

Integrated Pest Management Recommendations

Product Name	Targeted Pest
ANTS	
Abamectin Bait – Planet Natural (Ascend) Abamectin Bait – Whitmire (Advance)	Fire Ants Carpenter and Household Ants
Borate granular ant bait – BASF (Mother Earth)	Carpenter and Household Ants
BEEES	
Boric Acid – Whitmire (PT 249 35% Boric Acid)	Yellow Jackets and Bees
BEEETLES	
Garlic Repellent – Harmony (Guardian) Mustard and Chili Oil Repellent – Valoram, Armorex Insect Growth Regulators – Halofenzimide and Mach-2 Epazote and Nichols Garden	Flea Beetle Beetle Grubs Stored Products Beetle
COCKROACHES	
Abamectin Dust or Spray – Avert Pt-300, PT 310 Borate-based bait – Niban FG, Seabright (roach-free) Idoxacarb Bait – Advion Fibronil Bait Stations (child resistant) -- Maxforce	Roaches
FLEAS	
Sodium Octaborate (carpet treatment) – The Ecology Works Insecticidal Oil – Gardens Alive! And Orange Guard	Fleas
LICE	
Enzyme Shampoo – Lice-B-Gone Pyrethrin Shampoo – Pronto and RID	Head Lice
SILVERFISH	
Borate-based Insecticides – Waterbury (Mop Up) Peaceful Valley (Roach Powder)	Silverfish

TERMITES	
Borate Termiticide & Wood Preservatives: NISUS (Bora-Care, Jecta), Permachink (Guardian, Shellguard) Borate-treated lumber: Osmose Termite Baits: Ensystex, BASF (Subterfuge)	Termites
SLUGS AND SNAILS	
Insecticidal Soap: Harmony (M-Pede), Agricola El Sol (Act – 92) Slug Bait: Garden’s Alive (Escargo, iron phosphate); Certis, Harmony (Sluggo)	Slugs and Snails
TICKS	
Diatomaceous Earth, with pyrethrin: Permaguard, Nitron (Permaguard Pet and Animal); Nitron (Permaguard household) Repellent: DEET Repellent – REI (Cutter’s, Jungle Juice)	Ticks

Permethrin Tick Repellent: WPC, Forestry Suppliers (Permanone); Sawyer	
CATERPILLARS	
Botanical Repellents – Renee’s (Sweet Basil Seeds); Park Seed (holy basil); Nichol’s Garden, J.L. Hudson (Epazote) Insect Growth Regulators (IGRs) – Syngenta, Rohm and Haas Pheromone Mating Disruptants – Checkmate for codling moth, tomato pinworm, oriental fruit moth, pink bollworm, peach tree borer.	Caterpillar Codling moth Tomato pinworm Oriental fruit moth Pink bollworm Peach tree borer
MOSQUITOS	
Insecticidal Oil – Clove Oil, Garlic, Cottonseed Oil Enzyme Soap – Charlie’s (Agrizyme) Insect Growth Regulators – Zoecon (Enstar) Insecticidal Soap – Harmony (M-Pede), Agricola El Sol (Act – 92), Woodstream (Concern), St. Gabriel (Sharpshooter)	Mosquitos Aphids
FRUIT FLIES	
Spinosad Bait – Dow, Harmony (Naturlyte), GF-120 Pyrethrin – Whitmire (PT 175 microencapsulated), PT 565, PT 505 XLO), Peaceful Valley (Py-Rin w/o PBO), Monterey (Bug Buster O, w/o PBO)	Fruit Flies
FLIES (NUISANCE)	
Botanical fly Repellants – Planet Natural, Natural Insect Control, Gardener’s Supply (Skeeter Shoo, citronella), Woodstream, Gardens Alive (Bite Blocker, geranium oil), Stateline (Horse Shoo, citronella fly repellent) Pyrethrin – Roxide, Harmony (Revenge), Whitmire (PT 175 microencapsulated), PT 565, PT 505 XLO), Waterbury (Purge III)	Flies (Nuisance)

Additional Bed Bug Information

- Use Carbon Dioxide Traps – The following link at <http://abc7ny.com/archive/7212643/> provides a good description on how to build a successful bed bug trap.
- Tea tree oil, cedar oil, and orange oil are harmful to bed bugs on contact. Mix with water in a spray bottle and lightly mist the areas you are treating daily.
- Diatomaceous Earth -- Diatomaceous Earth (often referred to as "DE") is an off white talc-like powder that is the fossilized remains of marine phytoplankton. When sprinkled on a bug that has an exoskeleton (such as bed bugs, ants or fleas) it compromises their waxy coating which ultimately leads to their demise.
- Stop Bugging Me! Bed Bug Spray – This chemical spray is biodegradable and has plant-based ingredients.
- Cold-pressed neem oil -- Neem oil is a vegetable oil pressed from the fruits and seeds of the neem (*Azadirachta indica*), an evergreen tree which is endemic to the Indian subcontinent and has been introduced to many other areas in the tropics.

Bed Bugs

- Encourage tenants to change and wash bedding regularly.
- Discourage tenants from bringing second-hand furniture into their home unless they have thoroughly inspected and cleaned the items first.
- Encourage reduction of clutter
- Personnel should inspect mattress and headboard with flashlight.
- If concerned about exposure, after travel, seal all items in plastic bags until time for washing or treatment.
- Encouraging the unpacking of clothes directly into washer / dryer.

- Encourage the close inspection of luggage with flashlight and magnifying glass for bed bugs upon returning home.
- Clean and vacuum bed bug prone areas daily.
- Immediately seal and dispose of vacuum bag.
- Install encasements on mattress and box spring.
- Install bed bug interceptors under bed and furniture legs.
- Make the bed is an island: Keep bed away from wall and do not let bedding touch the floor.
- Remove clutter where bed bugs can hide.
- Isolate infested items in sealed plastic bags or containers.
- Treat items in hot dryer for 30 min.
- Clean and scrub seams / folds with detergent.
- Seal cracks where bed bugs can hide.

Moss control (trees and shrubs)

<p>Copper Sulfate Copper sulfate is often used as a fungicide or algacide, but it can also work to control mosses if used during the dormant period when the plant is not growing. It is available as a dust, wettable powder and fluid concentration. It is used primarily by farmers and may not be available at all stores. Tri- Basic copper sulfate and Bordeaux (copper sulfate formulated with lime) are formulations that have been used to control mosses on trees and shrubs. There are a lot of products available and you should consult labels before attempting to use any of them. A sprayer is generally used to apply copper sulfate on to trees.</p>	<p>Effectiveness Copper sulfate is effective at killing mosses when used properly. It works by disrupting photosynthesis. It will also damage plants, especially if they are in active growth. You will have to continue applying it every few years if you don't improve cultural conditions like sunlight and air circulation because the mosses will return. The dead mosses will also persist after spraying for a while before they weather and fall off the branches.</p>	<p>Side Effects Copper sulfate is a moderately toxic product and care should be taken when handling this pesticide. Poisoning and even death has been attributed to ingestion of copper sulfate. Protective equipment including long sleeve clothes, mask and safety glasses should be used. Chronic effects that have been documented include liver disease and anemia due to long term exposure to applicators over several years. This product can also be harmful to wildlife, especially aquatic organisms like fish. Copper sulfate should not be used near creeks or bodies of water.</p>
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Moss control (roofs, decks, and sidewalks)

<p>Zinc Strips Zinc strips are usually considered the long-term solution to controlling mosses <i>Dicranoweisia</i>. Zinc strips and galvanized flashing are apparently relatively safe and inexpensive for roofs. They effectively kill or retard the growth of mosses and fungi and appear to have effect up to 15 feet below the zinc flashing along the length of the flashing.</p>	<p>Effectiveness Zinc strips can be effective for many years. The effect of galvanized flashing can persist for decades. Success rates vary with the degree of moss development and weather. Zinc strips or flashing are most effective before mosses are well developed. Physical removal of existing moss followed by installation of zinc strips or flashing is an</p>	<p>Negative Side Effects: Direct runoff from the zinc strips or flashing to surrounding vegetation, fish ponds, or water supplies should be avoided, because some contamination by zinc is likely to occur. Zinc strips should not be used with strong acids or bases.</p>	<p>Possible Alternatives: Consider periodic physical control.</p>
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	effective long-term strategy for suppressing moss growth.		
<p>Potassium salts of fatty acids</p> <p>This product is non-staining on most surfaces and is for use on decks, fences, roofs and lawns. This product will supposedly not harm bordering plants. This product is made from biodegradable fatty acids. It is water based and non-corrosive to metals, and contains no zinc or iron. This product is available in liquid form in several brands. One brand is Safer.</p>	<p>Effectiveness: Many people have reported varying degrees of success with the use of potassium salt products. Experimental trials by the University of Oregon using on <i>Racomitrium</i> on asphalt resulted in very little kill, even at concentrations well above the recommended dose. Other trails resulted with reasonable success.</p>	<p>Negative Side Effects: Because this product occurs naturally in the environment and is biodegradable, the environmental side effects are presumed to be small. This product is toxic to aquatic invertebrates. These products should not be applied directly to water and should not come into contact with water sources.</p>	<p>Possible Alternatives: Use bleach Chlorine bleach (sodium hypochlorite) can be used on a number of surfaces contaminated with mosses including decks, patios, walks and roofs. When used to proper concentrations bleach is non corrosive to metals and will not stain treated areas. One should, however, avoid contact with clothing. Brand names of bleach especially for mosses can be found in the moss control area in garden centers - one brand is 30seconds brand. To apply bleach mix one part water with one part concentrate. Use a backpack sprayer and spray liquid to dry area infected with mosses. Usually a mixture of 4 parts water to 1 part bleach is effective. Ensure that the mixture doesn't flow into flowerbeds or storm drains. Bleach is toxic to fish and invertebrates and can be deadly to plants if not managed properly.</p>

Aphid Control

<p>Aphids. Low to moderate numbers of leaf-feeding aphids aren't usually damaging in gardens or on trees. However, large populations can turn leaves yellow and stunt shoots. Aphids can also produce large quantities of a sticky exudate known as honeydew, which often turns black with the growth of a sooty mold fungus. Some aphid species inject a toxin into plants, which causes leaves to curl and</p>	<p>Chemical Control. If insecticides are needed, insecticidal soaps and oils are the best choices for most situations. Oils may include petroleum-based horticultural oils or plant-derived oils such as neem or canola oil. These products kill primarily by smothering the aphid, so thorough coverage of infested foliage is required. Apply these materials with a high volume of water, usually a 1 to 2% oil solution</p>	<p>Biological Control. Natural enemies can be very important for controlling aphids, especially in gardens not sprayed with broad-spectrum pesticides (e.g., organophosphates, carbamates, and pyrethroids) that kill natural enemy species as well as pests. Usually natural enemy populations don't appear in significant numbers until aphids begin to be numerous. Among the most important natural</p>
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further distorts growth.	in water, and target the underside of leaves as well as the top. Soaps, neem oil, and horticultural oil kill only aphids present on the day they are sprayed, so applications may need to be repeated. Although these materials can kill some natural enemies that are present on the plant and hit by the spray, they leave no toxic residue so they don't kill natural enemies that migrate in after the spray.	enemies are various species of parasitic wasps that lay their eggs inside aphids. The skin of the parasitized aphid turns crusty and golden brown, a form called a mummy. The generation time of most parasites is quite short when the weather is warm, so once you begin to see mummies on your plants, the aphid population is likely to be reduced substantially within a week or two. Many predators also feed on aphids. The most well-known are lady beetle adults and larvae, <u>lacewing</u> larvae, soldier beetles, and <u>syrphid fly</u> larvae. Naturally occurring predators work best, especially in garden and landscape situations.
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Another PPRC recommendation included:

Baits. Bait products are the primary pesticides used to treat cockroach infestations. They can be packaged as pastes, gels, granules, or dusts. Most insecticides used in baits are slow acting. Consequently an effective bait program does not give immediate results, but may take 7 days or longer. Baits can be quite effective for long-term control of cockroaches unless the cockroaches have other food sources available to them.

Bait Stations. The most popular form for use is prefilled bait stations, which are small plastic units that contain an attractive food base along with an insecticide. Refillable bait stations are available in stores and are refilled with bait granules or gel. The advantage of bait stations is that insecticides can be confined to a small area rather than being dispersed, and they are relatively child resistant. Baits in plastic containers also remain effective for many months.