

Crop Tree Management

Keep biggest, best trees to increase timber values

Dave McGill, Forest Resources Specialist, WVU Extension Service

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Trees increase in value as they increase in size. As trees grow larger, they contain more wood and - potentially - more high-quality wood. One strategy for producing value in farm and family woodlots is to make high-quality trees grow to a marketable size in the shortest time possible. To accelerate the growth of trees and their timber value, woodland owners use a thinning method called crop tree management (CTM).



A four-sided release treatment removed competing trees from around the crowns of the northern red oak (left) and Yellow-popular (right) crop trees.

CTM is an effective way to accelerate tree growth and produce higher wood quality and higher market value in anticipation of a future timber sale. CTM consists of three parts:

1. Selecting high-quality "crop trees"
2. Providing these crop trees with ample space to grow by removing the competition from neighboring trees
3. Considering the next generation

Selecting crop trees

Crop trees are trees that are carefully selected for their potential to grow high-quality wood. When selecting crop trees, it's good to follow the saying "keep the biggest and the best." Crop trees should have crowns (the leaf-bearing branches) that are well-positioned among neighboring trees. Trees that have crowns in the full sunlight are good candidates to select as crop trees. In contrast, trees with their crowns completely shaded by neighboring trees are called "suppressed"; they seldom recover to make good crop trees.

Some tree species are prone to stem sprout, also called epicormic branching, where new branches grow directly out of the tree trunks instead of from the tips of the existing branches. Epicormic branching can decrease the value of the tree's wood. White oak, elm, and basswood readily form epicormic sprouts so you must take extra care if you select any of these species as crop trees.

It is important to select crop trees having minimal defects since the primary role of crop trees is to produce high-quality wood. Natural defects reduce the wood's value. For example, the knots in lumber are the remnants of branches that were attached to the main stem (trunk) of the tree. So trees without lower branches will produce knot-free wood within the trunk's branch-free zone. Other external signs of inner wood defects are open wounds from earlier injury, fungal "conks" on the tree trunk, deformed bark indicating a covered wound, and holes that insects have bored into the tree trunk.

Good potential candidates for crop trees have these features:

- Straight stem
- Large, leafy crown
- Absence of lower branches along the main stem
- Tight bark (no cracks that expose the inner part of the tree)

How many crop trees should be selected in a woodlot? This depends on the amount of work you are willing and able to do or to have done. A rule of thumb is to select between 20 and 50 crop trees per acre. Another important forestry adage is “manage the best sites first”; that is, invest your efforts in the most productive areas where you will reap the most rewards. If your resources are limited, you might select only a dozen or so of the very best trees per acre on the very best sites.

You can identify crop trees with paint or flagging. Some family forest owners will even mark the trees so they can track their growth over time.

Providing space to grow

After you select the best crop trees, the second step in CTM is to make sure each of those trees has ample space to grow. This step is called a crop tree “release” or “thinning.”

The trees with crowns touching the crown of the crop tree are either cut or injected with herbicide to eliminate the side shade cast upon the crop tree’s crown. Crop trees can be released by felling neighboring trees with chainsaws or by treating the neighboring trees with herbicides. Both methods have advantages and disadvantages. Chain-saw felling is physically more demanding and hazardous if the trees are large, but the trees will be on the ground (not falling in pieces over the years), which will likely increase the area's scenic beauty.

Injecting the competing trees with herbicide is a simpler and safer process, but the trees will be left upright until they eventually decompose. This process can take years, although it is important to remember that many species of wildlife inhabit or glean food from dead standing trees. Only special types of herbicides and injection methods should be used to release crop trees because some chemicals can inadvertently “flashback” from a treated tree to a crop tree, harming or killing it.

Crop tree release should be carried out when the trees are at least 15 years old or the crop trees are more than 25 feet tall. As neighboring tree crowns are eliminated, the crop trees' crowns will expand into the newly opened space. The growth of the tree trunk accelerates as the crown size and leaf surface area increase. In general, crop trees that are released on all four sides of their crowns will grow about 50 percent more than unreleased trees. If a tree is growing at 2 inches in diameter per decade in an unmanaged stand, it is likely to grow at least 3 inches in diameter per decade following release.

Considering the next generation

At all stages of forest management, it is important to consider questions of productivity as well as sustainability (having healthy forests for future generations). It is important for owners to consider how they want their forests to look in 20 to 30 years. This is especially true when applying crop tree release to older trees. Attention should be given to the condition of new seedlings and the amount of light reaching them on the forest floor.

Following these simple guidelines is a first step in ensuring productive woodlands. CTM is a versatile method for private forest owners to use to increase the timber value of their woodlands and to ensure the health and vigor of the forest in the future.

For questions concerning the planning and application of CTM, contact your West Virginia Division of Forestry service forester, your consulting forester, or your county's WVU Extension agent. These and other questions about forest management can also be directed to me (304-293-2941, ext. 2474) or to the WVU Appalachian Hardwood Center (304-293-2941, ext. 2465).