Rhinocoris</i> sp.	Assassin bug	1
Pentatomidae <i>Atelocera foveata</i> Dallas	Stink bug	1
Total		685