Midwest Laboratories®
13611 B Street, Omaha, Nebraska 68144 (402) 334-7770 FAX (402) 334-9121 www.midwestlabs.com

PROS AND CONS ON WINTER SOIL SAMPLING

When is the best time of the season to collect soil samples? Conflicting viewpoints based on manpower and time availability versus known variations of soil pH and nutrient levels, due to season and crop effect, can make the organization of soil sample collection efforts a real dilemma. Winter soil sampling has its advantages and disadvantages and knowing which elements in soil analysis are subject to the most variation will aid in the proper interpretation of soil analysis done during the winter months.

Obtaining a good, representative soil sample (i.e., proper, consistent depth, adequate number of cores per sample, etc.) is one of the most important factors in reliable soil analysis results. The winter months can allow more time for collecting an adequate number of soil composites for a representative soil sample, while often allowing better field access and surface terrain evaluation than other seasons. More time is also available for evaluation of the soil test results, enabling desired modification or formulation of soil fertility recommendations to suite specific crop responses or soil conditions.

Critics of winter soil sampling cite documented research efforts showing seasonal variation in soil test levels. Of prime concern are test values for soil pH, phosphorus and potassium. During winter months, soil pH values tend to be higher than during the growing season (1) (5), due to decreases in soluble salts, CO_2 concentrations (4) and absence of nitrogen fertilizer nitrification (6) (8).

Figure 1 (1)

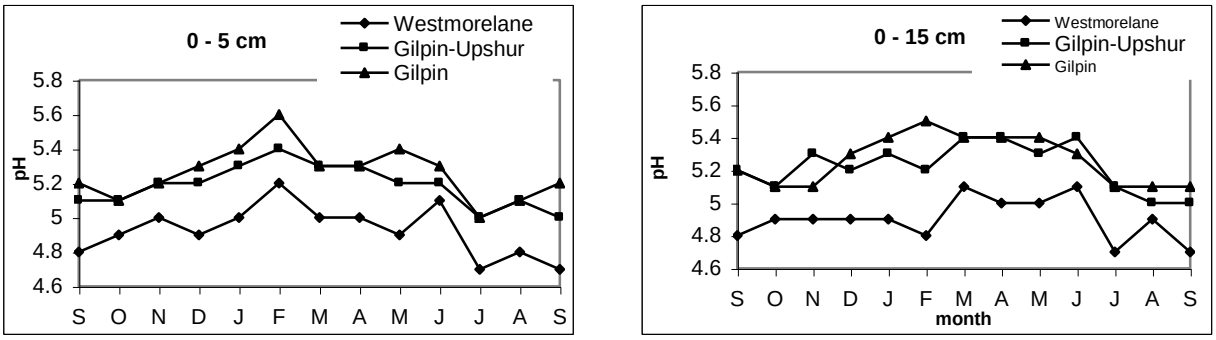

Fig. 1 - Effect of Time and Depth of Soil Sampling upon pH

Phosphorus soil test values trend higher in the winter and early spring months (3) (5). The amount of variation appears to be related to soil pH, phosphorus soil test level and percent organic matter. Phosphorus soil test values are closely linked to soil pH. Soil pH decreases with addition of nitrogen fertilizers in the spring, and as ammonium nitrification continues throughout the growing season, peaking in mid-to-late July, soil test values for soil pH and phosphorus show similar growing season depressions. CO_2 evolution from root exudation and organic matter decomposition enhance the pH and phosphorus test level depression during the summer months.

Figure 2 (1)

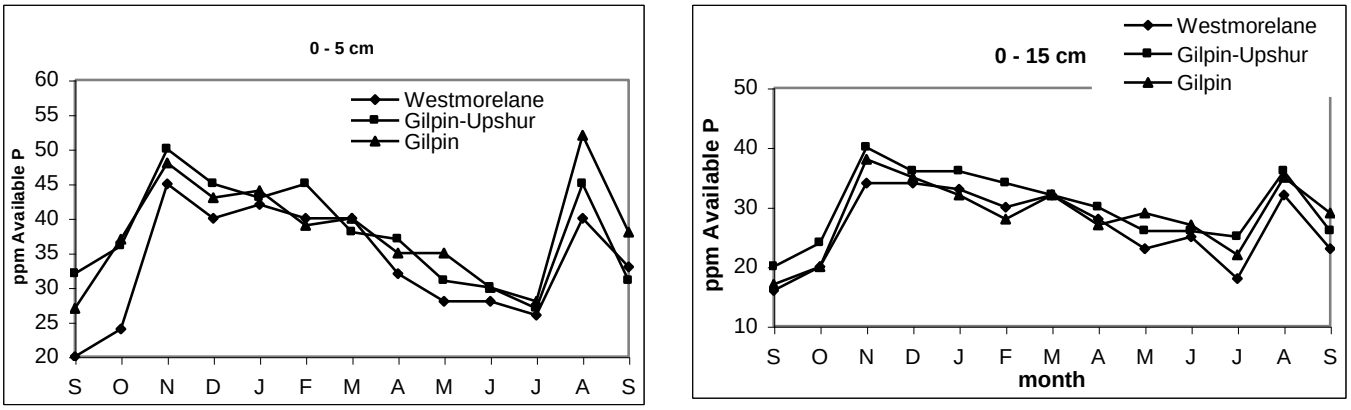

Fig. 2 - Effect of Time and Depth of Soil Sampling upon Available P

When soil test levels for phosphorus and organic matter are high, the amount of potential seasonal variation of phosphorus test values tends to increase (4) (5). Potassium soil test values generally increase during the winter months because of shifts in soil equilibrium conditions due to crop removal (4) and/or freezing and thawing actions releasing fixed potassium from non-exchangeable forms, depending upon the type of clay minerals present (3) (5) (7).

FIGURE 3 (1)

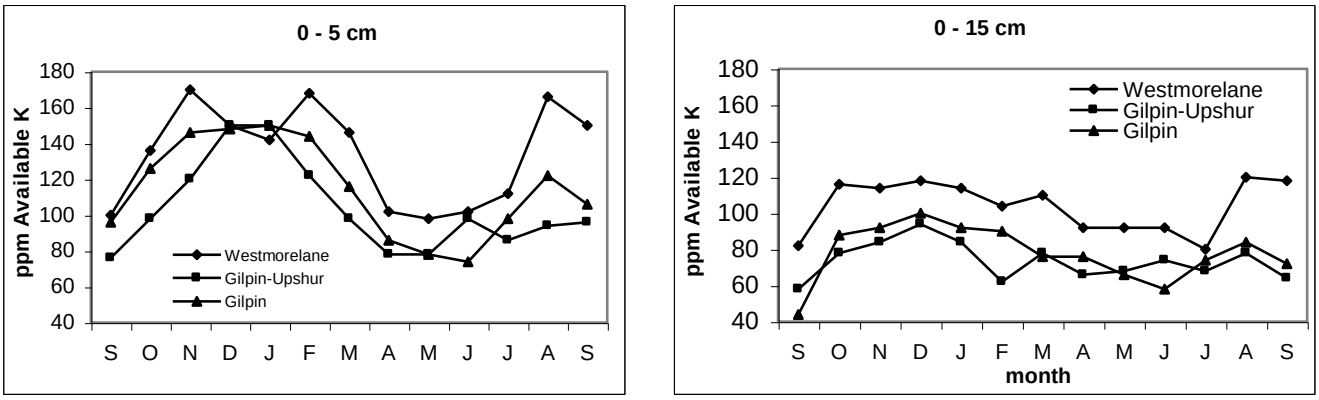

Fig. 3 Effect of Time and Depth of Soil Sampling upon Available K.

Sandy soils do not tend to reflect these results, showing little season change in exchangeable potassium other than slight depressions in the potassium soil test in the June-July-August period (9). Calcium soil test values follow similar trends with respect to season and soil type (4). Magnesium soil test values would be expected to behave similarly. However, magnesium tends to form a higher proportion of soluble compounds in the soil than calcium (2), and plant uptake may result in greater growing season depression of magnesium soil test levels than calcium test levels.

Organic matter test values can be expected to vary according to season, with the amount of variation highest in the medium to high C.E.C. soils. During the winter months, percent organic matter is fairly constant, showing increases starting in the late spring, building and leveling off through the summer months.

Although variation of soil test values is associated with winter soil samples, observing basic guidelines will enable proper interpretation of winter soil tests. Always strive to obtain a good representative soil sample, consistently sampling within the same season of the year. These steps will make the soil test results a more valuable tool as a basis for regular comparison, enabling soil fertility recommendations to be better tailored to suit desired crop response and soil conditions.

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