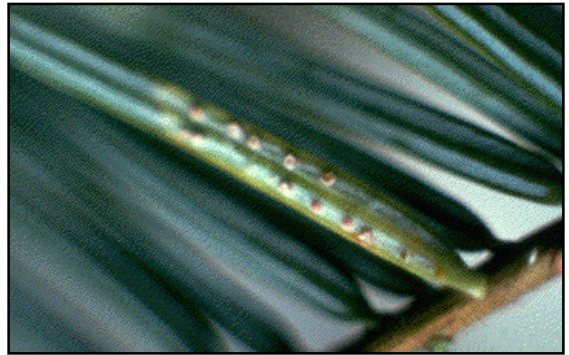


RUST

Rusts affect the leaves, stems, floral parts, and fruits of many plants. Usually rusts are localized on the leaves or branches with only limited spread to other areas. The symptoms appear as small brown, yellow, orange, or white blisters sometimes surrounded by a yellow halo on the undersurface of leaves. They gradually increase in size until they darken and rupture, exposing masses of yellow, orange to black spores. Rusts can also form swellings and galls on some hosts.



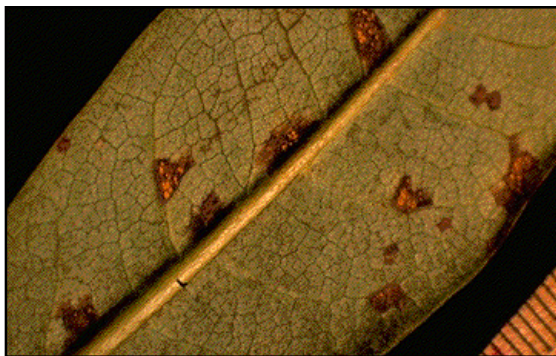
Abies with Rust



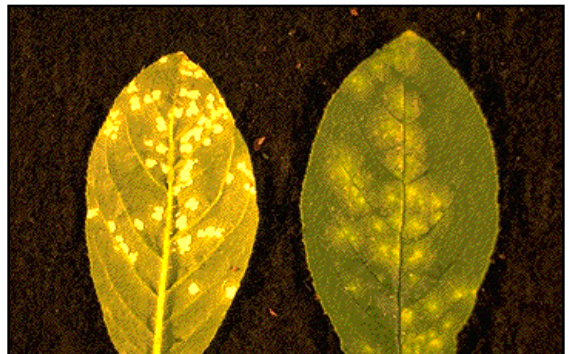
Rust on *Populus*



Senecio with Rust



Rust on *Populus*



Rust on *Cloeme*



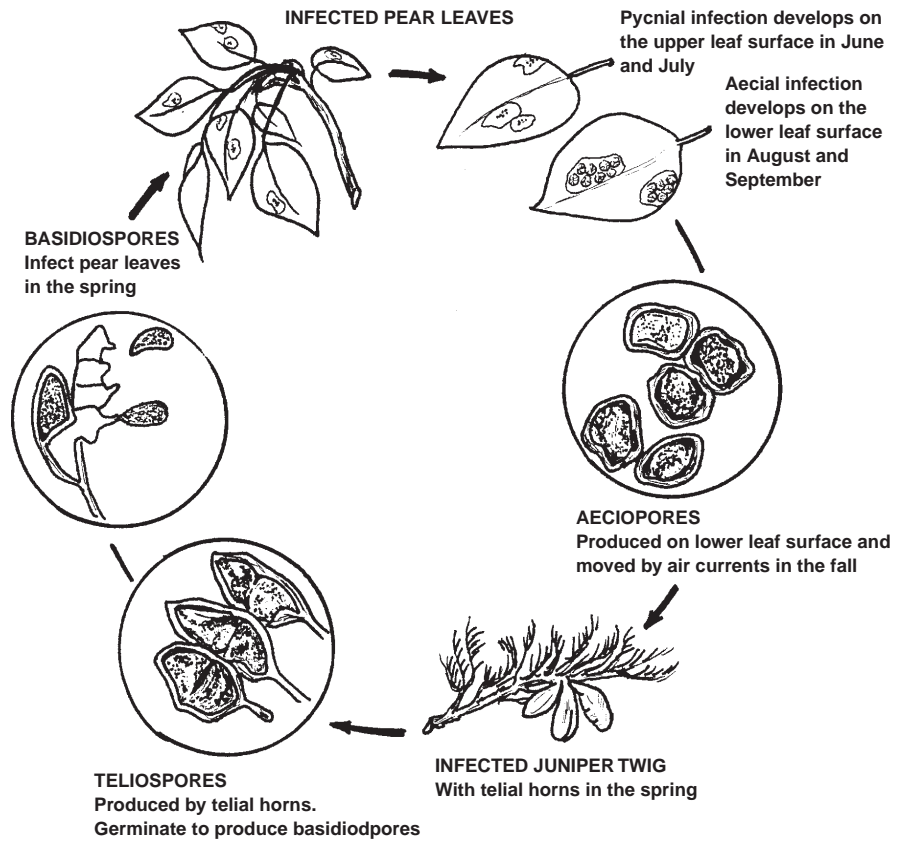
Rust on *Heuchera*

Life Cycle

There are two main types of rusts with distinctly different life cycles. The first type, known as "autoecious" requires a single host to complete its life cycle. The other, "heteroecious" needs two different plant hosts. These overwinter on the alternate hosts, then transfer to the other host to complete the life cycle. Spores can be spread by wind, insects, rain, or animals, and require wet conditions for infection of the alternate plant host.

Species identification is required to determine proper control. If alternate hosts are involved, removal of these plants and burning of infected plant material and fallen leaves is recommended.

Pear Trellis Rust Life Cycle



Antirrhinum (*Puccinia antirrhini*)

Upper leaf surfaces develop pale yellow spots. Brownish rings develop under leaves, on young stems and on the calyx. Plants flower early, are small, and finish prematurely.



Rust on *Antirrhinum*

Cedar Rust (*Gymnosporangium* spp.)

Requires an alternate host, *Juniperus*, to complete life cycle. Symptoms include yellow leaf spots, premature leaf drop, and deformed fruit and stems. Reddish brown galls form in spring, becoming full-sized and dome-shaped in fall. On juniper, similar galls are formed which release spores to *Crataegus* (hawthorn) in humid weather. Removal of alternate hosts will prevent the problem.



Crataegus with Juniper Rust

Chrysanthemum White Rust (*Puccinia horiana*)

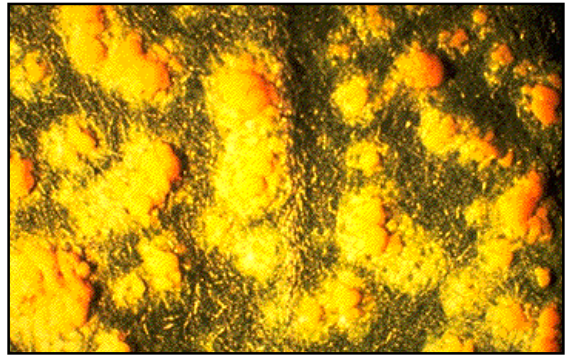
Pale, greenish-yellow spots appear on upper sides of leaves, the centres of which later turn brown. On the bottom, pinkish-buff areas develop under spots, which gradually turn white. The fungus requires high humidity and a film of moisture for infection. If this rust is found, it should be reported to Agriculture and Agri-Food Canada immediately.

Dianthus (*Uromyces dianthi*)

Chocolate-brown to red powdery spore masses form on leaves, stems, and flower buds. Spots are about 1.5 to 6.5 mm long and surrounded by a yellow margin. Plants become stunted and leaves curl up. Spores are spread by splashing water.

Fuchsia (*Pucciniastrum epilobii*)

Leaves develop spots with tan centres and purple borders. Rusty coloured blister-like spots appear on undersides of leaves. This results in stunting of growth, death of leaves and eventual defoliation. Spores overwinter on plant debris, germinating in spring in warm wet conditions. The rust also infects fireweed and true fir (*Abies*).



G. Guy

Chrysanthemum White Rust



G. Guy

Chrysanthemum White Rust



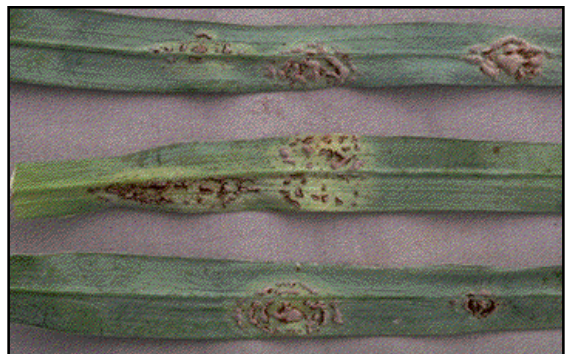
Fuchsia Rust



Fuchsia Rust



S. T. Koike

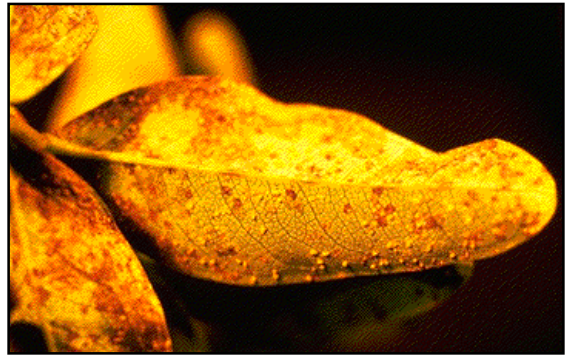
Rust on *Dianthus*

S. T. Koike

Rust on *Dianthus*

Hypericum (*Melampsora hypericorum*)

Yellow, red, or brown spots are observed on leaf surfaces. During spring and early summer, powdery orange spores are produced from fruiting bodies on the lower leaf surface. In fall and in early winter, infected areas on lower leaf surface die, although orange colour remains.



Hypericum Rust

Mahonia (*Cumminsella mirabilissima*)

Large yellow spots on the undersides of leaves become swollen. Lesions are visible on both leaf surfaces, eventually breaking open to release reddish spores. This rust is very common at the coast becoming serious in cold wet seasons, as it does not develop at temperatures above 20°C.



Hypericum Rust

Pear Trellis Rust (*Gymnosporangium fuscum*)

Requires the alternate host, pear, to cause damage. During wet weather in April and early May, black swellings on juniper branches release an orange jelly-like mass of spores that infect leaves of nearby pear trees. After this release of spores, the infection on juniper remains dormant until the next spring.

Overwintering occurs on juniper, with pear trees showing symptoms in summer. Yellow-orange to red spots with black centres appear on pear leaves in June and July. By late August, the spots thicken and spores emerge from the lower leaf surface. On heavily diseased trees, infection may spread from leaves to fruits and twigs.



Pear Trellis Rust



Cumminsella Rust on Mahonia



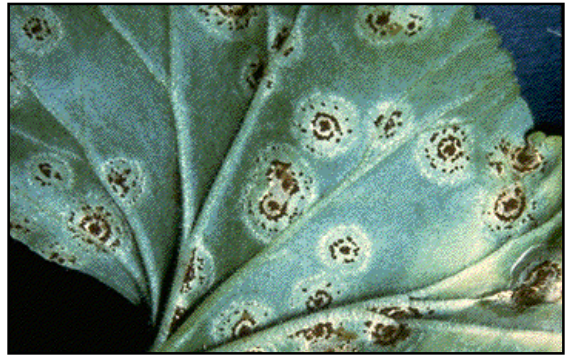
Cumminsella Rust on Mahonia



Pear Trellis Rust on Juniperus

***Pelargonium* (*Puccinia pelargonii-zonalis*)**

Early symptoms are small yellow leaf spots. Brown or rusty pustules develop in rings on the underside of leaves in infected areas. Spots on the upper leaf surface turn brown. Leaves eventually turn yellow and die in severe attacks. Plants may be partially defoliated. Spores may remain infectious for at least three months.

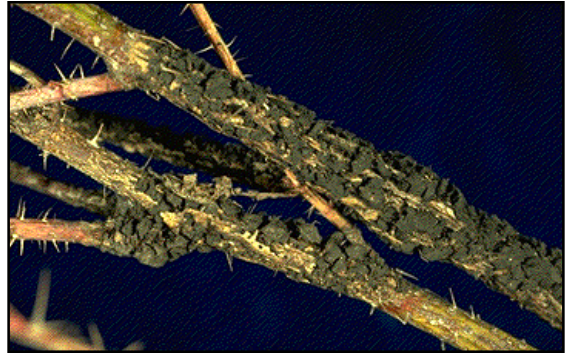


J. Matteoni

Pelargonium with Geranium Rust

***Rosa* (*Phragmidium mucronatum*)**

Symptoms appear on leaves as powdery orange masses on lower surfaces. On upper surfaces, yellow areas develop above lower spore masses. Towards the end of the summer, the rusty spots turn black and produce spores; leaves may fall prematurely. Spores are spread through splashing water or through air.



R. Byrher

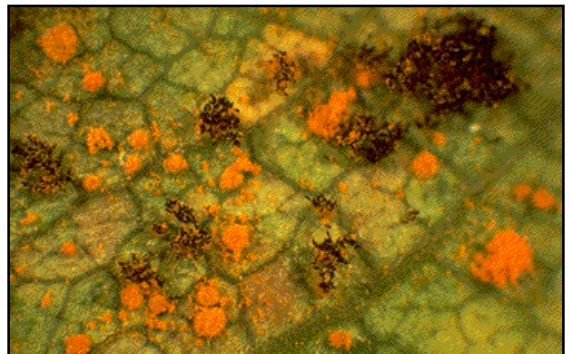
Rust Telia on Rosa

Western Gall Rust (*Endocronartium harknessii*)

An alternate host is not required for this rust. Rough, globular galls appear on branches or trunk several years after the infection occurred and enlarge annually. Fungus is orange when fruiting. Infects hard pines such as lodgepole, mugho, Austrian, Scots, and ponderosa, and may be spread by infected seedlings.



Alberta Environment Centre

Western Gall Rust on *Pinus*

S. T. Koike

Rust Uredia/Telia on Rosa



S. T. Koike

Rust on Rosa

White Pine Blister Rust (*Cronartium ribicola*)

Attacks five-needled pines and requires currants or gooseberries as alternate hosts. Infection begins in a small twig, which dies back, then moves to increasingly larger branches until it reaches the trunk. When this happens, the entire tree above the canker dies. Needles above a canker are short and yellowish, dropping prematurely. In May, white blisters burst and release orange spores that reinfect alternate hosts in the area.

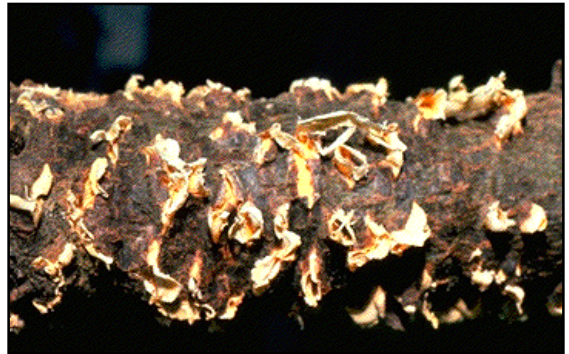


Pacific Forestry Centre

White Pine Blister Rust



White Pine Blister Rust



Pacific Forestry Centre

White Pine Blister Rust