Interpreting Soil Testing Laboratory Results for Vegetable Crops

The report form from the Mississippi State University Extension Service Soil Testing Laboratory may be confusing at first, but if you look at each line on its own, the form is not difficult to understand.

The first few lines under the greeting identify the sample you submitted. Under Laboratory Results, the crop you specified on the form is mentioned. If you decide to plant a different crop, ignore the recommendations at the bottom of the page. The next line is the number the laboratory assigns for its own use. It helps the laboratory find the sample if there is a question and the sample needs to be run a second time. The next line is the identification you gave.

Under Laboratory Results are the results from the testing. The first, and most important, is the soil pH level. All vegetable crops do best when pH levels are between 6.0 and 7.0. The only time the soil pH should be below 5.5 is when Irish potatoes are being grown in a field with a history of scab. Levels between 5.5 and 6.0 are intermediate in production potential and in most years will not influence yields greatly. However, any time soil pH levels fall below 5.2, soil manganese availability may become high enough to cause toxic levels of this nutrient in the plants. This disorder causes plant stunting and severely diminishes yields. Adding most forms of nitrogen to a sandy soil can drop pH levels a few tenths and cause soil manganese to become available at toxic levels, so 5.5 is the level recommended.

The next several lines report the phosphorus, potassium, magnesium, zinc, and calcium levels found in the soil by the laboratory. The numbers are not important by themselves. More important is the ranking. “Very high” means no response to additional nutrient is expected. “High” means no response would be expected except in stress situations or very high yield levels. “Medium” means a response would be expected at normal yield levels. “Low” means a response to additional nutrients would be expected at any yield level. “Very low” means the plant would probably not survive because of lack of that nutrient.

There is no ranking given to the calcium level, for two reasons. The first and foremost reason is that calcium levels vary with cation exchange capacity of the soil. Soil texture provides a hint about cation exchange capacity. A reading of 1,500 pounds per acre would be very high on Arredondo fine sand in George County but very low on Sharkey clay in Issaquena County. The second reason is that most soils that require additional calcium are also acid soils that require liming. Adding lime to soil will also supply calcium. Calcium is critical for crops such as tomatoes, peppers, watermelons, and squash that suffer from blossom end rot. For these crops, a special note is added for supplemental calcium.

Why isn’t a test for nitrogen run? Several reasons, including cost, reliability, time, and lack of relationships between soil nitrogen levels and yield. Soil nitrogen levels change greatly due to moisture levels, microorganism activity, temperature, leaching, and organic matter levels. A test run on samples taken in November (to allow time for lime applications to react for spring) would not give reliable results about the nitrogen status of that soil in March. Soil organic matter is estimated, and from that a number is derived for the amount of nitrogen the soil will probably supply.

Recommendations make up the rest of the sheet. These recommendations are based on research done in Mississippi and other southeastern states, and experiences of university personnel. These are only recommendations, and you can modify them to suit a specific production system. If you consistently produce 20 percent higher yields than the state projected yields, you may increase your fertilizer application rate prudently. Do not be concerned about increasing or decreasing the amount of fertilizer by 10 percent on an area and observing what happens.

The first recommendation is the amount of lime to add if the soil pH levels indicate it is required. Acceptable liming materials include calcitic limestone, dolomitic limestone (particularly if magnesium levels are low), basic slag, crushed oyster shells, or any other material with a calcium carbonate equivalent of 85 or higher. The finer

a material is ground, the more quickly it reacts with the acidity of the soil. The best time to lime is at least 3 months before planting, but you can get acceptable results from applying very finely ground material up to 1 month before planting. Thorough mixing with the soil will allow the lime to react more completely.

The next set of recommendations is for the amount of fertilizer material to add. The type of fertilizer shown is only one way the amount of nutrients recommended can be supplied. Check with your local fertilizer dealer to determine the best way the pounds of N-P-K per acre can be spread on your field. If 8-24-24 is not available in your area, you can substitute another source. You can use urea rather than ammonium nitrate; Sul-po-mag is a source of both P and K; and ammonium phosphate is a good source of N and P. Check for the best, cheapest, and/or easiest way to supply the nutrients. Use foliar fertilization with N-P-K only as a last resort.

Placement of fertilizer is important. If you are growing something with a limited root system, you must place the fertilizer where the roots will pick it up. It makes no sense to broadcast fertilizer to an entire field if the roots explore only 33 percent of the volume. If you have access to equipment that broadcasts only fertilizer, consider fertilizing before making beds. The equipment that makes beds will move the fertilizer into the bed where most of the roots are. For agronomic crops, you can save money by reducing phosphorus levels when the fertilizer is banded. For vegetable crops, a savings of $5 to $10 per acre is probably not worth worrying about. If money is very short, consider reducing only the phosphorus by 10 percent.

To make calibration of fertilizer spreaders easier, determine the amount of fertilizer needed per row foot by dividing the width of the row (in feet) into 43,560 (the number of square feet in an acre). For example, if you grow squash on a 42-inch row, you would divide 43,560 by 3.5 (42 inches = 3.5 feet) to get 12,430 row feet per acre. If the recommendation were for 500 pounds of 5-15-30 per acre, you would divide 500 pounds by 12,430 feet to obtain 0.04 pounds per row foot, or 4 pounds per 100 row feet. Another example would be watermelons grown on a 6-foot-wide row. 43,560 divided by 6 equals 7,260 row feet per acre. If 1,000 pounds of 13-13-13 were recommended per acre, you would set the spreader to apply 13.8 pounds per 100 row feet. A third example would be tomatoes grown on a 7-foot-wide row. If the recommendation were for 350 pounds of 8-24-24, you would apply 5.6 pounds per 100 row feet (350 pounds divided by 6,229 feet).

The rest of the soil test report form consists of notes specific to the crop selected. These include sidedressing instructions, supplemental calcium notes, micronutrient recommendations, and other important points about supplying the nutrients needed for proper crop production.

The last thing is the name and telephone number of your county Extension office. If you have any questions, call for assistance.

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