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STATUS OF HOMOPTERANS ON ARECA PALMS AND THEIR NATURAL ENEMIES

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ABSTRACT

Areca palm, *Areca catechu* Linn. is now cultivated in an area of about 268 thousand hectares (1997-98) and this has almost doubled since 1971-1972. Young plantations practising monoculture of areca palms bring in many new pest problems. Of these, many species of homopterans including five genera of armoured scale insects, two species of mealy bugs, one species each of palm aphid and aleyrodid are noticed. Few plant hoppers are also found colonising the leaves. Two species of scale insects including *Aonidiella orientalis* (Newst.) colonise the leaves and developing fruit bunches. The feeding results in characteristic yellowing of the leaves and loss of vigour in severely damaged fruit bunches. The mealy bugs, especially *Planococcus* sp are mostly seen on leaflets, inside the leaf sheaths, on the inner angle of spadices and on inflorescences. They also colonise developing fruit bunches. Mealy bug infestation on inflorescence along with the association of nest building ants may lead to the drying up of the same. A species of whitefly is also gaining importance especially in young plantations. It infests the leaves of areca palm. Both nymphs and adults of these suck the sap from the leaves. Further disfiguration of the leaves is caused by the honeydew secreted vy them. The honeydew attracts the growth of sooty moulds. The palm aphid, *Cerataphis* sp. is emerging as a major problem on developing inflorescences. This aphid colonises all parts of inflorescence *viz,* the rachii, the rachillae, female flowers and developing fruits. Colonies are also seen on leaflets and on the spathes covering the unopened spadices. Shedding of female flowers and young fruits occur due to the feeding of this aphid. The indigenous natural enemies of these hompterans including parasites, predators and insect pathogens are being discussed. Coccinellids, predaceous thrips and mites, and parasites on scale insects, a syrphid and a chrysopid on palm aphid and a parasite and a coleopteran predator on whitefly are the indigenous natural enemies observed so far.

INTRODUCTION

Many homopteran insects were recoded from areca palms by earlier workers. These include scale insects, mealy bugs and aphids, which colonise the plant parts like leaves, inflorescences and fruit bunches (Pillai and Kurien, 1959; Nair and Menon 1963; Daniel and PremKumar (1976). But none of these assumed a major pest status till the early nineties when the scenario changed. Surveys conducted in the last few years and queries from farmers showed that few species of homopterans are becoming abundant in many areas. They are causing visible damage in many instances. Some of these homopterans are cosmopolitan in nature, but their occurrence in abundance on areca palm is reported for the first time. The reasons for their outbreak are manifold. The increase in area under cultivation, especially as a monoculture and the practice of modern cultivation methods especially the use of insecticides as a 'wholesome' meal to the palms are some of the reasons for the emergence of these homopterans to critical levels amounting to the status of a pest. A project is envisaged to document all the homopterans observed on areca palms, to assess the nature and extent of their damage and their pest status. The natural

enemies of these insects are also being studied. The preliminary findings are given in this paper.

MATERIALS AND METHODS

The study area consisted of plots of areca palms of two-10 years of age located at CPCRI Regional Station, Vittal and plots of farmers in different parts of Puttur Taluk of Dakshina Kannada district. These palms were observed regularly to document all the homopterans and their natural enemies. These insects were classified according to their family characters and wherever possible the genera were determined. The nature of damage caused by the major homopterans were also recorded. The incidence of mealy bugs, two major species of scale insects *viz, Aonidiella orientalis* Newst. and *Corunaspis* sp. and the palm aphid, *Cerataphis* sp.are being recorded at monthly intervals. The data for seven months are presented in this paper. The natural enemies collected on these insects were brought to the laboratory and their predatory/parasitic nature were confirmed.

RESULTS AND DISCUSSION

Scale insects, mealy bugs, white flies and palm aphids are the major homopterans collected from various parts of areca palms. The symptoms of infestation, the damage caused by the feeding of these insects and the extent of damage caused by the major ones are described below.

Armoured scale Insects (Diaspididae) : Six genera of scale insects of the family Diaspididae were collected so far from different plant parts of areca palm. Of these, the Oriental yellow scale, *A. orientalis* and the mussel scale *Corunaspis* sp. were the major ones. *A. orientalis* colonised all green parts of the palm like leaves, leaf sheaths, developing fruit bunches and the green portion of the stem surface near the crown. But the insect developed more quickly on developing fruit bunches and they were abundant from July to November months. *Corunaspis* sp. infested the developing fruit bunches. It's colonisation was uniform on all parts of the bunches. Their population also increased after the monsoon rains. Leaf infestation was very low. All other hard scales collected colonised mainly the leaves and leaf sheaths. They included *Aspidiotus* sp., *Chionaspis* sp. and two other unidentified ones.

The damage caused by continuous feeding of *A. orientalis* and *Corunaspis* sp. resulted in the cracking of the developing fruit surface. The site of the feeding surface turned necrotic. When the colonisation and feeding were severe, the kernels did not develop properly resulting in lower grade dried nuts. The damage on colonized leaves was chlorotic patches which turned necrotic afterwards. The damage done by *Chionaspis* sp. on leaves were more severe on palms with compact crowns.

Scale insects were noted as causing severe damage to areca fruits in the early nineties (Anonymous, 1993, and Anonymous, 1994.) The field incidence and the loss caused by *A. orientalis* were studied by Padmanaban *et al.* (1997). Now one more species has also assumed importance. Both biotic and abiotic reasons can be attributed to the present major status of these cosmopolitan insects. The most important reason was the continuous spraying of endosulfan/dimethoate on areca bunches against tender nut drops in the 1980-90 period by farmers. Though scientific data are not available, when the package of practices followed by farmers were gathered, all mentioned about the regular spraying of insecticides. This could have resulted in an imbalance in the natural ecosystem, resulting in secondary outbreak of scale insects leading to the present condition. Cautious steps are required to restore the balance in nature between the insects and their natural enemy complex consisting of coccinellid predators, parasites and insect pathogens.

Mealy bugs (Pseudococcidae): A species of *Planococcus* and an unidentified species were found colonising the areca palm. They infested the leaves, leaf sheaths, spadices, inflorescences and growing bunches. These mealy bugs were attended to by a species of brownish black ant (to be identified). This ant often made mud nests over the mealy bug colonies, especially on spindle leaves of young palms, the bases of spadices and freshly opened inflorescences. Severe feeding by mealy bugs resulted in necrosis on spindle leaf. Total bunch failure is

also noticed in few instances of spadix / inflorescence infestation.

White flies (Aleyrodidae): An unidentified white fly is emerging as an important insect problem on young areca palms. They were seen colonising only the leaves of areca palms. The feeding resulted in chlorosis. The honeydew produced by this insect favoured the growth of sooty mould; thus impairing with the photosynthetic activity. White flies were not observed on the spindle and the immature leaves.

Palm aphid (Aphididae): The palm aphid of genus *Cerataphi s* was seen infesting the leaves, spadices, inflorescence and fruit bunches having young fertilised female flowers. The symptom of palm aphid infestation was shedding of developing buttons (immature fruits). A species of ant was always associated with this aphid, feeding on the honeydew excreted by them. Of all the homopterans found damaging the areca palm, this aphid caused more direct loss to the crop by feeding on developing buttons resulting in immature fruit drop. The population of palm aphid was more before monsoon season and declined immediately after the rainfall . Though the aphid was reported by earlier workers (Nair and Menon, 1963), the present abundant status of this aphid on areca palm is noticed after a lapse more than 25 years. This aphid was also reported from other palms like coconut (David, 1958; Rajagopal *et al.* 1990), oil palm (Turner, 1974) and Raphia palm (Enobakhare,1994).

Observations are regularly are being taken on the natural incidence of mealy bugs, white flies and aphids in areca ecosystem where the minimum interference through insecticides/fungicides are done. At present, palm aphid and white flies are important insects on young areca plantations.

The natural enemy complex of homopterans: The indigenous natural enemies of all the four homopteran groups are being studied and documented.

Scale insects: When the scale insects became abundant on areca palms, the first and most conspicuous natural enemies appeared are the coccinellid predator, *Chilocorus circumdatus* (Gyll) and a species of predatory thrips, *Aleurodothrips fasciapennis* (Franklin). *C. nigritus* (Fab.) was noticed at a later date and in very few numbers. A phytosciid and a cheylitid predacious mites were also present on all scale insect colonies. The cheylitid mite was found to be more abundant. These mites fed on the all the stages of the scales. *Cybocephalus* sp. (Cybocephalidae) also appeared later feeding on scale insects. Parasitism, caused by two unidentified parasites belonging to Encyrtidae and Aphelinidae were noticed, ranging from very mild to high populations of all scale insect colonies.

Two species of insect pathogens were also noticed under natural conditions infecting *A. orientalis* colonies. The fungus infected all stages of the insects.

Mealy bugs: A species of cecidomyiid was found associated with the mealy bug colonies of *Planococcus* sp. Maggots of this dipteran fed on different stages of the mealy bug. A coccinellid predator, probably *Pseudoscymnus* sp. and a parasite were the other indigenous natural enemies associated with this mealy bug

White flies: An unidentified coleopteran was found predatory on the white flies. The grubs of this predator fed on the eggs and immature stages of this aleyrodid. A species of parasite was also noticed. The larvae of the chrysopid, *Ankylopteryx* sp. was found feeding on the eggs and immature stages of this white fly. This chrysopid, a general predator in areca ecosystem, preys on other pests like palm aphid, phytophagous mites and cocoa aphids.

Palm aphids: Only two predatory insects were noticed on palm aphid colonies so far. One was a syrphid, *Dideopsis aegrotus* (Fab.) maggots of which fed on all stages of the aphid. The second predator noticed was the general chrysopid, *Ankylopteryx* sp. The larvae fed on the immature stages of the aphid. Parasites or other predators were not noticed so far on palm aphid colonies.

Spiders: More than ten species of spiders were encountered so far on areca crowns. Their predatory status on these homopterans are be-

ing studied. Two species of spiders were found more frequently on white fly and aphid colonies.

The indigenous natural enemies could be augmented to manage the host insect populations. Various aspects of the natural enemy fauna of these homopterans are being studied in detail including the biosystematics which is important for any further steps in natural enemy utilisation.

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