



Studies on the extent of damage caused by *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) on six vegetable crops

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ABSTRACT: A survey was conducted to study the incidence and extent of damage caused by American serpentine leaf miner, *Liriomyza trifolii* on six vegetable crops, using an infestation index and score for the intensity of infestation in a 0 – 4 scale based on the infested area on each leaf. Among the six crops surveyed maximum infestation index was observed in ash gourd (55%) followed by cowpea (45%). The older leaves were preferred more than the younger leaves. The infestation (25%) was minimum in pumpkin and bitter gourd. ©2014 Association for Advancement of Entomology

KEY WORDS: *Liriomyza trifolii*, incidence and extent of damage, vegetable crops.

The leaf miners, *Liriomyza* spp. are economically important phytophagous pests of several vegetable crops coming under the family Agromyzidae (Diptera). Six species of *Liriomyza* are reported as polyphagous pests (Morgan *et al.*, 2000; Linden, 2004).

The American serpentine leaf miner, *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) is a serious pest of vegetable and ornamental plants. The pest surveillance conducted in Kerala by KHDP (1998) and Smitha (2003) revealed severe incidence of *L. trifolii* on cowpea, ash gourd, bitter gourd and tomato and higher incidence of this pest was reported during the months of January to March. The damage is caused by the maggots which are leaf miners, feeding on the mesophyll tissues leaving the epidermis intact, resulting in serpentine mines on the upper leaf surface. Heavy infestation causes desiccation and drying of leaves (Chandler and Thomas, 1983). The wide host range, short life cycle and faster development of resistance to insecticides make the management of *L. trifolii* very difficult.

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A survey was conducted at the Department of Agricultural Entomology, College of Horticulture, Kerala Agricultural University, Vellanikkara to study the extent of damage caused by *L. trifolii* from six vegetable crops, namely, cowpea (*Vigna unguiculata* (L.)), ash gourd (*Benincasa hispida* Thunb.), snake gourd (*Trichosanthes cucumerina* L.), bitter gourd (*Momordica charantia* L.), watermelon (*Citrullus lanatus* (Thunb.) Matsum. & Nakai) and pumpkin (*Cucurbita moschata* Duchesne) grown in Madakkathara and Vellanikkara of Thrissur district to estimate the extent of infestation caused by *L. trifolii*. Ten infested plants from each crop were randomly selected in the crop fields. From each plant, 15 leaves were selected at random for taking observations on damage.

Scoring for the intensity of infestation was done in a 0 – 4 scale (Table 1) based on the infested area present on each leaf.

Table 1. Scoring for *Liriomyza trifolii* infestation on leaf

Per cent leaf area infested	Score	Infestation intensity
0	0	No infestation
1 - 15	1	Low infestation
16 - 30	2	Medium infestation
31 - 50	3	High infestation
>51	4	Severe infestation

The infestation index was also worked out for each crop surveyed as given below (Wheeler, 1969).

$$\text{Infestation index} = \frac{\text{Sum of all scores}}{\text{Number of scores} \times \text{Maximum score}} \times 100$$

The intensity of infestation varied in different crops (Table 2). Among the six crops surveyed from two locations of Thrissur district, namely, Madakkathara and Vellanikkara, the highest infestation index was observed in ash gourd (55%) followed by cowpea (45%). The older leaves were preferred more than the younger leaves. The lowest infestation (25%) was observed for pumpkin and bitter gourd.

Ash gourd, cowpea, snake gourd and watermelon were highly preferred by *L. trifolii*. This was in agreement with Smitha (2003) who reported severe infestation of leaf miner on cowpea, ash gourd and pumpkin. Pest surveillance studies conducted by Kerala Horticultural

Table 2. Severity of damage caused by *Liriomyza trifolii* to different crops

Sl. No.	Crops	Infestation index (%)
1	Ash gourd	55.00
2	Cowpea	45.00
3	Snake gourd	42.50
4	Water melon	35.00
5	Pumpkin	25.00
6	Bitter gourd	25.00

Development Programme also showed severe infestation of *L. trifolii* on the above mentioned crops (KHDP, 1998). Reghunath and Gokulapalan (1996) gave an account of the severe infestation of *L. trifolii* in cowpea, tomato and cucurbits in Kerala. Reji (2001) reported the highest incidence of *L. trifolii* during summer season with mean infestation index being 67.63 per cent.

Ash gourd was observed as the highly preferred crop. This corroborates with the finding of Smitha (2003) who also reported the high susceptibility of ash gourd among cucurbits to *L. trifolii*. The bottom leaves were damaged more than upper leaves by the larval stages of *L. trifolii*. The cotyledons were damaged more. The tender leaves were free from infestation. Higher sugar and nitrogen content of the cotyledons would enhance the infestation by *L. trifolii*. According to Ananthakrishnan (1992) sugar acted as feeding stimulants and larvae fed more voraciously on plant parts containing highest concentration of sugars. The chlorophyll content was also higher in cotyledons (Terman, 1977). Feeding activity and fecundity was also reported to be higher with increase in nitrogen content of leaf (Mikenberg and Ottenheim, 1990).

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