

HORTICULTURE SUBMISSION FORM



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Owner Name: _____
 Sample ID: _____
 Species: _____
 Date: _____

Specimen Source (Please Circle):
 Swab Leaf/Needle Conk/Mushroom Petiole
 Twig Branch Trunk Bore Root Flower

A C C O U N T	Acct #	P A Y M E N T	Check Enclosed Amount: _____
	Name		Credit Card
	Address		AMEX Discover Master Card Visa On File
	City		Exp. Date: ____/____/____
	State/ZIP		Name On Card
	Phone#		Credit Card Number
	Email		
	Fax		
	Text		

DNA TESTS \$20.00 each

Armillaria Genus (Can speciate: A.gallica, A. mellea, A. ostoyae, A. tabescens) Ash Yellows (16SrVII-A) Ca. Phytoplasma franini Bacterial Leaf Scorch (Xylella fastidiosa) Basidiomycetes Genus Bondarzewia berkeleyi Botrytis cinerea Boxwood Blight (C. buxicola) Brown Spot Needle Disease (Lecanosticta acicola) Ceratocystis Genus Cercospora Genus Coniophora puteana (Cellar Fungus) Cotton Root Rot (Phymatotrichopsis omnivora) Dead Spot Disease Diplodia Blight (Diplodia pinea) Dothistroma pini (Dothistroma Needle Blight) Dothistroma septosporum (Red Band Needle Blight) Dutch Elm Disease (O. ulmi, O. novo-ulmi) Elm Yellows (Ca. Phytoplasma ulmi) Emerald Ash Borer (Agrilus planipennis) Fire Blight (Erwinia amylovora) Fomitopsis pinicola (Red Belt Conk) Fusarium Genus Fusarium oxysporum Ssp. Ganoderma Genus Ganoderma applanatum Ganoderma lucidum Ganoderma zonatum Geosmithia Genus Geosmith morbida (Thousand Canker Disease) Grifola frondosa (Hen of the woods) Hericium Genus Inonotus dryadeus	Kabatina juniperi Kretzschmaria Genus Kretzschmaria deusta (Brittle Cinder Fungus) Laetiporus cincinnatus Laetiporus sulphureus Lethal Yellowing of Palms (Ca. P. palmae - 16SrIV-A) Lethal Yellowing of Palms (TPPD Ca. P. palmae - 16SrIV-D) Neonectria cinnabarina Nitidulid Beetle DNA detection Oak Wilt (Ceratocystis fagacearum) Palm Trunk Rot (Thielaviopsis paradoxa) Phaeolus schweinitzii Pholiota Genus Phomopsis juniperivora Phytophthora cactorum Phytophthora Genus Phytophthora palmivora Phytophthora ramorum Phytoplasma Genus Pinewood Nematode (B.xylophilus) Pleurotus Genus Seiridium Genus (Can speciate: S. cardinal, S. cupressie, S. unicorn) Southern Pine Beetle (Dendroctonus frontalis) Sparassis spathulata Stereum Genus Take All Disease Thousand Canker Disease Trametes versicolor Tubakia dryina/iowensis Verticillium Genus (Can speciate: V. albo-atrum/dahlia/longisporum) Volutella Blight (Volutella buxi)
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RNA TESTS \$25.00 each

Rose Rosette Virus Tobacco Ringspot Virus
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PANEL TESTS

Pine Needle Blight Tri-plex D. pini, D. septosporum, L. acicola	\$45.00
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For additional species and tests please visit online @ <http://www.vetdna.com>



Sampling Recommendations for Horticultural DNA/RNA Testing

General

DNA/RNA testing requires only a very small amount of infected or infested tissue, or pieces of insects or mushrooms or conks for successful identification of selected organisms. Therefore, it is critical that the tissues submitted for testing are taken from a location in the tree that contains the organism of interest. Unlike traditional identification or isolation from tissues, molecular testing offers the ability to identify pathogens in tissues that have been contaminated by secondary agents or in samples that have dried or been partially degraded. However, it will only identify the specific organism being tested for and will not identify pathogens not in the specific test selected. In addition, as some pathogens are secondary invaders of dead or diseased tissues identification of their presence may not indicate them as a primary cause.

Because of the potential of any sample to be contaminated by soil, pathogens on bark surfaces, or on sampling tools or equipment, it is critical that appropriate field procedures be followed when obtaining samples for testing. These procedures are primarily aimed at removing tissues or contaminants from samples or sampling equipment. The following are general recommendations:

- All knives, drill bits, chisels or other tools should be flamed sterilized before any sample is extracted.
- Remove all soil, bark or other tissues where appropriate before taking final samples (for example expose sapwood by removing bark before taking a sample intended to test pathogen in wood or vascular tissues).
- Do not chisel, drill or cut through bark or soil to sample inner wood. This will contaminate samples with pathogens on bark and in soil.

Sample Size and Type

Small pieces of infected tissue are most desirable for testing. Final sample testing in the laboratory uses fine shavings from samples that are submitted. Therefore field sampling requires careful attention and selection of samples from tissues that are most likely to harbor the organism of interest. A one inch piece of wood provides adequate material for thousands of test. Therefore, only submit the specific tissues that you desired to be tested and are most likely to harbor the organism of interest.

- PLACE ALL TISSUES IN PLASTIC BAGS AND SEAL TO AVOID CONTAMINATION.
- DO NOT PLACE WET PAPER TOWELS IN WITH SAMPLES AS THERE IS NO NEED TO KEEP TISSUES FROM DRYING.
- DRIED SAMPLES ARE ACCEPTABLE.

Infected wood or stem tissues

- In most cases a 1 inch by 1 inch piece of tissue taken from the leading margin or edge between diseased and healthy tissues.
- Any decayed or infected wood or bark can be tested but this may not indicated the pathogen as the primary cause.
- A cross-section of branches with canker or wilt pathogen is acceptable. If larger branches are present in the field, we recommend cutting them into smaller sections so only infected tissues are submitted.

Fungal Fruiting Bodies (Conks/Mushrooms/Mycelial Growth)

- Small pieces (1 inch square) of the mushroom or conk.
- Swabs of mycelial growth or tissues with fungal growth are acceptable

Insects or Insect Frass

- Place the entire insect, any body part, or frass from the insect of interest in a vial, small plastic bag, or other secure container

Swabbing of Galleries or Pathogen Tissues

- Swabs of borer galleries, or tissues where the insect or pathogen is exposed can be used for testing. Run the swab over the suspect tissue or insect gallery and submit the swab.

Interpretation of Results

RAL only reports specific results from testing of the samples submitted without interpretation. Additional consultation for diagnostics are available from a plant pathologist at an additional charge.

Pathogen/Insect Specific Sampling Recommendations

Armillaria genus and Armillaria species

- Small pieces of wood suspected to be infected with the fungus. Pieces taken from the margin between health and diseased tissues are most desirable. Armillaria is a common colonizer of the bark and root and samples with bark or soil may test positive for this fungus.
- Rhizomorphs of the fungus are acceptable as a single sample (do not send Rhizomorphs and wood samples as a single submission. These need to be tested individually as separate samples)
- Pieces of wood or roots with mycelial fans
- Small pieces of mushrooms
- Any decayed root or wood in the tree can be tested but may not indicate Armillaria as the primary cause. Remove bark and sample the edge of decayed or diseased tissues if confirmation of Armillaria as a primary cause is intended.

Bacterial Leaf Scorch

- Petioles from leaves showing symptoms. Do not send leaves without petioles
- Branch tissues and other stem tissues that contain outer vessels or xylem can be tested but may or may not produce positive results

Canker Diseases

- Samples that include the diseased tissues on the edge of cankers or from the margin between healthy and disease tissues are most likely to identify the primary cause of the canker.

Dutch Elm Disease (DED)

- Infected stem or branch tissues that include outer vessels or xylem from areas of the tree suspected to be killed by the disease. Stems infected by DED usually have discoloration of the vascular tissues.
- Increment cores from stems on sections of the tree that are actively wilting. Be sure to include vessels from outer rings.

Elm Yellows

- Leaf petioles or stem cross-sections from branches showing yellows symptoms
- Leaves or stems from witches' brooms

Fireblight

- Shoots that include the margin between healthy and blighted shoot tissues
- Sections through cankers on stems or trunks

Fusarium oxysporum

- Stem sections through diseased tissues that include a margin between healthy and diseased tissues

Fusarium wilt of Palms

- Pieces of the petiole base or rachis from fronds showing tip dieback or one/two-sided leaflet death.
- Stem sections with vascular tissues from sections of the trunk that are diseased

Ganoderma applanatum (Artist conk)

- See sampling for wood decay fungi.

- Small pieces of the conk
- Any decayed wood in the tree can be tested but may not indicate *G. applanatum* as the primary cause

Pathogen/Insect Specific Sampling Recommendations

Ganoderma lucidum

- Small pieces of trunk or root wood suspected to be infected with the fungus taken on the margin or edge of decayed wood. See Root Pathogen sampling for root samples.
- Small pieces of the conk
- Any decayed wood in the tree can be tested but may not indicate *G. lucidum* as the primary cause.
- Root tissues should have bark removed before sampling

Kretzschmaria deusta

- Small pieces of wood suspected to be infected with the fungus taken on the margin or edge of decayed wood
- Small pieces of the black stromatic tissue or fruiting of the fungus
- Any decayed wood can be tested but may not indicate *K. deusta* as the primary cause.

Lethal Yellowing of Palms

- Stem sections with infected vascular tissues

Nitidulid Beetle

- The whole insect or pieces of the insect

Oak Wilt

- Infected stem or branch tissues that include vessels or xylem from areas of the tree suspected to be killed by the disease
- Stems sections with vascular discoloration are most likely to harbor the pathogen

Phytophthora and *Phytophthora* species

- Discolored stem tissues taken from the margin cankers, or bleeding, or dead areas

Phytoplasma genus

- Shoot, stems or leaves from infected tissues

Pythium

- Diseased, small diameter fibrous roots from dying trees
- On turf-infected blades or leaves of grass.

Root Decay Fungi and Pathogens

- Root pathogens that kill bark and cambium should have these tissues intact on root samples
- For fungi that decay woody roots, remove bark and expose disease sapwood
- Flame sterilize tools or use a new drill bit or chisel to take a sample of sapwood free of bark and soil

Thielaviopsis paradoxa of palms

- Infected stem tissues

- Base of infected fronds

Thousand Canker Disease

- Stem cross section through cankered tissue, or pieces of stem tissue taken from the margin of cankers

Wilt Pathogens including Verticillium wilt and *Verticillium* species

- Cross section through infected or wilting branches
- Increment cores of trunk tissues from sides of the tree suspected to be infected
- Cross section through diseased roots

Rose Rosette Disease

- Shoots from current years growth

Tobacco Ringspot Virus

- Root tissues are most likely to harbor the virus
- Bark or leaves

Wood Decay of Trunk, Roots or Branches

- Remove bark to expose sapwood
- Flame sterilize tools for taking final samples
- Drill or chisel into decayed wood or wood suspected of decay and place chips into sample bags
- Samples taken from the edge of decayed wood are most likely to identify the primary cause of decay in a specific location.