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Christmas Tree Insect Control Recommendations, 2015

A diverse complex of insect pests affect Christmas trees and nearly every part of the tree from the terminal leader to the roots, can be infested by at least one insect pest. Some insects affect multiple conifer species while others are specialists and affect only one species. It is important to know about pest biology and pesticide activity as insecticides must be applied when the susceptible stage of the insect is present.

Timing and Control

Monitoring degree-day accumulation will help you estimate when insects are active. Degree-day accumulation is a way of keeping track of how quickly temperatures warm up in the spring which greatly affects insect development. It is more accurate and reliable to base your scouting and control activities on accumulated degree-days than on the calendar. Generally, insect development progresses only if temperatures are at least 50 degrees F. Therefore, degree-day accumulations are usually based on a threshold temperature of 50 degrees F (DD50). Accumulated degree-days are calculated weekly by Michigan State University (MSU) and are available from the MSU Agricultural Weather site at www.enviroweather.msu.edu

Insect	Life stage	GDD_{50} Months	Control Options	Page # Pest Manual* 1998/2014
Admes mite *Eurytetranycus admes*	Eggs, larva or adults	Spring to fall	abamectin, bifenthrin, bifenazate, chlorpyrifos, clofentezine, cyflumetofen, disulfoton, etoxazole, fenazaquin, hexythiazox, horticutural oil, insecticidal soap, oxydemeton-methyl, peppermint and rosemary oil, propargite, spirodiclofen	**NA/28**
ants *Formica spp.*		Spring to fall	bifenthrin, carbaryl, chlorpyrifos, thiamethoxam	**113/137**
aphids (Cinara spp., spotted and white pine aphid)	when aphids abundant	Spring to fall	abamectin, acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, disulfoton, horticulture oil, imidacloprid, insecticidal soap, malathion, oxydemeton-methyl, peppermint and rosemary oil, pymetrozine, spirotetramat, thiamethoxam	**76/89**
bagworm *Thyridopteryx ephemeraeformis*	shortly before egg hatch when bags are still small	early to mid June	acephate, azdirachtin, Bacillus thuringiensis subsp. Kurstaki stain ABTX-351 or EG7841, biefenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, emamectin benzoate, flubendiamid, malathion, methoxyfenozide, permethrin, spinosad tebufenozide	**57/65**

Insect	Life stage	GDD_{50} Months	Control Options	Page # Pest Manual* 1998/2014
balsam gall midge *Paradiplosis tumifex*	adults laying eggs galls apparent	150-300 550-700	acephate, azdirachtin, bifenthrin, chlorpyrifos, cyfluthrin, esfenvalerate, thiamothoxam	**27/30**
balsam fir sawfly *Neodiprion abieties*	Treat if the larvae are abundant in early to midsummer	June-July	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, horticulture oil, imidacloprid, insecticidal soap, malathion, phosmet, spinosad, thiamethoxam	**NA/66**
balsam shoot boring sawfly *Pleroneura brunneicornis*	Treat when caterpillars are small and before much feeding injury occurs		acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, horticulture oil, imidacloprid, insecticidal soap, malathion, phosmet, spinosad, thiamethoxam	**NA/90**
balsam twig aphid *Mindarus abietis*	egg hatch stem mothers present (control target)	60-100 100-140	abamectin, acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, disulfoton, esfenvalerate, imidacloprid, insecticidal soap, horticulture oil, malathion, oxydemeton-methyl, peppermint and rosemary oil, pymetrozine, spirotetramat, thiamethoxam	**29/32**
balsam wooly adelgid *Adelges piceae*	First generation of crawlers	May-July	acephate, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, horticulture oil, imidacloprid, insecticidal soap, oxydemeton-methyl, spirotetramat, thiamethoxam	**NA/91**
conifer root aphid *Prociphilus americanus*			imidacloprid	**NA/139**
Cooley spruce gall adelgid *Adelges cooleyi*	1st adults active - *Spruce* 1st adults active - *Douglas-fir* 1st galls visible - *Spruce* 1st nymphs - *Douglas-fir* 2nd nymphs - *Douglas-fir* 2nd adults active	25-120 90-180 200-310 90-150 600-1000 1500-1600	acephate, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, horticulture oil, imidacloprid, insecticidal soap, oxydemeton-methyl, spirotetramat, thiamethoxam	**106/128**

Insect	Life stage	GDD_{50} Months	Control Options	Page # Pest Manual* 1998/2014
Douglas-fir needle midge *Contarinia pseudotsuga*	Time application within a week after first adults are detected in traps.	200-250	acephate, azdirachtin, bifenthrin, chlorpyrifos, cyfluthrin, esfenvalerate, thiamothoxam	**NA/35**
eastern pine shoot borer *Eucosma gloriola*	1st adults active	75-200	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, imidacloprid, malathion, permethrin, phosmet, spinosad	**79/98**
eastern pine weevil (formerly northern pine weevil) *Pissodes nemorensis*	1st adults active 2nd adults active	25-100 1200-1400	acephate, azadirachtin, bifenthrin, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, oxydemeton-methyl. phosmet	**85/100**
eastern spruce gall adelgid *Adelges abietis*	1st adults active egg hatch, galls begin forming 2nd adults active	25-100 250-310 1500-1600	acephate, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, horticulture oil, imidacloprid, insecticidal soap, oxydemeton-methyl, spirotetramat, thiamethoxam	**107/131**
elongated hemlock scale *Fiorinia externa*	dormant prior to bud break When crawlers are active, may take several applications due to staggered life cycle	mid-March to mid-April June-October	dormant oil acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, horticultural oil, imidacloprid, insecticidal soap, malathion, oxydemeton-methyl, spirotetramat	**NA/39**
eriophyid mites *Setoptus and Nalepella spp.*	when mites are present	May - September	abamectin, carbaryl, fenazaquin, horticulture oil, spirodiclofen	**35/40**
European pine sawfly *Neodiprion sertifer*	1st larvae	100-195	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, horticulture oil, imidacloprid, insecticidal soal, malathion, phosmet, spinosad, thiamethoxam	**58/67**

Insect	Life stage	GDD_{50} Months	Control Options	Page # Pest Manual* 1998/2014
European pine shoot moth *Rhyacionia buoliana*	1st larvae egg hatch adults active	50-220 900-1000 700-800	acephate, azadirachtim, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, malathion, methoxyfenozide, phosmet, tebufenozide	**80/101**
grasshopper *Melanoplus spp.*	Mid-summer		acephate, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate	**59/69**
gypsy moth *Lymantria dispar*	egg hatch, 1st larvae young caterpillars pupation	145-200 450 900-1200	acephate, azadirachtin, *Bacillus thuringiensis (Bt),* bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, emamectin benzoate, flubendiamide, insecticidal soap, methoxyfenozide,oxydemeton-methyl, phosmet, spinosad, tebufenozide	**60/70**
introduced pine sawfly *Diprion similis*	1st larvae	400-600	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, imidacloprid, insecticidal soap, malathion, phosmet, spinosad, thiamethoxam	**62/72**
jack pine budworm *Choristoneura pinus pinus*	young larvae feeding large larvae feeding defoliation noticeable	300-350 650-700	acephate, azadirachtin, *Bacillus thuringiensis,* bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, flubendiamide, methoxyfenozide, spinosad, tebufenozide	**63/73**
jack pine tip beetle *Conopthorus resinosae*	shear off injured tips	summer to fall	Insecticides not needed & likely to be ineffective	**82/103**
Japanese beetle *Popillia japonica*	adult foliar feeding	950-2150	azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, malathion, methoxyfenozide, permethrin, phosmet	
Nantucket pine tip moth *Rhyacionia frustrana*	young larvae	mid-May -mid June	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, imidacloprid, malathion, methoxyfenozide, permethrin, sphosmet, spinosad	**84/105**

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northern pitch twig moth *Retinia albicapitana*	clip flagged branches or break open blister and crush larvae		Insecticides not needed & likely to be ineffective	**109/132**
Pales weevil *Hylobius pales*	1st adults active 2nd adults active	25-100 1200-1400	acephate, azadirachtin, bifenthrin, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, oxydemeton-methyl. phosmet	**86/106**
pine bark adelgid *Pineus strobi*		April - mid-May	bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, horticulture oil, imidacloprid, insecticidal soap, oxydemeton-methyl, spirotetramat, thiamethoxam	**117/142**
pine bark beetle (pine engraver) *Ips spp.*			azadirachtin, bifenthrin, carbaryl	**NA/153**
pine chafer *Anomela oblivia*	1st adults active	450-600	azadirachtin, cyfluthrin, esfenvalerate	**64**
pine false webworm *Acantholyda erythrocephala*				**71/75**
pine needle midge *Contarinia baeri*	1st adults active	400-500	acephate, azdirachtin, bifenthrin, chlorpyrifos, cyfluthrin, esfenvalerate, thiamothoxam	**65**
pine needle scale *Chionaspis pinifoliae*	1st generation egg hatch 1st generation - hyaline stage (control target) 2nd generation egg hatch 2nd generation - hyaline stage (control target)	250-400 400-500 1250-1350 1500	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, horticultural oil, imidacloprid, insecticidal soap, malathion, oxydemeton-methyl, spirotetramat	**44/50**
pine root collar weevil *Hylobius radicis*	1st adults active 2nd adults active	300-350 1200-1400	acephate, azadirachtin, bifenthrin, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, oxydemeton-methyl. phosmet	**118/143**

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pine root tip weevil *Hylobius rhizophagus*			cyfluthrin	**89/110**
Pine shoot beetle *Tomicus piniperda*	new adults emerge begin shoot-feeding optimal control window	 500-550 450-500	bifenthrin, chlorpyrifos, cyfluthrin	**90/111**
pine spittlebug *Aphrophora parallela*	when 95% of spittle masses on pines are empty	late June to mid July	bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, spirotetramat	**92/113**
pine thrips *Gnophothrips spp.*			acephate, azadirachtin, carbaryl, bifenthrin, malathion, oxydemeton-methyl, thiamethoxam	**45/51**
pine tortoise scale *Toumeyella parvicornis*	egg hatch begins; 1st crawlers egg hatch ends crawlers settling	400-500 1000-1200	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, horticultural oil, imidacloprid, insecticidal soap, malathion, oxydemeton-methyl, spirotetramat	**93/114**
pine tube moth *Argyrotaenia pinatubana*			Insecticide rarely needed	**66/77**
pine tussock moth *Dasychira pinicola*	larvae feeding on foliage	late May to mid June	acephate, azadirachtin, *Bacillus thuringiensis (Bt),* bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, emamectin benzoate, flubendiamide, insecticidal soap, methoxyfenozide,oxydemeton-methyl, phosmet, spinosad, tebufenozide	**67/78**
pine webworm *Pococera robustella*				**71/79**
red-headed pine sawfly *Neodiprion lecontei*	1st larvae	400-600	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, imidacloprid, malathion, phosmet, spinosad, thiamethoxam	**68/80**

Insect	Life stage	GDD_{50} Months	Control Options	Page # Pest Manual* 1998/2014
Saratoga spittlebug *Aphrophora saratogensis*	When all or nearly all (90%) spittlemasses on sweetfern plants are empty. Control sweetfern in plantation.	late June to mid-July	bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, spirotetramat	**95/115**
spruce budscale *Physokermes piceae*	egg hatch, 1st crawlers	700-1150	acephate, azadirachtin, bifenthrin, buprofezin, carbaryl, chlorpyrifos, cyfluthrin, disulfoton, horticultural oil, insecticidal soap, malathion, oxydemeton-methyl, spirotetramat	**99/119**
spruce budworm *Choristoneura fumiferana*	1st larvae	200-300	acephate, *Bacillus thuringiensis*, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, diflubenzuron, emamectin benzoate, esfenvalerate, flubendiamide, methoxyfenozide, spinosad, tebufenozide	**69/82**
spruce-fir looper *Macaria signaria*			bifenthrin, cyfluthrin, diflubenzuron, emamectin benzoate, methoxyfenozide, spinosad	**NA/83**
spruce gall midge *Mayetiola piceae*	adult emerge eggs hatch (control window)	70-100 130-145	azadirachtin, carbaryl, chlorpyrifos, cyfluthrin, thiamethoxam	**NA/133**
spruce needleminers *Taniva albolineana, Epinotia nanana, Coleotchnites piceaella*	1st larvae	150-200	bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, esfenvalerate, permethrin, spinosad	**70/84**
spruce spider mite *Oligonychus ununguis*	1st egg hatch	150-175	abamectin, bifenthrin, bifenazate, chlorpyrifos, clofentezine, cyflumetofen, disulfoton, etoxazole, fenazaquin, hexythiazox, horticutural oil, insecticidal soap, oxydemeton-methyl, peppermint and rosemary oil, propargite, spirodiclofen	**51/84**
striped pine scale *Toumeyella pini (King)*	egg hatch	750-800	acephate, azadirachtin, bifenthrin, carbaryl, chlorpyrifos, cyfluthrin, horticultural oil, imidacloprid, insecticidal soap, malathion, oxydemeton-methyl, spirotetramat	**93/114***

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white grubs *Phyllophaga and Polyphylla spp.* *Rhizotrogus majalis*			carbaryl, imidacloprid	**123/151**
white pine weevil *Pissodes strobi*	1st adults active 2nd adults active	25-220 1200-1400	acephate, azadirachtin, bifenthrin, chlorpyrifos, cyfluthrin, diflubenzuron, esfenvalerate, oxydemeton-methyl. phosmet	**101/122**
Zimmerman pine moth *Dioryctria zimmermani*	1st larvae adult flight	25-100 1700	acephate, bifenthrin, chlorpyrifos, cyfluthrin, diflubenzuron, methoxyfenozide	**126/156**

* **Christmas Tree Pest Manual, Second Edition (MSU Extension Bulletin E-2676) / Christmas Tree Pest Manual, Third Edition, 2014**