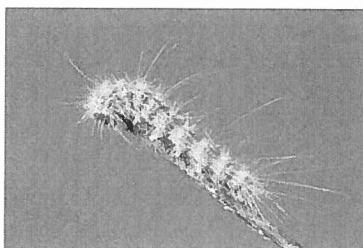


## Bug-Wise

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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. Given 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 pyrethrins 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.