



## BOBCAT (*Lynx rufus*)



The bobcat (*Lynx rufus*), a small wild cat, can be found across much of New York State, except on Long Island and parts of Central and Western New York. About twice the size of the domestic cat, adult males weigh about 28 pounds and are 22 inches high at the shoulder. Females are usually much smaller in size, reaching an average of 20 pounds. Bobcats are tawny to grey in color, with black spots, and very soft, dense, short fur. They have a stout body, pointed ears, and short, "bobbed" tails that are black-spotted with a white-tip.

The bobcat is an elusive and solitary creature, and catching a glimpse or seeing signs of this animal is a rare treat. They are mainly nocturnal, but sometimes venture out in the daytime. When visiting suitable habitat in the winter, you may be able to find bobcat tracks in the snow. Follow the tracks to experience life from a bobcat's point of view, walking from vantage point to vantage point in search of food. You may walk across a log to cross a stream, climb to the top of a rock formation, or stop and visit a brush pile. Be prepared these cats are excellent climbers and strong swimmers!

Bobcats are efficient, wary predators equipped with sharp senses of sight, smell and hearing. They have four large canine teeth to pierce deeply into

prey and retractable, hooked claws on both the front and hind feet. Bobcats are opportunistic and will prey on anything that is available. Small animals such as mice, voles, shrews, squirrels, chipmunks, birds, rabbits and hares, form the bulk of the bobcat's diet. They will also feed on porcupines, minks, muskrats, skunks, fish, frogs, and insects. Bobcats will even occasionally take sick, weak, or crippled deer, and will store carcasses for later use by covering them with leaves.

The bobcat primarily inhabits extensive forests, wooded swamps, rocky outcrops, and occasionally agricultural areas. The most critical features of bobcat habitat are places for refuge and protection, such as rocky ledges.

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## BOBCATS

Bobcats often use rocky ledges and rock piles for shelter, breeding, and raising young. Brush piles, hollow trees, and logs also provide good cover for resting and dens. Bobcats are not present in heavily developed areas. However, they can use patches of wooded habitat.

Bobcats breed from late February to early March, and young are born in April or May following a 50 to 60 day gestation period. Bobcats give birth in dens, rock crevices, caves and hollow logs insulated with dry leaves and mosses. Average litter size is two kittens, but can range from one to five. Kittens stay with their mothers for several months, learning to hunt and kill prey.

Foxes, owls, and adult male bobcats may kill bobcat kittens. However, the most common cause of mortality for kittens and juveniles is starvation due to low food supply. During severe winters, adult bobcats may die of starvation too. In addition, adults may be injured or killed by their prey. Several diseases carried by raccoons and feral cats including rabies, feline distemper, and feline leukemia may infect adults. Bobcats may live up to 14 years in the wild.

Bobcats will be attracted to areas where they can find suitable shelter and food. Habitat features that attract and benefit small mammals like clear cuts, brush piles, and large logs left on the forest floor will in turn enhance habitat for bobcats. Hollow logs will also be used as dens, and bobcats often prefer to walk across logs in the winter rather than forge through deep snow. You can take further steps to benefit bobcats by protecting rocky outcrops and crevices from disturbance, and providing good hunting habitat nearby.

The New York State Department of Environmental Conservation would like to learn more about the occurrence and distribution of bobcats in New York, particularly in areas where hunting and trapping of bobcat is not permitted, including most of Central and Western New York. In these areas, landowners like you, who spend a considerable amount of time outdoors can be an essential resources for information on bobcats. If you have

information, and would like to report bobcat sighting visit the NYSDEC web site at <http://www.dec.ny.gov/public/30770.html>

*Source: The New York Forest Owner, January/February 2008, Volume 46:1. Photo courtesy of David Westphalen/Painet Inc.*

### DID YOU KNOW. . .

- The Basenji (African wolf dog) is the only dog that cannot bark.
- A dog's pregnancy term is 60 days.
- Most modern dog breeds were developed about 100 years ago
- Eight million pets lose their lives in animal shelters each year.
- About one family in three owns a dog.
- Pilgrims were the first to introduce cats to North America.
- Cats sweat from the pads of their paws.
- The Maine Coon cat is America's only "natural" breed of domestic feline.
- The calories burned daily by the sled dogs running in Alaska's annual Iditarod race average 10,000.
- The 1,149-mile race commemorates the 1925 "Race for Life" when 20 volunteer mushers relayed medicine from Anchorage to Nome to battle a children's diphtheria epidemic.

*Source: Creatures Corner News*



## TREE VALUE: A BASIS FOR WOODLAND MANAGEMENT

Managing your woodlot for sawtimber is the principle focus of this article and provides a basic understanding of financial considerations involved with sawtimber management.

### Sawtimber Management

Although relatively few forest owners state that financial gain from sawtimber sales is the primary reason for owning forestland, virtually ALL private forests are harvested for sawtimber sooner or later! Therefore, it is generally financially advantageous for forest owners to manage their stands, especially those with good productive potential, for the eventual sales. Typically, sawtimber management activities are quite compatible, even complementary to other ownership objectives such as wildlife. Appropriate, timely silvicultural practices often will double the eventual sales revenue while simultaneously improving wildlife habitat, enhancing biodiversity and promoting sustainable production.

The final goal of timber management is to provide for sustained, multi-generational, harvest and sale of trees suitable for lumber or veneer. Harvesting and selling timber is the pay off for years of timber management or, at the very least, the culmination of decades of forest growth. It is important to plan and proceed carefully. It may be years before a forest recovers from improper harvesting practices.

Just as a brief exercise to help you gain some insight to relative value of different sawtimber species, take a moment to fill in the blanks on the following table. Let's assume each tree is part of a medium sized sales and contains two 16-ft. logs. Price is for stumpage (the price a logger would pay for the tree as it stands on the stump in the woods).

As you will see from the answers, stumpage

value varies greatly by species. Several other variables greatly influences sawtimber values also such as; quality of logs, size and volume of the sale, efficiency of the harvest, distance to mills, size of trees, limitations on conditions of the sales, etc. The NYS Dept. of Environmental Conservation publishes the "New York Stumpage Price Report" semiannually. This report lists the most common and range of stumpage prices for several species by region throughout NYS.

### What's that tree worth?

20-inch D.B.H.* white pine	\$ ___ sawtimber	\$ ___ firewood
20-inch D.B.H.* black cherry	\$ ___ sawtimber	\$ ___ firewood
20-inch D.B.H.* red maple	\$ ___ sawtimber	\$ ___ firewood

\*D.B.H -diameter at breast height(4.5 feet from the ground)

Answers: A 20" diameter tree, with 2, 16 ft. logs contains 580 board feet of lumber (International 1/4" log rule). Recent stumpage prices per 1000 board feet (MBF) are about \$120, \$50, and \$125 for pine, cherry, and red maple respectively. There is no market for conifer firewood, and hardwoods are worth about \$13/cord. A 20" diameter tree, used entirely for firewood, would have approximately 0.73 full cords.



Sources: Forest Connect 2007; Volume 3, Issue 6; This article was written by Gary Goff and Peter Smallidge, Source: Department of Natural Resources, Cornell University, Ithaca, NY

## WHEN TO HARVEST?

As soon as a tree has enough wood fiber to meet the costs of felling, limbing, bucking, skidding, loading, transporting, and processing, it has a positive dollar value to the forest owner and is merchantable. However, just because you can harvest the tree, doesn't mean you should harvest the trees. It is usually financially unwise to harvest trees as soon as they reach the minimum merchantable size, however, because they are not yet at their optimum value. Log buyers will "come calling" as soon as they see trees that will meet their expenses and provide an adequate profit margin for their work. Profits for forest owners increase greatly as the trees continue to grow from 12 to at least 18 inches D.B.H. (refer to table on page 3 that illustrates a number of important timber management considerations)

At 12 to 14 inches DBH, hardwoods have a low value, but the rate at which they are increasing in value is high, especially for fast-growing trees with proper growing space. This is a good size to think about thinning (removing) the low quality trees to concentrate growth on these higher quality trees, whether for mast production or sawtimber. Don't fall to the temptation to cut the big trees and let the little trees grow.

As a sugar maple tree increases in diameter from 14 to 24 inches, it may increase 33 percent in merchantable height, increase 4 times in volume (110 to 458 board feet), and increase more than 10-fold in dollar value (\$44 to \$458). If the tree is veneer quality its value would be substantially more.

At 14 to 18 inches DBH, hardwoods may nearly double in value for each 2 inches of growth in diameter as log grade improves with size and as height growth continues. At a growth rate of 2 inches in diameter every 10 years (10 growth rings/inch), a tree will double in value in 10 years (a compound growth rate of 7 percent, not

including inflation). Tree value increases as trees grow because (1) they attain a larger volume, (2) they often shift into the next better log grade and are worth more per board foot, and (3) the price of sawtimber has typically increased with inflation.

At 20 to 24 inches DBH, hardwoods increase substantially on a dollar basis, but because the grade has peaked, the rate at which their value is increasing may slow to a compound growth rate of 3 percent or less. The increase in dollar value is mostly the result of the increase in volume. Growth rate is also slowing, and the risk of natural disturbances is greater.

At 24 to 28 inches DBH, the dollar value continues to increase, but change in grade and height are unlikely. Also, growth in diameter is typically slower as the tree reaches biological maturity. These two factors could reduce the compound growth rate to 2 percent or less.

The diameter thresholds given above might tempt you to harvest based only on tree diameter. Tree harvesting is a tool to provide revenue to the land owner, but also provides the opportunity to regenerate the forest to produce the next high quality crop of trees.

The timber value of individual trees regardless of the species, logging costs and current market trends, is largely a function of the total amount of wood fiber they contain and the quality of their lumber or veneer. Log grade is determined by size (diameter and length), form and the presence or absence of defects such as knots, ingrown bark, and work holes. In general, as a tree increases in size, its logs increase in grade; as grade and size increase, so does value. Diseased trees in contrast may lose value and grade faster than they grow in volume.

*Continued on page 5*

A timber harvest to maximize financial return should therefore, occur when the rate of tree growth and value have peaked. The timber harvest should follow or coincide with silvicultural practices that ensure adequate forest regeneration.

Hardwoods such as sugar maple, on good sites, reach financial maturity (the age at which a tree is no longer increasing in value at a profitable

rate) at about 20 to 24 inches. Whereas, on poor sites it may be reached at 16 to 20 inches. As indicated in Table 2, the age at which trees reach financial maturity varies significantly depending on species, site quality, damage from insect and disease attacks, and management history. Typically, active management will shorten the time to financial maturity.

Source: Forest Connect 2007, Volume 3, Issue 6

**Table 1.** Stumpage Value of Sugar Maple Trees based on Size and Grade

Illustrates the potential value of high-quality 14 to 20-inch crop trees. These trees are merchantable but definitely not “financially” mature. They are the true money makers in a woodland and, therefore should not be harvested during this prime growth period unless there are extenuating circumstances. Not all trees in a stand will show this kind of value growth. The majority of trees should, over time, be removed to allow adequate sunlight for the favored crop trees. Firewood is a good market for such trees. Note that because firewood trees do not improve in grade, their value is tied directly to volume growth only . Consequently, their annual compound value growth rate is only about 1.5%.

DBH (inches)	No.of 16-Foot Logs	Volume <sup>b</sup> (bd.ft.)	Grade <sup>c</sup>	Dollar value MBF <sup>d</sup>	Age of tree	Dollar Value Firewood	Value/tree Sawtimber	Annual Compound growth rate <sup>e</sup>
12	1.0	58	2 to 3	300	50	2	17	8.5% (1/10" growth ring)
14	1.5	110	1 to 2	500	60	3	55	“ “
16	1.5	146	1	700	70	5	102	“ “
18	2.0	240	1	900	80	7	216	3% (1/10" growth ring)
20	2.0	305	1 to 2	1,000	90	9	305	“ “
24	2.0	458	1	1,100	110	13	504	1.5% (1/12" growth ring)
28	2.0	635	1	1,200	134	17	762	“ “

a) Diameter at breast height or 4 1/2 feet above ground. b) international 1/4-inch rule. c) Grade classification of butt log: 1= highest value. These are typical grade changes with size. d) Numbers represent stumpage value on Doyle scales based on 2007 NYS stumpage and estimates for volume and grade. e) Does not include inflation, but quality sawtimber value generally matches or exceeds the inflation rate.

**Table 2.** Average age at which timber species reach financial maturity (24 inches DBH\* ) in managed stands \*\* on good sites.

65-75 years	75-95 Years	95-124 years	125 years or more
White pine	Black oak	Hemlock	White oak
Tulip poplar	Black cherry	Sugar maple	Chestnut oak
Red oak	White ash	Red maple	
Red pine	Basswood	Yellow birch	
		Hickory	

\*DBH = diameter at breast height or 4 1/2 feet above ground.

\*\*Growth rate may be one-third less in unmanaged stands.

**Table 3.** Firewood provides an important and useful product that helps concentrate growth on higher value hardwoods. This chart estimates the volume of full cords associated with trees, by their diameter. Cord volume estimates assume the tree is utilized to a 4" diameter top.

DBH	Standard Cord	DBH	Standard Cord
6	0.03	14	0.33
8	0.08	16	0.45
10	0.15	18	0.58
12	0.23	20	0.73

## CORNELL CHRONICLE: FESCUE GRASS SECRETES HERBICIDE

Certain varieties of common fescue lawn grass come equipped with their own natural broad-spectrum herbicide that inhibits the growth of weeds and other plants around them.

Cornell researchers have identified the herbicide as an amino acid called meta-tyrosine, or m-tyrosine, that these lawn grasses exude from their roots in large amounts. This amino acid is a close relative of para-tyrosine (p-tyrosine), one of the 20 common amino acids that form proteins.

Reporting on the discovery in the current issue of the *Proceedings of the National Academies of Science*, Frank Schroeder, the paper's senior author and an assistant scientist at the Boyce Thompson Institute for Plant Research on Cornell's campus, said, "We at first didn't believe m-tyrosine had anything to do with the observed herbicidal activity, but then we tested it and found it to be extremely toxic to plants but not toxic to fungi, mammals or bacteria."

Co-author Cecile Bertin, Ph.D. '05, research director for PharmAfrican, a Montreal-based bio-pharmaceuticals company, made the initial discovery that fescue grasses inhibit plants from growing around them.

"While m-tyrosine itself is too water soluble to be applied directly as a herbicide, this research may lead to development of new varieties of fescue grasses that suppress weeds more effectively, which could reduce the need for synthetic herbicides", said Schroeder. By increasing our understanding of basic plant biology, the discovery of m-tyrosine's herbicidal properties could also help researchers discover more sustainable ways to control weeds or completely new herbicides, Schroeder added.

He and his colleagues are now conducting experiments to understand how m-tyrosine works as a plant killer. Plants depend on the production of large amounts of another common amino acid, phenylalanine, which is essential for the biosynthesis of wood, cell walls and lignin.

"Phenylalanine, m-tyrosine and p-tyrosine are structurally all very similar," said Schroeder. "Because of this similarity, we think that m-tyrosine might simulate high concentrations of phenylalanine, which would normally provide negative feedback for phenylalanine biosynthesis" and, thereby, suppress plant growth.

Schroeder and colleagues are also trying to understand why fescue grasses do not succumb to the toxin themselves. They found that when phenylalanine was added to plants dying from m-tyrosine exposure, they recovered. As a result, the researchers suspect that these fescue varieties may overproduce phenylalanine to save themselves from their own toxin.

People have not recognized how effective some fescue varieties are at suppressing weeds because m-tyrosine production appears to be highly dependent on environmental conditions, Schroeder said, which is another area that the researchers are currently investigating.



This image shows fescue grass roots, which exude a yellow material that contains an amino acid called mtyrosine as a major component. the chemical structure for mtyrosine is superimposed on the photo.

Source: Krishna Ramanujan, Cornell CHRONICLE ONLINE; October 22, 2007.

## BAT DIE-OFF PROMPTS INVESTIGATION

### DEC Asks For Cavers' Help to Prevent Spread of "White Nose Syndrome"

Thousands of hibernating bats are dying in caves in New York and Vermont from unknown causes, prompting an investigation by the New York State Department of Environmental Conservation (DEC), as well as wildlife agencies and researchers around the nation.

The most obvious symptom involved in the die-off is a white fungus encircling the noses of some, but not all, of the bats. Called "white nose syndrome," the fungus is believed to be associated with the problem, but it may not necessarily contribute to the actual cause of death. It appears that the impacted bats deplete their fat reserves months before they would normally emerge from hibernation, and die as a result.

Until researchers understand the cause and how it is spread, state environmental officials and caving organizations are asking people not to enter caves or mines with bats until further notice to avoid the possible transfer of the disease from cave to cave. Vermont officials are making a similar request.

"What we have seen so far is unprecedented," said Alan Hicks, DEC's bat specialist. "Most bat researchers would agree that this is the gravest threat to bats they have ever seen. We have bat researchers, laboratories and caving groups across the country working to understand the cause of the problem and ways to contain it. Until we know more, we are asking people to stay away from known bat caves."

Bat biologists across the country are evaluating strategies to monitor the presence of the disease and collect specimens for laboratory analysis. Biologists are taking precautions — using sanitary clothing and respirators when entering caves — to avoid spreading the disease in the process.

Bat populations are particularly vulnerable during hibernation as they congregate in large numbers in caves — in clusters of 300 per square foot in some locations — making them susceptible to disturbance or disease. The vast majority of the hundreds of thousands of bats known to hibernate in New York do so in just five caves and mines. Because bats migrate as far as hundreds of miles to their summer range, impacts to hibernating bats can have significant implications for bats throughout the Northeast.

Indiana bats, a state and federally endangered species, are perhaps the most vulnerable. Half the estimated 52,000 Indiana bats that hibernate in New York are located in just one former mine — a mine that is now infected with white nose syndrome. Eastern pipistrelle, northern long-eared and little brown bats are also dying. Little brown bats, the most common hibernating species in the state, have sustained the largest number of deaths.

DEC has been working closely with the Vermont Fish and Wildlife Department, the U.S. Fish and Wildlife Service, the Northeast Cave Conservancy and the National Speleological Society, along with other researchers from universities and other government agencies. DEC will provide updates as they become available.

Sources: <http://blogs.cce.cornell.edu/community/horticulture/2008/02/19/bat-die-off-prompts-invest>



## AN ILLUSTRATED GUIDE TO PRUNING ORNAMENTAL TREES AND SHRUBS ON THE HOME GROUNDS

Pruning, the selective removal of specific parts of a plant, is practiced for one or a combination of reasons: to maintain plant health, control growth, encourage yield, or create a special form such as a hedge, an espalier, or a dwarf specimen. This article covers the first three categories, as well as hedges. References on page 15 give detailed pruning recommendations about espaliers and dwarf specimens.

In general, pruning should modify plant growth for the landscape design without sacrificing natural growth character.

**To maintain good plant health**, dead, diseased, or injured plant parts should be removed. Crossing branches should be pruned out to prevent rubbing, to allow light and air to reach the inner parts of the plant, and to enhance the structural form of the plant. Spindly, crowded stems are thinned out.

**Control of growth** by pruning may be required when a plant has been placed in a location where it exceeds the mature size called for in the landscape design.

**To encourage yield** of flowers, fruit, or larger foliage, several practices may be followed, such as pruning off a number of buds to produce larger, though fewer flowers, or removing a fixed number of flower buds while allowing the remainder to develop into fruit. Pruning selected parts of a plant can serve to stimulate individual shoot growth and larger leaves.

### Terminology

**Head back** - Cutting a twig or small branch back to a bud. Often done in summer on present year's wood but also applicable in winter pruning to one and two year old wood.

**Thinning** - Selective removal of twigs or branches back to lateral or main stem. Crowded branching is reduced by half or more in the case of some shrubs (lilacs); also includes the cutting of stems to ground level.

**Deciduous** - Plant which loses its leaves in the fall.

**Evergreen** - Plant which does not lose all of its leaves at one time.

### Pruning Sequence for Old Overgrown and/or Broken Deciduous Shrubs

(Shrubs with many branches from the base)

#### Early spring, first year:

Shrubs broken by snow, wind, or accident should be cut back to the ground (Fig. 1). Fertilize and water in May and June.

#### Late spring, early summer, first year:

Prune out excessive growth as it appears, leaving about five to seven shoots (Fig. 2). To encourage low branching, head back the shoot well below the height or width desired for the shrub in question. Otherwise, head back selected vigorous shoots by one third their length. Do this in June before the active growth stops.

#### October, first year:

To restrict the length of remaining shoots, induce side shoots in spring, and encourage hardiness of tender shoots, pinch out the terminal bud (Fig. 7).

*Continued on page 9*

**Early spring, second year:**

Remove the winter-injured wood, excessive branching, and any undesirable growth.

**Early summer, second year:**

Thin out young side shoots. Where two shoots identical in size and growth arise from buds opposite each other, remove the tip of one (Fig. 4).

**In future seasons:**

Remove some major old branches to approximately ground level each year or so, then follow the steps above as re-growth develops (Fig. 6).

Prune as little as is consistent with rebuilding the shrub. The amount of growth and vigor of the shrub after severe pruning will depend on a large clean leaf surface, ample soil moisture, and plenty of sun. Plants that are weak through poor soil, disease, and lack of moisture or sun light are not likely to be rejuvenated by heavy pruning.

Cut the plant to within 6"-8" of the ground (Fig. 1) or cut out old stems leaving vigorous growth for building new plant. With grafted varieties enough stem wood containing buds must be allowed to remain; otherwise the root-stock will take over.

As re-growth develops from a vigorous root system, select six or more well placed vigorous shoots to remain, remove others (Fig. 2).

**Early spring, before bud break, second year:**

Cut back new shoot growth to a foot or so from the ground (Fig. 3). (This will induce low branching from the one-year-old wood.)

**Early spring, second year:**

Remove winter-injured wood, excessive branching, and any undesirable growth.

**Early summer, second year:**

Thin out young side shoots (Fig. 4). Where two shoots identical in size and growth arise

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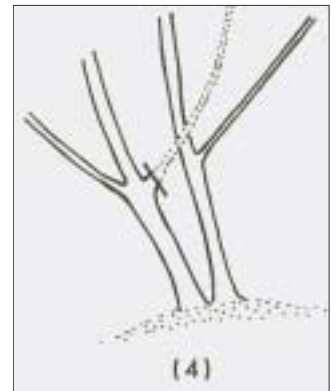
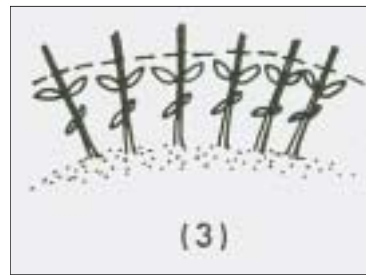
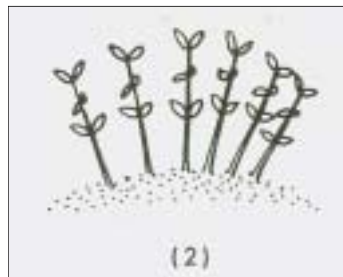


Figure 1 - Cut plant to within 6"-8" of the ground.  
 Figure 2 - Select 6 or more well-placed, vigorous shoots.  
 Figure 3 - Cut back new shoot growth.  
 Figure 4 - Thin out young side shoots.

Figure 5 - Head back sturdy shoots In mid-summer.  
 Figure 6 - Remove some major branches to approximate ground level.  
 Figure 7 - Pinch out terminal bud.

from buds opposite each other, head back or remove the tip of one.

Remove dead flower heads after blooming to tidy up appearance; head back one of the pair of shoots which often arises at the base of the flower structure.

#### **Mid-summer, second year:**

Head back, sturdy shoots in mid-summer; thin out undesired shoots (Fig. 5 on page 9)

#### **In future seasons:**

Remove some major branches to approximately ground level each year or so (Fig. 6 on page 9), then follow the above steps as re-growth develops. Prune out privet or ash under stock used in budded or grafted lilacs so that it does not out grow the graft. Excessive pruning should be avoided with grafted lilac; one or more stems should be left when old plants are renewal pruned.

### **Pruning Sequence for Deciduous Shrubs at Planting Time and Annually Thereafter**

(Shrubs with many branches from the base when the plant is for use as a specimen of natural form, not to be restricted in size or used as a hedge, espalier, or standard.)

#### **Planting time first year:**

Prune small bare root shrubs to an eight inch height at planting time (Fig. 8). Prune container and ball-and-burlap shrubs little, if at all, at planting time. Keep shrubs in their natural form of growth. Cut off old and interfering branches at the ground or at a point flush with the branch from which it is growing.



Figure 8 - Prune small bare root shrubs to 8"



Figure 9a - Remove dead, diseased, interfering, or broken wood.

Remove lateral branches to thin densely branched areas in the head of the plant. Make these cuts above a joint.

#### **Early spring, second year:**

Remove dead, diseased, interfering, or broken wood (Fig. 9a). Do not prune more than is obviously necessary.



#### **Late spring, second year:**

Remove excessive growth as it appears. Select strong well-placed shoots for future growth; remove weak or unnecessary growth. Head back excessively long growth (Fig. 5 on page 9).

#### **Early spring, third year and thereafter:**

Prune dead, diseased, or broken wood. Prune to obtain new branches year after year. Cut off a few of the oldest branches near the ground; next year, cut off a few more of the oldest branches. Continue this practice annually. Complete the cycle in three to five years.

After old stems are removed, thin out remaining dense areas of the shrub; take out ill shaped, crowding, and rubbing branches.

#### **Late spring, third year and in future years:**

Prune out excessive growth as it appears. To encourage branching of new shoots, head back the new shoots well below the height or width desired for the plant. Do this in June while growth is still active.

#### **Summer, third year and in future years:**

Restrict the length of new shoots by heading back one third to one-half their length (Fig. 9b on page 11).

*Continued on page 11*

This will induce side shoots next spring, and may encourage hardiness in the restricted shoots. In plants like lilacs and viburnums which flower the next spring from a terminal bud, leave selected branches un-pruned for production of bloom.



Figure 9b - Cut off a few of the oldest branches near the ground.

**Pruning Sequence for Deciduous Trees and Tree-Like Shrubs at Planting and Thereafter**

**Planting time first year:**

Thin out the head of bare root plants about one-fourth, selecting well spaced branches for future structure. Do not cut out the main leader. Thin crowded areas (Fig. 10). Head back remaining branches. On container and ball and burlap plants, little if any thinning is necessary. Correct other faulty structures by cutting out interfering branches and eliminating narrow crotches, as they are not as strong as wide ones. Make all cuts directly above a joint, or, if a branch is completely removed, cut it off flush with the main trunk of the tree (Fig. 11). Broken branches should be cut back to the first joint below the break.



Figure 10 - Thinning and heading back a tree.

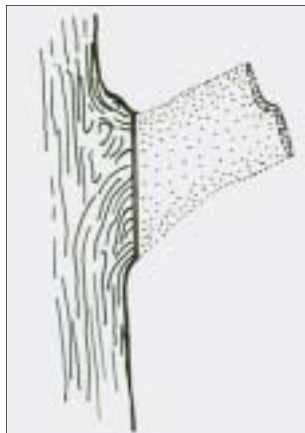


Figure 11 - Prune Flush with the trunk.

**In future years:**

Prune deciduous trees and tree form or semi tree form shrubs, whether large or small, in much the same way as described above. Remove all dead, interfering, or broken branches and unnecessary wood (Fig. 12). Never leave a stub end on a tree. Take special care to maintain the natural shape of the tree and the ultimate strength of its structure. A narrow crotch is not as strong as a wide one, so try to eliminate the narrow angles that may exist between two branches. Do this by heading back one branch of the pair. Some small twigs may be trimmed off where they are too close together. Make all cuts just above the bud or flush with the branch from which it is growing.



12a



12b

Figure 12 - Remove all dead interfering broken branches or unnecessary wood. Following this procedure, the shrub shown in Figure 12a should look like that shown in 12b.

The best time for general tree pruning is during the late winter (March) or very early spring. In early spring, cambium growth (the cells between the bark and the solid wood) is most active and pruning wounds heal quickly. Such trimming may, however, be done at almost any time of the year without damage to the tree if you take proper precautions to paint all wounds one inch or more in diameter. Emulsified asphalt is a good paint.

If you brace weak crotches, be careful not to girdle the branches that are to be supported. To save a weak crotch from splitting, place screw hooks in the two branches to be strengthened and secure a cable between them. Figure 13 shows one method of saving a weak crotch. Shown on page 12

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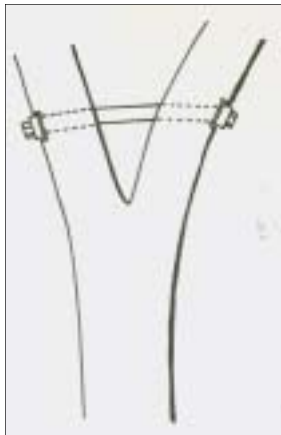


Figure 13 - A method used to save a weak crotch from splitting.

**Pruning Narrowleaf Evergreens: Trees and Shrubs**

The main objective in pruning evergreens is to produce a more bushy, compact plant. Pruning new growth at the ends of twigs and branches forces the plant to make additional new growth. Many evergreens will not produce buds if cut back to three or four year old growth. Not all evergreens however, can be pruned at the same time or in the same manner.

Pines, firs, and spruces make only one growth during a year. Most other evergreens, such as arborvitae, juniper, yew, retinospora, and hemlock continue to develop during the growing season.

**General Pruning Rules**

Remove dead or diseased wood as it occurs. Prune as little as is consistent with the landscape purpose of the plant. Prune back to a branch or trunk or just above a plump bud.

**Spruce and fir**

In early spring, cut back individual twigs to where side buds, have formed. When present year's growth is completed, head it back for one half its length, particularly on lead shoots (Fig. 14). This will be in late May or June, according to season or location.

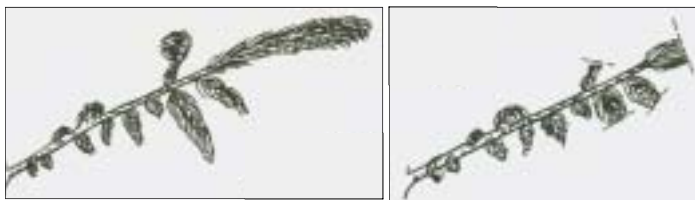
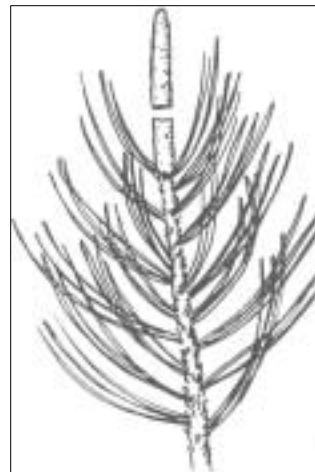


Figure 14 - When the present year's growth is completed, head back spruce and fir for one half the length of this growth.

**Pine**

Head the candles back one half their length in May and June before the needles unfold to



establish dense growth (Fig. 15).

Figure 15 - Head back candles on pine to one half their length in May and June before the needles unfold to establish dense growth.

**Arborvitae, juniper, retinospora, yew, and hemlock**

In late May or June, remove an inch or two of the new growth. This causes the plant to develop more twigs and become more compact.

Cutting back the tops of overgrown evergreens causes different results with different plants. Yew, hemlock, and arborvitae will produce growth from dormant buds on old wood. Japanese false cypress and junipers, spruce, pine, and firs are not likely to regenerate new growth.

Winter pruning of long branches (on evergreens that regenerate) is sometimes desirable when the plant has become straggly, through long neglect. Cut long branches to encourage new bud development early in the next growing season. If such pruning is postponed until summer, dormant buds already present may remain so until the following spring when several will break near each pruning wound. In the interim, the plant will appear unattractive.

**Pruning Rhododendrons**

As dead, broken, or diseased wood appears on rhododendrons, cut it off to the first healthy branch (Fig. 16). Little additional pruning of these plants is necessary, except to keep them in scale with the landscape effect.

In the case of old, leggy plants, it may be advisable to cut the plant back to a foot or less from the ground at the earliest opportunity in spring (Fig. 18). New branches will form from dormant and sometimes from adventitious\* buds.

*Continued on page 13*



Figure 16 - As dead, broken, and diseased wood appears on rhododendrons, cut it off the first healthy branch.

Many persons remove the old flower trusses to prevent seed formation (Fig. 17).



Figure 17 - Old flower trusses on rhododendrons are often removed to prevent seed formation.



Figure 18 - It may be advisable to cut back old leggy rhododendrons to one foot or less from the ground at the earliest opportunity in the spring.

In a few years, the plant should flower again as a full, shapely bush with a minimum of annual heading back of side branches to thicken young growth.

**Pruning Hedges**

Many woody plants are suitable for use in hedge plantings. The choice of a particular plant depends upon the purpose of the planting. If a screen or barrier planting is desired, plants with a very dense habit of growth, evergreen foliage, or thorny branches are appropriate choices. If the hedge is to serve as a background for architectural features in a Dower garden or to outline a formal garden, low-growing kinds may be desirable. Plants tolerant of shade or poor soil conditions are often particularly useful.

A hedge should be trimmed in June. This removes most of the current season's growth. Unless the

plants are very rapid growing, they need no more trimming for the rest of the summer. Those that grow rapidly may need to be trimmed three or more times a year (early May, June, and late July) if they are to be kept neat.

Clipped hedges should be kept narrower at the top than at the bottom. A hedge two feet high should be from three to four inches narrower at the top than at the bottom. Start to shape the hedge in this form the first season after planting, and maintain it year after year until the hedge has acquired the desired height. This form encourages dense growth close to the ground.



Hand shears, lopping shears, and pruning saws are the basic tools employed in most pruning jobs. Other types of pruning tools are needed for special types of pruning.

To cut twigs and small branches, hand shears are used.

For larger branches up to an inch or so in diameter, loppers usually serve well. Branches too large to prune with loppers are pruned with pruning saws, one type of which has a curved blade which bites on the pull stroke.

\*A bud arising at an unusual point other than a leaf axil or the end of a shoot or spur, as on a trunk, branch, or shoot.

Source: Arthur S. Lieberman; *Plant Sciences, Floriculture and Ornamental Horticulture 2; Information Bulletin 23*

## BERRY WORKSHOP

"A Primer for Berry Production" will be the topic of a workshop on March 12th at 7PM at the Cornell Cooperative Extension of Herkimer County office in East Herkimer.

The workshop will feature Laura McDermott, berry specialist from Cornell University. The workshop will include specifics such as site selection, pre-planting protocol, choosing berry varieties, annual cultural requirements, pest management and marketing considerations. Laura will also have a segment for current berry growers on new innovations that could help your business thrive. The moderately acidic soil of Central New York is conducive to berry production. Whether you just want to grow berries in the home garden or are considering a full scale business this workshop is for you and it's free of charge.

Participants are asked to register by calling the Cornell Cooperative Extension office at 315-866-7920 by March 10th. Register early, as space is limited.

## GETTING TO KNOW THE SYMPTOMS OF ARTHROPOD INJURY ON AN ORNAMENTAL PLANT

Effective management of key arthropod (insects and mites) pests of woody ornamental plants requires a great deal of knowledge and observation skills. It's important for you to learn to recognize damage symptoms on key plants in landscapes and nurseries. Many individuals do not understand the difference between a symptom and a sign on a woody ornamental plant. A **symptom** of arthropod injury on an ornamental plant can be defined as the damage that's evident on the host plant as the result of successful attack by a pest. Some examples of symptoms of arthropod injury include chewed foliage, stippled, yellowed, or bronzed foliage, distortion of plant parts, and dieback of plant parts. A sign is usually defined as the presence of a life stage of the key pest or commonly seen products that may remain on the host plant after the life stage of a pest is no longer evident.

Examples of signs of arthropod activity include honeydew and subsequent sooty mold, fecal specks, tents or webs, spittle, pitch tubes, waxy material, or cast exoskeletons. The focus in this article will be on symptoms of key pest injury.

**Skeletonized Foliage** - The most easily observed symptom caused by arthropod pests on woody ornamental plants is chewed foliage. Frequently, the chewed foliage is damaged in a manner that could be described as random or irregular. Many different species of leaf-eating caterpillars feed in this fashion. Most arborists, landscapers, and nurserymen are familiar with skeletonized foliage. When observed, this symptom is often associated with damage caused by the adult Japanese beetle, *Popillia japonica*. The larval stage of the oak skeletonizer, *Bucculatrix ainsliella*, (a caterpillar) will remove epidermal tissue from host foliage that is much finer than that caused by the adult Japanese beetle. The damage caused by the larval stage of the elm leaf beetle, *Xanthogaleruca luteola*, is also skeletonized foliage, but this damage is apparent on the lower leaf surface.

The larval stage of the imported willow leaf beetle, *Plagiodera versicolora*, initially causes skeletonized foliage on the lower leaf surface, but later larvae will feed on both leaf surfaces. See Image 1. The adult imported willow leaf beetle either chews holes in the foliage or at the edge of the leaf.

**Marginal Notching** - Most plant health care specialists recognize the symptom of marginal notching as damage caused by the adult stage of a species of weevil. The most common weevil species that feeds in this manner is the black vine weevil, *Otiorhynchus sulcatus*. See Image 2. Another weevil whose adult stage feeds on woody ornamental plant foliage is the twobanded Japanese weevil, *Callirhopalus bifasciatus*. The marginal notching caused by adult twobanded Japanese weevil is much smaller than that caused by the adult stage of the black vine weevil.

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•**Interveinal Chewed Foliage-** Sometimes chewed foliage is described as being interveinal where all plant tissue is removed except for the midrib and secondary veins. This symptomatology is apparent whether the infested leaf is compound or simple. The resulting symptom of damaged foliage is often described as resembling a fish skeleton. See Image 3. This symptom is often associated with damage caused by species of leaf-eating caterpillars in the family Geometridae. Common key pest species of woody ornamental plants that are members of this family include the fall cankerworm, *Alsophila pometaria*, and the elm spanworm, *Ennomos subsignarius*.

•**Very Fine Stippling-** Key arthropod pests of woody ornamental plants that have piercing-sucking mouthparts produce different symptoms. The symptomatology produced by species of spider mites. (*Tetranychus* spp and *Oligonychus* spp.) is apparent when examined with a hand lens in the form of very fine stippling on host plant foliage. See Image 4.

•**Coarse Stippling-** The symptom of stippling injury caused by the adult and nymphal stages of species of lace bugs (*Corythucha* spp. and *Stephanitis* spp.) is more coarse than that caused by spider mites. See Image 5.

•**Snowflake Stippling-** The symptom of leafhopper injury on woody ornamental plant foliage when viewed with the aid of a hand lens is often described as being in the shape of a snowflake. See Image 6

•**Leaf Mining-** Distortion of woody ornamental host plant foliage as a symptom is easily observed by most arborists, landscapers, and nurserymen. Key pest species of aphids, eriophyid mites, gall makers, psyllids, and thrips all cause this type of symptom on the key host plants on which they feed . See Image 8.

•**Dieback-** Species of wood borers, bark beetles, scale insects, gall makers, and the larval stages of root-feeding beetles or weevils cause the symptom known as dieback on woody ornamental plants. The two scale insect families whose members are commonly called armored scales and soft scales both cause dieback. You can differentiate these two by the presence of honey dew sooty mold.



Image 1. Skeletonized willow foliage caused by the larval stage of the imported willow leaf beetle, *Plagiodera versicolora*.

Image 2. Marginal notching on rhododendron foliage caused by the adult stage of the black vine weevil, *Otiorhynchus sulcatus*.



Image 3. Interveinal feeding injury on maple caused by the larval stage of the fall cankerworm, *Alsophila pometaria*.

Image 4. Feeding injury (fine stippling) caused by the southern red mite, *Oligonychus illicis*, on azalea foliage.



Image 5. Feeding injury (coarse stippling) caused by the azalea lace bug, *Stephanitis pyrioides*, on azalea foliage.

Image 6. Snowflake feeding pattern caused by a leafhopper species on maple foliage.




Image 7. Leafmining injury on inkberry foliage caused by the larval stage of the inkberry leafminer, *Phytomyza illicicola* (a fly).

Image 8. Distorted foliage caused by a species of elm leaf aphid.

Source: *Branching Out*,

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