

## **Highbush Blueberry Site and Soil Requirements**

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### **Introduction**

Broadly speaking, climate conditions in New England can limit the area where Highbush blueberries can be successfully grown. Highbush blueberries are only successful south of a line extending from the southern end of Lake Champlain, VT to Portland, ME as temperatures below  $-20^{\circ}\text{F}$  will kill blueberry shoot and flower buds. In the area where successful Blueberry production is possible, site selection is a major factor in the successful blueberry production. There are three major considerations in selecting a site to grow commercial blueberries, 1) location relative to market outlets, 2) soil type relative to moisture, fertility and pH, and 3) topography. These considerations are interrelated and are described in more detail below.

### **Location**

Since blueberries are often sold on a Pick-Your-Own (PYO) basis, accessibility of the field to customers and adequate parking will be important features of a good site. A muddy bumpy access road and/or a parking area suitable only to ATV's will discourage potential customers from visiting your farm. A location somewhat near major roads will also be beneficial as opposed to a field that requires a GPS system to locate. If the crop is to be sold wholesale or retail through a roadside stand or farmer's market, these accessibility issues are less important, but remember, you still have to be able to move the harvested fruit out of the field and into cold storage quickly.

### **Soil Type**

#### *Soil Moisture*

Blueberries have a reputation for growing well in wet soils. While somewhat true, this can be misleading. It's not true that blueberries like wet soils. However, because they have very shallow root systems, they can tolerate sites with a high water table better than many other plants. They will, however, suffer and perform badly in sites where they are forced to have 'wet feet'. Sites where there is standing water for any length of time during the year, can lead to suffocated roots and infection by root rot pathogens such as Phytophthora and Pythium. Also a general failure to thrive in such sites will likely lead to a host of other problems, too. If a site tends to be wet but is the only site you have available, try to improve the drainage by tiling and drawing water away from your planting and also raise up the rows where the bushes will be planted to get as much of the root system out of the saturated profile of the soil.

Conversely, a site that is very dry can lead to problems with drought stress. Mulching around the base of the bushes to suppress weeds will also help conserve soil moisture in the root zone. Some sites will also need supplemental irrigation to help the bushes through excessively dry spells. Drip irrigation is best for this purpose because it delivers water to the soil rather than wetting the entire plant as space between rows. It may be wise to test the water quality of your source of irrigations water to determine if it is suitable for this purpose. Sometimes, excessively low water pH, chemical contaminants, salinity or pathogens (e.g., Phytophthora) can be found in irrigation water, which can lead to problems with crop production. Many soil testing laboratories can also perform water quality tests.

#### *Soil Fertility*

Blueberries are not very demanding of soil fertility. A moderately fertile soil will grow productive blueberry plants with some judicious fertilization. Again, mulching around the base of the bushes for weed suppression will also provide some fertility to the bushes as the organic matter (e.g., sawdust, chips, chopped leaves, etc.), decomposes. This slow release of nutrients is good for delivering the nutrients needed by the blueberry bush. Also, blueberries have a unique root structure in that they lack true root hairs and depend on soil microorganisms (mycorrhizae) to help break down nutrients and mediate uptake into the roots. Supplemental fertilization informed by soil and leaf tissue tests once the bushes are mature will round out the program.

### Soil pH

My esteemed colleague from New Jersey, Gary Pavlis, often tells his growers, “The three most important factors in successful blueberry production are pH, pH and pH.” This is because of the unusual requirement of very acid soil for these plants. For blueberries, the ideal pH is between 4.2 and 4.8 although a soil pH up to 5.5 is acceptable. A pH lower than this severely limits nutrient availability in the soil. The pH can be adjusted either via the addition of lime (to raise the pH) or sulfur (to lower the pH). Most often we need to suppress the pH for prospective blueberry sites. This should be done prior to planting. It is much harder to make these adjustments after the bushes are in the ground. Sulfur is effective at lowering soil pH and comes as a wettable powder or prills (See table below for amounts). Acidifying fertilizer can also be used to make minor adjustments in soil pH. Ammonium sulfate is often used for this purpose.

### Amount of sulfur required to lower the soil pH.\*

Present pH of Soil	Target pH of Soil					
	4.5			5.0		
	Sand	Loam (lbs/acre)	Clay	Sand	Loam (lbs/acre)	Clay
4.5	0	0	0	—	—	—
5.0	175	520	610	0	0	0
5.5	350	1,050	1,130	175	520	610
6.0	520	1,520	1,610	350	1,050	1,130
6.5	650	2,000	2,090	520	1,520	1,610
7.0	830	2,530	2,610	650	2,000	2,090
7.5	1,000	3,010	3,090	830	2,530	2,610

*\*Iron sulfate may be used at eight times the above rates.*

### Topography

One of the benefits of growing perennial crops is that they can succeed (sometimes excel) on sloping land whereas annual crops are better grown on relatively flat land for ease of planting, cultivation, etc. This opens up a lot of possibilities. However, steep slopes (>5%) should be avoided because they are erodable, and difficult to perform tractor work (spraying, etc.) and irrigate uniformly. Moderate slopes (3-5%) offer good air drainage, which reduces the risk of frost injury. South-facing slopes tend to bloom a few days earlier than other slopes and may suffer from more frost damage as a result. High locations with little or no wind breaks can suffer from wind damage from excessive wind exposure during the winter.

Low-lying areas are often problematic in that they have limited water and air drainage

options. Raised beds can be used to offset problems with water drainage. Air drainage is harder to improve in these sites and they may well be frost pockets. Planting later-blooming varieties may be the only option here.

Finally, a location that receives maximum sun exposure will be the most productive. Even though the natural setting for wild blueberries is usually in the understory of a mixed hardwood forest, which indicates some level of shade tolerance, fruit production required more sun exposure. Locations with excellent sun exposure will be more productive than shady locations.

### **Summary**

Good attention paid to site selection to ensure a favorable climate, suitable soil and accessible location will pay off in a more productive and enduring blueberry planting.