Original Research Article

Parasitoid of the genus *Liriomyza* Mik. In Iraq

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**ABSTRACT**

The aim of this study to survey hymenopterous parasitoids on leafminer *Liriomyza* Mik in Iraq. The survey was showed eight species belonging to seven genera under three families, the parasitoids are: *Diglyphus isaea* (Walker), *Diglyphus crassinervis* Erdős, *Pediobius metallicus* (Nees), *Neochoyscharis Pormosa* (Westwood), *Cirrospilus vittatus* Walker, *Halticoptera circulus* (Walker), *Opus* sp. and *Ratzeburgiola incompate* Boucek, and *Leriomyza bryionae* was recorded as new host of the last one.

**Keywords**

*Liriomyza*, Agromyzidae, Hymenopterous parasitoids, Host plants, Iraq

**Introduction**

*Liriomyza* is a cosmopolitan group of pests that consist of more than 370 species which are widely distributed in the New and Old World, (Parrella, 1987; Asadi *et al.*, 2006). Many of them are economically important pests of the field crops, ornamental vegetables, throw out the world (Spencer, 1973, 1990). Larvae of the genus are polyphagous attacking ornamental and vegetable crops in the families Asteraceae, Brassicaceae, Cucurbitaceae, Fabaceae, Solanaceae and many of other families of plants (Cikman and Salle, 2011).

Infestation by *Liriomyza* spp. can caused both direct and indirect damage, such as: vectoring disease, destroying young seedling, causing reductions in crop yields, causing sun burning of fruits, reducing the aesthetic value of ornamental plants and causing problems for plant quarantine (Abdul Rassoul and Al -Saffar, 2013).

Species of *Liriomyza* can be recognized by their unique mine patterns on plant leaves. These pattern could lead to the isolation of populations of parasitoids, especially if the pattern are used in host recognition. The shapes of the mine are correlated with rates of parasitism (Parkman *et al.*, 1989).

*Liriomyza* spp. are known to have many natural enemies, particularly in their native home in the New World (Murphy and LaSalle, 1999). In Asia 41 species of parasitoids in four different families were found. However in general and under natural conditions, parasitism is usually low early in crop development and gradually increases as the crop matures (Parrella, 1987).
Parsitoids assemblages of dipteran leafminers are dominated by Eulophidae, Braconidae and Pteromalidae that attack the larval and pupal stages of the flies. Noyes,(2004), listed over 300 species of agromyzids parasitoids , and over 80 species that are known to attack Liriomyza species.

Eulophid hymenopterous were the commonest and widely distributed parasitods such as Diglyphus isaea, Pediobius metalicus attack Liriomyza species which are very important that attack crops and plants in glasshouse in several region such as L. sativa, L. bryonia, L. trifoli. Some parasitoid species are also hyperparasitoeds such as Neochrysocharis formosa, which is an endoparasitoids of several parasitoids of Liriomyza. In one study , hyperparasitism by N. formosa was found to be as high as 100%for 2 months immediately following the firtst incuulative releas of Diglyphus isaea (Ozawa,et al, 2002 Liu, 2009).

The parasitoids of Liriomyza spp. were studied in several countries of the world, Al–Azawi, 1967, 1971; Petcharat et al, 2002; Cikman et al (2006); Sha et al, 2007 Cinkman and Salle,(2011) Talebi et al (2011); Cinkman, (2012); Talibe et al (2011); Asadi et al , (2006); Gencer, 2004; (Ghahari and Yefremova, 2013).

Materials and Methods

The survey of parasitoids of leaf miners were carried out during February – March and October 2013, several provinces of Iraq(Baghdad, Kerbala, Nejef, Diywaniya, Takreet, Duhok.

The infested leaves of different host plants consist of Trigonella phoenum, Trifolium hamosa, Medicago sativa, Raphanus sativus, Melilotes indecus, Cucumis melo, Cucurbita sativa, Citrulus vulgaris.

The infested leaves were collected and brought to the laboratory of entomology and put in Petri Dishes covered with filter paper under constant conditions Temperatures 25C±1 and relative humidity 5%. After that parasitoids were impressed from field sample and kept in small capsule.

The Liriomyza spp. were identified using external morphology and male aedegous, (Spencer, 1972), the parasitoids identified by one of us and according to the reliable keys of (Chao-Dong and Da-Wei,2001; Gates et al, 2002; Yefremova et al, 2011) All specimens are deposited at Department of Entomology at Iraq Natural History Research Center and Museum.

Results and Discussion

In this study eight hymenopterous parasitoids species attacking Liriomyza spp. belonging to seven genera under three families, Eulophidae, Braconidae and Pteromalidae, were collected from different region of Iraq. The list of species is given below.

Order : Hymenoptera (Linneus, 1758)
Family : Eulophidae (West wood, 1829)

1.Genus : Diglyphus Walker , 1844
D. isaea (Walker, 1838)

Material examined: D. isaea was found in Baghdad from Liriomyza congesta on Medicago sativa on 15.2. 2013 (♀♀, ♂♂) Kerbala, L. bryonia on Medicago sativa on 15.3.2013(♀♀, ♀♂) in Nejef L.sativa on Cucurbita sativa (♀♀, ♂♂). and (♀♀, ♂♂ ) Trigonella phoenum 10.4.2013 (♀♀, ♂♂) L. bryonia on Melilotes indicus 20.4.2013.
Diglyphus crassinervis Erdős, 1958

Material examined: D. crassinervis was found in Baghdad on L. sp. on weeds (Abu Gharaiib 2.3.2013) (2♀, ♂) L. bryoniea on Melilotes indicus (2♀, ♂).

This species has been previously recorded from Phytomyza horticola (Mekhlif and Abdul Rssoul, 2002) collected from different host plants.


General Distribution: Palaeartic Region

2. Genus: Pediobius Walker, 1846
Pediobius metalicus (Nees, 1834)

Material examined: It was found in Baghdad on L. sp. on weeds on 10.3.2013 (2♀, ♂). in Tarimyia on L. brassicae. Raphanus sativa 20.4.2013 (2♀, ♂) in Baghdad on L. bryoniea on Melilotes indica 15.4.2013 (10♀, 2♂).

This species has been previously recorded as endoparasitoid from Melanogromyza phaseoli (Tryon) (Diptera : Agromyidae) from gold stem of Dolchos sesiquipedalis (Abdul-Rassoul , 1976) endoparasitoid on Phytomyza atricornis from Baghdad Jan. and Feb. 1970 (Al- Ali, 1977) and on Phytomyza horticola ( Mekhlif and Abdul-Rassoul, 2002).

Hosts: Primary sometimes secondary, solitary endoparasites of larveae and pupae of mining forms of Lepidoptera and Diptera , Particulary agromyzids genus Phytomyza, Liriomyza, and Dizgomyza (Boucek, 1965 Boucek and Askew,1968)

General Distribution: Europ, Asia, North America (Civelek and önder,1999).

3. Genus: Cirrospillus Westwood, 1832
Cirrospillus vittatus Walker, 1838

Material examined: It was found in Baghdad on L. bryoniea on Trigonella Phoenum 16.3.2013, 30.3.2013 (15♀, 3♂).

This species has been previously recorded as Cirrospillus sp. Hyperparasites of Lepidoptera pupae through its primary braconid and ichneumond hosts: Baghdad April (Al–Ali,1977) recorded on Phytomyza horticola ( Mekhlif and Abdul-Rassoul,2002).


4. Genus: *Neochrysocharis* Kurdjumov, 1912
*Neochrysocharis formosa* (Westwood,1833).

**Material examined:** It was found in Baghdad on *L. congesta* on *Medicago sativa* on 20.3.2013 (♀♂) from *L.bryoniea* on *Melilotes indica*.

This species has been previously recorded from *Phytomyza horticola* (Mekhlif and Abdul-rassoul,2002).

**Hosts:** Endoparasitoid of the larvae and pupae of Coleoptera (Chrysomilidae) and Lepidoptera (Torticidae, Pyralidae, Yponomutidae) (Hansson, 1995).

**Family:** Braconidae Nees, 1812
**Genus:** *Opius* Wesmael, 1835
*Opius* sp.

**Material examined:** Two samples were collected from *L.sativa* on weeds

**Family:** Pteromalidae Daiman, 1820
**Genus:** *Halticoptera* Spinola, 1811
*Halticoptera circulus* (Walker, 1833)

**Material examined:** It was found on *L. sativa* on *Trigonella Phoenum* in 16.3.2013 ,from Baghdad, (♀♂,♀♂) This species has been previously recorded as *H.* sp , Baghdadon Ternip 26.3. 1970( El-Haidari *et al.*) , on, *Phytomyza atricornis* (Al –Ali , 1977), on *Phytomyza horticola* (Mekhlif and Abdul Rassoul,2002).


**Genera Distribution:** Wide distribution through United State and Southern Canada also Mexico and Europe(Peck,1963 Burks,1979).

**Genus:** *Ratzeburgiola* Erdős
*Ratzeburgiola incomplete*, Boucek, 1971

**Material examined:** It was found on *L. bryoniea* on *Melilotes indica* from Baghdad on 20.3.2013.(♀♀♀) .

This case of parasitism on *Liriomyza bryoniea* as a new alternative host record to Iraq.


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