

DISEASE NOTES



First Report of *Heterobasidion occidentale* on *Sequoia sempervirens* in Northern California

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In 2007, *Heterobasidion* basidiocarps (“fruit bodies”) were found on 37 of 200 coast redwood (*Sequoia sempervirens*) stumps surveyed in four stands owned by the Green Diamond Resource Company near McKinleyville, CA (Humboldt County). All were second or third growth stands, last logged 7 to 13 years prior to the survey here described. In 2015, during a second follow-up survey, 10 fruit bodies and two rotted wood samples were collected from 10 separate stumps, their DNA was extracted, and the internal transcribed spacer (ITS) was amplified and sequenced using the ITS1f-ITS4b primers described by [Gardes and Bruns \(1993\)](#). All sequences (e.g. GenBank accession no. MF488718) had a 99 to 100% homology with ITS sequences of *Heterobasidion occidentale* (e.g., KC492946), a widespread root and butt rot agent common on *Abies*, *Picea*, and *Tsuga* spp. in western North America, and also found on *Sequoiadendron giganteum* in the central Sierra Nevada ([Garbelotto and Gonthier 2013](#)). Sapwood in 97% (range 96 to 100%) of the 200 stumps first surveyed, including all stumps where *H. occidentale* fruit bodies had formed, displayed a characteristic stringy, laminated sap rot that affected more than 60% of the stump surface. The sapwood rot was similar to the rot described in *Abies* spp. stumps colonized by the same pathogen. Stumps in which sapwood rot is visible on the top are normally colonized as standing trees, while stumps colonized after tree felling normally display a smooth intact top ([Garbelotto et al. 1999](#)). This observation leads us to believe *H. occidentale* had infected standing sequoias, prior to their felling. About 14% of stump sprouts were damaged during the first survey, apparently killed in part by advancement of decay caused by *H. occidentale*. Nonetheless, when fruit bodies and wood samples were collected from 10 stumps during the second survey, several sprouts appeared to be healthy on each of the stumps surveyed. While *H. annosum sensu lato* has been previously reported on sequoia ([French 1989](#)), the pathogen species has since been split into *H. irregulare* and *H. occidentale* ([Otrosina and Garbelotto 2010](#)). This is the first report of *H. occidentale* on sequoia, and the first to describe putative symptoms in detail. Sequoias in northern California are sympatric with Grand fir (*Abies grandis*), Sitka spruce (*Picea sitchensis*), and Western hemlock (*Tsuga heterophylla*), all well-known hosts for *H. occidentale*, and it is likely the inoculum responsible for

infection of sequoias may have been generated on those tree species. However, *H. occidentale* is rarely seen fruiting on standing sequoias, hence redwood logging may have dramatically increased basidiospore inoculum loads of *H. occidentale* by greatly enhancing the production of fruit bodies on these stumps.



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