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Disease Notes

First Report of the White Pine Blister Rust Pathogen, *Cronartium ribicola*, in Arizona

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White pine blister rust, caused by *Cronartium ribicola* J.C. Fisch., was found on southwestern white pine (*Pinus flexilis* James var. *reflexa* Engelm., synonym *P. strobiformis* Engelm.) near Hawley Lake, Arizona (Apache County, White Mountains, 34.024°N, 109.776°W, elevation 2,357 m) in April 2009. Although white pines in the Southwest (Arizona and New Mexico) have been repeatedly surveyed for blister rust since its discovery in the Sacramento Mountains of southern New Mexico in 1990 (1,2), this was the first confirmation of *C. ribicola* in Arizona. Numerous blister rust cankers were sporulating on 15- to 30-year-old white pines growing in a mixed conifer stand adjacent to a meadow with orange gooseberry bushes (*Ribes pinetorum* Greene), a common telial host in New Mexico. Most of the observed cankers were producing their first aecia on 5-year-old branch interwhorl segments (i.e., formed in 2004). The two oldest cankers apparently originated on stemwood formed about 14 and 21 years before (1995 and 1988). Neither uredinia nor telia were seen on expanding gooseberry leaves in late April, but these rust structures were found later in the season. Voucher specimens deposited in the Forest Pathology Herbarium-Fort Collins (FPF) were determined by host taxa and macro- and microscopic morphology as *C. ribicola*—white pine with typical cankers, aecia, and aeciospores (1). Six collections of aeciospores from single, unopened aecia provided rDNA sequences (ITS1-5.8S-ITS2, primers ITS1F and ITS4) with two different repeat types (GenBank Accession Nos. HM156043 and HM156044 [J. W. Hanna conducted analysis with methods described in 3]). A BLASTn search with these sequences showed 100 and 99% similarities, respectively, with sequences of *C. ribicola*, including accessions L76496, L76498, and L76499 from California (4). Additional reconnaissance of white pines on the Fort Apache Indian Reservation and neighboring Apache-Sitgreaves National Forests was conducted from May through September 2009. Although the blister rust infestation was distributed over more than 100 km² of forest type, infected trees were restricted to mesic and wet canyon bottoms (climatically high-hazard sites) and were not found on dry sites—even where aecial and telial hosts occurred together. Recent dispersal within the White Mountains was suggested by a presence of infected

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gooseberry plants on several sites where infected white pines were not yet evident. Geils et al. (1) concluded that the initial infestation in New Mexico had originated by long-distance, aerial transport from California to the Sacramento Mountains in 1969. Since then, numerous additional infestations in the Southwest have been discovered; but we do not know which of these (including Arizona) resulted by dispersal from California or New Mexico. Although rust may eventually infest many host populations in the Southwest and disease may kill most trees in some locations, differences in site hazard and spread provide managers with numerous opportunities to maintain white pines and *Ribes* spp.

References: (1) B. Geils et al. For. Pathol. 40:147, 2010. (2) F. Hawksworth. Plant Dis. 74:938, 1990. (3) M.-S. Kim et al. For. Pathol. 36:145, 2006. (4) D. Vogler and T. Bruns. Mycologia 90:244, 1998.