

Do Modern Insecticides Defeat IPM Concepts?

The industry must continue to pursue environmentally friendly products for broad-spectrum control

By Rick Brandenburg



QUICK TIP

The 2008 Golf Industry Show in Orlando is over, so what have we learned? For those who visited the Agrium Advanced Technologies booth, you learned about our promise to provide turf managers with "Smarter Ways to Grow." Our recent launch of XCU™ fertilizer is proof of that. Over the years, technology in slow-release fertilizers typically reduced the amount of nitrogen by means of a controlled mechanism added to the product. But XCU combines sulfur-coated and polymer sulfur-coated technologies into a product that is more durable, without sacrificing total nitrogen concentration. So if you're looking for an improvement on time-tested technology, try XCU with its 43 percent nitrogen concentration.

In this two-part series, we'll explore the history and development of integrated pest management (IPM) in turfgrass and how it has changed over the past decade. The focus of the article will be on how our newer insecticides have changed so dramatically in recent years and how the manner in which they are used and the timing of application may be perceived as anti-IPM. In addition, the newer products are so much lower in mammalian, bird and fish toxicity and have fewer off-target effects than the products of just a few years ago that IPM may not carry the same sense of urgency that it used to. In some areas, a once-active desire to use biological and natural control has subsided due to the availability of reduced-risk conventional pesticides.

Some of my colleagues and some practitioners may disagree with me. However, as I look around at an increasingly competitive market, higher expectations, continued societal concerns over pesticides, increasing regulations in many areas and newer, less-toxic products, I see a changing perspective on IPM and its implementation.

For many turfgrass managers, controlling insects is not real high on their priority lists. Insects often surprise us, and our ability to manage them quickly and effectively can be difficult. Our thoughts should focus on not only how we can make insect management cost-effective and environmentally friendly, but also how we can make it easier, less time consuming and less of an aggravation for the turfgrass manager who is always multitasking.

In this article, we will look at the definition of IPM and what it means in turf-

grass, and some of the challenges we face. In April, we'll take a closer look at efforts to develop new safe products for broad-spectrum control that, in some ways, resemble the products of 20 years ago. Final comments will focus on the need to keep moving ahead with new, more environmentally friendly products that help keep our industry on the right track.

The world around us

IPM is a concept that's been around a long time. When I began my career in the late 1970s, I was involved in the early stages of IPM development and implementation. Much of the driving force associated with IPM development was that in many ways we had become trapped in what was called a "pesticide treadmill." In other words, we were relying more heavily upon the use of synthetic pesticides with no real end in sight. Synthetic pesticides had not been around that long in the late 1960s and early 1970s, and they had proven to be easy, fast and cost-effective for managing pest problems. They increased yields, profits and the acreage that could be grown on farms. Their impact was almost immeasurable.

However, there were more and more concerns surfacing. As early as 1962, Rachel Carson's "Silent Spring" sounded a warning message that these pesticides were having negative impacts in our environment. While one can debate the scientific merit of some of what was written in this book, no one can ignore that it served as a real wake-up call for pesticide use. As researchers studied the interactions of pesticide use and the environment, the disruptive effect

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of pesticide applications on the ecosystem became clearer.

The complex nature of an ecosystem is a challenge to understand. Even a turfgrass setting is very complex. The interactions of organisms and the environment are quite intricate and the balance can be upset easily. One particularly disconcerting discovery in many agricultural systems was that the applications of many pesticides were reducing the populations of beneficial organisms. This often resulted in one of two things happening. First, the pest that was treated would often rebound much faster than its natural enemies and become a problem again in a few weeks. The other situation that was often observed was that other pest problems could be created by eliminating the natural enemies that typically kept them in check once a pesticide was applied. Without going into exhaustive detail, it was these types of scenarios that created the "pesticide treadmill" situation in that each application often seemed to create the need for a second application.

Scientists have spent decades studying various ecosystems from corn fields and orchards to hay fields and even golf courses to understand the complexities associated with each system. This includes the natural enemies that help keep pests in check. Thresholds for treatment were developed that help avoid unnecessary applications, scouting and monitoring techniques that allow us to stay on top of pest problems. Alternative strategies to manage pests were also developed that helped reduce the use of conventional pesticides.

This was the advent of IPM, and it has been implemented in various shapes and forms around the world. One of the challenges in turfgrass is that our threshold are not based upon economics, such as how many bushels of corn will I lose if I do not treat, but rather on aesthetics. This is challenging because beauty is often in

the eye of the beholder and there are many standards for turfgrass appearance. This has been problematic as we often tolerate very little damage to turf. We also often had different goals that may include improving turf quality, reducing pesticide use, cutting costs or some combination of these concepts.

Synthetic reliance

We have made considerable progress in the development of alternative strategies for pest control, including cultural practices, endophyte-enhanced turfgrass, biological control, forecasting, monitoring and improved understanding of natural enemies. However, despite all of this, we still rely very heavily upon the use of conventional synthetic insecticides to control our insect pest problems. The effectiveness of these products is so good that, in light of the potential problems that some people believe might occur from pesticide use, we generally accept them as the best way to do business.

For many years we used various scouting and monitoring programs to try and stay one step ahead of pests and apply the insecticides only if we knew a real threat existed for turfgrass damage. This was in keeping with IPM philosophy of using such products in a timely and as needed basis. Many of the older organophosphates gave us a lot of flexibility because they were broad spectrum and killed a lot of different insect pests and could be targeted toward about any stage of the insect. In other words, they were good for just about anything you might be afflicted with and could be used at almost any time. This gave turf managers a lot of flexibility and encouraged us to operate in a reactive, rather than a preventive manner, to solve insect problems.

However, various regulatory, environmental, business and human-health issues began to take their toll on a number of these older products. We saw this change

Many of the older organophosphates offered flexibility, but various human health, regulatory, environmental and business issues began to take their toll in the 1990s.



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Weeds are opportunistic plants – if you give them the opportunity they will flourish. Eliminate the opportunity by establishing the densest turf possible through optimal nutritional management and turfgrass health. Floratine offers products and tools designed to meet this goal, including balanced nutritional products, soil testing and analyses, Turf Action Plans tailored to a wide variety of conditions, and Floratine University events that bring industry leaders together to offer sound turfgrass management education. To learn more about Floratine's proactive approach to managing turfgrass health, or for a list of distributors, please visit www.floratine.com.

in availability of older products accelerate following the 1996 signing of the Food Quality Protection Act that looked at all potential exposures to a pesticide group rather than a specific product or use. Since many of the old organophosphates were used so extensively, the potential exposure was quite high. These products began to drop like flies from use in turfgrass. As new products came along, this flexibility to use a single product on almost any insect pest at almost any time seemed to erode.

Two products that drew a lot of attention when they were first introduced about 12 years ago were Merit and Mach2.

The guidelines for use of these products for white grub management were to use them in more of a preventive rather than a curative approach. This seemed to be counter to IPM philosophy. In other words we were indicating it was OK to go ahead and put down an insecticide before you even know if you will have a damaging grub population. These products and their recommended use patterns drew a lot of criticism. This was despite the fact that these products were applied at lower use rates as compared to the older chemistries, had lower toxicities to many animals such as fish, birds, people, etc., and actually worked better than most of the older products they replaced.

Over the past 10 years, we've come closer to accepting the use of Merit and Mach2 and are including the newer insecticides Arena, Meridian and Allectus into that same group of products. We realize that with proper scouting, mapping and timely applications, these products can be used in a cost-effective and environmentally friendly manner. While our IPM philosophies often dictate the approach of treating only when an imminent outbreak is about to occur, our ability to do this is often limited. The trade-off is to treat in a more preventive manner, but do it based upon good records of "high risk" areas where grubs consistently occur and

Using fertilizers as insecticide carriers changes IPM strategy because we're treating for insects despite their presence.

use products that have a more favorable environmental profile. That seems to be a good approach. However, we now see competitive marketing encouraging later season use, and turfgrass managers looking to delay the application for these products so they can be used later in the season as more of a curative approach.

Another industry trend that challenges our IPM philosophy is the use of fertilizers as insecticide carriers. This approach is one of convenience and cost. It is easy to apply both your fertilizer and insecticide with one application. This is a time and money saving approach. In addition, fertilizers often make

very good carriers for insecticides as they release the products very quickly with even a little bit of irrigation or rain. What's the problem with them? Well, the IPM purists will tell us that once we purchase the fertilizer/insecticide combination, we are committed to treating for insects even if they are not really present. Another good point is that the timing makes sense from an agronomic perspective because fertilizer application might not make sense biologically for good timing to control insects. Both of these can certainly be a concern from a cost perspective and product performance. However, for some pests that occur in certain areas on a very consistent basis, the timing for treatment does often coincide with fertilizer use, such as mole cricket or white grub treatments in warm-season turf. In such situations, this can be an excellent option.

Dr. Rick Brandenburg has been conducting research and education programs on insect pest management for more than 25 years. He has taught seminars to golf course superintendents throughout the United States and in more than a dozen foreign countries. He currently serves as co-director of the Center for Turfgrass Environmental Research and Education at North Carolina State University in Raleigh. He can be reached at rick_brandenburg@ncsu.edu.