Virginia Cooperative Extension
Virginia Tech • Virginia State University
www.ext.vt.edu

The Annual Bluegrass Weevil as a Golf Course Pest in Virginia

Authored by Shannon Bradley, Student Graduate Assistant, Department of Entomology, Virginia Tech; and Alejandro Del-Pozo, Assistant Professor and Extension Specialist, Department of Entomology, Virginia Tech
(Published July 2023)

Introduction

The annual bluegrass weevil (ABW; *Listronotus maculicollis*, Coleoptera: Curculionidae) is an expensive pest of cool season grasses, such as poa (*Poa annua*) and creeping bentgrass (*Agrostis stolonifera*). In recent years, ABW have become a more prominent pest of golf courses in Virginia.

Description

ABW are small beetles measuring about 3-5 mm (3/32 – 3/16 inch) with an extended snout that is characteristic of these adults (Fig. 1). Female ABW are slightly larger than male ABW, though this difference in size is anecdotal. Adult ABW can range in color from a reddish brown to a black color, as they darken through a process called sclerotization that occurs as their exoskeleton hardens. ABW larvae are white or cream in color and have a brownish head capsule with no legs (Fig. 2). They range from about 1-3 mm (1/25 – 3/16 inch) depending on their life stage.

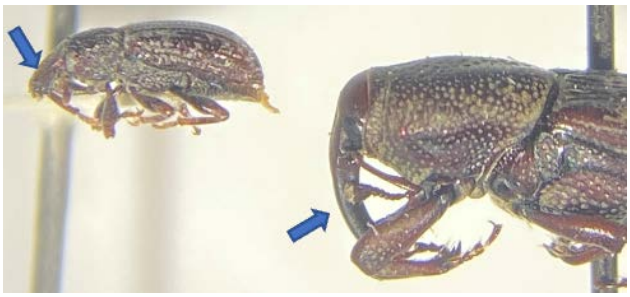

Figure 1. An ABW is pictured on the left with the antennae higher on the snout towards the head. A billbug weevil is pictured on the right with antennae that sit lower on the snout, further from the head. Photo by Shannon Bradley.

Figure 2. Left to right: ABW adult and immatures. Beneath the ABW is the tip of a pen for reference of their small size. Photo by Shannon Bradley.

Life Cycle

ABW can be found from February to November in Virginia, which differs from more northern states, as the warm weather offers a longer season for this pest. ABW overwinter as adults in leaf litter near trees and then emerge and move towards the rough of the golf course as weather warms. While numbers can be found throughout this time frame, the largest densities of ABW populations are expected between the end of May and the beginning of July (Fig. 3). These peaks in the population of adults are then often followed by damage caused by immatures. Immature ABW have five instars, each taking 5-7 days to develop.

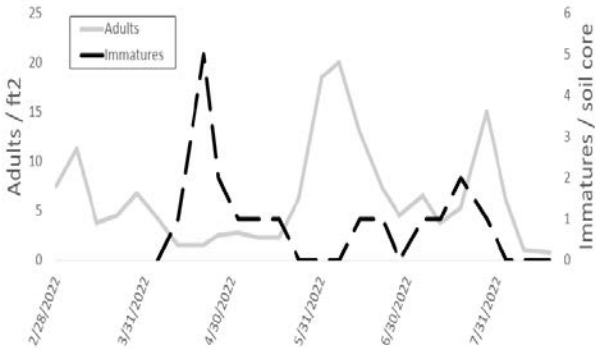

Figure 3. Adult and immature populations collected from a golf course in Richmond, VA in 2022. Immature populations peaked in late-April and adult populations peaked about six weeks later in early June.

Damage

Most turfgrass damage caused by ABW is the result of immature feeding, though the adults could also feed on the turf blades. Immature ABW feed along the sheath of the leaves and eventually shift their feeding to the roots of the turfgrass. These feeding habits cause an uneven surface, and the infested turfgrass often yellows or browns. As with many stressors of turfgrass, ABW damage often starts as a small area of brown and then continues to spread. This damage can appear to be stress caused by lack of water (Fig. 4). Due to the high standard of care for turfgrass under golf course settings, this browning and unevenness is unacceptable.

Figure 4. Left side shows turfgrass with large populations of ABW found in July 2022. The right side shows the same spot six weeks later. Photos by Shannon Bradley

Impacts of Damage

Monitoring and management of this pest is essential to avoid large areas of highly damaged turfgrass. The ABW is a major pest, not only in terms of the damage it causes, but also in the management plans which often present a large expense. Golf course superintendents in Virginia have reported spending up to $7,000 annually to treat ABW. Consistent monitoring of the greens is critical to early detect infestations of this pest.

Monitoring

Adult ABW are monitored using a soap water flush, in which lemon-scented dish soap is an irritant, driving adults from the turfgrass (Fig. 5 and Table 1). This method is affordable, does not damage the turfgrass, and is an effective way of monitoring the presence of adults.

To complete a soap water flush, combine soap and water following the ratio provided in Table 1. Pour the mixture over one squared foot (0.31 m^2) area and let sit. After one minute, observe the area for the presence of adult ABW, which will often climb to the top of turfgrass blades. Repeat pouring, waiting, and observing (suggested to do two flushes on the same selected spot). Additional adults may be collected after this second flush which will saturate the soil. Plan to do flushes over at least three different sections of the green.

Immature ABW are monitored using soil cores (7.62 cm of diameter by 8.89 cm in length, 3 by 3.5 inches) taken from suspect areas. These soil cores are then placed under heat lamps for 24 hours. The heat from the lamps causes the immature ABW to move away from the heat and fall into a container with ethanol. When heat lamps are unavailable, immature ABW can be scouted using saltwater floats. Soil cores are also taken for this method and are broken apart and shaken in a saltwater mixture. Due to the density of the immature ABW, they are expected to float to the surface of the mix.

Table 1. Proportions of salt or soap to water for ABW monitoring.

Scouting Method	Life Stage	Time (min)	mL or grams	Water (Liter)
Soap Flush	Adult	2	30	3.79
Saltwater Float	Immature	15	170	1

Note: Time is in reference to the waiting period needed before proceeding to collect ABW counts.

Both methods that monitor for immature ABW require that turfgrass is removed and inspected

because larvae are often found in the soil and in lower portions of the turfgrass. As an alternative tool, light reflectance could be a nondestructive method of monitoring for both adult and immature ABW under golf course conditions.

Figure 5. A handful of ABW collected from a soap water flush. Photo by Shannon Bradley.

Light Reflectance for Monitoring ABW

Light reflectance is the measurement of the quantity of light that is reflected off from an object and is collected with an instrument called a spectrometer (Fig. 6). Light reflectance signatures (Fig. 7) can be used to determine the overall health of a plant, with healthier plants having higher reflectances.

Mathematical indices can also be calculated using the reflectance gathered at different wavelengths to highlight specific characteristics of the plant such as chlorophyll content or foliar damage.

Normalized Difference Vegetation Index, NDVI, is an index commonly used to highlight stress in turfgrass using red and near-infrared wavelengths. A preliminary analysis has shown a negative relationship between NDVI and ABW densities. The ultimate goal is for golf course superintendents to use light reflectance and identify ‘hot spots’ of ABW populations.

Figure 6. The spectrometer in use (backpack) at a golf course, collecting light reflectance. Photo by Joseph Leo.

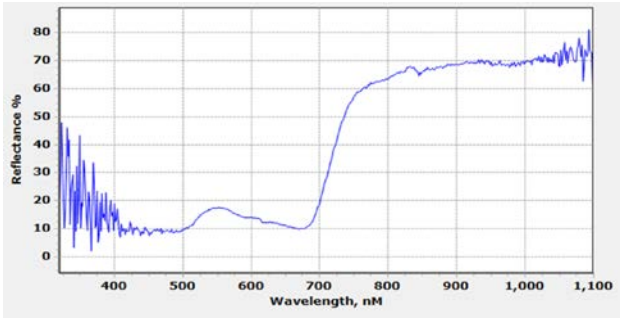

Figure 7. An example of light reflectance signature taken from turfgrass under field conditions.

Visit Virginia Cooperative Extension: ext.vt.edu.

2023 ENTO-565NP