

Aphthona cyparissiae



Classification

Phylum: Arthropoda

Class: Insecta

Subclass: Pterygota

Division: Endopterygota

Order: Coleoptera

Suborder: Polyphaga

Superfamily: Chrysomeloidea

Family: Chrysomelidae

Subfamily: Halticinae

Tribe: Aphthonini

Genus: *Aphthona*

Species: *Aphthona cyparissiae* (Koch)

General Life History

There is little published information available on *Aphthona cyparissiae* biology, but its life history is similar to that of other univoltine *Aphthona* species (Maw, 1981; Rees and Spencer, 1993; Sommer and Maw, 1982). *A. cyparissiae* overwinters as a diapausing larva in the soil and on or near a leafy spurge root. Overwintered larvae resume development in the spring, and pupation occurs within the soil from late spring to early summer. Adults emerge from the soil throughout the summer and begin feeding on leafy spurge leaves and flowering structures. *A. cyparissiae* adults are about 3 mm long. They rarely fly under field conditions and instead move about by hopping in typical flea beetle fashion. Adults are relatively long-lived beetles, capable of surviving several weeks to several months, depending on field conditions (Maw, 1981). At a given location, the seasonal pattern of adult *A. cyparissiae* abundance is intermediate among introduced *Aphthona* spp. (Hansen, unpublished data).

Mating occurs on leafy spurge shoots, after which adult females lay eggs at the soil surface or in the soil on or near the base of a leafy spurge stem. Generally, *Aphthona* spp. females lay a total of 100-300 eggs during their lifetime, in clusters of 20-30 every three to five days (Sommer and Maw, 1982). Larvae hatch, burrow into the soil and begin feeding on very small leafy spurge roots and root hairs. As they develop, *A. cyparissiae* larvae utilize progressively larger spurge roots; mature larvae may also be found burrowing within large lateral roots and root buds. Larval root feeding continues through the summer and into the fall, until cold temperatures and the onset of dormancy. There are a total of three larval stadia.

Host Range In The Field and Greenhouse Testing

Aphthona cyparissiae appears to feed only on cypress spurge (*Euphorbia cyparissias* L.), leafy spurge (*Euphorbia esula* L.) and several other closely related *Euphorbia* spp. in its native Europe (Sommer and Maw, 1982). To date, introduced United States populations of *A. cyparissiae* have been reported only from *E. esula*.

Laboratory and controlled field studies showed at least limited feeding by *Aphthona cyparissiae* adults on the foliage of a number of European and North American *Euphorbia* spp. (Sommer and Maw, 1982). Limited larval development was observed on plants from several subgenera, but only a few European *Euphorbia* spp. in the subgenus *Esula* were considered suitable hosts (Sommer and Maw, 1982). However, no North American *Euphorbia* spp. in the subgenus *Esula* were included in these experiments. Thus, the host plant range of *Aphthona cyparissiae* appears restricted to the subgeneric level, and may only include leafy spurge and other Eurasian *Euphorbia* species in the subgenus *Esula*.

List of Known Parasitoids or Predators of *Aphthona cyparissiae*

Consumption of *Aphthona* spp. larvae and adults by generalist predators, particularly ants, has been reported anecdotally. Parasitoids are reported to be rare among European *A. cyparissiae* populations (Sommer and Maw, 1982). No native or introduced parasitoids have been reported among *A. cyparissiae* populations in the United States.

Impact of *Aphthona cyparissiae* on Leafy Spurge

Under optimal site conditions, *Aphthona cyparissiae* populations will, directly or indirectly, kill leafy spurge plants over large areas. As leafy spurge stem densities decline, the relative abundance of nontarget grasses and forbs will increase. Leafy spurge control over at least several acres has been reported from several locations in the western United States and Canada where *A. cyparissiae* has been released.

The host range of *Aphthona cyparissiae* is limited to plant species in the subgenus *Esula* of the genus *Euphorbia*, including the target weed (*Euphorbia esula* L.) and cypress spurge (*E. cyparissias* L.), an introduced weed in eastern North America. The two federally protected native spurges (*Euphorbia garberi* Engelm. and *E. deltiodes* Engelm. ex Chapm.) are in the subgenus *Chamaesyce* (Pemberton, 1985) and are not potential host plants for *A. cyparissiae*.

The potential host status of 21 North American spurges (occurring north of Mexico) in the subgenus *Esula*, including *E. purpurea* (Raf.) Fernald and *E. telephiodes* Chapm., has not been evaluated. Of these, nine are annuals (Pemberton, 1985) that could possibly be utilized by *A. cyparissiae*, but would not permit completion of the life cycle and, hence, population establishment; flea beetle larvae require plant roots year round. The 12 native perennials in the subgenus could be considered possible *A. cyparissiae* hosts, though most occur in the southern United States and are not sympatric with leafy spurge populations (Pemberton, 1985).

Location where *Aphthona cyparissiae* was originally collected

Initial releases of *Aphthona cyparissiae* in the United States were collected from sites in Austria, Hungary, Switzerland and Yugoslavia, or from Saskatchewan, Canada. *A. cyparissiae* occurs naturally in Spain, France, Italy, Germany, Switzerland, Austria, Hungary, Czechoslovakia, Poland, Russia, Yugoslavia and Bulgaria.

Expected North American Range

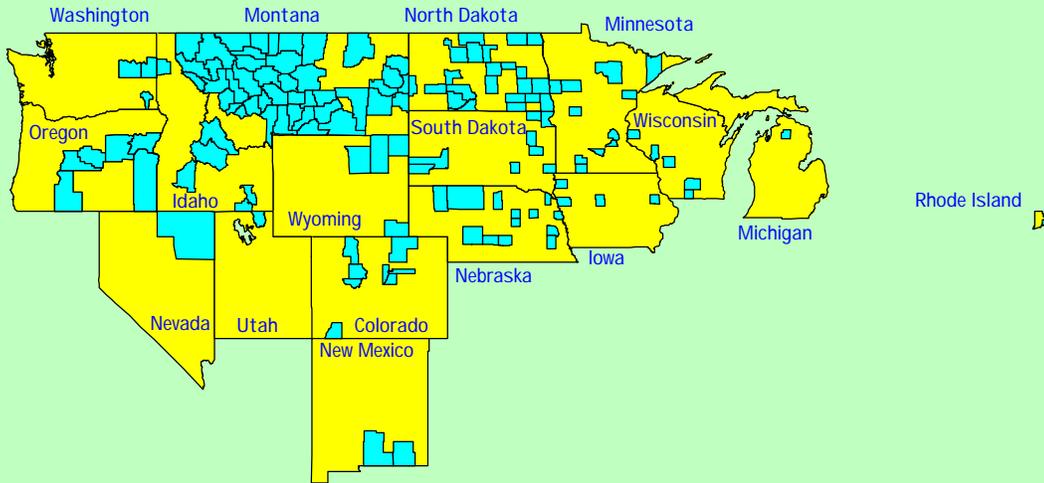
There are no obvious climatic or ecological barriers to survival and establishment of *Aphthona cyparissiae* in most or all of the leafy spurge infested areas of the United State and Canada. However, *A. cyparissiae* appears best adapted to moderately dry sites. The largest *A. cyparissiae* populations should be expected where precipitation patterns and/or soil conditions favor these site conditions. Of course, the ultimate North American range of this insect will reflect the extent of human redistribution activities.

Current North American Distribution

Aphthona cyparissiae was approved for release in May of 1986. Through 1999, this biocontrol agent has been released in 17 states and over 150 counties. Established populations are present in all states where *Aphthona cyparissiae* has been released. In several of these states, limited intrastate redistribution of *A. cyparissiae* has begun. This insect is also widely established throughout central and western Canada.

Aphthona cyparissiae

USDA - APHIS - PPQ 1988 - 1999 Redistribution



Data Source: BBCS Biocontrol of Weeds Database

Map by Harold Ziolkowski USDA-APHIS-PPQ Bozeman Biological Control Station

Specific Reference on *Aphthona cyparissiae*

Sommer, G. and E. Maw. 1982. *Aphthona cyparissiae* (Koch) and *A. flava* Guill. (Coleoptera: Chrysomelidae): Two candidates for the biological control of cypress and leafy spurge in North America. Intl. Inst. of Biol. Contr., Delémont, Switzerland. Final report: 42.