

NEW METHOD FOR MASS REARING THE LEAFMINER, *LIRIOMYZA TRIFOLII* (BURGESS) (DIPTERA : AGROMYZIDAE)

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Abstract

This investigation was carried out under glasshouse conditions ($25 \pm 3^\circ\text{C}$, $65 \pm 5\%$ R.H.) at Plant Protection Research Institute, Dokki, Giza. This method aims to produce a large numbers of leafminer adults, *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) with little costs of materials used and less labors. Common bean plants (*Phaseolus vulgaris* L.) were used for rearing *L. trifolii* held in rearing cages. Artificial infestation with *Liriomyza* adults was done for ten hours then plants were transferred to other cages. After seven days from hatching plant leaves were picked up and put on cartoon trays for pupation, pupae were collected by brushes and put in big glass jars for 9-11 days for adult emergence. Emerged adults used for recycling the rearing method of *Liriomyza* and/or for rearing the parasitoid, *Diglyphus isaea* (Walker) (Hymenoptera: Eulophidae) and/or *Liriomyza* biological studies.

INTRODUCTION

There was a little published data about rearing of leafminers such as McGregor (1914) who confined adults of *Liriomyza pusilla* (Meig) with seedling cotton plants in an unsuccessful attempt to induce oviposition. Classen (1942) also failed in an attempt to induce mating and oviposition when he confined the adults of *Agromyza laterella* Zett. with iris plants. Webster & Parks (1913) succeeded in inducing the adults to oviposit in confinement. They also observed that confined flies fed readily on sugar water. Parrella *et al* (1987) use the chrysanthemum plants to rear the agromyzid, *Liriomyza trifolii*, the author expose plants to *L. trifolii* colonies for 2 h to standardize larval development.

The aim of this work to produce a large numbers of leafminer adults, *L. trifolii* with little costs of materials used and less labors.

MATERIALS AND METHODS

To establish the culture of *L. trifolii*, infested common bean (*Phaseolus vulgaris* L.) leaves with *L. trifolii* larvae were collected from fields, After that the leaves put in big glass jars with filter papers, covered with pieces of thin cloth, kept in position by means of rubber bands for *Liriomyza* pupation. The pupae collected and kept in big glass jars with filter papers and inspected daily to remove the emerged adult flies by using the aspirator. The adults kept in the pupation glass jars confined with Taphla leaves as a carrier for honey droplets as a food source for adults and changed daily.

Common bean seeds were cultivated in polyethylene pots (8 cm² diameter) (Fig. 1). Pots were held in rearing cages (60 cm² high, 50cm² wide, 50 cm² long) (Fig. 2), after 30 days, the plants (two plants/pot) were ready for adults infestation.

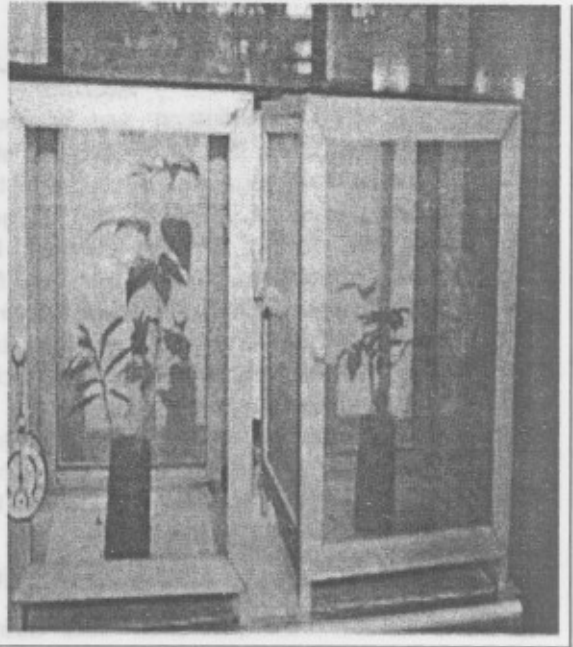


Fig. 1. Polyethylene pots used for common bean seeds sowing.

Fig. 2. Rearing cages used to held pots.

Bean pots were exposed to *Liriomyza* females in rearing cages for ten hours for egg laying (thus, eggs almost hatched at the same period), potted plants were transferred after exposure period and relocated in other rearing cages.

After seven days from hatching (and just before late larvae turn into pupae) the potted plants leaves were picked up, infested leaves put on big carton trays upon shelves for pupation. Pupation will occur nearly within one day before the picked leaves (containing late larvae) become dried out, this assure that there is no need to utilize any method to maintain plant leaves in a fresh conditions hence, rearing costs will decrease.

After pupation, dropped pupae removed from trays and leaves, collect with brushes, kept in the pupation glass jars with filter papers, covered with pieces of thin cloth, kept in position by means of rubber bands. Adults emerge nearly after 9-11 days from pupation, Part of the emerged adults can used for potted bean infestation to reprocess the above rearing technique and the other part can utilized in other purposes as mass rearing of the parasitoid, *Diglyphus isaea* depending on the adult numbers produced.

Liriomyza adults can be handle by three ways:

* By the aspirator, the most suitable handling.

* Or by putting the glass jars containing adults into deep-freezer for 3-4 minutes to anesthetize adults, this method need more studies to know its side effects on fecundity of adults.

* Or by putting the glass jars containing adults into refrigerator for 20-30 minutes to make adults motionless, this method is less active for handling adults as it need to handle in fast.

RESULTS AND DISCUSSION

This technique aimed to produce a large numbers of leafminer adults with little costs of materials used and less labors. The technique depend on that, the pupation will occur nearly within one day before the picked leaves become dried out, hereby there is no necessitate to utilize any method to maintain plant leaves in a fresh conditions hence, rearing costs will decrease. By this mass rearing technique, adult *Liriomyza* production can induce a large amount of *Liriomyza* insects depending on rearing cages, trays and pupation glass jars numbers with fewer costs and labors. As shown in **Table (1)** mean number of adult *Liriomyza* produced per one female during its life span average 91.13 - 94.50 adults, also daily numbers of *L. trifolii* adults produced from one cage (one pot) containing ten *L. trifolii* pairs average 90.67 - 94.00 adults, **Table (2)**. Thus, by this method obtained adult numbers could maximize depending on cage (pots) numbers used. For example, if we use ten cages about 920 adult *Liriomyza* will produced daily.

The present work agrees with the findings of Webster & Parks (1913), who succeeded in inducing the adults to oviposit in confinement. They also observed that confined flies fed readily on sugar water. Also, Parkman *et al* (1989) mentioned that, total development times for larvae of *L. sativae* reared on castor bean varied from 13.1 & 28.5 days at 30 & 20 °C, respectively. *L. sativae* females produced a mean of 164.5 larval progeny at 25 °C on castor bean during an average lifespan of 13.4 days.

Table 1. Produced numbers of *Liriomyza trifolii* adults per female.

Produced numbers of <i>L. trifolii</i> adults from one female during its life span										
	Cage 1	Cage 2	Cage 3	Cage 4	Cage 5	Cage 6	Cage 7	Cage 8	Total	Mean
Repeat 1	96	77	102	89	80	98	87	100	729	91.13
Repeat 2	100	85	99	96	102	80	105	89	756	94.50
Repeat 3	79	88	104	90	102	101	85	89	738	92.25

Table 2. Daily numbers of *Liriomyza trifolii* adults produced from one cage.

Day	Adults resulted from infested plants by ten <i>L. trifolii</i> pairs/ cage during ten days											
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	Total	Mean
Repeat 1	60	89	100	99	105	88	90	100	80	65	876	90.67
Repeat 2	74	90	104	99	75	89	90	100	96	90	907	92.56
Repeat 3	69	88	100	96	105	98	100	80	91	88	915	94.00

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طريقة جديدة للتربية الكمية لحشرة صانعة أنفاق أوراق الفول

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أجريت هذه الدراسة تحت ظروف الصوب الزجاجية ($25 \pm 3^\circ\text{C}$ ، $65 \pm 5\%$ رطوبة نسبية) - معهد بحوث وقاية النباتات - الدقي - الجيزة. وقد تم استخدام نباتات الفاصوليا العادية لتربية حشرة صانعة أنفاق أوراق الفول *Liriomyza trifolii* داخل أقفاص تربية خاصة. أجريت العدوى الصناعية بالحشرة للنباتات لمدة 10 ساعات فقط داخل الأقفاص لتنقل النباتات في أقفاص أخرى لا تحتوى على الحشرة. وبعد 7 أيام من فقس البيض تم قطع أوراق النباتات التي تحتوى على العمر الأخير لليرقات ووضعها على صواني من ورق الكرتون حتى حدوث التعذر. يتم جمع العذارى بواسطة فرشاة وتوضع في برطمانات زجاجية كبيرة مفروشة بورق لمدة 9-11 يوم حتى خروج الحشرات الكاملة والتي تستخدم في إعادة التربية الكمية للحشرة أو للتربية الكمية للطفيل *Diglyphus isaea* أو التجارب البيولوجية للحشرة. وتهدف هذه الطريقة إلى إنتاج كمية كبيرة من الحشرات الكاملة باستخدام مواد رخيصة وعمالة قليلة.