

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

C.D. EARDLEY AND M.W. MAMSELL

Biosystematics Division, Plant Protection Research Institute Private Bag x134, Pretoria, 0001, RSA

INTRODUCTION

The directives were to undertake:

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

METHODS

Sampling was carried out in an orchard on the Westfalia Estate during a three day period from 8-10 September 1992. Two people were involved in the survey, but only one person was involved in the sampling on each of the three days.

Several orchards were assessed on the day preceding the survey to select the most suitable sampling sites with regard to floral density and receptivity of flowers for pollination. Three sampling sites were selected 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 sixteen 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 in between periods of observation and recording. At the conclusion of the survey the material collected was identified (Table 1). The data on each species was collated to determine the daily activity and relative abundance of all the insects that visited the flowers that were monitored.

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 three day period.

FAMILY, ORDER & SCIENTIFIC NAME	COMMON NAME	RELATIVE ABUNDANCE
HYMENOPTERA		
Apidae <i>Apis mellifera</i> Linnaeus	Honey-bee	609
Anthophoridae <i>Allodape microsticta</i> Cockerell	Small carpenter bee	11
Halictidae <i>Lasioglossum</i> sp.	Halictine bee	2
Sphecidae <i>Philanthus</i> sp.	Sphecid wasp	2
Formicidae <i>Crematogaster</i> sp. sastanea-group	Ant	5
<i>Camponotus cinctellus</i> (Gerstaecker)	Ant	25
LEPIDOPTERA		
Pieridae <i>Belenois aurota</i> (Fabricius)	Brown-veined white butterfly	26
DIPTERA		
Calliphoridae <i>Chrysomya regalis</i> Robineau-Desvoidy	Blow fly	2
<i>Rhyncomya forcipata</i> Villeneuve	Blow fly	18
<i>Lucilia</i> sp.	Blow fly	8
<i>Rhinia apicalis</i> (Weidemann)	Blow fly	3
Muscidae <i>Musca domestica</i> Linnaeus	House fly	21
Tachinidae <i>Cylindromyia</i> sp.	Tachinid fly	2
Otitidae <i>Physiphora clausa</i> (Macquart)	Picture winged fly	5
Syrphidae <i>Eristalinus taeniops</i> (Weidemann)	Hover fly	1
Eumerus sp.	Hover fly	1
<i>Allobaccha</i> sp.	Hover fly	2
Bombyliidae undetermined	Bee fly	4
COLEOPTERA		
Chysomelidae undetermined	Leaf beetle	5
TOTAL		752

RESULTS

The results of the survey are summarized in Table 1. This table indicates the identity and the relative abundance of each species.

There were few flowering plants in the vicinity which could have significantly diluted the effect of the pollinators, except for a small litchi orchard about 500 metres away. The

litchi flowers did attract large numbers of honeybees.

CONCLUSION

The survey revealed that many different insects, other than honeybees, visited the avocado blossoms. Most of these, however, are 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 be negligible.

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 simply rob the flower of nectar and carry very little or no pollen. Many of these insects are simply 'tourists' that visit the flowers for nectar while passing through the orchard. The only insects that appear to pollinate the flowers are the honeybees (*Apis mellifera*), the small carpenter bee (*Allodape microsticta*) and a calliphorid fly, (*Rhyncomya forcipata*). Only honeybees were present in sufficiently high numbers to influence pollination.

The small carpenter bees and the calliphorid flies do, however, have the potential to become pollinators of significance, should their numbers increase dramatically. As shown in Fig. 1, the small carpenter bees carry some pollen on hairs on the underside of the body. It appeared during the study that the position of the pollen load and the small size of this bee (6-9 mm in length) possibly makes an individual small carpenter bee a potentially more efficient pollinator of the small avocado flowers than an individual honeybee.

The honeybees' activity appeared to be fairly consistent throughout the day, but declined markedly during windy periods and late in the afternoon. Calliphorids were most active during the early morning and disappeared completely by midday.