

# Algae

[*Cyanobacteria*]

## SYMPTOMS

Although they do not infect grasses, blue-green algae are a significant pest problem in the turfgrass industry. These organisms contain chlorophyll just like plants, but they grow by producing chains of thread-like cells similar to fungi. Symptoms of algae appear in areas where the turf canopy has been thinned by poor growing conditions or other pest activity. In these areas, a green or black mat of fuzzy growth is evident in the turf canopy or on the surface of the thatch. During periods of dry weather, this algal growth forms a dry, cracking crust on the thatch surface that repels water and impedes turf recovery.



**Host Grass Species:** all turfgrasses; most problematic on putting green turf



algal growth in turf



**Note:** Still not sure if this is the right disease? The [Turfgrass Disease Identification](#) program may be helpful. Or consult the experts at the [Turf Diagnostics Lab](#). Check the TurfFiles [glossary](#) for definitions of unfamiliar terms.

## FACTORS AFFECTING DISEASE DEVELOPMENT

Algae may develop whenever thinning of the turf canopy permits sufficient air, light, and water to reach the thatch surface. Algal growth is most aggressive during the late spring, summer, and early fall when warm, humid conditions are conducive to algae growth and turf thinning. Low mowing heights, shady conditions, poor soil drainage, and frequent irrigation also encourage algal growth in the turf canopy.

Algae have historically been thought of as secondary colonizers, meaning that they only fill-in areas where turf density has been reduced by some other problem. However, mounting evidence indicates that high levels of algae activity can directly cause thinning of putting green turf, possibly by production of toxins or competition for air, water, and nutrients. An aggressive algae management program can greatly increase the density and overall quality of putting greens during periods of warm and humid weather.

## CULTURAL CONTROL

Maintenance of dense, healthy turf is the most effective way to prevent algae invasions. Avoid establishing turf in areas that are heavily shaded or poorly drained, or take steps to correct these

problems in established turf. Mow at the recommended height for each turfgrass species, and increase mowing heights in shady areas to compensate for the reduced light levels. Irrigation should be applied deeply and infrequently; apply sufficient water to wet the entire root zone, and then reapply as needed when the turf shows signs of wilt. Putting greens and other heavily trafficked areas must be cultivated regularly to maintain soil drainage and aeration.

## CHEMICAL CONTROL

Ammonium sulfate, hydrated lime, or other materials can be applied to “burn” the algae in infested areas. Extreme caution is needed when doing this, especially on golf course putting greens, as these materials can also burn the turf or cause nutritional imbalances in the soil.

The fungicides chlorothalonil and mancozeb are also effective algaecides. These products will control algae on a preventative or curative basis, but preventative applications are much more effective. Repeat applications on a 10 to 14 day interval during warm, humid weather provides excellent algae control and significantly increases the density of putting green turfgrasses. Note that chlorothalonil and mancozeb are not approved for application to residential lawns. Fludioxonil (Medallion) provides moderate algae suppression and may be useful in areas where chlorothalonil and mancozeb cannot be applied.

Fungicides containing copper hydroxide should be used with caution, as copper can accumulate in the soil to toxic levels after repeated applications. For this reason, copper hydroxide should only be used under extreme circumstances to bring severe algae infestations under control.

Once a severe algae infestation has occurred, fungicide applications alone will not provide acceptable control. Additional steps must be taken to physically break-up the mat of algal growth so that the turf can recover. Spiking, aerification, verticutting, topdressing, or combinations thereof are effective ways to accomplish this.

Fungicide	Efficacy <sup>(1)</sup>	Resistance Risk <sup>(2)</sup>	Class <sup>(3)</sup>	Products <sup>(4)</sup>
chlorothalonil + thiophanate-methyl**	++++	1	benzimidazole + nitrile	Spectro, ConSyst, Peregrine, Tee-1-Up, TM/C
mancozeb**	++++	1	dithiocarbamate	Fore, 4 Flowable Mancozeb, Dithane, Mancozeb DG, Pentathlon, Protect, Wingman
mancozeb + copper hydroxide**	++++	1	dithiocarbamate + inorganic	Junction
chlorothalonil**	++++	1	nitrile	Daconil, Chlorostar, Chlorothalonil, Echo, Legend, Manicure, Pegasus
chlorothalonil + phosphorous acid**	++++	1	nitrile + phosphonate	Vitalonil
chlorothalonil + fluoxastrobin**	++++	1	nitrile + QoI	Disarm C
fludioxonil	++	1	phenylpyrrole	Medallion

\*\* Not for application to residential lawns.

### Footnotes:

(1) **Efficacy Codes:**

- ++++ excellent control when conditions are highly favorable for disease development
- +++ good control when disease pressure is high, or excellent control when disease pressure is moderate

++	good control when disease pressure is moderate, excellent control when disease pressure is low
+	good control when disease pressure is low
0	does not provide adequate control under any conditions
?	cannot be rated due to insufficient data

(2) **Resistance Risk:**

- 1 Rotating and tank-mixing not necessary, but recommended to avoid potential side effects from continuous use of same chemical class.
  - 2 Rotate to different chemical class after 3-4 applications; tank-mixing not necessary.
  - 3 Rotate to different chemical class after 2-3 applications; tank-mixing not necessary.
  - 4 Rotate to different chemical class after 1-2 applications; tank-mixing not necessary.
  - 6 Rotate to different chemical class after 1-2 applications; tank-mixing with low or moderate risk product recommended.
  - 9 Rotate to different chemical class after EVERY application; tank-mix with low or moderate risk product for EVERY application.
- (3) Continual use of fungicides with similar control mechanisms (modes of action) can result in fungi that are resistant to some chemicals. Poor or ineffective disease control can be expected when this occurs. Managers can reduce the chances of this happening by mixing or alternating fungicides belonging to different chemical classes.
- (4) Recommendations of specific chemicals are based upon information on the manufacturer's label and performance in a limited number of trials. Because environmental conditions and methods of application may vary widely, performance of the chemical will not always conform to the safety and pest control standards indicated by experimental data. When more than one brand name exists for an agricultural chemical, the name of brand that first came onto the market is listed first. Otherwise, brand names are listed in alphabetical order. The order in which brand names are given is not an indication of a recommendation or criticism.

Recommendations for the use of agricultural chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services does not imply endorsement by North Carolina State University or discrimination against similar products or services not mentioned. Other brand names may be labeled for use on turfgrasses. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical. For assistance, contact your county's Cooperative Extension agent.

**Useful links:**

Glossary: <http://www.turffiles.ncsu.edu/Glossary.aspx>

Turf Diagnostics Lab: <http://ncstateturfdiagnostics.com/TDL/Home.html>

Turfgrass Disease Identification Program: <http://www.turffiles.ncsu.edu/diseaseID/>

Turfgrass Disease Management Program: <http://www.turffiles.ncsu.edu/diseasemgmt/>

Turf Irrigation Management System: <http://www.turffiles.ncsu.edu/tims/>

© North Carolina State University. This information sheet was prepared by Lane P. Tredway, Gail G. Wilkerson, Bridget R. Lassiter, Jenifer J. Reynolds, and Gregory S. Buol. Departments of Plant Pathology and Crop Science, College of Agriculture & Life Sciences, North Carolina State University. Prepared February 8, 2011. Available on-line at [www.turffiles.ncsu.edu](http://www.turffiles.ncsu.edu). This publication was made possible through a grant provided by the Center for Turfgrass Environmental Research & Education (CENTERE) whose purpose is to support worthwhile projects that will benefit both the private sector and the public, and protect the environment.