Botanophila seneciella (Meade)

INVASIVE SPECIES ATTACKED: Tansy Ragwort (*Senecio jacobaeae*)

PREVIOUSLY KNOWN AS: *Hylemya seneciella* Meade and *Pegohylemyia seneciella*

TYPE OF AGENT: Seed feeding fly

COLLECTABILITY: Passive distribution

ORIGIN: France

DESCRIPTION AND LIFE CYCLE

Adult:
The dull grey adults are similar to houseflies. They have slightly clouded, clear wings that extend beyond their body, ranging from 4 - 6 mm long. The female's abdomen is conical, while the male's is narrow and both are covered with short hairs. Adults emerge to coincide with floral bud formation of tansy ragwort. Females can be observed walking over bolting plants investigating floral bud suitability. Appropriate buds used for oviposition will be 3 - 4 mm in diameter. Egg-laying coincides with floral development, usually about one week after they emerge. Females deposit eggs individually near the top of developing seeds between floral bracts. Adult life span is about 44 days.

Fig. 1. *B. seneciella* pupa (credit Powell et al. 1994)

Egg:
Eggs are small, oval shaped and somewhat off-white coloured. Eggs incubate for 3 - 4 days.

Larva:
Creamy-white larvae hatch during June, July and early August. At high elevations, emergence may be delayed until July. Three larvae instars feed for 26 - 29 days, developing to 4 - 6 mm long while consuming part or all of the seeds. Early stages of seedhead attack can be identified by observing a frothy secretion appearing from a small brown puncture dot. Late stages are recognized by tufts of sticky brown florets or white pappus appearing from between bracts. Infected seedheads, when opened, will expose the larvae or feeding evidence - a hollow black cavity. Larvae mature in late summer, exit the seedheads and move to the soil to pupate.

Fig. 2. *B. seneciella* feeding evidence in floral heads

Pupa:
A dark brown puparium is developed five days after the larvae enters the soil and remains there until the following spring.

Overwintering stage:
Pupae overwinter within the soil.

Fig. 3. *B. seneciella* dispersal site on Vancouver Island (Coastal Douglas-fir zone)

EFFECTIVENESS ON HOST PLANT
Larvae feed in developing seedheads, often consuming all seeds and reproductive floral parts. The best control has been on small isolated tansy ragwort patches where 30% of flower heads are attacked. On large sites, the rate of attack plummets to 2%. Seedheads average 10 to 15% attack. *Botanophila seneciella* on its own, is unable to provide adequate control, but contributes to the overall desired affect when released onto sites with *Longitarsus* spp. or *Cochylis atricapitana*.

HABITAT AND DISTRIBUTION

Native:
The native range of *B. seneciella* is unknown.

North America:

B. seneciella appears to have few site restrictions, establishing easily on tansy ragwort growing in variable habitats. It has shown a preference for the open habitat of meadows, forest openings and right-of-way's. Commonly it attacks plants in semi-shaded areas with light canopy but avoids heavy shade. It fills a niche for areas less desired by other agents, specifically *Tyria jacobaeae*. It has superior host seeking capabilities and can easily locate isolated patches of tansy ragwort. *B. seneciella* is found established in Canada in B.C. and in the United States in Wash., Calif., Idaho, Oreg. and Mont.

British Columbia:

B. seneciella has been released and found established into the Coastal Western Hemlock biogeoclimatic zone. In addition, *B. seneciella* has also been found dispersed in the Coastal Douglas-fir and Interior Douglas-fir zones.

Fig. 4. *B. seneciella* dispersal location in the Abbotsford area (Coastal western hemlock) zone

BRITISH COLUMBIA RECORD

Origin:

The Canadian *B. seneciella* populations came from French stock reared in California.

History:

The first *B. seneciella* release in B.C. occurred in 1968 in Peardonville, but it did not establish. Later, in 1985, another release was made in Abbotsford on Sumas Mountain.

Fig. 5. *B. seneciella* dispersal location in the South Okanagan near Naramata (Interior Douglas-fir zone)

Field results:

In 1986, a survey carried out on Vancouver Island found the fly was well distributed in the Nanaimo area. In 1998, Ministry staff found *B. seneciella* larvae at the southern interior tansy ragwort infestation in the Okanagan Valley near Naramata. *B. seneciella* has dispersed itself freely enough to no longer warrant collections for new releases in most situations. *B. seneciella* has been found sharing sites with *Longitarus jacobaeae* (Italian and Swiss strains), *Cochylis atricapitana*, and *T. jacobaeae*. The majority of the *B. seneciella* found in B.C. is believed to be the result of self-dispersing populations.

Collection for redistribution:

B. seneciella has dispersed itself freely enough to no longer warrant collections for new releases in most situations. If releases are required, larvae transfers are best suited for this agent by transplanting infested plants to new locations.

Fig. 6. *B. seneciella* dispersal location in the central Okanagan near Kelowna (Interior Douglas-fir zone)

- Larvae can be transferred in a variety of methods:
    - Releasing 1,000 to 1,500 seedheads, average 10 to 15 % attack, is sufficient to create a new colony;
    - Plants can be transplanted to new sites by moving infested plants just before peak bud formation to ensure seed heads are infected. Transfers made too early or too late can result in non-viable treatments;
    - Infested plants can also be harvested in late summer and by keeping plant roots adequately moist and their stems placed on sand allows the larvae to leave the heads and pupate in the sand. The sand is then stored in a cool location and placed at the release point the following spring; and
- Adults can also be swept as an alternative to larvae/pupae transfers. Adult collections can occur in the early mornings when the temperatures are still cold. By keeping the adult flies cool and dry, they can survive up to one week before they must be released.

NOTES

- *B. seneciella* can co-exist with *Longitarsus spp*. and *C. atricapitana*, but is a poor competitor against *T. jacobaeae*. Isolated small sites or widely spaced individual plants are undesirable for *T. jacobaeae*, however, *B. seneciella* will establish in these types of infestations, subsequently avoiding competition and filling a specific niche.
- *It* is not a strong invasive plant control agent but is the only one to establish east of the Cascade Mountains.
- *B. seneciella* was screened by New Zealand and the United States.

REFERENCES

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