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First Record of *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) on *Hibiscus rosa-sinensis* in Nigeria

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Abstract: A survey of mealybugs found in the southern guinea savanna of Nigeria was conducted and *P. solenopsis* was found on *Hibiscus rosa-sinensis* plant where the adult aggregated on the stem of the plant. Specimen of this was sent to Systematic Entomology Laboratory in the U.S and was identified by Douglas Miller (the editor of scale insect forum). The adult recovered were females and the mouth part is the opisthorhynchous type with a long straight aseptate stylet. The organism was host specific and stationary. The tip of the abdomen was protruded with long setae. Various body appendages were measured and the life cycle studies conducted. Comparison between this mealybug and other related species was done and documented for the first time in Nigeria.

Key words: *Hibiscus rosa-sinensis*, *P. solenopsis*, organism, Nigeria

INTRODUCTION

Phenacoccus solenopsis is a pest of ornamental and fruit trees world wide and it is known to be cryptic in nature. It was described originally from the U.S. in 1898 and it remained there where it is widespread, until 1992 when, it was reported in Central America, the Caribbean and Ecuador (Williams and Granara de Willink, 1992; Ben-Dov, 2004d). It occurrence in other areas is not surprising because insects that were previously found in a particular area are now occurring in other new geographic areas where they are believed to have been introduced. It is uncertain if this sequence of spread represents a true, recent expansion in geographic distribution of the species from North America to South America or is simply a coincidence of collection and identification efforts. Larraín (2002) recently noted *P. solenopsis* as a pest of *Solanum muricatum* in Chile while its existence was reported for the first time in Brazil on tomatoe plant (Mark and Gullan, 2005) and Information on the occurrence and distribution is limited. This mealybug has been found previously on a relatively wide variety of host plants including species in economically important families such as Cucurbitaceae and Fabaceae as well as Solanaceae, however, Williams and Granara de Willink (1992) noted that *P. solenopsis* is very similar in appearance (microscopically) to *P. solani* Ferris and *P. defectus* Ferris. In another study conducted, for example, by Santa-Cecília *et al.* (2002), the presence of 2 species of mealybugs that had not previously been known to occur on coffee in Brazil was documented and they noted further that there was need for additional survey and taxonomic studies on such pests in the area.

In this study, a survey of mealybugs found in the southern guinea savanna of Nigeria was conducted and *P. solenopsis* was found on *Hibiscus rosa-sinensis* plant where they aggregated on the stem of the plant. Specimen of this was sent to Systematic Entomology Laboratory in the U.S and was identified by Douglas Miller (the editor of scale insect forum).

This purpose of this study is to describe this new species which has not been reported in Nigeria before, while this research is however, part of a wider study of mealybug types in the particular ecological zone of Nigeria.

MATERIALS AND METHODS

Slide preparation: Each developmental stage was treated and prepared on a slide according to the method of Mckenzie (1967). Body length and width, Lengths of Prothoracic, mesothoracic and metathoracic legs, antenna and stylet were taken in millimeter with the aid of a microscope (Periplan G.F 50/60HZ model 12.5X/16MF) fitted with a micrometer eye piece.

Life cycle: The life history was determined as well as the instar durations (stadia) in days and documented for each

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developmental stage Data obtained were subject to t-test analysis while mean and standard error was calculated.

RESULTS AND DISCUSSION

Adult: The adult recovered were females. They were oblong in shape and light to dark yellow in appearance. Adult has a total body length ranging between 15.61 mm and 18.01 m ($\bar{X}$ = 16.81±1.20 mm) n = 20 and the body width ranging between 10.33 and 11.59 mm ($\bar{X}$ = 10.96±0.63 mm) n = 20. The head also has a pair of 7 to 8 segmented filiform antenna having a length range from 2.21 to 2.49 mm ($\bar{X}$ = 2.35±0.14 mm) n = 20. The mouth part is the opisthorhynchous type with a long straight aseptate stylet with a length range of 0.84 to 1.68 mm ($\bar{X}$ = 1.25±0.14 mm) n = 20. The thorax and abdomen forms the widest part of the body. The metathoracic pairs being the longest with an average length of 4.79 to 5.21 mm ($\bar{X}$ = 5.00±0.21 mm); Prothoracic and mesothoracic legs length of 3.91 to 4.19 mm ($\bar{X}$ = 4.05±0.14 mm) n = 20 and 4.15 to 4.49 mm ($\bar{X}$ = 4.32±0.17 mm) n = 20, respectively. The tip of the abdomen was protruded.

Egg: Not observable

1st instar: It is oblong in shape and yellow in colour. It is devoid of mealyscale cover and hence conspicuously orange. The total body length range between 11.07 and 13.47 mm ($\bar{X}$ = 12.27±1.20 mm) n = 20 while the body width range between 0.11 mm and 1.37 ($\bar{X}$ = 0.74±0.63 mm) n = 20. The head has 2 filiform 7 to 8-segmented antennae with a length range of between 1.39 and 1.67 mm ($\bar{X}$ = 1.53±0.14 mm) n = 20. The mouthpart is conspicuous and modified into a stylet of the length range from 0.95 to 2.99 mm ($\bar{X}$ = 1.97±1.02 mm) n = 20. The prothoracic, mesothoracic and metathoracic legs which had the ranges and mean values of 3.94 to 4.22 mm ($\bar{X}$ = 4.08±0.14 mm); 4.34 to 4.68 mm ($\bar{X}$ = 4.51±0.17 mm) and 4.74 to 5.16 mm ($\bar{X}$ = 4.95±0.21 mm), respectively n = 20.

2nd Instar: Shape is oblong and it is yellow in colour. The body lacked mealywax secretion. The total body length range was between 11.82 and 14.22 mm ($\bar{X}$ = 13.02±1.20 mm) n = 20 while its body width ranges between 7.39 and 8.69 mm ($\bar{X}$ = 8.02±0.63 mm) n = 20. The head carry 2 eyes and 2 filiform 7-segmented antennae. Antennal length varied between 1.33 and 1.61 mm ($\bar{X}$ = 1.47±0.14 mm) n = 20. The mouthpart was represented by a long straight stylet with a range of 1.06 and 1.88 mm ($\bar{X}$ = 1.47±0.41 mm) n = 20. The thorax had 3 pairs of legs with metathoracic leg being the longest, i.e., with a range of 4.44 to 4.46 mm ($\bar{X}$ = 4.65±0.21 mm) n = 20. This is followed by the mesothoracic leg with a range and mean of 3.95 to 4.29 mm ($\bar{X}$ = 4.12±0.17 mm) n = 20 mesothoracic leg and 3.86 to 4.14 mm ($\bar{X}$ = 4.00±0.14 mm) n = 20 for prothoracic leg. The tip of the abdomen is protruded and has 2 setae.

3rd instar: It is dark yellow in colour and oblong in shape. The total body length range between 12.50 and 14.97 mm ($\bar{X}$ = 13.77±1.20 mm) n = 20, while the body width range between 8.49 and 9.75 mm ($\bar{X}$ = 9.12±0.63 mm) n = 20. The antenna is straight, filiform and 7-segmented, pointing forward with a mean length of 1.24±0.14 mm and a range of 1.10 to 1.38 mm (n = 20). The mouth was conspicuous and modified into a stylet of mean length of 1.23±0.41 mm and a range of 0.82 mm and 1.64 (n = 20). The thorax had 3 pairs of limb i.e., prothoracic, mesothoracic and metathoracic with the length range as 3.86 to 4.14 mm ($\bar{X}$ = 4.00±0.41 mm), 4.15 to 4.49 mm ($\bar{X}$ = 4.32±0.17 mm) and 4.27 to 4.69 mm ($\bar{X}$ = 4.18±0.21 mm), respectively n = 20.

Life cycle: There are three nymphal and the adult stages. The total number of days from egg to adult (longevity) was 37 days.

1st instar: This stage lasted about average of 6 days, the organism lacked permanent feeding sites because of high motility.

2nd instar: This Stage lasted 8 days. The feeding site was fairly at the adaxial surface but mostly the individuals aggregated on the stem of the host plant.

3rd instar: This lasted 10 days and there was the appearance of white cottony substance covering the entire body. Each started to moult on the 7th day of the stadium. It was stationary on the stem where it fed and sheltered. Adult stage last 7 ZX days, the entire body is covered with white mealy substance. The organism was host specific and stationary. They aggregated to appear as a white rap of cotton and attached to the stem. Colonies were found on the abaxial of the leaf surface of the host. The tip of the abdomen was protruded with long setae.

Though, Miller *et al.* (2005a) found that the live appearance of *P. solenopsis* differed from the other two species of *Phenacoccus* earlier mentioned in that its female adult generally had paired dark spots and/or stripes dorsally, whereas the females of the other 2 species appeared to be uniformly white dorsally, this was not observed on *P. solenopsis* in this study. He noted

further that *P. solenopsis* usually has short lateral wax filaments and slightly longer terminal wax filaments (less than half as long as the body) same was observed in this study. The morphological variation observed was suspected to be due to some un-identified ecological reasons.

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REFERENCES

Ben-Dov, Y., 2004d. ScaleNet, *Phenacoccus solenopsis*. Available from: http://198.77.169.79/catalogs/pseudoco/Phenacoccussolenopsis.htm.

Larraín, P., 2002. Incidencia de insectos y ácaros plagas en pepino dulce (*Solanum muricatum* Ait.) cultivado en la IV Región, Chile. *Agricultura Técnica*, 62: 15-26.

Mark, P.C. and P.J. Gullan, 2005. A new pest of tomato and other records of mealybugs (Hemiptera: Pseudococcidae) from Espirito Santo, Brazil. ZOOTAXA, 964: 1-8.

Mackenzie, H., 1967. Mealybug of California with taxonomy, biology and control of North America Sp. University of califonia press. Berkeley and Los Angeles, pp: 526.

Miller, G.L., D.R. Miller, E.M. Limones, R.J. Gill and R.W. Carlson, 2005a. The United States National Collection of Scale Insect Availablefrom:http://www.sel.barc.usda.gov:591/scale_slide/slide_frame.htm.

Santa-Cecilia, L.V.C., P.R. Reis and J.C. Souza, 2002. About the nomenclature of coffee mealybug species in Minas Gerais and Espírito Santo States, Brazil. [Sobre a nomenclatura das espécies de cochonilhas-farinhentas do cafeeiro nos Estados de Minas Gerais e Espírito Santo.] *Neotropical Entomology*, 31: 333-334.

Williams, D.J. and M.C. Granara de Willink, 1992. *Mealybugs* of Central and South America. CAB Int. Lon. Eng., pp: 635.