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## Insecticide Recommendations

The list below covers the most useful and widely available natural and synthetic insecticides for gardeners. Synthetic insecticides are manufactured compounds that do not normally occur in nature. Natural insecticides are products whose active ingredients originate in a plant, animal or mineral, or whose action results from biological process. Be aware that "Natural" doesn't mean "Harmless". Natural products can harm people, plants or animals if used incorrectly.









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### Natural Insecticides

- **Neem Oil (Azadirachtin)** Neem oil is derived from the tropical tree *Azadirachta indica*. It repels pest and once ingested interrupts their growth cycle, killing larvae as well as adults. It is effective against aphids, beetles, caterpillars, mealybugs, root weevils, whiteflies and others. Neem oil controls insects in egg, larvae and adult stages. It also controls mites and some plant diseases.
- **Bacillus thuringiensis (Bt)** Bt is a bacterium that is lethal to many caterpillars, including cabbage worm, geranium budworm and hornworm.
- **Diatomaceous Earth** A powdery substance made from the skeletons of microscopic marine organisms. Effective against pests such as ants, aphids, cutworms, slugs and snails. Works by matting on the insect and damaging its protective coat.
- **Horticultural Oils** These are highly refined petroleum oils that smother pests, pest eggs and disease spores. In winter, during the dormant season, they are applied to control insect eggs, some overwintering insects and certain diseases. In summer, these oils are used at a lower rate to combat insects such as aphids, mealybugs, mites, scales, thrips, and whiteflies.
- **Insecticidal Soap** Made not from detergent, but from potassium salts of fatty acids found in plants and animals. Effective against pests such as aphids, mealybugs, mites, scales, thrips and whiteflies. Hard water inactivates it, so mix the concentrate with soft water, distilled water or rain water.
- **Pyrethrins** Derived from compounds found in dried flowers of *Tanacetum cinerariifolium*. Both a contact and stomach poison. It is lethal to many pests. It breaks down quickly in sunlight, so apply after sundown to give it more time to act.

### Synthetic Insecticides

- **Acephate** A systemic poison (one absorbed by the plant and incorporated into its tissues), this broad spectrum product is used against aphids, beetles, caterpillars, grasshoppers, leaf miners, mealybugs, thrips, root weevils, whiteflies and other pests. Do not use on edible crops.
- **Carbaryl** Broad spectrum contact insecticide. Controls most chewing insects, but it is not effective against sucking types. Registered for use on edible crops.
- **Malathion** Broad spectrum contact insecticide that controls aphids, beetles, caterpillars, mealybugs, scales, thrips, whiteflies and other pests.
- **Pyrethroids** Synthetic versions of plant-based Pyrethrins, Pyrethroids are increasingly being used in pesticides and are effective against many garden and household pests. Active ingredients include permethrin, cyfluthrin and others.

Pest	Symptoms	Recommended Chemicals
 <p data-bbox="94 331 175 359">Aphids</p>	<p data-bbox="391 132 1156 264">Aphids damage plants by sucking the sap from the leaves, twigs, stems or roots. Many aphid species produce large amounts of honeydew, a sweet and sticky sap. The honeydew will accumulate on anything found under infested trees or plants.</p>	<p data-bbox="1179 132 1534 233">Neem Oil, Pyrethrins, Insecticidal Soap, Acephate, Malathion &amp; Pyrethroids</p>
 <p data-bbox="94 562 228 590">Caterpillars</p>	<p data-bbox="391 363 1156 527">In the early stages of their life cycle caterpillars may only eat the tissue on the surface of the leaves, as they grow older, they will chew away the leaf and leave only the skeleton of the leaf. However, as they grow larger caterpillars need more food and will eat the entire leaf.</p>	<p data-bbox="1179 363 1419 390">Bacillus thuringiensis</p>
 <p data-bbox="94 793 250 821">Grasshoppers</p>	<p data-bbox="391 594 1156 758">Grasshopper damage may include feeding on cotyledons, true leaves, or leaf petioles, but more importantly, feeding on the main stem of young seedlings. Feeding of the stem appears similar to cutworm damage, but grasshoppers often will not completely cut or feed through the main stem.</p>	<p data-bbox="1179 594 1528 659">Diatomaceous Earth, Carbaryl, Acephate &amp; Permethrin</p>
 <p data-bbox="94 1024 212 1052">Mealybugs</p>	<p data-bbox="391 825 1156 968">The insects gather in cottony white masses on roots, stems, branches and leaves of many plants, sucking sap and reducing plant vigor. Honeydew secretions from their feeding encourage mold growth on foliage and attract ants and fungi.</p>	<p data-bbox="1179 825 1528 999">Neem Oil, Horticultural Oil, Pyrethrins &amp; Malathion. For minor infestations, daub the pests with a cotton swab dipped in rubbing alcohol</p>
 <p data-bbox="94 1266 168 1293">Scales</p>	<p data-bbox="391 1056 1156 1146">The scale appears as a hard, waxy shell that is tightly attached to the bark. Leaves may become sticky and discolored with heavy feeding.</p>	<p data-bbox="1179 1056 1516 1121">Horticultural Oil, Insecticidal Soap and Malathion</p>
 <p data-bbox="94 1486 159 1514">Slugs</p>	<p data-bbox="391 1287 1156 1430">Sluf will eat soft succulent growth, including seedlings, young tender shoots, leaves and flowers are damaged or eaten, particularly in wet conditions. Slime trails may be visible near the damaged tissues</p>	<p data-bbox="1179 1287 1474 1352">Diatomaceous Earth, Iron Phosphate &amp; Metaldehyde</p>
 <p data-bbox="94 1717 256 1745">Spiders Mites</p>	<p data-bbox="391 1518 1156 1640">To the naked eye, spider mites look like flecks of red, yellow or green. Signs of mite infestation include yellow-stippled leaves and a tan or bronze cast to the foliage. You also may be able to see very fine webs between the leaves.</p>	<p data-bbox="1179 1518 1516 1583">Neem Oil, Horticultural Oil, &amp; Insecticidal Soap</p>
 <p data-bbox="94 1917 168 1944">Thrips</p>	<p data-bbox="391 1749 1156 1839">In heavy infestations, both flowers and leaves are discolored and fail to open properly, looking twisted or stuck together. If you look closely, you will see stippled, puckered areas on flowers and foliage.</p>	<p data-bbox="1179 1749 1516 1814">Horticultural Oil, Insecticidal Soap, Acephate and Malathion</p>