



ENTFACT-124

### Vendors of Microbial and Botanical Insecticides and Insect Monitoring Devices

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*Inclusion in this publication does not imply any endorsement nor does exclusion imply any criticism of suppliers or their products. Microbial (single celled) organisms are considered pesticides under current government regulations. Before using these biologicals, consult your Extension agent for information concerning legal use.*

#### Introduction

Current attitudes in the U.S. concerning food safety and environmental quality have raised the general public's interest in alternative (non-synthetic pesticide) pest controls. Although use of "natural" or "organic" insecticides appear as logical alternatives, their use is not quite as clear cut as one might expect. First, there is a difference of opinion about the definitions of what products are natural and/or organic. (Although Kentucky now has a law which defines organic for purposes of commerce.) What is called natural by one person may not be considered so by another. Additionally, some products generally considered to be natural or organic are more toxic to mammals than some synthetic insecticides. For example, nicotine has an LD<sub>50</sub> (rat oral) of 50 to 60 mg/kg (milligram of toxin per kilogram of body weight). For example, 1 mg/kg would be roughly equal to 0.00004 ounces of toxin per 2.2 pounds of body weight, or 0.0132 ounces of toxin per 150 pound person. These figures for the common synthetic pesticide Sevin is LD<sub>50</sub> (rat oral) of 246 to 283 mg/kg. (Lower LD<sub>50</sub> figures are more toxic.) The moral: answers that appear to be too simple and too good, probably are.

#### Botanical Insecticides and Insecticidal Soaps

Botanical insecticides and insecticidal soaps are promising alternatives for use in insect management. However, like conventional synthetic insecticides, botanicals and insecticidal soaps have advantages and disadvantages and should be judged accordingly. Each compound must be evaluated in terms of toxicity, effectiveness, environmental impacts and costs. Even though botanicals and insecticidal soaps are naturally derived and are relatively safe if used properly, they are poisons and should be handled with the same caution as synthetic insecticides.

What are botanical insecticides and insecticidal soaps? Botanicals are naturally occurring insecticidal compounds derived from plants. They are processed into various forms which include:

- ! preparations of crude plant material;
- ! plant extracts or resins; and
- ! pure chemicals isolated from plants.

#### Advantages

- ! **Rapid degradation** -- less persistence in environment and reduced risks to non-target organisms. May be applied shortly before harvest without leaving excessive residues.
- ! **Rapid action** -- act very quickly to stop feeding by pest insects. They may not cause death for hours or days, but they often cause immediate paralysis or cessation of feeding.
- ! **Low mammalian toxicity** -- most botanicals and insecticidal soaps have low to moderate mammalian toxicity.
- ! **Selectivity** -- in the field, their rapid degradation and action as stomach poisons make them more selective in some instances for plant-feeding pest insects and less harmful to beneficial insects.
- ! **Low toxicity to plants** -- most botanicals are not phytotoxic (toxic to plants). Insecticidal soaps and nicotine sulfate, however, may be phytotoxic to some ornamentals.

#### Disadvantages

- ! **Rapid degradation** -- this characteristic, although desirable in some respects, creates a need for more precise timing or more frequent applications.
- ! **Toxicity** -- all toxins used in pest control pose some hazard to the user and to the environment.
- ! **Cost and availability** -- botanicals tend to be more

expensive than synthetics, and some are not as widely available.

- ! **Lack of test data** -- data on effectiveness and long-term (chronic) toxicity are unavailable for some botanicals, and tolerances for some have not been established.

#### **Types of Botanical insecticides**

- ! Pyrethrum and Pyrethrins -- Pyrethrum is the powdered dried flower head of the pyrethrum daisy, *Chrysanthemum cinerariifolium*. Most of the world's pyrethrum crop is grown in Kenya. The word "pyrethrum" is the name for the crude flower dust itself, and the term "pyrethrins" refers to the six related insecticidal compounds that occur naturally in the crude material.

**Note:** Pyrethroids are not botanical insecticides. They are synthetic compounds that are based on the chemical structure. etc. of natural pyrethrins.

- ! **Rotenone** -- Rotenone occurs in the roots of *Lonchocarpus* species in South America, *Derris* species in Asia, and several other related tropical legumes. It is also used in fish management programs.
- ! **Sabadilla** -- Sabadilla is derived from the ripe seeds of *Schoenocaulon officinale*, a tropical lily plant which grows in Central and South America.
- ! **Ryania** -- Ryania comes from the woody stems of *Ryania speciosa*, a South American shrub.
- ! **Nicotine** -- Nicotine is a simple alkaloid derived from tobacco, *Nicotiana tabacum*, and other *Nicotiana* species. Insecticidal formulations generally contain nicotine in the form of 40 percent nicotine sulfate and are currently imported in small quantities from India.
- ! **Citrus Oil Extracts: Limonene and Linalool** -- Crude citrus oils and refined compounds are extracted from orange and other citrus fruit peels.
- ! **Other Essential Plant Oils: Repellents and Insecticides** -- The most common essential oils are the oils of cedar, lavender, eucalyptus, pennyroyal and citronella.
- ! **Neem** -- Neem products are derived from the neem tree, *Azadirachta indica*, that grows in arid tropical and subtropical regions on several continents. The active ingredient is both a feeding deterrent and a growth regulator.
- ! **Insecticidal Soaps** -- Insecticidal soaps generally are not considered to be botanical insecticides, although the oils from which they are produced may be of plant origin. In general terms, insecticidal soaps are made from the salts of fatty acids. Oleic acid, present in olive oil and other vegetable oils, is especially effective.

**Caution:** Homemade soap spray ."recipes" can be dangerous and harmful, calling for cleaning agents, fuel oils, polishes, solvents, and other materials that are toxic to plants and many animals (including humans).

#### **Microbial Insecticides**

Microbial insecticides are products containing microorganisms (or their byproducts) which result in insect diseases. Like botanical insecticides, they are of natural origin and have similar advantages and disadvantages. However, unlike botanicals, microbials have no effect on mammals. In fact, any given microbial will kill only a very limited group of insects.

#### **Types of Microbial insecticides**

- ! **Bacillus thuringiensis (B.t.)** -- This is probably the most common microbial "active ingredient." This organism is incorporated into several products, most of which are used to control caterpillar pests. Recently specific strains of B.t. have been selected for the ability to control mosquitos, black flies and other organisms. For example: B.t. strains 'kurstaki', 'berliner' and 'aizawai' are used for controlling larvae of many lepidoptera, while B.t. 'tenebrionis' is used against larvae of Colorado potato beetle and B.t. 'israelensis' is used to control mosquito larvae. Be sure the product you choose is labeled to control the pest you are targeting.

Additionally, while some crops have been modified to express the insecticidal protein produced by Bacillus thuringiensis these genetically altered plants are not considered in this publication.

- ! **Bacillus popilliae or B. lentimorbus** -- These microbes are used to control the larval stage (white grub) of Japanese beetle. They, too, are formulated into several different products.
- ! **Nosema locustae** -- This microscopic protozoan is used in several products to control grasshoppers.

Because of the very selective nature of microbial insecticides, users must know what pest they are after and read the label of the selected product to ensure a proper selection.

In addition to using commercial products, it often is possible to collect diseased insects in the field. By grinding and spreading this "disease," you may be able to produce your own "insecticide."

## Abbreviations Used in This Publication

### *Insect Diseases*

BTH -- *Bacillus thuringiensis*  
BP -- *Bacillus popilliae*  
BL -- *Bacillus lentimorbus*  
NL -- *Nosema locustae*

### *"Natural" Insecticides*

SP -- Soaps  
OL -- Oils  
SB -- Sabadilla  
RT- Rotenone  
PY-- Pyrethrum  
NS -- Nicotine Sulfate  
RY- Ryania

### *Traps*

PT -- Pheromone Traps  
FT -- Food Traps  
RS -- Red Spheres (apple mimic)  
YST -- Yellow Sticky Traps

### *Collecting Equipment*

SU -- Sticky Stuff for replenishing sticky traps  
SN -- Sweep Nets  
MA -- Magnifying Device  
WMD -- Weather Monitoring Device  
SD -- Saving Device ( live trap )

The caterpillar larval bacterium *Bacillus thuringiensis* is available through many retail and wholesale concerns under various brand names.

**Note:** Many vendors listed in this publication also are listed in: Johnson, D.W. 1998. *Vendors of Beneficial Organisms in North America*. ENTFACT-125. University of Kentucky College of Agriculture Cooperative Extension Service.

These two publications in conjunction with the appropriate publication listing synthetic insecticides for your crop will give you the widest possible range of insect control tactics.

## *Retail and Wholesale Suppliers*

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### **AgriSense**

4230 West Swift, Suite 106  
Fresno, CA 93722  
(209) 276-7037  
Traps: PT, YST, FT

### **Applied Bionomics**

P.O. Box 2637  
Sidney, B.C.  
Canada, V8L 4C1  
(604)656-2123  
Traps: PT, YST  
Collecting Equipment: SU, MD

### **Beneficial Insectary**

245 Oak Run Road  
Oak Run, CA 96069  
(916) 472-3715  
Insect Diseases: BTH,NL

### **Burpee Seed Company**

300 Park Avenue  
Warminster, Pa 18974  
(215) 674-4900  
Insect Diseases: BP  
"Natural" Insecticides: SP, OL, RT  
Traps: PT

### **Fairfax Biological Laboratories, Inc.**

Clinton Corners, NY 12514  
(914) 266-3705  
Insect Diseases: BP, BL

### **Foothill Ag Research, Inc.**

510 W. Chase Drive  
Corona, CA 91720  
(714) 371-0220  
Traps: PT, YST

### **GARDENS ALIVE! National Gardening Res. Cen.**

Hwy 48 -- P.O. Box 149  
Sunman, IN 4704 1  
(812) 68-3800  
Insect Diseases: BTH, BP, NL  
"Natural" Insecticides: SP, SB, RT, RY, PY, NS, OL  
Traps: PT, RS, YST  
Collecting Equipment: SU

### **Great Lakes IPM**

10220 Church Road NE  
Vestaburg, MI 48891  
(517) 268-5693  
Traps: PT, FT, RS, YST  
Collecting Equipment: SU, SN, MA, WMD, SD

**Harmony Farm Supply**

P.O. Box 460  
Graton, CA 95444  
(707) 823-9125  
Insect Diseases: BTH, NL  
"Natural" Insecticides: PY, RT, RY, SB, SP, OL  
Traps: PT  
Collecting Equipment: SU, MA, WMD

**Hydro-Gardens, Inc.**

P.O. Box 9707  
Colorado Springs, CO 80932  
(303) 893-3618  
Insect Diseases: NL  
Traps: YST  
Collecting Equipment: MA, SU, WMD

**IPM Laboratories, Inc.**

Main Street  
Locke, NY 13092-0099  
(315) 497-3129  
Traps: YST

**Koppert System c/o Gerharts**

P.O. Box 146  
North Ridgeville, OH 44039  
Traps: PT, YST

**Kunafin Trichogramma Insectaries**

Route 1, P.O. Box 39  
Quemado, TX 78877  
(512) 773-0149  
Traps: PT, YST

**National Gypsy Moth Management Group**

RD 1, Box 715  
Landisburg, PA 17040  
(717) 789-3434  
Insect Diseases: BT  
Traps: PT

**Nature's Control**

P.O. Box 35  
Medford, OR 97501  
(503) 899-8318  
"Natural" Insecticides: SP  
Traps: YST  
Collecting Equipment: MA

**Necessary Trading Co.**

P.O. Box 603  
New Castle, VA 24127  
(703)864-5103  
Insect Diseases: BTH  
"Natural" Insecticides: SB, RT, RY, SP, PY  
Traps: PT, RS, YST  
Collecting Equipment: SU

**Organic Pest Management Consultant**

P.O. Box 55267  
Seattle, WA 98155  
(206) 367-0707  
Insect Diseases: BTH, BP  
"Natural" Insecticides: OL, RT, PY, RY  
Traps: PT, YST

**Rincon-Vitova**

Insectaries, Inc.  
P.O. Box 95  
Oak View, CA 93022  
(805) 643-5407  
Traps: PT

**Ringer Corporation**

9959 Valley View Rd.  
Minneapolis, Minn. 55304  
(612) 941-4180  
Insect Diseases: BP, NL, BTH  
"Natural" Insecticides: SP, PY  
Traps: PT

**Trece, Inc.**

P.O. Box 6278  
Salinas, CA 93912  
(408) 758-0204  
Traps: PT, FT, RS, YST  
Collecting Equipment: SD

**West Coast Ladybug Sales**

P.O. Box 903  
Gridley, CA 95948  
(916) 534-0840  
Insect Diseases: BTH, NL

**Urban Insect Solutions**

1420 Jandymar Court  
Lexington, KY 40517  
Dr. Chris Christensen  
(859) 273-3747  
Traps: PT, YST