

# Stem and Cone Rusts of Pine

## Southwestern Cone Rust *Cronartium conigenum* Hedgc. & N. Hunt

**Host:** Chihuahua pine, with live oaks as alternate hosts.

**Symptoms/Signs:** This disease produces swollen, deformed cones on Chihuahua pine that, when ripe, are loaded with orange spores beneath a thick papery outer surface. On oak, this disease produces several different spore stages. The type most often observed has the appearance of brown to black wool on the lower leaf surface.

**Biology:** This fungus produces spores on swollen deformed cones (galls) of Chihuahua pine in July and August, and other spores on the undersides of leaves of Mexican blue, Dunn, Emory, gray, canyon live, netleaf, silverleaf and Arizona white oaks throughout the summer. Cones become infected during their first year of development, swell into misshapen galls of various sizes, produce no seeds and do not open. Aecia develop 2 to 3 years after infection. Galls die after aecial production but remain on the trees. Large galls usually kill the branches that bear them.

**Effects:** During periods of outbreak brought on by favorable weather, cone rust may kill more than 50 percent of the cones on groups of trees. This disease also affects other pine species in Mexico.

**Similar Diseases:** None

**References:** 93, 117



*Figure 239. Swollen Chihuahua pine cone infected with *C. conigenum* and sporulating. An uninfected cone is on the right.*