

PUBLIC HEALTH INSECT CONTROL OUTDOORS AND PARASITES OF HUMANS¹

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PEST	PRODUCT TYPE	ACTIVE INGREDIENT PRODUCT NAME (IF SPECIFIED)	METHODS AND RATE OF APPLICATION	REMARKS AND PRECAUTIONS
Mosquitoes, Biting Flies, Gnats, Chiggers, and Ticks	EPA approved repellents: Available in a variety of formulations	Many brands and formulations sold, the active ingredients listed below are EPA approved.	Protect skin by applying a small amount on the palm and rubbing onto exposed skin.	FOR ALL REPELLENTS: Wash hands after applying. Keep out of eyes and mouth. Higher concentrations provide longer periods of protection. Imperative to treat all exposed skin for maximum effectiveness.
		<i>DEET</i> or <i>N, N-Diethyl-meta-toluamide</i>	Aerosol applications: hold 6–8” from skin or clothing and apply with a slow sweeping motion. Rub gently to spread over skin evenly. Also spray on clothing.	Long time standard. Children should use 30% concentrations or less. Product should be applied by parents, apply to parent’s hand and then spread onto child’s skin. Approved for use on children over 2 months old. May damage watch crystals.
		<i>IR3535</i> <i>Amino acid based</i>		Classified as a bio-pesticide by the EPA. Approved for use on children over 2 months old.
		<i>Metofluthrin</i> (via Off! Clip-ons)		Personal, mechanical device for those who don’t want to apply repellents to themselves.
		<i>Oil of lemon eucalyptus</i>		Not approved for children under 3 years old. Skin reactions have been documented.
		<i>P-methane diol</i>		A newly approved active ingredient by the EPA.
		<i>picaridin</i>		Effective alternative to DEET. Approved for use on children over 2 months old.
		<i>permethrin</i> Many brands and formulations	To be used on clothing only.	Good choice when exposed to ticks and chiggers.
		Refined oil of <i>Nepta cateria</i> (catnip oil)		<i>Nepta cateria</i> is a member of the mint family of plants.
		<i>2-undecanone</i>		Classified as a bio-pesticide by the EPA.
Ants, Fire For more information: See publication, <i>Managing Imported Fire Ants in Urban Areas</i> (UGA Extension Bulletin #1191), at extension.uga.edu/publications	Mound Drenches	<i>acephate</i>	Dilute with water as instructed on the label.	Treatments tend to be more effective after soil temperatures have warmed to 60°F. The active ingredients listed may come in various formulations—be sure to use one labeled for fire ants. Mix the proper amount into a gallon container such as a water sprinkling can. Pour the solution on top of and around the mound like a gentle rain. Do not otherwise disturb the mound. Use a minimum of 1 gallon of solution per mound. Check mounds 5–7 days later and re-treat if the colony has moved or new mounds are found. Very effective technique when only a few mounds are involved.
		<i>bifenthrin</i>		
		<i>carbaryl</i>		
		<i>cyfluthrin</i>		
		<i>imidacloprid</i> and <i>b-cyfluthrin</i>		
		<i>permethrin</i>		
		<i>spinosad</i>		
		<i>thiamethoxam</i> and <i>lambda-cyhalothrin</i>		
<i>zeta-cypermethrin</i>				

¹ Be certain that the insecticide you purchase is labeled for the site desired.

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Ants, Fire (continued)	Granular/ Dust Products	<i>acephate</i>	For treating individual mounds, measure out the recommended amount as specified by the label. Sprinkle on the top of and around the mound.	Mow area where mounds will be treated prior to treatment. Best results if treated area is thoroughly watered immediately after application. Treat as mounds appear. Residual control for up to 4 weeks. Use a water sprinkler can or water hose to wet the mound and begin washing the insecticide into the mound. Allow 5–7 days for control.	
		<i>bifenthrin</i>			
		<i>carbaryl</i> Sevin			
		<i>cyfluthrin</i>			
		<i>deltamethrin</i>			
		<i>gamma-cyhalothrin</i>			
		<i>indoxacarb</i>			
		<i>imidacloprid</i> and <i>betacyfluthrin</i>			
		<i>fipronil</i>			
		<i>lambda-cyhalothrin</i>			
		<i>permethrin</i>			
		<i>spinosad</i>			Listed by Organic Materials Review Institute for use in organic production. Check label.
		<i>thiamethoxam</i> and <i>lambda-cyhalothrin</i>			
	<i>zeta-cypermethrin</i>				
	Bait Formulations	<i>abamectin B1</i> Enforcer Ascend	Typically baits can be used at 2–5 Tbsp of bait per mound or 1–1.5 lbs broadcast per acre. Read the label for rates. Baits are usually slower acting than other formulations. They are more effective if applied during the spring or fall, and broadcast is more economical than mound treatment. Apply baits when ants are actively foraging for food. Few baits are labeled for vegetable gardens. Check the label. <i>(hydromethylnon + s-methoprene)</i> Dual active ingredients target worker ants and prevent the queen from laying fertile eggs		
		<i>fipronil</i> Maxforce			
		<i>hydramethylnon</i> Amdro			
		<i>hydromethylnon + s-methoprene</i> First Strike Extinguish Plus			
		<i>indoxacarb</i> Ortho Fire Ant Killer Mound Bait			
<i>s-methoprene</i> Extinguish					
<i>spinosad</i> Ferti-Lome Come and Get It					
<i>pyriproxyfen</i> Distance, Spectracide					

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Bedbugs Bedbugs are difficult to eliminate and often require professional assistance.	Spray	<i>Several permethrin-based products available</i>	Thoroughly clean the mattress, springs, bed frame, and area surrounding the bed. Lightly spray (do not soak) bedsteads, slats, springs, baseboards, and wall cracks. Allow to dry thoroughly (at least 4 hours) before use.	Bedbug infestations require a thorough cleaning of the infested area. Anything that can be removed from the infested area should be. Bedbugs are typically nocturnal, feeding at night and hiding during the day in cracks and crevices near the bed or chairs and couches that are used regularly. Bites typically occur on areas of exposed skin overnight. Treatments should target cracks and crevices on the bed and bedding, the structure of the bedroom itself and the decor (behind pictures). Complete coverage is absolutely essential. Follow-up monitoring will be necessary. Any subsequent activity detected will require a follow-up treatment. The need for a followup treatment is not unusual. Sprays including <i>pyriproxyfen</i> will target eggs as well.
		<i>cyfluthrin</i> 0.1% Bayer Advanced Home Pest Control		
		<i>imidacloprid</i> Ortho Home Defense Spray		
		<i>cypermethrin</i> Hotshot Bedbug Killer		
		Natural <i>Pyrethrin</i> Concentrate		
	Powder	<i>silicon dioxide</i> Diatomaceous Earth	Fine granular/powder-based product. Apply to all cracks and crevices around bed area.	
	<i>deltamethrin</i>			
Bees, Wasps, Hornets, and Yellow Jackets For more information: See publication <i>Stinging and Biting Pests of People</i> (UGA Extension Circular #782) at extension.uga.edu/publications	Aerosol	<i>A variety of active ingredients are available in jet spray formulations.</i>	Apply in evening when insects are at rest. With wind at back, aim at nest opening in trees, bushes, under eaves or in ground cracks and crevices. Thoroughly treat nest. Re-treatment may be necessary. If possible, destroy nest or seal nest opening.	Nuisance honey bee nests can often be removed by bee removal experts. Contact a Cooperative Extension agent for more information. Some aerosols produce a jet stream up to 20–25 ft for the safety of the operator and the ability to reach nests high off the ground. Apply in the evening. Make sure a clear and accessible escape route is planned and available to the applicator prior to initiating spraying.
	Dust	<i>carbaryl</i> or <i>permethrin</i>	Make sure a clear and accessible escape route is planned and available prior to initiating treatment.	Dust formulations have proven effective in treating nests with confined openings as a result of colony members moving the product throughout the colony. Ground nests particularly susceptible.
Eye Gnats	Aerosol Foggers	<i>A variety of products and active ingredients available in aerosol foggers</i>	Follow label instructions carefully. Spray downwind to allow spray to drift through area to be treated. Dense vegetation should be targeted, while avoiding flower plants in an effort to minimize pollinator exposure.	Air movement from electric fans will give protection in a limited area. Commercial repellents are not very satisfactory. However, devices like the Thermocell Mosquito Repellent or the Off Power Pad Lamp may provide localized relief. Not suitable control for households. Fogging and space sprays give temporary relief to limited areas (patio, porch, etc.). Mosquito adulticides will provide temporary relief.
	Ready-to-Use	<i>resmethrin</i> 0.2% Black Flag Fogging Insecticide	Fogging insecticides formulated for electric and propane gas powered thermo-foggers to be used undiluted. (Handheld models for homeowners from Ace Hardware, Lowes, Home Depot, and probably others). Spray downwind to allow spray to drift through area to be treated.	Read label instructions carefully. Wear proper protective equipment. Relief from fogging will typically be temporary.

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Fleas (outside treatment only)	Concentrate, Dust, Granular or Ready-to-Use Hose-End Products	Products containing <i>beta-cyfluthrin</i> , <i>bifenthrin</i> , <i>bifenthrin</i> , <i>zeta-cypermethrin</i> , <i>carbaryl</i> , <i>cyfluthrin</i> , <i>cypermethrin</i> , <i>deltamethrin</i> , <i>esfenvalerate</i> , <i>gamma-cyhalothrin</i> , <i>imidacloprid</i> , <i>beta-cyfluthrin</i> , <i>lambda-cyhalothrin</i> , <i>malathion</i> , <i>permethrin</i> , <i>tralomethrin</i> , <i>thiamethoxam</i> , <i>lambda-cyhalothrin</i> , and <i>pyriproxyfen</i>	Trim vegetation and grass to reduce harborage (hiding sites) and increase insecticide contact with pests.	At time of treatment, bedding should be removed, site treated and fresh bedding provided. A comprehensive program is required to eliminate development on animals and in bedding and loafing/confinement areas. A follow-up treatment 7–10 days after initial treatment is suggested.
		<i>pyridine</i> 1.3% Martin's IG Regulator Concentrate with Nylar		Insect growth regulator, best if used in conjunction with an adulticide. If used with an adulticide, necessity of follow-up treatment reduced.
		<i>Pyriproxyfen</i> 1.3%, <i>Navaluron</i> 1.3% Tekko Pro		Insect growth regulator, see comments above.
House Flies, Blow Flies, Stable Flies, Deer Flies, Black Flies, and Gnats (outside treatment only) Most efficient control technique is to eliminate larval habitats if possible.	Aerosol Foggers	<i>A variety of products and active ingredients available in aerosol foggers.</i>	Follow label instructions carefully. Spray downwind to allow spray to drift through area to be treated. Dense vegetation should be targeted, while avoiding flower plants in an effort to minimize pollinator exposure.	Can provide temporary relief in areas with limited air movement.
		<i>methomyl</i> fly baits—several products	¼ lb (4 oz.)/500 sq ft (Scatter daily or as needed for quick knockdown.)	Avoid placing bait where children, pets, or other animals will be exposed.
		<i>cyantraniliprole</i> Zyrox Fly Granular Bait	3.2–6.4 oz/1000 sq ft	Alternative active ingredient that could be useful in an insecticide resistance management program.
		<i>dinotefuran</i> Quick Strike Fly Bait	¼ lb (4 oz.)/500 sq ft	
	Concentrates and Ready-to-Use Products	Products containing <i>beta-cyfluthrin</i> , <i>bifenthrin</i> , <i>cyfluthrin</i> , <i>cypermethrin</i> , <i>deltamethrin</i> , <i>esfenvalerate</i> , <i>lambda-cyhalothrin</i> , <i>permethrin</i>		Residual products: Spray around house foundations, outside of buildings on resting areas, garbage cans, under porches, along fences and shrubbery, border vegetation and other areas where flies congregate.
		<i>malathion</i>		May do a poor job with house flies due to resistance.
		<i>resmethrin</i> 0.2% Black Flag Fogging Insecticide	To be used undiluted.	Ideal for use in electric, propane or gas-powered foggers available through home improvement and hardware stores.

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House Flies, Blow Flies, Stable Flies, Deer Flies, Black Flies, and Gnats <i>(continued)</i>	Traps and Pest Strips	<i>dichlorvos</i> 18.6% No Pest Strip	Treats 900–1200 cubic foot area	Suspend in area where flies are active, away from concentrations of human activity. Not for use in food handling areas. Lasts up to 4 months.	
		<i>nithiazine</i> 1% Quick Strike Fly Abatement Strip		Traps should not be placed in direct association with areas of human activity. By design, the traps draw flies to them.	
		<i>Variety of sticky traps and funnel/jug traps</i>			
Lice—Head, Body, and Crab For more information: See <i>A Parent's Guide to the 'Nitty-Gritty' about Head Lice</i> (UGA Extension Circular #851) at extension.uga.edu/publications . Pesticide sprays to surfaces and objects in the home are not recommended to control head lice populations.	Various products available as shampoos, cream rinse, mousse, gels, or lotions.	Traditional products typically contain either <i>permethrin</i> , <i>pyrethrins</i> , or <i>pyrethrum</i> extract. Products using <i>Natrum muriaticum</i> (salt), <i>dimethicone</i> (silicone) and <i>mineral oil</i> as the active ingredients are now available over the counter. These products claim to be effective against pesticide-resistant lice.	Follow label directions! Inspect head after 7 days. Despite label claims, shampoos usually do not kill all eggs (nits) present. If live lice or eggs less than ¼ of an inch from the scalp are seen, a second treatment should be given. Significant time should be spent removing any and all nits that are observed. Read the label carefully for additional precautions.	Head lice live on the scalp and lay small white eggs (nits) on individual hair shafts close to the scalp. Nits are most easily found on the nape of the neck or behind the ears. Combing with a fine-toothed comb is considered a highly effective technique for eliminating head lice populations. All personal headgear, scarves, coats and bed linen should be disinfected by machine washing in hot water and drying using the hot cycle of the dryer for at least 20 minutes. Personal combs and brushes should be disinfected by soaking in hot water (above 130°F) for 5–10 minutes. Vacuuming lounging areas to pick up hairs and lice is helpful. However, head lice cannot live off a human host for more than 24 hours.	
		Prescription Medications	<i>benzyl alcohol</i> lotion	Does not kill eggs. Second treatment required 9 days after first.	Lotion is flammable, allow hair to dry naturally, do not use electric heat sources to dry or style hair.
			<i>ivermectin</i> lotion	Prevents newly hatched lice from surviving.	
			<i>malathion</i> lotion	Kills eggs and lice, single application adequate for most patients.	
			<i>spinosad</i> topical suspension	Kills eggs and lice, retreatment not usually needed.	
Midge Larvae (Chironomidae)	Liquid	<i>methoprene</i> 20% Strike	Standing water: 10 lb/A for initial dose, supplemental dose for 5–7.5 lb/A required every 21 days. Waste-water treatment sites: 5 oz/1 million gallons of flow for 14 days. Maintenance rate of 2.5–3 oz/1 million gallons will prevent reinfestation.	An insect growth regulator that disrupts the molting process. Will suppress mosquitoes in standing water and filter flies in water treatment sites.	
		<i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Bti) 1200 ITUs Vectobac 12AS	Standing water less than 6 feet deep: 1 gallon/A every 14 days. Waste water treatment sites: 20 mg/liter ai (1.67 ml) per liter of waste water. Treat for 30 minutes, repeat applications as needed after 2–4 weeks.	Not effective against all midge species, members of the subfamilies Chironomini and Tanytarsini are generally susceptible. Will suppress mosquitoes in standing water and filter flies in water treatment sites.	

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Midge Larvae (continued)	Pellet	<i>Bacillus thuringiensis</i> subsp. <i>israelensis</i> Bactimos PT, 2–3%	18–26 lb/A Lower rates may suppress populations after successive applications.	Target areas where larvae are developing.
	Water Dispersible Granule	<i>Bacillus thuringiensis</i> subsp. <i>israelensis</i> VectoBac WDG	Use maximum mosquito rate of 7–14 oz/A	Has been used effectively in large-scale and international applications.
Mites, Chiggers See repellents.	Variety of products available in either concentrate, granule or ready-to-use formulations	Products containing <i>beta-cyfluthrin</i> , <i>bifenthrin</i> , <i>carbaryl</i> , <i>cyfluthrin</i> , <i>deltamethrin</i> , <i>gammacyhalothrin</i> , <i>imidacloprid</i> <i>beta-cyfluthrin</i> , <i>lambdacyhalothrin</i> , <i>permethrin</i> , or <i>tralomethrin</i> will all be effective if applied according to label.	Mow grass and trim vegetation prior to insecticide application. Water lightly, immediately after granule applications.	<i>Permethrin</i> is the repellent of choice for chiggers. <i>Permethrin</i> is for treating clothing only. Keep grass cut short and open to the sun to help reduce chiggers. Vegetation should not touch legs on walking trails.
		<i>sulfur</i> 100% wettable dusting sulfur	2 lb/1000 sq ft	Apply with enough water for thorough coverage. Treat at weekly intervals and a day or 2 before protection is desired.
Mites clover mites (outside use only)	Variety of products available in concentrate granular and ready-to-use formulations	Products containing <i>bifenthrin</i> , <i>cyfluthrin</i> , <i>deltamethrin</i> , <i>gammacyhalothrin</i> , <i>imidacloprid</i> , <i>beta-cyfluthrin</i> , <i>lambdacyhalothrin</i> , <i>malathion</i> , <i>permethrin</i> , <i>pyrethrin</i> , and <i>tralomethrin</i> will work effectively when used according to label instructions.	Spray lower foundation of house as well as ground, lawn and plants in an area 10 feet wide around the perimeter of home. Water lightly, immediately after granule application.	Keeping the turf 12–48" from the side of the building will help create a barrier for clover mites.
Mites human itch mite (scabies)	Lotions or Creams	<i>permethrin</i> Elimite (Physician's prescription only)	A physician should be consulted for diagnosis and treatment. The lotion or the cream is applied to dry skin in a thin layer and rubbed in thoroughly. Usually 1 oz is sufficient for an adult. A total body application should be made from the neck down. The lotion or cream is left on for 8–12 hours then removed by thorough washing.	Scabies rarely affects the head of children or adults but may occur in infants. One application is usually curative. Read the label carefully. Some itching may continue several weeks after a successful treatment due to the healing process of damaged tissue.

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Mites rodent mites, bird mites	Few products specifically labeled for these pests.	Products labeled for perimeter pests would be effective. Mites are not typically hard to control off their host.	Treat in cracks and crevices, attics, between walls, or other dry inconspicuous areas harboring mites.	Various mites that feed on rodents or birds will readily attack man, especially when the normal host is not available (dead, migrated, etc.) or large populations develop. Biting can cause severe itching and discomfort. Remove the nest if possible and exclude hosts.
		Various formulations of chemicals are available.	Quick kill, but no residue.	Follow label precautions carefully. DO NOT over-treat or an explosion is possible.
		<i>pyrethrins</i> 0.03 8 in 1 Mite and Lice Spray		Can treat birds and cages.
Straw Itch Mites		<i>pyrethrins</i> Various formulations	In a kitchen, spray infested area after removing food.	Mites are parasitic on the larva of grain and cereal insects. Mites readily bite man when in contact with infested hay, straw, or stored grain or flour. Can cause intense itching and fever. Remove infested materials. To prevent, keep products dry. For a residue in a food handling area, select one of the insecticides labeled for spraying of cockroaches. Apply to infested area following label instructions.
Mosquitoes larval stage For more information see: <i>Best Management Practices of Integrated Mosquito Management</i> (UGA Extension Circular # 1154); <i>Mosquito Biology and Behavior</i> (UGA Extension Circular # 1155); and <i>The Intersection of Mosquito Management and Pollinator Protection</i> (UGA Extension Circular # 1188) at extension.uga.edu/publication .	Briquets	<i>Bacillus thuringiensis</i> , subsp. <i>israelensis</i> (Bti) Mosquito Dunks	1/100 sq ft	Very safe and effective. Re-treat as needed.
		<i>methoprene</i> Altosid Briquets	1/100 sq ft	Several types available with increasing residual activity (30–180 days).
		<i>methoprene</i> Pre-Strike Granules	1 lb./8000 sq ft	21 day residual—available in pet stores. Can be used in pet waters.
	Granular	<i>Bacillus sphaericus</i> Vectolex	5–20 lb/A	Very effective against the <i>Culex</i> species. Some residual control, reapply as needed after 2–4 weeks.
		<i>Bacillus thuringiensis</i> , subsp. <i>israelensis</i> (Bti) Mosquito Bits	1 tsp/25 sq ft	Treatments need to be repeated every 7–12 days
	Tablets	<i>Bacillus thuringiensis</i> , subsp. <i>israelensis</i> (Bti) VectoBac DT	1 tablet/13.2 gal (50 liters)	Reapply at monthly intervals as needed.
		<i>methoprene</i> Amdro Quick Kill Mosquito Bombs	1 Tb/100 sq ft	
	Water Soluble Pouch	<i>Bacillus sphaericus</i> Vectolex WSP	Catch basins: 1 pouch/unit Open habitats: 1 pouch/50 sq ft Reapply as needed every 1–4 weeks.	
		<i>Bacillus sphaericus</i> and <i>Bacillus thuringiensis</i> subsp. <i>israelensis</i> Terro Mosquito Larvicide Pouches	1 pouch/50 sq ft Reapply as needed every 1–4 weeks.	

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Mosquitoes adult stage Additional information is available at ent.uga.edu/extension/controlling-mosquitoes.html and UGA Extension Circular #1188, <i>The Intersection of Mosquito Management and Pollinator Protection</i> .	Aerosol Foggers	A variety of products and active ingredients are available.	Follow label instructions carefully. Spray downwind to allow spray to drift through area to be treated. Dense vegetation should be targeted, while avoiding flower plants in an effort to minimize pollinator exposure. Spray areas infested with mosquitoes with a slow sweeping motion while moving away from treated area. Spray when air is still. Repeat if necessary.	For temporary relief over limited areas.
	Surface/Residual Concentrate	Products containing <i>bifenthrin</i> , <i>carbaryl</i> , <i>cyfluthrin</i> , <i>cypermethrin</i> , <i>deltamethrin</i> , <i>gamma-cyhalothrin</i> , <i>imidacloprid</i> & <i>beta-cyfluthrin</i> , <i>lambda-cyhalothrin</i> , <i>malathion</i> , <i>permethrin</i> , <i>tralomethrin</i> , or <i>zeta-cypermetherin</i> are all effective if used properly.	Wet surfaces uniformly, carefully treat vegetation, trying to coat bottom surfaces of leaves on shrubbery.	
	Hand-held foggers	<i>resmethrin</i> 0.2% Black Flag Fogging Insecticide	For use in electric, propane, or gas powered thermal fogger (available Ace Hardware, Lowes, Home Depot, and probably others).	Follow manufacturer and label directions carefully. For temporary relief over limited areas.
	TRAPS: Several types of insect traps are sold for mosquito control. These include the Mosquito Magnet, Flowtron Power Trap, The Dragon-Fly, traditional “bug-zappers,” and others. While all of these traps will usually catch and kill mosquitoes, it is important to carefully read the operating instructions to be certain that the trap you plan to purchase has been shown to be effective against the species of mosquito that you have present. In general, you do not “trap-out” a pest population.			
	CANDLES, LAMPS, TORCHES & CLIP-ONS: Typically these devices contain <i>citronella</i> , <i>allethrin</i> , or <i>metofluthrin</i> . These devices are effective in repelling mosquitoes in enclosed areas or under still conditions. Moderate air movement will significantly reduce effectiveness.			
Moth Flies larval stage	Liquid	<i>methoprene</i> 20% Strike	Wastewater treatment sites: 5 oz/1 million gal of flow for 14 days. Maintenance rate of 2.5–3 oz/1 million gal of flow will prevent reinfestation.	Metering pumps are the most efficient and accurate application method. Will also suppress Chironomid midge larvae.
	Biological Control Agent	<i>Bacillus thuringiensis</i> var. <i>isrealensis</i> (Bti) Vectobac 12AS	Wastewater treatment sites: 10–20 mg/liter ai (0.833–1.67 ml) per liter of wastewater. Treat for 30 minutes, repeat applications as needed after 2–4 weeks.	Does not damage the zoogloea in wastewater filters and adds no chemicals to the discharges of receiving rivers and streams.

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Moth Flies adult stage Perimeter Treatments	ULV Concentrate	Most mosquito adulticides are also labeled for “nuisance flies” and would be effective for short-term suppression of a pest population.	Follow label instructions.	
	Concentrate EC	<i>permethrin, bifenthrin, deltamethrin</i>		Various formulations are available as a perimeter or barrier treatment.
Perimeter Pests: centipedes, millipedes, scorpions, spiders (outside treatment only) For more information see: <i>Millipedes & Centipedes</i> (UGA Extension Bulletin #1088) at extension.uga.edu/publication .	A variety of products are available in either concentrate, granular or ready-to-use formulations.	Products containing <i>bifenthrin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, fipronil, gamma-cyhalothrin, imidacloprid, lambda-cyhalothrin, permethrin</i> , or <i>zeta-cypermethrin</i> will be effective if used according to the label.	To prevent pests from entering building, spray a 5 foot band of soil around the house next to the foundation to a height of 2–3 feet. Thoroughly spray any piles of firewood, debris and other outside areas where they are found.	Removing piles of wood and trash close to inhabited areas will reduce harborage areas. Removing mulch at least 3 feet from sides of buildings will reduce millipede breeding. Do not burn sprayed firewood within 2 weeks following treatment.
Ticks brown dog tick and spot treatments outside Tick control is best conducted as part of a comprehensive program where the animals involved, their bedding and the indoor and outdoor areas that they use are all treated.	Concentrate EC	Any product containing <i>bifenthrin, carbaryl, cyfluthrin, cypermethrin, esfenvalerate, permethrin, tralomethrin</i>	<i>carbaryl</i> or <i>permethrin</i> are suggested for brown dog tick treatments	Standard residual treatment involves thoroughly spraying window frames, door sills, porch and patio walls, foundations, cracks and crevices. Spray a 5-ft band around the house, 2–3 feet up wall.
	Dusts	5% or 10% <i>carbaryl</i> (several products available)	2–4 lb/1000 sq ft	Best applied after rain and with no rain or irrigation for 48 hours post-treatment.
	Granules	Any products containing <i>bifenthrin, betacyfluthrin, carbaryl, deltamethrin, gamma-cyhalothrin, imidacloprid, lambda-cyhalothrin, permethrin</i>		Perimeter treatment to building surfaces and ground treatment.
	Ready-to-Use Hose-End	Any products containing <i>bifenthrin, cyfluthrin, deltamethrin, lambda-cyhalothrin, permethrin</i> , or <i>tralomethrin</i>		

■ PUBLIC HEALTH INSECT CONTROL OUTDOORS AND PARASITES OF HUMANS

PEST	PRODUCT TYPE	ACTIVE INGREDIENT PRODUCT NAME (IF SPECIFIED)	METHODS AND RATE OF APPLICATION	REMARKS AND PRECAUTIONS
<p>Ticks area-wide treatment: campgrounds, picnic areas, footpaths, recreational parks, backyards, and other outside</p> <p>For more information see: <i>Protect Yourself from Ticks</i> (UGA Extension Circular #937) at extension.uga.edu/publications</p>	Granular	<i>bifenthrin</i> (several products available)	1.2 lb/500 sq ft	Higher rates are recommended for most sites. Granular formulations usually work best if lightly watered after application.
		8.0% <i>carbaryl</i> The Andersons Professional Turf Products	2.4 lb/1000 sq ft	Large scale tick control is a difficult task. It is important to keep vegetation mowed and trails cleared where the majority of human activity occurs. By eliminating the majority of vegetation that will contact hikers' legs a large percentage of tick contacts can be eliminated. Walking trails should be cut as low as possible.
		0.1% <i>cyfluthrin</i> Bayer Advanced Multi-Insect Killer	2–3 lb/1000 sq ft	The Andersons Professional Turf Products—product of choice of public health specialists dealing with Lyme Disease and invasive species.
		0.15% <i>imidacloprid</i> & 0.05% <i>beta-cyfluthrin</i> Bayer Advanced Lawn, Complete Insect Killer for Soil & Turf	2–3 lb/1000 sq ft	The Asian Longhorn tick (<i>Haemaphysalis longicornis</i>) has recently been identified in Georgia. This tick can occur in large numbers on livestock and wildlife and should be aggressively treated if identified.
		0.04% <i>lambda-cyhalothrin</i> Spectracide Triazicide Soil & Turf Insect Killer Granules		
	0.25% <i>permethrin</i> Spectracide Bug Stop Insect Control Granules			
Concentrate EC	<i>esfenvalerate</i> , <i>permethrin</i> Various products		Uniform coverage important.	
Concentrate WP	Rabon 50WP	2 lb formulation/25 gallons to treat about 1 acre.	Most readily available through poultry supply dealers. This is the chemical of choice.	