Soil Sampling Procedures

Modified from: Jeffrey S. Jacobsen, Soil Scientist
– source http://www.montana.edu/wwwpb/pubs/mt8602.html

Uniform fields can be sampled in a simple random, stratified random or systematic pattern. The result from these sampling plans, the soil test value, provides an estimate of the entire population of possible soil test results. As the number of cores increases, the error, or chance of obtaining an inaccurate estimate of the average soil test value, decreases. Practically speaking, the time required to obtain soil samples governs the number of cores taken. A good sampling plan helps to ensure the accuracy of the soil test result. Three common soil sampling plans are presented in Figure 1.

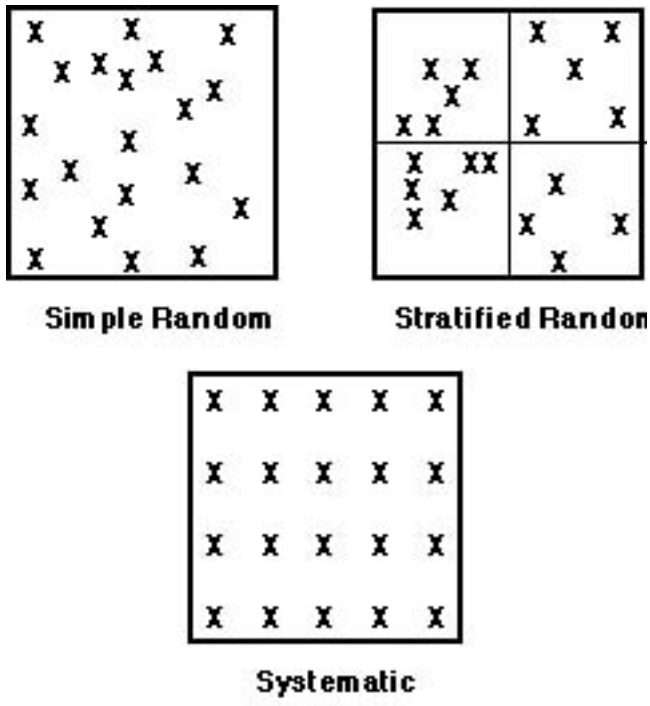

Figure 1. Soil sampling plans (X represents an individual soil core location).

With a simple random system each soil core is selected separately, randomly and independently of previously drawn units. A stratified random sample is taken from a field that has been divided into several subunits or quadrants from which simple random cores are obtained. This increases the precision for the field. The systematic sample is a further progression in an attempt to ensure complete field coverage, similar to the change from the simple random to the stratified random. Cores are taken at regularly spaced intervals in all directions.

The systematic sampling plan has been widely accepted, because it is straightforward and potentially increases the accuracy of soil tests.

Recent research termed "prescription farming" or "farming by soil" has attempted to integrate the inherent variability of soils with differential fertilizer application. This may or may not include sophisticated application equipment. From a soil sampling perspective, a field is divided into management areas that have similar soil types, terrain position (ridge, side slope, bottom) or other unique features (Figure 2).

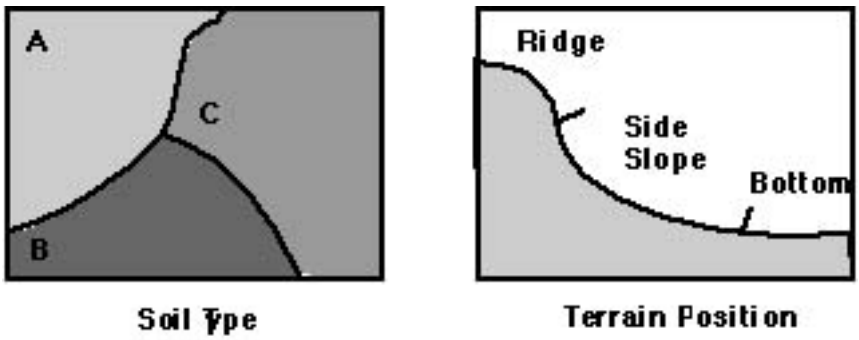

Figure 2. Prescription farming soil sampling plans.

Once these areas are identified, then either a simple random or systematic sampling plan is utilized for soil sampling.

Specialized Sampling

Widespread acceptance of conservation tillage necessitates the adaptation of suitable soil sampling techniques for reduced tillage fields. The lack of tillage in reduced and no-till systems results in stratified physical and chemical characteristics of the surface soil. Conservation tillage changes the distribution of soil acidity, phosphorus and potassium, which affects fertility and herbicide programs. When soil sampling, the plow layer should be divided into two depths, from 0 to 2 inches and from 2 to 6 inches. Sample cores between the rows if starter fertilizer was banded in past years. If all fertilizer is applied in a band for irrigated crops, sample three to four cores that are spaced equally between the ridge or row. For example, if the row spacing is 36 inches, cores are taken at 9, 18 and 27 inches from one reference row. This evens out chances of sampling directly in a fertilizer band (Figure 3).

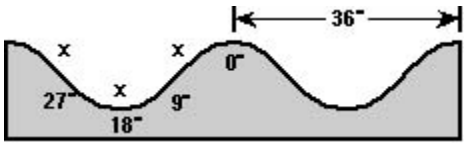

Figure 3. Soil sample locations for irrigated row crops (X represents one individual soil sample location).

Soils that have been deep banded dictate taking an increased number of cores. Several sets of cores should be taken from 10 to 15 locations at a distance equal to one-half the fertilizer band width near the row placed band.

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