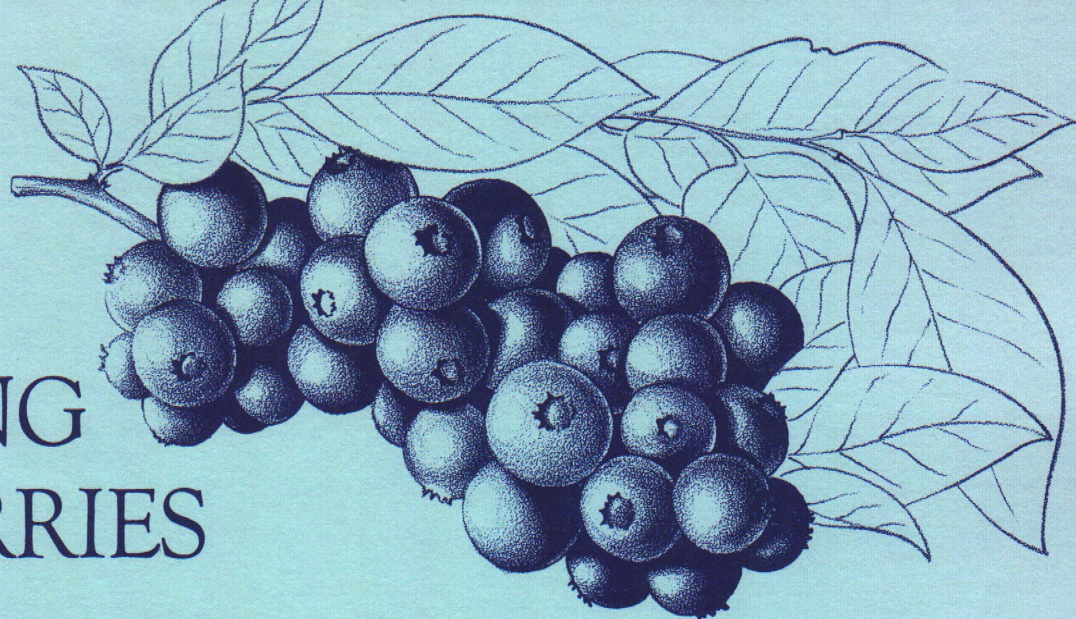


Hints on GROWING BLUEBERRIES



Cooperative Extension Service - Michigan State University

by

STANLEY JOHNSTON, JEROME HULL, JR., and JAMES MOULTON

Department of Horticulture, Michigan State University

INTRODUCTION

Purpose of the Folder

This folder is intended to help people desiring to grow cultivated highbush blueberries, either in home gardens or commercial plantations. Although both high and lowbush types grow wild in Michigan, only the highbush has been successful under cultivation. Promising hybrids from highbush-lowbush crosses are now under test in northern Michigan. Some have lowbush plant traits with large attractive berries like those of the highbush blueberry. Certain of these hybrids will be released in future years if tests continue to be favorable.

FACTS FOR PROSPECTIVE COMMERCIAL GROWERS

The blueberry is a highly specialized crop. It has exacting soil and climatic needs. Its cultural requirements—use of fertilizers, pruning, tillage—differ somewhat from other fruits. Further, it needs insect and disease control measures for profitable commercial production.

The initial cost of establishing a planting are high. Good blueberry land is scarce and usually will cost about \$500.00 per acre to purchase, clear, and prepare for planting. Cost of plants needed for an acre ranges from \$225.00 to \$350.00 or even higher for new varieties.

The first full crops occur six to eight years after planting. No crop is picked the first two years. In the third year 400 to 800 pounds to an acre (about $\frac{1}{2}$ pint to a bush) are produced and in the fourth, 1400 to 2000

pounds to an acre (1 to 2 pints a bush). Full crops of 2 to 3 tons to an acre (4 to 6 pints to a bush) can occur as early as the sixth year and should be expected by the eighth year. In some cases plantings yield much larger crops.

LOCATING THE PLANTING

Its Range in Michigan

The highbush blueberry is suited to that area of Michigan located south of a line extending from Muskegon to the lower end of Saginaw Bay. It is not adapted to more northern areas because: 1) it needs an average growing season of 160 days; and 2) it is badly injured or killed by winter temperatures 20 to 25 degrees below zero.

Most of the blueberry production is near Lake Michigan in the southwestern part of the state in Van Buren, Allegan, Ottawa, Muskegon and Berrien counties.

Its Site Needs are Peculiar

The blueberry grows best on sites where most other crops fail. Some of the finest blueberry land was thought to be nearly worthless several years ago. Wild highbush blueberries or wild spirea are good indicators of the right conditions for cultivated blueberries.

The Type of Soil is Very Important

Blueberries perform best on loose textured soils. Mixtures of sand and peat are best. Heavier soils are suitable if they are sufficiently acid and high in organic matter. The best soil types for highbush blueberry

growing in Michigan are classified as Newton and Saugatuck.¹

A high content of organic matter is desired in blueberry soils. Other factors being equal, yields of blueberries are largest where organic matter is highest. Avoid peat soils as they are usually found in low sites subject to frosts and winter injury. Plants growing on peat tend to grow late in the fall, and therefore are especially susceptible to injury from moderately low temperatures in November or early December.

Choose very acid soils ranging from pH 4.0 to 5.1. Consult your county agricultural agent and have the soil tested. Avoid soils testing higher than pH 5.1 for commercial plantations.

Constant but moderate soil moisture is needed by the blueberry. The best soils are those where the water table remains within 14 to 22 inches below the surface. Good surface drainage, however, is very important since blueberry roots need plenty of aeration. Water remaining on the surface for more than a day during any part of the growing season is harmful to roots.

Air Drainage to Avoid Frost Damage

The best sites are large open areas where air can move freely. Avoid "pockets" or narrow valleys where cold air tends to settle. Areas surrounded either with hills or dense stands of trees have poor air movement. Good air circulation reduces the chances for spring frost damage. Fungus diseases, such as mummy berry, are less likely to build up where there is good air movement. Open areas also are cooler, less humid, and more pleasant for working during hot weather at harvest time.

CHOOSE THE RIGHT VARIETIES

Over 50 varieties of the highbush blueberry have been introduced to growers since it first was cultivated. Few of these are adapted to Michigan conditions. Select two or three varieties, ripening in succession, from the list below (listed in order of ripening season, early to late). These have grown well in Michigan and seem to be the best varieties for the state.

Bluecrop—The best early variety now available to Michigan growers. Bush is very hardy and productive, berries are medium-large, firm, and bright blue with excellent scar. Quite tart if picked too soon but otherwise a very good variety. Appears to be adaptable to machine harvesting.

Rubel—An older variety that performs well only on ideal blueberry soils. Berries are only of medium size, but firm, ship well, and outstanding for processing. Bush is well adapted to mechanical harvesting.

Jersey—Michigan's major variety that has not yielded well the last few years. Poor yields may be the result

of unfavorable temperatures in late May during full bloom. There is some evidence Jersey bushes age sooner than other commonly grown varieties.

PREPARING THE SOIL

Newly-cleared land is best, since it usually contains more organic matter than older land. Thoroughly work the soil for at least two years preceding planting to subdue weeds and grasses. Troublesome weeds such as horsenettle and quackgrass, if present, should be treated with the herbicide, amitrole-T, at 4 pounds per acre the year prior to planting.

Add lime if the soil tests below pH 4.0. Use pulverized dolomitic (high magnesium) limestone. Apply in commercial plantations at a rate of 1 to 4 tons to an acre, depending on soil acidity and texture.

Add sulfur to soils testing above pH 5.1, to acidify small problem areas. This is not practical for large commercial plantings except for dressing up spots slightly above pH 5.1. It probably is not practical to try to lower the pH of soils testing above 5.5. Apply one pound of sulfur on each 100 square feet of land on sandy soils and two pounds on loamy or clayey soils. Test soil one year after applying sulfur. Treat again if soil pH is still too high.

Blueberries are not suggested for home garden plantings. Birds get all the ripe berries unless the garden planting is completely netted to protect the ripening fruit. The plants require spraying for insect and disease control. If the soil is not sufficiently acid, it is an expensive task to acidify it as outlined, and the results are uncertain.

PROPER PLANTING STOCK IS IMPORTANT

Buy Inspected Plants from Reputable Sources

Buy only inspected blueberry plants which carry a State Certificate of Inspection. Buy plants either from commercial growers or reputable nurseries. Choose only standard varieties suggested in this folder or in later publications. Avoid other, especially older, varieties. Most varieties not listed on this page have been tested and have not performed satisfactorily under Michigan conditions.

Use 2 or 3-Year-Old Plants

Set 2-year-old plants if you can get them. Three-year-old stock is good, but usually costs more. Avoid plants older than 3 years for commercial planting. They often are culls which were too weak to sell as younger plants.

Plant in Early Spring

Set blueberry plants in the spring as soon as the soil can be worked. Space plants 4 feet apart in rows, with 10 feet between rows. Set plants 2 inches deeper than they grew in the nursery.

Mix a shovelful of acid peat with the soil in each planting hole when setting in sandy soils low in organic matter.

¹Consult Special Bulletin 402, SOILS OF MICHIGAN, for a description of these soils. It also contains a full-color map showing their general location in Michigan.

Remove fruit buds, either before or soon after setting the plants.

No Cross-Pollination Needed

Cultivated blueberries are self fertile, so they need no cross-pollination. If you want a long harvest season, however, plant 2 or 3 varieties ripening in succession. If this is done, you might set 2 to 4 rows of one variety and alternate with 2 to 4 rows of another. Experiments in other states indicate berries may be larger and slightly earlier maturing when cross-pollination does occur.

SOIL CULTURE

Cultivation

Most blueberry roots are close to the soil surface. Cultivate no deeper than 2 to 3 inches and only often enough to keep weeds in check.

In bearing plantations, sow an annual cover crop after harvest. In young non-bearing plantations sow the cover crop earlier—August 1st. Sow oats at a rate of 1 bushel per acre.

Mulching

In most commercial blueberry plantations, using mulches is not practical. Mulching materials such as weathered sawdust, corncobs, leaves, wood shavings, and similar materials are suitable for home gardens. Straw is also a satisfactory mulch but presents a great fire hazard. Maintain the mulch at depths of 6 to 8 inches. Do not use fresh unweathered materials, especially fresh sawdust, since they can injure the plants. If you use mulches, double the amount of nitrogen fertilizer normally applied, until the mulch is well decomposed.

Fertilizer

Avoid Nitrates and Chlorides. Fertilizers containing nitrates and chlorides are sometimes toxic to blueberry plants. Do not apply nitrate forms of nitrogen or chloride forms of potassium. A special grade of fertilizer is formulated for blueberries. Currently, this is a 16-8-8-4 (the fourth number refers to magnesium oxide). In home plantings apply either ammonium sulfate or urea if you can not obtain specially mixed blueberry fertilizer.

When and How to Apply

On newly set plants apply fertilizer about 4 weeks after planting. Sprinkle it by hand thinly around each plant, keeping it 12 to 18 inches from the crown. Starter solutions have not been found to be beneficial on the blueberry.

After the first year apply fertilizer in April, just before the buds break. Apply it either by hand or with machinery, but spread it evenly to avoid injury to roots. If you use powdery fertilizers, be sure the plants are dry so it will not damage the buds. On very sandy soils a second fertilizer application of 50 to 100 pounds per acre of ammonium sulfate may be beneficial following heavy spring rains.

Fertilizer Rates

Leaf analysis is the best aid to determine fertilizer needs of established blueberry bushes. Consult your county cooperative extension office for details on collecting and handling leaf samples.

Nitrogen—This is often the only fertilizer element needed in blueberry plantings. Basic applications of nitrogen on good plantings should be at a rate equal to 320 pounds of ammonium sulfate per acre on mature plantings over 8 years of age. For younger plantings, apply at a rate equal to 80 pounds per acre for each 2 years of age. If soil pH is below 5.0, fertilize with urea.

Potassium—When potassium fertilizer is necessary, apply 75 to 100 pounds of potassium sulfate per acre or use a 2-1-1 ratio fertilizer in amounts to supply the basic nitrogen application. (The first number refers to nitrogen; the second to phosphorus, expressed as available phosphoric acid; and the third to potassium given as water-soluble potash).

Phosphorus—Phosphorus applications are seldom necessary on an annual basis. When necessary, apply concentrated superphosphate (0-46-0) at 200 pounds per acre. Phosphorus could also be supplied by using a 2-1-1 ratio fertilizer as the source of nitrogen.

Calcium—When leaf analysis indicates low calcium content and soil pH is below 4.5, apply 500-1000 pounds per acre of pulverized or hydrated dolomitic lime.

Magnesium—When a need for magnesium occurs, apply 16 pounds of magnesium utilizing a complete fertilizer containing 4 per cent magnesium or apply an equivalent amount of magnesium sulfate or magnesium oxide.

Fertilizer rates for individual bushes utilizing the special blueberry fertilizer mixture (16-8-8-4) are presented in the following table:

Table 1. Fertilizer rates for Michigan blueberries (based on special blueberry mixture 16-8-8-4).

| Age of plantation ^o (years) | Amount of fertilizer to use | |
|---|-----------------------------|---------------------|
| | Per plant (ounces) | Per acre** (pounds) |
| 1 | 1 | 51 |
| 2 | 1 | 51 |
| 3 | 1.5 | 102 |
| 4 | 2 | 153 |
| 5 | 3 | 204 |
| 6 | 4 | 255 |
| 7 | 4.5 | 306 |
| 8 and older | 5 | 357 |

^oRefers to the number of years since the plants were set in the field—not the nursery age of the plants.

^{**}This assumes a spacing of 4 feet in the rows and 10 feet between rows, thus 1089 plants to an acre, and would furnish 65 pounds of elemental nitrogen per acre for plantings 6 years and older.

Prune for Larger Berries and Earlier Ripening

The blueberry needs no pruning until the third year after planting. In the third year remove only the small, spindly, and twiggy growth near the base of the plant. This tends to promote a more upright bush and keeps the fruit away from the ground.

Prune each year after the third year. Remove:

1. Dead and injured branches.
2. Fruiting branches close to the ground.
3. Spindly, bushy twigs on mature branches.
4. Old stems or parts low in vigor.

Blueberry bushes which are pruned moderately each year produce larger berries but smaller yields than unpruned bushes. The heavier the pruning, the bigger the berries and the smaller the yield. Pruning also tends to make the fruit ripen faster. In seasons of drought, the berries on unpruned bushes are often very small. Remove old, black canes to the ground, to insure earlier ripening and larger berries for fruit left on the bush.

Prune any time during the dormancy season, after most of the leaves have dropped in the fall. Pruning can be continued as late as blossom time in the spring, if necessary.

Harvest Once Each Week

The fruit of cultivated blueberries is borne in clusters made up of 5 to 10 berries. The berries in a cluster ripen in succession usually over a period of several weeks. Pick once each week to remove berries as they ripen. From 3 to 5 pickings are needed to harvest all the fruit, depending on the variety and season.

The harvest of early varieties starts in early July in southwestern Michigan. Late varieties extend to mid-September and later in some years. Peak production of the chief variety, Jersey, comes during the first week in August.

Pick only those berries which are fully ripe. Berries with a reddish tinge are not yet ripe. Be sure all of the ripe fruit is removed so there will be no overripe berries at the next picking.

Handle blueberries carefully and as little as possible, since they are easily bruised.

In picking use both hands. Roll (do not squeeze) the berries between thumb and forefinger as you pull them gently from the cluster. A small pail attached to the picker's belt or a rope around his waist frees both hands for picking.

About half of the Michigan blueberry crop is sold fresh and half is processed. For fresh market use, cultivated blueberries are usually packed in pint fiber boxes. The boxes are heaped with berries of uniform size and covered with a cellophane sheet. This sheet is fitted snugly around the box and held with a rubber-band or a paper adhesive tape. The boxes are then packed for market in 12-pint flats.

Mechanical harvesting is possible using either small portable picking units or large straddle row harvesters. Small portable units consist of power supply, hand operated picking heads to vibrate berries from the bush, and small portable catching unit. Large straddle row harvesters vibrate berries on to conveyors carrying fruit to lugs carried at rear of machine. Cleaning and sorting is essential for mechanically harvested blueberries.

Weed Control

An automatic rotary hoe, used regularly, does an acceptable job of keeping weeds down in the blueberry row. Several herbicides (weed-controlling chemicals) can very effectively and economically replace cultivation in the row. Apply either diuron or simazine at 2 to 4 pounds per acre in the spring before the buds break.

The heavier rate of application is suggested only for heavy-textured soils or for areas of plantings having extensive weed infestations.

Repeat annually until weeds are subdued or eliminated. Then use annually at the lower rate suggested. Do not cultivate treated area after applying. For non-bearing plantings, include amitrole-T at 2 pounds per acre with one of the above herbicides for more effective control of established weeds. Apply herbicides at low pressure (40 pounds), using off-center swivel type nozzles (such as 1/4 in. TOC-12 or -16) mounted at a height to produce a 2 1/2- to 3-foot spray band. Spraying along each side of the row results in about a 5-foot weed-free band in and along the row. Consult Extension Bulletin #433 for annual revision of herbicides for horticultural crops.

Disease and Insect Control

Several diseases and insects affect the blueberry, and their control is essential. Spray materials and recommendations may change from year to year. Consult the latest edition of the Michigan State University Spraying Calendar, Extension Bulletin #154, for the up-to-date pest control program on blueberries.