

Aphthona abdominalis



Classification

Phylum: Arthropoda	Superfamily: Chrysomeloidea
Class: Insecta	Family: Chrysomelidae
Subclass: Pterygota	Subfamily: Alticinae
Division: Endopterygota	Tribe: Aphthoni
Order: Coleoptera	Genus: <i>Aphthona</i>
Suborder: Polyphaga	Species: <i>A. abdominalis</i> (Duftschmid)

General Life History

Aphthona abdominalis is a multi-voltine species capable of producing three generations per year. *Aphthona* flea beetles produce four life stages; egg, larva, pupa and adult. The foliage-feeding adults can live 40 to 60 days. During that period they mate and females lay eggs near the soil surface at the base of spurge plants. Individual females can lay up to 60 eggs singly or in small groups of two to six. Upon egg hatching, the larvae feed on subterranean shoots and young roots. These larvae penetrate the plant tissues and feed inside shoots, root apices and root buds. Three larval instars develop within 18-21 days, and may be present from May to September. Third stage larvae move close to the soil surface where they develop into pupae. The duration of the pupal stage is 10 days at 20-21 degrees C. Pupation can occur from June to September.

Aphthona abdominalis overwinters in the soil as an adult. *A. abdominalis* is the only flea beetle species to date that has been introduced for the control of leafy spurge that produces more than one generation per year (Fornasari, unpublished).

Host Range in the Field and Greenhouse Testing

The results of the studies conducted show that *A. abdominalis* has a narrow host range. In the laboratory, under no-choice conditions, feeding of adults and development of larvae occurred on *E. maculata* L., but in the oogenesis test the eggs laid by adults that fed only on *E. maculata* L. did not hatch. In the laboratory no-choice host suitability test, one individual completed development to adult on *E. marginata* Pursh. and two adults on *E. corollata* L. Nevertheless, under field conditions, these species were not suitable hosts for *A. abdominalis* and were not fed upon. When the plant species that showed to be susceptible to attack by *A. abdominalis* in the lab were exposed to adults under field conditions, only leafy spurge (*Euphorbia esula* L.) were attacked and infested. American populations of leafy spurge from Montana, Nebraska, Wisconsin and Wyoming were readily accepted and infested by *A. abdominalis* (Fornasari, unpublished).

Impact of *Aphthona abdominalis* on Leafy Spurge

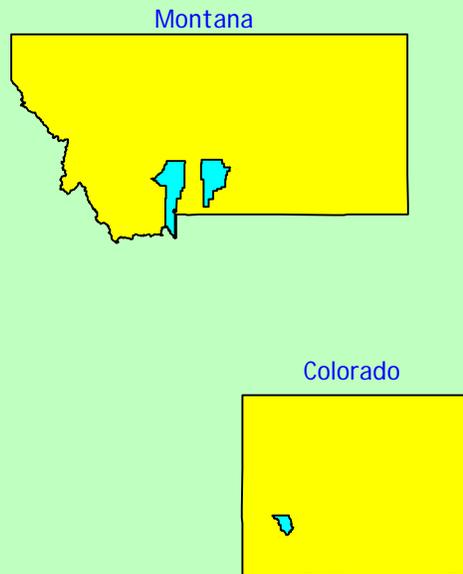
Soon after eggs hatch, neonate larvae move rapidly downwards in the soil, attempting to penetrate into the plant through clefts and openings in the root bark, or through feeding on shoots or tender parts at the axis of root buds. In the laboratory, the larvae did not remain inside the same plant part, but exited and penetrated repeatedly into new parts. The same kind of damage on shoots, adventitious subterranean stem buds and roots was found on the leafy spurge plants heavily infested by *A. abdominalis* in the garden. The larvae were found feeding mainly on subterranean shoots and young roots. Most of the first, second and third instar larvae penetrated and fed inside shoots, root apices, and root buds. The adults feed on the leaves of leafy spurge, having a preference for the youngest leaves at the tip of the stems and on the shoots. The stems of shoots were also destroyed. Young leaves were completely consumed by *A. abdominalis*. On well developed leaves, feeding usually began on the lower side of the leaf, and sometimes the thin epidermis of the upper side of the leaf was left. It appears that because of different emergence periods, feeding remains constant in spite of differences in longevity. Adults that emerged in July and August had a higher metabolism with higher feeding rates, but they also had shorter life cycles (Fornasari, unpublished).

Location where *Aphthona abdominalis* was originally collected

Initial releases of *Aphthona abdominalis* in the United States were collected in Italy. *A. abdominalis* occurs in northern and central Italy, Spain, France, southern Poland, Austria, eastern Yugoslavia, the Balkans, Naxos, Hungary, Romania, Bulgaria, southern Soviet Union, Asia Minor and northwest Iran (Fornasari, unpublished).

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USDA - APHIS - PPO 1993 - 1996 Redistribution



Data Source: BBCS Biocontrol of Weeds Database

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

Current North American Distribution

Aphthona abdominalis was approved for release in North America in May of 1992. Through 1996, *A. abdominalis* has been released in two states: Montana and Colorado. Recovery of this species has not been confirmed and it appears to be unestablished in North America.

Specific Reference on *Aphthona abdominalis*

Fornasari, L., N.R. Spencer and A.D. Prevost. 1992. An Environmental Assessment of *Aphthona abdominalis* (Duftschmid) ARS-Biological Control of Weeds Laboratory Montpellier, France. USDA/ARS Biological Control of Weeds Research Unit Sidney, MT. Unpublished Report: 36.