

The IPM Practitioner

Monitoring the Field of Pest Management

Volume XXIII, Number 11/12, November/December 2001

2002 Directory of Least-Toxic Pest Control Products

The 2002 Directory is a gateway to more than two thousand useful pest control items (for Quick Access see Box A on page 2 and the Index on page 38). Many of these products, services, or beneficial organisms have come to our attention in connection with articles published in BIRC's *IPM Practitioner* or the *Common Sense Pest Control Quarterly*, through IPM programs designed by our staff, or via recommendations from colleagues.

This Directory is unique because it is compiled by IPM technical experts, includes specific product descriptions, and is organized in concert with the IPM decision-making process (see *The IPM Practitioner* 13(11/12):1-9). All information is current, and is constantly updated on BIRC's computerized database system. It is divided into four management sections: Insects, Plant Disease, Vertebrates, and Weeds. Within each section, information is listed in alphabetical order by specific pest grouping. The IPM decision-making steps used to organize individual pest listings include Identification & Monitoring plus a consideration of Physical, Horticultural, Biological, and Least-Toxic Chemical Control methods.

For each product, specific descriptions are included when applicable, followed by the company name and the product name when available (in parentheses). Addresses and phone numbers of manufacturers and suppliers are listed alphabetically by company name at the end of the Directory. An Index to the Directory follows the List of Addresses.

Feedback and Disclaimer

Two caveats apply to this information. First, to the best of our knowledge, these products, services, and beneficials are effective and are produced by



Photo courtesy of the USDA

Shown here is the big-eyed bug, *Geocoris punctipes*, a predator of aphids, lygus bugs, caterpillars, mites, and a number of other arthropod plant pests. Sources for this insect and many other least-toxic or non-toxic pest control products can be found in this Directory.

reputable companies. However, they are used at your own risk, and BIRC makes no guarantees or warranties regarding any listing. To help us maintain quality control, we encourage you to contact us about your experiences, both positive and negative, with any of these companies or resources.

Secondly, all information was current at press time. However, pest control is a rapidly changing field: products come and go, and companies change hands and locations on a regular basis. Therefore, if you fail to reach any of the companies listed here, contact us at PO Box 7414, Berkeley, CA 94707; 510/524-2567.

Beneficial Insects

Both domestic and international producers of beneficials found in the Directory are listed by alphabetical order in the List of Addresses at the end of the

Directory. Names and addresses of Biobest distributors are listed separately in Box B at the beginning of the List of Addresses, and Koppert distributors are listed in Box C.

To obtain speedy delivery and receive advice from experienced sources, we recommend that you order directly from pro-

Acknowledgment

The *IPM Practitioner* would like to thank all the companies who supplied us with information, the National Biological Control Institute for a grant to help with production (see page 37), the generous support of BIRC members, our advertisers, and William Quarles and Jennifer Bates who did all the clerical and production work on this issue.

The IPM Practitioner

Monitoring the Field of Pest Management

The *IPM Practitioner* is published ten times per year by the **Bio-Integral Resource Center (BIRC)**, a non-profit corporation undertaking research and education in integrated pest management.

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Manuscripts

The IPMP welcomes accounts of IPM for any pest situation. Write for details on format for manuscripts.

Citations

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Subscriptions/Memberships

A subscription to the IPMP is one of the benefits of membership in BIRC. We also answer pest management questions for our members and help them search for information. Memberships are \$60/yr (institutions/libraries/businesses); \$35/yr (individuals). Canadian subscribers add \$15 postage. All other foreign subscribers add \$25 airmail postage. A Dual membership, which includes a combined subscription to both the *IPMP* and the *Common Sense Pest Control Quarterly*, costs \$85/yr (institutions); \$55/yr (individuals). Government purchase orders accepted. Donations to BIRC are tax-deductible. FEI# 94-2554036.

Change of Address

When writing to request a change of address, please send a copy of a recent address label.

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ducers. Most of the producers listed rear at least one beneficial, but may distribute organisms produced by other companies.

Some producers may refer you to a distributor for small quantities.

Whether the company is a producer or a distributor can be determined when a company representative is contacted. Since space limitations preclude listing all retail distributors of beneficial insects, only a select few are included.

International Orders of Beneficials.

U.S. purchasers of natural enemies from Canada or other foreign countries must secure an import permit prior to ordering. Permit form #526 (for Canada) and forms for importing from other countries are available from: USDA-PPQ/APHIS, Federal Center Bldg., Hyattsville, MD 20782. Canadians purchasing from U.S. producers need form #720, available from: Agriculture Canada, PPQD, Permit Office, Ottawa K1A 0C6.

Quantities of Beneficials. Questions about quantities to order, timing, and procedures for releasing the natural enemies can be answered by the producers. BIRC members/subscribers can also obtain advice from our technical staff. When making inquiries, please specify pest species, approximate number of plants (e.g., acreage, bench space, etc.), estimate of numbers of pests (e.g., number per sample leaf or percent of crop infested), and life stage of pest (adult, larva, etc.).

Instructions for Beneficials. Most producers send instructions for releasing beneficial insects. However, these organisms are most effective when used within a full IPM program. Send for BIRC's Publications Catalog for a listing of 'how-to' articles on incorporating biological control organisms within IPM programs for specific pests.

Box A. Quick Access

If you are looking for a specific item, see the Index on pages 38 and 39. To find a remedy for your pest problem, look in one of the four major sections according to whether the pest is an insect (arthropod), plant disease pathogen, vertebrate, or a weed. Except for the weed section, pests are listed by alphabetical order in each of the major categories. When you have found the pest listing, there are separate sections for Identification and Monitoring, and for Physical, Horticultural, Biological, or Least-Toxic Chemical Controls. For instance, to find a parasitoid to control aphids, look in the Insect Management section under Aphids, then under Biological Controls, then under Parasitoids. To find a trap for a raccoon, look in the Vertebrate section under Raccoons, then under Physical Controls until you find a listing of traps. Brand name items are enclosed in parentheses, and are attached to a series of suppliers. The first supplier on the list is the manufacturer.

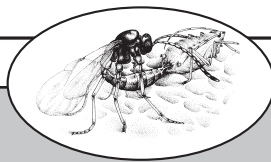
If the product you are seeking is not in the Index, you must know how the product is used, and for which pests, in order to immediately find the listing. If the item you are

seeking is hard to categorize, each of the four main divisions has a Miscellaneous section. If you are looking for a specific item such as insecticidal soap, diatomaceous earth, or silica gel, and do not know which pest category you should look at, browse major pest sections such as Ants and Aphids first, then browse Miscellaneous.

Beneficials

To find beneficial insects or arthropods, look first in the Index. If there is no listing in the Index, find the appropriate major section, then the alphabetical listing of the pest you are trying to control. When you have found the pest listing, then look under **Biological Controls**. Parasitoids available to fight your pest are listed first, followed by effective predators. **Beneficials are listed in alphabetical order by scientific name.**

A list of suppliers follows every item in the Directory. To find the addresses and phone numbers for the suppliers listed, look up each supplier by alphabetical order in the List of Addresses at the end of the Directory.



INSECT MANAGEMENT

ANTS

Physical Controls

High Performance Vacuum:

Proteam (L'il Hummer, Optimus)

Heat Treatment (carpenter ants):

TPE/Thermapure (Call for local practitioners)

Sticky Barrier:

Tanglefoot, Planet Natural, Charley's, Gardens Alive!, Great Lakes, Harmony, • Peaceful Valley • Phero Tech (Stikem Special)

Solar-powered Ant Trap (for fire ants):

Heitman Labs (Solar Ant Charmer)

Teflon Barrier:

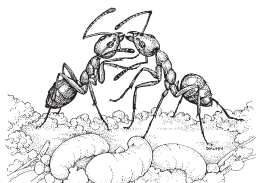
Check local hardware store in plumbing supplies

Pet Bowls with Barriers:

Alternative Control (Fool-A-Bug)

Tree Wrap:

Olson (Stiky Tree Guards) • Peaceful Valley



Biological Controls

Insect-Attacking Nematodes:

Mixture of species (for fire ant): Gulf Coast

Parasitic Mites:

Pymotes tritici: (for fire ant): ARBICO • Biofac • Praxis

Least-Toxic Chemical Controls

Abamectin Bait (for fire ants):

Whitmire, Planet Natural (Ascend)

Abamectin Bait (for carpenter and household ants): Whitmire (Advance)

Fenoxycarb Bait (for fire ants):

Syngenta (Award, Logic)

Hydramethylnon Bait (for fire ants):

TopPro (Amdro) • Clorox (Maxforce)

Methoprene Bait (for fire ants): Wellmark (Extinguish)

Methoprene Bait (for Pharoah ant): Wellmark (Pharorid)

Pyriproxifen Bait (for fire ant): Valent USA (Distance)

Spinosad Bait (for fire ant): Dow (Conserve)



Botanical Sprays:

Woodstream (Mint Oil) • EcoSmart (herbal extracts) • Orange Guard (Orange Oil) • Kinzua (Orange Oil) • Insecto (Pine oil for fire ants)

Borate-Based Insecticides:

Waterbury (Mop-Up) • Whitmire (PT 240D Perma-Dust) • Waterbury, Planet Natural (Borid) • NISUS (Nibor)

Borate liquid ant baits (1%):

Waterbury, Gardener's Supply, Harmony (Drax) • Peaceful Valley • Woodstream (Victor) • JT Eaton (Dr. Moss) • Whitmire • Innovative

Ant Cafe for Liquid Baits:

Innovative Products

Borate liquid bait (5%): Senoret, Harmony (Terro) • Roxide (Roxo)

Borate gel bait: Blue Diamond (ProJoeS, 4.5% DOT) • Innovative (Gourmet, 6% DOT) • A Safe (Uncle Albert's, 5% DOT)

Borate granular ant bait: NISUS, Target (Niban, Niban FG)

Borate granular fire ant bait (18% boric acid):

Bushwhacker

Borate rods (for carpenter ants):

Pole Care (Impel Rods)

Borate-treated lumber (for carpenter ants):

Roy O. Martin • Osmose • Louisiana Pacific

Borate treatments (for carpenter ants):

NISUS, Target, Vopak (Bora-Care) • Permashink (Guardian, Shellguard) • Sashco (Penetreat) • NISUS (TimBor)

Diatomaceous Earth (DE) (ants, crawling insects, stored products. Permaguard, Diafil, Crop Guard, Protect-It, and Dryacide are for stored products use. Baited DE and DE with pyrethrin is used for crawling insects such as ants, roaches, and others):

Celite (100% freshwater DE, Diafil) • Eagle Picher (100% freshwater DE, Crop Guard, All Gone) • Hedley (90% Marine DE and 10% silica gel, Protect-It) • Natural Insecto, Natural Insect Control (90% marine DE, 10% food bait, Insecto) • Dryacide (97% freshwater DE and 3% silica gel) • Permaguard, Nitron, Pristine (100% freshwater DE, Permaguard) • Intagra, Necessary (Concern) • Harmony • Nature's Control • Peaceful Valley • JT Eaton (Answer) • Gardener's Supply

With pyrethrin (fire ant):

Permaguard, Pristine, Nitron (Permaguard Household) • Necessary (Concern) • Gardens Alive • Organic Solutions

Hydramethylnon Bait Station and Granular Bait:

Clorox Company (Maxforce, Combat)

Fipronil Bait Station:

Clorox Company (Maxforce)

Integrated Perimeter Bait Station:

B & G (Perimeter Patrol) • Maxforce • Whitmire (ACE)

Sulfuramid Bait Stations:

FMC (Fluor-Gard) • Whitmire (Pro-Control) • S.C. Johnson (Raid Max)



Insecticidal Soap:

Woodstream, Planet Natural, Gardens Alive!, Harmony, Nitron, Johnny's, Smith & Hawken, Peaceful Valley, Charley's (Safer Insecticidal Soap)

With pyrethrin:

Woodstream, Harmony, Planet Natural (Safer Yard and Garden, Safer Tomato and Vegetable)

Pyrethrin:

Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Hess & Clark (microencapsulated, Capsul-Ban) • Hess & Clark (Formula 66, LD 44Z) • AgrEvo (Kicker) • Peaceful Valley (w/o PBO, Py-Rin) • Monterey (Bug Buster O, w/o PBO)

Repellent Garlic Spray:

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Harmony • Peaceful Valley • Soil Technologies (Garlic Gard) • Ecosci (Enviropeel)

Silica Aerogel:

100% Pure:

Cabot (Cab-O-Sil) (Must order 10 pound minimum) • Degussa (Wessalon S., Aerosil 380) (Must order 25 pound minimum)

With pyrethrin:

AgrEvo, Target (Drione) • Whitmire, Purity Products (PT 239 Tri-Die) • Vopak

APHIDS

Identification & Monitoring

Monitoring Traps:

Gardens Alive!, Great Lakes, Olson, Gemplers, Trécé (Pherocon) • Consep, Harmony, Gemplers • Natural Insect Control • Peaceful Valley • Phero Tech

Physical Controls

Barriers & Exclusion Devices:

Gardens Alive! • Planet Natural

High Pressure Sprayer:

W.H. Vinton (Water Wand)

Reflective mulch:

Mipco

Row Covers:

American Agrifabrics (AgGro) • Gardener's Supply • Gardens Alive! (Super-Light) • Great Lakes (BBA) • Harmony (Harvest Guard, Tufbell) • Peaceful Valley (Tufbell, AgGro) • Shepherd's (AgGro) • Mipco • BBA • Natural Insect Control

Screening:

Green-Tek • Hydro-Gardens (Fly Barr) • Tipper, Harmony, Peaceful Valley (Tie-Net)

Sticky Adhesive:

Seabright, Charley's, Great Lakes, Harmony, Phero Tech, (Stickem Special) • ARBICO, Planet Natural, Great Lakes, Harmony, Natural Insect Control, Gemplers, Tanglefoot (Tangle-Trap) • Peaceful Valley

Sticky Trap/Tape:

ARBICO • Gardens Alive • Great Lakes, Olson, Gemplers (Yellow Sticky Traps & Tapes) • Seabright (Sticky Traps) • Phero Tech • Great Lakes, ARBICO, Planet Natural, Gemplers (Versagard) • Peaceful Valley • Harmony • Springstar • Nature's Control • Woodstream

Traps:

ARBICO • Planet Natural • Gardens Alive! • Great Lakes • Harmony • IPM Labs • Natural Insect Control • Gemplers • Peaceful Valley • The Green Spot • Olson • Phero Tech

Biological Controls

Habitat:

Earwig Shelter: Biotechnik

Beneficial Seed Blend (for plants that attract beneficial insects:

Harmony • Peaceful Valley • Lohse Mill • Rincon-Vitova • Cornflower Container-grown beneficial plants: Cornflower

Attractant for lady beetles:

Woodstream, Harmony, Santa Cruz Hort, ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (SureFire) • The Green Spot (Ladybug lure) • Springstar

Microbial Insecticides:

Beauveria bassiana (fungus for aphid control): Troy, Gardener's Supply, Hydrogardens (Naturalis O, L, ES) • Emerald (Mycotrol, Botanigard)

Paecilomyces sp. (fungus for aphid control): Bio Pré • HydroGardens •

BioBest • Certis

Verticillium lecanii (fungus for greenhouse use):

Koppert (Mycotal, Vertalec)

Parasitoids:

Aphelinus abdominalis: BioBest • Duclos • Koppert • Natural Insect Control • Praxis • Rincon Vitova

Aphidius colemani: (for cotton aphid): Biological Control • BioBest • BioBest Canada • Syngenta Bioline • International Technology • IPM Labs • Koppert • Natural Insect Control • Plant Sciences • W. Neudorff • The Green Spot • BioBee • Martin Grima • Rincon Vitova • Garta • Florikan • Katz

Aphidius ervi (for potato aphid): Bio Pre • BioBest • BioBest Canada • Koppert • W. Neudorff • IPM Labs • Natural Insect Control • Garta

Aphidius matricariae: Applied Bionomics • Evergreen • Syngenta Bioline • Gartneri • IPM Labs • Koppert • Natural Pest Control • Nature's Control • Praxis • W. Neudorff • The Green Spot • Rincon Vitova

Aphidius sp.: Biological Crop • The Green Spot

Diaeretiella rapae: ARBICO • Praxis

Episyrphus balteatus: Flora • Katz

Lysiphlebus testaceipes: Praxis • Bioplanet • Flora • Katz

Praon myzophagum: Biowise

Trioxys pallidus (for walnut aphid): Praxis

Predators:

aphid midge, *Aphidoletes aphidimyza*: ARBICO • Applied Bionomics • BioBest • Biological Crop • Bio Pre • Evergreen • Planet Natural • Budai • Syngenta Bioline • Biowise • Gartneri • Hydro-Gardens • International Technology • IPM Labs • Koppert • Natural Insect Control • Natural Pest Control • Nature's Control • Peaceful Valley • Plant Sciences • Praxis • Rincon-Vitova • Sautter & Stepper • The Green Spot • W. Neudorff • Flora • EcoSolutions • BioBee • Katz

Lacewings:

Chrysoperla carnea or *Chrysopa carnea*: A-1 Unique • Bio Ag • Biological Crop • Bioplanet • Bowen • The Green Spot • Gartneri • Gardens Alive • Koppert • Kuida • Natural Insect Control • Natural Pest Controls • Organic Control • Peaceful Valley • Praxis • Rincon-Vitova • Sautter & Stepper • W. Neudorff • American Insectaries • Katz

Chrysoperla rufilabris or *Chrysopa rufilabris*: ARBICO • Bio Ag • Biofac • Bowen • Planet Natural • IPM Labs • Kuida • M & R Durango • Natural Insect Control • Nature's Control • Peaceful Valley • Praxis • Rincon-Vitova • Western Farm • The Green Spot • American Insectaries

Chrysoperla spp.: Beneficial Insectary • International Technology • Kunafin • Smith & Hawken • Flora • Buena

Mallada signata: Bugs for Bugs

Lady beetles:

Convergent lady beetle, *Hippodamia convergens*: A-1 Unique • ARBICO • Bio Ag • Biofac • Bowen • Buena • Evergreen • Planet Natural • Gardens Alive • Hydro-Gardens • International Technology • IPM Labs • Koppert • Kunafin • M & R Durango • Natural Insect Control • Natural Pest Controls • Nature's Control • Peaceful Valley • Praxis • Rincon-Vitova • Smith & Hawken • The Green Spot • The Ladybug Company • Ladybug Farms • Western Farm • EcoSolutions

Lady beetle, *Coleomegilla maculata*: IPM Labs • Florikan • Natural Insect Control

Lady beetle, *Propylea quatuordecimpunctata*: Praxis
Lady beetle, *Harmonia axyridis*: Biobest, Koppert, Applied Bionomics,
Rincon Vitova, The Green Spot, Evergreen, Bioplanet
Lady beetle, *Adalia bipunctata*: Andermatt

Predatory bugs:

Big-eyed bug, *Geocoris punctipes*: Biofac • Biotactics • Rincon Vitova
• Natural Insect Control

Insidious flower bug, *Orius insidiosus*: IPM Labs • Syngenta Bioline •
Gartnerei • Nature's Control • Rincon Vitova • Katz • Flora

Orius laevigatus: Bioplanet

Orius spp.: Biobest • Duclos • Natural Insect Control • Peaceful Valley
• Syngenta Bioline

Minute pirate bug, *Orius tristicolor*: ARBICO • Planet Natural • Praxis
Mirid bug, *Deraeocoris brevis*: Applied Bionomics

Least-Toxic Chemical Controls

Cinnamic Aldehyde:

Emerald, Peaceful Valley (Cinnamite)

Cinnamon Oil, Garlic, Cottonseed Oil:

JH BioTech, Harmony (GC-Mite)

Aphid Alarm Pheromone:

Springstar

Diatomaceous Earth: See Ants

Insect Growth Regulators:

Wellmark (Enstar)

Insecticidal Oil:

Highly refined oil (from fish):

Peaceful Valley

Highly refined oil (from petroleum):

Monterey, Harmony (Saf-T-Side) • Valent USA, Harmony, Peaceful
Valley (Volck) • Sun, Gardens Alive!, Harmony, Peaceful Valley,
Charley's (Sunspray) • PBI/Gordon (Acme) • The Green Spot •
Florikan (Target Oil) • Gardens Alive (Eco-Oil) • JMS (JMS Stylet Oil)

Highly refined oil (from plants):

Stoller, Peaceful Valley (Natur'l Oil 93% soybean) • ARBICO
(Spreadall 93% cottonseed) • Gardens Alive • Harmony (EcoErase)

Insecticidal Soap:

Harmony (M-Pede) • Agricola El Sol (ACT-92) • Intagra, Necessary
(Concern) • Woodstream (Safer Rose and Flower, Insecticidal Soap,
Fruit and Vegetable) • Peaceful Valley • Shepherd's • The Green Spot

With pyrethrin:

Intagra, Necessary (Concern) • Woodstream, Gardens Alive!, Harmony,
Nitron (Safer Yard and Garden, Tomato and Vegetable) • Peaceful
Valley

Neem Products:

Certis, Intagra, Harmony (Azatin) • Woodstream, Harmony, Peaceful
Valley (Safer's BioNeem, Japanese Beetle Repellent) • Certis, Planet
Natural, Peaceful Valley, Harmony (Neemix, Trilogy) • Green Light •
San Jacinto (Organica)

Pyrethrin:

Johnny's, Peaceful Valley (Pyrenone) • AgrEvo (Kicker) • Whitmire
(microencapsulated PT-175 MicroCare, PT 565, PT 505) • Hess &
Clark (microencapsulated, Capsul-Ban, Formula 66, LD-44Z) •
Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug-Buster
O, w/o PBO) • Intagra, Necessary (Concern) • PBI/Gordon (Garden
Guard, Pyrethrin Dust)

Pyrethrin and Oil:

Gardens Alive (Pyola) • Harmony (Pyola)

Pyrethrin, rotenone, copper, sulfur:

Bonide, Gardener's Supply (Bonide Garden Dust)

Pyrethrum Powder:

Planet Natural • Peaceful Valley • Nichols Garden

Repellent Garlic Spray:

Garlic Research Labs, Chemical-Free, Planet Natural, (Garlic Barrier)
• Soil Technologies (Garlic Gard) • The Green Spot • Vegetable Juices
(Pure Garlic Oil) • JH Biotech • Harmony

Repellent Mustard Oil:

Soil Technologies

Repellent Hot Pepper Wax:

Charley's • Harmony (Wilder's) • The Green Spot • Garden City

Sabadilla Powder:

Gardens Alive! • Dunhill, Harmony, Peaceful Valley (Veratran) •
Nichols Garden

BEEES

(See Yellow Jackets)

BEETLES

(Crop and Stored Product Pests)

Identification & Monitoring

Attractant for Cucumber Beetle:

Sigma Chemical (eugenol) • Trécé (CIDE-
TRAK CRW)

Pheromones & Traps:

For agricultural & horticultural insects:

Woodstream, Gardens Alive! (Safer
Japanese Beetle Trap, Surefire) • Gemplers, Great
Lakes, Phero Tech (Wing Trap I and II, Unitrap, Delta Traps) • Scentry,
Gemplers, Great Lakes, ARBICO, Planet Natural (Scentry) • Phero
Tech (Phero Tech Lures) • Scentry, Great Lakes, ARBICO, Planet
Natural, Gemplers, Natural Insect Control (Delta & Wing Trap) • Trécé,
Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Harmony
(Catch-em) • Suterra, ARBICO, Insects Ltd., Great Lakes, Intagra,
Santa Cruz Hort, Harmony, Gemplers (BioLure) • Hercon, Great Lakes
(Luretape) • Tomagro (TomaAttract)

For forestry insects:

Phero Tech (Phero Tech Lures)

For Japanese beetle:

Trécé, Gardens Alive, Great Lakes, Olson, Harmony • Phero Tech •
Woodstream, Harmony, Great Lakes(Safer) • Tanglefoot • Springstar

For pepper weevil:

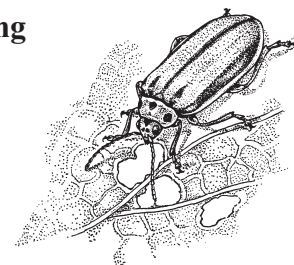
Trécé, Gardens Alive, Great Lakes, Olson, Harmony (Pherocon PEW)

For stored product insects:

Great Lakes (Trappit Insect Probe) • Verdant, Santa Cruz Hort,
ARBICO, Great Lakes, Necessary, Gemplers (Safer) • Trécé, Gardens
Alive, Great Lakes, Olson, Harmony, Gemplers (Storgard, WB Probe II
for weevils) • Trécé (Dome for confused flour beetle) • Trécé (Dome
for cigarette beetle) (Sanitrap for cigarette beetle)

Physical Controls

Controlled Atmosphere System (for stored grains):



The Aerogen • Air Products (Prism System)

Row Covers:

American Agrifabrics (AgGro) • Great Lakes (BBA) • Gardener's Supply, Necessary, Gardens Alive! (Floating Row Covers) • Gardens Alive! (Super-Light Insect Barrier) • Harmony (Harvest Guard, Tufbell) • Peaceful Valley (Tufbell, AgGro) • Mipco

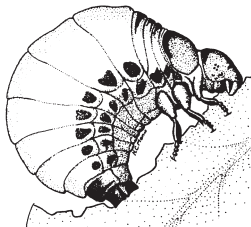
Spiked lawn aerator sandals

(for white grub control):

Gardener's Supply • Planet Natural

Traps and Sticky Tape:

Sterling Intl. (Japanese Beetle Trap)
• Phero Tech (Chroma) • Scentry,
Great Lakes, ARBICO, Planet Natural,
Gemplers (Scentry) • Peaceful Valley



Biological Controls

Attractant for soldier bugs that attack pest beetles:

Sterling Intl., Planet Natural, Natural Insect Control (Rescue!)

Seed mix to attract beneficial insects:

Lohse, Harmony, Peaceful Valley, Rincon-Vitova

Syringe for nematode injection (for borers):

 Gardens Alive

Insect-Attacking Nematodes:

Heterorhabditis bacteriophora: BioLogic • IPM Labs • Integrated Biocontrol • Natural Insect Control • Plant Health Care • Koppert
Heterorhabditis megidis: Andermatt • Biological Crop • Biobest • International Technology • W. Neudorff • Plant Sciences
Heterorhabditis spp.: Syngenta Bioline • Biowise • Hydro-Gardens • M & R Durango • Natural Insect Control • Nature's Control • Nematec • W. Neudorff • Peaceful Valley
Heterorhabditis marelatus: Evergreen

Steinernema carpocapsae: Biological Crop • Biofac • BioLogic • Certis • Planet Natural • Gardens Alive! • Hydro-Gardens • IPM Labs • M & R Durango • Natural Insect Control • Peaceful Valley
Steinernema feltiae: BioLogic • Certis • International Technology • IPM Labs • Koppert • Natural Insect Control • W. Neudorff
Steinernema feltiae and *Heterorhabditis* sp. (mix): North Country
Steinernema riobravisi: Certis • Harmony

Microbial Insecticides:

Bacillus thuringiensis (BT) for beetle larvae:

Bonide, Gardener's Supply (Bonide) • Johnny's, Harmony (Colorado Potato Beetle Beater) • Ecogen (Raven, Foil) • Plant Health Care

Bacillus thuringiensis tenebrionis (BTT):

Valent USA (Novodor) • Gardens Alive (Potato Shield)

Bacillus popilliae (milky spore disease):

St. Gabriel, Gardener's Supply, North Country (Milky Spore)

Beauveria brongniartii (fungus for Melolontha):

Andermatt

Beauveria bassiana (fungus for grubs):

Troy, Hydrogardens, Planet Natural, Gardener's Supply (Naturalis T)

Insecticidal oil spreader-sticker used with BT:

Monterey (Nature's Own)

Parasitoids:

Anaphes spp. (for cereal leaf beetle): Rincon-Vitova
Anisopteromalus calandrae (stored product beetles): ARBICO • Biofac • Praxis
Bathyplectes curculionis (for alfalfa weevil): Praxis
Cephalonomia waterstoni (for rusty grain beetle): Praxis
Catalaccus grandis (for boll weevil): Rincon-Vitova
Catalaccus hunteri (for pepper weevil): Rincon-Vitova
Edovum puttleri (for Mexican bean, CO potato beetle): Praxis

Lemophagus crioceritor (for asparagus beetle): Praxis

Meigenia mutabilis (for alfalfa weevil): Praxis

Microctonus spp. (for alfalfa weevil): Praxis

Pediobius foveolatus (for Mexican bean beetle): ARBICO • Praxis • IPM Labs

Tetrastichus asparagi (for asparagus beetle): Praxis

Tetrastichus julis (for cereal leaf beetle): Praxis

Predators:

spined soldier bug, *Podisus maculiventris* (for CO potato beetle): ARBICO • Bug Factory • Rincon-Vitova
warehouse pirate bug, *Xylocoris flavipes* (for stored product beetles): ARBICO • Biofac • Praxis

Least-Toxic Chemical Controls

Baits (cucurbitacin, with carbaryl for cucumber beetle or corn rootworm):

MicroFlo (Adios, Slam)

Borate-Based Insecticides:

Whitmire (PT 240D) • Nisus (Niban, Niban FG)

Diatomaceous Earth: See ANTS

Epazote (*Chenopodium ambrosioides*)

for protection against stored product beetles:

Nichols Garden • J.L. Hudson

Garlic Repellents:

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Soil Technologies (Garlic Gard) • Harmony (Guardian) • Vegetable Juices (pure garlic oil)

Mustard Repellent:

Soil Technologies

Insect Growth Regulators (for beetle grubs):

Bayer Agricultural (halofenzimide, Mach-2)

Insecticidal Soap (for flea beetle):

Intagra (Concern) • Woodstream (Safer) • Peaceful Valley

With pyrethrin:

Intagra (Concern Multi-Purpose), Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard and Garden) • Peaceful Valley

Neem Products:

Certis, Planet Natural (Azatin) • Woodstream, Harmony, Gardener's Supply, Peaceful Valley, The Natural Gardening (Surefire Japanese Beetle Repellent) • Woodstream, Harmony, Peaceful Valley (Safer's BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • Gardens Alive (Neem-Away) • Green Light, Harmony (Rose Defense) • San Jacinto (Organica)

Nicotine Analog (for beetle grubs):

Bayer Agricultural (imidacloprid, Admire)

Pyrethrin:

Roxide • Whitmire (microencapsulated PT-175 MicroCare, PT 565, PT 505) • Johnny's, Peaceful Valley (Pyrenone) • Hess & Clark (microencapsulated, Capsul-Ban, Formula 66, LD-44Z) • AgrEvo (Kicker) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster O, w/o PBO)

Pyrethrin, rotenone, copper, sulfur:

Bonide, Gardener's Supply (Bonide Garden Dust)

Pyrethrum Powder:

Nichols Garden • Harmony • Peaceful Valley

Rotenone:

Bonide • Peaceful Valley

Sabadilla:

Dunhill, Harmony (Veratran) • Peaceful Valley

Silica Aerogel: See ANTS



Spinosad Microbial Isolate (leaf beetles):
Dow Agro (Conserve)

BEETLES

(Structural Pests)

Identification & Monitoring

Trained Dogs (for detection):
Industrial Narcotic • Beacon Dogs

Physical Controls

Cold Treatment (liquid nitrogen):
Tallon Pest Control (The Blizzard System)

Electrical Treatment (for drywood termite & boring beetles):
ETEX (Electrogun)

Heat Treatment:
TPE/Thermapure (Call for local practitioners) • In Denmark (AS Skadedyrcentralen) • In England (Thermo Lignum) • Topp (Heaters)

Microwave Treatment:
Bio-Integral Resource Center (Call for local referrals)

Microwave Equipment:
Wavelength • Professional Equipment

Least-Toxic Chemical Controls

Borate Rods:
Pole Care, Nisus (Impel Rods)

Borate Termiticide & Wood Preservative:
NISUS, Target, Vopak (Bora-Care) • Permachink (Guardian, Shellguard) • Sashco (Penetreat) • NISUS (TimBor)

Borate Treated Lumber and Building Material:
Roy O. Martin • Gross and James (cross ties) • Osmose • Louisiana Pacific

Borate Treated Logs:
Appalachian • Coast-to-Coast • Lok-N-Logs

BLACKFLY

(See Mosquitoes)

BORERS

(See Beetles)

BUGS

(Hemipterans)

Identification & Monitoring

Pheromones & Traps:
Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Phero Tech • Peaceful Valley

Physical Controls

Screening:
Tipper, Harmony, Peaceful Valley (Tie-Net)

Row Covers:
American Agrifabrics (AgGro) • Great Lakes (BBA) • Gardens Alive (Super-Light) • Gardener's Supply, Gardens Alive (Floating Row Covers) • Harmony (Tufbell, Harvest Guard) • Peaceful Valley (Tufbell, AgGro) • Mipco • Gemplers • Shepherd's

Vacuum:
BioQuip • D-VAC • Proteam (Hummer, Optimus, inside use)

Horticultural Controls

Beneficial Seeds and Plants:
Cornflower • Harmony • Lohse Mill

Insect-Resistant Turfgrass:

Endophytic Ryegrass (repels billbugs & caterpillars):
Lofts Seed (Repell, Repell II, Yorktown III, Palmer II, Prelude II) • Turf Seed (Citation II, Birdie II, Omega II, CBS II, Manhattan II, Charger, Quickstart, 246 Sunrye) • Turf Seed (Sunrye) • Gardens Alive (Turf-Alive) • Turf Seed (Citation III, Bright Star, Catalina, Navajo, Road Runner)

Endophytic tall fescue (repels billbugs):
Turf Seed (Apache, Tomahawk) • Lofts Seed (Jamestown II, Reliant)

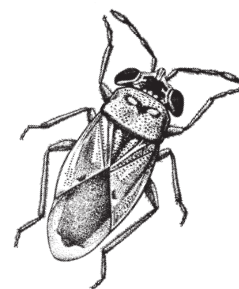
Biological Controls

Attractant for soldier bugs that attack pest bugs:
Sterling Intl., Planet Natural, Natural Insect Control (Rescue!)

Microbial Insecticides:
Entomopathogenic fungus:
Beauveria bassiana (for chinch bugs): Troy, Hydrogardens, Gardener's Supply (Naturalis T) • Emerald (Botanigard)
Metarhizium anisopliae (for meadow spittlebug, coffee leafminer): Agricola El Sol • Bio Pre

Parasitoids:
Anaphes iole (for lygus bug): Natural Insect Control • The Green Spot
• Rincon-Vitova • Beneficial Insectary
Trissolcus spp. (for stink bug eggs): Praxis

Predators:
spined soldier bug, *Podisus maculiventris* (for CO potato beetle, bugs general, caterpillar general): ARBICO • Gardens Alive! • Natural Insect Control • Bug Factory • Rincon-Vitova
predatory bug, *Deraeocoris brevis* (for lygus bug): The Green Spot • Applied Bionomics



Least-Toxic Chemical Controls

Borate-Based Insecticides:
Whitmire (PT 240D, PT 249 Perma-Dust) • Nisus (Niban bait)

Diatomaceous Earth: See ANTS

Garlic-based repellent:
Soil Technologies (Garlic Gard) • Harmony (Guardian) • Garlic Research (Garlic Barrier)

Insecticidal Soap:
Intagra (Concern) • Woodstream (Safer) • Peaceful Valley
With pyrethrin:
Woodstream (Safer Yard and Garden, Safer Tomato and Vegetable)
• Necessary, Intagra (Concern Multi-purpose) • Peaceful Valley

Neem Products:

Certis, Planet Natural, Nitron, Johnny's (Azatin)
• Woodstream, Harmony (Safer's BioNeem) • Certis, Peaceful Valley,
Harmony (Neemix, Trilogy) • Green Light (Rose Defense)

Pyrethrin:

Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) •
Johnny's, Peaceful Valley, (Pyrene) • Intagra (Concern) • Hess &
Clark (microencapsulated, Capsul-Ban, Formula 66, LD-44Z) •
AgrEvo, Insects Limited (Kicker, Drione) • Peaceful Valley (Py-Rin,
w/o PBO) • Monterey, Harmony (Bug Buster O, w/o PBO)

Pyrethrin and Oil:

Gardens Alive (Pyola) • Harmony (Pyola)

Pyrethrin, rotenone, copper, sulfur:

Bonide, Gardener's Supply (Bonide Garden Dust)

Sabadilla:

Planet Natural • Gardens Alive! • Dunhill, Harmony (Veratran)

Silica Aerogel: See ANTS

CATERPILLARS

Identification & Monitoring

Pheromones & Traps:

**For agricultural & horticultural insects: delta, dome, diamond,
funnel, jackson, and wing traps**

Great Lakes, Gemplers (Multi-Pher, Unitrap, Delta Traps) • Phero
Tech, Great Lakes (Unitrap) • Scentry, Gemplers, Great Lakes,
ARBICO, Planet Natural (Scentry) • Suterra, Harmony, Planet Natural,
Gardens Alive, Peaceful Valley, The Natural Gardening (BioLure) •
Phero Tech (Phero Tech Lures) • Scentry, Great Lakes, ARBICO,
Planet Natural, Natural Insect Control (Delta & Wing Trap, Heliothis
Trap) • Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers
(Pherocon) • ARBICO, Harmony (Catch-em) • Peaceful Valley •
Hercon • San Jacinto • Tanglefoot (Codling Moth) • Tomagro

For forestry insects:

Phero Tech (Phero Tech Lures)

For stored product insects:

Woodstream, Santa Cruz Hort, ARBICO, Peaceful Valley, Great Lakes,
Necessary, Gemplers (Pheromone Traps, Safer) • Phero Tech (Phero
Tech Lures) • Trécé, Gardens Alive, Olson, Great Lakes, Harmony,
Peaceful Valley (Storgard) • Woodstream, Santa Cruz Hort (Clothes
Moth Pheromone) • Springstar • Certis, Harmony (Clothes Moth) •
Woodstream (Pantry Pest Pheromone) • Springstar (Clothes Moth)

Physical Controls

Controlled Atmosphere System (for stored grains):

The Aerogen • Air Products (Prism System)

Row Covers:

American Agrifabrics (AgGro) • Great Lakes (BBA) • Gardens Alive!
(Super-Light) • Gardener's Supply, Gardens Alive, (Floating Row
Covers) • Harmony (Harvest Guard, Tufbell) • Peaceful Valley (Tufbell,
AgGro) • Mipco • Shepherds

Sticky Barrier:

Tanglefoot, Planet Natural, Gardens Alive!, Great Lakes, Harmony,
Intagra, Phero Tech, Peaceful Valley (Tanglefoot)

Sticky Trap/Tape:

For stored product insects:

Santa Cruz Hort (Wing & Delta Traps) • Peaceful Valley • Agro
Biotech • Phero Tech

For agricultural & horticultural insects:

Scentry, Great Lakes, ARBICO, Planet Natural, Gemplers (Scentry
Gypsy Moth Trap) • Peaceful Valley • Phero Tech • Tomagro

Traps:

Woodstream, Harmony, Peaceful Valley, The Natural Gardening
(Gypsy Moth Trap) • Ladd, Planet Natural (Red Sphere Fruit Fly) •
Woodstream, Harmony, Great Lakes, Intagra, The Natural Gardening
(SureFire Codling Moth) • Tomagro

Tree Wrap:

Olson (Stiky Tree Guards) • Planet Natural, Peaceful Valley (Bug Belt)
• Phero Tech

Horticultural Controls

Insect-Resistant Turfgrass:

Endophytic Ryegrass (repels billbugs & caterpillars):

Lofts Seed (Repell, Palmer II, Prelude II, Yorktown III) • Turf Seed
(Citation II, Birdie II, Omega II, CBS II, Manhattan II, Charger,
Quickstart, 246 Sunrye) • Gardens Alive (Turf-Alive)

Endophytic Tall Fescue (repels caterpillars):

Turf Seed (Apache II, Tomahawk, Coronado Gold, Tarheel)

Biological Controls

Attractant for soldier bugs that attack pest caterpillars:

Sterling Intl., Planet Natural, Natural Insect Control (Rescue!)

Seed Mix to Attract Beneficials:

Harmony • Peaceful Valley • Lohse Mill • Planet Natural • Gardens
Alive • Rincon-Vitova • Cornflower (also plants)

Seeds for plants to repel pest Lepidoptera:

Shepherd's (sweet basil) • Nichols Garden, J.L. Hudson (epazote) •
Park Seed (holy basil)

Seeds for California Native Plants:

Pacific Coast Seed

Bat Houses to Attract Moth-Eating Bats:

The Green Spot • Natural Insect Control

Earwig Shelters (habitat for caterpillar biocontrol in orchards):

Biotechnik

Insect-Attacking Nematodes:

Heterorhabditis bacteriophora: BioLogic • IPM Labs • Natural Insect
Control

Steinernema carpocapsae: BioLogic, Certis, IPM Labs, Natural Insect
Control, Peaceful Valley

Steinernema feltiae: BioLogic, Certis, IPM Labs, Natural Insect
Control

Steinernema riobravis: Certis, Harmony

Syringes for nematode injection (for borers):

Gardens Alive

Microbial Feeding Stimulant:

Peaceful Valley

Microbial Insecticides:

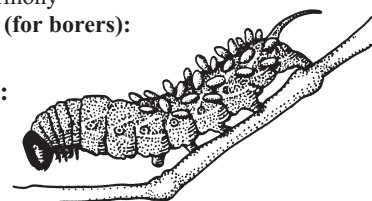
***Bacillus thuringiensis* (BT):**

Valent USA, Peaceful Valley, Johnny's, English Woodlands (Dipel,
Dipel 4L, 2X, 10G, ES, Xentari WDG) (Topside Dipel) • Koppert,
PBI/Gordon (Bactospeine) • Nitron (Caterpillar Killer) • ARBICO •
Planet Natural • Agricola El Sol (BST-88, BST-88A) • Ecogen (Foil)

***Bacillus thuringiensis aizawai* (BTA):**

Valent USA (Xentari, Florbac) • Certis (Agree, Design)

***Bacillus thuringiensis kurstaki* (BTK):**



Ecogen (Condor, flowable) • Monterey (Lepid BT) • Valent USA (Biobit, Foray) • Peaceful Valley, Harmony (Caterpillar Attack, Vegetable Insect Attack) • Certis, Peaceful Valley, Harmony (Javelin WG, CoStar) • Planet Natural • Monterey, Harmony (Caterpillar Clubber) • Plant Health Care, Ecogen (Crymax)

BT protein encapsulated in *Pseudomonas*:

Ecogen, Gardens Alive (M-Peril, M-Trak, Match, MVP-II)

***Beauveria bassiana* for soil and turf (sod webworm):**

Troy, Hydro-Gardens, Gardener's Supply (Naturalis-T) • Emerald (Botanigard)

Insecticidal spreader-sticker oil for BT:

Monterey (Nature's Own)

***A. orana* granulosis virus (for leafroller):**

Andermatt (Capex)

Codling moth granulosis virus:

Andermatt (Madex) • Certis (Cyd-X, call for availability)

NPV (from alfalfa looper or celery looper):

Certis (call for availability)

NPV from *H. zea* (for caterpillars):

Certis (Gem-Star)

NPV (nucleopolyhedrosis virus) (for gypsy moth):

Agricola El Sol (VPN-80, VPN-82) • U.S. Forest Service, USDA

NPV (nucleopolyhedrosis virus) (for beet armyworm):

Certis (Spod-X)

Parasitoids:

Anisopteromalus calandrae (stored product): Biofac

Blepharipa schineri (parasitic fly for gypsy moth): USDA Rearing Lab

Bracon hebetor (for stored product moth): Biofac • Arbico

Casinarina arjuna (for gypsy moth): Praxis

Coccygomimus disparis (for gypsy moth): Praxis

Cotesia marginiventris (for gypsy moth, stored product moth):

ARBICO • Biofac • Rincon Vitova • The Green Spot • Natural Insect Control

Cotesia melanoscela (Korean strain) (for gypsy moth, sales to government agencies only): Biobase • Praxis

Cotesia plutellae (for diamondback moth): ARBICO • Biofac • Natural Insect Control

Diadegma insularis (for diamondback moth): ARBICO • Praxis

Glyptapanteles indiensis (for gypsy moth): Praxis

Goniozus legneri (for navel orangeworm, omnivorous leafroller):

ARBICO • Beneficial • Bio Ag • Bowen • California BioWorks •

Kuida • Praxis • Rincon-Vitova • M&R Durango

Lydella thompsoni (for European corn borer): Praxis

Macrocentrus ancylicivorus (for Oriental fruit moth): ARBICO • Praxis

Meteorus pulchricornis (for gypsy moth, government agencies only):

Biobase • Praxis

Microchelonus blackburni (for pink bollworm): Praxis

Microplitis plutellae (for diamondback moth): Praxis

Ooencyrtus kuvanae (for gypsy moth): Praxis

Orgilus lepidus (for potato tuber moth): Bugs for Bugs

Pentalitomastix plethoricus (for navel orangeworm): ARBICO • Bowen

• California BioWorks • Praxis

Trichogramma brassicae: Beneficial • IPM Labs • Koppert • Nature's Control • Rincon Vitova • The Green Spot

Trichogramma carverae: Bugs for Bugs

Trichogramma dendrolimi (for moth eggs): Bowen

Trichogramma evanescens (for moth): Koppert

Trichogramma minutum (for Eastern U.S. orchards): ARBICO •

Beneficial • Biofac • Bowen • Planet Natural • International Technology • IPM Labs • M & R Durango • Nature's Control • Peaceful Valley • Rincon Vitova • The Green Spot

Trichogramma ostrinae: Beneficial Insectary

Trichogramma platneri (for Western U.S. orchards): ARBICO •

Beneficial • Bio Ag • Bowen • Planet Natural • Kuida • Rincon-Vitova

• Peaceful Valley • International Technology

Trichogramma pretiosum (for moth eggs in vegetable & field crops):

ARBICO • Beneficial • Bio Ag • Biofac • Bowen • Planet Natural •

FAR • Gardens Alive! • Kuida • IPM Labs • M & R Durango • Nature's

Control • Rincon-Vitova • Peaceful Valley • The Green Spot • Bugs for

Bugs

Trichogramma spp. (for moth eggs in vegetable & field crops):

Beneficial Insectary • Conrad Appel • KWS • Kunafin • Natural Insect

Control • Natural Pest Controls • Organic Control • Peaceful Valley •

Praxis • Smith & Hawken • The Natural Gardening • Arnold Brothers •

Buena • Natural Enemy

Trichogrammatoidea bactrae (for moth egg in fields & orchards, pink bollworm): Rincon-Vitova • The Green Spot

Predators:

big-eyed bug, *Geocoris punctipes*: Biofac • Rincon-Vitova • California Bioworks • Natural Insect Control

predatory bug: *Deraeocoris brevis*: Applied Bionomics • Natural Insect Control

spined soldier bug, *Podisus maculiventris*: ARBICO • Natural Insect Control • Bug Factory • Rincon Vitova

warehouse pirate bug, *Xylocoris flavipes*: (for stored product moths):

ARBICO • Planet Natural • Biofac • Praxis

Least-Toxic Chemical Controls

Botanical Repellents:

Shepherd's (sweet basil seeds) • Park Seed (holy basil) • Nichol's

Garden, J.L. Hudson (epazote) • Soil Technologies (Garlic Gard) •

Gardens Alive (Herbal Moth Repellent) • Garlic Research, Harmony,

San Jacinto (Garlic Barrier)

Diatomaceous Earth: See ANTS

Insecticidal Soap: See APHIDS

Insect Growth Regulators (IGRs):

Syngenta (fenoxycarb, Comply, Precision) • Rohm and Haas (tebufenozide, Confirm)

Microbial Isolate (Spinosad):

Dow (Conserve)

Neem Products:

Certis, Planet Natural, The Green Spot (Azatin) • Woodstream,

Harmony, Peaceful Valley (Safer's BioNeem) • Certis, Harmony,

Peaceful Valley (Neemix, Trilogy) • Green Light, Gardener's Supply

(Green Light)

Pheromone Mating Disruptants:

Checkmate for codling moth, tomato pinworm, oriental fruit moth, pink

bollworm, peach tree borer; Isomate for codling moth, oriental fruit

moth, greater and lesser peach tree borer, oblique-banded leafroller,

pandemis leafroller, beet armyworm, pink bollworm; NoMate for toma-

to pinworm, pink bollworm, tufted apple bud moth; Disrupt for peach twig borer, oriental fruit moth, codling moth, and gypsy moth: Suterra, Harmony, Great Lakes, Harmony, ARBICO, Peaceful Valley (Checkmate) • Pacific Biocontrol, Great Lakes, Harmony, Peaceful Valley (Isomate) • Scentry, Great Lakes, ARBICO, Planet Natural (NoMate) • Scentry, Great Lakes, ARBICO, Planet Natural, Gemplers (Attract & Kill, NoMate PBW-MEC for pink bollworm) • Hercon (Disrupt)

Pheromone Lures for many Lepidoptera:

Trécé (Pherocon) • Tomagro (TomaAttract) • Great Lakes IPM • Suterra (BioLure) • Phero Tech

Pyrethrin:

Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Waterbury (Purge III) • Johnny's, Peaceful Valley (Pyrenone) • Hess & Clark (microencapsulated, Capsul-Ban) • AgrEvo (Kicker) • Monterey, Harmony (Bug-Buster-O, w/o PBO) • Peaceful Valley (Py-Rin, w/o PBO)

Pyrethrum powder:

Nichol's Garden • Harmony

Rotenone:

Bonide • Peaceful Valley

Sabadilla:

Dunhill, Harmony, Peaceful Valley (Veratran)

Silica Aerogel: See ANTS

COCKROACHES

Identification & Monitoring

Flashlight with Red Filters:

Streamlight

Pheromone Trap:

Woodstream (Victor)

Physical Controls

Caulk:

Hardware Store

Teflon barrier protects pet food bowls:

See hardware store for Teflon tape

Pet Bowls with Barrier:

Alternative Control (Fool-A-Bug)

Traps:

Woodstream (Victor, sticky) • Gardens Alive (Roach Free) • Certis, Harmony (Lo-Line)

Pheromone Trap:

Woodstream

Glue board trap:

Bell (Trapper) • Woodstream

Trap & attractant:

Woodstream, Harmony, ARBICO, Peaceful Valley, Great Lakes (The Dungeon) • Seabright (Safe Stop) • Woodstream (Victor, pheromone) • Springstar

Vacuums:

Proteam (Hummer, Optimus)

Biological Controls

Parasitoids:

Anastatus tenuipes: Rincon-Vitova • PNE

Aprostocetus hagenowii: Bio Pre • PNE • Rincon-Vitova

Comperia merceti: Rincon-Vitova • PNE

Tetrastichus incertus: Praxis

Least-Toxic Chemical Controls

Baits:

Abamectin dust or spray:

Whitmire (Avert PT-300, PT-310) • Gardens Alive!

Abamectin gel bait:

Whitmire (Avert 320)

Borate-based bait:

NISUS (NIBAN Granular Bait, Niban FG) • Blue Diamond Manufacturing (for bait gun) • Seabright (Roach Free) • Waterbury (50% boric acid, CB Attrax) • Blue Diamond (ProJoe)

Hydramethylnon bait stations (child-resistant):

Clorox Company (Maxforce, Combat)

Fipronil bait stations (child resistant):

Clorox Company (Maxforce)

Hydramethylnon gel bait:

TopPro, Target, Van Waters (Siege)

Sulfluramid bait station:

S.C. Johnson (Raid Max)

Xanthine bait station (prevents reproduction):

Cleary (Ecologix Roach Terminal)

Bait gun:

Specialty Products • Target • Jim Simmons • Blue Diamond • Whitmire

Botanical Sprays:

Orange Guard, Vopak, Target (orange oil) • Woodstream (Mint Oil) • EcoSmart (herbal oil)

Dust applicators:

Parker Pest (Pest Machine) • Peaceful Valley (Pest Pistol)

Borate-Based Insecticides:

Organic Control (Ant-T-Roach) • Enforcer (Roach Ridd) • Waterbury (Mop-Up, Roach-Kil, Borid) • Whitmire (PT 240 or 249 Perma-Dust) • Copper Brite, Harmony (Roach Prufe) • Peaceful Valley • Woodstream (Victor) • J.T. Eaton • NISUS (Nibor)

Diatomaceous Earth:

Natural Insecto, Natural Insect Control (Insecto w 10% food bait) • Woodstream (SureFire) • Hedley Technologies (Insecolo w 3% food bait) • Hedley Technologies (Protect-It w 10% silica gel) • Celite • Dryacide • Eagle Picher • Peaceful Valley • Pristine (Permaguard D-10) • JT Eaton (Answer) • Necessary, Intagra (Concern)

With pyrethrin:

Permaguard, Pristine, Nitron (Permaguard) • The Natural Gardening (Insectigone) • Gardens Alive • Organic Solutions

Hydroprene IGR:

Wellmark (Gentrol)

Hydroprene IGR Controlled Release Station:

Wellmark (Point Source)

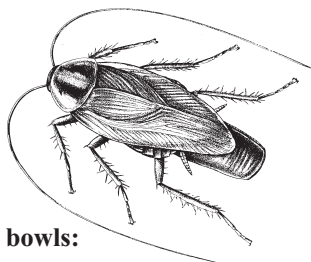
Pyrethrin:

Roxide • Whitmire (PT-175 microencapsulated, PT 505, PT 565) • Hess & Clark (microencapsulated, Capsul-Ban, Formula 66, LD-44Z) • AgrEvo, Insects Limited (Kicker)

Silica Aerogel:

100% Pure:

Cabot (Cab-O-Sil) (Must order 10 pound minimum) • Degussa (Wessalon S., Aerosil 380) (Must order 25 pound minimum)



With pyrethrin:

AgrEvo, Target (Drione) • Whitmire, Purity Products (PT 239 Tri-Die)
• Van Waters & Rogers

CRICKETS

(See Grasshoppers)

EARWIGS

Physical Controls

Least-Toxic Chemical Controls

Diatomaceous Earth: See ANTS

Insecticidal Soap: See APHIDS



FLEAS

Physical Controls

Combs:

Gardens Alive! • Hansen's Pet (Ancol)

Vacuums:

Proteam (Hummer, Optimus)

Sticky light traps:

Enforcer Products (Over Nite Flea Trap) • Happy Jack • Zema •
Gardens Alive • Whitmire (Ultralight) • Springstar (Flea Trap) •
Woodstream (Victor)

Sticky Traps and Tape:

Bell (Trapper) • Olson • Gemplers

Biological Controls

Insect-Attacking Nematodes:

Certis (BioFlea) • Peaceful Valley • Organic Control • Gardens Alive •
Hydrogardens • Planet Natural • Biologic

Least-Toxic Chemical Controls

Sodium octaborate:

The Ecology Works (Flea Nix powder) • Flea Busters (Rx for Fleas)
(Call company for treatment)

Insecticidal Oil:

Citrus or herbal oil extract:

Security, Gardens Alive! (Flea Stop Shampoo) • Orange Guard, Vopak,
Target (Orange Guard) • Woodstream (Poison Free) • EcoSmart
(BioOrganic, EcoPCO)

Diatomaceous Earth:

Natural Animal (EcoZone) • Natural Insecto, Natural Insect Control
(Insecto) • Necessary • Intagra • Peaceful Valley • Hedley Technologies
(Protect-It) • Celite • JT Eaton (Answer)

With pyrethrin:

Permaguard, Pristine, Nitron (Permaguard) • Organic Solutions

Insect Growth Regulators:

Lufenuron (oral formulation for pet):

Syngenta (Program) • Drs. Foster and Smith

Methoprene:

Wellmark (Precor) • AgrEvo (Alter) • Enforcer (FGR)

Methoprene (with permethrin) for fleas:

Wellmark, Gardens Alive!, Necessary, Peaceful Valley (Precor 2000) •
Enforcer (Flea Fogger, Flea Spray)

Insecticidal Soap:

With pyrethrin:

Woodstream, Planet Natural, Gardens Alive!, Harmony (Flea & Tick
Attack) • Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard
and Garden) • Peaceful Valley

Fipronil flea adulticide:

Merial, Aventis (Frontline) • Drs. Foster and Smith

Nicotine analog flea adulticide:

Bayer Animal (Imidacloprid, Advantage) • Veterinarians

Pyrethrin:

Del (Lice, Tick & Flea Spray) • Roxide • Whitmire (PT 175 microen-
capsulated, PT-565, PT-505 XLO) • Enforcer (Flea & Tick Spray,
Powder, Shampoo) • Hess & Clark (microencapsulated, Capsul-Ban,
Formula 66, LD-44Z) • AgrEvo (Kicker, Drione)

Pyrethroid (microencapsulated):

3M Corp (Sectrol) (Sold only to veterinarians)

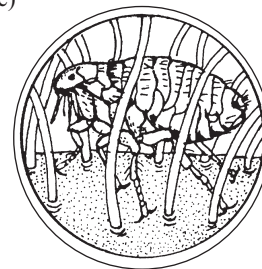
Pyrethrum powder:

Natural Animal (EcoZone), Peaceful Valley

Repellent (Herbal Flea Collar):

Harmony • Planet Natural

Silica Aerogel: See ANTS



FLIES

(Nuisance)

Identification & Monitoring

Pheromones & Traps for Agricultural Pests:

Security (Trap 'n Toss) • Phero Tech, Great Lakes (Unitrap) • Trécé,
Gardens Alive!, Great Lakes, Harmony, Olson, Peaceful Valley,
Gemplers (Pherocon) • Hercon

Test Kit for Insecticide Resistance:

Silver Lake

Physical Controls

Bag to Seal Caskets against Phorids:

Ensure-A-Seal (Tyvek)

Fly bonnet for horses:

WF Young (Fly Bonnet) • Wiese (Ultra Shield)

Screening:

Hydro-Gardens (Fly Barr) • Tipper, Harmony, Peaceful Valley (Tie-
Net)

Sticky Adhesive

Tanglefoot, ARBICO, Planet Natural, Great Lakes, Gemplers,
Harmony, Natural Insect Control, Charley's (Tangle-Trap) • Phero Tech
• Seabright

Cone-Type Solar Traps:

ARBICO • Great Lakes (Musca Terminator) • Olson (Stiky) • Roxide
(Aeraxon) • Great Lakes • The Green Spot • Peaceful Valley • Fly
Master • Natural Insect Control

Jar-Type and Disposable:

Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control (Victor Fly-In-Saucer, Fly Magnet) • Fly Master • Security, Gardens Alive (Trap-N-Toss) • Sterling Intl. (Rescue!) • Wiese • Harmony

Electrocution Black Light Fly Traps:

Gilbert Industries (Electrocuting Light Traps) • B & W (Mantis) • Actron

Adhesive Black Light Traps:

Olson, Great Lakes, Gempler's (blacklight, sticky) • Whitmire (Vector) • Waterbury (pheromone and light) • Whitmire (Actron, programmable) • Actron

Solar-powered electrocution traps:

Olson, Great Lakes, Gempler's (Tower of Doom, Dungeon of Doom, solar electrocution) • Baley's

Sticky trap/tape:

Springstar (fly strip) • Loveland (Sticky Roll) • Olson, Great Lakes, Gemplers (Sticky Pyramid for face flies, Sticky Cylinder for stable flies, Window Trap) • Western Farm • Phero Tech (Chroma) • Roxide (Aerixon, window trap) • Security (Fly Inn, Fly Stop, Big Stik)

Biological Controls

Insect-Attacking Nematodes:

Heterorhabditis megidis: Andermatt • Biological Crop • BioBest • Koppert • International Technology • W. Neudorff
Heterorhabditis sp.: Syngenta Bioline • Biowise • Hydro-Gardens • Koppert • M & R Durango • Natural Insect Control • Nature's Control • Nematec • Praxis • Peaceful Valley • Gardens Alive

Steinernema carpocapsae: Biofac • BioLogic • Certis • Hydro-Gardens • IPM Labs • M & R Durango • Natural Insect Control • Peaceful Valley • Harmony

Steinernema feltiae: BioLogic • BioBest • Biological Crop • Certis • IPM Labs • Natural Insect Control • Koppert • W. Neudorff • International Technology • Harmony • Planet Natural

Steinernema sp.: Beneficial • Certis • English Woodlands • Natural Insect Control • Nature's Control • Praxis

Sterile flies for release (onion maggot):

De Groene

Microbial Insecticides:

Ivermectin for bot flies, etc.:

Merial, Aventis (Ivomec Pour-On)
(Sold only to veterinarians & licensed suppliers)

Ivermectin and clorsulon:

Merial, Aventis (Ivomec-F Injection)
(Sold only to veterinarians & licensed suppliers)

Parasitoids:

Muscidifurax raptor: Biofac • IPM Labs • Kunafin
Muscidifurax raptorellus: IPM Labs • The Green Spot • Rincon-Vitova
Muscidifurax sp.: Beneficial Insectary • Bowen • Peaceful Valley • Spalding

Muscidifurax zaraptor: ARBICO • Planet Natural • Kunafin • M & R Durango • Natural Pest Controls • Nature's Control • Rincon-Vitova • The Green Spot • Buena

Nasonia vitripennis or *Mormoniella vitripennis*: ARBICO • Natural Pest Controls • Praxis

Pachycrepoideus vindemiae: Kunafin • Praxis

Spalangia cameroni: Kunafin

Spalangia gemini: Kunafin

Spalangia corana: Biofac

Spalangia endius: ARBICO • Kunafin • Natural Pest Controls • Rincon-Vitova • The Green Spot • Better Pest Management • Buena

Spalangia nigroaenea: Kunafin

Spalangia sp.: Beneficial Insectary • M & R Durango • Peaceful Valley • Praxis • Spalding • Kunafin

Sphegigaster sp.: Peaceful Valley • Praxis

Trichomalopsis spp.: Beneficial Insectary

Urolepis rufipes: Kunafin

Parasitic mites:

Glyptolaspis confusa: Praxis

Hypoaspis miles: Biological Crop

• Koppert • Garta • Florikan • Evergreen

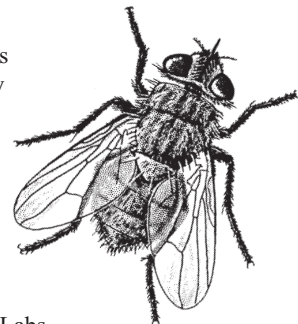
Predators:

Histerid beetle, *Carcinops pumilio*: IPM Labs

Predatory mite, *Macrocheles* spp.: Praxis

Dung beetle, *Onthophagus gazella*: Praxis

Predatory fly, *Ophyra aenescens*: Praxis



Least-Toxic Chemical Controls

Botanical Fly Repellents:

Planet Natural, Natural Insect Control, Gardener's Supply (Skeeter Shoo, citronella) • Woodstream, Garden City (Bite Blocker, geranium oil) • Wiese (Horse Shoo, citronella fly repellent) • ARBICO (Aloe Herbal Spray) • EcoSmart (BioOrganic)

Diatomaceous Earth: See ANTS

Pyrethrin:

Roxide, Harmony (Revenge) • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Waterbury (Purge III) • Hess & Clark (microencapsulated, Capsul-Ban, Formula 66, LD-44Z)) • AgrEvo (Kicker) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster O, w/o PBO)

Silica aerogel: See ANTS

FRUIT FLIES

Identification & Monitoring

Pheromones & Traps:

ARBICO, Harmony (Catch-em) • Great Lakes, Gemplers (Multi-Pher, Unitrap, Delta) • Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Suterra (Biolure) • Scenturion

Physical Controls

Traps:

Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control (Victor Fly-In Saucer, Fly Magnet) • Biobest • Planet Natural • Phero Tech

Apple maggot red sphere trap:

Ladd, Gemplers, Harmony, Necessary, Natural Insect Control (Ladd) • Harmony (SureFire) • Peaceful Valley • Phero Tech • Springstar

Light traps:

Gilbert Industries (Professional Light Traps) • Gemplers

Sticky trap/tape:

Phero Tech (Chroma) • Scentry, Great Lakes, ARBICO, Planet Natural,



Gemplers (Jackson Fruit Fly Trap) • Olson • Santa Cruz Hort • Peaceful Valley

FUNGUS GNATS

Physical Controls

Screening:

Hydro-Gardens (Fly Barr) • ATI (Greenhouse screen) • Tipper (Tie-Net) • Green-Tek

Sticky Adhesive:

Seabright, Great Lakes, Harmony, Phero Tech (Stickem Special) • Tanglefoot, ARBICO, Planet Natural, Great Lakes, Gemplers, Harmony, Natural Insect Control, Charley's (Tangle-Trap) • Peaceful Valley

Traps:

ARBICO • Natural Insect Control • Woodstream (Safer Flying Insect) • Phero Tech (Chroma) • Olson, Great Lakes, Gemplers (Sticky Stuff, Sticky Traps) • Peaceful Valley • Springstar • IPM Labs

Biological Controls

Insect-Attacking Nematodes:

Heterorhabditis megidis: Koppert • W. Neudorff

Heterorhabditis sp.: Hydro-Gardens • Koppert • M & R Durango • Nature's Control • Natural Insect Control • Nematec • W. Neudorff • Peaceful Valley • Gardens Alive • Florikan

Steinernema bibionis: W. Neudorff

Steinernema carpocapsae: Biofac • BioLogic • Biobest • Certis • Planet Natural • Gardens Alive! • Hydro-Gardens • IPM Labs • M & R Durango • Natural Insect Control • Peaceful Valley

Steinernema feltiae: BioLogic • BioBest • Certis • IPM Labs • Koppert • Natural Insect Control • W. Neudorff • International Technology • Plant Sciences • Andermatt • Garta • M&R Durango

Steinernema riobravis: Certis • Harmony

Steinernema spp.: Beneficial • Certis • Biowise • Harmony • Hydro-Gardens • Johnny's • Koppert • Natural Insect Control • Nature's Control • BioLogic

Microbial Insecticides:

Bacillus thuringiensis (BT):

Valent USA, Gardens Alive!, Harmony, IPM Labs, Peaceful Valley (Gnatrol) • Gardens Alive (Knock-Out)

Spreader-Sticker Oil for BT Products: Monterey (Nature's Own)

Predators:

Predatory mite, *Geolaelaps* spp.: Praxis • Rincon-Vitova

Predatory mite, *Hypoaspis miles*: ARBICO • Applied Bionomics • BioBest • BioBest Canada • Biological Crop • Biowise • IPM Labs • Koppert • Natural Insect Control • Bug Factory • International Technology • Plant Sciences • The Green Spot • Nature's Control • Evergreen

Least-Toxic Chemical Controls

Diatomaceous Earth: See ANTS

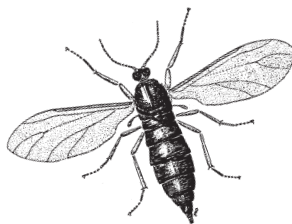
Insect Growth Regulators:

Methoprene:

Wellmark (Enstar)

Cyromazine:

Syngenta (Armor)



Insecticidal Oil: See APHIDS

Neem Products:

Certis, Planet Natural, Harmony (Azatin) • Woodstream, Harmony (Safer's BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy)

Pyrethrin:

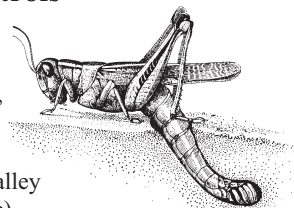
Hess & Clark (microencapsulated, Capsul-Ban) • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster O, w/o PBO)

GRASSHOPPERS

Physical Controls

Row Covers:

American Agrifabrics (AgGro)
• Great Lakes (BBA) • Gardener's Supply, Gardens Alive! (Floating Row Covers)
• Gardens Alive! (Super-Light)
• Harmony (AgGro, Tufbell) • Peaceful Valley (Tufbell, AgGro) • Shepherd's (Agrofabric)
• Mipco • BBA



Biological Controls

Insect-Attacking Nematodes (for mole crickets):

Steinernema carpocapsae: Certis • BioLogic • IPM Labs

• Natural Insect Control • Harmony • Andermatt

Steinernema feltiae: Certis • BioLogic • IPM Labs • Natural Insect Control • Harmony

Microbial Insecticides:

Protozoan pathogen:

Nosema locustae (for grasshoppers): Harmony • Hydro-Gardens • M & R Durango (Nolo Bait) • Nitron, Planet Natural, Gardens Alive! (Semispore Bait)

Fungal pathogen:

Beauveria bassiana (for grasshopper, crickets): Troy, Hydrogardens, The Green Spot, Gardener's Supply (Naturalis-T)

Least-Toxic Chemical Controls

Borate-Based Insecticides:

NISUS, Target (NIBAN Granular Bait for crickets) • Whitmire (PT 240 or PT 249 Perma-Dust)

Diatomaceous Earth: See ANTS

Insecticidal Soap:

Necessary, Intagra (Concern) • Peaceful Valley • Woodstream (Safer)

With pyrethrin:

Necessary, Intagra (Concern Multi-Purpose) • Peaceful Valley • Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard and Garden Insect Attack)

Neem Products (Act as Repellents): See APHIDS

Repellent Garlic Spray:

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Soil Technologies (Garlic Gard) • Harmony • Peaceful

Rotenone:

Bonide • Peaceful Valley

Sabadilla:

Planet Natural • Dunhill, Harmony (Veratran) • Peaceful Valley

GRUBS

(See Beetles)

LEAFHOPPERS

Identification & Monitoring

Sticky trap/tape:

Scentry, Great Lakes, ARBICO, Planet Natural (Versagard) • Phero Tech

Physical Controls

Barriers & Exclusion Devices:

Planet Natural • Gardens Alive!

Plastic film to attract leafhoppers:

Western Farm (HopperFinder)

Sticky Adhesive:

Seabright, Great Lakes, Harmony, Phero Tech
(Stikem Special) • Peaceful Valley

Traps and Sticky Tape:

ARBICO • Planet Natural • Gardens Alive • Harmony • IPM Labs
• Woodstream (Safer) • Peaceful Valley • Phero Tech (Chroma)

Biological Controls

Parasitoids:

Anagrus atomus: Biowise • BioBest

Anagrus epos (for grape leafhopper): ARBICO • Praxis

Anagrus spp.: Biological Crop

Least-Toxic Chemical Controls

See APHIDS

LEAFMINERS

Physical Controls

Sticky Adhesive:

Seabright, Great Lakes, Harmony, Phero Tech (Stikem Special) •
Tanglefoot, ARBICO, Planet Natural, Great Lakes, Harmony, Natural
Insect Control, Charley's (Tangle-Trap) • Peaceful Valley

Sticky Trap/Tape:

Olson • Gemplers • Phero Tech • Trécé, Great Lakes (Pherocon) •
Harmony • Peaceful Valley • Planet Natural • Gardens Alive

Biological Controls

Parasitoids:

Dacnusa sibirica: ARBICO • Biobest • Biobest Canada • Biofac •
Biological Crop • Duclos • Biowise • Gartnerei • Koppert • Natural
Pest Control • Natural Pest Controls • Praxis • Sautter & Stepper
• W. Neudorff • The Green Spot • Natural Insect Control
• International Technology • Rincon-Vitova • Garta

Diglyphus isaea: • ARBICO • Azienda • BioBee • Biobest • Biofac
• Bioplanet • Biological Control • Syngenta Bioline • Duclos • Biowise
• Gartnerei • Koppert • Natural Pest Control • Natural Pest Controls •
Plant Sciences • Sautter & Stepper • W. Neudorff
• Natural Insect Control • The Green Spot • International Technology
Rincon-Vitova

Opius pallipes: Bio Pre

Microbial Insecticides:

BT (for citrus leafminer):

Valent USA, Peaceful Valley, Planet Natural, English Woodlands
(Dipel) • Plant Health Care, Ecogen (Crymax)

Entomopathogenic Fungus:

Metarhizium anisopliae (for meadow spittlebug, coffee leafminer):
Agricola El Sol • Bio Pre

Least-Toxic Chemical Controls

Abamectin:

Merial, Planet Natural, Peaceful Valley (Avid)

Cyromazine:

Syngenta (Trigard)

Insecticidal Oil:

Florikan (Target Oil) • JMS (JMS Stylet Oil) • (See Aphids for a More
Complete Listing)

Neem Products:

Certis, Planet Natural, Harmony, Peaceful Valley, The Green Spot
(Azatin for ornamentals, Neemix for food crops) • Woodstream,
Harmony, Peaceful Valley (Safer's BioNeem) • Gardens Alive (Neem-
Away) • Green Light

Repellent Hot Pepper Wax:

Charley's • Harmony (Wilder's) • The Green Spot

LICE

Identification & Monitoring

Head lice detection kit:

Del (Pronto Lice Detection Kit, for home use)

Head lice prevention, management and educational products:

National Pediculosis Association



Physical Controls

Head lice comb:

Health Enterprises (MC-12) • National Pediculosis Association
(LiceMeister)

Least-Toxic Chemical Controls

Enzyme Shampoos:

Safe Effective (Lice-B-Gone)

Permethrin Cream Rinse:

Warner Lambert (Nix)

Pyrethrin:

Del (Bare Liquid, Lice, Tick & Flea Spray)

Pyrethrin shampoo, for head lice:

Carter-Wallace (Triple X) • Del (Pronto) • Hogil Pharmaceuticals (A-
200) • Pfizer (RID) • Care Technologies (Clear, with enzymes)

Pyrethrin, with pubic lice comb:

Hogil (Innogel Plus for pubic lice)

MAGGOTS

(See Flies)

MEALYBUGS

Physical Controls

Screening:

Hydro-Gardens • Tipper, Harmony (Tie-Net) • Peaceful Valley

Biological Controls

Parasitoids:

Anagyrus fusciventris: Bio Pre

Anagyrus pseudococci: Amos Rubin • Bio Bee • Biological Control • Plant Sciences • Praxis

Leptomastidea abnormis: Amos Rubin • Bio Pre • Praxis • W. Neudorff • Natural Insect Control

Leptomastix dactylopii: Amos Rubin • Azienda • Biobest • Bioplanet • Koppert • Natural Insect Control • Plant Sciences • Praxis • W. Neudorff • The Green Spot • Rincon-Vitova • Flora • Katz

Leptomastix epona: Bio Pre • Sespe Creek

Pauridia peregrina: Praxis

Pseudaphycus flavidulus: Bio Pre

Pseudaphycus maculipennis: Bio Pre

Predators:

Lacewing, *Sympherobius sanctus*: Amos Rubin • Bio Bee • Bio Pre

Lady beetles:

Mealybug destroyer, *Cryptolaemus montrouzieri*: Amos Rubin • ARBICO • Azienda • Bio Bee • Biobest • Biofac • Bioplanet • Buena • Biological Control • Biological Crop • Bio Pre • Planet Natural • Bugs for Bugs • Biowise • Hydrogardens • IPM Labs • Koppert • M & R Durango • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Bug Factory • Nature's Control • Organic Control • Plant Sciences • Praxis • Rincon-Vitova • W. Neudorff • Peaceful Valley • The Green Spot • Western Farm • EcoSolutions

Hyperaspis polita: Amos Rubin

Nephus reunioni: Amos Rubin • Bio Pre

Scymnus bipunctatus: Amos Rubin

Least-Toxic Chemical Controls

Diatomaceous earth: See ANTS

Insecticidal Oil:

Highly refined oil (from fish):

Peaceful Valley

Highly refined oil (from petroleum):

Monterey, Harmony (Saf-T-Side) • Valent USA, Harmony, Peaceful Valley (Volck) • Sun Oil, Gardens Alive!, Harmony, Peaceful Valley, Charley's, The Green Spot (Sunspray) • The Green Spot • Gardens Alive (Eco-Oil)

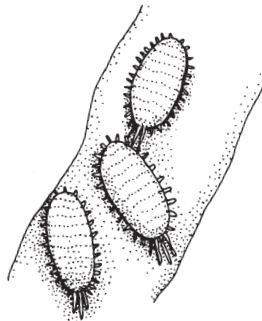
Highly refined seed oil:

Stoller, Peaceful Valley
(Natur'l Oil, 93% soybean)
• ARBICO (Spreadall 93% cottonseed)

Insecticidal Soap: See APHIDS

Neem Products:

See LEAFMINERS



MITES

Identification & Monitoring

Traps:

Phero Tech (Varroa Mite Trap)

Physical Controls

Furniture covers for dust mites:

Allergy Control Products

High Pressure Water Sprayer:

W.H. Vinton (Water Wand)

Mattress Covers (to exclude dust mite):

Puritans Pride

Vacuums:

Proteam (Hummer, Optimus)

Biological Controls

Microbial Insecticides:

Beauveria bassiana: Troy, Hydrogardens, Gardener's Supply (Naturalis-O and L) • Emerald (Botanigard)

Predators:

Lady beetle, *Stethorus punctillum* (for European red spider mite): Applied Bionomics • Biobest Canada • Evergreen • Rincon Vitova • Nature's Control • Natural Insect Control

Predatory bugs:

Big-eyed bug, *Geocoris* sp.: Biotactics • Rincon-Vitova • Natural Insect Control

Orius insidiosus: Syngenta Bioline • Gartenbau • Gartnerei • International Technology • IPM Labs • Koppert • Nature's Control • The Bug Store

Orius laevigatus: Koppert • Biological Crop

Orius majusculus: Biological Crop • Sautter & Stepper • W. Neudorff

Orius spp.: Biobest • Bioplanet • Bio Pre • Duclos • Natural Insect Control • Peaceful Valley • Rincon-Vitova

Orius tristicolor: ARBICO • Planet Natural • Praxis

Predatory gall midge (the mite midge):

Feltiella acarisuga: Bio Pre • Biobest • Biobest Canada • Biological Crop • Biowise • Koppert • Natural Insect Control • Rincon-Vitova • Bug Factory

Predatory mites:

Amblyseius californicus (for two-spotted spider mite): ARBICO • Bio Ag • Bio Pre • BioBest • Biotactics • Bowen • Planet Natural • Hydro-Gardens • International Technology • IPM Labs • Koppert • Kuida • M & R Durango • Natural Insect Control • Natural Pest Controls • Nature's Control • Peaceful Valley • Plant Sciences • Rincon-Vitova • Western Farm • The Green Spot • Syngenta Bioline • Beneficial

Amblyseius cucumeris (for two-spotted spider mite): Applied Bionomics • ARBICO • Evergreen • Syngenta Bioline • Gartnerei • Hydro-Gardens • International Technology • IPM Labs • M & R Durango • Bug Factory • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Peaceful Valley • Plant Sciences • Praxis • Rincon-Vitova • W. Neudorff • Beneficial Insectary • Ecosolution • *Amblyseius degenerans* (for mites): The Green Spot • Evergreen • Syngenta Bioline • Natural Insect Control

Amblyseius fallacis (for two-spotted spider mite, European red mite):

Applied Bionomics • Evergreen • IPM Labs • Natural Insect Control • The Green Spot • Beneficial Insectary

Galendromus annectans (for perseia mite): ARBICO • Biotactics • Rincon-Vitova • Beneficial Insectary

Galendromus helveolus (for perseia mite): ARBICO • Biotactics • Rincon-Vitova • Applied Bio Pest • Beneficial

Hypoaspis aculeifer (for bulb mite): Biobest

Mesoseiulus longipes or *Phytoseiulus longipes* (for two-spotted spider mite): ARBICO • Biotactics • Planet Natural • Hydro-Gardens • IPM • M & R Durango • Natural Insect Control • Nature's Control • Peaceful Valley • Praxis • The Green Spot

Metaseiulus occidentalis or *Galendromus occidentalis*: ARBICO • Bio Ag • Biological Control • Biotactics • Bowen • Planet Natural • Florikan • Gartenbau • IPM Labs • Koppert • Kuida • M & R Durango • Natural Insect Control • Natural Pest Controls • Nature's Control • Peaceful Valley • Plant Sciences • Praxis • Rincon-Vitova • The Green Spot • Western Farm • Beneficial Insectary
Neoseiulus scyphus (spider mite): Biotactics
Neoseiulus setulus (for cyclamen mite): ARBICO
Phytoseiulus macropilis (spider mite): Biotactics • Rincon-Vitova • Beneficial Insectary

Phytoseiulus persimilis (for two-spotted spider mite): Applied Bionomics • ARBICO • Azienda • Bio Bee • Bio Ag • Biobest • Biobest Canada • Bio Pre • Biocontrol • Biofac • Bioplanet • Biological Control • Biological Crop • Biotactics • Bowen • Planet Natural • Budai • Syngenta Bioline • CO. DEA • Central Coast • Duclos • Evergreen • Biowise • Florikan • Gartenbau • Gartneri • Hawkesbury • Hydro-Gardens • International Technology • IPM Labs • Koppert • Kuida • M&R Durango • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Bug Factory • Nature's Control • Peaceful Valley • Plant Sciences • Beneficial • Rincon-Vitova • Sautter & Stepper • Sweetbriar • TriCal • W. Neudorff • Zaklad • The Green Spot • Buena • EcoSolutions • Flora • Katz

Typhlodromus pyri: Biowise

Typhlodromus athiasae (for red mite): Amos Rubin

Typhlodromus mcgregori (Banks mite): Biotactics

Typhlodromus rickeri: Rincon-Vitova

Least-Toxic Chemical Controls

Abamectin (Isolated from *Streptomyces avermitilis*):

Merial, Planet Natural (Avid)

Cinnamon oil, garlic extract:

JH Biotech, Harmony (GC Mite)

Cinnamic aldehyde (orchard, field mites):

Emerald, Florikan (Valero)

Cinnamic aldehyde (greenhouse):

Emerald, Florikan (Cinnamite)

Insecticidal Oil:

Highly refined oil (from fish):

Peaceful Valley

Highly refined oil (from petroleum):

Monterey, Harmony (Saf-T-Side) • Valent USA, Harmony, Peaceful Valley (Volck Supreme Spray) • Sun Oil, Charley's, Gardens Alive!, Harmony, Peaceful Valley (Sunspray) • Gardens Alive (Eco-Oil) • The Green Spot • JMS (JMS Stylet Oil) • PBI/Gordon (Acme Dormant)

Highly refined seed oil:

ARBICO (Spreadall, 93 % cottonseed) • Stoller, Peaceful Valley (Natur'l Oil)

Insecticidal Soap: See APHIDS

Neem Products: See APHIDS

Pyrethrin:

Hess & Clark (microencapsulated, Capsul-Ban, Formula 66, LD 44Z) • Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster-O, w/o PBO)

Pyrethrin, rotenone, sulfur and copper (garden mites):

Bonide, Gardner's Supply (Bonide Garden Dust)

Pyrethroid (fluvalinate):

Wellmark, Miller Bee (Apistan Strips for bee mites)

Pyrethroid (permethrin-soaked cotton balls given to laboratory rodents to kill ectoparasite vectors):

Ecohealth (Mite Arrest)

Repellent Garlic Spray (for spider mite):

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley

Repellent Hot Pepper Wax:

Harmony • The Green Spot • Peaceful Valley • Garden City

Silica Aerogel: See ANTS

Tannic acid (for house dust mites):

Allergy Control Products

MOSQUITOES

Identification & Monitoring

Mosquito Traps:

BioQuip (CDC, EVS, New Jersey) • Gempler's • American Biophysics (carbon dioxide) • Biosensory (baited)

Attractant for Mosquito Traps:

Flowtron (Octenol controlled release)

• Sigma Chemical (Octenol) • Biosensory

Mosquito larvae collection devices:

Clarke Mosquito Control (Dippers)

• BioQuip • Ben Meadows

Physical Controls

Screening and Netting:

BioQuip • REI • Apex Medical

Monomolecular Films to Stop Larvae: Cognis (Agnique) • Henley (Arosurf)

Biological Controls

Habitat:

Bat Houses: Harmony, Natural Insect Control, The Green Spot, Peaceful Valley, Plow and Hearth

Purple martin bird houses: Nature House (Trio)

Microbial Insecticides:

Bacillus sphaericus (for Culex larvae): Valent Bio (VectoLex, Spherimos)

Bacillus thuringiensis israelensis (BTI) for mosquito & blackfly larvae: Valent Bio, Harmony, Peaceful Valley (Vectobac) • Valent Bio, Peaceful Valley (Skeetal, Bactimos) • Wellmark (Teknar) • Summit, Harmony, Nitron, Sutton, Smith & Hawken, Natural Insect Control (Mosquito Dunks) • Planet Natural, Peaceful Valley (Mosquito Control)

Parasitoids:

Encarsia opulenta (for citrus blackfly): Praxis

Predators:

mosquito fish, *Gambusia affinis*: J. Reilly (Fish shipped May-July) • Natural Pest Controls • Richmond



Least-Toxic Chemical Controls

Insecticidal Oil: See APHIDS

Insect Growth Regulators:

Methoprene pellets, Wellmark (Altosid)

Repellents (Botanical):

Planet Natural, Natural Insect Control (Skeeter Shooo Botanical) • San Jacinto (Mosquito Beater) • S.C. Johnson, Planet Natural (citronella candles) • Woodstream, Gardens Alive (Bite Blocker, geranium oil) • Tender, A.M. Leonard (Natrappel citronella) • Woodstream (Mosquito Barrier Area Repellent) • Roxide (herbal)

Seeds or Mosquito-Repelling Plants:

Shepherds (sweet basil) • Park Seed (holy basil) • J.L Hudson (seeds for repellent plants)

DEET repellent:

REI (Cutter's, Jungle Juice) • BioQuip

Pyrethrin repellent (not for use on skin):

WPC (Permanone) • Apex Medical (Repel) • Waterbury (Purge III)

MOTHS

(See Caterpillars)

NEMATODES

Biological Controls

Beneficial Nematodes:

Steinernema spp.: Certis, Nitron, Johnny's • BioLogic • Hydro-Gardens

Biocontrol bacteria:

Burkholderia cepacia: Market VI (Deny)

Bacillus chitosporus: Rincon-Vitova (Activate)

Biocontrol Fungi:

Arthrobotrys sp. (Europe only): Bio Pre

Dactylella sp.(Europe only): Bio Pre

Hirsutella rhossiliensis (Europe only): Bio Pre

Myrothecium verrucaria: Valent USA (DiTera)

Paecilomyces lilacinus: Bio Pre

Experimental Fungus: International Mycological Institute

Natural chitin-protein nematicide:

Igene Biotechnology, Harmony, Peaceful Valley (ClandoSan) • Planet Natural

Botanical nematicide: Soil Technologies (Nemastop)

SAWFLIES

Physical Controls

Traps and Sticky Tape:

Great Lakes

Least-Toxic Chemical Controls

Insecticidal Soap: See APHIDS

Neem Products:

Certis, Planet Natural, Harmony (Azatin) • Woodstream, Harmony, (Safer's BioNeem) • Certis, Planet Natural, Harmony, Peaceful Valley (Neemix, Trilogy) • San Jacinto (Organica)

SCALES

(See Beetles)

Identification & Monitoring

Pheromones & Traps:

ARBICO, Harmony (Catch-em) • Trécé, Great Lakes, Gemplers, Harmony, Peaceful Valley (Pherocon, Multi-Pher, Unitrap, Delta Traps) • Scentry, Great Lakes, ARBICO, Planet Natural, Gemplers, Natural Insect Control (Delta & Wing Trap) • Phero Tech • Woodstream (SureFire) • Scenturion

Sticky Trap/Tape:

ARBICO • Planet Natural • Great Lakes • Olson • Gemplers • Scentry • Peaceful Valley • Phero Tech

Physical Controls

Barriers & Exclusion Devices:

Planet Natural • Gardens Alive!

Screening:

Hydro-Gardens (Fly Barr)

Sticky Adhesive:

Seabright, Great Lakes, Harmony, Phero Tech (Stickem Special)

Traps and Sticky Tape:

Planet Natural • Gardens Alive! • Harmony • IPM Labs • Phero Tech (Chroma) • Peaceful Valley

Biological Controls

Parasitoids:

Aphytis lingnanensis (for California red scale): Amos Rubin • Bugs for Bugs

Aphytis melinus (for red scale): ARBICO • Bio Ag • Bio Pre • Bowen • FAR • IPM Labs • Kuida • Natural Insect Control • Natural Pest Controls • Organic Control • Peaceful Valley • Praxis • Rincon-Vitova • Sespe Creek • Western Farm • The Green Spot • Bioplanet

Coccophagus lycimnia: Praxis • Bio Pre

Comperiella bifasciata (for red scale): Praxis

Encyrtus lecaniorum: Bio Pre

Metaphycus helvolus (for black scale): ARBICO • Bio Pre • IPM Labs • Natural Insect Control • Natural Pest Controls • Peaceful Valley • Praxis • Rincon-Vitova • Sespe Creek • The Green Spot

Metaphycus zebratus (for soft scale): Bio Pre

Microterys flavus (for brown scale): ARBICO • Bio Pre • Natural Pest Controls • Praxis • W. Neudorff

Parasitic mite, *Cunaxoides* spp.: Praxis

Predators:

Lady beetles:

Chilocorus baileyi (for armored scale): Bugs for Bugs • W. Neudorff

Chilocorus circumdatus (for citrus snow scale, armored scale): Bugs for Bugs • W. Neudorff

Chilocorus spp.: Praxis • Bioplanet

Chilocorus nigritus (for hard scale): Bio Pre • W. Neudorff

Cybocephalus catalinae: IPM Labs

Cybocephalus nipponicus: IPM Labs



Harmonia axyridis: Applied Bionomics • Natural Insect Control • Evergreen • Rincon Vitova
Lindorus lophanthae: ARBICO • Bio Pre • Bioplanet • Planet Natural • Bugs for Bugs • Natural Insect Control • Rincon-Vitova • The Green Spot • Sespe Creek
Scymnus sp. (for soft scale): Bio Pre

Predatory mite, *Euseius* spp. (for scale general, sweetpotato whitefly): Praxis

Least-Toxic Chemical Controls

Insect Growth Regulators

Fenoxycarb: Syngenta (Comply, Precision)

Methoprene: Wellmark (Enstar)

Insecticidal Oil: See Aphids

Insecticidal Soap: See Aphids

Pyrethrin: See Aphids

Repellent Hot Pepper Wax

Planet Natural • The Green Spot • Charley's • Harmony

SILVERFISH

Least-Toxic Chemical Controls

Borate-Based Insecticides:

Waterbury (Mop-Up) • Whitmire (PT 240 aerosol or PT 240 D 99% boric acid dust) • Peaceful Valley (Roach Powder) • Nisus, Target (Niban FG) • NISUS (Timbor) • Planet Natural (Borid) • J.T. Eaton

Diatomaceous Earth: See ANTS

Pyrethrin:

AgrEvo (Kicker, Drione)

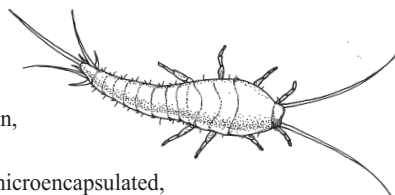
• Hess & Clark

(microencapsulated, Capsul-Ban,

Formula 66, LD-44Z)

• Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO)

Silica Aerogel: See ANTS



SLUGS AND SNAILS

Physical Controls

Barriers & Exclusion Devices:

Copper snail barrier:

Custom Copper/Snail Barr, Harmony, The Natural Gardening, Peaceful Valley (Snail-Barr) • Woodstream, The Green Spot (Safer)

Traps:

Woodstream, Harmony, Santa Cruz Hort., ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (Safer) • Nitron, Peaceful Valley, Gardens Alive!, ARBICO (Slug Saloon)

Trap with barley/rice yeast bait:

Gardener's Supply (Slug Trap)

Biological Controls

Predators:

Predatory nematode for snails, *Phasmarhabditis* sp.: Biowise

Predatory snail, *Rumina decollata* (for brown garden snail): ARBICO • C. H. Musgrove • Peaceful Valley • Rincon-Vitova • Sespe Creek

Predatory fly, *Tetanocera* spp. (for European slug): Praxis

Least-Toxic Chemical Controls

Insecticidal Soap: See APHIDS

Slug Bait:

MicroFlo (Slugmaster, metaldehyde) • Garden's Alive (Escargo, iron phosphate) • Monterey, Harmony, Peaceful Valley (Sluggo, iron phosphate)

TERMITES

Identification & Monitoring

Moisture Meter:

Jim Simmons • Professional Equipment • Van Waters • Ben Meadows

Rigid borescope for detecting termites:

Van Waters & Rogers (Econoscope) • Professional Equipment

Termite Sniffer:

Professional Equipment

Trained Dogs:

Beacon Dogs • Industrial Narcotic

Biological Controls

Insect-Attacking Nematodes:

Steinernema carpocapsae: BioLogic • Certis • Hydro-Gardens

Physical Controls

Cold Treatment (liquid nitrogen):

Tallon Pest Control (The Blizzard System)

Electrical Treatment (for drywood termite & boring beetles):

ETEX (Electrogun)

Heat Treatment:

In Denmark: AS Skadedyrcentralen

TPE/Thermature (Licenses USA companies - Call for Local Practitioners) • In England (Thermo Lignum) • Topp (heaters)

Microwave Equipment:

Wavelength • Professional Equipment

Microwave Treatment:

Call the Bio-Integral Resource Center (see address list)

Least-Toxic Chemical Controls

Borate Termiticide & Wood Preservative:

NISUS, Target, Van Waters, Peaceful Valley (Bora-Care, Jecta) • Pole Care (Impel Rods) • Permashink (Guardian, Shellguard) • Sashco (Penetreat) • NISUS (TimBor)

Borate-treated logs:

Appalachian • Coast-to-Coast • Lok-N-Logs

Borate-treated lumber:

Gross & James (cross ties) • Osmose • Louisiana Pacific

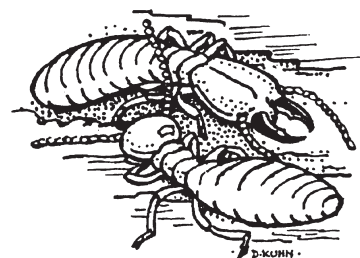
Borate application foamer:

Richway Industries

Imidacloprid Soil Treatment:

Bayer Agricultural (Premise)

Fipronil Soil Treatment: Aventis (Termidor)



Termite Baits:

Diflubenzuron Exterra System: Ensystex

Diflubenzuron Outpost Bait: Whitmire

Hexaflumuron Sentricon System: Dow AgroSciences

Sulfluramid Bait: FMC Corporation (FirstLine) • Spectrum (Terminate)

Termatrol Monitoring Station: Whitmire

Silica Aerogel (in wall voids and attics to repel drywood termites):

See ANTS

THRIPS

Identification & Monitoring

Pheromones & Traps:

Great Lakes • Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Peaceful Valley

Sticky Trap/Tape:

ARBICO • BioBest • Planet Natural • Great Lakes • Gemplers • Scentry • Western Farm (Blue Plastic) • Phero Tech

Physical Controls

Screening:

Green-Tek, The Green Spot (No-Thrip) • Tipper, Harmony, Peaceful Valley (Tie-Net)

Traps and Sticky Tape:

Springstar • Harmony • Natural Insect Control • Olson • Gemplers • Phero Tech • Great Lakes • Peaceful Valley • Western Farm (Blue Plastic)

Biological Controls

Microbials

Beauveria bassiana: Emerald, Florikan, Harmony (Botanigard)

• Troy (Naturalis O, L)

Verticillium lecanii: Koppert (Mycotal, Vertalec)

Predators:

Lacewing, *Chrysoperla* spp.: Smith & Hawken • W. Neudorff

Lacewing, *Mallada signata*: Bugs for Bugs

Predatory thrips, *Franklinothrips orizabensis*: American Insectaries

Predatory bugs:

Deraeocoris brevis: Applied Bionomics • The Green Spot

Macrolophus nubilis: Flora Nutzlinge • Katz

Orius albidipennis: Bio Bee

Orius insidiosus: Syngenta Bioline • Koppert • IPM Labs • Gartneri • Nature's Control • Plant Sciences • The Green Spot • International Technology • Biobest Canada • Natural Insect Control

Orius laevigatus (for western flower thrips): Amos Rubin • Bioplanet • Bio Bee • Koppert • Biological Control • Biological Crop • Plant Sciences

Orius majusculus: Koppert • Sautter & Stepper • W. Neudorff • Bioplanet

Orius spp.: Biobest • Bioplanet • Bio Pre • Duclos • Natural Insect Control • Peaceful Valley • Rincon-Vitova

Orius tristicolor: ARBICO • Planet Natural • Praxis

Predatory mites:

Amblyseius barkeri: FAR • IPM Labs • M & R Durango

• Natural Insect Control • Sautter & Stepper • W. Neudorff

Amblyseius cucumeris: ARBICO • Applied Bionomics • Biobest • Biofac • Planet Natural • Syngenta Bioline • Gartneri • Hydro-Gardens • International Technology • IPM Labs • Koppert • M & R Durango •

Evergreen • Bug Factory • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Nature's Control • Peaceful Valley • Gemplers • Plant Sciences • Praxis • Rincon-Vitova • W. Neudorff • The Green Spot • Borregaard • Sautter and Stepper • Garta • Biological Crop
Amblyseius degenerans: Amos Rubin • Applied Bionomics • Bio Pre • Bio Bee • Biological Control • International Technology • IPM Labs • Koppert • Natural Insect Control • The Green Spot

Hypoaspis miles (for springtail thrips): Applied Bionomics • IPM Labs • Natural Insect Control • Bug Factory • The Green Spot • International Technology • Koppert • Flora • Katz

Least-Toxic Chemical Controls

Cinnamon Oil, Garlic: JH Biotech, Harmony (GC-Mite)

Diatomaceous Earth: See Ants

Insecticidal Soap: See Aphids

Neem Products:

Certis, Planet Natural, Harmony (Azatin, Align) • Woodstream, Harmony (Safer's BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Neemazad, Trilogy, Triact) • Green Light • San Jacinto (Organica)

Pyrethrin:

Johnny's, Peaceful Valley (Pyrenone)

• AgrEvo (Kicker) • Necessary (Concern)

Repellent Garlic Spray:

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley • Harmony

Sabadilla:

Dunhill, Harmony (Veratran)



TICKS

Physical Controls

Curved tweezers:

BioQuip Products (foreceps)

Tweezers, magnifier & specimen storage bag:

REI (Tick Solution Kit) • BioQuip • A.M. Leonard (TickPick)

Least-Toxic Chemical Controls

Diatomaceous Earth, with pyrethrin:

Permaguard, Pristine, Nitron (Permaguard Pet & Animal) • Pristine, Nitron (Permaguard Household)

Insecticidal Oil:

Citrus oil (d-limonene) extract:

Orange Guard, Vopak, Target

Pennyroyal, Eucalyptus, Citronella Shampoo:

Hansen's Pet Systems

Repellents:

DEET repellent:

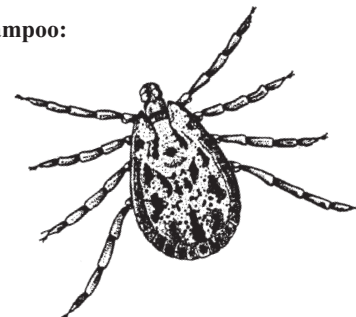
REI (Cutter's, Jungle Juice)

Permethrin tick repellent:

WPC, Apex Medical, Forestry Suppliers (Permanone) • Sawyer

Selective Pesticide Fipronil:

Merial, Aventis (Frontline) • Veterinarians



Insecticidal Soap:

With pyrethrin:

Woodstream, Planet Natural, Gardens Alive!, Harmony (Flea & Tick Attack) • Woodstream, Gardens Alive!, Harmony, Nitron, The Natural Gardening (Safer Yard and Garden) • Peaceful Valley

Pyrethrin:

Del (Lice, Tick & Flea Killing Spray)

Pyrethroid (permethrin-soaked cotton balls taken to rodent nests to kill ectoparasite vectors):

Ecohealth, Harmony (Damminix)

Silica Aerogel: see ANTS

WASPS

(See Yellowjackets)

WEEVILS

(See Beetles)

WHITEFLIES

Identification & Monitoring

Pheromones & Traps:

Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Phero Tech • Peaceful Valley • The Green Spot

Sticky Trap/Tape:

Scentry, Great Lakes, ARBICO, Planet Natural, Gemplers (Versagard) • Hansen's • ARBICO • Natural Insect Control • Peaceful Valley

Physical Controls

Screening:

Hydro-Gardens (Fly Barr) • Tipper, Harmony, Peaceful Valley (Tie-Net) • Green-Tek, The Green Spot (Anti-Virus)

Sticky Adhesive:

Tanglefoot, ARBICO, Planet Natural, Great Lakes, Gemplers, Harmony, Natural Insect Control, Charley's (Tangle-Trap) • Seabright, Harmony, Great Lakes (Stickem) • Peaceful Valley • Phero Tech

Traps:

Woodstream (Safer Flying Insect) • ARBICO (Insect-A-Peel) • Phero Tech • Springstar

Light traps:

Gilbert Industries (Light Traps)

Sticky trap/tape:

ARBICO • Natural Insect Control • Olson, Great Lakes, Gemplers, Charley's (Stiky Stuff, Stiky Traps) • Seabright (Sticky Traps) • Harmony • Peaceful Valley • Nature's Control

Biological Controls

Microbial Insecticides:

Beauveria bassiana fungus: Troy, Hydro-Gardens, Gardener's Supply, Planet Natural (Naturalis O, L, ES) • Emerald, Hydro-Gardens, Harmony, Rincon-Vitova (Mycotrol, Botanigard)

Paecilomyces fumosoroseus fungus (call for availability in the U.S.): Certis • Biobest • Hydro-Gardens • Bio Pre • Harmony

Verticillium lecanii fungus (for greenhouse use): Koppert (Mycotal, Vertalec)

Codacide oil to use with fungal spray: Microcide

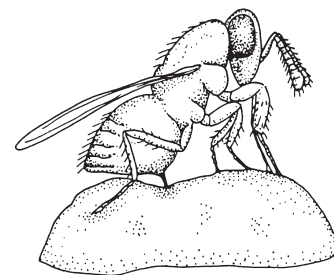
Parasitoids:

Encarsia deserti: Hydro-Gardens

Encarsia formosa (for greenhouse whitefly): ARBICO • Applied Bionomics • Biobest • Biofac • Bioplanet • Biological Crop • Budai • Syngenta Bioline • CIE • CO. DEA • Duclos • Biowise • Evergreen • Gartnerei • Hydro-Gardens • IPM Labs • Koppert • M & R Durango • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Nature's Control • Organic Control • Peaceful Valley • Planet Natural • Plant Sciences • Praxis • Rincon-Vitova • Sautter & Stepper • W. Neudorff • Zaklad • The Green Spot • Flora • International Technology • Biobest Canada • Katz

Encarsia mundus: Bioplanet

Eretmocerus californicus (for sweetpotato or silverleaf whitefly): Beneficial • Bio Pre • Florikan • International Technology • IPM Labs • Plant Sciences • Praxis • The Green Spot • Rincon-Vitova • Buena



Eretmocerus eremicus: Syngenta Bioline • Hydrogardens • Biobest Canada • The Green Spot • Plant Sciences • Natural Insect Control • Koppert • Biological Crop • M&R Durango • Rincon-Vitova

Predators:

Lacewing (greenhouse use), *Chrysoperla carnea* or *Chrysopa carnea*: See APHIDS for suppliers

Lacewing (greenhouse use), *Chrysoperla rufilabris*: See APHIDS for suppliers

Lacewing (greenhouse use), *Mallada signata*: Bugs for Bugs

Lady beetle, *Delphastus pusillus* (for sweetpotato or silverleaf whitefly): Amos Rubin • ARBICO • Biobest • Biological Crop • Evergreen • Planet Natural • Hydro-Gardens • International Technology • IPM Labs • Natural Insect Control • Nature's Control • Praxis • Rincon-Vitova • Peaceful Valley • The Green Spot • American Insectaries

Lady beetle, *Delphastus catalinae*: Applied Bionomics • Rincon-Vitova

Predatory mite, *Euseius rubini*: Amos Rubin

Predatory bug, *Macrolophus caliginosus*: Biobest • Bioplanet • Biowise • Koppert

Predatory bug, *Dicyphus hesperus* Applied Bionomics • Bug Factory

Least-Toxic Chemical Controls

Diatomaceous Earth: See ANTS

Insect Growth Regulators:

Wellmark (Enstar)

Insecticidal Oil:

Highly refined oil (from petroleum):

Monterey, Harmony (Saf-T-Side) • Sun Oil, Gardens Alive!, Harmony, Peaceful Valley (Sunspray) • Florikan (Target Oil) • Gardens Alive (Eco-Oil) • The Green Spot • PBI (Acme)

Highly refined seed oil:

Stoller, Peaceful Valley (Natur'l Oil) • Gardens Alive (Oil Away)

Insecticidal Soap: See APHIDS

Neem Products:

Certis, Planet Natural, Harmony (Azatin) • Woodstream, Harmony, Peaceful Valley (Safer's BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • San Jacinto (Organica)

Pyrethrin:

Johnny's, Peaceful Valley (Pyrenone) • AgrEvo, Insects Limited (Kicker) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster-O w/o PBO)

Repellent Garlic Spray:

Garlic Research Labs, Chemical-Free (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley

WORMS

(See Caterpillars)

YELLOWJACKETS and BEES

Identification & Monitoring

Pheromones & Traps:

Woodstream, Planet Natural, Peaceful Valley, Harmony, Great Lakes (SureFire) • Phero Tech (Phero Tech Lures) • Phero Tech, Great Lakes (Unitrap) • Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • San Jacinto (for Africanized bees)

Training Video for Honeybee Emergencies:

A.I. Root

Physical Controls

Beekeeping equipment for use on bee swarms, yellowjacket nest removal:

A.I. Root (bee veil, gloves, suits) • Dadant & Sons (Bee veils & coveralls) • BioQuip

Bee swarm traps:

Scentry, Great Lakes, ARBICO, Planet Natural (Swarm Trap)

• San Jacinto • Gemplers

Bee Pheromone Lure:

Miller Bee • Phero Tech

• San Jacinto

Bee Pheromone Spray to attract bees:

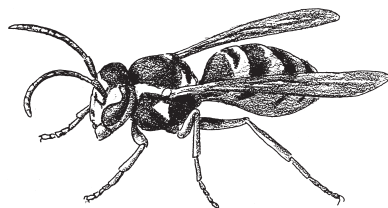
Phero Tech (Fruit Boost)

Bee Varroa Mite Trap:

Phero Tech

Yellowjacket Traps:

Seabright, Great Lakes, Harmony, Phero Tech, Gemplers (Yellowjacket Inn) • Sterling Intl. (Rescue! Yellowjacket) • Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control (Victor Fly-In-Saucer) • Woodstream, Harmony, Santa Cruz Hort, ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (SureFire) • Woodstream (Safer Pheromone Trap)



Least-Toxic Chemical Controls

Boric acid:

Whitmire (PT 240 20% aerosol, PT 240D 99% pure boric acid dust)

Diatomaceous Earth (with pyrethrin): See ANTS

Insecticidal Soap:

For Africanized Bees:

Harmony (M-Pede)

Pyrethrin:

Hess & Clark (Capsul-Ban microencapsulated, Formula 66, LD-44Z) •

Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO)

• Gardener's Supply (Pyrethrin and Rotenone)

Essential Oils:

Ecosmart (BioOrganic, EcoPCO)

Mint Oil:

Woodstream (Poison Free)

Resmethrin plus components that "freeze" wasps:

Roxide (Revenge Wasp & Hornet Killer)

Silica Aerogel (with pyrethrin): See ANTS

Sting Stop (for pain): Boericke

Wasp/Bee Sting Medication:

Self-injected epinephrine:

Darby (EpiPen) • Hollister-Stier (Ana-Guard) • Dey Labs (EpiPen)

First-aid for bee stings:

Miller Bee (Sting Aid)

MISCELLANEOUS

Educational Materials

Databases (Pest Management):

Bio-Integral Resource Center (Online Organic) • University California Statewide IPM Project (IMPACT Database) • World Wide Web

On-line, CD-ROM database of registered pesticide products, chemical fact sheets, MSDS sheets:

NPIRS User Services (Pest Bank) • World Wide Web

Pest Management Publications & AV Products:

Books on agriculture, horticulture, pest management:

Jack and the Beanstalk

Integrated Pest Management publications:

Bio-Integral Resource Center (BIRC)

Slides on biological control:

BCW

Slides, reference library, training manuals:

Vopak

Videos introducing IPM in agriculture, landscaping, & greenhouses, two pest ID slides kits:

San Luis Video

Identification & Monitoring

Computers & Software:

Apple scab forecasting equipment:

Gemplers (PSAOC consultant software)

Compost maturity test kit: Woods End (Solvita)

Portable data recording equipment:

Wescor (Biophenometers)

Information/Identification Services & Supplies:

Entomological specimens (10,000 species): Combined Scientific Supplies, Great Lakes, Gemplers, BioQuip

Equipment, supplies & books: BioQuip • Gemplers

Ichneumonid identification service: American Entomological Institute

Identification and information service for pests and beneficial insects: CAB Biosci • BioNet

Identification of insect pathogens: Consulting Diagnostic Service

Identification of Entomopathogenic Nematodes: CAB Biosci

Information, identification of agricultural, urban insects: Cooperative Extension Service (local offices)

Information service on biological control: CAB Biosci • Bio-Integral Resource Center (BIRC)

Information on Pheromone Use and Development: American Semiochemical Association

Information on Pesticide Toxicity: <http://ace.orst.edu/info/extoxnet> • <http://www.pesticideinfo.org> • Bio-Integral Resource Center

Information on BIRC Publications: <http://www.birc.org>

Information on Biocontrol Insectaries: ANBP

Online Organic Database: <http://www.birc.org>

Sustainable Agriculture Website:

<http://www.sarep.ucdavis.edu/grants/database>

Monitoring Devices:

Data Logger: Onset Computer (Hobo)

Electronic insect counter: Automata (Data-Lynx BUGCOUNT)

Flashlight with red filters: (Streamlight)

Flashlight Helmet: Streamlight (Cyclone)

Inspection mirror: Applied Bionomics, Harmony Farm (Magnifier hand lenses, headband magnifiers)

Microscopes: Gemplers (Donegan Optical) • RF Inter-Science, Gemplers (Macroscope 25, Macroscope 45, Macroscope 18-36 Zoom)

Moisture meters: Delmhorst (Delmhorst) • Jim Simmons • Professional Equipment

Termite Sniffers: Professional Equipment

Radon Test Kits: Professional Equipment

Sweep nets: Oakfield Apparatus • BioQuip • Great Lakes

Temperature monitor: Great Lakes (Taylor Min/Max Thermometer) • (CropClok 1000 Temperature Integrator, Dickenson Self-Contained Temperature Recorders) • Gempler's

Maximum-Minimum Thermometer: BioQuip • Great Lakes

Degree-day Calculators: Gemplers • BioQuip

Vacuums: ARBICO (Bug Sweep) • BioQuip Products (Insect Vacs) • D-VAC Company (D-VAC) • McCluney • Gardener's Supply (Bug Vacuum) • Proteam (Hummer, Optimus) • Peaceful Valley

Water bacteria analysis kits: Professional Equipment • Idexx • Neogen

Weather monitor & disease forecasting system: Automata (Data-Lynx Degree Day) • Neogen (EnviroCaster) • Gemplers (Pessl Metos Products)

Pesticide Residue Detection:

Aquatic sampling equipment: Wildlife Supply

Detection of carbamate, organophosphate & thiophosphate residues in air, water, soil or surfaces: Neogen (Veratox, Ticket) •

Silverlake

Lead testing kit: Professional Equipment • Planet Natural

Lead, pesticides, nitrates test kit: Silverlake

Physical Controls

Row Covers:

Charley's (Harvest-Gard) • See Beetles (crop pests)

Biological Controls and Supplies

Artificial Diets:

For lacewings & lady beetles:

Rincon-Vitova • The Ladybug Company • The Green Spot (Biodiet) • Oliver

Wheat for lacewings & lady beetles:

Planet Natural • Peaceful Valley, Charley's (Pred-Feed) • Natural Insect Control

Teflon Insect Barrier:

Local Hardware Store (see Plumbing Supplies)

Habitat:

Bat house to encourage insect predation by bats:

Gardener's Supply (Bat House) • Peaceful Valley • Green Spot • Natural Insect Control • Harmony

Seed mixture for beneficial insect habitat:

Gardens Alive! (Haven Flowering Herbs, Haven Cover Crop) • Peaceful Valley (Good Bug Blend, Border Patrol) • Lohse Mills • Shepherd's • Gardner's Supply • W. Atlee Burpee

California Native Grass and Flower Seeds: Pacific Coast Seeds

Soil analysis test kits: BioQuip • Great Lakes • Peaceful Valley

Transplants for beneficial insect habitat:

Cornflower Farms

Insect and Microbial Rearing Supplies:

Autolysed yeast (rearing medium, fruitfly attractant, baiting control): Bugs for Bugs

Sitotroga cerealella (moth eggs for Trichogramma rearing medium): Kunafin

Supplies for rearing insect pathogens: International Mycological Institute • Oliver • Invitrogen

Pollination aids:

Ecogen (Bee-Scent) • Phero Tech (Fruit Boost)

Pollinators: bumble bee, *Bombus* spp.: W. Neudorff • Biobest • Koppert • Natural Insect Control • Bio Bee

Predators:

Chinese praying mantid, *Tenodera aridifolia sinensis*: ARBICO • Planet Natural • M & R Durango • Natural Insect Control • Natural Pest Controls • Peaceful Valley • Praxis • Smith & Hawken • A-1 Unique • Nature's Control • The Green Spot

Red hybrid earthworms, *Lumbricus* sp.:

A-1 Unique • Rincon-Vitova

Pesticide Application Equipment

Application equipment for structural pest control:

B & G • Harmony • Peaceful Valley • Professional Equipment • Vopak

Bait applicator:

Specialty Products (BaitGun) • Whitmire • Blue Diamond

Dusters:

B&G Equipment (B&G Dusters) • AgrEvo (Actisol) • Planet Natural, Nitron, Peaceful Valley, Gardens Alive, Charley's (Dustin Mizer) • Vopak (Getz Gun) • Parker (P.E.S.T. Power Applicator) • Woodstream, Peaceful Valley (Pest Pistol)

Electrostatic sprayers/dusters:

Electrostatic Spraying Systems • Pristine • Bee Tee • Agr Evo

Sprayers:

Planet Natural • Bee Tee, Pristine (Murayama) • Gardener's Supply (Spraydoc) • Green Pro • Harmony • Vopak • Gempler's

Tool for Injecting Wall Voids: B & G

Protective Skin Coating: Gloves in a Bottle

Respirators:

BWS • Harmony • Lab Safety Supply (full hood respirator) • Survivair (Series 86 Disposable APR) (Call Survivair for local distributors) • Vopak

Production Supplies

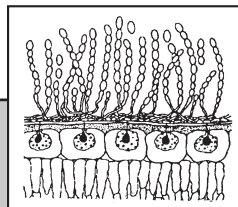
Irrigation Equipment: Harmony

Organic Fertilizer: Gardener's Supply • San Jacinto • Harmony • Peaceful Valley • New Era

Recycling Resources

Compost, Used Materials: Calmax • New Era

Portable Bailer to Recycle Solarization Plastic: Kennco



PLANT DISEASE MANAGEMENT

CROWN GALL DISEASE

Biological Controls

Microbial Fungicides:

Agrobacterium radiobacter strain K84: AgBioChem, Necessary, Harmony (Galltrol-A, Gallex) • New BioProducts, IPM Labs (NoGall K1026) • Western Farm

PATHOGENS

of Flowers, Foliage and Fruit

Identification & Monitoring

Apple scab forecasting equipment:

Harmony (Qualimetrics Hygrothermograph) • Automata (Scab Off software)

Automata (Grapemold)

Lettuce downy mildew prediction software:

Automata (Let Down)

Indicator plant (Summer Madness petunia) for tomato spotted wilt: Ball Seed

Tomato spotted wilt virus detection kit: Agdia

Plant disease detection kits: Neogen (Reveal)

Weather monitor & disease forecasting system (for fire blight):

Gemplers (MARYBLYT)

Physical Controls

Fungal Barriers:

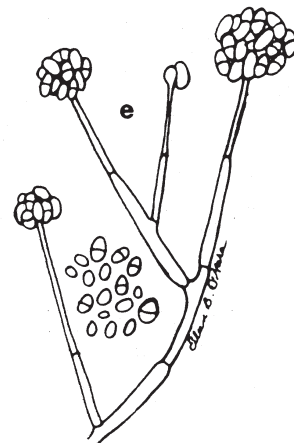
Antitranspirants:

Green Pro (Vita Coat) • Miller (Vapor Gard) • PBI/Gordon (Transfilm) • Precision (Preserve) • Wilt-Pruf (Wilt-Pruf) • Nature's Touch (Leaf Cote Clear) • Peaceful Valley

Habitat:

Styrofoam blocks to increase ventilation:

Beaver Plastics, First Choice (Ventblocks)



Horticultural Controls

Disease-Resistant Roses:

Heritage Rosarium • High Country • Hortica • Heirloom • Jackson and Perkins • Lowe's Own • Vintage Gardens • Rose Catalog • American Rose Society

Biological Controls

Microbial Fungicides:

Ampelomyces quisqualis (biofungicide for powdery mildew):

Ecogen, Harmony, Plant Health Care (AQ-10)

Bacillus pumilis (biofungicide): Rincon-Vitova (Activate)

Bacillus laterosporus (Rosa Flora): Better Flora

Bacillus subtilis (Serenade): AgraQuest

Candida oleophila (for postharvest protection of citrus):

Ecogen (Aspire)

Compost tea brewers: Growing Solutions • SoilSoup • Microb Brewer • Earth Tea

Pseudomonas fluorescens (for fire blight): Plant Health Technologies, Peaceful Valley (Blight Ban)

Pseudomonas solanacearum (non-pathogenic for bacterial wilt control): Natural Plant Protection

Trichoderma harzianum (for grey mold): Makhteshim-Agan

(Trichodex) • Bioworks (Plant Shield) • Borregaard • Binab (Plant Gard)

Trichoderma sp. (for chlorotic vine leaf curl): Binab (Binab-T)

Streptomycin antibiotic (for pear, apple fire blight):

Peaceful Valley (Agrimycin)

Least-Toxic Chemical Controls

Baking soda with sticker: Gardener's Supply (Remedy) • Monterey • Peaceful Valley

Calcium Foliar Spray: Bonide (Rot-Stop)

Cinnamic aldehyde: Emerald (Valero)

Garlic and Oil: JH Biotech, Harmony (GC-3)

Copper & Sulfur Fungicides:

Planet Natural (micronized sulfur) • Monterey (Nordox, Copper Count N, Micronized Sulfur) • Peaceful Valley, The Natural Gardener (Kocide, Bordeaux) • Harmony • Bonide, Gardener's Supply (Bonide Garden Dust) • Gardens Alive (copper soap) • Woodstream (Rose and Flower) • Intagra, Necessary (Concern fungicidal soap) • Stoller (TopCop)

Flowable sulfur formulation:

Woodstream, Harmony, Charley's, (Safer Garden Fungicide) • Peaceful Valley • Stoller (That)

Fungicidal Soap (copper and soap): Gardens Alive (Soap Shield)

Peroxide Oxidants: Biosafe (Oxide, Zero Tol)

Oil and Lime-Sulfur:

The Green Spot • Best Sulfur Products

Calcium Thiosulfate:

Best Sulfur Products (Thiocal)

Highly refined oil (from petroleum) & sulfur:

Necessary • Peaceful Valley

Mint oil: Soil Technologies (Fungastop)

Neem Products (for mildew, botrytis, rust): Certis, Harmony, Peaceful Valley (Trilogy, Triact) • Greenlight • San Jacinto (Organica)

Horticultural Oil: See APHIDS

ROOT PATHOGENS

Identification and Monitoring

Detection kit for pathogens:

Neogen (Reveal)

Physical Controls

Heat, Steam and Hot Water:

Heat (electric soil sterilizer):

Olson, Great Lakes, Gemplers

Hot Water:

Aqua Heat

Solarization Plastic:

Mipco • AEP • Peaceful Valley

Portable Bailer to Recycle

Solarization Plastic:

Kenngo Manufacturing

Steam Machines and Boilers:

Sioux • Saskatoon

Biological Controls

Microbial Fungicides:

Burkholderia cepacia: Market VI (Deny)

Fusarium oxysporum (non pathogenic): Natural Plant Protection

Gliocladium virens (for pythium, rhizoctonia):

Certis, Harmony, Gardens Alive (SoilGard)

Gliocladium sp. (for fusarium, pythium): Kemira Oy, Hydro-Gardens (Gliomix)

Microbial Antagonists: San Jacinto (MicroGro) • Rincon-Vitova

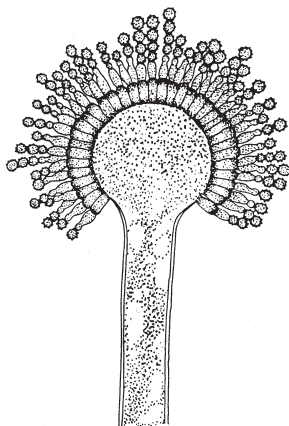
Pseudomonas aureofaceans (leased system for golf courses): EcoSoil (BioJect system)

Pseudomonas cepacia: Soil Technologies (Bac-Pack)

Pseudomonas solanacearum (non-pathogenic): Natural Plant Protection

Pseudomonas spp. (also includes other antagonists, mycorrhizae and growth stimulating enzymes): Green Releaf (BioReleaf)

Streptomyces griseoviridis strain K61 (for fusarium, damping off,



pythium, phytophthora, etc.): Kemira, Hydro-Gardens (Mycostop) • AgBio (Mycostop) • Peaceful Valley • Rincon-Vitova • Harmony • Plant Health Care

Streptomyces sp.: Spray-N-Grow (RootGuard)

Streptomyces lydicus (for fusarium, rhizoctonia, pythium):

San Jacinto (MicroGro)

Trichoderma harzianum (soil treatment for root pathogens): BioWorks (Rootshield, Turfshield) • Binab • Wilbur-Ellis (Bio-Trek, for brown patch, dollar spot on golf courses) • Borregaard • Harmony

Trichoderma atroviride (cold tolerant): Ag Tech (Plant Helper)

Trichoderma sp. (for growth promotion): Plant Health Care (Compete)

Disease-Suppressive Seed or Soil Treatment:

Bacillus subtilis: Gustafson (Kodiak) • Plant Health Care • Rincon-Vitova (Activate) • AgraQuest (Serenade)

Bacillus uniflagellus: Rincon-Vitova (Activate)

Bacillus spp. (mixture): Rincon-Vitova

Burkholderia cepacia: Market VI

Trichoderma harzianum (seed treatment for root pathogens): BioWorks (Rootshield, Planter's Box) • Agricola Mas Viader • Plant Health Care

Disease-suppressive peat moss:

Southern Importers (Southland)

Disease-suppressive container mixes or compost:

BioComp • Earthgro (Scotts) • Sun-Gro • Southern • Louisiana Pacific • O.M. Scotts (Hyponex) • Paygro

Micronutrients: Spray-N-Grow

Compost Tea Brewing Equipment: Growing Solutions • SoilSoup • Microb Brewer • Earth Tea

Endomycorrhizae to increase plant nutrition and help protect against disease:

Glomus sp. (VAM fungus): Bioscientific (Mycorise) • BioOrganic •

Green Releaf (BioReleaf) • Mikro-Tek • Plant Health Care (Mycor) •

Biological Crop • Natural Fertilizer • Philom (TagTeam) • Rincon-

Vitova • AgBio • Roots • Mycorrhizal Applications

Ectomycorrhizae (forest nurseries, urban trees):

Pisolithus tinctorius: Rincon-Vitova • Plant Health Care (Mycortrees) •

Plant Revolution • AgBio • Mycorrhizal Applications

Pisolithus, *Rhizopogon* mixtures: Roots • Plant Health Care

TREE WOUND PATHOGENS

Biological Control

Trichoderma sp.: Binab (Binab-T), to treat tree wounds

TURF DISEASES

Identification & Monitoring

Detection kit for turf diseases:

Neogen (Reveal) • Neogen (Alert)

Compost maturity test kit:

Woods End (Solvita)

Physical Controls

Turf Aerator:

Harmony, Peaceful Valley (Gorilla Core Aerator)

Horticultural Controls

Brown patch resistant turfgrass:

Turf Seed (Tar Heel, Wolfpack, Coronado Gold, Olympic Gold)

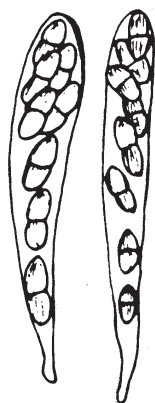
Biological Controls

Microbial Soil Amendments:

New Era Farm Service (composted soil amendments) • Jade Mountain (composting toilet) • Northeast Organics (Turf Cocktail to stimulate microbes in soil) • Lane • Agro Dist

Beneficial microorganisms that attack turf pathogens:

Gardener's Supply (Green Magic) • Green Releaf (BioReleaf) • Peaceful Valley (Restore) • Wilbur-Ellis (BioTrek) • Bioworks (Turfmate) • Eco-Soil (BioJect) • Soil Technologies (BacPack) • Natural Fertilizer • Plant Health Care (Compete)



MISCELLANEOUS

Educational Materials

Pest Management Publications & AV Products:

Integrated Pest Management publications, videos:

Bio-Integral Resource Center (BIRC)

Identification & Monitoring

Apple scab forecasting equipment:

Great Lakes IPM (Belfort Leaf Wetness Recorder)

Information/Identification Services:

Fungal identification service and supplies: CAB Biosci

Information, identification of agricultural, urban insects:

Cooperative Extension Service (local offices)

Information service on biological control using microbes: CAB Biosci

Miscellaneous Compost Aids: Beckner (Compost Aerator) • Charley's (Compost Thermometer) • Natural Insect Control (Earthworms) • Woods End (Compost Maturity Test Kit)

Compost Tea Brewing Equipment: Growing Solutions • SoilSoup • Microb Brewer • Earth Tea

Mycotoxin Detection Kits: Neogen

Nematode identification service: CAB Biosci

Plant Disease Detection Kits (for fusarium mold, pythium, phytophthora, rhizoctonia, sclerotinia, brown patch, dollar spot): Neogen Corp. (Alert, Agri-Screen, Reveal)

Plant Disease Detector: Automata Inc. (Leaf Moisture Sensor)

Plant Disease Prediction Software (for general fungal disease, apple scab, botrytis, powdery mildew): Automata Inc. (GET WELL) • Automata (Scab Off) • Automata (GrapeMold)

Recycler for Solarization Plastic (Portable Bailer): Kennco

Recycler Catalog (sources of compost, etc.): Calmax

Soil Testing Kits, pH Meters: BioQuip • Great Lakes • Great Lakes (Hannah) • Ben Meadows • Harmony • Peaceful Valley • Gemplers

Soil Testing, Microbials and Minerals: BBC Labs • Soil Foodweb



VERTEBRATE MANAGEMENT

BATS

Educational Materials

Bat House Construction Booklet:

Bat Conservation International, Plow & Hearth, Peaceful Valley, Harmony

Bat Houses: The Green Spot • Natural Insect Control • Harmony • Peaceful Valley

Identification & Monitoring

Flashlight with red filters:

Streamlight (Streamlight)

Physical Controls

Copper mesh hole filler:

Allen Special Products (Stuf-Fit)

Netting:

Wildlife Control (Bat Kit, Swallow & Woodpecker Kit for home-made bat check valve, Wildlife Net) • Gemplers (Wildlife Net)



BIRDS

Physical Controls

Barriers & Exclusion Devices:

Wildlife Control (Pigeon Barrier) • Birdbarrier (Daddi Long Legs)

Copper mesh hole filler:

Allen Special Products (Stuf-Fit)

Metal projectors:

Cat Claw (Cat Claw) • Wildlife Control • Bird-X • Nixalite (Nixalite) • Birdbarrier (Birdpoint)

Netting:

Wildlife Control, Gemplers (Wildlife Net) • Bird-X • JT Eaton • InterNet, Great Lakes (Internet) • Animal Repellents • Peaceful Valley • Nichols Net • Nixalite (Netting) • Sterling Marine • Sutton • Tenax (Ornex) • Tipper, Harmony, Peaceful Valley (Tie-Net) • Birdbarrier (Birdnet, Stealth Net) • BioCare • Margo

Wire exclusion systems:

National Netting • Birdbarrier (Birdwire, Birdcoil)

Deterrents:

Alarms & detonators:

Bird-X (BirdGard, Transonic IX-L, Ultrason ET) • Birdbarrier (Birdwailer) • Reed-Joseph (Electronic Scare Away, Scare Away Pyrotechnics, Multi Bang Automatic Cannon, Rotomat Revolving Platform) • Wildlife Control (ZON Propane Cannons, Shell Crackers,

Bird Bombs, Bird Whistlers, ZON Automatic Scarecrow) • Agricultural Supply, Margo (Zink Bird Banger) • Bird-X (Nixalite) • Sutton (bird bomb, cannon)

Distress calls to deter Canada geese:

Wildlife Control

Electric Shock Deterrent:

Birdbarrier (American Birdfence, solar)

• Avian Flyaway

Flashing light deterrent:

Bird-X (Bird Strobe Light)



Reflective tape:

Reed-Joseph, W. Atlee (Scare-Away Reflecting Tape) • Wildlife Control, Agricultural Supply, Peaceful Valley (Mylar Silver Strips) • Bird-X (Irri-Tape) • Smith & Hawken (Birds Beware) • Sutton

Live Traps (for starlings, pigeons, etc.):

National Live Trap • Nature House • Reed-Joseph (Trap Away) • Tomahawk, Plow & Hearth (Tomahawk) • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply (Havahart, Victor) • Margo

Repellents:

Bird-X (Bird-Proof) • Sutton • Peaceful Valley

Repelling balloons:

Reed-Joseph (Evil Eye) • ARBICO (Bird Scare Eye Balloon, Owl Scarecrow) • Plow & Hearth (Scare Eye) • Bird-X, Peaceful Valley, Gemplers (Scare Eye) • W. Atlee (Birds-Away Inflating Snake, Ollie-Owl) • Bird-X (Terror Eyes) • Gempler's • Sutton • Tanglefoot

Repellent gel: Sutton • Hot Foot America

Repelling kites:

Sutton • Cochranes • Peaceful Valley

Sticky repellent:

Tanglefoot (Tanglefoot Bird Repellent) • Peaceful Valley

Sticky Adhesive:

Olson, Hydro-Gardens (Stiky Stuff) • Seabright (Stickem Special) • Gemplers, Great Lakes, Necessary, Nixalite (Tanglefoot) • Peaceful Valley

Least-Toxic Chemical Controls

Repellents:

Nixalite, Peaceful Valley, Plow & Hearth (Ropel) • Bird-X (Bird Proof) • JT Eaton (4-the-birds) • Becker Underwood, Martinson-Nicholls (ReJexit Migrate for Canada geese, ReJexit Fog Force for pigeons, gulls, ReJexit Crop Guardian for starling, gulls, catbirds on fruit)

CATS/DOGS

Biological Controls

Guard Donkeys to Protect Sheep:

American Donkey

Physical Controls

Cat tongs:

Tomahawk, Plow & Hearth (Tomahawk)

Electric Fencing:

Gardener's Supply

Least-Toxic Chemical Controls

Repellents:

Animal Repellents • Sterling Intl. (Rescue! Dog & Cat Repellent) • Peaceful Valley (Ropel) • Farnam (Get Off My Garden)

GOPHERS and MOLES

Biological Controls

Nematodes to Eat Insects that are Mole Food:

Certis, Harmony, Hydro-Gardens, IPM Labs, The Green Spot *Beauveria bassiana* (to kill soil insects that attract moles):

Troy, Hydro-Gardens, Harmony (Naturalis)

Owl Boxes (to shelter owls that prey on gophers): Rincon Vitova • Harmony • Natural Insect Control

Horticultural Controls

Gopher Resistant Plants: (Call BIRC for list)

Physical Controls

Barriers & Exclusion Devices:

Harmony (Root Guard Baskets) • Peaceful Valley

Tree Wrap:

Gemplers (T&G Plastic Tree Shields) • Peaceful Valley (Spiral Tree Guard)

Deterrents:

Roxide (Revenge Smoke Bomb)

Live Traps for gophers:

Harmony, Peaceful Valley, Tomahawk

Lethal Traps for moles:

Woodstream, Harmony (Out of Sight squeeze type, Victor, harpoon type) • Peaceful Valley

Lethal Traps for gophers:

Woodstream, Harmony, Santa Cruz Hort, Arbico, Peaceful Valley, Great Lakes, Necessary, The Natural Gardening, Gardens Alive (Black Hole, box type) • Woodstream (Victor Easy Set, Gopher Getter, squeeze type)

Least-Toxic Chemical Controls

Gopher Bait Blocks (for emergency use mainly in agriculture): JT Eaton (Answer, diphacinone)

Mole Repellent: Mole-Med, Soil Technology, Gardens Alive (Mole-Med) • Gardener's Supply • Becker Underwood • Value Garden

Gopher Repellent: Gardens Alive (Gopher-Med)

DEER

Physical Controls

Deterrents:

Alarms & detonators:

Agricultural Supply • Critter Control • Margo • Coop Eco

Roadside highway reflectors to deter deer:

Strieter (Strieter-Lite)

Electric fencing:

North Bradford (Techfence) • Gardener's Supply • Gallagher Power Fence • Waterford • Tenax

Wireless Fence (for guard dogs): Drs. Foster and Smith

IR Sensor to Turn On Sprinklers: Gardener's Supply (Water Defence)

Heat Activated Alarm: Drs. Foster and Smith

Tree Wrap:

Gemplers (T&G Plastic Tree Shields) • Peaceful Valley (Spiral Tree Guard)

Least-Toxic Chemical Controls

Repellents:

Intagra, Gardener's Supply, Gardens Alive!, Harmony, Plow & Hearth, Peaceful Valley (Deer-Away, Get Away) • Harmony (National Deer Repellent) • Gardens Alive!, Harmony, Peaceful Valley (Hinder Deer & Rabbit Repellent) • Peaceful Valley, Harmony (National Scent) • Peaceful Valley (Ropel) • Gardener's Supply (Champon's) • Wildlife Management • Envirodyne (Meat Meal) • Harmony (Not Tonight Deer)

LIVESTOCK PREDATORS

Biological Controls

Donkeys to Protect Sheep:

American Donkey

Physical Controls

Alarms & Detonators:

Reed-Joseph (Scare Away Pyrotechnics, Multi Bang Automatic Cannon, Rotomat Revolving Platform) • Agricultural Supply • Critter Control • Margo

Electric Fencing:

Gallagher Power Fence (Gallagher) • Waterford (ShockTactics, Flexinet) • Gardener's Supply

Live Traps:

Reed-Joseph (Trap Away) • Tomahawk, Plow & Hearth (Tomahawk) • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply (Havahart)

Least-Toxic Chemical Controls

Repellents:

Peaceful Valley, Nixalite, Peaceful Valley, Plow & Hearth (Ropel)

RABBITS

Physical Controls

Electric Fencing:

Gallagher Power Fence (Gallagher) • Waterford (ShockTactics, Flexinet) • Gardener's Supply

Live Traps:

Wildlife Management • Tomahawk, Great Lakes, Peaceful Valley • Woodstream, Harmony • Margo

Netting:

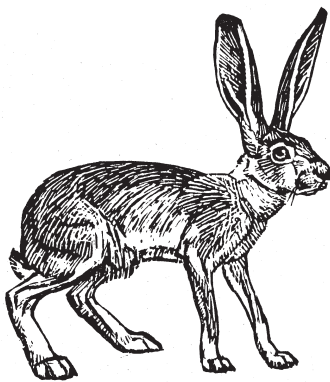
Wildlife Control, Gemplers (Wildlife Net)

Tree Wrap:

Gemplers (T&G Plastic Tree Shields) • Peaceful Valley (Spiral Tree Guard)

Least-Toxic Chemical Controls

Repellents:



Gardens Alive, Harmony (Hinder Deer & Rabbit Repellent) • Harmony (National Scent) • Peaceful Valley (Ropel) • Envirodyne (Green Screen) • Intagra, Gardener's Supply, Gardens Alive, Harmony, Plow & Hearth, Peaceful Valley (Get Away)

RACCOONS

Physical Controls

Barriers & Exclusion Devices:

Stromberg's (Catcher-Holder Poles for animal restraint) • Tomahawk, Plow & Hearth (catch poles)

Electric fencing:

Gallagher Power Fence (Gallagher) • Waterford (ShockTactics, Flexinet) • Gardener's Supply

Wireless Fence (for guard dogs): Drs. Foster and Smith

Heat Activated Alarm: Drs. Foster and Smith

Live Traps and Carrying Cages:

National Live Trap • Reed-Joseph (Trap Away) • Safeguard (Safeguard) • Tomahawk, Plow & Hearth (Tomahawk) • Wildlife Control • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply (Havahart, Victor) • Wildlife Management • Margo

Wildlife Removal/Relocation Services:

Critter Control (for small animals only)

Least-Toxic Chemical Controls

Repellents:

Nixalite, Peaceful Valley, Plow & Hearth (Ropel) • Gardener's Supply (Champon's) • Intagra, Gardener's Supply, Gardens Alive, Harmony, Plow & Hearth, Peaceful Valley (Get Away)

RATS and MICE

Identification & Monitoring

Flashlight with red filters:

Streamlight (Streamlight)

Rodent contamination detection devices:

BioQuip (Spectronics, Blacklight Kits) • Professional Equipment

Physical Controls

Copper mesh hole filler:

Allen Special Products (Stuf-Fit)

Traps (for rats and mice):

Sterling Intl. (Rescue! Dispose-A-Mouse) • Reed-Joseph (Trap Away) • Seabright, Phero Tech (Smart Mouse Trap) • Tomahawk, Plow & Hearth (Tomahawk) • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply, Havahart, Victor) • Woodstream (Victor Holdfast) • Woodstream (Victor Tin Cat, Terminator) • Wildlife Management

Glue board trap:

Woodstream (Victor Holdfast) • Bell (Trapper products) • JT Eaton (Eaton's Stick-em) • Enforcer (Enforcer Rat & Mouse Glue Traps)

Electrocutor trap:

AgriZap • Professional Equipment

Live Trap:

Seabright • Tomahawk

Least-Toxic Chemical Controls

Tool to Place Baits and Traps:

Arcoa (EZ Reacher)

Baits:

Necessary (Rampage) • Peaceful Valley • Trapper Jack's (macadamia nut lure) • Bell (Detex, non-toxic monitoring bait)

Bait stations:

Bell (Protecta, RTU) • JT Eaton (Rat Depot) • Lipha Tech (Bait Safe)

Stop feed, single dose (0.075% cholecalciferol Vitamin D3):

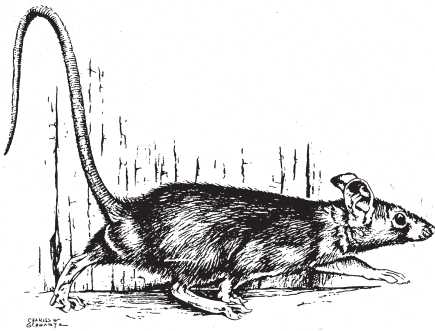
Bell (Quintox)

Anticoagulants:

D-Con (D-Con, warfarin) • Bell (Final, warfarin)

• Bell (Contrac, bromadiolone) • Bell (Liqua-Tox II, diphacinone) •

Bell (Ditrac, Ditrac Tracking Powder, diphacinone)



• D-Con (D-Con II, brodifacoum) • Lipha Tech (Maki, bromadiolone) • Lipha Tech (Rozol, chlorphacinone)

Zinc phosphide:

Bell (ZP Rodent Bait AG) • Bell (ZP Tracking Powder)

SKUNKS

Physical Controls

Catch Poles:

Tomahawk, Plow & Hearth (Tomahawk)

Electric Fencing:

Gallagher Power Fence (Gallagher) • Waterford (ShockTactics, Flexinet) • Gardener's Supply

Live Traps and Carrying Cages:

National Live Trap • Reed-Joseph (Trap Away) • Safeguard (Safeguard) • Tomahawk, Plow & Hearth (Tomahawk) • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply (Havahart) • Margo (Tru Catch) • Nichols • Wildlife Management

Least-Toxic Chemical Controls

Repellents:

Nixalite, Peaceful Valley (Ropel)

Skunk Deodorant:

Drs. Foster & Smith (Skunk Kleen) • NISUS (BAC-AZAP)

SQUIRREL

Squirrel-Proof Bird Feeders:

Arundale (The Mandarin) • Looker

Hot Pepper Treatment for Birdseed:

Mellinger's (Squirrel Away)

Live Traps:

Tomahawk • Woodstream • Harmony • Peaceful Valley

Repellent:

Harmony • Peaceful Valley • J.T. Eaton

WILDLIFE

Physical Controls

Control Equipment:

Cat tongs:

Tomahawk, Plow & Hearth, Harmony

Poles to catch animals:

National Live Trap • Tomahawk, Plow & Hearth (Tomahawk) • Wildlife Management

Protective Gloves:

Tomahawk, Plow & Hearth (Tomahawk)

Snake tongs:

National Live Trap

Alarms & Detonators:

Reed-Joseph (Scare Away Pyrotechnics, Multi Bang Automatic Cannon, Rotomat Revolving Platform) • Agricultural Supply • Critter Control • Margo

Infra-Red Triggered Water Cannon:

Gardener's Supply (Water Defence)

Heat Activated Alarm:

 Drs. Foster and Smith

Wireless Fences (for guard dogs):

 Drs. Foster and Smith

Copper Mesh Hole Filler:

Allen Special Products (Stuf-Fit)

Electric Fencing:

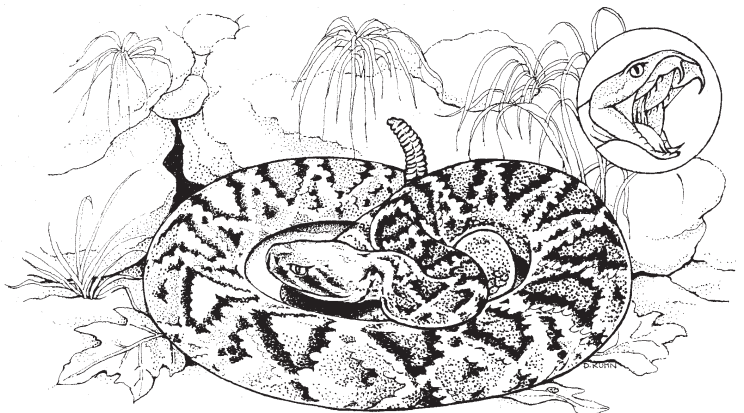
Waterford (ShockTactics, Flexinet) • Gallagher • Gardner's Supply • Peaceful Valley • Harmony • Jade Mountain (solar electric) • Margo (for bear, wolverine)

Live traps:

Margo (for large animals) • National Live Trap • Reed-Joseph (Trap Away) • Safeguard (Safeguard) • Tomahawk, Plow & Hearth, Great Lakes (Tomahawk) • Wildlife Control • Woodstream, Great Lakes, Harmony, Peaceful Valley, Gardener's Supply (Havahart, Victor)

Wildlife Removal/Relocation Services:

Margo (for large animals) • Critter Control (for small animals only)



Least-Toxic Chemical Controls

Repellents:

Nixalite, Peaceful Valley, Plow & Hearth (Ropel) • Becker Underwood (Rejexit to deter Canada geese) • Mole-Med, Gardens Alive, Soil Technologies (Mole-Med, Repellent for moles)

MISCELLANEOUS

Educational Materials

Integrated Pest Management Publications:

Bio-Integral Resource Center



WEED MANAGEMENT

Educational Materials

Pest Management Publications & AV Products:

Integrated Pest Management publications, videos:

Bio-Integral Resource Center

Identification & Monitoring

Information/Identification Services

Information, identification of agricultural, urban insects:

Cooperative Extension Service (local offices)

Information service on biological control of weeds:

International Institute of Biological Control

Physical Controls

Barriers and Exclusion Devices:

Asphalt crack filler:

Garon Products (Crack-Fill)

Electric Shredder to Make Mulch:

Gardener's Supply (Gloria) • BCS America

Mulch:

Peaceful Valley (IRT, Planter's Paper) • Birkett Mills (Mul-Tex) • Appleseed (EweMulch) • Penny Newman (Rice Hull Mulch)

Sunlight Barrier (aquatic weeds):

Applied Biochemists (Aquashade)

Weed control fabric/plastic:

Easy Gardener, Peaceful Valley (WeedBlock Landscape Fabric) • BBA, Planet Natural (Tyar Landscape Fabric) • Gardener's Supply (Weed Mat) • Gardens Alive! • Amoco (Duon) • AEP (IRT Plastic) • Peaceful Valley (IRT Plastic) • BBA (Tree Circles)

Flamers:

Ben Meadows • Forestry Suppliers (Panama) • Plow & Hearth (Weed Destroyer) • Flame Engineering, Planet Natural, Harmony (Red Dragon) • Peaceful Valley • Planet Natural • Gemplers

Heat Treatment (system using boiling water):

Waipuna (Waipuna System) • Aqua Heat

Heat Treatment (portable propane radiant heat): Forevergreen

Skin Protectant:

Poison oak/ivy cleanser/prevention:

Apex Medical (Stoko-Gard Outdoor Cream) (Sell only to pharmacists)
• Smith & Hawken (Tecnu Cleanser) • Masune (Ivy Block, Technu)
• Gempler's (Ivy Shield) • Sawyer (Itch Balm)

Weeding Animals:

Books, pamphlets, lists of breeders:

American Donkey & Mule • American Southdown Breeders' (sheep) • Natural Colored Wool Growers'

Weeding Tools:

Brush-clearing tools:

Forestry Suppliers
Hand tools: Gardener's Supply • Smith & Hawken • Plow & Hearth • Peaceful Valley • BCS America • A.M. Leonard • New Tribe (Weed Wrench, woody shrubs) • The Natural Gardening (Thistle Monster)

Mechanical Weeder: Weed Badger (Tiller, Qwik-Disk, Cyclone Spade, Mower, Undercutter)

Mechanical harvester: Hockney Weed Cutter (underwater weeds)

Rotary cutters: Bush Hog (Bush Hog Rotary Cutter)

Tiller/mulcher/mower: Weed Badger (Weed Badger)

Weedeater: Poulan/Weed Eater • BeeTee Equipment Sales (Husqvarna)

Biological Controls

Bacterial Biostimulation for Algae Control:

Plant Health Care (Pond Saver) • Enviro-Rep (Super Bug) • Gardener's Supply (Bacta-Pur)

Sterile grass carp fish (for aquatic weeds):

American Sport (not often available in CA; diploid and triploid) • East Arkansas • J.M. Malone (triploid grass carp) • Keo Fish Farms (diploid and triploid) • Richmond Fisheries • Whiskers Catfish Farm (triploid)

California Native Plants: California Native Plant Society

Herbivores:

Aceria malherbae (mite for field bindweed): Praxis

Agapeta zoegana (for knapweed): Praxis

Agonopterix alstroemeriana (poison hemlock): BCW

Aphthona spp. (beetle for leafy spurge): Praxis • BCW

Apion fuscirostre (stem weevil for Scotch broom): Bio Collect

Apion ulicis (stem weevil for gorse): Bio Collect

Aplocera plagiata (St. John's wort): BCW

Bangasternus orientalis (for yellow starthistle): Bio Collect • BCW • Peaceful Valley

Cassida rubiginosa (for Canada thistle): BCW

Ceuthorynchidius horridus (for musk thistle): Praxis

Ceutorhynchus litura (thistle weevil for Canada thistle): BCW • Praxis

Chrysolina quadrigemina (beetle for St. Johnswort): Bio Collect • BCW

Coleophora klimeschiella (for Russian thistle leafminer): Bio Collect

Coleophora parthenica (for Russian thistle stem borer): Bio Collect

Cypocleanus achates (knapweed root weevil): BCW

Eustenopus villosus (yellow starthistle): BCW • Bio Collect • California Bioworks

Gallerucella californiensis (purple loosestrife defoliating weevil): BCW

Hyles euphorbiae
(hawk moth for spurge weed): Praxis

Larinus planus (weevil for Canada thistle): BCW

Leucoptera spartifoliella (leafminer for Scotch broom): Bio Collect

Longitarsus jacobaeae
(flea beetle for tansy ragwort): BCW • Bio Collect

Metzneria paucipunctella (for knapweed): BCW

Microlarinus lareynii
(weevil for puncturevine): Bio Collect • Peaceful Valley

Microlarinus lypriformis (weevil for puncturevine): Bio Collect

Oberea erythrocephala (beetle for leafy spurge): BCW • Praxis

Rhinocyllus conicus (weevil for musk, milkthistle, Italian thistle): Bio Collect • Praxis

Sphenoptera jugoslavica (stem borer for knapweed): Praxis

Spurgia esulae (gall midge for leafy spurge): Praxis • BCW

Urophora affinis (gall fly for knapweed): BCW

Urophora cardui (gall fly for Canada thistle): BCW

Urophora quadrifasciata (gall fly for knapweed): BCW

Urophora sirunaseva (gall fly for yellow starthistle): Bio Collect

Trichosiromus horridus (weevil for musk thistle): BCW • Praxis

Tyria jacobaeae (cinnabar moth for tansy ragwort): Bio Collect • BCW

Distributes stem & seed weevils against puncture vine:

CALTEC Agri Marketing Services • Peaceful Valley

Weeder Geese (brown Chinese):

Holderread's Waterfowl Farm & Preservation Center • Morris Farms & Hatcheries

Weeding Chickens:

Inman Hatcheries • Murray McMurray Hatchery • Stromberg's Chicks & Game Birds Unlimited

Microbial Herbicides:

Alternaria cassiae (for sicklepod, available sporadically): Dow Agro (Casst)

Colletotrichum gloeosporioides (for northern jointvetch, available sporadically): Ecogen (Collego)

Phytophthora palmivora (available sporadically for strangervine): Valent USA (DeVine)

Xanthomonas campestris (annual bluegrass): EcoSoil (XPo)

Least-Toxic Chemical Controls

Application equipment:

Forestry Suppliers (Hypo-Hatchet Tree Injectors) • AG Spray Equipment

Herbicidal Soap (postemergent):

Monterey, Harmony (QuiK Weed) • Gardens Alive (WeedAside) • Intagra, Harmony (Concern)

Herbicidal Fatty Acids (postemergent):

Dow Agro, Harmony (Scythe)

Herbicidal Essential Oil (postemergent):

EcoSmart (BioOrganic) • North Country (Burnout, limonene, vinegar)

Least-Toxic Herbicide (corn gluten meal pre-emergent):

Grain Processing • Soil Technologies • Gardens Alive (WOW) • Fertrell, Gardener's Supply, Peaceful Valley, North Country (Weedstop) • Floyd Rogers • Hardesty (Suppressa) • Manning Agricultural • Rhodes • Safe Earth • Walts • Blue Seal • Soil Technologies • Harmony • BioScape (Bioweed)

Corn Gluten hydrolysate:

Grain Processing



