

Evaluation of the status of cypress canker on young Port-Orford-cedar in Coos County, Oregon

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Background:

Cypress canker was first detected in Oregon on Port-Orford-cedar (*Chamaecyparis lawsoniana*) seedlings in the root disease resistance breeding program at the Dorena Genetic Resource Center in Cottage Grove in 2000. In 2003 the disease was found on Port-Orford-cedar seedlings from Dorena that had been outplanted at a test site in a plantation near Coos Bay, Oregon. Cypress canker was also found on Port-Orford-cedar seedlings in the surrounding plantation and on a Port-Orford-cedar sapling adjacent to the plantation. However, test seedlings from the same lot at Dorena that were planted at three other sites showed no evidence of disease. This suggested that the seedlings may have become infected after outplanting. A preliminary survey of Port-Orford-cedar seedlings in eight other plantations within two miles of this test site found a total of six infected seedlings in four of the plantations. This was the first time cypress canker was detected in operational plantings of Port-Orford-cedar. In 2004 the disease was also found on Port-Orford-cedar seedlings in four other test plantings in northern California and southern Oregon. The origin of these infections was also not clear. The seedlings at these test sites had also come from several different sources.

Cypress canker, caused by the fungus *Seiridium cardinale*, is an invasive disease that was first identified on planted Monterey cypress in Palo Alto, California in 1928 (Wagener 1939). Its geographic origin is unknown. The disease became widespread and severe on Monterey cypress in California planted on dry inland sites. The same fungus, or one closely related has been found causing cankers on redwood in northern California (Bega 1964) and western red cedar in British Columbia (personal communication, Brenda Callan, Pacific Forestry Centre, Natural Resources Canada). In New Zealand and in the Mediterranean region, the disease causes severe damage to cypresses and cedars, including Port-Orford-cedar (Graniti 1998). In 1990 cypress canker was reported on a 12 inch diameter Port-Orford-cedar in the vicinity of Hiouchi, California (personal communication, Jack Marshall, California Department of Forestry). Wagener reported isolated cases of infection on Port-Orford-cedar in California in 1939. This suggests it has been occurring sporadically on Port-Orford-cedar in California for many years.

Examination of the infected Port-Orford-cedar at the various test sites and plantations showed cypress canker causing branch mortality, topkill and bole defects (Figure 1). In most cases it did not appear to be causing tree mortality, although occasionally stems were weakened and broke at the site of the canker. The disease has rarely been observed on older Port-Orford-cedar, aside from the two trees previously mentioned, but it may be difficult to detect on older trees. Now that there is renewed interest in planting Port-Orford-cedar it is important to understand the

current distribution and impact of the disease before Port-Orford-cedar plant materials are moved from place to place and high-value resistant stock is widely deployed.

Objectives

The objective of this survey was to quantify the distribution, incidence, and severity of cypress canker on young Port-Orford-cedar in plantations in Coos County, Oregon. Surveying young trees in plantations allowed us to examine a large number of Port-Orford-cedar over a large area relatively quickly.

Methods

Twenty-eight randomly selected, two-to-ten year-old plantations (4 to 120 acres in size) belonging to the US Forest Service, the Bureau of Land Management, Coos County, and two large industrial private companies were surveyed for cypress canker in the spring of 2005 (Figure 2). Hundredth acre plots were installed at a sampling intensity of 1.5 plots per acre. Data were collected on the number of live Port-Orford-cedars, the number infected, the number of cankers per tree, and the presence of stem cankers, top kill or branch flagging. Both planted and natural seedlings were included. Between plots, Port-Orford-cedars were examined in transects twelve feet wide. Stems with cankers were cut and sent to the Southwest Oregon Forest Insect and Disease Service Center for identification based on fruiting bodies spore morphology, and cultures.

Results and Discussion

A total of 1,765 Port-Orford-cedar seedlings were examined in 1665 plots and 32 miles of transects in 1,129 acres of plantations distributed around Coos County (Table 1). Cypress canker was detected on four Port-Orford-cedar seedlings in one plantation, near the same area where it was detected in the four plantations in 2003 and 2004. One stem canker was found on each infected tree. No branch mortality or top kill was observed. In the combined data from the five plantations where infected trees were found in 2003, 2004 and 2005, a total of three percent (11 of 394) of the seedlings that were examined were infected. All five plantations were within four miles of the coast. Cypress canker was not detected in any of the other 27 plantations in the 2005 survey.

At this time, cypress canker is not widespread in operational plantings of Port-Orford-cedar. It occurs sporadically, primarily near the coast. It is possible that the mild temperatures, windy conditions, frequent rain and high relative humidity along the coast are conducive to spread of spores and infection. Questions remain as to the origin of the fungus, the source of infection in the test plantings, and the relative susceptibility of root-disease resistant breeding stock. However, cypress canker does not appear to be a major concern when considering whether to plant Port-Orford-cedar. Forest managers, especially in coastal areas, should be aware of the disease, recognize its symptoms, and remove infected individuals if any are encountered during intermediate stand treatments. Nursery managers should also be aware of the disease and ensure that they are shipping disease-free seedlings.

Literature Cited

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Graniti, Antonio 1998. Cypress canker: A pandemic in progress. Annual Review of Phytopathology 36: 91-114.

Wagener, Willis W. 1939. The canker of *Cupressus* induced by *Coryneum cardinale* n. sp. Journal of Agricultural Research 58(1): 1-47.

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Figure 1. Symptoms of cypress canker on Port-Orford-cedar



1a. Infected, dead branch on an open-grown Port-Orford-cedar. The canker is at the base of the branch where it joins the bole.



1b. A small canker on the stem of a Port-Orford-cedar seedling. Note distinct margin between diseased (purplish) and healthy tissue, and resin exuding from canker.



1c. Large canker on the stem of a Port-Orford-cedar seedling with sunken, discolored tissue and copious resin flow

Figure 2. Location of cypress canker survey plots

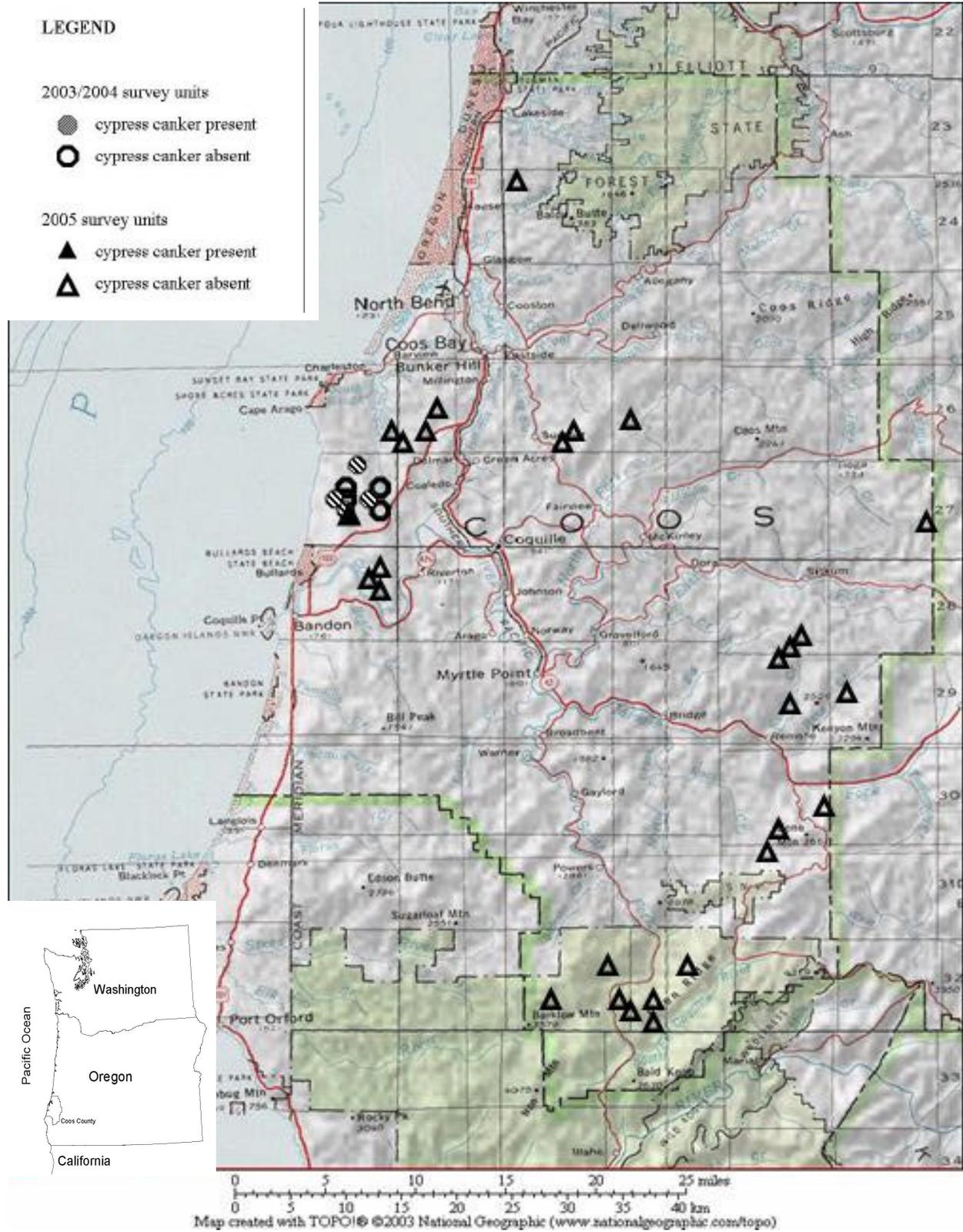


Table 1. 2005 survey summary by unit

UNIT	Unit acres	# Plots	# POC in plots	# infected POC in plots	Miles of transects	# POC in transects	# infected POC in transects
1	18	26	121	0	0.7	72	0
2	120	169	5	0	3.0	16	0
3	90	102	39	0	1.8	71	0
6	27	42	11	0	0.6	12	0
8	70	101	46	0	1.8	64	0
9	103	142	35	0	2.0	45	0
10	105	152	25	0	2.7	55	0
12	38	56	62	0	1.4	194	0
13	19	27	5	0	0.4	4	0
14	40	53	33	0	1.4	43	0
15	43	68	9	0	1.8	29	0
16	6	11	0	0	0.2	4	0
17	65	101	6	0	2.5	25	0
18	90	144	33	0	2.7	121	0
19	10	30	34	1	0.5	84	3
20	5	10	10	0	0.2	21	0
21	25	34	1	0	0.6	6	0
22	35	48	0	0	1.2	7	0
23	16	27	6	0	0.5	3	0
24	4	7	0	0	0.2	5	0
25	10	17	34	0	0.4	86	0
26	7	12	3	0	0.3	12	0
27	19	31	7	0	0.5	12	0
28	55	71	17	0	1.3	30	0
29	20	29	27	0	0.5	36	0
30	20	39	33	0	0.7	54	0
31	27	50	16	0	0.9	36	0
34	42	66	0	0	1.7	0	0
TOTALS 28 units	1129	1665	618	1	33	1147	3