IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 10, Issue 10 Ver. III (October 2017), PP 25-28
www.iosrjournals.org

Study of Some Biological Parameters of Mealyubg *Phenacoccuc solenopsis* (Tinsley) (Hemiptera: Pseudococcidae) As an ExoticPest on*Hibiscus rosa-sinensis* In Iraq.

[*]Shaymaa Hameed Al-Obaidy[1], M.S.Abdul-Rassoul[2], Nidhal Abdulhadi Jaafar[1]
[1]*(DepartmentOf Plant Protection, College Of Agricultuer/ University Of Baghdad, Iraq)*
[2]*(Iraq Natural History Research Center and Museum / University Of Baghdad, Iraq)*
Corresponding Author: Dr.Shaymaa Hameed Al-Obaidy

Abstract: *The biology of cotton mealybug Phenacoccus solenopsis (Tinsley) was studied when the insect collected from HibiscussRosa-sinensis plant in September 2014 in Iraq.The insect was an exotic and new pest in Iraq, at first it was outspread on ornamental plants then it infects many agricultural crops like sunflower and eggplants.The mean of female fecundity was 623.3 eggs under perfect conditions , however The sexual reproduction produce male more than the parthenogenesis , there were two pairs of dark black coloured spots on dorsal surface of female body and two pairs of waxy filaments at the end of male body.*

Keywords: *Biology, Hemiptera, Iraq, Mealyubg, Phenacoccuc solenopsis.*

Date of Submission: 25-10-2017 Date of acceptance: 31-10-2017

I. Introduction

The Solenopsis mealybug *Phenacoccus solenopsis* recorded as anew insect pest on ornamental plant *Lantana camara* as well as other host plant for the first time in Iraq during August 2014(Abdulrassoul *et al*., 2015). Those insects distributed word wide on cotton ,vegetables,fruits , ornamental plants and weeds (Dhwan *et al*., 2007, wang *et al*, 2010) .*P. solenopsis* orginally reported on ornamentals and fruit crops in New Mexico (Tinsley ,1898). Then it spread to Caribbean and Ecuador (Ben –Dov, 1994), Chile (Larrain ,2002), Argentina(Granara de Willink, 2003), Brazil (Culik and Guallan, 2005) , Pakistan(Abbas *et al.*, 2005), India (Yousuf *et al*., 2007), Nigeria (Akintola and Ande, 2008), Srilanka (Prishanthini and Laxmi , 2009), Australia (Admin ,2010), Egypt (Abd-Rabou *et al*., 2010), Indonesia (Munniappan *et al.*, 2011), Iran (Moghddam and Bagheri, 2011), Cyprus (Eppo 2011), Turkey(Kaydan *et al.*, 2013), Japan (Tanaka and Tabata, 2014) and Iraq (Abdulrassoul *et al.*, 2015).

The cotton mealybug *P. solenopsis* is a polyphagous insect feeding on more than 200 plant species assigned to approximately 60 families such as Asteraceae, Euphorbiaceae , Fabaceae , Malvaceae and Solanaceae.As an important insect pest, this insect has an economic and environmental impact. Large population of mealybug cause general weakening, defoliation and death of susceptible plants by sucking sap from leaves, twig, stem, roots and fruiting bodies, and indirectly by serving as rectors of plant diseases, honeydew deposition causes growth of sooty moulds and other secondary infections that decreases Photosynthesis and reduces the marketability of plant products (Ibrahim *et al*., 2015).

The mealybug insects has many traits make it aserious pest like the body covered with mealy wax secetion reduced the insecticide effects and save it from natural enemies attack, as well as, the highly spreading because of diversity of reproduction manners and various host plant(Alrubaeae and AlObaidy , 2014). The goal of this study was to know the biology, behavior and life cycle of this insects on *Hibiscus rosa-sinensis* under laboratory conditions.

II. Materials And Methods

2.1 Preparation of insect colonies

Adults of mealybug females were collected from *Hibiscus rosa-sinensis* plant in home garden in al-Mansoor and brought to the insect laboratory at Plantprotection Department ,College of Agriculture ,University of Baghdad in September 2014, 30 crawlers were placed on *Hibiscus rosa-sinensis* leaves in petridishes (9 cm dia. × 1 cm ht.) containing wet cotton with help of soft hair brush for each of the life history parameter, for that individual leaves with petioles of same size were collected from plants, which didn`t exposed to pesticide application and free from mealybug infesation, were washed with tap water, dried and used as food source.The leaf petiole were wrapped with cotton wool dipped in water to keep the leaves wet. Each leaf was infested with an adult female and observed daily under microscope till egg laying (Nikam *et. al*., 2010).

2.2 Study of biological parameters

The time of egg laying was recorded, this egss were counted and put on the plant leaves. The eggs incubation period, emerged nymph, nymphal stages and its duration, pupal period of male, male age after emergance from Cocoon , pri-oviposition, oviposition and post- oviposition periods of female, fecundity and longevity of female and male were recorded,separately.

2.3Data analysis

Data were statistically analysed using statistical software Genestat 2013 with Compelet Randomized Deizin.

III. Results And Discussion

The biology of *Phenacoccus solenopsis* is presented in tabl 1 . The temperature of experiment was 35±2°c and it was the best conditions for the Pest development.

Table 1: Biological Parameters of *Phenacoccus solenopsis* (Tinsley) on *Hibiscus rosa-sinensis*(L.) under laboratory conditions.

Biological Parameters (Day)	Mean	Range	DS
Incubation Period	2.33	1	0.57
First Nymphal Stage	4.5	1.4	0.72
Second Nymphal Stage	4.7	0.2	0.1
Third Nymphal Stage	4.4	0.7	0.36
Pupal Period	7.6	0.5	0.26
Pre-oviposition Period	6.7	0.7	0.36
Oviposition Period	14	2	1
Post- oviposition Period	6.76	0.9	0.49
Fecundity(no. of eggs laid/ female)	623.3	110	55.08
Longevity for Male	2.66	1	0.57
Longevity for Female	27.47	2.6	1.32

The female laided the eggs on the *Hibiscus rosa-sinensis* leaves ,the eggs colored light yellow with oval shape laid in a cottony ovisac from the end of female abdomen it were covered with the wax secretion ,the female laided 623.3 eggs gradually as amean through her life and this is called the Fecundity.The eggs hatching to the nymphs after 2.33 days incubation period,the new nymphs looked like the eggs in the beginning of the hatching, However; it was bigger and mobile . it's color changed to the whight because of the wax substances which was similarly to meal covered the nymph body so for this reasone the insect called Mealybug.

The nymphs leave the eggs sac and go away from thier mother and it called crawells, and that because of it started to looking for suitable place for live and feeding .There are three instars for nymphs, the period of first,second and third instar was 4.5 ,4.7 ,4.4 days , respectively.After that the nymphs growing to be male or female ,the adult female of *P. solenopsis* were wingless and oblong in shape with yellow in colour , having two pairs of black spots on dorsal side of body region .the colour of head ,thorax, antenna and legs was yellowish-brown, whereas abdominal region pale yellow (Fig .1)The observation on preoviposiyion ,oviposition ,and post oviposition periods of *P. solenopsis* were 6.70 ,14 ,6.76 days,respectively. Longevity of female 27.47 days (Table 1).The male start forming acylindrical silky coccon with whight color which were stick on the cover of petridish or the plant leaf (Fig 1).the Pupa remained in the coccon for 7.6 days and then the male was emergence from the coccon and it lives for 2.66 days and died. The present study is first report on biology of *P. solenopsis* from Iraq. However, majority of observations match with the biological features of *P. solenopsis* on *Hibiscus rosa-sinensis* as explained by Akintola and Ande (2008) .

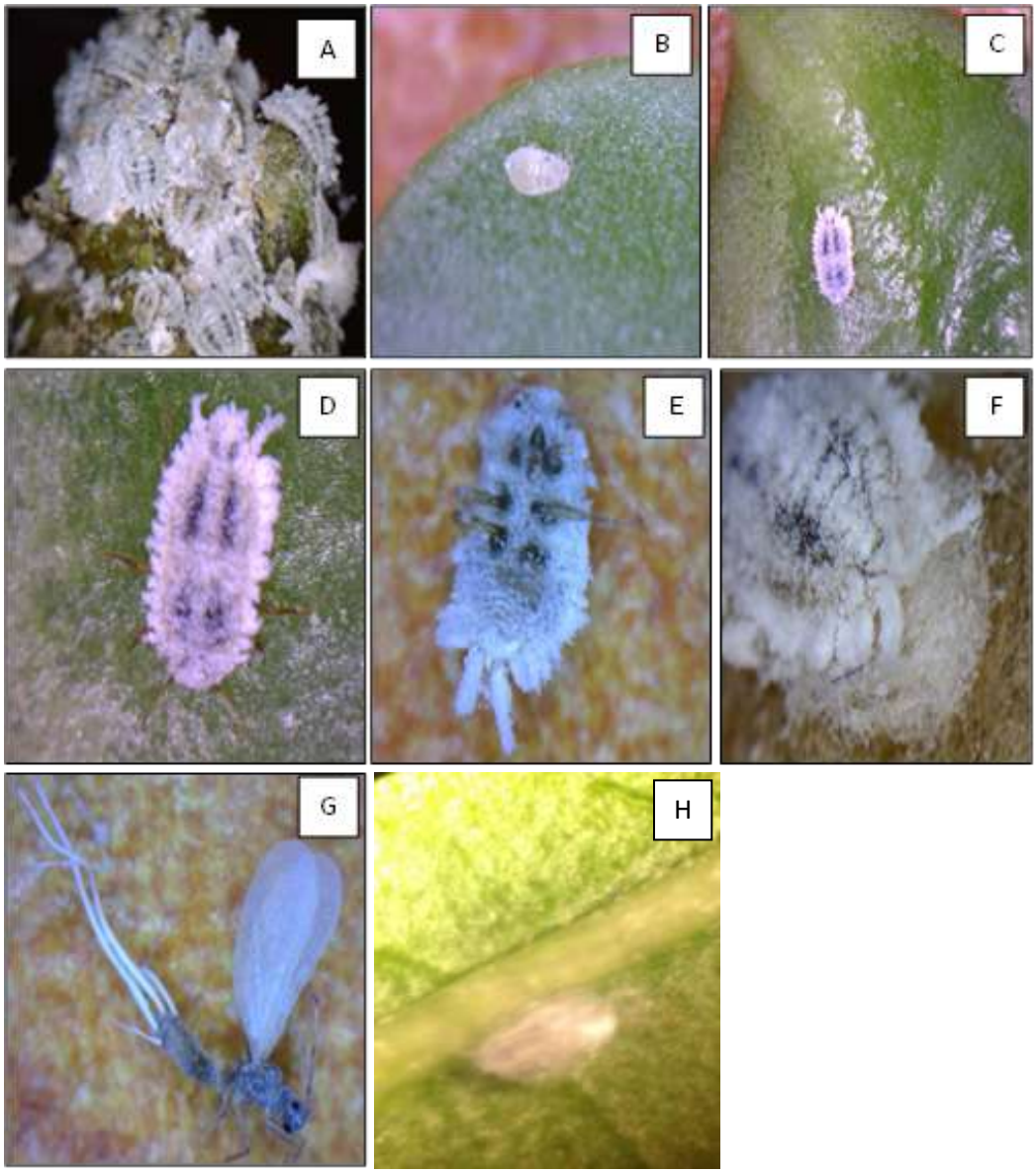

Figure 1: Insect life stage**A**.Insect colony **B**.second nymphal instar **C**.third nymphal instar **D**.female adulte **E**.ventral surface of female **F**.cottony ovisac **G**.male **H**.male cocoon

Acknowledgement

We are grateful to Prof. Dr.Radhi Al-Jasani for his advices that made this study butter.

References

[1]. Abdul-Rassoul , M.S., I. M. AL-Malo and F.B. Hermiz. 2015. First record and host plants of Solenopsis Mealybug Phenacoccus solenopsis Tinsley, 1898 (Hemiptera : Pseudococcidae) from Iraq. Journal of Biodiversity and Environmental Sciences (JBES) 7(2):216-222.

[2]. Dhawan AK., K. Singh , S.Saini , B. Mohindrus, A. Kaur ,G.Singh and S. Singh. (2007).Incidence and damage potential of mealybug, Phenacoccus solenopsis Tinsley ,on cotton in Punjab.Indian Jour. Ecol. 34:110- 116.

[3]. Wang ,y., G.W.Watson and R.Zhang. 2010. The Potential distribution of an invasive mealybug Phenacoccus solenopsis and its threat to cotton in Asia. Agri. Forest Entomol., 12:403-441.

[4]. Tinsley , J. D.1898.Notes on coccidae, with description of new species. Can. Entomol.30:317-320.

[5]. Ben-Dov Y. 1994. A systematic catalogue of the mealy bugs of the world (Insecta: Homoptera: Coccoidea: Pseudococcidae and Putoidae) with data on geographical distribution, host plants, biology and economic importance. Intercept Limited, Anover, UK. P. 686.

[6]. Larrain S.P. 2002. Insect and mite pes incidence on sweet pepinos Solanum muricatum (Ait.) cultivated in the IV Region, Chile. Agricultura-Tecnica 62(1): 15-26.

[7]. Granara de Willink M.C. 2003. New records and host plants of Phenacoccus sp. for Argentina (Hemiptera: Pseudococcidae). Revta Sociedad Entomologia Argentina. 62:80-82.

[8]. Culik M.P.,P.J. Gullan .2005. A new pest of tomato and other records of mealy bugs (Hemiptera: Pseudococcidae) from Espirito Santo, Brazil.Zootaxa 964:1-8.
[9]. Abbas G., M.J. Arif , S. Saeed . 2005. Systematic status of a new species of the genus Phenacoccus Cockerell (Pseudococcidae), a serious pest of cotton Gossypium hirsutum L. in Pakistan. Pakistan Entomologist 27, 83-84.
[10]. Yousuf M., M. Tayyib , S. Shazia . 2007. Mealybug problem on cotton in Pakistan. Pakistan Entomologist 24,49–50.
[11]. Akintola ,A.J. and A. T. Ande.2008. First record of Phenacoccus solenopsis Tinsley(Hemiptera:Pseudococcidae) on Hibiscusrosa sinensis in Nigeria. Agricultural Journal (Medwell Journals, Pakistan) 3(1):1-3.
[12]. Prishanthini M.,V.M.Laxmi .2009.The Phenococcus solenopsis. Department of Zoology, Eastern University, Sri Lanka. Available online: http:// www.dailynews.lk/2009/07/01 /fea30.asp.
[13]. Admin.2010.Exotic mealybug species-a major pest in cotton Published February 12,2010 http:// the beatsheet.com.au/ mealybugs/exotic mealybug species amajor new pest in cotton /Accessed on 25th May 2010.
[14]. Abd-Rabou S., J.F.Germain, T. Malausa.2010. Phenacoccus parvus Morrison et P. solenopsis Tinsley,deux Cochenilles nouvelles pour1'Egypte (Hemiptera: Pseudococcidae).Bulletin de la Socie'te' Entomoloque de France 115(4): 509-510.
[15]. Muniappan R.,B.M.Shepard,G.W.Watson,G.R.Carner, A. Rauf,D. Sartiami, P. Hidayat ,J.V.K.Afun , G. Goergen , A.K.M.Ziaur Rahman .2011. New Records of Invasive Insects (Hemiptera:Sternorrhyncha) in Southeast Asia and West Africa.Journal of Agricultural and Urban Entomology 26(4), 167-174.
[16]. Moghaddam M., A.N. Bagheri . 2011. A new record of mealybug pest in the south of Iran, Phenacoccus solenopsis (Hemiptera: Coccoidea: Pseudococcidae) Journal of Entomological Society of Iran 30(1), 67- 69.
[17]. EPPO. 2011. New pest records in EPPO member countries. EPPO Reporting Service 4, 2011/082.
[18]. Kaydan M.B., A.F.Çaliskan , M.R.Ulusoy . 2013.New record of invasive mealybug Phenacoccus solenopsis Tinsley (Hemiptera: Pseudococcidae) in Turkey (In English; Summary In French, Turkish). EPPO Bulletin 43(1), 169-171.
[19]. Tanaka H, Tabata J. 2014. A new record of Phenacoccus solenopsis Tinsley, 1898 from Kyushu district, Japan. Japanese Journal of Entomology 17(3), 119-120 [TanakaTa2014].
[20]. Ibrahim,S.S., F.A.Moharum and N.M.Abd-El-Ghany.2015. the cotton mealybug Phenacoccus solenopsis Tinsley (Hemiptera : Pseudococcidae) as a new insect pest on tomato plants in Egypt. Journal of Plant Protection Research.55(1): 48-51.
[21]. AL-Rubeae, J.K. and Sh.H. AL-Obaidi (2014).Relationship of Reproduction Ability with Age of Predator Chrysoperla carnea Aphids Feeding on Nymphs citrus Mealybugs. Egyptian J.of App. Scie. 29(12).(In Arabic; Summary In English).
[22]. Nikam, N.D. , B.H. Patel and D.M. Korat. 2010. Biology of invasive mealy bug, Phenacoccus solenopsis Tinsley(Hemiptera: Pseudococcidae) on cotton. Karnataka J. Agric.Sci., 23: 649-651.

Sh.H. Al-Obaidy. " Study of Some Biological Parameters of Mealyubg Phenacoccuc solenopsis (Tinsley) (Hemiptera: Pseudococcidae) As an Exotic Pest on Hibiscus rosa-Sinensis In Iraq." IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS), vol. 10, no. 10, .2017, pp. 25–28