# EPPO Datasheet: *Stenocarpella macrospora*

Last updated: 2023-12-01

## IDENTITY

**Preferred name:** *Stenocarpella macrospora*
**Authority:** (Earle) Sutton
**Taxonomic position:** Fungi: Ascomycota: Pezizomycotina: Sordariomycetes: Diaporthomycetidae: Diaporthales: Diaporthaceae
**Other scientific names:** *Diplodia macrospora var. caulicola* Mariani, *Diplodia macrospora* Earle, *Diplodia pollacciana* Allescher, *Diplodia rusci f. macrospora* Pollacci, *Diplodia rusci var. macrospora* (Pollacci) Saccardo & P. Sydow, *Macrodiplodia macrospora* (Earle) von Höhnel, *Macrodiplodia zeae var. macrospora* (Earle) Petrák & Sydow, *Stenocarpella zeae* Sydow & P. Sydow
**Common names:** dry rot of ears and stalks of maize, dry rot of maize, leaf striping of maize
[view more common names online...]
**EPPO Categorization:** A2 list
[view more categorizations online...]
**EPPO Code:** DIPDMC

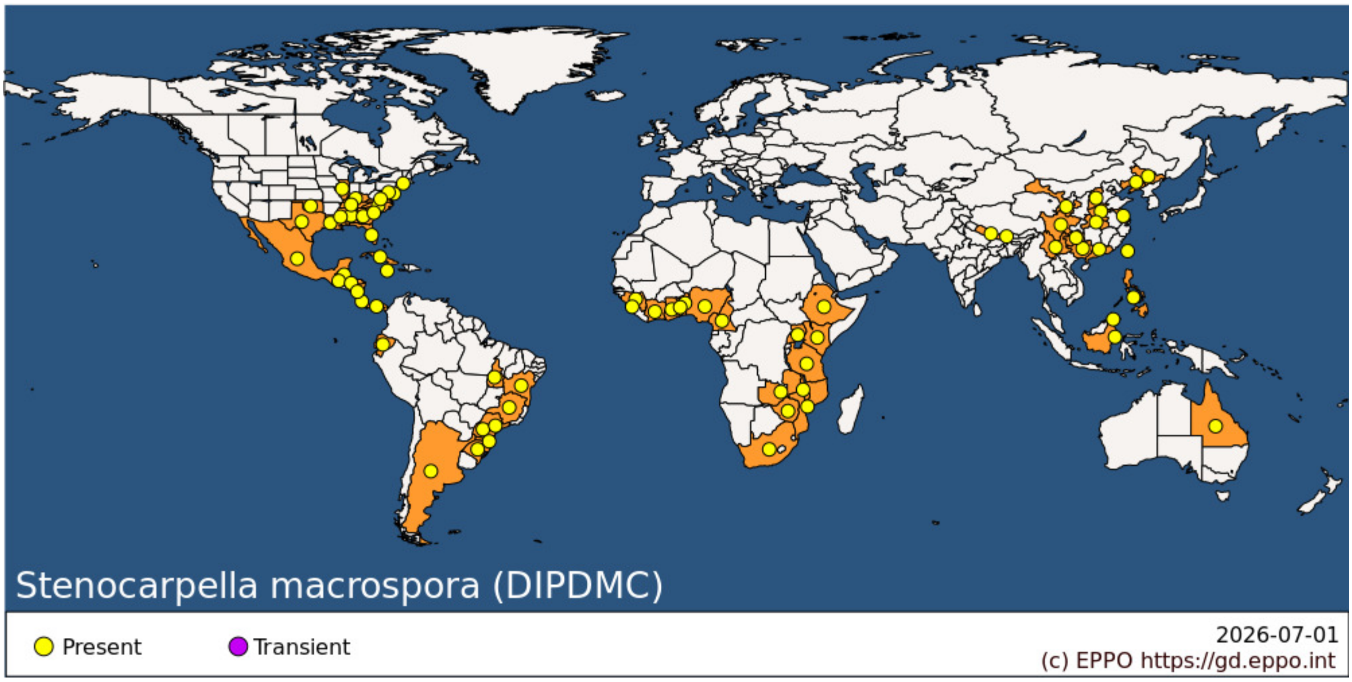
## HOSTS

Maize is the only host reported for *Stenocarpella macrospora*.

**Host list:** *Zea mays*

## GEOGRAPHICAL DISTRIBUTION

*Stenocarpella macrospora* is distributed in almost all regions of the world, except the EPPO region. It has previously been reported in the EPPO region but is no longer present. It was reported in Austria, Italy and Romania, but did not establish. In Austria, *S. macrospora* was reported once in 1993 in crops grown from old imported seed lots (EPPO, 2023). It can be found in Africa, Asia, the Americas and Oceania.




**Africa:** Benin, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mozambique, Nigeria, Sierra Leone, South Africa, Tanzania, United Republic of, Togo, Uganda, Zambia, Zimbabwe
**Asia:** China (Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Jiangsu, Jilin, Liaoning, Shanxi, Sichuan, Yunnan), India (Sikkim), Indonesia (Kalimantan), Malaysia (Sabah), Nepal, Philippines, Taiwan
**North America:** Mexico, United States of America (Alabama, Connecticut, Delaware, Florida, Georgia, Illinois, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia)
**Central America and Caribbean:** Belize, Costa Rica, Cuba, Guatemala, Honduras, Jamaica, Nicaragua, Panama
**South America:** Argentina, Brazil (Bahia, Minas Gerais, Parana, Rio Grande do Sul, Santa Catarina, Sao Paulo, Tocantins), Ecuador
**Oceania:** Australia (Queensland)

## BIOLOGY

*Stenocarpella macrospora* is necrotrophic, exhibiting a parasitic phase in the developing plant and saprophytic phase in crop residue. *S. macrospora* overwinters as viable pycnidia and mycelium on maize debris in the soil or on seed. Under warm, moist conditions, spores are extruded from pycnidia in long cirrhi and disseminated by wind and rain and, probably, by insects. Maize plants are infected primarily through the crown, mesocotyl and roots and, occasionally, at the nodes between crown and ear. Following this, stalks are invaded. The development of the stalk rot phase is favoured by dry weather early in the growing season, followed by extended periods of rainfall shortly after silking. In stalk infections, injury to the vascular system disrupts translocation and, consequently, reduces grain size.

Unbalanced fertility, low potassium, poor drainage, mechanical and insect damage, cultivar and planting density all influence disease severity. The ear and grain rotting phase is similarly favoured by above-normal rainfall from silking to harvest, ears being most susceptible during the weeks after silking. Invasion of the ear is usually by way of the shank. Hybrids with poor husk coverage or thin pericarps are often highly susceptible.

There is evidence that growth of *S. macrospora* is induced by an organic substance secreted by *S. maydis*, and that, in many instances, the former can utilize complex carbohydrates only when a growth factor required is present. Race specialization has not been reported.

For more information, see Koehler (1960), Dhanraj (1966), Sutton & Waterston (1966), Christensen & Wilcoxson (1967), Walker (1969), Shurtleff (1980).

## DETECTION AND IDENTIFICATION

## Symptoms

*Seedlings*

Infected seed gives rise to pre-emergence death in cold soils or blighted seedlings in warmer soils. Seedlings develop brown, cortical lesions on the internode between the scutellum and coleoptile, and the seminal roots are frequently destroyed.

*Leaves*

Symptoms start as small light tan to dark brown lesions on leaves. Over time, the lesions may expand into longer lesions running parallel with the leaf. As the lesions elongate, concentric zones are visible in the lesion where the initial symptoms occur (Anderson *et al*., 2021). Leaf margins surrounding the lesion may appear chlorotic and have a water- soaked appearance (Marasas & Van der Westhuizen, 1979). Over time, lesions may coalesce to form large blighted areas on the leaf.

*Stalk rot*

Symptoms do not usually appear until several weeks after silking, and generally arise following root infection. Oval, irregular or elongate, single or confluent lesions, 1-10 cm long, with pale cream-brown centres and indeterminate darker borders are frequently associated with stalk rot infection. Leaves wilt, become dry and appear greyish-green, the symptoms resembling frost damage. Affected plants may die suddenly. The green colour of the internodes fades and they become brown to straw-coloured, spongy and easily crushed. The pith disintegrates and becomes discoloured, with only the vascular bundles remaining intact. Dark, sub-epidermal pycnidia may be seen clustered near the nodes, and white fungal growth may also be present on the surface(Sutton & Waterston, 1966; Christensen & Wilcoxson, 1967; Walker, 1969; Shurtleff, 1980).

*Ear rot*

Infection usually begins at the ear base, moving up from the shank. If infection occurs within 2 weeks after silking, the entire ear turns greyish-brown, shrunken and completely rotten and light. Alternatively, early infections result in bleached or straw-coloured husks. Lightweight ears usually stand upright with inner husks adhering tightly to one another or to the ear because of mycelial growth between them. Black pycnidia may be scattered on husks, floral bracts and the sides of kernels. Late-infected ears show no external symptoms, but when ears are broken and grains removed, a white mould is commonly found growing between the grains whose tips are discoloured. For more information, see Sutton & Waterston (1966), Christensen & Wilcoxson (1967), Walker (1969), Shurtleff (1980).

## Morphology

Since a number of primary and secondary fungi may be present, microscopic observation of fruiting bodies is recommended.

Pycnidia are immersed, spherical to subglobosa, dark brown to black, 200-300 µm in diameter, with multicellular walls and a circular protruding papillate ostiole, 30-40 µm in diameter. Conidia of *S. macrospora* are straight or curved, rarely irregular, 1 (0-3) septate, smooth-walled, pale-brown, with rounded or truncated ends and relatively large, 7.5-11.5 x 44-82 µm (ANSES, 2018; Sutton & Waterston, 1966).

## Detection and inspection methods

Visual examination in a site of production is not an appropriate method for the detection of *S. macrospora* and samples should be sent directly for laboratory testing (EPPO, 2021).

Seed infested with *S. macrospora* show discoloration and are shriveled, mouldy and may be rotten when heavily infected. These symptoms are not specific to this pest as may fungal infestations show similar symptoms. Seeds may be infested asymptomatically.

Seeds of maize should be placed on 1 % malt agar and incubated at 20 °C for 7 days. Subsequent microscopical observation should then reveal the presence of the fungi. The Japanese Plant Protection Service proposed a procedure which required less time by removing the outer layers of the seeds halfway through the incubation period, with subsequent microscopic examination (Dai *et al*., 1987).

*Stenocarpella macrospora* and S. *maydis* can be collectively detected using a genus-specific primer (Xia & Achar, 2001). A molecular biology approach based on real-time PCR is an easy, fast, and sensitive test for specific targets than conventional methods of diagnosis. Barros et al. (2014) and Pinto et al. (2022) have developed and validated real-time PCR tests for *S. maydis.*

## PATHWAYS FOR MOVEMENT

International movement of *S. macrospora* will most probably occur through the movement of infected maize seed for planting and intended for animal feed. EFSA (2022) note that as *S. maydis* can survive in host plant debris in soil, therefore soil and other growing media may be a pathway for movement. Non-host plants with infected debris in the growing media may be a pathway for entry. EFSA (2022) also note that mycelium, pycnidia and conidia of *S. maydis* may also be a contaminant other substrates (e.g. straw, used machinery and equipment). It therefore seems likely that these may also be pathways for *S. macrospora.* Natural spread of the fungi can be regarded as rather limited.

## PEST SIGNIFICANCE

### Economic impact

Stalk and grain rots are universally important and among the most destructive diseases of maize throughout the world. In most cases, rots are caused by a complex of several species of fungi and bacteria, rather than by a single species. Therefore, it is difficult to assess the loss due to *S. macrospora* alone. EPPO (1999) notes that the disease is not economically important except in isolated cases of water-logged crops. Yield of maize was reduced only when necrotic lesions in the second internode above the ground involved 50% or more of the tissue, and not when lesions were smaller; thus, the maize plant can tolerate a certain level of infection. Losses due to stalk and grain rots vary from season to season and between regions, but may be greater than 50 %. In the USA, 10-20 % yield reductions are common. Losses arise directly from poor grain filling and indirectly from harvest losses because of lodging. *S. macrospora* under specific conditions can produce mycotoxins such as Diplodiol (Cutler *et al*., 1980).

### Control

A balanced nutritional status of the soil, reducing stress, general good agronomic and tillage practices and the planting of tolerant maize hybrids all form part of an integrated approach to reducing the probability of disease. Cultural methods are the main management strategies for *S. macrospora*, since the fungus overwinters as pycnidia and mycelium on corn residues (which can include leaves, stalks, and cobs), and can remain viable for at least one growing season.

Seed treatments are fairly effective in controlling seedling blight, but once the fungus is established in the soil, crop rotation for at least two seasons is necessary to eliminate it.

### Phytosanitary risk

Maize is an important silage and grain crop in the EPPO region. *S. macrospora* could have a considerable economic impact in warm, humid regions. *S. macrospora* has been intercepted in certain countries in the EPPO region, without having established.

## PHYTOSANITARY MEASURES

Certified *Z. mays* seed should be used. Seeds of *Z. mays* from countries where *S. macrospora* occurs should come from pest free areas or in a pest-free site of production. For the inspection of consignments of seed, the EPPO Standard PM 3/78(2) can be used (EPPO, 2021).

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## ACKNOWLEDGEMENTS


This datasheet was extensively revised in 2023 by Felipe A. M. Ferreira Pinto, Epagri Santa Catarina- Brasil . His valuable contribution is gratefully acknowledged.


## How to cite this datasheet?

EPPO (2026) *Stenocarpella macrospora*. EPPO datasheets on pests recommended for regulation. Available online. https://gd.eppo.int

**Datasheet history**

This datasheet was first published in the EPPO Bulletin in 1982 and revised in the two editions of 'Quarantine Pests for Europe' in 1992 and 1997, as well as in 2023. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', ‘Hosts’, and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

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Co-funded by the European Union