

# Silviculture similar to vegetable gardening

By JAMES C. FINLEY

Area Forest Resource Agent

Cooperative Extension Service Penn State University  
 UNIVERSITY PARK - Silviculture is the art and science of growing trees. An analogy can easily be drawn between silviculture and a vegetable garden. When a tree is planted, weeded, and thinned, one can expect to get a good crop, provided the plants receive adequate care and are protected from disease and insects. But trees planted in the wrong site, forced to compete with weeds, or left in crowded rows will not produce good crops.  
 Just like gardens, need to be weeded and thinned in order to produce good crops of timber and water. In time, we will do the weeding and thinning, but often we do not have the time or patience to wait.  
 Through the years foresters have learned how individual trees and other organisms interact to influence another's growth. They have studied tree species and determined specific requirements for growth. This study of the requirements is called "silvics." Silvics has defined several needs which influence a plant's ability to survive and grow. Light, water, and nutrients are primary regulators of a species' competitive ability.  
 Careful observation reveals that certain species are found in particular locations within a stand. For instance, hemlock frequently occurs on north facing slopes or along stream banks in coves, but is seldom seen on south facing slopes. Hemlock grows best on these sites because of abundant moisture. It does not grow well on dry areas. Hemlock has a wide-spreading shallow root system bringing moisture near the soil surface.  
 Hemlock frequently occurs in nearly pure stands or areas that contain essentially nothing but hemlocks. Hemlock's tolerance to shading is the reason for this characteristic. Hemlock forms a very dense canopy and allows very little light to reach a forest floor. Only species that can grow under very heavy shade will survive, and hemlock can survive in heavy shade. Con-

sequently, hemlock seedlings will become established in the shade of the parent tree. They will survive, grow, and replace older hemlocks (when the older hemlocks die). Hemlock is classified as a climax species because once it fully occupies a site, it will continue to dominate the site and exclude other species. Species composition of a climax forest will persist until either a natural disturbance or man alters the stand.

Another example of a species influenced by moisture is chestnut oak (rock oak). This species is most often found on dry ridge sites. It grows on more moist sites, but is unable to compete successfully for light against species such as hemlock. As a result, chestnut oak grows where other species cannot find sufficient moisture.

It soon becomes evident that light and moisture can limit successful growth of any species. Foresters have studied the natural occurrence and growth rates of species and have constructed charts of relative tolerance to shade. These charts are used to explain why trees occur where they do within a forest and to understand their vigor.

- A list of relative tolerance to shade follows:  
 Very Tolerant - Eastern Hemlock, Beech, Sugar Maple, Basswood, Hop Hornbeam.  
 Tolerant - Red Maple, Silver Maples, Yellow Birch.  
 Intermediate - E. White Pine, Elm, Amer. Hornbeam.  
 Intolerant - Black Cherry, White Ash, Yellow Poplar, White Oak, Red Oak, Hickory.  
 Very Intolerant - Paper Birch, Black Locust, Aspen, Larch.

Tolerance within a species is recognized by a number of characteristics. Tolerant species such as hemlock or beech persist in a forest understory. They respond to release from competition for light and moisture with accelerated growth and improved vigor, even after being suppressed for many years.

Under the same competitive conditions, lower branches of intolerant species usually die and break off many years earlier than those of tolerant species. This natural process is called self-pruning. Crowns of shade tolerant species have a denser appearance, and more leaf layers than do

intolerant species, because lower branches remain alive much longer than those of intolerant trees. As a result, tolerant species frequently are slow to self-prune. They also tend to have more taper in the sawlog portion of their boles (trunks) in order to support their crowns.

Within mixed stands, tolerant trees persist and compete very well with species of equal size. Consequently, they tend to form stands that are dense, with more stems per acre than stands of intolerant species.

In even-age situations, such as occur after fires or clear cuts, tolerant species are quickly overtopped by faster-growing intolerant species. The tolerant trees will persist until the intolerant species is removed. The tolerant trees will then dominate the stand.

However, in a situation where both tolerant and intolerant trees are being established under an existing canopy, tolerant trees will dominate from the start. Because tolerant species prosper under shaded conditions they eventually become a major stand component, regardless of circumstances leading to stand regeneration.

The chart of relative tolerances shows that some of our more valuable species are found among intolerant species (black cherry, yellow poplar, white oak). These intolerant species have growth characteristics that make their wood valuable. Stands of intolerant species often have widely spaced stems, thus promoting rapid growth in height and diameter of each tree.

Crowns on intolerant trees will be small, resulting in relatively little log taper. Intolerant species in properly stocked stands will self-prune quickly, yielding high quality lumber with few knots.

Various species compete for a position within a developing stand. Left to nature, this competition can leave a lot to chance. Timber Stand Improvement (TSI) Practices shorten the time required to develop desirable forests. One common set of TSI practices is intermediate harvest cuttings.

TSI practices include weeding (of inferior trees and tree species), thinning (so that growth within the stand

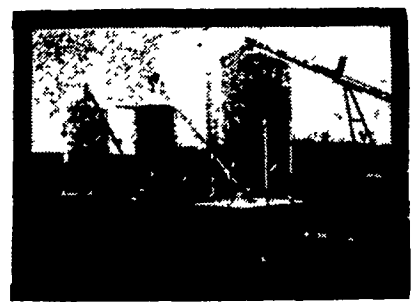
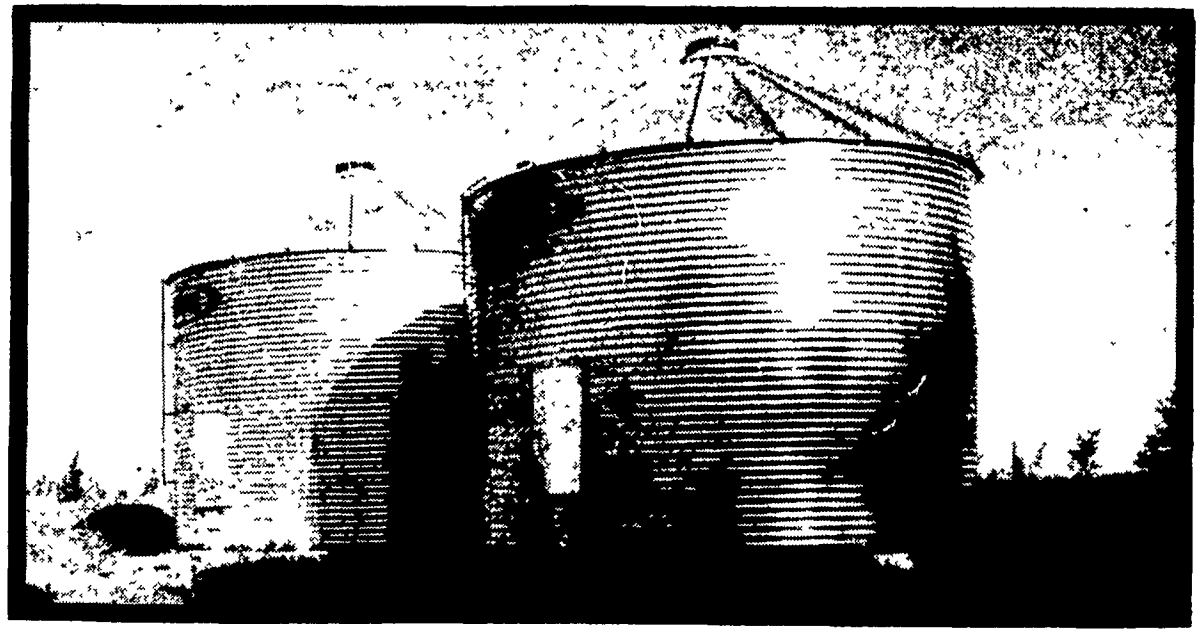
[Continued on Page 38]

YOU BUY..



GRAIN DRYER BINS

WINTER BIBLEE



**NEW FINANCE PLAN**  
 ★ 15% DOWN PAYMENT  
 ★ 5 YEARS ON BALANCE  
 ★ 7% INTEREST "ASCS Financing"

LET YOUR AGRI-BUILDER HELP YOU DESIGN AN EFFICIENT SYSTEM FOR YOUR GRAIN

IN BUSINESS TO STAY

SEE YOUR LOCAL AGRI-BUILDER

M. STAHLMAN  
 Cash Valley Road  
 Land, Md. 21502  
 Phone 301-777-0582

TAM AGRI CORPORATION  
 R.D. #1, Mountain Road  
 Dillsburg, Pa. 17019  
 Phone 717-432-3376

TEMCO PARTS CO. INC.  
 Route 213 and 544  
 Chestertown, Md. 21620  
 Phone 301-778-4454

C.H. WALTZ SONS INC.  
 Cogan Station, Pa. 17728  
 Phone 717-435-2921

MEAD SALES  
 Box 409  
 Pa. 16601  
 Phone 814-944-6045

TAP ENTERPRISES INC.  
 R.D. #3, Box 256A  
 Fleetwood, Pa. 19522

TRI-STATE MARINE DIST. INC.  
 Route 256  
 Deale, Md. 20751  
 Phone 301-867-1447

MARK ANTHONY & SONS  
 R.D. #1  
 Rochester Mills, Pa. 15771  
 Phone 412-286-9250

P. E. Hess, Butler Mfg. Co. **BUTLER** AGRI-BUILDER  
 Box 337, Oxford, PA 19363

I'm interested in more information on Butler products.  
 Buildings  Bins  Dryers  Bulk-O-Matics

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 County \_\_\_\_\_ Zip \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_  
 Phone \_\_\_\_\_  
 [Include area code] LF