Alternative strategies for controlling chinch bugs

by Christopher Sann

Despite the fact that the three different chinch bug species cause significant economic damage to turf stands across the country, little recent research has been done in new, alternative strategies for controlling chinch bug populations.

Currently grubs appear to be garnering the majority of the research for alternative methods of controlling turfgrass insect pests. But a considerable amount of information about chinch bugs is available to help turfgrass managers: to reduce overall pesticide usage, to reduce the cost of implementing those control strategies, and to provide superior control to many of the traditional approaches.

Chinch bugs have natural enemies

The main reason that the explosive population growth of chinch bugs has not led to their becoming the most widespread and devastating of all of the turfgrass insect pests is the large number of natural enemies that chinch bugs must contend with.

The southern chinch bug has at least eight different insect predators and parasites that feed on the various stages of chinch bugs and at least one fungal microorganism that can attack it. The other two chinch bug species have similar numbers of predators.

One of the insect predators is the big eyed bug. Big eyed bugs prey on chinch bug in all stages of life. They eat on average two chinch bugs per day. What big eyed bugs lack in feeding habits they make up with large numbers. Populations can be as high as 15 to 18 per square foot in chinch bug infested turf, where they rely on their greater speed to capture their prey. Earwigs are also a predator and can be voracious feeders on adult chinch bugs, consuming as many as 50 in a 24-hour period. Additionally, chinch bugs are the prey for certain parasitic wasps and some spiders and mites. Populations of predator insects and a pathogenic fungus, *Beauveria bassiana*, were so prevalent at one infested site being studied in Florida that the normally high summer time populations collapsed in August because of their feeding.

In turf stands that are not treated with insecticides, natural predators and other factors contributing to natural mortality are the controlling factors that keep chinch bug populations below explosive levels. If natural predators can be so successful at controlling chinch bug populations, the question arises: why do spotty chinch bug infestations continue? The answer lies in the fact that, even in unmanaged environments, turf stands develop the sort of ideal microenvironments that can lead to self-sustaining wild populations and that managed turf areas that get regular insecticide applications will often have problems with chronic chinch bug infestations.

Insecticide clearly controls the chinch bugs species at the sites, but it also controls their non-targeted natural enemies. This unintended side effect can be avoided if insecticide applications are withheld until monitored chinch bug populations reach a level of 25 to 30 bugs per square foot. This level of chinch bug infestation indicates that the predators to prey relationship is out of balance and that the predators and other natural factors have failed to control the infestation.

At this point outside intervention, in the form of an insecticide application, is required. This is made, despite the unintended consequences to the existing natural predator complex, to avoid the probable explosive population growth with its accompanying severe turfgrass damage and its long term potential for self-sustaining populations.

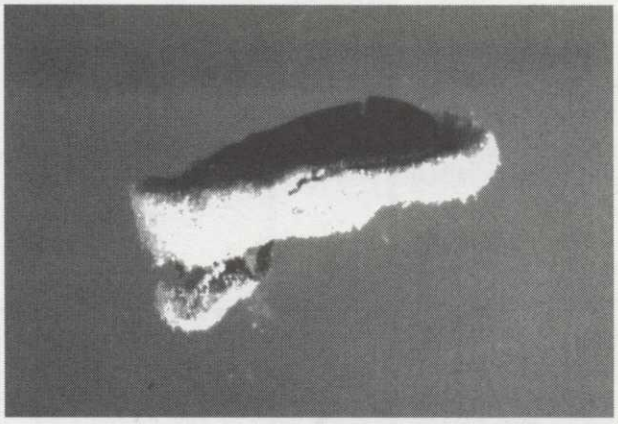

Photo provided by Dr. Mike Villani, Cornell University

An adult chinch bug infected with the parasitic fungus, *Beauvaria bassiana*.

Less toxic insecticide tests show mixed results

Testing of low-toxic insecticides, like insecticidal soap and horticultural oils, as alternatives to the traditional high-toxic insecticides used to control many of the turf grass insect pest species, have been only partially successful. When tested by themselves, they showed little to no control. When combined with other turf insecticides that had previously shown excellent control results, the combinations showed commercially acceptable results, 80% control or greater, at active ingredient levels of the high-toxic insecticides that were only 25% to 50% of the normally recommended amounts. On sites where liquid controls are used these combinations of reduced-rate turf insecticides with non-traditional low toxic insecticides may reduce the damage to the non target species.

Applications of bio-rational products like Neem oil extracts and biological based controls such as some species of parasitic nematodes have shown control levels that averaged about 50%, but none of the applications control levels approached the commercially acceptable standard. However, one test of a strain of nematodes, sold as Exhibit,

did prove just as successful at controlling chinch bug populations as any of the traditional chemical insecticides that were tested.

A new approach to chinch bug control

Since the results of testing on low toxic insecticides, bio-rationals, and biological controls have been hit or miss at best and no new alternative controls are appearing, the most successful method of controlling burgeoning chinch bug populations is still applications of traditional turf insecticides. When these applications are combined with accurate field inspection data and a good working knowledge of chinch bug biology, the amount of pesticides required to control high populations is often reduced by as much as 90%. This means that the judicious application of these materials can dramatically reduce the cost of control while reducing the amount of toxics in the environment.

Site surveys are critical

The first action a turfgrass manager must take in establishing this new knowledge-based chinch bug control strategy is to survey the sites under his management and classify each area as either high priority or low priority for chinch bug infestation.

High priority areas are:

- sunny, dry sites, such as south-facing sloped areas or areas next to sidewalks and roadways
- sites with a high fine fescue populations, such as turf stands where bluegrass and fine fescue plant populations are roughly equal
- sites maintained at high fertilization levels
- sites that have a history of chinch bug infestations
- sites immediately adjacent to areas with a history of chinch bug infestation
- sites that get regular insecticide applications for chinch bugs or any other turf insect pest

Low priority areas are:

- turf stands with high proportions of bluegrass, greater than 60%, and low proportions of fine fescue, less than 15%
- turf areas with high proportions of tall fescues or high-endophitic ryegrasses varieties
- sites that are shady or tend to be wet
- sites maintained at low fertilization levels
- sites with no history of chinch bug infestations
- sites that do not receive regular doses of insecticide

Once a site has been prioritized, the designation will indicate the strategy the turfgrass manager should pursue to manage chinch bugs infestations.

Cultural practices

Areas designated as high priority should have a comprehensive strategy of cultural practices in place before any decision is made to make any insecticide applications. Where thatch is a problem, regular efforts should be made to reduce thatch by dethatching, core aeration and thatch reducing compounds. Where areas are subject to much sunshine, well-placed trees can increase shade and cause the shade-intolerant chinch bug to look elsewhere for forage. Where turf stands are prone to be dry, increased watering, wetting agents and rooting compounds can increase root mass and reduce plant stress.

Increase cutting height in drought prone areas. Overseed areas with high fine fescue populations with high endophite tall fescue or ryegrass species. Reduce excess fertilization by using slow release or organic based fertilizers.

Low priority areas should be monitored to watch for changes that would favor chinch bug infestations. Changes, such as increases in thatch levels, increases in fine fescue populations, infestations in adjacent areas, loss of shade in an area, and permanent reductions in canopy moisture levels should be regularly rated and recorded. As these changes take place corrective measures should be undertaken to lessen the negative effects of these changes.

Scouting is the crucial element

Despite the best planned cultural management strategies for either priority, chinch bug populations may reach levels that require outside intervention. No matter what the priority designation of a site may be, timely samplings should be made to check on the presence of chinch bugs, the life stages present, and their population densities per square foot. Sites that have high priority designations should be scouted two to three times more often than low priority areas. Once a population of 25 to 30 individuals, instars and adults, is counted, an appropriate insecticide application should be made.

The exception to this rule is sites with chronic infestation histories. These sites are best managed with regular insecticide applications. But a site that has a history of stubborn, chronic infestations might benefit from some changes in application timing. An early, preemptive application, at the first appearance of over-wintering adults, combined with a late fall application to reduce the number of adults that may survive at over-wintering sites, may reduce population thresholds to the point that natural factors and predators can keep populations low enough that future insecticide applications can be dictated by actual numbers of individuals rather than the history of the site.

Managed chinch bug control will continue

A combination of cultural practices and chemical controls will be the dominant strategy for controlling chinch bug population for the foreseeable future. Alternative chinch bug management techniques should prove to be very successful in a majority of infestations, but they will require an increased level of research and funding for them to become a reality. ■