

Data Sheets on Quarantine Pests

Xanthomonas arboricola pv. *corylina*

IDENTITY

Name: *Xanthomonas arboricola* pv. *corylina* (Miller *et al.*) Vauterin *et al.*

Synonyms: *Xanthomonas campestris* pv. *corylina* (Miller *et al.*) Dye
Xanthomonas corylina (Miller *et al.*) Starr & Burkholder

Taxonomic position: Bacteria: Gracilicutes

Common names: Bacterial blight (English)
Bactériose du noisetier (French)

Notes on taxonomy and nomenclature: The genus *Xanthomonas* has recently been extensively revised with a number of pathovars elevated to rank of species and existing species descriptions substantially altered (Vauterin *et al.*, 1995). The new name *Xanthomonas arboricola* pv. *corylina* was proposed as part of this revision.

Bayer computer code: XANTCY

EPPO A2 list: No. 134

HOSTS

The main host of *X. arboricola* pv. *corylina* is hazelnuts (*Corylus avellana*), but *C. colurna*, *C. maxima* and *C. pontica* are also susceptible.

GEOGRAPHICAL DISTRIBUTION

Bacterial blight of hazel was described for the first time in the west of the USA (Oregon) in 1913 (Barss, 1913). After this initial report, it was found (possibly through introduction) in Yugoslavia (Sutic, 1956), Italy (Noviello, 1969), Turkey (Alay *et al.*, 1973), France (Luisetti *et al.*, 1976; Prunier *et al.*, 1976), Russia (Koval, 1978), UK (Locke & Barnes, 1979), Australia (Wimalajeewa & Washington, 1980), Algeria (Gardan, 1982) and more recently in Chile (Guerrero & Lobos, 1987). For more information, see Gardan & Deveaux (1987).

EPPO region: Algeria, Denmark, France, Italy, Netherlands, Russia, Slovenia, Spain, Switzerland, Turkey, UK, Yugoslavia.

Asia: Turkey.

Africa: Algeria.

North America: Canada (British Columbia; IMI, 1996), USA (Oregon, Washington).

South America: Chile.

Oceania: Australia (Western Australia).

EU: Present.

Distribution map: See IMI (1996, No. 699).

BIOLOGY

The bacterium is introduced into an orchard or nursery on infected planting material, multiplies on the young plants and spreads from plant to plant on pruning tools or by rain splash. Multiplication occurs on the leaf surface (epiphytic phase), 10^3 - 10^6 bacteria occurring per leaf throughout the growing season. The bacterium penetrates through stomata into buds, leaves and new shoots. There is a possibility of transmission by pollen to female flowers. Although *X. arboricola* pv. *corylina* can survive in cankers from one year to the next, this has little epidemiological importance. Infection of buds occurs during vegetative growth and they provide the main source of inoculum in the spring. The bacterium can survive over 4 months on fallen leaves but does not overwinter in the soil (Gardan, 1982; 1983).

In culture, the optimum growth temperature is 28°C. Temperatures over 20°C are more favourable to leaf infections and the incubation time is shorter than at lower temperatures.

DETECTION AND IDENTIFICATION

Symptoms

Symptoms are different in orchards and nurseries. In orchards, hazel is grown like other fruit trees, suckers being pruned away every year. In nurseries, on the other hand, suckering is encouraged on the mother plants, to produce shoots for layering. The mother plants bear densely crowded long young shoots, on which the disease can spread very readily.

In nurseries

Shoots more than a year old show bud dieback, necrosis of the shoot tips and spots on leaves, in spring after bud-burst. Shoots may dry out entirely as the bacterium spreads downwards, either girdling the base and causing dieback of the distal portion, or causing cankers 10-25 cm long with longitudinal surface cracks. Brownish-black necrosis may appear on the convex side of the layered shoots. This necrosis can spread to the stump and girdle the shoot, resulting in its complete dieback.

The new growth shows oily lesions starting at the tip and spreading rapidly back: buds form limited necrotic cankers at which the shoots are liable to break. Buds below the necrotic zone then develop abnormally, giving a characteristic bushy appearance.

Leaves show numerous oily polygonal lesions which may run together to cause a general chlorosis of the lamina and premature leaf fall.

In orchards

While bud cankers, necrosis and dieback of new lateral shoots and cankers are seen, leaf symptoms are rare. Fruits show 'black heel' symptom with browning of the shell and corresponding part of the involucre, which are covered with bacterial slime. Oily lesions 3-7 mm long are sometimes seen on the involucre and shell before lignification.

Morphology

X. arboricola pv. *corylina* is a Gram-negative rod with a single polar flagellum. It is strictly aerobic. Like other *Xanthomonas* bacteria, it produces a yellow carotenoid pigment in the culture medium. For more details on diagnostic characters, see Bradbury (1987).

MEANS OF MOVEMENT AND DISPERSAL

The main mode of spread is on infected planting material. The potential for natural spread can be considered as relatively low. Seeds from fruits picked on infected trees can produce infected seedlings.

PEST SIGNIFICANCE

Economic impact

Four countries account for the bulk of world hazelnut production: Turkey, Italy, Spain and the USA (in decreasing order). In the last, bacterial canker is considered the most serious disease of hazel, of more economic importance than all other hazel diseases put together. Greatest losses are seen in orchards 1-4 years old, in which up to 10% mortality has been recorded. Older plants are rarely killed, but numerous buds and fruiting shoots are destroyed, losses in yield varying from 1 to 10% (Miller, 1949). In France, over 250 000 young plants have been destroyed since 1975. In 1983, one 1300-ha area suffered the loss of about 50 trees 7-8 years old, and one 2-ha area of 4-year-old plants was completely killed by girdling cankers at the base of the trunk.

Control

The disease can be controlled by removing and destroying affected shoots, disinfecting pruning tools, spraying with copper-based products and using cultivars with some resistance when planting new orchards (Negret, Gunslebert, Segorbe, Longue d'Espagne, Merveille de Bollwiller) or the species *Corylus pontica*. Production of healthy planting material is the major preventive measure.

Phytosanitary risk

X. arboricola pv. *corylina* is an EPPO A2 quarantine organism (OEPP/EPPO, 1986), but is not considered of quarantine concern by any other regional plant protection organization. *X. arboricola* pv. *corylina* is still of very limited distribution in the EPPO countries where it has been introduced. Other countries, while they may not be major hazelnut producers, are still at risk.

PHYTOSANITARY MEASURES

Direct inspection of imported planting material is unlikely to be reliable, so if material is imported from areas where the disease is known to occur, nursery inspections are necessary. Plants for planting of *C. avellana* from countries where *X. arboricola* pv. *corylina* occurs should have been grown in an area where the bacterium does not occur and at a place of production found free from *X. arboricola* pv. *corylina* during the last growing season (OEPP/EPPO, 1990).

Since the main mode of transmission is through infected planting material the cultivation of mother plants according to an EPPO-approved certification scheme could replace a special quarantine requirement.

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