



ABW/WHITE GRUBS CONTROL
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TURF
REPORTS

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The Environmental Science business of Bayer is proud to sponsor the following report on managing white grubs and annual bluegrass weevil (ABW) as well as tracking the use of GPS technology.

The golf industry continues to struggle with ABW as it spreads west and south from the Northeast United States into areas previously undetected. The longer ABW resides in a particular area, the chances increase for both insecticide resistance and multiple overlapping generations, making control more difficult. Control of ABW revolves around season-long multi-pronged programs with multiple insecticide applications targeting primarily overwintering adults and 1st generation larvae as well as later generation larvae. Rotating insecticide modes of action is critical to limit the chance of resistance development in ABW populations at your course.

Though white grubs traditionally have been more problematic in the eastern half of the country, turf managers throughout the U.S. are now accounting for these insect pests. Unlike ABW, insecticide resistance has not been documented in white grubs and likely will not occur since they have only one generation per year. However, we are seeing population shifts in white grub species. Where Japanese beetles and northern or southern masked chafers were the most predominant species, we are now seeing more oriental beetles, Asiatic garden beetles and May/June beetles. The white grubs themselves rarely cause significant damage; it's actually the raccoons, skunks, feral hogs, and other vertebrates foraging for the larvae that cause the most problems. Controlling larvae in late summer with long-lasting soil insecticides should minimize the damage from the foraging animals.

Earlier this summer, Bayer officially launched Tetrino™ – an exciting new tool in the fight against ABW and white grubs. Featuring the active ingredient tetraniliprole, Tetrino is a new diamide insecticide that joins the ranks of other Bayer favorites like Merit and Dylox. This new active ingredient is taken up quickly into the turf plant providing knockdown within days of application. It offers unrivaled control of white grub and ABW larvae, as well as billbugs, black turfgrass *Ataenius*, and caterpillars like armyworm and cutworm. As is the case with all insecticides targeting soil larvae, optimum application timing of Tetrino is when adults are present in order to control the larvae appearing shortly thereafter. Tetrino offers tremendous flexibility to the superintendent with two rates and up to four applications per year depending on your geography and pest pressure. You can learn more about this game-changing new technology at es.bayer.us/tetrino.

Again, Bayer is honored to support the following ABW and white grub report based on a survey administered by *Golf Course Industry*. If you have questions regarding controlling these pests or others on your course, our Green Solutions Team of turfgrass technical specialists are just a phone call, email, or text message away, as is our nationwide team of area sales managers. Let us know if we can help!

Zac Reicher, Ph.D.

Rob Golembiewski, Ph.D.

Green Solutions Team, Bayer



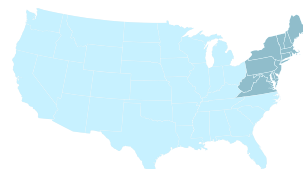


Two prominent pests, one survey

Some turfgrass pests are potentially more destructive than others – and it often depends on geography. To gain a better understanding of how golf course maintenance teams attempt to control two turf wreckers, *Golf Course Industry* partnered with Bayer for a “Turf Reports” focused on ABW and white grubs control. Working with Signet Research, a New Jersey-based independent research firm, we sent a 20-question survey to a list of 4,455 print and/or digital subscribers who are superintendents, directors of agronomy or assistant superintendents. The survey was distributed via email July 20 through July 29. Results are based on 280 completed responses and the confidence level is 95% with a sampling tolerance of approximately +/- 5.9%. The survey is the second of three “Turf Reports” studies that will be published in 2021.

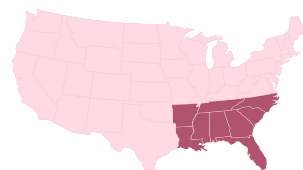


Where is your course located



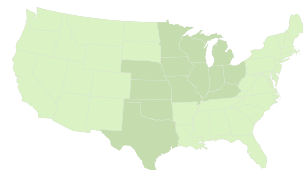
NORTHEAST

28%



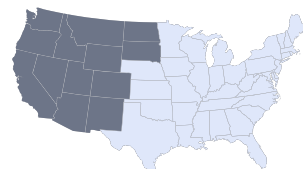
SOUTHEAST

20%



CENTRAL

34%



WEST

18%



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White grub damage is a concern for many golf maintenance professionals.

The good news about annual bluegrass weevil and white grubs is that they are, for now, still a relatively regional problem and large chunks of the country are unaffected. The bad news is that, if the turf you work on is affected, they can be an unrelenting and unpredictable scourge.

Just as all people are different people, to quote the fictional football-turned-futbol coach **Ted Lasso**, all ABW and white grubs are different ABW and white grubs. There is no simple solution. The superintendent 30, 20, 10 or even three miles away might have figured out what works for them but apply their chemistries to your turf and the results could differ radically.

"Everyone's different," says **Shaun Marcellus**, the golf course superintendent at Wanumetonomy Golf and Country Club in Middletown, Rhode Island, located on Aquidneck Island not far from The Breakers. "Some people have red hair, blond hair, green hair, how you tan is different, where you're from is different, what attracts you to this or attracts you to that." With ABW and white grubs, Marcellus says, the microclimate, the trees, the shade, the fertilizer, the wetting agent, the stress of the turf "all factor in, for sure. But that's the fun

part, to stay ahead of them. How can you outsmart 'em?"

There are no simple answers, nor is there an answer that will work for everybody. Marcellus is in his fourth season at Wanumetonomy and is still honing on exact chemistries.

Tom Bolon has experienced better luck in Ohio. Bolon is the longtime director of agronomy at Lake Forest Country Club in Hudson, Ohio, almost equidistant between Cleveland and Akron. Schedule the first application in late May and the second in early August. That approach has worked almost since Bolon first spotted ABW.

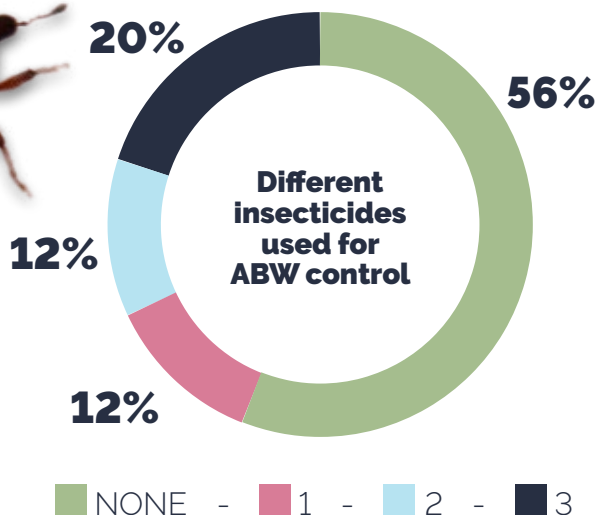
"We were noticing them early when they moved into the area and we got smacked right in the teeth" Bolon says. He organized curative measures immediately then shifted to a preventative program "that has not failed us." He remains on high alert, though. "I'm waiting for the day I walk in and the stuff we're using isn't working."

Charlie Fultz has had a different experience with ABW and white grubs than either Bolon or Marcellus.

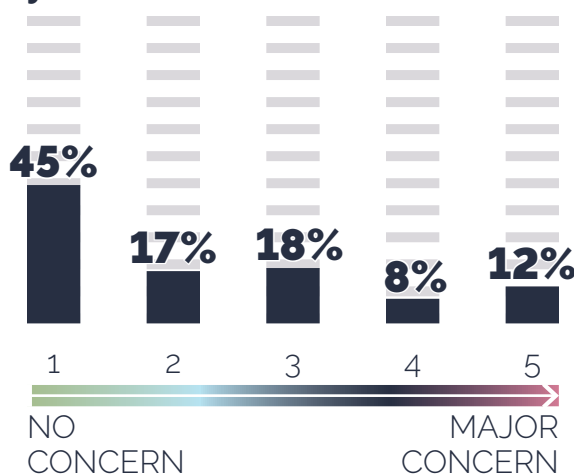
Fultz was in the golf course maintenance industry for 13 years, then left for another 13. Now the golf course superintendent and interim general manager for the city of Harrisonburg, Virginia, as well as the turf manager for the City of Harrisonburg Parks and Recreation, Fultz says ABW was nowhere to



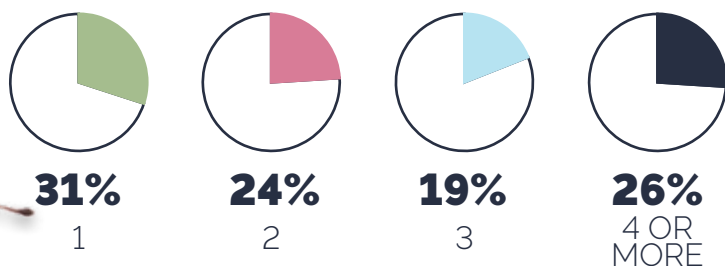
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Potential concern of ABW damage at your course



Preventative ABW control applications per year (courses that make applications only)



Areas of course that experience ABW damage

APPROACHES/ COLLARS	27%
FAIRWAYS	26%
TEES	20%
GREENS	17%
ROUGH	6%
BUNKER FACES	1%
NONE OF THE ABOVE	60%

be found in Virginia when he left in 2008. That was a problem for the superintendents in Pennsylvania, New Jersey, maybe Maryland. When he returned last year, though, they were everywhere.

"It was going to be a learning experience for me," he says, "because I had never dealt with it."

Fultz started to watch old webinars, poring over information and best practices, and applying what he learned. When he searched his plant protectant building, he discovered row upon row of different products, thousands of dollars of different chemistries. His predecessors, it seemed, had tried anything and everything in an effort to "see what would stick." But just like Marcellus and Bolon, Fultz learned what works for somebody else will probably not work for you. "There is no cure-all for it," he says. "You just

hope you do your best."

Fultz talks with other superintendents in and around Harrisonburg, including one, he says, just half an hour away, who spotted active ABW in January. "How do you have grubs active in January?!" he asks incredulously. "And he was actually seeing damage! In January!"

That superintendent works on a course tucked back into a ski resort valley, which provides a different microclimate where temperatures are five to six degrees cooler than other area courses. All courses are different courses.

"You have to find the niche that works for you nine months out of the year," Fultz says. "We never seem to totally get away from it and we're always on the watch for it. You have to determine what your tolerance level is, too. It's an interesting issue

Use of insecticide for preventative ABW control

	YES	NO
NORTHEAST	86%	14%
SOUTHEAST	15%	85%
CENTRAL	25%	75%
WEST	14%	86%

Resources used to time insecticide applications

HISTORICAL COURSE DATA	73%
RESEARCHER RECOMMENDATION	36%
SALES REPRESENTATIVE RECOMMENDATION	26%
ADVANCE WEATHER REPORTS	25%
DIGITAL APPS OR PLATFORMS	21%
OTHER	12%
NONE	5%

Other responses included: Threshold damage, phenological indicators, Growing Degree Days, scouting techniques, soap flush, input from peers, soil temperatures, personal experience, turf appearance

Annual insecticide budget

3%	21%	19%	26%	31%
NONE	\$1 TO \$2,999	\$3,000 TO \$4,999	\$5,000 TO \$9,999	\$10,000 OR MORE

Insecticide budget by region



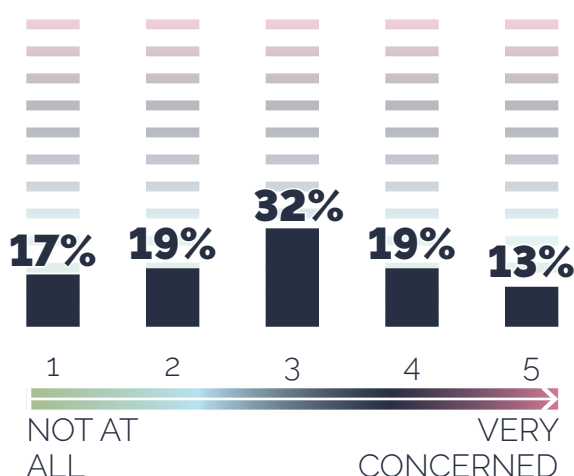
and we don't have a solution that works for everybody."

Fultz, Bolon and Marcellus all ranked ABW as a "high concern" on our recent ABW and white grubs survey, which was distributed in conjunction with Signet Research. The survey received 280 responses and carries a 95 percent confidence level. Among that group, 53 additional superintendents or agronomy directors reported that ABW ranked

as a "high concern," either a 4 or a 5 on a 5-point scale. More than 77 percent of that subgroup work in the Northeast. (For comparison, about 16 percent work in the Midwest, a little more than 5 percent work in the Southeast, and a little more than 2 percent work in the West.)

About 40 percent of all respondents use an insecticide for preventative control of ABW, including nearly 86 percent of respondents in the

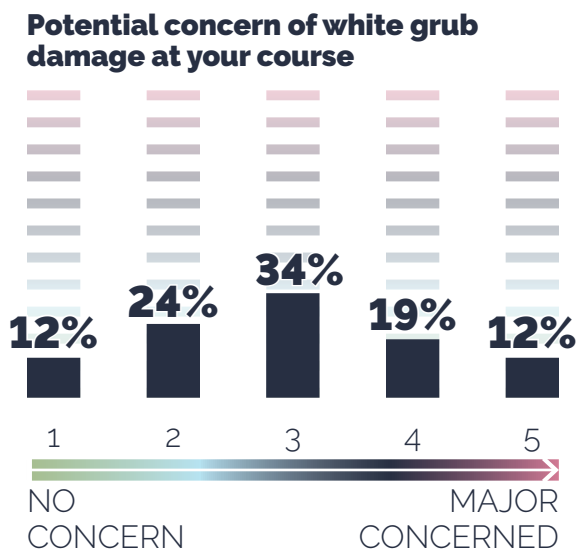
Concern about insecticide resistance



Northeast, with the average number of annual applications at 2.90 and the average number of products at 1.17. (In the Northeast, those averages are 3.41 and 2.87, respectively.)

Why the variety? "It's like if you're a coach and you run the same play seven times in a row," Marcellus says, "the opposing coach is probably going to figure out how to stop it. How do you make those adjustments? That's what we're trying to do, to stay two

ABW larvae under damaged turf.



Describe your white grubs insecticide control program

58%
PREVENTATIVE

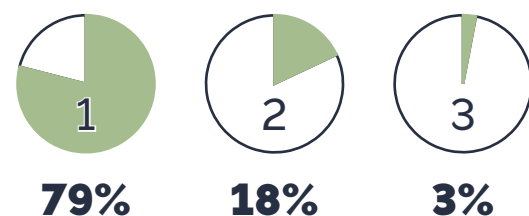
6%
CURATIVE

36%
COMBINATION OF BOTH

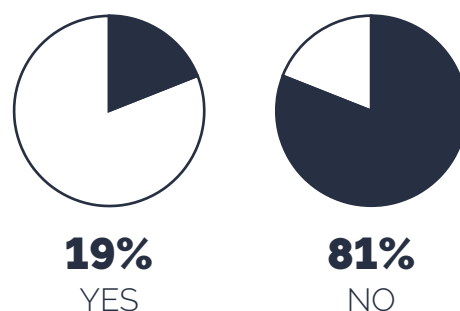
Use of insecticide for preventative white grubs control

	YES	NO
NORTHEAST	87%	13%
SOUTHEAST	75%	25%
CENTRAL	98%	2%
WEST	64%	36%

Annual preventative applications for white grubs control (courses that make applications only)



Has your course invested in GPS spraying technology?



Areas of course that experience damage from white grubs

ROUGH	65%
FAIRWAYS	54%
TEES	31%
APPROACHES/ COLLARS	26%
BUNKER FACES	25%
GREENS	18%
OTHER	2%
NONE OF THE ABOVE	15%

Other responses included: Green and tee surrounds, fescue areas, club lawns,

Describe your white grubs insecticide control program

58%
PREVENTATIVE

6%
CURATIVE

36%
COMBINATION OF BOTH

steps ahead so we don't get caught."

White grubs have more of a range. About 30 percent of respondents ranked them as a "high concern" — again, a 4 or a 5 on a 5-point scale — including 42 percent of all respondents working in the Midwest, 29 percent in the West, a little less than 25 percent in the Northeast, and about 21 percent in the Southeast.

At least they're far more likely, according to the survey results, to hang out in the rough. (About 65 percent of respondents said their white grubs had damaged their rough. The other major damaged area was fairways, at about 54 percent.)

"I hope companies are seeing this can be a devastating problem," Fultz says, "and we need more tools

in the shed."

Who knows where ABW and white grubs will pop up next. If you don't deal with them, be glad and know that you might soon enough. And if you do, well ... good luck.

"When the world blows up, the only things left will be cockroaches and weevils," Marcellus says with a laugh, "because we got nothing to kill 'em."