## INSECT CONTROL IN RECREATION AREAS

Pesticide labels for commercial and homeowner products that are currently registered for use in Arkansas may be found through the Arkansas Department of Agriculture/State Plant Board website by clicking on the following link: https://agriculture.arkansas.gov/crops-industry/pesticides/pesticide-registration/

| Insect | Repellent | Rate | Application | Comments/Precautions |
|---|---|---|---|---|
| **Repellents for: Mosquitoes, Biting Flies, Gnats, Chiggers and Ticks** | DEET or N, N-Diethyl-meta-toluamide (many brands and formulations) | --- | **Hand Application:** Protect skin by applying a few drops on the palm and rubbing onto exposed skin. | Wash hands after applying. Keep out of eyes and mouth. Higher concentrations provide longer protection, but complete coverage is required. |
| | DEET or N, N-Diethyl-meta-toluamide (many brands and formulations) | --- | **Aerosol Application:** Hold 6-8 inches from skin or clothing and apply with a slow sweeping motion. Rub gently to spread over skin evenly. Also spray on clothing. | DEET may damage watch crystals or other plastic materials. 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 of age. |
| | IR3535 (Amino acid based) | | | Classified as a bio-pesticide by the EPA. |
| | oil of lemon eucalyptus | --- | | Not approved for children under 3 years of age. Skin reactions have been documented. |
| | picaridin | --- | | Effective alternative to DEET for children over 3 years old. |
| | permethrin (many brands and formulations) | --- | To be used on clothing only. | Also good choice when exposed to ticks and chiggers. |

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|---|---|---|---|---|
| **Ants** | alpha cypermethrin (Fendona CS) | | Apply as directed on label. | |
| | carbaryl (various brands) | See label. | | Treat mounds and surrounding area or apply broadcast. |
| | pyrethroids (Advanced Garden, DeltaGard, Scimitar, Talstar, Tempo) | See label. | | |
| **Ants (Imported Fire Ants)** | **Apply all bait products when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.** | | | |
| | abamectin B1 0.011% (Award II) | 5-7 Tbsp/mound<br>1 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate. | |
| | hydramethylnon (Amdro, Amdro Pro, Combat Fire Ant Bait, MaxForce) | 2-5 Tbsp/mound<br>1 -1.5 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate. | |
| | indoxacarb (Advion) 0.045% | 4 Tbsp/mound<br>1.5 lb/acre | Distribute uniformly around mound.<br>Broadcast rate. | |
| | metaflumizone (Siesta Fire Ant Bait) 0.063% | 1.0 to 1.5 lb/acre<br>2 to 4 Tbsp/mound | Broadcast rate.<br>Mound-to-mound treatment rate. | Do Not exceed 6.0 lbs/A total or 4 applications in a 1 year period. |
| | pyriproxyfen (Distance, Esteem) | 1-4 T/mound<br>1-1.5 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate. | This is an IGR. |
| | S-methoprene (Extinguish) | 3-5 T/mound<br>1-1.5 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate | This is an IGR. |
| | S-methoprene + hydramethylnon (Extinguish Plus) | 3-5 T/mound<br>1-1.5 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate | This is an IGR plus a toxicant. |
| | spinosad 0.015% (Antixx Fire Ant Bait, Conserve Fire Ant Bait / OMRI Listed, Ferti-lome Come and Get It Fire Ant Killer) | 4-6 T/mound<br>2.5-5 lb/acre | Mound-to-mound treatment rate.<br>Broadcast rate | |

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|---|---|---|---|---|
| **Ants (Imported Fire Ants)** (cont.) | **Apply all bait products when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.** | | | |
| | acephate (Orthene T, T&O WSP) 75% | 0.33 lb in 26.6 gals water | Mound drench only. | Apply 1 gal of mix to each mound area by sprinkling the mound until wet and treat 4 ft diameter circle around mound. Do not treat mound more than once per season. |
| | acetamiprid + bifenthrin (Transport Mikron) 5% + 6% | 1.25 fl oz in 1 gal water | Apply 0.11% concentration of active ingredient to cover 1,000 sq. ft. | Do not apply more than 1 gallon 0.11% finished dilution per 1,000 square feet. |
| | alpha cypermethrin (Fendona CS) | | Apply as directed on label. | |
| | fipronil 0.0143% granular insecticide (Quali-Pro Fipronil, Top Choice) | 2 lbs/1000 sqft or 87lbs/acre | Broadcast only. | For use on home lawns, golf courses, commercial and recreational turf, and sod farms. One application per year. Restricted-Use Pesticide. |
| | pyrethroids (various)<br>bifenthrin (Talstar)<br>cyfluthrin (Tempo)<br>deltamethrin (Deltagard)<br>lambda cyhalothrin (Scimitar CS, GC)<br>permethrin (various) | See label | | |
| **Eye Gnats** | prallethrin 0.04% and cyfluthrin 0.03% (OFF! Outdoor Fogger Backyard Pretreat) | -- | See label. | 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.<br><br>Not suitable control for indoor use.<br><br>Fogging and space sprays give temporary relief to limited areas (patio, porch, etc.). Mosquito adulticides will provide temporary relief. |
| | tetramethrin 0.15%, deltamethrin 0.15%, piperonyl butoxide 0.75% (Bonide Mosquito Beater Yard Fog) | -- | See label. | |
| | tetramethrin 0.2% and phenothrin 0.2% (Cutter Backyard Bug Control Outdoor Fogger) | -- | See label. | |
| **Midge** | temephos (5% Skeeter Abate) | | 2-10 lb/acre | For control of mosquito and midge larvae, apply uniformly by conventional air or ground equipment. Application of this product by Belly-Grinder is prohibited. |
| | methoprene 20% EC (Strike) | 4-5 oz/1 million gal wastewater | --- | For use in wastewater treatment facilities. Uniformly apply at the influent side over a 24-hour period. Apply to natural and manmade aquatic habitats. High rate recommended for wastewater. |
| | 4.25% pellet (Strike) | --- | 5-10 lb/acre | |
| | spinosad 2.5% G (Natular XRG) | ready to use | 5-20 lb | |

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|---|---|---|---|---|
| **Ticks and Chiggers** | acetamiprid + bifenthrin 22.73% + 27.27% (Transport) | | Apply 0.11% concentration of active ingredient to cover 1,000 sq ft. | DO NOT apply more than 0.11% finished dilution per 1,000 square feet. Apply outdoors as an exterior perimeter treatment around structures. |
| | alpha cyermethrin (Fendona CS) | | Apply as directed on label. | |
| | beta-cyfluthrin (Tempo)<br>SC Ultra 11.8%<br>Ultra WP | <br>6-12 fl oz/acre<br>7.7-15.4 oz/acre | | Use high rate for chiggers. Apply when pests first appear. Reapply as needed based on pest reinfestation. DO NOT treat more than 6 times per year. Keep children and pets off treated areas until lawn has dried. |
| | bifenthrin (Talstar)<br>EZ Granular Insecticide 0.2% | <br>100-200 lb/acre | <br>Ready to use. | DO NOT make spot applications. Treat the entire area where exposure to ticks may occur. DO NOT allow public use of treated areas during application. |
| | P Professional Insecticide 7.9% | 0.5-1.0 fl oz/ 1,000 sq ft | Broadcast treatment rate. | DO NOT make spot applications. Treat the entire area where exposure to ticks may occur. Use application volumes of up to 10 gal/1,000 sq ft to get uniform coverage when treating dense grass foliage. Limit repeat application to no more than once every 7 days. |
| | carbaryl (Sevin)<br>80 WSP<br>SL | <br>2.5 to 5 lb/acre<br>2 to 4 qts/A | | Repeat applications as necessary up to a total of 4 times per year but not more often than once every 7 days. |
| | deltamethrin (Suspend 0.42 SC) | 17.5-26.0 fl oz/acre | | Apply when pests become evident. Apply as a broadcast spray in a minimum of 2 gal of water/1,000 sq ft. |
| | imidacloprid 21.0% - beta-cyfluthrin 10.5% (Temprid SC) | 0.27-0.54 fl oz/gal water | | Apply at rate not to cause drip/run-off from site. NOT labeled for chiggers. |
| | rosemary oil, Geraniol, Winter-green (Essentria IC3) | 1 to 8 ounces of Essentria IC3 per gallon of water | 43 gal/Acre | 2 gallons per 1,000 square feet. |
| | tetrachlorvinphos (Rabon 50% WP) | 0.5 lb/6 gal water | | Apply as a spot treatment using a low pressure handwand sprayer only. Apply along woody borders of kennels, yards, campgrounds, recreational parks, footpaths, and roadways leading to such areas. |

| Insect | Insecticide | Mixing Instructions and Application Equipment | Application Rate @ 10 mph | Droplet Size Requirements on Label (μm) | Comments/Precautions |
|---|---|---|---|---|---|
| **Mosquitoes, Adults (Ground application)** | alpha cypermethrin (Fendona CS) | | | | Apply as directed on label. |
| | bifenthrin 7.9L (Bifen I/T) | 0.33 to 1.0 fl oz/gal water in backpack or hydraulic sprayer | | | Apply at a rate of 1 gallons per1000 square feet for thorough coverage of lawns and/or ornamentals. |
| | deltamethrin (Suspend Polyzone) | 0.33 to 1.0 fl oz/gal water in backpack or hydraulic sprayer | | | Treat with mist or spray around landscape plants, turf, ground cover, under decks, around building foundations where mosquitoes may rest. |
| | etofenprox (Zenivex E20) | Apply undiluted or up to 1:4.5 dilution | Varies with dilution | VMD-7-30 um<br>Dv 0.9 < 50 um | Do not apply more than 0.18 lbs per acre per site per year. Do not make more than 25 applications per site per year. |
| | garlic oil 0.04% (Terminix ALLCLEAR ATSB Mosquito Bait Concentrate) | Thoroughly mix 1 part concentrate in 3 parts water and apply with ground based spray equipment such as motorized portable, pump-up, backpack, handheld, vehicle mounted and other ground based spray equipment capable of medium to heavy spray droplets. | | | Apply at a rate of 10-20 ounces per 100 linear feet to vegetation 1 to 5 feet above the ground wetting both surfaces of foliage to the point of runoff. Do not apply with handheld or truck-mounted cold ULV or thermal foggers or by aircraft. |
| | lambda-cyhalothrin (Cyonara 9.7, Demand CS, Cysmic CS) | 0.8 fl. Oz/gal. water in backpack or hydraulic sprayer | | | Treat resting areas on structures as well as surrounding shrubs. |
| | malathion 96.5% concentrate (Fyfanon ULV) | Use undiluted with aerosol ULV sprayer.<br>Dilute 3.9 to 5.2 gal to 100 gal with No. 2 fuel or diesel oil; use in thermal fog sprayer. | 2 to 4.3 fl oz/min | VMD < 30 μm<br>Dv 0.9 < 50 μm | Apply only when weather conditions are favorable. Do not spray when wind speed is more than 3 mph. Wind and rising air currents may cause undesirable spray drift and reduce insect control. Avoid direct application to vehicles; as paint damage may result. Toxic to fish, aquatic invertebrates, and aquatic life stages of amphibians. |
| | naled 62% concentrate (Dibrom 8 Emulsive) | 0.8 to 1.6 fl oz diluted with water | 2-8 qts diluted spray/acre | VMD < 60 μm<br>Dv 0.9 < 115 μm | **Restricted Use Pesticide.** Toxic to fish, aquatic invertebrates, and wildlife. Do not directly apply to water or to areas where runoff into water is likely to occur. |
| | | 3-5 qts per 100 gal water using mist or cold fogger | 0.1 lb a.i./acre | VMD < 40 μm<br>Dv 0.9 < 75 μm | |
| | permethrin 10% to 57% concentrate | Apply undiluted or mix with refined mineral or soybean oil. | 0.31 to 15 oz/ min depending on dilution | VMD = 150 to 300 μm | Permethrin 57% is not for use in residential misting systems. Do not allow drift onto cropland, poultry ranges or potable water supplies. Do not use on crops used for food or forage. |
| | (Permanone) 10% EC | Dilute 1:20 with water (6.5 fl oz/ 1 gal of water). | | | Treat surfaces using course wet spray. Do not allow runoff to enter storm drains or waterways. |
| | permethrin (20%) and piperonyl butoxide (20%) (Aqua-Reslin) | Dilute 1 gal with 2 to 12 gal water. | 2.1 to 9 oz/min depending on dilution | VMD < 30 μm<br>Dv 0.9 < 50 μm | Dilute with water only. Toxic to fish and aquatic invertebrates. Can be used as barrier spray on building foundations (up to 3' height) and vegetation around structure, but not within 100 feet of lakes and streams. Structural applications to areas other than foundation limited to crack & crevice. |
| | permethrin and piperonyl butoxide (Permanone 31-66, Biomist 3 + ULV) | Dilute 1 gal to 2.4 gal with light weight oil; use in ULV sprayer. | 0.5 to 3 fl oz/min | VMD < 30 μm<br>Dv 0.9 < 50 μm | Do not exceed 25 applications at maximum rate at any site in one year. |

| Insect | Insecticide | Mixing Instructions and Application Equipment | Application Rate @ 10 mph | Droplet Size Requirements on Label (μm) | Comments/Precautions |
|---|---|---|---|---|---|
| **Mosquitoes, Adults (Ground application)** (cont.) | prallethrin (1%) and sumithrin (5%) and piperonyl butoxide (5%) (Duet) | Apply undiluted with aerosol ULV sprayer | 2.5 to 7.5 oz/min | VMD = 8 to 30 μm<br>Dv 0.9 < 50 μm | DO NOT allow drift onto pastureland, rangeland or potable water supplies. |
| | pyrethrins (5%) and piperonyl butoxide (25%) (Aquahalt) | Apply undiluted or diluted with water and applied as an ultra low volume (ULV). | 0.27 to 0.76 oz/acre | VMD < 30 um<br>Dv 0.9 < 50um | Do not apply more than 0.2 pounds of pyrethrins/acre/ year or 1.0 pound PBO/acre/year in any treated area. |
| | sumithrin and piperonyl butoxide (Anvil 10+10 ULV or 2+2 ULV) | Use undiluted or dilute 10+10 formulation with light mineral oil. | 0.21 to 0.62 oz/acre | VMD < 30 μm<br>Dv 0.9 < 50 μm | |
| **Mosquitoes, Adults (Fixed-wing aerial application)** | deltamethrin (Imperium) | 0.00089 to 0.00134 lb. ai/A (undiluted or diluted in water) | Varies with dilution | See label. | During any three day period do not apply more than 0.00134 lb ai/A. Do not make more than 25 applications per site per year at the high rate of 0.00134 lb ai/A. More frequent applications and more than 25 applications per site may be made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquitoborne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort. |
| | etofenprox (Zenivex E20) | 0.00175 to 0.007 oz (undiluted) per acre | Varies with dilution | VMD < 60 μm<br>Dv 0.9 < 100 μm | DO NOT spray more than 0.18 lbs etofenprox per acre per site per year. Do not make more than 25 applications per site per year. More frequent treatments may be made to prevent or control a threat to public and/or animal health determined by a state, tribal, or local health or vector control agency on the basis of documented evidence of disease-causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort. |
| | malathion 96.5% concentrate (Fyfanon ULV) | Use undiluted. | 2.6-3.0 fl oz/acre | VMD < 60 μm<br>Dv 0.9 < 100 μm | Toxic to fish, aquatic invertebrates and aquatic life stages of amphibians. DO NOT directly apply to water or to areas where runoff into water is likely to occur.<br>DO NOT retreat a site more than three times in any one week except in emergencies. |
| | naled 87.4% concentrate (Dibrom) | Use undiluted. | 0.5-1.0 fl oz/acre | VMD = 60 μm<br>Dv 0.9 < 115 μm | Toxic to fish, aquatic invertebrates, and wildlife.<br>DO NOT directly apply to water, except when necessary to target areas where adult mosquitoes are present or to areas where runoff into water is likely to occur. NOT for use in or around homes. |
| | | Dilute 50-100 fl oz to 100 gal with No. 2 fuel oil or diesel oil. | 1 gal/acre | VMD = 60 μm<br>Dv 0.9 < 115 μm | |

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| Insect | Insecticide | Mixing Instructions and Application Equipment | Application Rate @ 10 mph | Droplet Size Requirements on Label (μm) | Comments/Precautions |
|---|---|---|---|---|---|
| **Mosquitoes, Adults (Fixed-wing aerial application)** (cont.) | permethrin (20%) and piperonyl butoxide (20%) (Aqua-Reslin) | Dilute 1 gal with 2-12 gal water. | 2.1-9.0 oz/min depending on dilution | VMD < 60 μm<br>Dv 0.9 < 100 μm | Dilute with water only. Toxic to fish and aquatic invertebrates. |
| | prallethrin (1%) and sumithrin (5%) and piperonyl butoxide (5%) (Duet) | Apply diluted with aerosol ULV sprayer. | 0.41-1.24 oz/acre | VMD = < 60 μm | DO NOT allow drift onto pastureland, rangeland or potable water supplies. |
| | pyrethrins (5%) and piperonyl butoxide (25%) (Aquahalt Water-Based Adulticide) | Apply undiluted or diluted with water and applied as an ultra low volume (ULV). | 0.28-0.76 fl oz/acre | VMD < 60 μm<br>Dv 0.9 < 100 μm | DO NOT treat a site with more than 0.0025 lb ai/acre per day. DO NOT apply more than 0.0625 lb ai/acre per year. |
| | sumithrin (10%) and piperonyl butoxide (10%) (Anvil 10+10 ULV) | Use undiluted or dilute with light mineral oil if dilution is preferred. DO NOT DILUTE WITH WATER. | 0.21-0.62 fl oz/acre | VMD < 60 μm<br>Dv 0.9 < 115 μm | Application should be made at 75 to 300 feet for rotary aircraft and 100 to 300 feet for fixed-wing aircraft. |

**KEY:** Dv 0.9 = 90% of the spray volume droplets are smaller than value given
VMD = Volume Median Diameter
μm = micrometer

## INSECT CONTROL IN RECREATION AREAS

| Insect | Insecticide | Mixing Instructions and Application Equipment | Application Rate Per Acre | Comments/Precautions |
|---|---|---|---|---|
| **Mosquitoes Immatures** | | | | |
| | *Bacillus sphaericus* (Vectolex) | | | Only effective against larvae. Apply uniformly by aerial or conventional ground equipment. Reapply as needed after 1-4 weeks. Use higher rates in areas where extended residual control is necessary or in habitats having deep water or dense surface cover. |
| | CG 7.5% | ready to use | 5-20 lb | |
| | WDG 51.2% | ground (5-100 gal water/acre)<br>aerial (0.5-10 gal water/acre) | 0.5-1.5 lb | |
| | WSP 7.5% | | 1 pouch/50 sq ft | |
| | *Bacillus thuringiensis,* var. *israelensis* (Bactimos, Teknar, Vectobac) | Dilute with sufficient water to obtain uniform coverage. | | Only effective against larvae. Can be applied to all breeding habitats, including potable water supplies. |
| | 50 WP | | 6-12 oz | |
| | 2 WP | | 4-16 oz | |
| | 14.3% aqueous conc. | | 0.5-3.0 pt | |
| | 15% aqueous conc. | | 0.5-3.0 pt | |
| | 1.2% aqueous conc. | | 0.25-2.0 pt | |
| | 0.8% aqueous conc. | | 0.5-2.0 pt | |
| | *Bacillus thuringiensis*, var. *israelensis* (Bactimos) briquettes 10% | ready to use | --- | Use one briquette per 100 sq ft of surface area regardless of depth. |
| | *Bacillus thuringiensis*, var. *Israelensis* (Bactimos, Teknar, Vectobac) granules 0.2% pellets 0.4% | ready to use | --- | Apply 4-10 lb per acre with aircraft or ground equipment. |
| | methoprene 20% EC (Altosid) | 3-4 fl oz/gal water | 1 gal | Apply when larvae are in 3rd and 4th instar. Methoprene will not kill pupae or adults. |
| | methoprene (Altosid) briquette 2.1%, 8.6% (Altosid) pellet 4.2% (Altosid) granule 0.27%, 1.5% | ready to use | --- | Water less than 2 ft; 1 briquette per 100 sq ft deeper or flowing water; 1 briquette per 10 cu ft, 2.5- to 10-lb pellet per acre; use high rate in breeding sites with high organic content. |
| | monomolecular surface film (Agnique MMF) | --- | 0.2-0.5 gal | Use in conjunction with indicator oil to avoid overtreatment. Can be used for semipermanent or permanent fresh water sources (including potable and irrigation). |
| | proprietary mosquito control oils (GB-1111, etc.) | undiluted | 1-5 gal | Dosage depends on amount of flotage and vegetation in water. |
| | Spinosad (Natular XRT 6.25% G, Naturlar T30 8.33%) | ready to use | See label for appropriate water volume and depth. | No effect on pupal or adult mosquitos. Toxic to aquatic organisms. Non-target aquatic invertebrates may be killed in waters where this pesticide is used. |
| | temephos (5% Skeeter Abate) | | 2-10 lb/acre | For control of mosquito and midge larvae, apply uniformly by conventional air or ground equipment. Application of this product by Belly-Grinder is prohibited. |

All chemical information provided is given with the understanding that no endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned. Individuals who use pesticides are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Before purchasing or using any pesticide, always read and carefully follow the label directions.