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New Jersey Agricultural
Experiment Station

Beta-version 2022

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Conifer Pest Scouting

Scouting with growing degree-days

Rutgers Green Industry Working Group

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Conifer Pest Scouting Guide

~beta-version 2022~

Timing is everything in pest management! You must obtain your local growing degree-day accumulation values to use this pest scouting guide. Degree-day models allow us to predict when to scout for pests and when to target vulnerable life stages of pest development (egg hatch, adult emergence, crawler activity, adult flight). Growing degree-days (GDD_{50}) refer to the accumulation of heating units, which are the average air temperature over a 24h period minus the minimum temperature threshold. A 'growing' degree-day, means the **min. (or base) temperature threshold is 50°F,** whereas the **max. temperature threshold is most often set to 95°F**. Growing degree-days are not exact and should be viewed as *ranges,* i.e. begin scouting prior to GDD_{50} expectations for any given pest. Blind pesticide applications, without ground-truthing the pest's development stage, may not deliver desired outcomes in terms of control or ecological impacts on beneficials or wildlife. Please alert twaller@njaes.rutgers.edu if pest observations differ from those listed here.

Approximate 2021 Growing Degree-days as reference - Differ from region to region, year to year													
Region	Location	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	1-Nov	1-Dec
Southern	Upper Deerfield (NJ50)	0	0	0	75	229	591	1294	2100	2937	3495	3721	3725
Central	Howell / Freehold (NJ10)	0	0	0	67	153	440	1090	1838	2622	3134	3316	3316
Northern – West	High Point (NJ59)	0	0	0	21	92	353	910	1519	2195	2582	2649	2649
Northern – Metro	Oakland (D6302)	0	0	0	45	160	488	1140	1867	2621	3100	3207	3207
Compiled using USPEST.ORG (Base 50, Degree-day calculator(general purpose), Simple average/growing dds (min. 50F - Max. 95F))													

Pest Scouting – Growing Degree-day Ranges						0 – 75 GDD50
Crop Type	**Common Name**	***Scientific Name***	**GDD Min (50F)**	**GDD Max (95F)**	**Ref.**	**Developmental / Target Stage**
Conifer	**Taxus mealybug**	*Dysmicoccus wistariae*	7	91	2	Spring control of overwintering stage
Conifer	**Conifer rust mites**	*Eriophyidae*	7	22	4	Overwintering eggs hatch
Conifer	**Elongate hemlock scale**	*Fiorinia externa*	7	120	2	Spring control of overwintering stage
Conifer	**Pales weevil**	*Hylobius pales*	7	121	RU	Overwintering adults become active / prevent egg laying
Conifer	**Spruce spider mite**	*Oligonychus ununguis*	7	121	RU	Overwintering eggs hatch
Conifer	**White pine weevil**	*Pissodes strobi*	7	58	RU	Overwintering adults become active / prevent egg laying
Conifer	**Juniper scale**	*Carulaspis juniperi*	22	148	2	Spring control of overwintering stage
Conifer	**Spruce bud scale**	*Physokermes piceae*	22	120	2	Spring control of overwintering stage
Conifer	**Pine bark adelgid**	*Pineus strobi*	22	58	2	Spring control of overwintering stage
Conifer	**Eastern spruce gall adelgid**	*Adelges abietis*	25	100	3	spring control of overwintering stage
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	25	120	3	Spring control of overwintering stage
Conifer	**Zimmerman pine moth**	*Dioryctria zimmermani*	25	100	3	1st larvae
Conifer	**Northern pine weevil**	*Pissodes approximatus*	25	100	4	1st adults active
Conifer	**White pine weevil**	*Pissodes strobi*	25	220	4	1st adults active
Conifer	**European pine sawfly**	*Neodiprion sertifer*	35	145	1	Hatched larvae
Conifer	**Fletcher scale**	*Parthenolecanium fletcheri*	35	148	2	Spring control of overwintering stage
Conifer	**European pine shoot moth / borer**	*Rhyacionia buoiana*	50	220	4	1st larvae active
Conifer	**Pine bark adelgid**	*Pineus strobi*	58	618	2	Spring control of overwintering stage
Conifer	**Pine tortoise scale**	*Toumeyela parvicornis*	58	148	2	Cralwer activity
Conifer	**Balsam twig aphid**	*Mindarus abietinus*	60	100	4	Egg hatch

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See final page for additional resources, including how to obtain your local degree-days

Pest Scouting – Growing Degree-day Ranges						75 – 550 GDD50
Crop Type	**Common Name**	***Scientific Name***	**GDD Min (50F)**	**GDD Max (95F)**	**Ref.**	**Developmental / Target Stage**
Conifer	**Eastern pine shoot borer**	*Eucosma gloriola*	75	200	4	1st adults active
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	90	180	4	1st adults active - Douglas fir
Conifer	**Pine engraver (Ips bark beetle)**	*Ips spp.*	100	150	4	1st adults active
Conifer	**Balsam twig aphid**	*Mindarus abietinus*	100	150	4	Stem mothers present (control target)
Conifer	**European pine sawfly**	*Neodiprion sertifer*	100	195	4	1st larvae active
Conifer	**Larch casebearer**	*Coleophora laricella*	120	150	4	Egg hatch
Conifer	**Hemlock Woolly Adelgid**	*Adelges tsugae*	150	150	RU	Eggs and 10% hatch
Conifer	**Spruce needleminer**	*Endothenia albolineana*	150	200	4	1st larvae active
Conifer	**Spruce spider mite**	*Oligonychus ununguis*	150	175	4	1st egg hatch
Conifer	**Spruce spider mite**	*Oligonychus ununguis*	150	175	4	1st egg hatch
Conifer	**Balsam gall midge**	*Paradiplosis tumifex*	150	300	4	Adults laying eggs
Conifer	**Spruce spider mite**	*Oligonychus ununguis*	190	363	RU	Immatures/Adults
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	200	310	4	1st galls visible - Spruce
Conifer	**Douglas fir needle midge**	*Contarinia pseudotsugae*	200	400	3	Adults emerge from soil
Conifer	**Arborvitae leafminer**	*Argyresthia thuiella*	245	360	RU	Larvae Treatments (1st generation)
Conifer	**Pine sawflies (Red-headed)**	*Neodiprion lecontei*	246	1388	RU	Larvae (1st generation)
Conifer	**Eastern spruce gall adelgid**	*Adelges abietis*	250	310	5	egg hatch, galls begin forming (not a control target)
Conifer	**Pine Needle Scale**	*Chionaspis pinifoliae*	298	448	RU	Crawlers (1st generation) - control target
Conifer	**Pine eriophyid mites**	*Eriophyidae*	298	533	5	Typical treatment window
Conifer	**Turpentine beetle**	*Dendroctonus terebrans*	300	350	4	Parent beetles colonizing brood material
Conifer	**Pine root collar weevil**	*Hylobius radicis*	300	350	4	1st adults active
Conifer	**Hemlock Woolly Adelgid**	*Adelges tsugae*	350	350	RU	Eggs and 50% hatch
Conifer	**Elongate Hemlock Scale**	*Fiorinia externa*	360	700	RU	Crawlers (1st generation)
Conifer	**Larch casebearer**	*Coleophora laricella*	363	618	2,4	Nymphs active - typical treatment window
Conifer	**Pine needle midge**	*Thecodiplosis brachynteroides*	400	500	7	Adults (1st generation)
Conifer	**Pine tortoise scale**	*Toumeyella parvicornis*	400	1000	4	Crawlers
Conifer	**Striped pine scale**	*Toumeyella sp.*	400	500	3	Crawlers (1st generation)
Conifer	**Hemlock looper**	*Lambdina fiscellaria*	448	707	5	Typical treatment window
Conifer	**Pine Chafer (Anomela Beetle)**	*Anomala oblivia*	450	600	7	Adults (1st generation)
Conifer	**Pine shoot beetle**	*Tomicus piniperda*	450	500	4	Adults emerge; begin shoot feeding - control target
Conifer	**European pine shoot moth**	*Rhyacionia buoliana*	480	710	5	Larvae Treatment
Conifer	**Arborvitae Leafminer**	*Argyresthia thuiella*	533	700	RU	Adults (egg laying) - larvae treatments

Pest Scouting – Growing Degree-day Ranges						550 – 2800 GDD50
Crop Type	**Common Name**	***Scientific Name***	**GDD Min (50F)**	**GDD Max (95F)**	**Ref.**	**Developmental / Target Stage**
Conifer	**Juniper scale**	*Carulaspis juniperi*	550	700	7	Egg hatch
Conifer	**Balsam gall midge**	*Paradiplosis tumifex*	550	700	4	Galls apparent
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	600	1000	7	Nymphs active - Douglas fir (control target)
Conifer	**Cryptomeria scale**	*Aspidiotus cryptomeriae*	600	800	3	First crawler emergence
Conifer	**Cryptomeria scale**	*Aspidiotus cryptomeriae*	600	800	RU	Crawlers (1st generation)
Conifer	**Bagworm**	*Thyridopteryx ephemeraeformis*	600	900	RU	Larvae (early instars) - ONLY CONTROL WINDOW
Conifer	**Spruce budscale**	*Physokermes hemicryphus*	700	1150	4	Crawlers (1st generation)
Conifer	**Juniper scale**	*Carulaspis juniperi*	707	1260	RU	Crawlers (1st generation)
Conifer	**Striped pine scale**	*Toumeyella pini*	750	800	4	Egg hatch
Conifer	**Pine tortoise scale**	*Toumeyella parvicornis*	1000	1200	4	Egg hatch ends, last of crawlers
Conifer	**Pales weevil**	*Hylobius pales*	1200	1400	4	Adults 2nd generation
Conifer	**Pine root collar weevil**	*Hylobius radicis*	1200	1400	4	2nd generation adults active
Conifer	**Northern pine weevil**	*Pissodes nemorensis*	1200	1400	4	2nd generation adults active
Conifer	**White pine weevil**	*Pissodes strobi*	1200	1400	4	2nd generation adults active
Conifer	**Pine Needle Scale**	*Chionaspis pinifoliae*	1250	1350	7	Crawlers (2nd generation)
Conifer	**Pine Needle Scale**	*Chionaspis pinifoliae*	1290	1917	3	Crawlers emerge (2nd generation)
Conifer	**Hemlock scale**	*Abgrallaspis ithacae*	1388	2154	5	Typical treatment window
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	1500	1775	RU	Adults/nymphs (Douglas Fir)
Conifer	**Pine Needle Scale**	*Chionaspis pinifoliae*	1500	-	4	Hyaline crawlers = treatment timing
Conifer	**Nantucket tip moth**	*Rhyacionia frustrana*	1514	1917	RU	Adults 2nd generation
Conifer	**Rust-mites**	*Nalepella and Setoptus spp.*	1644	2030	RU	Nymphs / adults
Conifer	**Juniper webworm**	*Dichomeris marginella*	1645	1917	RU	Larvae Treatment
Conifer	**Cryptomeria scale**	*Aspidiotus cryptomeriae*	1750	2130	RU, 4	Crawlers emerge (2nd generation)
Conifer	**Arborvitae leafminer**	*Argyresthia thuiella*	1800	2200	RU	Larvae Treatment (3rd generation)
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	1850	1950	RU	Galls open (Spruce)
Conifer	**Zimmerman pine moth**	*Dioryctria zimmermani*	1917	2154	5	Treatment window (adult flight-1700 GDD)
Conifer	**White pine aphid**	*Cinara strobi*	1991	2271	RU	Adults
Conifer	**Maskell scale**	*lepidosaphes pallia*	2035	-	6	Egg hatch / crawler (2nd generation)
Conifer	**Spruce spider mite**	*Oligonychus ununguis*	2375	2806	5	Typical treatment window
Conifer	**Elongate hemlock scale**	*Fiorinia externa*	2515	2625	RU	Typical treatment window - fall activity
Conifer	**Eastern spruce gall adelgid**	*Adelges abietis*	2800	3000	3	Fall control of overwintering stage
Conifer	**Cooley spruce gall adelgid**	*Adelges cooleyi*	2800	3000	3	Fall control of overwintering stage

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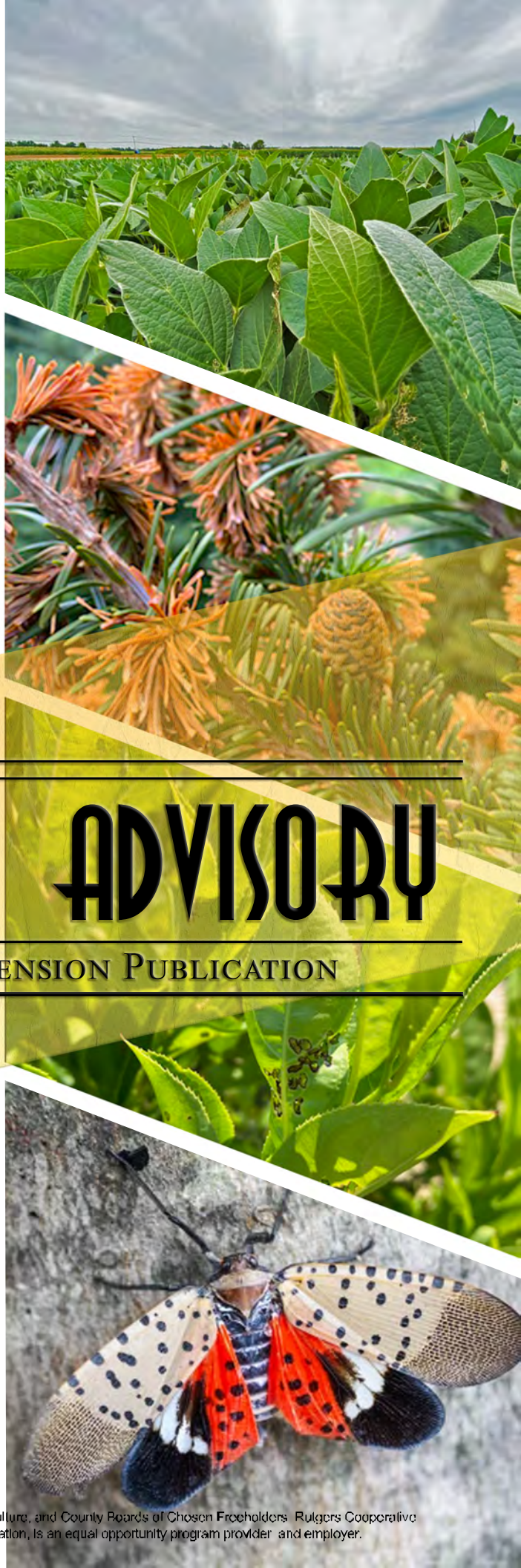

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PLEASE VISIT THESE LINKS FOR MORE INFORMATION

(FOLLOW THE URL IN PDF FORMAT OR SCAN THE QR CODE IF HANDHELD)

Instructions on obtaining your local growing degree-days

https://plant-pest-advisory.rutgers.edu/?s=obtaining

NEWA
Growing degree-day calculator

https://newa.cornell.edu/degree-day-calculator

UPEST
Growing degree-day calculator

https://uspest.org/dd/model_app

Syngenta GreenCast
Growing degree-day calculator

https://www.greencastonline.com/growing-degree-days

Additional Growing Degree-day Resources and Source / Citation Information

1. http://ccetompkins.org/resources/using-growing-degree-days-for-insect-management
2. https://extension.psu.edu/ipm-basics-for-christmas-trees#section-2
3. www.canr.msu.edu/ipm/agriculture/christmas_trees/gdd_of_conifer_insects
4. www.agriculture.nh.gov/publications-forms/documents/landscape-pests.pdf
5. https://extension.umd.edu/ipm/pest-predictive-calendar-landscapenursery

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PEST SCOUTING NOTES

DATE	PEST/DISEASE	GDD_{50}	LIFESTAGE	NOTES

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