Extreme heat compounds insect problems

We can't control the weather, but an understanding of its effects on pests and their control can be useful.

South

by R.L. BRANDENBURG, Ph.D./N.C. State University

Why would a sudden change of weather create unusual insect problems? The answer goes beyond insects being cold-blooded and controlled by temperature.

Some insects simply survive better on stressed turf. At other times, certain insects will become a problem because the unusual weather patterns may allow them to escape their natural controls.

Hot and dry weather favors chinch bugs because a fungal disease that often keeps them in check doesn't perform well under those conditions.

Cool, wet springs may lead to more cutworm problems in the summer.

Unusually hot, dry conditions may result in more armyworms in the turfgrass as other food sources are depleted. This alerts us to potential pest outbreaks, but does not replace the need for turf monitoring and scouting.

Insect forecasting

The term "degree-days" is often mentioned in association with weather and insects. Degree-days are simply an accounting tool for recording how warm it has been. Most living organisms have a threshold—or minimum temperature—during which time development is possible. For insects, a common threshold is 50°F. Temperatures below this ususally mean development does not take place. Insect development is more rapid as the temperature climbs above 50°F.

Developmental models have cumulative degree-day targets that indicate when an important event is likely. For example, if mole cricket eggs are expected to hatch at 2,000 degree-days—and it usually occurs around June 17 in Raleigh, N.C.—we base our prediction on that model. Should we have 1,900 degree-days by June 1, and accumulate about 30 additional degree days thereafter, then we can estimate that egg hatch will occur earlier than June 17. With this information in hand, we know when to begin soap flushes to verify egg hatching.

Once hatching has been verified, we can begin timely and effective control measures.

The effectiveness of various control measures can be dramatically affected by the weather.

Cool weather may render the insects less active and the insecticides less effective. Rainy weather can reduce the effectiveness of insecticides applied for control of foliar pests. However, the hot, dry conditions we had during 1995 often have the greatest impact on control efficacy. The management of soil pests such as grubs and mole crickets is adversely affected in a number of ways. The hot, dry soil surface may cause insecticides to bind to organic matter or to vaporize. Either way, less insecticide is available to the target site.

Control of soil insects requires that the insecticide be moved down into the soil. The longer the insecticide is on a hot, dry surface, the more likely it is to be degraded by sunlight.

Irrigation

Moisture from rainfall or man-made irrigation systems is made even more impor-

How to calculate degree-days

1) Record the maximum and minimum temperature for the day.
2) Add the two numbers.
3) Divide by 2 for an "average temperature."
4) Subtract 50°F (insect development threshold temperature).
5) The sum is the number of degree-days for that day.

A negative number is not used since it means no development occurred. If the minimum temperature for a day was 60°F, and the temperature was 80°F, then the average would be 70°F (80+60=140÷2=70).

Subtracting the 50°F threshold would yield 20. This is the number of degree-days recorded for that day.

SOURCE: DR. BRANDENBURG

A - White grub populations and the efficacy of control can be affected by weather.

B - Natural enemies, such as this beetle larva dining on a caterpillar pupa—can be affected by weather.

C - The hot, dry weather of North Carolina caused sporadic outbreaks of sod webworms, as the moths laid eggs in drought prone areas.

tant by the negative consequences of hot, dry weather. Additionally, hot, dry weather often moves the insects deeper into the soil, and therefore more difficult to control. Many turfgrass managers irrigate sites before treatment. By thoroughly soaking the soil—two to three days in advance for white grubs and one day for mole crickets—two important functions are accomplished. First, the irrigation will cause the insects to move closer to the soil surface and be more susceptible to the control measure. This pre-irrigation also reduces the insecticide binding in the organic matter near the surface. The post-application irrigation is still required immediately after treatment.

Biological materials, such as entomogenous nematodes are just as susceptible (if not more so) to hot, dry conditions as conventional synthetic insecticides.

A good scouting program and attention to detail while applying insecticides can help you manage insect pests through adverse weather conditions. **LM**

TURFGRASS PEST CONTROL CALENDAR

When to scout for insects and mites

Pests	I*	P**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ants	II	A			S or Gr									
Armyworms and cutworms	III	A						S						
Bees and wasps	II	A							S					
Billbugs	III	D,E,F					S or Gr							
Chinch bugs	III	B						S						
White grubs	I	A			S or Gr					S or Gr				
Green June beetles	I	A				S					S			
Ground pearls	III	A						M						
Leafhoppers and spittlebugs	II	A						S						
Mole crickets	I	G,H			S or Gr					Ba				
Sod webworm	III	C,D,E,G						S or Gr						

*Degree of importance as pest: I= Important pest, frequent occurrence; II= Usually present, but generally not a pest; III= Occasional pest, treat when detected.

**Preferred grass species: A= Centipedegrass, fescue, and many other grasses; B= Saint Augustinegrass; C= Fescue; D= Bluegrass; E= Bermudagrass; F= Zoysiagrass; G= Bentgrass; H= Bahiagrass.

S= Sprays; Gr= Granules; Ba= Baits; M= Maintain the turf in healthy condition, irrigate.

For warm-season disease control: know your turf!

South

by BRUCE MARTIN, Ph.D. / Clemson University

Diseases can seriously limit the successful culture of warm-season turfgrasses. Fungi are most of the living causal agents of disease in warm-season grasses, but nematodes are a problem, too, particularly in sandy soils.

Successfully managing diseases in warm-season grasses depends on knowing the requirements of the particular grass in question, the biology of the pathogens, and good turf horticultural practices. Pesticide applications are valuable in an overall integrated pest management system, but they must be used responsibly.

Brown patch

A major disease of cool-season grasses, brown patch also commonly attacks warm-season grasses, including bermudagrass, St. Augustinegrass, centipedegrass and zoysiagrass. The primary causal agent is *Rhizoctonia solani*, but the strain which causes the disease differs from those encountered as pathogens of cool-season grasses.

Brown patch symptoms appear in the spring, as the turfgrass is breaking dormancy, or in the fall, as the turfgrass approaches dormancy. Individual disease patches may be 20 or more feet in diameter. Shoots along the outer border of patches usually are yellow due to rotted leaf sheaths near the soil surface.

Dollar spot

This disease occurs on all of the warm-season turfgrasses, but gets severe in bermudagrass

and zoysiagrass. Best conditions for dollar spot are warm, humid weather. Dollar spot can be more severe on nitrogen-deficient turf or turf that has become drought stressed before rain or high humidities occur.

Symptoms differ depending on the grass's height of cut. On turf cut low, patches of about one to two inches in diameter develop. On higher-cut turf, patches may exceed five inches in diameter. Characteristic leaf lesions are a bleached tan with distinct reddish brown or purplish margins. Leaves may become girdled. In early morning, it is not uncommon to see a gray mycelial growth.

Spring dead spot

Spring dead spot of bermudagrass occurs in transition zone areas of the U.S. It is common in the Piedmont and mountain areas of the Carolinas and Georgia, but rare in the coastal regions. Hybrid bermudagrasses are particularly susceptible, but common types may also be afflicted. Several fungi probably cause this disease. All are relatively slow-growing, root-colonizing fungi.

Symptoms include dead circular areas of turf, two or three feet in diameter, found in spring as bermudagrass breaks dormancy. Patches of diseased turf may persist for several years. Older patches develop a "frog-eye" symptom with healthy grass in the center.

Generally, spring dead spot develops in turf that is three to six years old. Excessive thatch, late-summer nitrogen applications, and low temperatures in winter predispose turf to spring dead spot.

Gray leaf spot

Gray leaf spot is caused by *Pyricularia grisea*, a very common disease of St. Augustinegrass occurring in hot humid weather. It is more severe in new turf, in shady locations with poor air movement.

Infections occur on leaves and stolons, first as small brown spots with a distinct brown color, to a purple border around the infected tissue. Lesions may become very numerous and expand to completely consume leaves and girdle stolons. Severe infections may leave turf with a scorched appearance. The disease is sometimes called "blast" due to this symptom.

Leaf spot

Bipolaris sorokiniana causes leaf, crown and root diseases of bermudagrass and zoysiagrass during warm, wet weather in mid-summer. The diseases start as leaf spots, and may progress to crown and root rots. *Exserohilum rostrata* has been reported to cause a leaf spot of St. Augustinegrass and bermudagrass. However, these diseases are rarely severe where these grasses are cultured in open, sunny locations, with good soil drainage. If they occur, it may be a sign of other stresses to the turf that can be managed culturally.

On bermudagrass or zoysiagrass, small dark brown lesions appear on leaf blades and sheaths and may expand to larger, irregular, straw-colored lesions. Stolons and roots may develop a dark, or dry rot. The turf may brown and thin, over a period of weeks or months.

Pythium diseases

More of a problem in cool-season grasses, some Pythium species cause general decline by infection of roots.

St. Augustinegrass is susceptible during prolonged warm, wet periods. Poor surface and subsurface drainage favors pythium fungi, and encourages algae in areas where disease has weakened the grass.

Fairy ring

Symptoms appear as rings or arcs of green, stimulated turf which may be accompanied by declining grass and mushroom formation. Problems develop when mushroom mycelia accumulate in the soil and dry it out. Fairy rings may persist and increase in diameter over years. The fungi may colonize old roots, stumps, or thatch, or may be mycorrhizal on living trees. Newly-constructed putting greens may develop infestations after only a few months or years.

Nematodes

Turf infested with damaging nematode species appears unthrifty; weeds invade weak or dead areas. Infested areas tend to wilt prematurely, even when adequate soil moisture is available. In most cases, nematodes occur in very sandy soils. **LM**

CONTROL PRODUCTS FOR WARM-SEASON TURF DISEASES

Brown patch	Eagle WSP; Daconil 2787F; Daconil 90WDG; Daconil Ultrex; Prostar 50 WP; Bayleton 25 WP; Banner 14.3EC; Rubigan AS; Chipco 26019 50WP; Chipco 26019 23.3%F; Fore 37%F; Fore 80WP; Terraclor 75 WP; Turfside 10G; Curalan 41.3% F; Curalan DF; Cleary's 3336 50WP; Cleary's 3336 46%F; Sentinel 40WG
Dollar spot	Eagle WSP; Daconil 2787 F; Daconil 90WDG; Daconil Ultrex; Banner 14.3 EC; Bayleton 25WP; Curalan 50WP; Curalan DF; Rubigan AS; Chipco 26019 50WP; Chipco 26109; 23.3%F; Fore 80WP; Cleary's 3336 50WP; Cleary's 3336 46%F; Vorlan DF; Vorlan Flo; Sentinel 40WG
Spring dead spot	Rubigan AS; Eagle WSP
Gray leaf spot	Daconil 2787F; Daconil 90WDG; Daconil Ultrex; Banner 14.3%EC; Sentinel 40WG
Leaf spot	Daconil 2787F; Daconil 90WDG; Daconil Ultrex; Chipco 26019 50WP; Chipco 26019 23.3%F; Banner 14.3%EC; Curalan 50WP; Curalan Flo; Vorlan DF; Vorlan Flo; Fore 37%F; Fore 80WP; Eagle WSP
Pythium diseases	Aliette 80WP; Koban 30WP; Subdue 2E; Subdue 2G; Banol 6E
Fairy rings	Prostar 50WP
Nematodes	Mocap 10G; Nemacur 10G; Nemacur 3E

Note: each product has specific use rates and intervals. Read labels and follow specifications as listed on label.

SOURCE: DR. MARTIN