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CURRENT STATUS OF PAPAYA MEALY BUG, *PARACOCCUS MARGINATUS* (HEMIPTERA: PSEUDOCOCCIDAE) PARASITISM BY *ACEROPHAGUS PAPAYAE* IN SELECTED AREAS OF SRI LANKA

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ABSTRACT

Papaya Mealy Bug, *Paracoccus marginatus* is an invasive pest causing damage to more than 60 crops worldwide. With the invasion of the pest into Sri Lanka in 2008, the pest rapidly distributed over the island and destroyed more than 40 plant species. *Acerophagus papayae*, an efficient, exotic parasitoid of the papaya mealy bug, *Paracoccus marginatus* was imported from Puerto Rico and released to the field in 2009 to control the outbreak of papaya mealy bugs. The pest population was controlled by 98% within 3 months of the release of the parasitoids. Five years after the release of the parasitoids, pest damage tends to increase in localized areas of the Island. This study aimed at identifying the post-release efficiency of the parasitoids in controlling the papaya mealy bugs. The efficiency of parasitization was ranged from 11% to 100% in different locations. Depending on the results, a programme was planned for mass rearing and releasing the parasitoid into areas where pest outbreaks occur during 2015.

Key words: Papaya mealy bug, *Paracoccus marginatus*, parasitism, *Acerophagus papaya.*

INTRODUCTION

The papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink, is a hemipteran insect pest that attacks more than 60 species of host plants all over the world, including economically important tropical fruits and ornamentals (Walker, Hoy and Meyerdirk, 2014). It was discovered in Manatee and Palm Beach counties in Florida in 1998 and subsequently spread rapidly to many other countries all over the world. It potentially poses a threat to numerous agricultural production systems if not controlled. The papaya mealy bug was first noticed in Sri Lanka in 2008 and subsequently spread rapidly all over the island, destroying many agricultural crops. It infested more than 40 host-plant species in Sri Lanka while mainly damaging to papaw crops (Galanihe *et al.*, 2010).

Biological control was identified as a key component of integrated management programme for the papaya mealybug, and a classical biological control program was initiated in 2009 by introducing an exotic parasitoid *Acerophagus papaya* Noyes and Schauff. Parasitoids were obtained from the USDA-APHIS parasitoid-rearing facility at the Puerto Rico Department of Agriculture. The parasitoid was initially released into 21 selected locations and the mealy bug outbreak was successfully controlled in those locations reducing the population level by 95-100% within a period of one month (Anon, 2009).

Within past few years, papaya mealy bug have damaged papaw crops in many locations in the island mainly during the dry periods having warm climatic conditions. This weather was prevailing in between the two rainy seasons. Although the mealy bug infestation was not spreading to other areas, these localized mealy bug populations build up caused heavy damage to the papaw crops in particular locations.

Therefore, this study was conducted with the objective of estimating the current level of parasitism of mealy bug by exotic parasitoid that was released to the field in 2009 in the areas where pest outbreaks were reported recently.

MATERIALS AND METHODS

Ten random samples of papaya mealy bug infested fruits were collected from the papaw fields that were reported to have damaged in 12 locations (Kurunegala, Hamangalla, Alabadagama, Pillassa, Arambekade, Narammala, Kahatagasdigiliya, Suriyaweva, Andiyagala, Kalpitiya, Ambepussa and Katunayake) during 2013. The parasitized mealy bugs were identified by brown to black discolouration and by developed mummies of the nymphs. Number of parasitized mealy bugs and total number of mealy bugs were counted on 10 sq. cm. area of each of three infested fruits, observing under a dissecting microscope. Percentage of parasitized mealy bugs in each location was calculated using these data.

RESULTS AND DISCUSSION

Papaya mealy bug samples collected in all the locations had parasitised mealy bugs by *Acerophagus papayae.* Percentage parasitism in the samples

collected from Kurunegala district were the lowest ranging from 11.0% to 44.7% (Figure1). Samples from the locations in the dry zone were ranged from 60.5% to 100%. This clearly shows that the parasitoid is capable of controlling the pest. However, the level of parasitism is different among locations but reasons for such differences are unknown. Hence, it is important to find out the reasons for the low parasitisation in the particular locations. This may probably be due to differences in farmers practices in controlling the pest.

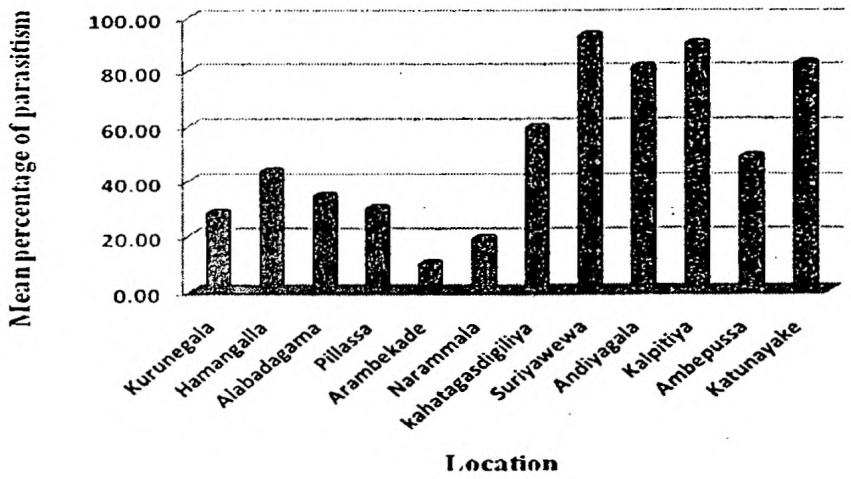

Fig.1 The level of parasitism of papaya mealy bug, *Paracoccus marginatus* by the exotic parasitoid, *Acerophagus papayae* in different locations during 2013.

The parasitoid, *Acerophagus papayae* is highly specific in its host. It parasitizes only the species *Paracoccus marginatus*. If any other mealy bug species infestation occurs, farmers may require use of an insecticide to control the pest. Use of insecticides to control papaya mealy bugs is detrimental to the parasitoids, which ultimately lead to the pest outbreaks in those areas. Hence, educating farmers on identification of papaya mealy bugs separately from other mealy bug species is important in improving their knowledge on deciding the control measures to be used. It is also important to find out if there are any other factors that affecting the level of parasitism. There may be hyperparasitism occurs if hyperparasites of the *Acerophagus papayae* are available in Sri Lanka. Three species of hyperparasitoids, namely *Chartocerus* sp., *Marietta leopardina* and *Cheiloneurus* sp., were recorded in Malaysia (Mastoi *et al.*, 2014).The *Cheilonerus* spp. are reported as a common secondary parasitoid infesting mealy bug species in Asia (Mastoi *et al.*, 2014). Four hyperparasitoid species were reported in Pakistan (Hakim Ali Sahito, Unpublished). A low incidence of two hyperparasitoid species

(*Eunotus* sp. and *Procheiloneurus dactylopii*) were reported in Palau. Further studies are needed to find out the reasons for low level of parasitism in certain locations. Mass rearing and release of the parasitoid to the locations where localised pest outbreaks occur need to be done in future.

CONCLUSION

Level of parasitism of papaya mealy bugs varies among locations due to unknown reasons. In certain locations, the percentage of parasitism was 100% showing the efficiency of the introduced exotic parasitoid, *Acerophagus papayae*.

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