

Intraspecific Competition among Same-aged Larvae and Adults of *Liriomyza trifolii* (Diptera: Agromyzidae) in Field Bean Primary Leaves: Effects on Colony Production

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Abstract

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The agromyzid leafminer, *Liriomyza trifolii* (Burgess), is a major pest of vegetables and ornamentals throughout the world. For its biological and chemical control studies, the suitable rearing methods of this leafminer must be established. This study investigated the intraspecific competition among same-aged larvae and adults in three width grades of field bean primary leaves (*Phaseolus vulgaris* var. *communis* Aeschers) for providing better production methods of this leafminer and its parasitoids. The experiments were conducted at 25°C under three grades of primary leaf width, i.e., the small, middle, and large leaf width was 6.0–7.0, 7.1–8.0, and 8.1–9.0 cm, respectively. In 17 larval densities, 11–95 third-instar larvae were divided into 17 grades at intervals of 5 larvae, the control treatment being 0 grade including 1–10 larvae, while, in 5 adult densities, numbers of pairs of adults in proportion to numbers of seedlings conducted in laboratory were 10 : 20, 20 : 20, 30 : 20, 40 : 20, and 60 : 20, respectively. The results showed that the larval survival and pupal length grades of *L. trifolii* were directly affected by grades of primary leaf width and leafminer larval density, the pupal length of I, II, III, IV, and V grades being 1.85–2.11, 1.67–1.82, 1.49–1.63, 1.31–1.45, and 1.05–1.27 mm, respectively. Exploitative competition occurred among third-instar larvae. The emergence of pupa, size of adult, female proportion, longevity, fertility and number of feeding stipples were all indirectly affected by grades of primary leaf width and leafminer larval density through leafminer pupal length. The longevity and fertility of this female leafminer were also affected by the adult density. This study indicates that the suitable rearing methods of *Liriomyza trifolii* are as follows: 30 seedlings without mature leaves of field bean in which 10- and 11-d-old, primary leaf width was 7.1–9.0 cm are placed in a screen cage (75 by 55 by 50 cm, 92 meshes) containing 80 2-d-old and mated females that are allowed to oviposit for 7 h at 25°C, but another 20 females are added daily to maintain the uniform number of females. After 6 days, when eggs develop to third-instar larvae, 15–20 larvae/leaf are suggested to provide for the successive production of this leafminer, and 20–30 larvae/leaf are for its larval parasitoids, *Hemiptarsenus varicornis* (Girault) and *Neochrysocharis formosa* (Westwood), respectively.

Key words: *Liriomyza trifolii*, Intraspecific competition, Production, Field bean.

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