LTO Glaskracht Nederland

Advice card

Saprothrophic fungi

There are increasingly more problems with the growth of fungi in the substrate during the production stage. As a result of increasing pressure on the application of peat replacing products in the substrates and decreasing use of widely functioning fungicides, more risks can be expected with excessively growing saprothrophic fungi. These are harmful for the production, but not directly for the crop.

The fungi

The most important saprothrophic fungi in production cultures are:

- Leucocoprinus;
- Peziza;
- Sphaerobolus;
- Athelia.

Host plants

There seems to be no specific host plant series. The fungus leucocoprinus was found in various potplant cultures, such as phalaenopsis, zamioculcas, anthurium, ficus, succulents under which aloë, spathiphyllum, camellia and yucca/beaucarnea. Sphaerobolus was found in bromelia.

Distribution

Distribution is possible through substrate, young plant material and in drain water if it contains substrate parts.

Survival

The fungus can survive in bad conditions. They can also exist for a considerable time in potting soil (and in the chain) without growing a visible mushroom. From the fungus yellow or white fungus balls are developed, also known as primordia. Subsequently they produce the asexual spores. The sexual spores are formed in the cap of the developed mushroom.
The spores germinate at a favourable moment influenced by much moisture and a high temperature (20-28°C).

Presence in substrates

Fungi and other organisms naturally occur in substrates. Fungi can be latent in substrates and are sometimes, influenced by culture conditions, stimulated to excessive growth.

figure 1

For leucocoprinus mainly a strong fluctuation of dry and wet culture conditions seems to be important to stimulate this process. Fungi growth was found in more substrate types including bark, peat and peat combined with coir. For saprothrophic fungi other than leucocoprinus, the presence of a certain type of peat or other organic components can stimulate the growth of fungus.

Diagnosis: which fungus is it?

If the fungus is visible it is possible to determine what kind of fungus it is, based on externalities and molecular detection. A specific treatment can then be determined and the source of contamination can be traced. With the current molecular techniques, mushrooms, sphaerobolus and peziza can be detected reliably. Various laboratories offer this service.

Invisible contaminations in substrates can also be detected with molecular techniques (limitedly). For the time being only at highly infected samples. The presence of fungus threads in substrates doesn't have to be equally distributed. Then more samples are necessary to collect sufficient material for the random survey.

Hotline

To gain a better insight in the size and nature of the presence of saprofytes in pot plant cultures, a platform has been founded. Within this platform information from practice is collected and available knowledge is shared. The platform www.ltoglaskrachtnederland.nl/saprotrofe-schimmels is an initiative of RHP, VPN, LTO Glaskracht Nederland, Plantum, Wageningen UR Glastuinbouw, Koppert Biological Systems and Groen Agro Control.

More information

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Leucocoprinus birnbaumii (figure 1)

- Also referred to as golden yellow mushroom.
- One of the most important causes of water repellent behaviour of the substrate that leads to a lack of moisture.
- How to recognise: sulphur yellow or white colour, odourless and white spore spint.
- Other species: L. lilacinogranulosus (rose-purple lilac granular mushroom) **(figure 2)**, and L. brebissonii (brown speckle mushroom).

Peziza species (figure 3)

- Also referred to as cup fungus.
- Produce a bowl-shaped fruiting body without a stem. The size of the fruiting body can vary from 3 to 10 cm.
- Often grow in clusters.
- The fungus threads preferably grow in nutritious substrates based on wood chips, compost and other litter.

Sphaerobolus (figure 4)

- Also referred to as artillery fungus.
- The packets of black spores can be shot up to 6 meters from the mushroom-like bodies.
- The packets of spores are very sticky, easily attach to all kinds of bottoms (plants, all holes and cracks in greenhouses) and are therefore hard to remove.
- The fungus likes light (phototropic), so the spores are shot in the direction of the nearest light source.

Athelia turficola (figure 5)

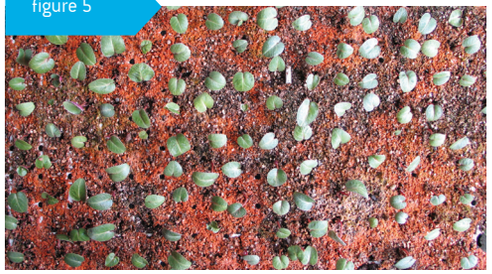
- Decomposes wood and wood rests and extracts its nourishment from it.
- Fruiting bodies are white at first and later cream coloured. They can easily be detached from the substrate.
- Are mainly found in peat based substrate. They can occur at a certain stage as a parasite on plants and other fungi.

figure 2

figure 3

figure 4

figure 5



Recognition and symptoms

The presence of mushrooms can initially be recognised by dried spots in the substrate or by pot plants that show a certain lack of growth. With uninterrupted growth, white or yellow fungus balls are developed. In exceptional cases the fungi are also visible on top of the substrate. One of the consequences is water repellent behaviour of the substrate. This causes a lack of moisture and irregular water uptake.

The development of mycelium preceeds the growth of fruit bodies in the substrate. Therefore they can stay unnoticed for a long time. These saprothrophic fungi live on dead organic material and are not considered as pathogenic, because they don't actually need a living host plant to complete their life cycle. Fungi can increase in the culture under certain circumstances. Excessive growth in the substrate of, for example, leucocoprinus leads to a strongly interrupted growth of the plant and big differences in moisture uptake capacity. Because phalaenopsis is grown in transparent pots, the yellow or white fungus balls of this fungus are noticed earlier. Damage by sphaerobolus causes black spots on the leaf. These cosmetic aspects cause complaints in the trade and consumer stage. The visible presence of fungi is also not desired.

Preventing contamination

Points of interest plant material/substrate

- Inspect potting soil and plant material on arrival, checking for suspicious structures and presence of a stuffy, mushroom-like smell.
- When in doubt, perform a molecular diagnosis aimed at mushroom developing fungi, including leucocoprinus.

Points of interest hygiene

Prevent spreading at the nursery:

- Remove contaminated pots from the greenhouse.
- Clean potting machines and flooded benches/ floors.
- Physically separate the potting part from culture part.
- Disinfect nutritional water.
- Disinfect (packing-)material and trolleys.
- Disinfect pruning equipment.
- Keep the floor clean.

Measures in case of contamination

Points of interest culture

- Examine if the contamination can be traced back to a delivered consignment of plants or substrates or change of culture circumstances if a chemical treatment doesn't work or is undesirable in the production chain. If a changed composition of the substrate is the initiator of the problem, consult your supplier and adjust the composition of the substrate.
- A chemical treatment can be performed with Ortiva (azoxystrobine). In a lab test a low quantity was effective (as from 0,001 ml/l). Ortiva should be used limitedly because of the sensitivity to development of resistance. Possibly alternate with Switch (fludioxonil and cyprodinil) and Topsin, which are effective at higher concentrations (0,1 ml/l).
- Organic substrate components are sensitive to fungi. The choice in substrate components can lower the sensitivity to saprothrophic fungi or reinforce them. If necessary change the recipe of the growing medium.
- Use disinfection equipment to prevent the chance of spreading as much as possible. Biocides based on hydrogen peroxide or chlorine quickly decrease the growth of fungus in water floods. Contact between the fungus and biocide is important for it to work. Oxidative agents react strongly with organic material.