



Research Note

Classical biocontrol of papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink in Kerala using the parasitoid, *Acerophagus papayae* Noyes and Schauff (Hymenoptera: Encyrtidae)

K. R. LYLA*, M. S. SINISH, C. V. VIDYA and MANI CHELLAPPAN

AICRP on Biological Control of Crop Pests & Weeds, College of Horticulture, Kerala Agricultural University

AINP on Agricultural Ornithology, Vellanikkara

* Corresponding author E-mail: lylaramakrishnan@yahoo.com

ABSTRACT: Papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera: Pseudococcidae) was first observed in Kerala during 2009. It was found infesting on papaya, mulberry, brinjal, tomato, cowpea, jack, plumeria, hibiscus, ocimum, raulfia, teak and rubber. *Acerophagus papayae* Noyes and Schauff (Hymenoptera: Encyrtidae) was mass reared and released @ 25-100 nos. / plant in Thrissur and Ernakulam districts of Kerala. Before the release of the parasitoid the incidence was above 60 per cent and intensity was medium to very high. A rapid survey carried out in the released areas showed that the percentage of infestation came down to below five and intensity of infestation was medium to very low. In other districts the incidence was low with the activity of *A. papayae*

KEY WORDS: Papaya mealybug, *Paracoccus marginatus*, *Acerophagus papayae*, Kerala

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Papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera: Pseudococcidae) was observed in Kerala during 2009 and was first reported on papaya during 2010 (Lyla and Philip, 2010). Severe incidence of the pest was observed on mulberry plants (Krishnakumar and Rajan, 2009). It was found infesting on brinjal, tomato, cowpea, jack, *Plumeria*, hibiscus, ocimum, raulfia, teak, rubber and parthenium (Chellappan, 2010).

In Kerala, despite the use of water spray and chemicals the incidence of *P. marginatus* on papaya plants was severe, necessitating the use of biological control agents.

Survey on papaya mealybug

Surveys on papaya mealybug and their natural enemies were carried out during October–November months, 2010 from randomly selected villages of different districts of Kerala. Twenty five randomly selected plants from each village were surveyed and the incidence recorded in a scale of 1–5 (1 – very low, 2 – low, 3 – medium, 4 – high and 5 – very high). During the survey it was found that above 60 per cent of the papaya plants were infested with the mealybug and

the intensity of damage ranged from medium to very high (grade 3 to 5). The mealybug infested garden plants like hibiscus and *Plumeria*. Mulberry plants in three districts of Kerala – Idukki, Wayanad and Palakkad were also infested with *P. marginatus*.

Three exotic parasitoids, *Acerophagus papayae* Noyes and Schauff, *Anagyrus loeckii* Noyes and *Pseudleptomastix mexicana* Noyes and Schauff (Hymenoptera Encyrtidae) were received from National Bureau of Agriculturally Important Insects (NBAIL, Bangalore during October, 2010.

Among them, *A. papayae* was multiplied in the laboratory on potato sprouts containing immature stages of *P. marginatus*. Mature potatoes with eyes were collected, washed in water to remove the dirt and disinfected using five per cent sodium hypochlorite solution. A slight incision was made in the eye free area of potato and treated with gibberlic acid 100 ppm solution for half an hour. The treated potatoes were air dried and sown on moist sand in plastic basins and covered with black cloth. The potatoes were infested with *P. marginatus* females with ovisacs. Males can be easily identified from 4th instar onwards by their long and slender nature with well developed wings in adults. Sprouted

potatoes with mealybugs were placed in cages and *A. papayae* were released for egg laying. After 20 days, *A. papayae* adults were collected from cages for field releases. Papaya seedlings were also used for the multiplication of *A. papayae*.

State level release of the parasitoid was made at Krishi Vygyan Kendra, Malappuram on 09-12-2010 and supplied the parasitoid to farmers from different parts of Kerala. The adults of *A. papayae* were released @ 25 to 100 nos/plant depending upon the intensity of mealy bug incidence. During February – March 2012, a random survey was carried out in different districts of Kerala and the results indicated drastic reduction in the incidence of *P. marginatus* with the good activity of *A. papayae* (Table 1). The percentage of infestation came down to below five and intensity of infestation was medium to very low. Similar results were observed in Maharashtra (Nakat *et al.*, 2010), Karnataka (Shylesha

et al., 2010) and Tamil Nadu (Kalyanasundaram *et al.*, 2010). During 2009, the incidence was very severe throughout Kerala. The timely release of the parasitoid during 2010 suppressed the population of *P. marginatus* and the parasitoid persisted in the field even eighteen months after release.

The parasitoid emergence from the random samples drawn from different locations of Thrissur and Ernakulam district revealed that the emergence of parasitoids ranged from 18 to 75 depending on the severity of incidence of *P. marginatus* (Table 2).

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Table 1: Survey for the incidence of *Paracoccus marginatus* and *Acerophagas papayae* in different locations at Kerala

No. of villages covered in each district	% infested plants	Infestation grading	Incidence of <i>A. papayae</i>
Thrissur – 10	2.2	Low – Medium	Present
Ernakulam – 4	3.7	Low – Medium	”
Palakkad – 4	1.6	Very low	”
Malappuram – 6	3.1	Very low	”
Wayanad – 6	1.5	Very low	”
Kozhikkode – 4	1.6	Low	”

Table 2: Incidence of *Paracoccus marginatus* and *Acerophagas papayae* at Thrissur and Ernakulam

Location	Mealybug infestation (Grading)	<i>A. papayae</i> emerged/ 30 cm ² leaf area
Thrissur		
1	Medium	55
2	Medium	75
3	Low	18
4	Medium	41
5	Medium	48
Ernakulam		
1	Medium	33
2	Low	18
3	Medium	64
4	Medium	38
5	low	11

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