



Winter 2001-2002, No. 6

SIMPLE SUGGESTIONS FOR SUCCESS IN SOIL SAMPLING

Have you heard the saying, “Fall is an ideal time to collect soil samples”? Before collecting soil samples this fall, you might want to consider another truth: “The greatest source of error in a soil testing and fertilizer recommendation program is the sample collection.”

Soil fertility professionals recommend a composite sample, based on no fewer than 15 to 20 cores to represent no more than about 20 acres. When dried, this composite sample often weighs less than a pound, but is intended to represent the average fertility of the furrow-slice, or the upper 6-2/3 inches of plowed or cultivated soil, which weighs approximately 2 million pounds per acre. In other words, this one-pound box or bag of sampled soil represents no more than 0.0000025 percent of the field, assuming a 20-acre field. At the laboratory, the one-pound sample is usually dried, pulverized and blended, screened/sieved, and a 2 to 5-gram (0.01-pound) subsample is withdrawn for the actual analyses. (This seemingly small subsample weight is enough to provide good, repeatable analytical results of the collected soil.) Looking at it another way, the laboratory subsample ends up representing only 0.00000028 percent of a 20-acre field’s weight. Even if the sampling is as intensive as a 1-acre grid, the subsample would still represent no more than 0.00000055 percent of that one acre-furrow-slice. **These facts should illustrate why it is absolutely essential that every effort be made to collect only the highest quality soil samples to represent fields, management zones, sampling grids or grid points.**

An inconsistent or incorrect sampling depth is frequently cited as the major source of soil sampling error. The correct depth depends on the tillage system used, for example: moldboard plowing—7 to 8 inches deep; chisel plowing or disking – 6-2/3 inches; no-tilling – frequently 0 to 3 or 0 to 4 inches, but sometimes 0 to 6 inches. If fertilizer has been band-applied, the laboratory should be consulted for appropriate sampling schemes. Some labs recommend a random sampling of the banded row area and inter-row areas, especially if the exact band location is unknown. Laboratories in some regions may have developed soil test calibrations based on specific proportions of samples from fertilizer bands vs. soil away from the bands. The individual laboratory should be consulted for its recommended sampling depth based on specific tillage systems and fertilizer application methods. **Following are some additional tips to consider in getting quality soil samples.**

Tools—Hollow soil sampling probes or soil augers can be used successfully. A probe is often preferred because intact cores can be obtained from a fairly accurate depth with precision. Some mark soil probes with a file, or by other permanent means (a welded bead, for example), to accurately gauge sampling depth. Plastic buckets are preferred for holding and mixing sampled cores before transfer to shipping bags or boxes. Metal, galvanized, and rubber buckets should be avoided because they may contain zinc and other micronutrients which could contaminate the samples and interfere with accurate micronutrient analyses.

Time of year—Research in the Midwest, South, and other regions has shown that soil fertility levels (e.g. pH, phosphorus and potassium) vary seasonally; that is, from month to month. Soil pH can fluctuate seasonally as much as 0.5 to 0.8 pH units. Extractable soil phosphorus levels can vary with soil wetting and drying cycles, especially in those soils with high extractable iron and/or aluminum. Extractable soil potassium can also vary from month to month. The key is to collect soil samples at similar moisture and temperature, and preferably the same month, from year to year. These facts help explain why it is important to collect soil samples at least every two to three years, to determine any fertility trends: increases, decreases, or relative maintenance.

There is no substitute for quality control (or error control) in a soil sampling program. The person collecting the samples is directly responsible for the integrity of collected soil samples and, indirectly, the analytical results and recommendations. Attention to a few simple suggestions can help ensure a successful soil sampling, testing, and fertility management program for improved profitability. Collect quality samples for quality results!

—CSS—

For more information, contact Dr. Cliff S. Snyder, Midsouth Director, PPI, P.O. Drawer 2440, Conway, AR 72033-2440. Phone: (501) 336-8110. E-mail: csnyder@ppi-far.org

Note: *Agri-Briefs* are available online at the PPI web site: www.ppi-ppic.org/agri-briefs