

Puccinia acroptili Syd

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

TYPE OF AGENT: Leaf & stem rust (fungus)

COLLECTABILITY: Not permitted

ORIGIN: South-central Asia

DESCRIPTION AND LIFE CYCLE

General development:

Rust coloured pustules form on plants every 12 - 16 days, covering stems and leaf surfaces.

Detailed development:

The rust fungus develops from its overwintering stage (teliospores) and germinates into spores that require cross pollination (basidiospores). Club-shaped structures develop in summer, where the spores (usually three) grow at the tips of diminutive stalks. The pollination process is usually done by flies or other insects as they move through the plant community. After initial cross pollination the structures develop into single celled yellow-brown spores (urediospores), which are self-producing. The advantage of this method of development is rapid spread with multiple, reproductive generations each season. When days shorten in the autumn, the rust develops the overwintering spores (teliospores). *Puccinia acroptili* occurs on upper and lower leaf surfaces. Spores are wind dispersed.

Overwintering stage:

Thick-walled spores (teliospores) that are medium chestnut-brown coloured, develop on dead leaves in the fall and remain so until spring germination.

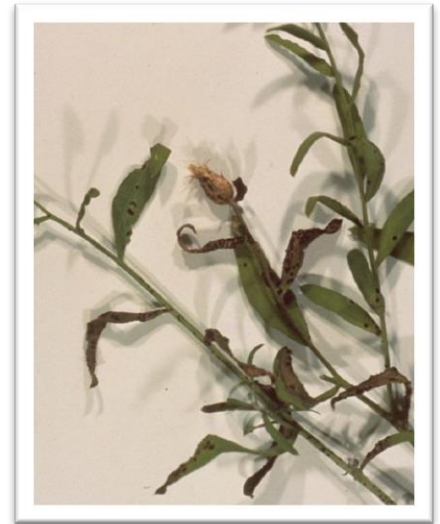


Fig. 1. *P. acroptili* rust pustules (credit Powell et al. 1994)

EFFECTIVENESS ON HOST PLANT

Heavy attack is required to kill leaves. In its native habitat *Puccinia acroptili* kills plants.

HABITAT AND DISTRIBUTION

Native:

P. acroptili originates in south-central Asia.

North America:

P. acroptili occurs widespread within Russian knapweed habitat. Large, dense stands appear to be more affected by the rust than small patches or isolated individual plants. In North America, its distribution occurs from Mexico to Canada, including into B.C., and east to Sask. Establishment in Sask. and B.C. suggests that it also occurs in Alta.

British Columbia:

P. acroptili has been found established at all treatment sites. Dispersal appears quite widespread in the Bunchgrass and Ponderosa pine biogeoclimatic zones.



Fig. 2. *P. acroptili* rust on rosette

BRITISH COLUMBIA RECORD

Origin:

It is not clear how *P. acroptili* established itself in B.C.

History:

It is unknown when *P. acroptili* first established in B.C. It was redistributed in 1985 and 1986 into three locations: Cawston; Walhachin; and, Okanagan Falls. All sites established and it is self-dispersing throughout the southern interior of B.C.

Field results:

P. acroptili occurs in Russian knapweed stands throughout the province at varying levels of effectiveness. At all sites, some plants appear resistant with no negative impact while other plants in the same infestations have heavy rust and are collapsing. Although *P. acroptili* has been noted to be quite widespread in B.C. there have been very few recorded incidents noted in the provincial application (IAPP).



Fig. 3. Established *P. acroptili* release site near Okanagan Falls (Interior Douglas-fir zone)



Fig. 4. Established *P. acroptili* release site in Lac du Bois near Kamloops (Bunchgrass zone)

Collection for redistribution:

Collect infected plant material and scatter among plants at new locations. Successful spore transfer is best just prior to light rain or before dew accumulations.

NOTES

- In Saskatchewan, on sites where *P. acroptili* co-exists with *Subanguina picridis*, galls produced by the nematode in the previous year were heavily attacked with rust. The mixed population appeared to promote extremely enlarged gall development and the Russian knapweed plants became stunted.

REFERENCES

1. Harris, P. and R. L. Conner. 2005. Classical biological control of weeds established biocontrol agent *Puccinia acroptili* Syd. Leaf rust disease. Agriculture and Agri-Food Canada. Updated August 3, 2005. http://res2.agr.ca/lethbridge/weedbio/agents/apucacr_e.htm. (Accessed Feb 15, 2007).
2. Mortensen, K. and M. M. Molloy. 1989. Fungi detected on *Acroptilon repens* (Russian knapweed) during surveys from 1981 to 1988. Can. Plant Dis. Survey. Vol. 69: 2, 143 - 145.
3. Powell, G. W., A. Sturko, B. Wikeem and P. Harris. 1994. Field guide to the biological control of weeds in British Columbia. B.C. Min. For. Res. Prog.