Feature Article

Drought and Climate Change Accentuate Insect Problems in Irrigated Turf

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Drought conditions were especially severe during the first half of 2002 along the entire Atlantic coast from Florida north to Maine, from the Gulf states across Texas, and in the Plains, Southwest, and Rocky Mountain states. Non-irrigated lawns, golf roughs, and surrounding fields and pastures have been brown or dormant for much of the summer. **Such conditions often magnify insect problems on irrigated lawns and golf courses.** Winged adults of many pest insects concentrate their egg-laying in moist areas. Some, especially ones with mobile immature stages (e.g., armyworms, mole crickets), may emigrate from dry border areas to feed on lush turf.

Soil moisture is the most important factor determining the distribution and abundance of turf insects. Consider white grubs, the larvae of masked chafers, Japanese beetles, European chafer, black turfgrass ataenius, and other species. All of these beetles lay eggs in moist soil, typically 1 to 2 in. deep (2.5–5 cm) under turf. Small and oval when first laid, the eggs swell by absorbing water from surrounding soil, hatching in 2 to 3 weeks. Eggs won't survive if soil moisture is below about 10%. The tiny, newly-hatched grubs also are unlikely to survive in very dry soils.

Not surprisingly, adult behavior is affected by rainfall and irrigation. If drought occurs during the weeks before adults normally appear, the newly-mature beetles may remain underground until rain softens the ground. The first heavy downpour triggers intense flight, mating, and egg-laying activity. **Some species (e.g., Japanese beetle) 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 lawns and golf turf, particularly when surrounding areas are dry.** I have seen 6-fold increases in grub densities in irrigated lawns compared to adjacent dormant ones. On golf courses where fairways and tees are protected by preventive insecticides, this often translates into the highest grub densities being in moist green and tee banks, and irrigated rough. Mole crickets display similar behavior on southern golf courses, seeking more moist turf areas when overall conditions are dry.

Drought also tends to concentrate surface-feeding pests in irrigated turf. In Kentucky, drought-related watering restrictions in recent summers were followed by increased damage to fairways and putting greens from the bluegrass webworm (*Parapediasia teterella*), a ubiquitous species that normally is more abundant in higher-mowed lawns and roughs. Like most turf caterpillars, it completes several generations per growing season. By late summer, non-irrigated roughs and nearby residential turf had become so dry that they were unsuitable as larval food, and the moths focused their egg-laying on whatever green turf they could find. Larval populations became increasingly concentrated on fairways, tees, and putting greens. Cutworms probably behave similarly.

Recent plague-like outbreaks of armyworms (*Pseudaletia unipuncta*) on cool-season lawns, golf courses, and athletic fields also seem to be climate-related. **Armyworms normally favor corn and small grains, but larvae may migrate *en masse* from parched pastures or agricultural fields into adjacent moist turf.** Annual infestations originate from moths that are carried north on frontal systems and deposited in downdrafts associated with storms. **In 1999–2001, armyworm arrivals coincided with severe spring droughts affecting portions of the Midwest and Northeast. Corn had not yet germinated because the soils were so dry. The moths evidently sought an alternative for egg-laying, and the resulting larval populations wreaked havoc on turf.**

Drought can aggravate outbreaks of some pests by suppressing naturally-occurring insect pathogens, especially nematodes and fungi. Hairy chinch bugs, for example, thrive in hot dry conditions, whereas a lethal fungus, *Beauveria*, often suppresses their populations when rainfall is abundant. **Drought-stressed turf is less able to tolerate and recover from damage from root-feeders or other insects.**

Insects are cold-blooded so their growth rate is temperature-dependent. **Inordinately warm weather may allow pests with multiple broods (e.g., turf caterpillars, chinch bugs, ants) to complete extra generation(s) and reach higher densities by the end of a growing season.** A prolonged autumn allows grubs to feed and grow longer before hibernating, likely enhancing their overwintering survival.

Turf managers should keep an especially close watch on irrigated areas, where insect pests tend to concentrate, when surrounding non-irrigated areas become very dry.

Syringing and Hand Watering Greens

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dry spots, most water repellency occurs in the top 1 to 2 inches (2.5-5.0 cm) of soil, but the problem can be as deep as 6 inches (15 cm) (Karnok and Tucker, 2002). Hence, **wetting agents often are required to assist with water penetration through the hydrophobic zone of repellency. The same is true for alleviating drought damage caused by fairy rings.** Powered water injection devices also are useful for wetting hydrophobic soils. For more information on managing localized dry spots and fairy rings see **TurFax** articles published in 1999 and 2002, respectively.

References

Beard, J.B. 2002. Turf Management For Golf Courses. Ann Arbor Press, Chelsea, MI.

Karnok, K. and K. Tucker. 2002. Water-repellent soils Part I. Where are we now? Golf Course Management. 70(6):55962.