

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
Adelgids (balsam woolly adelgid, cooley, eastern spruce gall)	bifenthrin (Talstar Nursery Flowable)		20-40 oz/acre	12	Will also control twig aphids and spider mites but not rust mites.
	bifenthrin 25% (Sniper)		3.9-12.8 oz/acre	12	Will also control twig aphids and spider mites but not rust mites.
	bifenthrin (OnyxPro)		1.8-14.4 oz/acre	12	
	chlorpyrifos (Lorsban 4E, Nufos 4E)		1 qt/acre	24	DO NOT treat plants under extreme heat or drought stress. Control is achieved only when eggs and crawlers are not present.
	dinotefuran (Safari)		4-8 oz/100 gal	12	DO NOT apply more than 2.7 lb/acre.
	esfenvalerate (Asana XL, Adjourn)		5.8-9.6 oz/100 gal	12	Use full rate to control balsam woolly adelgid.
	imidacloprid (Couraze 1.6F, Pasada 1.6F, Provado 1.6 F)		4-8 oz/acre OR 2 oz/100 gal	12	Adding a spray adjuvant may improve coverage. DO NOT apply more than 40 oz/acre per year.
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
	petroleum oil (Damoil)		2-4 gal/100 gal dormant use 1-3 gal/100 gal summer use	4	
	spirotetramat (Movento)		5-10 oz/acre	24	Maximum use 20 oz/acre per year. Use adjuvant to increase penetration.
Ants	bifenthrin (Talstar Nursery Flowable)		5-10 oz/acre	12	
	carbaryl (Sevin SL)		1 qt/acre	12	
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	DO NOT treat plants under extreme heat or drought stress.
Ants, Imported Fire Ant (field-grown woody ornamentals in-field treatment prior to shipment)	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: 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				
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.
	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.

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Aphid (including balsam twig aphid and cinara aphid) (cont.)	<i>Beaveria bassiana</i> (Naturalis T&O)	0.3-1.0 oz/gal	30-100 oz/100 gal	4	Spray immediately after mixing.
	bifenthrin (Talstar Nursery Flowable)		40 oz/acre	12	
	bifenthrin 25% (Sniper)		3.9-12.8 oz/acre	12	Will also control twig aphid and spider mites but not rust mites.
	bifenthrin (OnyxPro)		1.8-14.4 oz/acre	12	
	carbaryl (Sevin SL)		1 qt/acre	12	
	chlorpyrifos (Lorsban 4E, Nufos 4E)		1 qt/acre	24	DO NOT treat plants under extreme heat or drought stress.
	cinnamaldehyde (Cinnamite)	0.85 oz/gal	85 oz/100 gal	4	
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	
	disulfoton (Di-System 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 into soil or applied to areas with permanent ground-cover. DO NOT make more than one application per year. Broadcast: Spread granules in the root zone of 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	
	imidacloprid (Couraze 1.6F, Pasada 1.6F, 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/acre per year.
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
	petroleum oil (Damoil)		2-4 gal/100 gal dormant use 1-3 gal/100 gal summer use	4	
	pymetrozine (Endeavor)		up to 10 oz/acre	12	
spirotetramat (Movento)		5-10 oz/acre	24	Maximum use 20 oz/acre per year. Use adjuvant to increase penetration.	
thiamethoxam (Flagship 25WP)		2-4 oz/100 gal OR 4-8 oz/acre	12	Maximum use 8 oz/acre per year.	

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Bagworm	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	bifenthrin (Talstar Nursery Flowable)		5-10 oz/acre	12	
	carbaryl (Sevin SL)		1 qt/acre	12	
	diflourorbenzamide (Dimilin 4L)		1-2 oz/acre	12	Apply to early instars in mid to late June.
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
	spinosad (Conserve SC)		4-16 oz/acre	4	
	tebufenozide (Confirm)		4-8 oz/acre	4	Apply to early instar larvae; foliage development should be a minimum of 20%. DO NOT apply more than 16 oz/acre per year.
Elongate Hemlock Scale	bifenthrin 25% (Sniper)		3.9-12.8 oz/acre	12	Will also control twig aphid and spider mites but not rust mites.
	buprofezin (Talus 70 DF)		14 oz/acre	12	
	buprofezin (Talus 40 SC)		21.5 oz/acre	12	
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	
	dinotefuran (Safari)		4-8 oz/100 gal	12	DO NOT apply more than 2.7 lb per acre.
	esfenvalerate (Asana XL)		5.8-9.6 oz/100 gal	12	Best results when mixed with dimethoate.
	Talus		14 oz/100 gal	12	
European Pine Shoot Moth	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	DO NOT treat plants under extreme heat or drought stress.
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	
	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	12	
Nantucket Pine Tip Moth	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	carbaryl (Sevin SL)		1 qt/acre	12	
	diflourorbenzamide (Dimilin 4L)		1-2 oz/acre	12	Apply when second generation instars are present or 70% of first generation pupal cases are empty.
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	

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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 into soil or applied to areas with permanent ground-cover. DO NOT make more than one application per year. Broadcast: Spread granules in the root zone of 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, Adjourn)		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, Pounce)		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)		1.3-1.5 lb/acre	24	
	tebufenozide (Confirm)		8 oz/acre	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, Adjourn)		5.8-9.6 oz/100 gal	12	
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
Rosette Bud Mite	dimethoate (various brands)		1.3 pt/acre	10 days	
	spirotetramat (Movento)		5-10 oz/acre	24	Maximum use 20 oz/acre per year. Use adjuvant to increase penetration.
Rust Mite	abamectin (Ardent 0.15 EC)		4 oz/100 gal	12	
	chlorpyridan (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 Clean Crop)		1.0-1.5 pt/acre	10 days	
	petroleum oil (Damoil)		2-4 gal/100 gal dormant use 1-3 gal/100 gal summer use	4	
	spirodiclofen (Envidor 2SC)		18-24.7 oz/acre	24	Make only one application per season.

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Sawfly (redheaded pine, red pine, European pine)	carbaryl (Sevin SL)		1 qt/acre	12	
	chlorpyrifos (Nufos 4E)		1 qt/acre	24	
	diflourorbenzamide (Dimilin 4L)		2-4 oz/acre	12	Apply to early instars.
	esfenvalerate (Asana XL, Adjourn)		5.8-9.6 oz/100 gal	12	
	imidacloprid (Couraze 1.6F, Pasada 1.6F, 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/acre per year.
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
	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; see also elongate hemlock scale)	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	chlorpyrifos (Lorsban 4E)		1 qt/acre	24	DO NOT treat plants under extreme heat and drought stress. Apply when scale crawlers are active.
	dinotefuran (Safari)		4-8 oz/100 gal	12	DO NOT apply more than 2.7 lb per acre.
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre/year.
	petroleum oil (Damoil)		2-4 gal/100 gal dormant use 1-3 gal/100 gal summer use	4	
	thiamethoxam (Flagship 25WP)		2-4 oz/100 gal OR 4-8 oz/acre	12	Maximum use 8 oz/acre per year.
Seed Bug	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
	permethrin (Permethrin 3.2 EC)		30 oz/acre	12	
Spider Mite (spruce spider mite)	abamectin (Ardent 0.15 EC)		4 oz/100 gal	12	
	abamectin (Avid 0.15 EC)		4-8 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)	0.3-1.0 oz/gal	30-100 oz/100 gal	4	Spray immediately after mixing.
	bifenazate (Floramite)		2-8 oz/100 gal	12	Add an adjuvant like Silwet L-77 or Slygard 309 to the Floramite solution.
	bifenthrin (Talstar Nursery Flowable)		40 oz/acre	12	

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Spider Mite (spruce spider mite) (cont.)	bifenthrin 25% (Sniper)		3.9-12.8 oz/acre	12	Will also control twig aphid and spider mites but not rust mites.
	bifenthrin (OnyxPro)		1.8-14.4 oz/acre	12	
	chloropyridan (Sanmite)		4 oz/100 gal OR 10.7 oz/acre	12	
	chlorpyrifos (Lorsban 4E, Nufos 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 (Apollo SC)		4-8 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	
	cyflumetofen (Sultan Miticide)		13.7 fl oz/100 gal	12	DO NOT exceed the maximum seasonal use rate of 27.4 fl oz of Sultan per crop growing cycle. DO NOT make more than two (2) applications of Sultan per crop per year
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	
	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 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.
	etoxazole (TetraSan 5 WDG)		8-16 oz/100 gal	12	TetraSan kills mite eggs and nymphs but not adult mites. Treated adults will not produce viable eggs.
	fenpyroximate (Akari 5 SC)		16-24 oz/100 gal	12	
	hexathiazox (Savey) 50 WP	3-6 oz/acre	2 oz/100 gal	12	DO NOT make more than one application per year.
	propargite (Ornamite-CR)		3.0-7.5 lb/acre	7 days	No more than 3 applications per year. Compatibility restrictions.
spirodichlofen (Envidor 2SC)		18-24.7 oz/acre	24	Make only 1 application per season.	
spiromesifen (Judo)		1-4 oz/100 gal	12	DO NOT apply more than 4 times per season.	

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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	
	lambda-cyhalothrin (Lambda-T, Silencer, Warrior)		2.58-5.12 oz/acre	24	Maximum use 1.92 pt/acre per year.
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)	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	chlorpyrifos (Lorsban 4E, Nufos 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, Adjourn)		5.8-9.6 oz/100 gal	12	
	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.
	imidacloprid (Admire Pro)		7-14 oz/acre	12	Maximum per season: 14 oz/acre
	thiamethoxam (Flagship 25WG)		8 oz/acre	12	Apply from adult flight through peak hatch of targeted species.
Zimmerman Pine Moth	azadirachtin (Aza-Direct)		1-2 pt/acre	4	Under extremely heavy pest pressure, up to 3 1/2 pt may be used.
	dimethoate (Dimethoate 400 or Clean Crop)		1.0-1.5 pt/acre	10 days	