Gibberella moniliformis, fusarium

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cellular organisms - Eukaryota - Fungi/Metazoa group - Fungi - Dikarya - Ascomycota - Pezizomycotina - Sordariomycetes - Hypocreomycetidae - Hypocreales - Nectriaceae - Gibberella - Gibberella moniliformis

Brief facts

- *Gibberella moniliformis* is primarily a pathogen (facultative endophyte) of maize that causes ear and stalk rot, but it can also cause disease in other crop species.
- The fungal infection can result in contamination of the grain with mycotoxins (fumonisins) which can cause severe toxicosis and liver and kidney damage in animals and humans upon ingestion of infected grains.
- Infection of the plant can be asymptomatic (latent).

Developmental stages

The stage on which the fungus produces sexual spores is called the **teleomorph** (or perfect stage), the other, asexual, stage is called the **anamorph** (or imperfect stage). *Gibberella moniliformis* anamorph is known as *Fusarium verticillioides*.

- endophytic phase

  the fungus grows in the biotrophic association with maize; in this stage the fungus is transmitted "vertically", or, through seed stage; this phase cannot be controlled by application of fungicides and remains the resrvoir from which infection and toxin biosynthesis takes place in each generation of plants

  - asymptomatic growth

    this is a long-term association of the fungus and the plant during which the pathogen grows without doing substantive harm to its host; toxin production is relatively low at this stage

  - symptomatic growth

    2-3% seedlings infected through the seed develop the disease and die within 2 to 3 weeks, however, some of them may recover and grow without further symptoms; usually the disease ("stalk rot") develops on later stages of the plant growth and induced by conditions that encourage early senescence (water and temperature stress, other diseases); diseased plants take on a grayish green hue then turn tan; pith disintegrates and stalks feel spongy when squeezed

- saprophytic phase

  the fungus grows by using nutrients from decaying debris and soil; on this stage the fungus is spread

"horizontally", and infection is introduced from outside (through corn silk or injured tissue); this stage can be controlled by application of fungicides

Tissues

- conidium

  a vegetative spore; this type of spores is produced by the fungus in saprophytic stage of its growth; conidia serve for asexual reproduction and distribution of the fungus "horizontally"

- mycelium

  the vegetative part of a fungus, consisting of a mass of branching, threadlike hyphae

  - hypha

    threadlike filaments forming the mycelium of a fungus; the fungal hyphae localize mostly intercellularly during asymptomatic endophytic phase and are not disruptive to the structure of the host's cells (although systemic morphology and histology of the plant is changing); hyphae of disease-causing strains are found in both intercellular and intracellular sites

References

PubMed articles

- Bacon CW et al. Biological control of *Fusarium moniliforme* in maize. *Environ Health Perspect. 2001 May;109 Suppl 2:325-32.* **PMID: 11359703**

Websites

- **Yates IE at al. Effects of Endophytic Infection by *Fusarium moniliforme* on Corn Growth and Cellular Morphology. *Plant Disease / July 1997***
- **Doctor Fungus: *Fusarium moniliforme* synopsis**
- **University of Nebraska-Lincoln: Fusarium Stalk Rot**

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