A witch's brew of troubles with the Bermudagrass mite

Bermudagrass stunt mites are an increasing turfgrass problem at golf facilities with bermudagrass fairways and roughs.

As an entomologist and extension specialist, I usually have recommendations (if not solutions) to most insect problems. But for the past few years, the Bermudagrass mite, also known as the Bermudagrass stunt mite, has severely bruised my ego.

Never heard of the Bermudagrass mite? Well, you are not alone. Whenever I show a picture of the typical "witch's broom" damage (Image 1) in South Carolina or Texas, I can see eyes widening and heads nodding. Many golf facilities in the southern U.S. may be infested, but few superintendents, managers and owners recognize the damage. Many think that those bunchy stems are just mutations.

The Bermudagrass mite is a species of eriophyid mite. The characteristics of the eriophyid mites, as a group, are their small size – a Bermudagrass mite is about the size of the full stop, or period, at the end of this sentence – banana-shaped body, and two pairs of legs (as opposed to four pairs on typical mites and three pairs on typical insects). The Bermudagrass mite is whitish cream in color or translucent, as seen in Image 2. A large number feed under the leaf sheath, causing stunted internodes and a typical

Image 1. Infestation by the Bermudagrass mite stunts stem growth in common and hybrid Bermudagrass, causing the characteristic "witch's broom" symptom in stem (left) and the entire tuft (right).
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Image 2: Adult Bermudagrass mites are tiny, with a banana-shaped body, two pairs of legs, and a whitish cream or translucent color. Eggs are oval and translucent.

witch's broom symptom (Image 1). Because of their small size, color and habit of feeding under the leaf sheath, individual Bermudagrass mites are extremely difficult to see even with a hand lens. The witch's broom damage is a more reliable diagnostic characteristic.

A few years may pass before the number of witch's brooms reaches a noticeable level. The witch's broom formation is permanent, and the infestation causes the stunted stolons even under higher fertilization and irrigation levels. Over time, turfgrass stems and stolons die. The witch's broom damage is often misdiagnosed as mutation or nematode infestation. Therefore, it is always a good idea to collect samples of live witch's brooms. Samples should be sealed in a plastic bag and sent to local extension offices or extension specialists for identification.

The next step is to determine the threshold at which management action becomes necessary. Dr. David Shetlar and Dr. Harry Niemczyk of The Ohio State University developed a sampling protocol for the Bermudagrass mite. The recent flare-up of Bermudagrass mites is most likely the result of a combination of several factors. Those unlucky few who have to manage the damaged turf soon realize there are no effective management options against the Bermudagrass mite. We know so little about this pest that it is almost impossible to formulate an effective management program at the moment.

Editor's Note

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dicofol (Kelthane 50 WSP at 0.366 ounces per 1,000 square feet) by 22 percent. The results were not close to 85 percent reduction, which I consider to be good efficacy.

The results from my study are surprisingly similar to those generated by Dr. George Butler (University of Arizona) and Dr. Jim Reinert (then at University of Florida) in the 1960s to 1980s and summarized by Dr. Reinert in an article published in the USGA Green Section Record in 1982 called The Bermudagrass Stunt Mite. The active ingredients that provided good or decent reduction in these earlier studies were Diazinon, UC-55248, oxamyl (Vydate), aldicarb (Temik), propoxur (Baygon), and chlorpyrifos (Dursban). The most effective active ingredient against the Bermudagrass mite, Diazinon, has been phased out. The uses of chlorpyrifos and dicofol in golf courses have been greatly restricted. Abamectin is restricted to the management of nematodes on golf course putting greens.

What other chemical management options do we have? What is the efficacy of other active ingredients registered for the management of mites? The Bermudagrass mite feeds deep within the leaf sheath, so would the addition of a penetrant, surfactant, or oil increase efficacy of existing pesticides? What about different types or brands of surfactants? Does a higher spray volume help penetrate the leaf sheath? How frequently do we have to repeat the application? We do not have answers to any of these questions.

CULTURAL MANAGEMENT TIPS.

One of the biggest obstacles to developing an effective management program is our lack of understanding of Bermudagrass
mite biology. The complete life cycle from egg to adult is five to 10 days, and it is faster with higher temperatures. Each female produces a dozen eggs. The population is usually active in late spring and summer. However, the location and life stage in which the Bermudagrass mite overwinters, as well as the timing of the population emerging from overwintering and beginning to cause turfgrass damage, are not known. Not knowing its biology, it is difficult to determine the timing of pesticide applications to get ahead of the population and damage.

Because damage is most noticeable on longer stems, lowering mowing height may help remove many infested stems. It is possible that scalping, in addition to vacuuming of clippings, may remove most of the infested stems. A higher fertilization and irrigation volume may help lightly infested turf outgrow some damage. Fertilization can also be a double-edged sword. On one hand, fertilization can promote growth and recovery. On the other hand, higher nitrogen levels have been linked to larger and more damaging populations of mites.

It is also important to remember that the Bermudagrass mite spreads within a golf course by hitching a ride on clippings. Therefore, sanitation of mowing equipment after working in an infested area is crucial in delaying the spread. Blowing clippings after mowing can also spread populations to other turf areas. There are no experimental or even anecdotal data to suggest that any of the cultural control tactics work.

ADDITIONAL RESEARCH NEEDS.
Host plant resistance presents the most promising aspect of Bermudagrass mite management. The Bermudagrass mite attacks only common and hybrid Bermudagrass. Therefore, for a severely infested golf course, replanting with zoysiagrass or other suitable turfgrass species may be a good, if costly, alternative. Bermudagrass cultivars vary in their susceptibility to the Bermudagrass mite. As summarized in 1982 by Dr. Reinert in The Bermudagrass Stunt Mite, some of the popular cultivars, such as Tifway, TifEagle, and common Bermudagrass, are susceptible, while Tifdwarf, TifSport, Franklin, and Midiron provide good resistance. Bermudagrass putting greens are not an issue for Bermudagrass mite damage. The ultra-low mowing height on greens makes it uninhabitable for the Bermudagrass mite. It is time to conduct new research to evaluate the potential of newer Bermudagrass cultivars, such as Celebration, which has a more aggressive growth habit, to resist or outgrow mite damage.

CONCLUSION.
We have not made much progress in managing the Bermudagrass mite in the past three decades. In fact, we may have taken a few steps backward with the phasing out of several effective pesticides, a continuing ignorance of the Bermudagrass mite’s biology and the efficacy of new active ingredients, and the lack of development of resistant Bermudagrass cultivars and management practices. This witches’ brew of problems demands more attention and resources from the golf industry. I am a firm believer that as great as the challenge may be, our drive and ingenuity can help us find a way out of the trouble.

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To read the report Dr. James A. Reinert’s The Bermudagrass Stunt Mite (1982), enter bit.ly/1alk3we into your browser.