

Fertilizer – How Much To Apply

Don't Pay for Nutrients That Are Not Needed

Chip East
Regional Extension Agent
Commercial Horticulture

If you are going to fertilize a crop it is important to perform a soil analysis in order to find out how much of what type fertilizer is needed. It cost \$7.00 for Auburn University Soil Testing Laboratory to analyze your soil. The Alabama Cooperative Extension Publication number ANR-6-A, titled Home Soil Testing: Taking a Sample, describes the procedure of how to collect and send off the soil sample to Auburn University. From this simple procedure you will get recommendations of what nutrients such as nitrogen, phosphorus, and potassium along with possible lime requirements your soil needs. When your soil test results come back, it will tell you how much nutrients to apply on a per acre basis and per 1000 square feet for those with less than an acre plots. In order to try to keep this as simple as possible, I will be speaking in terms of fertilizer per acre basis. An acre is 43560 square feet if you would like to calculate how many acres you are planting.

What do the numbers such as 8-8-8, 10-10-10, 13-13-13, and 17-17-17 mean when they are written on fertilizer bags? Those numbers represent the percentages of nitrogen, phosphorus, and potassium that are in that bag. A 50 pound bag of 13-13-13 does not have 50 pounds of nitrogen, phosphorus and potassium in that bag, but only 6 ½ pounds of each. ($50 \times 13\% = 6.5$)

Let's go over a couple of examples. If your soil test results recommended 80 pounds of nitrogen, 80 pounds of phosphorus, and 80 pounds of potassium per acre, what fertilizer materials should be applied? Since nitrogen, potassium, and phosphorus are all needed a complete fertilizer such as 8-8-8, 10-10-10, 13-13-13, or 17-17-17 will work, but different amounts of each are needed. Simply divide the pounds of fertilizer needed, in this case 80 pounds, by the percentage of the nutrient in the bag. If 8-8-8 is used, dividing 80 pounds by 8% will give the answer of 1000 pounds. That means 1000 pounds of 8-8-8 is required to fertilize one acre with 80 pounds of nitrogen, phosphorus and potassium. If 13-13-13 is used, dividing 80 pounds by 13% will give the answer of 615 pounds. That means 615 pounds of 13-13-13 are required to fertilize one acre with 80 pounds of nitrogen, phosphorus, and potassium. If you were to calculate this with 10-10-10 and 17-17-17 you would work them the same way. It would take 800 pounds of 10-10-10 or 471 pounds of 17-17-17 to obtain the desired 80 pounds of nitrogen, phosphorus, and potassium per acre. ($80/10\% = 800$ and $80/17\% = 471$)

These calculations will tell you not only how much to apply, but will also help you decide on the most economical fertilizer. For example, it would take twenty 50 pound bags of 8-8-8 per acre to add the 80 pounds of nitrogen, phosphorus, and potassium. ($1000/50 = 20$) It would take 12.3 bags of 13-13-13 per acre to add the 80 pounds of nitrogen, phosphorus, and potassium. ($615/50 = 12.3$) If 8-8-8 cost \$11.50 per bag and 13-13-13 cost \$14.75 per bag it would cost \$230.00/acre to fertilize with 8-8-8 and \$181.43/acre to fertilize with 13-13-13. ($\$11.50 \times 20 = \230 and $14.75 \times 12.3 = \$181.43$) Contact your

fertilizer supplier for current prices. In this example using 13-13-13 would save the farmer \$48.57 per acre. ($\$230 - 181.43 = 48.57$)

Try another example. Let's say the soil test recommended 120 pounds of nitrogen and no phosphorus and no potassium. It is common to have a soil test with this type of recommendation. This means you have proper amounts of phosphorus and potassium in your soils and do not need any more of these elements for proper plant growth. Applying fertilizers such as 8-8-8 or 13-13-13 would be applying unneeded nutrients. Applying more than needed will not cause the plants to grow any better and will cost you more money. Fertilizer materials with nutrient contents such as 34-0-0 or 45-0-0 are common to find and just what this examples needs. Divide the pounds of fertilizer per acre needed, in this case 120 pounds, by the percentage of nutrient being used. If 34-0-0 is used, divide 120 pounds by 34% will give the answer of 353 pounds. ($120/34\% = 353$) If 45-0-0 is used, dividing 120 pounds by 45% will give the answer of 267 pounds. ($120/45\% = 267$) This field would need 353 pounds of 34-0-0 or 267 pounds of 45-0-0 per acre to obtain the recommended 120 pounds of nitrogen.

Call around and find out what fertilizer materials are selling for in your area and compare prices per acre not prices per bag. Since more bags of one product may be needed than another the cheapest price per bag may not be the most economical. On a larger scale the cheapest price per ton may not be the cheapest price per acre after it is spread. Some nutrients such as 45-0-0 may only be available in bulk quantities and not in individual bags.

The soil test will also tell you how much lime is needed per acre or per 1000 square feet and when to apply the fertilizer during the year. If 120 pounds of nitrogen was needed per acre we would not apply that much at one time. We have several publications on soil testing and gardening on our web site at www.aces.edu.