

Suggested

BLUEBERRY

Fertilization Timings and Rates



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Blueberry plants are sensitive to overfertilization, and the nutrient demand of blueberries is low compared to row crops and vegetables. Blueberry species evolved under the canopy of coniferous forests in acidic soils (4.0-5.4 pH), of which nutrient availability is extremely restricted compared to plants growing in soils at 5.5-6.8 pH. For this reason, overfertilization can cause salt burn to the roots, which is observed as shoot dieback and leaf scorch (Figure 1). This guide explains how to fertilize blueberry to avoid excess nutrient applications while providing adequate plant growth and yield.



Figure 1. Overfertilization causes salt injury on the leaves of a 1-year-old southern highbush blueberry plant. Photo: Jeremy Kichler, Colquitt County Extension

If fertilizing solely through the irrigation system (fertigation), overwatering can easily become a problem when fertilizing during periods of rain. Keeping the soil saturated with water can increase root rots. Although fertilizing through the irrigation system is a common practice, establishing the planting with flexibility to fertilize by granular applications and fertigation will reduce the risk of overirrigating blueberry beds.

For blueberry plants, the analyses of the fertilizer (10-10-10, 10-5-5, or 7-0-7) is not as important as the type of nutrients being applied. Blueberry plants will not use nitrate fertilizers. Use ammoniacal sources of nitrogen (N) like ammonia sulfate, ammonia nitrate, or urea, and avoid chlorinated compounds like muriate of potash (KCl) and magnesium chloride ($MgCl_2$). Blueberry fertilizer mixes that are nutrient specific to acidic soil-loving plants are available commercially. Test leaf tissue annually and soil samples at least every third year to get feedback on the effectiveness of your fertilization program.

Blueberry plants are sensitive to elevated levels of salt in the soil, which necessitates multiple fertilizer applications throughout the growing season. In southeastern Georgia commercial blueberry production areas, the soils are well drained but the water table can be close to the surface. In other regions where soil has poor drainage, is prone to erosion, or has high levels of cation exchange capacity (CEC), modest rates and multiple fertilizer applications can minimize the potential of loss by runoff from heavy rains, leaching of nutrients into ground water, and salt injury from overfertilization.

The following information includes fertilization rate and timing recommendations for southern highbush and rabbiteye blueberries in southern Georgia.



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Table 1. Fertilization of southern highbush and rabbiteye blueberries in the establishment year.

	Blueberry fertilization for 12-by-3-foot row spacing ^z			
	Total N/A/yr	Granular fertilization		Fertigation
		4 applications	6 applications	Weekly (27 weeks)
Liner^y	40 lbs	10 lbs N	7 lbs N	1.5 lbs N
Pots^x	54 lbs	14 lbs N	9 lbs N	2 lbs N

^zAt 12-by-3-foot spacing, there are 1,210 blueberry plants per acre. If your plant density or spacing differs, simply divide your plant density by 1,210 and multiply the total N to get the adjusted rate, for example (2904/1210)*40 lbs N = 96 lbs N per acre per year, which is the rate for a planting with 3-by-5-foot spacing.

^yA liner is a rooted cutting that was started in trays. These are small plants with minimal shoot and root growth.

^xA pot is a liner plant transplanted into a pot to allow for greater shoot and root mass before being planted in the field, usually at 2 to 3 years old.

When establishing a blueberry planting, it is extremely important to test the soil prior to planting. If the soil pH is above 5.5 and calcium is above 900 lbs/acre, the ground will be unsuitable for planting blueberry. If the calcium is less than 900 lbs/acre but the pH is 5.5 to 6.5, elemental sulfur should be applied prior to planting to lower soil pH. This may take multiple applications. Resample the soil before forming beds for planting, and if the soil pH is still above 5.4, apply and incorporate more elemental sulfur into the soil. Applying and incorporating monoammonium-phosphate (MAP) or diammonium-phosphate (DAP) at 200 lbs/acre during land preparation is suggested to improve establishment, especially if soils are low in phosphorus. After planting, the plants should be watered to settle the soil around the roots. Fertilization should be delayed for four to six weeks, which will allow the roots to expand from the root ball and begin exploring the soil.

Table 2. Fertilization of southern highbush and rabbiteye blueberries in the second and third season.

	Blueberry fertilization for 12-by-3-foot row spacing			
	Total ^z N	Granular fertilization		Fertigation
		4 applications	6 applications	Weekly (27 weeks)
2nd & 3rd	90 lbs	22.5 lbs N	15 lbs N	3.3 lbs N

^zThis rate is suggested to promote growth and push the plants into full production.

Table 3. Fertilization of southern highbush and rabbiteye blueberries in the fourth season and beyond.

4 th year	12-by-3-foot row spacing for southern highbush (SHB) blueberries 12-by-4-foot row spacing for rabbiteye (RE) blueberries				
	Total N	Budbreak	Granular fertilization ^z		Fertigation
			4 weeks after budbreak	Postharvest (3 applications)	Weekly (27 weeks)
SHB	100 lbs	25 lbs N	25 lbs N	17 lbs N	4 lbs N
RE	68 lbs	17 lbs N	17 lbs N	11 lbs N	2.5 lbs N

^zGranular fertilization is suggested to be applied at 50% total N before harvest. The first application at budbreak and the second four weeks later or before fruit color change, while they are green and pea size. Postharvest fertilization can be applied in three applications approximately every six weeks. The last application should be no later than mid-October and preferably by the first week of October or four to six weeks before the first killing frost.

Fertilizer

Fertilizer analysis relates to the amount of nutrient. The first number is nitrogen (N), the second is phosphorous (P), and the third is potassium (K), noted as N-P-K. Some products express the analysis as phosphate (P₂O₅) and potash (K₂O), and in either case these are the first three numbers that indicate the analysis of the fertilizer. Figure 2 offers an example of 10-10-10 granular fertilizer, whose ratio represents 10% N, 10% P, and 10% K. The proportions are numerically reported as percent (%) of the total by weight. If you have 10 lbs of this fertilizer, there will be 1 lb of N, P, and K, respectively. A complete fertilizer has only N-P-K; however, N-P-K with added nutrients, like secondary nutrients like calcium (Ca) magnesium (Mg), and sulfur (S), and micronutrients like iron (Fe), manganese (Mn), boron (B), zinc (Zn), copper (Cu), nickel (Ni) and others, will be noted on the label and presented as a percent (Figure 2).

Figure 2. A granular fertilizer label of 10-10-10 guaranteed analysis.

**SUPER RAINBOW
PLANT FOOD
10-10-10**

GUARANTEED ANALYSIS

Total Nitrogen (N)	10.0%
9.5% Ammoniacal Nitrogen	
0.5% Nitrate Nitrogen	
Available Phosphate (P ₂ O ₅)	10.0%
Soluble Potash (K ₂ O)	10.0%
Calcium (Ca)	3.0%
Magnesium (Mg)	2.0%
2.0% Water Soluble Magnesium (Mg)	
Sulfur (S)	12.0%
12.0% Combined Sulfur (S)	
Boron (B)	0.07%
Manganese (Mn)	0.25%
0.001% Water Soluble Manganese (Mn)	
Zinc (Zn)	0.10%
Chlorine (Cl) not more than	6.0%

Derived From: Ammonium Sulfate, Ammonium Nitrate, Ammonium Phosphate, Calcium Sulfate, Potassium Chloride, Sulfate of Potash-Magnesia, Sodium-Calcium Borate, Manganese Oxide, Manganese Sulfate, Zinc Oxide

Directions for use. Use in accordance with recommendations of a qualified individual or institution, such as, but not limited to, a certified crop advisor, agronomist, university crop extension publication, or apply according to recommendations in your approved nutrient management plan.

Warning – Some crops may be injured by the application of boron. Contact your local county agent or field consultant for specific crop information.

Guaranteed by:
Agrium U.S. Inc.
4582 South Ulster Street, Suite 1700
Denver, CO 80237

This refers to the amount of nutrient in the product, noted as percent by weight. These numbers represent the percent of nitrogen (N), phosphorous (P), and potassium (K), or N-P-K.

Notice that the nutrients are presented in percentages and that chlorine is in the product. If plants begin to show symptoms of leaf scorching (Figure 1), the fertilizer may be contributing to the condition. Soil and leaf tissue sampling along with changing fertilizer may help to diagnose and correct the leaf scorch symptoms.

This is the identity of the nitrogen source. In this example, N is 95% ammoniacal.

Calculations The above recommendations (Tables 1, 2, and 3) express fertilization based on N, and for blueberry plants, the N should be ammoniacal. Below are some example calculations to determine how much N is being applied based on the fertilizer analyses.

Granular fertilizer

Apply 10 lbs of N to an acre with a fertilizer analysis of 10-10-10 granular:

N = 10% by weight or 0.10 per unit weight.

$$\frac{10 \text{ lbs N}}{0.1 \text{ N}} = 100 \text{ lbs of 10-10-10}$$

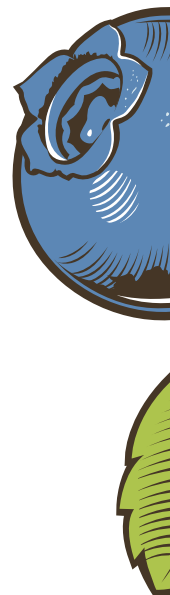
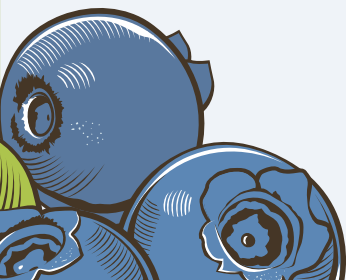
Divide by the decimal form of the percent to calculate the amount N in an application.

If using a fertilizer with an analysis of 12-4-8, how much should be applied at a rate of 10 lbs N/acre?

$$\frac{10 \text{ lbs N}}{0.12 \text{ N}} = 83 \text{ lbs of 12-4-8}$$

How much P is applied if using 83 lbs 12-4-8?

$$83 \text{ lbs} \times 0.04 \text{ P} = 3.3 \text{ lbs P}$$



Liquid fertilizer

What if fertigating with 10-5-5? How much should be applied at a rate of 2 lbs N/acre?

First, what is the density of the fertilizer? Density is mass over volume (mass/volume; g/l or lbs/gallons) and may have been included in the analyses with the liquid fertilizer. If the density is not included, weigh out a gallon of fertilizer. Then calculate the amount of N in each gallon:

Density (mass/volume) x decimal percent of nutrient analysis (10%N/100% = 0.10 N)

$$= 10 \text{ lbs/gal} \times 0.10 \text{ N} = 1 \text{ lbs N/gal}$$

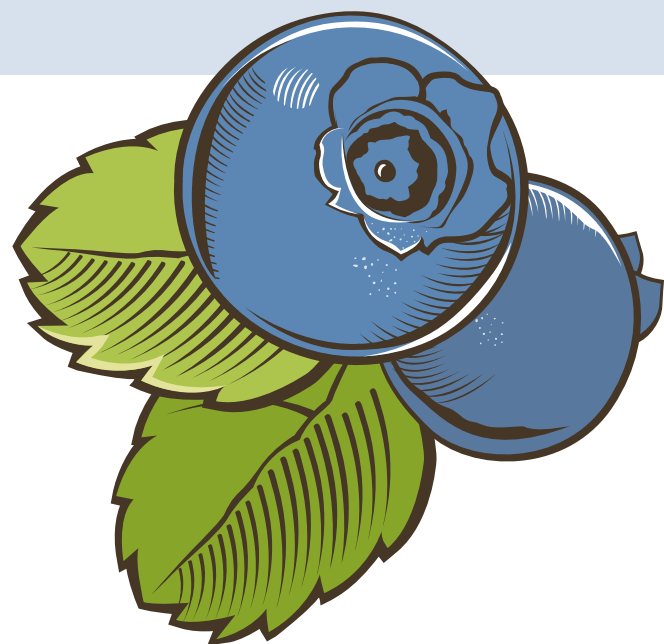
$$\frac{\text{gal} \mid 2 \text{ lbs N}}{1 \text{ lbs N} \mid} = 2 \text{ gal}$$

Plant density

How to calculate plant density: (1 acre = 43,560 square feet)

$$\frac{\text{acre sq ft}}{\text{plant spacing}} = \frac{43560 \text{ sq ft}}{12 \text{ ft} \times 3 \text{ ft}} = 1210 \text{ plants/acre}$$

The effect of fertilization can vary depending on the site and cultivar. Water movement through the soil, soil organic matter, and climate can have a tremendous effect on growth rate with any fertilization program. Observation is key to determining whether the plants are growing sufficiently to support the crop load. Commonly, excessive growth relates to overfertilization, whereas poor growth, reddened leaves, and poor yields may indicate nutrient deficiency. For further information on blueberry irrigation systems and chemical injection, see University of Georgia Cooperative Extension Bulletin 1504, "[Low-Volume Irrigation Systems for Blueberry with Chemigation and Fertigation Suggestions.](#)" If you have other questions, please contact your local UGA Extension Agriculture and Natural Resources agent.



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