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Comandra Blister Rust

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Comandra blister rust is a native disease in Arizona on ponderosa pine. It also occurs on Mondell pine, a pine species introduced for landscapes and Christmas tree production in Arizona. Comandra blister rust can cause death of ponderosa saplings, but it is not an important disease of mature ponderosa trees. However, infections kill Mondell pine, and they should not be planted within a mile of *Comandra*.

The alternate host for the rust is *Comandra pallida*, for which the disease is named. *Comandra pallida*, commonly called bastard toadflax, is a small herbaceous perennial plant found in close association with oak. It has small light pink flowers in terminal clusters and nutlike fruit. It is found throughout Arizona at elevations of 4,000-8,000 ft.

Pathogen – Comandra blister rust, *Cronartium comandrae*

Hosts – *Pinus eldarica* (Mondell pine, Afghan pine), *Pinus ponderosa* (ponderosa pine) and *Comandra pallida*, bastard toadflax

Symptoms/signs – On Mondell pine, Comandra blister rust causes branch dieback and death of trees of all ages. Swollen areas develop in branches and trunks, and the bark and underlying sapwood die. On pine, orange "blisters" develop on trunks and branches as the bark splits and ruptures. Infections on *Comandra*, the alternate host, appear as orange or rusty colored pustules on leaves after summer rains.

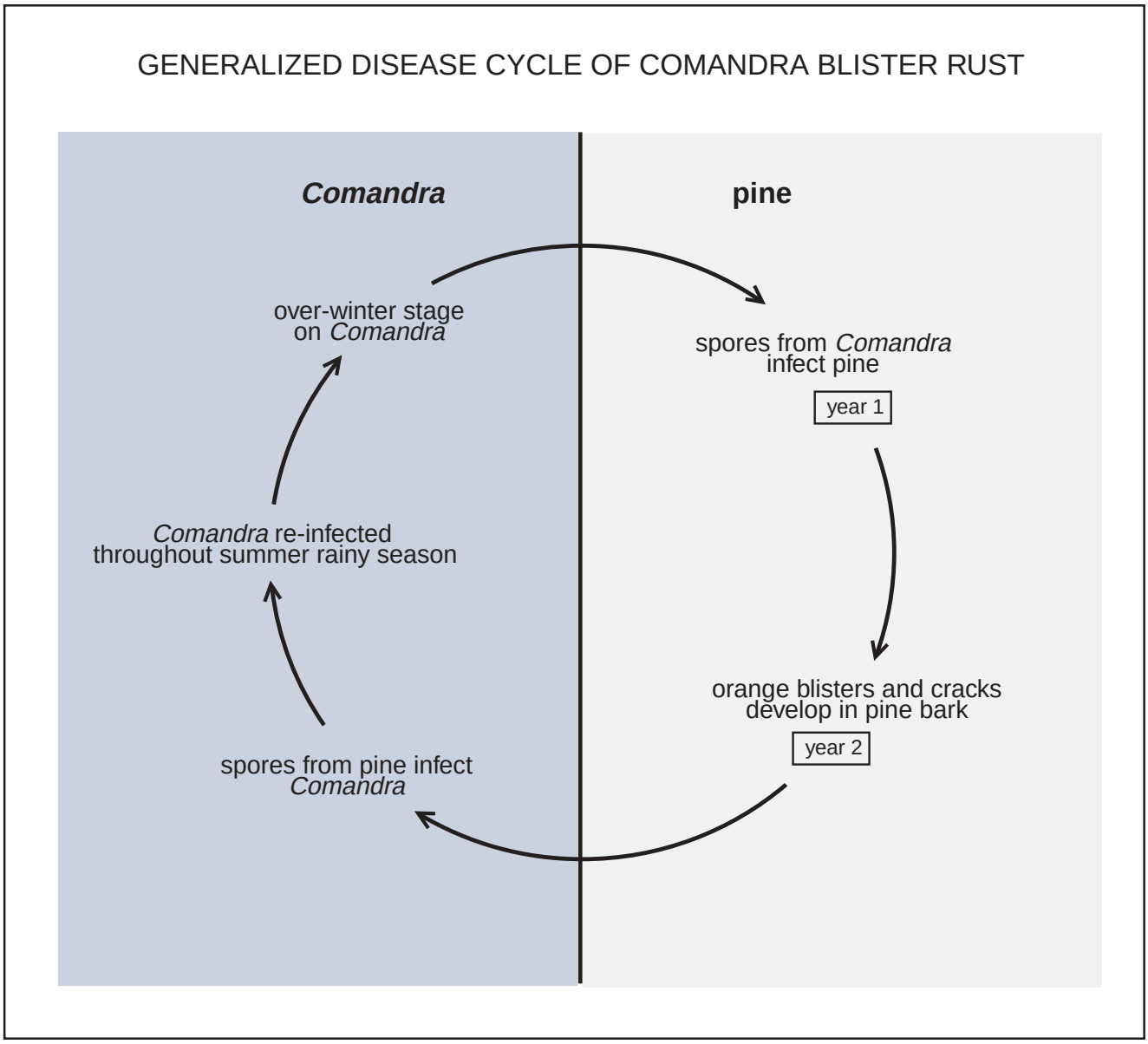
Disease – Like many rust fungi, Comandra blister rust is a very specialized pathogen. It requires two specific hosts (pine and *Comandra*) to complete its life cycle and has five different spore forms. Infection occurs in pine needles after rains in late spring or after the summer monsoon in late summer by spores (sporidia or basidiospores) produced on the alternate host, *Comandra*. These are delicate spores that can travel in air currents only about one mile. During the first year, the fungus becomes established in pine bark, and swollen areas with fruiting structures (spermagonia) develop in branches and trunks.

The following year a different spore stage, the aecial stage, develops on pine in April and May.

Comandra blister rust on Mondell pine.

At a Glance

- *Mondell pine should not be planted within a mile of Comandra populations.*
- *Infection of pine occurs through needles by spores produced on Comandra, but spores produced on pine cannot re-infect pine.*
- *There is no effective control for Comandra blister rust, and infected trees should be replaced with non-susceptible native trees.*



Aecia develop into bright orange blisters, then rupture and produce spores (aeciospores). The bark cracks and dries out, resulting in death of the bark and sapwood. The aeciospores produced on pine infect *Comandra* when there is enough moisture for germination. Aeciospores do not re-infect pine. They remain viable after being air borne for long distances, and can infect *Comandra* many miles from the nearest ponderosa pine.

During the summer, other spores (urediniospores) develop on the *Comandra* and infect only *Comandra.* This stage is known as the repeating stage since the urediniospores re-infect *Comandra* throughout the rainy season and cause an increase in disease in *Comandra.* An overwintering or resting stage, the telium, develops on *Comandra* in summer and fall. After spring and summer rains, the cycle begins over again the following year as telia on *Comandra* germinate and produce spores (sporidia) that infect pine.

Environmental conditions – Disease is favored by high humidity and moisture. Infection of pine usually occurs after spring rains in April and May or the summer rainy season from July through September when spores produced on *Comandra* are carried by air currents for short distances. These spores do not effectively move more than one mile from their host. However, the potential for disease occurs wherever *Comandra* grows and susceptible pines such as *Pinus eldarica* are introduced. Landscape environments and Christmas tree plantations afford a good microclimate for disease since low branches and close proximity of trees increase humidity.

Rusty colored pustules (aecia) on pine

Prevention/control – Susceptible pines such as Mondell pine should not be planted within a mile of *Comandra* populations since the spores that infect pine must come from *Comandra*. Disease has been severe on Mondell pine in areas of oak habitat near Prescott and Sedona where *Comandra* is common, but has not been observed in Christmas tree plantations in the Sulfur Springs Valley. Although fungicide applications may suppress development of the fungus on pine, they have not been shown to kill the fungus and are, therefore, not recommended. In landscape pines, removal of lower limbs and use of drip irrigation may reduce humidity and disease but are not reliable strategies for control.

Swelling and cracking of trunk of Mondell pine infected with Comandra blister rust.

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