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WASHINGTON STATE UNIVERSITY
INSECT CONTROL WITHOUT SYNTHETICS

Most of us remember when reasonably good gardens could be grown with little or no use of insecticides. While a number of pests now encountered are recent imports from other countries, for the most part we face the same pest insect complex found in pre-DDT days. Fortunately, a few recent nonpesticide approaches to insect control have been developed. These new developments combined with many old-time practices make it possible to obtain reasonably insect-free garden produce without the use of synthetic insecticides. Bear in mind, however, that you must accept some level of damage greater than is presently acceptable. In avoiding the use of modern synthetics, the following recommendations must be considered:

1. Avoid or limit the growing of highly insect-susceptible crops.
2. Be willing to accept a certain amount of insect damage.
3. Prepare to expend additional labor to achieve control.
4. Plant and care for a larger garden than you normally would to obtain the necessary yield to offset insect losses.
5. Expect considerable damage from several soil insects and from codling moth on apples and pears (especially in eastern Washington). We have no satisfactory control for these pests unless you use modern synthetics, or the older arsenicals for codling moth and fumigants for soil pests.

Other publications are available through your county agent on control of garden pests relying chiefly on short residual, low hazard, synthetic insecticides such as malathion, diazinon, carbaryl, dicofol, naled, and others.

This bulletin is written *only for the backyard gardener*. It does not replace the various WSU recommendations on the use of low hazard synthetic insecticides for home uses. The following recommendations are not based entirely on nonpesticide approaches. The few suggested pesticides are not synthetics but are low hazard materials derived from plants, dormant and summer petroleum oils, and lime-sulfur and elemental sulfur. These insecticides and their properties are listed below:

Pyrethrins. These insecticides are derived from the dried flowers of a species of *Chrysanthemum* and have been used for controlling insects since ancient times. They have the property of "quick knockdown" and very short residual effects. Therefore, they must be used often. They are sold most frequently with an activator or synergist (piperonyl butoxide, piperonyl cyclonene, or some other synergist). The use of pyrethrins without these low hazard and safe activators would be much less effective, difficult to obtain, and almost prohibitive in cost. An insecticide chemically similar to pyrethrins has been developed called allethrin. It has similar properties to pyrethrins. The pyrethrins kill insects only by contact. They are effective against a wide range of garden pests especially the soft-bodied forms, but will not control mites. Do not spray around fish ponds. Consult the label for specific usages. Sprayed edible portions of fruits and vegetables can safely be eaten soon after application, but read and follow the label carefully.

Rotenone. For centuries natives of tropical Africa and South America used this plant derivative as a fish poison. Fortunately, although this chemical is highly toxic to most cold-blooded animals, it is very safe for most warm-blooded types, including man. Natives make powder of the root of the *Derris* plant or related plants containing rotenone and place the material in a

lake or stream to kill fish. The fish die quickly and can then be eaten. This chemical is still used to rid lakes from unwanted "trash" fish. In the mid-19th century, its properties as an insecticide were discovered and it became widely used until the midforties, when DDT and other synthetics largely replaced it. It has longer residual action than the pyrethrins, but also requires repeated applications. *Rotenone is probably the best general-purpose, nonsynthetic garden insecticide available.* It can be used either as a dust or spray and kills a wide range of garden insects such as caterpillars, aphids, and certain beetles, but is ineffective against spider mites and soil insects. Read the label carefully for specific usages.

Nicotine. This old-timer unfortunately controls only aphids, related soft-bodied sucking insects, thrips, and a few species of caterpillars. It does not control most chewing insects. It is derived from the tobacco plant and is usually sold as a 40 percent liquid concentrate of nicotine sulfate (Black Leaf 40) which is then diluted with water and applied as a spray. Nicotine dusts are not normally sold for backyard use because of the irritation to the operator. Nicotine is much less effective when applied during cool weather. It has short residual effects and can be used on vegetables very close to harvest. *Nicotine concentrate is extremely poisonous.*

There are several other plant-derived insecticides, such as sabadilla, *Ryania*, and hellebore, but unfortunately, with the exception of *Ryania*, which is used primarily for codling moth on apples and pears in southeast Canada, these are rarely available in the Pacific Northwest.

Dormant and Summer Oils. Petroleum oils have been used for insect control as early as 1787 and are still popular, although not used as extensively as they might. *Apply them only on woody plants.* There are two principal types: the dormant oils which should only be applied on trees or shrubs which are in a dormant or delayed-dormant condition and summer oils which can be used during the growing season, but are also restricted to *woody plants*. To apply a strictly dormant oil during the growing season will severely burn foliage. For summer use, be certain to purchase oil especially prescribed for this purpose and apply only on those plants for which the material is recommended. There are some special oils which can be applied either summer or winter; however, the concentration used in summer is far less.

Oils control many insects and their eggs, such as overwintering leafrollers, and aphid and mite eggs, as well as nymphs and adults of aphids, scale insects, and mites. These oils must first be diluted with water. They contain emulsifying agents which facilitate their mixing when added to water. The oils cause little or no harm to most beneficial insects and resistance of pests to these sprays does not occur. They are particularly nonhazardous to human health.

Lime-Sulfur (Liquid). This old-timer is still in commercial use. You use it much the same as for the dormant oils diluted with water. Do not apply to apricot trees at any time; you may injure the foliage. *Use only on woody plants and only during the dormant season,* or up to prebloom on some plants. The only exception is on caneberries where it can be used for dryberry mite and redberry mite in the spring when vegetative buds are 1/2 inch long. This material is particularly effective against pearleaf blister mites, rust mites and their close relatives, as well as for many insect eggs. These sprays also have fungicidal value. On fruit trees, lime-sulfur is often mixed with dormant oil to increase its efficiency. Use lime-sulfur with caution when you treat ornamentals near your house. The spray drift when dried is most difficult to remove from buildings, and may cause stains on all types of painted surfaces.