



Understand your Agro-One Soil Test Results

1. Check the crop and soil name

Agro-One uses the soil name and cropping plans you report on your submission form to generate fertilizer recommendations specifically for your field, so it's important that they're accurate. Look up your soil's name on the Web Soil Survey, websoilsurvey.nrcs.usda.gov/, and don't leave the future crop plan blank on the submission form. If you're not sure what you're going to grow, at least list "mixed vegetables" as the upcoming crop. Also remember that the recommendations are only as good as the sample you took in your field. Your sample should be composed of a mixture of at least ten 8-inch soil cores from around the field.

Agro-One Soils Laboratory
730 Warren Road Ithaca, NY 14850
PH: 607-255-2897 ext. 2179
Fax: 607-257-1350
www.dairyone.com

Soil Analysis Report

Sample #: 70855040
Date Sampled: 6/5/2010
Date Received: 8/18/2010
Date Mailed: 9/9/2010

Crop, 3 Years Ago:
Crop, 2 Years Ago:
Crop, Last Year: Strawberries, Spring
Tillage Depth: Not specified
Manure: No
County: Tompkins
Field / Location: STRAWB 2010
Soil Name: Castile
Acres:
Statement ID: Grower's name

Grower's name

Component	Mod. Morgan ppm	Mod. Morgan lbs/acre	Morgan Equiv. lbs/acre	Soil Test Levels				
				Very Low	Low	Medium	High	Very High
Phosphorus (P)	3	6	6	*****	*****	*****	*****	*****
Potassium (K)	61	123	121	*****	*****	*****	*****	*****
Calcium (Ca)	1,849	3,697		*****	*****	*****	*****	*****
Magnesium (Mg)	303	607		*****	*****	*****	*****	*****

Water pH	Calcium Chloride Buffer pH	No Till Buffer pH	Organic Matter (%)	Nitrate-N (ppm)	HWS Boron (lbs/acre)	Soluble Salts (mmhos/cm)	Total N (%)
5.8	5.8		4.4		0.0		

Other Nutrients, Mod. Morgan, lbs/acre								
Sodium (Na)	Aluminum (Al)	Sulfur (S)	Zinc (Zn)	Manganese (Mn)	Iron (Fe)	Copper (Cu)	Boron (B)	Molybdenum (Mo)
	78.1		0.5	16.9	8.8			

Soil Fertilizer Recommendations		lbs / acre	lbs / acre	lbs / 1000 sqft
Year	Crop	Lime	N P ₂ O ₅ K ₂ O	Lime N P ₂ O ₅ K ₂ O
1	Strawberries, Spring	2.0	100 30 30	91.8 2.3 0.7 0.7

Nutrient recommendations provided by Cornell University. These are general comments. Always consult with your crop advisor for recommendations specific to your farm. For assistance interpreting your report, contact your local Cooperative Extension office at 607-272-2292.
Yr1 Apply 80 lbs/acre of N in July, and another 20 lbs/acre the first of September. Do not apply N in early spring except on sandy soils.
Yr1 Apply fertilizer uniformly around the plants or through drip irrigation. Do not allow granules to remain on leaves. Do not fertilize when leaves are wet.
Yr1 The best time to apply potassium and phosphorus fertilizers is in the fall before mulch is applied.
Yr1 Use both a soil test and leaf analysis to adjust nutrient levels.
Yr1 Lime rate is for 100% ENV. To calculate actual rate: rate to use = recommended rate/ENV (if lime source) x 100.
Yr1 Apply lime only at bed renovation or during fall of year.

2. Look at the soil pH

pH is a measure of soil acidity and affects the availability of most soil nutrients. For most crops, a pH between 6.0 and 7.0 gives the best nutrient availability. If the pH is too high or too low, adding more fertilizer won't fix the resulting nutrient deficiency. pH must first be corrected by adding lime (to raise pH) or sulfur (to lower pH). Check the fertilizer recommendations at the bottom of the test to see the lime recommendation for your field.

pH details

pH can be measured using different methods, but for most samples, "water" extraction most closely mimics what plant roots feel, and you will see results in this category. "Buffer pH" is the measure the lab uses to calculate how much lime your particular soil needs, since heavy soils have more buffering capacity and need more lime to change their pH than sandy soils.

3. Major nutrients: P, K, Ca, and Mg

The soil levels are reported in pounds per acre (lbs/A) or parts per million (ppm). Notice that ppm x 2 = lbs/A, so it is easy to convert between units. The relative levels of the soil nutrients to the right of the lbs/acre results are the most important to notice, since the same nutrient lb/acre may be high for one soil type or crop while for another it is medium. "High" is considered to be a good level and may not generate a fertilizer recommendation. A "medium" level is considered to be adequate for the short term but nutrient supplementation may be recommended to maintain or build soil test levels for the future.

"Morgan" versus "Mod Morgan"

Agro-One will use one of two chemicals to extract the nutrients in your soil sample before they are measured, either "Morgan" solution or "Modified-Morgan" solution. Cornell field crops experts prefer the Morgan solution because it reports P levels that correlate more accurately with recommendation database when soil P is low, allowing for more accurate P fertilizer recommendations for field crops. For fruits, vegetables, lawns and gardens, the more economical Modified Morgan solution will be used because the nutrient recommendations are, in almost all cases, identical to those based on the Morgan test.

Excessive Nutrients

If you are growing fruits or vegetables, your soil nutrient levels will never be reported as "very high," which would be considered excessive. Be aware that Cornell's soil health group considers phosphorus levels above 50lbs/acre to be excessive and a risk of polluting water.

Estimating soil-supplied N

You can expect 10-20 lbs of plant-available nitrogen to be released during the growing season per percentage organic matter, depending upon temperature and moisture.

Remember that past cover crops, manures and composts contribute nitrogen.

4. Nitrogen. Nitrogen is not routinely reported on soil tests because it cycles quickly between chemical forms (ammonium, nitrate, nitrite, organic N), and is very sensitive to weather changes and leaching. Measuring nitrate-N (using a pre-sidedress nitrogen test) gives a snap-shot of plant-available nitrogen on the day the soil was sampled, but does not predict the season-long nitrogen supply. The lab can measure total N in a soil sample, but the interpretation of the resulting number is not clear. Therefore, the nitrogen recommendation at the bottom of the test is not dependent on your soil test. Rather, it is the amount of nitrogen normally applied to grow the crop you listed on the submission form. Some field samples reduce the N recommendation when you list legumes as previous crops on your sample sheet, but fruit and vegetable samples do not. Neither does the recommendation reflect the inherent N-supplying capacity of your soil, which is closely related to organic matter.

5. Organic Matter. The organic portion of the soil, though a small percentage of the whole, is critical for healthy soil function. High organic matter feeds soil microbes and leads to good soil structure, nutrient cycling and retention, improved water holding capacity, and other perks. Low organic matter means soil organisms are hungry and less active, leading to less nutrient cycling and a structurally degraded soil. How much organic matter a soil is capable of maintaining depends largely on the soil texture (inherent to the soil) and on past tillage (management). Soil organic matter increases, albeit very slowly over many years, with compost/manure applications, long term cover crops, and reduced tillage.

Soil Organic Matter (%)

	High	Medium	Low
Sand	> 3.2	2.3-3.2	1.8-2.3
Silt	> 3.3	2.6-3.3	2.2-2.5
Clay	> 4.5	3.2-4.5	2.6-3.1

From Cornell's Soil Health Manual

6. Other nutrients: Na, Al, S, Zn, Mn, Fe, Cu, B, Mo. Agro-One routinely reports only Al, Zn, Mn, and Fe, but does not interpret the results as "high, medium, or low." The other nutrients can be tested upon request, for an additional fee. For fruit crops, the normal soil range for most of these nutrients is unclear, and B is best assessed with a leaf test. For vegetables only Zn and B have established levels. Soil test levels of Fe, Al and Mn are more useful for diagnosing a toxicity problem than for informing fertilizer recommendations. If $Mn + Fe + Al = >150$ lbs/acre, plant toxicity could result.

Zn and B levels for most Veg crops (lbs/A)

	High	Medium	Low
Zinc	> 1.0	0.5-1.0	<0.5
Boron	> 0.75	0.35-0.75	< 0.35

Fertilizing small areas

For areas less than an acre, you can convert the recommendations to fit your needs.

There are 43560 ft²/A

7. Fertilizer recommendations: Seen at the bottom of your test results, these are generated by the Cornell Recommendations Engine using the major nutrient results above. They are reported in pounds of actual nutrient, *not pounds of fertilizer*. For instance, 10-10-10 (N-P-K) fertilizer is only 10% nitrogen by weight, so to apply 100 lbs of nitrogen, you need $100/0.10 = 1000$ lbs of fertilizer. In this example you also get 100 lbs P and 100 lbs K, which you may or may not need. Choose nutrient sources that minimize over-applying nutrients that you have in ample supply.

8. Comments: These are important to read, as they will contain nutrient recommendations beyond lime and N-P-K, as well as instructions on application timing.

9. Why do I have blank boxes? Some tests are not routinely done but are available upon request—if not requested, these boxes will be blank. Calcium chloride is sometimes used as an extractant to measure pH in very sandy soils. No Till pH focuses on the pH in the top inch of soil, since all nutrients and herbicides are applied to the soil surface. Soluble Salts is generally used as a diagnostic tool if road salt injury or high salinity due to fertilizers is suspected. Na, S, Cu, B, and Mo can be requested for an additional fee, see "other nutrients" above. If the major nutrient soil test levels chart or the fertilizer recommendations are missing it is because the soil name or this year's crop was missing on your submission form. Call the lab and make the correction.

10. More information: Soil science is complicated and this fact sheet only scratches the surface. For more information, see the Cornell Nutrient Spear Program's extensive fact sheet collection at <http://nmsp.cals.cornell.edu/guidelines/factsheets.html>