

Species regeneration notes

The following pages outline the general requirements for successfully regenerating some species groups (e.g., oak, map). The first page of each species group gives some background information on history, distribution, and mature size. This page also notes the commercial, ecological, and aesthetic value of the species group. The second page provides information on regenerating selected species. This section is meant as a general guide and starting point for discussion with a professional forester. The meaning of the symbols used in this section is given below. Specific guidelines will depend vary by species (i.e., northern red oak vs. scarlet oak), local soils, and other factors.

Seed dispersal mechanisms: Tree species utilize a variety of mechanism to disperse seed. Some species spread their seed upon the wind. Other species depend on small mammals to bury their seed, while birds carry some seeds great distances.



Small mammals



Birds



Wind

Reproductive modes: While all trees begin as seedlings, only the older, established seedlings (advanced regeneration) of some species can grow into canopy openings. Some species develop vigorous, fast-growing sprouts from buds hidden in stumps and roots.



Seedlings



Advanced regeneration

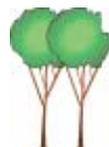


Stump sprout



Root suckering

Light requirements: The relative minimum requirement for sunlight varies among species. Tolerant species can survive and grow in full shade. midtolerants in partial shade, and intolerants only in full sunlight. Some species require clearcutting to develop into mature trees.



Tolerant



Midtolerant



Intolerant



Best with clearcutting

Special considerations: This section provides information on some problems that might be encountered when regenerating specific species. For example, regenerating oaks will be difficult in areas with large deer herds. Species with thin bark are susceptible to damage by careless logging. This wounding increases the possibility of heart rot.



Browsed by deer



Adapted to fire



Damaged by fire



Thin bark



Insect problems



Disease problems

Oak (*Quercus* spp.)



Oaks dominate the landscape throughout most of Connecticut. Oaks are disturbance-dependent species and most of our oak forests arose on lands that were repeatedly burned and harvested prior to 1900. Native Americans would soak the acorns in streams during the winter to remove the tannins that made them inedible. These large, majestic trees can live for several centuries, especially northern red and white oaks. Mature trees can reach over 120 feet tall with diameters of 2 feet or more. Northern red oak is Connecticut's most valuable timber tree in both value and volume (19% of total).

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Wood products

Veneer, fine furniture, cabinets, railroad ties, pallets, firewood, and flooring. White and chestnut oak are used to make barrels and ship hulls.



Wildlife

Acorns are used by many species, including white-tailed deer, turkey, squirrels, chipmunks, and blue jays. White and chestnut oak acorns, because of their lower tannin content, are eaten before the acorns of other species.

Aesthetics

The massive trunks and wide spreading branches typical of oaks lend the forest a gnarly, primeval sense of permanence. The leaves of scarlet and red oak often create a second peak in fall color during late October.



Oak (*Quercus* spp.)

Seed dispersal

Oaks produce large seed crops at 2-10 year intervals. The large acorns that are dispersed by blue jays and small mammals germinate in the spring.



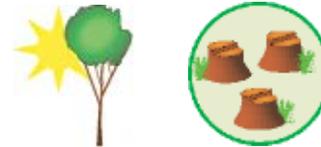
Reproductive modes

Successful oak reproduction develops from stump sprouting and from advanced regeneration (seedlings with root systems that are 5-20-years old).



Light requirements

Although oak seedlings can grow in partial shade, eventually over-story removal (final stage shelterwood, clearcutting or patch cutting) is required to achieve the full sunlight conditions necessary for seedling to develop into mature trees.



Site requirements

Northern red oaks grow on good to average quality sites common to middle and lower slopes. Black and white oaks are on middle slopes with average site quality. Chestnut and scarlet oaks grow on low quality sites on upper slopes and ridgetops.



Special considerations

Oaks need protection from browsing where deer herds are large. Prescribed burning prior to seedling germination can enhance seedling height growth.



Best methods successfully regenerate oak



Shelterwood method



Reserve tree method

Maple (*Acer* spp.)



Red maple has become the most common tree in Connecticut, accounting for one-quarter of all trees. This increase has been attributed to fire suppression and the increased use of partial cutting (as opposed to the earlier practice of clearcutting). Their ability to grow in light (red maple) to heavy shade (sugar maple) allow both species to persist for decades as small saplings under the shade of larger trees.

Sugar maple is a long-lived species that can survive for over 300 years, red maple commonly less than 150 years. Sugar maple is the larger of the two species with mature trees commonly reaching over 100 feet tall with diameters of 2 feet or more.

USES

Wood products

Maple syrup, furniture, lumber, railroad ties, pallets, firewood, specialty products.



Wildlife

The large hollows commonly found in centenarians are favorite den sites of raccoons, porcupines, and flying squirrels. Chickadees, wrens, and cardinals eat the seeds and deer will eat the leaves and twigs.

Aesthetics

The early kaleidoscope of fall colors in red maple swamps herald the arrival of autumn. During early spring, red maple flowers mist the hills with a twinkling of reds and yellows. Sugar maple is the queen of the fall with leaves turning every hue from clarion yellow through bright orange to beet red; often with the full range of colors on the same tree.



Maple (*Acer* spp.)

Seed dispersal

Sugar maple produces large amounts of winged seeds (samara) at 3-7 year intervals, red maple about every other year. The seeds are primarily dispersed by the wind.



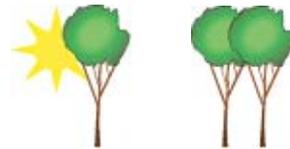
Reproductive modes

Both species depend on advanced regeneration that develops after partial cutting or gaps created by the death of larger trees. Red maple reproduction can develop from stump sprouts.



Light requirements

Sugar maple is among the most shade-tolerant species in southern New England. Red maple is competitive in partial shade created by partial cutting.



Site requirements

One of the reasons that red maple continues to increase in southern New England is its ability to grow on all but the driest and wettest of sites. Sugar maple regeneration is found on lower slope positions where soil moisture is adequate. There is some evidence that its distribution is limited by the amount of calcium in the soil.



Special considerations

Although logging damage rarely kills maples, it often creates wounds that cause extensive internal rot. Both species are weakened by wildfire.



Best methods to successfully regenerate maple



Single tree selection



Diameter limit harvest

Eastern White Pine (*Pinus strobus*)



Eastern white pine can grow on sites ranging from dry ridgetop to swampy valley. In 1710, the English Parliament passed the *White Pine Act* to protect the large white pine needed for masts.

Although largely ineffective, this was one of the first acts that set colonists and England on a collision course.

This large, majestic species can live for 300-400 or more years. Mature trees can reach heights of 150 feet with diameters approaching 3 feet.

USES

Wood products

Furniture, lumber, bark mulch, ship masts.



Wildlife

Where eastern white pine is not common, deer will eat needles and terminal buds of seedlings and saplings. Red-breasted nuthatches both eat pine seeds and nest in cavities. Red squirrels also eat pine seeds by methodically dismantling the cones.

Aesthetics

Mature eastern white pine stands with their massive boles soaring high above inspire a sense of awe and reverence, especially when the wind whispers through the needles. The green of scattered pines accent fall colors and provide a reminder of life during the monochrome months of winter.



Eastern White Pine (*Pinus strobus*)

Seed dispersal

Eastern white pine produces large amounts of seeds at 3-10 year intervals. The seeds are dispersed by the wind in the fall.



Reproductive modes

Successful white pine reproduction can be obtained from seedlings in large openings or clearcuts where a seed source is abundant and some mineral soil is exposed. Advanced regeneration is more important when using multi-aged stand management.



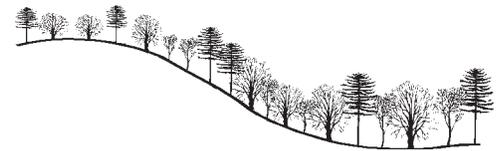
Light requirements

Although eastern white pine seedlings can grow in partial shade, eventually overstory removal (final stage shelterwood or clearcutting) is necessary for seedlings to develop into mature trees.



Site requirements

Eastern white pine can be found in every site from deep sands to swamps. However, regeneration success is best on sites that are droughty at some period during the year.



Special considerations

Eastern white pine seedlings need protection from wildfire and occasionally deer browsing. Ideally, regeneration should be established under a partial-shade overstory to reduce pine weevil damage.



Best methods to successfully regenerate white pine



Silvicultural clearcut



Reserve tree method

Birch (*Betula* spp.)



Black birch is often found on average sites, and yellow birch on moist to wet sites, throughout the state. Black birch is now the second most common tree species in Connecticut. Both species contain oil of wintergreen, methyl salicylate, which gives birch beer its distinctive taste. The presence of this chemical, poisonous at high doses, provides some protection from deer browse damage. Many of the larger black birch trees have one or more large cankers that reduces the potential economic value of this species. Although both species can survive for 200 years, maximum ages of about 120 are more typical. Mature trees are commonly 80 feet tall, with diameters slightly larger than a foot.

USES



Wood products

Veneer, lumber, railroad ties, pallets, and firewood.

Wildlife

The seeds of these trees provide some winter food for chickadees, ruffed grouse, and chipmunks. The bark of yellow birch is utilized for nesting material by some birds.

Aesthetics

The golden fall foliage of birch leaves adds gaiety to autumn landscapes. The frilly, peeling light-colored bark of yellow birch is a unique feature of moist woodlands



Birch (*Betula spp.*)

Seed dispersal

Black and yellow birch produce large amounts of seeds at 1-2 year intervals. The small seeds are dispersed 300 feet or more across crusted snow by the wind in mid winter.



Reproductive modes

Successful birch reproduction can be obtained from seedlings in large openings or clearcuts. Black birch can also produce successful regeneration in openings created by shelterwood operations.



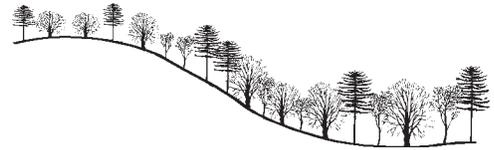
Light requirements

Although birch seedlings can grow in partial shade, eventually over-story removal (final shelterwood removal or clearcutting) is necessary for seedlings to develop into mature trees.



Site requirements

Black birch is commonly found on average quality sites; yellow birch on moister sites. In the northern part of the state, black birch is found towards ridgetops and yellow birch on midslopes.



Special considerations

Both black and yellow birch are very susceptible to fire and logging damage. Although necrotia canker is common on black birch and can make the wood unmerchantable, it rarely kills seedlings.



Best methods to successfully regenerate black and yellow birch



Commercial clearcut



Group selection

American Beech (*Fagus grandiflora*)



Beech is a common species in forest preserves and high-graded stands. It is a slow-growing, long-lived species (when not infested with beech bark disease), and is our most shade-tolerant hardwood. Saplings can survive for 100 years or more in the understory before reaching the upper canopy. Unfortunately, an introduced insect/disease complex, beech bark disease, has killed and weakened beech across a large part of the eastern United States. In the absence of beech bark disease, trees can survive for several centuries. A mature beech can approach 100 feet in height with diameters of 2 feet or more. Because beech has a tendency to root sucker, what appears to be a small beech grove is often an extended clone

USES

Wood products

Furniture, chopping blocks, baskets, railroad ties, pallets, and firewood.

Wildlife

American beech seeds provide food for large animals such as black bears and small animals such as white-footed mice. A variety of birds also eat the seeds.

Aesthetics

The distinct smooth bark is an easy identifier for beech. Young lovers have been known to carve testimonials to their everlasting devotion in the bark of beech trees, though whether this contributes to the aesthetics is questionable. Few herbaceous plants grow in the deep shade of a beech grove providing the forest, in the absence of beech



American Beech (*Fagus grandiflora*)

sprouts, with an open, “shady glade” appearance.

Seed dispersal

American beech produces large seed crops at 2-8 year intervals. The medium sized seeds are dispersed by blue jays and small mammals.



Reproductive modes

Successful American beech reproduction develops from root suckers and advanced regeneration. Beech seedlings can persist in the understory for decades.



Light requirements

American beech is among the most shade tolerant species in southern New England and can develop in all but the darkest shade.

Site requirements

American beech regeneration is found on midslope positions where soil moisture is adequate. It is also found on lower slopes and benches.



Special considerations

Logging damage can create wounds that cause extensive internal rot. Beech bark disease can stunt growth of saplings and causes deformed growth.



Best methods to successfully regenerate American beech



Single tree selection



Unmanaged forest



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A special thanks to Hull Forest Products for permission to photograph their mill operations (page 11). We would also like to thank J.P. Barsky, M.J. Bartlett, G. Milne, D. Beers, and J.E. Gillespie for their helpful comments

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