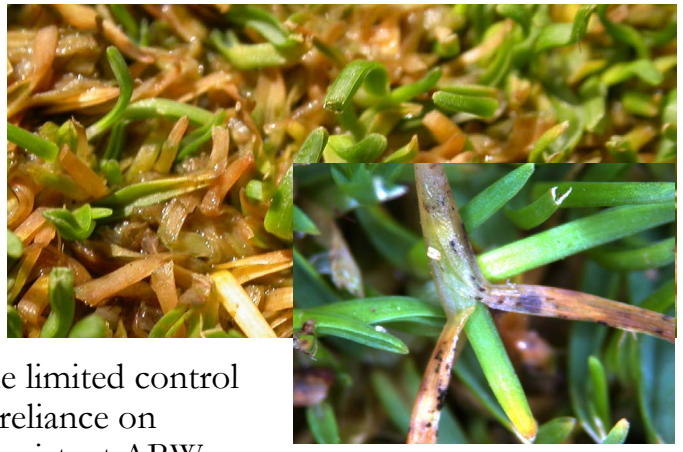
Emerging Pests of Annual Bluegrass

This project has refined our understanding of annual bluegrass, annual bluegrass weevil, and anthracnose diseases. New chemical treatments and maintenance practices are now available to the turfgrass industry, making pest management on golf courses safer, more affordable, and more successful.

Who cares and why?

Anthracnose diseases cause yellow lesions on annual bluegrass leaves and rot stems and roots. Dead, collapsed plants result in poor turf for golf courses. If the disease is detected in early stages, properly applied fungicides can protect other plants. NE-1025 researchers have also investigated ways to prevent and control anthracnose diseases with new fertilization, irrigations, and mowing practices. Above photo by Ned Tisserat, CSU. Photos below by John Kaminski, PSU.



Cultivated turfgrass (including lawns and recreational surfaces) covers 12 million hectares in the U.S. Turfgrass is an important source of green space and provides numerous ecosystem services (such as reduced soil erosion, mitigation of heat islands, soil carbon sequestration, and air pollution control). Golf is a major component of the turfgrass industry, with over 16,000 courses in the U.S. Golf courses provide important opportunities for jobs, economic development, and tax revenues. A recent report by the World Golf Foundation stated that golf contributes $62.2 billion worth of goods and services each year to the national economy. Golf courses maintenance in the Northeast and Mid-Atlantic is becoming increasingly complicated by two pests: the annual bluegrass weevil (ABW), which inflicts heavy damage to the visual and functional quality of the turfgrass, and fungal anthracnose diseases that result in damaging leaf blights, leaf rot, and/or root rot. With limited knowledge about these pests and few effective management options, golf course managers increasingly rely on chemical pesticide use. However, pesticides provide limited control of ABW and anthracnose diseases. In addition, increased reliance on pesticides has resulted in a greater incidence of pesticide-resistant ABW and anthracnose fungus populations. Furthermore, the general public is increasingly concerned about pesticide exposure and the potential for water contamination and long-term effects on human health and the environment. Improved pest management strategies can reduce pesticide use, thereby alleviating public concerns and minimizing economic losses in the golf industry.

What has the project done so far?

NE-1025 has been instrumental in building a network of turfgrass entomologists, management specialists, breeders, and pathologists in the Northeast and Mid-Atlantic U.S. Participating scientists have improved procedures for breeding programs that have been used to analyze turfgrass resistance to ABW and anthracnose diseases. Researchers have also enhanced models that describe and predict pest infestation severity. The NE-1025 team has conducted numerous field trials that have evaluated the effectiveness of new maintenance practices and biological, chemical, and genetic options for controlling these pests. Studies in several states have demonstrated that a slight increase in the rate of nitrogen (a

major element in fertilizers) significantly suppresses anthracnose diseases, particularly when quick-release forms of nitrogen are used. Scientists have also shown that increasing mowing height as little as 0.4 millimeters can reduce disease severity and that more frequent mowing does not increase the incidence or severity of anthracnose diseases. Other studies have found that the organic compound, piperonyl butoxide, helps successfully control ABW populations that are resistant to pyrethroid insecticides. Researchers have distributed kits to golf course managers for testing whether ABW are resistant to pyrethroids and have published several articles on best management practices in turfgrass industry magazines across North America.

Growing concerns about the cost of using pesticides on golf courses and their possible environmental and human health impacts have propelled research on alternative ways to control ABW and anthracnose diseases. For example, a mower manufacturer altered a product line as a direct result of anthracnose research at Cornell University, and many golf course managers have increased mowing height, adjusted mowing and rolling frequency, and modified fertilizer and irrigation programs. Top photo by Brett Chisum. Bottom photo courtesy of Christa Conforti, Presidio Trust.

Impact Statements

Coordinated the exchange of datasets, knowledge, and culture collections among scientists, pest control specialists, and plant breeders, advancing research and filling critical knowledge gaps.

Helped golf course managers decide which control tactics to use and when to use them by sharing information about ABW and anthracnose diseases and the potential for pesticide resistance.

Updated the WeevilTrak website weekly, helping golf course managers make informed, timely, and effective choices about pest control.

Improved knowledge about alternative pest control options, limiting unnecessary and ineffective pesticide use, and thereby reducing costs for the golf course industry, minimizing human and environmental health risks, and protecting recreational opportunities.

Influenced golf course maintenance guidelines and new mower designs that have reduced overall levels of anthracnose diseases and pesticide use.

What research is needed?

Additional research using cutting-edge technologies is needed to gain a deeper understanding of the biology of ABW and anthracnose diseases. Scientists also need to test new treatments and techniques, monitor pesticide resistance, and track pest distributions across the U.S.

Want to know more?

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Compiled and designed by Sara Delheimer