

## Sudden outbreak of mealybug and armoured scale causing severe damage to economic crops in Bangladesh

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### ABSTRACT

Recently attack of different vegetable crops viz., eggplant, lady's finger, papaya, basil etc. by citrus mealybug, *Planococcus citri* (Risso) (Homoptera: Pseudococcidae) has been noticed in Bangladesh. It is mainly a pest of citrus and coffee crops but now it has become polyphagous in nature. Based on laboratory studies on immature and mature fruits of lady's finger; the total period of all four nymphal stages lasted for  $32.6 \pm 4.17$  days at an average room temperature of  $28 \pm 2^\circ\text{C}$  and 70-75% RH during September, 2009. Male mealybug has a short life span of  $3.0 \pm 0.21$  days. Females live for nearly  $80.7 \pm 10.43$  days with an oviposition period of approximately 21 days. This mealybug is capable of active movement throughout its adult life. The stripped mealybug, *Ferrisia virgata* (Cockerell) was found to infest the leaves of different ornamental plants in Rajshahi and Dhaka, Bangladesh. It is a polyphagous pest damaging coffee, sweet potato, jute, groundnut, tomato, citrus, cotton, guava etc. causing enormous damage to them. The female lays about 300-400 eggs which hatch in few hours. The life cycle is completed in about 40 days. The small and big black ants tend *F. virgata* and they keep other insects including hymenopteran parasites away from the mealybug. The cottony cushion scale, *Icerya purchasi* Mask. (Homoptera: Margarodidae) is a soft-bodied mealybug infesting guava leaves all over Bangladesh. It is reddish-brown and lays up to 600-700 eggs during her lifetime. The life cycle is completed within 46-240 days depending on different environmental conditions. The females develop parthenogenetically. It is a sucking pest and mainly feeds on citrus. Its secondary hosts include fig, apple, almond, guava etc. Due to severe infestation, premature falling of leaves occurs. The ber or plum scale, *Aonidia ziziphi* Rah. was recorded from Rajshahi, Bangladesh as a serious pest of ber or plum plant damaging the leaves and immature fruits during December-January, 2007. The female reproduces parthenogenetically. Due to severe attack of mealybug, the pericarp of immature fruit is damaged to some extent and it becomes unfit for human consumption and market value is greatly reduced.

**Keywords:** Mealybug, *Planococcus citri*, armoured scale, *Aonidia ziziphi*, life cycle, maphometric studies.

### Introduction

The citrus mealybug, *Planococcus citri* (= *Pseudococcus citri*) (Risso) (Homoptera : Pseudococcidae) is a serious pest of citrus plants in tropical countries of South Asia (Satyanrayanas & Reddy 1994) . It attacks almost every flowering plant (Bartlett 1978). This citrus mealybug is a vector of swollen shoot disease of cocoa and tobacco (Hill 1983, Newton 1953). Mealybug infestation often allows the entry of fungi that may cause internal rotting of the fruit (Furness 1991).

The stripped mealybug, *Ferrisia virgata* (= *Ferrisiana virgata*) (Cockerell) is a destructive and polyphagous pest damaging foliages and

young shoots of coffee, sweet potato, jute, groundnut, tomato, citrus, cotton, guava, ornamental plants, etc. causing heavy damage to them (Hill 1983, Pelley 1968). Adult female covered with powdery white wax and bears a pair of purplish dorsal stripes along the back and there are two long wax tails. The female lays 300-400 eggs which hatch in few hours. The life cycle is completed in about 40 days. *F. virgata* tends small and big black ants and they keep other insects including hymenopteran parasites away from the mealybug (Ahmed *et al.* 2008). According to Alam (1967), the cottony cushion scale, *Icerya purchasi* Mask. (Homoptera: Margarodidae) is a soft bodied mealybug infesting guava leaves all over Bangladesh. It is

reddish brown and female possess white fluted egg sac secreted by her. It oviposits up to 600-700 eggs during her lifetime. The life cycle is completed within 46-240 days depending on environmental conditions. The ber or plum scale, *Aonidia ziziphi* Rah. was recorded from Rajshahi, Bangladesh as a serious pest of ber or plum plant damaging the leaves and immature fruits. It reproduces through parthenogenesis. The present paper deals with sudden outbreak of mealybug and armoured scale in brinjal, lady's finger and plum including their damage potential and some aspects of biology.

### Materials and Methods

The citrus mealybug, *Planococcus citri* (Risso) was reared on immature lady's finger fruit in the laboratory at a room temperature of 24-28°C during September, 2009. The culture of stripped mealybug, *Ferrisia virgata* (Cockerell) was maintained by supplying fresh shoot of ornamental plants in the laboratory under laboratory conditions. The mass culture of cottony cushion scale, *Icerya purchasi* Mask. made by supplying fresh tender leaves of guava plants. All these adult mealybugs deposited their eggs in white waxy sacs chiefly at the axils of branching stem or leaves. Room temperature and relative humidity were recorded daily and the Morphometric studies were undertaken at an average room temperature of  $28 \pm 2^\circ\text{C}$  and 70-75% R.H. The different developmental stages of these mealybugs were presented in 80 % ethanol with a drop of glycerine for future study.

### Results and Discussion

It is evident from the present study that *P. citri* attacked immature and mature fruits of eggplant and lady's finger in the research field of BCSIR Laboratories, Dhaka, Bangladesh. The total life cycle of this mealybug elapsed for  $32.6 \pm 4.17$

days during September, 2009. After 7 days, the eggs hatched and young mealy bugs began to spread over the immature and mature fruits of lady's finger and eggplant. Due to severe attack of this mealybug, the entire eggplant fruit appeared to be a spherical ball because of its crowding nature. It passes through four nymphal stages to become adult. The 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> nymphal stages lasted for  $9.5 \pm 1.35$ ,  $8.3 \pm 1.12$ ,  $2.5 \pm 0.30$  and  $3.2 \pm 0.05$  days respectively (Table 1). Male mealybugs live for  $4.0 \pm 0.05$  days after the final nymphal moult. The average longevity of female mealybug is  $80.7 \pm 10.43$  days. Eggs are laid in cluster covered by ovisac threads. The mass culture of *P. citri* was made of sprouted potatoes (Islam *et al.* 2004). According to Varshney (2000), *P. citri* is a minor pest of citrus, pigeon pea and black pepper in Tripura, India. This insect has two forms, a root from which attacks the roots of its host and an aerial form that attacks the foliage and fruit (Ahmad *et al.* 2008). This mealybug is capable of active movement throughout its adult life. The photograph of *P. citri* attacking lady's finger is shown in Fig. 1.





**Fig1.** *P. citri* attacking lady's finger

The stripped mealy bug, *F. virgata* was found to infest the leaves of different ornamental plants in Rajshahi and Dhaka, Bangladesh. Adult female is covered with powdery-white wax and bears a pair of purplish dorsal stripes along the back. Female laid 300-400 eggs. Nymphal stage lasted for six weeks. The life cycle takes about 40 days. According to Atwal (1976) *F. virgata*, is generally found under the calyx of fruits and cause scarring. During study period, it was observed that natural enemy ants often tend the mealybugs. Parasites and coccinellid beetles are found in association with this pest.

The cottony cushion scale, *I. purchasi* is recorded from the infested guava leaves from Dhaka, Bangladesh during March, 2009. It is a soft-bodied, reddish brown insect. The female bears white fluted egg sac secreted by her. It oviposits up to 600-700 eggs during her lifetime. The life cycle is completed within 46-240 days depending on different environmental conditions (Atwal 1976). According to Alam (1967), *I. purchasi* is a pest of citrus leaves in Sylhet. It is a sucking pest mainly feeds on citrus. Its secondary hosts include apple, almond, walnut, fig, grapevine etc. The photograph of this mealybug is given in Fig.2.

The armoured scale, *Aonidia ziziphi* Rah. (Homoptera: Diaspididae) was recorded from damaging immature ber fruit during December-January, 2007. Adult females are specialized by the absence of antennae and legs. Its body is covered with hard waxy scale. Anal ring bears 2 setae. The female reproduces parthenogenetically. Due to severe attack of this mealybug, the pericarp of mature fruit is damaged to some extent. The fruit becomes





**Fig 2.** The cottony cushion scale, *I. purchasi* attacking Guava leaves

unfit for human consumption and market value is greatly reduced. The photograph of this mealybug is shown in Fig.3.



**Fig 3.** The armoured scale, *Aonidia ziziphi* attacking ber fruits and leaves.

**Table 1.**

Morphometric studies on the citrus mealybug, *P. citri*

| Life stages                   | Duration (days) $\pm$ S.D.        |
|-------------------------------|-----------------------------------|
| Egg                           | 5.0 $\pm$ 1.10                    |
| 1 <sup>st</sup> nymphal stage | 9.5 $\pm$ 1.35                    |
| 2 <sup>nd</sup> nymphal stage | 8.3 $\pm$ 1.12                    |
| 3 <sup>rd</sup> nymphal stage | 2.5 $\pm$ 0.30                    |
| 4 <sup>th</sup> nymphal stage | 3.2 $\pm$ 0.25                    |
| Pupa                          | 4.0 $\pm$ 0.05                    |
| <b>Total life cycle</b>       | <b>32.6 <math>\pm</math> 4.17</b> |
| Longevity (adult male)        | 3.0 $\pm$ 0.21                    |
| Longevity (adult female)      | 80.7 $\pm$ 10.43                  |

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