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IN THIS ISSUE

- White Grubs, Soil Moisture, and Drought
- Post-Drought Stress Recovery of Turfgrasses
- 1999 Was a Big Year for Spring Dead Spot
- Rust Problems Increase in Midwest
- Hurricanes and Flooding Problems
- Natural Organic Chelating Agents for Plant Nutrients
- Research Summary: The Influence of Fertilization Timing on Typhula Blight Occurrence
- Communicating Seasonal Timing
- J.B Comments: Interpreting Cultivar Assessments for Putting Greens
- Ask Dr. Beard

White Grubs, Soil Moisture, and Drought

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Soil moisture is probably the most important factor determining the distribution and abundance of white grubs in turf. Severe drought had the eastern United States in a withering grip, and non-irrigated lawns and golf roughs have been brown and dormant through much of the summer. How will these conditions affect grub populations this year, and what about next summer?

Recall that white grubs are the larvae of stout-bodied beetles called scarabs, a group that includes native masked chafers, May and June beetles, and black turfgrass ateniuss, as well as exotic species such as Japanese beetle, European chafer, Oriental beetle, and Asiatic garden beetle. All of these beetles lay their eggs in moist soil, typically 1 to 2 in. (2.5–5 cm) under turf or pasture grasses. Small and oval when first laid, scarab eggs enlarge and become nearly spherical after absorbing water from surrounding soil. **Eggs will**

shrivel and die if soil moisture drops below about 10%. The tiny, newly hatched grubs also are unlikely to survive in very dry soils.

Not surprisingly, rainfall and irrigation also affect behavior of the adult beetles. If drought occurs during the weeks before adults normally appear, **the newly mature, unmated beetles may remain underground, their emergence delayed until rain softens and wets the ground. The first heavy downpour often triggers the onset of intense flight and mating activity.**

Once mated, females seek out moist grassland in which to lay eggs. Some species, e.g., Japanese beetles, may fly a half mile (0.8 km) or more in search of suitable egg-laying sites. My research has shown that **egg-laden females are attracted to irrigated turf, particularly when surrounding areas are dry.** Thus, irrigated lawns and fairways will often have relatively high densities of grubs. **On golf courses where fairways are protected by preventive grub treatments, this often translates into moist, untreated areas such as tee banks, green banks, and close, irrigated rough having the highest grub populations.**

Once the grubs are about half-grown, irrigation or rainfall begin to work in the turf manager's favor. Moist soils in August and September mask the feeding damage and encourage regrowth of roots. **Whereas irrigated turf often will tolerate 12 or more grubs per ft² (0.1 m²) before showing injury, the same turf may be damaged by half that number if the grass is additionally stressed by drought.**

Large grubs tend to move deeper when soils become dry. When applying curative grub treatments (e.g., Dylox or Turcam) to relatively dry turf in late summer, irrigating a day or two *before* application may help to draw the grubs closer to the surface. This increases their contact with the insecticide residues and often provides better control. Of course, post-treatment watering is still needed to leach the residues into the root zone.

The drought of 1999 likely caused widespread mortality of eggs and young grubs in non-irrigated turf and pastures, so overall grub populations may be lower next year. But, don't let your guard down. Beetles that emerge from irrigated turf often lay eggs in the same areas, so your perennial grub "hot spots" will still be at risk. 