A Practical Look at Soil Testing

by Russ Barker, *CCA-ON*

Late summer and fall is the best time, in my view, to either initiate or update soil testing around the farm. There are some good reasons for following this practice.

1. It gives the best clues to whether there will be an economical response to applications of phosphorous, potash and lime to the field and at what rates these materials should be applied for best results depending on subsequent crops. If commodity prices continue to deteriorate this information will become much more relevant than ever before.
2. It provides bench marks to judge your individual fertility program's effect on soil test levels. In other words is the fertility program maintaining, increasing or decreasing soil fertility levels?

In working with clients I find that despite best intentions, soil testing is still not used to its full advantage. A lack of time and too much money are the usual reasons given for not following a regular soil testing program. When you add in results that sometimes contradict each other it is easy to throw your hands in the air.

I must admit that one sample result over a 100 acre farm barely gives enough information to make an informed decision. This is exactly the reason to up your game, so to speak with soil testing.

To illustrate, I will use the sample results pulled three weeks ago from a 50 acre field after the wheat was harvested. This particular field has a yield history as follows:

2013	Corn	200 bus/acre
2014	Soybeans	51 bus /acre
2015	Soybeans	54 bus/acre
2016	Wheat	122 bu/acre

Calculating the amount of P and K per bushel removed by each crop tells that over this four year period these crops have removed 237 lbs of P and 256 lbs of K. That's a lot of fertility.

We also know that over the same four years fertilizer applications have totaled 135 lbs of P and 150 lbs of K. This is obviously not enough to keep up with removal, which most agronomists would agree, is a typical occurrence.

We know that areas of fields yield better than other areas and most years the different areas usually behave the same way. There are many ways from sophisticated yield maps to satellite imagery to good old fashioned experience that help identify and isolate high yielding zones from lower yielding zones. In this particular case, good old fashioned low tech experience was most helpful. The field was divided into four zones, two zones where high yields are routine and two zones that are lower yielding. The zone results are as follows:

Yield Zone	OM %	pH	P (ppm) (Bicarb)	K ppm
1. Low	4.3	6.4	16 L	80 M
2. Low	4.0	6.7	20 L	102 M
3. High	4.5	6.6	15 L	68 L
4. High	4.3	6.5	9 VL	66 L

Now we have a complete picture of the field which tells us a lot from a fertility point of view.

1. Yield in this field is being driven by OM and pH. Both are in optimum condition for high yields.
2. Over many years the high yield zones appear to have removed more fertility than the low yield zones. The evidence supports the theory that the fertility program has not been good enough over both the short and long term to maintain fertility levels in the high yield areas.
3. Minimum P levels for high yields are 18-20 ppm and minimum K levels are 100-120 ppm. The P and K levels in zones 3 and 4 are worrisome.

Going forward, what should the plan be?

1. Since this farm is owned and not rented the total application amounts of P and K need to increase. There is risk of the high yielding and most profitable areas dropping off because of declining fertility.
2. This field will respond very well to applications of P and K.
3. Particular attention should be paid to zones 3 and 4 at application time. When fertilizer rates are being calculated, some additional amounts need to be allocated and applied to the high yield zones.

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This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCA's.