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Leaf Analysis for Fertilizer Requirements of Michigan Fruit Crops
Michigan State University Extension Service
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LEAF ANALYSIS



for fertilizer requirements
of Michigan
fruit crops

COOPERATIVE EXTENSION SERVICE, MICHIGAN STATE UNIVERSITY

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A Leaf Analysis Program for Michigan fruit growers was established by the Horticulture Department of Michigan State University in 1953. It was one of the first programs designed to provide precise fertilizer recommendations on the basis of leaf analysis.

Several years of research and observations have demonstrated that leaf analysis of established fruit plantings provide the most reliable information of nutrient needs.

Leaf analysis may be used to diagnose or confirm a particular nutrient problem in an orchard after symptoms are present. More importantly, leaf analysis can determine nutrient shortages or excesses before symptoms develop. Usually, it reveals that certain fertilizers being used are not needed, resulting in the most economical fertilizer program.

Tree fruits (apple, pear, sour cherry, sweet cherry, peach and plum), blueberries, and grapes are included in the program.

To check your fertilizer program by leaf analysis, submit one or more samples collected according to directions which follow. Each sample may be analyzed for 1) nitrogen only, 2) potassium only, 3) spectrographically for phosphorus, calcium, magnesium, iron, boron, copper, and zinc, or 4) any combination of 1, 2, and 3.

SUBMITTING SAMPLES

Containers and questionnaires for each sample may be obtained from the nearest county extension office or the Department of Horticulture, Michigan State University.

Each leaf sample should be considered to represent a condition rather than a certain acreage. It may represent one plant or tree or several acres. You must judge the uniformity of your own conditions to determine the number of samples necessary for accurate recommendations.

TAKING LEAF SAMPLES

Accuracy of diagnosis depends upon accuracy of sample collection. It is important that the methods described are followed for each different kind of fruit. Any deviation from this will reduce the reliability of report. Above all—Do not mix varieties or kinds of fruit into one sample.

Tree Fruits

Each sample should contain about 100 leaves collected as follows:

1. Collect all leaf samples between July 1 and August 15. Use the earlier date in southern Michigan and later date in northern Michigan.

2. Select all leaves from middle of current terminal growth (see Fig. 1). Do not select spur leaves. Not more than two leaves should be taken from any one shoot. Use shoots reachable from the ground and from different sides of the trees. Choose leaves free from insect, disease, and mechanical damage.

3. Remove leaves with a downward or backward pull so that the stem (petiole) remains attached to the leaf. Pulling toward the terminal bud (end of shoot) may break the petiole or remove the bud at the base of the petiole. If removing leaves results in strips of bark being removed—wait for 1 or 2 weeks until leaves are more mature. Place leaves in the container provided (a No. 5, or similar, perforated paper bag). Identify sample on bag and enclose questionnaire with a number or other identifying statement.

4. Before the leaves wilt, wash them to remove spray residue and dirt. This may be done by dipping the sample in a detergent solution and rinsing with clear tap water. Do not allow the leaves to stand in the detergent or rinse water more than one minute. Remove excess water with a flipping action.

5. After washing, return the leaves to the bag. Complete the questionnaire and place it in the bag. Clip the bag shut to prevent spillage.

Blueberries

1. Collect leaf samples between July 15 and August 15.

2. Select leaves from middle of current terminal growth. Do not select leaves from laterals bearing fruit or water sprouts (Fig. 2).

Fig. 1. For tree fruits, select all leaves from the middle of current terminal shoots. Remove the leaves with a downward pull so the stem remains with the leaf.



3. Follow steps 2, 3, 4, and 5 as outlined for tree fruits.

Grapes

Rather than the complete leaf, only the leaf petiole is used. Figures 3, 4, and 5 illustrate how these are collected.

1. Collect petiole samples between July 15 and August 15.
2. Select mature leaves near the center of the shoot, but beyond any fruit clusters.
3. Cut off the leaf close to the shoot (Fig. 3).
4. Cut leaf blade from petiole. Discard leaf blade—save only petiole (Fig. 4).
5. Collect 100 petioles for analysis (Fig. 4).
6. Place petioles in paper bag and dry for several days at room temperature. Complete the questionnaire and place it in the bag with the sample. Clip bag to prevent spillage.

QUESTIONNAIRE

The questionnaire is designed to provide specific information for each sample submitted. This includes: 1) grower's name and address, 2) variety and age of plants, 3) growth and yield, 4) current fertilizer program, 5) soil management program, 6) spray materials used, 7) soil test results (if available).

SENDING IN THE SAMPLE

Do not send freshly collected samples. They may mold enroute. Leaves or petioles are ready for mailing when they have dried sufficiently to crumble when crushed. The sample container is pre-addressed to the Plant Analysis Laboratory, Department of Horticulture, Michigan State University, East Lansing, Michigan 48823. It may be used as a mailing container or all samples may be packaged together. Or, the samples may be taken to the County or District Extension Office where they will be transmitted to the Plant Analysis Laboratory.

REPORTING RESULTS

After the sample is analyzed, information is recorded on punched cards. The computer prepares the Nutrient-Balance Chart, printing out recommendations for a fertilizer program.

Four copies of each report are prepared. One copy is kept on file in the laboratory and three are sent to the District Horticultural Agent. He retains a copy and sends 2 copies to the County Extension Office which keeps one and sends the original to the grower. Thus, the extension agent is able to examine the reports and make any necessary corrections before sending them to the grower.

CHARGE FOR ANALYSIS

The following charges are made to cover the cost of analysis and computer charges:

Nitrogen only	\$ 2.00 per sample
Potassium only	2.00 per sample
Spectrographic only	7.00 per sample
Complete analysis	10.00 per sample

These charges are subject to revision and should be determined before sending samples.

Do not send money, checks or money orders with the samples. When analyses have been completed, the University Business Office will bill you.

For additional information contact your County Extension Offices, your District Horticultural Agent, or the Plant Analysis Laboratory, Department of Horticulture, Michigan State University, East Lansing, Michigan.



Fig. 2. For blueberry, select leaves from mid position of lateral shoots on fruiting canes.



Fig. 3. Select mature grape leaves near the center of the shoot. Cut off the leaf including its petiole or stem close to the shoot.



Fig. 4. Cut the leaf blade from the petiole. Discard the leaf blade and save only the petiole.



Fig. 5. Collect 100 grape petioles for analysis. Dry them in a paper bag for several days at room temperature.