

# Insects and Diseases that Damage Trees

Between 1997 and 2002, 70 insects and 27 diseases were reported to cause tree damage or mortality on over 30 million acres of forestland in the Northeast (USDA Forest Service 2003c). Pests that caused damage in multiple States and years are listed in Tables 1-3, and their corresponding scientific names are listed in Appendixes A and B. Scientific names for their tree hosts are listed in Appendix C. Figures 8, 9, and 10 depict areas with damage associated with the most predominant insects and diseases in the region. Maps are grouped according to whether the pests are native to North America or introduced from other continents, because introduced pests pose a larger threat of causing unprecedented changes that may permanently disrupt ecological processes.

The most common type of observed damage was direct defoliation by larvae of forest tent caterpillar, gypsy moth, spruce budworm, eastern tent caterpillar, and many other insects that feed on tree leaves and needles. The second most common type of damage was indirect defoliation associated with wood boring insects and vascular diseases such as oak wilt, white pine blister rust, dogwood anthracnose, and beech bark disease. Other types of observed and reported tree damage from insects and diseases include branch dieback of crowns, cankers on stems and branches, and tree mortality. Although growth loss is not directly observed, defoliation, crown dieback, and other types of damage can lead to reduced increments in tree diameter and height. With the exception of white pine blister rust, damaging insects are generally more of a problem than diseases for softwood tree species. Declines of eastern white pine, balsam fir, and spruce are also evident in the region.

Specific insects and diseases generally affect only one to several tree species, are active within a limited area of several thousand acres, and endure for just a few years. Exceptions occur when some defoliators, such as gypsy moth and spruce budworm, attain high populations and cause epidemics over widespread areas. Exceptions also exist for many diseases, such as dogwood anthracnose, that tend to persist in areas once they have become established. As discussed earlier, drought can result in additional stress and premature tree mortality. Trees can normally tolerate up to 3 years of defoliation, but may die when just 1 year of defoliation is combined with the additional stress of drought.

It is difficult to quantify the loss of growth and the mortality of trees associated with insects and diseases. Impact assessments require data sets that can precisely demonstrate spatial correlations between the incidence of pests and tree conditions. In addition, tree conditions need to be represented by data collected after the occurrence of a damaging pest event because of the lag in associated tree growth loss and mortality. Most of the available FHP pest survey data for the Northeast are for 1997-2002, while most FIA data represent tree conditions before this time period. However, additional data are available for gypsy moth and spruce budworm for 1975-1997, and thus facilitate analyses to demonstrate associations between these pests and the condition of their respective host tree species. Additional analyses for these and other pests will become feasible as FIA data representing conditions beyond 2002 become available.

**Table 1. Insects that damage hardwood trees.**

<b>NATIVE INSECTS</b>	American beech	Ash species	Aspen species	Basswood species	Birch species	Black cherry	Oak species	Red maple	Sugar maple
Cherry scallop shell moth	X					X			
Common oak moth							X		
Eastern tent caterpillar	X				X	X			X
Fall cankerworm							X	X	
Fall webworm	X	X			X	X	X	X	X
Forest tent caterpillar			X	X			X		
Jumping oak gall							X		
Large aspen tortrix			X						
Maple leafcutter									X
Maple trumpet skeletonizer									X
Oak leaftier							X		
Oak skeletonizer							X		
Orange-striped oakworm							X		
Peach bark beetle						X			
Periodical cicada						X	X		
Scarlet oak sawfly							X		
Variable oakleaf caterpillar	X						X		
Walkingstick	X								X
<b>INTRODUCED INSECTS</b>									
Asian longhorned beetle		X			X			X	X
Basswood thrips				X					
Birch leafminer					X				
Emerald ash borer		X							
Gypsy moth			X	X			X		
Oystershell scale	X								
Pear thrips								X	X
Satin moth			X						

**Table 2. Insects that damage softwood trees.**

<b>NATIVE INSECTS</b>	Balsam fir	Eastern hemlock	Eastern white pine	Jack pine	Spruce species	Southern yellow pines
Eastern spruce budworm	X				X	
Hemlock looper	X	X			X	
Jack pine budworm				X		
Southern pine beetle						X
Spruce beetle					X	
White pine weevil			X			
<b>INTRODUCED INSECTS</b>						
Balsam woolly adelgid	X					
Common pine shoot beetle			X			
Hemlock woolly adelgid		X				
Pine false webworm			X			

**Table 3. Diseases that damage trees.**

**HARDWOOD TREES**

<b>INTRODUCED DISEASES</b>	American beech	Ash species	Butternut	Flowering dogwood	Oak species	Sugar maple
Ash yellows		X				
Bacterial leaf scorch					X	X
Beech bark disease	X					
Butternut canker			X			
Dogwood anthracnose				X		
Oak wilt					X	

**SOFTWOOD TREES**

<b>INTRODUCED DISEASES</b>	Balsam fir	Eastern hemlock	Eastern white pine	Jack pine	Spruce species	Southern yellow pines
White pine blister rust			X			

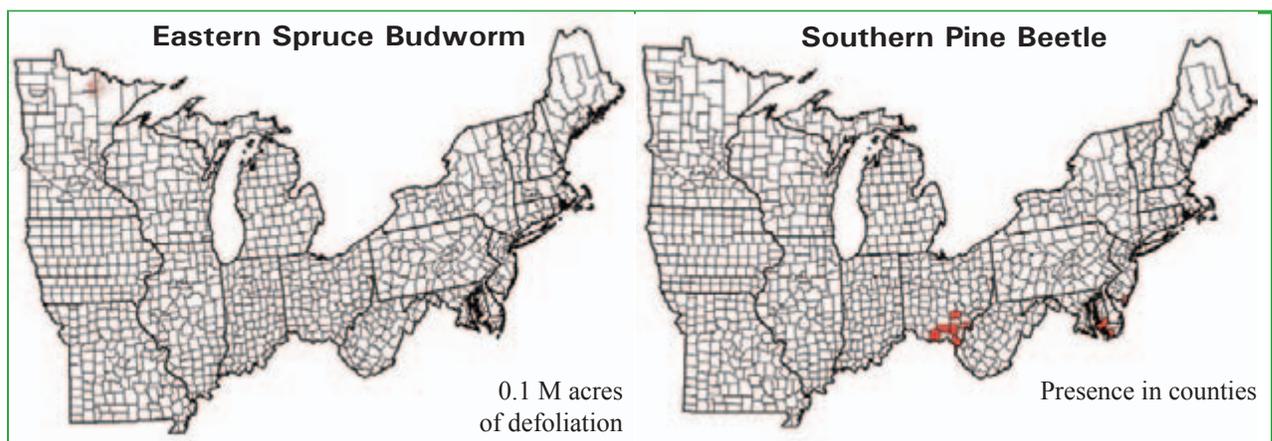
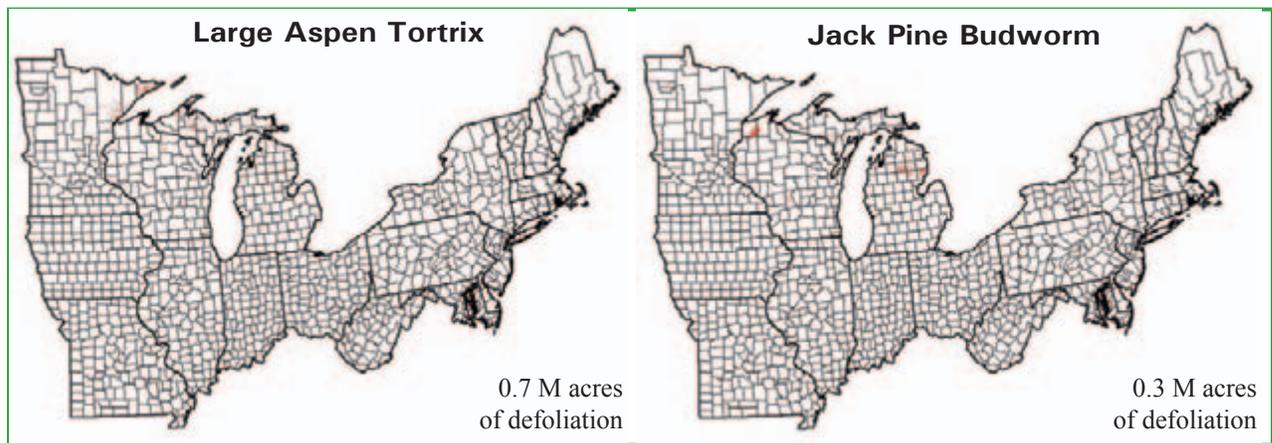
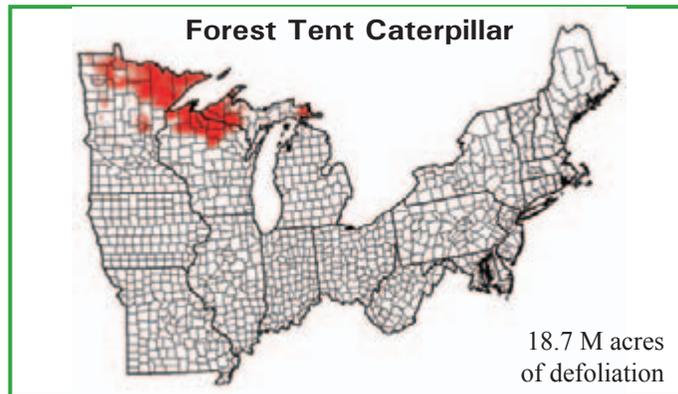


Figure 8. Forest areas with trees damaged during 1997-2002 by native insects of forest tent caterpillar (*Malacosoma disstria*), large aspen tortrix (*Choristoneura conflictana*), jack pine budworm (*Choristoneura pinus*), spruce budworm (*Choristoneura fumiferana*), and southern pine beetle (*Dendroctonus frontalis*). (Source: USDA Forest Service. Unpublished data, Forest Health Protection Program).

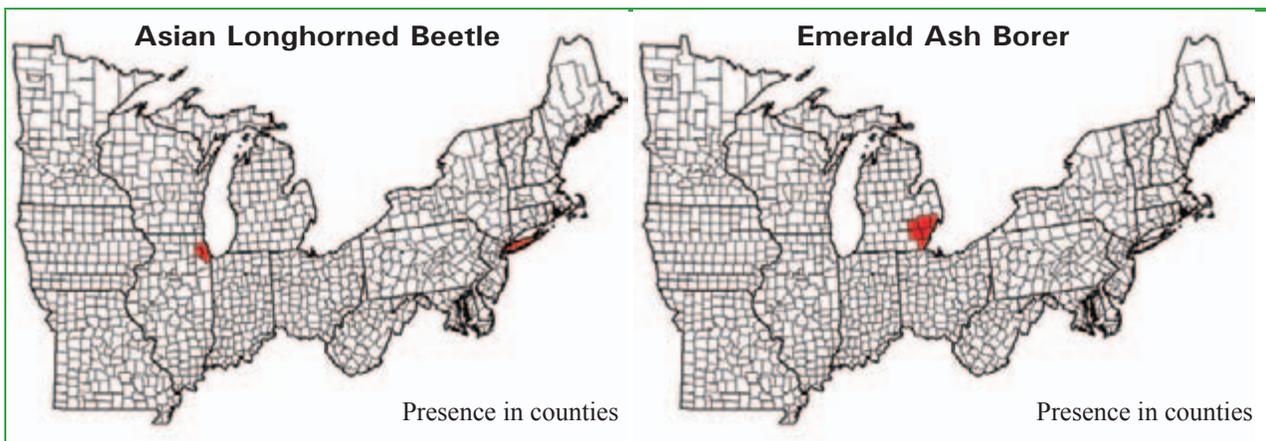
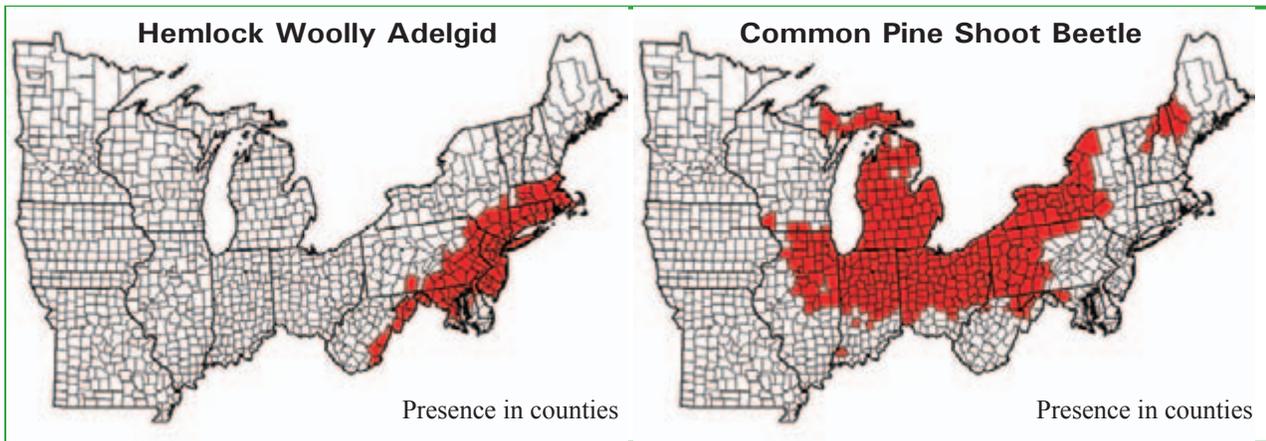
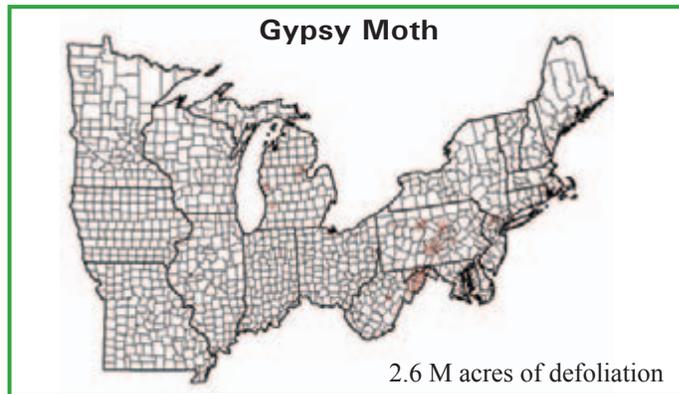


Figure 9. Forest areas with trees damaged during 1997-2002 by introduced insects of gypsy moth (*Lymantria dispar*), hemlock woolly adelgid (*Adelges tsugae*), common pine shoot beetle (*Tomicus piniperda*), Asian longhorned beetle (*Anoplophora glabripennis*), and emerald ash borer (*Agrilus planipennis*). (Source: USDA Forest Service. Unpublished data, Forest Health Protection Program).

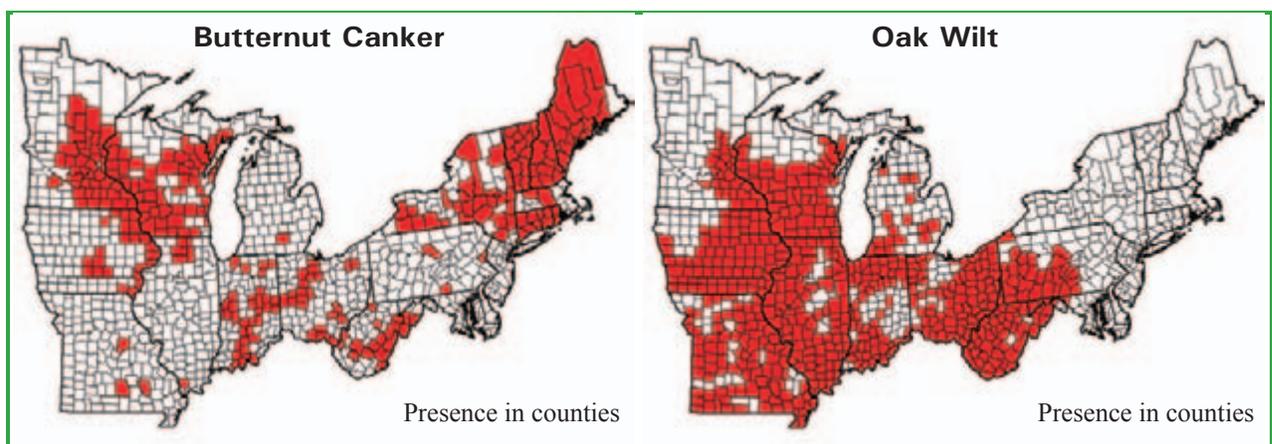
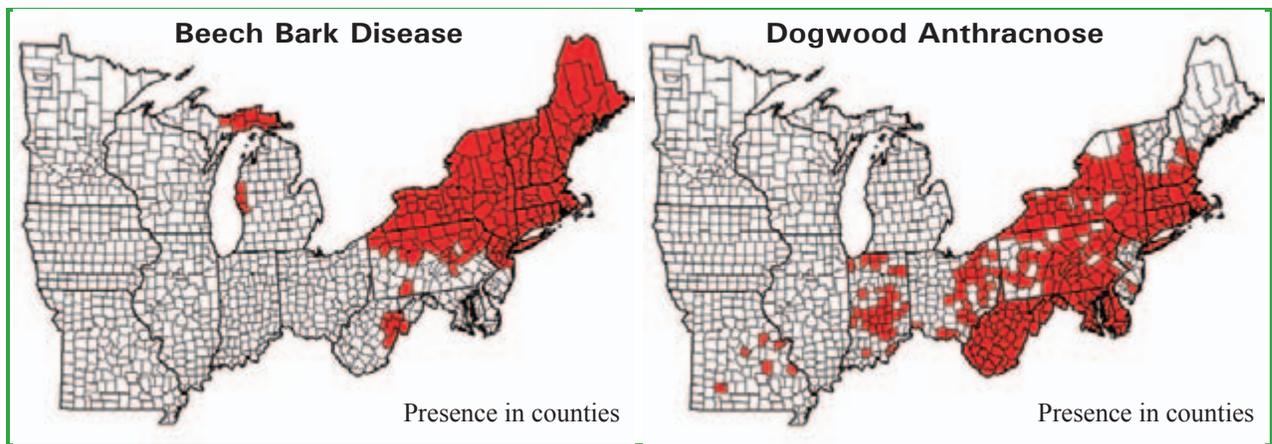
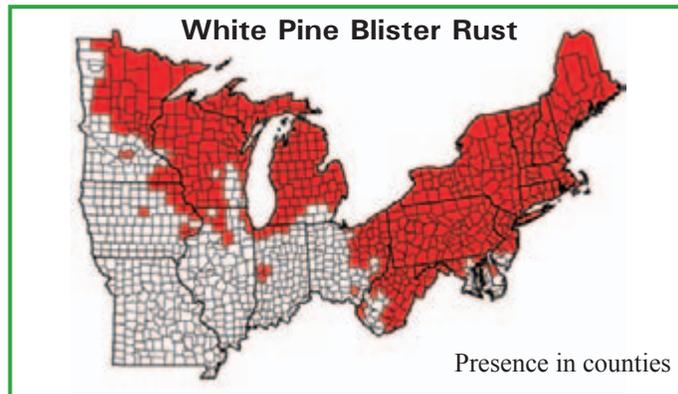


Figure 10. Forest areas with trees damaged during 1997-2002 by introduced diseases of white pine blister rust (*Cronartium ribicola*), beech bark disease (*Nectria* spp.), dogwood anthracnose (*Discula destructiva*), butternut canker (*Sirococcus clavigignenti-juglandacearum*), and oak wilt (*Ceratocystis fagacearum*). (Source: USDA Forest Service. Unpublished data, Forest Health Protection Program).