CONTROLLING NOXIOUS RUSSIAN Knapweed IN THE NORTH AMERICA

Locations  
Canada, United States

Dates  
01/01/1999 - Ongoing

Summary  
Russian knapweed is one of several invasive plants of rangelands that arrived in North America as a seed contaminant in the 19th century, in this case from Asia. Biological control is often a good approach for these plants, but a nematode species introduced in the 1970s proved ineffective against Russian knapweed. Funded by a US and Canadian consortium, CABI has been tasked with researching new biological control agents for introduction, some of which are already showing promise.

The problem  
Russian knapweed (*Rhaponticum repens*) is an herbaceous perennial plant native to Asia. It was accidentally introduced into North America in the late 19th century as a contaminant of alfalfa seed. The plant has a large native range but genetic studies suggest that the origin of the populations in North America is Kazakhstan and/or Uzbekistan. To date, Russian knapweed has spread to 45 of the 48 contiguous states in the USA, and is considered noxious in 16 western states and one Canadian province.
What we are doing

In the 1970s, efforts to control Russian knapweed in the USA by biological means led to the release of a nematode species, but this agent had little impact. Investigations on biological control of Russian knapweed were resumed in 1997. CABI’s centre in Switzerland has surveyed various regions in the native range to assess the herbivores associated with Russian knapweed, and has studied the biology and host specificity of selected biological control candidates.

Results so far

So far, two new biological control agents have been approved for field release in the USA and Canada: the gall wasp *Aulacidea acroptilonica* in 2008 and the gall midge *Jaapiella ivannikovi* in 2009. Both species have successfully established in both countries, and a large distribution programme covering eight US states has been initiated by USDA-APHIS. In Wyoming, the gall midge reduces seed output by more than 90% and shoot biomass by 30%, confirming results of earlier impact studies in Uzbekistan.

The mite, *Aceria acroptiloni*, has been extremely challenging to work with; not only is the species extremely sensitive to transportation, but until now, we have not had long-term establishment on control plants under experimental conditions. In the past few years, we have put in a tremendous amount of effort to improve our knowledge of this species and our understanding of the host-range test results.

In 2018, we moved the open-field plot to Shirvan, where the mite occurs naturally. However, again in 2019, we were unable to obtain establishment of the mite on the control plants. Despite the high impact of this mite on the reproductive output of Russian knapweed, we have decided to suspend any additional work with this species.

The field surveys in Kazakhstan proved to be extremely successful and a potential new agent has been located, a small leaf mining weevil, *Pseudorcheistes distans*. The combined effect of larval mining and adult feeding can have a significant effect on plant productivity and we have noted plant mortality with high densities of the weevil. We plan to initiate host range tests with this species in spring 2020.

Donors

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Partners

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