

TIMELY INFORMATION

Agriculture & Natural Resources

Insecticides for Backyard Vegetable Production

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Integrated pest management (IPM) is a decision-management system that incorporates the use of multiple pest management tactics. IPM is not only applicable to commercial vegetable production industry that uses the Restricted Use Pesticides (RUPs), but IPM strategy is also applicable to backyard vegetable production that uses General Use Pesticides (GUPs). Gardeners do not need a pesticide certification to use GUPs but they have to be aware of pest control options. This article is based on the Alabama IPM Handbook Volume 2, "Home Garden Vegetables Insect Control Recommendations" which was published in 2008 and is available for download at <http://tinyurl.com/yjjpy24>. You can



also Google the title and find it easily on the Internet. About 15 active ingredients are now registered for backyard vegetable production but only a few are commonly sold in retail stores. These insecticides are classified as contact poisons, stomach poisons, and systemic insecticides. Below is a list of some common active ingredients (AI) found in the stores along with the product names, crops, target insects, and post-harvest intervals (or PHI; number of days to wait after insecticide application prior to harvest).

***Bacillus thuringiensis* (Bt):** This is a microbial insecticide available as Dipel, Thuricide manufactured by Fertilome and Bonide. Bt can be used on broccoli, cabbage, cauliflower, collard, leafy vegetables, etc. It is best when applied to small caterpillars. If you use a trap crop, then Bt can be used to contaminate insects for early pest control. Action of Bt is slow, so apply at the first sign of trouble. PHI = 0 days. It is an environmentally-friendly product for gardeners due to selective action on target insects.

Bifenthrin: This is a synthetic pyrethroid (e.g., Ortho "Bug-B-Gon-Max", "Eliminator Ant, Tick, & Flea Killer" by Gro Tech for use in soil pest control for vegetable production) with a broad-spectrum contact action (it is not absorbed into the plant). It can be used in broccoli, Brussels sprouts, cabbage, cauliflower, cantaloupe, cucumber, pumpkin, squash, egg plant, lettuce, spinach, peppers, sweet corn, beans and peas to manage aphids, cucumber beetles, squash vine borer, pickleworms, and a number of caterpillar pests. Eliminator Ant, Tick, and Flea Killer granular insecticide has 0.1% Bifenthrin and is sold in retail stores for use in bean, cucurbit, pepper and eggplant production but it apparently is not labeled for tomatoes. PHI is 7 days. Many fire ant control products in retail stores also have Bifenthrin but are not labeled for use in vegetable production because the formulation can harm crops.

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Malathion: This is an old chemistry which is still around because malathion has good contact action against caterpillars and flea beetles. It is available in spray formulation marketed by Hi-Yield, Bonide, Southern Ag and others. Gardeners should rotate this insecticide with alternative insecticides like Bt and spinosad (Fertilome's "Borer, bagworm, and tent caterpillar"), if possible, to avoid insecticide resistance. Malathion can be applied to almost all vegetables but follow the product label before application. PHI is 3 days.

Carbaryl: This also is an old chemistry that can cause insecticide resistance if pesticide rotation is not followed. In spray form, carbaryl which is available as Sevin (Bonide, Garden Tech, Southern Ag, etc.) can affect pollinators and other beneficial insects. Carbaryl has a broad activity label on many vegetable crops with PHI of 3 days. One granular or bait formulation sold in large bags called Sevin Lawn Insect Control (Garden Tech) has vegetables on the label for managing soil insect pests like grubs. Baits are safer to use than Carbaryl spray.

Insecticidal soap: Although PHI for these products is zero, insecticidal soap is sometimes hard to find in retail stores. Due to the contact action against soft-bodied insects like aphids and whiteflies, several repeat applications of soaps are required during production season which makes it less favorable among gardeners. Organic vegetable producers like the product because it is an alternative insecticide with no harmful residues on produce. Insecticidal soap is different from regular detergents used in the household and will not cause leaf burn if applied correctly.

Permethrin: This insecticide is sold as a multi-purpose insect killer by many companies (Bonide, Ortho, Green Light, Spectracide etc.) and is labeled for use on numerous vegetable crops such as broccoli, Brussels sprout, cabbage, cauliflower, cantaloupe, cucumber, pumpkin, squash, sweet corn, tomatoes and others. This product can provide some relief from stink bugs if sprayed periodically on crops like tomato and sweet corn. PHI is 1 day which indicates quick knock-down action on insects and convenience for use. Being a synthetic pyrethroid, Permethrin products (Bug-B-Gon Garden Dust, Complete Home and Garden Spray, Spectracide Bug Stop, etc.) can affect beneficial insect activity in gardens.

Pyrethrin: Pyrethrin is based on a natural insecticide derived from the flowers of Chrysanthemum called pyrethrum. Bonide, Green Light, Espoma, and Southern Ag market the Ready-to-Use (RTU) pyrethrin products in nice plastic bottles. Note that some pyrethrin-containing products may be premixes, e.g., NEEM II – a new product from Green Light actually has pyrethrin along with 70% neem oil. Pyrethrin can be used for a quick knock-down of insects like beetles, cutworms and whiteflies, but it can affect beneficial insects also. PHI is zero and there is no residual activity (spray is needed every 3-4 days under a high pest pressure).

Imidacloprid: This is a new generation neonicotinoid insecticide that has excellent systemic activity (absorbed into plants) against sucking pests like aphid, leafhoppers, whiteflies, and thrips. Until 2010, imidacloprid products marketed by Bayer were available for use in lawn and ornamental plants (e.g., "Bayer Advanced Tree and Shrub" or Merit with 1.47% imidacloprid). In 2010, Bayer has introduced the "Bayer Advanced Fruit, Citrus and Vegetable Insect Control" that has 0.24% imidacloprid (available in bright blue 32-oz bottles). This new product can be used in cucurbits, legume crops (bean and pea), leafy and fruiting vegetables including tomatoes for controlling aphids, flea beetles, leafhoppers, thrips and whiteflies. Due to systemic action, the product should be applied early as transplant drench or shortly after planting to allow the product to be absorbed in the plant. PHI is 21 days meaning this product should not be used close to harvest. Only one application of this product can provide long-term protection from sucking pests but not stink bugs. For stink bugs, the best options are either use of pyrethroid insecticides for rapid knock-down or using non-

insecticidal management methods like trap crops, conservation of natural enemies, use of physical barriers, and timely harvest of fruits.

Neem oil: These products are basically oils with little azadirachtin in them. Azadirachtin is a natural insecticide that repels pests and causes growth abnormalities in immature insects like caterpillars and plant bugs. Azatrol (Gordon) is an insecticide containing azadirachtin recommended for organic crop production. You may use neem oil just as you would any other horticultural oil (contact insecticides). You will find numerous neem oil products from companies like Green Light, Olympic, Safer, Monterey, and Southern Ag. Neem oil can be a good rotation partner with other synthetic insecticides for vegetable IPM and substitute insecticides in low pest pressure.

In this article, some major insecticides and new products were discussed to guide you in buying insecticides for garden use. It is best to purchase pesticides from a reliable store where you may find additional information about products and their usage. Always follow the insecticide label and only use insecticides when absolutely necessary. Trade names are used only to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar. For more information on insecticide mode of action or usage, contact Dr. A at bugdoctor@auburn.edu or call 251-331-8416.