A STUDY OF MANGO INSECT PESTS WITH EMPHASIS ON MANGO TWIG BORER, *Nephonoclea* spp. (COLEOPTERA: CERAMBYCIDAE) AND ITS NATURAL ENEMIES

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ABSTRACT

The succession of mango insect pests with emphasis on mango twig borer and its natural enemies in relation to mango penology was determined under Central Luzon State University and farmer's field conditions. Visual and destructive sampling were used for monitoring of mango twig borer's adult and larva respectively. Mobile mango insect pests and natural enemies were monitored using insect net, while immobile insects including the immature ones were monitored visually. Small insects and other arthropods were collected by tapping the branches underneath a white material. Nocturnal and flying insects were monitored through the use of yellow sticky trap. Twenty branches from each stratum, ten from inner and ten from outer branches were used as samples. Weekly monitoring was done in each location.

Result showed that at CLSU condition, the occurrence of mango twig borer started at flushing or nine to ten months before flower induction (90 to 300 DAFI) up to pre –opening of flower (26-29 DAFI). No mango twig borer was found during flower opening to blooming stages (15-22 days after bud break or 36 DAFI). Population was higher at the middle strata of the outer branches of canopy. Under farmer's field condition, no twig borer was observed at pre-opening up to fruit set stages.

Other mango insect pests observed under farmer's field and CLSU conditions were corn silk beetle, mango hopper and fruit flies. Corn silk beetle occurred during flushing stage. Mango hopper appeared from bud break (7-12 DAFI) until fruit setting (39-49 DAFI) while fruit flies were noted from fruit setting to fruit maturity (49-120 DAFI). Seed borers were observed from fruit setting to fruit development up to harvesting.

Natural enemies such as *Eucophyla smaragdina*, lace wings, staphylinid beetle praying mantis, spiders and wasps were also observed throughout the growing period of the crop. But as to what specific insect pest they predate or parasitized was not determined.

Keywords: Mango twig borer, *Nephonoclea* spp. Coleoptera, Cerambycidae, natural enemies, *Mangifera indica*

1. INTRODUCTION

Mango is one of the top export products of the Philippines. The Department of Science and Technology (DOST) realize that mango is an export winner crop, hence, given the utmost priority has been given to maintain global competitiveness [1, 2]. To attain this goal, the crop should be protected from pests which contribute greatly to the reduction of fruit quality as well as harvest quantity. Carabao mango, one of the world's most popular varieties is beset with noxious pests. The major ones include the mango hoppers, twig cutter, seed borer, tip borer and fruit flies.

Twig borer (*Nephonoclea* spp. Coleoptera: Cerambycidae) is a major pest of mango. This may not affect the quality per se but the quantity of harvested fruits [3]. The pest is destructive during shoot and flower development stage. The larvae bore into the tip of shoots and flowers which result in wilting and eventual death of the attacked parts. At present, insecticides and pruning of the affected parts are only the remedy/ solution against this insect. To control the larvae, systemic insecticides and proper timing of application are required. However, the main problem, with insecticides is that they pose environmental hazards including threat to human health [4].

The possible natural enemies associated with mango insect pests especially mango twig borer have not yet been identified.

In an effort to develop a sustainable management strategy for mango insect pests specially twig borers, this study was conducted to monitor the succession of insect pests of mango with emphasis on mango twig borer and their natural enemies.

2. MATERIALS AND METHOD

A total of 24 mango trees (12 at CLSU and 12 at farmer's field) were used in this study. Mango trees with an age range of 5-10 years old were randomly marked to distinguish them as experimental trees. Experimental trees were protected only when severe infestation of mango hopper was observed.. Monitoring commenced in September 2001 that was one week after fertilizer application and every week thereafter and was stopped in August 2002. Sweep method of monitoring was done for mobile insects, while beating of ten twigs over a white material was used in monitoring thrips and other tiny arthropods. For immobile insects and other arthropods which includes the immature stage, monitoring was done by counting the individual insects. However, for insect like red ants, nests built was counted. Weekly placement of 12 pieces coupon bond size ply wood painted yellow sticky traps was likewise

undertaken to monitor nocturnal insect and other arthropods. Mango seed borer was monitored by collecting damaged fruits.

Monitoring activity was performed for the different strata of the mango canopy, i.e. upper, middle and lower strata and at inner (one meter long from the outer portion of the branch) and outer portion of each stratum at different growth stages of the mango tree. Growth stages were based on days before and after flower induction (DBFI and DAFI), such as flushing, shoot development ,bud break, bud elongation pre-opening, flower opening and blooming, fruit setting, fruit development and fruit maturity.

Twenty randomly selected twigs per stratum, ten from inner and ten from outer portions of the branches were used as samples. Immature stages which were difficult to identify was sent to the laboratory for proper identification. Likewise, unidentified insects were brought to proper authority for identification. Standard cultural practices and management for mango production were followed except for insecticide application. Meteorological data was taken at the PAG-ASA based at CLSU.

3. RESULTS AND DISCUSSION

Result of the monitoring on the succession of insect pests with emphasis on mango twig borer under CLSU and farmers' field conditions showed that the occurrence of mango twig borer started from flushing (90-300 DBFI) up to pre-opening stage (26-29 DAFI) with a total of 112 individuals (adult and larvae) while at fruit development to maturity (90 - 120 DAFI) 322 individuals (232 larvae and 90 adults) were detected. It was also found that the occurrence of the pest was higher at the outer branches of the middle strata (259) than at the outer and inner branches of the lower and upper strata (63). Their population slowly diminished and none were detected during flower opening to fruit set. Since some of the branches of the experimental trees did not bear fruits, these branches started to flush, hence adult of the pest was observed again at fruit development to maturity. In this case some branches were on their flushing and shoot development stage and higher population was noted .

On the other hand, corn silk beetle appeared at flushing stage (90-300 DAFI) and mango hopper occurred together with mango twig borer at 7-12 DAFI or bud break and lasted until fruit set up to harvest. Mango seed borer and fruit flies were likewise observed at fruit setting to harvest. Most of the pests were observed at the outer branches of the middle strata of the mango canopy.

Natural enemies observed were the red ants *Eucophyla smaragdina*, praying mantis, staphilinid beetle, lace wings and spider. Their occurrence and succession showed that most of

them are present in all the crop penology. But as to what specific insect pest they predate or parasitized was not determined.

4. CONCLUSION

Nephonoclea spp. is prevalent at almost all stages of the crop unlike other mango insect pests. Knowing the occurrence of these pests in certain locations will serve as a guide for farmers to effectively control them. Presence of the natural enemies in the mango ecosystem can help reduce the population of the mango insect pests.

5. ACKNOWLEDGEMENTS

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