

Aulacidea acroptilonica Tyurebaev

INVASIVE SPECIES ATTACKED: Russian knapweed (*Acroptilon repens* (L.))

TYPE OF AGENT: Gall forming wasp

COLLECTABILITY: Not available for general distribution

ORIGIN: Ultrama, Uzbekistan

DESCRIPTION AND LIFE CYCLE

Adult:

Aulacidea acroptilonica adults are small, black gall wasps. Their body measures 2.2-2.7 mm long, excluding the ovipositor that can be 1.9-2.4 mm long¹. The female to male ratio is 90-100% of the adults and they can emerge with an average 160 fully developed eggs within their abdomen. Mating and ovipositioning occurs within hours after the adults emerge. Females that do not mate can still go on to lay eggs. As with other Hymenoptera, it is suspected *A. acroptilonica* are haplo-diploid (capable of producing male adults from unfertilized eggs and females from fertilized eggs). The female seeks suitable ovipositioning locations on the plant's main and lateral shoots by walking around and tapping the surface with her antennae⁷. Once she finds a suitable location to oviposit, the female inserts her ovipositor into the shoot several times before inserting her ovipositor into the plant's meristematic tissue and deposits one or more eggs^{7, 1}. The entire ovipositioning process can take up to 50 minutes to complete at a single location on the plant¹. Adults are short lived and generally 2-9 days long, with the average of approximately 4.9 days².

In Uzbekistan, the adults begin to appear in early April and in Turkey the adults emerge two weeks later during the latter half of April. Galls collected from Uzbekistan and stored overwinter emerged in the lab between mid-April to late-May⁷. Cold spring temperatures may delay pupa development and subsequently adult emergence for one year⁴.

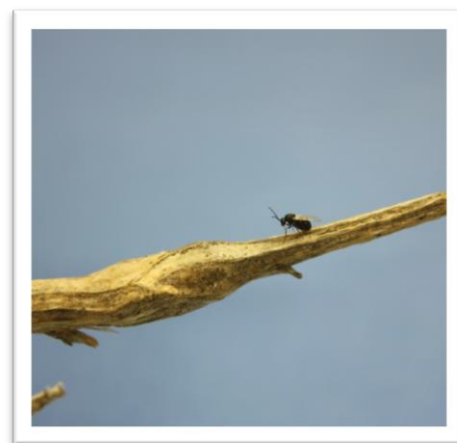


Fig. 1. *A. acroptilonica* adult on dried overwintered gall



Fig 2. *A. acroptilonica* adult on Russian knapweed shoot tip

Egg:

The eggs measure 0.21x0.09 mm. In some young galls, *A. acroptilonica* eggs are dark grey coloured¹.

Larva:

The larvae's saliva incites the plant to form a gall within which the larvae feed. Larvae complete their entire development inside chambers within the gall. By late July, the larvae will be fully developed. The gall size is closely related to the number of gall chambers¹.

Pupa:

Mature larvae generally pupate in the spring inside the gall. However, it is possible for the larvae to delay pupation until the following autumn¹.

Overwintering stage:

Mature larvae overwinter within the gall¹.

EFFECTIVENESS ON HOST PLANT

Gall formation diverts nutrients away from flower development, seed formation and normal plant tissue growth. In some conditions gall development can cause significant stress to the plant's ability to produce seeds and compete in the growing environment. Subsequently, they can reduce the spread of seeds⁷. *A. acroptilonica* from Uzbekistan create larger galls with thicker walls and have fewer parasites than those from Turkey¹.

HABITAT AND DISTRIBUTION

Native:

The native range of *A. acroptilonica* is reported to be from Turkey, Georgia, southern Russia, Iran, Kazakhstan, and Uzbekistan. *A. acroptilonica* requires undisturbed habitats with little to no grazing or soil cultivation. In Turkey and Uzbekistan, the gall wasp is found in varying habitats including roadsides, cropland, orchards, vineyards, and wastelands. In Central Asia, it establishes in undisturbed, semi-desert ecosystems⁷.

North America:

Between 2005 and 2012, several shipments of *A. acroptilonica* were received in North America for rearing purposes. The recipients included quarantine facilities in the U.S.A and Canada: Bozeman, Mont.; Edinburg, Tex.; Mission, Tex.; and, Alta. Poor emergence occurred in all facilities for several years and neither country was able to establish a population until 2010⁶. In 2010, low density populations of *A. acroptilonica* became established at several sites in Mont., Wyom., and Alta⁵. By 2011, one site in Mont. was well established and was expected to become a collection site by 2012. Also in 2011, good adult emergence from 400 galls shipped from Switzerland to Alta., resulted in several field releases⁶. In 2015, a collection from a field population in Alta. was released in B.C.

British Columbia:

The desired B.C. habitat is not known at this time. It is reported to prefer sites near water. The single field release has been made in the Ponderosa pine biogeoclimatic zone. The site is open with no canopy nor wind break and is situated near a small lake at an elevation of 867 m.



Fig. 3. *A. acroptilonica* exit holes from dried galls

BRITISH COLUMBIA RECORD

Origin:

The *A. acroptilonica* adults released in B.C. arrived from Taber, Alberta field sites originally populated with wasps from Uzbekistan.

History:

In April 2015, 500 galls were received by MFLNRO from Agriculture and Agri-Food Canada (AAFC), Lethbridge, AB and reared in an uncontrolled lab environment. The majority of adults emerged over a relatively short time between May 14 and May 25th. The resulting 735 adults were released daily into a single field site near Kamloops.

Field results:

Same year monitoring was carried out in September 2015. Over 300 galls were observed in approximately 40 minutes. The site was monitored in October 2016 and in 41 minutes 379 galls were observed. Galls were found out to approximately 12-15 m from the point of release. Many stems carried multiple galls, some of which had exit holes in a small portion of the galls. A single stem was partially dissected and found to house a pupa case, vacant cavities and one live larva. In 2017 galls were found 25 m away from the release point. Future efforts at this site will focus on monitoring and agent development with the intent to collect galls for redistribution.



Fig. 4. Established *A. acroptilonica* release site near Kamloops (Ponderosa pine zone)

NOTES

- Parasites that attack the galls usually do not affect all the larval chambers within the gall¹.
- Lab studies indicate that plants with a large shoot base may go on to produce galls more often than a plant with a small shoot base³.

REFERENCES

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