THE CRAZY ANT, *ANOPLOLEPIS LONGIPES* (JERDON) (HYMENOPTERA: FORMICIDAE) ON COCONUT PALMS IN NEW GUINEA.

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ABSTRACT

Nests of the crazy ant Anoplolepis longipes, *in the crowns of coconut palms, contained all castes and life stages except queen brood. The ant was attracted to the male flowers on the coconut inflorescence rather than honeydew-producers. Workers fed on nectar from male flowers and sap extruded from scars resulting from recently shed male flowers. Workers foraged on the inflorescence over 24 hours with maximum foraging activity at temperatures of 27.3 and 30.3° C.*

Key words: Anoplolepis longipes, *Nesting, Carbohydrate source , Foraging behaviour on coconut palms.*

INTRODUCTION

The crazy ant, *Anoplolepis longipes* (Jerdon) is widespread throughout the tropics (Way & Khoo 1992). In Papua New Guinea (PNG) *A. longipes* is particularly prevalent in disturbed habitats (Wilson and Taylor 1967).

The ant is frequently a pest of plantation crops because it increases the numbers of sap feeding insects, for example the coccids; *Ceroplastes rubens* Maskell, on citrus and cinnamom, and *Coccus celatus* DeLotto, on coffee (Haines and Haines 1978 a, Williams 1982). Copius amounts of honeydew, produced by these sap-feeders, subsequently lead to the growth of sooty mould on the leaves. Additionally, the ant often encourages pest species indirectly by harassing predators and parasites of the pest (Young 1982, 1996).

In some circumstances, *A. longipes* is regarded as beneficial because it disrupts the feeding and egg laying behaviour of pest species (Room & Smith, 1975; Young, 1982).

Premature nutfall on coconut palms infested with *A. longipes* has been recorded from a number of localities in PNG (Young 1996). In one instance, it was found that premature nutfall was due to attacks by the coconut spathe moth, *Tirathaba rufivena* Walker (Lepidoptera: Pyralidae). Moth populations were high on palms infested with *A. longipes* and low on palms without the ant. It was suspected that *A. longipes* disturbed the foraging behaviour of moth predators.

A. longipes is predominantly a ground nesting species and on heavy or relatively impervious soils the majority of nesting sites are found under fallen vegetation and leaflitter (Haines & Haines 1978 b; Young 1996). It has been presumed that the presence of honeydew producing insects attract the ant to the coconut palm (Way 1953; Greenslade, 1971; Haines & Haines 1978 b). However, I had marked large numbers of *A. longipes* workers on coconut inflorescences (unpublished data). The coconut palm produces a branched inflorescence. Each branch carries the more numerous male flowers apically and the female flowers on the basal part. Male flowers open progressively from the apical end of each branch over a period of 15 days. For this research I decided to investigate if honeydew-producers were attracting *A. longipes* to palms or whether the attraction was the inflorescence.

MATERIALS AND METHODS

Observations were made on palms infested with crazy ants at Maralumi Estates, Markham valley, PNG, over a 17 month period from November 1976 to March 1978. Each month five palms were climbed and the nests in the crowns were examined for the

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presence or absence of various castes and life stages of *A. longipes*. Additionally, the palms were searched for the presence of honeydew producing insects and samples were returned to the laboratory for identification.

In order to determine whether *A. longipes* was obtaining carbohydrate from honeydew-producers or some other source, three healthy palms were trunk injected with 12 g a.i. of monocrotophos to eliminate sap feeding insects. Three healthy palms were selected as controls. Observations on the ant and honeydew-producers were made over the suceeding three weeks.

The foraging activity of *A. longipes*, on coconut inflorescences, was recorded over a 24 hour period. Three palms were selected, each with an inflorescence which had emerged within the previous 48 hours. A wet and dry bulb thermometer was placed in a sheltered position close to each inflorescence. Every two hours an observer climbed the palm and made counts of the numbers of workers foraging on the inflorescence over a three minute period. Additionally, wet and dry bulb readings were recorded for each palm.

RESULTS

Ant nests on palms were located in the crowns or amongst the roots above soil level. Nests in crowns were either in the axils of palm fronds or between the inner spathe and the base of the peduncle of dead inflorescences, as described by Way (1953).Throughout the 17 month period, the crown nests contained all castes and life stages with the exception of queen larvae and pupae.

Crazy ants were observed foraging on palms throughout the day and night. Workers constantly trailed up and down the trunk except during high winds, very high temperatures or heavy rain. The gasters of some workers, trailing down the trunk, were often distented, suggesting that the ants had been feeding on liquid. There was always a small number of workers foraging on the fronds, however most workers were congregated on recently emerged inflorescences. Exudate from the stigma of female flowers was attractive to the ant, as described by Corbett (1932). However, the main attraction was the male flower. Male flowers were observed to open early in the morning and to have fallen by late afternoon. Workers were observed feeding on nectar oozing from the bases of unopened male flowers and inside open flowers, as well as sap extruded from scars resulting from recently shed flowers. When all the male flowers had fallen, and the resulting scars had healed, the inflorescence was no longer attractive to the ant.

Three species of honeydew - producers were tended by *A. longipes* on palms. *Palmicultor browni* Williams (Hemiptera: Coccidae) was the most common, being located in the axils of fronds and in the spear of the palm. *Ceraphis lataniae* Boisduval (Hemiptera: Aphidae) and *Aleurodicus destructor* Mackie (Hemiptera: Aleyrodidae) occurred on the undersides of leaflets. There was little sooty mould present, indicating that populations of homopterans were low in palms infested with *A. longipes.*

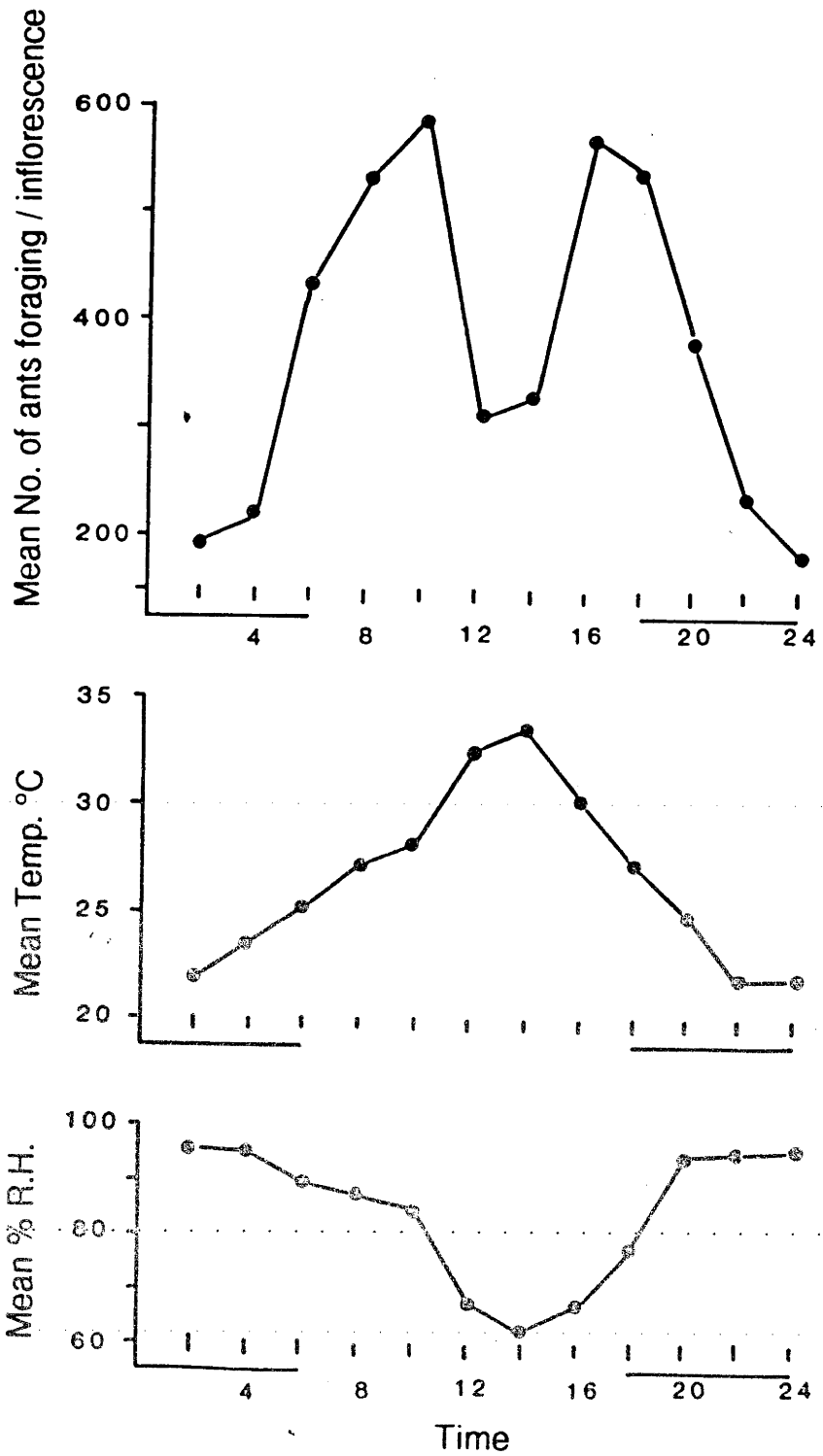
Prior to trunk injection it was not possible to accurately estimate the numbers of homopterans on the trial palms, however all three species were present. Three weeks after the trunk injections, crazy ants continued to ascend and descend the palms. No live homopterans were found on two of the palms, while 3 *P. browni* were on the third palm. Homopteran cadavers were found on all injected palms, indicating the effectiveness of the monocrotophos treatment. Populations of the three species of honeydew-producers were present on the control palms throughout the observation period. The foraging behaviour of *A. longipes* on control palms did not appear to be different to that on trunk injected palms.

Workers foraged on the inflorescences throughout the 24 hour observation period (Fig. 1). Mean numbers of workers peaked between 0800 and 1000 hours , and again between 1600 and 1800 hours. Mean temperatures at 0800 and 1000 hours were 27.3 and 28.3°C respectively, while temperatures at 1600 and 1800 hours were 30.3 and 27.3°C. Peak foraging activity occurred at relative humidities ranging from 67 to 88 percent. During daylight the lowest numbers of workers were recorded at 1200 and 1400 hours, when temperatures were 32.6 and 33.6°C respectively. Numbers of workers were lowest from 2200 hours to 0400 hours, when temperatures ranged from 22.0 to 23.5°C and the relative humidity was greater than 95 percent. The foraging observations were repeated on two subsequent occasions and while the numbers of workers varied from the original observations, the pattern remained essentially the same.

DISCUSSION

The crown of the coconut palm possibly provides more stable nesting sites than under fallen vegetation and leaflitter on the ground. The absence of queen

Figure 1. **Number of *A. longipes* workers foraging on coconut inflorescences over a 24 hour period.**



larvae and pupae from crown nests is puzzling and may suggest the ant is unable to collect sufficient protein in the crown to sustain queen brood.

While the monocrotophos injections did not kill all the honeydew-producers on the injected palms, populations of honeydew-producers were sharply reduced by comparison with those on the control palms. Since the ant continued to forage on the injected palms, it is reasonable to conclude that nectar from male flowers, and sap resulting from the abcision of male flowers, was the most important source of carbohydrate for the ant on the Maralumi coconut palms. *A. longipes* colonies are continuous rather than discrete (Greenslade 1972, Haines & Haines 1978 b). As a result, carbohydrate from the inflorescence is probably taken by workers and distributed to ground nests some distance away. This would explain workers with distended gasters trailing down the trunk. The ready availability of carbohydrate from the inflorescence could provide an additional reason for the ant nesting in the crown.

Low populations of homopterans suggest that nectar and sap are quantitatively, and perhaps qualitatively, a better source of carbohydrate for the ant than honeydew. Alternatively, if *A. longipes* is of African origin as suggested by Way & Khoo (1992), the ant may not be adapted to the honeydew-producers found at Maralumi, since *P. browni* is native to New Guinea and the Solomon Islands, *A. destructor* to South East Asia and *C. lataniae* to Central America (Lever 1969, William and Watson 1988). However, Way (1953) found that *C. lataniae* was the main source of food for *A. longipes* on coconuts in East Africa. In the Solomon Islands, Greenslade (1971) observed that *A. longipes* was not as dependent on honeydew as other species of ant nesting in palms. Additionally, both Greenslade (1972) and Haines and Haines (1978 b) state that *A. longipes* is essentially a scavenger, being dependent on protein collected on the ground. At Maralumi, the population density of *A. longipes* was high, and perhaps in this situation the ant has to utilize nectar and sap since it is unable to efficiently tend the homopterans present to supply-sufficient carbohydrate.

Workers foraged on the inflorescence continuously over the 24 hour period, with peak numbers foraging in the early morning and late afternoon. Maximum foraging activity occurred between 27.3 and 30.3°C, which is in broad agreement with the results of Haines and Haines (1978 b). The morning peak coincided with the maximum availability of nectar and the afternoon peak with the maximum availability of sap. Therefore the numbers of ants foraging may have been the result of a combination of optimum temperatures and availability of food.

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