

Microlarinus lareynii (Jacquelin duVal)

INVASIVE SPECIES ATTACKED: Puncturevine (*Tribulus terrestris* L.)

TYPE OF AGENT: Seed feeding beetle (weevil)

COLLECTABILITY: Not established

ORIGIN: Italy

DESCRIPTION AND LIFE CYCLE

Adult:

Microlarinus lareynii weevils are 4-5 mm long with brown coloured cylindrical bodies that widen at their posterior. Their bodies are covered with grey, erect hairs. Their snouts are short and broad. Adults emerge from overwintering locations in the spring and begin feeding on plants. Females prepare oviposition locations by chewing a small pit into the side of a developing seedpod. Young pods are preferred over mature ones. Eggs are deposited singly into the pit and the opening is then sealed with grey-black fecal cement. The pit must be deep enough into the seed covering to ensure the newly hatched larvae will be in direct contact with the enclosed seed chamber. Each female will lay up to 324 eggs. The number of generations depends on the climate. When plants decline, the adults have keen host plant seeking abilities, and take flight as required.

Egg:

Eggs are dark yellow or pale amber coloured, oval, and measure 0.5 mm in length.

Larva:

The larvae are C-shaped and dirty yellow coloured. Development occurs within the seedpod through four instars. Assuming conditions are ideal at the time of oviposition, the newly hatched larvae will attack the seed immediately and in most cases will destroy all the developing seed in one of the five chambers of the seedpods before moving to another. Usually, each larva will use two sections of the spiny, five-chambered seedpods, and up to three weevils can complete development in a single pod. If eggs are deposited into mature pods, the protective seed coat will have already hardened and the new larvae will be unable to penetrate through it. In this case they will attempt to feed beneath the outer pod layer, but will eventually die.

Pupa:

Pupae are creamy white or pale yellow and 4.5 mm long. Pupation lasts four to five days and occurs within the pod chamber which is loosely filled with frass. The duration from egg to adult typically takes 25 - 30 days at 20 to 30°C.

Overwintering stage:

Adults that emerge from pods in August through September overwinter in surface litter.

EFFECTIVENESS ON HOST PLANT

The most effective damage is caused by the larvae as they feed on developing seeds. Individual larvae will usually feed within two chambers and will consume all seeds present. Adult feeding on stems, leaves, buds, flowers and fruits have limited effect on the plants' vigour.



Fig. 1. *M. lareynii* adult on plant stem (credit USDA ARS, 2011, Bugwood.org). See notes.



Fig. 2. *M. lareynii* adult on seedpod (credit Coombs, 2011, Oregon Dept. Agric., Bugwood.org). See notes.



Fig. 3. *M. lareynii* inside seedpod (credit Coombs, 2011, Oregon Dept. Agric., Bugwood.org). See notes.



Fig. 4. *M. lareynii* adult feeding on plant stem. (credit Coombs, 2011, Oregon Dept. Agric., Bugwood.org). See notes.

HABITAT AND DISTRIBUTION

Native:

Microlarinus lareynii is sensitive to cold weather, limiting its habitat to warm or hot areas. In its native habitat it is common to Eurasia and Africa and is consistently found in India, Rajasthan Desert, Italy and coastal and interior France. It has a wider distribution than *M. lypriformis* (a stem feeder) as it was found in 1958 at 90% of all sites researched.

North America:

Since its introduction to the U.S.A., it has become established in Ariz., Calif., Colo., Hawaii, Kans., N. Mex., Nev., Okla., Oreg., Tex., Utah and Wash. Releases made in 1961 and 1963 in south eastern Wash. initially failed to establish presumably due to harsh winters. Another attempt was made in 1982 with a cold hardy strain from Colo., however, it too has not proven to be very effective due to the cooler climate.

British Columbia:

M. lareynii has been released into one of the hottest locations in B.C. in the Bunchgrass biogeoclimatic zone in the Okanagan Valley. No establishment has been found at the release location, therefore, its habitat preferences in B.C. cannot be determined.

BRITISH COLUMBIA RECORD

Origin:

M. lareynii released in B.C. populations originate from Italy via Colorado.

History:

A single *M. lareynii* release was made in 1986 in Osoyoos, from a collection taken from what was considered to be the harshest climate where *M. lareynii* had established to date in the U.S.A. Repeat visits to the Osoyoos site have revealed no establishment. Considerations for importing additional weevils are ongoing.

Field results:

Several years after the release, the Osoyoos release site underwent extensive disturbance, however, the plant has regenerated and is now appearing to slowly spread in the lower Okanagan and Similkameen areas. It is not known if the agent established prior to the excavation. In the late fall of 2013, suspicious looking pod and stem feeding was observed at two puncturevine sites in Oliver, but it was too late in the season to confirm whether the weevil had dispersed to these two locations. The following year the two sites were revisited and the remaining plants were inspected for adults and feeding, but neither was found. The status of this agent is still being investigated and monitoring for establishment is ongoing.

NOTES

- When combined with *M. lypriformis*, *M. lareynii* can significantly reduce plant vigour.
- There are no cold weather biological control agents available for puncturevine in the United States or Canada.
- Figures 1, 2, 3, and 4 have been cited according to the contributor's specified requirements as of 2015-03-04 www.invasives.org.

REFERENCES

1. Andres, L.A. and G.W. Angalet. 1963. Notes on the ecology and host specificity of *Microlarinus lareynii* and *M. lypriformis* (Coleoptera: Curculionidae) and the biological control of puncture vine, *Tribulus terrestris*. J. Econ. Entomol., 56(3): 322-340.
2. Coombs, E. 2011. Puncturevine seed weevil (*Microlarinus lareynii*) on puncturevine (*Tribulus terrestris*). Oregon Dept. Agriculture. Bugwood. Updated May 2011. <http://www.ipmimages.org> (Accessed April 9, 2015).
3. Harris, P., unpublished data, 2006, Agricul. and Agri-Food Canada, Lethbridge, AB. (P. Harris, pers. comm., Nov. 2006).
4. Piper, G.L. 1984. Biological control of weeds in Washington: status report, In: Proc. VI Intern. Sym. Biol. Contr. Weeds, 1984, Vancouver, Canada, pp. 817-826.
5. Turner, C.E. 1996. *Microlarinus lareynii*. Sect. II, Puncturevine. In: Biological control of weeds in the west. N.E. Rees, P.C. Quimbly Jr., G.L.Piper, E.M. Coombs, C.E. Turner, N.R. Spencer, and L.V. Knutson, (editors). Western Soc. Weed Sci.
6. United States Department of Agriculture, Agriculture Research Station. 2011. Puncturevine seed weevil (*Microlarinus lareynii*) on puncturevine (*Tribulus terrestris*). USDA ARS European Biological Laboratory, France. Forestry Images, Bugwood. Updated August 2011. <https://www.forestryimages.org/browse/detail.cfm?imgnum=0021085> (Accessed April 9, 2015).