

Data Sheets on Quarantine Pests

Atropellis spp.**IDENTITY****Name:** *Atropellis* spp.**Taxonomic position:** Fungi: Ascomycetes: Helotiales**Common names:** Branch and trunk canker of pine, twig blight (English)
Kiefernringenkrebs (German)**Notes on taxonomy and nomenclature:** Two species are of economic importance, *A. piniphila* and *A. pinicola*. The following species have also been reported on *Pinus* but are of minor significance: *A. apiculata* Lohman *et al.*, *A. tingens* Lohman & Cash, *A. treleasei* (Saccardo) Zeller & Goodding, which has been transferred to *Discocainia* as *D. treleasei* (Saccardo) J. Reid & Funk.**EPPO A1 list:** No. 5• ***Atropellis piniphila*****Name:** *Atropellis piniphila* (Weir) Lohman & Cash**Synonyms:** *Cenangium piniphilum* Weir
Atropellis arizonica Lohman & Cash**Bayer computer code:** ATRPPP**EU Annex designation:** II/A1• ***Atropellis pinicola*****Name:** *Atropellis pinicola* Zeller & Goodding**Synonyms:** *Godronia zelleri* Seaver**Bayer computer code:** ATRPPC**EU Annex designation:** II/A1**HOSTS**• ***Atropellis piniphila***The main host is *Pinus contorta*, but *A. piniphila* can also attack *P. albicaulis*, *P. banksiana*, *P. jeffreyi*, *P. monticola*, *P. ponderosa*, *P. taeda* and *P. virginiana*.• ***Atropellis pinicola***On *P. contorta*, *A. pinicola* can cause an important branch and trunk canker, although more frequently the causal fungus is *A. piniphila*.Minor cankers occur on: *P. lambertiana*, *P. monticola* and *P. strobus*. Minor twig blights occur on *P. nigra* and *P. sylvestris*.Some of these *Pinus* spp., such as *P. sylvestris*, *P. contorta* and *P. nigra*, are widely present in Europe as forest trees, and many other pines have been introduced as ornamental trees.**GEOGRAPHICAL DISTRIBUTION**• ***Atropellis piniphila*****EPPO region:** Absent.

North America: Sporadic in western states of USA (Arizona, Idaho, Montana, New Mexico, Oregon, South Dakota, Washington), and reported from Alabama, North Carolina and Tennessee. Canada: Widespread in Alberta and British Columbia, present in Saskatchewan and Northwest Territories.

EU: Absent.

Distribution map: See CMI (1981, No. 543).

- ***Atropellis pinicola***

EPPO region: Absent.

North America: Canada (British Columbia), USA (Idaho, Montana, Oregon, Washington).

EU: Absent.

Distribution map: See CMI (1981, No. 544).

BIOLOGY

The primary source of inoculum is ascospores, released in wet weather. There is evidence to suggest the ascospores are primarily air-disseminated, although rain may well play a secondary role in dispersal. Apothecia may appear within 4 years of infection and continue to form on the canker. Conidia, which precede apothecia, are produced in mucilaginous masses on the bark surface. The term 'conidia' may not be appropriate since these spores may have a sexual function rather than a propagative one. Although relatively more cankers are found on pines in wet habitats, the greatest amount of inoculum is produced by stem cankers in dry sites. Infection occurs mainly at the branch nodes, and occurs readily through pruning wounds. For *A. pinicola* the infection apparently occurs through uninjured bark or leaf scars. The mycelium grows more rapidly in the xylem than the bark, but rarely invades the pith. Infections commence only in tissues more than 5 but less than 30 years old.

In malt agar cultures of *A. piniphila*, there is some mycelial growth even at 30°C, whereas the growth of the mycelium of *A. pinicola* is inhibited at 25°C.

For further details see also Anon. (1963), Hopkins (1963).

DETECTION AND IDENTIFICATION

Symptoms

Incipient cankers show no external sign of the underlying infection. Dark-brown, necrotic spots, 5 mm in diameter, occur within the bark, possibly enclosed by a single layer of wound tissue. The first external symptom is a drop of resin on the bark surface. Copious fresh resin is found during the summer at the margin of cankers throughout their life.

Cankers are elongated and flattened, but deep and covered with bark which is cracked; they occur particularly at the branch whorls on young branches. Multiple stem cankers may be found. The mean annual rate of canker development was estimated at 45 mm longitudinally and 6 mm tangentially. Dead branches are not invaded externally to the stem, but the base may be attacked. Needles on attacked trees may become chlorotic in summer.

The disease is frequently associated with the stem rust *Cronartium coleosporioides* in the Pacific north-west of the USA (EPPO/CABI, 1996).

For additional information see also Lohman & Cash (1940), Boyce (1961), Anon. (1963), Hopkins (1963).

Morphology

- ***Atropellis piniphila***

There is a characteristic blue-black staining of the wood beneath cankers. A red or brown discoloration is usually present in xylem at the edge of the blue-black zone.

Apothecia erumpent, brownish black, irregularly disc-shaped with a short central stalk, 2-5 mm in diameter. Ascospores hyaline, elliptical-fusoid, aseptate or uniseptate, 16-28 x 4.7 μm . Conidia very thin-walled, hyaline, aseptate, cylindrical, rounded at the ends and possess a mucilaginous coat; 3.5-8.3 x 0.7-1.7 μm .

For further details see also Diller (1962), Reid & Funk (1966).

- ***Atropellis pinicola***

Perennial cankers are rare and then found on the main stem as smooth, elongated, flattened depressions covered with bark.

Apothecia erumpent, sessile or with a very short central stalk, 2-4 mm in diameter. Asci clavate, interspersed with hair-like paraphyses. Ascospores long, narrow, 1- to 6-celled, hyaline; 30-65 x 1.5-4 μm . Conidia narrowly ellipsoid to bacillar, 1-celled, hyaline; 8-11 x 1.7-3 μm .

Detection and inspection methods

Atropellis spp. may be identified using a colorimetric test: a fragment of apothecia turns 5% aqueous KOH a bluish green. *A. apiculata* will turn the solution chocolate brown.

Timber of *Pinus* from countries where the disease occurs should have had the bark removed; however, it is possible that removal of bark may be ineffective as a safeguard if it does not eliminate superficial or deep cankers which may contain mycelium or apothecia, and so any material with canker lesions should be carefully inspected. Particular attention should be paid to the younger branches and twigs of growing material of *Pinus* consignments from countries where the disease occurs.

MEANS OF MOVEMENT AND DISPERSAL

Under natural conditions, *Atropellis* spp. spread by ascospore dispersal within pine stands. In international trade, logs with the bark attached may contain ascospores or traces of mycelium, as may cankers on younger branches and twigs of growing material.

PEST SIGNIFICANCE

Economic impact

- ***Atropellis piniphila***

A. piniphila causes a serious canker of *P. contorta*, particularly in trees 5-25 years old in overcrowded, pure stands; it is widespread on *P. albicaulis*. On *P. ponderosa*, *A. piniphila* causes long cankers. On other pines, only a minor twig blight occurs. In addition to deformation, infected bark adheres to the underlying wood, so preventing effective debarking.

- ***Atropellis pinicola***

A. pinicola is important on *P. contorta* on which it can cause extensive branch and stem cankers leading to malformation and consequent lowering of wood quality. It is seldom important on other pines, and generally never sufficiently severe to cause tree death.

For additional information see also Baranyay *et al.* (1973).

Control

Cultural methods such as thinning of overcrowded stands may help to prevent infection, but no chemical control methods have been worked out.

Phytosanitary risk

Atropellis spp. are listed by EPPO (OEPP/EPPO, 1979) as A1 quarantine pests, as well as by IAPSC. They have not been inoculated to tree species in the EPPO region and their reaction is thus unknown; however, these fungal species do present a hazard to all native

and exotic pines such as *P. contorta*, *P. strobus*, *P. nigra* and *P. sylvestris*, which are important in the EPPO region.

PHYTOSANITARY MEASURES

EPPO (OEPP/EPPO, 1990) recommends that the importing countries may prohibit bark of *Pinus* from North America. If isolated bark of *Pinus* is imported from North America, the consignment must have been heat-treated or fermented. If wood of *Pinus* is imported from North America, the consignment must have been debarked or kiln-dried.

BIBLIOGRAPHY

- Anon. (1963) *Atropellis* canker of pine. In: *Internationally dangerous forest tree diseases. Miscellaneous Publication of the Forest Service, US Department of Agriculture* No. 939, pp. 84-85.
- Baranyay, J.A.; Szabo, T.; Hunt, K. (1973) Effect of *Atropellis* canker on growth and utilization of lodgepole pine. *Information Report - Forestry Service, Canada* No. BC-X-86.
- Boyce, J.C. (1961) *Forest pathology* (3rd edition), pp. 244-255. McGraw Hill Book Co. Inc., New York, USA.
- CMI (1981) *Distribution Maps of Plant Diseases* No. 543 (edition 1). CAB International, Wallingford, UK.
- CMI (1981) *Distribution Maps of Plant Diseases* No. 544 (edition 1). CAB International, Wallingford, UK.
- Diller, J.D. (1962) Differentiation of three *Atropellis* species, based on gross cultural characteristics. *Phytopathology* **52**, 1217-1218.
- EPPO/CABI (1996) *Cronartium coleosporioides*. In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB INTERNATIONAL, Wallingford, UK.
- Hopkins, J.C. (1963) *Atropellis* canker of lodgepole pine. Etiology, symptoms and canker growth rate. *Canadian Journal of Botany* **41**, 1535-1545.
- Lohman, M.L.; Cash, E.K. (1940) *Atropellis* spp. from pine cankers in the United States. *Journal of the Washington Academy of Sciences* **30**, 255-262.
- OEPP/EPPO (1979) Data sheets on quarantine organisms No. 5, *Atropellis* spp. *Bulletin OEPP/EPPO Bulletin* **9** (2).
- OEPP/EPPO (1990) Specific quarantine requirements. *EPPO Technical Documents* No. 1008.
- Reid, J.; A. Funk (1966) The genus *Atropellis*, and a new genus of the Helotiales associated with branch cankers of western Hemlock. *Mycologia* **58**, 417-439.