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Data Sheets on Quarantine Pests

Ciborinia camelliae

IDENTITY

Name: *Ciborinia camelliae* Kohn
Synonyms: *Sclerotinia camelliae* Hara
Sclerotinia camelliae Hansen & Thomas
Anamorph: There is no known macroconidial anamorph but a microconidial anamorph has been described (Kohn & Nagasawa, 1984).
Taxonomic position: Fungi: Ascomycetes: Helotiales
Common names: Flower blight, petal blight (English)
Bayer computer code: SCLECA
EPPO A1 list: No. 190
EU Annex designation: II/A1

HOSTS

The only hosts are species of *Camellia*. *Camellia japonica*, *C. japonica* subsp. *rusticana*, *C. reticulata* and *C. sasanqua* (Iriyama, 1980) are attacked. All cultivars and hybrids appear to be susceptible. They are grown as ornamentals either under glass in any part of the EPPO region or outdoors especially in countries with an Atlantic climate.

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
Asia: Indigenous in Japan (Honshu).
North America: Occurring wherever camellias are grown, in Canada and the USA (California, Florida, Georgia, Louisiana, North Carolina, Oregon, South Carolina, Texas).
EU: Absent.

BIOLOGY

The annual disease cycle begins with the germination of sclerotia. In North America sclerotia remain dormant during the summer and autumn but from January to April, during cool, cloudy and damp periods, they become active, each producing up to 12 apothecia. Activity may continue for several weeks, ensuring coincidence between flowering and ascospore production. Ascospores are discharged in large numbers and are the only source of infection. Closed flowers cannot be infected but infection can take place at any time after the tips of the petals are visible in opening buds. Since sclerotia only germinate in the spring, flowers produced in the autumn, either naturally or after treatment with gibberellic acid, do not become infected (Baxter & Segars, 1989). No secondary propagative spores are formed and there is consequently no flower-to-flower spread (Baxter & Epps, 1981). The microconidial anamorph, which is formed on fallen flowers, has no infective role but is probably a necessary feature of the sexual process.

The optimum temperature for the development of infection in the flowers is 15-18°C but it can occur fairly quickly between 10 and 24°C (Baxter & Epps, 1979). Infection without the development of symptoms may take place at even lower temperatures, but if infected flowers are brought inside, or if the outside temperature rises, symptoms then develop. This means that the fungus could be introduced on cut blooms not showing any symptoms (Brooks, 1979).

Sclerotia are formed within 15-30 days after infection has taken place. Infected flowers fall to the ground and eventually disintegrate. The sclerotia are then released into the soil where they may remain in a viable condition for up to 5 years (Baxter & Epps, 1979). A single sclerotium can produce apothecia during successive years.

Full descriptions of the life history of *C. camelliae* and of the disease cycle of flower blight are given by Hansen & Thomas (1940).

DETECTION AND IDENTIFICATION

Symptoms

As the name suggests, camellia flowers are affected but not roots, stems or leaves. The first symptom is often darkening of the veins on the petals, but brown spots or blotches soon appear and spread until the whole flower turns brown and drops. A photograph in black and white of an infected flower is given in Brooks (1979). The affected tissues do not disintegrate rapidly and infected flowers retain their shape and firmness for many days after they have fallen. Under moist conditions the fungus forms microconidia on the fallen flowers. These appear as black droplets of liquid against the rusty brown colour of the infected petals. As the disease progresses the fungus produces sclerotia either at the base of each petal or as a compound structure in the base of the entire flower. The sclerotia are variable in size and shape and may extend beyond the limits of the petals.

Morphology

Sclerotia black, discoid, occurring singly or aggregated, up to 12 x 10 x 2 mm. Remains of petal tissues embedded within cortex and medulla of the sclerotium. Apothecia stipitate-cupulate, arising from sclerotia on or in the soil. Stipe variable in length, 2-100 x 1-2 mm. Receptacle 5-18 mm diameter, cupulate at first, becoming discoid to plano-convex. Hymenium buff to dull cinnamon when young, becoming dull umber to dark brick at maturity (Rayner, 1970). Ascospores hyaline, one-celled, ovate to obovate, biguttulate to multiguttulate, uninucleate, 7.5-12.5 x 4.0-5.0 µm. Microconidia catenate, brown-walled, globose to obovate, 2.5-4.0 µm.

A detailed illustrated description with comparisons of American and Japanese isolates is given by Kohn & Nagasawa (1984).

Detection and inspection methods

The formation of microconidia and sclerotia makes possible the accurate diagnosis of camellia flower blight (Baxter & Epps, 1979). Formation of sclerotia will also occur if slightly infected flowers are incubated under conditions of high humidity at 10-15°C (Brown, 1983). The fungus is easy to isolate and grow in culture (Holcomb, 1980a; Kohn & Nagasawa, 1984).

MEANS OF MOVEMENT AND DISPERSAL

Under natural conditions *C. camelliae* is spread readily by wind-borne ascospores. There is circumstantial evidence for spread up to 24 km by this means (Brown, 1983). In international trade, *C. camelliae* could easily be spread on cut flowers of camellia, on camellia plants with open flowers or as sclerotia in soil accompanying camellia plants.

PEST SIGNIFICANCE

Economic impact

In North America *C. camelliae* can cause considerable damage to camellia blooms both outdoors and under glass and also on cut blooms at shows. It is considered to be one of the most serious diseases of camellias in certain states of the USA (Brooks, 1979).

Control

There is no satisfactory method for controlling camellia flower blight at present. A number of measures have been used which give partial control of the disease, however. These include destruction of infected flowers, the application of black plastic sheet to the soil beneath camellias (Baxter & Epps, 1979), spraying the soil surface with fungicides to reduce ascospore formation (Haasis & Nelson, 1953) and spraying the open flowers with fungicides such as triadimefon (Holcomb, 1980b). There is no indication that a satisfactory control procedure will be developed in the foreseeable future.

Phytosanitary risk

C. camelliae was recently added to the EPPO A1 list of quarantine pests, but is not listed as a quarantine pest by any other plant protection organization. In the EPPO region, it is potentially dangerous to camellias, wherever grown. In its evaluation of *C. camelliae*, EPPO considered the argument that the total economic value of camellia production in the region is not large enough for specific measures to be justified. It concluded that such measures were justifiable on condition that the economic impact of the measures taken was commensurate with the risk. The addtion to the EPPO list harmonizes it with EU Directive Annex II/A1.

PHYTOSANITARY MEASURES

On the basis of recommendations of the Royal Horticultural Society in the UK (Brooks, 1979), it is suggested that importation of cut flowers of camellia and of camellia plants with open flowers (i.e. with coloured buds) should be prohibited from countries where *C. camelliae* occurs. The normal EPPO recommendations for soil accompanying plants (OEPP/EPPO, 1990) would adequately cover the risk arising from sclerotia in soil. Camellia growers would be advised to keep any plants imported from countries where *C. camelliae* occurs under careful observation for 18 months.

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