Take-All Patch

The problem

Take-all patch is an important root disease of all bentgrasses. It is caused by the fungus *Gaeumannomyces graminis var. avenae*. The disease can appear in wet, cold conditions or in warm-hot conditions when plants are experiencing stress. Aboveground injury to bentgrass is due to root infection belowground because the fungus disrupts vascular tissue within the root cortex. Take-all survives on previously infected roots, and it can be a recurring problem on infected plants.

What to look for

Take-all symptoms usually appear in late spring to early summer during the time period coinciding with first wilt stress. Initially reddish-brown to bronze patches are small, only a few centimetres in diameter. In time, individual patch size will increase, eventually reaching 1 metre or more in diameter.

A primary indication of take-all in the field is that only bentgrass is affected whereas other turf species inside the patch remain unaffected and healthy. In severe cases the patch interior thins significantly. Often, weeds or other grasses will colonize the thinned patches of bentgrass.

Roots of infected creeping bentgrass are colonized by dark brown to black ectotrophic runner hyphae. The hyphae then produce mats of mycelium and lobed hyphopodia which are useful for microscopic identification of *Gaeumannomyces* species. Infected roots change in appearance, and the central root cortex loses its transparent colour and becomes darkened, with roots turning dark brown to black as the infection advances.

Creeping bentgrass golf surfaces are vulnerable to take-all, and the disease is most prevalent in growing seasons that experience drought. Interestingly, take-all symptoms lessen and often disappear during mid-summer (peak soil temperatures suppress root infection), but symptoms can return in the fall. Over time, the disease can naturally decline, but in other situations take-all patch will remain a chronic disease after 10+ years.

Envu solutions

Cultural practices that are successful in reducing take-all patch rely on maintaining soil pH between 5.5–6.0 and using ammonium sulfate in spring and fall. Liming and use of nitrate forms of nitrogen should be minimized as both can enhance disease. Take-all patch severity can be reduced by applications of manganese sulfate (2.2 kg per ha in the spring). Fungicides are often used in conjunction with cultural strategies because soils deficient in manganese or high in pH can be difficult to correct.

DMI and QoI fungicides are most effective against take-all. Best control of take-all patch occurs when fungicides are applied preventatively in the fall (Sept.-Nov.) when soil temperatures are 10–18 °C at a 5 cm depth. In situations of chronic take-all, fungicides should be reapplied preventatively in the spring when soil temperatures reach >12 °C for five days at a 5 cm depth with two to three applications every 21 to 28 days required. Fungicides must target infected roots so apply at high label rates with flat fan nozzles in 8–20 L of water per 100 m^2 (or use 0.6–1.3 cm of irrigation immediately after application) to ensure fungicide contact with the root zone.

Mirage® Stressgard® contains a DMI fungicide that is labelled in other regions such as the United States for take-all patch. Mirage Stressgard also contains Stressgard® Formulation Technology that will help reduce summer stress on cool-season turfgrass, and this can improve recovery potential following damage. Signature® XTRA Stressgard® tank-mixes promote plant health and reduce the effects of summer decline as well as wilt stress associated with certain diseases such as take-all patch.

Take-all patch affecting a creeping bentgrass fairway in late spring.
Photo: Derek Settle, Envu
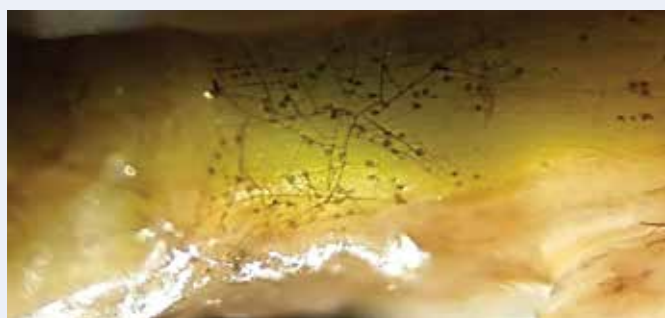
Infected stolon exhibiting runner hyphae with lobed hyphopodia.
Photo: Jesse Benelli, Envu

Take-all patch affecting a creeping bentgrass fairway. Note that annual bluegrass can colonize the center of the patches.
Photo: Jesse Benelli, Envu

To talk about your specific needs or to learn more about our solutions, please contact an Envu representative.

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