Prepared by CABI and EPPO for the EU under Contract 90/399003

Data Sheets on Quarantine Pests

# *Chrysomyxa arctostaphyli*

## IDENTITY

**Name**: *Chrysomyxa arctostaphyli* Dietel
**Synonyms**: *Melampsoropsis arctostaphyli* J.C. Arthur
**Anamorph**: *Peridermium coloradense* (Dietel) J.C. Arthur & Kern
**Taxonomic position**: Fungi: Basidiomycetes: Uredinales
**Common names**: Common yellow witches' broom rust, spruce broom rust (English)
Fichtennadelrost (German)
**Notes on taxonomy and nomenclature**: *C. arctostaphyli* is distinct from fir broom rust, *Melampsorella caryophyllacearum* (De Candolle) Schroeter on *Abies*, which has uredial and telial stages on *Cerastium* and *Stellaria* (Arthur, 1962).
**Bayer computer code**: CHRYAR
**EPPO A1 list**: No. 8
**EU Annex designation**: I/A1

## HOSTS

*C. arctostaphyli* develops aecia on *Picea* spp. and telia on *Arctostaphylos uva-ursi*. The main *Picea* spp. concerned are *P. abies*, *P. engelmannii* and *P. sitchensis*. It has also been inoculated successfully to *P. glauca* and *P. mariana*. In the EPPO region, *P. abies* and *P. sitchensis* are important forest trees. *Arctostaphylos uva-ursi* has a wide Eurasian distribution, including the EPPO region.

For additional information, see also Savile (1950), Anon. (1963), Gremmen (1964), Ziller (1974).

## GEOGRAPHICAL DISTRIBUTION

**EPPO region**: Absent.
**North America**: Almost coexistent with the range of
*Picea*, but more common in the west; Canada (throughout); USA (mainly in north: Alaska, Arizona, Colorado, Idaho, Maine, Michigan, Montana, New Mexico, New York, Oregon, South Dakota, Utah, Washington, Wisconsin, Wyoming).
**EU**: Absent.
**Distribution map**: See CMI (1968, No. 441).

## BIOLOGY

Abundant pycnia are produced on the current year's needles of the *Picea* broom in late spring. Fungal mycelium invades the bark and outer xylem of branches and trunks. Aeciospores are produced during the summer and infect *Arctostaphylos uva-ursi*. Basidiospores produced on the latter, a trailing woody plant, are thought to infect *Picea* in early summer. There are no urediniospores. It has been suggested, but not confirmed, that *Picea*-to-*Picea* transmission by aeciospores occurs.

The hyperparasite *Cladosporium aecidiicola* very commonly covers the aecial sori of the spruce broom rust. For further details see also Pady (1941), Savile (1950), Anon. (1963), Gremmen (1964), Ziller (1974).

## DETECTION AND IDENTIFICATION

### Symptoms

**On *Picea* spp.**

The first symptom is needle etiolation in summer. Release of dormant buds results in conspicuous, compact, perennial witches' brooms with yellow-green needles on which foul-smelling, subepidermal pycnia are found. These are followed by aecia which give the brooms a yellow-orange appearance. Needles subsequently die and fall in the autumn, leaving the broom to appear dead during winter. Witches' brooms of conifers not caused by rust retain the colour of normal dark-green foliage throughout the year; only a few of their needles are shed. Sometimes cankers, fusiform swellings and secondary brooms form on the branches and trunk. Trees lose vigour and spike tops, dead branches and mortality are common. Seldom are more than 25% of *Picea* trees in a stand infected; and fewer than 1% of trees bear brooms.

A *Nectria* sp. fruits on old brooms of the rust and the aecial sori are often covered by *Cladosporium aecidiicola*, a green-pigmented fungus. Symptoms are similar to *Melampsorella caryophyllacearum* on *Abies*. They may be distinguished not only by host, but also by the looser, larger brooms on *Picea*. Distinct woody swellings are more commonly caused by the *Abies* parasite, which also changes the shape and colour of infected needles more than does the spruce broom rust.

**On *Arctostaphylos uva-ursi***

The rust is most noticeable in late spring and causes a purple-brown leaf spot. Orange-brown, waxy telia form in crowded groups on these spots on the underside of leaves.

### Morphology

Teliospores oblong, rounded at both ends, wall smooth and colourless, uniformly 1-1.5 µm thick; 13-18 x 23-64 µm. Basidiospores 7.5-8 x 8.5-9.5 µm. Aeciospores orange-yellow, catenulate, with columnar warts and no smooth spot on the wall; 16-25 x 23-35 µm.

## MEANS OF MOVEMENT AND DISPERSAL

Long-distance dispersal is most likely on infected plants, although intercontinental spread is possible by wind-blown aeciospores; the latter can survive storage for several months.

## PEST SIGNIFICANCE

### Economic impact

Although able to infect many *Picea* spp., the rust is only important on *P. engelmannii* and *P. pungens*, in southern Colorado and northern Arizona (USA). Damage results from death of branches, deformation of trunks, reduced growth and also from the fact that secondary decay fungi can enter by the rust infection sites. In 21 stands of merchantable *P. engelmannii* in Colorado, an average cull factor of 24% due to broken or dead tops adjacent to dead rust brooms has been reported. Since diseased trees are liable to shed branches, they represent a hazard to the public.

### Control

No chemical control measures have been elaborated.

### Phytosanitary risk

*C. arctostaphyli* is listed as an A1 quarantine pest by EPPO (OEPP/EPPO, 1979) and is also of quarantine significance for IAPSC. Since *Arctostaphylos uva-ursi* is more commonly associated with *Picea* in Eurasia than in North America, the rust is a great potential danger to *Picea* stands in Europe and Asia (Ziller, 1974). For other details see also Anon. (1963).

## PHYTOSANITARY MEASURES

EPPO (OEPP/EPPO, 1990) recommends that all countries should prohibit importation of plants for planting (except seeds and tissue cultures), and cut branches of *Picea* from North America and Canada.

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