2015 Directory of Least-Toxic Pest Control Products

The 2015 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 40). 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 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; birc@igc.org.

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.

Note to Quarterly Members

Because it was necessary to limit Quarterly production this year, Quarterly subscribers are receiving this Directory as a membership bonus.
To obtain speedy delivery and receive advice from experienced sources, we recommend that you order directly from producers. 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.).

Acknowledgement

The IPM Practitioner would like to thank all the companies who supplied us with information, our advertisers, and the generous support of BIRC members and StopWaste.Org that made this Directory possible. Thanks also to William Quarles, Jennifer Bates, Matthew Feucht, Erin Berg and our printer Inworks.

Box A. Quick Access

If you are looking for a specific item, see the Index on pages 40 and 41. 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.

Manuscripts

The IPMP welcomes accounts of IPM for any pest situation. Write for details on format for manuscripts or email us, birc@igc.org.

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.

Change of Address

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

Physical Controls

Ant Proof Bowl:
The Antser

High Performance Vacuum:
Proteam (Sierra, Optimus)

Repellent Mulch: Green Light (CedarCide)

Sticky Barrier:
Tanglefoot, Planet Natural, Charley’s, Gardens Alive!, Great Lakes, Harmony, Phero Tech (Tanglefoot) • 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

Tree Wrap:
Olson (Stiky Tree Guards) • Peaceful Valley

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)

Fenoxycarb Bait (for fire ants): BASF (Ampro) • Bayer ES (Maxforce)

Methoprene Bait (for fire ants): Zocon (Extinguisher)

Spinosad Bait (for fire ants): Dow, Green Light (Conservate)

Spinosad Bait: Monterey • Certis (Seduce)

Fipronil Bait (for fire ants): Bayer

Indoxacarb Bait (for fire ant): Dupont (Advion)

Botanical Sprays:

Liquid Fence (EcoLogic) • EcoSmart (herbal oils) • Orange Guard (Orange Oil) • JH Biotech (Ant Out) • Zocon (Essentia) • Zocon (EcoExempt, EcoPCO)

Borate-Based Insecticides:

Waterbury (Mop-Up) • Whitmire (PT 249 Perma-Dust) • Waterbury, Planet Natural (Borid) • NISUS (Nibor)

Borate liquid ant baits (1%):
Waterbury, Gardener’s Supply, (Drax) • Peaceful Valley • Woodstream (Victor) • JT Eaton (Dr. Moss) • Whitmire • Innovative • Nisus (Terro PCO)

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) • Rockwell (Intice) • Whitmire (Advance) • Rockwell (Invict)

KM Ant Pro Bait Station: KM Ant Pro

Borate granular ant bait: NISUS, Target (Niban, Niban FG) • Rockwell (Intice) • BASF (Mother Earth)

Borate rods (for carpenter ants):
Pole Care (Impel Rods)

Borate-treated lumber (for carpenter ants):
Osmose

Borate treatments (for carpenter ants):
NISUS, Target, Univir (Bora-Care) • Permachink (Guardian, Shellguard) • Sashco (Penetreat) • NISUS (TimBor)

Diatomaceous Earth (DE) (ants, crawling insects, stored products. Permaguard, Diafil, Crop Guard, and Protect-It 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, MN-53) • Hedley (Imidan-I) • Whitmire (Mother Earth) • Permaguard, Nitron, (100% freshwater DE, Permaguard) • Woodstream (Concern) • Harmony • Nature’s Control • Peaceful Valley

With pyrethrin (fire ant):
Permaguard, Nitron (Permaguard Household) • Woodstream (Concern)

Indoxacarb (Advion) Stations, Gels:
Dupont

Dinofuran Bait: BASF (Alpine)

Hydramethylnon Bait Station and Granular Bait:
Bayer ES (Maxforce, Combat)

Fipronil Bait Station and Gels:
Bayer ES (Maxforce, Combat)

Integrated Perimeter Bait Station:
B & G (Perimeter Patrol) • Maxforce • Whitmire (ACE)

Sulfuramid Bait Stations:
Whitmire (Advance)

Thiamethoxam (Optigard) Gels:
Syngenta

Insecticidal Soap:
Woodstream, Planet Natural, Gardens Alive!, Harmony, Nitron, Johnny’s, Smith & Hawken, Peaceful Valley, Charley’s (Safer Insecticidal Soap, Concern) • Certis (DES-X) • Peaceful

With pyrethrin:
Woodstream, Harmony, Planet Natural (Safer Yard and Garden, Safer Tomato and Vegetable) • Peaceful (Safer)

Pyrethrin:
Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Neogen (Formula 66, LD 44Z) • Monterey (Bug Buster O, w/o PBO) • Bayer (Harmonix)

Repellent Garlic Spray:
Garlic Research Labs, (Garlic Barrier) • Harmony • Peaceful Valley • Soil Technologies (Garlic Gard)

Silica Aerogel:
100% Pure:
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 (Bug Blaster)

Reflective mulch:
- Mipco • Peaceful

Row Covers:
- Gardener’s Supply • Gardens Alive! (Super-Light) • Great Lakes (Fiberweb) • Harmony (Harvest Guard, TuBell) • Peaceful Valley (TuBell, AgGro) • Shepherd’s (AgGro) • Mipco • Fiberweb • Natural Insect Control

Screening:
- Green-Tek • Hydro-Gardens (Fly Barr) • Tipper, Harmony (Tie-Net)

Sticky Adhesive:
- Sebright, 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) • Sebright (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 • Greenmethods • Olson • Phero Tech

Biological Controls

Habitat:
- Greenhouse banker plants: IPM Labs
- Beneficial Seed Blend (for plants that attract beneficial insects): Harmony • Peaceful Valley • Lockwood • Rincon-Vitova • Cornflower
- Container-grown beneficial plants: Cornflower

Attractant for lady beetles:
- Woodstream, Harmony, ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (SureFire) • Greenmethods (Ladybug lure) • Springstar • Gardens Alive • AgBio (Magnet)

Microbial Insecticides:
- Beauveria bassiana: (fungus for aphid control): Troy, Gardener’s Supply, Hydrogardens (Naturalis O, L, ES) • Laverlam, Bioworks (Mycontrol, BotaniGuard) • Harmony (BotaniGuard)
- Burkholderia A396 (Venerate): Marrone
- Chromobacterium (Grandevero): Marrone
- Paecilomyces sp. (fungus for aphid control): Bio Pré • HydroGardens • BioBest • Certis (PFR-97)

Parasitoids:
- Aphelinus abdominalis: Biobest • Ducasol • Koppert • Natural Insect Control • Rincon Vitova • Greenmethods • Biobest Canada • Arbico
- Aphidius colemani: (for cotton aphid): Biological Control • Biobest • Biobest Canada • Syngenta Bioline • International Technology • IPM Labs • Koppert • Natural Insect Control • W. Neudorff • Greenmethods • BioBee • Martin Grima • Rincon Vitova • Garta • Florikan • Katz • Arbico

Aphidius ervii: (for potato aphid): Bio Pre • Biobest • Koppert • W. Neudorff • IPM Labs • Natural Insect Control • Garta • Greenmethods • Arbico • Rincon-Vitova

Aphidius matricariae: Evergreen • Syngenta Bioline • Gartneri • IPM Labs • Koppert • Nature’s Control • W. Neudorff • Rincon Vitova • Natural Insect Control

Aphidius sp.: Biological Crop • Greenmethods • Biobest Canada

Eyeptus balleatus: Flora • Katz

Lysiphlebus testaceipes: Flora • Katz

Praon myziphagum: Biowise

Tamarixia triozae: (for psyllids): International Technology

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 • Nature’s Control • Rincon-Vitova • Sautter & Stepper • Greenmethods • W. Neudorff • Flora • BioBee • Katz • Biobest Canada • Ecosolutions

Lacewings:
- Chrysoperla carnea or Chrysopa carnea: A-1 Unique • Biological Crop • Bioplanet • Gartneri • Gardens Alive • Koppert • Kuida • Natural Insect Control • Natural Pest Controls • Organic Control • Peaceful Valley • Sautter & Stepper • W. Neudorff • American Insectaries • Katz • TipTop • Nature’s Control • Bugological

Chrysoperla rufilabris or Chrysopa rufilabris: ARBICO • Biofac • Planet Natural • IPM Labs • Kuida • Natural Insect Control • Nature’s Control • Peaceful Valley • Rincon-Vitova • Western Farm • Greenmethods • American Insectaries

Chrysoperla spp.: Beneficial Insectary • International Technology • Kunafin • Flora

Malloida signata: Bugs for Bugs

Micromerus variegatus: Applied Bionomics

Sympherobius sp.: FAR

Lady beetles:
- Convergent lady beetle, Hippodamia convergens: A-1 Unique • ARBICO • Evergreen • Planet Natural • Gardens Alive • Hydro-Gardens • International Technology • IPM Labs • Koppert • Natural Insect Control • Natural Pest Controls • Nature’s Control • Peaceful Valley • Rincon-Vitova • Greenmethods • The Ladybug Company • EcoSolutions • Applied Bionomics

Lady beetle, Coleomegilla maculata: Florikan
Lady beetle, *Harmonia axyridis*: Biobest, Koppert, Rincon Vitova, Greennmethods, Bioplanet
Lady beetle, *Adalia bipunctata*: Andermatt • Biobest Canada • Natural Insect Control • Biobest USA
Lady beetle, *Scymnus creperus*: IPM Labs

**Predatory bugs:**

Anthisious flower bug, *Orius insidiosus*: IPM Labs • Syngenta Bioline • Gartnerci • Nature’s Control • Rincon Vitova • Katz • Flora
*Orius laeavigatus*: Bioplanet
*Orius spp.*: Biobest • Duclos • Natural Insect Control • Syngenta Bioline

Minute pirate bug, *Orius tristicolor*: ARBICO • Planet Natural

**Least-Toxic Chemical Controls**

**Clove Oil, Garlic, Cottonseed Oil:**
JI BioTech, Harmony (Pest Out) • Safer Gro

**Aphid Alarm Pheromone:**
ARBICO

**Diatomaceous Earth: See Ants**

**Enzyme Soap:** Charley’s (Agrizyme)

**Essential Oils:** Brandt (Ecotec) • Liquid Fence • EcoSmart

**Insect Growth Regulators:**
Zoecon (Enstar)

**Insecticidal Oil:**
Highly refined oil (from fish):
Organic Labs (Organocide, 95% fish, 5% sesame)

Highly refined oil (from petroleum):
Monterey, (Monterey) • Valen USA, Harmony (Volck) • Sun, Gardens Alive!, Peaceful Valley, Charley’s (SunSpray) • Florikan (Target Oil) • Gardens Alive (Eco-Oil) • Summit • Peaceful Valley • Harmony (Stylet Oil)

Highly refined oil (from plants):
Stoller, Peaceful Valley (Natur’l Oil 93% soybean) • ARBICO

**Insecticidal Soap:**
Harmony (M-Pede) • Agricola El Sol (ACT-92) • Woodstream (Concern) • Woodstream (Safer Rose and Flower, Insecticidal Soap, Fruit and Vegetable) • St. Gabriel (Sharpsbether) • Certis (DES-X) • Peaceful Valley • Gowan (M-Pede)

**With pyrethrin:**
Woodstream (Concern) • Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard and Garden, Tomato and Vegetable) • Peaceful Valley (Safer)

**Neem Products:**
Certis, Harmony (Azatin) • Woodstream, (Safer’s BioNeem, Japanese Beetle Repellent) • Certis, Planet Natural, Peaceful Valley, Harmony (Neemix, Trilogy) • Green Light • San Jacinto (Organica) • PBI (Azatrol) • Agro (AZA Direct, EcoSense, EcoSide) • Gowon (AZA) • Bioworks • Certis (Neemazad) • Agro, Peaceful (DeBug) • Garden Essentials, Harmony (100% neem oil) • Parry (Azamet)

**Pyrethrin:**
Johnny’s, Peaceful Valley (Pyreneone) • Whitmore (microencapsulated PT-175 MicroCare, PT 565, PT 505) • Neogen (Formula 66, LD-44Z) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, (Bug-Buster O, w/o PBO) • MGK, Peaceful, Monterey, Harmony (PyGanic)

**Pyrethrin and Oil:**
Gardens Alive (Pyola) • Harmony (Pyola)

**Pyrethrin, rotenone, copper, sulfur:**
Bonide, Gardener’s Supply (Bonide Garden Dust)

**Pyrethrin and Neem:**
MGK (Azera)

**Pyrethrum Powder:**
Planet Natural • Nichols Garden

**Repellent Garlic Spray:**
Garlic Research Labs, Chemical-Free, Planet Natural, (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley • Vegetable Juices (Pure Garlic Oil) • JH Biotech • Safer Gro • Harmony

**Repellent Mustard Oil:**
Soil Technologies

**Repellent Hot Pepper Wax:**
Charley’s • Harmony (Hot Pepper Wax) • Peaceful Valley • St. Gabriel

**Sabadilla Powder:**
Gardens Alive! • MGK, Harmony, Peaceful Valley (Veratran) • Nichols Garden • MGK

**BEES**
(See Yellow Jackets)

**BEETLES**
(Crop and Stored Product Pests)

**Identification & Monitoring**

**Attractant for Cucumber Beetle:**
Sigma Chemical (eugenol) • Trécé (CIDETRAK 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 (Sentry) • 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, Harmony, Gemplers (BioLure) • Hercon, Great Lakes (Luretape) • Tomagro (TomaAttract) • AgBio (Oriental, Cucumber Beetle)

For forestry insects:
Trécé, Gardens Alive, Great Lakes, Olson, Harmony, Phero Tech (Phero Tech Lures)

For Japanese beetle:
Trécé, Gardens Alive, Great Lakes, Olson, Harmony • Phero Tech • Sterling • 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) • Woodstream, 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) (Storgard II and III) • Insects Ltd.
Physical Controls

Controlled Atmosphere System (for stored grains):
The Aerogen • Air Products (Prism System)

Row Covers:
Great Lakes (Fiberweb) • Gardener’s Supply, 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, Gemplers (Scentry) • Peaceful Valley • AgBio (oriental beetle) • Gardener’s Supply (Asian LB Trap) • Woodstream (Surefire Japanese Beetle Trap)

Biological Controls

Seed mix to attract beneficial insects:
Lockwood, Harmony, Peaceful Valley, Rincon-Vitova

Syringe for nematode injection (for borers): Gardens Alive

Insect-Attacking Nematodes:
Heterorhabditis bacteriophora: BioLogic • IPM Labs • Adermatt • Natural Insect Control • Plant Health Care • Koppert • Peaceful Valley
Heterorhabditis megidis: Adermatt • Biological Crop • Biobest • International Technology • W. Neudorff • Plant Sciences • Rincon-Vitova
Heterorhabditis spp.: Syngenta Bioline • Biowise • Hydro-Gardens • Natural Insect Control • Nature’s Control • W. Neudorff • Peaceful Valley • Rincon-Vitova
Heterorhabditis marelatus: Evergreen • BioLogic
Steinernema carpocapsae: Biological Crop • Sierra Biological • BioLogic • Planet Natural • Gardens Alive! • Hydro-Gardens • IPM Labs • Natural Insect Control • Peaceful Valley • Rincon-Vitova
Steinernema feltiae: BioLogic • International Technology • IPM Labs • Koppert • Natural Insect Control • W. Neudorff • Steinernema feltiae and Heterorhabditis sp. (mix): North Country (Grub Gard)
Steinernema riobravis: Harmony • Sierra Biological
Steinernema kraussii: Becker Underwood • Rincon-Vitova

Microbial Insecticides:

Bacillus thuringiensis (BT) for beetle larvae:
Bonide, Gardener’s Supply (Bonide) • Johnny’s, Harmony (Colorado Potato Beetle Beater)
BT galleriae (for adult Japanese beetles): Phyllom
Bacillus thuringiensis tenebrionis (BTT):
Valent USA, Peaceful Valley (Novodor) • Gardens Alive (Potato Shield)
Bacillus popilliae (milky spore disease):
St. Gabriel, Gardener’s Supply, North Country (Milky Spore)
Beauveria bassiana (fungus for grubs):
Troy, Hydrogardens, Planet Natural, Peaceful Valley (Naturalis T)
Metarhizium anisopliae (black vine weevil): NovoZymes (MET52)
Chromobacterium (beetle grubs): Marrone (Grandevo)

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
Pedioius foveolatus (for Mexican bean beetle): ARBICO • IPM Labs • Rincon Vitova • Green Methods

Predators:

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

Least-Toxic Chemical Controls

Borate-Based Insecticides:
Whitmore (PT 249) • 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) • JH Biotech (Bio Repel)

Mustard and Chili Oil Repellent:

Soil Technologies (Valorum, Armorex)

Insect Growth Regulators (for beetle grubs):

Dow Agro (halofenozide, Mach-2) • O.M. Scott (Grub-EX)

Insecticidal Soap (for flea beetle):

Woodstream, Peaceful Valley, Harmony (Concern, Safer) • Certis (DES-X) • Gowan (MPede)

With pyrethrins:

Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard and Garden) • Peaceful Valley

Neem Products:

Certis, Plant Natural (Azatin) • Woodstream, Gardener’s Supply, Peaceful Valley, The Natural Gardening (Surefire Japanese Beetle Repellent) • Woodstream, Peaceful Valley (Safer’s BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • Gardens Alive (Neem-Away) • Green Light, Harmony (Rose Defense) • San Jacinto (Organica) • PBI (Azatrol) • Agro, Peaceful Valley (DeBug) • Gowan (AZA) • Bioworks (Molt-X) • Parry (AzaMax) • Garden Essentials, Harmony (100% neem oil)

Pyrethrin and Neem: MGK (Azaer)

Pyrethrin:

Roxide • Whitmore (microencapsulatd PT-175 MicroCare, PT 565, PT 505) • Johnny’s, Peaceful Valley (Pyreneone) • Neogen (Formula 66, LD-44Z) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, (Bug Buster O, w/o PBO) • MGK, Peaceful, Harmony (PyGanic)

Pyrethrin, rotenone, copper, sulfur:

Bonide, Gardener’s Supply (Bonide Garden Dust)

Pyrethrum Powder:

Nichols Garden • Harmony • Planet Natural

Roteneone:

Bonide

Sabadilla:

MGK, Harmony (Veratran) • Peaceful Valley

Silica Aerogel: See ANTS

Spinose Microbial Isolate (leaf beetles):
Dow Agro (Entrust) • Gardens Alive (Bulls-eye) • Monterey • Harmony
(Structural Pests)
Identification & Monitoring

Trained Dogs (for detection):
American K-9 • Florida Canine

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

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

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

Microwave Equipment:
Professional Equipment

Least-Toxic Chemical Controls

Borate Rods:
Pole Care, Nisus (Impel Rods)

Borate Termiticide & Wood Preservative:
NISUS, Target, Univar (Born-Care) • PermaChink (Guardian, Shellguard) • Sashco (Penetreat) • NISUS (TimBor) • NovaGuard

Borate Treated Lumber and Building Material:
Osmose

Borate Treated Logs:
Appalachian • Lok-N-Logs

Heat for Bedbugs:
Thermapure • PestHeat • Tempair (Thermal Remediation)

Vacuum:
BioQuip • Proteam (Sierra)

Horticultural Controls

Beneficial Seeds and Plants:
Cornflower • Harmony • Lockwood

Insect-Resistant Turfgrass:
Endophytic Ryegrass (repels billbugs & caterpillars):
Pennington (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) • Peaceful Valley

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

Biological Controls

Stink Bug Attractant (Sterling)

Microbial Insecticides:
Chromobacterium (stinkbug): Marrone (Grandevo)

Entomopathogenic fungus:
Beauveria bassiana (for chinch bugs): Troy, Hydrogardens, Gardener’s Supply (Naturalis T) • Laverlam, BioWorks (Botanigard) • Peaceful Valley

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

Parasitoids:
Peristenus relictus (for lygus bug):
Rincon-Vitova

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

Least-Toxic Chemical Controls

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

Diatomaceous Earth: See ANTS

Essential Oil (for Bed Bugs):
Reneotech (EcoRaider)

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

Insecticidal Soap:
Woodstream (Concern) • Woodstream (Safer) • Certis (DES-X) • Gowan, Harmony (M-Pede)

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

Silica Gel (for Bed Bugs): Rockwell (CimeXa)

Hydroprene IGR for bedbugs:
Zoecon (Gentrol)

Neem for Bedbugs: Terramera (Cirkil)

Neem Products:
Certis, Planet Natural, Nitron, Johnny’s (Azatin) • Woodstream (Safer’s
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 (Coding Moth) • Tomagro • Isca Technologies • Trece (Pherocon, coding moth and others)

For forestry insects:
Phero Tech (Phero Tech Lures)

For stored product insects:
Woodstream, 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 (Clothes Moth Pheromone) • Springstar • Certis, Harmony (Clothes Moth) • Woodstream (Pantry Pest Pheromone) • Springstar (Clothes Moth) • Insects Ltd. • Trece (Storgard Quick Change Dome) • Trece (Storgard II) • Trece (Storgard III)

Physical Controls

Controlled Atmosphere System (for stored grains):
The Aerogen • Air Products (Prism System)

Mineral Coating to Protect Fruit:
BASF, Peaceful Valley, Gardens Alive (Surround) • Certis

Row Covers:
Great Lakes (Fiberweb) • Gardens Alive! (Super-Light) • Gardener’s Supply, Gardens Alive, (Floating Row Covers) • Harmony (Harvest Guard, Tufbell) • Peaceful Valley (Tufbell, AgGro) • Mipco

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

Sticky Trap/Tape:

For agricultural & horticultural insects:
Scentry, Great Lakes, ARBICO, Planet Natural, GEMPLERS (Scentry Gypsy Moth Trap) • Peaceful Valley • Phero Tech • Tomagro • Tanglefoot • Crop Production (Hopper Finder) • Trece

Traps:
Woodstream, Harmony, Peaceful Valley, The Natural Gardening (Gypsy Moth Trap) • Ladd, Planet Natural (Red Sphere Fruit Fly) • Woodstream, Harmony, Great Lakes, The Natural Gardening (Surefire Codling Moth) • Sterling (Smart) • Springstar • Trece

Tree Wrap:
Olson (Sticky Tree Guards) • Planet Natural, Peaceful Valley (Bug Belt) • Phero Tech • Tanglefoot

Horticultural Controls

Insect-Resistant Turfgrass:
Endophytic Ryegrass (repels billbugs & caterpillars):
Pennington (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) • Peaceful

Endophytic Tall Fescue (repels caterpillars):
Turf Seed (Apache II, Tomahawk, Coronado Gold, Tarheel) • Peaceful

Biological Controls

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

Seed Mix to Attract Beneficials:
Harmony • Peaceful Valley • Lockwood • 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:
Natural Insect Control • Peaceful Valley • Planet Natural • Arbico

Insect-Attacking Nematodes:
Heterorhabditis bacteriophora: BioLogic • IPM Labs • Natural Insect Control • Andermatt
Heterorhabditis mariae: BioLogic
Steinernema carpocapsae: BioLogic, IPM Labs, Natural Insect Control, Peaceful Valley, Sierra Biological
Steinernema feltiae: BioLogic, IPM Labs, Natural Insect Control
Steinernema riobravis: Harmony • Sierra Biological

Syringes for nematode injection (for borers):
Gardens Alive • Natural Insect Control

Microbial Feeding Stimulant:
Peaceful Valley

Microbial Insecticides:
Bacillus thuringiensis (BT):
Valent USA, Harmony, Johnny’s, Greenlight (Dipel, Dipel 4L, 2X, 10G, ES, Xentari WDG) (Topside Dipel) • Koppert (Bactospine) • Sinerton (Caterpillar Killer) • ARBICO • Planet Natural • AgriCo Health & Florent (Bacillus thuringiensis kurstaki (BTK)):
Trichogramma
Greenmethods • Bugs for Bugs
Kuida • Nature’s Control • Rincon-Vitova • Peaceful Valley • Plant Health Care, Certis (Crymax) • Monterey

**BT protein encapsulated in Pseudomonas:**
Certis, Gardens Alive (M-Peril, M-Trak, Mattch, MVP-II)

**Bacillus bassiana for soil and turf (sod webworm):**
Troy, Hydro-Gardens, Gardener’s Supply (Naturalis-T) • Laverlam, BioWorks (Botanigard) • Peaceful Valley

**Chromobacterium (Grandevo):** Marrone

**Burkholderia A396 (Venerate):** Marrone

**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)

**NPV (from alfalfa looper or celery looper):**
Certis (call for availability)

**NPV from H. zeae (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 • Natural Insect Control

Cotesia plutellae (for diamondback moth): ARBICO

Goniotus legneri (for navel orangeworm, omnivorous leafroller): ARBICO • Beneficial • California BioWorks • Kuida

Orgilus lepidus (for potato tuber moth): Bugs for Bugs
Pentalitomastix plethoricus (for navel orangeworm): California BioWorks

**Trichogramma brassicae:** Beneficial • IPM Labs • Koppert • Nature’s Control • Rincon Vitova • Greenmethods

**Trichogramma carverae:** Bugs for Bugs

**Trichogramma evanescens** (for moth): Koppert

**Trichogramma minutum** (for Eastern U.S. orchards): ARBICO • Beneficial Insectary • Biofac • Planet Natural • International Technology • IPM Labs • Nature’s Control • Peaceful Valley • Rincon Vitova • Greenmethods

**Trichogramma ostriniae:** Beneficial Insectary • IPM Labs

**Trichogramma platura:** (for Western U.S. orchards): ARBICO • Beneficial • Planet Natural • Kuida • Rincon-Vitova • Peaceful Valley • International Technology • FAR

**Trichogramma pretiosum** (for moth eggs in vegetable & field crops): ARBICO • Beneficial • Biofac • Planet Natural • FAR • Gardens Alive! • Kuida • Nature’s Control • Rincon-Vitova • Peaceful Valley • Greenmethods • Bugs for Bugs

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

Beneficial Insectary • Conrad Appel • Kunafin • Natural Insect Control • Natural Pest Controls • Organic Control • Peaceful Valley • Natural Enemy • Hydrogardens

*Trichogrammatoides bactreae* (for moth egg in fields & orchards, pink bollworm): Greenmethods

**Predators:**
predatory bug: *Deraeocoris brevis*: Applied Bionomics • Natural Insect Control
spined soldier bug, *Podisus maculiventris*: ARBICO • Natural Insect Control • Bug Factory • Rincon Vitova • Greenmethods

warehouse pirate bug, *Xyllocoris flavicipes*: (for stored product moths): ARBICO • Planet Natural • Biofac • Natural Insect Control

**Least-Toxic Chemical Controls**

**Botanical Repellents:**
Renee’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) • JH Biotech • Brandt (Ecotec) • EcoSmart • Liquid Fence

**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, Green Light (Entrust) • Gardens Alive (Bulls-Eye) • Harmony • Peaceful Valley • Monterey (Insect Spray)

**Neem Products:**
Certis, Planet Natural (Azatin) • Woodstream (Safer’s BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • Green Light, Gardener’s Supply (Green Light) • Agro (Agroneem) • Gowam (AZA) • BioWorks (Molt-X) • Garden Essentials, Harmony (100% neem oil) • Parry (Azamax)

**Pheromone Mating Disruptants:**
Checkmate for codling moth, tomato pinworm, oriental fruit moth, pink bollworm, peach tree borer; Puffer or Paramount aerosols for NOW, OFM, codling moth; Isomate for codling moth, oriental fruit moth, greater and lesser peach tree borer, oblique-banded leafroller, pandemis leafroller, pink bollworm; NoMate for tomato pinworm, pink bollworm, tufted apple bud moth, oriental fruit moth, codling moth, omnivorous, obliquebanded, and pandemis leafrollers; Disrupt for peach twig borer, oriental fruit moth, coding moth, and gossip moth.

Manufacturers and suppliers are:
Suterra, Harmony, Great Lakes, Harmony, ARBICO, Peaceful Valley (Checkmate) • Suterra (Puffer, Paramount) • Pacific Biocontrol, Great Lakes, Harmony, Peaceful Valley (Isomate) • Scentry, Great Lakes, ARBICO, Planet Natural (NoMate) • Scentry, Great Lakes, ARBICO, Planet Natural, Gempler’s (Attract & Kill, NoMate PBW-MEC for pink bollworm) • Hercon, Great Lakes (Disrupt) • Trece (Cidetraek, Codling Moth, OFM) • Trece (Cidetraek, Indianmeal moth)

**Pheromone Lures for Many Lepidoptera:**
Trécé (Pherocon) • Tomagro (TomaAttract) • Great Lakes IPM •
Suterra (BioLure) • Phero Tech • Isca Technologies • Suterra (Scenturion) • AgBio

Pyrethrin:
Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Waterbury (Purge III) • Monterey (Bug-Buster-O, w/o PBO) • MGK, Peaceful, Harmony (PyGanic) • Woodstream (Safer)

Pyrethrum powder:
Nichol’s Garden • Harmony
Rotenone:
Bonide
Sabaddilla:
MGK, 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
Traps:
Woodstream (Victor, sticky) • Great Lakes (AgriSense)

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 (Sierra, Optimus)

Biological Controls

Parasitoids:
Anastatus tenuipes: Rincon-Vitova
Aprostocetus hagenowii: Bio Pre • Rincon-Vitova
Comperia merceti: Rincon-Vitova

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 Attract) • Blue Diamond (ProJoe) • Nisus (Magnetic)

Dinofuran bait: BASF (Alpine)
Indoxacarb bait: Dupont (Advion)

Hydromethylnon bait stations (child-resistant):
Bayer ES (Maxforce, Combat)
Fipronil bait stations (child resistant):
Bayer ES (Maxforce)
Hydromethylnon gel bait:
TopPro, Target, Univar (Siege) • Zoecon (Matrix)
Sulfuramid bait station:
S.C. Johnson (Raid Max)
Bait Attractant:
Rockwell (Invite)
Bait gun: Specialty Products • Target • Whitmire

Botanical Sprays:
Orange Guard, Univar, Target (orange oil) • Woodstream (Mint Oil) • EcoSmart (herbal oil) • Zoecon (Essentria)

Drain Cleaner, Degreaser Microbial to Remove Cockroach Food:
American Bio-Systems (Bio-Mop) (Drain Gel)
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 249) • Copper Brite, Harmony (Roach Prufe) • Woodstream (Victor) • J.T. Eaton • NISUS (Nibor) • Nisus (Boracide)

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) • Celta • Eagle Picher • Peaceful Valley • JT Eaton (Answer) • Dicofel

With pyrethrin:
Permaguard, Nitron (Permaguard) • The Natural Gardening (Insectigone) • Gardens Alive • Organic Solutions

Hydromephene IGR:
Zoecon (Gentrol)

Hydromephene IGR Controlled Release Station:
Zoecon (Point Source)

Pyriproxyfen IGR: MGK (NyGard)

Pyrethrin:
Roxide • Whitmire (PT-175 microencapsulated, PT 505, PT 565) • Neogen (Formula 66, LD-44Z) • Bayer (Harmonix)

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:
Bayer ES, Target (Drione) • Whitmire (PT 239 Tri-Die) • Univar

CRICKETS

(See Grasshoppers)
**EARWIGS**

Physical Controls

**Least-Toxic Chemical Controls**

Diatomaceous Earth: See ANTS

Insecticidal Soap: See APHIDS

**FLEAS**

Physical Controls

**Combs:**
Gardens Alive!

**Vacuums:**
Proteam (Sierra, Optimus)

**Sticky light traps:**
Enforcer Products (Over Nite Flea Trap) • Happy Jack • Gardens Alive • Springstar (Flea Trap) • Woodstream (Victor) • Natural Insect Control • Peaceful Valley

**Sticky Traps and Tape:**
Bell (Trapper) • Olson • Gemplers

**Biological Controls**

Insect-Attacking Nematodes (outside treatment):
Peaceful Valley • Organic Control • Gardens Alive • Hydrogardens • Planet Natural • Biologic

**Least-Toxic Chemical Controls**

Sodium octaborate (carpet treatment):
The Ecology Works (Flea and Mite Control)

**Insecticidal Oil:**
Citrus or herbal oil extract:
Gardens Alive! (Flea Stop Shampoo) • Orange Guard, Univar, Target (Orange Guard) • Woodstream (Poison Free) • EcoSmart • Zoecon (Essentria, EcoExempt, EcoPCO)

Diatomaceous Earth (minimize exposure to dust, use material with low crystalline silica content):
Natural Animal (EcoZone) • Woodstream • Peaceful Valley • Eagle Picher (MN-53) • Cellite (Diafil) • Permguard (food grade) • JT Eaton (Answer)

With pyrethrin (do not use on cats):
Permguard, Nitron (Permguard)

**Spot-On Treatments for Pets:**
Fipronil flea adulticide:
Merial (Frontline) • Drs. Foster and Smith

Fipronil adulticide with methoprene:
Merial (Frontline Plus) • Drs. Foster and Smith

Nicotine analog flea adulticide:
Bayer Animal (Imidacloprid, Advantage) • Veterinarians

Selamectin flea adulticide:
Pfizer (Revolution)

Insect Growth Regulators:
Lufenuron (oral formulation for pet):
Syngenta (Program) • Drs. Foster and Smith

Methoprene (collars or sprays):
Zoecon (Precor) • Enforcer (FGR)

Methoprene (with permethrin) for fleas (do not use on cats):
Zoecon, Gardens Alive! (Precor)

Pyriproxifen (collars or sprays):
MGK (Nylar) • Bayer (Fleegard)

**Insecticidal Soap:**

With pyrethrin (do not use on cats):
Woodstream, Planet Natural, Gardens Alive!, Harmony (Flea & Tick Attack) • Woodstream, Gardens Alive!, Harmony, Nitron (Safer Yard and Garden) • Peaceful Valley

Pyrethrin (do not use on cats):
Del (Lice, Tick & Flea Spray) • Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Enforcer (Flea & Tick Spray, Powder, Shampoo) • Neogen (Formula 66, LD-44Z)

Pyrethrum powder (do not use on cats):
Natural Animal (EcoZone), Planet Natural

Repellent (Herbal Flea Collar):
Planet Natural

Silica Aerogel: See ANTS

**FLIES**

(Nuisance)

**Identification & Monitoring**

Pheromones & Traps for Agricultural Pests:
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) • Stateline (Ultra Shield)

**Screening:**
Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control, Charley’s (Tangle-Trap) • Phero Tech • Seabright

Cone-Type Solar Traps:
ARBICO • Great Lakes (Musca Terminator) • Olson (Sticky) • Tanglefoot (Aeroxon) • Great Lakes • Peaceful Valley • Natural Insect Control

Jar-Type and Disposable:
Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control (Victor Fly-In-Saucer, Fly Magnet) • Sterling Intl. (Rescue!) • Stateline • Harmony • Sterling (with attractant)

**Horse Fly Trap:**
Newman (Horse Pal)

**Electrocution Black Light Fly Traps:**
Gilbert Industries (Electrocuting Light Traps) • B &W (Mantis) • Actron

**Adhesive Black Light Traps:**
Great Lakes, Gempler’s (blacklight, sticky) • Whitmire (Vector) • Whitmire (Actron, programmable) • Actron

**Solar-powered electrocution traps:**
Great Lakes, Gempler’s (Tower of Doom, Dungeon of Doom, solar electrocution)

**Sticky trap/tape:**
Springstar (fly strip) • Natural Insect Control • Loveland (Sticky Roll) • Crop Production (Hopper Finder) • Phero Tech (Chroma) • Tanglefoot (Aeroxon, window trap) • Zoecn (Fly Inn, Fly Stop, Big Stik)

**Biological Controls**

**Insect-Attacking Nematodes:**
*Heterorhabditis megidis:* Andermatt • Biological Crop • BioBest • Koppert • International Technology • W. Neudorff

*Heterorhabditis sp.:* Novartis BCM • Biowise • Hydro-Gardens • Koppert • Natural Insect Control • Nature’s Control • Peaceful Valley • Gardens Alive

*Steinernema carpocapsae:* BioLogic • Hydro-Gardens • IPM Labs • Natural Insect Control • Peaceful Valley • Harmony • Sierra Biological

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

*Steinernema sp.:* English Woodlands • Natural Insect Control • Nature’s Control
Microbial Drain Cleaner (drain flies): American BioSystems

**Sterile flies for release (onion maggot):**
De Groene

**Microbial Insecticides:**
*Ivermectin for bot flies, etc.:
Bayer Animal (Ivomec Pour-On)
(Sold only to veterinarians & licensed suppliers)

*Ivermectin and clorosulon:
Bayer Animal (Ivomec-F Injection)
(Sold only to veterinarians & licensed suppliers)

**Parasitoids:**
*Muscidifurax raptor:* IPM Labs • Kunafin • Natural Insect Control
*Muscidifurax raptorellus:* IPM Labs • Greenmethods • Rincon-Vitova • Natural Insect Control • Kunafin • Spalding
*Muscidifurax sp.:* Beneficial Insectary • Peaceful Valley • Spalding
*Muscidifurax zaraptor:* ARBICO • Planet Natural • Kunafin • Natural Pest Controls • Nature’s Control • Greenmethods • Spalding

*Nasonia vitripennis or Mormontella vitripennis:* ARBICO • Natural Pest Controls • Bioplanet
*Spalangia cameroni:* Kunafin • Spalding • Arbico • Rincon Vitova
*Spalangia gemini:* Kunafin
*Spalangia endius:* Kunafin • Natural Pest Controls • Rincon-Vitova • Greenmethods • Bugs for Bugs
*Spalangia nigroaenea:* Kunafin
*Spalangia sp.:* Beneficial Insectary • Peaceful Valley • Spalding • Kunafin

*Sphegigaster sp.:* Peaceful Valley

**Trichomalopsis spp.:** Beneficial Insectary

**Urolepis rufipes:** Kunafin

**Parasitic mites:**
*Stratiolaespus:* Applied Bionomics
• Koppert • Garta • Florikan • Evergreen

**Predators:**
*Histerid beetle, Carcinosps pumilis:* IPM Labs • Rincon Vitova
Dung beetle, *O nthophagus spp.:* Rincon Vitova
Predatory fly, *Hydrotaea aenescens:* IPM Labs

**Least-Toxic Chemical Controls**

**Botanical Fly Repellents:**
Planet Natural, Natural Insect Control, Gardener’s Supply (Skeeter Shoo, citronella) • Woodstream, Gardens Alive (Bite Blocker, geranium oil) • Stateline (Horse Shoo, citronella fly repellent) • ARBICO (Aloe Herbal Spray) • EcoSmart (Bioganic) • WF Young (UltraShield) • Liquid Fence

**Diatomaceous Earth:** See ANTS

**Pyrethrin:**
Roxide, Harmony (Revenge) • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Waterbury (Purge III) • Neogen (Formula 66, LD-44Z) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey, Harmony (Bug Buster O, w/o PBO) • Bayer (Harmonix) • MGK, Harmony (PyGanic)

**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)

**Physical Controls**

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

**Apple maggot red sphere trap:**
Ladd, Gemplers, Harmony, Tanglefoot, 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 • Peaceful Valley

**Least-Toxic Chemical Controls**

**Pyrethrin:** (see nuisance flies)

**Spinosad Bait:** Dow, Harmony (Naturlyte), GF-120
**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, Stiky Traps) • Peaceful Valley • Springstar • IPM Labs

**Biological Controls**

**Insect-Attacking Nematodes:**
- *Heterorhabditis megidis*: Koppert • W. Neudorff
- *Heterorhabditis sp.:* Hydro-Gardens • Koppert • Nature’s Control • Natural Insect Control • W. Neudorff • Peaceful Valley • Gardens Alive • Florikan
- *Steinernema bibionis*: W. Neudorff
- *Steinernema carpocapsae*: BioLogic • Biobest • Planet Natural • Gardens Alive • Hydro-Gardens • IPM Labs • Natural Insect Control • Sierra Biological
- *Steinernema feltiae*: BioLogic • BioBest • IPM Labs • Koppert • Natural Insect Control • W. Neudorff • International Technology • Plant Sciences • Andermatt • Garta • Sierra Biological • EcoSolutions
- *Steinernema riobravis*: Harmony • Sierra Biological
- *Steinernema spp.:* Beneficial • 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.:* Rincon-Vitova • Natural Insect Control
- Predatory mite, *Gaeolaelaps gillespiei: Applied Bionomics
- Predatory mite, *Stratiolaelaps scimitus: ARBICO • Applied Bionomics
  - BioBest • BioBest Canada • Biological Crop • Biowise • IPM Labs • Koppert • Natural Insect Control • Bug Factory • International Technology • Jorgen Reitzel • Plant Sciences • Greenmethods

**Least-Toxic Chemical Controls**

**Insect Growth Regulators:**
- Methoprene:
  - Zoecon (Enstar)

**Insecticidal Oil:** See APHIDS

**Neem Products:**
- Certis, Planet Natural, Harmony (Azatin) • Woodstream, Harmony (Safer’s BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • PBI (Azatrol) • Agro (EcoSense) • Gowam (AZA) • Agro (DeBug) • Parry (AzaMax)

**Pyrethrin:**
- Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Peaceful Valley (Py-Rin, w/o PBO) • Monterey (Bug Buster O, w/o PBO) • MGK, Harmony (PyGanic)

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**GRASSHOPPERS**

**Physical Controls**

**Row Covers:**
- Great Lakes (Fiberweb) • Gardener’s Supply, Gardens Alive! (Floating Row Covers)
  - Gardens Alive! (Super-Light)
- Harmony (AgGro, Tuftbell) • Peaceful Valley (Tuftbell, AgGro) • Shepherd’s (Agrofabric)
  - Mipco • Fiberweb

**Biological Controls**

**Insect-Attacking Nematodes (for mole crickets):**
- *Steinernema carpocapsae*: BioLogic • IPM Labs • Natural Insect Control • Harmony • Andermatt
- *Steinernema feltiae*: BioLogic • IPM Labs • Natural Insect Control • Harmony • Sierra Biological
- *Steinernema scapterisci*: Gardens Alive • Becker Underwood
- *Steinernema riobravis*: Sierra Biological • Harmony

**Microbial Insecticides:**
- Protozoan pathogen:
  - *Nosema locustae* (for grasshoppers): Harmony • Hydro-Gardens
  - M & R Durango (Nolo Bait) • Nitron, Planet Natural, Gardens Alive! (Semispore Bait) • Peaceful Valley

**Fungal pathogen:**
- *Beauveria bassiana* (for grasshopper, crickets): Troy, Hydrogardens, Gardener’s Supply (Naturalis-T) • BioWorks (Mycolyte)

**Least-Toxic Chemical Controls**

**Borate-Based Insecticides:**
- NISUS, Target (NIBAN Granular Bait for crickets) • Whitmire (PT 249 Perma-Dust)

**Neem Products (Act as Repellents):** See APHIDS

**Repellent Garlic Spray:**
- Garlic Research Labs, (Garlic Barrier) • Soil Technologies (Garlic Gard) • Harmony • Peaceful Valley

**Rotenone:**
-
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:
Crop Production (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 spp.: Biological Crop

Least-Toxic Chemical Controls (see Aphids)

LEAFMINERS

Physical Controls
Sticky Adhesive:
Seabright foot, 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 • Biological Crop • Duclos • Biowise • Gartnerei • Koppert • Natural Pest Controls • Sautter & Stepper • W. Neudorff • Greencrisis • Natural Pest Control • International Technology • Rincon-Vitova • Garta
Diglyphus isaea: ARBICO • Azienda • BioBee • Biobest • Bioplanet • Biological Control • Syngenta Bioline • Duclos • Biowise • Gartnerei • Koppert • Natural Pest Controls • Plant Sciences • Sautter & Stepper • W. Neudorff • Natural Insect

Control • Greenmethods • International Technology • Rincon-Vitova
Opis pallipes: Bio Pre

Microbial Insecticides:
BT (for citrus leafminer):
Valent USA, Peaceful Valley, Planet Natural, Biowise (Dipel)

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

Least-Toxic Chemical Controls
Abamectin:
Bayer Agricultural, Planet Natural (Avid)

Insecticidal Oil:
Florikan (Target Oil) • (See Aphids for a More Complete Listing)

Neem Products:
Certis, Planet Natural, Harmony, Peaceful Valley, Greenmethods (Azatin for ornamentals, Neemix for food crops) • Woodstream, Harmony, Peaceful Valley (Safer’s BioNeem) • Gardens Alive (NeemAway) • Green Light • PBI (Azatrol) • Agro (EcoSense) • Gowan(AYA)

Repellent Hot Pepper Wax:
Charley’s • Harmony (Hot Pepper Wax) • St. Gabriel

LICE

Identification & Monitoring
Head lice detection kit:
Insight (Pronto Lice Detection Kit, for home use)

Head lice prevention, management and educational products:
National Pediculosis Association

Physical Controls
Head lice comb:
Health Enterprises (Acu-Life) • National Pediculosis Association (LiceMeister)

Least-Toxic Chemical Controls
Enzyme Shampoos:
Safe Effective (Lice-B-Gone)

Pyrethrin shampoo, for head lice: Insight (Pronto) • Bayer (RID)

MAGGOTS
(See Flies)

MEALYBUGS

Physical Controls
Screening:
Hydro-Gardens • Tipper, Harmony (Tie-Net) • Peaceful Valley

Biological Controls

Parasitoids:
Anagrus fusciventris: Bio Pre
Anagrus pseudococci: Amos Rubin • Bio Bee • Biological Control • Associates • FAR
Leptomastidea abnormis: Amos Rubin • Bio Pre • W. Neudorff • Natural Insect Control

Leptomastix dactylopii: Amos Rubin • Azienda • Biobest • Bioplanet • IPM Labs • Koppert • W. Neudorff • Rincon-Vitova • Flora • Katz • Biobest Canada • Biobest USA

Leptomastix epona: Bio Pre
Pseudaphycus flavidulus: Bio Pre

Predators:
Lacewing, Sympherobius sanctus: Amos Rubin • Bio Bee • Bio Pre
Lacewing, Micromus variegatus: Applied Bionomics

Lady beetles:
Mealybug destroyer, Cryptolaemus montrouzieri: Amos Rubin • ARBICO • Azienda • Bio Bee • Biobest • Biobest Canada • Bioplanet • Biological Control • Biological Crop • Bio Pre • Planet Natural • Bugs for Bugs • Bioworks • Hydrogardens • IPM Labs • Koppert • Natural Insect Control • Natural Pest Controls • Bug Factory • Nature’s Control • Organic Control • Rincon-Vitova • W. Neudorff • Greenmethods • EcoSolutions • Associates • FAR
Hyperaspis polita: Amos Rubin
Nephus reunioni: Amos Rubin • Bio Pre

Least-Toxic Chemical Controls

Citrus Mealybug Pheromone: Syngenta Bioline
Chromobacterium: Marrone (Grandevo)
Diatomaceous earth: See ANTS

Insecticidal Oil:
Highly refined oil (from fish):
Organic Labs
Highly refined oil (from petroleum):
Monterey, Harmony (Saf-T-Side) • Valent USA, Harmony, Peaceful Valley (Volck) • Sun Oil, Gardens Alive!, Harmony (SunSpray) • Gardens Alive (Eco-Oil) • Summit • Brandt (Tritec) • Monterey
Highly refined seed oil:
Stoller, Peaceful Valley
(Natur’l Oil, 93% soybean)
• ARBICO (Spreadall 93% cottonseed)

Insecticidal Soap: See APHIDS

Neem Products:
See LEAFMINERS

Physical Controls

Furniture covers for dust mites:
Allergy Control Products

Mattress Covers (to exclude dust mite):
Puritans Pride • Allergy Control

Mattress Cleaning Machine: Hygienitech

Vacuums: Proteam (Sierra, Optimus)

Kaolin Crop Protection: BASF, Peaceful (Surround)

Biological Controls

Microbial Insecticides:
Beauveria bassiana: Troy, Hydrogardens, Gardener’s Supply (Naturalis-O and L) • Laverlam, Bioworks, Harmony (Botanigard) • Peaceful Valley • BioWorks (Mycontrol)
Burkholderia (Venateate): Marrone

Predators:
Lady beetle, Stethorus punctillum (for European red spider mite):
Applied Bionomics • Evergreen • Rincon Vitova • Nature’s Control • Natural Insect Control • Greenmethods • ARBICO • EcoSolutions

Predatory bugs:
Orius insidiosus: Syngenta Bioline • Gartenbau • Gartnerei • International Technology • IPM Labs • Koppert • Nature’s Control • The Bug Store • ARBICO • Rincon Vitova
Orius laevigatus: Koppert • Biological Crop

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

Orius spp.: Biobest • Bioplanet • Bio Pre • Duclos • Natural Insect Control

Orius tristicolor: ARBICO • Planet Natural

Predatory gall midge (the mite midge):
Feltiella acarisuga: Bio Pre • Biobest • Biobest Canada • Biological Crop • Biowise • Koppert • Natural Pest Controls • Rincon-Vitova • Bug Factory • Greenmethods • Nature’s Control • ARBICO • EcoSolutions

Predatory mites:
Amblyseius andersonii (for spider mites): Syngenta Bioline • EcoSolutions • International Technology • Greenmethods
Amblyseius californicus (for two-spotted spider mite): Bio Pre • BioBest • Biotactics • Planet Natural • Hydro-Gardens • International Technology • IPM Labs • Koppert • Kuida • Natural Insect Control • Natural Pest Controls • Nature’s Control • Rincon-Vitova • FAR • Greenmethods

Amblyseius cucumeris (for two-spotted spider mite): Applied Bionomics • ARBICO • Evergreen • Syngenta Bioline • Hydro-Gardens • International Technology • IPM Labs • Bug Factory • Natural Insect Control • Natural Pest Controls • Rincon-Vitova • W. Neudorff • Bio Bee

Amblyseius degenerans (for mites): Evergreen • Syngenta Bioline
Amblyseius fallacis (for two-spotted spider mite, European red mite):
Applied Bionomics • Evergreen • IPM Labs • Natural Insect Control • Biotactics • ARBICO • Rincon-Vitova

Galendromus annecetans (for persea mite): ARBICO • Biotactics • Rincon-Vitova

Galendromus helveolus (for persea mite): ARBICO • Biotactics • Rincon-Vitova

MITES

Identification & Monitoring

Traps:
Phero Tech (Varroa Mite Trap)
**Hypoaspis aculeifer** (for bulb mite): Biobest

**Mesoseiulus longipes** or **Phytoseiulus longipes** (for two-spotted spider mite): ARBICO • Biotactics • Planet Natural • Hydro-Gardens • IPM • Natural Insect Control • Nature's Control • Peaceful Valley • Greemmethods • Rincon-Vitova

**Metaseiulus occidentalis** or **Galeruonopsis occidentalis**: ARBICO • Biological Control • Biotactics • Planet Natural • Florikan • Gartenbau • IPM Labs • Koppert • Kuida • Natural Insect Control • Natural Pest Controls • Nature’s Control • Peaceful Valley • Rincon-Vitova • Greemmethods

**Neoseiulus setulae** (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 • Biobest • Biobest Canada • Bio Pre • Bioplanet • Biological Control • Biological Crop • Biotactics • Planet Natural • Syngenta Bioline • CO. DEA • Central Coast • Duclos • Evergreen • Biowise • Florikan • Gartenbau • Gartnerci • Hydro-Gardens • International Technology • IPM Labs • Koppert • Kuida • Natural Insect Control • Natural Pest Controls • Bug Factory • Nature’s Control • Peaceful Valley • Rincon-Vitova • Sautter & Stepper • W. Neudorff • Zaklad • Greemmethods • EcoSolutions • Flora • Katz • Natural Enemies

**Scolothrips sexamaculatus** (predatory thrips): Rincon Vitova

**Typhlodromus athiasae** (for red mite): Amos Rubin

### Least-Toxic Chemical Controls

**Abamectin** (Isolated from *Streptomyces avermitilis*):
Bayer Agricultural, Planet Natural (Avid)

**Cedar Oil** (Cedar Gard):
NRG

**Herbal Oils (Zero Tol):** Natural Gardening Solutions

**Clove oil, garlic extract**:
JH Biotech, Safer Gro, Harmony (Pest Out)

**Essential Oils**:
Liquid Fence (EcoLogic) • Brandt (Ecotec) • EcoSmart • Monterey

**Organic Neem Extract**:
Parry (AzaMax)

### Insecticidal Oil:

**Highly refined oil (from fish):**
Organic Labs (95% fish, 5% sesame, Organocide)

**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 (Sprayspray) • Gardens Alive (Eco-Oil) • Summit • Brandt (Tritec)

**Highly refined seed oil:**
ARBICO (Spreadall, 93% cottonseed) • Stoller, Peaceful Valley (Natur’l Oil) • Monterey (Erase)

### Insecticidal Soap: See APHIDS

### Neem Products: See APHIDS

### Pyrethrins:
Neogen (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) • MGK, Peaceful, Harmony (PyGanic) • Bayer (Harmonic, w/o PBO)

**Pyrethrin, rotenone, sulfur and copper (garden mites):**
Bonide, Gardner’s Supply (Bonide Garden Dust)

**Pyrethropid (fluvalinate):**
Zocon, 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, (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley • Safer-Gro

**Repellent Hot Pepper Wax:**
Harmony • Peaceful Valley • St. Gabriel

**Borates:** Ecology Works (Flea and Dust Mite Control)

**Tannic acid (for house dust mites):**
Allergy Control Products

### MOSQUITOES

#### Identification & Monitoring

**Mosquito Traps:**
BioQuip (CDC, EVS, New Jersey) • Gempler’s • Woodstream (Mosquito Magnet) • Biosensory (Dragonfly) • Envirosafe (MegaCatch) • Peaceful Valley (Lentek) • Flowtron • Springstar

**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) • Univar

### Biological Controls

**Habitat:**
Bat Houses: Harmony, Natural Insect Control, Peaceful Valley
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, Peaceful Valley (Vectobac) • Valent Bio, Peaceful Valley (Bactimos) • Zocon (Teknar) • Summit, Harmony, Nitron, Sutton, Natural Insect Control (Mosquito Dunks) • Ecological (Microbe Lift) • Harmony (Mosquito Bits)

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

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Least-Toxic Chemical Controls

Insecticidal Oil: See APHIDS

Insect Growth Regulators:
Methoprene pellets, Zoecen (Altosid)

Repellents (Botanical):
Planet Natural, Natural Insect Control (Skeeter Shoo) • San Jacinto (Mosquito Beater) • S.C. Johnson, Planet Natural (citronella candles) • Woodstream, Gardens Alive (Bite Blocker, geranium oil) • Tender, A.M. Leonard (Natrapel citronella) • Woodstream, Garlic Research (Mosquito Barrier Area Repellent) • Dr. T’s • Charley’s • EcoSmart (Shoo Bug) • HOMS (Bite Blocker) • Gardens Alive (Sting Free, geranium oil) • WPC (Repel lemon eucalyptus) • Liquid Fence

Seeds or Mosquito-Repelling Plants:
Renee’s (sweet basil) • Park Seed (holy basil) • J.L Hudson (seeds for repellent plants)

DEET repellent:
REI (Cutter’s, Jungle Juice) • BioQuip • 3M (Ultrathon)

Pyrethrin repellent (not for use on skin):
WPC (Permanone) • Waterbury (Purge III)

MOTHS
(See Caterpillars)

NEMATODES

Biological Controls

Beneficial Nematodes:
Steineriema spp.: Nitron, Johnny’s • BioLogic • Hydro-Gardens

Biocontrol bacteria:
Burkholderia cepacia: Soil Technologies
Bacillus chitinosporus: Rincon-Vitova (Activate)
Pasteuria usage: Pasteuria BioScience

Biocontrol Fungi:
Arthrobotrys sp. (Europe only): Bio Pre
Dactylella sp.(Europe only): Bio Pre
Myrothecium verrucaria: Valenta USA, Peaceful Valley (DiTera)
Paecilomyces lilacinus: Bio Pre • Prophyla • Certis (MelonCon)

Experimental Fungus: International Mycological Institute

Chitin: Planet Natural • Peaceful (Shrimp Shells)
Botanical nematicide: Soil Technologies (Nemastop) • Monterey (Nema Q)

Sesame: Poulenger (Dragonfire, oil; Ontrol, liquid) • Natural Organic (Nemastop, groundup plant) • Brandt (Nemax, sesame oil)

Neemcake: Agro

SAWFLIES

Physical Controls

Traps and Sticky Tape:
Great Lakes

Least-Toxic Chemical Controls

Insecticidal Soap: See APHIDS

Spinosad: Dow • Harmony • Monterey

Neem Products: Certis, Planet Natural, Harmony (Azatin) • Woodstream, Harmony, (Safer’s BioNeem) • PBI (Azatrol) • Agro

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)

Sticky Trap/Tape:
ARBICO • Planet Natural • Great Lakes • Olsen • 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 Pre • FAR • IPM Labs • Kuida • Natural Insect Control • Natural Pest Controls • Organic Control • Rincon-Vitova • Sespe Creek • Greenmethods • Ecosolutions
Coccophagus lycimnia: Bio Pre
Encyrtus lecaniorum: Bio Pre
Metaphycus zebratus (for soft scale): Bio Pre

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

Predators:
Lady beetles:
Chilocorus baileyii (for armored scale): Bugs for Bugs • W. Neudorff
Chilocorus circumdatus (for citrus snow scale, armored scale): Bugs for Bugs • W. Neudorff
Chilocorus nigritus (for hard scale): Bio Pre • W. Neudorff
Harmonia axyridis: Rincon Vitova

Lindorus lophanthae: ARBICO • Bio Pre • Planet Natural • Bugs for Bugs • Natural Insect Control • Rincon-Vitova • Ecosolutions
Scymnus sp. (for soft scale): Bio Pre
Least-Toxic Chemical Controls

**Insect Growth Regulators**
- Fenoxycarb: Syngenta (Comply, Precision)
- S-Kinoprene: Zocon (Enstar)

**Insecticidal Oil:** See Aphids

**Insecticidal Soap:** See Aphids

**Pyrethrin:** See Aphids

**Repellent Hot Pepper Wax**
- Planet Natural
- Charley’s
- Harmony
- St. Gabriel
- Peaceful Valley

SILVERFISH

Least-Toxic Chemical Controls

**Borate-Based Insecticides:**
- Waterbury (Mop-Up)
- Whitmire (PT 249 35% boric acid dust)
- Peaceful Valley (Roach Powder)
- Nisus, Target (Niban FG)
- NISUS (Timbor)
- Planet Natural (Borid)
- J.T. Eaton

**Diatomaceous Earth:** See ANTS

**Pyrethrin:**
- Bayer ES (Kicker, Drione)
- Neogen
- (Formula 66, LD-44Z)
- Roxide
- Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO)
- Bayer (Harmonix)

**Silica Aerogel:** See ANTS

SLUGS AND SNAILS

Physical Controls

**Barriers & Exclusion Devices:**
- Copper snail barrier:
  - Harmony, The Natural Gardening, Peaceful Valley (Snail-Barr)
  - Woodstream (Safer)

**Traps:**
- Woodstream, Harmony, Santa Cruz Hort., ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (Safer)
- Nitron, Peaceful Valley, ARBICO (Slug Saloon)

**Trap with barley/rice yeast bait:**
- Gardener’s Supply (Slug Trap)

Biological Controls

**Predators:**
- Predatory nematode for snails, *Phasmarhabditis sp.:
  - Biowise
  - Becker Underwood
- Predatory snail, *Rumina decollata* (for brown garden snail): ARBICO
  - Rincon-Vitova
  - Sespe Creek
  - FAR
  - Tip Top

Least-Toxic Chemical Controls

**Insecticidal Soap:** See APHIDS

**Slug Bait:**
- Garden’s Alive (Escargro, iron phosphate)
- Monterey, Harmony, Peaceful Valley (Sluggo Plus, iron phosphate)
- Certis, Harmony (Sluggo)

TERMITES

Identification & Monitoring

**Acoustic Detection:** Acoustic (AED 2010)
**Infrared for Termite Detection:** Termicam, Termiscan, Professional
**Microwave for Termite Detection:** Termatrac (Termatrac)
**Moisture Meter:**
- Professional Equipment
- Univar
- Ben Meadows
- Delmhorst

**Rigid borescope for detecting termites:**
- Univar (Econoscope)
- Professional Equipment

Termite Sniffer:
- Professional Equipment
- Termite Detection (CO2)

Trained Dogs:
- American K-9
- Florida Canine

Biological Controls

**Insect-Attacking Nematodes:**
- *Steinernema carpocapsae*: BioLogic, Hydro-Gardens

Physical Controls

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

**Heat Treatment:**
- In Denmark: Tanaco
- TPE/Thermapure (Call for Local Practitioners)
- In England (Thermo Lignum)
- Topp (heaters)
- Pest Heat

**Microwave Equipment:**
- 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 (Bora-Care, Jecta)
- Pole Care (Impel Rods)
- Permachink (Guardian, Shellguard)
- Sashco (Penetreat)
- NISUS (TimBor)

**Borate-treated logs:**
- Appalachian
- Lok-N-Logs

**Borate-treated lumber:**
- Osmose

**Borate application foamer:**
- Richway Industries

**Limonene (XT-2000):**
- XT-2000

**Imidacloprid Soil Treatment:**
- Bayer ES (Premise)
- Fipronil Soil Treatment: BASF (Termidor)
- Altriset soil treatment: Dupont
- Termatrol Monitoring Station: Whitmire

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## THRIPS

### Identification & Monitoring

**Pheromones & Traps:**
- Great Lakes • Trécé, Gardens Alive!, Great Lakes, Olson, Gemplers (Pherocon) • Peaceful Valley • AgBio (Thrips Lure)

**Sticky Trap/Tape:**
- ARBICO • BioBest • Planet Natural • Great Lakes • Gemplers • Scentry • Crop Production (Blue Plastic) • Phero Tech

### Physical Controls

**Screening:**
- Green-Tek (No-Thrip) • Tipper, Harmony, Peaceful Valley (Tie-Net)

**Kaolin coatings:**
- BASF, Peaceful Valley (Surround) • Planet Natural

**Traps and Sticky Tape:**
- Springstar • Harmony • Natural Insect Control • Olson • Gemplers • Phero Tech • Great Lakes • Peaceful Valley • Crop Production (Blue Plastic)

### Biological Controls

**Microbials**
- *Beauveria bassiana*: Laverlam, Bioworks, Florikan, Harmony (Botanigard) • Troy (Naturalis O, L) • BioWorks (Mycorel)

**Verticillium lecanii**: Koppert (Mycotal, Vertalec)

**Chromobacterium**: Marrone (Grandevo)

**Burkholderia (Venerate)**: Marrone

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

**Predatory bugs:**
- *Deraeocoris brevis*: Applied Bionomics • Greenmethods

**Macrolophus nubilis**: Flora Nutzein • Katz

**Orius insidiosus**: Syngenta Bioline • Koppert • IPM Labs • Gartnereri • Nature’s Control • Greenmethods • International Technology • Biobest Canada • Natural Insect Control • Rincon Vitova

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

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

**Orius spp.:** Biobest • Bioplanet • Bio Pre • Duclos • Natural Insect Control • Ecosolutions

**Orius tristicolor**: ARBICO • Planet Natural

**Predatory mites:**
- *Amblyseius barkeri*: FAR • IPM Labs • Natural Insect Control • Sautter & Stepper • W. Neudorff

**Amblyseius cucumeris**: ARBICO • Applied Bionomics • Beneficial • Biobest • Biobest Canada • Biofac • Planet Natural • Syngenta Bioline • Gartnereri • Hydro-Gardens • International Technology • IPM Labs • Koppert • Evergreen • Bug Factory • Natural Insect Control • Natural Pest Control • Natural Pest Controls • Nature’s Control • Peaceful Valley • Gemplers • Rincon-Vitova • W. Neudorff • Greenmethods • Borregaard • Sautter and Stepper • Garta • Biological Crop • EcoSolutions

**Amblyseius degenerans**: Amos Rubin • Applied Bionomics • Bio Pre • Bio Bee • Biological Control • International Technology • IPM Labs • Koppert • Natural Insect Control • Biobest Canada

**Amblyseius swirskii**: Syngenta Bioline • EcoSolutions • International Technology

**Gaeolaelaps gillespiei**: Applied Bionomics

**Stratiolaelaps scimitus** (for springtail thrips): Applied Bionomics • IPM Labs • Natural Insect Control • Bug Factory • International Technology • Koppert • Flora • Katz • Peaceful Valley • Rincon-Vitova

### Least-Toxic Chemical Controls

**Clove Oil, Garlic:** JH Biotech, Harmony (Pest Out)

**Essential oil:** Brandt (Ecotec) • Liquid Fence • EcoSmart

**Diatomaceous Earth:** See Ants

**Insecticidal Soap:** See Aphids

**Neem Products:**
- Certis, Planet Natural, Harmony (Azatin, Align) • Woodstream, Harmony (Safer’s BioNeem)

**Pyrethrin:**
- Johnny’s, Peaceful Valley (Pyrenone)

**Repellent Garlic Spray:**
- LGT, Peaceful Valley • Harmony • JH Biotech

**Sabadilla:**
- MGK, 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, Nitron (Permaguard Pet & Animal) • Nitron (Permaguard Household)

**Microbial Insecticide:** Novozymes (MET52, *Metarhizium anisopliae*)

**Insecticidal Oil:**
- Citrus oil (d-limonene) extract:
  - Orange Guard, Univar, Target

**Repellents:**
- DEET repellent:
  - REI (Cutter’s, Jungle Juice)

**Permethrin tick repellent:**
- WPC, Forestry Suppliers (Permanone)

**Selective Pesticide Fipronil:**
- Merial (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:**
Bayer (Harmonix)

**Pyrethroid (permethrin-soaked cotton balls taken to rodent nests to kill ectoparasite vectors):**
Ecohealth, Harmony (Damminix)

**Silica Aerogel:** see ANTS

**TMS Tick Management System:** Bayer ES

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### WASPS

(See Yellowjackets)

### WEEVILS

(See Beetles)

### WHITEFLIES

**Identification & Monitoring**

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

**Sticky Trap/Tape:**
Scenry, Great Lakes, ARBICO, Planet Natural, Gemplers (Versagard) • ARBICO • Natural Insect Control • Peaceful Valley

**Physical Controls**

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

**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 • Phero Tech (Chroma) • Olson, Great Lakes, Gemplers, Charley’s (Sticky Stuff, Sticky Traps) • Seabright (Sticky Traps) • Harmony • Peaceful Valley • Nature’s Control

### Least-Toxic Chemical Controls

**Diatomaceous Earth:** See ANTS

**Insect Growth Regulators:** Zoecon (Enstar)

**Insecticidal Oil:**
Highly refined oil (from petroleum):
Monterey, Harmony (Monterey) • Sun Oil, Gardens Alive!, Harmony, Peaceful Valley (SunSpray) • Florikan (Target Oil) • Gardens Alive (Eco-Oil) • Brandt (Tritec)

**Highly refined seed oil:**
Stoller, Peaceful Valley (Natur’l Oil) • Gardens Alive (Oil Away)

**Insecticidal Soap:** See APHIDS

### Neem Products:
Certi, Planet Natural (Azatin) • Woodstream, Peaceful Valley (Safer’s BioNeem) • Certis, Harmony, Peaceful Valley (Neemix, Trilogy) • San Jacinto (Organica) • PBI (Azatrol) • Agro (EcoSense, AZA Direct) • Gowan (AZA) • Monterey • Agro (DeBug) • Parry (AzaMax)
**Pyrethrin:**
Monterey (Bug Buster-O w/o PBO) • MGK, Harmony, Peaceful (PyGanic) • Bayer (Harmonix)

**Repellent Garlic Spray:**
Garlic Research Labs, (Garlic Barrier) • Soil Technologies (Garlic Gard) • Peaceful Valley • Safer Gro

**Essential Oils:**
Zoecon (Essentria, EcoPCO) • Sterling (WHY) • Ecosmart

**Mint Oil:**
Liquid Fence (Mint Oil Wasp Killer)

**Resmethrin plus components that “freeze” wasps:**
Roxide (Revenge Wasp & Hornet Killer)

**Silica Aerogel (with pyrethrin):** See ANTS

**Wasp/Be Sting Medication:**
Self-injected epinephrine:
Verus (Twinject) • Dey Labs (EpiPen)

**First-aid for bee stings:**
Miller Bee (Sting Aid)

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**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)

**Physical Controls**

**Beekeeping equipment for use on bee swarms, yellowjacket nest removal:**
Miller Bee (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) • Isca

**Bee Varroa Mite Trap:**
Phero Tech

**Yellowjacket Traps:**
Sterling Intl. (Rescue! Yellowjacket) • Woodstream, Great Lakes, Peaceful Valley, Natural Insect Control (Victor Fly-In-Saucer) • Woodstream, Harmony, ARBICO, Peaceful Valley, Great Lakes, The Natural Gardening (SureFire) • Woodstream (Safer Pheromone Trap) Yellowjacket Attractant (Sterling)

**Least-Toxic Chemical Controls**

**Boric acid:**
Whitmire (PT 249 35% boric acid)

**Diatomaceous Earth (with pyrethrin):** See ANTS

**Insect Repellent Garbage Bags:** Pest Guard

**Insecticidal Soap:**
For Africanized Bees: Gowan, Harmony (M-Pede)

**Pyrethrin:**
Neogen (Capsul-Ban microencapsulated, Formula 66, LD-44Z) • Roxide • Whitmire (PT 175 microencapsulated, PT-565, PT-505 XLO) • Gardener’s Supply (Pyrethrin and Rotenone) • Bayer (Harmonix) • Woodstream (Safer Flying Insect)

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**WORNS**

**Educational Materials**

**Databases (Pest Management):**
Bio-Integral Resource Center (Online Organic) • University California Statewide IPM Program (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:**
Univar

**Videos introducing IPM in agriculture, landscaping, & greenhouses, two pest ID slides kits:**
San Luis Video

**Identification & Monitoring**

**Computers & Software:**
Apple scab forecasting equipment:
GEMPLERS (PSAO) consultant software

**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
**Pheromone Monitoring Traps:** Trece (Storgard, Pherocon)

**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 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

**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’s (Cyclone)
- Inspection mirror: Applied Bionomics, Harmony Farm (Magnifier hand lenses, headband magnifiers) • Professional Equipment

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

**Microwave Termite Detectors:** Termatrac (Termatrac)

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

**Termite Sniffers:** Professional Equipment

**Radon Test Kits:** Professional Equipment

**Infrared Cameras (for termites):** Professional Equipment

**Sweep nets:** Oakfield Apparatus • BioQuip • Great Lakes

**Trap for Asian Ladybeetles:** Gardener’s Supply

**Temperature monitor:** Gempler’s

**Maximum-Minimum Thermometer:** BioQuip

**Degree-day Calculators:** Gemplers • BioQuip

**Vacuums:** ARBICO (Bug Sweep) • BioQuip Products (Insect Vacs) • D-VAC Company (D-VAC) • Gardener’s Supply (Bug Vacuum) • Proteam (Sierra, 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

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### Physical Controls

**Asian Ladybug Trap:** Springstar

**Row Covers:** Charley’s (Harvest-Gard) • See Beetles (crop pests)

**Plum Curculio Traps:** Great Lakes

**Varroa Mite Traps:** Great Lakes

**Stinkbug Trap:** Sterling • AgBio

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### Biological Controls and Supplies

#### Artificial Diets:

**For lacewings & lady beetles:** Rincon-Vitova • The Ladybug Company • Greenmethods (Biodiet) • Oliver • Planet Natural • Gardens Alive (Bug Pro)

**Wheat for lacewings & lady beetles:** Planet Natural • Peaceful Valley, Charley’s (Good Bug) • Natural Insect Control

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### Teflon Insect Barrier:

Local Hardware Store (see Plumbing Supplies)

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### Habitat:

**Bat house to encourage insect predation by bats:** Gardener’s Supply (Bat House) • Peaceful Valley • Natural Insect Control • Harmony • Planet Natural

**Seed mixture for beneficial insect habitat:**
- Gardens Alive! (Haven Flowering Herbs, Haven Cover Crop)
- Peaceful Valley (Good Bug Blend, Border Patrol) • Lohse Mills • Gardener’s Supply • W. Atlee Burpee • Renee’s

**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

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### 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

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### Supplies for rearing insect pathogens:

International Mycological Institute • Oliver • Life Technologies

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### Pollination aids:

- Phero Tech (Fruit Boost)
- **Pollinators:** bumble bee, *Bombus* spp.: W. Neudorff • Biobest • Koppert • Natural Insect Control • Bio Bee

**Mason bee lodge:** Arbico

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### Predators:

Chinese praying mantid, *Tenodera aridifolia sinensis*: ARBICO • Planet Natural • Natural Insect Control • Natural Pest Controls • Peaceful Valley • A-1 Unique • Nature’s Control • Greenmethods

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### Red hybrid earthworms, *Lumbricus sp.*:

- A-1 Unique • Rincon-Vitova • Natural Insect Control

**Earthworm cocoons:** Gardens Alive

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### Pesticide Application Equipment

**Application equipment for structural pest control:**
- B & G • Harmony • Peaceful Valley • Professional Equipment • Univar

**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 (Earth Duster) • Technicide • Univar (Getz Gun) • Parker (P.E.S.T. Power Applicator) • Woodstream, Peaceful Valley (Pest Pistol)

**Electrostatic sprayers/dusters:**
- Electrostatic Spraying Systems • Bee Tee

**Sprayers:**
- Planet Natural • Bee Tee • Gardener’s Supply
(Spraydoc) • Green Pro • Harmony • Univar • Gempler’s • Lesco

**Tool for Injecting Wall Voids:** Paragon • B & G

**Protective Skin Coating:** Gloves in a Bottle

**Respirators:**
- BWS • Harmony • Lab Safety Supply (full hood respirator) • Sperian (Series 86 Disposable APR) (Call Sperian for local distributors) • Univar

**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

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**PLANT DISEASE MANAGEMENT**

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**CROWN GALL DISEASE**

**Biological Controls**

- **Microbial Fungicides:**
  - *Agrobacterium radiobacter strain K84:* AgBioChem, Necessary, Harmony (Galltrol-A, Galllex) • New BioProducts, IPM Labs (NoGall K1026)

**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) • Hydros

**Physical Controls**

Fungal Barriers:

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**Antitranspirants:**
- Green Pro (Vita Coat) • Miller (Vapor Gard) • PBI/Gordon (Transfilm)
- Wilt-Pruf (Wilt-Pruf) • Better Flora (Wilt Pruf) • Harmony

**Kaolin coating:** BASF, Peaceful, Gardens Alive (Surround)

**Horticultural Controls**

**Disease-Resistant Roses:**
- Heritage Rosarium • High Country • Hortica • Heirloom • Jackson and Perkins • Vintage Gardens • Rose Catalog • American Rose Society

**Biological Controls**

- **Microbial Fungicides:**
  - *Aureobasidium pullans:* Westbridge
  - *Bacillus amyloliquefaciens:* Certis • Novozymes
  - *Bacillus pumilis* (biofungicide): AgraQuest (Sonata) • Rincon-Vitova (Activate) • Harmony (Sonata)
  - *Bacillus subtilis* (Serenade, Rhapsody): AgraQuest, Gardens Alive • BioWorks (Cease)
  - *Coniothyrium minitans* (for Sclerotinia): Prophyta
  - Compost tea brewers: Growing Solutions • SoilSoup • MicroBrewer • Sustainable
  - *Pseudomonas fluorescens* (for fire blight): NuFarm (Blight Ban)
  - *Pseudomonas solanacearum* (non-pathogenic for bacterial wilt control): Natural Plant Protection
  - *Pseudomonas syringae* (for postharvest): Jet Harvest (BioSave)
  - *Trichoderma harzianum* (for grey mold): Makhhteshim-Agan (Trichoden) • Bioworks (Plant Shield) • Borregaard • Binab (Plant Gard)
  - *Trichoderma sp.* (for chlorotic vine leaf curl): Binab (Binab-T)

**Least-Toxic Chemical Controls**

- **Agents for Induced Resistance:** Syngenta (Actigard) • Garden’s Alive (harpin, Green Guard) • JH Biotech (Fosphite) • Organic Labs (Plant Doctor) • Plant Health Care (Harpin)
- **Bicarbonate with sticker:** Gardener’s Supply (Remedy) • Monterey • Bioworks (Milstop) • Harmony (Bicarb)
- **Calcium Foliar Spray:** Bonide (Rot-Stop) • Monterey
- **Essential Oil:** EcoSmart (Sporan) • Monterey (PhytoGard) • Soil Technologies (Fungastop) • Brandt (Sporatec)
- **Garlic and Oil:** JH Biotech, Safer Gro, Harmony (Mildew Cure)
- **Giant Knotweed Extract:** Marrone (Regalia)
- **Copper & Sulfur Fungicides:** Monterey, Harmony (Liqui-Cop) • Monterey (Nordox, Copper Count N, Micronized Sulfur) • Harmony, Peaceful (Copper Hydroxide) • Bonide, Gardener’s Supply (Bonide Garden Dust) • Gardens Alive, Planet Natural (copper soap) • Woodstream (Rose and Flower) • Stoller (TopCop)
- **Flowable sulfur formulation:** Woodstream, Harmony, Charley’s, (Safer Garden Fungicide) • Peaceful Valley • Stoller (That) • Harmony (Kumulus)
- **Fungicidal Soap (copper and soap):** Gardens Alive (Soap Shield)
- **Peroxide Oxidants:** BioSafe (Oxidate, Zero Tol)
- **Oil and Lime-Sulfur:** Best Sulfur Products
- **Calcium Thiosulfate:** Best Sulfur Products (Triocal)
Highly refined oil (from petroleum) & sulfur: Peaceful Valley
Neem Products (for mildew, botrytis, rust): Certis, Harmony, Peaceful Valley (Trilogy, Triact) • Greenlight • San Jacinto (Organica)
Potassium Phosphate (Fosphite): JH Biotech • AgBio (AgriFos) • Organic Labs (Plant Doctor)

Horticultural Oils: See APHIDS

ROOT PATHOGENS

Identification and Monitoring
Detection kit for pathogens:
Neogen (Reveal) • Agdia • Hydros

Physical Controls
Heat, Steam and Hot Water:
Heat (electric soil sterilizer):
Great Lakes, Gemplers
Solarization Plastic:
Mipco • Peaceful Valley
Portable Bailer to Recycle Solarization Plastic:
Kennco Manufacturing
Steam Machines and Boilers:
Sioux • Saskatoon

Biological Controls
Microbial Fungicides:
Burkholderia cepacia: Soil Technologies
Fusarium oxysporum (non pathogenic): Natural Plant Protection
Gliocladium virens (for pythium, rhizoctonia): Certis, Harmony, Gardens Alive, Peaceful (SoilGard) • AgBio (Primastop)
Gliocladium sp. (for fusarium, pythium): Kemira Oy, Hydro-Gardens (Gliomix)

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

Pythium oligandrum: Gowan (Polyversum)
Pseudomonas cepacia: Soil Technologies (Bac-Pack)
Pseudomonas solanacearum (non-pathogenic): Natural Plant Protection
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 • Plant Natural
Streptomyces sp.: Spray-N-Grow (RootGuard)

Streptomyces lydicus (for fusarium, rhizoctonia, pythium):
Natural Industries, Harmony (Actinovate)
Trichoderma harzianum (soil treatment for root pathogens): BioWorks (Rootshield, T-22) • Binab • Borregaard • Harmony
Trichoderma atroviride (cold tolerant): AmPac (Plant Helper)
Trichoderma gamsii: Isagro (Tenet) • AgraQuest (BioTam)
Trichoderma spp. mix: BioWorks (Rootshield Plus)

Disease-Suppressive Seed or Soil Treatment:
Bacillus subtilis: Rincon-Vitova (Activate) • Gardens Alive • Growth Products (Companion) • Bayer (Kodiak) • Harmony (Serenade)
Bacillus uniflagellus: Rincon-Vitova (Activate)
Bacillus spp. (mixture): Rincon-Vitova

Induced Resistance Seed Treatment: Heads Up
Trichoderma harzianum (seed treatment for root pathogens): BioWorks (Rootshield, T-22) • Agricultura Mas Viader
Trichoderma gamsii: Isagro (Tenet) • AgraQuest (BioTam)
Neemake Soil Amendment: Peaceful Valley • Agro

Disease-suppressive container mixes or compost:
Earthgro (Scotts) • Sun-Gro • Louisiana Pacific • O.M. Scotts (Hyporon) • Paygro

Micronutrients: Spray-N-Grow
Compost Tea Brewing Equipment: Growing Solutions • SoilSoup • Microb Brewer • Sustainable • Willamette

Endomycorrhizae to increase plant nutrition and help protect against disease:
Gnomus sp.(VAM fungus): Bioscientific (Mycorise) • BioOrganic • Mikro-Tek • Biological Crop • Natural Fertilizer • Rincon-Vitova • AgBio • Novozymes • Mycorrhizal Applications • Peaceful Valley

ECTOMYCORRIZAE (forest nurseries, urban trees):
Pisolithus tinctorius: Rincon-Vitova • Peaceful Valley • Plant Success • AgBio • Mycorrhizal Applications
Pisolithus, Rhizopogon mixtures: Novozymes
Myconate (stimulates mycorrhizae): 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) • Hydros

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) • NRG (Activate)

Beneficial microorganisms that attack turf pathogens:
Gardener’s Supply (Green Magic) • Peaceful Valley (Restore) • BioWorks (Turfmate) • Soil Technologies (BacPack) • Natural Fertilizer • Novozymes (Green Releaf) • NRG (Slap, Nemaguard)
MISCELLANEOUS

Educational Materials
Integrated Pest Management publications, videos:
Bio-Integral Resource Center (BIRC)

Identification & Monitoring
Apple scab forecasting equipment:
Automata (Scab Off)

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: Charley’s (Compost Thermometer) • Natural Insect Control (Earthworms) • Woods End (Compost Maturity Test Kit)

Compost Tea Brewing Equipment: Growing Solutions • SoilSoup • Microb Brewer • Sustainable • Willamette • Peaceful Valley

Composting Toilet: Real Goods

Mycotoxin Detection Kits: Neogen

Nematode identification service: CAB Biosci

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

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 Bailers): Kennco

Soil Testing Kits, pH Meters: BioQuip • Ben Meadows • Harmony • Peaceful Valley • Gemplers • Woods End (Soil Respiration) • Arbico

Soil Testing, Microbials and Minerals: Earthfort

Soil Test Strips (pH, NPK): Peaceful Valley • Harmony • Charley’s

BATS

Educational Materials
Bat House Construction Booklet:
Bat Conservation International, Peaceful Valley, Harmony

Bat Houses: 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:
Wildlife Control • Bird-X • Nixalite (Nixalite) • Birdbarrier (Birdpoint) • Nixalite (E-Spike)

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

Wire exclusion systems:
Birdbarrier (Birdwire, Birdcoil) • Birdbusters • Nixalite (Flight Line)

Deterrents:
Alarms & detonators:
Bird-X (BirdGard, Transonic IX-L, Ultrason ET) • Birdbusters (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) 

Holographic owl: Bird Busters

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) • Bird Busters (Geese Away) • Bird Busters (Firefly)

Reflective tape:
Reed-Joseph, W. Atlee (Scare-Away Reflecting Tape) • Wildlife Control, Agricultural Supply, Peaceful Valley (Mylar Silver Strips) • Bird-X (Irri-Tape) • Sutton

Live Traps (for starlings, pigeons, etc.):
Tomahawk (Tomahawk) • Woodstream, Harmony, Peaceful Valley, Gardener’s Supply (Havahart, Victor) • Margo

Repellents:
Bird-X (Bird-Proof) • Sutton • Peaceful Valley (California Scarecrow)

Repelling balloons:
Reed-Joseph (Evil Eye) • ARBICO (Bird Scarer Balloon, Owl Scarer) • Peaceful Valley (Octopus) • Bird-X, Peaceful Valley, Gemplers (Scare-Eye) • W. Atlee (Birds-Away Inflating Snake, Ollie-Owl) • Bird-X (Terror Eyes) • Geemper’s • Sutton • Tanglefoot • Great Lakes

Repellent gel: Sutton • Hot Foot America

Repelling kites:
Sutton • Cochranes • Peaceful Valley

Sticky repellent:
Tanglefoot (Tanglefoot Bird Repellent) • Peaceful Valley

Sticky Adhesive:
Seabright (Stickem Special) • Gemplers, Nixalite (Tanglefoot) • Peaceful Valley

Least-Toxic Chemical Controls

Birth Control (pigeons):
Innolytics (Ovocontrol)

Repellents:
Nixalite, Peaceful Valley • Bird-X (Bird Proof) • JT Eaton (4-the-birds) • Becker Underwood, Martinson-Nicholls (ReJexit) • Sutton (Rejexit) • Liquid Fence • Westbridge (BioLink)

CATS/DOGS

Biological Controls

Guard Donkeys to Protect Sheep:
American Donkey

Physical Controls

Cat tongs:
Tomahawk (Tomahawk)

Electric Fencing:
Gardener’s Supply

GOPHERS and MOLES

Biological Controls

Nematodes to Eat Insects that are Mole Food:
Certis, Harmony, Hydro-Gardens, IPM Labs, BioLogic
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

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, Woodstream

Lethal Traps for moles:
Woodstream, Harmony, Arbico, Peaceful Valley, Great Lakes, The Natural Gardening (Black Hole, box type) • Woodstream (Vicor Easy Set, Gopher Getter, squeeze type) • Macabee

Least-Toxic Chemical Controls

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

Mole Repellent: Soil Technology, Gardens Alive (MoleRelief) • Gardener’s Supply • Becker Underwood • Peaceful Valley

Gopher Repellent: Gardens Alive (GopherRelief) • Soil Technologies • Peaceful Valley • Liquid Fence

DEER

Physical Controls

Deterrents:
Alarms & detonators: Critter Control • Margo

Roadside highway reflectors to deter deer: Strieter (Strieter-Lite)

Electric fencing: Gardener’s Supply • Gallagher Power Fence • Tenax • Tru-Test (electric tape) • Trident (Minnesota Fence) • Peaceful (baited electroshock post)

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

Plastic Fence: Trident • Peaceful Valley • Harmony

IR Sensor to Turn On Sprinklers: Gardener’s Supply (Water Defence) • Charley’s (Scarecrow) • Planet Natural

Heat Activated Alarm: Drs. Foster and Smith
LIVESTOCK PREDATORS

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

Least-Toxic Chemical Controls
Repellents: Woodstream, Peaceful Valley, Trident (Deer Away) • Shake Away, Harmony (Shake Away) • Peaceful Valley (Ropel) • Gardener’s Supply (Champon’s) • Wildlife Management • Enviroydne (Meat Meal) • Liquid Fence • Tree World, Harmony, Peaceful (Plantskydd)

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) • Critter Control • Margo

Electric Fencing:
Gallagher Power Fence (Gallagher) • Gardener’s Supply

Live Traps:
Tomahawk (Tomahawk) • Woodstream, Harmony, Peaceful Valley, Gardener’s Supply (Havahart)

Least-Toxic Chemical Controls
Repellents:
Peaceful Valley • Planet Natural • Harmony

RABBITS

Physical Controls
Electric Fencing:
Gallagher Power Fence (Gallagher) • Gardener’s Supply

Live Traps:
Wildlife Management • Tomahawk, 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 (Hinder Deer & Rabbit Repellent) • Peaceful Valley (Ropel) • Enviroydne (Green Screen) • Gardener’s Supply, Gardens Alive, Harmony, Peaceful Valley (Get Away) • Woodstream

RACCOONS

Physical Controls
Barriers & Exclusion Devices:
Stromberg’s (Catcher-Holder Poles for animal restraint) • Tomahawk (catch poles)

Electric fencing:
Gallagher Power Fence (Gallagher) • Gardener’s Supply

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

Heat Activated Alarm: Drs. Foster and Smith

Live Traps and Carrying Cages:
Safeguard (Safeguard) • Tomahawk (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 (Ropel) • Gardener’s Supply (Champon’s) • Gardener’s Supply, Gardens Alive, Harmony, Peaceful Valley (Get Away) • Woodstream (Critter Ridder) • Shake 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) • Seabright, Phero Tech (Smart Mouse Trap) • Tomahawk (Tomahawk) • Woodstream, Harmony, Peaceful Valley, Gardener’s Supply, Havahart, Victor) • Woodstream (Victor Holdfast) • Woodstream (Victor Tin Cat, Terminator) • Wildlife Management • Natural Insect Control

Glue board trap:
Woodstream (Victor Holdfast) • Bell (Trapper products) • JT Eaton (Eaton’s Stick-em) • Enforcer (Enforcer Rat & Mouse Glue Traps)
SQUIRREL

**Squirrel-Proof Bird Feeders:**
- Arundale (The Mandarin)

**Live Traps:**
- Tomahawk • Woodstream • Harmony • Peaceful Valley

**Repellent:**
- Harmony • Peaceful Valley • J.T. Eaton • Woodstream

WILDLIFE

**Physical Controls**

**Control Equipment:**
- Cat tongs: Tomahawk, Harmony

**Poles to catch animals:**
- Tomahawk • Wildlife Management

**Protective Gloves:**
- Tomahawk

**Snake tongs:**
- Tomahawk

**Alarms & Detonators:**
- Reed-Joseph (Scare Away Pyrotechnics, Multi Bang Automatic Cannon, Rotomat Revolving Platform) • Critter Control • Margo

**Infra-Red Triggered Water Cannon:**
- Gardener’s Supply (Water Defence) • Charley’s (Scarecrow)

**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:**
- Gallagher • Gardener’s Supply • Peaceful Valley • Harmony • Margo (for bear, wolverine)

**Live traps:**
- Margo (for large animals) • Reed-Joseph (Trap Away) • Safeguard (Safeguard) • Tomahawk, 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 (Ropel)

**MISCELLANEOUS**

**Educational Materials**

**Integrated Pest Management Publications:**
- Bio-Integral Resource Center
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)
Mulch:
Peaceful Valley (IRT, Planter’s Paper) • Birkett Mills (Mul-Tex) • Penny Newman (Rice Hull Mulch)
Sunlight Barrier (aquatic weeds):
Applied Biochemists (Aquashade)
Weed control fabric/plastic:
Easy Gardener, Peaceful Valley (WeedBlock Landscape Fabric) • Fiberweb, Planet Natural (Typar Landscape Fabric) • Gardener’s Supply (Weed Mat) • Gardens Alive! • Peaceful Valley (IRT Plastic) • Fiberweb (Tree Circles)

Flamers:
Ben Meadows • Forestry Suppliers (Panama) • Flame Engineering, Planet Natural, Harmony (Red Dragon) • Peaceful Valley • Planet Natural • Gemplers • Flame Weeds • Rittenhouse • Sunburst

Heat Treatment (system using boiling water):
Sunburst
Heat Treatment (portable propane radiant heat): Forevergreen • Rittenhouse

Skin Protectant:
Poison oak/ivy cleanser/prevention:
Masune (Ivy Block, Technu) • Gempler’s (Technu) • Sawyer (Itch Balm)

Weeding Animals:
Books, pamphlets, lists of breeders:
American Donkey & Mule • Natural Colored Wool Growers’

Weeding Tools:
Brush-clearing tools: Forestry Suppliers
Hand tools: Gardener’s Supply • Smith & Hawken • Peaceful Valley • A.M. Leonard • Uprooter • ProQuo (Puller Bear)
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: BeeTee Equipment Sales (Husqvarna)
Weed Hound: Hound Dog Products (for dandelion)

Biological Controls

Bacterial Biostimulation for Pond Maintenance:
Ben Meadows, Gemplers (Pond Saver) • Enviro-Rep (Super Bug)
Sterile grass carp fish (for aquatic weeds):
Keo Fish Farms (diploid and triploid) • Richmond Fisheries

California Native Plants: California Native Plant Society

Herbivores:
Aphthona spp. (beetle for leafy spurge): BCW
Aphthona nigriscutis (beetle for leafy spurge): BCW
Aphthona lacertosa (beetle for leafy spurge): BCW
Aplodera plagiata (inchworm for St. John’s wort): BCW
Ceutorhynchus litura (thistle weevil for Canada thistle): BCW
Chrysolina quadrigemina (beetle for St. johnswort): BCW
Cypocleanus achates (knapsweed root weevil): BCW • ARBICO
Eustenopus villosus (weevil for yellow starthistle): BCW • California Bioworks
Gallerucella pusilla (purple loosestrife defoliating weevil): BCW
Gynnetron antirrhini (toadflax seedcapsule weevil): BCW
Laminus obtusus (knapsweed weevil): BCW
Laminus minutus (knapsweed weevil): BCW
Longitarsus jacobaeae (flea beetle for tansy ragwort): BCW
Mecinus janthiformis (for toadflax): BCW
Microlarinus lareynii (weevil for puncturevine): Peaceful Valley
Oberea erythrocephala (beetle for leafy spurge): BCW

Spurgia esulae (gall midge for leafy spurge): BCW
Urophora cardui (gall fly for Canada thistle): 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:
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): No current supplier
*Phytophthora palmivora* (available sporadically for stranglervine): Valent USA (DeVine)
*Phoma macrostoma* (turf weeds): Scotts
*Sclerotinia minor* (turf weeds): Sylvan
*Streptomyces* (rice weeds): Marrone

**Least-Toxic Chemical Controls**

**Application equipment:**
Forestry Suppliers (Hypo-Hatchet Tree Injectors) • AG Spray Equipment

**20%-25% Acetic Acid:** Bradfield • Ecoval • Pharm Solutions

**Herbicidal Soap** (postemergent):
Monterey, Harmony (Herbicidal Soap) • Gardens Alive (WeedAside) • Woodstream (Concern) • Certis (Final San-O) • BioSafe (AXXE)

**Herbicidal Essential Oil** (postemergent):
Dr. Earth (Final Stop) • North Country (Burnout) • Monterey (Burnout) • St. Gabriel (Burnout 2) • Harmony • JH Biotech, Peaceful Valley (Weed Zap) • Brandt (Matratec) • Cutting Edge, Harmony (Avenger, limonene) • Soil Technologies (Phydura) • Liquid Fence • EcoSmart (Clove oil)

**Citric Acid:** Summerset (All Down)

**Fatty Acid Herbicide:** Planet Natural (Scythe) • Westbridge (Suppress)

**Iron chelate:** Gardens Alive (Iron-X) • Scotts (Fiesta)

**Least-Toxic Herbicide** (corn gluten meal pre-emergent):
Grain Processing • Soil Technologies • Gardens Alive (WOW) • Fertrell, Gardener’s Supply, Peaceful Valley, North Country (Weedzstop) • Floyd Rogers • Manning Agricultural • Rhodes • Safe Earth • Walts • Blue Seal • Soil Technologies • Harmony

**Corn gluten hydrolysate:** Grain Processing:

**PredaLure**
Controlled release. Attracts predators/parasites to crop for control of aphids, mites, leafhopper, many others.

**Honey Bee Lure**
Controlled release dispenser attracts bees for increased pollination. No spray. No mess.

**Mycostop** Biofungicide

**Pentra-Bark** Surfactant

**Agri-Fos** Fungicide

**Insect Traps**
Stink Bugs, Oriental Beetles, Onion Maggot, Thrips, more

**Cucumber Beetle Trap**

**Myccorrhiza**

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### ADDRESSES OF PRODUCERS AND SUPPLIERS

#### A
- **A-1 Unique Insect Control**, 5504 Sperry Dr., Citrus Heights, CA 95621; 916/961-7945, Fax 916/967-7082; ladybugs@unique.com; www.a-unique.com
- **Abby Laboratories (Quality Blending)**, 15840 Central Avenue NE, Ham Lake, MN 55304; 763/422-0402, Fax 763/422-0405; www.qualityblending.com
- **Acoustic Emission Consulting**, 5000 San Juan Avenue, Suite D, Fair Oaks, CA 95628; 916/965-4827, Fax 916/965-4350; www.aceconsulting.com
- **Actron Inc.**, PO Box 572244, Tarzana, CA 91357; 805/933-1301, Fax 805/933-1304; www.actron.com
- **AgBioChem Inc.**, 10795 Bryne, Los Molinos, CA 95941; 530/586-1561, Fax 530/527-6288; www.agbio-inc.com
- **AgBioSystems**, PO Box 1368, La Quinta, CA 92253; 888/371-3353, Fax 888/708-5353; www.bio-systems.com
- **American Donkey & Mule Society**, PO Box 1210, Lewisesville, TX 75067; 972/219-0781, Fax 972/219-0781; www.loveonelgars.com
- **American Insectaries**, 243 S. Escondido Blvd., #318, Escondido, CA 92025; 760/747-2920, Fax 760/489-0353; www.americaninsectaries.com
- **American K-9 Team**, PO Box 425, Tarpon, FL 34688; 727/742-5804; www.k9teams.com
- **American Rose Society**, 8877 Jefferson Paige Road, Shreveport, LA 71119-8877; 318/938-5402, Fax 318/760-5405; www.ars.org
- **A.M. Leonard, Inc.**, 241 Fox Dr., PO Box 816, Piqua, OH 45356; 800/543-8955, 937/733-2694, Fax 800/433-0633; www.amlecom.com
- **Amos Rubin (Int.)**, 14, Rahavat Ilan, Givat Shmuel 54506, ISRAEL; 972-3-5351798, Fax 972-3-5341019
- **Ampac Biotech**, 1380 North Abby, Fresno, CA 93703; 559/266-8324, Fax 559/233-1068; www.ampacbiotech.net
- **Andermatt Biocontrol**, Stahlermatten 6, 6146 Grossdietwil, SWITZERLAND; +41 62 917 5006; www.andermattbiocontrol.ch
- **Appalachian Log Structures**, PO Box 614, Ripley, WV 25271; 800/458-9990, 304/372-6410; www.applog.com
- **Applied Biochemists**, W175 N11163 Stonewood Drive #234, Germantown, WI 53022; 800/558-5106, Fax 262/255-4268; www.appliedbio-nomics.com
- **Applied Bionomics Ltd.**, 11074 W. Saanich Rd., Sidney, BC, CANADA V8L 5P5; 877/656-2123; 250/656-2123, Fax 250/656-3844; www.appliedbio-nomics.com
- **ARBICO**, PO Box 8910, Tucson, AZ 85738; 800/827-2847, 520/825-9785, Fax 520/825-2038; www.arbico.com
- **Arcoa Industries (ArcMate)**, 911 S. Andreasen Dr., Escondido, CA 92029; 888/637-1926; 760/599-6915, Fax 760/599-6986; www.arcmatel.ch
- **Arundale Products**, 5444 Highland Park Dr., St. Louis, MO 63110; 800/866-2473, 314/652-1220; www.skycafe.com; www.squirrel-stuff.com
- **A Safe Pest Eliminators**, 11338 SW 158th Place, Miami, FL 33196; 305/388-1128; http://naturalbait.com
- **Association of Natural Biocontrol Producers (ANBP)**, PO Box 1609, Clovis, CA 93613; 559/360-7111, Fax 800/553-4817; www.anbp.org
- **Associates Insectary**, PO Box 969, Santa Paula, CA 93061; 805/933-1301, Fax 805/933-1304; www.associatesinsectary.com
- **A-Trap USA**, 2021 Sperry Avenue No. 11, Ventura, CA 93003; 888-332-3728, 805/652-1117, Fax 805/652-1155; www.raticator.com
- **Automata Inc.**, (see McCremonn Connect); www.mccremonnconnect.com
- **Avian Flyaway**, 510 Turtle Cove, Suite 109, Rockwall, TX 75087; 800/888-0165, 972/771-6679, Fax 972/722-0165; www.avianflyawayinc.com
- **Azienda Agraria Giardina, S.P. 104, Contrada Carrozzi Miloca, 90600 Siracusa, ITALY; 0931-721444; www.agricoliagiardina.it

#### B
- **Ball Seed Co.**, 622 Town Rd., West Chicago, IL 60185; 800/879-2255, 630/231-3500, Fax 630/231-3605; www.ballseed.com
- **BASF Professional Pest Control**, 26 Davis Drive, PO Box 13528, Research Triangle Park, NC 27709; 800/777-8570, 919/547-2000; http://pestcontrol.basf.us
- **Bat Conservation International**, PO Box 162603, Austin, TX 78716-2603; 800/538-BATS, 512/372-9721, Fax 512/372-9724; www.batcon.org
- **Bayer Advanced (Natria)**, 2 TW Alexander Drive, Research Triangle Park, NC 27709; 919/549-2365; Fax 919/549-3975; www.bayeradvanced.com
- **Bayer Crop Science**, 2 TW Alexander Drive, Research Triangle Park, NC 27709; 919/549-2597, Fax 530/750-0113; www.cropscience.bayer.com
- **Bayer ES (Environmental Science)**, 2 TW Alexander Drive, Research Triangle Park, NC 27709; 800/331-2867; www.backedby-bayer.com
- **BCW (see Biological Control of Weeds)**
- **Becker Underwood (see BASF Crop Protection)**, 800/232-5907; www.beckerunderwood.com
- **Bee Tee Equipment Sales**, 7880 Patterson Rd., Livermore, CA 94550; 925/961-8750; www.bettereequipment.com
- **Bell Laboratories Inc.**, 3099 Kinsman Blvd., Madison, WI 53704; 608/241-0202, Fax 608/241-9631; www.belllabs.com
- **Beneficial Insectary**, 9664 Taqueria Ct., Redding, CA 96003; 800/477-3715, 530/226-6300, Fax 530/226-6310; www.insectary.com
- **Ben Meadows Co.**, PO Box 5277, Janesville, WI 53547; 800/241-6401, Fax 800/628-2068; www.benmeadows.com
- **Best Sulfur Products (BSP) (see Tersendello Kerley)**, 800/800-4854; www.kinet.com
- **Better Flora (see Will-Pruf)**, 18624 Downing Rd., Kearney, MO 64060; 800/324-0705; 816/320-3397, Fax 816/630-2399; www.better-flora.com
- **B & G Equipment Company**, 135 Region South Dr., PO Box 1190, Jackson, GA 30233; 800/544-8811, 678/688-5601; Fax 678/688-5633; www.bgsequip.com
- **Binah Bio-Innovation AB**, Breidholmen, SE-545 92 Algaras, SWEDEN; +46 42 16 37 04, Fax +46 42 16 24 97; www.binah.se
Troy Biosciences, Inc., 113 S. 47th Avenue, Phoenix, AZ 85043; 800/448-2843, 602/233-9047, Fax 602/272-4155; www.troybiosciences.com

Tru-Test Inc., 528 Grant Road, Mineral Wells, TX 76067; 800/874-8494, Fax 940/327-8048; www.tru-test.com

Turf Seed (Scotts), 7644 Keene Rd., Gervais, OR 97026; www.scotts.com

U

United Industries, 2520 Northwinds Parkway, Alpharetta, GA 30004; 800/332-5553; www.spectrumbrands.com

Univar USA, 2256 Johnson Ave., San Jose, CA 95131; 800/888-4897, 408/435-8700, Fax 408/434-6489; www.univarsa.com

University of California Statewide IPM Program, University of California, Davis, CA 95616-8624; 530/752-8350, Fax 530/752-6004; www.ipm.ucdavis.edu

Uprooter, Grants Pass, OR 97527; 541/226-9872; www.theproofter.com

U.S. Borax Inc., 8051 E. Maplewood Ave. No. 4, Greenwood, IN 46111-7300; www.borax.com

USDA Insect Rearing Lab, 1000 Pennsylvania Ave., NE, Washington, DC 20250; 202/205-8333; www.fs.fed.us

Value Gardens, 9100 W. Bloomington Freeway, Suite 113, Bloomington, MN 55431; 888-603-1008, 952/884-6477; www.valuegardens.com

Vegetable Juices Inc., 7400 S. Narragansett, Chicago, IL 60638; 708/924-9500; www.vegetablejuices.com

Verus Labs (Northstar Medical), PO Box 8025, Walnut Creek, CA 94596-8025; 800/624-6094, 809/824-3610, 925/256-2700, Fax 925/256-2484; www.verus.com

Value Gardens, 9100 W. Bloomington Freeway, Suite 113, Bloomington, MN 55431; 888-603-1008, 952/884-6477; www.valuegardens.com

W.

Wall's Organic Fertilizer, PO Box 31580, Seattle, WA 98103; 206/297-9092, Fax 206/297-9093; www.wallsorganic.com

Waterbury Companies Inc. (see FMC), 1735 Market St., Philadelphia, PA 19103; 800/321-1362, Fax 215/299-6100; www.fmcsolutions.com

W. Atlee Burpee Seed Co., 300 Park Ave., Warminster, PA 18974; 800/888-1447, 215/674-4900, Fax 800/487-5530; www.burpee.com

Weed Badger Division, 5673 95th Ave. SE, Marion, IA 52304; 800/437-3392, 701/778-7511, Fax 701/778-7501; www.weedbadger.com

Wescor Inc., 370 West 1700 South, Logan, UT 84321; 800/453-2725, 435/752-6011, Fax 435/752-4127; www.wescor.com

Westbridge Agricultural, 1260 Avenida Chelsea, Vista, CA 92081; 800/876-2767, 760/599-8855, Fax 760/599-6965; www.westbridge.com

Western Farm Service (see Crop Production Services), www.cpsagi.com

WF Young, Inc., 302 Benton Drive, East Long Meadow, MA 01028; 800/628-9653, Fax 413/526-8990; www.absorbine.com; www.wfyoung.com

Whitmire Microgen Inc. (see BASF), 26 Davis Highway Rd., Research Triangle Park, NC 27709; http://pestcontrol.basf.us

Wildlife Control Technology Inc., 2501 N. Sunnyside Avenue, Fresno, CA 93727; 800/235-0262, 559/490-2262, Fax 559/490-2260; www.wildlife-control.com

Wildlife Management Supplies (a Division of Critter Control), 9435 Cherry Bend Rd., Traverse City, MI 49684; 800/451-6544, 231/947-2400, Fax 231/947-9440; www.crittercontrol.com

Wildlife Supply Company, 86475 Gene Lassere Blvd, Yulee, FL 32097; 904/225-9889; www.wildlifesupply.com

Williamette Organics, 5645 SW Scholls Ferry Rd., Portland, OR 97225; 877/432-6249, Fax 503/585-9321; www.williametteorganics.com

Wilt-Pruf Products Inc., PO Box 469, Essex, CT 06426-0469; 800/972-0726, 860/767-7033, Fax 860/767-7265; www.wiltpruf.com

Wireless Deer Fence, 7654 Shilo Rd. PO Box 11, Unionville, IN 47468; 866/468-3337, 812/333-5307, Fax 812/333-8242; www.wirelessdeerfence.com

W. Neudorff, Postfach 1209, D-31857, Emmenthal, GERMANY; 49-5155-624160, Fax 49-5155-6100; www.neudorff.com

Woods End Research Laboratory, 290 Belgrade Rd., PO Box 297, Mount Desert, ME 04663; 207/295-2427, Fax 207/293-4248; www.westbridge.com

Woodstream, 69 N. Locust St., Lititz, PA 17543-0327; 800/800-1819, 717/626-2125, Fax 717/626-1912; www.woodstreampro.com

WPC Brands, 1 Repel Road, PO Box 198, Jackson, WI 53037; 800/558-6614, 262/677-4121, Fax 262/677-9006; www.repel.com

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