



Testing For Healthy Soil

www.drgoodearth.com

P.O. Box 50084, St. Louis, MO 63105

Phone: 314-994-2167 Fax: 314-994-2167

Gardener: John Bush

3560 N Xavier Rd

Attica, IN 47918

765-762-6299

Dealer

EarthCo

P.O. Box 50084

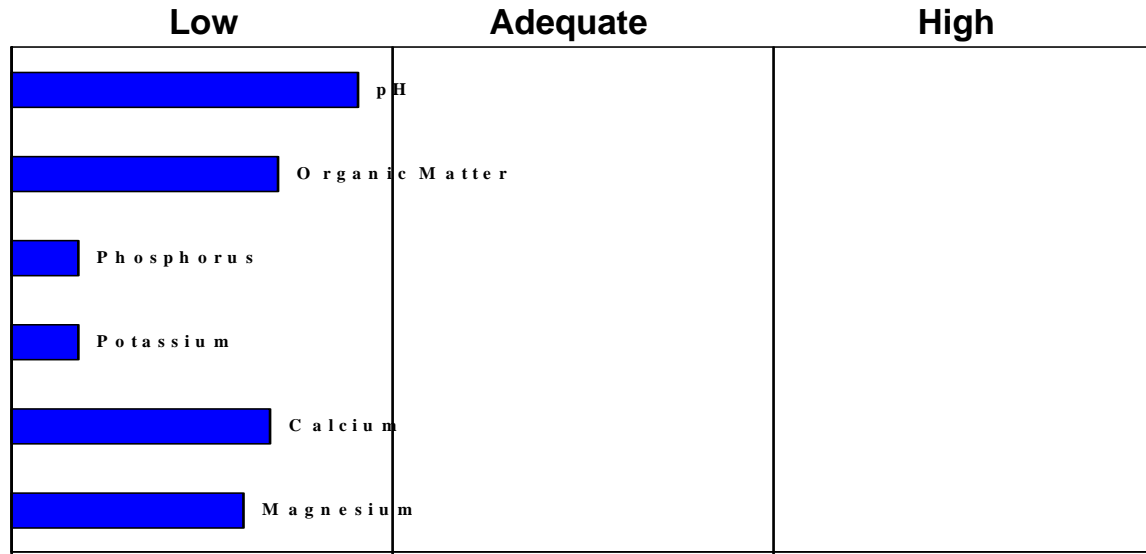
St. Louis, MO 63105

Report Date: November 25, 2009

Lab # 27736-1

Crops: Vegetables

Sample ID: Box 1



<u>Test</u>	<u>Test Value</u>	<u>Recommendation</u>
<i>pH</i>	<i>5.7</i>	<i>Apply 3 lbs Lime/100 sq ft</i>
<i>Organic Matter</i>	<i>1.4%</i>	<i>Add 2" compost/peat moss & incorporate</i>
<i>Phosphorus</i>	<i>0.3 lbs/1000 sq ft</i>	<i>Apply 1/4 lb/100 sq ft</i>
<i>Potassium</i>	<i>1.3 lbs/1000 sq ft</i>	<i>Apply 1/4 lb/100 sq ft</i>
<i>Calcium</i>	<i>33.8 lbs/1000 sq ft</i>	<i>Apply 6 lbs gypsum/100 sq ft-See Comments</i>
<i>CEC = 5.8</i>		
<i>Magnesium</i>	<i>3.1 lbs/1000 sq ft</i>	<i>Apply 1/4 lb/100 sq ft</i>



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To correct your soil deficiency, select a brand of fertilizer in the table below and apply the amount stated by weight, cups or tablespoons per given area

<u>Deficiency</u>	<u>Fertilizer</u>	<u>% Product</u>	<u>Amt to Apply/100 sq ft</u>		
			<u>Weight or Cups or Tbsp</u>		
Low pH	Hi-Yield Limestone	100%	2.5 lbs	4.00	64
	Calcitic Limestone Calcium carbonate	100%	2.5 lbs	6.00	96
	Dolomitic Limestone Calcium/Magnesium	100%	2.5 lbs	6.00	96
Nitrogen	Scotts Starter Fertilizer (20-27-5)	20%	1.5 lbs	3.50	58
	Peters All Purpose Fertilizer (20-20-20)	20%	1.5 lbs	3.50	58
	Miracle-Gro Tomato Food (18-18-21)	18%	1.5 lbs	4.00	62
	Miracle-Gro Rose Food (18-24-16)	18%	1.5 lbs	4.00	62
	Osmocote Indoor/Outdoor Slow Release (19-6-12)	19%	1.5 lbs	3.50	59
	Osmocote Veg. & Bedding Plant Food (14-14-14)	14%	2.0 lbs	5.00	80
	Miracle-Gro All Purpose Fertilizer (15-30-15)	15%	2.0 lbs	4.50	74
	Vigoro Blood Meal Organic (12-0-0)	12%	2.5 lbs	6.00	96
	Vigoro Bone Meal Organic (1-11-0)	1%	30 lbs	72.0	1152
	Milorganite Organic Slow release (6-2-0)	6%	5.0 lbs	12.0	192
	Fertilome Rose Food (14-12-11)	14%	2.0 lbs	5.00	82
	Fertilome Tree & Shrub Food (19-8-10) + 1% Iron	19%	1.5 lbs	4.00	61
	Hi-Yield Ammonium Sulfate (21-0-0)	21%	1.5 lbs	3.50	55
	Urea (45-0-0)	45%	0.5 lbs	1.50	26
	Blood Meal 14-0-0 (organic nitrogen)	14%	2.0 lbs	5.00	82
Phosphorus	Hi-Yield Superphosphate	18%	1.5 lbs	2.00	33
	Triple Superphosphate 0-46-0	46%	0.5 lbs	1.00	17
	Cottonseed Meal Organic phosphorus	2%	13 lbs	33.0	520
	Fish Meal Organic phosphorus	6%	4.0 lbs	13.0	213
	Scotts Starter Fertilizer (20-27-5)	27%	1.0 lbs	2.00	34
	Miracle-Gro All-Purpose Fertilizer (15-30-15)	30%	1.0 lbs	2.00	31
Osmocote Veg. & Bedding Plant Food (14-14-14)	14%	2.0 lbs	4.00	67	



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Potassium	Hi-Yield Muriate of Potash	60%	7 oz	0.75	10
	Sulfate of Potash - Magnesia Sul-Po-Mag (organic)	22%	1.0 lbs	1.00	18
	Miracle-Gro All-Purpose Fertilizer (15-30-15)	15%	1.5 lbs	4.00	62
	Osmocote Veg. & Bedding Plant Food (14-14-14)	14%	2.0 lbs	4.00	67
	Sulfate of Potash 0-0-50	50%	0.5 lbs	1.00	19
Calcium	Hi-Yield Gypsum (granular)	23%	5.0 lbs	8.00	125
	Calcium sulfate Gypsum	22%	5.5 lbs	13.0	209
Magnesium	Hi-Yield Magnesium sulfate	16%	1.5 lbs	2.50	40
	Magnesium Sulfate Epsom Salts	10%	2.5 lbs	6.00	96
	Sulfate of Potash - Magnesia Sul-Po-Mag (organic)	11%	2.5 lbs	5.00	87

COMMENTS (Low pH, Phosphorus, Potassium, Calcium & Magnesium): The soil pH of this sample is low (acidic soil) and would require the addition of lime to raise it back into a more acceptable range for good growth. Because the magnesium level is low, the type of lime to use is dolomitic lime. Dolomitic lime contains 10 to 20% magnesium and will assist with this nutrient deficiency. Limestone can be applied any time of year. The fall is ideal since it will take weeks to months to effectively change the soil pH. Incorporation into the soil can be important to speed the process along. When that is not possible, then surface application is necessary. Alternatively for lawns, core aeration followed by surface application is highly effective. Within one year, the pH should once again be checked so that additional treatment can be considered.

Both phosphorus and potassium are also low. The table gives several products that can be used to solve these individual deficiencies one at a time. The advantage of this is that you will apply only what you need to correct the deficiency of each. If you use a complete fertilizer containing nitrogen, phosphorus and potassium in an attempt to correct nutrient deficiencies, be careful not to overapply the nitrogen since it will potentially burn the roots. Use caution with rates higher than 2 pounds of actual nitrogen per 1,000 sq. ft. This would be considered maximum for any single application. Also keep in mind that excessive growth may be at the expense of fruit set in the case of fruits and vegetables and higher mowing frequency in the case of lawns.

This sample was also found to be low in calcium and magnesium. While 40% of the limestone recommended above to correct the pH will be calcium, we advise you to apply an additional amount of calcium. Calcium can be supplied any time of year by applying gypsum (calcium sulfate) over the surface and incorporating it to a root zone depth of 6 to 8 inches in the case of gardens or 3 to 4 inches in the case of new lawn areas. For existing lawns, core aeration followed by surface application is ideal. For other crops, just surface apply at the rate recommended - incorporate where possible. Gypsum will not affect the soil pH.

As for magnesium, if dolomitic limestone was not used to raise the pH as stated above, then you may use magnesium sulfate (epsom salts) separately to raise the magnesium levels as given in the deficiency table. This should be applied along with the limestone and gypsum. Incorporation is advised via core aeration or by power raking these materials into the root zone.



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Attica, IN 47918	P.O. Box 50084	Crops: Vegetables
765-762-6299	St. Louis, MO 63105	Sample ID: Box 1

Fertilizer Recommendations

VEGETABLES (GENERAL): The timing and rate of nitrogen fertilizer application will depend upon the type of vegetable crop/plant being grown, the stage of development and soil type. Prior to planting in the spring, as a general nitrogen recommendation for all annual vegetable crops/plants, apply 3 pounds of actual nitrogen per 1,000 sq. ft. and till into the soil. This is equal to spreading 30 pounds of a fertilizer with 10% nitrogen (10-0-0) over an area measuring 1,000 sq. ft. This recommendation is for nitrogen only. Any other nutrient deficiencies as determined through soil testing should be addressed separately. Additional fertilizers might be recommended to correct these deficiencies at the same time. Periodic nitrogen applications during the growing season will be necessary again, depending upon the plant being grown. Keep in mind that sandy and well-drained soils should be fertilized more often with diluted concentrations for the best growth response.

FRUITING VEGETABLES (Tomatoes, Peppers, Eggplant, Cucumbers, Squash, Beans, etc.): For all seeded and transplanted vegetables, in 4 to 6 weeks after planting or when plants are half grown or just after the fruit is set, apply nitrogen fertilizers in the amounts shown in the table above for the area given. Repeat this application 3 and 6 weeks later for tomatoes. Work the fertilizer into the soil with a hoe or cultivator. Be sure to wash granular fertilizers off of the foliage to prevent burning.

LEAFY VEGETABLES AND ROOT CROPS (Lettuce, Spinach, Carrots, Beets, etc.): For all seeded and transplanted vegetables, when plants are half grown, broadcast the nitrogen fertilizer amounts given in the table above or side-dress (apply a band of fertilizer along one side of the row 6 to 10 inches away from the plant row). Lightly work this into the soil with a hoe or cultivator.

PERENNIAL VEGETABLES: Perennial vegetables like asparagus and rhubarb require timely applications of nitrogen fertilizers to maintain plant vigor and growth throughout the season. This builds nutrient reserves in the root system and consistent production of produce.

ASPARAGUS: Before the crop emerges in the spring or after the final harvest, broadcast 1 to 1.5 pounds of actual nitrogen per 1,000 sq. ft.

RHUBARB: When the plants are less than 6 inches tall, apply 1.5 pounds of actual nitrogen per 1,000 sq. ft.

General Explanation

SOIL pH: The expressed measure of the soil acidity is called pH. Values range from 1.0 (acid) to 14 (alkaline) with a pH of 7.0 being neutral. Most ornamental plants including annuals, perennials as well as lawns, vegetables, trees, shrubs, small fruit and tree fruit will do well in the pH range of 6.3 to 7.0. Soil test results on this sample recommend the addition of lime or lime-based material in order to adjust the pH into a more desirable range for plant growth. Raising the pH will take a period of months depending on the soil type and initial pH. During the growing season, never apply more than 50 pounds of lime per 1,000 sq. ft. at one time. If more is required, space applications about two weeks apart. After the growing season, more than 50 pounds per 1,000 sq. ft. may be applied at one time. The pH should be checked at 12 month intervals to monitor the



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change in pH level.

ORGANIC MATTER: Garden soils with less than 5% organic material will benefit from additions of compost, leaf mold, peat moss or other organic material applied to the surface as a mulch or worked into the soil before planting. To incorporate, add about 4 bushels of organic matter per 100 sq. ft. or spread a 2-inch layer over the surface before turning the soil. When amending soils with sawdust, straw or wood chips, add nitrogen fertilizer at the rate of one-half pound of nitrogen per 1,000 sq. ft. of planting area to prevent plants from becoming nitrogen deficient. As an example using a general garden fertilizer like 10-10-10, spread 5 pounds over 1000 sq. ft. This amount is equal to one-half pound of actual nitrogen (10% of 5 pounds). For existing lawns, a light application of organic matter like compost can be surface applied or top dressed over the area. When possible, core aerate the lawn extensively prior to application. For native wildflower gardens, only sparing amounts of organic matter should be applied. An over-application may cause excessive growth and lodging. One-half inch deep layer around the plant should be sufficient.

NITROGEN: Good plant growth depends upon a sufficient supply of nitrogen in the soil for uptake. Since it leaches from the soil and is used by other soil organisms, it needs to be applied each growing season. The amount of nitrogen fertilizer to be applied depends upon the plant or crop being grown. Vegetables require more nitrogen than shade trees and shrubs because they are growing fast and fruit production is the goal. Too much nitrogen can cause excessive, "leafy" growth, slow fruit development and possibly burn plants. Inorganic sources of nitrogen are typically soluble in water and have a higher potential for leaf burn, if not applied correctly or in the right amounts. Inorganic forms of nitrogen include ammonium nitrate (33% nitrogen), calcium nitrate (15%), sodium nitrate (16%), urea (46%) and potassium nitrate (12%). Organic forms of nitrogen require the action of soil microbes to make nitrogen available for plant uptake. Therefore, the process takes time and generally these fertilizers are less apt to burn plants. Sources of organic nitrogen include dried blood (12% nitrogen), hoof and horn meal (12%), fish meal (8%), cottonseed meal (7%), and livestock/poultry manure (2 to 4%).

PHOSPHORUS: Adequate levels of phosphorus for most plants and crops should be in the range of 2 to 4 pounds per 1,000 sq. ft. Higher levels will not damage the crop/plant, but may overload the soil with unnecessary nutrients. When applied as a fertilizer, phosphorus will stay in the soil for long periods. The availability of phosphorus to plant roots is dependent upon pH and soil temperature. Cold soils and a pH range below 5.0 or above 7.5 make phosphorus less available for root uptake. Inorganic sources of phosphorus include superphosphate (20% phosphorus) and treble superphosphate (45%). Organic forms of phosphorus include bone meal (12%), fish meal (6 to 7%), cottonseed meal (2%) and poultry manure (2 to 4%).

POTASSIUM: Adequate levels of potassium for most plants and crops should be in the range of 6 to 12 pounds per 1,000 sq. ft. Levels greater than 25 pounds per 1,000 sq. ft. can burn plants. Care should be taken in applying potassium fertilizers so that amounts do not cause leaf burn. Where indicated, follow the directions to split applications so that half is applied now and half in 4 to 6 weeks during the growing season. Always incorporate by tilling when possible. After the growing season, applications of potassium can be increased without the threat of burning plants. Inorganic sources of potassium include potassium chloride which is also called muriate of potash (60% potassium), potassium nitrate (44%) and potassium sulfate (48%). Organic sources include wood ashes (5%:- use at the rate of 2.5 lbs per 100 sq. ft. and check the pH to ensure that it remains under 6.5), greensand (6%), seaweed or kelp (1 to 5%) and cottonseed meal (1 to 2%).

CALCIUM - MAGNESIUM: Both calcium and magnesium are important for building strong cell walls, photosynthesis and activation of enzymes in plant cells. It is uncommon for either nutrient to be deficient in soils. However, their relative amounts are good indicators of a soil's ability to supply nutrients to plant roots for uptake. Calcium is added to soil in the



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form of limestone or gypsum (calcium sulfate). Limestone will change the pH of the soil from acid to alkaline and should only be applied when the soil pH is too acid for good plant growth. If the pH is adequate and calcium levels are low, gypsum should be added to increase the amount of calcium in the soil. Additions of gypsum will not affect the soil pH. Magnesium can be supplied in the form of epsom salts (magnesium sulfate).