

Zeuxidiplosis giardi Kieff

INVASIVE SPECIES ATTACKED: St. John's wort (*Hypericum perforatum* L.)

TYPE OF AGENT: Gall forming midge

COLLECTABILITY: Not established

ORIGIN: France

DESCRIPTION AND LIFE CYCLE

Adult:

Zeuxidiplosis giardi adults are very small, delicate flies that measure 3.0 mm long and are similar in appearance to fungus gnats⁵. Their bodies are dark red and they have grey heads, wings and legs¹. The adults are short lived, surviving only a few days and are capable of 5–7 generations per year depending on the climate⁵. The adults are sexually mature when they first emerge⁷. Each female is capable of producing 170 eggs and will deposit the eggs onto the plants' leaves or stems⁵.

Egg:

The eggs are red coloured, elongate shaped and measure 0.3 mm in length. The eggs incubate and hatch in 12 days⁵.

Larva:

There are three larval instars¹. The larvae are red-orange coloured and about 2 mm long. As the larvae emerge they attack the leaves and leaf buds and cause spherical galls to form. Multiple larvae can develop within each gall⁵.

Pupa:

Pupation also occurs within the galls and depending on the temperature, the pupation period can take as few as six or as many as 20 days⁶. The pupae are initially yellow-red coloured, but darken as they mature⁵.

Overwintering stage:

Larvae and pupae overwinter inside the galls^{5,7}.



Fig. 1. *Z. giardi* adult (credit-Norman. E. Rees, USDA Agriculture Research Service – Retired, Bugwood.org). See notes.

EFFECTIVENESS ON HOST PLANT

Leaf and stem galls are created by *Z. giardi* larvae². Typically the number of galls do not exceed 17 per stem, however, each gall can contain multiple larvae. Studies have shown that plants with galls can have reduced root size and vigour as opposed to plants with no galls. In large enough quantities, the impact of galls on an infestation can be severe. The galling located on stems may cause the stem and the root system to die. Heavily attacked plants can lose their ability to obtain moisture and may perish during the dry season. *Z. giardi* galling can also reduce the chances of seedling survival⁵.

HABITAT AND DISTRIBUTION

Native:

The native range of *Z. giardi* occurs in southern and central Europe. It is reported to occur in Portugal, Italy, France, Germany and England⁵. In southern France, severe *Z. giardi* losses have occurred when the host plant suffered from winter kill².

North America:

In the U.S.A., *Z. giardi* has established in Calif., Hawaii and Oreg. It has shown a preference for damp locations at high elevations that also have moderate to high humidity⁵. It appears to do well at St. John's wort sites that are located in forested areas⁴. *Z. giardi* appears to not prefer areas that become dry during the summer or locations that are prone to continuous winds. Heavily grazed areas will also have a negative impact on its survival⁵. *Z. giardi* is unlikely to establish in areas where the foliage of St. John's wort is susceptible to winter kill².

British Columbia:

The single release was made into the Interior cedar hemlock biogeoclimatic zone.

BRITISH COLUMBIA RECORD

Origin:

The *Z. giardi* population introduced to B.C. arrived from Calif. which in turn originated from France^{3, 5}.

History:

In 1955, plants infested with 250 *Z. giardi* adults were transplanted into a St. John's wort infestation near Christina Lake³. The following year the site was monitored and it was determined the agent did not survive after no galls were found. Since this time the site or area has not been revisited and monitored for *Z. giardi* mainly due to insufficient information regarding the exact release point for relocation. In recent years, investigation into the release location has revealed new information that may assist in relocating the general site area. Since its release over 50 years ago, it is assumed *Z. giardi* would have self-dispersed in the scattered St. John's wort infestations around Christina Lake if it did establish.

Field results:

Same year survival of *Z. giardi* was found in the general vicinity of the B.C. release, however, subsequent monitoring the following year in 1956 yielded no galls. As a result, it was determined the biocontrol agent may have perished as a result of the sub-zero temperatures that occurred in the November following release³.

NOTES

- There is a summer resting period but it is not clear if it is an actual dormancy period or if it is a natural response to heat⁵.
- *Z. giardi* has been released and established in Australia, but provides little damage to the plant⁴.
- In South Africa and Hawaii, *Z. giardi* provides effective control of St. John's wort⁴.
- Figure 1 has been cited according to the contributor's specified requirements as of 2015-03-04, www.invasives.org.

REFERENCES

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