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**Biological studies of the
European leafminer *Scaptomyza flava*
(Fallén) (Diptera: Drosophilidae)**

Muhammad Shakeel

2012

**Biological studies of the
European leafminer *Scaptomyza flava*
(Fallén) (Diptera: Drosophilidae)**

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Abstract

The European leafminer, *Scaptomyza flava* (Fallén), is an important pest of brassicas, peas and gypsophila in New Zealand. Information on its response to abiotic environment and on feeding, oviposition and mating behaviours is essential for the development and implementation of monitoring and control tactics. The present study reveals that the provision of honey is not desirable for its cost effective rearing as the females of this species have similar fecundity when provided with host plant, and host plant + honey solution. Feeding and oviposition activities are rhythmic in this species and maximum feeding and oviposition occur during the first six hours of the photophase. Therefore, early hours of the day are the optimal time for scouting its population. Mass rearing of this species for use in biological control or sterile insect technique (SIT) programmes should be carried out between 20° and 25°C where maximum fecundity occurs. Female *S. flava* create significantly more feeding punctures and lay significantly more eggs on the four- and six-leaf stage Chinese cabbages than on younger stages, suggesting that the cabbages of four- to six-stages are more susceptible to *S. flava* infestation. My results show that adult females prefer vigorous to water stressed plants for both feeding and oviposition and their larvae perform better in vigorous plants, supporting both preference and performance propositions of plant vigour hypothesis. In practice vigorous plants should thus be provided for *S. flava* adults to obtain flies of high quality and quantity. Female *S. flava* prefer to feed and oviposit on mature leaves where they perform better while their offspring's performance is similar in both young and mature leaves. This result suggests that adult rather than offspring performance is shaping host preference pattern for oviposition in this species, supporting the optimal foraging theory which predicts that females prefer to feed and oviposit on hosts best satisfying their own nutrition requirements. *Scaptomyza flava* males perform courtship displays to females before mounting and mating occur. Males confined in isolation are significantly more likely to achieve mating than males reared in groups, suggesting that the mass reared males to be used in SIT should be kept in isolation before release. Furthermore, mated males are significantly more likely to display courtship behaviour and achieve matings, suggesting that learning may play a role in higher mating success. Sexual harassment by males decreases *S. flava* female feeding, longevity and offspring production. Finally, my study indicates that males of this species prefer to mate with females having larger abdomen and longer ovipositor while females prefer males with longer antennae and fore-tarsi. These morphological traits are likely associated with feeding and reproductive fitness.

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