MEASURE AND MANAGE

The Importance of Proper Soil Sampling Procedures

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It is impossible for anyone to see, taste. or feel the fertility level of a given soil. The only way to definitively measure fertility is with an accredited laboratory procedure for analysis. The values stated on the resulting soil report are derived from a system of causes. The sampling procedure, sample preparation, analysis and reporting all contribute to the expectation of what a soil test will reveal to the client. Most clients soil test for the basic reason that they wish to know how much or if any fertility improvement is needed and which nutrients. Recently with Bill 81 the Nutrient Management Act adds a dimension of compliance by requesting current accredited soil test for the development of a Nutrient Management Plan and retest every 3 years.

The deviation from expected results can be traced back to how the soil sample was taken. Over 80% of the variance from expected results can be traced to this act. An understanding of the factors that can contribute to unexpected results need to be discussed. There are many variables involved with crop production. Weather and weather by management interactions may conspire to lessen crop performance. When we have an opportunity to control or eliminate variance we need to cease it. Consistency of sampling is one opportunity. Consistency of depth, number of cores, and management unit are 3 main factors that contribute the most to sampling variance.

Sampling depth for determination of pH, P, K,Mg Ca, etc is standardized at 15 cm or 6 inches. There are reasons for changing depth under no till. The stratification of nutrients may affect the management practices. A shallow sample in the top 5 cm or 2 inches to check for pH and the resulting need for lime is one such consideration. The recommendation tables in the OSMRSC publications assume a sampling depth of 15 cm for the interpretation of fertilizer rates. In the case of limestone applications the same 15 cm is assumed. Under shallow sampling there needs to be an adjustment of rate based on the sample depth. Usually under reduced till limestone rates are adjust down by 50 to 60 % and applied more frequently. Failing to adjust for these facts can result in an over application.

The following table illustrates the difference in P and K soil test values at different depths in notill and conventional till (Woodstock area)

Depth inches	**Conventional**			**Notill**		
	pH	P	K	pH	P	K
0-2	7.7	32	134	6.2	45	198
2-4	7,7	32	128	6.9	28	145
4-6	7.8	29	121	7.7	21	118

The P and K are in ppm. Both treatments received identical management for 3 years.

This chart illustrates the effect that sampling depth may have on results in reduced till and is one of the common sources of error.

The **number of cores** also influences the results. The following example shows the repeatability of sampling by two different people. One person was trained (#1) the other was a first time sampler.

	1st time			2nd time		
	pH	P	K	pH	P	K
Sampler 1	7.2	11	88	7.3	11	80
Sampler 2	7.3	23	152	7.2	10	89

Sampler 1 was trained, we sampled a 25 acre field following a Z pattern across the field, stayed away from headlands, took 20 cores to make a composite sample. Sampler 2 was given no instructions, the sampling method consisted of filling the sampling container on the headland with 5 cores. The second attempt was much better we instructed sampler 2 on proper sampling technique. This simple demonstration shows clearly the impact sampling technique can have on the results. The second sampling was well with in expectation and laboratory error.

The **Management Unit** or the size of land area upon which the grower is prepared to manage inputs factors in as well. Recording these areas and sampling them consistently is important in order to recognize historic trends. The NMA requires a sample every 25 acres, this would require 20 random cores across the area to make up a proper composite sample. Fields may be broken into smaller areas depending on changing soil texture such as sandy knolls and clay bottoms. Troubleshooting of problem areas may also be subdivided in an effort to identify opportunities to increase crop performance. In recent years Precision Agriculture and grid or zone sampling and mapping epitomize this approach. Special attention is required where management inputs have been altered. Spreading of manure on half the field then sampling the whole field will provide a sample that represents neither area. Recording of management units and applications is a must in order to have effective, meaningful results that can provide the proper information for planning soil sampling and making knowledge based decisions.

These are just a few of the factors affecting soil sampling results. Your local Certified Crop Advisor is attuned to the risk management opportunity of proper soil sampling methods and the impact that the results can have your compliance and profitability.