

# *Aphthona cyparissiae* (Koch)

**INVASIVE SPECIES ATTACKED:** Leafy spurge (*Euphorbia esula*)  
Cypress spurge (*E. cyparissias*)

**TYPE OF AGENT:** Root feeding flea beetle

**COLLECTABILITY:** Mass

**ORIGIN:** Austria, Hungary and Switzerland

## DESCRIPTION AND LIFE CYCLE

### Adult:

Adults are light brown or coppery coloured, oval-shaped and measure 3 - 4 mm long. Their unique feature, a dark brown gap at the top of the wing-covers distinguishes them from other *Aphthona* species. Adults begin to emerge in late June and continue through to August, often persisting later in lower numbers. As with all *Aphthona* species, adults congregate for feeding, mating and egg-laying. Adults will breed almost immediately and begin to lay eggs within one week. Intensive egg-laying lasts for two months before it slows for another two months. Eggs are deposited slightly underground near spurge roots in clusters of 20 or 30 every 3 - 5 days. Each female will lay up to 285 eggs during this period. *Aphthona cyparissiae* has a longer oviposition period than *A. nigricutis*. *A. cyparissiae* remains high on plants during warm summer days, often taking short flights. On warm days it avoids predation by jumping readily, but as temperatures drop to 10°C or less, they move less and are susceptible to animal grazing. Adults can be found through early summer on warm and hot days. During bright, hot days, adults rapidly rise on plants.



Fig. 1. *A. cyparissiae* adult (credit Powell et al. 1994)

### Egg:

Eggs measure 0.7 x 0.4 mm. During the three week incubation period, the pale coloured eggs darken to brown-yellow.

### Larva:

Elongated, slender, white larvae with brown heads often maintain a slight 'comma' shape through the three instars. Upon emergence, the larvae often feed together in small groups in a parallel formation on the youngest roots, avoiding the latex producing layers. The first instar completes in eight days. The second instar lasts 25 to 30 days and it no longer avoids the latex as it feeds on the outer tissues of older roots and freely moves between them. This feeding pattern continues for 45 days through the third instar. The damage the larvae create initiates new growth the next year, causing the plant to send out new shoots from the attacked locations. This is essential for the insect's survival. These new shoots provide an abundance of young roots for larvae feeding the next year and may subsequently increase the adult population. At optimal temperatures, the larvae feeding stage will last 75 to 80 days. When lower temperatures arrive, the larvae prepare for further development by returning to the soil. Complete development requires a 4-month period with temperatures at 10°C or less, (surviving to -13°C). Larvae which fail to complete the required feeding before the onset of winter will not finish development.



Fig. 2. *A. cyparissiae* larva (credit Powell et al. 1994)

### Pupa:

Pupation takes 28 to 57 days, occurring the following year during late spring or early summer.

### Overwintering stage:

Mature larvae overwinter in a prepared pupal chamber within the soil.

## EFFECTIVENESS ON HOST PLANT

The larvae stage is the main factor of control as it feeds on the various roots, disabling the plants' ability to absorb and store nutrients and moisture. The feeding will suppress the plants' vigour and reproductive ability, delay flowering, and weaken or kill plants.

Adult foliage feeding is quite impressive as they can completely consume small and young leaves, however the larvae contribute to the majority of the plant control. Each *Aphthona* species group feeds in a specific manner; brown coloured adult flea-beetles, including *A. cyparissiae* feed on the leaf margins. Adult feeding on leaf tissues and new shoots can impede photosynthesis, compounding nutrient starvation. Adults usually remain close to the release showing immediate effects of attack, but tend to disperse after five years.

Visual impacts seen at well-established treatment sites:

- Reduced number of flowering stems;
- A temporary increase of short, non-flowing stems is common, and will disappear after about four years; and
- Other vegetation fills the voids left from dead spurge.

## HABITAT AND DISTRIBUTION

### Native:

*A. cyparissiae* prefers habitats similar to that of *A. nigriscutis*, but in slightly moister areas often located in the bottom third of valley slopes and in depressions.

### North America:

*A. cyparissiae* will do well in areas where *A. nigriscutis* populations have decreased as a result of increased moisture. It prefers spurge sites within a bunchgrass plant community where soils have a sand content between 40 and 60%. It is susceptible to predation from large ant populations. A climate with a 4-month period of temperatures of 10<sup>0</sup> or less is required for complete development. *A. cyparissiae* shows a strong preference for cypress spurge over leafy spurge.

### British Columbia:

*A. cyparissiae* has been released and found established and dispersed in the Bunchgrass, Interior Douglas-fir and Ponderosa pine biogeoclimatic zones. It has also been released into the Sub-boreal spruce zone, but there is no record of it becoming established prior to subsequent invasive plant treatment on the site. However, because *A. cyparissiae* and *A. nigriscutis* are difficult to differentiate from each other, it is possible records of *A. nigriscutis* established in the Sub-boreal spruce zone may also include *A. cyparissiae* presence.

Of all the *Aphthona* species in B.C., this species is most tolerant of spurge at low density rates of 50 - 125 stems/m<sup>2</sup> and when mature plants reach at least 51 cm tall.

## BRITISH COLUMBIA RECORD

### Origin:

The *A. cyparissiae* populations released in B.C. originated from Eurasian stock reared in Alta. and Sask.

### History:

The first *A. cyparissiae* release in B.C. occurred in 1989 in the east Kootenays. In 1994, a population mixed with *A. nigriscutis* was released near Kamloops, and flourished within three years. Several thousands of adults have been collected from this location for redistribution and today the site has significantly less spurge. Since 1989, almost 100 *A. cyparissiae* releases have been made in B.C. *A. cyparissiae* and *A. nigriscutis* occur in mixed populations, dispersing freely in B.C.

### Field results:

Past monitoring results found mixed *A. cyparissiae/A. nigriscutis* populations established and well dispersed at most of the release sites. It is difficult to separate these two species and, therefore, it is acceptable to consider them as mixed populations in field results. Adult populations drop significantly when the plants become dried in August.



Fig. 3. Established *A. cyparissiae* mixed *A. nigriscutis* release and collection site north east of Clinton (Interior Douglas-fir zone)



Fig. 4. Suitable *A. cyparissiae* mixed *A. nigriscutis* habitat at release site in Kamloops (Bunchgrass zone)

### Collection for redistribution:

Sweep for adults through early summer on warm and hot days and aspirate to clean the collection. During bright, hot days, adults rapidly rise on plants, allowing for repeat sweeping. Sites are usually harvestable by three years following treatment.

Literature sources indicate new treatments provide earlier results when large numbers are released. When treatments are made with small numbers, the resulting populations tend to persist with small numbers, never showing a significant upward surge in population.



Fig. 5. Suitable *A. cyparissiae* mixed *A. nigriscutis* habitat at release site near Kamloops (Ponderosa Pine zone)

### REFERENCES

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