

**A & L Great Lakes Laboratories, Inc.**

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# **Plant Analysis Sampling Guide**

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**Sampling Information and  
Crop Code List**



**Quality Analyses for Informed Decisions®**

## INTRODUCTION

One of the more important factors affecting crop quality and yield is the nutrient status of the plant or the flow of nutrients to plant tissues during the growing season. Nutrient status is an "unseen" factor in plant growth, except when imbalances become so severe that visual symptoms appear on the plant. Determination of plant nutrient status requires precise laboratory analysis of plant tissue during the growing season.

## HOW CAN A TISSUE ANALYSIS HELP?

A plant tissue analysis will detect unseen hidden hunger and confirm visual deficiency symptoms. Toxic levels may also be detected. Though usually used as a diagnostic tool for future correction of nutrient problems, a plant tissue analysis from young plants will allow a corrective fertilizer application that same season. Combined with data from a soil analysis, a tissue analysis is an important tool in determining nutrient requirements of a crop.

A complete plant tissue analysis from A & L Great Lakes Laboratories will identify the nutrient status of the following elements:

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)
- Calcium (Ca)
- Magnesium (Mg)
- Sodium (Na)
- Sulfur (S)
- Zinc (Zn)
- Manganese (Mn)
- Iron (Fe)
- Copper (Cu)
- Boron (B)
- Aluminum (Al)

Nitrate-nitrogen, Chloride, molybdenum and other elements may be useful additions in particular situations.

## COLLECTION AND PREPARATION OF THE SAMPLE

Be sure to use a clean container. Never use a metal container as the metal may contaminate the sample.

Generally, two cups of lightly packed material provides a sufficient amount to conduct an analysis; one cup may be sufficient if gathering petioles. If plant samples have soil, dust, fertilizer, or spray residues on them, they will need a light washing, as follows: with aid of a plastic colander, immerse the sample in cool water containing a couple of drops of PHOSPHATE-FREE detergent, and gently agitate for no longer than about 10 seconds. Extended washing may damage the plant tissue and remove some of the soluble elements such as potassium.

Remove the sample from the colander and quickly rinse it with deionized water. Blot-dry with a clean towel. Either air-dry samples for one day (below 176° degrees F) or ship as soon as possible in perforated bags to allow air movement and a degree of drying in transit. **Never send fresh samples in sealed plastic bags unless kept cool. Never freeze samples. Do not include roots with samples for nutrient analysis.**

## SAMPLING LOCATIONS: WHEN AND WHERE TO SAMPLE

Before taking tissue samples, ensure that timing and location of samples correlates with interpretive data. Instructions for petiole and leaf sampling may differ. Also, comparing samples from both a "good" and a "bad" area often helps in determining corrective action. If specific sampling guidelines are not given, collect recently mature leaves just below the growing point from at least 25 plants.

A general sampling guide follows. Contact A & L Great Lakes for more detailed information on plant sampling strategies in addition to plant sample bags and other supplies.

**FIELD AND FORAGE CROPS**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
001	Alfalfa	Prior to flowering	Top 6 " (12 plants)
301	Alfalfa	Bloom	Top 6 " (12 plants)
319	Barley	Pre-boot stage	Top leaf (50+)
320	Barley	Boot stage	Top leaf (50+)
060	Barley	Emergence of head from boot	Whole tops (25+)
233	Bean, Faba/ Broad/Field	Summer	50 leaf blades w/o petioles - uppermost mature leaf
457	Beet, Sugar	Young plants (0-60 days)	Whole Plant (15+)
015	Beet, Sugar	Mid-season	Center leaf, fully developed (25+)
012	Beet, Sugar	Mid-season	Petiole from recently matured leaf (25+)
235	Bermudagrass, Coastal	4-5 week-old plants	40 whole tops
234	Bromegrass, Smooth	Summer midway between mowings	25 fully developed stems with leaves
076	Canola	Flowering	Whole plant (10+)
239	Clover, Alsike	First flower	20 whole tops
240	Clover, Ladino or White	Prior to flowering	50 mature leaves
166	Clover, Red	Prior to flower	Whole top 6" prior to flower (15)
241	Clover, Subterranean	Prior to flowering	75 mature leaves from new growth
225	Coffee	Mature plants, flower initiation	Leaf - mature from new growth (50+)
226	Coffee	Mature plants fruiting	Branch - Non-fruiting (25+)
227	Coffee, Robusta	Flower initiation	Branches - Non-fruiting (25+)
002	Corn	Less than 12"	Whole plant (15+)
006	Corn	Prior to tasseling	Leaf below whorl (12+)
003	Corn	Silking	Ear leaf (15+)
007	Corn	After black layer	Stalk segment, 6" to 14" above ground (10+)
008	Corn - Grain	Mature, harvested	Mature, harvested
230	Cotton	First squares to initial bloom	25 vegetative stems
231	Cotton	Full bloom	25 vegetative stems
005	Dry Bean	Mid-season	Leaf - recently mature (25+)
159	Fescue, Tall	Actively Growing	Whole tops from actively growing plants (1 quart)
178	Fescue, Tall	Actively Growing	Above ground portion (20+)
371	Flax	Budding to bloom	Upper 1/3 of plant (15+)
237	Foxtail, Italian Millet	4-5 weeks after clipping	20 whole tops
375	Ginseng	Mid-season	Leaf - recently mature (25+)
376	Ginseng	2-3 Year	Root (3-4 oz)
377	Ginseng Root	4-6 Year	Root (3-4 oz)
180	Hops	Mid-season	Recent fully developed leaf (30+)
089	Millet	Mid-season	Recent fully developed leaf (20+)
035	Mint	Mid-season	Recent fully developed leaf (50+)

**FIELD AND FORAGE CROPS**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
010	Oats	Head emergence from boot	Recently mature leaves (25+)
400	Oats	Boot Stage	Flag leaf (1 pint)
228	Oil Palm	Young non-fruiting trees	Leaflets from central portion of #3 frond (40+)
229	Oil Palm	Young non-fruiting trees	Leaflets from central portion of #17 frond (40+)
103	Orchardgrass	3-4 weeks between clippings	Whole tops (15+)
081	Peanuts	Early pegging	Whole tops (25+)
222	Peanuts	Prior to or at bloom	Whole tops (50+)
223	Peanuts	Early pegging	Whole tops (50+)
082	Rice	Panicle initiation	Recent fully developed leaf (25+)
232	Rice	Mid- tillering	25 mature leaves from new growth
149	Rye	Panicle initiation	Whole tops (25)
176	Ryegrasses	Bloom Onset	
085	Sorghum, Grain	Seedling, 20-40 days old	Whole plant, less than 12" (25+)
086	Sorghum, Grain	Vegetative, 40-60 days after planting	Recent fully developed leaf (25+)
087	Sorghum, Grain	Bloom stage, heads visible	Third leaf below head (25+)
088	Sorghum, Grain	Grain in dough stage	Third leaf below head (25+)
021	Soybean - Seed	Mature, harvested	Mature, harvested
420	Soybeans	Prior to flowering	Recent fully developed leaf (25+)
419	Soybeans	Early Bloom	Recent fully developed leaf (25+)
017	Soybeans	Prior to pod set	Recent fully developed leaf (25+)
238	Sudangrass	4-5 weeks between clippings	15 whole tops
080	Sunflower	Mid-season	Recent fully developed leaf (25+)
224	Tea	Actively-flushing plants	Young shoots (25+)
432	Timothy	Mid-season	Whole tops (1 quart)
051	Tobacco	30-45 days after planting	Recent fully developed leaf (15+)
052	Tobacco	45-60 days after planting	Recent fully developed leaf (15+)
053	Tobacco	60-80 days after planting	Recent fully developed leaf (15+)
054	Tobacco	80-100 days after planting	Recent fully developed leaf (15+)
055	Tobacco	Bloom	Recent fully developed leaf (15+)
236	Trefoil, Bird's-foot	First flower	50 mature leaves
439	Triticale	Boot initiation	Whole top (25+)
447	Wheat - Spring	Early	Whole plant (25+)
425	Wheat - Spring	Heading to Mature	Flag leaf (1 pint)
450	Wheat - Winter	Early spring	Whole plant (25+)
449	Wheat - Winter	Bloom	Recent fully developed leaf (1 pint)
013	Wheat - Winter	Prior to heading	Recent fully developed leaf (1 pint)
452	Wheat - Winter	Heading to mature	Flag leaf (1 pint)

**FLOWERS, LANDSCAPE, TREES & TURF**

Crop#	Crop Name	Growth Stage	Plant Part / Sampling Instructions
108	Almond	Mid-summer	Leaf - recently mature (25+)
135	Amelanchier	Summer	Leaf - mature from new growth (50+)
313	Arborvitae, American	Summer	Terminal cuttings (2-3") from 25 trees
315	Ash, Black	Mid-summer	Leaf - mature from new growth (30+)
209	Bedding Plants (general)	Mid-season	Leaf - recently mature (12+)
112	Beech Tree	Summer	Mature leaf from new growth (12+)
324	Begonia	Mid-season	Leaf - recently mature (25+)
095	Birch	Mid-season	Leaf - recently mature (25+)
202	Carnation	Mid-season	5th & 6th leaf pairs-non-flowering shoots (50+)
349	Cedar	Summer	Terminal cuttings (2-3") of 25 trees
153	Chestnut	Mid-summer	Leaf - recently mature from new wood (25+)
203	Chrysanthemum	Prior to bud start	4th leaf from tip (30+)
204	Chrysanthemum	Bud start to harvest	4th leaf from tip (30+)
110	Cork Oak	Mid-Summer	Leaf - recently mature (25+)
107	Dogwood	Summer	Leaf - mature from new growth (20+)
367	Euonymus	Container Production	Cuttings (top 2 - 3") from new growth (1 pint)
318	Fir, Balsa	Mid-season	Terminal cuttings (2-3") from 25 trees
100	Fir, Douglas (2-5 yrs)	Mid-season	Terminal cuttings (2-3") from 25 trees
114	Fir, Fraser	Mid-season	Needles from recently mature foliage (1 pint)
372	Flowers	Mid-season	Leaf - recently mature (50+)
208	Foliage Plants (general)	Mid-season	Leaf - recently mature (12+)
119	Geranium	Mature plants (4" pot)	Leaf - recently mature (40+)
206	Gerbera (Daisy)	Mid-season	Leaf - recently mature (20+)
205	Gladiolus	Mid-season	Leaf - recently mature (15+)
111	Hazlenut / Filbert	Summer	Mature leaves from new growth (25+)
460	Hemlock, Eastern	summer	25 2-3" Terminal cuttings, 2-3" (25+)
138	Hibiscus (rosa-sinensis)	Mid-season	Recent fully developed leaf (30+)
170	Hosta sieboldii	Summer growth	Leaf - mature from new growth (8+)
113	Hydrangea	Mature Plants, Non-flowering	Recently mature leaf (20+)

**FLOWERS, LANDSCAPE, TREES & TURF**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
389	Juniper	Summer	25 2-3" Terminal cuttings, 2-3" (25+)
120	Lily, Easter	Mid-season	Recent fully developed leaf (15+)
181	Nut Oak	Mid-Summer	Recently mature leaves (25+)
097	Oak	Mid-season	Recently mature leaves (25+)
083	Olive	Mid-season	Leaf from new growth (50+)
101	Pecan	Mid-season	Leaflet pair from new growth (25+)
207	Poinsettia	Actively growing	Recent fully developed leaf (20+)
096	Poplar	Mid-season	Recently mature leaves (25+)
182	Rhododendron	Summer	Mature leaf from new growth (20+)
201	Roses	Mid-season	Recently developed compound 5-leaflet leaf (35+)
160	Salvia	Mature	Mature leaf from new growth (50+)
418	Snap Dragon	Mid-season	Recent fully developed leaf (25+)
117	Spruce, Black or Bog	Summer	Terminal cuttings (2-3") (25+)
116	Spruce, Colorado Blue	Summer	Terminal cuttings (2-3") (25+)
157	St. Augustine-grass	Mid-season	Clippings from new growth (1 pint)
171	Sweet Gum	Summer	Recent fully developed leaf (25+)
437	Tree - Coniferous	Mid-season	Needles (1 pint)
438	Tree - Deciduous	Mid-season	Recent fully developed leaf (25+)
440	Turf - Bentgrass Green	Mid-season	Clippings from new growth (1 pint)
441	Turf - Poa Green	Mid-season	Clippings from new growth (1 pint)
066	Turfgrass	Mid-season	Clippings from new growth (1 pint)
092	Walnut, Black	Mid-season	Recently mature terminal leaflets (25+)
167	Walnut, English	Mid-season	Recently mature terminal leaflets (25+)
091	Yews	Mid-season	Leaves from terminal cuttings (15+)

**FRUIT CROPS**

Crop#	Crop Name	Growth Stage	Plant Part / Sampling Instructions
118	Apple	Mature / harvest	Fruit - whole (15-20)
314	Apple	Bud break to early leaf	Leaf - mature from new growth (50+)
018	Apple	Mid-season	Leaf - mature from new growth (50+)
308	Apple	Harvest	Leaf - mature from new growth (50+)
309	Apple	Growing season	Petiole
062	Apricot (canning)	Mid-season	Leaf - mature from new growth (50+)
061	Apricot (fresh fruit)	Mid-season	Leaf - mature from new growth (50+)
019	Banana	Mid-season	Mid-section leaf strips (15+)
326	Blueberry	Pre-bloom	Mature leaf - mid-portion current growth (1 pint)
327	Blueberry	Post-bloom	Mature leaf - mid-portion current growth (1 pint)
328	Blueberry	Mature to harvest	Mature leaf - mid-portion current growth (1 pint)
156	Blueberry	Mature	Fruit (20+)
325	Blueberry - Rabbiteye	Summer	Mature leaf - mid-portion current growth (1 pint)
329	Blueberry-Lowbush	90-100% tip die-back	Leaf - all from 90 stems
330	Brambles	Late Season	Leaf - 60 from non-fruiting canes
127	Cherry	Early season	Leaf - recently mature from new growth (50+)
027	Cherry	Mid-season	Leaf - recently mature from new growth (50+)
067	Cranberry	August 15 - September 15	Current season uprights - remove fruit (20+)
364	Cucumber	Harvest	Whole fruit
379	Grape	3 Weeks Pre-Bloom	Recently mature leaf blade (20+)
031	Grape	Full bloom	Leaf opposite basal cluster (20+)
380	Grape	Post-Bloom	Recently mature leaf blade (20+)
034	Grape	Mid to late summer	Leaf opposite basal cluster (20+)
384	Grape	Flowering	Petiole opposite basal flower clusters (50+)
032	Grape	Full bloom	Petiole opposite basal cluster (50+)
383	Grape	Ripening	Petiole opposite basal flower clusters (50+)

**FRUIT CROPS**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
155	Grape	Mature	Fruit (20+)
030	Grapefruit	Mid-season	Mature leaves from new growth (25+)
084	Kiwi	Mid-season	Recent fully developed leaf (30+)
140	Kiwi	Mature	Fruit
047	Lemon	Mid-season	Mature leaves from new growth (30+)
048	Lime	Mid-season	Mature leaves from new growth (30+)
099	Mango	Post-flowering	Mature leaves-new growth (15+)
175	Marionberry	Flower bud start	Recent fully developed leaf (50+)
397	Nectarines	Early spring to fruit set	Recent fully developed leaf (50+)
398	Nectarines	Mid-season	Recent fully developed leaf (50+)
040	Orange	Mid-season	Mature leaves from new growth (30+)
405	Peach	Early spring to fruit set	Mature leaves from new growth (50+)
041	Peach	Mid-season	Mature leaves from new growth (50+)
459	Peach	Fruit	Fruit (10+)
128	Pears	Bud break to early leaf	Mature leaves from new growth (50+)
071	Pears	Mid-season	Mature leaves from new growth (50+)
173	Pears - Portugal	Mid-Summer	Mature leaves from new growth (50+)
036	Plum	Mid-season	Mature leaves from new growth (25+)
158	Plum	Mature	Whole Fruit
065	Raspberry	Flower bud start	Recent fully developed leaf (50+)
177	Raspberry	Fruiting	Fruit
165	Raspberry, Red	2-3 weeks post-harvest	Mature leaf from midsection of primo-canes (50+)
429	Strawberry	Early Spring	Recent fully developed leaf (40+)
050	Strawberry	Flowering	Recent fully developed leaf (40+)
427	Strawberry	Mid Season	Recent fully developed leaf (40+)
428	Strawberry	Renovation	Recent fully developed leaf (40+)
063	Tangerine	5-7 months into growing season	Leaf from vegetative shoot (30+)

**VEGETABLE & GARDEN CROPS**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
317	Asparagus	Spring	Fronde - top 20" (10+)
024	Asparagus	Mid-season	Fronde - top 15" (10+)
172	Basil		Recent fully developed leaf (25+)
417	Bean, Snap	Prior to flowering	Recent fully developed trifoliate leaf (20+)
042	Bean, Snap	Flowering	Recent fully developed trifoliate leaf (20+)
321	Beet, Table	Young to bulb forming	Leaf blade (50+)
323	Beet, Table	Mid-growth (root dev'p 2-3 in)	Leaf blade (50+)
322	Beet, Table	Pre-Bulking (late summer)	Leaf blade (50+)
332	Broccoli	2 - 6 Weeks	Leaf - recently mature (15+)
333	Broccoli	6 - 12 Weeks	Leaf - recently mature (15+)
335	Brussels Sprouts	Mid-season	Leaf - recently mature (15+)
337	Cabbage	2-6 Weeks Old	Whole plant (15+)
340	Cabbage	8 leaf stage	Leaf - recently mature (15+)
004	Cabbage	Mid-season	Wrapper leaf (12+)
151	Cantaloupe	Flower start to small fruit	Unfurled leaf (5th from end) (12+)
152	Cantaloupe	Small fruit to harvest	Unfurled leaf (5th from end) (12+)
344	Carrot	Early emergence to 1-3 cm root	Leaf - recently mature (15+)
022	Carrot	Mid-season	Leaf - recently mature (15+)
221	Carrot	Mature	Root (10+)
347	Cauliflower	Early growth to pre-heading	Leaf - recently mature (20+)
348	Cauliflower	12 week to mature	Leaf - recently mature (12+)
025	Cauliflower	At heading	Leaf - recently mature (12+)
026	Celery	Mid-season	Leaf - recently mature, including petiole (12+)
020	Celery	6-week old plants	Petiole of recently fully developed leaf (12+)
105	Celery	Mid-season	Whole plant
029	Chive	Mid-season	Leaf - recently mature (40+)
078	Collards	Mid-season	Leaf - recently mature (12+)
122	Corn, Sweet	6-10" tall	Leaf - unfurled, 5th from tip (8+)
123	Corn, Sweet	10-15" tall	Leaf - unfurled, 5th from tip (8+)
124	Corn, Sweet	7-8 weeks, tassel start	Leaf - unfurled, 5th from tip (8+)
125	Corn, Sweet	Full tassel to silk start	Leaf - unfurled, 5th from tip (8+)
126	Corn, Sweet	End of silk	Leaf - unfurled, 5th from tip (8+)
179	Cucumber	Before Bloom	Recent fully developed leaf (12+)
363	Cucumber	Flower bud to small fruit	Recent fully developed leaf (12+)
028	Cucumber	Small fruit to harvest	Leaf - recently mature (12+)
199	Cucumber - Greenhouse	Fruiting	Second leaf away from growing tip (12+)
077	Eggplant	Small fruit to harvest	Leaf - recently mature (12+)

**VEGETABLE & GARDEN CROPS**

<b>Crop#</b>	<b>Crop Name</b>	<b>Growth Stage</b>	<b>Plant Part / Sampling Instructions</b>
373	Garlic	Bulbing	Leaf - recently mature (12+)
388	Horseradish	Through growing season	Recently mature blades with midribs (12+)
458	Kale	Mid-season	Recent fully developed leaf (15+)
390	Kidney bean	Mid season to pod set	Recent fully developed leaf (50+)
392	Lentils	Early growth	Whole plant (15+)
391	Lentils	Early flowering	Recent fully developed leaf (50+)
043	Lettuce	Mature	Wrapper leaf (12+)
393	Lettuce - Boston	8 leaf stage	Recent fully developed leaf (20+)
394	Lettuce - Boston	Mature	Wrapper leaf (12+)
395	Lettuce - Romaine	Mature	Wrapper leaf (12+)
044	Melon	Flower start to small fruit	Recent fully developed leaf
154	Mustard	Mid-season	Recent fully developed leaf (25+)
074	Okra	Early flowering	Recent fully developed leaf (12+)
401	Onion	1/3 - 1/2 grown	Whole tops, green portion (12+)
037	Onion	Half grown to maturity	Recent fully developed leaf (12+)
402	Onion	Mature (pre-bulking)	Whole top (10+)
139	Onion	Mature - harvest	Whole Bulb
115	Parsley	Mid-season	Whole tops (15+)
403	Parsnip	Mid-season	Recent fully developed leaf (1 pint)
039	Pea	First bloom	Recent fully developed leaf (50+)
408	Peas	Early	Whole plant (20+)
406	Peas	Pre-bloom	Recent fully developed leaf (1 pint)
407	Peas	Mature	Recent fully developed leaf (1 pint)
409	Peas (Snow or Sugar)	Mid-Season	Recent fully developed leaf (1 pint)
038	Pepper	First bloom to fruit set	Recent fully developed leaf (25+)
410	Pepper	Fruit set to mature	Recent fully developed leaf (25+)
016	Potato	Mid season	Recent fully developed leaf (25+)
169	Potato	Mid season	Leaf & petiole (4th from top of plant) (25+)
068	Potato	Early season (tuber set)	Petiole (4th from top of plant) (30+)
069	Potato	Mid season (tubers half grown)	Petiole (4th from top of plant) (25+)
070	Potato	Late season	Petiole (4th from top of plant) (20+)
073	Potato	Mature	Tubers (15-20)
045	Pumpkin	Mid-season	Recent fully developed leaf (12+)
145	Pumpkin	Mature	Mature fruit
046	Radish	Mid-season	Recent fully developed leaf (30+)
109	Radish	Mid-season	Whole root (10+)
134	Rhubarb	Mid-season	Recent fully developed leaf (5+)
136	Sage	Summer	Recent fully developed leaf (30+)

**VEGETABLE & GARDEN CROPS**

Crop#	Crop Name	Growth Stage	Plant Part / Sampling Instructions
102	Spinach	Mature	Recent fully developed leaf (15+)
049	Squash	Mid-season	Recent fully developed leaf (12+)
144	Squash	Mature	Mature fruit
431	Sweet Potato	Mid-season	Recent fully developed leaf (25+)
137	Tarragon	Summer	Recent fully developed leaf (20+)
161	Tomato	5-Leaf	Recent fully developed leaf (25+)
162	Tomato	First Flower	Recent fully developed leaf (25+)
163	Tomato	Early Fruit Set	Recent fully developed leaf (25+)
164	Tomato	First Ripe Fruit	Recent fully developed leaf (25+)
433	Tomato	Vegetative - Pre-Bloom	Petiole of recent fully developed leaf (50+)
434	Tomato	Blossom	Petiole of recent fully developed leaf (50+)
435	Tomato	Fruit Initiation	Petiole of recent fully developed leaf (50+)
436	Tomato	Fruit Sizing - 50% Ripe	Petiole of recent fully developed leaf (50+)
150	Tomato	Mature	Fruit, mature
386	Tomato - Green-house	Before Fruiting	Recently mature leaf including petiole (30+)
387	Tomato - Green-house	During Fruiting	Recently mature leaf including petiole (30+)
411	Tomato - Green-house	Fruiting	Recently mature leaf including petiole (30+)
399	Tomato - Green-house	Fruiting	Petiole of recently mature leaf (30+)
443	Turnip	Pre-bulking	Recently mature leaf cut at ground (40+)
446	Watercress	Summer	Most recently mature leaf
444	Watermelon	Flower to small fruit	5th leaf from tip (25+)
445	Watermelon	Small fruit to harvest	5th leaf from tip (25+)
456	Zucchini	Flowering to harvest	Recent fully developed leaf (25+)

**A & L Great Lakes Laboratories, Inc.**

3505 Conestoga Drive  
 Fort Wayne, IN 46808  
 Phone: 260-483-4759  
 Fax: 260-483-5274  
 Email: lab@algreatlakes.com  
 www.algreatlakes.com

