



# Purdue Plant and Pest Diagnostic Lab

GOT PLANT PROBLEMS? READ ON TO LEARN HOW YOU CAN TAKE FULL ADVANTAGE OF THE PURDUE DIAGNOSTIC LAB.

**By Tom C. Creswell and Gail E. Ruhl**

**A** plant diagnostic lab is a useful resource for growers with plant problems. Plant pest and disease diagnosis requires a partnership between the lab and the grower, and this article offers best practices on how to take full advantage of the services of the Purdue or other diagnostic lab.

Let's say you notice plants in your greenhouse that are stunted, wilting or have leaf spots. You have followed the first rule of thumb in diagnosis — observed that something is not normal and you want to learn the cause so you can manage the problem correctly. You are on your way to finding the answer and a diagnostic lab can help!

To identify a problem, diagnosticians need to see examples of the plants exhibiting the symptoms of concern. When collecting and submitting samples there are several steps that you should take to keep the sample in good condition and assure the best chance at rapid and accurate diagnosis.

## Early Communication

Contact the diagnostic lab and let them know you will be sending a sample and the tracking number of the package, if appropriate. This will help the diagnostic lab to know when to expect the package and also how to handle it.

## Importance of Sample Quality and Background Information

The accuracy of a disease diagnosis, abiotic problem, insect or weed ID can only be as good as the sample and information provided. Be sure to fill out the lab's submission form completely, including the origin of the plant if you are sending the sample for someone else. This will allow the diagnostician to check for reports of similar problems from other growers in that region. Provide information on patterns of symptom appearance in the greenhouse. Uniform distribution or large areas of symptomatic plants usually have an abiotic (non-infectious) cause such as



*Send this.*



*Not this.*

**Figures 1a and 1b.** When submitting plant samples, submit as much of the plant as possible. Samples must be fresh and in good condition.



True Grower Guarantee – another first and exclusive to be offered by Dümmen.

Dümmen USA introduced the True Grower Guarantee during OFA last summer to celebrate our new state of the art facility in El Salvador.

This program gives the assurance to our customers and their customers that the right product will be shipped on the right week. In most cases, order fill performance turned out to be 99.99% to 100%.

For more information on TGG, please see our catalog.



Write in 764



Figure 2. Bag samples to keep media off the foliage.

environmental stress or an injury; but we usually find disease or insects associated with randomly scattered or localized distribution of symptoms.

In addition to the distribution or pattern in the greenhouse, diagnosticians need to know the percent of the plants affected; time of symptom appearance; species or cultivars affected and crop history such as plant age, plant growth regulator, pesticides and fertilizer usage (including dates and rates). If all this sounds like you're filling out a new patient form at a doctor's office, just keep in mind that what may seem like an insignificant bit of information may be the one clue that allows the diagnosticians to make an accurate, rapid diagnosis. (See Figure 1, page 24.)

Symptoms may appear in parts of the plant that are not infected with the pathogen, i.e., symptoms of a root infection become apparent when leaves become yellowed and plants wilt. For this reason submit as much of the plant as possible. In most cases you will want to send an entire plant, several intact plants or a flat. Samples must be fresh and in good condition. Dead plants tell no tales. Due to secondary infections in extremely decayed plants, it is difficult to determine which organism may have created the problem in the first place. If possible, send in several plants with a range of symptoms

from moderate to severe. If sending a sample for weed identification make sure to include all parts of the plant, including leaves and stems, roots if possible, and any flowers, fruits or seeds.

### Packaging and Sending Samples

Keep leaves dry and free of media. Improperly packaged samples with growing medium on the leaves

#### DO IT RIGHT

Plants with suspect invasive/exotic pests should be double bagged in two zip-top or other sturdy, sealed bags. Disinfest outside of bag. You can use a 10 percent Clorox solution or 70 percent ethanol. Place double bags inside a crush proof box and tape all edges.

Also alert the diagnostic lab that you are sending a sample that you suspect may be an exotic pathogen so they can take special precautions in opening and handling it. Rapid delivery may be critical for containment of a regulated disease or insect so consider hand delivery or overnight express services for these types of samples.





promote the growth of secondary fungi and bacteria and create problems that did not exist when the sample was originally collected.

When submitting a whole plant, bag the root system to keep the leaves clean and dry, then wrap the foliage in dry newspaper before placing the whole plant inside a plastic bag that has been vented by cutting a few small holes to allow air exchange. Never add water to your sample. Samples that are slightly dry arrive in better condition than those shipped too wet.

When packaging additional symptomatic foliage you can wrap it in dry newspaper before bagging to keep leaves from direct contact with the plastic. Make sure that any accompanying paperwork is protected from moisture and easily accessible at the top of the package.

Samples that take a long time to get to the lab often decay or dry up, making diagnosis difficult. If you are close enough to the lab, consider hand delivering the sample or use an express delivery service when possible. Our lab, like most university diagnostic labs, is closed over the weekend so avoid shipping samples on Fridays and just before holidays. Samples in transit over a weekend or holiday may be too degraded to diagnose by the time they arrive at the lab. If in doubt, call the diagnostic lab prior to shipping to verify there will be someone there to receive the package.

### Proper Collection and Shipment of Insects

Most diagnostic labs provide identification of insects and other arthropods found on plants and in dwellings. The guidelines below will assure the best chance for quick identification.

Collect and send several specimens of the same insect and as many life stages as possible. Most insect specimens are best shipped in leak-proof vials of rubbing alcohol.

Grubs and caterpillars must be prepared before preservation

to prevent discoloration. Drop them into gently boiling water for about 30 seconds (never microwave them!) before placing in vials of rubbing

alcohol. Never send crushed insects or those taped to paper or cardboard. If you have a question about how to collect a sample, call the lab in

Spring 2013

**RED FOX** **news**

FOR TRUE GROWERS

**Sarita**  
GERANIUM

**ALL EYES ON COLOR AND HEAT**



**Award-winning Genes!**  
Cross of ivies and zonals voted Best New Red

**Spice it up!**  
Takes the heat and more

**Flirty Looks!**  
Five vivid colors



Watch the video here!

**RED FOX**  
TRUE GROWER'S SERIES

Dümmen USA, Inc · Phone 614-850-9551 · sales@dummenusa.com · www.dummenusa.com

Write in 765



*Figure 3. Insect vials should be clear and leak-proof. Use rubbing alcohol to preserve specimens.*

advance. Keep in mind that all common biting insects are visible to the naked eye, so make sure you can see and collect them in a vial of alcohol and avoid sending debris that you think may contain insects.

Small insects/mites found feeding on plant foliage can be shipped by clipping a branch or a few leaves and placing them between dry paper towels before enclosing in a zip-top bag. This helps absorb moisture and prevents fungal growth. Double-check the exterior of the bag for stray insects. This method works well for scale insects, mealybugs, whiteflies, lace bugs, thrips, mites, leafminers and other tiny arthropods. Mail in crush-proof

cardboard boxes or mailing tubes.

### Provide Detailed Collection Information

To provide an insect identification the entomologist will need to know:

- Where was the insect found? On what plant or other location?
- If on a plant, was the plant recently shipped from another state or location?
- What was the insect doing? Feeding on a plant? Biting a person? Is it a nuisance pest?
- State, town and county where collected.
- Name and contact information of collector (in case more sample material or more information is needed later)

To identify a problem, diagnosticians need to see examples of the plants exhibiting the symptoms of concern





## Using Digital Images to Enhance Diagnosis

Digital images can be a very helpful supplement to the physical sample by showing patterns of symptom distribution in the greenhouse or nursery. Digital images can help in diagnosis, especially if the plant problem produces signature signs (such as powdery mildew or ringspots of INSV). Many insects (such as scales, aphids or mealybugs) can also be identified to family or order if high quality images are submitted. Digital images allow for immediate submission of a possible exotic or invasive pest. Always include a size reference in some of the images (such as ruler or coins). Send several images include close ups of individual plants but also include views of the greenhouse bench or planting block to show the distribution and progression of the symptoms.


Digital images for insect identification should include the plant host, different life stages of the insect (if present), the nature of injury or damage, signs such as webbing, frass, exit holes and details of body parts.

When you send a complete sample and good background information you are giving the diagnostician the best conditions for a speedy and accurate diagnosis. The time required to complete testing and deliver an answer depends on the problem and the lab's current sample load but most clinics strive to provide an initial assessment of the problem in 3-5 days. Identification of bacteria or other pathogens that require isolation or DNA testing may take much longer.

Purdue University's Plant and Pest Diagnostic Lab is housed in the Department of Botany and Plant Pathology and is a collaborative effort with specialists from the departments of Entomology, Agronomy and Horticulture & Landscape Architecture.

We provide a full range of diagnostic services to greenhouses, nurseries, homeowners, farmers and agribusiness. Please visit our website at: [www.ppd.purdue.edu/PPDL/](http://www.ppd.purdue.edu/PPDL/)

A listing of diagnostic labs

associated with Land Grant Universities in other states is available at [www.apsnet.org/members/directories/Pages/UnivDiagnosticians.aspx](http://www.apsnet.org/members/directories/Pages/UnivDiagnosticians.aspx). 

*Tom Creswell is director of Purdue University's Plant and Pest Diagnostic Lab (PPDL); Gail Ruhl is the senior plant disease diagnostician and founder of the diagnostic lab in 1979.*



**Dahlia**  
XXL  
RED FOX

**Plus-size Model**

**NEW**

RED FOX  
XXL VERACRUZ

- Summer trials strong performer
- Stunningly huge flowers
- Ignores hot summer heat

Dümmen USA, Inc • Phone 614-850-9551 • [sales@dummenusa.com](mailto:sales@dummenusa.com) • [www.dummenusa.com](http://www.dummenusa.com)

**RED FOX**  
TRUE GROWER'S SERIES