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HOME, YARD & GARDEN PEST NEWSLETTER
College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign
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Last Issue for 2001

This is the twentieth and last issue of the *Home, Yard & Garden Pest Newsletter* for 2001. Comments about the newsletter are always appreciated. Feel free to let me or any of the authors know what you like or dislike about it as you see us at winter programs and other events. You can also contact any of us by phone, letter, or e-mail me at **nixonp@mail.aces.uiuc.edu.**

We are in somewhat of a transition stage between this newsletter's being offered only by mail to its being offered only on the Internet. Our mail subscriptions have dropped by two-thirds over the past few years as more people access this newsletter electronically. We do not know how many more years will pass before we make the transition completely to Internet access, but it is likely to occur.

If you are a mail subscriber, you will be contacted during the winter about renewing your subscription. We are expecting a modest $3.00 price increase in subscription rates to cover cost increases. Regardless of whether you receive this newsletter by mail or Internet, 2002 issues are expected to start in the first half of April. Thank you for your support and interest. *(Phil Nixon)*

INSECTS

Milky Spore Disease

The primary method of managing Japanese beetle grubs in turfgrass is with the use of insecticides such as trichlorfon (Dylox), halofenozide (Mach 2), and imidacloprid (Merit). All these materials are highly effective in maintaining Japanese beetle grub numbers below damaging levels. However, there is growing interest in the use of alternative pest control materials such as beneficial nematodes and microbial-based insecticides. One of the first microbial insecticides ever registered in the United States was milky spore disease. This bacterium was first detected in New Jersey in 1933. It became available commercially for use on turfgrass in 1948.

Milky spore disease is a bacterium that was initially referred to as *Bacillus popillae*, but it is now known as *Paenibacillus popillae*. The bacterium is applied to turfgrass as a dust. It is effective only in controlling Japanese beetle grubs; it has virtually no activity on other grub species. However, all larval stages are susceptible to the bacteria. Japanese beetle grubs must ingest the bacteria because the primary mode of entry is through the mouth. The bacterial spores reproduce within the grub, eventually turning the hemolymph, the internal insect fluids, an opaque white. Infested grubs eventually die, and bacterial spores disperse into the surrounding soil. Ingestion of the bacteria does not always produce infection as spores may pass through the gut and be discharged with fecal matter.

Milky spore disease was produced initially by collecting thousands of Japanese beetle larvae from the wild each spring and fall and bringing them to a laboratory for processing. Milky spore disease does not germinate well on an artificial medium or in test tubes. Nor will the bacteria develop on a dead insect, so infection needs to be induced through artificial means. This is normally accomplished by injecting live grubs with bacterial spores.

In the 1980s, it turned out that a different but related bacteria was actually being produced, which had little activity on Japanese beetle grubs. As a result, products were withdrawn from the marketplace. An earlier, more efficient, and consistent formulation method is now being used to produce milky spore disease.

Successful use of milky spore disease requires attention to environmental conditions, including temperature, moisture, soil structure, pH, and soil type. Efficacy of the disease may vary depending on cold temperatures; the spores are very cold-sensitive. Ideal soil temperatures for spore development during grub attack are between 60° and 70 °F (19° and 21°C). In cooler climates, like the Northeast, milky spore may take longer to spread than in warmer climates. It is important to know the soil temperatures within the profile during the fall and early spring when grubs are active.

Milky spore does not spread unless grubs are present in the soil. The density of the grub population is important in the establishment and buildup of the bacteria in the soil. As a result, the higher the density of the grub population, the faster milky spore will become established. In addition, infected grubs may eventually spread through the soil profile, increasing the likelihood of spreading the bacteria.

Bacterial spores tend to be concentrated in areas with high grub numbers. Spores bind tightly to soil particles and are normally located near the soil surface where grubs are likely to be located. Persistence in the soil ranges from 2 to 10 years with persistence as long as 30 years if grub recycling continues. In fact, studies have demonstrated that milky spore can last 15 to 20 years in the soil. It has been thought that milky spore may remain in the soil in a dormant but viable state until new infestations of grubs are present.

Milky spore disease is a population suppressant. The goal when using milky spore disease is to keep Japanese beetle levels below damaging thresholds (10 to 12 grubs per square foot). However, the use of milky spore disease is not without problems or concerns. First, it can be very difficult to determine results because other microorganisms (for example, predators and pathogens) in the soil may kill Japanese beetle grubs more rapidly than milky spore. Second, milky spore affects only one species of white grubs; and, in some situations, the Japanese beetle may not be the only or the predominant species. Third, results may take several seasons, 3 to 5 years in cooler climates, so several years may lapse before adequate control of grubs is achieved. Furthermore, populations of the pathogen may not increase quickly enough to retard the spread of an isolated colony of grubs. Finally, the use of milky spore may be cost prohibitive compared with other currently available pest control materials.

Birds and other wildlife that inadvertently move infected grubs when feeding naturally disperse the spores of milky spore disease. Milky spore is usually compatible with conventional insecticides. Research has determined that milky spore has no impact on beneficial organisms in the soil. In addition, it appears that the bacterium is compatible with Tiphia wasps, which are parasitoids of Japanese beetle grubs. *(Raymond Cloyd)*

PLANT DISEASE

Daylily Rust: What's the Big Deal?

You may have read something recently about a "new" rust disease on daylily that is spreading rapidly in the United States. The rust is daylily rust, discussed in issue number 15 of this newsletter. We've talked about rusts before on many landscape plants, and they were never considered major problems, so what's the big deal?

Daylilies have not been plagued with any serious disease or insect problems in the past. They are easy to grow and have been bred to provide hundreds of selections that thrive in our gardens. Many growers have become daylily collectors and have invested considerable time, plants, and space to develop splendid displays of these plants. Along comes a rust disease that causes yellow to brown spots on leaves, poor plant vitality, and leaf death in susceptible varieties. In addition, this rust can infect in 2 to 3 days, and spores are spread easily by wind and water. The pathogen can move easily between nurseries because spores can be present on leaves and tubers of symptom-free plants. The good news is that other species in the garden are not hosts of this rust. It is found on daylily and a perennial called *Patrinia*, but so far there have been no reports of rust on *Patrinia* in the United States.

Since my first article on this disease, the Plant Clinic has confirmed three cases of daylily rust in Illinois. It appears that all three cases involved plants that had been ordered by mail from out of state. Illinois Department of Agriculture inspectors have not seen daylily rust in Illinois nurseries. The general prediction is that this rust will soon become fairly common in our gardens, but meanwhile we need to do our best to keep it contained. Inspect new plants carefully. Because plants could be infected but not show symptoms, consider isolating new plants until you are certain that rust is not present. If rust appears in your daylilies, remove and destroy infected foliage. Consider using a fungicide to control this rust.

There is currently no fungicide that specifically lists daylily and rust on its label. It is likely that chemical testing will provide more information on efficacy in the next year. Meanwhile, the Florida Department of Agriculture and Consumer Services makes the following recommendation to Florida commercial nurseries and shippers of daylilies. They say to protect new growth by applying alternately two of the following four fungicides at the label rate and

interval: propaconizole (Banner Maxx), azoxystrobin (Heritage), flutolanil (Contrast), myclobutanil (Systhane).

I have two concerns with this chemical information. One is the availability of the products to homeowners. The names in parentheses are commercial trade names of products containing the active ingredient listed. These products may be used by homeowners, but commercial products usually come in large packages at considerable cost. Propaconizole is available in a homeowner product called Fertilome Systemic. Myclobutanil is available in a homeowner product called Immunox. The other two chemicals are not available in homeowner-sized packages.

My second concern is the suggestion of alternating two products. Many of the new systemic products (all of those suggested) are more effective than protective contact fungicides because they are systemic and because they have very specific ways in which they stop the fungus. When they are used repeatedly, the fungal pathogen (rust) may develop resistance to the fungicide, making it ineffective. The recommendation of alternating two products is intended to try to prevent fungicide resistance from developing. Modes or sites of action of chemicals are given names. Propaconizole and myclobutanil are DMIs, azoxystrobin is a STAR, and flutolanil is an Oxathiin (not understood). These labels categorize the fungicide according to how it works on the fungus. Because propaconizole and myclobutanil are both DMIs, rotating them will be ineffective. Nothing is gained when a homeowner alternates between Fertilome Systemic and Immunox. As more information develops on management of daylily rust, we will pass it along to our readers. Meanwhile, keep an eye on the daylily rust Web pages referred to in issue 15 of this newsletter. *(Nancy Pataky)*

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Home, Yard, and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others. Karel Jacobs and Donna Danielson of The Morton Arboretum also provide information and articles.

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