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[http://maine.gov/dacf/mfs/forest\\_health/index.htm](http://maine.gov/dacf/mfs/forest_health/index.htm)

## *Forest & Shade Tree - Insect & Disease Conditions for Maine*

### *April 11, 2014*

Welcome to the 2014 growing season and to the first of this year's *Insect and Disease Conditions Reports*! The relatively cold winter and slow spring season to date should provide us with at least a few extra days to prepare for the rush of spring activities we all anticipate.

The plentiful winter snows have provided great soil moisture conditions for the start of the growing season. A cool spring will provide ideal conditions for planting or transplanting perennials over a slightly longer time period. Be aware though, that the cooler weather will also dictate other schedules, and can slow the development of insect and disease activity as well as bud and foliage development of both conifers and hardwoods. For this reason, timing of chemical control treatments should be closely coordinated with plant and pest development for your local area, rather than by using standardized calendar dates.

There has been a good deal of winter injury and salt damage to roadside trees that has started to become apparent in the past few weeks. This damage may be quite visible for another month or so. Most of the conifer needle browning evident along streets and highways is the result of roadside salt spray, from which most affected trees will recover.

As in past years, diagnostic assistance for forest and shade trees and other woody ornamentals will be available from our insect and disease clinic, along with our *Conditions Reports*. And as always, we invite you to assist with our mission. We ask you to be vigilant and to report to us any observations on tree insects and diseases of concern to you. We appreciate your willingness, expertise and commitment to help keep our trees and forests healthy, and look forward to working with you this season.

### **Laboratory Hours**

Our business hours for 2014 will be 7:30 a.m. to 4:00 p.m. Monday through Friday, except for holidays. However, due to a very busy field schedule, we may not be able to staff the Insect and Disease Lab at all times. If you call our Lab and receive no answer, please call back another time. And if you plan to visit the Lab, you may wish to call ahead just to make sure someone will be present to meet with you.

If you have questions on insect and disease pests of trees, you can now submit a clinic form directly online at [http://maine.gov/dacf/mfs/forest\\_health/tree\\_ailment.html](http://maine.gov/dacf/mfs/forest_health/tree_ailment.html). We will also accept samples mailed in to our Lab in Augusta. Our street address and location remains the same ([50 Hospital Street, Augusta](#)); our mailing address is **168 State House Station, Augusta, 04333-0168**. Lastly, we have attached the following items to this report for your use:

- Advice and Technical Assistance Sheet.
- Insect & Disease Diagnostic and Report Form.
- Forest and Shade Tree - Early Season Guide to Pest Management in Maine

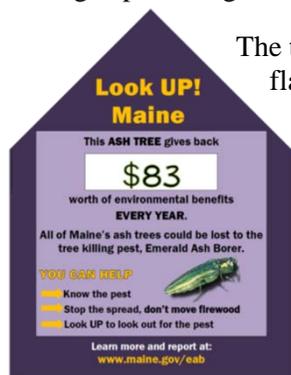
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## Arbor Week—Ash Tree Tagging

This year Arbor Week coincides with Emerald Ash Borer Awareness Week: May 18-24, 2014. Maine's [Project Canopy](#) and [Forest Pest Outreach Program](#) are encouraging people around the state to include an ash tree tagging event as part of their community celebrations of trees during the week. Most people have no idea how many ash trees are in their community forest, and therefore have no idea of what's at risk until it's too late. Tree tagging events have been organized from Maine to the Midwest as an effective way to raise awareness about the threat of the emerald ash borer (EAB). Organizers have found that after a tree tagging event, people are often surprised at the number of ash trees in their community and have a better appreciation for how important ash trees are to the landscape. People with a clear idea of how many ash trees are at risk in their yards and neighborhoods tend to act earlier to manage EAB than people who don't grasp the magnitude of the problem.



The tagging project involves attaching informational cards to ash trees using purple flagging. The Maine Forest Service Project Canopy will provide laminated tree tags and purple flagging. The tags can be removed anytime. However, we recommend removing them after a month or two, to avoid litter issues. The best sites for an ash tree tagging event are locations that are heavily visited, with large specimen ash trees, or abundant ash. Possible sites for tagging include: town parks, commons, or recreation fields; street trees; forested recreation areas: trailheads, campgrounds, picnic areas.

Resources for organizing a tree tagging event, including a “how to” checklist, sample event announcement, tips for engaging the local media, and sample check-in sheet, will be available soon online: [www.maine.gov/eab](http://www.maine.gov/eab). Or you can contact Jan Santerre for more information at 207-287-4987 [jan.santerre@maine.gov](mailto:jan.santerre@maine.gov).

## Quarantines

Maine has five forestry-related state quarantines. Four of them impact the movement of forest products. A summary of the quarantines is available on our Website and beginning on page D1 of the Appendix section of the 2014 Annual Summary Report. If you have any questions regarding forestry-related quarantines or moving or receiving regulated material, please contact Allison Kanoti at the Maine Forest Service, [allison.m.kanoti@maine.gov](mailto:allison.m.kanoti@maine.gov) or (207) 287-3147. Thank you for your continued cooperation in keeping these exotic forest pests and diseases contained.

**Regulated Ash:** In December last year primary processors of forest products in Maine received [a notice](#) about emerald ash borer and regulated ash. Since that notice was sent, Essex County, Massachusetts has been put under regulation for emerald ash borer. With two counties less than 30 miles from our border infested by this pest, there is increasing risk that regulated ash material may enter supply chains for Maine mills. As recently as this month, our counterparts in New Hampshire have alerted us that there are still inquiries from suppliers about moving ash products from the new emerald ash borer quarantine area to receivers in Maine.

**Beyond Maine Forest Service concerns about the possibility of such shipments introducing emerald ash borer into Maine before it might otherwise become established, movement of ash from such areas is federally regulated. Receipt of regulated ash requires a special federal compliance agreement.**

Such a compliance agreement can provide opportunity for limited, seasonally constrained, receipt of ash from quarantined areas. More information on compliance agreement requirements can be found at:

<http://1.usa.gov/1fDFnT6>. For questions about the agreements, contact our State Plant Health Director's office (USDA APHIS, PPQ) at: (207) 848-0001. You can also contact our office for more information.

## **Insects**

**Blacklegged Tick or Deer Tick** (*Ixodes scapularis*) – It is worth noting that deer ticks are active year round when conditions allow. Their activity will have picked up considerably with receding snow (for those of you up north, it *is* coming) and warming temperatures. In recent years, the Maine Medical Center had been providing tick identification services, but the funding for that project has ended. Now the University of Maine Cooperative Extension Pest Management Office will provide tick identifications. You can find more information at: <http://extension.umaine.edu/ipm/tickid/>.

**Browntail Moth** (*Euproctis chrysorrhoea*) – Winter webs of browntail moth glisten in the sun this time of year. Look for them in southern Maine at the tips of host branches including oaks, apples, birches, cherries, hawthorns, roses and other hardwoods. Within the webs, caterpillars are ready to feed as soon as temperatures warm and buds begin to expand. Exposure to caterpillar hairs, even those from the previous year, can cause dermatitis and other health problems in sensitive individuals.

Winter web counts were highest in parts of Bath, Bowdoinham, Brunswick and Topsham this year. We have seen pockets of infestation in other coastal locations from Lincoln County, south and in inland towns such as Augusta, China, Lewiston, Turner, Vassalboro and Waterville. These spot infestations take less staff time, but if they are in your backyard they are noteworthy. Small infestations can often be managed by clipping webs. Clip and destroy webs before the end of April (this is a fine winter activity when the woodstove is humming and the caterpillars are huddled in their webs, but a bucket of soapy water also works well). Pesticides are necessary to manage larger infestations. We have a list of licensed pesticide applicators that treat browntail moth and other pests of trees and shrubs available on-line or by request.



Overwintering web of browntail moth. Inset: Caterpillars within a web. (Maine Forest Service)

[www.maine.gov/dacf/mfs/forest\\_health/invasive\\_threats/browntail\\_moth\\_pesticide\\_applicator\\_info.htm](http://www.maine.gov/dacf/mfs/forest_health/invasive_threats/browntail_moth_pesticide_applicator_info.htm)

**Christmas Tree Pests** – Scout for **balsam shootboring sawfly** (*Pleroneura brunneicornis*) adults on sunny days in late April. If treatment is needed, it should be applied two weeks after adult activity is seen. See also: [http://extension.unh.edu/resources/files/Resource000986\\_Rep2307.pdf](http://extension.unh.edu/resources/files/Resource000986_Rep2307.pdf).

Look for nymphs of **balsam twig aphid** (*Mindarus abietinus*) on the undersides of previous-year needles in the lower crowns of Christmas trees in early May.

**Eastern Tent Caterpillar** (*Malacosoma americanum*) – Watch for the developing tents of these hairy caterpillars in cherries and apples in late-April and early-May in southern Maine (later as you move farther north). Consider removing the tents from valued ornamental and fruit trees while they are still

small. Cornell University Extension has a video of this very hungry caterpillar at work on YouTube: <https://www.youtube.com/watch?v=1qO6eCygTE>.

**Emerald Ash Borer** (*Agrilus planipennis*) – Emerald ash borer (EAB) has not yet been found in Maine, but it has been found nearby in eastern Massachusetts (North Andover (Essex County)) and southern New Hampshire (Concord, Canterbury and Loudon (Merrimack County)). Even though this destructive insect has been found on our doorstep, it is still too early to be treating specimen ash with pesticides to protect from this pest. Experts recommend holding off treatment until the EAB is within 10-15 miles of the trees in question.

In the meantime, resources are better spent on inventorying ash and survey and monitoring for the pest. An ash inventory can be as simple as a windshield survey to determine whether you have boatloads of ash to worry about or just a few. Ash phenology gives us a great opportunity to conduct surveys as hardwood leaves emerge. Ash are among the last to leaf out (black locust is another slow-poke), and because of this characteristic are easily recognized after other hardwood leaves have flushed. If you are taking time to do a more in-depth survey, consider recording location, size, value and likely management approach for each tree. If you are going to remove an ash if it gets infested, you might want to consider pro-active removal, especially if you have a large tree which will produce huge broods of beetles. Check out the [nhbugs.org](http://nhbugs.org) site on EAB, for some succinct advice on preparing for this pest in areas more than 10 miles from known infestations (<http://nhbugs.org/recommendations-homeowners-and-landowners>).

Visual surveys can be conducted this time of year. Symptoms to look for include increased woodpecker activity, bark splits and excessive shoots. Signs such as larval tunneling, larvae or pupae may also be found in infested trees. After leaf out be on the lookout for crown thinning as well. Adult beetle activity is not generally expected until early to mid-June, in southern Maine.

Later this year, consider participating in our [trap tree network](#) or conducting [biosurveillance](#) in your town. More information on these two survey methods will follow in later reports.

**Gypsy Moth** (*Lymantria dispar*) – Gypsy moth populations were up last year from previous years. Although egg mass plots did not indicate a looming outbreak, we did see the first defoliation mapped by aerial survey since 2002. Look for egg masses around prized landscape trees and shrubs now. If found, scrape them into a bucket of soapy water to reduce defoliation. In southern Maine the eggs will begin to hatch within the next couple weeks. Look for them soon if you intend to destroy them. In northern Maine, eggs in masses above the snow line should have experienced significant winter mortality.



“Blonding” caused by increased woodpecker activity on these ash in Canterbury, NH alerted people to the presence of emerald ash borer. (NH DFL, <http://t.co/Ng5R0plEaJ>).



Gypsy moth egg masses on birch and aspen in Orient, ME. (Maine Forest Service)

If you find gypsy moth egg masses (or larvae later in the spring) in the northern ends of Oxford, Franklin, Somerset, Piscataquis or Aroostook County, please report your find, including the location and photos if possible to our office. An expansion of the quarantine area for this pest is planned; see more in our Annual Summary Report.

**Hemlock Woolly Adelgid** (*Adelges tsugae*) – We have entered the time of year when hemlock woolly adelgid (HWA) can be spread on items other than live plants. Eggs and crawlers will both be out and can be transferred to hemlocks in new areas. If you are working in both infested and uninfested areas, try to begin your day in uninfested sites, and end in infested sites. To avoid spreading this pest to new locations, clean clothing and equipment before moving from infested areas to uninfested areas.

The quarantine rules for this pest were changed in September of last year. Among the changes, the quarantine area was expanded and the list of regulated articles was reduced. Hemlock products with top material (needles and branches), such as whole tree chips, is regulated by the quarantine as are live plants. For more information see our web page on quarantines, or contact us.

[http://maine.gov/dacf/mfs/forest\\_health/quarantine\\_information.html](http://maine.gov/dacf/mfs/forest_health/quarantine_information.html)

A popular question this year is what effect the cold winter had on this pest (and others). HWA samples were collected for winter mortality assessments, and assessments conducted in March. Mortality ranged from 67 to 87% across six sites, and averaged 78%. In comparison, mortality over the mild winter of 2011-2012 was less than 18% across five sites. Infested trees should experience a brief reprieve from heavy attack, and spread of this insect should be slowed compared to previous years. This assessment was conducted in cooperation with federal partners, and will be included with data from sites throughout the east. A follow-up assessment will be conducted in June at a subset of the six sites.

<b>Location</b>	<b>Collector</b>	<b>Date Collected</b>	<b>Live HWA</b>	<b>Dead HWA</b>	<b>Percent Mortality</b>
Freeport	MFS	3/11/2014	202	407	67
Wiscasset	MFS	3/11/2014	139	500	78
Cape Elizabeth	MFS	3/10/2014	101	424	81
Portland	MFS	3/10/2014	55	229	81
Falmouth	MFS	3/10/2014	65	440	87
Kittery	USFS	3/7/2014	121	398	77
		<b>TOTAL</b>	<b>683</b>	<b>2398</b>	<b>78</b>

**White Pine Weevil** (*Pissodes strobi*) - Host trees of the white pine weevil include, as one might guess, white pine, but the beetle also has a taste for other pines and spruces. Often the calls we get from homeowners are regarding favorite blue spruces damaged by the beetle. Larval feeding can kill the host's leader (terminal shoot), causing a loss of apical dominance, and can lead to development of a shrubby tree.

In southern Maine temperatures have climbed high enough to trigger emergence of white pine weevil adults from their winter homes in the duff beneath their host trees. The adults climb up the host trunks and feed on the terminal shoots. Soon after, females will deposit eggs in the terminal shoots. Eggs hatch

within a couple weeks and the larvae chew their way downward, cutting off the conductive tissue of the shoot and causing the shoot to wither and die.

Host leaders can be protected from attack by physical barriers and pesticides. A protective sleeve made from a nylon stocking and a twist tie is an easy, low-tech approach to preventing attack in small ornamental trees. Fasten the stocking before temperatures climb above 60 degrees Fahrenheit in the spring, and remove it before shoot elongation. See the early season guide for information regarding chemical controls.

See also: [http://www.na.fs.fed.us/spfo/pubs/fidls/wp\\_weevil/weevil.htm](http://www.na.fs.fed.us/spfo/pubs/fidls/wp_weevil/weevil.htm).

**Winter Moth** (*Operophtera brumata*) – As you get this report, or soon after, the tiny caterpillars of winter moth will be hatching and mining hardwood buds. The easiest way to track down the larvae at this stage is to inspect host buds for silk and specks of frass. Wait a few weeks, and the signature feeding damage will be evident on expanded host leaves. Like the cuts in a paper snowflake, the larval bites make holes through several layers of leaf tissue, giving the unfurled leaves a Swiss cheese appearance. Caterpillars will finish feeding by the end of May or early-June and drop to the soil to pupate.



First instar winter moth caterpillar on an expanding maple bud. (Maine Forest Service)

In Harpswell and Cape Elizabeth, we hope some of the larvae will have consumed the eggs of the introduced biological control: *Cyzenis albicans*, a tachinid fly. For those unlucky ones, the fly will develop within the cocoon, and prevent the winter moth from developing to adulthood.

## **Diseases and Injuries**

**Animal Damage** – The colder winter this year, along with a fair amount of snow pack in most areas has provided more difficult conditions for survival of some wildlife species than in recent past years. Deer in suburban and rural areas have been pressed to find browse during this time. Often ornamentals including yews, arborvitae, and several other species may be heavily browsed. Most browsed specimens will recover, but may need some pruning attention to reshape and restore the aesthetics. If damage is serious and consistent from year to year, consider replacing the plantings with less susceptible species. These can be “phased in” over a period of several years, to make the effort a more practical endeavor. A good list of plant materials that have been rated for susceptibility to animal browsing is:



Deer browsed yew (left) and spruce (right). (Maine Forest Service)

[http://www.ipm.msu.edu/uploads/files/deer\\_resistant\\_plants.pdf](http://www.ipm.msu.edu/uploads/files/deer_resistant_plants.pdf)

**Anthracnose Diseases of Oaks and Other Hardwoods** – A high incidence of leaf deformities, including cupping, stunting, leaf-spotting, marginal necrosis and defoliation occurred on oaks in many areas

throughout Maine last spring and summer. Occurrences of both late spring frost damage and anthracnose on the same individual often complicated the diagnoses. The primary anthracnose pathogen identified was *Apiognomonia quercina*. Oaks that were heavily damaged last year should be considered for fungicide treatment this year, in anticipation of additional damage. Anthracnose diseases can be effectively assessed only after the damage occurs, so specimen ornamentals and those already affected for one or more years should receive the recommended preventive treatment. Fungicides and timing of application include the same as those recommended for ash, maple, and other hardwood anthracnose diseases.

**Needle Diseases of Conifers** – Early spring is the appropriate time to use fungicides to manage for several needle disease pathogens. Needle diseases such as spruce needlecast on white and Colorado blue spruces, *Sphaeropsis* (= *Diplodia*) tip blight of red, Austrian, and Scots pine, and [Sirococcus shoot blight](#) of native and exotic species of hard pines are all perennial problems. Protection of the new, current-season foliage with fungicides can provide effective control. Specifics for several of the most important diseases are listed in the enclosed guide.

The new growth (foliage, needles, and shoots) needs to be treated with the appropriate fungicide before infection occurs. This usually requires an application shortly after budbreak, and again ten days to two weeks later, to protect the new growth as tissues expand. Timing of the first application varies from year to year, depending on local seasonal temperatures. This year, expect budbreak to lag slightly behind that which was seen last year. The below-normal temperatures throughout the late winter and early spring will delay plant development. Weekly observations of buds from late April through May will allow tailoring fungicide application timing to maximize effectiveness.



*Sirococcus* shoot blight damage to red pines. (Maine Forest Service)

**Pruning Ice Storm-Damaged Trees** – Trees with broken branches or tops that were damaged by one of the several ice storms of this past winter should be correctively pruned this year. This will help the tree recover from the injury, and can also reduce the hazard to people and property that can result from falling limbs. Unfortunately, this specific time of year (early spring) is *not* an appropriate time to accomplish the task. Pruning when sap is running to supply the new buds and the actively growing cambium (the tissue that is producing new wood and bark) can result in excessive bark tearing and significant *additional* injury to pruned trees. Wait until the leaves have fully expanded (July) before tackling this maintenance task.

A new publication is now available that describes the long-term effects of ice storm damage on trees. The USDA Forest Service publication “*Tree survival 15 years after the ice storm of January 1998*” authored by W.C. Shortle, K.T. Smith, and K.R. Dudzik is available online at: [http://www.fs.fed.us/nrs/pubs/rp/rp\\_nrs25.pdf](http://www.fs.fed.us/nrs/pubs/rp/rp_nrs25.pdf)

**White Pine Blister Rust** (*Cronartium ribicola*) – White pine blister remains a significant disease threat, especially to younger (seedling, sapling and pole-size) white pine stands. A new strain of the pathogen *Cronartium ribicola*, identified in late 2010, is now known to be able to infect previously resistant and immune species and cultivars of *Ribes* (currants and gooseberries). Although the quarantine for *Ribes* spp. in Maine has never allowed for the planting or cultivation of the resistant or immune cultivars of black currants anywhere in the state, they have been allowed in neighboring New Hampshire and several other



*Ribes* spp. leaf infection by *Cronartium ribicola*. (Maine Forest Service)

northeastern states. The level of risk now associated with this pathogen mutation is now under study by the USDA Forest Service. Development of the new pathogen strain provides a strong justification to continue the existing Maine quarantine regulations.

*Ribes* plants, the primary host of white pine blister rust, will be one of the first understory plants to leaf out, usually by mid-April in southern Maine. There are several native species common throughout Maine. Because foliage of most other forest vegetation has not yet emerged, early spring is an ideal time to scout for *Ribes* plants. Located plants can be treated now (physically removed or treated with herbicide), or “flagged” for treatment at a later date. Removal of all *Ribes* species within 900 – 1000 feet of susceptible pines or pine stands will greatly reduce the likelihood of infection by the white pine blister rust pathogen.



Blister rust canker on young white pine. (Maine Forest Service)

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Conditions Report No. 1, 2014

On-line: [http://maine.gov/dacf/mfs/publications/condition\\_reports.html](http://maine.gov/dacf/mfs/publications/condition_reports.html)

Maine Forest Service

[Forest Health and Monitoring](#)

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## Forest and Shade Tree Early Season Guide to Pest Management in Maine

[www.maineforestservice.gov](http://www.maineforestservice.gov) • [forestinfo@maine.gov](mailto:forestinfo@maine.gov) • (207) 287-2431 • 1-800-367-0223 (in Maine)

The following table should assist you in the early season planning process. **Remember that this is just a guide** and that conditions will vary. Many pests may be managed with several other suitable products not listed here, but also registered for use in Maine. This chart reflects those products that should be readily available and effective, *but not to the exclusion of others that may be suitable*. Information on any entry preceded by an \* may be available on our website or can be requested by calling or writing to the Insect and Disease Laboratory, 168 State House Station, Augusta, Maine 04333-0168, Phone (207) 287-2431, Fax (207) 287-2432.

Insect or Disease	Cultural Controls	Chemical Controls
Apple Scab	Remove any fallen leaves not raked last autumn; plant resistant crabapples such as 'Adams', 'Baskatong', 'Beverly', 'Bob White', 'David', 'Dolgo', 'Donald Wyman', 'Liset', 'Red Jewel' and 'Sugartyme'. Other varieties of apple that are resistant to scab include Liberty, Pristine, Jonafree, Freedom, Redfree, Crimson, Enterprise, and William's Pride.	Propiconazole (Banner), Thiophanate methyl (T-Methyl), Chlorothalonil (Daconil), or Mancozeb (Dithane, Fore, Ziram) from bud break every ten days during wet weather. Captan, Manzate, and Polyram are also effective.
Ash Anthracnose	Before budbreak, remove any fallen leaves not raked last autumn. Compost the leaves well away from ash trees.	Propiconazole (Banner), Chlorothalonil (Bravo, Daconil, Mainsail WDG) at budbreak, and again 10 to 14 days later.
Ash Leaf Rust	None which are practical and effective.	Mancozeb, chlorothalonil (Daconil), or Thiophanate methyl (T-Methyl), applied at budbreak and repeated 2 to 3 times at 10-day intervals.
*Balsam Gall Midge		Diazinon** or chlorpyrifos (Lorsban**) late May to early June.
*Balsam Shootborer Sawfly		Chlorpyrifos (Lorsban 4E**) or Diazinon AG500** 3 times at 5 day intervals during the 2 weeks following the observation of activity of adults (mid-late April) or in the two weeks prior to normal balsam twig aphid spray dates.
*Balsam Twig Aphid		Diazinon** or chlorpyrifos (Lorsban**) at bud break.
*Birch Casebearer		Malathion or carbaryl (Sevin) applied after most or all of the cases have moved to opening buds.
Black Knot of Peach, Plum, and Cherry	Prune and destroy knotted twigs and branches.	Thiophanate methyl (T-Methyl or Fungo Flo) or chlorothalonil (Daconil) when trees are dormant and twice again at three week intervals after budbreak.
*Browntail Moth	Clipping of overwintering webs is only effective prior to the time larvae beginning actively feeding on emerging foliage (April).	The use of pesticides is a complex issue requiring professional assistance and there are restrictions on treating near water. Call for more information.
*Bruce Spanworm		Emerges early as buds begin to swell on northern hardwoods, especially beech. Larvae bore into buds.

**NOTE:** These recommendations are not a substitute for pesticide labeling. Read the label before applying any pesticide. Pesticide recommendations are contingent on continued EPA and Maine Board of Pesticides Control registration and are subject to change.

**Caution:** For your own protection and that of the environment, apply the pesticide only in strict accordance with label directions and precautions.

\*\*Restricted-use pesticide may be purchased and used only by certified applicators.

Insect or Disease	Cultural Controls	Chemical Controls
		Controls not usually recommended.
Diplodia Tip Blight	<i>see</i> Sphaeropsis Shoot Blight	<i>see</i> Sphaeropsis Shoot Blight
Dothistroma Needle Blight		Copper sulfate (Kocide) or Thiophanate methyl (T-Methyl)
Dogwood Anthracnose	Remove any fallen leaves not raked last autumn; fertilize trees; prune out dead twigs and suckers; plant Chinese or Japanese dogwood instead of native flowering dogwood.	Chlorothalonil (Daconil), Thiophanate methyl (T-Methyl, Fungo Flo), Propiconazole (Banner), or Mancozeb (Dithane, Fore) at bud break and again three times at three week intervals.
Dutch Elm Disease	Plant disease resistant elms; eliminate all potential beetle breeding elm material within 700 feet of trees to be protected.	Bifenthrin (Onyx) or chlorpyrifos (Lorsban**) for beetle vector control on the lower 9' of trunk.
*Eastern Tent Caterpillar	Prune out egg masses on twigs prior to hatch; remove and destroy small tents as they develop (late April-early May)	<i>Bt</i> (Dipel or Thuricide), Acephate (Orthene), carbaryl (Sevin) or cyfluthrin (Tempo) on warm days when larvae leave tents to feed.
*Fall Cankerworm		<i>Bt</i> (Dipel or Thuricide), Acephate (Orthene), carbaryl (Sevin), cyfluthrin (Tempo) applied while larvae are small (late May-early June on boxelder in Aroostook County). Early to mid May on elm and oak in southern Maine.
*Gypsy Moth	Scrape egg clusters from tree boles and larger branches into a container and destroy them. Complete before egg hatch (late April).	<i>Bt</i> (Dipel or Thuricide), Acephate (Orthene), carbaryl (Sevin), cyfluthrin (Tempo), or diflubenzuron (Dimilin**) when larvae are actively feeding (early June).
Hawthorn Leaf Spot Mt. Ash Leaf Spot	Remove any fallen leaves not raked last autumn; plant resistant varieties such as <i>Crataegus crus-galli</i> .	Thiophanate methyl (T-Methyl or Fungo Flo), Chlorothalonil (Daconil), or Mancozeb (Dithane, Fore) as leaves unfold and at two week intervals until dry weather.
*Hemlock Woolly Adelgid	Watch for signs of infestation and report immediately.	Call for information.
Heterobasidion irregulare (= <i>H. annosum</i> ; <i>Fomes annosus</i> ) Red Pine Root Rot	Restrict thinning operations to between December and February, when spore dispersal is minimal.	Disodium octaborate tetrahydrate (Cellu-Treat) applied to freshly cut stumps (within three days of tree felling).
Horse Chestnut Leaf Blotch	Remove any fallen leaves not raked last autumn.	Thiophanate methyl (Fungo Flo) or chlorothalonil (Daconil) at bud break and twice more at 14 day intervals.
*Larch Casebearer		Carbaryl (Sevin) or cyfluthrin (Tempo) applied after most cases have moved to the expanding needle clusters (late April to early May).
Maple Anthracnose	Before budbreak, remove any fallen leaves not raked last autumn. Compost the leaves well away from maples.	Thiophanate methyl (Fungo Flo) at bud break and twice again at 10-14 day intervals.
Peach Leaf Curl		Chlorothalonil (Bravo) or Ferbam (Carbamate) or Ziram applied as full coverage spray when trees are dormant.
*Pear Thrips		Controls and timing not well understood. Thrips are active on expanding maple.
Pine-Pine Gall Rust of Jack and Scotch Pine	Prune rust galls from lightly infected trees; rogue heavily infected trees from plantations before May 1. Use disease free planting stock.	None at this time.
*Satin Moth		Treat infested poplars and willow in mid to late May with <i>Bt</i> (Dipel or Thuricide), carbaryl (Sevin) or cyfluthrin (Tempo).

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\*\*Restricted-use pesticide may be purchased and used only by certified applicators.

Insect or Disease	Cultural Controls	Chemical Controls
Sirococcus Shoot Blight of Spruces	Prune out affected twig tips by mid-summer, and destroy.	Chlorothalonil (Daconil, Bravo), at bud break and again 10 to 14 days later. Apply second application sooner if wet weather conditions prevail.
Sphaeropsis Shoot Blight of Red, Scotch, and Austrian Pines	Use disease free planting stock; remove non-crop-tree hard pines from area. Prune and burn lower, heavily infected and dead branches.	Chlorothalonil (Bravo), copper sulfate (Kocide), or Thiophanate methyl (T-Methyl, Topsin) at bud break and again when shoots are half grown.
*Spruce Gall Adelgids	Prune off and destroy new developing galls in mid to late June.	Treat infested trees just prior to bud break with dormant oil, carbaryl (Sevin) chlorpyrifos (Lorsban**) or imidacloprid (Merit). Controls can also be applied in the fall.
Spruce Needlecast of White and Colorado Blue Spruce (Rhizosphaera kalkhoffii)	Prune, remove, and destroy the most heavily infected, lower branches on larger trees.	Chlorothalonil (Bravo, Daconil), or copper sulfate (Bordeaux mix) as buds break and again 10 days to two weeks later.
*Ticks	Watch for ticks throughout the field season (April-November). Avoid high risk areas if possible, inspect yourself daily and remove ticks and use repellents as directed.	Compounds containing DEET can be used as repellents. Those containing the toxicant permethrin (Repel) can be used on clothing as directed.
*Viburnum Leaf Beetle	Where possible, prune off any twigs with scabby, egg-filled holes prior to May 1st.	Watch in mid - late May) for developing larvae and treat with acephate (Orthene), carbaryl (Sevin), or chlorpyrifos (Lorsban**) or imidacloprid (Merit).
*White Pine Blister Rust	Prune cankered lateral branches from trees and excise stem cankers by removing bark at least four inches above and below and two inches either side of discolored bark. Remove (uproot or apply herbicide) Ribes from within 1000 feet of white pine forests or plantations. Surveying for Ribes plants is most effective from mid- April through early May.	Herbicides for controlling native Ribes include Glypho 41, Accord XRT II, Roundup Pro, Roundup 2K, and Roundup Original II.
*White Pine Weevil	Refrain from planting white pine or spruce for reforestation in open areas, on heavy clay soils, or on heavily sodded fields. Correctively prune damaged trees to establish new leaders.	Apply control in the spring once there have been several days above 60 degrees Fahrenheit. Use Pyrenone Crop Spray, Astro, Onyx, Talstar** or Dibrom 8** at 14-20 day intervals until June. <u>Commercial Forest and Christmas Tree Plantations:</u> diflubenzuron (Dimilin**) or chlorpyrifos (Lorsban**).

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