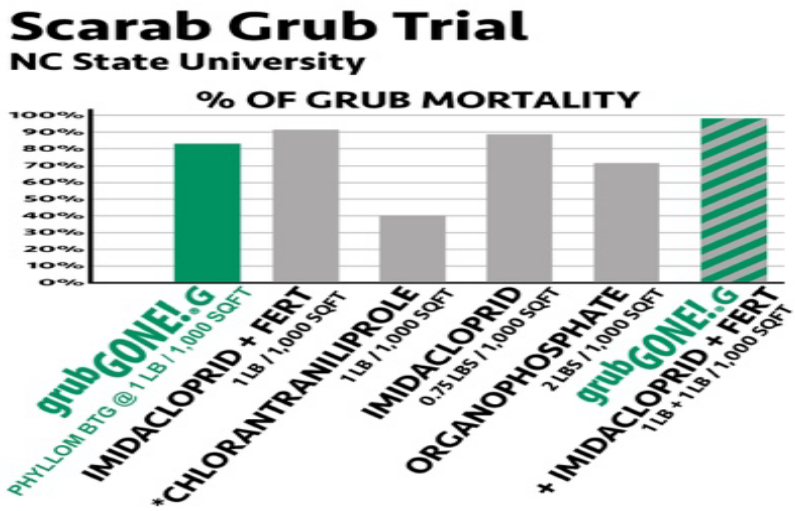
Treating for Grubs, Beetles & Weevils in Professional Landscapes utilizing an IPM Program for 100% Kill Rate

Benefits of Integrated Pest Management (IPM) Programs



Are you skeptical and don't want to try an organic solution for your client's turf grub, beetle and weevil problems? Integrated Pest Management (IPM) may be your answer to help gain the confidence to use high-performing non-chemical products in your program and perhaps eventually switch to some all-organic solutions. **IPM is an approach to pest management that relies on a combination of practices, including utilizing a proven chemical product at a very low application rate in combination with a powerful non-chemical, biological product.** grubGONE! G routinely demonstrates 80-90% control against Scarab Grubs. These results in many cases are similar to the leading grub control brands comprised of the chemical imidacloprid (ie Bayer Advanced Products) and better than those products using the chemical chlorantraniliprole (ie Syngenta Acelepryn).

Our Best Recommendation: Use a regimen that includes BOTH grubGONE!'s Naturally occurring BTG and a low rate of a product with the chemical imidacloprid. This mix results in close to 100% control against Scarab Grubs: better level of control than either product used alone. This would be an effective regimen for your homeowner clients looking to reduce chemical loads while still achieving very high results during times of high infestations. In addition, a successful IPM process includes proper maintenance, watering and feedings to ensure your turf is healthy.

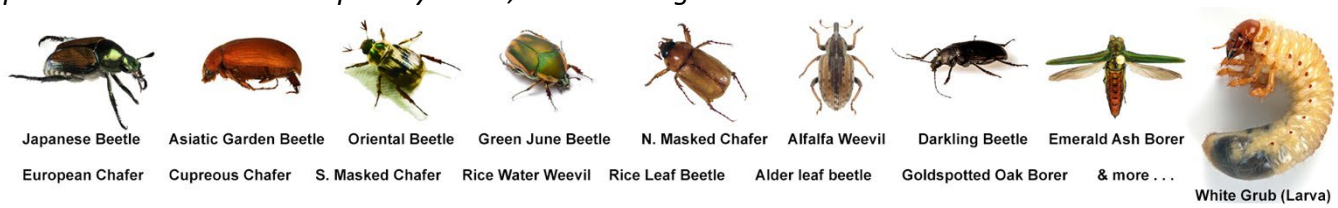
Similarly, IPM programs can be used to combat Japanese Beetles. Beetle traps have mixed results – they trap lots of beetles, but attract many from surrounding areas. So, by using them near a client's garden you may actually be doing more harm than good. During unusually high Japanese Beetle infestations, it may be good practice to place traps far away from your gardens in an effort to lure some beetles away from a client's plants. Then you can control the lower populations of beetles on your plants organically with beetleGONE!. **Like grubGONE! G, beetleGONE! tlc can be mixed with other products to increase effectiveness. Mixing beetleGONE! with some other specific products can also increase adhesion to foliage, decrease UV degradation and increase performance**. Some products that have been successfully used with beetleGONE! by homeowners and farmers include Neptune's Harvest Rose & Flowering 2-6-4 Organic Fertilizer, kaolin clay-based product (ie Surround® WP), Miller Chemical's Nu Film® P and even diatomaceous earth**.

**NOTE that diatomaceous earth is toxic to bees, so this would not be a solution for flowering plants or for use while bees are active.

But Japanese Beetles Don't Inhabit My Area

It is true that these colorful creatures of iridescent green and red, capture the most headlines but Japanese Beetles are just one species in the Scarab Family that is present across North America that cause damage to lawns and gardens. **Other damaging Scarab Beetle grubs and adults, weevils and borers that are controlled by the products developed by Phyllom BioProducts include:**

Asiatic Garden Beetle, European Chafer, Rose Chafer, May or June Beetle, Northern Masked Chafer, Southern Masked Chafer, Black Turfgrass Ataenius, Green June Beetle, Oriental Beetle, Billbugs, Annual Bluegrass Weevil, Leaf Beetles such as Rice and Alder Leaf, Weevils such as Sweet Potato, Pepper, Pecan, Citrus / Strawberry Root and other Root Weevils, Flea Beetle, Borers such as Emerald Ash Borer, Gold Spotted Oak Borer and Soap Berry Borer, and Darkling Beetles.



Unlike other organic options, grubGONE! & beetleGONE! control ALL of the above listed pests. *Target the Pest, Not the Rest!*

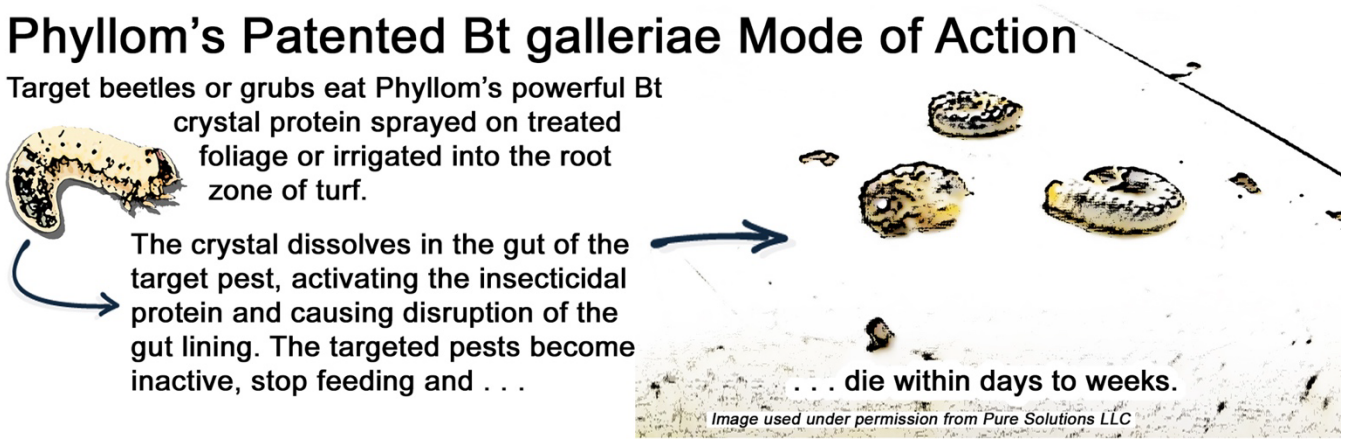
Natural. Effective. Targeted. Curative.

Discovered and developed by a team of experts over a span of 15 years, Phyllom BioProducts' patented strain of *Bacillus thuringiensis* (*Bt*) is the first bio insecticide powerful enough to effectively control susceptible beetles, weevils, borers and grubs. *And unlike the chemical products, Phyllom's line of products do not pose a risk to non-target beneficial insects such as earthworms and lady bugs nor to pollinators such as bees and butterflies.* **The New Standard for High Performance & Safety™. *You can now achieve a high level of control (>85%) like the chemical insecticides without doing harm to the natural ecosystem in your yard.***

And not only is grubGONE! a great alternative to chemicals against the smaller 1st instar grubs, but it outperforms the most popular Chlorantraniliprole-based chemical products in controlling the more mature and devastating 2nd & 3rd instar grubs*: making it a great fall rescue treatment option as well as a high-performing spring preventative product. ***See Trial Graph above. Chlorantraniliprole-based chemical products: Scotts GrubEx, Syngenta Acelepryn, FMC Durentis, Dupont products.**

What is BTG? And what makes it Safe?

The active ingredient BTG that the experts at Phyllom BioProducts discovered and developed is a protein contained in the microbe *Bacillus thuringiensis* subsp. *Galleriae* **(*Btg*): a naturally occurring soil bacterium that was found to be highly toxic to Scarab Beetles (and their larva) when ingested.** Through specialized expertise and technology, the Phyllom BioProducts Team was able to replicate and produce this unique bacterium and its active ingredient protein (BTG) for use in residential lawn & garden settings as well as in farms and forests to target destructive scarab beetle, weevil and borer invaders. The BTG proteins from this microbe selectively bind to the receptors in the gut of the targeted scarab pest, causing the pest to stop feeding and eventually die. **And since people, pets, birds, fish and other wildlife and even non-target beneficial insects do not have these gut receptors, they are unaffected by the BTG protein.**



… And what about the Chemical Competition?*

There exists a much different situation with **chlorantraniliprole-based chemical products**. Chlorantraniliprole is an insecticide in the chemical class of anthranilic diamides which has a very unique mode of action. It targets an insect's ryanodine receptors, disrupting muscle function and leading to paralysis and eventual death. This chemical may seem safer than previous market-leading chemicals. Unfortunately, people, pets and wildlife also have these ryanodine receptors in muscles (ie heart muscle); therefore, this chemical can be harmful at a high enough exposure based on concentration or level of exposure, length of time or repeated exposure and size of the exposed. For example, as with any chemical, children and smaller animals are more susceptible to toxic levels of exposure than adults and large animals. And with this chemical (and its metabolites) being relatively very persistent in the environment, the chances of repeated exposure in turf, soil and groundwater environments is substantially increased.

Information for Your Homeowner Clients: Identifying & Treating for Grubs (and Beetles) in Your Yard. . . Naturally and Organically!

What are the keys to controlling Turf Grubs? The first step is identifying that you have a problem. The larvae of Beetles (Turf Grubs) are typically ½ – 1 ¼ inch, worm-like, C-shaped insect pests that spend the majority of their life underground. They look somewhat like shrimp living in the soil. **Despite being small, when left untreated they can cause some BIG, expensive problems:**

1. Killing your grass by feeding on the roots.
2. Encouraging secondary foragers such as crows and racoons to dig up your turf as they search for and feed on the tasty morsels.
3. And finally, by mid-summer the grubs will turn into voracious foliar and flower-feeding beetles that can destroy ornamental plants, trees and fruit & vegetable gardens, which in some cases is more destructive to your yard than the grubs.

During the spring when ground and air temperatures start to warm up, grubs that retreated deep into the soil during the cold winter will move up near the surface of lawns to feed on the roots. Areas of your turf that look dead or thinning among an otherwise healthy lawn may be a sign of grub damage. Additionally, if you had turf damage from secondary foragers (discussed below) or an infestation of adult beetles the prior year then you likely have a grub problem this spring. To confirm the presence of grubs, use a shovel to peel up a section of unhealthy or browning lawn to identify whether grubs are present 1-2 inches below the surface. Typically, 5-10 grubs per square foot is enough to cause noticeable damage.

Preventative Maintenance

Whether or not you actually decide to dig up a small patch of your turf to positively identify the presence of grubs, **a well thought out preventative maintenance plan can save you both time and money down the road.** Proper watering and fertilizer treatments at regular intervals are keys to your turf's health. Healthy turf will be able to withstand (or mask) a grub infestation better than turf that has not been maintained. Part of your springtime preventative maintenance should include an application of grub control treatment to keep any suspected grub populations under control. Springtime treatments can also help reduce populations of destructive beetles during mid-summer: it will be easier for you to control these pests while they are localized and relatively stationary in the turf before they turn into adults and take flight. **grubGONE!®G is an organic granular product that can be spread on your turf** with a spreader and watered by irrigation or rain into the root zone to control grubs. Based on a naturally occurring bacteria *(Btg)*, **grubGONE! specifically targets scarab pests without harming the ecosystem in your yard.**

Beetle Infestations

Damage from Japanese Beetles in the United States amounts to millions of dollars in losses per year with most damage occurring in the Midwest and East Coast. However, the problem is no longer isolated to the eastern half of the country. Japanese beetles continue to move westward and south and now have become a big nuisance in Colorado, and even in isolated areas in California, Washington and Oregon. The beetles are adult stages of the grub larva that emerge from the ground during the summer months. Once the beetles emerge from the ground they will feed on a wide variety of fruits & vegetables, ornamental plants and trees. **beetleGONE!®tlc is a high-performing product to use once these scarab insects take flight.** Mix the product with water and spray on foliage every 7 – 10 days where the beetles are actively feeding. Most foliar-feeding Scarabs will be very active for approximately 2 - 4 weeks during peak infestation. Based on the same

naturally occurring bacteria *(Btg)* as grubGONE!, **beetleGONE! is safe to use while pollinators and other beneficial insects are active.** And an EPA allowed ZERO DAY Preharvest Interval means you can pick, pack and enjoy your veggies & fruits on the day of treatment. . . Of course, it's ALWAYS good practice to wash off any residual spray before consuming your harvest.

Beginning of the Grub Life Cycle

Within 2 weeks of peak flight, adult beetles begin to lay their eggs. Soon, grubs will hatch and begin the cycle all over again. Most professional lawn care operators find that this is the best time to treat for grubs; when they are in their early stages of development and most susceptible to grub control treatments. Typically, this is during mid-summer; July to early August.

Grubs & Secondary Foraging

Most homeowners don't even realize they have a grub problem until their well-manicured yard is visited by pigs, skunks, raccoons or crows that dig up yards in search of fattened-up grubs that continue to grow into the fall. Unfortunately, secondary foraging usually causes A LOT more damage than the grubs do. It's not uncommon for these animals to destroy entire yards! Traditionally, harsh chemical products were the best products to use in the fall against these larger, more mature grubs. But not anymore!

grubGONE!®G is the only nonchemical that effectively controls turf grubs from spring through fall, grubGONE! works not only against first-instar grubs but also against larger and hardier second- and third-instar grubs. ***Harness the Power of Mother Nature with BTG: The BioPesticide Inside®.*** grubGONE! therefore reduces populations of destructive grubs during spring-summer and helps to reduce secondary foraging in summer-fall. This easy-to-apply granule is **highly effective in controlling all types of scarab beetle grubs (such as chafers and Japanese beetles), billbugs, and bluegrass weevils in lawns without harming homeowners, pets, pollinators, earthworms, or wildlife. grubGONE! does not contaminate the soil or groundwater such as wells, streams, ponds, and lakes whereas the leading chemical products do.**

beetleGONE!®tlc Spray is used for highly effective organic control of adult beetles, weevils and borers without harming bees, butterflies or ladybugs. ***Target the Pest, Not the Rest!®*** For organic gardening. Mix in water and spray on edible garden plants, ornamental plants, trees or turf. beetleGONE! can also be mixed into or sprayed on potting or garden soil to

control beetle grubs. With a zero-day prehavest interval you can treat for beetles and harvest your food the same day. And there are no label restrictions for use around bees or flowering plants; therefore, **beetleGONE! can be safely used while pollinators are active. This is the only non-chemical spray product on the market that performs at a high level like the leading chemicals but is safe for homeowners and pollinators alike.**