

COMMERCIAL CHRISTMAS TREE PRODUCTION INSECT CONTROL

Insect or Mite	Insecticide and Formulations	Amount of Formulation Per Gallon of Spray	Amount Per 100 Gallons of Water	Minimum Interval (Hours) Between Application and Reentry	Precautions and Remarks
Ants	bifenthrin (Talstar Nursery Flowable)		5-10 oz/acre	12	Do not treat plants under extreme heat or drought stress.
	carbaryl (Sevin SL)		1 qt/acre	12	
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	
Ants–Imported Fire Ant (Field-grown woody ornamentals in-field treatment prior to shipment)	<p>Treatment is required to ship containerized or balled plants from quarantined to non-quarantined areas. Also, maintenance of fire ant free status of nurseries in federal imported fire ant quarantine areas requires certain actions. Consult Arkansas Plant Board to determine your nursery's classification, and consult USDA Program Aid No. 1822, "Imported Fire Ant 2007: Quarantine Treatments for Nursery Stock and Other Regulated Articles" for all rules and regulations pertaining to the federal imported fire ant quarantine and treatment requirements. The following insecticides are authorized by USDA for the treatment of regulated articles under the imported fire ant (IFA) quarantine:</p> <p>bifenthrin (Talstar, Bifenthrin Pro) G, F chlorpyrifos (Dursban, Chlorpyrifos) EC, W, G diazinon (Diazinon/D-z-n) WP, EC fenoxycarb (Award) Bait fipronil (Chipco Choice, Chipco Top Choice) G hydramethylnon (Amdro Pro, Siege Pro) Bait methoprene (Extinguish) Bait pyriproxyfen (Distance) Bait telfluthrin (Fireban) G</p>				
Aphid (including balsam twig aphid and cinara aphid)	abamectin (Avid 0.15 EC)		8 oz/100 gal	12	Do not apply more than 16 oz or less than 8 oz per acre. To suppress aphids, spray must contact young immatures. Spray immediately after mixing.
	<i>Beaveria bassiana</i> (Naturalis T&O)	0.3-1 oz/gal	30-100 oz/100 gal	4	
	bifenthrin (Talstar Nursery Flowable)		40 oz/acre	12	Do not treat plants under extreme heat or drought stress.
	carbaryl (Sevin SL)		1 qt/acre	12	
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	
	cinnamaldehyde (Cinnamite)	0.85 oz/gal	85 oz/100 gal	4	
	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall is less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.
	disulfoton (Di-Syston 15 G)		20-30 lb/acre	48 or 72 where rainfall exceeds 25 inches/year	<p>For use on firs only. Product must be either soil incorporated, watered in or applied to areas with permanent groundcover. Do not make more than one application per year.</p> <p>Broadcast: Spread granules in the root zone of the trees at the dripline and work into soil or water thoroughly within 48 hours of application. If rainfall is to be used to water-in granules, then application may be made when rainfall is anticipated between 36 and 48 hours after application. Not for use in bare-ground plantations.</p> <p>Note: Because fir trees (especially Fraser firs) are grown in mountainous terrain, the 25-foot buffer strip is not required to be level.</p>

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Aphid (including balsam twig aphid and cinara aphid)	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	Adding a spray adjuvant may improve control. Do not apply more than 40 oz/acre/year. Apply specified dosage per acre in sufficient water for complete coverage. Do not make more than two applications per season.
	imidacloprid (Provado 1.6 F)		4-8 oz/acre OR 2 oz/100 gal	12	
	oxydemeton-methyl (MSR Spray Concentrate)		1-2 pt/acre	48-72 in areas where average rainfall is less than 25 inches/year	
	pymetrozine (Endeavor)		up to 10 oz/acre	12	
Bagworm	bifenthrin (Talstar Nursery Flowable)		5-10 oz/acre	12	Apply to early instars in mid to late June. Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only. Apply to early instar larvae; foliage development should be a minimum of 20%. Do not apply more than 16 oz/acre/year.
	carbaryl (Sevin SL)		1 qt/acre	12	
	diflourorbenzamide (Dimilin 4L)		1-2 oz/acre	12	
	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	
	tebufenozide (Confirm)		4-8 oz/acre	4	
European Pine Shoot Moth	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress.
	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.
	phosmet (Imidan 70-WSB or Gowan)		1.3-1.5 lb/acre	24	
MIDGE (Douglas fir needle midge, pine needle midge)	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal		
Nantucket Pine Tip Moth	carbaryl (Sevin SL)		1 qt/acre	12	Apply when second generation instars are present or 70% of first generation pupal cases are empty. Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.
	diflourorbenzamide (Dimilin 4L)		1-2 oz/acre	12	
	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	

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Nantucket Pine Tip Moth (cont.)	disulfoton (Di-Syston 15 G)		20-30 lb/acre	48 or 72 in areas receiving at least 25 inches of rain per year	For use on firs only. Product must be either soil incorporated, watered in or applied to areas with permanent groundcover. Do not make more than one application per year. Broadcast: Spread granules in the root zone of the trees at the dripline and work into soil or water thoroughly within 48 hours of application. If rainfall is to be used to water-in granules, then application may be made when rainfall is anticipated between 36 and 48 hours after application. Not for use in bare-ground plantations. Note: Because fir trees (especially Fraser firs) are grown in mountainous terrain, the 25-foot buffer strip is not required to be level.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	Apply as needed for control. Spray sufficient gallonage to obtain good coverage of entire tree.
	permethrin (Permethrin 3.2 EC)		4-8 oz/100 gal	12	Begin applications when adults appear. Repeat applications may be made in 5- to 7-day intervals as needed.
	phosmet (Imidan 70-WSB or Gowan) tebufenozide (Confirm)		1.3-1.5 lb/acre 8 oz/acre	24 4	Apply to early instar larvae after each foliage flush at approximately 25% foliage expansion. Allow at least 6 hours between application and rainfall to assure thorough spray drying.
Pine Chafer	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	
Rosette Bud Mite	dimethoate (Dimethoate 400 or Dimethoate 4EC)		1-1 1/2 pt/acre	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.
Rust Mites	chloropyridan (Sanmite)		4 oz/100 gal or 10.7 oz/acre	12	
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress.
	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.
	spirodiclofen (Envidor 2SC)		18-24.7 oz/acre	24	Make only one application per season.
Sawfly (redheaded pine, red pine, European pine)	carbaryl (Sevin SL)		1 qt/acre	12	
	diflourorbenzamide (Dimilin 4L)		2-4 oz/acre	12	Apply to early instars.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	
	imidacloprid (Provado 1.6 F)		4-8 oz/acre OR 2 oz/100 gal	12	Adding a spray adjuvant may improve control. Do not apply more than 40 oz per acre per year.

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Sawfly (redheaded pine, red pine, European pine)	malathion (Malathion 8 or Gowan)	2 Tbsp/gal	1 pt/100 gal	12	
	phosmet (Imidan 70-WSB or Gowan)		1.3-1.5 lb/acre	24	
Scale (pine needle, pine tortoise, spruce bud, black pine, stripped pine)	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat and drought stress. Apply when scale crawlers are active.
	disulfoton (Di-Syston 15 G)		20-30 lb/acre	48 or 72 in areas receiving at least 25 inches of rain per year	For use on firs only. Product must be either soil incorporated, watered in or applied to areas with permanent groundcover. Do not make more than one application per year. Broadcast: Spread granules in the root zone of the trees at the dripline and work into soil or water thoroughly within 48 hours of application. If rainfall is to be used to water-in granules, then application may be made when rainfall is anticipated between 36 and 48 hours after application. Not for use in bare-ground plantations. Note: Because fir trees (especially Fraser firs) are grown in mountainous terrain, the 25-foot buffer strip is not required to be level.
	oxydemeton-methyl (MSR Spray Concentrate)		2 pt/acre	48-72 in areas where average rainfall is less than 25 inches/year	Apply specified dosage per acre in sufficient water for complete coverage. Do not make more than 2 applications per season.
Seed Bug	permethrin (Permethrin 3.2 EC)		30 oz/acre	12	
Spider Mite (spruce spider mite)	abamectin (Avid 0.15 EC)		4 oz/100 gal	12	Do not apply more than 16 oz or less than 8 oz per acre.
	<i>Beauveria bassiana</i> (Naturalis T&O)	0.3-1 oz/gal	30-100 oz/100 gal	4	Spray immediately after mixing.
	bifenazate (Floramite)		2-4 oz/100 gal	4	Add an adjuvant like Silwet L-77 or Slygard 309 to the Floramite solution.
	chloropyridan (Sanmite)		4 oz/100 gal or 10.7 oz/acre	12	
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress. If eggs are present, reapply in 7 to 10 days to control newly hatched nymphs.
	clofentezine (Ovation SC)		2-4 oz/100 gal or 4-8 oz/acre for low-volume applications; do not exceed 8 oz/acre	12	Most effective when applied at first sign of mite activity and mite eggs.
	cinnamaldehyde (Cinnamite)	2 Tbsp/gal	85 oz/100 gal	4	
	dimethoate (Dimethoate 400 or Dimethoate 4EC)	see label		10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.

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Spider Mite (spruce spider mite) (cont.)	disulfoton (Di-Syston 15 G)		20-30 lb/acre	48 or 72 in areas receiving at least 25 inches of rain per year	For use on firs only. Product must be either soil incorporated, watered in or applied to areas with permanent groundcover. Do not make more than one application per year. Broadcast: Spread granules in the root zone of the trees at the dripline and work into soil or water thoroughly within 48 hours of application. If rainfall is to be used to water-in granules, then application may be made when rainfall is anticipated between 36 and 48 hours after application. Not for use in bare-ground plantations. Note: Because fir trees (especially Fraser firs) are grown in mountainous terrain, the 25-foot buffer strip is not required to be level. TetraSan kills mite eggs and nymphs but not adult mite. Treated adults will not produce viable eggs. Do not make more than one application per year. Apply specified dosage per acre in sufficient water for complete coverage. Do not make more than 2 applications per season. No more than 3 applications per year. Compatibility restrictions. Make only one application per season. Do not apply more than 4 times per season.
	etoxazole (TetraSan 5 WDG)		8-16 oz/100 gal	12	
	hexathiazox (Savey) 50 WP	3-6 oz/acre	2 oz/100 gal	12	
	oxydemeton-methyl (MSR Spray Concentrate)		1-2 pt/acre	48-72 in areas where average rainfall is less than 25 inches/year	
	propargite (Ornamite-CR) spirodichlofen (Envidor 2SC) spiromesifen (Judo)		3.0-7.5 lb/acre 18-24.7 oz/acre 1-4 oz/100 gal	7 days 24 12	
Spittlebug	chlorpyrifos (Lorsban 4F)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	
Spruce Needle Miner	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Do not treat plants under extreme heat or drought stress.
Weevil (pales, northern pine, pitch eating, root collar, white pine)	chlorpyrifos (Lorsban 4E)	2 Tbsp/gal	3 qt/100 gal	24	Apply as a cut stump drench.
	diflourobenzamide (Dimilin 4L)		4-8 oz/acre	12	Treat prior to egg deposition.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	Apply specified dosage per acre in sufficient water for complete coverage. Do not make more than 2 applications per season.
	oxydemeton-methyl (MSR Spray Concentrate)		1-2 pt/acre	48-72 in areas where average rainfall is less than 25 inches/year	
	phosmet (Imidan 70-WSP or (Gowan)		1.3-1.5 lb/acre	24	
White Grub	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	Incorporate into the soil if possible.
	thiamethoxam (Flagship 25WG)		8 oz/acre	12	Apply from adult flight through peak hatch of targeted species.
Zimmerman Pine Moth	dimethoate (Dimethoate 400 or Dimethoate 4EC)		see label	10-14 days in outdoor areas where average annual rainfall less than 25 inches/year	Do not use on Christmas tree plantations. For use on Christmas trees grown in nurseries only.