# ***Bt and Other Organic Pesticides***

Ideally, there should be no pests in your garden because you have selected a crop that is well adapted to the Tulsa climate and soil, you irrigate regularly, and you provide proper fertilization.

However, bad things can happen to good gardeners! After you have tried the usual moves – hand picking insects off or blasting them with water, you lastly resort to a pesticide.

There are so many different types of pesticides available on the market today. Be aware that each one is meant to be effective against specific pests. If necessary, use your magnifying glass to discover your bug problem before you go to the garden store!

## But first, a bit of history!

In 1939, a chemist in Switzerland developed a new compound that would profoundly change the lives of farmers and ordinary folks around the globe. He demonstrated that DDT killed the Colorado potato beetle, a pest that was ravaging the potato crops across America and Europe.

DDT quickly became the new "wonder insecticide" and was credited with saving thousands of human lives in World War II by killing typhus-carrying lice and malaria-carrying mosquitoes.

In the years to come, this product of the 30's would go from a Savior to a Scourge. DDT was eventually banned, but it opened a long line of new organic chemical insecticides that would change agriculture.

## Next came Bt

Bacillus thuringiensis was developed in response to the use of broad damaging chemical pesticides in the forest environment. Bt is considered ecologically friendly and effective. Various strains have been used commercially in the United States since 1958.

Among the various strains of Bt that attack specific kinds of insects are:

- Bacillus thuringiensis variety israeliensis is used to control mosquitoes
- Bacillus thuringiensis variety tenebrionis is used to treat some pest beetles
- Bacillus thuringiensis variety kurstaki (Btk for short) is used to control caterpillars and cutworms in larvae stage and caterpillar pests that turn into gypsy moths

Keep in mind that butterflies go through a caterpillar (larval stage) just like garden pests and are voracious eaters. Look closely to make sure you are not killing a future butterfly!

It is highly recommended to not spray with an insecticide during the butterfly's larvae stage.

## ***The Good Guys***

Monarch Caterpillar

Swallowtail Caterpillar

## ***The Bad Guys***

Cotton bollworm Source: USDA

Treat Cotton bollworm with Btk


Treat Tomato hornworm with Btk

In 1995, Bt made headlines when it became the first protein genetically engineered with corn. Since then, crops with Bt genes have come to dominate most crop varieties planted in the U.S.

## ***Today's choice of Pesticides***

Azadirachtin products, such as Neemix and Aza-Direct, are extracts of oils found in the Neem tree. These products are insect growth regulators that slow or prevent insect molting and serve as feeding deterrents and repellents. Fair to good control of beetles (Cucumber, Colorado potato, Mexican bean, and flea) has been reported.

Pyrethrum is the naturally derived insecticide found in daisy flowers and commonly marketed as PyGanic. Quick knockdown and noticeably short residual activity are key traits of this product. It has been shown to produce good control of aphids (both in larvae stage and adult), whiteflies, thrips as well as knockdown of various beetles (cucumber, Colorado potato and flea).

Larvae stage of aphids

Adult Aphid

Azera is a product combination of Pyrethrum (like PyGanic) and Azadirachtin (like Azadirect/Neemix). Control of Japanese beetle, aphids, imported cabbage worm, leafhoppers and cucumber beetles was improved over the use of azadirachtin alone in recent studies.

Spinosad products provide particularly good control of caterpillars and thrips with fair to good control of flea beetles and Mexican Bean beetles.

Soaps and oils provide good knockdown of soft bodied insects such as aphids and mites. Repeat applications and thorough plant coverage is particularly important. Oils provide more residual activity than soaps.

Plant Extracts (e.g. d-limonene (citrus) and rosemary extras) work to disrupt insect neuroreceptors and act as anti-feedants. Fair to good control of aphids and spider mites has been reported.

Mineral dust kaolin clay (sold as Surround) repel and/or irritate insects and disrupt feeding and egg laying.

On the other hand, while synthetic pesticides (e.g. Malathion and Carbaryl) have been shown to be moderately effective in killing insect pests, these synthetic pesticides were found to be harmful to beneficial insects and may have a low/moderate toxicity to humans and pets. So, be very careful in using such less ecologically safe products.

## ***Application of Pesticides***

When applying any pesticide, the user is responsible for reading all label directions and making applications in a proper manner. Homeowners need to adhere to restrictions concerning the target crop and insect pest, the interval of time required between application and harvest, and proper protection of people, pets, and beneficial organisms including bees, predators, birds, and fish (i.e. non-target organisms). Wear unlined neoprene gloves and keep all materials out of contact with eyes, mouth, and bare skin. Always wash thoroughly after applying pesticides.

JT

**SOURCES:**


OSU Fact Sheet EPP – 7313: Home Vegetable Garden Insect Pest Control

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