

Growing Blueberries in Southeastern Wisconsin

(An in-depth look at soil and nutrient requirements)

Blueberry plants and habitat

Blueberries are an American native shrub originally found in New Jersey wetland areas. They can be found in the wild in Wisconsin along wooded areas, especially where pine trees are growing. They are a perennial shrub that sends new shoots mostly from the crown. They bear fruit on last year's wood.

The plant prefers moist (not wet) soil conditions with adequate soil porosity and drainage. They grow where the soil *ph* is under 6.0 and ideally between 4.5 and 5.5. Blueberries thrive in southwestern Michigan where the acidic, sandy soils provide an excellent natural habitat. So, unless your land lies within the blueberry's natural ecosystem and the soil is already acidic, it is usually necessary to adjust the soil structure and *ph* to accommodate the plant.

Bed preparation

In southeast Wisconsin, there is a massive amount of limestone under the topsoil; and the soil is naturally alkaline with a *ph* ranging between 7.0 and 8.0. Planting blueberries directly into these soils will result in smaller shrubs, slow growth rate with limited production and poor fruit quality. A better option is to plant them in containers or raised beds where the soil conditions can be better managed.

If you choose to create raised beds, select a site that drains well. Do not use plastic weed barrier or chemicals to kill the grass where the beds will be placed. Cardboard or newspaper is a better choice as a base layer to keep weeds from shooting up through the soil. The soil should be a mixture of sandy or loamy soil (not clay), with a mix of about 20% good compost and other organic matter such as 1" diameter wood chips, pine needles, and sphagnum peat moss. Organic matter provides for good aeration and moisture retention in the soil. It also serves as a repository for nutrients, and it is a food source for beneficial bacteria and fungi.

Lowering *ph*

A soil test is necessary to determine the beginning *ph* after combining the bedding materials. Most likely, it will be too alkaline for blueberries, so the soil will need to be acidified by adding elemental sulfur (S) to the soil and watering it in thoroughly. (Follow the directions on the package or do a web search for information.)

Sulfur is an essential nutrient for your plants; it is converted into soluble form that you plant can use by bacteria in the soil, as long as the soil remains well oxygenated. If your soil becomes anaerobic (if the oxygen level in the root zone falls under 6ppm), then anaerobic organisms will emerge from a dormant state and could convert the sulfur into hydrogen gas, sulfuric acid and other undesirable compounds toxic to your plants. Organic matter stores sulfur ions and acts as a buffer. This is another reason to have organic matter mixed in the soil.

Sulfur in its elemental form will burn the tender roots of blueberries, so it should be added to a new bed at least a year before planting. Then there is time for the soil organisms to perform their functions creating soil structure, recycling nutrients and breaking down the sulfur. Sulfur can be applied to the soil surface and it will have the same effect lowering the *ph*, but it will take longer. It is better to mix it in with the organic matter.

In addition to sulfur, mycorrhizal fungi spores should be added to the mix. These can be obtained either on line or at better garden supply stores. Humic acid is a good fungal food and should be watered in to provide more complex foods for soil organisms. Mulch the surface of the soil to retain moisture and suppress weed growth.

Blueberries have a small, shallow root system that lacks many root hairs. This affects the plant's ability to absorb water and mineral nutrients. They require the presence of mycorrhizal fungi to optimize their uptake of water and nutrients, protect themselves from pest and diseases and maintain an acidic environment.

Plant nutrition

Blueberries require their nitrogen source in the form of ammonium (NH₄). This is the form found in undisturbed soils and is made available by the fungal component in the soil. Soils that are disturbed by tilling, etc., allow bacteria to dominate the soil. Then bacteria convert ammonium (the form of nitrogen the plant needs) into Nitrate (N₃), which the blueberries cannot use. Since blueberries are a perennial plant, all of the nutrients are recycled, and there should be no need for supplemental fertilizers year to year. A small application of ammonium to the bed will spur growth for the current season and increase the yield for the next year. Too much nitrogen fertilizer results in too much growth, reducing yield this year.

Fertilizing

Keep in mind that no one is running around old growth forests adding N-P-K and micronutrients to the soil for ever tree that grows in that ecosystem. Still, they all grow just fine. The nutrients are already there in the soil, and they simply get recycled from season to season.

If there is sufficient organic matter in the soil, then all the essential nutrients are already there and the micro-organisms in the soil will perform the entire nutrient cycling that the plant needs. After all, the organic matter in the soil is made of decomposed plant material from plants that had enough of the essential nutrients that they needed to grow. These nutrients just get recycled from year to year. Running a soil test for NPK and other micronutrients by itself is of little use.

A better way to determine nutrient deficiencies is to have a leaf tissue analysis performed in a testing lab. This will show if there are problems with the uptake of any particular nutrients and a recommendation for remediation is provided by the lab.

Do not use readily available general fertilizers just because it seems like a good idea. Unless it is an approved organic product, it almost invariably comes in the form of salts that will provide too much of any given nutrient it contains. These soluble salts bond with the water molecules in the soil, making them unavailable to both the plant and the soil organisms that require adequate moisture to remain active and functioning. These products are expensive and unnecessary, and they kill the beneficial organisms in the soil that your blueberries depend upon.

(Also see the companion article “Maintenance, Insect Pests and Diseases of Blueberries” on this site.)

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