Chemical Control of Nursery Pests

**Bee warning** Read carefully before applying any material selected for use. Many insecticides are highly toxic to honeybees. Some should not be applied any time during bloom, while many others should be applied only in the early morning hours and/or late in the evening. Avoid spraying carbaryl and diazinon on plant surrounded by blooming flowers or weeds. Always take simple steps, such as removing (mowing) blooming clover from lawns adjacent to garden areas before applying materials that are hazardous to bees. In all cases, when given the choice, select the least hazardous material when plants in the infested vicinity are in bloom. Avoid using dusts wherever possible; spray formulations are preferred for bee safety.

**Protect pollinators:** See How to Reduce Bee Poisoning from Pesticides.

**Note:** Products are listed by alphabetical order and not in order of preference or superiority of pest control.

*For greenhouse plant see:*  
Greenhouse Ornamental Pests  
Characteristics of Insecticides

Using pyrethroid insecticides is associated with subsequent spider mite outbreaks: monitor plant closely after you use these materials.

Pesticides available for use in commercial nursery applications

<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Trade name (examples)</th>
<th>Chemical class</th>
<th>Typical use pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>abamectin</td>
<td>Avid, Lucid</td>
<td>acyclic lactone</td>
<td>translaminar systemic</td>
</tr>
<tr>
<td>acephate</td>
<td>Acephate, Orthene</td>
<td>organophosphate</td>
<td>foliar systemic</td>
</tr>
<tr>
<td>acequinocyl</td>
<td>Shuttle</td>
<td>naphthoquinone</td>
<td>spider mite</td>
</tr>
<tr>
<td>acetamiprid</td>
<td>Tristar</td>
<td>chlorodibenzoic</td>
<td>whitefly, aphid, adelgid, scale, psyllid, mealybug, leafflower, thrips, leafminer, plant bug, leaf eating beetles, fungus gnats larvae</td>
</tr>
<tr>
<td>alpha-cypermethrin</td>
<td>Fendona CD</td>
<td>synthetic pyrethroid</td>
<td>aphid, lepidoptera, flea beetle, webworm, grasshopper, plant bug, spittlebug</td>
</tr>
<tr>
<td>Bacillus thuringiensis</td>
<td>various (organic labels available)</td>
<td>microbial</td>
<td>specific, depends on variety; biopesticide</td>
</tr>
<tr>
<td>Beauveria bassiana</td>
<td>Botanigard, Mycotrol, Naturalis</td>
<td>fungus</td>
<td>whitefly, aphid, psyllid, thrips, weevil, mealybug</td>
</tr>
<tr>
<td>beta-cyfluthrin</td>
<td>Tempo</td>
<td>pyrethroid</td>
<td>aphid, caterpillar</td>
</tr>
<tr>
<td>bifenthrin</td>
<td>Menace, Talstar, Wisdom, many labels</td>
<td>pyrethroid</td>
<td>general, check label; most are restricted use pesticides.</td>
</tr>
<tr>
<td>bifenthrin/imidacloprid</td>
<td>Atera, Bithor</td>
<td>pyrethroid/neonicotinoid</td>
<td>combination product; systemic, check label for pests.</td>
</tr>
<tr>
<td>buprofezin</td>
<td>Talus</td>
<td>insect growth regulator</td>
<td>scale, whitefly, mealybug, leafflower, pear psylla acts on immature stages.</td>
</tr>
<tr>
<td>Burkholderia spp.</td>
<td>Venerate XC (OMRI)</td>
<td>bioinsecticide</td>
<td>loopers, aphids, mites, thrips, whiteflies, armyworms</td>
</tr>
<tr>
<td>carbaryl</td>
<td>Sevin</td>
<td>carbamate</td>
<td>general, check label for pest list.</td>
</tr>
<tr>
<td>chlorfenapyr</td>
<td>Pylon</td>
<td>pyroles</td>
<td>spider mites</td>
</tr>
<tr>
<td>chlorantraniliprole</td>
<td>Acelepryn</td>
<td>anthranilic diamide</td>
<td>caterpillar, aphid, lace bug, birch leafminer, beetle, borers</td>
</tr>
</tbody>
</table>
### Pesticides available for use in commercial nursery applications

<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Trade name (examples)</th>
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</thead>
<tbody>
<tr>
<td>chlorpyriphos</td>
<td>Dursban</td>
<td>organophosphate</td>
<td>general, check label for pest list; restricted use pesticide.</td>
</tr>
<tr>
<td>Chromobacterium</td>
<td>Grandevo</td>
<td>microbial</td>
<td>general, check label for pest lift.</td>
</tr>
<tr>
<td>canola oil</td>
<td>Earth-Tone Horticultural Oil (organic)</td>
<td>botanical oil</td>
<td></td>
</tr>
<tr>
<td>citronella/farnesol/geraniol/nerolidol</td>
<td>Biomite</td>
<td>botanical</td>
<td>mite</td>
</tr>
<tr>
<td>clarified hydrophobic extract of neem oil</td>
<td>Triac (OMRI), Trilogy (OMRI)</td>
<td>botanical oil</td>
<td>fungicide, miticide, insecticide, whitefly, mealybug, aphid, leafhopper</td>
</tr>
<tr>
<td>clofentezine</td>
<td>Ovation</td>
<td>tetrazine</td>
<td>spider mite</td>
</tr>
<tr>
<td>clothianidin</td>
<td>Arena</td>
<td>neonicotinoid</td>
<td>aphid, mealybug, whitefly, adelgid, lacebug, leaf beetle, psyllid, root weevils, systemic</td>
</tr>
<tr>
<td>cryolite</td>
<td>Cryolite Bait</td>
<td>inorganic</td>
<td>caterpillar, root weevil</td>
</tr>
<tr>
<td>cyantraniliprole</td>
<td>Mainspring</td>
<td>raynoid</td>
<td>plant bug, lepidopera, soft scale, thrips, whitefly, Japanese beetle</td>
</tr>
<tr>
<td>cyflumetofen</td>
<td>Sultan Miticide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cyfluthrin</td>
<td>Decathlon</td>
<td>pyrethroid</td>
<td>general – check label; restricted use pesticide.</td>
</tr>
<tr>
<td>cyfluthrin/imadclopid</td>
<td>Discus</td>
<td>pyrethroid/neonicotinoid</td>
<td>general – check label; combination product; systemic; restricted use pesticide.</td>
</tr>
<tr>
<td>cyfluthrin/piperonyl butoxide/pyrethrins</td>
<td>1600 X-clade</td>
<td>pyrethroid/synergist/pyrethrins</td>
<td>general – check label combination product; restricted use pesticide.</td>
</tr>
<tr>
<td>cypermethrin</td>
<td>Cyper TC, Enforcer</td>
<td>pyrethroid</td>
<td>ant, silverfish, sowbug greenhouse, seedhouse, and commercial building treatments; restricted use pesticide.</td>
</tr>
<tr>
<td>cyromazine</td>
<td>Citation</td>
<td>triazine: insect growth regulator</td>
<td>acts on immature fungus gnat, leaf miner, shore fly.</td>
</tr>
<tr>
<td>deltamethrin</td>
<td>Deltagard GC</td>
<td>pyrethroid</td>
<td>general – check label; restricted use.</td>
</tr>
<tr>
<td>diazinon</td>
<td>Diazinon</td>
<td>organophosphate</td>
<td>general; restricted use pesticide.</td>
</tr>
<tr>
<td>diflubenzuron</td>
<td>Dimilin 4L</td>
<td>benzoylphenylurea : insect growth regulator</td>
<td>acts on immature stages, conifer nursery; restricted use pesticide.</td>
</tr>
<tr>
<td>dimethoate</td>
<td>Dimethoate</td>
<td>organophosphate</td>
<td>general – check label; systemic.</td>
</tr>
<tr>
<td>dinofuran</td>
<td>Safari</td>
<td>neonicotinoid</td>
<td>aphid, mealybug, whitefly, fungus gnat, weevil, psyllid, borer, thrips, scale, systemic</td>
</tr>
<tr>
<td>emamectin benzoate</td>
<td>Enfold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>entomopathogenic nematode (live)</td>
<td><em>Heterorhabditis</em> spp., <em>Steinernema</em> spp.</td>
<td>microbial</td>
<td>soil pests such as root weevil.</td>
</tr>
<tr>
<td>esfenvalerate</td>
<td>Fenvastar EcoCap, Onslaught FastCap</td>
<td>pyrethroid</td>
<td>spiders, scorpions, check label for other pests.</td>
</tr>
<tr>
<td>ethoprop</td>
<td>Mocap</td>
<td>organophosphate</td>
<td>nematode, symphylan, field nurseries only, pre-plant only: Easter lilies (Curry County, OR); SLN OR-120005.</td>
</tr>
</tbody>
</table>

PNW Insect Management Handbook
<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Trade name (examples)</th>
<th>Chemical class</th>
<th>Typical use pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>etoxazole</td>
<td>TetraSan</td>
<td>oxazolin; insect growth regulator</td>
<td>spider mite</td>
</tr>
<tr>
<td>fenazaquin</td>
<td>Magus Miteicide</td>
<td>quinazoline</td>
<td>spider mite, whitefly</td>
</tr>
<tr>
<td>fenbutatin oxide</td>
<td>Vendex, Meraz</td>
<td>organotin</td>
<td>spider mite</td>
</tr>
<tr>
<td>fenpropathrin</td>
<td>Tame 2.4 EC</td>
<td>pyrethroid</td>
<td>general – check label; restricted-use pesticide</td>
</tr>
<tr>
<td>fenpyroximate</td>
<td>Akari EC</td>
<td>phenoxypyrazole</td>
<td>spider mite, broad mite, cyclamen mite, eriophyid mite, mealybug</td>
</tr>
<tr>
<td>fenvalerate</td>
<td>Onslaught</td>
<td>synthetic pyrethroid</td>
<td>lepidoptera, aphid, plant bug, sawfly, spittlebug, thrips</td>
</tr>
<tr>
<td>flonicamid</td>
<td>Aria Insecticide</td>
<td>pyridinecarboxamide</td>
<td>aphid, thrips, whitefly, scale leafflower, mealybug</td>
</tr>
<tr>
<td>flupyradifurone</td>
<td>Altus</td>
<td>butenolides</td>
<td>leafminer, leafflower, mealybug, lace bug, scale, whitefly, aphid</td>
</tr>
<tr>
<td>garlic oil/powder/cottonseed oil/oil of clove</td>
<td>Pestout (OMRI)</td>
<td>botanical</td>
<td>mite</td>
</tr>
<tr>
<td>hexythiazox</td>
<td>Hexagon</td>
<td>organosulfur</td>
<td>spider mite, ovioidal, larvalidal</td>
</tr>
<tr>
<td>hydramethylnon</td>
<td>Amdro, MaxForce</td>
<td>ant</td>
<td></td>
</tr>
<tr>
<td>imidacloprid</td>
<td>Provaunt</td>
<td>carbamate</td>
<td>caterpillar, sawfly, leafflower</td>
</tr>
<tr>
<td>indoxacarb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iron phosphate</td>
<td>Bug-N-Sluggio</td>
<td></td>
<td>slug, snail</td>
</tr>
<tr>
<td><em>Isaria fumosorosea</em></td>
<td>Prefer Microbial Insecticide</td>
<td>microbial</td>
<td>general – check label</td>
</tr>
<tr>
<td>kaolin</td>
<td>Surround (OMRI)</td>
<td>clay</td>
<td>may leave residue</td>
</tr>
<tr>
<td>lambda-cyhalothrin</td>
<td>Cyonara, Scimitar GC</td>
<td>pyrethroid</td>
<td>general – check label; restricted use pesticide</td>
</tr>
<tr>
<td>limonene</td>
<td>Orange Guard</td>
<td>botanical, monoterpine</td>
<td>aphid, spider mite</td>
</tr>
<tr>
<td>malathion</td>
<td>Malathion SEC, Fyfanon, Prentox</td>
<td>organophosphate</td>
<td>check label for non-tolerant plant</td>
</tr>
<tr>
<td>metaldehyde</td>
<td>Metaldehyde</td>
<td>aldehyde molluscide</td>
<td>slug, snail</td>
</tr>
<tr>
<td><em>Metarhizium anisopliae</em></td>
<td>Met 52</td>
<td>biological, fungus</td>
<td>root weevil grubs</td>
</tr>
<tr>
<td>methidathion</td>
<td>Supracide</td>
<td>organophosphate</td>
<td>aphid, scale, leafflower, moth, weevil; restricted use pesticide</td>
</tr>
<tr>
<td>methiocarb</td>
<td>Mesurol</td>
<td>carbamate</td>
<td>slug, snail, thrips; restricted use</td>
</tr>
<tr>
<td>methoxyfenozide</td>
<td>Intrepid 2F</td>
<td>diacylhydrazine</td>
<td>caterpillar</td>
</tr>
<tr>
<td>milbemectin</td>
<td>Ultiflora</td>
<td>macrocyclic lactonemite</td>
<td>mite; restricted use pesticide</td>
</tr>
<tr>
<td>mineral oil, petroleum distillate</td>
<td>Various</td>
<td>oil</td>
<td>soft-bodied pests</td>
</tr>
<tr>
<td>novaluron</td>
<td>Pedestal</td>
<td>benzoylphenyl urea</td>
<td>whitefly, thrips, leafflower, armymworm; insect growth regulator</td>
</tr>
<tr>
<td>oil of rosemary/peppermint</td>
<td>Ecotec Broad Spectrum (OMRI)</td>
<td>botanical/botanical oil</td>
<td>aphid, beetle, caterpillar, fungus gnat, shorefly, leafflower, leafflower, mite, soft scale</td>
</tr>
<tr>
<td>orthoboric acid</td>
<td>Niban</td>
<td>inorganic acid</td>
<td>slug, snail</td>
</tr>
<tr>
<td>oxydemeton-methyl</td>
<td>MSR Spray Concentrate</td>
<td>organophosphate</td>
<td>aphid, adelgid, thrips, white pine weevil, field-grown nursery stock; systemic; restricted use pesticide</td>
</tr>
<tr>
<td><em>Isaria fumosoroseus</em></td>
<td>PFR 97</td>
<td>biological, fungus</td>
<td>whitefly</td>
</tr>
<tr>
<td>permethrin</td>
<td>Ambush, Permethrin, Pounce, many labels</td>
<td>pyrethroid</td>
<td>general – check label; most are restricted-use pesticides</td>
</tr>
</tbody>
</table>
### Pesticides available for use in commercial nursery applications

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<tr>
<td>phenylethyl propionate</td>
<td>EcoVia WD</td>
<td>botanical</td>
<td>general</td>
</tr>
<tr>
<td>phorate</td>
<td>Thimet 20G SLN OR</td>
<td>organophosphate</td>
<td>nematodes in Easter Lily</td>
</tr>
<tr>
<td>phosmet</td>
<td>Imidan</td>
<td>organophosphate</td>
<td>birch leafminer</td>
</tr>
<tr>
<td>pirimiphos-methyl</td>
<td>Actellic 5E SLN WA</td>
<td>organophosphate</td>
<td>mealybug</td>
</tr>
<tr>
<td>potassium laurate</td>
<td>M-Pede, Insecticidal Soap (several OMRI, organic)</td>
<td>soap</td>
<td>general, contact only, no residual.</td>
</tr>
<tr>
<td>propargite</td>
<td>Omite</td>
<td>organosulfur</td>
<td>mite</td>
</tr>
<tr>
<td>propyleneglycol monolaurate</td>
<td>Acaritouch</td>
<td>fatty acid monoester</td>
<td>spider mite – good contact required.</td>
</tr>
<tr>
<td>pymetrozine</td>
<td>Endeavor</td>
<td>triazine</td>
<td>aphid, whitefly</td>
</tr>
<tr>
<td>pyrethrins/piperonyl butoxide (PBO)</td>
<td>PT 1600 X-clade, PT Pyrethrum TR</td>
<td>pyrethrins/synergist</td>
<td>general – check label.</td>
</tr>
<tr>
<td>pyrethrins/canola</td>
<td>PyGanic Dust (OMRI)</td>
<td>pyrethrins</td>
<td>general – check label.</td>
</tr>
<tr>
<td>pyridalyl</td>
<td>Overture</td>
<td>pyridazinone</td>
<td>lepidoptera, thrips</td>
</tr>
<tr>
<td>pyridaben</td>
<td>Sanmite</td>
<td>pyridazine</td>
<td>spider mite, whitefly</td>
</tr>
<tr>
<td>pyrifluquinazon</td>
<td>Rycar</td>
<td>triazine</td>
<td>whitefly, aphid, leafhopper, thrips, mealybug</td>
</tr>
<tr>
<td>pyriproxyfen</td>
<td>Distance</td>
<td>insect growth regulator</td>
<td>aphid, whitefly, scale, fungus gnats, leafminer</td>
</tr>
<tr>
<td>s-kinoprene</td>
<td>Enstar</td>
<td>insect growth regulator</td>
<td>greenhouse, shadehouse, lath structures only; acts on immature stage of aphids, whitefly, scale, mealybug, thrips</td>
</tr>
<tr>
<td>silicon dioxide (diatomaceous earth)</td>
<td>Perma Guard Garden &amp; Plant Protection Insecticide</td>
<td>inorganic</td>
<td>cucumber beetle, ant, caterpillar, aphid, stink bug, leaf mite</td>
</tr>
<tr>
<td>sodium borate complex</td>
<td>Prev-Am Ultra</td>
<td>inorganic</td>
<td>aphid, leafhopper, lygus, mealybug, mite, thrips, whitefly</td>
</tr>
<tr>
<td>sorbitol octanoate</td>
<td>Sorbishield 90</td>
<td>sugar ester</td>
<td>soft-bodied insects</td>
</tr>
<tr>
<td>spinosad</td>
<td>Conserve, Entrust</td>
<td>fungal metabolite</td>
<td>thrips, caterpillar, midge</td>
</tr>
<tr>
<td>spiromesifen</td>
<td>Judo</td>
<td>ketoenole</td>
<td>spider mite, broad mite, cyclamen mite, false spider mite, eriophydid mite, whitefly</td>
</tr>
<tr>
<td>spirotetramat</td>
<td>Kontos</td>
<td>tetramic acid</td>
<td>aphid, adelgid, whitefly, rust mite, spider mite, psyllid, spittlebug, mealybug, leafhopper; systemic chemistry</td>
</tr>
<tr>
<td>tau-fluvalinate</td>
<td>Mavrik Aquaflow</td>
<td>pyrethroid</td>
<td>general, container stock only</td>
</tr>
<tr>
<td>tebufenozide</td>
<td>Mimic</td>
<td>hydrazine, IGR</td>
<td>acts on moth immature stages.</td>
</tr>
<tr>
<td>thiamethoxam</td>
<td>Flagship</td>
<td>neonicotinoid</td>
<td>beetle grub, aphid, whitefly, mealybug</td>
</tr>
<tr>
<td>tolfenpyrad</td>
<td>Hachi-Hachi</td>
<td>pyrazole</td>
<td>aphid, leafhopper, lepidoptera, scale, thrips</td>
</tr>
<tr>
<td>trichlorfon</td>
<td>Dylox Turn &amp; Ornamental Ins.</td>
<td>organophosphate</td>
<td>caterpillar, bulb fly, cinch bug, beetle larvae</td>
</tr>
<tr>
<td>zeta-cypermethrin</td>
<td>various labels</td>
<td>pyrethroid</td>
<td>aphid, caterpillar, sucking insects</td>
</tr>
</tbody>
</table>
Pesticides registered for use on specific nursery pests

**aphid**
- abamectin (Avid)
- acephate (Acephate 90WDG)
- acetamiprid (TriStar)
- azadirachtin (Azatin)
- bifenthrin (Telstar, various)
- canola oil (Earth-tone Hort Oil)
- carbaryl (Sevin)
- chlorpyrifos (Dursban, various)
- Chromobacterium subsugae (Grandevo)
- clothianidin (Arena)
- cyfluthrin (Decathlon)
- deltamethrin (Deltagard)
- dinotefuran (Safari)
- esfenvalerate (Fenvastar EcoCap)
- imidacloprid (Discus)
- methoxyfenozide (Intrepid)
- spinosad (Conserve, Entrust)

**adelgid**
- alpha-cypermethrin (Fendona)
- acetamiprid (TriStar)
- azadirachtin (Azatin, Neemix, various)
- Bacillus thuringiensis aizawai (Dipel, various)
- Bacillus thuringiensis kurstaki (Zentari)—Most effective on younger stages of the caterpillars.
- Beauvaria bassiana (Mycotrol, Naturalis O)
- bifenthrin (Telstar, various)
- biobest (BotaniGard, Naturalis O)—Fungal pathogens.
- bifenthrin (Telstar, various)
- Burkholderia spp. (Venerate XC)
- canola oil (Earth-tone Hort Oil)—Other oils include clove, cottonseed, rosemary, peppermint, sesame.
- carbaryl (Sevin)
- chlorpyrifos (Dursban, various)
- Chromobacterium subsugae (Grandevo)
- clothianidin (Arena)
- cyfluthrin (Decathlon)
- deltamethrin (Deltagard)—For perimeter treatments.
- diazinon (Diazinon)
- dimethoate (Dimate, Dimethoate)
- dinotefuran (Safari)
- esfenvalerate (Fenvastar EcoCap)
- fenpropimorph (Tame)
- fenvalerate (Onslaught)
- fluorethrin (Aria)
- flupyradifurone (Altus)
- garlic oil/powder (Allitin Insect Repellent)
- garlic powder/oil of clove/cottonseed oil (Pest Out)
- horticultural oil (various)
- imidacloprid (Marathon, various)
- imidacloprid/cyfluthrin (Discus)
- Isaria fimosorosea Apopka strain 97 (Preferential Microbial Insecticide, PFR 97)
- kaolin (Surround)—May leave residue; thorough coverage essential.
- lambda-cyhalothrin (Scimitar, various)
- limonene (Orange Guard)
- malathion (various)
- methiocarb (Mesurol)
- neem oil (Trilogy)
- neem oil (MSR Concentrate)
- oxydemeton-methyl (MSR Spray Concentrate)
- peppermint/oil of rosemary (Ecotec Broad Spectrum)
- permethrin (Ambush, Pounce, Permethrin, various)
- potassium laureate (various)
- pyrethrin/PBO3
- pyriproxyfen (Distance)—Apply to the immature stages of the insect.
- s-kinoprene (Enstar II)—Apply to the immature stages of the insect.
- silicon dioxide (diatomaceous earth - Perma Guard Garden & Plant Protection Insecticide)
- sodium boreate
- sorbitol octanoate (Sorbishield 90)
- sporotetramat (Kontos)—Systemic activity
- tau-fluvalinate (Mavrik Aquaflo)
- thiamethoxam (Flagship)
- tolenpyrad (Hachi-Hachi)
- zeta-cypermethrin (Telstar, Cynoff)

**borders (general)**
- acephate (Acephate 90WDG)
- azadirachtin (Azatin, Neemix, various)
- bifenthrin (Telstar, various)
- carbaryl (Sevin)
- clothianidin (Arena)
- chlorpyrifos (Dursban, various)
- clothianidin (Cinnamol)
- cyfluthrin/imidacloprid (Discus)
- cyfluthrin (Decathlon)
- deltamethrin (Dimate, Dimethoate)
- dinotefuran (Safari)
- esfenvalerate (Fenvastar EcoCap)
- garlic oil/powder (Allitin Insect Repellent)
- imidacloprid (Marathon, various)
- lambda-cyhalothrin (Scimitar, various)
- malathion (various)
- pyrethrin/PBO3
- pyriproxyfen (Distance)—Apply to the immature stages of the insect.
- silicon dioxide (diatomaceous earth - Perma Guard Garden & Plant Protection Insecticide)
- sodium boreate
- sorbitol octanoate (Sorbishield 90)
- sporotetramat (Kontos)—Systemic activity
- tau-fluvalinate (Mavrik Aquaflo)
- thiamethoxam (Flagship)
- tolenpyrad (Hachi-Hachi)
- zeta-cypermethrin (Telstar, Cynoff)

**caterpillars**
- acephate (Orthene, various)
- acetamiprid (TriStar)
- alpha-cypermethrin (Fendona)
- azadirachtin (Azatin, Neemix, various)
- Bacillus thuringiensis aizawai (Dipel, various)—Most effective on younger stages of the caterpillars.
- Bacillus thuringiensis kurstaki (Zentari)—Most effective on younger stages of the caterpillars.
- Beauveria bassiana (Mycotrol, Naturalis O)
- bifenthrin (Telstar, various)
- biobest (BotaniGard, Naturalis O)—Fungal pathogens.
- bifenthrin (Telstar, various)
- Burkholderia spp. (Venerate XC)
- canola oil (Earth-tone Hort Oil)—Other oils include clove, cottonseed, rosemary, peppermint, sesame.
- carbaryl (Sevin)
- chlorpyrifos (Dursban, various)
- Chromobacterium subsugae (Grandevo)
- clothianidin (Arena)
- cyantraniliprole (Mainspring)
- cyfluthrin (Decathlon)
- esfenvalerate (Fenvastar EcoCap)
- deltamethrin (Deltagard)
- fenvalerate (Onslaught)
- garlic powder/oil (Allitin Insect Repellent)—Acts as an insect growth regulator and anti-feedant. Other oils include canola, neem, peppermint.
- imidacloprid/bifenthrin (Atera)
- imidacloprid/cyfluthrin (Discus)
- indoxacarb (Provaunt)
- insect growth regulator
- Isaria fimosorosea Apopka strain 97 (Preferential Microbial Insecticide, PFR 97)
- lambda-cyhalothrin (Scimitar, various)
- malathion (various)
- methoxyfenozide (Intrepid)—Begin applications when larvae are observed or at the first sign of feeding damage.
- mineral oil/petroleum distillate (various)—Apply in delayed-dormant period to destroy overwintering egg masses.

**spruce sawfly**
- acetamiprid (TriStar)
- azadirachtin (Azatin, Neemix, various)
- bifenthrin (Telstar, various)
- carbaryl (Sevin)
- clothianidin (Arena)
- chlorpyrifos (Dursban, various)
- clothianidin (Cinnamol)
- cyfluthrin/imidacloprid (Discus)
- cyfluthrin (Decathlon)
- deltamethrin (Dimate, Dimethoate)
- dinotefuran (Safari)
- esfenvalerate (Fenvastar EcoCap)
- garlic oil/powder (Allitin Insect Repellent)
- imidacloprid (Marathon, various)
- lambda-cyhalothrin (Scimitar, various)
- malathion (various)
- pyrethrin/PBO3
- pyriproxyfen (Distance)—Apply to the immature stages of the insect.
- silicon dioxide (diatomaceous earth - Perma Guard Garden & Plant Protection Insecticide)
- sodium boreate
- sorbitol octanoate (Sorbishield 90)
- sporotetramat (Kontos)—Systemic activity
- tau-fluvalinate (Mavrik Aquaflo)
- thiamethoxam (Flagship)
- tolenpyrad (Hachi-Hachi)
- zeta-cypermethrin (Telstar, Cynoff)

**Larvae**
- acephate (Orthene, various)
- acetamiprid (TriStar)
- alpha-cypermethrin (Fendona)
- azadirachtin (Azatin, Neemix, various)
- Bacillus thuringiensis aizawai (Dipel, various)—Most effective on younger stages of the caterpillars.
- Bacillus thuringiensis kurstaki (Zentari)—Most effective on younger stages of the caterpillars.
- Beauveria bassiana (Mycotrol, Naturalis O)
- bifenthrin (Telstar, various)
- biobest (BotaniGard, Naturalis O)—Fungal pathogens.
- bifenthrin (Telstar, various)
- Burkholderia spp. (Venerate XC)
- canola oil (Earth-tone Hort Oil)—Other oils include clove, cottonseed, rosemary, peppermint, sesame.
- carbaryl (Sevin)
- chlorpyrifos (Dursban, various)
- Chromobacterium subsugae (Grandevo)
- clothianidin (Arena)
- cyantraniliprole (Mainspring)
- cyfluthrin (Decathlon)
- esfenvalerate (Fenvastar EcoCap)
- deltamethrin (Deltagard)
- fenvalerate (Onslaught)
- garlic powder/oil (Allitin Insect Repellent)—Acts as an insect growth regulator and anti-feedant. Other oils include canola, neem, peppermint.
- imidacloprid/bifenthrin (Atera)
- imidacloprid/cyfluthrin (Discus)
- indoxacarb (Provaunt)
- insect growth regulator
- Isaria fimosorosea Apopka strain 97 (Preferential Microbial Insecticide, PFR 97)
- lambda-cyhalothrin (Scimitar, various)
- malathion (various)
- methoxyfenozide (Intrepid)—Begin applications when larvae are observed or at the first sign of feeding damage.
- mineral oil/petroleum distillate (various)—Apply in delayed-dormant period to destroy overwintering egg masses.
novaluron (Pedestal)
permethrin (Ambush, Pounce, Permethrin, various)
potassium laurate (various)
pyrethrin (Pyganic Dust)
pyrethrin/piperonyl butoxide pyridalyl (Overture)
silicon dioxide (diatomaceous earth
- Perma Guard Garden & Plant Protection Insecticide)
spinosad (Conserve, Entrust SC OMRI approved)
tau-fluvalinate (Mavrik Aquaflow)
tebufencozide (Minic)—Apply at initiation of egg hatch.
thiamethoxam (Flagship)
tolenpyrad (Hachi-Hachi)

clearwing moth borer
acephate (Acephate 90WDG)
bifenthrin (Talstar, various)
chlorpyrifos (Dursban, various)
methoxyfenozide (Intrepid)—Specific to caterpillars; mimics action of molting hormone.
permethrin (Ambush, Pounce, Permethrin, various)
pyrethrin (Pyganic Dust)
coneworm
acephate (Acephate 90WDG)
azadiractin (Azatin, Neemix, various)
Beauveria thuringiensis azaeai (Xentari)
Beauveria thuringiensis kurstaki (Dipel, various)
carbaryl (Sevin)
dimethoate (Dimate, Dimethoate)
garlic oil/powder (Allityn Insect Repellent)
permethrin (Ambush, Pounce, Permethrin, various)
phosmet (Imidan)
spinosad (Conserve, Entrust)
flea beetle
acephate (Orthene, various)
alpacypermethrin (Fendona)
azadirachtin (Azatin, Neemix, various)— Acts as an insect growth regulator and anti-feedant.
Beauveria bassiana (Botanigard, Naturalis L)
bifenthrin (Talstar, various)
carbaryl (Sevin)
chlorpyrifos (Dursban, various)
clothianidin (Arena)
cyfluthrin (Decathlon)
deltamethrin (Deltagard)—For perimeter treatments.
diazinon (Diazinon)
esfenvalerate (Fenvastar EcoCap)
ethoprop (Mocap)—Mocap for nematodes, symphyllans, field nurseries only, pre-plant only; Easter lilies (Curry County, OR). Supplemental label needed. Restricted use pesticide. SLN OR-120005
imidacloprid (Marathon, various)
imidacloprid/bifenthrin (Atera, Bithor)
kaolin (Surround)
lambda-cyhalothrin (Scimitar, various)
malathion (various)
peppermint (Ecotec Broad Spectrum)— Other oils include rosemary, canola oil.
permethrin (Ambush, Pounce, Permethrin, various)
potassium laurate (various)
pyrethrin (Pyganic Dust)
pyrethrin/piperonyl butoxide spinosad (Conserve, Entrust)
tau-fluvalinate (Mavrik Aquaflow)
thiamethoxam (Flagship)
lace bug
acephate (Orthene, various)
azadirachtin (Azatin, Neemix, various)
Beauveria bassiana (Botanigard, Naturalis L)
bifenthrin (Talstar, various)
carbaryl (Sevin)
Chromobacterium subsugaes (Grandevo)
chlorpyrifos (Dursban, various)
clothianidin (Arena)
cyfluthrin (Decathlon)
deltamethrin (Deltagard)—For perimeter treatments.
dimethoate (Dimate, Dimethoate)
dinotefuran (Safari)
esfenvalerate (Fenvastar EcoCap)
flupyradifurone (Altus)
imidacloprid (Marathon, various)
imidacloprid/bifenthrin (Atera, Bithor)
imidacloprid/cyfluthrin (Discus)
kaolin (Surround)
lambda-cyhalothrin (Scimitar, various)
limonene (Orange Guard)
malathion (various)
mineral oil/petroleum distillate (various)
peppermint oil, rosemary oil
permethrin (Ambush, Pounce, Permethrin, various)
potassium laurate (various)
pyrethrin (Pyganic Dust)
pyrethrin/piperonyl butoxide spinosad (Conserve, Entrust)
thiamethoxam (Flagship)
leaf beetle
acephate (Orthene, various)
acetamiprid (TriStar)
azadirachtin (Azatin, Neemix, various)
Beauveria thuringiensis tenebrionos (Bt)
(Novodor)—Labeled for elm leaf beetle.
bifenthrin (Talstar, various)
Chromobacterium subsugaes (Grandevo)
clothianidin (Arena)
cyfluthrin (Decathlon)
dimethoate (Dimate, Dimethoate)
dinotefuran (Safari)
esfenvalerate (Fenvastar EcoCap)
imidacloprid (Marathon, various)
imidacloprid/bifenthrin (Atera, Bithor)
imidacloprid/cyfluthrin (Discus)
lambda-cyhalothrin (Scimitar, various)
mineral oil/petroleum distillate (various)
oil of rosemary (Ecotec Broad Spectrum)
permethrin (Ambush, Pounce, Permethrin, various)
phosmet (Imidan)
potassium laurate (various)
thiamethoxam (Flagship)
leafhopper
acephate (Orthene, various)
acetamiprid (TriStar)
azadirachtin (Azatin, Neemix, various)
Beauveria bassiana (Botanigard, Naturalis L)
bifenthrin (Talstar, various)
buprofezin (Talus)—Do not rotate with chitin synthesis inhibitors.
canola oil (Earth-tone Hort Oil)
canola oil/pyrethrin (various)
carbaryl (Sevin)
chlorpyrifos (Dursban, various)
cinnamaldehyde (Cinnacure)
clothianidin (Arena)
cyfluthrin (Decathlon)
deltamethrin (Deltagard)—For perimeter treatments.
diazinon (Diazinon)
dimethoate (Dimate, Dimethoate)
dinotefuran (Safari)
esfenvalerate (Fenvastar EcoCap)
fenthropathrin (Tame 2.4EC)
fonicamid (Aria)
flupyradifurone (Altus)
garlic oil/powder (Allityn Insect Repellent)
imidacloprid (Marathon, various)
imidacloprid/bifenthrin (Atera, Bithor)
imidacloprid/cyfluthrin (Discus)
indexacarb (Provaunt)
kaolin (Surround)
lambda-cyhalothrin (Scimitar, various)
limonene (Orange Guard)
malathion (various)
mineral oil/petroleum distillate (various)
neem oil, (Triact, Trilogy)—Pre-test on small number of plants to check for phytotoxicity. Buffer spray solution to pH 5.5-7.0.
oil of rosemary (Ecotec Broad Spectrum)
oxymetho-ethyl (MSR Spray Concentrate)
**leafroller**

acephate (Orthene, various)
azadirachtin (Azatin, Neemix, various) *Bacillus thuringiensis aizawai* (Xentari)—Works best on small larvae. *Bacillus thuringiensis kurzstaki* (Dipel, various) *Beauveria bassiana* (Botanigard, Naturalis L) bifenthrin (Talstar, various) canola oil (Earth-tone Hort Oil) carbaryl (Sevin) chlorpyrifos (Dursban, various) *Chromobacterium subtsugae* (Grandevo) cinnamaldehyde (Cinnacure) cyfluthrin (Decathlon) deltamethrin (Deltagard) diazinon (Diazinon) emamectin benzoate (Enfold) esfenvalerate (Fenvastar EcoCap) fenpropathrin (Tame 2.4EC) garlic oil/powder (Allitin Insect Repellant) imidacloprid/bifenthrin (Atera, Bithor) kaolin (Surround) lambda-cyhalothrin (Scimitar, various) methoxyfenozide (Intrepid)—Specific to caterpillars; mimics action of molting hormone. mineral oil/petroleum distillate (various) novaluron (Pedesta)—Apply to immature insects. oil of rosemary (Ecote Broad Spectrum) permethrin (Ambush, Pounce, Permethrin, various) pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust) tebufenozide (Mimic)—Specific to caterpillars; apply at initiation of egg hatch. zeta-cypermethrin (Talstar, Cynoff)

**mite, eriophyid**

abamecint (Avid) carbaryl (Sevin) fenpyroximate (Akari) milbemectin (Ultralora)—Restricted use pesticide. mineral oil/petroleum distillate (various) pyrethrins/piperonyl butoxide spiroxifl Önce (Judo)—Avoid geranium, ferns, English ivy, Alstromeria, Impatiens.

**mite, spider**

abamecint (Avid) acephate (Orthene, various) acequinocyl (Shuttle) azadirachtin (Azatin, Neemix, various) bifenzate (Floramite)***—Good coverage is especially important with bifenazate. Compatible with predatory mites. bifenthin (Talstar, various) *Burkholderia* spp. (Venerate XC) chlorfenapyr (Pylon) chlorpyrifos (Dursban, various) *Chromobacterium subtsugae* (Grandevo) cinnamaldehyde (Cinnacure) clofentezine (Ovation) cyflumethoïl (Sultan Miticide) diazinon (Diazinon) dimethoate (Dimate, Dimethoate) emamectin benzoate (Enfold) esfenvalerate (Fenvastar EcoCap, Onslaught FastCap) etoxazole (TetraSan) fenazaquin (Magus Miticide) fenbutatin-oxide (Vendex) fenpyroximate (Akari) garlic powder/oil of clove/cottonseed oil (Pest Out)—Horticultural oils are most effective against the egg stage. Other oils include clove, peppermint, rosemary.

**mite, needleminer**

acephate (Orthene, various) carbaryl (Sevin) chlorpyrifos (Dursban, various)

**peachtree borer**

azadirachtin (Azatin, Neemix, various) bifenthin (Talstar, various) carbaryl (Sevin) chlorpyrifos (Dursban, various) esfenvalerate (Fenvastar EcoCap) lambda-cyhalothrin (Scimitar, various) permethrin (Ambush, Pounce, Permethrin, various) pyrethrins/piperonyl butoxide

**peach twig borer**

azadirachtin (Azatin, Neemix, various) *Bacillus thuringiensis kurzstaki* (Dipel, various) bifenthin (Talstar, various) carbaryl (Sevin) chlorpyrifos (Dursban, various) *Chromobacterium subtsugae* (Grandevo) cinnamaldehyde (Cinnacure) diazinon (Diazinon) esfenvalerate (Fenvastar EcoCap) kaolin (Surround)

**midge**

acetamiprid (TriStar) azadirachtin (Azatin, Neemix, various) bifenthin (Talstar, various) carbaryl (Drexel Carbaryl 4) chlorpyrifos (Dursban, various) cyfluthrin (Decathlon) cyfluthrin/imidacloprid (Discus) deltamethrin (Deltagard)—For perimeter treatments. dimethoate (Dimate, Dimethoate) esfenvalerate (Fenvastar EcoCap) kaolin (Surround)—May leave residue. imidacloprid lambda-cyhalothrin (Scimitar, various) oil of rosemary (Ecote Broad Spectrum) pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust) thiamethoxam (Flagship)

**peach tree midge**

acetamiprid (TriStar) azadirachtin (Azatin, Neemix, various) bifenthin (Talstar, various) carbaryl (Drexel Carbaryl 4) chlorpyrifos (Dursban, various) cyfluthrin (Decathlon) cyfluthrin/imidacloprid (Discus) deltamethrin (Deltagard)—For perimeter treatments. dimethoate (Dimate, Dimethoate) esfenvalerate (Fenvastar EcoCap) kaolin (Surround)—May leave residue. imidacloprid lambda-cyhalothrin (Scimitar, various) oil of rosemary (Ecote Broad Spectrum) pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust) thiamethoxam (Flagship)
lambda-cyhalothrin (Scimitar, various) methidathion (Supracide) methoxifenozide (Intrepid)—Specific to caterpillars; apply at initiation of egg hatch mineral oil/petroleum distillate (various) permethrin (Ambush, Pounce, Permethrin, various) pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust)

**plant bug**
acephate (Orthene, various) acetamiprid (TriStar) alpha-cypermethrin (Fendona) azadirachtin (Azatin, Neemix, various) *Beauveria bassiana* (Botanigard, Naturalis L) bifenthrin (Talstar, various) canola oil/pyrethrin (various) carbaryl (Sevin) chlorpyrifos (Dursban, various)

*Chromobacterium subsugae* (Grandevo) cytofluthrin (Decathlon) deltamethrin (Deltagard)—For perimeter treatments. dimethoate (Dimate, Dimethoate) dinofeturan (Safari) esfenvalerate (Fenvastar EcoCap) garlic oil/powder (Allitin Insect Repellent)—Other oils include cottonseed, peppermint. imidacloprid (Marathon, various) *Isaria fumosorosea* Apopka strain 97 (Preferal Microbial Insecticide, PFR 97) kaolin (Surround) mineral oil/petroleum distillate (various) oil of rosemary/peppermint (Ecotec Broad Spectrum) potassium laurate (various) pyrethrin (Pyganic Dust) sorbitol octanoate (Sorbishield 90) spirotetramat (Kontos)—Systemic activity. tau-fluvalinate (Mavrik Aquaflo) thiamethoxam (Flagship) zeta-cypermethrin (Talstar, Cyono)

root weevil
acephate (Orthene, various) azadirachtin (Azatin, Neemix, various) *Beauveria bassiana* (Botanigard, Naturalis L) bifenthrin (Talstar, various) clothianidin (Arena) cryolite (Gowan Cryolite Bait) cyfluthrin (Decathlon) dinofeturan (Safari) imidacloprid (Marathon, various) imidacloprid/cyfluthrin (Discus) *Isaria fumosorosea* Apopka strain 97 (Preferal Microbial Insecticide, PFR 97) lambda-cyhalothrin (Scimitar, various) malathion mineral oil/petroleum distillate (various) novaluron (Pestenal) permethrin (Ambush, Pounce, Permethrin, various) potassium laurate (various) silicon dioxide (diatomaceous earth - Perma Guard Garden & Plant Protection Insecticide) sorbitol octanoate (Sorbishield 90) tau-fluvalinate (Mavrik Aquaflo) thiamethoxam (Flagship) zeta-cypermethrin (Talstar, Cyono)

**sawfly**
acephate (Orthene, various) azadirachtin (Azatin, Neemix, various) bifenthrin (Talstar, various) canola oil (Earth-tone Hort Oil) carbaryl (Sevin) chlorpyrifos (Dursban, various) cyfluthrin (Decathlon) deltamethrin (Deltagard)—For perimeter treatments. diflubenzuron (Dimilin 25W) dimethoate esfenvalerate (Fenvastar EcoCap) fenvalerate (Onslaught) garlic oil/powder (Allitin Insect Repellent) imidacloprid (Marathon, various) imidacloprid/bifenthrin (Atera, Bithor) indoxacarb (Provaunt) lambda-cyhalothrin (Scimitar, various) malathion (various) mineral oil/petroleum distillate (various) oil of rosemary pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust) thiamethoxam (Flagship) tolenpyrad (Hachi-Hachi) zeta-cypermethrin (Talstar, Cyono)

**scale**
abamectin (Avid) acephate (Orthene, various) acetamiprid (TriStar) azadirachtin (Azatin, Neemix, various) bifenthrin (Talstar, various) buprofezin (Talus)—Do not rotate with chitin synthesis inhibitors. canola oil (Earth-tone Hort Oil)—Other oils include cottonseed. carbaryl (Sevin) chlorpyrifos (Dursban, various) cinnamaldehyde (Cinnacure) clothianidin (Arena) cyantraniliprole (Mainspring) cyfluthrin (Decathlon) deltamethrin (Deltagard)—For perimeter treatments. diazinon (Diazinon) dimethoate (Dimate, Dimethoate) dinofeturan (Safari) esfenvalerate (Fenvastar EcoCap) flonicamid (Aria) garlic oil/powder (Allitin Insect Repellent) cinnamaldehyde (Cinnacure)

**psyllid**
acephate (Orthene, various) acetamiprid (TriStar) azadirachtin (Azatin, Neemix, various) *Beauvaria bassiana* (Botanigard, Naturalis L) bifenthrin (Talstar, various) canola oil (Earth-tone Hort Oil) carbaryl (Sevin) chlorpyrifos (Dursban, various) cyfluthrin (Decathlon) deltamethrin (Deltagard)—For perimeter treatments. diflubenzuron (Dimilin 25W) dimethoate esfenvalerate (Fenvastar EcoCap) fenvalerate (Onslaught) garlic oil/powder (Allitin Insect Repellent) imidacloprid (Marathon, various) imidacloprid/bifenthrin (Atera, Bithor) indoxacarb (Provaunt) lambda-cyhalothrin (Scimitar, various) malathion (various) mineral oil/petroleum distillate (various) oil of rosemary pyrethrin (Pyganic Dust) spinosad (Conserve, Entrust) thiamethoxam (Flagship) tolenpyrad (Hachi-Hachi) zeta-cypermethrin (Talstar, Cyono)
thrips
abamectin (Avid)
acephate (Orthene, various)
acetamiprid (TriStar)
azadirachtin (Azatin, Neemix, various)
Beauveria bassiana (Botaniigard, Naturalis L)
bifenthrin (Talstar, various)
bifenazate (Floramite)—Good coverage
is especially important with bifenthrin. Compatible with predatory mites.
Burkholderia spp. (Venerate XC)
canola oil/pyrethrin (various)
carbaryl (Sevin)
chlorpyrifos (Dursban, various)
Chromobacterium subsugae (Grandeo)
cyfluthrin (Decathlon)
deltamethrin (Deltagard)—For perimeter treatments.
diflubenzuron (Dimilin 25W)
garlic oil/powder (Allityn Insect Repellent)
garlic powder/oil of clove/cottonseed oil (Pest Out)
imidacloprid (Marathon, various)
Isaria fumosorosea Apopka strain 97
(Preferal Microbial Insecticide, PFR 97)
kaolin (Surround)
lambda-cyhalothrin (Scimitar, various)
methoxyfenozide (Intrepid)
mineral oil/petroleum distillate (various)
oil of rosemary (Ecote Broad Spectrum)
permethrin (Ambush, Pounce, Permethrin, various)
pyrethrum (Pyganic Dust)—Some products.
spinosad (Conserve, Entrust)

white pine weevil
abamectin (Avid)
acephate (Acephate 90WDG)
bifenthrin (Talstar, various)
chlorpyrifos (Dursban, various)
imidacloprid/bifenthrin (Atera, Bithor)
Isaria fumosorosea Apopka strain 97
(Preferal Microbial Insecticide, PFR 97)
lamba-cyhalothrin (Scimitar, various)
malathion (various)
pyrethrin (Pyranic Dust)
pyrethrin/PBO
pyrifluquinazon (Rycar)
S-kinoprene (Enstar II)
sodium borate
sorbitol octanoate (Sorbishield 90)
spiromesifen (Judo)
spirotetratam (Kontos)—Systemic activity.
tau-fluvalinate (Mavrik Aquaflow)
thytemohexam (Flagship)

whitefly
abamectin (Avid)
acephate (Orthene, various)
acetamiprid (TriStar)
azadirachtin
Beauveria bassiana (Botaniigard, Naturalis L)
bifenthrin (Talstar, various)
buprofezin (Talus)
Burkholderia spp. (Venerate XC)
canola oil (Earth-tone Hort Oil)—Other oils include cottonseed, peppermint.
canola oil/pyrethrin (various)
carbaryl (Sevin)
chlorpyrifos (Dursban, various)
Chromobacterium subsugae (Grandeo)
cinnamaldehyde (Cinnacure)
clarified hydrophobic extract of neem oil (Tract, Trilogy)
clothalmidin (Arena)
cyfluthrin (Decathlon)
diazinon (Diazinon)
ditenoate (Ditec, Dimethoate)