

# SEASONAL DEVELOPMENT OF MEADOWFOAM FLY, *SCAPTOMYZA APICALIS* HARDY (DIPTERA: DROSOPHILIDAE) IN THE WILLAMETTE VALLEY

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## Abstract

Seasonal development of the meadowfoam fly (MFF) was studied in commercial meadowfoam fields in the Willamette Valley from December 1996 through June 1998. Numbers of adults caught at weekly intervals on yellow sticky cards defined flight peaks and seasonal occurrence of this insect. Larval populations in plants were monitored through the crop season with Berlese funnels.

Fly activity over the growing season was similar in both years. A small flight was detected on traps during the first two weeks of September 1997, about one month before meadowfoam fields were seeded. In both years flies were most numerous in early to mid March. Thereafter, numbers of flies trapped fluctuated within and between fields. The last flies were captured at the end of June.

No other host plants have been identified

## Introduction

Meadowfoam, *Limnanthes alba* Hartweg ex. Bentham (Limnathaceae) is native to northern California, southern Oregon and Vancouver Island, British Columbia. The unique long chain fatty acid oil in the seed is used in machine lubricants as well as by the cosmetic industry (Jolliff et al., 1981).

MFF is apparently the only insect that significantly damages meadowfoam in the Willamette Valley. Larvae tunnel into shoots, leaf petioles, stems and flower buds. Seed yield loss has been observed in both experimental plots and commercial fields heavily infested with MFF (Ehrensing et al. 1990).

Seasonal population trends of MFF in the commercial meadowfoam fields were described over two growing seasons from December 1996 to August 1998.

## Materials and Methods

Larvae and their population levels were monitored monthly from seeding to harvest. Eight samples of ten plants each were randomly taken beginning in December from each of five fields in 1996-97 and three fields in

1997-98. Larvae were extracted from plants using Berlese funnels.

Eggs and puparia observed on plant samples were recorded. Yellow sticky traps were used to monitor adults through the season in each of the fields. Traps were placed in fields about one month before meadowfoam was seeded and monitored through harvest. Six traps were placed in each field at the height of one foot from the ground. Each week traps were replaced and numbers of flies were recorded.

## Results

Overall, patterns of larval and adult populations were similar from field to field in both seasons. Larvae were first detected in meadowfoam samples in early January. Numbers increased sharply after mid February. Larval densities peaked between early and mid April. The greatest larval populations observed approached 25/crown in one field during April in 1998. Larval numbers declined as bloom increased through early June. No larvae were extracted from plant samples after full bloom (Figure 1).

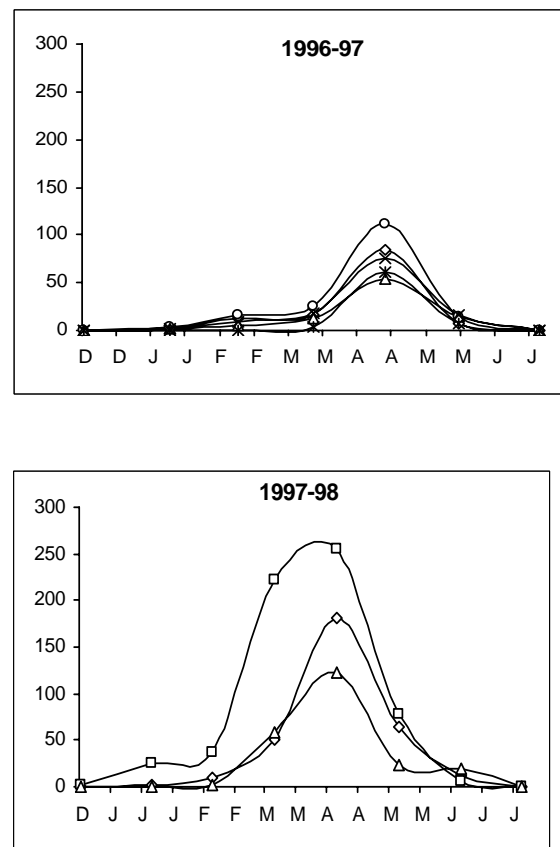


Figure 1. Averages larval densities (10 plants/sample, n=10) of *Scaptomyza apicalis* Hardy in five meadowfoam fields in 1996-97 and three fields in 1997-98 in the Willamette Valley, OR.

Larvae feed on above ground meristem tissue of the crowns and stems during the vegetative growth stage. Later, they tunnel into flower buds.

Brown puparia are usually attached to various plant structures on the lower half of the plants. A few puparia were found attached to dry stems after plants were harvested in late July 1998.

In 1997, the first fly was caught in early September well before meadowfoam was seeded. Small peaks occurred in the first half of September in every study sites following the first rains of late summers. Numbers declined through mid January. Populations increased rapidly in late January and peaked in March. Populations fluctuated widely and gradually declined when plants bloomed (Figure 2). The last flies were caught in late June of both years.

Adults appear to remain in meadowfoam fields throughout their lives, seemingly quite dependent on free moisture on plants or the soil surface. They readily fly short distances on calm, warm days but are rather inactive under the canopy or on the ground on cold, cloudy days. Females did not seem to have a preferred oviposition site on meadowfoam during plant vegetative growth. However, most eggs were deposited on or near flower buds later in the season.

To date, natural biological controls have not been found.

### Discussion

Meadowfoam fly occurs in all meadowfoam fields in the Willamette Valley. Egg laying flies are present at plant emergence in September, but at low numbers. Flies became abundant beginning in January. Larval populations build up in the late winter through spring and are capable of reducing plant stands, bloom and seed yield.

Meadowfoam (*Limnanthes* spp.) appears to be the only host for meadowfoam fly. Biological controls are glaringly absent. Surveys of native *Limnanthes* populations are being conducted for MFF and natural enemies. The hope is to identify and release effective biological controls into the Willamette Valley correlated from native populations of *Limnanthes* infested with MFF. Until then, growers may control meadowfoam fly with dimethoate insecticide (OR 24c) in late winter. A spray should be applied when daily fly catches on yellow sticky traps average 3 to 5 per trap.

### References

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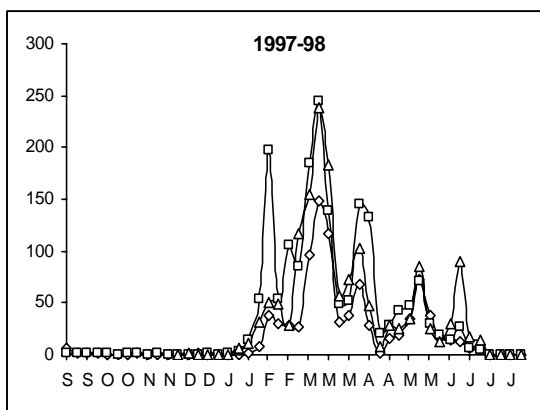
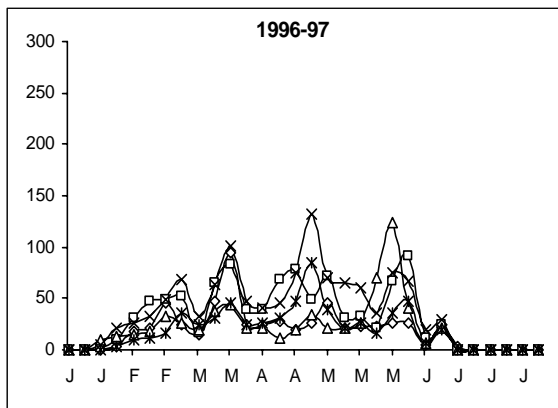


Figure 2. Average of adult *Scaptomiza apicalis* Hardy on yellow sticky traps (n=6) in five commercial meadowfoam fields in 1996-97 and three fields in 1997-98 in the Willamette Valley, OR.