

Data Sheets on Quarantine Pests

*Glomerella gossypii***IDENTITY**

Name: *Glomerella gossypii* Edgerton

Anamorph: *Colletotrichum gossypii* Southworth

Taxonomic position: Fungi: Ascomycetes: Phyllachorales

Common names: Anthracnose, pink boll rot or seedling blight of cotton (English)

Anthracnose du cotonnier (French)

Anthraknose (German)

Antracnosis del algodono (Spanish)

Bayer computer code: GLOMGO

EPPO A2 list: No. 71

EU Annex designation: II/B

HOSTS

The only host is cotton. *Gossypium barbadense* and *G. hirsutum* cultivars are mostly susceptible, while *G. arboreum*, *G. herbaceum* and *G. thurberi* cultivars show some resistance (Bollenbacher & Fulton, 1971). In the EPPO region, cotton is grown in Mediterranean and Eastern European countries.

GEOGRAPHICAL DISTRIBUTION

G. gossypii, which is probably indigenous to America, now occurs in most cotton-growing areas throughout the world but tends to be localized in the higher rainfall areas.

EPPO region: Locally established in Bulgaria and Romania; reported from but not established in Italy (Sicily), Spain, Tunisia.

Asia: Afghanistan, Armenia, Azerbaijan, Bangladesh, Cambodia, China (widespread), Georgia, India (Bihar, Madhya Pradesh, Maharashtra), Indonesia, Japan (Honshu), Korea Democratic People's Republic, Korea Republic, Myanmar, Pakistan, Philippines, Taiwan, Thailand. Mostly absent from the Near East.

Africa: Central African Republic, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Mali, Malawi, Mozambique, Nigeria, Sudan, Senegal, Somalia, Tunisia, Uganda, South Africa, Zaire, Zimbabwe. Probably present in most sub-Saharan countries.

North America: Bermuda, Mexico, USA (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas; also Hawaii, Kentucky, Missouri, Tennessee).

Central America and Caribbean: Barbados, Costa Rica, Cuba, Dominican Republic (unconfirmed), Guatemala, Honduras, Haiti, Jamaica, Nicaragua, Puerto Rico, El Salvador, Trinidad and Tobago.

South America: Argentina, Brazil (Bahia, Ceara, Espirito Santo, Sa\tilde{o Paulo), Colombia, Ecuador, Guyana, Paraguay, Uruguay, Venezuela. *Colletotrichum gossypii* var. *cephalosporioides* reported at least from Brazil and Paraguay.

Oceania: Australia (Western Australia; an earlier record in Queensland was mistaken), Guam.

EU: Present (reported but not established).

Distribution map: See CMI (1974, No. 317).

BIOLOGY

G. gossypii is transmitted through seed, and may also overwinter in infected cotton plant debris. Perithecia usually develop in old, dead tissues, and release ascospores which are the primary inoculum source. Usually, only the conidial spore stage is seen on the cotton plant. Secondary spread by conidia occurs in rain and wind and, in Côte d'Ivoire, a hemipteran insect, *Dysdercus* sp., is thought to be an important vector. Two strains of *G. gossypii* are reported to exist in Côte d'Ivoire: strain 1 attacking both *Gossypium hirsutum* and *G. barbadense* and strain 2 being pathogenic only to *G. barbadense* (Follin, 1970). For more information, see also Viennot-Bourgin (1949), Cauquil (1960).

Colletotrichum gossypii var. *cephalosporioides* differs from *C. gossypii* var. *gossypii* in virulence, aggressiveness, morphology, growth on various media and ability to develop at less than 30°C. For symptoms to develop, an RH of about 100% and a temperature of 25°C are needed for 8-10 h (Follin & Mangano, 1983).

DETECTION AND IDENTIFICATION

Symptoms

The disease caused by *G. gossypii* is most serious on seedlings and bolls, but lesions also occur on the stems and leaves of plants, sometimes producing a scald-like effect. Seedlings from infected seeds wilt and die. Infected bolls develop small, round, water-soaked spots which rapidly enlarge, become sunken and finally develop reddish borders with pink centres. In dry weather, diseased areas may be greyish in colour. Badly diseased bolls become mummified (darkened and hardened) and never open. In partially affected bolls, the fungus grows through and infects the seed. Lint from diseased bolls is frequently tinted pink and of inferior quality. For more information, see also Cauquil (1960) and Cognee (1963).

A form of the anamorph known as *Colletotrichum gossypii* var. *cephalosporioides* causes a serious disease, known as ramulose, escobilla or witches' broom (Watkins, 1981). Symptoms observed in the field include excessive branching, stem twisting, leaf curl, and necrotic lesions on leaves, bolls and stems (Mathieson & Mangano, 1985).

Morphology

G. gossypii in general resembles the widely distributed *G. cingulata* in its perithecia and conidia (see for example Mordue, 1971) and could practically be regarded as a cotton-specific form of that fungus, which is not reported as attacking cotton. Perithecia are formed embedded in the plant tissue, with beaks extending through the epidermis. They do not collect around a mycelial nodule or form in a stroma, but are distinct and separate (Watkins, 1981). Conidia are formed in mucilaginous acervuli, appearing as pink spore masses in infected bolls. Seed infection is not detectable visually.

Detection and inspection methods

A seed testing method, by germination, developed by Halfon-Meiri & Volcani (1977) has been incorporated into an EPPO quarantine procedure (OEPP/EPPO, 1992).

MEANS OF MOVEMENT AND DISPERSAL

Natural spore dispersal will only move the fungus locally. Over longer distances and in international trade, movement is only in infected cotton seeds. Theoretically, cotton plants could also transport the pathogen, but there is no such movement in practice.

PEST SIGNIFICANCE

Economic impact

Cotton anthracnose has become less important as a seedling disease since the general practice of seed treatment with fungicides. However, it is still prevalent on seedlings and bolls in the more humid parts of eastern USA, possibly as a result of cultural methods to increase vegetative growth (Simpson *et al.*, 1973).

In north-west Côte d'Ivoire (Boundiali sector), *G. gossypii* has been shown, either alone or in combination with insect larvae, to reduce boll production by about 25%, with 15-18% of bolls being mummified. In Senegal in 1970-71, rot caused by fungi, including *G. gossypii*, affected only 2.7% of bolls, although, in severe cases, 40-60% losses on bolls have been reported. In India, anthracnose became serious in 1953 and, by 1959, was the limiting factor in cotton production.

Control

The disease is relatively easy to control by producing seeds from healthy bolls, treating seeds with fungicides or acid treatment. Cultivars may show some resistance and this is being actively sought against the more aggressive var. *cephalosporioides* (Carvalho *et al.*, 1984).

Phytosanitary risk

G. gossypii is listed by EPPO as an A2 quarantine pest (OEPP/EPPO, 1982). The disease is of minor economic importance in the EPPO countries where it now occurs, for in general cotton is not grown in high-rainfall areas within the EPPO region and these are the conditions which most favour the disease. It is reported still absent from several cotton-producing countries (Maghreb countries, Greece, Israel, Turkey) and from the Central Asian Republics of the USSR. Var. *cephalosporioides* from South America presents a further risk (especially if it is also seed-borne).

PHYTOSANITARY MEASURES

EPPO recommends (OEPP/EPPO, 1990) that cotton-growing countries should offer a choice between three alternative phytosanitary measures: growing-season inspection of the seed crop, seed testing and acid delinting.

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