

# CHRISTMAS TREE INSECT CONTROL

Will Hudson, Extension Entomologist

PEST	INSECTICIDE AND FORMULATION	AMOUNT/100 GAL.	COMMENTS
Bagworm, Pine webworm, other foliage feeders	dimethoate 2.67EC Sevin 80S Sevin XLR acephate (Orthene 75S and others, Tree & Ornamental Spray Formulations) Spintor 25E	3 pts. 1 1/4 lbs. 1 qt.  1/3 lb. 2/8 fl. oz./acre	Apply when small bagworms are first observed.
Aphids	dimethoate 2.67EC acephate (Orthene 75S and others, Tree & Ornamental Spray Formulations)  thiamethoxam (Flagship 25WG) imidacloprid (Provado, others)	3 pts.  1/3 lb. 2/4 oz.  See label	Apply as needed to prevent aphid and honeydew buildup. A clean/up spray should be applied two weeks prior to harvest. Thorough coverage is critical in aphid clean/up sprays.  Formulations vary.
Hemlock woolly adelgid	dimethoate thiamethoxam (Flagship 25WG)	3 pts. 4 oz.	
Nantucket Pine Tip and other tip moths	Ambush 2EC Asana XL (.66EC) Confirm 2F dimethoate 2.67 EC acephate (Orthene 75SP and others, Tree & Ornamental Spray Formulations) Dimilin 25WP Warrior T Mimic 2LV Spintor 25E	9.6 fl. oz./acre 5.8 / 9.6 fl. oz. 8 fl. oz./acre 3 pts.  1 lb. 4 ozs./acre 3.2 fl. oz./acre 8 fl. ozs./acre 2/8 fl. oz./acre	Use pheromone traps to improve timing of tip moth sprays. Repeat application as needed to prevent young larvae from penetrating tips. Two applications, two weeks apart, are required for each of the third and fourth generations.  Dimilin should be applied only once, at the beginning of the second generation egg hatch. Do not apply more than 16 fl. oz. of Mimic per year. Thorough coverage is very important.
Mites	Vendex 50WP bifentazot (Floramite SC)	8/16 oz. 4/8 ozs.	
Pine needle scale Pine tortoise scale	Superior oil, 70 sec. acephate (Orthene 75SP and others, Tree & Ornamental Spray Formulations)	2 gals.  2/3 lb.	Apply oil as dormant spray. Apply other chemicals when crawlers are active.
Pine weevils (Pales & Pitch eating weevils)  (White pine weevils)	chlorpyrifos (Dursban 4E, others) permethrin (Astro, etc.) bifenthrin (Onyx)  Metasystox/R	1 pt. See label 16 / 32 ozs.  1/2 pts./acre	Apply in early spring when new growth starts and adult weevils are active.
Sawflies	imidacloprid (Provado) Spintor 25C Sevin XLR acephate (Orthene 75S and others)	4/8 oz./acre 2/8 fl. oz./acre 1 qt. 1/3 lb.	Sawflies may be controlled by sprays applied for tip moths.
<p>If different pesticide formulations are used, they should be used at an equivalent amount of actual toxicant per unit (100 gal., acre, or tree).  <b>PLEASE READ ALL INSTRUCTIONS, RESTRICTIONS AND SAFETY REQUIREMENTS ON THE PESTICIDE LABELS.</b></p>			

# CHRISTMAS TREE DISEASE CONTROL

Jean L. Williams-Woodward, Extension Plant Pathologist

CROP	DISEASE	PESTICIDE	RATE	SCHEDULE AND REMARKS
Eastern Red Cedar, Junipers Arizona Cypress Arborvitae Leyland Cypress	Needle blight ( <i>Passalora sequoiae</i> ; syn. <i>Cercosporidium sequoiae</i> )	azoxystrobin Heritage Quadris	4 oz/100 gal 6 fl oz/acre	Apply at 7-14 day intervals depending upon product used. Refer to product labeling for intervals. Spores are initially dispersed in early to mid-June in USDA Zone 7 (Athens, GA), with symptoms and spore release peaking in Aug-Sept. Begin preventive applications by mid-June. Curative applications can reduce disease when applied Aug-Oct when symptoms are first seen. Note: Removal and disposal of infected plant parts can reduce spread. Air-blast applications are not as effective as pistol or direct application to interior of tree.
		Chlorothalonil (Daconil, Bravo)	Labeled rate depending upon formulation.	
		Copper hydroxide (Kocide 2000, 3000; Nu-Cop; CuPRO 2005 T/N/O)	Labeled rate depending upon formulation.	
		Mancozeb (Fore, Dithane, etc.)	1.5 lb/100 gal	
	Phomopsis tip blight ( <i>Phomopsis juniperovora</i> )	azoxystrobin (Heritage)	1 to 4 oz/100 gal	Spray at 7-28 day intervals as needed. Do not make more than 3 sequential applications before rotating with non-strobilurin product
		mancozeb (Fore, Dithane, etc.)	1.5 lb./100 gal	Begin spraying at first sign of disease in a full coverage spray at 7-10 day intervals throughout season.
		propiconazole (Banner MAXX)	5 -8 fl oz/100 gal	Begin at bud break in spring. Spray to drip every 14-21 days.
		thiophanate methyl Cleary 3336WP  Allban Flo	24 oz./100 gal  20 fl oz/100 gal	Begin applications when disease first appears, or during suggested periods of disease incidence. Apply additional applications every 7-14 days.
	Cedar Rust ( <i>Gymnosporangium sp.</i> )	Bordeaux Mixture	8 lbs. copper sulfate + 8 lbs. hydrated lime + 100 gals. water	Spray cedars and junipers from July to August.
		propiconazole (Banner MAXX)	2-4 fl oz./100 gal	Spray to drip. Spray from July through August every 14-21 days.
Pines	Needle diseases ( <i>Lophodermium</i> needle cast, Brown spot, <i>Diplodia</i> tip blight)	azoxystrobin Heritage Quadris	1-4 oz/100 gal 6.0-15.5 fl oz/acre	Begin applications prior to disease development and continue at 7-21 day intervals following resistance management guidelines. Do not apply more than 2 sequential applications before alternating with a fungicide not in FRAC Group 11.
		chlorothalonil (Bravo Ultrex)	5 lbs/100 gal or acre	Make first application in spring prior to bud break. Make applications at 6 to 8 week intervals.
		Ferbam Granuflo	2 lbs./100 gals	Begin application in spring or early summer before infestation occurs. Repeat after heavy rains and at 10-14 day intervals as long as needed.
		mancozeb (Pentathlon DF)	1 to 2 lbs./100 gals	For <i>Lophodermium</i> , spray every 7 to 10 days from mid-August to October.
		propiconazole (Banner MAXX)	5-8 fl oz./100 gal	Spray to drip. Spray from July through August every 14-21 days.
Pine Nursery	Fusiform rust ( <i>Cronartium fusiforme</i> )	Ferbam Granuflo	2 lbs./100 gals	After seedlings emerge, spray at 3-7 day intervals up to July 1. Remove and dispose of infected plants.
		triadimefon (Bayleton 50DF)	4-16 ozs./acre	Apply specified dosage per acre in a uniform spray with a minimum of 20 gals. of water per acre by ground or 5 gals. of water per acre by air. Begin applications prior to infection intervals depending upon disease pressure. Use lower rates in areas of low disease incidence and higher rates in areas of severe disease incidence. A maximum of 4 applications of 16 ozs. per acre may be made per season. A spreader sticker is needed to help adhere spray solution to the pine trees.
		Ziram Granuflo, Ziram 76WP	2 lbs./100 gals. water	Apply at 3 to 5 day intervals from plant emergence to mid-June.

# CHRISTMAS TREE WEED CONTROL

Mark A. Czarnota, Extension Horticulturist - Weed Science

APPLICATION	HERBICIDE FORMULATION	APPLICATION RATE (per/Acre)	REMARKS & PRECAUTIONS
<b>Site Preparation</b>	glufosinate/ ammonium (Finale 1 L)	2/6 qt	<b>Broadleaf weed &amp; grass control.</b> For annual grasses & weeds, apply 2/3 qts. per acre if weeds are less than 6" tall, apply 4 qts. per acre when weeds are greater than 6" tall. For control of perennial grasses & weeds, apply 4 qts. per acre when weeds are less than 8" tall, and 6 qt s. per acre when weeds are taller than 8". <b>Do not apply over-the-top of desirable seedlings.</b>
	glyphosate  Various trade names and formulations.	Refer to lab el	<b>Broadleaf weed &amp; grass control.</b> Glyphosate should be applied prior to transplanting, but after weed emergence. Refer to the label for rates, surfactant recommendations, and tillage delays after application. In areas with severe perennial weed problems such as johnsongrass or bermudagrass, it is advisable to treat area s in late summer or early fall (about six weeks before first frost). This must be done prior to planting trees. <b>Do not apply over-the-top of desirable seedlings.</b>
<b>Seed Bed Preparations</b>	dazomet 99% (Basamid 99 G)	350 lb	<b>Control of germinating weed seed:</b> Refer to label for detailed instructions. Product must be applied to cultivated soil, incorporated, watered in, and sealed with water or a tarp for several days. This product can also control soil borne diseases and nematodes (see label for control directions).
<b>Preemergence<sup>1,2</sup></b>	benefin 1.0% oryzalin 1.0% (XL 2 G)	200/300 lb	<b>Broadleaf weed &amp; grass control.</b> May be applied over the top of established Christmas trees. Do not apply to Douglas/fir or Eastern Hemlock.
	flumioxazin (BroadStar 0.25 GR) (SureGuard 51 WDG)	150 lb 8 / 12 oz.	Provides excellent control of many annual weeds. BroadStar may be used over/the/top of many containerized ornamentals (see label). SureGuard can be used as a post directed spray to containerized an d field grown ornamentals (trees) that have been established for at least one year. Sureguard can also be applied over/the/top of select conifers (see label for precautions and tolerant species)
	isoxaben (Gallery 75 DF)	0.66 / 1.33 lb	<b>Broadleaf weed control.</b> For preemergent control of broadleaf weeds apply to established <sup>2</sup> White fir, Arizona cypress, Eastern redcedar, Norway and Blue spruce, <i>Chamaecyparis</i> spp., <i>Juniperus</i> spp., <i>Thuja</i> spp., and white pine seedlings. Activation requires one/half inch of rainfall, irrigation or soil incorporation within 21 days of application.
	oryzalin (Surflan 4 AS) (Surflan 85 DF)	2.0 / 4.0 qt 2.4 / 7.1 lb 2.4 / 4.7 lb	<b>Broadleaf weed &amp; grass control.</b> Apply as directed spray to soil surface or as in over/the/top in established <sup>2</sup> <i>Abies</i> spp., <i>Cedrus</i> spp., <i>Chamaecyparis</i> spp., <i>Cryptomeria</i> spp., <i>Cupressus</i> spp., Leyland cypress, Deodar cedar, <i>Picea</i> spp., <i>Pinus</i> spp., <i>Tsuga</i> spp., & <i>Taxus</i> spp. The 2 qt. rate will provide 2/4 months of weed control while 4 qt. rat e will extend control to 4/8 months.
	pendimethalin (Pendulum 3.3 EC) (Pendulum AquaCap 3.8 ACS)	2.4 / 4.8 qt 2.1 / 4.2 qt	<b>Broadleaf weed &amp; grass control.</b> Apply at 2.4/4.8 qts./ A. Use low rates for short/term weed control (2/4 months) and higher rates for long term weed control (6/8 months). May be app lied over the top of established <sup>2</sup> Christmas trees. Species listed on label are. <i>Abies</i> spp., <i>Taxus</i> spp., <i>Thuja</i> spp., <i>Tsuga</i> spp., <i>Chamaecyparis</i> spp., <i>Cryptomeria</i> spp., <i>Juniperus</i> spp., <i>Picea</i> spp., <i>Pinus</i> spp., Leyland cypress, Redcedar, and Douglas fir. Do not apply over the top of trees on very hot days or some burn may occur.
	pendimethalin (Pendulum 2G) (Corral 2.68 GR)	100/200 lb 76 / 114 lb	<b>Broadleaf weed &amp; grass control.</b> Use low rates for short term weed control (2/4 months) and higher rates for long term weed control (6/8 months). May be applied over the top of established <sup>2</sup> Christmas trees. Species listed on label are. <i>Abies</i> spp., <i>Taxus</i> spp., <i>Thuja</i> spp., <i>Tsuga</i> spp., <i>Chamaecyparis</i> spp., <i>Cryptomeria</i> spp., <i>Juniperus</i> spp., <i>Picea</i> spp., <i>Pinus</i> spp., Leyland cypress, Redcedar, and Douglas fir.
	prodiamine (Barricade 65 WG) (Barricade 4L)	1/2.3 lb 21 to 48 oz	<b>Broadleaf weed &amp; grass control.</b> May be applied over/the/top of <i>Abies</i> spp., <i>Chamaecyparis</i> spp., <i>Cupressus</i> spp., <i>Juniperus</i> spp., <i>Picea</i> spp., <i>Pinus</i> spp., <i>Taxus</i> spp., <i>Thuja</i> spp., <i>Tsuga</i> spp. seedlings

**CHRISTMAS TREE WEED CONTROL (continued)**

APPLICATION	HERBICIDE FORMULATION	APPLICATION RATE (per/Acre)	REMARKS & PRECAUTIONS
<b>Preemergence</b> <sup>1,2</sup>	simazine (Simazine 4 L and Princep 4 L)	Broadcast/A 2/4 qt	<b>Broadleaf weed &amp; grass control.</b> Apply 2/4 qts. in at least 25 gallons of water per acre over/the/top of 2 year/ old or older established <sup>2</sup> conifers including arborvitae, <i>Abies</i> spp., <i>Picea</i> spp., <i>Taxus</i> spp., white pine, redcedar, and scotch pine. Do not apply more than once a year. Remove weed growth before application.
	simazine (Princep Caliber 90) (Simazine 90 DF) (Simazine 90 WDG) Various trade names available	Broadcast/A 2.2/4.4 lb	<b>Broadleaf weed &amp; grass control.</b> Water dispersible granule. Apply 2.2/4.4 lbs. Princep in at least 25 gallons of water per acre over/the/top of 2 year old or older established <sup>2</sup> conifers including arborvitae, <i>Abies</i> spp., <i>Picea</i> spp., <i>Taxus</i> spp., white pine, redcedar, and scotch pine. Do not apply more than once a year. Remove weed growth before application.
	simazine (Simazine 4 L and Princep 4 L) + oryzalin (Surflan AS)	Broadcast/A 2/4 qt + 2/4 qt	<b>Broadleaf weed &amp; grass control.</b> Apply as directed spray to soil or over/ the/top of 2 year/ old or older established <sup>2</sup> conifers including arborvitae, <i>Abies</i> spp., <i>Picea</i> spp., <i>Taxus</i> spp., white pine, redcedar, and scotch pine. Do not apply more than once a year. Remove weed growth before application. or preemergent control of broadleaf weeds and grasses.
	sulfometuron (Oust XP 75%)	Broadcast/A 2 to 6 oz/A	<b>Broadleaf weed &amp; grass control:</b> Provides excellent long term preemergence weed control when starting with bare ground. Apply to established <i>Pinus</i> spp. Limited information is available on the safe use of other conifers. Initial studies at University of Georgia have indicated safety on plants established 2 years or longer. Rates included in the study were 2 to 6 oz/A, and tolerant species included <i>Abies</i> spp., <i>Cedrus</i> spp., <i>Chamaecyparis</i> spp., and <i>Cupressus</i> spp. Would suggested using Oust on small acreage for 1 to 2 years before large scale usage. Stunting has been reported several species when applied to plants established less than one year.
	trifluralin (Treflan 5G)	Broadcast/A 80 lb	<b>Broadleaf weed &amp; grass control.</b> Apply to established <sup>2</sup> <i>Abies</i> spp., <i>Chamaecyparis</i> spp., <i>Cupressus</i> spp., <i>Juniperus</i> spp., <i>Picea</i> spp., <i>Pinus</i> spp., <i>Taxus</i> spp., & <i>Tsuga</i> spp. seedlings preferably to bare ground. Activate with rain fall or shallow incorporation within 3 days of applications.
	trifluralin & isoxaben (Snapshot 2. 5 TG)	Broadcast/A 100 / 200 lb	<b>Broadleaf weed &amp; grass control.</b> Apply to established 2 <i>Abies</i> spp., <i>Chamaecyparis</i> spp., <i>Cryptomeria</i> spp., <i>Cupressus</i> spp., <i>Juniperus</i> spp., <i>Picea</i> spp., <i>Pinus</i> spp., & <i>Thuja</i> spp., seedlings with a drop or rotary type spreader in late summer to early fall or in early spring before target weeds germinate, or immediately after cultivation. Weed residues must be removed or mixed into the soil before application. One/half inch of rainfall or irrigation, or soil incorporation with in three days after treatment is required for activation. Provides preemergent control of most annual grasses and broadleaf weeds.
<b>Preemergence</b> <sup>1,2</sup> & <b>Postemergence</b>	oxyfluorfen (Goal 2 XL) (GoalTender 4L)	Broadcast/A 4/8 pt 2/4 pt	<b>Broadleaf weed &amp; grass control.</b> Applications may be made prior to weed emergence or to weeds already emerged that are less than 4" tall. Add 0.25% (2 pts./100 gals. of spray solution) of a 80% or greater nonionic surfactant. Apply over/the/top prior to bud break or after foliage has hardened off to the following. <i>Abies</i> spp., <i>Tsuga</i> spp., <i>Pinus</i> spp., <i>Picea</i> spp., <i>Thuja</i> spp., <i>Juniperus</i> spp., and <i>Taxus</i> spp.
	oxyfluorfen (Granular Herbicide 63)	12.5 / 50 lb	Can be applied following seeding. During periods of cool, cloudy weather, make certain that seedlings have hardened off prior to application. Will control many broadleaf weeds and annual grass species from seed or young plants (1 to 3 leaf stage).
	pronamide (Kerb 50 WP)	Broadcast/A 2 to 4 lb	<b>Broadleaf weed &amp; grass control.</b> Apply in fall to 6 month and older Arborvitae, pine, cedar, Hemlock, Juniper, fir, spruce and Yew seedlings for pre and early post/emergence control of winter annual and perennial grasses and preemergence control only of selected broadleaf weeds and some grasses.
<b>Postemergence</b>	clethodim (Envoy Plus 0 .97 L)	Broadcast/A 9 to 32 oz	<b>Grass control.</b> Controls most grasses in over/the/top application to cedars, firs, pines and spruces. For control of annual grasses use a 9/16 oz. rate. For control of perennial grasses use a 12/32 oz. rate. Add a crop oil concentrate at 1% by volume to all treatments.
	clopyralid (Stinger 3 L)	1/5 / 1/4 fl. oz. per gallon	<b>Broadleaf weed control.</b> Spray over/the/top to actively growing balsam fir, blue spruce, Fraser fir, scotch pine, and white pine. Apply 1/4/1/2 pt. Stinger per acre to control annual weeds. For perennial weeds apply 1/2/3 pt. Stinger per acre. Use broadcast or b and application with a minimum of 10 gal. water per acre. Applications may be repeated but do not exceed 2/3 pt./acre. Do not use a crop oil or surfactant.).

**CHRISTMAS TREE WEED CONTROL (continued)**

APPLICATION	HERBICIDE FORMULATION	APPLICATION RATE (per/Acre)	REMARKS & PRECAUTIONS
<b>Postemergence</b>	fluaazifop/P/buytl (Fusilade DX 2L)	8/16 oz	<b>Grass control.</b> Apply to actively growing non/stressed grasses 2/8 inches tall. Perennial grasses such as bermuda grass may require second application to regrowth. Add 1% crop oil concentrate (2 pt./25 gal.) or 0.25% (½ pt. per 25 gal.) nonionic surfactant to all applications. Avoid contact with conifer foliage by directing spray.
	sethoxydim (Segment 1L)	2.25 / 3.75 pt	<b>Grass control.</b> Controls annual and perennial grasses in over/the/top spray in pine, fir, spruce, juniper, and cypress Christmas tree plantations. A crop oil or surfactant is not needed. Use a 1.5 to 2.25 % solution for spot application.
	sethoxydim (Segment 1L) + oxyfluorfen (Goal 2XL)	2.25 / 3.75 pt + 1/2 pt	<b>Broadleaf weed &amp; grass control.</b> Apply as an over/the/top spray in conifer Christmas tree plantation. Do not apply to seedlings less than 10 months old. Apply when weeds are actively growing, but before conifers break bud in spring or after conifer foliage hardens off in the fall.
	sethoxydim (Segment 1L) + clopyralid (Stinger 3 L)	0.5/1.5 pt + 1/4/2/3 pt	<b>Broadleaf weed &amp; grass control.</b> Spray over/the/top to actively growing balsam fir, blue spruce, Fraser fir, scotch pine, and white pine. Apply 1/4/1/2 pt. Stinger per acre to control annual weeds. For perennial weeds apply ½/2/3 pt. Stinger per acre. Use broadcast or band application with a minimum of 10 gal. water per acre. Applications may be repeated but do not exceed 2/3 pt./acre. Do not use a crop oil or surfactant.
<b>Directed &amp; Spot Sprays</b>	2,4/D (Barrage and many others)	Check label	<b>Broadleaf weed control.</b> For herbaceous broadleaf weed control, mix 51 oz. of Barrage in 100 gallons of water, for brush control mix 96 oz. of Barrage in 100 gallons of water. Do not allow spray of drift to contact conifer foliage.
	glufosinate/ ammonium (Finale 1 L)	1.5/4 oz. per gallon of water	<b>Broadleaf weed &amp; grass control.</b> Use the lower rate for control of annual weeds and the higher rate for perennial weeds. DO NOT apply over/the/top of desirable seedlings.
	glyphosate  Various trade names and formulations	Refer to label	<b>Vegetation control:</b> May be applied as a shielded or directed spray to the base of the trees. DO NOT apply over/the/top of desirable seedlings. Injury to trees can occur if the spray contacts the foliage. Use a 0.5% solution for control of annual weeds less than 6" tall (add a nonionic surfactant). A 1/2% solution will control most perennial weeds. Use 5% solution for annual & perennial weed control if spray coverage is not complete. Use a 5/10% solution for woody brush & trees. Refer to the label for rates and surfactant recommendations for specific perennial weeds. Glyphosate is very water soluble and can be tanked mixed with many preemergent herbicides. Refer to glyphosate label to determine compatibility with preemergent herbicides.
	halosulfuron (SedgeHammer 75DF) (Manage 75DF)	0.9 grams (per gallon) 2/3 / 1 1/3 oz	<b>Sedge control:</b> Apply as a post/directed application to control yellow and purple nutsedge in established Christmas trees. Apply with 1/3 fluid ounce of nonionic surfactant. DO NOT allow the spray to contact foliage of Christmas trees. Wait three months after transplanting before application. On areas scheduled to be planted in Christmas trees wait 4 weeks between application and transplanting.
	paraquat (Gramoxone Inteon 2 SL) Various trade names and formulations	1.3 to 4.0 pt (varies by formulation, check label)	Apply as directed spray to control annual weeds in ornamental trees. <b>DO NOT</b> allow spray to contact green stems or foliage of ornamentals. Add a nonionic surfactant. Gramoxone Extra is a Restricted Use Herbicide.

<sup>1</sup> All preemergent herbicides require a rain or irrigation event in order for herbicide activation to occur (approximately 0.5 to 1.0 inch of water). If no rain event occurs and no supplemental watering is provided after a preemergent herbicide application, weed control can be extremely poor.

<sup>2</sup> Most preemergent herbicides will only control germinating weed seed. Generally, preemergent herbicides will not control weeds after they have become established (1<sup>st</sup> or 2<sup>nd</sup> true leaf), and most preemergent herbicides will not control weeds coming from vegetative structures (i.e. yellow and purple nutsedge).