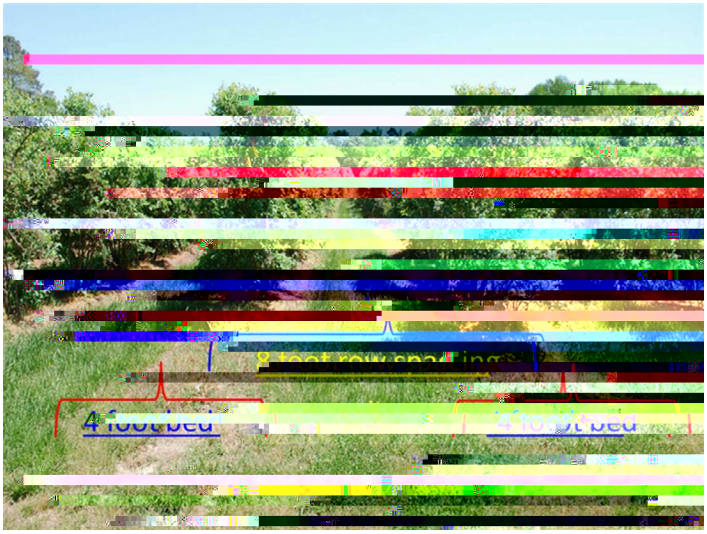
Introduction

Florida's commercial blueberry industry has increased signi cantly in both acreage and value, expanding from approximately 1,000 acres in 1993 to more than 4,000 acres in 2010 (Braswell 2010), and from $39 million in 2007 to $72 million in 2009 (Strange 2007). Per capita consumption of blueberries has increased by 400% during the last decade (Braswell 2010). Florida produced approximately 17.7 million pounds of fresh blueberries in the 2010 season. However, Florida only contributed 4.2% of total U.S. fresh blueberry production, which was more than 416.5 million pounds (USDA-NASS 2011). e value of blueberries destined for processing has also increased. e total U.S. value of processed blueberries grew from $62.3 million in 2009 to $136.0 million in 2010 (USDA-NASS 2011).

In other words, the rate of N divided by the linear bed feet gives the amount of N per linear bed foot to be applied. Multiplying the total linear feet of bed and the amount of N per linear foot of bed provides the total amount of N for the fertigation event. For calculating recommended fertilizer rates in raised-bed, mulched cultural systems, see http://edis.ifas.u .edu/ss516.



Step 2: Calculate the total weight of liquid fertilizer needed for fertigation. e total weight depends on both total N to be applied and the grade of the selected N fertilizer solution. For instance, UAN-32 (urea-ammonium nitrate solution, 32-0-0) contains 32% N by weight. e total weight of the fertilizer solution to apply is equal to the total N needed (from Step 1) divided by the N concentration (0.32 in this example). For example, if you need 100 pounds of N for a particular fertigation event, how much UAN-32 do you need? Divide 100 pounds by 0.32. You need 312.5 pounds of UAN-32.

Step 3: Calculate the number of gallons of liquid N fertilizer. is number is determined by the density of liquid N fertilizer. Every solution fertilizer has a density listed on the fertilizer label. For example, 1 gallon of UAN-32 weighs 11.05 pounds; thus, the density of this particular fertilizer is 11.05 pounds per gallon. e amount of fertilizer in gallons to apply is calculated by dividing the total weight of solution fertilizer (from Step 2) by the density.

Step 4: Calculate the dilution factor. e dilution factor is determined using the N concentration of the solution N fertilizer and the target N concentration in the irrigation water (parts per million [ppm]) for the fertigation event. e fertilizer grade (e.g., 32%) should rst be converted into ppm by multiplying it by 1,000,000. e fertilizer concentration in ppm (e.g., 320,000 ppm) is then divided by the target N concentration (e.g., 150 ppm). e result is the dilution factor.

Step 5: Calculate the injection rate. e injection rate is determined by dividing the irrigation water ow rate (e.g., 1,000 gallons per minute) by the dilution factor (from Step 4).

Step 6: Calculate the injection time. Injection time is determined by dividing the number of gallons of solution N fertilizer needed (from Step 3) for the fertigation event by the injection rate (from Step 5).

Practical example

We will use UAN-32 (32% N, 11.05 pounds per gallon) to apply 5 pounds N per acre to a 5-acre blueberry eld with 8-foot spacing. e irrigation ow rate is 1,000 gallons per minute and the target N concentration in the irrigation line is 150 ppm. To calculate the injection rate and time:

Step 1 Total N: 5 lb/acre N × 5 acres = 25 lb N

Step 2 Pounds of UAN-32: 25 lb N ÷ 0.32 = 78.1 lb UAN-32

Step 3 Gallons of UAN-32: 78.1 lb ÷ 11.05 lb/gal = 7.0 gal

Step 4 Dilution factor: 0.32 × 1,000,000 ppm ÷ 150 ppm = 2,133.3

Step 5 Injection rate: 1000 gal/min ÷ 2133.3 = 0.47 gal/min

Step 6 Injection time: 7.0 gal ÷ 0.47 gal/min = 15 min

erefore, in this particular case, 7.0 gallons of UAN-32 are needed for the fertigation event.

For di erent-sized blueberry farms with 1,000 gallons per minute irrigation ow rate at target N concentration of 150 ppm N and using UAN-32 as the N source, the corresponding gallons of UAN-32 and injection time can be found in Table 1. Here, 150 ppm N is recommended because if the N concentration is too low, the plants may not be able to get su cient N. e fertilizer should not exceed 200 ppm in fertigation (Krewer and NeSmith 2012). is example uses UAN-32. Other soluble fertilizers can also be used in fertigation. If using double drip tape per bed, the injection time can be shortened by up to 50%.

For a 10-acre eld using UAN-32 with a target N concentration of 150 ppm but with di erent water ow rates, the corresponding injection rate and time are shown in Table 2.

Why is it important to calculate the fertigation rate-correctly? Because we need to make sure that blueberry plants receive su cient—but not excessive—nutrients. We must avoid plant damage by not introducing too much salt at one time. We want to avoid over-applying fertilizer to save money in fertilizer cost, thus maximizing pro tability. We should prevent or minimize potential nutrient contamination of nearby water resources.

References

Braswell, B. 2010. “ ere’s Value in Growing Together: e Florida Blueberry Industry Continues to Take on the Many Challenges Any Agriculture Endeavor Faces.” Growing Produce. Accessed October 31, 2011. http://www.growingproduce.com/article/18510/there-s-value-in-growing-together

Burt, C., K. O’Connor, and T. Ruehr. 1995. Fertigation. San Luis Obispo: California Polytechnic State University.

Krewer, G. and D. S. NeSmith. 2012. “Bluberry Fertization in Soil.” University of Georgia Ext. Fruit Publication 01-1. Accessed January 19, 2015. http://www.smallfruits.org/Blueberries/production/blueberryfert.pdf.

Strange, C. 2007. “FDACS Funds Pojects to Enhance Florida Specialty Crop Competitiveness.” Florida Department of Agriculture and Consumer Services. Accessed October 31, 2011. http://www.freshfrom orida.com/press/2009/03302009.html

USDA-NASS (United States Department of Agriculture-National Statistics Service). 2011. “Noncitrus Fruits and Nuts 2010 Summary (July 2011).” Accessed December 9, 2011. http://usda01.library.cornell.edu/usda/nass/