

## **Insects in Recreation Areas**

*Dini M. Miller, Extension Entomologist, Virginia Tech*

*Sally L. Paulson, Medical Entomologist, Virginia Tech*

### **Red Imported Fire Ants**

**Quarantine Information:** Red Imported Fire Ant (RIFA) colonies can be found throughout the south eastern United States from Texas through Florida. RIFA has more recently expanded its range to the west, so that scattered colonies can now be found in New Mexico, Arizona, and California. More long-term established populations have also spread to the north, into the states of Oklahoma, North Carolina and Virginia. In 2009, several counties in Virginia were placed under the Federal Fire Ant Quarantine. These counties included James City, and York, and the independent cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach and Williamsburg. In 2019, survey data indicated that the RIFA populations had spread further in the state of Virginia so the quarantine locations were expanded to include the Counties of Brunswick, Greenville, Isle of Wight, Mecklenburg, Southampton, and the cities of Emporia and Franklin. What this quarantine means is that the Virginia Department of Agriculture and Consumer Services (VDACS) will no longer be responsible for treating fire ant mounds found in these cities and counties. Fire ant control will now be the responsibility of those citizens living in the quarantine locations. A current map of all RIFA quarantine locations in Virginia may be viewed at <https://www.vdacs.virginia.gov/pdf/fire-ant-quar-map.pdf>. However, it is important to note that not all RIFA populations occur in the quarantine area. RIFA colonies have also been documented in the city of Richmond and as far west as Montgomery County.

Note that RIFA infestations occurring outside of the quarantined areas in Virginia should still be reported to the VDACS Office of Plant & Pest Services at (804) 786-3515, or visit the VDACS website at <http://www.vdacs.state.va.us/>. Individuals and commercial pest control operators residing outside of the quarantined area should not attempt to treat fire ant infestations.

**Warnings:** RIFA are a common nuisance around dumpsters, trash cans, kitchen gardens, and areas where pets are fed and watered. Fire ants can also be a threat to small, young or confined pets. Puppies and kittens playing outdoors should be supervised in locations where fire ants are present. Likewise, dogs tied in the yard must have enough lead to allow them to move 10 or more yards in any direction to escape a fire ant attack. Dogs confined in runs should never be tied up.

### **Habitat**

Fire ants prefer to construct mounds in areas that are open and exposed to the sun. They are often found in cultivated fields or pastures. They are rarely found in wooded locations with heavy tree canopy. In urban areas, they will nest in cemeteries, parks, playing fields, and yards. Disturbing the mound may cause workers to remove the queen(s) and even the entire colony to another location. Colonies have also been found inside cars, tractors, and recreational vehicles. RIFA are attracted to electrical currents and will nest in and around heat pumps, junction boxes, traffic lights, and similar devices. Nesting RIFA have been known to cause electrical fires because they often chew on electrical wiring.

RIFA mounds in the yard are unsightly and will spread within a few months if there is no effort to eliminate them. However, the mounds must be treated properly or else the mound disturbance may cause the colony to split, resulting in two or three mounds. If you believe you have discovered a RIFA nest and live in the quarantine area, we recommend that you contact a pest control company immediately. Failure to eradicate an entire nest will result in the local establishment and spread of RIFA in a very short period of time.

### **Chemical Control**

The following section describing RIFA control techniques is to be used for fire ant control in the quarantine areas of Virginia. Individual mound treatments and baiting can both be employed to mitigate infestations in small areas (e.g., the area surrounding a single building or an urban playground). Whatever product you might choose to apply, please read and follow the label directions exactly. Improper pesticide applications have been responsible for a significant percentage of fire ant spread within the U.S.

### **Mound Treatments**

When treating individual fire ant mounds, it is extremely important that the mound remain undisturbed prior to treatment. Drenches, dusts or granules must come in direct contact with the ants to be effective. Disturbing the mound may cause the workers to move the queen(s) or even the entire colony to another location.

Individual mound treatments may take the form of a drench, where the mound is flooded with a large volume of liquid insecticide labeled for this purpose. This is the fastest acting method of fire ant management. Unfortunately, the queen may be located too deep in the soil to be killed by the insecticide, in which case control will only be temporary. Injection devices to aid in the deep penetration of liquid insecticide are readily available for professional pest control personnel, but these devices are not designed for homeowner use.

## 6-2 Nuisance Insects of the House and Yard: *Insects in Recreation Areas*

### Baiting

Fire ant baiting has been used to treat individual mounds, and even entire fields where the bait is broadcast across the landscape to address multiple fire ant colonies within the same area. For baiting individual mounds it is important to lightly apply the bait around the mound to avoid disturbing the colony. In this way foragers leaving the mound will immediately encounter the bait and transport it back into the mound for consumption by the queen(s) and other members of the colony. Broadcast baits are usually granular formulations that are put into a spreader and applied over a large infested area. Thus, foraging ants from multiple colonies can pick up the bait granules and bring them back into the nest.

For more detailed information see the Red Imported Fire Ant (RIFA) publication: <http://pubs.ext.vt.edu/444/444-284/444-284.pdf>

**Table 6.1 - Recommended Insecticide and Control Use**

Pests	Pesticide	Application and Remarks
<b>Outdoor Ants</b>	For colony control, ant species must be identified before a proper bait can be selected. Ants are finicky eaters and may prefer either a sweet or protein-based bait. Once the ant is identified, put out an appropriately labeled bait where foraging ants are seen.	Recent studies have indicated that non-repellent perimeter spray applications, combined with granular bait application around structure but several feet away from the spray application, have been very successful for preventing pest ant entry into structures.
<b>Chiggers</b>	bifenthrin Lambda-cyhalothrin	Bifen I/T (7.9 %) Demand EZ 2.43%
	carbaryl	Sevin (22.5% Concentrate) Sevin (5% Dust)
	cypermethrin <sup>1</sup>	Demon EC (0.1%)
<b>Blood-feeding Flies</b> (Deer Flies, Black Flies)	resmethrin	Ortho Outdoor Insect Fogger (0.25%)
	tralomethrin 0.03%	Real Kill Home Insect Control (0.03%)
	bifenthrin 0.05%	Ortho Home Defense MAX (0.05%, 0.0125% Zeta-cypermethrin)
<b>Mosquito Adults</b>	<b>Repellents for personal protection</b>	
	d phenothrin	Summit Outdoor Mosquito Repellent Coils (0.2%)
	<b>Yard Sprays</b>	
	cyfluthrin	Bayer Advanced PowerForce Multi-Insect Killer (0.75%)
	Lambda-cyhalothrin	Demand EZ (2.43%)
	bifenthrin	Bifen I/T (7.9 %)

<sup>1</sup>Professional Use: These products are not restricted use but are designated as professional use because they are more potent and require specialized training, application equipment, or personal protective equipment that make them unsuitable for homeowner applications.

**Table 6.1 - Recommended Insecticide and Control Use (cont.)**

Pests	Pesticide	Application and Remarks
<b>Mosquito Adults</b> (cont.)	<b>Aerosol Sprays</b> permethrin	Hot Shot Flying Insect Killer (0.15%, d-trans allethrin 0.25%)
	<b>Mosquito Larvae</b>	
	temephos	Abate EC (43%) Abate 1 SG Granules
	methoprene	Aquaprene Tossits (1.8%) Altosid XR Briquets (2.1%) Altosid SR 20 Liquid Concentrate (20%) Altosid XR-G Granules (1.6%)
	Biologicals: <i>Bacillus thuringiensis</i> (Bt), methoprene Gambusia fish	<b>Apply larvicides based on inspection of breeding sites and not on a routine basis.</b> Open bodies of water, such as large ponds and streams, are not mosquito-breeding areas and should not be treated. Polluted water usually requires a higher rate of pesticide than required for clean water. Temephos is harmful to fish; keep out of lakes, ponds, and streams. Use methoprene in small bodies of water not known to be fish habitats. Small backyard ponds should be checked for mosquito larvae. <b>Remove outdoor breeding sites:</b> water-holding containers such as old tires, cans, and buckets. Change water in bird baths and pet dishes frequently. Make sure gutters are not clogged.
<b>Red Imported Fire Ants</b>	If you live outside of these locations (Brunswick, Greenville, Isle of Wight, James City, Mecklenburg, Southampton and York counties or the cities of Chesapeake Emporia, Franklin, Hampton, Newport News, Norfolk, Poquoson Portsmouth, Suffolk, Virginia Beach and Williamsburg) do not attempt to treat fire ants yourself but call the Department of Agriculture Office of Plant and Pest Services immediately (804/786-3515 in Richmond or 757/562-6637 in Franklin). If you live within those counties and cities listed above, you are in the fire ant quarantine area and may treat the fire ants yourself.	Baits must be kept cool and dry. Do not store baits next to repellent or smelly insecticides or cleaning agents. Apply baits carefully according to the label directions. Be sure to apply the bait around the mound rather than on top of it. Fire ants forage out from the sides of their mound and will collect the bait near their foraging tunnels. Placing bait on top of the mound will incite the ants' defense response. The ants will attack aggressively but will not pick up the bait. Do not attempt using home remedies (applications of boiling water, diesel fuel, grits, gasoline, etc.) to kill a fire ant mound. Most home remedies will only disrupt the fire ant colony, causing it to split. This results in two additional mounds springing up right next to the treated mound a month or two after treatment. If home remedies were effective, we would not have fire ants infesting the entire southeastern United States. The Ortho product is applied as drench treatment to individual mounds. Read the product label for directions. For at least two decades USDA researchers have made heroic efforts to identify biological control agents that might slow or eliminate the spread of Red Imported Fire Ants in the US. There are currently three biological control agents under field investigation: a parasitic fungus, <i>Kneallhazia solenopsae</i> ; a virus, <i>Solenopsis invicta virus-3</i> (SINV-3); and two species of fire ant decapitating phorid flies. While the phorid flies have been used as biological control agents for a number of years, the fungus and RIFA specific virus are relatively new. These agents are intended to be used in combination but their efficacy in the field is still under investigation.
	fipronil	MaxForce FC Fire Ant Bait (0.00045%) <sup>1</sup>
	indoxacarb	Advion Fire Ant Bait <sup>1</sup> (0.045%)
	hydramethylnon	Amdro Fire Ant Bait Granules (0.73%) Amdro Kills Fire Ants Yard Treatment Bait (0.036%, methoprene 0.0172%) Extinguish Plus Fire Ant Bait 0.36% methoprene 0.25%
	pyriproxyfen	Esteem Fire Ant Bait (0.5%)
	acephate	Ortho Orthene Fire Ant Killer (50%)
	Zeta-cypermethrin	Amdro® QuickKill Fire Ant Mound Drench (0.35%)
<b>Spiders</b>	<b>Indoors:</b> Insecticidal dusts <b>Outdoors:</b> Pesticide sprays have been proven to have very limited efficacy. Use a vacuum or broom to eliminate webs and remove spiders.	<b>Indoors:</b> Spiders, egg sacs, and webs can be removed with a vacuum. Dispose of vacuum bag immediately. <b>Outdoors:</b> Turn off outdoor lights that attract spider food (insects). Practically all spiders in Virginia are harmless. The only exceptions are the black widow and brown recluse spiders (a non-native species that can be imported into the state of Virginia), which are poisonous. However, these spiders hide and are not often affected by sprays.

<sup>1</sup>Professional Use: These products are not restricted use but are designated as professional use because they are more potent and require specialized training, application equipment, or personal protective equipment that make them unsuitable for homeowner applications.

## 6-4 Nuisance Insects of the House and Yard: Insects in Recreation Areas

**Table 6.1 - Recommended Insecticide and Control Use (cont.)**

Pests	Pesticide	Application and Remarks
<b>Ticks</b> (outdoor areas)	esfenvalerate Conquer (3.48%) Eliminator Ant, Flea & Tick Killer II Concentrate (0.425%)	<p>Sprays can be applied to grassy and bushy areas near the house or kennels, the edges of lawns and gardens, and under porches.</p> <p><b>Outdoors (area control of ticks):</b> Do not spray plants with cypermethrin. Mow areas around the house, to reduce tick habitat. Ticks require high humidity to survive and thus are most often found in grassy, brushy, wooded, and shaded areas. Reducing the humidity in these areas by keeping grass well clipped, removing brush, and pruning trees to allow more sunlight to penetrate to the soil surface will discourage ticks from becoming established in these areas. Insecticide sprays can be applied but modifying the habitat is a more long-term approach to tick management.</p>
	permethrin Martin's Permethrin SFR (36.8%) Bonide® Ant, Flea & Tick Killer Granules (0.25%)	
	bifenthrin Bifen I/T (7.9 %) Eliminator Ant, Flea & Tick Killer Plus Granules (0.1%)	
	cypermethrin <sup>1</sup> Demon® Max (25.3%)	
	carbaryl Sevin® Concentrate Bug Killer (22.5%)	
<b>Yellow jackets</b> (ground nests)	prallethrin PT Wasp-Freeze II (0.1%)	<p><b>Above-ground nests:</b> Aerosols can be used for a quick knockdown of the nest. You can spray as far away as 15-20 feet. These quick-kill wasp aerosols have oily bases, so care should be taken to not stain surfaces.</p> <p><b>Outdoors/Indoors:</b> Locate nest entrance during daylight hours. Apply pesticide at night when most insects will be in the nest. Wear protective clothing. Remove above-ground nests when activity ceases.</p> <p><b>Below-ground nests:</b> Treat the nest first with aerosols. When aerosol is dry, apply an insecticidal dust in the opening. The dust will prevent future yellow-jacket emergence. Check the nest the following day to see if the insects are dead (can be verified by lack of activity). Repeat if necessary.</p> <p><b>Outdoors/Indoors:</b> Apply insecticide to the nest entrance at night. Do not cover the nest with soil. Wear protective clothing (and a bee veil) at all times during treatment.</p> <p><b>Baits and Lures:</b> Baited traps can be used when pesticide application is undesirable. Traps should be checked and cleaned daily. Lure traps can be used to reduce the number of localized foraging workers. The most common lure in traps, heptyl butyrate, attracts primarily the western yellow jacket and not other species. Meat such as chicken can be added as an attractant and will improve catches of the German yellow jacket and <i>Vespula vulgaris</i>. The meat must be replaced frequently because yellow jackets aren't attracted to rotting meat. Lures need to be replaced periodically; follow trap directions regarding replacement. To reduce the number of yellow jackets foraging in specific areas such as patios, picnic tables, concession stands, and dumpsters, place the traps around the periphery. In large areas such as parks, place traps about 200 feet from the area to be protected and about every 150 feet along the circumference. In backyards, place them along the edge of the property line as far away from patios or other protected areas as possible.</p>
	tetramethrin Wasp-X Wasp & Hornet Spray (0.5%. Etofenprox 0.5%, piperonyl butoxide 1%) Bonide Wasp & Hornet Killer (0.1%, permethrin 0.25%, piperonyl butoxide 0.5%)	
	geraniol EcoEXEMPT Jet (2.0%, 2-phenethyl propionate 3.0%)	
	cyfluthrin Tempo® Dust (1.0%)	
	pyrethrins (wasps only) PT 565 Plus XLO® (0.5%, piperonyl butoxide 1.0%, n-Octyl bicycloheptene dicarboximide 1.0%) CB 80 Extra (0.5%, piperonyl butoxide 4.0%)	

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## Wood-Destroying Insects

*Dini M. Miller, Extension Entomologist, Virginia Tech*

Control of wood-infesting insects is best accomplished by a professional pest control operator. The information below is intended to provide a homeowner with some understanding of the control methods and materials, but not all the steps are included. Read product labels. Most termite control chemicals are only available to professionals. For information on identifying termite infestations see the publication: Signs of Subterranean Termite Infestation (<http://pubs.ext.vt.edu/444/444-501/444-501.pdf>). For information on choosing a termite control option see the publication: Subterranean Termite Treatment Options (<http://pubs.ext.vt.edu/444/444-500/444-500.pdf>). Information on selecting a pest control company can be found in Section 1 of this guide.

**Table 6.2 - Recommended Insecticide Use**

Pests	Pesticide	Application	Nonchemical Control and Remarks
Termites (subterranean)	<b>Soil Treatment:</b>		Subterranean termites feed on materials containing cellulose and have strict moisture requirements. Prevent infestations by eliminating food and moisture resources surrounding the structure. <ul style="list-style-type: none"> <li>• Repair structural and plumbing leaks.</li> <li>• Pull all mulch and landscaping back at least 6 inches from the foundation.</li> <li>• Remove piles of trash and debris from around the home.</li> <li>• Remove dead tree stumps from the yard.</li> <li>• Keep firewood stacked away from the structure.</li> <li>• Make sure downspouts are long enough to direct water away from the foundation.</li> <li>• Keep gutters clean.</li> <li>• Avoid direct wood-to-ground contact when building porches or decks.</li> <li>• Siding, brick veneer, or foam insulation should not extend below the soil grade.</li> </ul> Termite control is a job for professional pest control operators. Homeowners do not have the training, experience, or equipment.
	fipronil	Termidor SC (9.1%) <sup>1</sup> Termidor HE (8.73%) <sup>1</sup>	
	imidacloprid	Premise 75 (75%) <sup>1</sup>	
	indoxacarb	Arilon (20%) <sup>1</sup>	
	cypermethrin	Demon Max (25.3%) <sup>1</sup>	
Permethrin	Prelude (25.6%) <sup>1</sup>		

<sup>1</sup> Professional Use: These products are not restricted use but are designated as professional use because they are more potent and require specialized training, application equipment, or personal protective equipment to be effective. Thus they are not appropriate for homeowner use.

<sup>2</sup> Used with Sentricon Termite Baiting System

<sup>3</sup> Used with Hex-Pro Termite Baiting System

## 6-6 Nuisance Insects of the House and Yard: Wood-Destroying Insects

**Table 6.2 - Recommended Insecticide Use (cont.)**

Pests	Pesticide	Application	Nonchemical Control and Remarks	
<b>Termites</b> (subterranean) (cont.)	<b>Baits:</b>	Subterranean termite baits are contained inside of plastic stations that are inserted into the soil around the perimeter of a structure. The bait is formulated in a cellulose matrix so that it is attractive to the foraging termites and they carry it back to the nest and feed the rest of the colony. Termite baits may take several months to work because the termites have to encounter them while foraging through the soil. There is no way of directing their foraging behavior. Termite baits tend to work best in shallow, sandy soil where the termites foraging tunnels do not run below the bait stations (~10").  Termite bait formulations contain active ingredients known as chitin synthesis inhibitors (CSI). These insecticides disrupt the insect's ability to molt properly so that they die in the process of shedding their skins during their growth period. The ultimate result is colony eradication.	Bait stations are typically placed around the perimeter of a structure at 10-foot intervals. The intervals may be less in locations where termite activity is known or suspected. Termite stations should be checked on a regular basis (quarterly during the warmer seasons) to determine if a station has been "hit" and additional stations or more bait is needed.	
	diflubenzuron			Advance (0.25%)
	novaluron			Trelona ABTS (0.50%)
	hexaflumuron			Shatter (0.5%)
	noviflumuron	Recruit IV (0.5%) Recruit HD (0.5%) Recruit IV AG (0.5%)		
<b>Powderpost beetles</b> (and old house borers)	disodium octaborate tetrahydrate	BoraCare (40%) Tim-bor (98%) Jecta (40%)	Controlling powderpost beetle and old house borer infestations is a job for a professional pest control operator. Painting wood surfaces will prevent beetles from reinfesting wood but will not prevent existing larvae from continuing to feed inside the wood and later emerging as adults.	

<sup>1</sup> Professional Use: These products are not restricted use but are designated as professional use because they are more potent and require specialized training, application equipment, or personal protective equipment to be effective. Thus they are not appropriate for homeowner use.

<sup>2</sup> Used with Sentricon Termite Baiting System

<sup>3</sup> Used with Hex-Pro Termite Baiting System

**Table 6.2 - Recommended Insecticide Use (cont.)**

Pests	Pesticide	Application	Nonchemical Control and Remarks	
<b>Carpenter ants</b>	<b>Baits, aerosols, insecticide sprays:</b>		<p>The most specific and effective carpenter ant baits are available only from a professional pest control operator. However, boric acid bait formulations labelled for carpenter ant control (Terro®; 5.4%) can significantly reduce the foraging population.</p> <p>The perimeter spray should be applied by a pest-management professional with the proper equipment. The application should be made in the early spring when ant populations are low. One application should last all season. Note that perimeter pesticide application laws have recently changed to protect ground water and pollinating insects. Pesticide can no longer be applied along concrete surfaces where there is risk of storm run-off. Also pesticides cannot be applied when pollinators are present. Read all pesticide labels carefully.</p>	
	abamectin	B- Advance Granular (0.011%)		
	thiamethoxam	Optigard ant gel bait (0.01%)		
	fipronil	Combat Max gel bait (0.001%)		
	<b>Perimeter treatments:</b>			
	indoxacarb	Arilon (20%) <sup>1</sup>		
	fipronil	Termidor 80 WG (80%) <sup>1</sup>		
	imidacloprid	Premise 75 (75%) <sup>1</sup>		
	lambda-cyhalothrin	Demand CS (9.7%) <sup>1</sup>		
	<b>Carpenter bees</b>	<b>Sprays and dusts:</b>		<p>Apply insecticide to the entry holes or galleries as soon as bee activity is observed (spring and early summer).</p> <p>Leave treated galleries open for 24 to 48 hours to ensure adult bees contact treated galleries. Afterward (48 hours), gallery entrance holes can be sealed with putty or caulk.</p> <p>The Premise label allows for preventative application to building surfaces (soffits, eaves, trim, etc.) as part of an exterior spot treatment. Carpenter bees are territorial, often returning to wood that they infested in previous years. Therefore, applications should be made to these areas in early summer, or as soon as bee activity is observed. Contact your professional pest control company if you have a recurring infestation.</p>
Note: Male bees cannot sting. Female bees will only sting if intentionally provoked.		cyfluthrin	Tempo 1% Dust (1%) <sup>1</sup>	
		lambda-cyhalothrin	LambdaStar UltraCap (9.7%) <sup>1</sup>	
		imidacloprid	Premise 2 (21.4%) <sup>1</sup>	
<b>Site Treatment:</b>				
		deltamethrin	Delta Dust (0.05%) and D-Fense Dust (0.05%)	
		lambda-cyhalothrin	Cyzmic CS (9.3%) and PT221L (0.05%)	
	disodium octoborate tetrahydrate	Tim-Bor Dust (98%)		

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6-8 *Nuisance Insects of the House and Yard: Wood-Destroying Insects*

## Household Insects

*Dini M. Miller, Extension Entomologist, Virginia Tech*

Improving the sanitation and maintenance in and around the home is the best way to prevent household insect and spider pests. Outdoor clutter and debris that harbor pests should be removed. Pest entry should be reduced by sealing holes and cracks around plumbing lines and windows. Indoors, proper sanitation, food storage, reducing clutter, and waste removal will deprive pests of food and water resources. All of these measures will make the home inhospitable to pests thus limiting their population growth.

### Bat Bugs

**Prevention:** Bat bugs inside a structure are typically the result of bats or birds roosting in the attic. If the bat bug population becomes very large, bugs will start to become a nuisance inside the home. Frequently, however, bat bugs become a problem after a bird or bat population has been removed from a structure. Bat bugs remaining in the empty roost no longer have a host to feed on so they move into the living space to feed on people. The best way to prevent a bat bug infestation is by eliminating access points around the structure to keep bats or birds from roosting inside. If a population of bats or birds has to be removed from a home, an effort should be made to clean out the nests and droppings (guano) left behind. Cleaning should only be performed while wearing a respirator because of the toxic fungal spores and bacteria associated with bat guano and bird droppings.

**Control:** Inspect locations where bat bugs have been seen, starting with electrical connections coming through the ceilings, then around the edges of the carpet, between the floorboards, and in drop ceilings, if applicable. Caulk and seal all openings that would allow bat bugs access to human living space. Vacuum the floors and closets thoroughly. Treat all areas where bat bugs are found with a labeled insecticide. A combination of insecticide products should be used simultaneously. Diatomaceous earth dust or another desiccant dust combined with a crack and crevice treatment is the best approach. All of these treatments should be applied by a professional.

### Bed Bugs

**Prevention:** Bed bugs are becoming an increasingly serious problem in the United States. Home infestations typically result from traveling and staying in hotels (even five-star hotels), motels, and camps or lodges and bringing the bed bugs home in luggage or clothes. To prevent infestations that might result from travel, or even staying at a friend's home, always inspect the mattress in your sleeping room for signs of bed bug infestation (live bugs or black speck-like feces in the mattress seams and tufts) prior to unpacking or sleeping in the bed. In the home, the removal of clutter will inhibit bed bug population growth and help to prevent bed bugs from becoming well established. Although bed bug populations cannot be eliminated by removing clutter alone, the removal of hiding places will make the environment less hospitable for bed bugs and much easier to treat with insecticides. It is essential that furniture, clothing, boxes, or other personal effects NOT be moved from an infested location to an uninfested location. Moving these items will simply spread the infestation because it is very difficult to determine if an item is free of all immature bed bugs and bed bug eggs. It is also important that you not bring other people's furniture, used furniture, or other peoples' belongings into your home unless you know they are bed bug free.

**Control using heat:** Because bed bugs and their eggs are unable to withstand temperatures above 122°F, properly executed heat treatments are very effective in killing bed bugs and controlling infestations. Heat treatments can be applied as whole-room, whole-home, and chamber treatments. Unfortunately, many of the smaller whole home heat treatment systems have proven to be inadequate when it comes to producing enough heat to kill all bed bugs in the home. In addition, the most effective whole homes heat systems are prohibitively expensive for smaller pest management companies to purchase. Therefore, it is very important for resident to require a detailed temperature report (taken from heat sensors placed in hard to heat locations and showing that those areas reached 122 degrees F), as documentation of their heat treatment efficacy.

**Control in beds and bedding:** All bedding should be dried in a clothes dryer for at least 30 minutes at a high temperature (130°F). Mattresses can be steam-cleaned or washed thoroughly with soap and water and left outside to dry. If washing or steam-cleaning is not possible, insecticide products that are labeled for mattress treatment can be applied to the mattress to kill the bed bugs. After cleaning or treating a mattress with an insecticide, it should be encased in a bed bug-proof mattress encasement to prevent any surviving bed bugs from getting off the mattress and biting. Encasing the mattress will also prevent it from becoming reinfested with any bed bugs still in the room. Box springs are a popular harborage for bed bugs. To treat the box springs, remove and discard the cloth backing to provide access to the inner frame. Then, you can treat the inside of the wood frame and along the slats and bedsprings with a labeled insecticide. Cover box springs with a bed bug-proof mattress encasement after treatment. Inspect the headboard and bed frame for bed bugs. Remove (either by vacuuming or with an adhesive lint roller) or kill any live bugs that are found, then treat the headboard and bed frame with an desiccant dust insecticide, following all label instructions.

## 6-10 Nuisance Insects of the House and Yard: **Household Insects**

**Control in infested rooms:** Inspect the room thoroughly by looking around the edges of the carpet, between the floorboards, behind photos or posters on the wall, along the door frames around closets, inside shoes that are worn infrequently, and in any other crack or crevice where bed bugs could be hiding. Remove or kill any live bed bugs that are found (either by vacuuming or with an adhesive lint roller). In areas where bed bug evidence (cast skins, feces, or live bugs) is found, remove all clothing and linens, placing them in a sealed plastic bag until they can be put into a hot dryer. Carefully inspect all personal items from areas where you found bed bug evidence. Portable heat chambers are now available for treating personal items and pieces of furniture. Dispose of unnecessary or unsalvageable items by taking them outside and prepare the rest for cleaning or treatment with an appropriately labeled insecticide. Treat furniture and other areas with a labeled insecticide. It is recommended that a combination of insecticide products be used simultaneously. A crack and crevice treatment and a long term residual desiccant dust insecticide in wall voids is the best approach. The infested location should be treated at least three times at two-week intervals. All of these treatments should be applied by a professional.

Keep in mind that bed bug treatment is very difficult. Most pest management professionals have only recently learned how to treat for bed bugs. Also, there are a limited number of products labeled for bed bug treatment and many only work by spraying the bed bug directly. There are even fewer low toxicity products that can be applied to mattresses or bedding. Bed bugs are hard to locate, hard to kill, and can live for several months without feeding so clutter removal, vigilance (monitoring), and patience are absolutely necessary when attempting to control this pest.

### **Red Imported Fire Ants (RIFA)**

Red imported fire ants (RIFA) rarely nest indoors, but if they do, you should call a professional pest control operator immediately. It has been documented that RIFA tend to enter structures during periods of heavy precipitation. RIFA are extremely aggressive and respond rapidly to any disturbance of the nest or a food resource. RIFA in structures can be very dangerous for small children or the elderly. A number of deaths have resulted from children or bedridden elderly adults being stung repeatedly by fire ants. Nursing homes and day care center need to be particularly vigilant about keeping fire ants controlled both indoors and out (See Insects in Recreational Areas).

Red imported fire ant (RIFA) colonies can be found throughout the southeastern United States from Texas through Florida, extending as far north as Oklahoma and Virginia. In 2009, cities (Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach and Williamsburg) and several counties (James City and York) in Virginia were placed under the Federal Fire Ant Quarantine. In 2019, this quarantine was expanded to include the counties of Brunswick, Greensville, Isle of Wight, Mecklenburg, Southhampton; and the cities of Emporia and Franklin. This quarantine means that the Virginia Department of Agriculture and Consumer Services (VDACS) will no longer be responsible for treating fire ant mounds in those areas. Fire ant control will now be the responsibility of those citizens living in the quarantine locations. A map (as of 2017 only) of all quarantined locations within the U.S. may be viewed at [https://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/fireants/downloads/fireant.pdf](https://www.aphis.usda.gov/plant_health/plant_pest_info/fireants/downloads/fireant.pdf). In Virginia, RIFA colonies are now established throughout Hampton Roads. Individual RIFA colonies have also been documented in the greater Richmond area and as far west as Montgomery County. Note that RIFA infestations occurring outside of the quarantined areas in Virginia should still be reported to the VDACS Office of Plant & Pest Services at (804) 786-3515 or visit the VDACS website at <https://www.vdacs.virginia.gov/plant-industry-services-fire-ant-suppressionand-eradication.shtml>.

For more detailed information see the Red Imported Fire Ant (RIFA) publication: <https://www.pubs.ext.vt.edu/444/444-284/444-284.html>.

## **Controlling Insects**

**Table 6.3 - Recommended Use**

<b>Pests</b>	<b>Prevention</b>	<b>Pesticide</b>	<b>Application</b>
<b>Ants</b>	Eliminate food materials that attract ants into home. Follow good sanitary practices. Perimeter sprays and granular bait formulations applied by a professional pest control operator will significantly reduce pest entry.	<b>Perimeter Sprays:</b> fipronil imidacloprid indoxacarb lambda-cyhalothrin	<b>For colony control:</b> Identify the type of ant and use a bait labeled for that species. Ants are finicky and may prefer a sweet or a protein-based bait. <b>Indoors:</b> Spray baseboards, cracks, door frames, and window sills.

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<sup>2</sup> Professional Use Outdoors

<sup>3</sup> Home Use

<b>Table 6.3 - Recommended Use (cont.)</b>			
<b>Pests</b>	<b>Prevention</b>	<b>Pesticide</b>	<b>Application</b>
<b>Asian lady beetles</b>	Seal all possible routes of entry, screen vents, and install door sweeps. Vacuum up live lady beetles that make their way indoors and dispose of the bag outdoors.	<b>Micro-cap formulation:</b> fipronil imidacloprid indoxacarb lambda-cyhalothrin	Termidor 80 WG Premise 75 (75%) <sup>1,2</sup> Arilon (0.1%) <sup>1</sup> Demand CS (0.03%) <sup>1</sup>
<b>Bat bugs</b>	The best way to prevent a bat bug infestation is by eliminating access points around the structure to keep bats or birds from roosting inside. Bat bugs can become a problem after a bird or bat population has been removed from a structure. Bat bugs remaining in the empty roost no longer have a host to feed on so they move into the living space to feed on people. See previous pages for more information.	<b>Professional-use Residual Products</b> <b>Baseboard sprays:</b> bifenthrin deltamethrin lambda-cyhalothrin <b>Crack and crevice:</b> bifenthrin deltamethrin lambda-cyhalothrin <b>Wall Voids:</b> diatomaceous earth silica gel	Talstar P (0.06%) <sup>1</sup> Suspend SC (0.06%) <sup>1</sup> Demand CS (0.03%) <sup>1</sup> Talstar P (0.06%) <sup>1</sup> Suspend SC (0.06%) <sup>1</sup> Demand CS (0.03%) <sup>1</sup> MotherEarth D (100%) CimeXa (100%)
<b>Bed bugs</b>	Although bed bugs cannot be eliminated by removing clutter, limiting the available hiding places will make the environment less hospitable for bed bugs and much easier to treat with insecticides. It is essential that furniture, clothing, boxes, or other personal effects NOT be moved from an infested location to an uninfested location. Moving these items will simply spread the infestation as it is very difficult to determine if an item is free of all immature bed bugs and bed bug eggs. See previous pages for more information.	<b>Professional-use Residual Products</b> <b>Crack and crevice:</b> bifenthrin deltamethrin beta-cyfluthrin lambda-cyhalothrin <i>Beauveria bassiana</i> <b>Combination products:</b> acetamiprid bifenthrin imidacloprid phenothrin lambda-cyhalothrin thiamethoxam beta-cyfluthrin imidacloprid metofluthrin, clothianidin, PBO <b>Pressurized insecticides:</b> dinotefuran chlorfenapyr phenothrin <b>Desiccant dusts:</b> diatomaceous earth dinotefuran diatomaceous earth silica gel	Tempo SC Ultra (0.05%) <sup>1</sup> Demand CS (0.03%) <sup>1</sup> Aprehend (2.0%) Transport GHP (0.11%) <sup>1</sup> Bedlam Plus (0.4%; 0.05%) <sup>1</sup> Tandem (0.13%) <sup>1</sup> Temprid SC (0.15%) Crossfire (1.42%) PT Alpine PT Phantom Bedlam (0.4%) <sup>1</sup> PT Alpine MotherEarth D (100%) CimeXa™ (100%)

<sup>1</sup> Professional Use: These products are not restricted use but are designated as professional use because they are more potent and require specialized training, application equipment, or personal protective equipment that make them unsuitable for homeowner applications.

<sup>2</sup> Professional Use Outdoors

<sup>3</sup> Home Use

<b>Table 6.3 - Recommended Use (cont.)</b>			
<b>Pests</b>	<b>Prevention</b>	<b>Pesticide</b>	<b>Application</b>
<b>Boxelder bugs</b>	Collect in vacuum cleaner or by broom and dust pan, and destroy. Plug openings in window sashes to prevent entry. Caulk cracks, etc. Spray only in areas inaccessible to children and pets.	<p><b>Biopesticides:</b> <i>Beauveria bassiana</i> Aprehend 2.0%</p> <p><b>Perimeter applications:</b> lambda-cyhalothrin Demand CS (0.03%)<sup>1</sup> fipronil Termidor 80 WG (0.06%)<sup>1 2</sup> deltamethrin Suspend SC (0.06%)<sup>1</sup> indoxacarb Arilon (0.1%)<sup>1</sup></p>	<p><b>Indoors:</b> Vacuum individual insects when they appear.</p> <p><b>Outdoors:</b> Apply preventative perimeter spray mid to late August.</p> <p>Note that perimeter pesticide application laws have recently changed to protect ground water and pollinating insects. Pesticide can no longer be applied along concrete surfaces where there is risk of storm run-off. Also pesticides cannot be applied when pollinators are present. Read all pesticide labels carefully.</p>
<b>Brown marmorated stink bugs (BMSB)</b>	Stink bugs begin aggregating on structures soon after the first cool day in September. Prior to September, plug openings in windows and vents that could provide the bugs with entry to the structure.	<p><b>Perimeter applications (1st week of September):</b> indoxacarb Arilon (0.1%)<sup>1</sup> bifenthrin Transport GHP acetamiprid (0.11%)<sup>1</sup></p>	<p><b>Indoors:</b> Vacuum up individual insects, but be aware stink bugs will make the vacuum smell strongly of their odor.</p> <p><b>Outdoor:</b> Well-timed perimeter applications may help to reduce bugs indoors, but cannot eliminate entry in most cases.</p> <p>Note that perimeter pesticide application laws have recently changed to protect ground water and pollinating insects. Pesticide can no longer be applied along concrete surfaces where there is risk of storm run-off. Also pesticides cannot be applied when pollinators are present. Read all pesticide labels carefully.</p>
<b>Carpet beetles</b>	Follow good housekeeping practices. Most infestations result from spilled dry pet food in cupboards and other storage locations. Clean hot air registers and cold air ducts. Use vacuum cleaner regularly. Frequently remove and destroy disposable vacuum cleaner bag. Never allow clothing, rugs, etc., to lie in a pile neglected over a period of time.	<p><b>Preventative:</b> Naphthalene residual Pyrethroid 0.015-0.03% microencapsulation or wettable powder</p>	<p><b>Indoors:</b> Treat rugs and carpets (including baseboards) evenly and lightly in areas of infestations. Store only previously cleaned clothing, etc., in air-tight closets or containers.</p>
<b>Clothes moths</b>	Follow good housekeeping practices. Clothing should be thoroughly brushed and hung outside in the sunlight. Dry-cleaning kills these pests. Prevent dust and lint from accumulating. Clean hot air registers and cold air ducts. Use vacuum cleaner regularly. Frequently remove and destroy disposable vacuum cleaner bag. Never allow clothing, rugs, etc., to lie in a pile neglected.	<p><b>Preventative:</b> Naphthalene residual</p>	<p><b>Indoors:</b> Store only previously cleaned clothing in air-tight closets and containers. Use moth crystals, balls, or flakes in garment bags and closets where clothes are kept. Replace periodically.</p>

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<sup>2</sup> Professional Use Outdoors

<sup>3</sup> Home Use

**Table 6.3 - Recommended Use (cont.)**

Pests	Prevention	Pesticide	Application
<b>Clover mites</b>	<b>Indoors:</b> Clover mites should be removed with a vacuum to reduce red smears and stains. <b>Outdoors:</b> A 5-ft band of bare soil around the foundation will discourage mite infestation. .	<b>Perimeter Spray:</b> indoxacarb lambda-cyhalothrin fipronil  imidacloprid b-cyfluthrin	<b>Indoors:</b> Direct spray onto mites in cracks and other areas where they hide. <b>Outdoors:</b> Prepare a 5-ft wide strip of bare soil next to the house foundation the first week of May. Apply to the bare soil as a barrier completely around the house. Note that perimeter pesticide application laws have recently changed to protect ground water and pollinating insects. Pesticide can no longer be applied along concrete surfaces where there is risk of storm run-off. Also pesticides cannot be applied when pollinators are present. Read all pesticide labels carefully.
<b>Cluster flies</b>	Seal all possible routes of entry, screen vents, and install door sweeps. Vacuum or trap flies with light traps or sticky traps.	<b>Perimeter Spray:</b> indoxacarb lambda-cyhalothrin fipronil  imidacloprid b-cyfluthrin	Early autumn application should be made to the perimeter of the structure to prevent adult fly entry.  Note that perimeter pesticide application laws have recently changed to protect ground water and pollinating insects. Pesticide can no longer be applied along concrete surfaces where there is risk of storm run-off. Also pesticides cannot be applied when pollinators are present. Read all pesticide labels carefully
<b>Cockroaches</b>	Using a vacuum is ideal for removing cockroaches and their debris when doing an initial clean out. Sticky traps can be used to monitor cockroach populations and detect infestations. Increasing sanitation will also prevent cockroaches from becoming established.	Gel baits Bait stations Boric acid powder Aerosol sprays Desiccant dusts	<b>Indoors:</b> Apply in cracks and crevices and in other out-of-sight areas. Treat areas where pipes go through walls or floors. Treat cockroach runways under sinks and behind appliances. Place bait and desiccant dusts in cracks and crevices where cockroaches hide.
<b>Crickets</b>	Eliminate moist harborage areas near structures. Crawl spaces should be ventilated and dry. Entry points should be sealed.	<b>Perimeter Sprays:</b> indoxacarb lambda-cyhalothrin fipronil  imidacloprid b-cyfluthrin  <b>Indoors:</b> Aerosol Sprays	<b>Indoors:</b> Use aerosol to knockdown and kill individual crickets. <b>Outdoors:</b> Spray windows, doorways, and other entry sites. Apply to foundation interior walls, window wells, subfloor crawl spaces, under garbage cans, at door thresholds, etc.

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**Table 6.3 - Recommended Use (cont.)**

Pests	Prevention	Pesticide	Application
<b>Drain Flies</b>	Sanitation is the best control measure. Clean away the gelatinous film (biofilm) from inside drains; clean garbage containers regularly. Do not allow wet lint to accumulate under washing machines. Avoid moist organic debris of any nature, especially in the basement.	Aerosol sprays  <b>Drain cleaners:</b> Bacterial foam products	<b>Indoors:</b> Use aerosols for adult fly control. For control of fly larvae in infested drains, use a bacterial drain treatment product to eliminate breeding sites. To clean drains after treatment, use a stiff brush and hot water to remove any remaining biofilm. Bacterial biofoam products are ideal for use because the foam can fill fly breeding spaces that brushes and gels cannot access. Leave the foam in place for several hours prior to rinsing.
<b>Earwigs</b>	Remove excessive clutter from the ground around the outside of house. Items such as tarps, boards, and firewood provide harborage for earwigs. Bait areas where earwigs are found most commonly. If a number of earwigs are found aggregating indoors, remove them with a vacuum and clean the area with soap and water. Cleaning will remove the pheromone chemicals that will attract other earwigs.	<b>Perimeter Spray:</b> indoxacarb Arilon (0.1%) <sup>1</sup> lambda-cyhalothrin Demand CS (0.03%) <sup>1</sup> fipronil Termidor 80 WG (0.06%) <sup>1,2</sup> imidacloprid Temprid SC (0.15%) b-cyfluthrin	Remove all mulch, plant debris, and organic material from around foundation to reduce moisture.
<b>Fleas</b> Note: Resistance to spot-on products is starting to become more prevalent in fleas; however, treating the pet is still the most effective method of flea control at this time.	Spot-on treatments and oral tablets for pets are by far the most effective way of eliminating fleas and ticks. Regular applications (1/ month) will often eliminate indoor flea problems. NEVER APPLY DOG FLEA PRODUCTS ON CATS. THIS CAN RESULT IN DEATH.	<b>Spot-on treatments (available at local animal clinics)</b> spinetoram, Cheristin Advantage II fipronil (s)-methoprene Fronline Plus selamectin Revolution <b>Tablets:</b> nitenpyram Capstar (cats & dogs) <b>Dogs only:</b> afoxolaner NexGard sarolaner Simparica sarolaner, moxidectin, and pyrantel Simparica Trio lotilaner Credelio fluralaner Bravecto <b>Collars:</b> flumethrin Seresto imidacloprid <b>Indoors:</b> (Insect growth regulators) Nylar™ Surge (1.3%) (s)-methoprene Precor IGR Concentrate (1.2%) pyriproxyfen Archer (1.3%) Desiccant dusts <b>Outdoors:</b> pyriproxyfen Archer (1.3%) esfenvalerate Virbac Yard Spray (0.44%)	<b>Indoors:</b> Apply insect growth regulators to carpets in rooms where flea infestation is apparent. Apply desiccant dusts in larval habitats like carpet edges and pet bedding. Apply in animals' sleeping quarters and replace old bedding with clean, fresh, untreated bedding. <b>Outdoors:</b> Treat infested areas of lawn, under dog houses (thoroughly clean the inside of dog houses regularly), and under porches with an insect growth regulator.

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**Table 6.3 - Recommended Use (cont.)**

Pests	Prevention	Pesticide	Application
<b>Flies</b>	Good sanitation and tightly fitting screens and garbage can lids are sound preventative control measures. Use of fly swatter is still practical. Do not contaminate food or utensils with insecticides. Bag pet waste before putting in garbage pails.	<b>Residual formulations:</b> microencapsulated or wettable powder <b>Quick knockdown:</b> labeled pyrethroid aerosol sprays	<b>Indoors:</b> Use an aerosol spray in the air when flies are present. Fly lights should be used in commercial kitchens. <b>Outdoors:</b> Apply to walls adjacent to dumpsters or other breeding sites. Light traps used outdoors will catch flies, but they also may attract flies in from other areas.
<b>Flour, Grain beetles</b>	Discard infested foods and keep uninfested food in containers with tightly-fitting lids. .	None	<b>Indoors:</b> Thoroughly clean infested shelves. Cover shelves with clean, fresh shelf paper or foil.
<b>Long-horned beetle</b>	These beetles frequently hitchhike into the home via firewood. It is wise to store firewood outdoors to prevent beetle emergence in the home.	None	<b>Indoors:</b> Usually, individual beetles can simply be picked up with a vacuum cleaner and then discarded.
<b>Millipedes</b>	<b>Indoors:</b> Millipedes that stray into the home can be picked up with the vacuum, or they can be collected with a broom and dust pan, and then discarded. <b>Outdoors:</b> Remove sources of moisture such as excessive mulch, decaying grass, leaves, etc., from around the house foundation. Double-sided tape placed along entryways can limit access into the structure.	microencapsulations wetable powder dusts in drier areas	<b>Indoors:</b> Use aerosol sprays on individual millipedes. <b>Outdoors:</b> Spraying pest entry sites may help, but outdoor applications during a mass millipede migration will do little to stop their numbers.
<b>Mosquitoes</b>	Maintain good, tight-fitting screens on windows and doors. Remove or frequently empty any containers on the premises that may hold rainwater. Clean out clogged roof gutters holding stagnant water. Backyard garden ponds can be stocked with predatory fish that feed on mosquito larvae.	Aerosol sprays Repellents for personal protection	<b>Indoors:</b> Use aerosol sprays according to label directions. <b>Repellent:</b> Use Deet or ethyl hexanediol aerosol according to the directions. <b>Outdoors:</b> Homeowner applications of mosquito control measures outdoors are discouraged due to concerns over water contamination and the impact on non-target animals.

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<b>Table 6.3 - Recommended Use (cont.)</b>				
<b>Pests</b>	<b>Prevention</b>	<b>Pesticide</b>		<b>Application</b>
<b>Pantry and stored-food pests</b>	Either throw away the infested items or kill the insects by placing the food item in a heated oven (130 degree F) for 30 min. Alternatively, infested food can be placed in a freezer (0 degrees F) for 4 days. Store un-infested foods in plastic or glass containers with tight fitting lids.	Aerosol sprays Boric acid powder		<b>Indoors:</b> Remove all items from the infested location and thoroughly clean shelves. Labeled insecticides may be sprayed into cracks and crevices. Cover shelves with clean, fresh paper or foil before placing packages or food in the cupboard.
<b>Red imported fire ants (RIFA)</b>	RIFA rarely nest indoors, but if they do, call a pest management professional immediately. .	<b>Outdoors:</b> Baits		For colony control outdoors: See Insects in Recreational Areas, p. 6-1. For indoor infestation, call a pest management professional immediately.
<b>Silverfish</b>	Remove potential sources of food and moisture. Seal cracks and crevices. Remove books, papers, and boxes that have been stored for long periods.	<b>Residual formulations:</b> Pyrethroid sprays		Infestations tend to be localized. Apply treatment to suspected harborage areas. Habitat modification can greatly enhance control.
<b>Sowbugs</b>	Reduce or eliminate moist areas around the home. Remove leaf piles, grass clippings, old boards, and excess ground cover. Caulk cracks around home foundation.	Dessiccant dusts		<b>Indoors:</b> desiccant dusts may be used along exterior doorways and basement windows (on the inside) to prevent entry”.
<b>Spiders</b>	Spiders can be successfully kept out of the house by careful screening, secure caulking, etc. Practically all spiders in Virginia are harmless. Exceptions are the black widow and brown recluse spiders, which are poisonous.  Note that the brown recluse spider is not native to Virginia.” Bites (and other wounds) of many kinds are often misdiagnosed by medical doctors as brown recluse spider bites.	Repellents for personal protection Vacuum		<b>Indoors:</b> Remove spiders, egg sacs, and webs with a vacuum. Seal and dispose of the bag immediately. Appropriately labeled dusts may be used if desired. <b>Outdoors:</b> Remove clutter and debris in the yard where spiders can hide. Turn off outdoor lights at night. Lights attract insects that spiders use as food.
<b>Ticks</b>	Keep grass cut to 3 inches or less. Trim vegetation along yard edges, paths, and trails. Remove garbage and wood piles to discourage rodent activity.	carbaryl pyrethroid sprays fipronil permethrin	Sevin Dust (5.0%)  Tick Box Tick Control System tick tubes	<b>Outdoors:</b> Treat under dog houses. Applications to large outdoor areas are impractical because ticks are often concentrated in spot locations.
<b>Wasps and hornets</b>	Remove nest when no activity is observed.	Aerosol sprays Wasp and hornet killer		<b>Outdoors:</b> Locate nest entrance during the day. Treat nest at night when most insects are inside. Wear protective clothing.

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## Index

<b>A</b>		<b>F</b>	
Ants .....	6-8	Fleas .....	6-12
Outdoor ants .....	6-2	Flies .....	6-13
Red Imported Fire Ants .....	6-3, 6-14	Black flies .....	6-2
Asian lady beetles .....	6-9	Blood-feeding flies .....	6-2
		Cluster flies .....	6-11
		Deer flies .....	6-2
		Drain flies .....	6-11
		Flour beetle .....	6-13
<b>B</b>		<b>G</b>	
Baits .....	6-3, 6-8, 6-14	Grain beetle .....	6-13
Bat bugs .....	6-7, 6-9		
Bat guano .....	6-7	<b>H</b>	
Bed bugs .....	6-7, 6-9	Hornet .....	6-14
Beetle		<b>I</b>	
Asian lady beetle .....	6-9	Imidacloprid .....	6-11
Carpet beetle .....	6-10	Insecticidal dust .....	6-3, 6-14
Flour beetle .....	6-13		
Grain beetle .....	6-13	<b>L</b>	
Long-horned beetle .....	6-13	Long-horned beetle .....	6-13
Bifenthrin .....	6-2	<b>M</b>	
Boric acid powder .....	6-11	Millipedes .....	6-13
Boxelder bugs .....	6-10	Mosquito .....	6-2, 6-3, 6-13
Brown marmorated stink bugs .....	6-10	Mosquito Larvae .....	6-3
Bugs		Mulch .....	6-12
Bat bug .....	6-9	<b>N</b>	
Bed bug .....	6-9	Naphthalene .....	6-10
Boxelder bug .....	6-10	<b>P</b>	
Sowbugs .....	6-14	Permethrin .....	6-3
		Pesticide .....	6-2, 6-5, 6-6, 6-8
<b>C</b>		<b>R</b>	
Carbaryl .....	6-2	Red imported fire ants .....	6-3, 6-14
Carpenter bees .....	6-6	Red Imported Fire Ants .....	6-8
Carpet beetles .....	6-10	Resmethrin .....	6-2
Chiggers .....	6-2		
Clothes moths .....	6-10		
Cluster flies .....	6-11		
Cockroaches .....	6-11		
Crickets .....	6-11		
<b>D</b>			
Drain flies .....	6-11		
<b>E</b>			
Earwig .....	6-12		

**S**

Silverfish ..... 6-14  
Sowbugs ..... 6-14  
Spiders..... 6-3, 6-14  
Stored-food Pests ..... 6-14

**T**

Temphos ..... 6-3  
Termites ..... 6-5  
Ticks ..... 6-4, 6-14  
Tralomethrin..... 6-2

**W**

Wasp ..... 6-14  
Wood-destroying insects ..... 6-5