GARDEN PEST CONTROL
A BRIEF HISTORY

Dr. Bob Gough | Text | Illustrations by The Principles of Fruit Growing by L.H. Bailey

'In years gone by it was of little concern if you found a worm in your tomato. You simply cut out the damaged areas and ate the rest.'

Pest control is a pressing gardening chore we all face. Weeds have always been with us but diseases and insects were little trouble to the early colonists; most of those pests and diseases hitchhiked rides into this country from Europe or Asia after the Revolutionary War. Over the years we have found ways to deal with them; some are based on superstition, some on ineffective plant decoctions, and some on highly toxic compounds. Today many gardeners are returning to using older, pre-World War II pest control methods with the thought that they are far safer than modern pesticides. That's not always true.

Rig for spraying

17th and 18th CENTURY

Weeds were hand-hoed as time allowed but there was little need for other pest control measures. Pest populations that did exist were checked naturally by the low densities of vegetable plantings around the countryside. Gardeners also were far less finicky than now about their produce and expected to find a worm or two in their squash. It was of little concern. What pest controls existed were primitive and generally ineffective. A 1629 recommendation for control of bacterial canker on fruit trees involved soaking the cankers in cow's urine. In 1711 the control of "flies" on ash trees involved spraying the trees with rue-steeped water. Rue (*Ruta* spp.) was one of the first botanicals used for pest control. Native Americans believed that the woman who tended the garden should remove her clothes under a full moon, and then drag them in a "magic circle" around the garden to prevent the ravages of cutworms. That this was practiced mainly near early Roman Catholic missions suggests the missionaries themselves introduced the practice into North America, for 1st century Roman writer Pliny the Elder, in his *Natural History*, mocks as absurd the same practice in use in his day. Columella too mentions a similar practice.

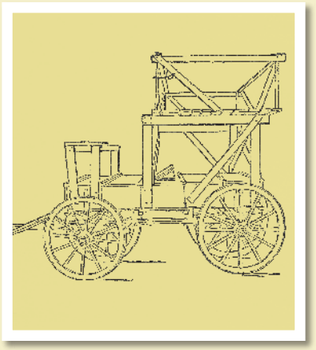
Most settlers got their gardening and farming information from almanacs, the first of which to be published in the colonies was probably issued by William Pearce of Cambridge, Massachusetts, in 1639. Instructions for doing nearly everything by the phases of the moon perpetuated all of the old astrological superstitions that harkened up to four millennia ago and that were codified by Claudius Ptolemy in his seminal 2nd–century work, the *Tetrabiblos*. Little scientific information was included in the almanacs because there was little to be had. Besides, pseudoscientific astrology sold copies.

Some of the first scientific experiments in controlling garden pests were carried out in Europe just before the American Revolution. Tobacco (*Nicotiana tabacum*) dust and rue water were considered best for controlling aphids and other insects. Unknown at the time, the nicotine in the tobacco dust was the effective and highly toxic insecticide in the combination.

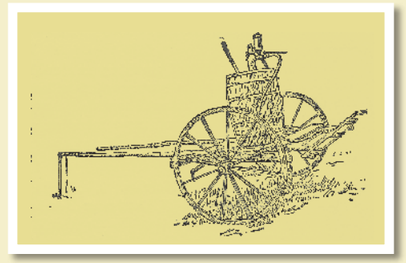
Pests became increasingly problematic soon after the American Revolution. The pea weevil and turnip fly destroyed crops around Philadelphia and an outbreak of potato blight, perhaps late blight (*Pseudomonas infestans*), was reported in Massachusetts. The Hessian fly, imported with Hessian mercenaries during the Revolution, destroyed wheat crops. The first attempts to control them took place about 1791 and involved spraying or dusting turpentine, soot, urine, and/or powdered wormwood (*Artemisia absinthium*) onto the plants. Still, horticultural pests were not major problems and control measures, other than handpicking, were rarely needed.

19th CENTURY

During the first half of the 19th century pest problems continued to increase. By 1814 farmers were using tar water, salt water, and aqueous herbal mixtures of wormwood, rue, and tobacco to control caterpillars. Shaker records from the 1840s tell of treating insect-infested garden plants with tobacco juice, soap, lime, salt, and ashes, all to no avail, forcing gardeners to resort to "squshing" [sic] the insects by hand. White hellebore (*Veratrum album* or *V. viride*) was widely recommended for insect control beginning about 1842. In parts of New England pests were considered God's punishment for sin and were fought with prayers and supplications. Diseases were mysterious and thought to be caused by a "morbid infection of the air" or "a surcharge of electric fluid." In some areas sulfur was recognized as effective against mildew as early as 1821. Salt water or mixtures containing corrosive sublimate (mercuric chloride) were also used.



Rack for spraying rig.



Outfit for spraying strawberries and potatoes.

By the latter half of the 19th century pests had become a big problem. The gypsy moth was introduced into the United States in 1868 and the Colorado potato beetle appeared in destructive numbers during that time as well, and some terribly toxic pesticides were developed to combat them. Paris Green, a copper-containing arsenical paint pigment, was first used against Colorado potato beetles in the 1860s. London Purple, another arsenical, made its American debut about 1880. Lead arsenate was first recognized as an insecticide in 1892 and remained in fairly broad use until about 1970. White hellebore remained a popular botanical for control of cabbage worms. Pyrethrum (*Chrysanthemum* spp.) became a widely available botanical insecticide after about 1880. Tobacco dust, lime, ashes, kerosene emulsion, whale-oil soap, sulfur, and Bordeaux (an aqueous suspension of copper sulfate and lime) were effective against a variety of pests. Gardeners knew that corn meal or wheat flour sprinkled on cabbage plants would control cabbageworms, but that was intolerably expensive; road dust did the same thing. The main control for the larger garden insects remained handpicking; smaller insects either were ignored or controlled mostly with soap emulsions or lime suspensions.

No good controls for fungal diseases existed before about 1880, when Bordeaux became available. Bordeaux, lime, copper-based compounds, and sulfur were fungicides widely used for many years.

20th CENTURY

The early 20th century saw an explosion in pest problems as garden densities increased. Garden sanitation and crop rotation were rightly stressed. The European corn borer was discovered near Boston in 1917 and spread rapidly across the country. Asparagus beetles and rust were highly destructive by World War I. Cabbage club root was fought by long rotations and, by mid-century, by formaldehyde soil drenches. Cabbage worms were killed with lead arsenate sprays and striped cucumber

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beetles with slaked lime or tobacco dust. Copper-lime mixtures and hydrated lime controlled flea beetles and nicotine still was used against aphids. The use of hellebore faded as pyrethrum and rotenone (*Chrysanthemum* spp.) became more widely recommended. Yet, pest control in the garden still was pretty much limited to handpicking and perhaps the use of a very few pesticides like lead arsenate and rotenone. I remember as a child being paid a penny for every 10 Japanese beetles or potato beetles I picked off the crops. Diseases were fairly effectively controlled with Bordeaux, sulfur, and copper dusts. Many of these pesticides were highly phytotoxic, to say nothing of their human toxicity. By this time it had become fairly common to plant seeds treated with red copper oxide or organic mercury compounds to control seed-born diseases and damping off. These seed treatments were a great benefit especially to gardeners planting in cold, wet soils. I used red copper oxide as well as coal tar on corn seeds as crow repellents. The insecticidal value of DDT in controlling body lice among soldiers was recognized in 1942, the same year the herbicide 2,4-D was introduced. Organophosphate insecticides like Malathion were introduced a few years later. All became important to gardeners over the next decades. Weeds were controlled by cultivation. Mulches were rarely mentioned until the 1930s, when the first good results using paper mulch, introduced about 1929, were reported. Salt spread over the ground was used regularly to control weeds in deep-rooted crops like asparagus, a practice no longer recommended.

Pests became an overriding concern after WWII, due in part to increasing garden densities and pest populations. It may also have a tinge of increasing fussiness in our eating habits. Sometimes we create our own problems. In years gone by it was of little concern if you found a worm in your tomato. You simply cut off the damaged areas and ate the rest. Now most Americans, so removed from gardening and used to pre-sorted, store-bought produce, will not tolerate a wormy tomato no matter how inconsequential the damage. All of these factors, along with a need to supply food to an exploding population, led to the strong increase in the use of pesticides after WWII. Nascent vegetable hybrids had built-in disease resistance and began to reduce our dependence upon some fungicides, but it was a small effort too late begun.

BANNING THE NASTIES

In the 1950s, chlorinated hydrocarbons like DDT began to replace arsenicals in the garden and the organophosphate Malathion began to edge out the far more acutely toxic nicotine sulfate, sold as Black Leaf 40. The chlorinated hydrocarbon chlordane was widely used to control wireworms and grubs in the soil as well as ants around the home. Seed treatments containing the then-new fungicides captan and thiram replaced older mercury and copper treatments. By 1965 the standard garden pesticide arsenal included the insecticides DDT, chlordane, methoxychlor, carbaryl, Malathion, and rotenone and the fungicides sulfur, captan, thiram, and ferbam. Bordeaux and lime sulfur were no longer widely available. Pumping all of these compounds into our environment in steadily increasing quantities became a rightly suspect practice during the 1960s; DDT and most other chlorinated hydrocarbons were banned for use in the United States in the early 1970s. Many of the organophosphates also were slowly phased out, though Malathion is still used. Carbaryl, a carbamate unrelated to either group, remains in wide use and rotenone has found new popularity. Pyrethrum has given way to its synthetic forms like pyrethrin and resmethrin, and there is renewed interest in Bordeaux and soap sprays. In this way garden pest control has returned to the practices of the 1930s, not necessarily a bad thing.

CURRENT PRACTICES

Weeds continue to be problems. Hand hoeing is still a very good option, as is mulching with paper, straw, pine needles, or black plastic, which was introduced about 1960. The newer colored plastic mulches increase early yields of some crops as well as suppressing weeds. There is seldom justification for using any herbicide in the vegetable garden. Besides, hoeing is great exercise.

In recent years much has been made of the use of companion plants in the garden. This is an old practice used widely in the 19th century, but its original meaning has been perverted by some modern garden writers. Originally, “companion planting” meant what we call today “intercropping” or “succession cropping.” It did not mean that one plant magically helped its neighbor to grow or that it repelled insects from neighboring plants. While it has been shown that some species of marigolds suppress soil nematode populations when planted densely and turned under, and that interplanting can confuse some insects, there is scant or no scientific evidence to support the marvelous teleological claims of some garden writers regarding other “companion” plant benefits, such as one plant “helping” another to grow because they “love” each other. This pseudoscientific concept of companion planting as commonly promoted today belongs in the same category as planting by the phases of the moon. But it does sell copy.

So what is the bottom line on controlling pests? Practice good garden sanitation, rotate crops, be vigilant, and handpick insects when possible. If all else fails, use the least toxic pesticide at your disposal. Simply spraying aphid-infested plants with the garden hose often will take care of the pests. Trap slugs under boards or in cans of beer. No matter how “least toxic” a pesticide is, never think it is “non-toxic.” Pesticides *have* to be toxic to kill the pests. Always follow label directions when using any pesticide, but hopefully you won’t have to use any at all. Perhaps most importantly, adjust your attitude about your produce. Accept a worm or two in those tomatoes. They won’t kill you.