Bug-Wise

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Pyrethrum, Pyrethrins, Pyrethroids, Permethrin, What's the Difference?: Currently there are many different insecticide products available for homeowner use that contain either pyrethrins or permethrin. Ggiven the similarity in their names, it is easy to get them confused, but there are some very important differences between these two active ingredients. Hopefully the following notes will help clarify the differences.

Pyrethrum: Pyrethrum is a botanical insecticide produced by grinding the flower heads of certain species of chrysanthemums, sometimes referred to as the pyrethrum daisies. Although there are a few other species that have insecticidal properties, *Chrysanthemum cinerariaefolium* is the most widely cultivated. However, the chrysanthemums that we routinely grow here in the US do not have insecticidal properties. Pyrethrum is one of the first insecticides; according to some reports it has been used since the first century AD. During the early 1800s this was known as Persian Powder and was used for control of lice and fleas. Because of its low mammalian toxicity and botanical source, pyrethrum remains a popular 'organic' insecticide today. The majority of the world's supply of pyrethrum is produced in Kenya where it is primarily grown as a cash crop on small farms.

Pyrethrins: Pyrethrins are the actual insecticidal compounds found in pyrethrum. There are several active compounds: pyrethrin I, pyrethrin II, cinerin I, cinerin II, jasmolin I and jasmolin II. Collectively, these active compounds are referred to as 'pyrethrins'. Pyrethrins work as contact insecticides and act on the nervous system of most insects to provide quick 'knockdown', although some insects may eventually recover. The activity of pyrtherins can be enhanced by combining them with a synergist such as piperonyl butoxide (PBO). However, when an inorganic synergist is combined with pyrethrins, the resulting insecticide can no longer be considered to be purely botanical, so organic producers make an important distinction between pyrethrins and pyrethrins + PBO (or other inorganic synergists). There are many commercially available homeowner products that contain pyrethrins + PBO (or some other synergists). One of the key disadvantages/advantages of pyrethrins is that they breakdown quickly when exposed to sun light, and thus provide very short residual activity.

Pyrethroids: Pyrethroids are 'pyrethrin-like' compounds that have been chemically synthesized based on the structure of pyrethrin molecules. Allethrin was one of the earlier synthetic pyrethroids to be commercially produced, but there are many others. Examples include resmethrin, tetramethrin, permethrin, cypermethrin, tralomethrin, deltamethrin, cyfluthrin, cyhalothrin, esfenvalerate, bifenthrin, and many others. Synthetic pyrethroids are not 'acceptable' for organic production, but they do have some key advantages over natural pyrethrins. In particular, they provide higher levels of insect control and longer residual control.

Permethrin: Permethrin is just one of many different synthetic pyrethroid insecticides available today. It was the first pyrethroid to be widely used in commercial row crops and vegetables (as Pounce or Ambush) but in recent years it has been replaced in these markets by 'second' and 'third generation' pyrethroids, such as zetamethrin (MustangMax), bifenthrin (Capture) and others. However, permethrin is currently one of the most important, most widely labeled insecticides available for use in the homeowner market. It is sold under many different brand names and in a number of different formulations. Depending on the formulation and label, permethrin is used for insect control in home vegetables, insect control in lawns and on ornamental plants, control of fleas and other indoor pests, as a treatment for head lice, and many other uses.

Fall Webworms: The many webs or tents that are occurring on pecan and persimmon trees are caused by the fall webworm, *Hyphantria cunea*. Actually, these caterpillars will feed on most any broadleaf tree, including apple and other fruit trees, but in our area they exhibit a strong preference for persimmon and pecan. Despite their name, these insects first appear in the spring, but because there are several generations per year, with populations increasing with each generation, they are most abundant in late summer and fall.

Fall webworms are relatively easy to identify by their tent, which occurs at the ends of limbs, enclosing a large number of leaves. The caterpillars are reluctant to leave the protection provided by the webbing and primarily feed inside the tent. The caterpillars themselves have a series of 'bumps' around each segment of the body, with numerous long fine, light-colored hairs growing from each bump. This gives the caterpillars an overall hairy appearance. Actually, there are two different races of fall webworms, a red-headed race and a black-headed race. Within each race the color of the bumps matches the head color.

Although they are unsightly, a few webs per tree do not present a significant threat. However, in some years this insect can build to very high numbers and cause total defoliation of even large, mature pecan trees. Although, trees normally survive such severe defoliation, this can have a significant impact on nut production, reducing fill and quality of the current year's crop and yield potential of the following year's crop. Commercial pecan producers normally control webworms coincidentally with insecticide sprays applied to control aphids, pecan weevils and other insect pests, but will spray specifically for webworms when the need arises.

One non-insecticidal method of control is to use a pole with a metal hook (easily made from a coat hanger) taped to the end to tear up the tent. Granted this is somewhat of a 'physical placebo', but it does expose the caterpillars to predators and result in increased mortality. However, they will rebuild, and the process may have to be repeated several times. In cases where an insecticide is deemed necessary, labeled treatments containing the active ingredient permethrin (there are many brand names) will be effective if they can be sprayed directly on, into, and around the web. In cases where the entire tree requires treatment, a treatment containing the active ingredient spinosad (Fertilome, Bore, Bagworm, Leafminer, and Tent Caterpillar Spray is one commonly available brand name), or a Bt product may be more appropriate.

There is really no easy, practical way for homeowners to spray large mature trees, but some electric powered sprayers are capable of reaching 15 to 20 feet or so. Also, there is a hose-end type sprayer that is designed specifically for treating trees and shrubs. Depending on available water pressure, this sprayer is capable of reaching 20 to 25 feet. This is one of the easiest, most economical ways for homeowners to apply foliar sprays to moderately tall trees or shrubs.

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