

Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera: Aleyrodida)

Munther Hamza Rathi

**Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera:
Aleyrodida)**

Munther Hamza Rathi

Diyala Univ., College of Science , Dept. of Biology

Summary

Methanolic and hexane extracts of *Schanginia aegyptiaca* were tested against different developmental stages of *Dialerodus citri* in laboratory bioassays . The obtained results revealed that methanol and hexane extracts significantly affected the mortality of different developmental stages of *Dialerodus citri* . The results of the present study suggested that the hexane extract were less effective than the methanolic extract at different concentrations (2 , 1 , 0.5) % .

Keywords : *Dialerodus citri* , *Schanginia aegyptiaca*

Introduction

There is an increasing interest in the use of plant-derived products for insect pest control in agricultural systems of the developed and developing worlds (Hall and Menn , 1999; Isman , 2006) . The reasons for this growing attention include relative ease of access to bioactive compounds and potentially higher safety to non-target organisms , biodegradable to non toxic products and potentially suitable for use in integrated management programs (Markouk et al. , 2000 ; Tare et al. , 2004) . Plant cells produce a vast amount of secondary products , many of these are highly toxic and are often stored in specific vesicles or in the vacuole (Rosenthal and Berenbaum , 1991) . Our research has explored the potential for native Iraqi plants to provide locally available biopesticides for farmers to protect their crops from pests . The citrus whitefly *D. citri* (Ashmead) was now is the most important citrus pest in Iraq . The whitefly injures the plant by consuming large amounts of plant sap, which it obtains with its sucking mouth parts. Further injury is caused by growth of sooty mold fungus which grows over fruit and foliage in the copious amount of honeydew secreted by this insect . This black fungus may completely cover the leaves and fruit so that it interferes with the proper physiological activities of the plants. Heavily-infested plants become weakness and produce low yield with smaller and insipid fruits (Pratt , 1958) .

**Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera: Aleyrodida)**

Munther Hamza Rathi

Materials and Methods

D. citri adults were collected from the citrus plants (Diyala region) and kept in cage containing young *Citrus aurantium* L. as host plant , after an ovipositional period of one day the adults were removed . The egg- bearing leaves on plant were incubated at room temperature (23 ± 3 C°) .

Fresh leaves of *S. aegyptiaca* were collected during March , 2011 . Samples were dried at room temperature for three weeks in the dark and subsequently were ground to fine size with a mill and stored in plastic containers at 10 C° (Haikal and Omar , 1993) . Fifty grams of plant sample were placed into 1000 ml Erlenmeyer flask containing 500 ml of methanol (polar solvent) , the flask then covered with aluminum foil and placed on the horizontal shaker and shaken (120 oscillations/min for 24 h) in the dark (Ayhan et al., 2011) , as well as hexane extract was prepared according to Harborn (1984) , 10 grams of the sieved powder were placed in thimble in soxhlet extraction at 40C° , the sample was extracted with 200 ml n-hexane (non-polar solvent) four 8 hours and the solvent was removed by rotary evaporator . Four different concentration were prepared from each extract (2 , 1 , 0.5 and 0.0) % . The effects of methanol and hexane extracts with their different concentrations were tested against eggs , first larval stage (mobile stage) , nymphal stages (immobile stages) and pupae of *D. citri* by taking 50 individuals from each stage (tow replicates were made for each treatment) . Mortality rates were recorded after seven days following treatment , and corrected to Abbots formula .

$$\text{Abbot} = \frac{\% \text{ mortality} - \% \text{ control}}{100 - \% \text{ control}} \times 100$$

Chi-square (χ^2) were used to analysis of results (SAS , 2004)

Results & Discussion

Results of present study indicated that methanolic extracts was more effective than hexan extracts , which means that most active materials was extracted by this solvent , in this respect Harborn (1973) mentioned that alkaloids are extracted by methanol and ethanol , and that least degree phenols (Alzubaidi , 2000) .Table 1 shows that methanolic extracts of *S. aegyptiaca* caused mortality to different stages of *D. citri* . Egg mortality ranged between 4% in control treatment to 28.12% at concentration of 2% while ,the best treatment against first larval stage is 2% which caused 73.19% mortality . Nymphal stages mortality ranged between 3% in control treatment to 50.70% at concentration of 2% . The pupae were also affected , the mortality rate reached 56.12% at the concentration of 2% . The data also showed a direct correlation between mortality and extract concentrations , significant difference were found among concentrations at $P < 0.01$. The effect of hexan extracts on different stages of *D. citri* are shown in table 2 , the mortality rates were significantly varied with concentration used in the treatments ($P < 0.1$, $P < 0.01$) . A direct correlation between extract concentration and the different stages mortality was found , egg mortality ranged

**Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera: Aleyrodida)**

Munther Hamza Rathi

between 3% in control treatment to 24.74% at concentration of 2% . Mobile stages were more susceptible by hexan extracts than egg stage , mortality rates ranged between 29.59% at concentration of 0.5% to 56.12% at concentration of 2% while, nymphal stages mortality reached to 39.79% at same concentration . Pupae were also affected , the mortality rate reached 29.16% at concentration of 2%.

In this respect Al- Mashhadani (2006) indicated that the methanolic extract of *Albizzia lebbeck* seeds caused high mortality of different stages of *Brevicoryne brassicae* at concentration of 35% while, Ayhan et al. (2011) found that high eggs and larval mortality were observed in grape berry moth *Paralobesia viteana* when treated with methanolic extracts of *Bifora radians* , *Arctium lappa* , *Humulum lupulus* and *Xanthium strumarium* . Tuwajj et al. (2009) also indicated that hexan extract of *S. aegyptiaca* affected on some biological aspect of *Culex quinquefasciatus* Mosquito , they found that the mortality rate in eggs , 1st (larval stage) , 2nd , 3rd (nymphal stages) and pupal mortality reached 18.7 , 75.9 , 62.3 , 48.3, and 46.7% respectively while, Al- Zubaidi et al. (2000) found that hexan extracts of *Callistemon regolus* significantly effect the developmental stages of *Musca domestica* . Eggs mortality may be due to embryo asphyxia inside the egg because the extract was formed as layer on the external shell (Saxena et al. 1980) . The extracts were more effective in first larval instar (crawlers) than other stages , this may attributed to the crawlers usually move a few centimeter in search of a feeding site (exposed to toxic extracts more than other stages (Dale et al. , 2005) .

**Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera: Aleyrodida)**

Munther Hamza Rathi

References :

- Abbot , W.S.1925 . A methods of computing the effectiveness of an in Insecticides . J. Econ. Entomol. 18 : 256 – 267 .
- Al- Mashhadani , S. A. 2006 . Effects of methyl alchohol extract of *Albizzia lebeck* with actra insecticide on survival of *Brevicoryne brassicae* L. (Homoptera : Aphididae) .M.Sc.Thesis. College of Science , University of Baghdad , Iraq . 84p.
- Al-Zubaidi,F.; Al- Rubae,H. & Al-Okaily,L. 2000. Solvent extracts of *Calistemon rugulosus* .affects groth,development and survival of *Musca domestica* . J. Babylon University ,5(3); 937- 943.
- Ayhan,G.;Isaacs,R. & Whalson,M. 2010. Ovicidal,larvicidal and anti-Ovpositional activities of *Bifora radians* and other plant extracts On the grape berry moth *paralobesia viteana* (Clemens) J.Pest Sci. 84:487-493.
- Dale , B. G. ; Michael , B. B. & Blackburn , J. S. 2005 . Identification of the molting hormone of the sweet potato (*Bemisia tabaci*) and greenhouse (*Trialeurodes vaporariorum*) whitefly. J. Ins. Physiol., 51: 47 – 53 .
- Hall,F.R. & Menn,J.J. 1999. Biopesticides : use and delivery.Humana, Totawa, N.J.
- Harborn , J.B., 1973. Phytochemical methods .Chapman&Hall,London.278pp.
- Harborn , J.B. 1984 . Phytochemical methods : A guide to modern techniques of plant analysis . Academic press , Chapman and Hall , 2nd . ed. New York . 288 p.
- Hiakal , M. A. & Omer , A. A. 1993 . Medicinal and aromatic plants. Escandrya , Egypt . 514p.
- Isman , M. B. 2006 . Botanical insecticides , deterrents and repellents in modern agriculture and an increasingly regulated world . Annu. Rev. Entomol. , 51 : 45 – 66 .
- Markouk ,M.; Bekkouche ,K.; Larhsini ,M.; Bousaid , M.; Lazrek , H. & Jana , M. 2000 . Evalution of some Moroccan medicinal extracts for larvicidal activity . J. Ethanopharmacol. ,73:293 – 297.
- Pratt, R. M. 1958 . Florida Guide to Citrus Insects . Diseases and Natrational Disorder in Color . Florida ,Gainesville:191pp.
- Tare , V. ; Deshpande , S. & Sharma , R. 2004 . Susceptibility of two different strains of *Aedes aegypti* (Diptera : Culicidae) to plant oils . J. Econ. Entomol. , 97 : 1734 – 1736
- Tuwajj,N.;Kafhaji,R.& Farhan,H.L.2009. Evaluation of hexane extract of *Schanginia aegyptiaca* Leaves against some biological aspects of mosquito, *Culex quinquefasciatus* Say. (Diptera: Culicidae).J.Kufa, 1(1):1-6pp.
- Rosenthal , G. A. & Berenbaum , M. R. 1991 . Herbivores : Their interaction with secondary plant metabolites . San Digo, Academic press. 468 p.
- SAS Institute , 2004 . SAS / STAT Users Guide for Personal computers. Release 6.12. SAS Institute Inc., Cary, North Carolina . U.S.A. 956 p.
- Sexena , R. ; Waldbauwr ,G. ; Liquido , N. & Puma , B. 1980 . Effect of neem seed oil on the rice leaffolder *Cnaphalocrocis medinalis* In : Schmutterer , H. ; Ascher, K. & Rembold , H. (Eds.) Proc. 1st . ed . Int. Neem Conf. Rottach. Egern. FRG. 189 – 204 .

Ovicidal and Larvicidal activity of *Schanginia aegyptiaca*
leaf extracts against *Dialerodus citri* (Ashmead) (Homoptera: Aleyrodida)

Munther Hamza Rathi

Table 1 : The effects of Methanolic extract of *S. aegyptiaca* on the mortality of different developmental stages of *D. citri*

Extract con. (%)	Eggs mort. (%)	larval mort.(%)	Nymphal mort. (%)	Pupal Mort. (%)
Control	4.00	3.00	3.00	2.00
0.5	15.62	35.05	25.77	20.40
1	23.95	50.51	31.95	35.71
2	28.12	73.19	56.70	56.12
Chi-square (χ^2) value	6.522 **	7.593 **	7.088 **	7.541 **

** (P<0.01).

Table 2 : The effects of Hexan extract of *S. aegyptiaca* on the mortality of different developmental stages of *D. citri*

Extract con. (%)	Eggs mort. (%)	1 st mort.(%)	Nymphal stages (%)	Pupae Mort. (%)
Control	3	2	2	4
0.5	14.43	29.59	16.32	11.45
1	16.49	36.73	30.61	14.28
2	24.74	56.12	39.79	29.16
Chi-square (χ^2) value	4.636 *	7.473 **	6.361 **	6.458 **

* (P<0.01), ** (P<0.01).

الفعالية الأبدية لمستخلصات أوراق نبات الطرطيع *Schanginia aegyptiaca*

Ovicidal and Larvicidal activity of Schanginia aegyptiaca
leaf extracts against Dialerodus citri (Ashmead) (Homoptera: Aleyrodida)

Munther Hamza Rathi

ضد بيوض ويرقات ذبابة الحمضيات البيضاء (Ashmead) Dialerodus citri

منذر حمزة راضي

جامعة ديالى / كلية العلوم / قسم علوم الحياة

الخلاصة:

أختبر مستخلص الميثانول والهكسان لأوراق نبات الطرطيع ضد الاطوار المختلفة لذبابة الحمضيات البيضاء، اشارت النتائج المتحصل عليها الى وجود فروق معنوية لكلا المستخلصين ضد الاطوار المختلفة ، كذلك وجد ان تأثير المستخلص الهكساني أقل من تأثير المستخلص الميثانولي على هلاكات الاطوار المختلفة لذبابة الحمضيات البيضاء.

كلمات مفتاحية: ذبابة الحمضيات ، المستخلص الهكساني

