Dollar spot

Sclerotinia homoeocarpa

Picture 1 *Dollar spot on the putting green, Korsør Golfklub, Denmark. September 2014. The spots are bright, straw-coloured to white and dry. They often create indents in the turf. Photo: Karin Normann Petersen*

Dollar spot - a new disease in Scandinavia

Dollar spot is a new disease in Scandinavia. It is caused by the fungus *Sclerotinia homoeocarpa*. In Scandinavia, we have found two genetic variants of this fungus. One seems similar to that found in the United States, while the other is clearly different. This makes it hard to say how serious injuries we can expect, but it seems clear that the disease may occur at lower temperatures than in the United States.

In the United States considerable amounts of fungicides are used to control this disease. Observations so far suggest that the disease is less severe in Scandinavia, but we believe that the damages will become worse with increased disease pressure and warmer climate.

Summary

Dollar spot is expected to become a serious problem. Two variants of the fungus have been identified in Scandinavia, but it is uncertain how widespread they are and how severe damage they may cause.

The fungus is spread with golf equipment and machinery. It causes disease on all commonly used grass species. The symptoms are light , round, wilted spots that appear in the turf when it is warm and moist.

Some grass varieties are more resistant than others. Maintenance that stimulates growth can limit the damages, but the use of fungicides may become necessary especially on greens, because the spots create indents in the surface and cause bad putting quality. The access to fungicides is limited.

Picture 2. *Dollar spot on a green with bentgrass, annual bluegrass and red fescue. September 2014. Photo: Karin Normann Petersen.*

Infection

The fungus *S.homoeocarpa* is spread with contaminated plant material on shoes, cutting equipment, and surface water. Some studies also suggest that the fungus is spread by seed infection.

The fungus overwinters as fungal threads or small lumps (stroma) on leaves or in the thatch.

When the weather is warm and humid, it grows and attacks the grass. It can penetrate the leaf, or enter through stomata and wounds. All grass species that are used at golf courses and football pitches are susceptible.

On Scandinavian golf courses, we have seen more attacks on fairways and approaches than on greens. Often the infection starts in high grass before it spreads to the short cut areas.

Symptoms in the field

In the turf the symptoms are straw-colored or white, dry and often circular spots. On greens the spots are more distinct and 3-5 cm in diameter. The spots form indents into the turf, and this can affect the putting quality and destroy the visual impression of the green. See picture 1.

On the fairways, approaches and in the semi-roughs the spots are usually bigger and not so sharply defined as on the greens (picture 2), and they can also melt together into larger continuous areas. By severe attacks you will find fungal threads along with the dew. The white mycelium can be seen on the top of the patches as a cotton-like layer. See picture 7.

If you study the leaves in the zone between fresh and damaged grass with a magnifying glass, you will be able to see that the fungus infects a point on the blade and "cuts it off" so that the outer part wilts and die. Between the infected area and the healthy tissue, there is often a brown or purple boarder zone (pictures 3-5).

The necrosis (= dead tissue) on the leaf stops the sugar production from photosynthesis, and by long-lasting attacks the crown can die from energy shortage, at least on the greens. But in most cases new fresh leaves are formed from the growing point, and in the Nordic countries we have not so far seen many fatal (= deadly) attacks of dollar spot.

Environmental conditions

The temperature seems to be important for the development of the fungus. The most serious attacks come when the summer is hot and dry. The fungus is active as long as the temperature is high, and experience from Denmark shows that it is not possible to succeed with re-seeding in the damaged spots before the temperature decreases and the fungus becomes inactive in the fall.

Two varieties in Scandinavia

We have isolated S. *homeocarpa* from different golf courses in Sweden, Denmark and Norway and we have analyzed parts of the genetic material in these fungi. They could be divided into two genetic groups.

The first group (Group A) consisted of all Danish (9) and most of the Swedish (6) isolates. The gene-sequences of these isolates were identical with those found in isolates from the United States, Canada and United Kingdom.

The second group (Group B) consisted of isolates from only two Swedish and one Norwegian golf course, and the genes in these isolates were quite different from those found in Group A (97.6% similarity).

A similarity of 97% is often used as a limit to define different species, but then other aspects will also be taken into consideration, for example whether there are distinct differences in visual characteristics or environmental requirements, such as the optimum temperature for growth.

Preliminary studies suggest that there are such differences, but we cannot yet say whether there is a difference between the two groups in terms of disease-causing ability. Group B is not reported elsewhere in the world, and we also do not know how widespread it is in the Nordic countries.

Picture 3. *Dollar spot on Kentucky bluegrass. The fungus attacks the middle of the leaves and "cuts them off." Photo from the United States: Trygve S. Aamlid*

Picture 4. *Attack of the dollar spot on a grass leaf. Note the brown/purple border zones between healthy and necrotic tissue. Illustration: Anita Ejderdun.*

Picture 5. *Dollar spot in Poa annua. Photo: Karin Normann Petersen*

Picture 6 and 7. *Dollar spot on green. In the morning dew, one can see fungus threads (mycelium) as a coating over the stain. The two images are from the same spot. Photo: Karin Normann Petersen.*

Picture 8. *Different susceptibility to dollar spot in species and varieties of bentgrass from American trials. Browntop (colonial bentgrass) is normally more resistant than creeping bentgrass, but there are also significant differences between varieties. Photo Trygve S. Aamlid*

Measures

Some grass varieties can be more resistant to dollar spot than others, but we don't have knowledge about this under Nordic conditions. Among the varieties of creeping bent used in the Nordic countries, 'Independence' is rated as one of the most susceptible, while 'Declaration' is among the most resistant (picture 8).

Preventive measures against dollar spot are everything that can be done to keep the plants in good growth, such as adequate fertilization, irrigation and aeration. If the plants experience drought stress, the attack will become significantly worse. This means that deficit irrigation cannot be recommended during an attack.

Dollar spot often appears when small rates of nitrogen fertilizer is used, and in some cases it may be enough to fertilize a little stronger to increase the growth of new leaves. But excessive fertilization makes the leaves more vulnerable to attack, so it's important to find the right level.

Dew removal and other measures that reduce the moisture in the sward is good.

Some microbiological products and several fungicides are effective against dollar spot, but currently none of these are approved in Norway or Denmark. In Sweden greenkeepers can use Banner Maxx (propikonazole) or Headway (propikonazole and azoxystrobin). However, repeated use of these fungicides may develop fungal strains that are resistant to these chemicals.

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Confusion with other diseases

Dollar spot can be confused with:

Microdochium patch (*Microdochium nivale*), but these patches occur at a lower temperature, and they are often more brownish in appearance

Red thread (*Laetisaria fuciformis*) infects the turf under the same conditions as dollar spot, but the spots are often larger and you'll see red/pink mycelium in the spots in the morning.

Pythium Blight (*Pythium* ssp.) occurs at night-temperatures above 18 ° C and very humid conditions. It forms irregular yellow to brownish spots that can also have visible white mycelium in the morning.

Tatsiana Espevig, NIBIO, in the laboratory. Photo: Agnar Kvalbein.

Secure identification and knowledge

To increase our knowledge about the new disease, it is important that observations of dollar spot are confirmed by a turf pathologist.

Samples for identification should be accompanied by photos and information about how serious the damage is and data about the weather before the disease outbreak. This information will help us develop better guidelines about this potentially severe disease.

These professionals are monitoring the development of dollar spot:

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Read more

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