

Altica carduorum Guer.

INVASIVE SPECIES ATTACKED: Canada thistle (*Cirsium arvense* (L.))

TYPE OF AGENT: Foliar feeding beetle

COLLECTABILITY: Not established

ORIGIN: Switzerland and France

DESCRIPTION AND LIFE CYCLE

Adult:

Metallic blue-black, 4 mm long adults emerge in late spring or early summer and feed on young thistle leaves. Typically the *A. carduorum* adults are present from April to July. The beetles need to recognize its host plant by biting into it. The feces created from feeding on Canada thistle attract the opposite sex, causing them to congregate. Dispersal occurs when adults take frequent flights and deposit feces on adjacent plants, creating the opportunity for another population to develop. Adult beetles spend most of the day on leaf surfaces, and move through sunlit and shaded sites. After a pre-oviposition period, females lay eggs over two months onto the underside of thistle leaves. This generation emerges in mid to late summer, but does not oviposit, but will instead prepare to overwinter.

Egg:

Eggs can be present from May to July. Eggs incubate for about one week. High levels of humidity may be required for successful egg development.

Larva:

Larva can be present from May to July. After hatching, young larvae feed on the lower leaf surface. There are three larval instars and mature third instar larva moves to the soil and buries themselves into one or two cm of soil or duff.

Pupa:

The pupae develop in the soil and emerge from June to September.

Overwintering stage:

Adults enter the soil in the fall and overwinter near host plants.

EFFECTIVENESS ON HOST PLANT

Larvae and adult are strictly foliar feeders. The adults that emerge in the spring feed on young leaves. Larvae feed on the underside of leaves up through to the upper cuticle creating transparent "windows".

HABITAT AND DISTRIBUTION

Native:

A. carduorum is native to Europe. To the east *A. carduorum* is distributed from east of the Caucasus to Kazakhstan, Kirgizia, Tadjikistan. To the west it occurs in isolated populations throughout the Mediterranean and eastern Europe including: Italy, Sicily, Sardinia, Spain, Cyprus, Corsica, Greece, Albania, Yugoslavia, Czechoslovakia and Switzerland. In Asia it is often found at sites surrounded by dry steppe as well as in moist zones of mountainous regions. *A. carduorum* establishes on irrigated or non-irrigated cropland, field and fence borders, fallow land and pastures. Dense stands of vigorous growing plants are required to increase populations. High levels of humidity are necessary, therefore, prairie environments may be unsuitable.

North America:

It is presumed *A. carduorum* did not establish from any released in Canada. Short term survival was found in Ont. and B.C. The greatest success was in Alberta where a small population persisted for three years.

British Columbia:

A. carduorum has been released into the Bunchgrass, Coastal Douglas-fir and Coastal western hemlock biogeoclimatic zones in B.C.

BRITISH COLUMBIA RECORD

Origin:

A. carduorum populations released in B.C. originated from Switzerland and France.

History:

A. carduorum was first introduced into B.C. in 1964 near Victoria. This location received a second population the following year. Two more releases were made near Victoria in 1968 and 1969. Another release was made in 1967 near Summerland that produced a few adults and eggs in the following year. This site was also supplemented with two more populations over the next two years. Human development in all the release areas may have interfered with the beetle's ability to establish.

Field results:

There has been no confirmation of establishment at any of the release sites. The general area containing the releases near Victoria has now been developed and no thistles could even be found at one of the sites. Another site near Victoria still had some thistle remaining in 2003, but no agents were found. A beetle very similar to *A. carduorum* collected from Canada thistle more than 60 km away from the nearest release was identified to be *Altica ambiens ambiens* LeConte, a native insect that is associated with alders (LaSage pers. comm.). The 1967 Summerland release site was developed into a park in 1969 and the thistle was mowed. Future efforts will focus on monitoring for potential establishment of this agent by sampling suitable dispersal sites near the original release locations.

NOTES

- *Observed adult movement between sun and shade is believed to be thermoregulatory.*
- *A biotype of A. carduorum (previously identified as A. circicola) found in China that may be better suited for Canadian prairies was investigated, but not approved, for release in Canada.*

REFERENCES

1. Harris, P. 2006. *Altica carduorum* [Canada thistle beetle](#). Calif. Dept. Food and Agric. November 15, 2006.
2. McClay, A.S., R.S. Bouchier, R.A. Butts and D.P. Peschken. 2001. Ch. 65, *Cirsium arvense* (L.) Scopoli, Canada thistle (Asteraceae). In Biological control programmes in Canada, 1981-2000. P.G. Mason and J T. Huber (editors). CAB International, UK.
3. Lactin, D.J., P. Harris, D.L. Johnson, F.H. Wan and A.G. Thomas. 1997. Modelling and mapping geographic ranges to evaluate weed biocontrol agents: A case study using *Altica carduorum* (Coleoptera: Chrysomelidae) and *Cirsium arvense* (Asteraceae). *Biocontrol Science and Technology*, 7:657-670.
4. Peschken, D.P. 1971. Part II, *Cirsium arvense* (L.) Scop., Canada thistle (Compositae). In Biological Control Programmes Against Insects and Weeds in Canada, 1959-1968. Commonwealth Agricultural Bureaux, England.
5. Wan, F.H and P. Harris. 1996. Host finding and recognition by *Altica carduorum*, a defoliator of *Cirsium arvense*. *Entomologia Experimentalis et Applicata*, 80:491-496.
6. Wan, F.H, P. Harris, L.M. Cai and M.X. Zhang. 1995. Host specificity of *Altica carduorum* Guer. (Chrysomelidae: Coleoptera), a defoliator of *Cirsium arvense* (L.) Scop. (Asteraceae) from North-western China. *Biocontrol Science and Technology* 6: 521-530.