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.

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In the southern United States, the early part of the summer of 1995 was unusually cool and wet.

In July the water was shut off and the thermostat climbed higher. The change in the weather was associated with drought stress on turfgrass, increased disease incidence, and some unusual insect problems.

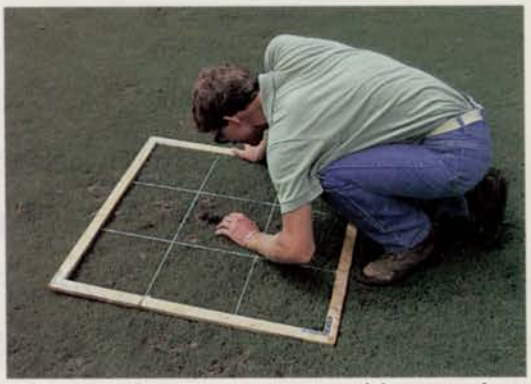
Why would a sudden change of weather create unusual insect problems? The answer goes beyond insects being cold-blooded and controlled by temperature.

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.

During 1995, the Southeast saw its share of chinch bugs late in the season due to the hot, dry conditions. However, the wet conditions earlier in the summer slowed their early-season build-up and prevented any early summer problems.

The number of white grubs observed in many areas this past fall was below normal, probably due to the fact that the soil was dry in many areas during the time the beetles were laying eggs. The dry soil was detrimental to egg survival and consequently resulted in fewer grubs.

Other weather relationships may be beneficial for some pests. Cool, wet springs may lead to more cutworm problems throughout 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.



Adverse weather means you must track insect numbers.

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

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

Heat stress makes diagnosis more difficult.

PRODUCTS FOR CONTROL OF WARM-SEASON INSECT PESTS

Southern chinch bug: bendiocarb (Turcam); ethoprop (Mocap); cyfluthrin (Tempo); permethrin (Astro); diazinon; chlorpyrifos (Dursban); isofenphos (Oftanol); isazofos (Triumph); fonofos (Crusade); lambda-cyhalothrin (Scimitar); acephate (Orthene); fluvalinate (Mavrik)
Timing: apply as needed during hot, summer months. Thorough coverage is critical. Irrigate immediately after application of granules. Avoid over-fertilizing.

Leafhopper/ two-lined spittlebugs: acephate (Orthene); bendiocarb (Turcam); chlorpyrifos (Dursban); diazinon; carbaryl (Sevin); isazofos (Triumph); fluvalinate (Mavrik).
Timing: begin monitoring and treat damaging populations in early summer.

Cutworms, armyworms: azadirachtin (Turplex); lambda-cyhalothrin (Scimitar); acephate (Orthene); carbaryl (Sevin); diazinon; isofenphos (Oftanol); chlorpyrifos (Dursban); fluvalinate (Mavrik).
Timing: Monitoring and treatment may be necessary in early spring through late fall.

Mole crickets: chlorpyrifos (Dursban bait); propoxur (Baygon bait); carbaryl (Sevin bait); bendiocarb (Turcam); chlorpyrifos (Dursban); isofenphos (Oftanol); fonofos (Crusade); acephate (Orthene); ethoprop (Mocap); fluvalinate (Mavrik); entomogenous nematodes (Vector MC and others).
Timing: Use soap flushes to monitor egg hatch. Treat emerging nymphs in early summer.

White grubs: bendiocarb (Turcam); diazinon; chlorpyrifos (Dursban); acephate (Orthene); isazofos (Triumph); amdro; avermectihn B (Affirm bait); fenoxycarb (Award bait).
Timing: treat small grubs in late summer and fall for best control.

Ground pearls: No known effective chemical controls. Follow proper turf man agement practices and irrigation.

Not all trade names are mentioned, and the ones listed are used as examples. No endorsement of products is intended nor does omission of any products imply criticism.

SOURCE: DR. BRANDENBURG

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.

Similar intuitive methods of insect pest forecasting are used in many states. Their value depends on the accuracy and completeness of the environmental information collected, and how specific the information is to the location of interest. Using a base of 50°F, we see our first Japanese beetle adults in North Carolina at about 1100 degree-days, which is the same for Ohio or New York. Only the time of year that target is reached is different for different states.

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 important 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

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.

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.