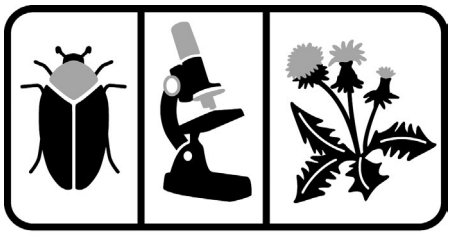
How to submit a sample to MSU Diagnostic Services



Diagnostic Services

Sample Submission

Collecting Plant Samples

It is best to send entire plants, although we recognize this is not always possible. Plants with root and crown rot diseases cannot be properly diagnosed unless root and crown tissue is submitted. Dig, rather than pull, plants from the ground to preserve the root integrity. Submit plants with symptoms that are in varying stages of decline. Avoid sending samples that contain only dead plants. Growers with larger crops/plantings are encouraged to submit multiple plants to ensure there is enough tissue for analyses by several diagnosticians with multiple methods. See below for instructions specific to various plant types.

Packaging Plant Samples

Do not add wet paper towel or other sources of moisture when packaging samples. Plant material should be wrapped in dry newspaper and then placed in a plastic bag to preserve the integrity of the sample. When root tissue is included, wrap the root balls in plastic to prevent the soil from coming in contact with the foliage. Large samples (ex. tree branches) can be cut in sections for easier packaging. Do not ship any type of sample that will leak contents from the packaging (ex. severely rotted fruit, loose soil, etc.). Almost all samples should be shipped in a box, rather than an envelope. Leaves and stems that are pressed and mailed in envelopes do not arrive in good condition. Include a completed copy of the submittal form, put the form in a separate re-sealable bag to prevent it from getting damp or soiled.

Shipping Plant Samples

Avoid shipping samples on Fridays; samples are not delivered to campus on weekends and may not arrive in the lab in good condition the following week. All major shipping companies deliver to the lab or campus. The shipping address is included on the top of the submittal form. Shipping containers/materials are not returned to clients unless previous special arrangements are made.

Images of Plant Samples

Images of the plants and the corresponding symptoms can be extremely helpful to the diagnostic staff. Images can be emailed to the lab. Please send multiple images including close up shots of the symptoms of concern, as well as images that show the entire plant/tree and its surroundings. In the email include your name and contact information, also indicate the date that the accompanying physical sample was or will be sent. Please note that out of focus images have limited or no value; we are not able to improve the focus of digital images. Images submitted to the lab may be used by lab staff, with proper photo credit, for educational purposes.

Out of State Clients

Clients submitting samples that are collected outside of Michigan must follow some additional packaging protocols. Samples must be double bagged and sealed (ex. two zip-lock freezer bags). Place the sealed bags in a sturdy shipping container. Our lab has USDA APHIS permits in place to accept samples from the continental U.S. Note, diagnostic fees are increased for out of state clients.

If you have any doubt about what or how to collect a good sample please contact the lab (517) 432-0988 or via pestid@msu.edu.

Submit samples to:

Michigan State University
Diagnostic Services
578 Wilson Rd., Rm. 107
East Lansing, MI 48824-6469
Phone: (517) 355-4536
Fax: (517) 432-0899

How to submit a sample to MSU Diagnostic Services *(continued)*

Crop Specific Details

Herbaceous Plants: When possible, send entire plants including roots and some soil. Roots and soil should be in a plastic bag tied off at the soil line to prevent soil from touching foliage. This plant material degrades fairly quickly; as a result plants should be dropped off in person or sent with overnight or priority shipping.

Plugs/Seedlings: It is tricky to get plugs submitted to the lab in good condition. Leave the plugs in the tray for shipping purposes. Entire trays are not required; a section of the tray can be cut and shipped. Submit a minimum of 12 plugs. Wrap the plug sheet in newspaper or add packing material that will prevent plugs from being dislodged from the tray. This plant material degrades fairly quickly; as a result plants should be dropped off in person or sent with overnight shipping.

Tree Samples with Leaf Spots: Select affected foliage, but wherever possible leave it attached to the branch. Send several affected samples representing the early and moderate stages of symptom progression. Although the sample may seem flat enough to package and ship in an envelope, please package and ship in a box. This protects the sample during the shipping process.

Trees with Suspected Vascular Wilt diseases including Verticillium Wilt, Dutch Elm Disease, Oak Wilt: Select branches that are partially wilted, with symptomatic leaves progressing from the tip of branches inward to the trunk. Be sure that branches are not totally wilted, dry, or dead. Select samples from up to three symptomatic branches per single tree. Branch samples should be at least 1 inch in diameter, cut into 6- to 8- inch lengths, and placed in large re-sealable plastic bags. Keep samples cool during sampling, shipping and storage, but do not freeze. Ship samples overnight mail (no later than Thursday) or deliver in person to the laboratory.

Vegetables: These samples may include plants, fruit, or both. If fruit rot is a concern select fruit that is in the initial stages of symptom development. Be sure to package in leak proof containers (ex. sealable plastic bags). Delivery personnel may not deliver packages that are leaking.

Residential Turf: Include a square of turf from the margin of the diseased area so that both healthy and diseased turf is included. Minimally, the turf square should be 6 inches x 6 inches. An intact layer of soil should remain on the root system. Wrap samples in newspaper and pack in a box for shipment. Do not add moisture to the turf prior to shipment. Provide a detailed description of cultural practices (irrigation, fertilization, pesticide application, etc.) and images of the symptoms in the lawn with the sample.

Please note that Diagnostic Services does not perform health analyses of golf course turf. Commercial turf samples are processed by the Turf Pathology Lab. Contact Dr. Joe Vargas, MSU Plant, Soil, and Microbial Sciences, at 517-353-9082 for further information on diagnosis of commercial turf samples. MSU Golf Turf Diagnostics Form.

Weed/Plant Samples

Herbaceous Plant Identification: Submit a representative sample containing vegetative structures, leaves and flowers. Plants may be pressed flat between papers or cardboard to prevent leaf crinkling. For best results, plants should be submitted immediately after taking the sample.

Woody Plant Identification: Submit a large section of the terminal end of the stem or branch. Where possible, include any flower or fruiting structures. Leaves may be pressed flat between papers or cardboard to prevent leaf crinkling. Woody plants may be wrapped in plastic to retain moisture.

Herbicide Resistance

Weed seed is required to conduct a whole plant bioassay in the greenhouse to screen for herbicide resistance. Mature, high quality seed or seedheads should be collected from suspicious plants in the late summer or fall; ideally pooled samples with seed/seedheads from 5 or more plants will ensure adequate seed quantity. For species specific information on correctly identifying mature seed and collection tips please review the herbicide resistance information on **pestid.msu.edu**. Place samples in sealed a paper bag. Do not submit samples in a plastic bag as mold and decay will compromise the sample. Screens will be designed by herbicide site of action (e.g. EPSP synthase inhibitor, ALS inhibitors, Photosynthesis inhibitors, etc.). Screening results are generally available 2-3 months after submission to allow for seed cleaning, dormancy breaking measures, greenhouse growth, herbicide application, and evaluation.

Nematode Samples

Always store nematode samples in plastic bags or other containers that retain moisture. Submit a pint to a quart of soil per sample. If nematode samples need to be stored prior to submission try to keep them cool.

Problem Diagnosis: Collect soil and roots (or foliage) from the margins of diseased areas. Submit samples of diseased and apparently healthy plants for comparison purposes.

How to submit a sample to MSU Diagnostic Services *(continued)*

Problem Avoidance: Collect soil and roots (if available) by walking a zigzag or w-shaped pattern. Try to collect 10-25 subsamples using a soil probe, trowel or shovel. One sample per field is adequate unless you can identify problem areas such as sandy locations, along ditch or river banks where flooding occurs, etc., then two or more samples are recommended.

Insect/Arthropod Samples

Precise identification of insect or other arthropods requires specimens to be undamaged upon arrival in the lab.

It is very important to kill and ship the specimens in a manner that will not damage the delicate structures that facilitate their identification. It is always best to include multiple specimens whenever possible.

Dried and unprotected insects crumble easily during the mail process. Kill and ship specimens in a small, leak proof container rubbing alcohol or white vinegar.

Moths/Butterflies: Place specimens in the freezer for half an hour to kill them and gently pack in a small box or vial with tissue paper.

Ants/Other Adult Arthropods: Ant specimens should only include worker ants (i.e. those without wings). Submit ants and all other hard-bodied specimens in vinegar.

Larvae (Caterpillar, grub, maggot, etc.): Whenever possible, soft-bodied larvae should be lightly boiled for a few minutes before placing them in vinegar. This prevents the specimens from shriveling and becoming discolored, however this only works if the larvae are alive when placed in the boiling water.

Images of Insects, Spiders, Ticks and other arthropods: We can often identify a specimen from an image provided that the image is taken in good light and it is in focus. Images of insects, spiders, ticks and other arthropods can emailed to the lab at pestid@msu.edu. Please remember that if the image looks dark or blurry to you, it's going to look dark and blurry to us when we receive it. We don't have any way to correct or improve the quality of an image. Images submitted to the lab may be used by lab staff, with proper photo credit, for educational purposes.

Pesticide Analysis Samples

MSU Diagnostic services does not test for pesticide residues in-house, however a list of recommended agencies who conduct such tests is available upon request.

Services and Fees for MSU Diagnostic Services

Note: Fees for out-of-state samples are triple. Contact lab for procedures not described below.

Plant Health Analysis

Routine plant analysis $20.00
In-House ELISA tests: $20.00
Bacterial ID (BIOLOG ®): $25.00

Weeds/Plants

Plant ID $10.00
Herbicide resistance in weeds $90.00

- This test will include multiple sites of action, based on seed quantity and quality
- MI Soybean growers qualify for free testing of the following species courtesy of the Michigan Soybean Promotion Committee:
  - -Palmer amaranth
  - -Waterhemp
  - -Horseweed/marestail
  - -Common lambsquarters
  - -Common ragweed
  - -Giant ragweed

Nematodes

Basic nematode analysis: $25.00
Foliar nematode analysis: $25.00
Total nematode community analysis: $50.00
Full-SCN type testing $75.00
Mini-SCN type testing. $40.00
Verticillium analysis (potato soil or stems only)
Wet sieving: $25.00
Dilution plating: $20.00
Both $40.00

Insects/Arthropods

Common insect ID: . . . . . N/C
Keyout insect ID: $20.00

Michigan State University
Diagnostic Services
578 Wilson Road
East Lansing, MI 48824-6469
Office: 517.355.4536
FAX: 517.432.0899
www.pestid.msu.edu

Lab Use Only
Case # _____
Date received _____
Amount paid _____
Check/receipt#_____
MSU account # _____
Diagnostic fee _____

Submitter

Name _____
Business _____
Address _____
City/State/Zip _____
Phone _____FAX _____
Email address _____
Send results to □ Submitter □ Grower/MSUE/Other

Grower/MSUE/Other (if different than submitter)

Name _____
Business _____
Address _____
City/State/Zip _____
Phone _____FAX _____
Email address _____
Send invoice to □ Submitter □ Grower/MSUE/Other

Plant or sample type:_____

County where sample was collected _____ Sample reference _____
Describe symptoms or injury _____
When did symptoms first appear? _____

Plant parts affected
□ Entire plant □ Trunk/stem
□ Leaves/needles □ Roots
□ Twigs/limbs □ Fruit
□ Bud □ Flower

Type of planting
□ Field □ Garden
□ Greenhouse □ Nursery
□ Other _____

Prevalence
□ Entire planting
□ Single area
□ Few scattered plants
□ Other _____

Soil type
□ Sandy □ Clay
□ Muck □ Silt loam
□ Soilless media

Other background information
Age of plant _____
Planting date_____
Height of plant _____
How many plants affected? _____
How often watered? _____
Sunny or Shaded? _____

Chemical history – list fertilizer, herbicide, insecticide, fungicide, and PGR applications including date and rate used

Insect/Arthropod Samples

Where was the insect found? _____
How many insects are there? _____
What was the insect doing there? _____
Do you have young children living with you? _____

Plant/Weed ID Samples

Plant type
□ Tree □ Groundcover
□ Shrub □ Herbaceous
□ Vine □ Grass

Plant size
Height _____
Width _____

Fruit
Color _____
Size _____
Month _____

Flowers
Color _____
Size _____

Plant Age
□ Annual
□ Perennial

For **diagnostic fee details** contact the lab or www.pestid.msu.edu

USE REVERSE SIDE TO PROVIDE ADDITIONAL INFORMATION MSU-DS-Form-012-001 version 3.0

Michigan State University
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578 Wilson Road
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Office: 517.355.4536
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Lab Use Only
PDIS Case # _____
ID # _____
Date received _____
Amount paid _____
Check/receipt#_____
MSU account # _____
Diagnostic fee _____

SCREENING FOR HERBICIDE-RESISTANT WEEDS

- Mature, high quality seed is required. Please refer to "Tips for collecting weed seeds" on our website for collection details. The screening process takes 2-4 months to complete, depending on the species.
- Courtesy of the MI Soybean Promotion Committee, MI soybean growers qualify for free testing of the following species: Palmer amaranth, waterhemp, horseweed/marestail, common lambsquarters, common & giant ragweed.
- Screening of these weeds from rotations not including soybeans is available for $90/sample. Screening of other species may be possible in consultation with Diagnostic Services.

Submitter

Name _____
Business _____
Address _____
City/State/Zip _____
Phone _____FAX _____
Email address _____
Send results to □ Submitter □ Grower/MSUE/Other

Grower/MSUE/Other (if different than submitter)

Name _____
Business _____
Address _____
City/State/Zip _____
Phone _____FAX _____
Email address _____
Send invoice to □ MSPC □ Submitter □ Grower/Other

SPECIES to be screened:

SAMPLE LOCATION (GPS or nearest crossroads):_____

City/town where sample was collected: _____ County: _____

Field ID: _____ Number of Acres: _____

FIELD HISTORY

Year	Crop	Tillage	Herbicide(s)
			Burndown:
			PRE:
			POST:
			Burndown:
			PRE:
			POST:
			Burndown:
			PRE:
			POST:
			Burndown:
			PRE:
			POST:

For **diagnostic fee details** contact the lab or www.pestid.msu.edu

USE REVERSE SIDE TO PROVIDE ADDITIONAL INFORMATION MSU-DS-Form-HerbResist-Nov2017