



ISSN: 0976-3376

Available Online at <http://www.journalajst.com>

ASIAN JOURNAL OF  
SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology  
Vol.07, Issue, 04, pp.2676-2678, April, 2016

## RESEARCH ARTICLE

### FIRST RECORD OF *PSYTTALIA CONCOLOR* (SZÉPLIGETI) (HYMENOPTERA: BRACONIDAE) AS A PARASITOID OF THE *CERATITIS CAPITATA* (WIEDEMANN) (DIPTERA: TEPHRITIDAE) IN IRAQ

\*<sup>1</sup>Samira A. Khlaywi, <sup>2</sup>Abdul-Rassoul, M. S. and <sup>2</sup>AL-Taweel, A.A.

<sup>1</sup>Ministry of Science and Technology, Agricultural Research Directorate, Baghdad – Iraq

<sup>2</sup>University of Baghdad, Iraq Natural History Research Center and Museum, Baghdad – Iraq

#### ARTICLE INFO

##### Article History:

Received 15<sup>th</sup> January, 2015

Received in revised form

25<sup>th</sup> February, 2016

Accepted 06<sup>th</sup> March, 2016

Published online 27<sup>th</sup> April, 2016

#### ABSTRACT

In this study, *Psytalia* (=Opius) *concolor* (Szépliget) (Hymenoptera: Braconidae) is recorded for the first time as a parasitoid on the larvae of the *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) in Wassit Province, Iraq.

##### Key words:

*Ceratitis capitata*, *Psytalia concolor*,  
Parasitoid.

Copyright © 2016 Rabindra Hazarika and Mrigendra Mohan Goswami. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### INTRODUCTION

Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) is considered as one of the most destructive pest on fruit and vegetables worldwide and infests over 400 plant species in tropical, subtropical and temperate regions (Vargas *et al.*, 1984 ; Copeland, 2002). The origin of *C. capitata* are thought to be Afro tropical (De Meyer *et al.*, 2002), but it has been transported extensively through trade (Karsten *et al.*, 2013) and established as an invasive species in many countries (De Meyer *et al.*, 2008). In Iraq this pest is considered as one of the most important pest in citrus and stone fruits orchards (AL-Haidari, 1947). Infested fruits are unacceptable for human consumption, damage level in some orchards can reach 100% (Broughton and Francis, 1998). Aerial bait – spraying, organized by the government has been used to achieve controlling this pest. Although bait-spraying is less harmful to beneficial microorganisms and the environment. *P. concolor* is a koinobiont endoparasitoid of many species belong to Tephritidae, (Diptera) likes *C. capitata* and others fruit flies. In *P. concolor* the ovipositor plays important roles in host location and host discrimination processes (Canale and Raspi, 2000). This parasitoid classified as *P. concolor* using diagnosis characteristic (Forewing vein 2RS about twice the length of r...) (Carmichael, 2005) (Figure 1).

*P. concolor* is commonly mass-reared on medfly in the Mediterranean regions, because Medfly is easier to rear in large quantities than olive fly. In addition for parasitoids that attack a host concealed within plant tissues, ovipositor-probing often constitutes an essential element of host searching behavior (Van Dijken and Van Alphen, 1998). This parasitoid was originally described from Tunisia on *Bactrocera oleae* (Marchal, 1910) and found in Algeria and Libya (Cameron, 1941), Morocco (Balachowsky, 1931) and south Africa (Fischer, 1973). *Psytalia concolor* was introduced to Jordan (Mustafa and Al-Zaghal, 1987) and Lebanon (Brnetic and Domazet, 1981). Therefore the aim of this study was to survey populations of *C. capitata* in Iraq for the presence of parasitoids and, if found, to determine their identity, prevalence and sex ratio to introduce it in future within biological control strategies and SIT program to control *C. capitata* and *Dacus ciliates* pest.

#### MATERIALS AND METHODS

Seven samples of Apricot fruits were collected randomly either directly from Apricot trees or from fallen fruits underneath the trees from an Apricot orchard at AL-Suwaira region / Wassit province- Iraq on 26. May 2015. These samples were brought to the laboratory for examination and infested fruits by second / third instars larvae of *C. capitata* were kept in an plastic jar (10 kg capacity) with soil which also collected from underneath the Apricot trees to a depth of

\*Corresponding author: Samira A. Khlaywi

Ministry of Science and Technology, Agricultural Research Directorate, Baghdad – Iraq

5 cm. These jars were covered by Organza materials and kept in rearing room at  $27 \pm 2^\circ\text{C}$ , 60- 70% RH and 14:10 light : dark. The adults of parasitoids emerged were collected preserved into 80% alcohol and samples were sent to the Iraqi National History Research Center and Museum , University of Baghdad, for identification the species by the expert Dr. M. S. Abdul-Rassoul.

## RESULTS AND DISCUSSION

Table (1) showed that the average infestation rate of apricot fruits by *C. capitata* second and third larval instars which was 72.2% and after incubating the infested Apricot fruits at rearing room conditions we observed a total of 22 adult parasitoids (12 females and 10 males) . Some of these parasitoids as mentioned into materials and methods was sent to Iraqi Natural History Museum, University of Baghdad, Baghdad /Iraq and was classified as *Psytalia* (=Opius) *concolor* (Hymenoptera: Braconidae), following the diagnosis characteristic (Forewing vein 2RS about twice the length of r...) (Carmichael, 2005) (figure 1 and 2). This is the first record of this parasitoid in Iraq reported to attack *C. capitata* (Diptera: Tephritidae) larvae.



Figure 3. The wing of parasitoid (field sample)

AT the meantime we are trying to rear this parasitoid hoping to use it in combination with Sterile Insect Technique to control *C. capitata* in citrus and stone fruits orchards in Iraq in near future, in addition to use this parasitoid to control *Dacus ciliatus* too.

Table 1. Number and sex of the parasitoid *Psytalia concolor* isolated and identified from Apricot samples collected from Apricot orchard from AL- Suwaira region / Wassit Province – Iraq on 26. May. 2015

Sample Nos.	Nos. of Apricot fruits examine	Nos. of Apricot fruits infested with <i>C. capitata</i> larvae	Nos. of parasitoid emerged for <i>C. capitata</i> pupae	Sex of parasitoid	
				female	male
1	103	83(80.6%)	5	3	2
2	85	74(87.1%)	3	2	1
3	63	48(76.2%)	3	-	3
4	96	78(81.3%)	3	2	1
5	28	15(53.6%)	-	-	-
6	18	12(66.7%)	-	-	-
7	345	218(63.2%)	8	5	3



Figure 1. Represents adult male and female of the parasitoid

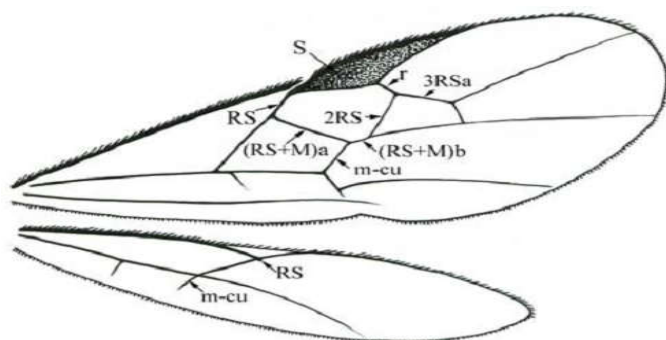


Figure 2. Opiine wing venation and terminology (following Sharkey & Wharton)

## REFERENCES

- AL-Haidari, D. 1947. Fruit flies. Iraqi J. of Agricultural, 2(4): 225 – 229.
- Balachowsky, A. 1931. pp.93-97 In: Rapports sommaires sur les travaux accomplis dans les laboratoires en 1930..
- Brnetic, D. and Domazet, D. 1981. pp. In: Biological control of olive fly (*Dacus oleae* Gmel.) by means of the sterile male technique and by Opius concolor (*O. concolor* Szepl.). Sveuciliste u Splitu, Institut za jadranske kulture : meliora ciju krsa, Sveuciliste u Splitu.
- Broughton, s. and De L. Francis, 1998 . Mediterranean fruit fly control. Entomol. At department of Agriculture Western Australia.
- Cameron, E. 1941. The biology and post-embryonic development of Opius ilicis n. sp., a parasite of the holly leaf-miner (*Phytomyza ilicis* Curt.) Parasitology 33:151-169
- Canale, A. and Raspi, A. 2000. Host location and ovipositor behavior in *Opius concolor* Szepliget (Hymenoptera, Braconidae).-Entomological Problems, 31 (1): 25-32.
- Carmichael, Amy c., Wharton, Robert A. and Clarke, Anthony R. 2005. Opiine ((Hymenoptera: Braconidae) parasitoids of tropical fruit flies (Diptera: Tephritidae) of the Australian and South Pacific region. *Bulletin of Entomological Research*, 95(6) 545-569.

- Copeland, R. S., Wharton, R. A. Luke, Q. and De Meyer, M. 2002. Indigenous hosts of *Ceratitidis capitata* (Diptera: Tephritidae) in Kenya. *Ann. Entomol. Soc. Am.* 95:672-694.
- De Meyer, M., Copeland, R. S., Wharton, R. A. and Mc Pheron, B. A. 2002. On the geographic origin of the medfly *Ceratitidis capitata* (Weidemann) (Diptera:Tephritidae). Proceedings of the 6th International Fruit Fly Symposium, Stellenbosch, South Africa, pp. 45–53.
- De Meyer, M., Robertson, M. P., Peterson, A. T. and Mansell, M. W. 2008. Ecological niches and potential geographic distributions of Mediterranean fruit fly (*Ceratitidis capitata*) and Natal fruit fly (*Certitidis rosa*). *Journal of Biogeography*, 35, 270–281. doi:10.1111/j.1365-2699.2008.01916.x.
- Fischer, M. 1973. Ueber die afrikanischen Opiinae der Sammlung Townes im American Entomological Institute in Ann Arbor, Michigan (Hymenoptera, Braconidae, Opiinae) *Polskie Pismo Entomologiczne* 43:241-272.
- Karsten, M., Jansen van Vuuren, B., Barnaud, A. and Terblanche, J. S. 2013. Population genetics of *Ceratis capitata* in South Africa: Implications for dispersal and pest management. *PLoS ONE*, 8, e54281. doi:10.1371/journal.pone.0054281.
- Marchal, P. 1910. Sur un Braconide nouveau, parasite de *Dacus oleae*. *Bulletin de la Societe Entomologique de France*. 13: 243-244.
- Mustafa, T. M. and Al-Zaghal, K. 1987. Frequency of *Dacus oleae* (Gmelin) immature stages and their parasites in seven olive varieties in Jordan *Insect Science and its Application* 8:165-169.
- Van Dijken M. J. and Van Alphen J. J. M. 1998. The ecological significance of differences in host detection behavior in co-existing parasitoid species.-*Ecological Entomology*, 23: 265-270.
- Vargas, R. I., Miyashita, D. H. and Nishida, T. 1984. Life history and demographic parameters of three laboratory reared tephritids (Diptera: Tephritidae). *Ann. Entomol. Soc. Am.* 77: 651-656.

\*\*\*\*\*