



Agriculture

Agdex 235/05
October 1996
Revised: September 2008

BASIC BLUEBERRIES

AN INTRODUCTION TO GROWING WILD BLUEBERRIES ON PRINCE EDWARD ISLAND

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INTRODUCTION

The wild (lowbush) blueberry is a small fruit which is for the most part confined to northeastern North America. The wild blueberry producing areas are Nova Scotia, Newfoundland, New Brunswick, Prince Edward Island, Quebec and Maine. In 1995, 120 million pounds of blueberries were produced in these six provinces/states. Maine is the largest producer of wild blueberries representing up to 55 percent of production. Newfoundland is the smallest producer representing between one and two percent of North American production.

In 2007, there was approximately 125 full and part-time growers producing 8.3 million pounds of blueberries. Between 1979 and 1990, Island blueberry production increased from 500,000 pounds to 1,962,000 pounds.

The Island is an attractive blueberry producing area due to the fact the fields are relatively level and rock free which makes crop management much easier. This contrasts to the hilly and rocky blueberry barrens found in other producing areas. Moreover, the Island's blueberry yields compare very favorably to yields in other producing areas. For instance, the average

five-year yield (1985-89) in Maine was 1,607 pounds per acre. In 1989, the Island's yield was 1,953 pounds per acre. Average yield per acre has dropped somewhat due to new acreage being developed and berries not fully up to maximum production. The Island's yield performance and the level, rock free fields which allow mechanization represents a competitive advantage which can potentially overcome some of the Island's competitive disadvantages such as distance from markets.

The majority of the Island crop (99 percent) is shipped to processors, while approximately one percent of the crop is sold locally as fresh product.

PRODUCTION

Production of wild blueberries (*Vaccinium angustifolium*) differs in many significant ways from production of other fruit crops. The uniqueness of blueberry production is derived partly because the plant is native to Prince Edward Island and partly because of the biology of the species. Unlike other crops, wild blueberries are not planted but instead are developed from native existing stands. Since the harvested crop comes from fields composed of managed,

native plants, lowbush blueberries are now marketed as wild blueberries. This is in contrast to the highbush or cultivated blueberry (*Vaccinium corymbosum*) which is planted and maintained in a manner similar to an orchard. The highbush blueberry is not native to Prince Edward Island.

In established wild blueberry fields, modern agriculture management practices, such as weed and pest control, can produce a crop which can consistently yield 3,000 pounds per acre. Under favorable conditions, yields of up to 8,000 pounds per acre have been realized.

How Does the Plant Grow

Blueberries primarily spread by rhizomes or underground runners. These rhizomes give rise to new roots and stems. All shoots arising from the same rhizome system have similar characteristics and are referred to as a blueberry clone. In unmanaged fields, the rate of spread by rhizomes averages only 5 to 8 centimetres per year. Where competition from weeds has been reduced, rhizomes have been found to grow as much as 38 centimetres in one season. It is this relatively slow spread of the rhizomes which accounts for the long period of time required to bring a new field from initial clearing to full coverage.

As the rhizomes spread, new shoots are formed and emerge in early spring. These shoots are perennial; and unless subjected to pruning, they will continue to grow. During late fall, buds develop on the shoot tips. These buds can be either flower buds or vegetative (leaf) buds. On new shoots, the ratio of flower buds to vegetative buds is greater as compared to two or three year old shoots. In addition, the flower buds on new shoots are more winter hardy and produce more individual flowers. By taking advantage

of this aspect of the biology of the plant, growers have been able to dramatically increase yields by pruning the fields on alternate years. This ensures that the fields are comprised of new shoots and thus have a high density of fruit-producing flowers.

Land Requirements

The prime requirement for blueberry land development is that the native wild blueberry is already present. Forest or scrub land with 20 percent blueberry coverage have been successfully developed into productive fields. In general, the greater the initial density of blueberries, the shorter the time required to bring the field into production.

Blueberries grow well on sandy, well-drained acid soils. The optimum soil acidity level for wild blueberries is between 4.3 and 5.0. Although highly suitable for blueberries, soils with these levels of acidity are generally unsuitable for other types of agriculture.

Access and level, rock-free fields are additional factors which enhance the ability to become productive blueberry fields. Abandoned farm land has the greatest potential for blueberry production because the land has been previously levelled and cleared of large rocks and trees; however, many productive fields have been developed from former woodland.

Since management of a blueberry field requires that machinery must be able to get on the land in early spring, 'wet' land is generally not suitable.

A soil survey conducted by Agriculture Canada identifies the soil types which are suitable for blueberry production. The survey, updated in 1988, also maps the locations of these soil types

on Prince Edward Island. A total of 177,400 hectares are identified as having soil types suitable for blueberries. It should be emphasized that land with a capability to produce blueberries is not necessarily economical to develop.

A complete list of soil types identified as suitable for blueberries and their hectarage can be found in Table 1.

TABLE 1
Soil Types Suitable for Blueberries

Type (P.E.I.)	Total	Hectarage
Culloden	58,000	
Alberry	99,000	
Haliburton	7,200	
Kildare	6,800	
Gowanbrae		3,500
Dunstaffnage		2,700
Bunbury	200	
TOTAL		177,400

Source: *Prince Edward Island Soil Survey* (1988), MacDougall (ret.) and Veer, Land Resource Research Centre, Ottawa.

The Department of Agriculture has developed a map outlining potential blueberry areas on Prince Edward Island. This map can be used as a guide for locating areas which may have potential. Individual properties should still be assessed to determine if the blueberries can be economically developed.

At present, about 10,000 are in production with a further estimated 3,000 acres at various stages of development.

Field Development and Management

Blueberry production can be divided into two distinct stages -- initial development and management of existing fields.

Initial development may require removal of trees, stumps and rocks; construction of access roads and firebreaks; and specialized weed-control methods such as wiping or basal treatment of brush. In some cases, land leveling to accommodate farm machinery may be required. This stage may take from two to ten years depending on the level of input, initial density of blueberries, topography of the land and existing trees and weeds. During this period, the blueberry grower receives little if any income from the operation.

The *Atlantic Canada Wild Blueberry Weed Control Guide* available from the Department of Agriculture, Fisheries and Forestry, outlines in detail brush and stump treatments noted above.

The second stage, management of existing fields, is an on-going operation involving weed control, pest control, pruning by mechanical methods or burning, ensuring pollination of the crop and occasionally applying fertilizer. There is no defined life span for a wild blueberry field. Once established, a blueberry field could continue to produce indefinitely if properly managed.

Initial development varies with the type of land and the existing trees and weeds. Blueberry fields can and have been developed from abandoned farmland, woodland and brushland. The

cost of development, production methods and length of time required to bring land into production vary considerably depending on the initial land type.

The most cost effective and simplest land type to develop is abandoned farm land. Initial development may simply require pruning and an overall application of the appropriate herbicide. Often, scattered brush and shrubs are associated with this type of land. These require spot treatments with specific herbicides. If the density of blueberries is high enough, the field may be harvested the next year. Usually, four to six years is required before the grower can expect a reasonable harvest.

Brushland is the most common land type developed. Often, the land was harvested for forestry and has regrown with dense stands of brush and other weeds. Development of this type of land is similar to abandoned farm land except the brush has to be cut, piled and burned. This operation can be labour intensive; although, many of the mechanical brush cutters could be used to reduce labour costs. In addition, the cut stump must be treated to prevent regrowth. To allow mechanization (use of tractors with boom sprayers, flail mowers and mechanical harvesters) the large stumps must be removed.

Woodland requires additional input to harvest the trees. This type of land sometimes requires land levelling to eliminate cradle hills. Stump removal is usually carried out three to five years after the trees have been harvested. If brush control is carried out immediately after the trees have been harvested, the amount of input required for this operation can be greatly reduced.

Although the length of time required to bring a woodland into blueberry production is long, due to the time required for stump removal, the

grower can sometimes realize a profit from the sale of the harvested trees.

In all cases, it is important to note that although initial development costs vary, the length of time required to bring a blueberry field into production is primarily dependent on the initial density of blueberry plants. Good management practices can increase the rate of spreading of the clones, reducing the length of time for initial development.

Once the initial development stage has been completed, the developed field is placed on a continuous two-year cycle of a vegetative year followed by a cropping year. It is a common practice to divide the fields so that half of the fields are harvested in any one year.

The first operation in the management cycle is pruning. As noted earlier, this procedure is required to increase flower and fruit formation. Pruning can be carried out either by flail mowing or by burning. Although mowing is less expensive than burning, burning plays a useful role in reducing populations of injurious pests. However the type of pruning is less common in modern blueberry productions.

In early spring, after the fields have been pruned, a single application of a herbicide is usually required. Additional spot treatments of herbicide are sometimes required to control persistent weeds such as bayberry. Weed control is not only important in maximizing yields, but encourages spreading of the blueberry clones and enables the crop to be harvested by machine. During the growing season, monitoring must be carried out to identify yield-reducing diseases and insects.

On Prince Edward Island a Pesticide Certification Certificate is required to use agriculture class pesticides, including herbicides.

The following year (the "bearing" or "crop" year) the flower buds open and come into bloom. To ensure good fruit set, pollination by insects is required. Most of the pollination is carried out by commercial honeybee colonies. Growers often supplement their pollination requirements with leaf cutter bees, bumble bees and native pollinators. As in the non-cropping year the fields must be monitored for diseases and insects and control measures carried out if required.

Blueberry harvest begins the last two weeks in August and the cycle begins again.

Production requirements for fresh product require a more stringent control of the blueberry maggot as compared to fruit destined for processing. The Blueberry maggot, a common pest which reduces fruit quality, is not found in all areas of Canada. Federal regulations restrict the movement of fresh berries to prevent the spread of this pest. Recent changes to the Import and Domestic Plant Quarantine Regulations require that fresh blueberries may be only moved from all infested areas to non-infested areas if they are inspected and found to have no maggots. Under the current regulations, Prince Edward Island is considered an infested area.

Harvesting

There are two methods of harvesting wild blueberries - hand harvesting using a metal rake or machine harvesting. The crop is harvested between August 13 and September 1. An average fifty-acre blueberry farm requires fifteen harvesters to hand rake the crop in ten

days. Depending on yield, a person can harvest five hundred pounds in one day.

A number of different machine harvesters are available. The most common harvester used is the Braggs Blueberry Harvester. The harvester is mounted on a two or four-wheel drive tractor. It is normally operated with one tractor operator and one other worker who rides on the back of the tractor, inspecting berries and providing fresh boxes for the berries dropping from the conveyor belt. A thirty-five horsepower tractor will provide ample power for the harvester. Power is delivered to the harvester from the tractor, which drives the motor of a self-contained hydraulic system.

Blueberries are stripped from the bushes with a one-metre wide harvesting head. Because the head is narrower than the tractor and offset, it is necessary that all harvesting take place in the same direction. This requires the tractor to circle back after each pass to begin the next harvesting strip or to harvest the field in a circular fashion. The harvester performs best on level ground, free of weeds and rocks. A harvester can harvest 2.5 to 3.0 acres per ten-hour day.

MARKETING

The crop is shipped to processors in PEI, Nova Scotia and Maine. Some growers deal directly with the processing companies while others belong to marketing cooperatives which sell the members crop. Usually a grower will obtain plastic tubs from the buyer prior to harvest. The harvested crop is placed into the tubs and transported to one of the local receiving stations. The receiving station will then transport the fruit to a processing plant.

Some growers sell their product to local retail outlets for the fresh fruit market. Although this product commands a higher price, the fruit must be of a high quality, properly graded and packaged.

GOVERNMENT PROGRAMS

The Department of Agriculture provides a number of programs and services to assist new and existing blueberry producers.

Some of the services and programs include:

- . Soil and leaf testing
- . Production publications
- . Production information
- . Information sessions
- . Field tours

For more information contact:

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