

Getting the most out of your blueberry soil test report

- Proper site selection is critical for planting success.
- Blueberries thrive in acidic soils. Be certain your soil pH is in the optimal range.
- Add a nitrogen (N) source at the recommended rate and time.
- Once established additional phosphorus (P) or potassium (K) is rarely needed.

General Information

Blueberry plants prefer well-drained, acidic, sandy loam soils with organic matter content greater than 3%. Soils with a clay or silt content greater than 20% are not favorable for growing blueberries. Blueberry plants have a shallow root system and need good drainage to thrive. Plant on raised beds if good drainage does not exist. Beds should be at least 8" high and 48" wide.

Soil pH Recommendations

Blueberry plants do not establish well in high pH (7.0) or high calcium soils (>2,000 lbs./acre). It is difficult and impractical to lower and maintain a proper pH in alkaline soils. Alternative sites should be considered for growing blueberries.

The ideal pH for growing blueberry plants is 4.5. They can tolerate a pH of 3.8 – 5.5 if the organic matter content is high.

When the pH is outside the optimum range for growing blueberry plants acidifying materials will be needed to lower soil pH. Sulfur is used to lower the soil pH and should be worked into the upper 6-8 inches of soil before planting. Allow one year for complete reaction to take place.

When adjusting the pH in established plantings apply half the recommended rate in early spring and half in late fall around the drip line. Apply no more than 4 pounds (lbs.) of sulfur per 100 feet of row or 3 oz. per plant at any one time. Higher rates of sulfur will burn or kill blueberry plants.

Check the soil pH regularly to determine if additional acidifying materials will be needed.

Promote plant health, increase yield, and save money with proper fertilizer applications.

Fertilizer Sources

Organic matter is added to the soil to improve soil properties by increasing the water and nutrient holding capacity, improving aeration and drainage, feeding microorganisms and providing some nutrients. Common organic matter sources include composted manure, peat moss, plant-based compost and plant and animal by-products.

Animal manures and plant-based compost (yard waste, grass clippings, food waste) are readily available and popular amendments and fertilizers commonly considered as ***natural organic***.

Nutrient content of composted products will vary depending on the source (plant or animal), moisture content, how it was stored and how long it was composted. Weed seeds, a high salt content and pathogens might be a problem with fresh manure or other organic materials if they are not fully composted. Knowing the nutrient and salt content of your compost or manure pile would add precision to application rates for a given site. However, this would require testing every time one of the above variables changes making this impractical and cost prohibitive for the average gardener.

The nutrient analysis of commercially available manure and compost is found on the bag. Keep in mind these products may also have a high salt content and only 5 to 20% of the nitrogen will be available to the plants during the first year of application.

Only mix in manure or other materials that are fully composted. Fully composted manure has aged for at least 6 to 9 months. Incorporate into the upper 4 to 6 inches of soil before plants are in the ground to allow time for the slow release of nutrients in the root zone and to minimize runoff.

More about organic matter

Annually replenishing organic matter to improve soil health is a common practice. Sandy soils with an organic matter content of 2-2½% and clayey soils with 3-5% organic matter will perform fine.

Too much of a good thing? *If a regular soil test indicates nutrient levels exceed crop needs, limit compost applications to promote healthy soil for plant success.*

Inorganic fertilizers are compounds that are chemically synthesized from basic raw materials, isolated from naturally occurring sources or mined materials that provide nutrients. They are less expensive and have a higher nutrient content. They are water-soluble and are quickly available to plants, easy to apply and especially useful in cool weather.

Care should be taken however, when using *water-soluble fertilizer* sources because they are made of salts that can burn plants. Also, if over applied and watered in excessively they can leach beyond the root zone and end up in the ground water which impacts water quality negatively.

The nutrient content (fertilizer analysis) is required on every bag of commercially available fertilizer. The first number indicates the percent of nitrogen (N), the second number is the percent of phosphate (P_2O_5) a source of phosphorus, and the third number is the percent of potash (K_2O) a source of potassium. They are simply referred to as N-P-K. A 50 lb. bag of 5-10-5 contains 2½ lbs. of N, 5 lbs. of P_2O_5 and 2½ lbs. of K_2O . The rest of the material is made up of other inert material, such as sand or clay granules to help spread the fertilizer.

When nitrogen (N), phosphorus (P) and potassium (K) are all needed, a *complete fertilizer* that contains all 3 nutrients, for example: 10-10-10, 5-10-5, or 5-10-10, can be used.

When establishing blueberry plants

Prepare the soil the year before planting. If the soil contains less than 3% organic matter incorporate peat moss or well-decayed pine sawdust or bark to improve plant survival and growth. Apply 3 to 4 inches of the organic material over the row in a band 18 to 24 inches wide and incorporate into the upper 6 to 8 inches using a spade or roto-tiller. If the organic material is incorporated in the fall, any sulfur required to lower the pH or recommended phosphorus and potassium can be added at the same time.

Nitrogen

Nitrogen is a key element however it is not recommended the planting year except on sandy soils. See **Table D** for some commonly available nitrogen fertilizer sources and recommended application rates.

Phosphorus

Phosphorus (P) is important in early root development and can improve the quality of fruits.

When phosphorus is needed, note the soil test level and select a phosphorus fertilizer source and apply at the recommended rate found in **Table A**.

Potassium

Potassium (K) increases water efficiency, improves stress tolerance and the quality of fruit.

Note the soil test level and select a potassium fertilizer source and apply at the recommended rate. The application rate is based on whether the soil is sandy (see **Table B**) or fine-textured and more clayey in nature (see **Table C**).

Keep in mind that wood ashes contain potassium (3-7% K_2O) and if used supplemental K will not likely be needed.

Table A: Soil test reports levels and approximate phosphorus (P) recommendations and some phosphorus fertilizer sources
--

Soil test report levels	Ounces of phosphate (P ₂ O ₅) to apply per 100 feet of row	Some fertilizer sources that contain phosphorus (P) (notice the concentration differs for each so the amount to apply differs)			
		Super-phosphate 0-20-0 20% P₂O₅	Triple Super-phosphate 0-46-0 46% P₂O₅	Rock Phosphate 0-3-0 3% P₂O₅	Bone Meal also contains N 1-15-0 15% P₂O₅
		Amount of product to apply per 100 feet of row if you plan to use:			
Very low	3¼ oz.	1 lb.	7 oz.	6¾ lbs.	21½ oz.
Low	2 oz.	10 oz.	4⅓ oz.	4 lbs.	13 oz.
Medium	1 oz.	5 oz.	2¼ oz.	2 lbs.	6½ oz.
High	0	0	0	0	0

Table B: Soil test report levels approximate potassium (K) recommendations for coarse-textured (sandy) soils and some potassium fertilizer sources

Soil test report levels	Ounces of potash (K ₂ O) to apply per 100 feet of row	Some fertilizer sources that contain potassium (K) (notice the concentration differs for each so the amount to apply differs)		
		Potassium Sulfate 0-0-50 50% K₂O	Greensand 0-1.5-7 also contains P 7% K₂O	Kelp 1-0-4 also contains N 4% K₂O
		Amount of product to apply per 100 feet of row if you plan to use:		
Very low	3¼ oz.	6.5 oz.	3 lbs.	5 lbs.
Low	2½ oz.	5 oz.	2¼ lbs.	4 lbs.
Medium	1½ oz.	3 oz.	1⅓ lbs.	2⅓ lbs.
High	0	0	0	0

Table C: Soil test report levels and approximate potassium (K) recommendations for fine-textured (clayey) soils and some potassium fertilizer sources

Soil test report levels	Ounces of potash (K ₂ O) to apply per 100 feet of row	Some fertilizer sources that contain potassium (K) (notice the concentration differs for each so the amount to apply differs)		
		Potassium Sulfate 0-0-50 50% K ₂ O	Greensand 0-1.5-7 also contains P 7% K ₂ O	Kelp 1-0-4 also contains N 4% K ₂ O
		Amount of product to apply per 100 feet of row if you plan to use:		
Very low	2 oz.	4 oz.	1¾ lbs.	3 lbs.
Low	1½ oz.	3 oz.	1⅓ lbs.	2⅓ lbs.
Medium	1.0 oz.	2 oz.	¾ lb.	1½ lb.
High	0	0	0	0

Fertilizing established plantings

Blueberry plants and their associated (beneficial) endomycorrhizal fungi can extract phosphorus and potassium from the soil efficiently, which allows them to grow in nutrient poor soils.

Additional phosphorus and potassium are rarely needed after the plants are established.

Nitrogen is always needed on established bushes and should always be applied at the recommended rate. Blueberries are easily damaged by excess fertilizer and could reduce plant quality, yield and possibly cause environmental concerns.

Nitrogen requirements vary with cultivar, plant age, and presence of organic matter, mulch, weed pressure or watering practices.

Remember, there is no benefit to applying more fertilizer than plants require. In fact, over application of nutrients may be harmful to plant growth and the environment.

Sprinkle the fertilizer in a ring around the bush. Do not work into the soil which may damage shallow roots. Table E provides the nitrogen application rate and timing for established blueberry plants.

Table D: <u>Approximate</u> nitrogen fertilizer to apply per blueberry bush at each application time						
Age of Planting (years)	Ammonium sulfate 21-0-0	Urea 46-0-0	Blood Meal 12-0-0	Corn Gluten 10-0-0	Time of application	Comments
0*	0	0	0	0	-	Do not fertilize newly planted blueberries*.
1	0	0	0	0	-	
2	2 oz.	1 oz.	4 oz.	4½ oz.	May and June	Apply when plants flower. Sprinkle fertilizer in a ring around the bush. Don't work into the soil which may damage roots.
3	2½ oz.	1¼ oz.	4½ oz.	5 oz.	May and June	
4	3 oz.	1½ oz.	5 oz.	6 oz.	May and June	
5	3½ oz.	1¾ oz.	6 oz.	7 oz.	May and June	
6	4 oz.	2 oz.	7 oz.	8 oz.	May and June	Do not exceed these nitrogen rates from now on.

*Nitrogen is not recommended the planting year except on sandy soils. If you have sandy soils, fertilize at the rate listed for year 2.

For more gardening information visit Cornell Garden-Based Learning website:

<http://gardening.cals.cornell.edu/garden-guidance>

For more information on growing fruit:

<http://gardening.cals.cornell.edu/garden-guidance/foodgarden/#Growing%20Fruit>