Diagnosing Plant Problems

Stephanie Romelczyk

ANR – Westmoreland County

Strange (But TRUE!) Extension Questions

Do you know anybody that grows black widow spiders? I need 3000 of them.

Can I put formaldehyde on my vegetable garden to kill Fusarium wilt on my tomatoes?

If I grind up banana peels and spread them over my yard, will the grass be greener?

When I moved into my new house, the builder advised I should water my new lawn 3 times a day. How long should I continue to do this? I've lived here for seven years now.

I need help. My lawn is infested with piranha! (Poa annua)

I have a plant in my yard, I do not know what it is, and it has been there awhile. Do you know what it is?

I've got a call or sample….

now what?

Don’t have a physical sample?
Request one!

Before Starting, Remember…

Many factors contribute to plant health

Plant problems often result from more than one cause

Different problems can look similar!

Use the process of elimination in making a diagnosis!


Natural variation


Viral disease


Spider mite injury


Nutritional disorder

Put the Ball in their Court!

Step 1: Twenty Questions!

- **#1**: Plant species involved
- Date symptoms noticed
- Rapidity of symptom development
- Age of plant(s)/when planted
- Number/percentage of plants affected(total #)
- Percentage of plant affected/rest of plant
- Distribution/pattern
- Environmental conditions

Twenty Questions! (ctd)

- Management practices
- Soil sample
- Previous occurrence or pest problems
- Chemicals used on or near problem plant
- Insects found and how abundant
- Recent nearby activities
- Recent weather conditions

Virginia Cooperative Extension
Virginia Tech • Virginia State University

Publication 444-113

Insect Identification and Diagnosis Request

Send physical Samples to: Insect Identification Lab, Dept. of Entomology (0319), Price Hall, Rm. 216
170 Drillfield Dr., Blacksburg, VA 24061
Images: email good clear JPEG with a scan of this completed form to: idlab@vt.edu

Agent name_____ Grower/Homeowner_____

See back of form for important information on replies Address_____

County/City_____ _____

Signature_____ Phone_____

1. Date Collected_____ 2.Host_____

3. For plant pests: Distribution: ☐ One plant ☐ Several Plants ☐ Scattered ☐ Clumped ☐ Widespread
Damage: ☐ Roots ☐ Bark ☐ Twigs/Stems ☐ Leaves ☐ Bud ☐ Fruit

4. For inside pests: In what part of the building or house was the insect found? _____

5. Insect abundance: ☐ none observed ☐ one ☐ few ☐ common ☐ abundant ☐ extreme

6. a.) Description of the problem, b.) How serious is the damage:

_____

_____

_____

6. c.) Date insects or damage first found? _____ last years crop? _____

7. Previous occurrence and control applied _____

8. Do you desire a control recommendation? ☐ yes ☐ no

9. ☐ Commercial Grower or Farmer ☐ Homeowner ☐ Urban Pest Control Operator ☐ Medical doctor
☐ Park, School, Nature Center ☐ other _____

See back of form for collecting and shipping instructions

Do not write below this line

10. File no. _____ 11. Date Received ____/____/_20____

12. Common Name _____

13. Comments

14. Reply sent by email _____ 15. Determined by_____

www.ext.vt.edu

Produced by Communications and Marketing, College of Agriculture and Life Sciences, Virginia Tech, 2016

VT-0516/ENTO-196NP

Virginia Cooperative Extension
Virginia Tech • Virginia State University

Plant Disease Diagnostic Form

Publication 450-097

Submit specimens and this form to: Plant Clinic, 106 Price Hall, 170 Drillfield Dr., Virginia Tech, Blacksburg, Virginia 24061-0331

Date Collected _____ Lab I.D. No. _____

SEE *www.ppws.vt.edu/extension/plant-disease-clinic/submitting-samples.html* FOR INSTRUCTIONS ON HOW TO COLLECT SPECIMENS AND COMPLETE THE NUMBERED SECTIONS OF THIS FORM.

1. Plant _____ Cultivar/Variety _____

2. Extension Agent _____ County _____ Phone (_____)_____

Grower _____ Grower email _____

Address _____ Phone (_____)_____

3. *Briefly describe the symptoms and ask the specific question you want answered:*

4. Do you want a control recommendation for:
☐ Home lawn/garden ☐ Commercial production ☐ Lawn/landscape management ☐ other

Plant Part Affected	*General* Appearance	*Disease* Distribution	*Location*	
☐ roots	☐ wilted	☐ general	☐ field/farm	☐ golf course
☐ crown	☐ yellowed	☐ scattered plants	☐ garden	☐ sod farm
☐ stem or branch	☐ stunted	☐ in spots or groups	☐ landscape	☐ Christmas tree farm
☐ leaves	☐ stained/streaked	☐ certain cultivar	☐ nursery	☐ vineyard
☐ flower	☐ leaf spot/blight	☐ in low areas	☐ greenhouse	☐ orchard
☐ fruit	☐ leaf mottle	☐ upland areas	☐ athletic field	☐ forest
☐ seeds	☐ other_____	☐ other_____	☐ other_____	☐ indoor plant

5. *Size of total planting:* Acres _____ *or* square feet _____ *or* number of plants _____

Percent of crop affected _____ or number of plants affected _____

Last year's crop 20___ _____ Crop planned for next year 20___ _____

Symptoms first noticed, date _____ Occurrence in previous years: ☐ No ☐ Yes ☐ Unknown

6. Past weather conditions: ☐ normal ☐ rainy ☐ dry ☐ hot ☐ cold ☐ other

Have plants been irrigated? ☐ yes ☐ no how much? _____

7. SOIL:

Type	*Terrain*	*Drainage*	*Soil-less*	*Mulch*
☐ *sandy*	☐ *sloped*	☐ *good*	☐ *pinebark*	☐ *bark chips*
☐ *clay*	☐ *level*	☐ *moderate*	☐ *peat moss*	☐ *plastic*
☐ *loam*	☐ *low*	☐ *poor*	☐ *other*_____	☐ *other*_____
☐ no till	☐ conventional till	☐ minimal till		

www.ext.vt.edu

Produced by Communications and Marketing, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University, 2014

VT-0315/PPWS-62NP

Virginia Cooperative Extension
Virginia Tech • Virginia State University

www.ext.vt.edu

At this point…

- If it looks like you *need some time to work* on the sample, tell the client exactly that
- Be sure to get a **name** and **number/email** to follow up

Step 2: Signs and Symptoms

- Visually take note of signs and symptoms
  - Hand lens
  - Dissecting microscope
  - Light microscope

A Symptom Is…

A **visual clue** indicating the plant is suffering from a disease or disorder

A Sign Is…

Evidence of the organism

Step 2: Signs and Symptoms

- Visually take note of signs and symptoms
  - Hand lens
  - Dissecting microscope
  - Light microscope
- May help to write a brief description of visual “clues”

Describing Signs and Symptoms

- See handout

Let's Practice!

Making Sense of the Clues

Step 3: Do research on possible causes

Process of elimination:

1. Rule out insects as cause

Characteristics of Insect Damage

Symptoms:

- Stippling
- Leaf Holes
- Ragged-looking Leaves
- Deformed Leaves

Signs:

- Frass
- Honeydew/Sooty Mold
- Actual Insect

Distribution: clumps or hotspots

Step 4: Confirming Insect ID

Send sample to Insect Identification Lab at Virginia Tech

Step 3: Do research on possible causes

Process of elimination:

1. Rule out Insects as cause
2. Rule out Abiotic causes

Characteristics of Abiotic Disorders

Distribution: uniform

Characteristics of Temperature Problems:

Too Low?

- Slower plant growth
- Necrotic tissue

Too High?

- Rapid wilting
- Sunscald

Characteristics of Soil Moisture Problems:

Too Little?

- Wilt
- Leaf scorch
- Stunting
- Chlorosis
- Aborted flowers
- **Typically sandy soil**

Too Much?

- Root rot
- Fruit cracking
- Wilt
- **Drainage problem/clay soil**

Characteristics of Light Problems:

Too Little?

- Spindly, elongated growth
- Lack of germination

Too Much?

- Leaf burn
- Lack of flowering
- Sunscald

Wrong kind?

- Stunting
- Lack of flowering
- Elongated growth
- Promote flowering

Characteristics of Fertility Problems:

Too Little?

- Nutrient deficiency
- Chlorosis or necrosis
- Lack of new growth
- Stunting – normal, dark green or yellow color

Too Much?

- Soluble Salt Injury
- Root burn
- Leaf tip/marginal burn
- Wilt


Fertilizer damage: start with healthy material

Iron Deficiency

Step 4: Confirming Nutrient Problem

- Send soil sample to Virginia Tech Soil Testing Lab
- Tissue sampling through Waypoint or another private lab
- **Ideal**: take sample from affected and unaffected areas

Characteristics of Herbicide Injury

- Often confused with virus
- **Symptoms:**
  - Bleached spots
  - Chlorosis/necrosis of leaves
  - Stunted/distorted growth

Herbicide Injury

Step 3: Do research on possible causes

Process of elimination:

1. Rule out Insects as cause
2. Rule out Abiotic causes
3. Confirm Plant Pathogen

Characteristics of Fungal Diseases

Symptoms:

- Spots with concentric rings
- Cankers
- Wilts
- Rots
- Damping-off

Signs:

- Spores
- Mycelium
- Mushrooms/conks

Dispersed by wind, water and human activity

Characteristics of Bacterial Diseases

Symptoms:

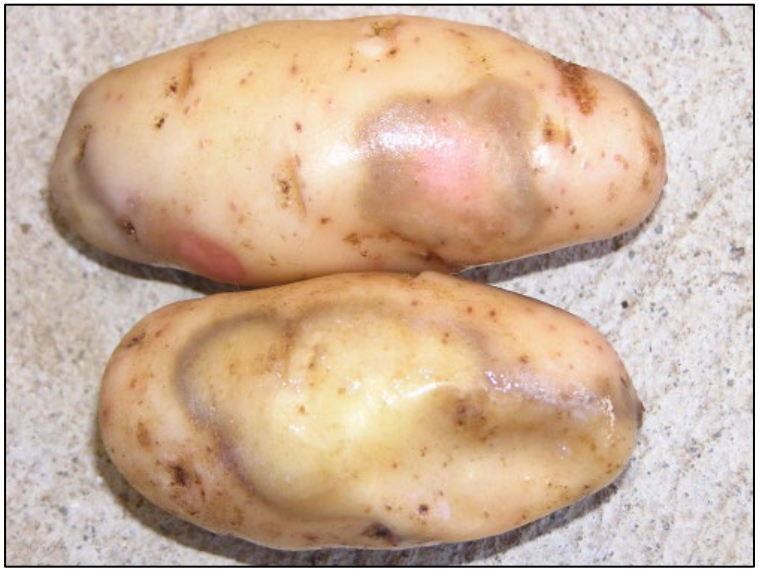
- Water-soaked, angular lesions
- Slimy texture
- Foul odor
- Leaf and fruit spot
- Canker
- Wilt
- Gall
- Soft rot

Signs:

- Bacterial streaming

Dispersed by water and human contact


5367248



Characteristics of Viral Diseases

Symptoms:

- Distorted growth
- Mottling
- Mosaic
- Ring spots
- Necrosis
- Stunting

Signs: must be verified in lab

Step 4: Confirming a Disease Problem

Send sample to Plant Clinic at Virginia Tech

Collecting a Sample

- Sample should be fresh and shipped ASAP
- Collect whole plant w/roots and ~ 1 pt soil
- DEAD MATERIAL DOES NOT HELP!!

Packaging Sample

- Place root ball in a bag or wrap in aluminum foil
- Place top of plant in another plastic bag
- Do not use wet paper towels in packages
- Ship in the early part of the week to allow time to get to Blacksburg

Turf Samples

Characteristics of Nematodes

Symptoms:

- Stunted plants and root systems
- Poor/slow growth
- Death of plant

Signs:

- Galls on root systems

Step 4: Confirming a Nematode Problem

Send a soil sample to Nematode Assay Lab at Virginia Tech

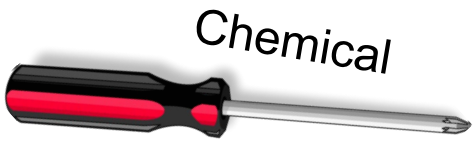
Collecting a Sample

- Similar to a soil sample
- Take subsamples from feeder-root zone across area
- Sample to a 6” depth
- Need at least 1 pint of soil

Step 5: Follow up

Contact client with diagnosis & prevention/control strategies

Remember the toolbox when giving recommendations!



Control Recommendations

- Rotation
- Remove Plant Debris
- Remove Affected Plants
- Use Registered Pesticides
- Resistant or Tolerant Varieties
- Pruning
- Soil Test
- Weed and Insect Control
- Mulching