# Natural Abundance of the Tomato Leaf Miner *Liriomyza Bryonia* (Kaltenbach) (Diptera: Agromyzidae) on Some Winter Host Plants in Alejelat Region, Libya

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*Abstract*— Natural abundance of the leaf miner *L. bryoniae* (Kaltenbach**)** was studied on four winter host plants [broad bean (*Veciafaba*), pea (*Pisum sativum*) , mallow (*Malva sylvestris*) and snow thistle *(Sonchus oleraceus*)] in Alejelat region . *L. bryoniae* showed low populations in December on all studied host plants except broad bean. then ,developed high populations in February and march then the population decreased till the end of the growing season.

*L. bryoniae* recorded three peaks of abundance on all host plants, except broad bean(4 peaks) the highest peak recorded 104, 260, 156 and 222 individuals/ 100 infested leaflets on broad bean, pea, mallow and snow thistle respectively . The highest average numbers occurred in February on all host plants, except broad bean recording 206.0 ± 57.0,99.5 ± 48.9 and 146.8 ± 30.8 individuals/ 100 infested leaflets pea, mallow and snow thistle ,respectively and 59.0 ± 36.6 individuals/ 100 infested leaflets on broad bean recorded on December . On the other hand the lowest monthly average numbers occurred in April recording(19.5 ± 6.4, 39.5 ± 12.0, 10.0 ± 1.4 and 9.5 ± 3.5individuals/ 100 infested leaflets) on Broad bean, Pea, Mallow and Snow thistle respectively.

***Keywords*—**Kaltenbach, Broad bean, Pea, Mallow, Snow thistle.

## I. Introduction

GENUS *Liriomyza* contains more than 300 species, widely distributed in the new and old world but are commonly found in temperate areas **(Parrella, 1987)**. *L. bryoniae*is polyphagous and as such can feed indiscriminately on plants from a number of different orders, including many vegetable and ornamental species **(Minkenberg & van Lenteren, 1987).** Few authors have discussed the wild plants that *L. bryonia e*utilises as hosts**(Gil-Ortiz *et al.* 2008)** The tomato leaf miner, *L. bryoniae*, is a highly polyphagous species of leaf miner among other things, infestations of the tomato leaf miner, *L. bryoniae*, damaging the leaves of the tomato plants, reducing the photosynthetic area and therefore reducing yield of the crop **(Spencer 1973)** The tomato leaf miner *L. bryoniae* is an economically important pest of greenhouse tomato crops in the UK, which at high infestations can reduce the value of the crop by up to 20% **(walker 2012).** The life history of *L. bryoniae*is typical of the genus, as outlined in (**Parrella1987)**. A fertilized adult female will deposit eggs individually through holes made in a leaf, formed by the thrusting of the female's ovipositor through either surface, adaxail or abaxail, of a leaf and into the mesophyll. In this way females form two types of leaf puncture: a fan shaped puncture used only for feeding, and a tubular puncture used for both feeding and oviposition **(Parrella, 1987)**. Each oviposition leaf puncture contains just one opaque ellipsoidal egg **(Minkenberg & van Lenteren, 1987).** Three larval instars develop within the leaf and by continued feeding mine their way through the leaf until the final larval instar cuts a semi-circular exit hole through the leaf surface **(Parrella, 1987).** The prepupal larvae leaves its mine and pupates in the soil at the base of the plant at a depth of approximately 5cm **(Minkenberg & van Lenteren, 1986; Parrella, 1987)**. Pupal colour ranges from light yellow to dark-brown **(Malais & Ravensberg, 2003).**

## II. Materials And Methods

The present study was carried out in Alejelat region. four winter host plants were targeted for this study [broad bean (*Veciafaba*), pea (*Pisum sativum*) , mallow (*Malva sylvestris*) and snow thistle *(Sonchus oleraceus*)]Hundred leaflets infested with *L. bryonia* were taken from each plant . Samples were kept in plastic bags and transferred to be examined in the laboratory .Number of living *L. bryonia* larvae and number of killed larvae were counted and recorded . Normal agricultural practices of fertilizing and irrigation were followed and no chemical control measurements were applied . Samples took place from the appearance of the emergence of the first leaves and continued weekly until harvest.

## III. Results And Discussion

Data presented in fig (1)shows the numbers of *L. bryonia* larvae on four winter host plants.

On brad bean *L. bryonia* larvae recorded low numbers in the beginning of the season early December , then the population increased recording four peaks of abundance ( 104, 69, 52 and 45 individuals/ 100infested leaflets) occurred in 27$^{th}$ of

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December , the 17 $^{h}$ of January , 14$^{th}$ of February and 21$^{th}$ of march respectively.

On pea, the population of *L. bryonia* recorded three peaks of abundance (146, 148 and 260 individuals/100infested leaflets) on 3$^{th}$ of January , 31$^{th}$ of January and 7$^{th}$ of March respectively .

On mallow, the population of *L. bryonia* recorded three peaks of abundance ( 105, 156 and 129 individuals/100 infested leaflets) occurred in 3$^{th}$ of January , 14$^{th}$ of February and 14$^{th}$ of march respectively .

On snow thistle, the population of *L. bryonia* recorded Three peaks of abundance (118, 222 and 145 individuals/100 infested leaflets) on 3$^{th}$ of January, 31$^{th}$ of January and 14$^{th}$ of march respectively .

It could be concluded that , the population of *L. bryonia* larvae showed (3 - 4) peaks of abundance on all targeted host plants , recording low populations in the beginning of the growing season , then reaching its highest peaks in February and march (except brad bean that recoded its higher peak on December) ,then the population decreased towards the end of the season. Similar results were obtained by (**Elkhouly2009)** who found that the *l.trifolii* recorded the same number of population peaks on broad bean, kidney bean, fenugreek, sour clover and chick pea as winter host plants. These results are also in agreement with those of **(Awadalla*et al*.2009)** and **(Khouly, 2003).**With regard to the previous studies on the parasitoids of different leaf mining species , it could be seen that the low population recorded in the beginning of the season is due to the activity of the larval pupal endoparasitoids , while the low population recorded at the end of the season is due to the high activity of the larval ectoparasitoid *Diglyphusisaea*.

On the other hand the realatively high abundance of *L. bryonia* in the beginning of the season in comparison with our previous studies on *L. trifolii* may be due to the lack of the larval pupal endoparasitoids in the area of the study or due to the unpreference of these parasitoids to *L. bryonia* as an insect host.

As shown in table (1) *L. bryonia* showed its highest monthly average numbers in February on pea, mallow and sow thistle recording (206.0 ± 57.0, 99.5 ± 48.9 and 146.8 ± 30.8 individuals / 100 infested leaflets) respectively and (59.0 ± 36.6/ individuals/ 100 infested leaflets) on December. On the other hand the lowest monthly average numbers occurred in April on the four studied host plants recording (19.5 ± 6.4, 39.5 ± 12.0, 10.0 ± 1.4and 9.5 ± 3.5individuals/ 100 infested leaflets) on Broad bean, Pea, Mallow and Snow thistle respectively .

TABLE I

MONTHLY AVERAGE NUMBERS OF THE L.BRYONIA LARVAE ON FOUR WINTER HOST PLANTS

| Months | Broad bean | Pea | Mallow | Snow thistle |
|---|---|---|---|---|
| December | 59.0 ± 36.6 | 101.5 ± 33.5 | 45.3 ± 17.2 | 68.0 ± 21.0 |
| January | 51.7 ± 11.3 | 125.2 ±25.6 | 78.2 ±16.9 | 142.6 ± 56.9 |
| February | 33.2 ± 14.0 | 206.0 ± 57.0 | 99.5 ± 48.9 | 146.8 ± 30.8 |
| March | 34.2 ± 6.2 | 190.5 ± 81.0 | 81.3 ± 49.2 | 86.8 ± 45.3 |
| April | 19.5±6.4 | 39.5±12.0 | 10.0±1.4 | 9.5±3.5 |
| Mean ± SD | 39.52±15.8 | 132.5±67.9 | 62.9±35.4 | 90.7±56.9 |

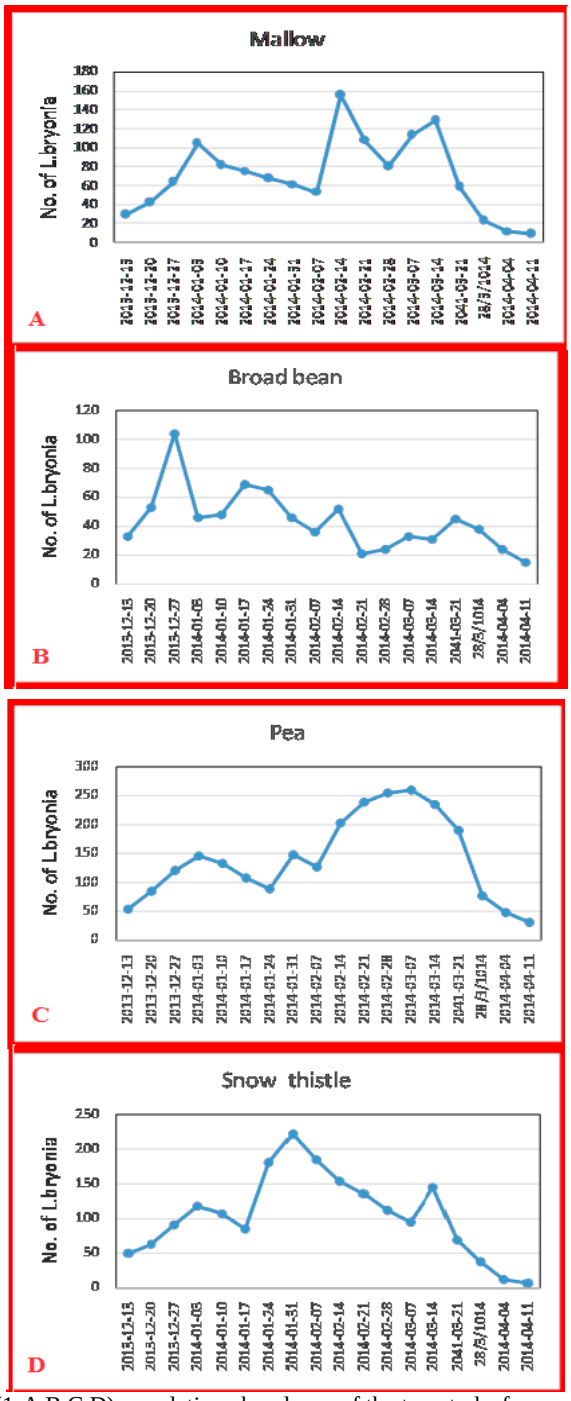


Fig. (1-A,B,C,D) population abundance of the tomato leaf miner *L. bryonia* on four winter host plants during the growing season 2013/2014.

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