

CONIFER PEST SCOUTING – BY INSECT GROUP – 1

Adelgids						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Adelgid	Pine bark adelgid	<i>Pineus strobi</i>	22	58	2	Spring control of overwintering stage
Adelgid	Eastern spruce gall adelgid	<i>Adelges abietis</i>	25	100	3	Spring control of overwintering stage
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	25	120	3	Spring control of overwintering stage
Adelgid	Pine bark adelgid	<i>Pineus strobi</i>	58	618	2	Spring control of overwintering stage
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	90	180	4	1st adults active - Douglas fir
Adelgid	Hemlock woolly adelgid	<i>Adelges tsugae</i>	150	150	RU	Eggs and 10% hatch
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	200	310	4	1st galls visible - Spruce
Adelgid	Eastern spruce gall adelgid	<i>Adelges abietis</i>	250	310	5	egg hatch, galls begin forming (not a control target)
Adelgid	Hemlock woolly adelgid	<i>Adelges tsugae</i>	350	350	RU	Eggs and 50% hatch
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	600	1000	7	Nymphs active - Douglas fir (control target)
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	1500	1775	RU	Adults/nymphs (Douglas Fir)
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	1850	1950	RU	Galls open (Spruce)
Adelgid	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>	2800	3000	3	Fall control of overwintering stage
Adelgid	Eastern spruce gall adelgid	<i>Adelges abietis</i>	2800	3000	3	Fall control of overwintering stage
Aphids						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Aphid	Balsam twig aphid	<i>Mindarus abietinus</i>	60	100	4	Egg hatch
Aphid	Balsam twig aphid	<i>Mindarus abietinus</i>	100	150	4	Stem mothers present (control target)
Aphid	White pine aphid	<i>Cinara strobi</i>	1991	2271	RU	Adults
Beetles						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Beetle	Pine engraver (Ips bark beetle)	<i>Ips spp.</i>	100	150	4	1st adults active
Beetle	Turpentine beetle	<i>Dendroctonus terebrans</i>	300	350	4	Parent beetles colonizing brood material
Beetle	Pine shoot beetle	<i>Tomicus piniperda</i>	450	500	4	Adults emerge; begin shoot feeding - control target
Beetle	Pine Chafer (Anomela Beetle)	<i>Anomala obliqua</i>	450	600	7	Adults (1st generation)
Caterpillar / Moths / Borers						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Caterpillar	Eastern pine shoot borer	<i>Eucosma gloriola</i>	75	200	4	1st adults active
Caterpillar	Nantucket tip moth	<i>Rhyacionia frustrana</i>	1514	1917	RU	Adults 2nd generation
Caterpillar	Zimmerman pine moth	<i>Dioryctria zimmermani</i>	25	100	3	1st larvae
Caterpillar	European pine shoot moth / borer	<i>Rhyacionia buoiana</i>	50	220	4	1st larvae active
Caterpillar	Larch casebearer	<i>Coleophora laricella</i>	120	150	4	Egg hatch
Caterpillar	Spruce needleminer	<i>Endothenia albolineana</i>	150	200	4	1st larvae active
Caterpillar	Arborvitae leafminer	<i>Argyresthia thuiella</i>	245	360	RU	Larvae Treatments (1st generation)
Caterpillar	Pine sawflies (Red-headed)	<i>Neodiprion lecontei</i>	246	1388	RU	Larvae (1st generation)
Caterpillar	Larch casebearer	<i>Coleophora laricella</i>	363	618	2,4	Nymphs active - typical treatment window
Caterpillar	Hemlock looper	<i>Lambdina fiscellaria</i>	448	707	5	Typical treatment window
Caterpillar	European pine shoot moth	<i>Rhyacionia buoliana</i>	480	710	5	Larvae Treatment
Caterpillar	Arborvitae Leafminer	<i>Argyresthia thuiella</i>	533	700	RU	Adults (egg laying) - larvae treatments
Caterpillar	Juniper webworm	<i>Dichomeris marginella</i>	1645	1917	RU	Larvae Treatment
Caterpillar	Arborvitae leafminer	<i>Argyresthia thuiella</i>	1800	2200	RU	Larvae Treatment (3rd generation)
Caterpillar	Zimmerman pine moth	<i>Dioryctria zimmermani</i>	1917	2154	5	Treatment window (adult flight-1700 GDD)
Caterpillar	Bagworm	<i>Thyridopteryx ephemeraeformis</i>	600	900	RU	Larvae (early instars) - ONLY CONTROL WINDOW
Midges / Borers						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Midge	Balsam gall midge	<i>Paradiplosis tumifex</i>	150	300	4	Adults laying eggs
Midge	Douglas fir needle midge	<i>Contarinia pseudotsugae</i>	200	400	3	Adults emerge from soil
Midge	Pine needle midge	<i>Thecodiplosis brachyteroides</i>	400	500	7	Adults (1st generation)
Midge	Balsam gall midge	<i>Paradiplosis tumifex</i>	550	700	4	Galls apparent
Note: Growing degree-day values utilize daily average air temperatures with a minimum temperature threshold (a.k.a. 'base') of 50F = GDD50 (max. temp. threshold set at 95F). These values are accumulated from a biofix date, such as January or March 1st in the NE USA. Provided GDD50 are scouting ranges and should be truthed.						
Daily GDD50 = (Max + Min temp.) / 2 - 50 (min temp. threshold)						
References			RU	Rutgers Cooperative Extension - Landscape IPM Notes		
			2	http://cctetompkins.org/resources/using-growing-degree-days-for-insect-management		
			3	https://extension.psu.edu/ipm-basics-for-christmas-trees#section-2		
			4	https://www.canr.msu.edu/ipm/agriculture/christmas_trees/gdd_of_conifer_insects		
			5	https://www.agriculture.nh.gov/publications/forms/documents/landscape-pests.pdf		
			6	https://extension.umd.edu/ipm/pest-predictive-calendar-landscapenursery		
			7	https://www.canr.msu.edu/ipm/agriculture/christmas_trees/gdd_of_landscap_insects		
			Unv. Del.	Coorespondance with Dr. Kunkel (University of Delaware) evolving.gdd.ranges		
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CONIFER PEST SCOUTING – BY INSECT GROUP – 2

Mites						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Mite	Conifer rust mites	<i>Eriophyidae</i>	7	22	4	Overwintering eggs hatch
Mite	Spruce spider mite	<i>Oligonychus ununguis</i>	7	121	RU	Overwintering eggs hatch
Mite	Spruce spider mite	<i>Oligonychus ununguis</i>	150	175	4	1st egg hatch
Mite	Spruce spider mite	<i>Oligonychus ununguis</i>	190	363	RU	Immatures/Adults
Mite	Pine eriophyid mites	<i>Eriophyidae</i>	298	533	5	Typical treatment window
Mite	Rust-mites	<i>Nalepella and Setoptus spp.</i>	1644	2030	RU	Nymphs / adults
Mite	Spruce spider mite	<i>Oligonychus ununguis</i>	2375	2806	5	Typical treatment window

Scale Insects						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Scale	Taxus mealybug	<i>Dysmicoccus wistariae</i>	7	91	2	Spring control of overwintering stage
Scale	Elongate hemlock scale	<i>Fiorinia externa</i>	7	120	2	Spring control of overwintering stage
Scale	Spruce bud scale	<i>Physokermes piceae</i>	22	120	2	Spring control of overwintering stage
Scale	Juniper scale	<i>Carulaspis juniperi</i>	22	148	2	Spring control of overwintering stage
Scale	Fletcher scale	<i>Parthenolecanium</i>	35	148	2	Spring control of overwintering stage
Scale	Pine tortoise scale	<i>Toumeyella parvicornis</i>	58	148	2	Crawler activity
Scale	Pine Needle Scale	<i>Chionaspis pinifoliae</i>	298	448	RU	Crawlers (1st generation) - control target
Scale	Elongate Hemlock Scale	<i>Fiorinia externa</i>	360	700	RU	Crawlers (1st generation)
Scale	Striped pine scale	<i>Toumeyella sp.</i>	400	500	3	Crawlers (1st generation)
Scale	Pine tortoise scale	<i>Toumeyella parvicornis</i>	400	1000	4	Crawlers
Scale	Juniper scale	<i>Carulaspis juniperi</i>	550	700	7	Egg hatch
Scale	Cryptomeria scale	<i>Aspidiotus cryptomeriae</i>	600	800	3	First crawler emergence
Scale	Spruce budscale	<i>Physokermes hemicryphus</i>	700	1150	4	Crawlers (1st generation)
Scale	Juniper scale	<i>Carulaspis juniperi</i>	707	1260	RU	Crawlers (1st generation)
Scale	Striped pine scale	<i>Toumeyella pini</i>	750	800	4	Egg hatch
Scale	Pine tortoise scale	<i>Toumeyella parvicornis</i>	1000	1200	4	Egg hatch ends, last of crawlers
Scale	Pine Needle Scale	<i>Chionaspis pinifoliae</i>	1290	1917	3	Crawlers emerge (2nd generation) - control target
Scale	Hemlock scale	<i>Abgrallaspis ithacae</i>	1388	2154	5	Typical treatment window
Scale	Cryptomeria scale	<i>Aspidiotus cryptomeriae</i>	1750	2130	RU, 4	Crawlers emerge (2nd generation)
Scale	Maskell scale	<i>Iepidosaphes pallia</i>	2035	-	6	Egg hatch / crawler (2nd generation)
Scale	Elongate hemlock scale	<i>Fiorinia externa</i>	2515	2625	RU	Typical treatment window - fall activity

Sawfly						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Wasp	European pine sawfly	<i>Neodiprion sertifer</i>	35	145	1	Hatched larvae
Wasp	European pine sawfly	<i>Neodiprion sertifer</i>	100	195	4	1st larvae active

Weevil						
Pest Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Reference	Developmental / Target Stage
Weevil	White pine weevil	<i>Pissodes strobi</i>	7	58	RU	Overwintering adults become active / prevent egg laying
Weevil	Pales weevil	<i>Hylobius pales</i>	7	121	RU	Overwintering adults become active / prevent egg laying
Weevil	Northern pine weevil	<i>Pissodes approximatus</i>	25	100	4	1st adults active
Weevil	White pine weevil	<i>Pissodes strobi</i>	25	220	4	1st adults active
Weevil	Pine root collar weevil	<i>Hylobius radialis</i>	300	350	4	1st adults active
Weevil	Northern pine weevil	<i>Pissodes nemorensis</i>	1200	1400	4	2nd generation adults active
Weevil	Pales weevil	<i>Hylobius pales</i>	1200	1400	4	Adults 2nd generation
Weevil	Pine root collar weevil	<i>Hylobius radialis</i>	1200	1400	4	2nd generation adults active
Weevil	White pine weevil	<i>Pissodes strobi</i>	1200	1400	4	2nd generation adults active

Note: Growing degree-day values utilize daily average air temperatures with a minimum temperature threshold (a.k.a. 'base') of 50F = GDD50 (max. temp. threshold set at 95F). These values are accumulated from a biofix date, such as January or March 1st in the NE USA. Provided GDD50 are scouting ranges and should be truthed.

$$\text{Daily GDD50} = \frac{(\text{Max} + \text{Min temp.})}{2} - 50 \text{ (min temp. threshold)}$$

References

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5	https://www.agriculture.nh.gov/publications-forms/documents/landscape-pests.pdf
6	https://extension.umd.edu/ipm/pest-predictive-calendar-landscape-nursery
7	https://www.canr.msu.edu/ipm/agriculture/christmas_trees/gdd_of_landscape_insects
Unv. Del.	Correspondence with Dr. Kunkel (University of Delaware) <i>evolving GDD ranges</i>

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