

## Incidence of Parasitoids on the Leaf-miner Species, *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae), in Tomato Fields, at Qaluobia Governorate, Egypt

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### ABSTRACT

Field studies were carried out to determine the population density of the leaf-miner, *Liriomyza trifolii* (Burgess) attacking early summer plantations of tomato fields and percentages of parasitism on it. The incidence of naturally major parasitoid species of the pest recorded during the two successive seasons, 2008 and 2009, at Qaluobia Governorate, Egypt, were also investigated. Obtained data revealed that, the common surveyed parasitoid species of *L. trifolii* were; *Chrysocharis* sp., *Cirrospilus* sp., *Diglyphus crassinervis*, *D. isaea* and *Neochrysocharis* sp. The surveyed parasitoid species played an important natural role in suppressing the pest population density. The total parasitism rate increased when all parasitoid species occurred together at the same time, compared to the existence of each parasitoid separately. The two common recorded parasitoid species; *D. isaea* and *Neochrysocharis* sp., are candidates to be mass reared for controlling *L. trifolii* in tomato fields and/or greenhouses.

**Key words:** Tomato, pests, *Liriomyza trifolii*, parasitoids, interaction, Egypt.

### INTRODUCTION

Tomato, *Lycopersicon esculentum* Mill. (Family: Solanaceae) is one of the familiar and popular vegetable crops throughout most temperate and tropical countries (Oji and Ali, 2005).

Many insect pest species were known attacking tomato plants, particularly, the leaf miner, *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) (Uygun *et al.*, 1995; Akihito *et al.*, 1999; Misayo *et al.*, 2003 and Mostafa 2006). However, this pest worldwide represents one of the most destructive insect pest species not only to different vegetables, but also to ornamental crops (Gahbicheh, 2001).

Extensive studies have been continuously encouraged and developed in the field of biological control of insect pests using many biocontrol agents such as parasitoids. Recent control strategies depend principally on knowing pest natural enemy relationship. Also, the use of biological control does requires detailed knowledge of pest biology and population dynamics, as well as, the natural enemies associated with the pest and their impact (Bekheit, 2005 and Mostafa, 2006).

The present work was conducted to study *L. trifolii* population densities and to estimate percentages of parasitism on it, in early summer plantations of tomato, at Qaluobia Governorate, Egypt. The study also focused on recording the interactions existed naturally among major recorded parasitoid species of the pest.

### MATERIALS AND METHODS

Studies were carried out at Qaluobia

plantations of tomato of the two successive seasons, 2008 and 2009. An area of one feddan (at El-Manaial district), was annually selected. Experimental area received all regular recommended agricultural practices, except use of chemical insecticides.

#### Population of the Leaf miner *L. trifolii* and percentage of parasitism

At the age of 45 days of planting, in the second week of January of the two seasons of study, weekly samples of 500 leaflets (5 leaflets/plant × 100 plants), were collected. Leaflets were directly transferred to the laboratory in paper bags for inspection and for actual weekly counting of *L. trifolii* larvae, using a stereomicroscope. The percentages of tomato leaflets damage by the pest were also estimated. Collected infested leaflets were placed in glass jars (17 cm height x 11 cm diameter), provided daily with filter papers (to absorb moisture). The pest larvae were left until pupation and subsequently adults' emergence of either *L. trifolii* or its parasitoid species.

Emerged parasitoid species were weekly collected, classified by the aid of a stereomicroscope and counted. Emerged parasitoid species were identified at the Biological Control Research Department, Plant Protection Research Institute, Agricultural Research Center (ARC), Giza, Egypt. Percentages of parasitism on *L. trifolii* larvae were estimated, according to the equation described by El-Khawas and El-Khawas (2005). Natural interactions existed between the recorded *L. trifolii* and its parasitoid species, and the percentages of their occurrence to each others were also studied. Inspection of tomato leaflets was ended in the third week of May in the two studied seasons 2008 and