



# Wild Blueberry FACT SHEET



## Pruning Lowbush Blueberry Fields

Fact Sheet No. 229, UMaine Extension No. 2168

### Introduction

It is believed that Native Americans periodically burned off trees and shrubs of the sand plains of eastern Maine to stimulate blueberry production. Wild blueberry growers have found by experience and through research that periodic pruning, by fire or mowing, can stimulate higher yields. Pruning is accomplished by removing as much of the above ground portion of the plant as possible. Yields are generally highest when fields are pruned after each harvest, creating a two-year cycle, with the first year vegetative and the second year fruiting. Traditionally, fields were pruned by *free-burning* the blueberry plants and weeds. The hope was that the entire field would burn. Free-burning offers a very inexpensive method of pruning, yet is very hard to control and often does not burn the field completely. Spreading an even layer of straw over the field for fuel or the use of oil burners gives the grower much more control. In the late 1970's, in an attempt to reduce the cost of pruning with straw or fuel oil, research was conducted using a flail mower to prune. Through modification, flail mowers will follow the contour of the field providing an inexpensive yet acceptable pruning method.

Whichever pruning method is chosen, it is important to remove as much of the stem as possible. An unpruned or partially pruned blueberry plant will have an excessive number of branches. Branched plants are more difficult to harvest and less productive since a greater amount of energy is put into vegetative growth. A greater percentage of fruit buds on branched plants are produced on the terminals (tips) of the branches, making them more susceptible to winter injury than buds produced nearer the base.

### Time of Pruning

If pruning is delayed in the fall until after the first killing frost, most of the nutrients in the leaves will be translocated (moved) to the rhizome. Pruning may be done from the first killing frost until growth resumes in the spring. Canadian researchers (Eaton and White, 1960) found that pruning early in the fall or in the late spring, after growth has resumed, will have a detrimental effect on the number of stems, length of stems, and the total number of flower buds produced.

### Thermal Pruning

Pruning with fire offers many advantages that mowing does not. The heat produced by fire will not only kill the stem, but may also reduce the incidence of insects, diseases, and weeds. Insects overwintering on or near the surface of the soil may be killed by the fire's heat. These insects include: flea beetle, leaf beetle, spanworm, and strawberry rootworm. The heat produced during pruning may also destroy overwintering fungal organisms on the soil surface, such as mummy berry, botrytis blight and powdery mildew. Pruning with fire will reduce small coniferous trees and some weeds that spread by seed. Seeds on the weed stalks and on the soil surface may be burned, especially in the fall, thereby reducing the number of plants that could be produced in following years.

When pruning with fire it is important that the intensity of the fire is controlled. Overly hot fires do a good job of pruning, but can destroy valuable organic matter on the soil surface. An overly hot fire usually means that excess fuel has been used, which raises the cost of pruning. On the other hand, fires that are not intense enough will not kill the stems to the ground or will skip spots. Free-burns that rely on natural fuel in the field generally will burn too hot or too cool.

## Methods of Burning

1. **Free-Burn:** The free-burn relies upon the blueberry plants, weeds and the surface organic (pad) matter for fuel. Due to the nature of most blueberry fields, the amount of fuel will not be uniform over the entire field. A dry day is needed for a free-burn. Even so, hot spots will burn deep into the organic pad, while cool spots will not burn completely. Free-burns are not recommended due to the uneven pruning obtained.
2. **Burning with Straw:** Many blueberry growers choose to spread straw onto the fields for fuel. The straw is spread evenly over the field by hand or with a mechanical straw spreader. It is important that the straw be free of weed seeds and be spread evenly to avoid hot and cool spots when burning. If the straw is spread in the fall, snow will help pack the straw down around the plants. Two tons of straw or salt marsh hay will suffice for an acre. Due to the high cost of labor and straw, it may be more economical to prune by an alternate method. Burning with straw is best suited to fields that are too steep or rocky for other types of pruning.
3. **Burning with Fuel Oil:** In the 1940's burners were developed to prune fields more effectively. The Woolery oil burner has three or four burner heads, and each head acts as a torch, consuming 50 gallons of fuel oil per hour. After the energy crisis of the early 1970's, modifications were made in the Woolery burner to reduce consumption by 40%. In the late 1970's, the Bosse' burner head was developed. When used on the Woolery burner it reduced consumption by 60% over conventional heads. A newly designed burner head will be in production in 1988. The flame from the new head will be shielded to keep the heat produced by the burner nearer the ground. Fuel consumption is projected to be 20 to 30% of the conventional Woolery burner. The reduction in fuel consumption reduces the number of refueling stops, which increase labor and machinery productivity by 25 to 30%. (Address inquiries about this new burner head to: Blueberry Producers Association of Nova Scotia, P.O. Box 550 Truro, Nova Scotia B2N 5E3.)
4. **Burning with Liquid Propane (LP) Gas:** Liquid Propane gas burners were introduced in 1962 to reduce the cost of burning with oil. LP gas burners were less expensive to construct and cost less to operate. The affordability of these burners makes it possible for more small-scale growers to own pruning equipment. Pruning with LP gas can be successful under proper conditions. Their effect is reduced in wet, windy and cold weather conditions. Also, LP gas can be very dangerous if not handled properly. Consult an LP gas expert. Care must be taken when designing and constructing equipment, to reduce the likelihood of an accident.

## Mower Pruning

Pruning with mowers is a fairly new method. In the early 1980's research at the University of Maine demonstrated that when flail mow pruning is done properly it is as effective as burning. Pruning with mowers costs less and will eventually increase the organic matter on the soil surface. However, fields should be monitored much more closely for disease and insects.

Pruning with mowers is just another way to remove the blueberry stem and stimulate the plant to put out new shoots from the rhizome. Flail mowers appear to be best suited for mower pruning because the configuration of the blades prevents damage to the mower in rocky conditions. Rotary mowing of small fields with a lawn-type mower is feasible if the operator is careful not to hit rocks and scalp knolls.

Advantages of mower pruning include:

1. Blueberry and weed stems mowed to ground level will not get caught in rakes, increasing ease of raking and raising fruit quality.
2. Plant residue left on the soil surface improves water holding capacity of the field.
3. Soil erosion caused by raindrop splash and water run-off is reduced.
4. Increased levels of organic matter will reduce leaching of pesticides into the groundwater.
5. As the organic matter content of the soil increases, the availability of plant nutrients should also increase.

6. Increased organic matter on the soil surface may help rhizome spread because of moderated soil temperatures.
7. Bush cutting done after harvest with a rotary mower to reduce weed stems is not needed. The flail mower will cut bushes one inch in diameter and larger, depending on the type of flail mower and the condition of the blades.

As with most practices, there are possible disadvantages to mower pruning which need to be considered. These include:

1. Fields must not be too rocky or uneven. Rock removal and filling of holes will improve fields and should be considered a method to increase mowable acreage. Occasional large rocks can be avoided.
2. The occurrence of disease and insects may be greater in flail mowed fields than burned fields. Disease and insect monitoring is important to maintain healthy fields. The diseases that may become more prevalent in flail mowed fields are: mummyberry (*Monilinia*) and blossom blight (*Botrytis*). For identification and control methods of these diseases refer to Wild Blueberry Fact Sheets 211 and 219, *Blueberry Diseases 1* and *Chemical Disease Control for Wild Blueberries*.

The insects that may become more prevalent in flail mowed fields are: blueberry spanworm (Itame-argillacearia), blueberry flea beetle (Altica-sylvia) and blueberry sawfly (Neopareophora-litura) and two species of Pristiphora. For identification and control methods of these insects refer to the Wild Blueberry Insect Fact Sheets and the Chemical Insect Control For Wild Blueberry Fact Sheet.

### **Additional Hints for Successful Flail Mow Pruning**

1. **Mower Width:** Good pruning is achieved with a mower that is narrow enough to get into dips in the field. Narrow mowers (less than 3 feet) follow the contour of the field better than wider mowers. Mower widths vary from two to nine feet. Choose the width that best fits your fields. If a narrow (two to three-foot) mower is needed, it may be possible to team (gang) up three, four or five mowers to cover a wider area. Wide mowers will miss dips and scalp knolls.
2. **Tractor Speed:** Slow tractor speeds may be necessary to achieve good pruning. One or two mph is a typical speed needed to cut stems or strip them of their outer bark. Stripping the stems of their outer bark will cause the entire stem to die back during the winter.
3. **Height of Pruning:** Cut stems as close to ground level as possible. Plants cut to ground level will have stems emerging in the spring from the rhizome. Stems arising from old stems or stubble are less vigorous and productive than stems from rhizomes.
4. **Time of Pruning:** Pruning may begin in the fall after the leaves have turned red and begin to fall. Pruning may continue as long as the field is free of snow. Fall pruning is preferred because the stubble will die back to ground level during the winter months.
5. **Spot Burning:** In most fields there will be areas around rocks, at the edges of the field, in dips, or in excessively bumpy areas that can't be mowed. These small areas can be burn-pruned with a small portable flame thrower, a conventional oil burner, or with straw any time prior to new growth starting in the spring.
6. **Machine Maintenance:** Machine maintenance is important if the expected life of the machinery is to be achieved. Follow your owner's manual so that maintenance is done on time and properly.
7. **Safety:** Safety first!! Always turn the engine off when adjusting or repairing motorized equipment. Follow the owners manual for safe operation of all equipment.

### **Pruning Costs**

Pruning costs will vary greatly depending upon the type of equipment used and the number of acres pruned. As the acreage increases, the cost of the equipment per acre decreases. It is important to match the equipment to the work that needs to be accomplished. It would be impractical to prune 1,000 acres with a three-foot flail mower, or to use a mechanical straw spreader to spread straw on five acres of land every year.

For a small farm, sharing equipment with another grower may be a good alternative to purchasing costly equipment. It may be quite easy to work out share schedules to satisfy all the owners. For instance, flail mowers can be easily shared because mowing can begin in October and continue into December most years, with many days of good pruning weather. When large acreage is involved it is often advisable to have at least one owner or a shared employee available to operate the equipment on a full-time basis. This will ensure that the group is getting the maximum use from the equipment and good operation days are not lost.

The following tables will help estimate the costs of the various pruning techniques on different size farms or cooperatives. **(Actual costs on your farm may be different - these figures are for comparison only.)**

Estimated Total Pruning Costs*			
Farm Size (acres)			
Pruning Techniques	10	100	1,000
Operation Costs Per Acre (\$)			
Straw burning - manual spreading	\$148.89	\$123.43	\$119.64
Straw burning - mechanical spreading	211.08	98.97	85.94
Oil burning - conventional heads	236.31	112.74	98.68
Oil burning - Bosse' heads	225.43	77.65	61.17
Flail mowing**	34.77	16.40	16.16
Source: Hanson, et al., 1982.			
* Includes equipment, labor and material costs, based on June 1984 prices.			
** 10 A costs based on 16HP tractor and 1 Mott mower; 100 A costs based on 16HP tractor and 2 Mott mowers; 1,000 A costs based on 35HP tractor and 3 Mott mowers.			

Labor Requirement and Initial Investment		
Pruning Techniques	Labor Requirements (man-hours/acre)	Initial Investment (\$)
Straw burning - spread manually	11.30	0.00*
Straw burning - spread mechanically	2.95	22,925.00
Oil burning - conventional heads	2.43	24,800.00
Oil burning - Bosse' heads	2.43	25,450.00
Flail mowing		
10A	2.00	3,200.00
100A	1.00	4,300.00
1,000 A	.65	21,325.00
Source: Hanson et al., 1982. (prices reflect 1984 updating) *Does not include truck needed to transport straw from the stack to the field.		

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