

Timing is everything

The smallest (youngest) immature stages of turfgrass insect pests usually are most vulnerable to insecticides.

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The key to successful management of turf insects is understanding their habits and the life cycles. This determines when a particular management strategy is most appropriate. Each insect species has stages that are most vulnerable to control. That's when your control efforts have the greatest chance of success. In addition, each insect species has particular habits that have a bearing on insecticide decisions; some insects

feed on stems and leaves. Meanwhile some of the most troublesome turf insect problems are soil insects, which spend much of their time in the root zone but may make brief forays into the thatch. These include various species of white grubs in cool-season grasses.

The habitat affects management approaches. Insects which feed and live primarily in stems and leaves are more exposed than others, while those that hide in the thatch are just a bit more protected and less vulnerable to insecticide applications.

Therefore, the chemical characteristics of insecticides become important. A material like chlorpyrifos (Dursban) would be a wise choice for some of the thatch-inhabiting insects because the material is bound quickly in thatch and remains right where the insects are most active. However, such a material often is not able to penetrate the thatch and reach the soil-thatch interface and therefore often does not reduce white grub populations significantly.

Distribution

Some insects occur in particular areas, preferring certain soil types or certain turf species. For example, hairy chinch bugs (the most common species in cool-season turf) prefer lawns with thick thatch and usually cause the most damage in sunny areas and soils that drain well. Insect problems often show up first in turfgrass on south-facing slopes, in part because these areas are under more moisture and temperature stress during the summer and are more likely to suffer from additional insect activity.

There are several species of white grubs that attack cool-season turfgrass. Many of these species were introduced to North America accidentally, and have adapted to conditions rapidly.

The Japanese beetle, introduced in New Jersey around 1915, has spread until it can be found in virtually every state east of the Mississippi River. The European chafer, which was first found near Rochester, NY, in 1940, has spread to the southern shores of the Great Lakes, through the heart of Michigan, and throughout much of eastern Massachusetts. The oriental beetle, apparently introduced in Connecticut around 1910, is well established throughout coastal New England and has spread into other regions as well. It has also become a major pest in production nurseries, and has ne-



The effectiveness of any control product can only be determined after extensive field trials under varying real-life conditions.

occur in the soil, which means special efforts must be taken to ensure penetration of an insecticide beyond the thatch, while others reside in the thatch, so insecticides that are bound readily in thatch are perfect choices.

Habitat

Most turf insects are active only in certain parts of the turfgrass community. Some, like bermudagrass mite and other mite species, tend to remain on the leaves and stems during much of their development. Others, like chinch bugs, two-lined spittlebug, webworms, and cutworms, are active in the thatch and

cessitated the use of soil drenches before plants can be shipped to non-infested areas. The Asiatic garden beetle has been around for at least 70 years, primarily in the northeastern U.S., but until recently was not considered to be a major pest in turf. However, there have been increased reports of activity of this species in turfgrass, perhaps as a result of changing patterns of insecticide use.

Habits

Each white grub species has a slightly different life cycle and behaves differently in the soil. Thus, it's important to determine which species is present before attempting to control the grub problem.

For example, European chafer grubs remain in the root zone later in autumn and return earlier in the spring than other grub species. Oriental beetles tend to be quicker and move downward in the soil profile when the upper soil dries out. Under unusually dry conditions, grubs of most species will migrate downward to avoid the hot, dry conditions. In these circumstances, watering the area about 24-36 hours before the intended insecticide application will trick the grubs into thinking that conditions are improving, and they will move back upward into the root zone. The insecticide application will have a much better chance of success.

There are many species of cutworms and webworms that attack turfgrass, and most are active at night. Searches for caterpillars during the daytime usually are futile, unless a "disclosing solution" (an irritating drench or soap flush) is used to force them to crawl to the surface. When insecticides are used to control cutworms or webworms, the applications should be made as late in the day as possible so the material is still "fresh" when the caterpillars emerge to feed in the evening.

Timing of application

In many cases an insecticide is the most reliable option for managing a turf insect problem, but the success of that material depends on the timing of application. Consider these rules of thumb when dealing with pest insects:

- ▶ most insect eggs and pupae are not susceptible to insecticides, and

White grubs and other soil insects tend to be the most difficult to control because an insecticide must penetrate through the thatch to contact them.

- ▶ the smallest (youngest) immature stages usually are most vulnerable to insecticides.

A turf manager needs to determine when the pests will be in the egg or pupa stage, and avoid the temptation to treat at that time. The best target date is to treat just as the last of the immatures, whether larvae (of insects like white grubs and weevils) or nymphs (of chinch bugs and other insects with gradual development), emerge from eggs.

The period during which an insecticide can be used with success, varies with insect species. For most white

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TURF INSECT CONTROL PRODUCTS

COMMON NAME	TRADE NAME	SPEED	PERSISTENCE
acephate	Orthene	rel. fast	short
bendiocarb	Turcam	intermediate	intermediate
bifenthrin	Talstar	rel. fast	intermediate
carbaryl	Sevin	intermediate	intermediate
chlorpyrifos	Dursban	intermediate	intermediate
cyfluthrin	Tempo	rel. fast	intermediate
diazinon	(Diazinon)	intermediate	intermediate
deltamethrin	Deltaguard	rel. fast	intermediate
ethoprop	Mocap	rel. fast	intermediate
fipronil	Chipco Choice	slow	very long
fonofos	Crusade, Mainstay	intermediate	intermediate
halofenozide	Mach 2	intermediate	rel. to very long
imidacloprid	Merit	very slow	very long
isofenphos	Oftanol	slow	relatively long
lambda-cyhalothrin	Battle, Scimitar	rel. fast	intermediate
trichlorfon	Proxol, Dyllox	fast	short

Speed of efficacy (how quickly pest reduction may be observed):

fast=1-3 days; rel. fast=3-5 days; intermediate=4-7 days; slow=7-14 days; very slow=2-3 weeks.

Residual activity (most likely period during which pest control can be expected):

short=1-2 weeks; intermediate=3-6 weeks; relatively long=5-10 weeks; very long=more than 3 months.

For all products, note that state regulations vary and information may not be completely accurate. Always check the label to confirm that the pest you wish to control is indeed on the label. Mention of a product does not imply endorsement by the author.



White grubs are much easier to control when they're smaller than these.

grub species, young grubs emerge sometime between mid July and early September, and most of them emerge during a three-week period or so. If the situation dictates that a treatment must be made just as the grubs begin to emerge (for example, scheduled lawn care rounds), a turf manager probably should use one of the slower-acting but longer-lasting insecticides on the market. If a grub problem becomes apparent late in the "window of opportunity" (perhaps early Sep-

tember, as grubs are already developing and causing damage), a turf manager should use one of the faster-acting materials, even though most of those materials also break down relatively quickly.

For many of the thatch insects like chinch bugs, webworms, cutworms, treatments can be made in response to insect activity. However, in an area with a history of cutworm or webworm activity, a turf manager should watch for moth activity. Moths of both cutworms and webworms are nocturnal and are attracted to black light traps. In addition, many sod webworm species can be seen flying haphazardly just above the turf, particularly at dusk. When the number of moths increases noticeably, you should consider treating the area about two to three weeks later. This allows time for the moths to mate, for the females to produce and lay eggs, and for the eggs to hatch into tiny (and vulnerable) caterpillars.

Note: mention of any particular product does not imply endorsement by the author. **LM**

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Insects and their treatment

WHITE GRUBS

Feed on roots of turfgrass. Early symptoms—turf resembles drought stress. Heavily damaged turf can be rolled back like a carpet because there are no roots remaining.

Cultural control: Provide adequate moisture to root zone. Avoid mowing too low. Minimize other agronomic stresses.

Chemical strategies: Use products which can penetrate thatch reasonably well. If treating when grubs are just emerging (often mid July to mid August), use a slower-acting but longer-lasting material. If spot treating after damage becomes evident, use a fast-acting material. Water in any application with at least 0.25 inch water as soon after application as possible to improve contact with grubs.

CHINCH BUGS

Suck plant juices from stems. Usually most severe or noticeable in sandy soils or sunny areas, especially in areas with thick thatch. Usually most active in summer months.

Cultural control: Reduce thatch. Avoid drought stress. Use endophytic cultivars of ryegrasses or fescues.

Chemical strategies: Many turf insecticides are labeled and effective. Consider using products that will remain in the thatch (e.g., Dursban). Apply in late spring or early summer if sampling documents need. Summer applications can also be very effective if necessary. Water in lightly, just enough to move the insecticide off the blades.

BILLBUGS

Perhaps the most misdiagnosed turf insect problem in the Northeast. Young larvae burrow inside plant stems, older larvae are very difficult to time, and once larvae are well established, the population is difficult to control. Timing of application is critical, and there are several billbug species that may be involved in any given location. Check with local extension specialists or private consultants for your area. Water in lightly, just enough to move the insecticides off the blades.

WEBWORMS, CUTWORMS

Caterpillars hide in thatch during the day and feed at night on tender tissue. Caterpillars sometimes emerge from burrow holes, nibble off a few blades, and pull them back into the burrow to ingest during the day. May thin or kill patches of grass. Several species of both webworms and cutworms, each with different life cycles, often more than one generation per year.

Cultural control: reduce thatch, avoid drought stress, use endophytic cultivars of ryegrasses and fescues.

Chemical strategies: many turf insecticides are labeled and effective. Consider using materials which remain in the thatch or are relatively immobile like some of the new pyrethroids. Treat two or three weeks after peak moth flights. Treat as late in the day as possible. Water in lightly and avoid mowing for a day or two after application if possible.