Integrated Management Of Annual Bluegrass Weevil

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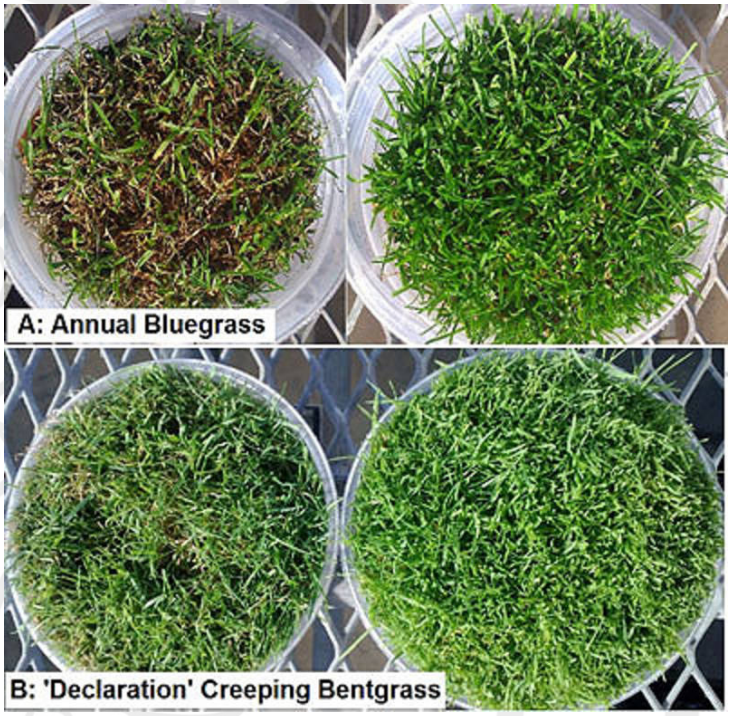

On the left, cumulative damage of annual bluegrass (A) and 'Declaration' creeping bentgrass (B) four weeks after introduction of 12 female and 12 male adult annual bluegrass weevils (ABW) compared to the control on the right. Research at Rutgers University found creeping bentgrasses resistant or tolerant of ABW infestations

Rutgers University scientists are developing effective and sustainable methods for annual bluegrass weevil (ABW) management.ABW is a severe pest of closely mowed turf areas on golf courses in the Mid-Atlantic and Northeast regions of the USA. Along with other organizations, the USGA funds their work on:

1. Determination of bentgrass tolerance or resistance to ABW larvae feeding;
2. Development of effective and practical monitoring methods for ABW; and
3. Finding alternatives to chemical insecticides for curative control of ABW larvae.

ABW go through two to three generations per year with the first generation causing the greatest damage. In the spring, adults emerge from overwintering sites such as leaf litter and tall grasses around the golf course. They move to closely mowed turf areas over several weeks. Mated females chew notches in the grass stem and deposit their eggs. The young larvae (first to third instars) are stem borers causing limited damage. Older ABW larvae (fourth and fifth instars) cause severe damage by feeding on turfgrass crowns. If not controlled, high larval populations can destroy large areas of turfgrass on a golf course.

In their studies, bentgrass species were resistant or tolerant to ABW. Compared to annual bluegrass, bentgrasses were less suitable and non-preferred for egg laying. Yet, females did lay eggs on bentgrasses even if annual bluegrass was available. Bentgrasses were less suitable for larval growth, but ABW could develop from eggs to pupae. Bentgrasses also could have higher larvae densities but less visible damage. Among the tested bentgrasses species, creeping bentgrasses were most resistant and tolerant to ABW (See Figure 1).

The most attractive plant compound was 3-hexenyl acetate phenyl ethyl alcohol. This compound was not a strong enough attractant to lure adult ABW out of infested fairways. While the compound is not a strong attractant alone, combinations with other plant volatiles are possible. The researchers did not detect a specific ABW sex pheromone in their studies. They did find two compounds (α-muurolene and E-β-ocimene) emitted from male and females feeding on annual bluegrass. The scientists also are working on the identification of aggregation pheromones.

Steinernema carpocapsae nematodes combined with imidacloprid provided curative control of ABW larvae. This combination also provided preventive control of white grubs. Split applications of nematodes 5 to 7 days apart combined with imidacloprid provided 95% control of ABW.

Annual bluegrass is susceptible to ABW damage and creeping bentgrasses demonstrated a significant level of resistance. Overseeding with creeping bentgrass cultivars could be beneficial in areas with recurring ABW infestations. The best overseeding time is from mid-June to July, which coincides with the period of greatest damage by ABW larvae. Also, bentgrass establishes better when annual bluegrass is weak.

The risk of population growth still exists because ABW laid eggs and larvae developed in all grasses tested. Researchers will continue to investigate combinations of plant resistance with other sustainable management practices.

Mean total number of annual bluegrass weevils (*Listronotus maculicollis)* individuals (all developmental stages combined) recovered from plugs of annual bluegrass (*Poa annua*) or cultivars of three bentgrasses (*Agrostis* spp.) in a no-choice field experiment. Means capped with the same letter do not differ significantly (Source: Kostromytska and Koppenhöfer, 2014).

Source: Olga Kostromytska, Albrecht M. Koppenhöfer, and Cesar Rodriguez-Saona

Advancing Integrated Management of Annual Bluegrass Weevil

Olga S. Kostromytska and Albrecht M. Koppenhöfer. 2014. Oviposition preferences and larval survival of annual bluegrass weevil, *Listronotus maculicollis*, on Poa annua and selected bentgrasses (Agrostis spp.). The Netherlands Entomological Society, Entomologia Experimentalis et Applicata 152: 108–119.

Additional Information:

Adaptation and Management of Fine Fescues for Golf Course Fairways
Improvement of Low-input Fine Fescues
Finessing Fine Fescue
Northern Exposure: The 2015 U.S. Open at Chambers Bay
SCRI Fine Fescue Collaborative Research Project
Golf Course Turfgrass Reduction