Northern Neck Master Gardeners 2022 Help Desk Presentation

March 16, 2022

Help Desks Reopen In-Person This Spring!

Please Volunteer by Signing Up

https://nnmg.org/emgs/help-desk/

NNMG Help Desks Will Re-Open to the Public During the Spring of 2022

Help Desk	Weekday Open (9:00 am to Noon)	Address:	Telephone (Area Code 804):
Westmoreland	Mondays (starting May 2)	18849 Kings Highway, Montross	493-8924
Northumberland	Tuesdays (starting April 5)	7154 Northumberland Hwy, Heathsville	580-5694
Lancaster	Thursdays (starting April 7)	8311 Mary Ball Rd, Suite 302, Lancaster	462-5780

The Help Desk's Email Address is HelpDeskNNMG@gmail.com.

Requests for Information are Usually:

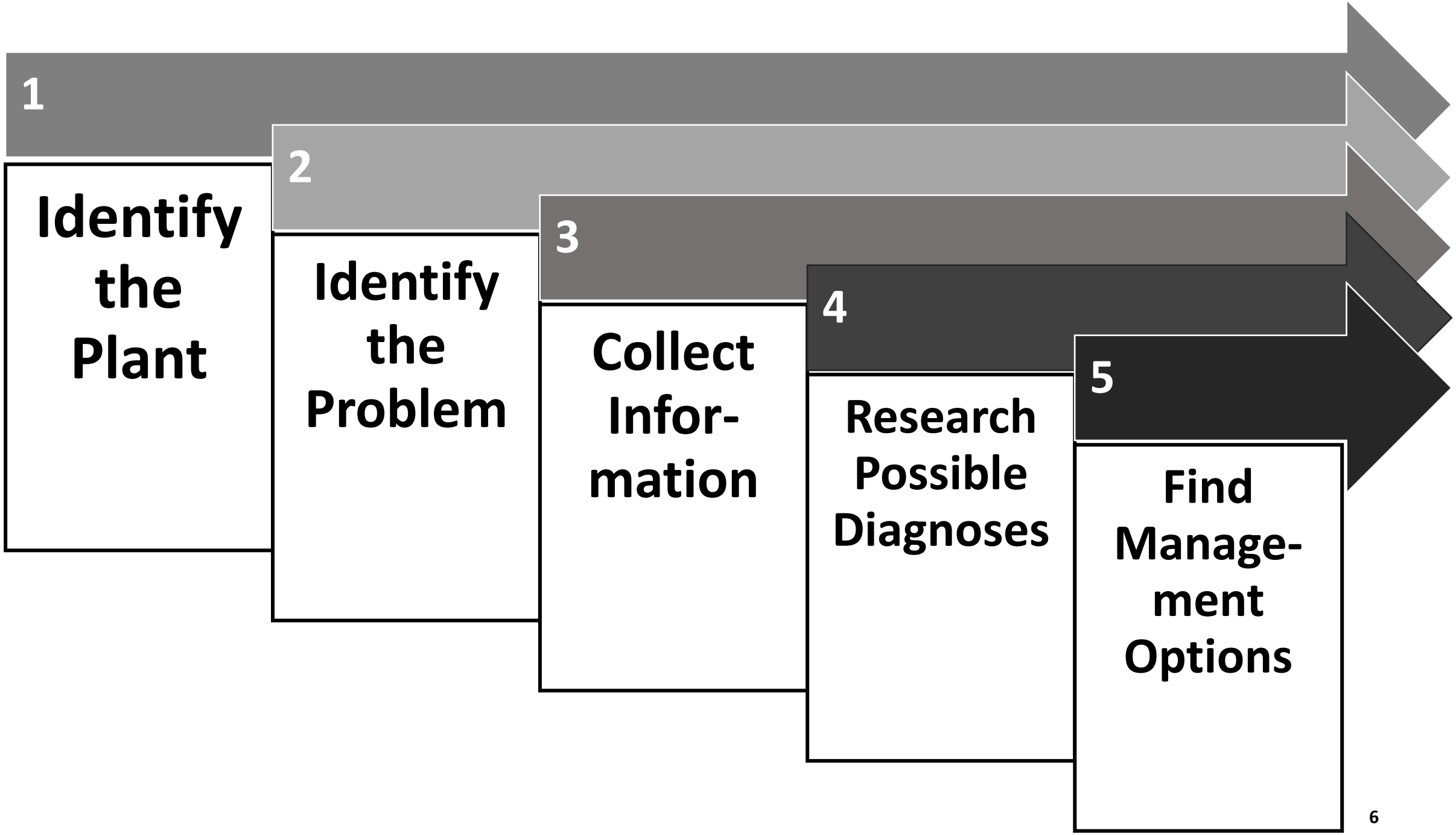
1. Help with Plant Problems
2. Plant Identification (ornamentals, weeds, fruits)
3. Insect Identification
4. Wildlife Problems (deer, voles, moles, gophers)
5. Requests for Cultural Information
   a) Tree fruit, small fruit, ornamentals, lawns, pruning
6. Shoreline Issues (plants, erosion, request for SEP evaluations)
7. Recommendations for a Professional (arborists, landscapers)

In-Person Help Desks Gives Us Access To:

- **Office Telephones** (rather than having to use our phones)
- **VCE Printed References**
  - 2022 Pest Management Guide
  - EMG Training Handbook
- **Reference Books,** including:
  - Ortho Problem Solver
  - Diseases of Trees and Shrubs
  - Insects that Feed on Trees and Shrubs
- **Office Microscopes**

How to Become a Plant Detective!

Five Steps in a Diagnostic Process


1
Identify the Plant
2
Identify the Problem
3
Collect Infor-mation
4
Research Possible Diagnoses
5
Find Manage-ment Options

Step 1: Identify the Plant

- Correctly Identifying the Plant is Important! Knowing the Plant's genus and species will help you:
  - Gain understanding of its normal growing conditions
  - Identify any symptoms or signs of disease
  - Determine if the cause is biotic (living) or abiotic (non-living)
  - Select the correct diagnostic tools
  - Determine rest of diagnostic process

Plant Nomenclature

Genus ("general")

- Group of closely related plants with similar features (flowers, fruits, etc.) compared with other genera within the same family.
- A plant's genus is the first word in a Latin scientific name.
- Example: *Rosa* indicates the Rose group

Species ("specific")

- Next level of classification down from genus.
- A narrower grouping of organisms within a genus.
- A plant's species is the second word in a Latin scientific name.
- Example: rugosa is the rugosa species within the Rose group.

Rugosa rose

- The genus (or general) name for a plant places it in a particular group, as in Rosa for the rose group.
- Knowing the genus still does not tell us the particular plant among the many relatives in the group. For that we need the species (specific) name, as in rugosa of the Rosa genus.
- By convention, the genus is given first and is capitalized, the species is second and not capitalized, and both are in italics if in print.
- The proper scientific name for this example is then *Rosa rugosa*, the Rugosa Rose by its common name.

Resources for Plant Identification

- Internet search engines
  - Google, MS Bing, Yahoo, Baidu, Yandex, DuckDuckGo, Ask.com, Ecosia, Aol.com, etc.
- Plant Identification apps
  - Free: PlantNet, iNaturalist, PlantSnap
  - Paid: PictureThis, FlowerChecker, Garden Compass, Plantix
- BUT….
  - Always confirm with trustworthy sources
  - Confirm plant can grow in Northern Neck (USDA Hardiness Zone 7b)!

Take Photos to Help Identify the Plant

- Images should be clear and in focus
  - Avoid small-size images (< 500 pixels)
  - ≈2,000 pixels should work well
- Take from multiple angles & distances
  - Close-up, entire plant & plant in the landscape
- Show junction of healthy & unhealthy tissue
- Show any pattern in the landscape
- See examples of suitable images on following pages

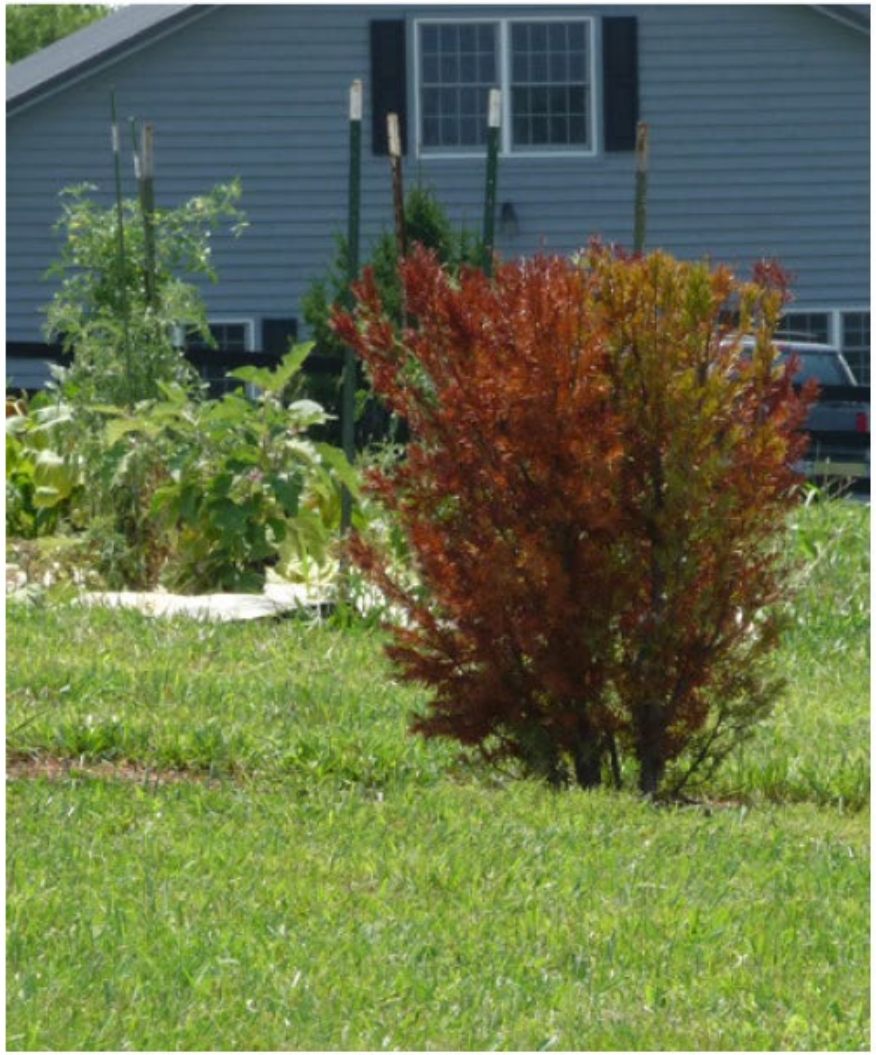
Boxwood Problem

Well-focused close-up image

Overall image of the whole plant

Image of the plant in the landscape

Yew Problem

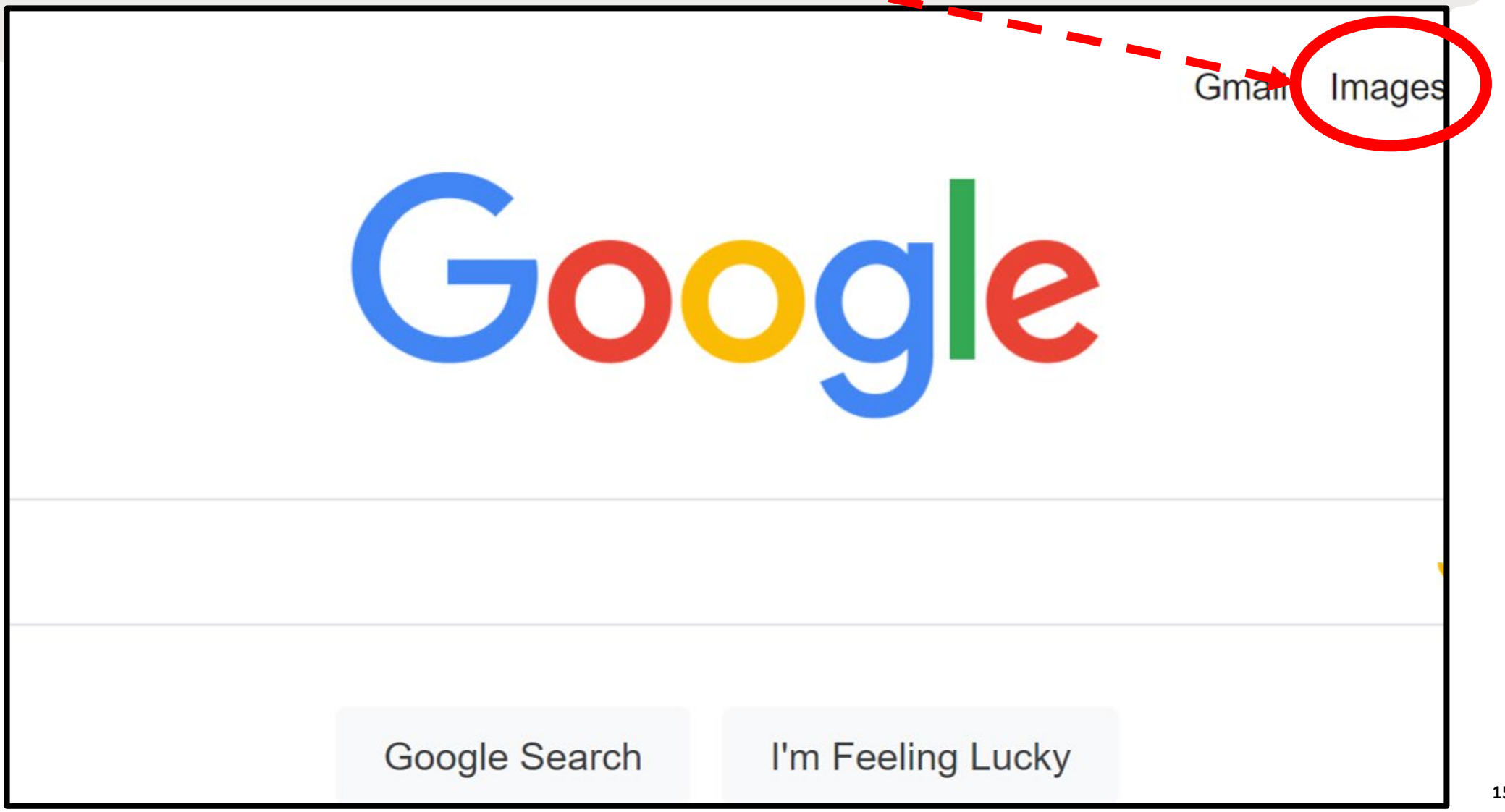


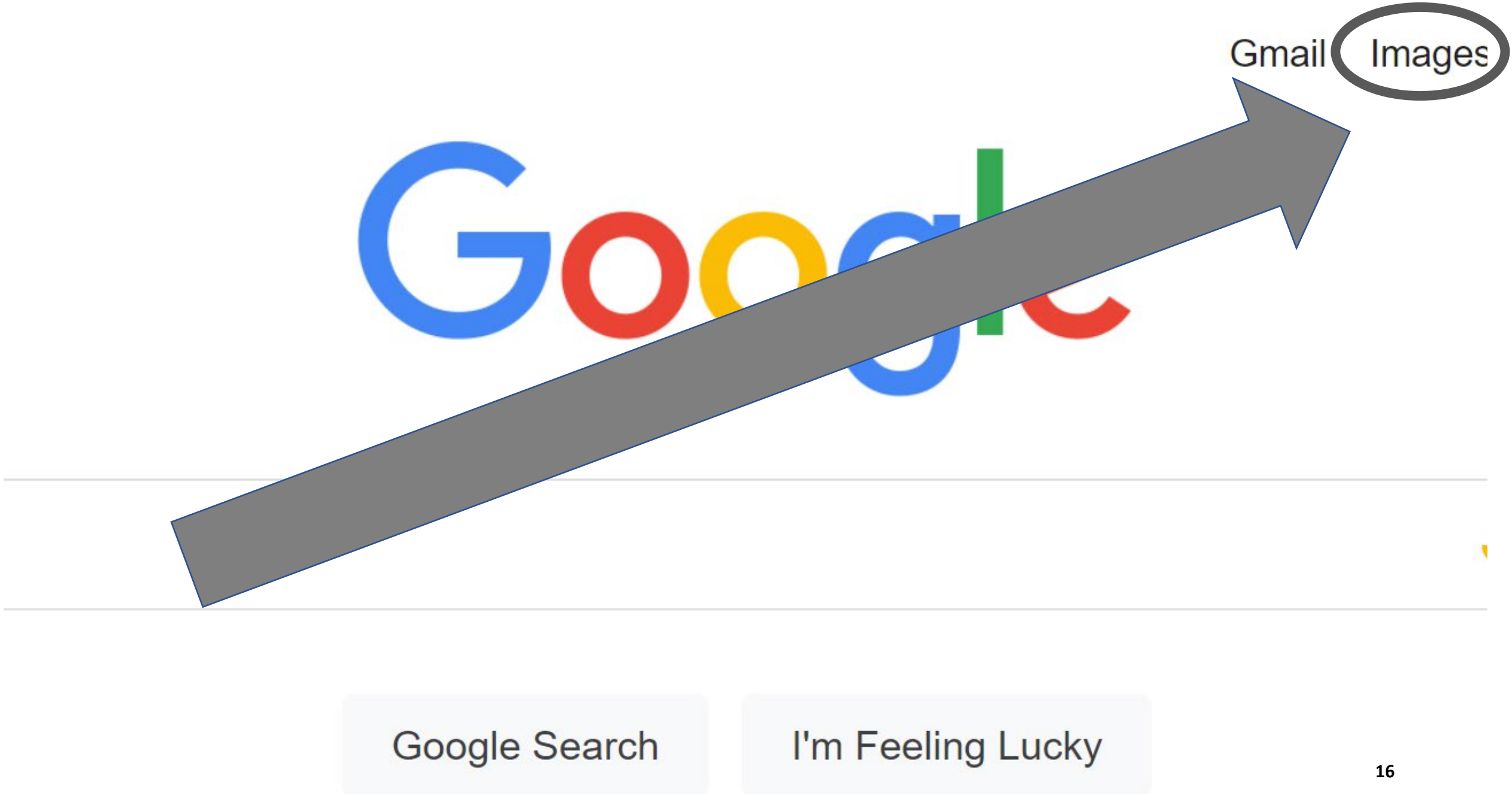
Overall image of the symptoms on the plant

Pattern of the problem in the landscape

Examples of Well-focused Close-up Images

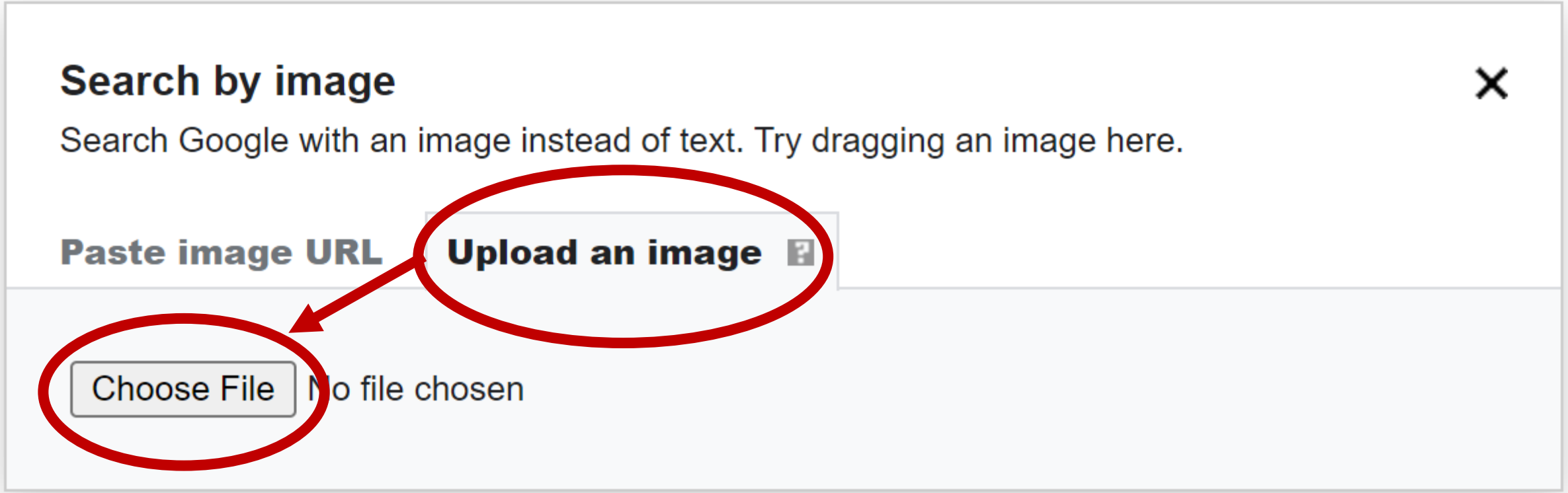
Use Google Images to Identify Plants




Gmail
Images
Google Search
I'm Feeling Lucky

Google Images

Click on the camera icon

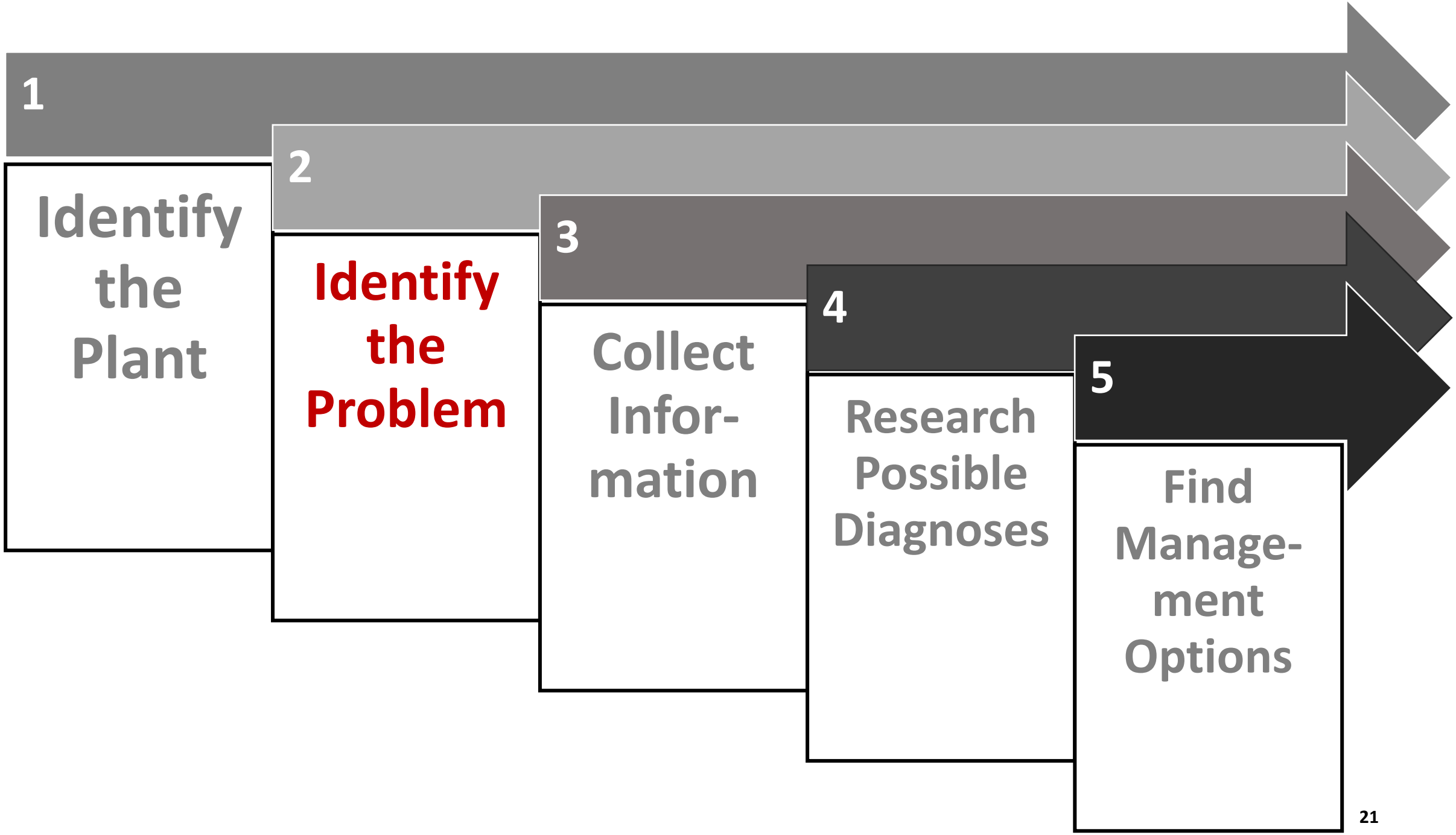

Google
Images
Search by image
Search Google with an image instead of text. Try dragging an image here.
Paste image URL
Upload an image
Choose File
No file chosen

I uploaded this photo to Google Images.

The next slide shows photos that Google found on the internet

Google Provided These Similar Images:

Visually similar images


1
Identify the Plant
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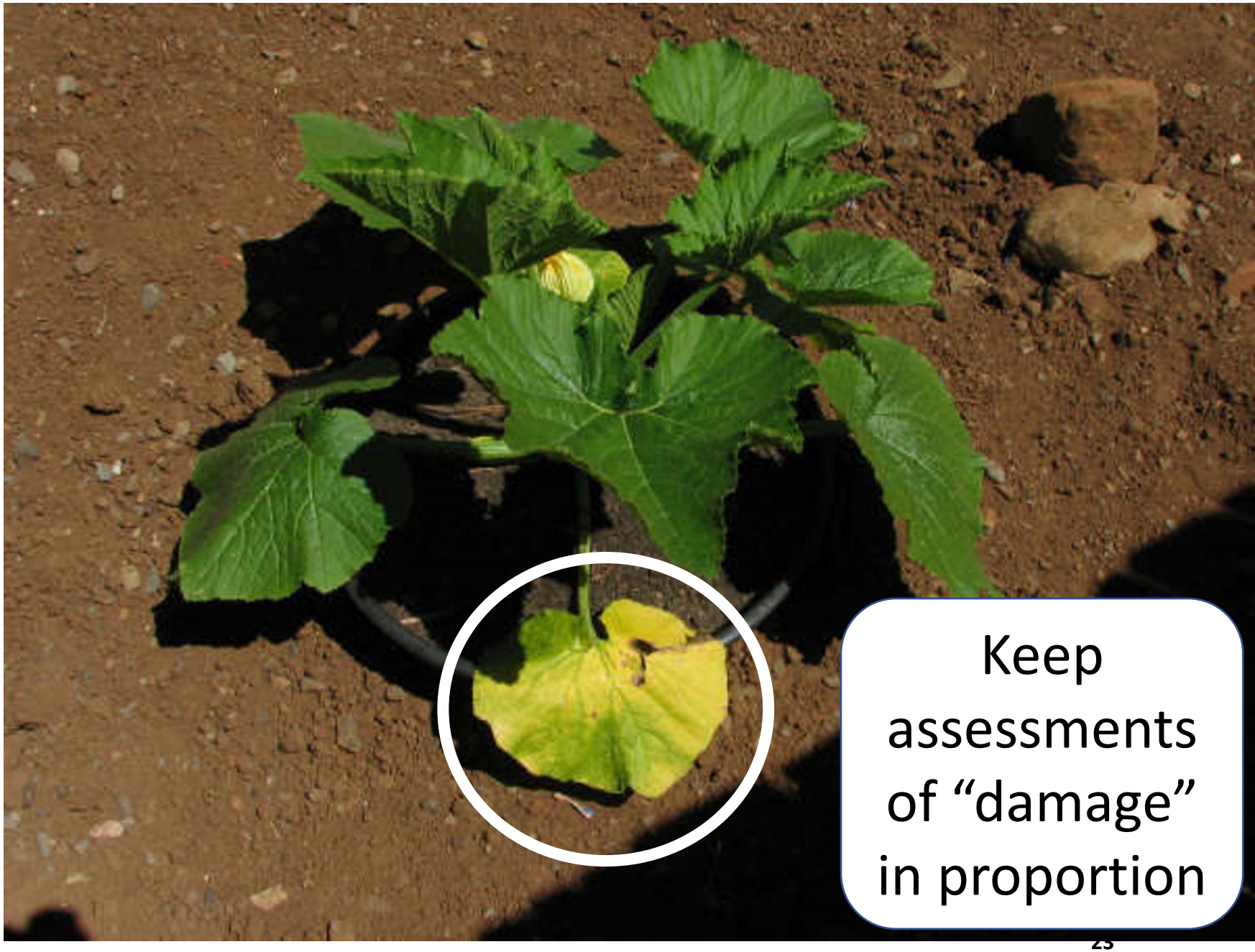
Step 2: Identify the Problem – General Steps

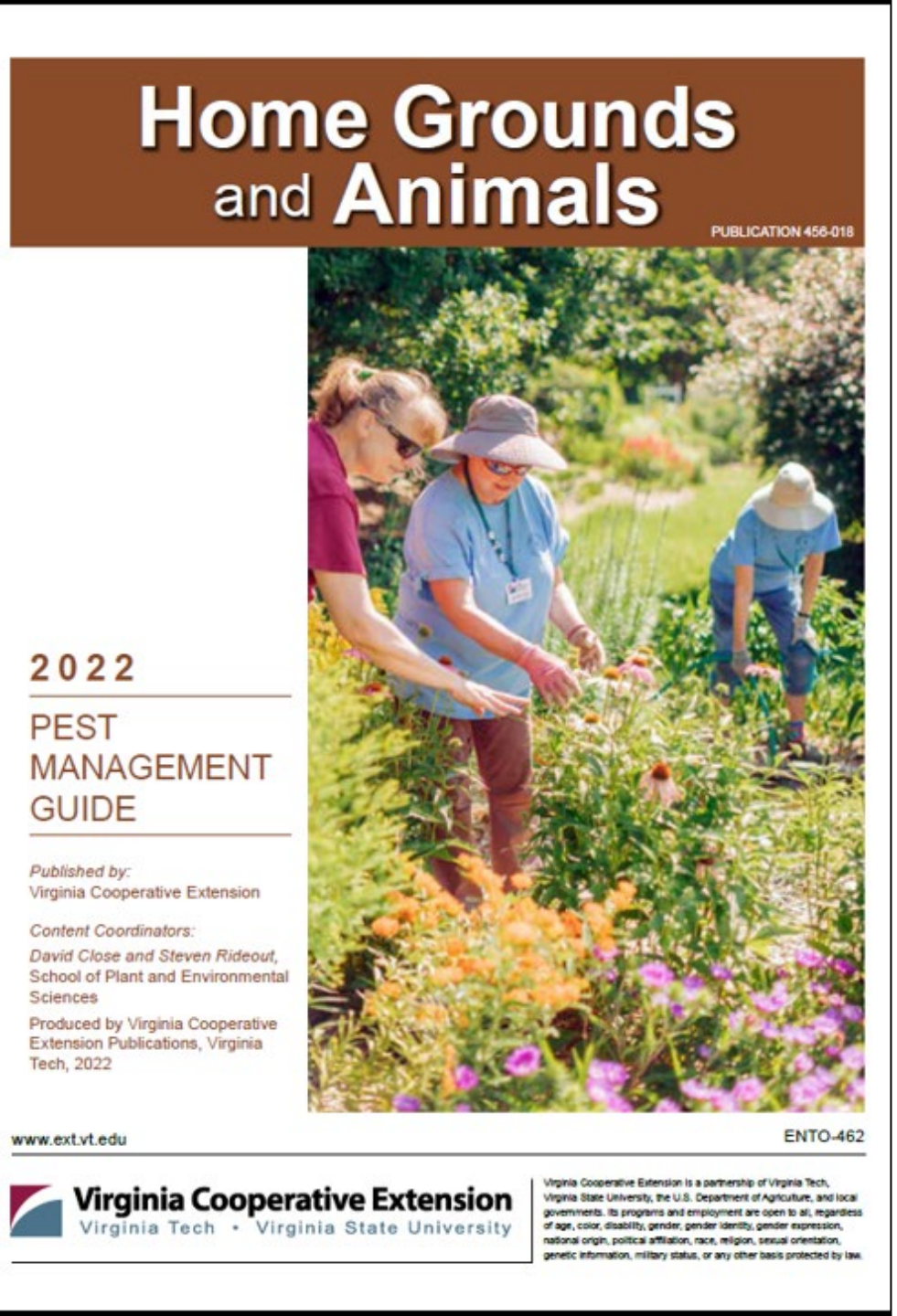
A	**Describe any signs or symptoms you observe.**
B	**Determine if <u>what you're seeing</u> is normal for your plant.**
C	**Determine if what you're seeing is caused by something biotic or abiotic.**

Despite the yellow leaf, this squash plant's foliage in general and its upper part look very healthy.



Keep assessments of "damage" in proportion

However, this squash plant's leaves are affected by powdery mildew, a fungal disease

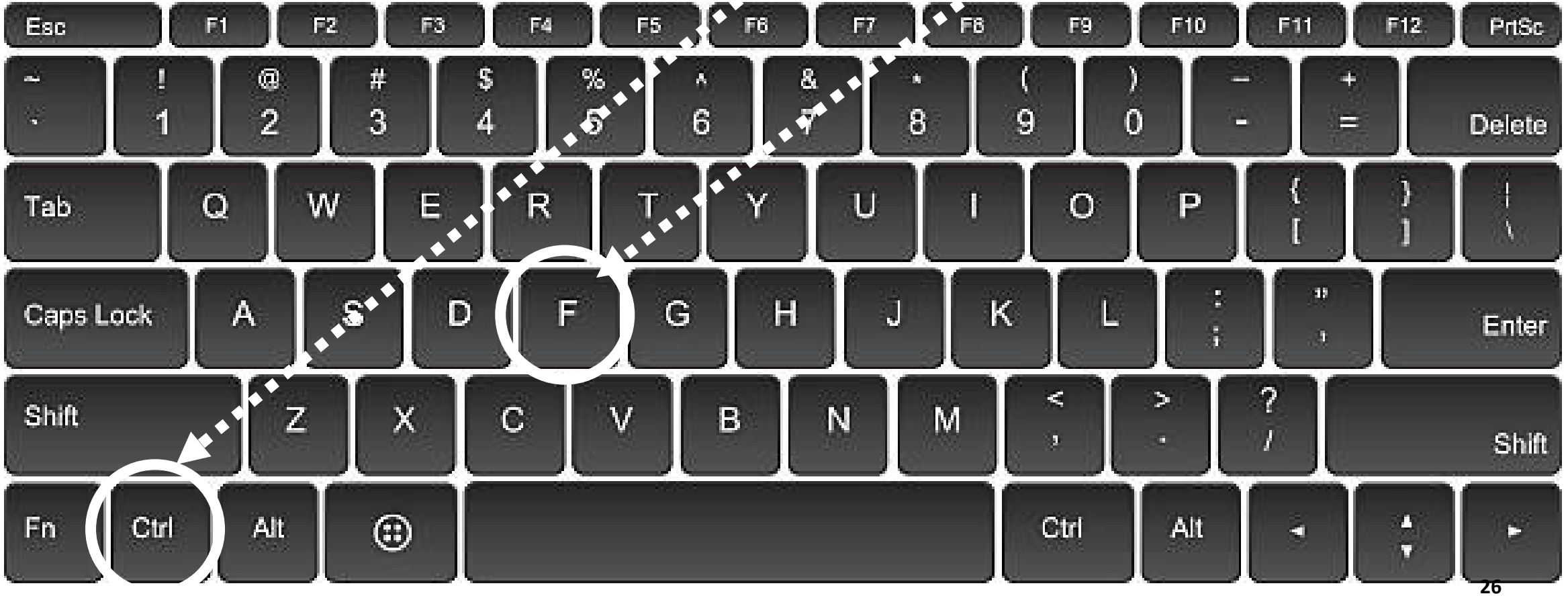


The 2022 Pest Management Guide – Home Grounds and Animals

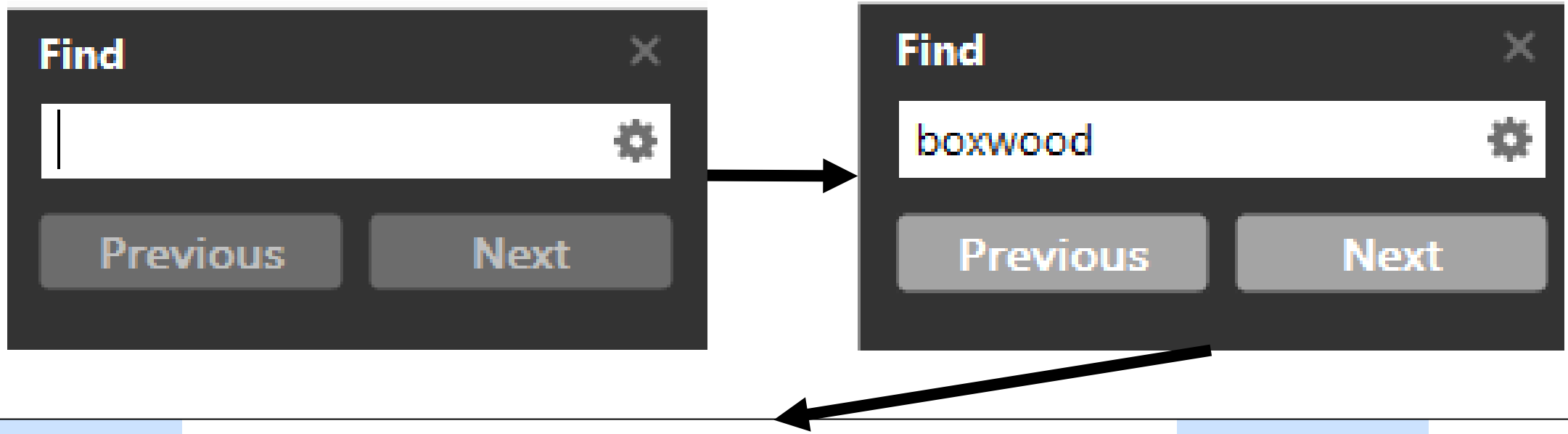
- Once you have identified the plant, you can use the Pest Management Guide to find the most common diseases affecting the plant in VA
- Download the PMG at https://www.pubs.ext.vt.edu/456/456-018/456-018.html

How to Search the PMG

Press and hold the Ctrl and the F keys:



PMG Search Example



Boxwood (***Buxus***) – Botryosphaeria dieback, *boxwood blight*, *boxwood decline*, lesion nematode, Macrophoma leaf spot, Volutella blight

PMG's Listing of Common Diseases of Boxwoods *in Virginia*

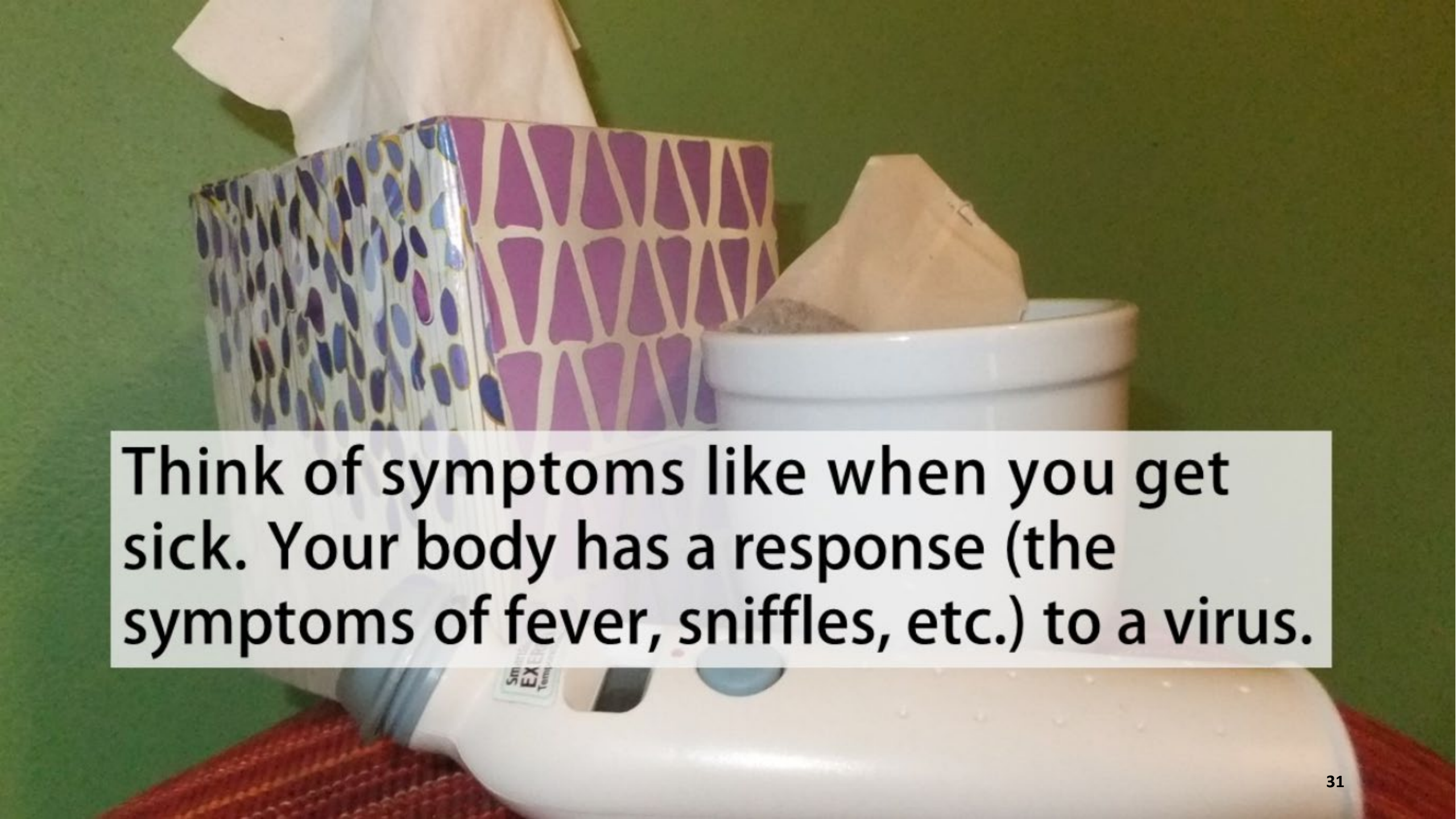
- Botryosphaeria dieback
- *Boxwood blight*
- *Boxwood decline*
- Lesion nematode
- Macrophoma leaf spot
- Volutella blight

Common diseases that usually require chemical treatments are in *italics*

Symptoms and Signs of Plant Disease

Symptoms

- The reaction(s) by the plant to the stress(es) that may be affecting it.
- The physical characteristics of a problem expressed by the plant.
- Wilting of this cucumber plant is a symptom that may be caused by several potential causes.
- We need to look closer at the plant to find specific signs of the cause(s).



Think of symptoms like when you get sick. Your body has a response (the symptoms of fever, sniffles, etc.) to a virus.

<u>Signs</u> are evidence of the actual causal agent

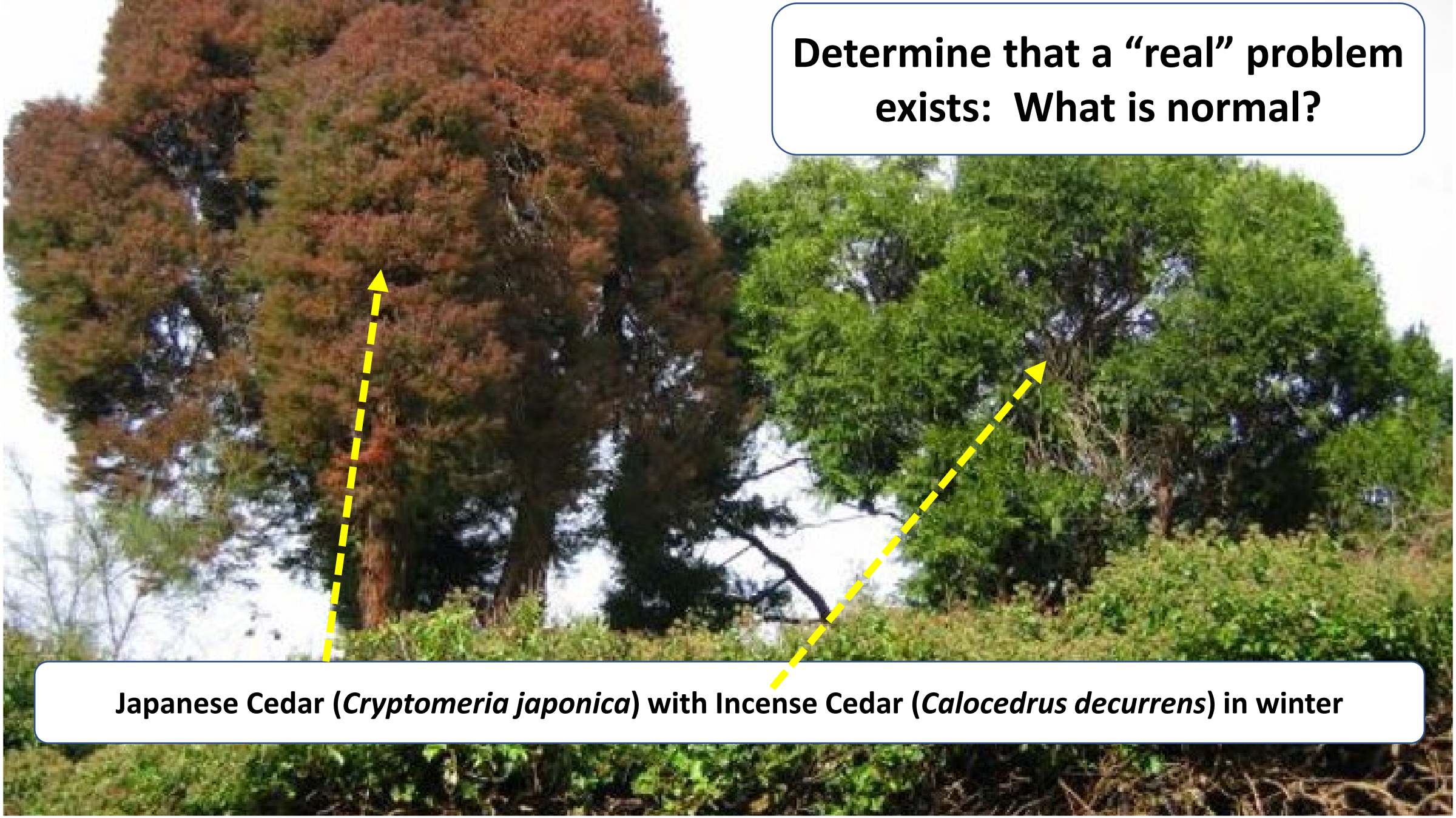
They are the disease, insect, vertebrate, etc.

Symptoms and Signs (continued)

- In the previous photo, a portion of the Goldentrain tree's canopy is distorted, which is a symptom of the problem.
- Looking more closely, we observe aphids feeding on the twigs. The aphids are a sign of a biotic cause of the plant disease.
- An additional sign is the shiny deposits on the foliage, which is honeydew exuded by the aphids.
- Looking for and finding signs of a specific pest is important in diagnosing the problem and developing a plan to deal with it.

Having Identified the Plant, ask …

A. Is there a real problem?
B. What is the population of affected plants?
C. Describe the pattern of damage
D. Is the problem spreading, improving or constant?
E. Describe the symptoms and signs you are seeing.



Determine that a “real” problem exists: What is normal?

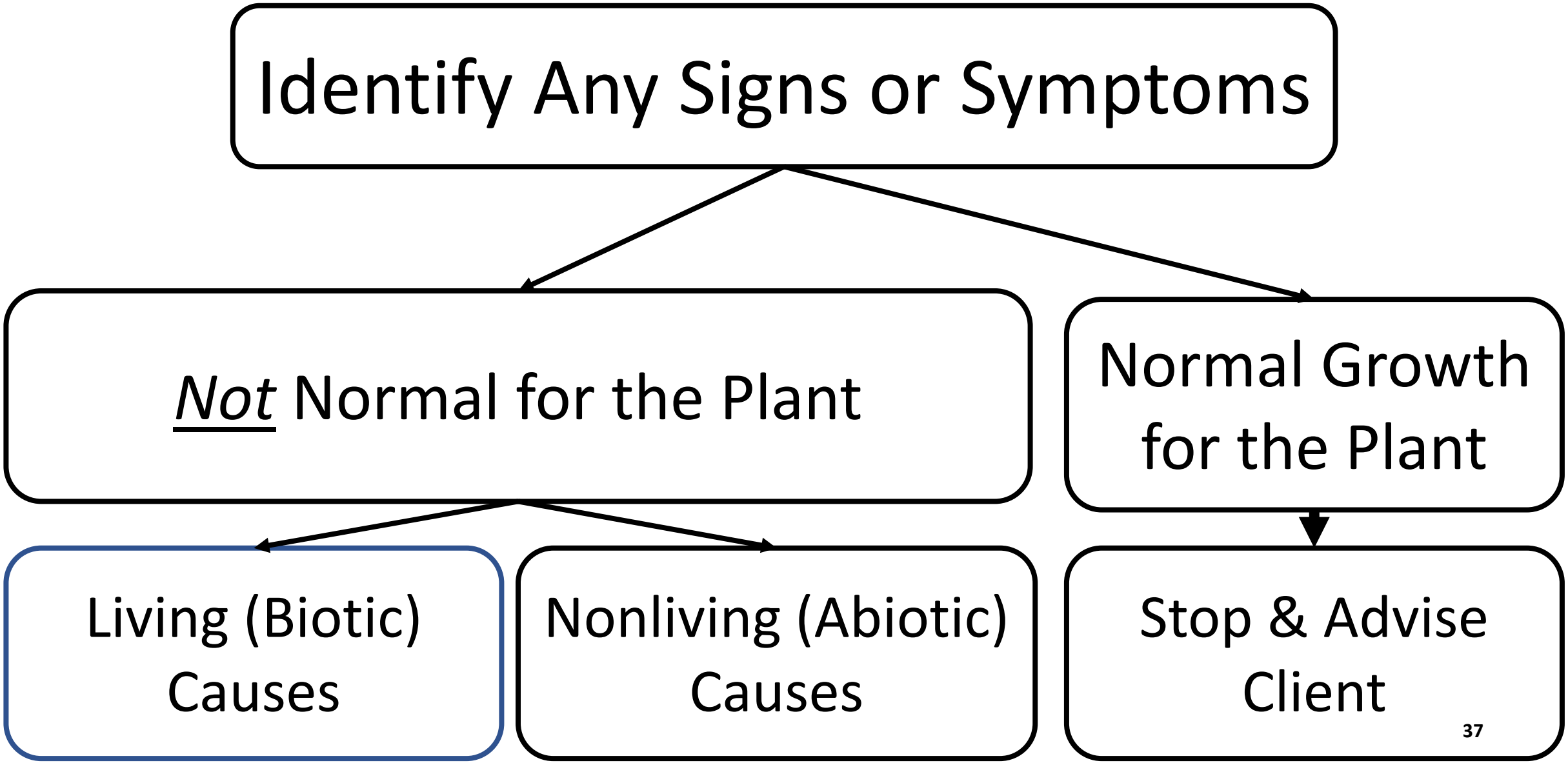
Japanese Cedar (*Cryptomeria japonica*) with Incense Cedar (*Calocedrus decurrens*) in winter

Notes on the Previous Photograph

Knowing the identity of the host plant will enable you to understand the characteristics of the plant. The previous slide shows a pair of cedar-like conifers photographed in winter. The tree on the left is Japanese cedar (*Cryptomeria japonica*) and that on the right is Incense cedar (*Calocedrus decurrens*).

The Japanese cedar has turned a distinct reddish-brown color and, in comparison to the Incense cedar, may look stressed. In fact, some selections of this tree simply turn this color in winter in response to cool temperatures, and with warmer weather in spring, the tree returns to a bluish-green color.

Steps in Identifying the Problem



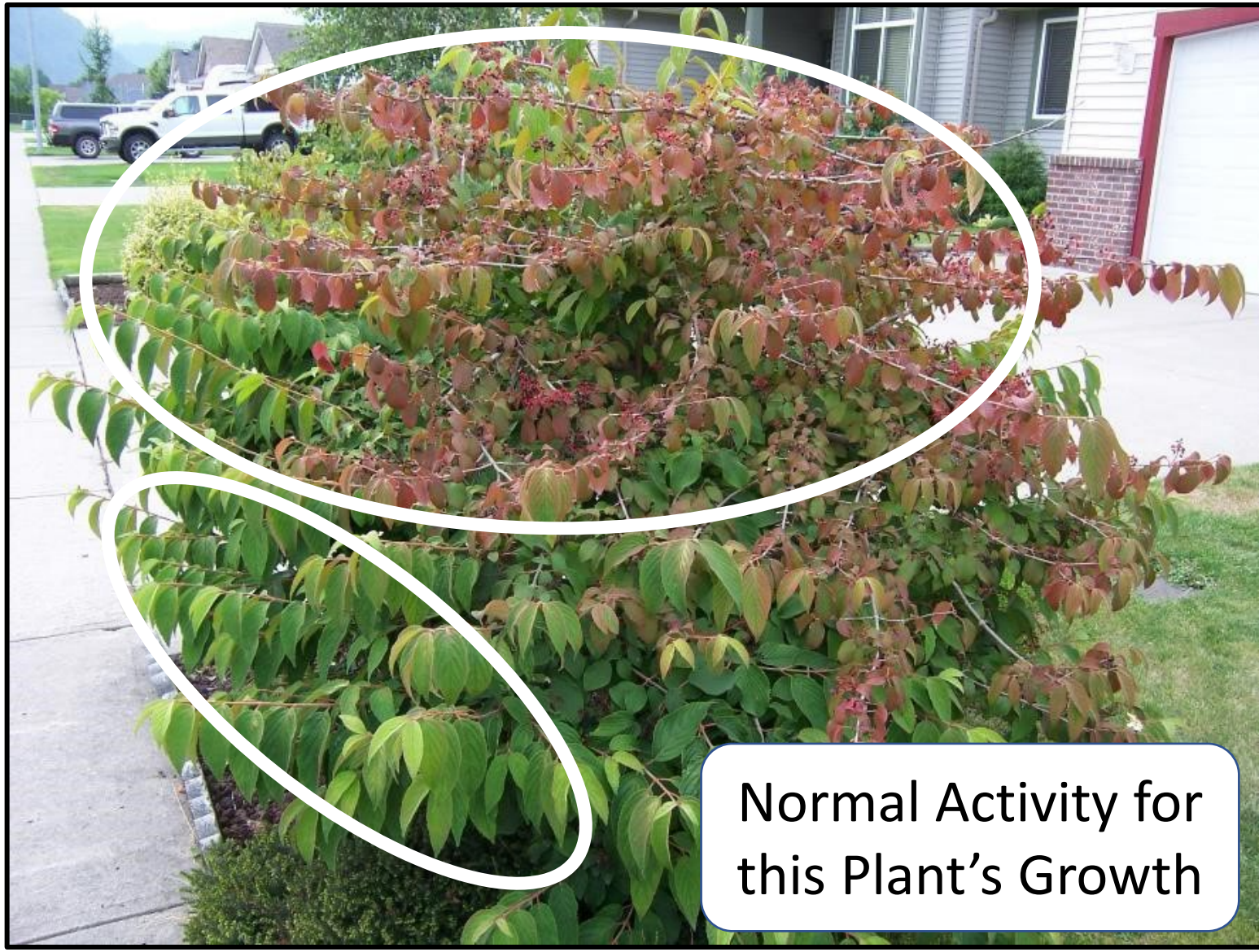
This is a pine tree in mid-summer with most of its foliage turning brown. This is not normal for any conifer in the middle of the growing season.

So this is a problem. We want to find out what is the cause.

Double File Viburnum

(*Viburnum tomentosum*)

Some of the uppermost leaves of this viburnum have turned reddish-brown, while the leaves below remain green. The change in color is caused by flowers having been borne in spring and now fruit and seeds are developing. The green shoots below are vegetative this year and will bear flowers and fruit next year.




C - Is there a “population” of diseased plants? How many are affected?

Comments on Previous Photo

- In the previous photo, some of the arborvitae in the hedge are stressed or dead. The “population” of concern is all the arborvitae, affected or not.
- Although there are other plants visible, including a pine and a flowering plum, these are separate “populations” from the arborvitae.
- Cultural requirements of plants vary widely, and when different species are put together in one environment they may respond differently.
- Also, diseases and pests tend to be specific to individual species or even cultivars of plants, so it is helpful to identify the total affected population of plants.


Hebe
(*Hebe* sp.)
Boxwood
(*Buxus sempervirens*)

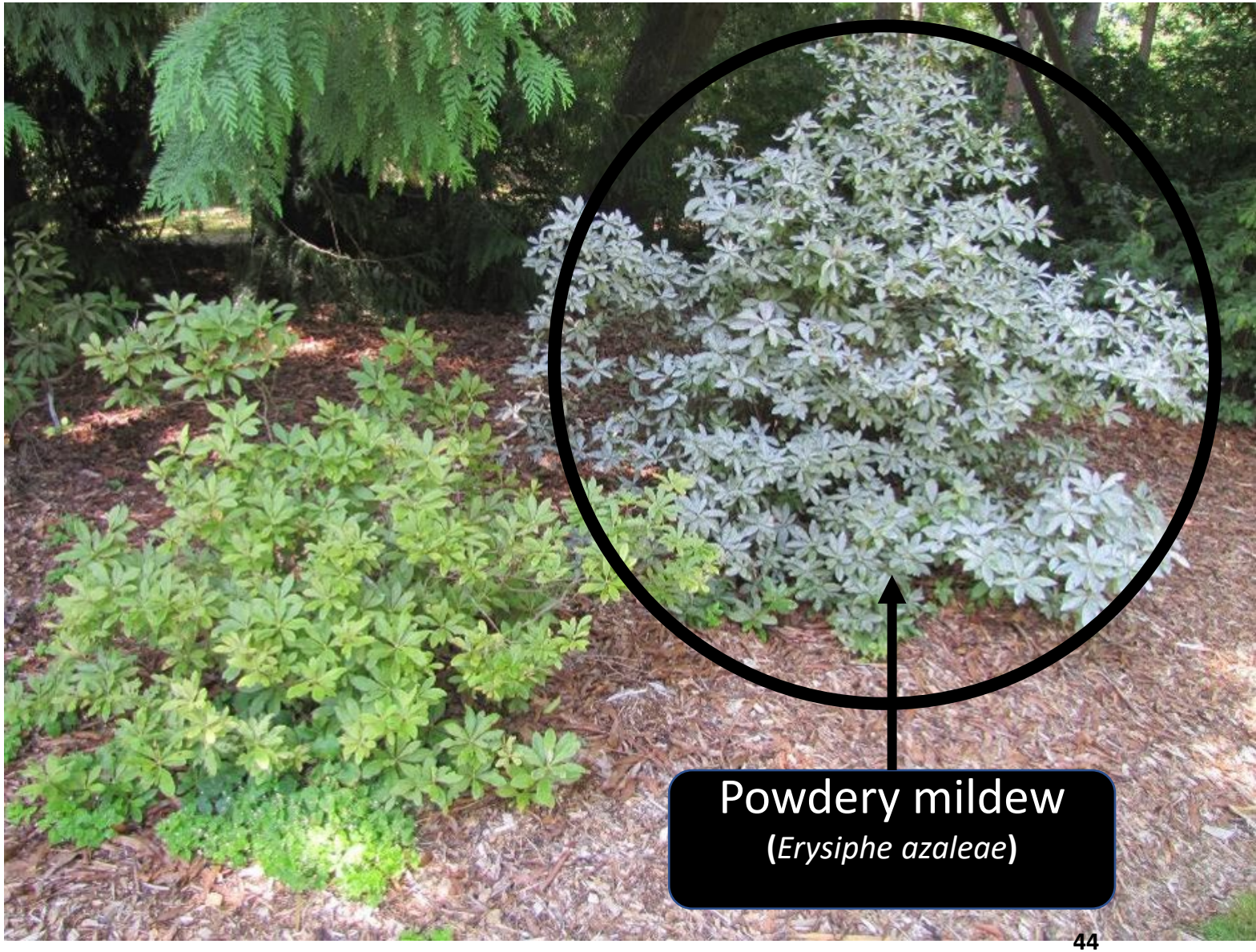
The previous photo shows an example of the difference in response of two different populations of plants to injury. The green plants are boxwood, and the brown plants between them are Hebe. While both are broadleaved evergreen plants, the Hebe plants have dropped all their leaves and appear to be dead.

This photo was taken after a particularly cold winter, and the damage to the Hebe plants was because of cold temperatures. The boxwood plants, however, show no injury.

Even though both are broad-leaved evergreen landscape plants, the boxwood are considered hardy to temperatures below 0 degrees F. Hebes, by comparison, may be injured by temperatures of only 20 degrees F, depending on cultivar.

Variation in Response by Different *Species* Within a *Genus*

- Azaleas are in the genus Rhododendron, which has more than 900 species. These two azaleas are different species within the genus.
- Although growing side by side, the plant on the right is a silvery color because of Powdery mildew. The species on the left is unaffected by the disease.



Biotic

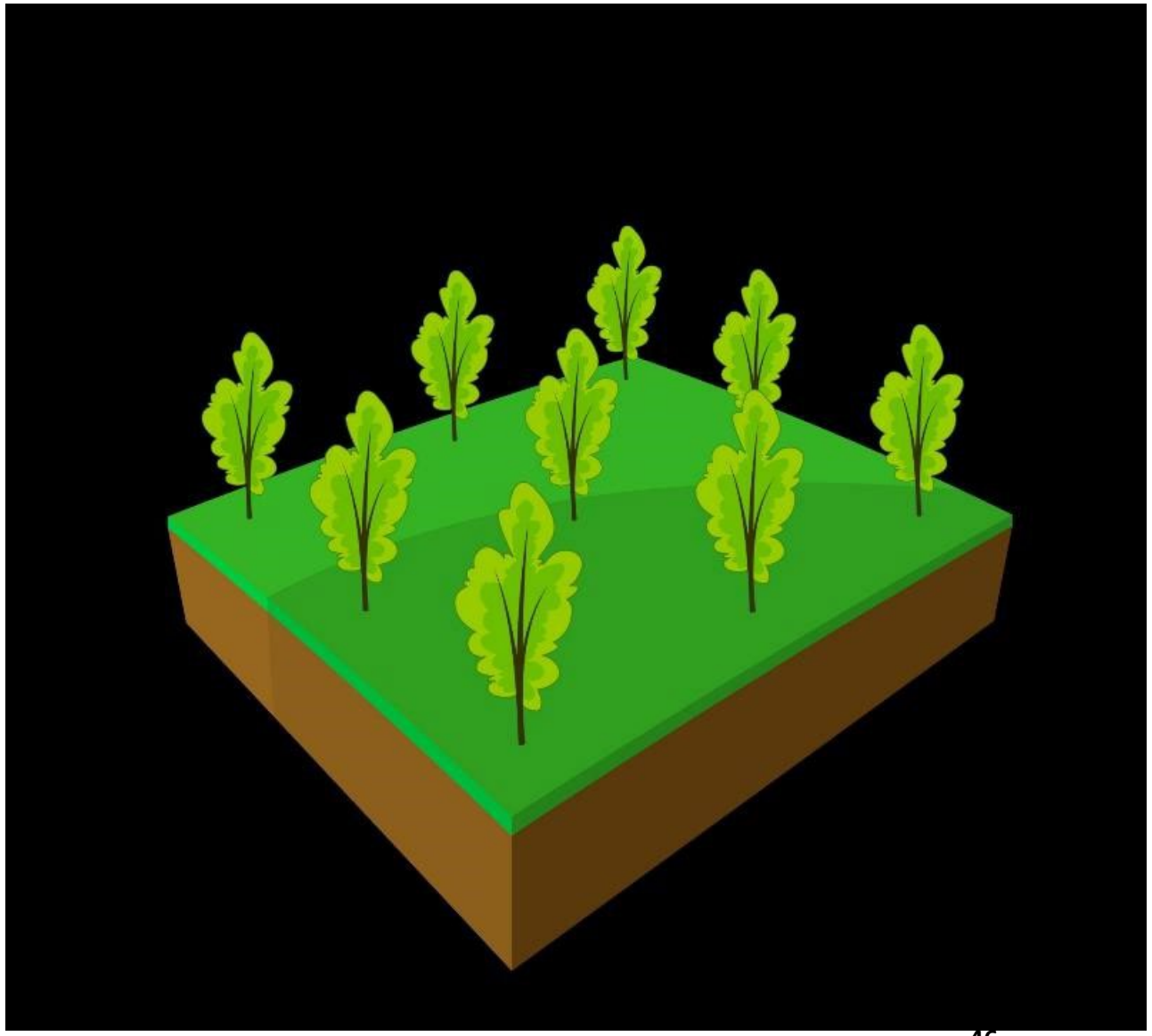
- Caused by something living
- Examples:
  - Insect damage
  - Weed competition
  - Fungal / Bacterial activity
- Damage usually in *irregular* patterns

Abiotic

- Caused by something "nonliving"
- Examples:
  - Excess / insufficient light, water, or nutrients
  - Pesticide overdose
- Damage usually in *a regular* pattern

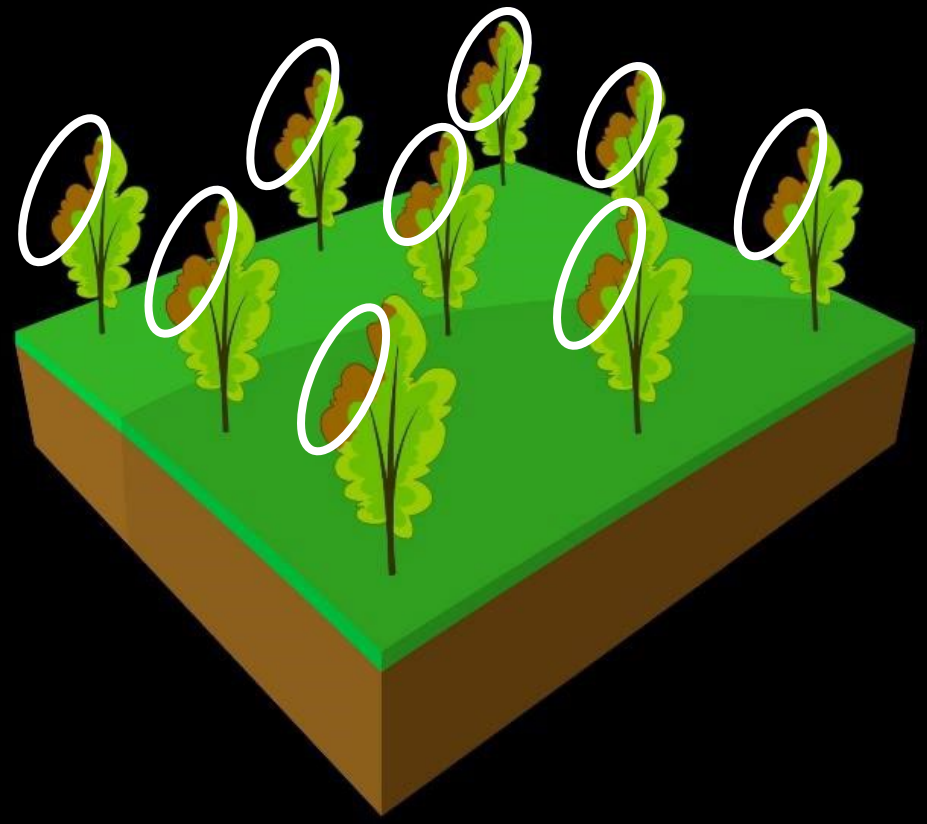
Representation of a Population of Plants

- This illustration represents a population of plants, essentially the same species of tree.
- All these look healthy, without any obvious signs of problems.
- Illustrations on the next page distinguish between abiotic and biotic factors causing disease in this population.



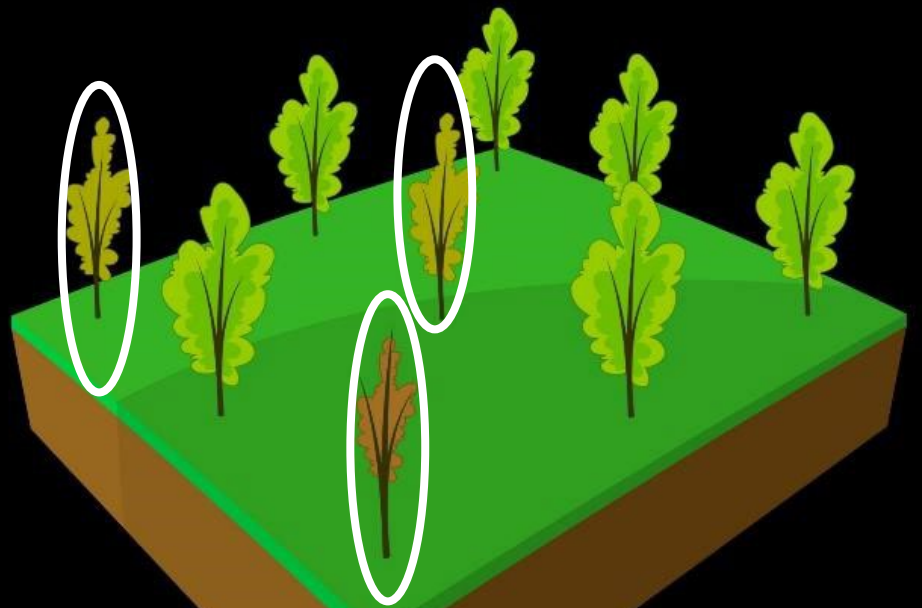
Abiotic (Non-living) Factors:

Same Part of
Entire Population
Affected:



Biotic (Living) Factors:

RANDOM
Pattern of Damage:



It May Be an Abiotic (Non-Living) Issue if….

- More than one species in the area display same symptoms
- Changes are sudden and widespread
- "Non-infectious" (i.e.: doesn't spread over time)
- No signs of any insect, disease pathogen or wildlife

Causes of Abiotic Disorders and Injuries

- Drought
- Flooding
- Excessive Heat or Cold
- Pesticides
- Nutrient Deficiencies
- Physical Injuries from Vehicles or other Equipment
- Severe Weather
- Environmental Pollution
- Vandalism
- Poor Nutrition
- Too Much/Little Sunlight
- Homemade Remedies

Uniform Pattern of Damage in the Landscape

The groundcover on the right is periwinkle, so the population consists of hundreds of the same plant. When grown in part shade, the plant is a medium green color (see inset in bottom right). Here, however, it is being grown in full sun, causing the chlorosis (yellowing) throughout the plant. This is a *uniform* pattern on the entire population of plants as the result of an abiotic, environmental problem.

Periwinkle (*Vinca minor*) grown in full sun

Uniform Pattern of Damage in the Landscape

Another example of a uniform pattern of damage in a population, in this case a hedge of Arborvitae. Most of these are showing browning of the lowest foliage. In addition, a strip below the affected plants shows where the grass and weeds have been killed. The reason for this pattern was that glyphosate was used to kill the grass and weeds at the base of the hedge, but it was applied carelessly and impacted the hedge as well.

Note the Arborvitae in the foreground appears healthy, but grass is also growing at its base, so the herbicide was not applied here.

Arborvitae (*Thuja occidentalis*)

Same Pattern of Damage on Multiple Populations

This photo is a landscape planted alternately with a topiary pine, a rhododendron and a dwarf euonymus - 3 separate species therefore 3 separate populations.

The tops of all 3 plants shown browning of the foliage, possibly due to the work being performed on the building.

RANDOM PATTERN:

Brown patches on Arborvitae caused by Berckmann's blight

Progressive spread of a living organism

Not all three plants are equally affected by the blight, indicating a biotic (living) cause.

BIOTIC CAUSE

Browning of Arborvitae foliage caused by spider mites.

Note uneven distribution of browning: some plants are totally affected, some not at all and other are partially affected.

What Part / Parts of the Plant are Infected?

Both the fruit and leaves of this Apple tree are infected with scab (*Venturia inaequalis*)

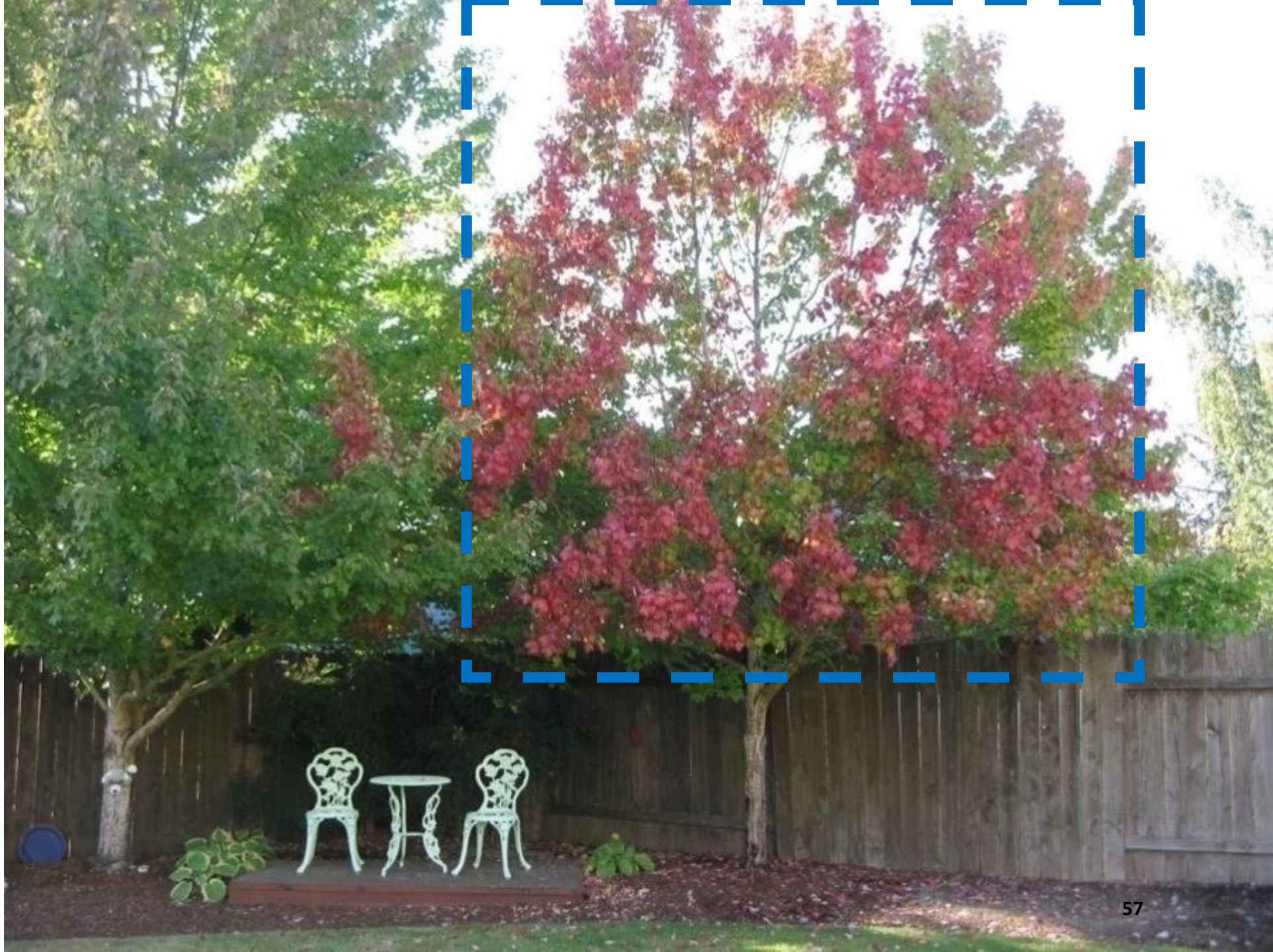
Individual Stems Dying Back Entirely

Japanese Maple, of which three of its branches have wilted & turned brown. Possible cause is Verticillium wilt, to which the tree species is susceptible.

Photo of two Red Maples taken in August.

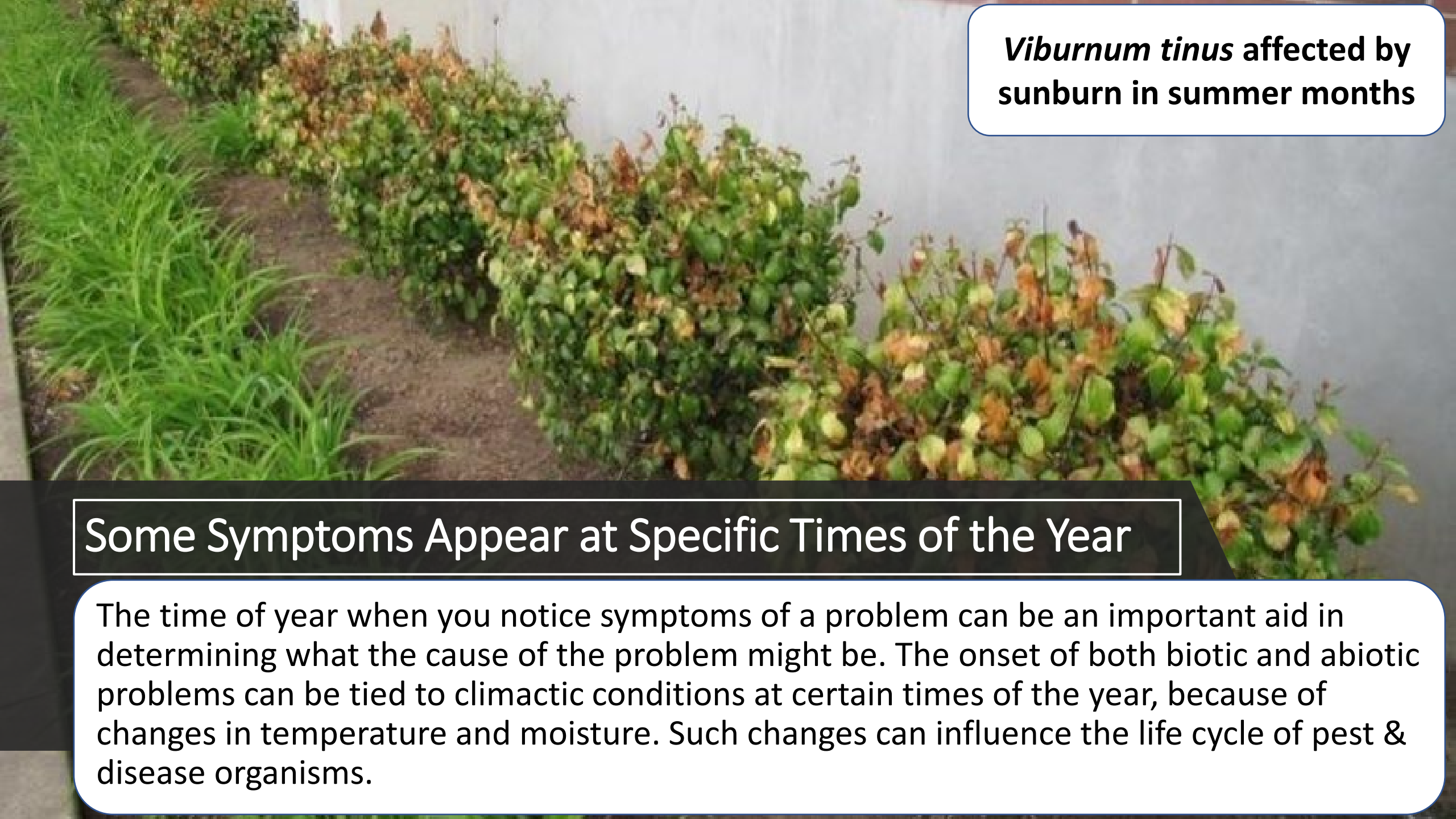
The tree on the right is showing premature fall color.

See photo on next page for possible cause.



Close-up photo of the tree's trunk shows cracking of the bark and weeping of black fluid from cracks.

Problem may be root or trunk related (Phytophthora Canker).



***Viburnum tinus* affected by sunburn in summer months**

Some Symptoms Appear at Specific Times of the Year

The time of year when you notice symptoms of a problem can be an important aid in determining what the cause of the problem might be. The onset of both biotic and abiotic problems can be tied to climactic conditions at certain times of the year, because of changes in temperature and moisture. Such changes can influence the life cycle of pest & disease organisms.

E - Is the problem spreading, improving or constant?

About the Previous Slide

When we are trying to determine the cause of a plant problem, we often only see the plant at a single moment in time. Learning more about the time-development of the symptoms can be critical to determining the cause of the problem.

If you are observing the plant for the first time, you may need to rely on others to provide you with information on how the plant has appeared in the past. What you are looking for is evidence that the problem has visibly worsened over time, or that they have remained essentially unchanged, or that they have improved. Each of these possibilities gives further clues as to the potential cause.

Step 3: Collecting Information

Use the forms available under the Drive app of helpdesknnmg@gmail.com

Help Desk Gmail Account

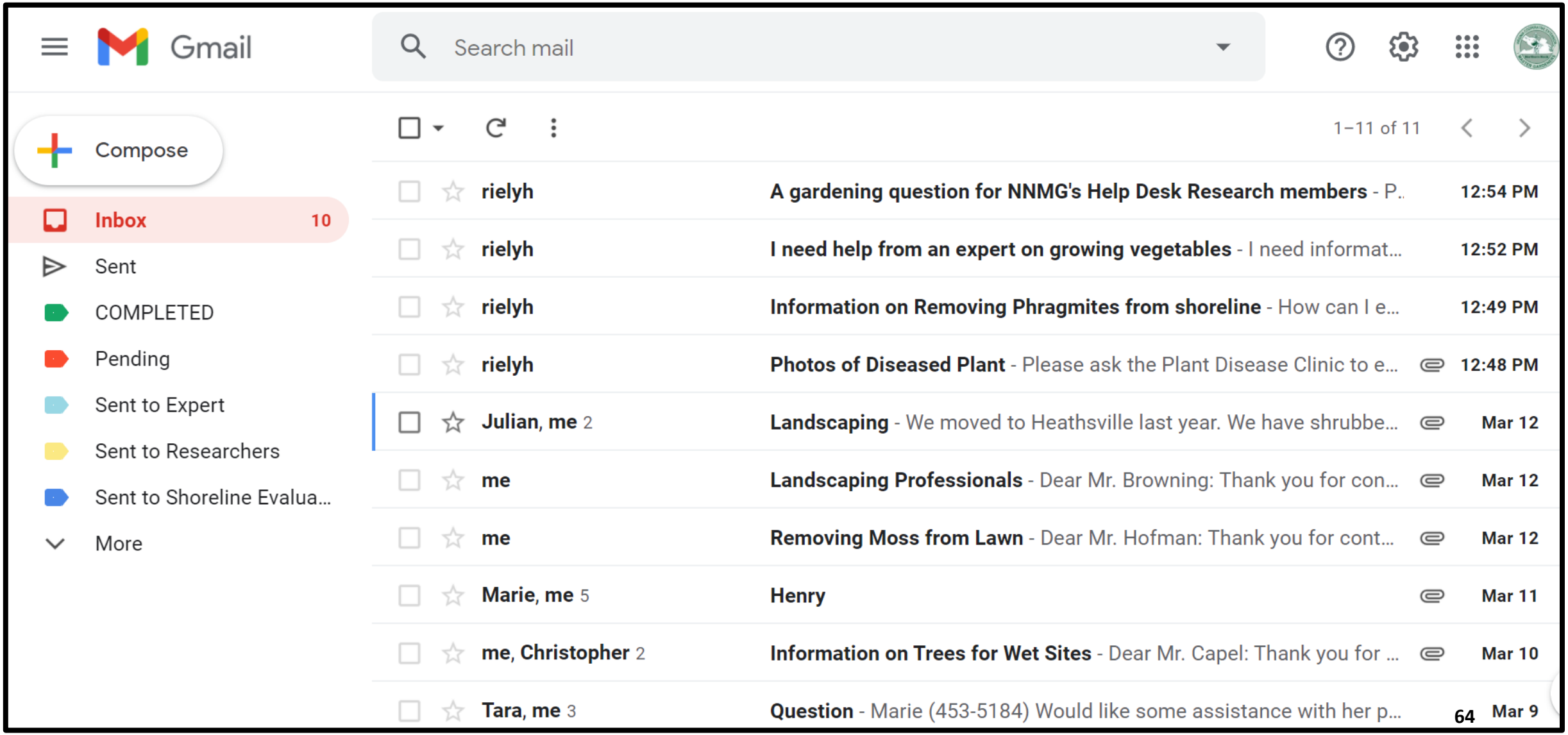
Access Through
www.google.com

User Name:
helpdesknnmg@gmail.com

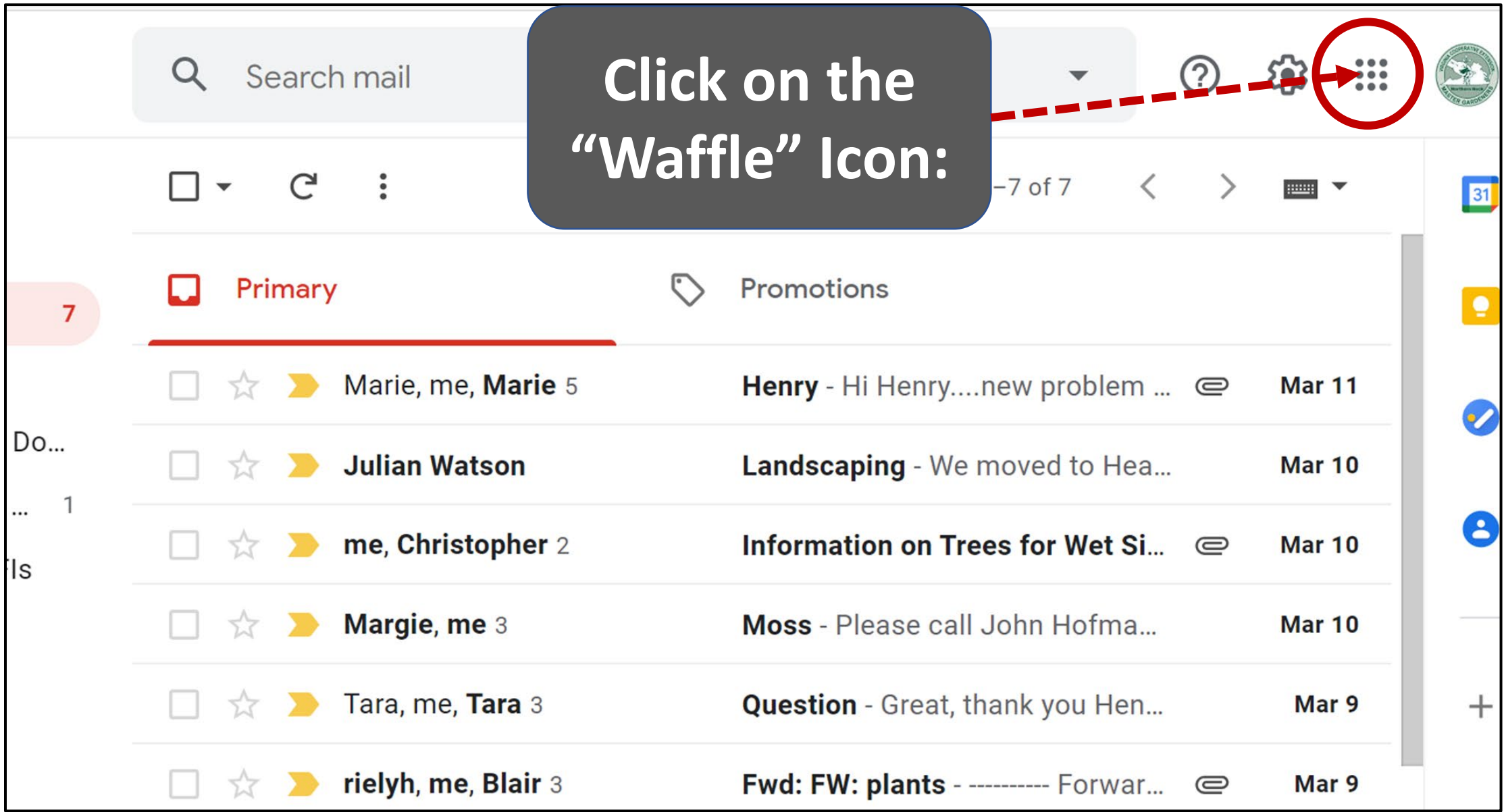
Password: NNMG@VT22473

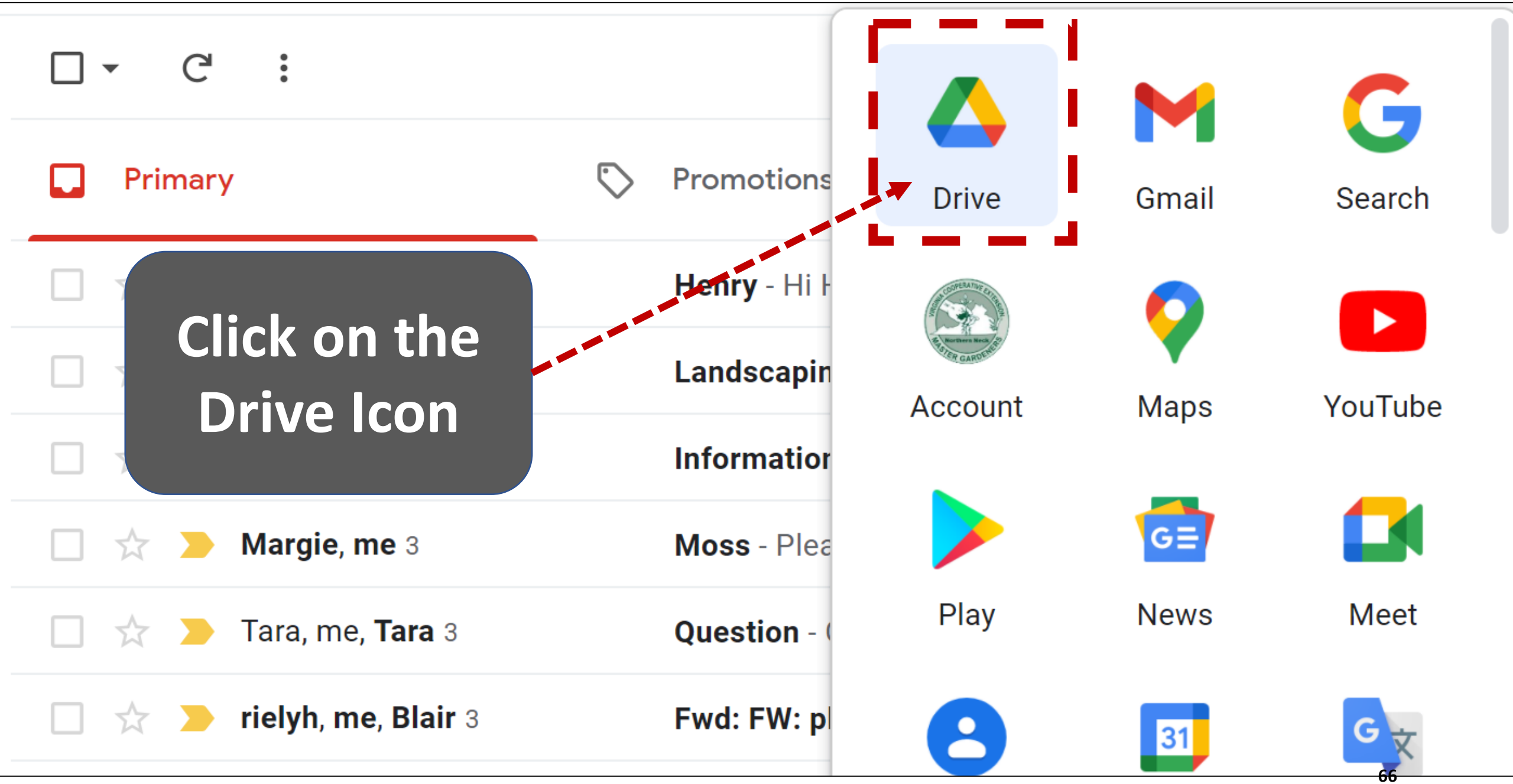
Recovery Email:
nnmgadm@gmail.com

The Gmail Window



How to Access The Google Drive App:

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Click on the Drive Icon
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Account
Maps
YouTube
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News
Meet
Henry - Hi
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Margie, me 3
Moss - Plea
Tara, me, Tara 3
Question -
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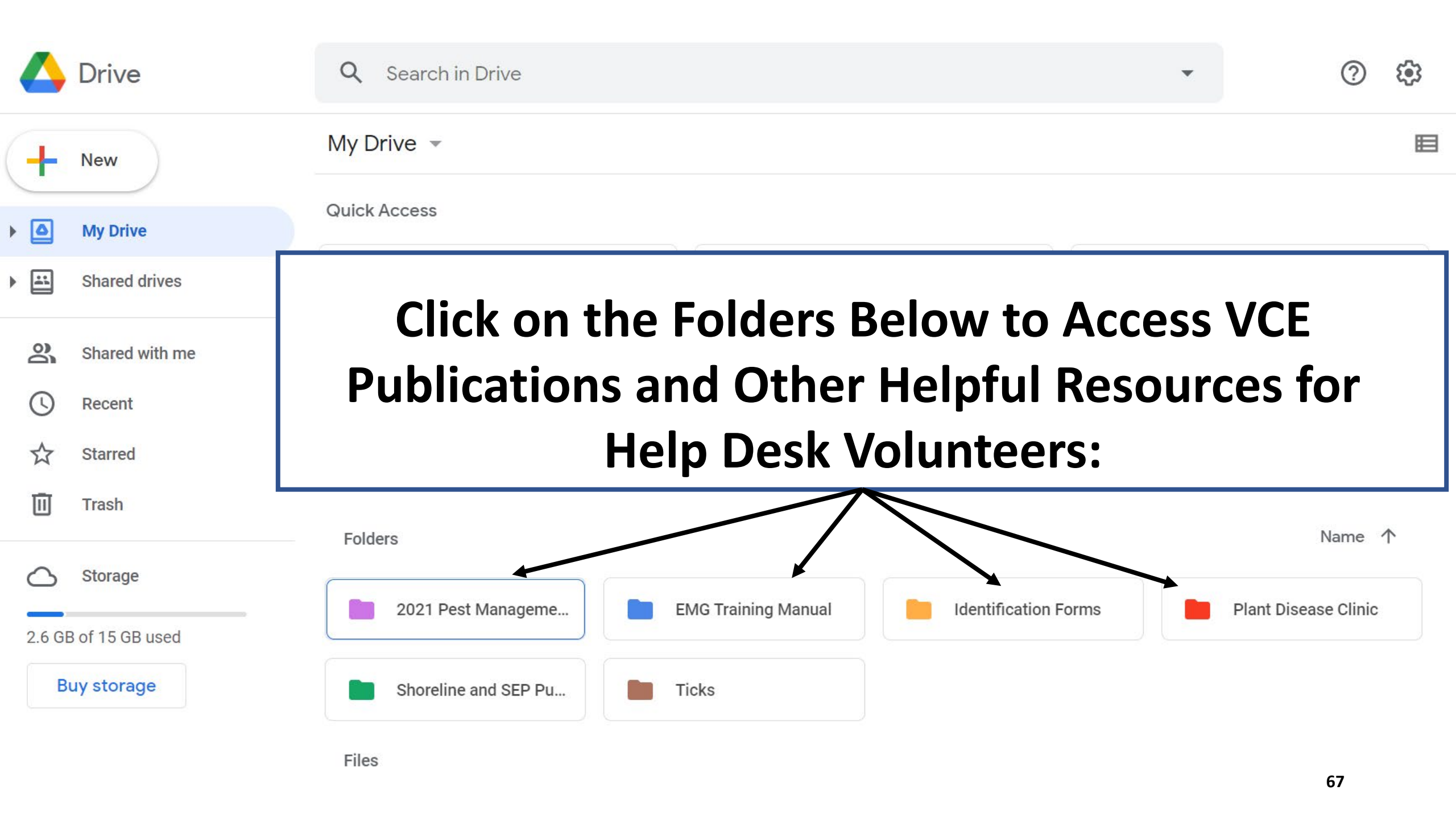
Drive
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Recent
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Storage
2.6 GB of 15 GB used
Buy storage
My Drive
Quick Access
Click on the Folders Below to Access VCE Publications and Other Helpful Resources for Help Desk Volunteers:
Folders
Name
2021 Pest Manageme...
EMG Training Manual
Identification Forms
Plant Disease Clinic
Shoreline and SEP Pu...
Ticks
Files

Virginia Cooperative Extension

Virginia Tech • Virginia State University

Plant Disease Diagnostic Form

Publication 450-097
Revised 2020

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/index.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

VCE Plant Disease Diagnostic Form

Click on the link above to download Form

Stephanie's Handouts on Diagnosis

(Available on Drive App of Help Desk Email)

Making a Diagnosis

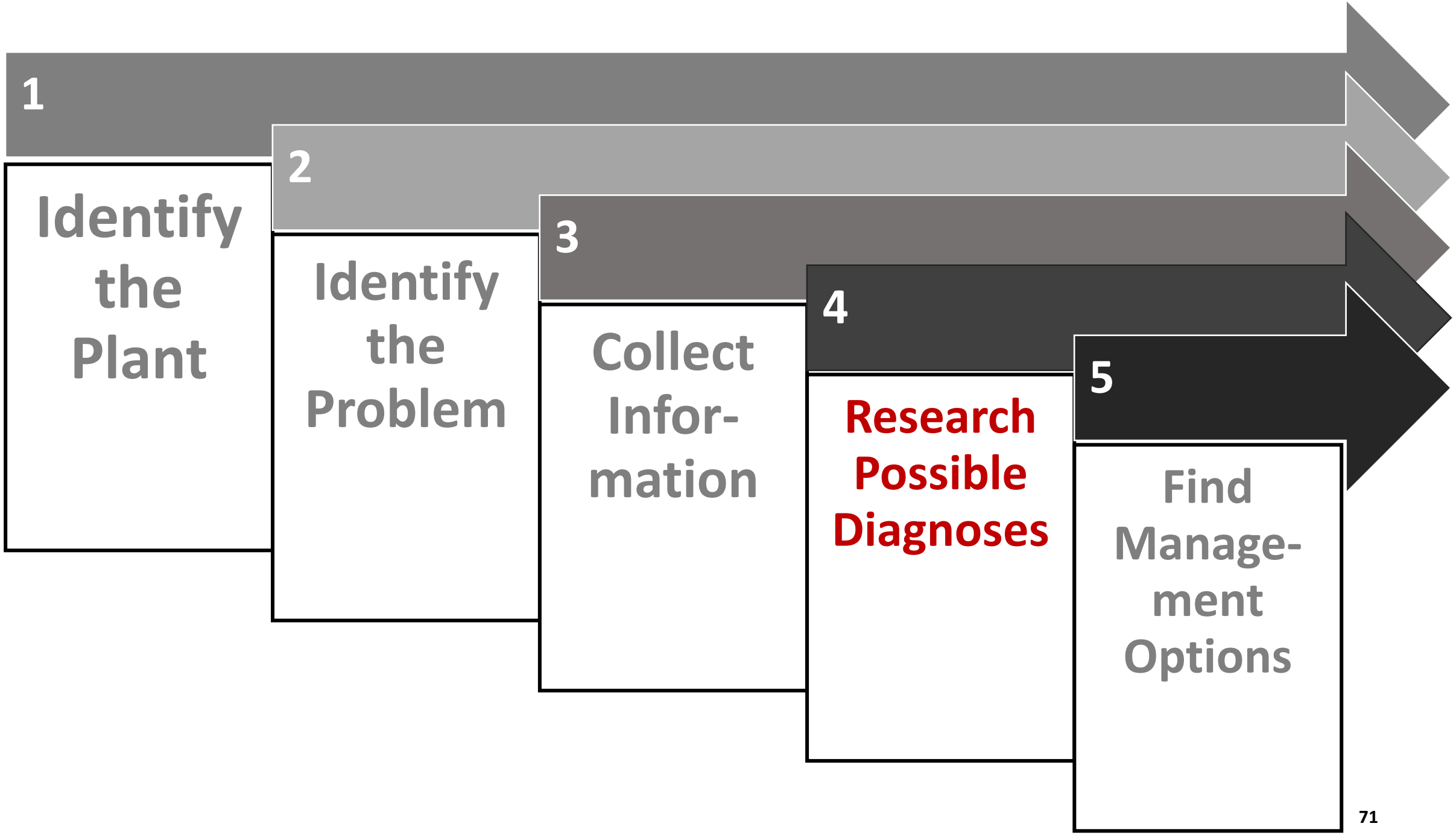
Diagnosis Cheat Sheet

20 Questions to Ask when Diagnosing a Sick Plant

Plant Diagnostic Keys from EMG Handbook

- **Annual & Perennial Flowers**
- **Ornamental Trees & Shrubs**
- **Small Fruit**
- **Vegetables**

(Available on Drive App of Help Desk Email)


1
Identify the Plant
2
Identify the Problem
3
Collect Infor-mation
4
Research Possible Diagnoses
5
Find Manage-ment Options

Step 4: Research Possible Diagnoses:

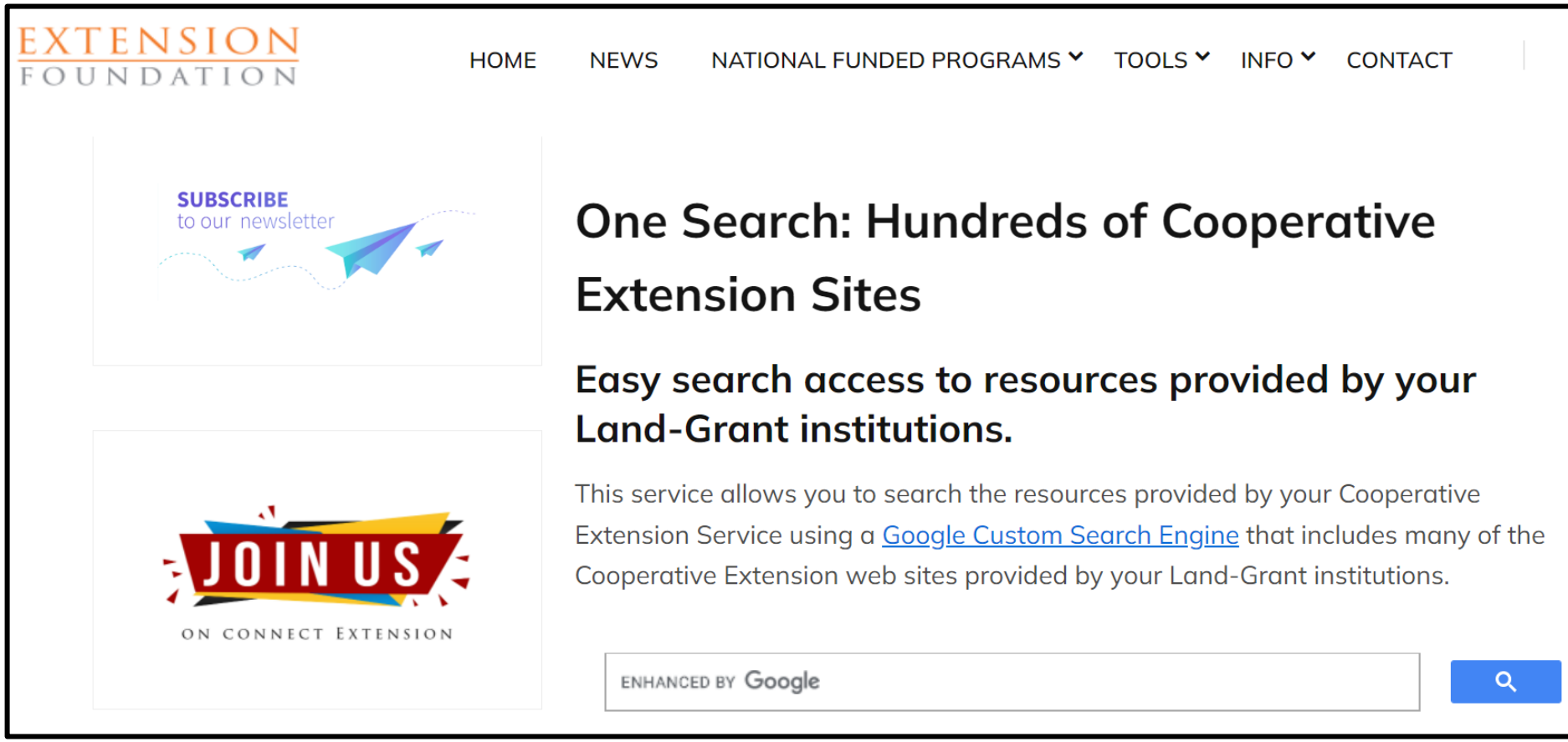
- Reference Books at Help Desks
- VCE Publications & Websites
- Extension One Search Website
- Extension Publications from Nearby States (NC, SC, MD, PA)
- Internet Searching (in general)

VCE Publications & Websites

- Research-based and specific to Virginia
- https://ext.vt.edu/
- https://www.pubs.ext.vt.edu/
- https://vtechworks.lib.vt.edu/handle/10919/5523

Extension Foundation One Search Website

- This website allows you to search the resources provided by VCE and other Cooperative Extension Services using a Google Custom Search Engine that includes VCE and other Cooperative Extension web sites.



https://extension.org/search/

Click on the Links Below to Access to Extension Publications from Nearby States:

- North Carolina
- South Carolina (Clemson)
- Maryland
- Pennsylvania

Consider Bookmarking These Websites

- https://ext.vt.edu/
- https://www.pubs.ext.vt.edu/
- https://vtechworks.lib.vt.edu/handle/10919/5523
- https://extension.org/search/
- https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderSearch.aspx
- https://plants.ces.ncsu.edu/identify_a_plant/
- https://www2.ipm.ucanr.edu/diagnostics/
- https://extension.umd.edu/resource/what-causes-trees-and-shrubs-die
- https://landscapeplants.oregonstate.edu/node/2163

Research On The Internet

.edu	**Very Trustworthy**	**Educational institution – information is research-based and peer reviewed.**
.gov	**Very Trustworthy**	**Government source – Information is research-based and peer reviewed.**
.org	**Potentially trustworthy**	**Website associated with non-profit organization. May be credible but should be verified. Note organization's mission/ bias may influence its information.**
.com	**Least trustworthy Requires verification**	**You must verify information with a credible source. These websites have no requirement to present research-based, unbiased information.**

Definition of a Host Index

- A reference book may have, as one of its indices, an index of insects or diseases that can occur on a particular plant (or host, hence the name “host index”).
- This index provides a list of possible problems affecting a particular genus.
- If you know a plant’s genus, you can use the host index to obtain a listing of the plant’s common diseases and insect pests.

Using A Host Index

You've identified the plant's genus:

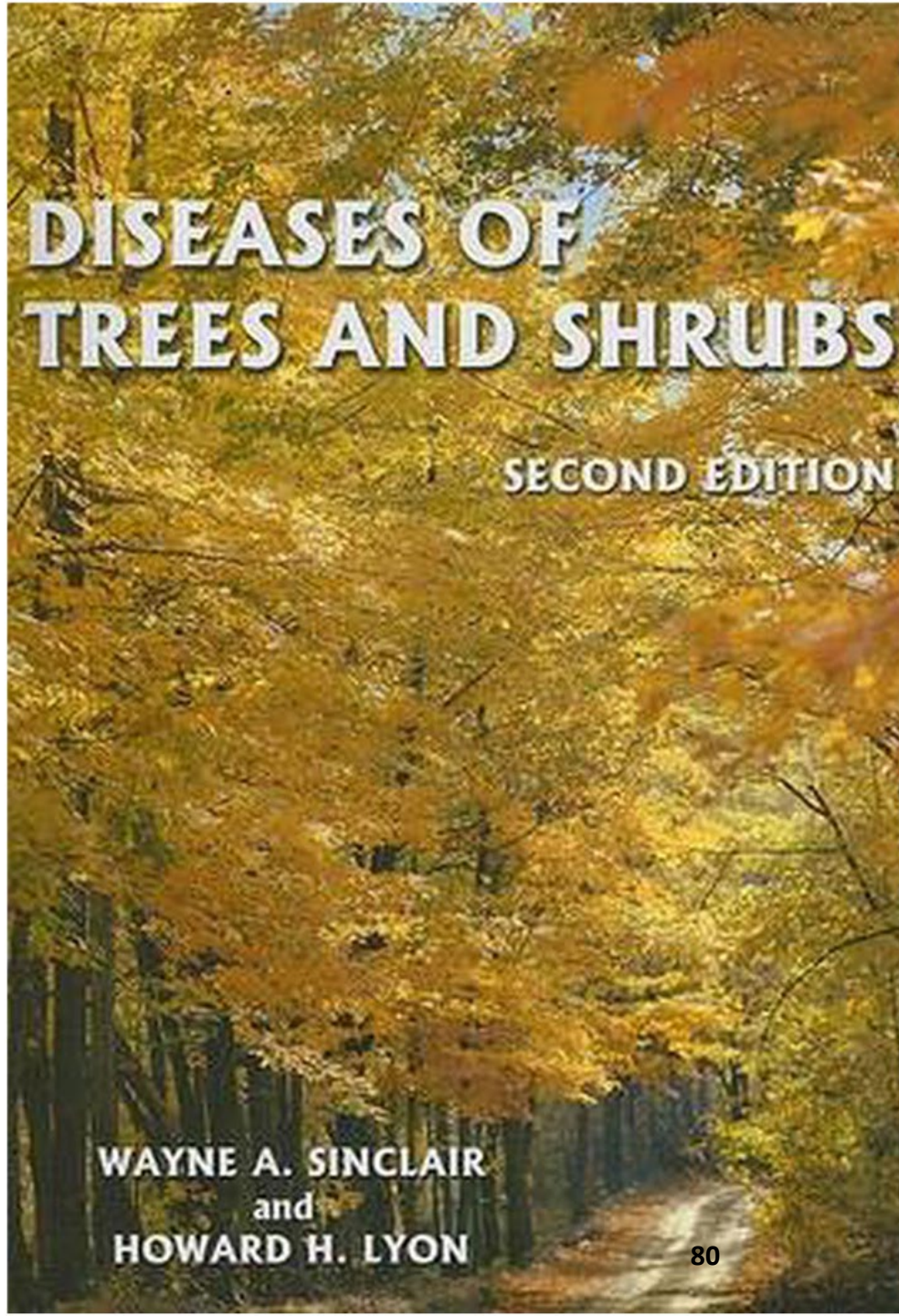
Example:
Gleditsia triacanthos

The Host Index will give you a list of the possible problems affecting plants in the genus *Glenditsia*.

Host Index Example from Diseases of Trees and Shrubs

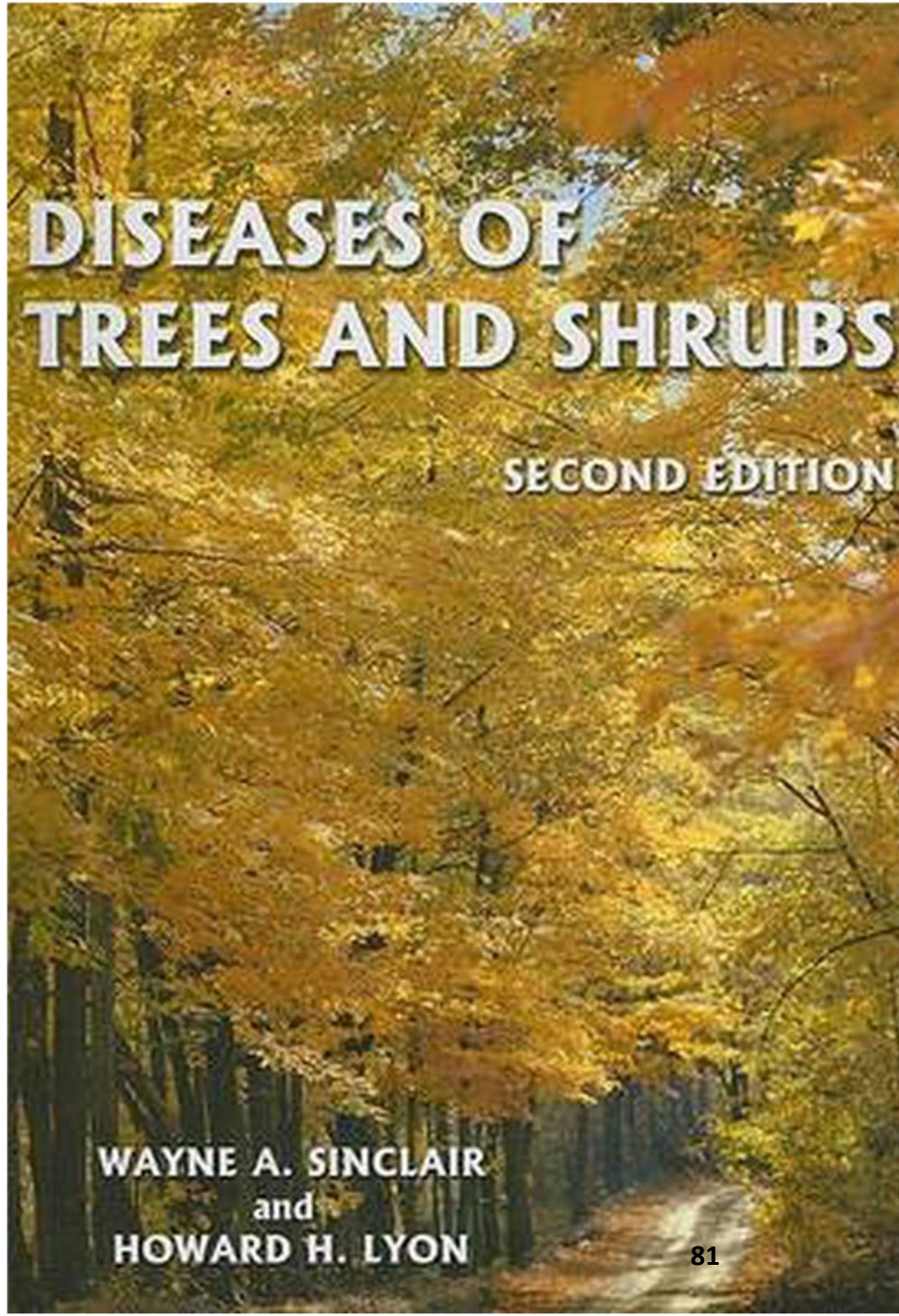
By Wayne Sinclair & Howard Lyon

- You suspect your Norway Maple is infected with Maple tar spot disease, but you don't know definitely.
- You know Maple is of the genus *Acer*.
- You search under "A" (for *Acer*) in the host index of this book.
- Use this index for a "rule-out" search of the Maple's disease



Host Index Example from Diseases of Trees and Shrubs

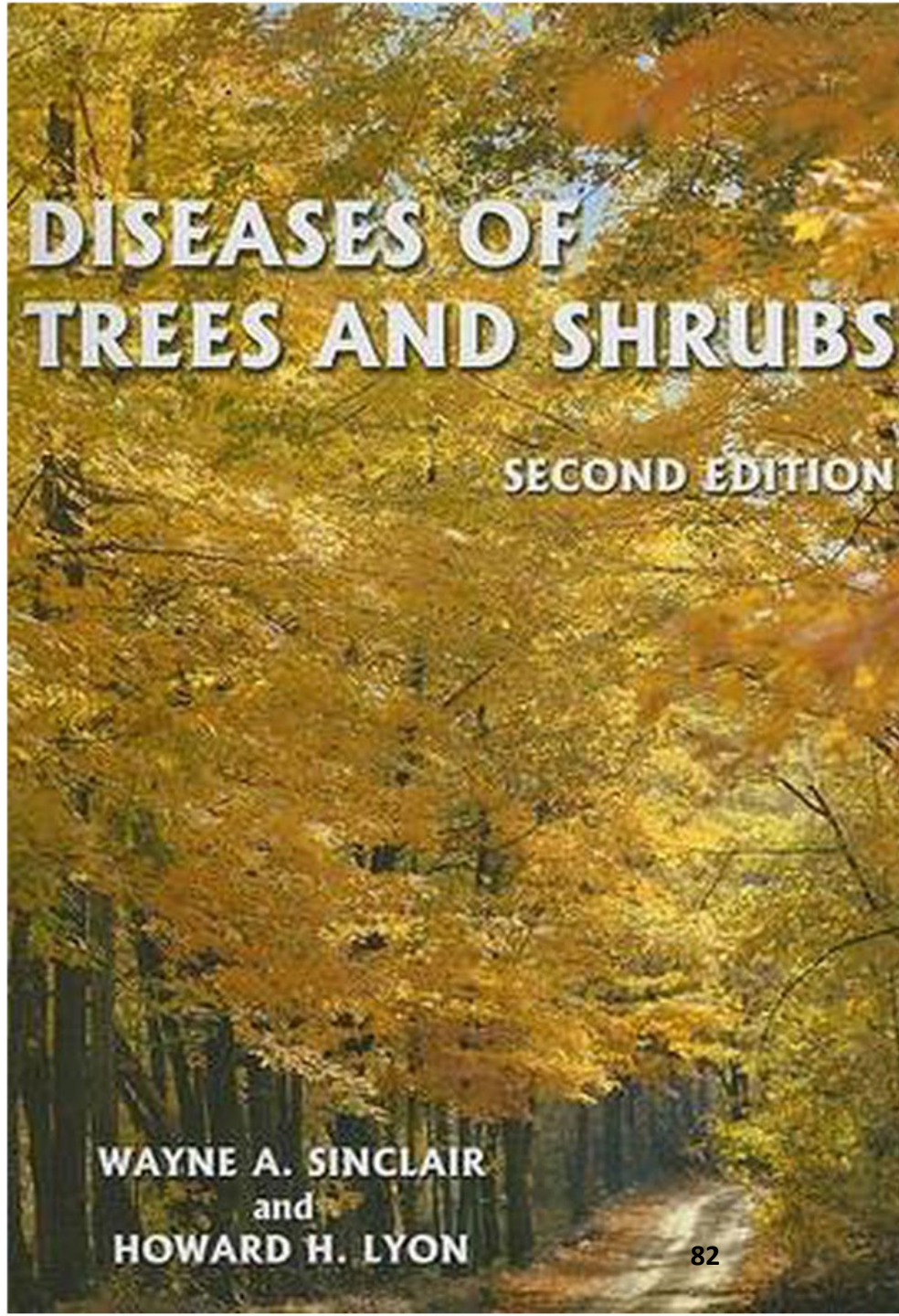
- Symptoms or “common” names are presented in normal type
- Diseases and signs will be *italicized* in their normal Latin name.
- Examples:
  - Armillaria root rot
  - Bacterial disease
  - *Alternaria*
  - *Arabis mosaic virus*
  - *Aureobasidium apocryptum*



Host Index Example

(continued)

- You suspect your Norway Maple has maple tar spot disease caused by the *Rhytisma* spp. fungus
- You search for *Rhytisma* under Acer in the index
- This will give the page number of diseases of Acer caused by Rhytisma



Help Desk Reference Books

- Good resource, with photos, for research diagnoses.
- More detailed information than websites.
- Publications often include pictures & descriptions of symptoms & signs caused by causal agents
  - (disease, insects, wildlife, abiotic issues).
- Be aware of the book's publication date.
  - Plant and disease names can change or be recategorized.
- Don't accept the book or publication's recommendations for pesticides, if provided.
- *Always use the pesticide recommendations of VCE's PMG.*

Three Tips for Internet Searches

1. Search for a Pest or Issue *you Suspect*.
2. Search Using a Description of *What You See*.
3. Search by using the term "*Common Pests and Issues*" for your identified plant.

Tip 1: Search for a Pest or Issue You Suspect

1. Look up information for your suspected pest or issue
2. Confirm if it matches with signs & symptoms
3. Use for targeted or rule-in search.

Example 1:

"I heard something about asparagus beetles on the radio. I've seen small insects on my asparagus foliage. I think I have them, so I'll go to the Virginia Cooperative Extension site and search for "asparagus beetle".

VCE's Publications on Asparagus Beetles:

Asparagus Beetles

www.pubs.ext.vt.edu › content › dam › pubs_ext_vt_edu

File Format: PDF/Adobe Acrobat

Description: Two species of **asparagus beetles** are found in Virginia, the **asparagus beetle**, Crioceris asparagi (L.), and the spotted **asparagus beetle**

Asparagus Beetles | VCE Publications | Virginia Tech

www.pubs.ext.vt.edu › ...

Sep 27, 2017 **...** ... Department of Entomology, Virginia Tech. This publication is available in a PDF file format only. Fact sheet on **Asparagus Beetles**.

Index Symbols A

www.pubs.ext.vt.edu › content › dam › pubs_ext_vt_edu › ENTO-462-J

File Format: PDF/Adobe Acrobat

Asiatic garden beetle ..... 4-34 ... **Asparagus beetle** . ... Bean beetle parasite (Pediobius foveolatus) .

Introduction for Home Vegetable Insect Section

www.pubs.ext.vt.edu › content › dam › pubs_ext_vt_edu › ENTO-462-B

File Format: PDF/Adobe Acrobat

Inspect plants for egg clusters, beetles, caterpillars, and other insects as ... Description: Adults of the **asparagus beetle** are 1/4 inch (6.25 mm) long, ...

Tip 2: Search Using Description of *What You See*

- Try an internet search using a short description of what you observe. This will help you get started on narrowing your options:
  - "No, that's definitely not it"
  - "Maybe, but I need to confirm this with a trustworthy, research-based source."

Example 2:

A new plant is crawling up your garden fence, and you want to know if it's a weed. You do an internet search with these search terms:

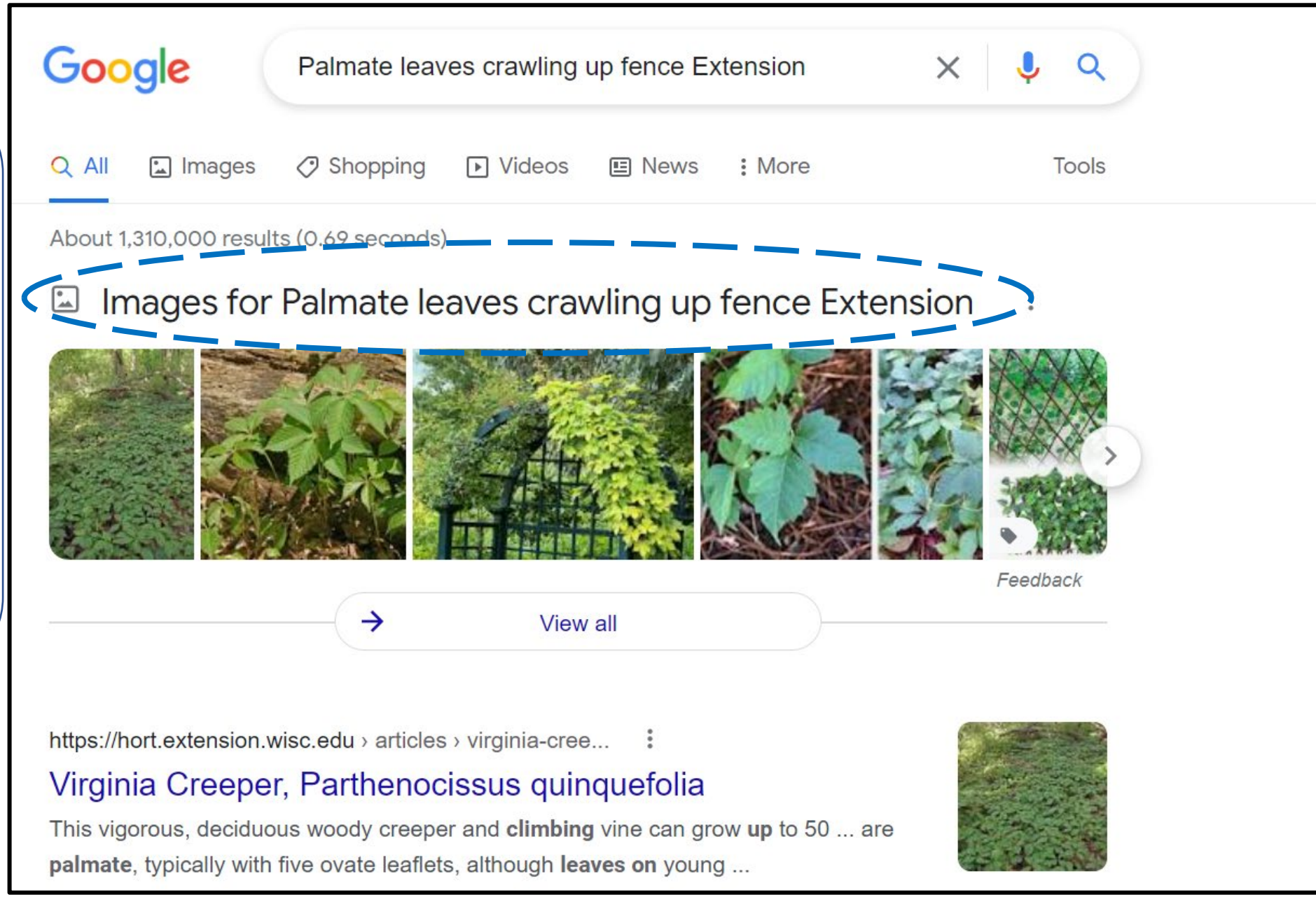
"Palmate leaves crawling up fence Extension"

You also include "extension" in your search term bring up trustworthy Extension resources in your search.

(Including “Extension” in your search term will bring up trustworthy Extension resources in your search)

Google provided the images on the right.

The plant is possibly Virginia Creeper.



Tip 3: Search for *Common Pests* & *Common Issues* for Your Plant

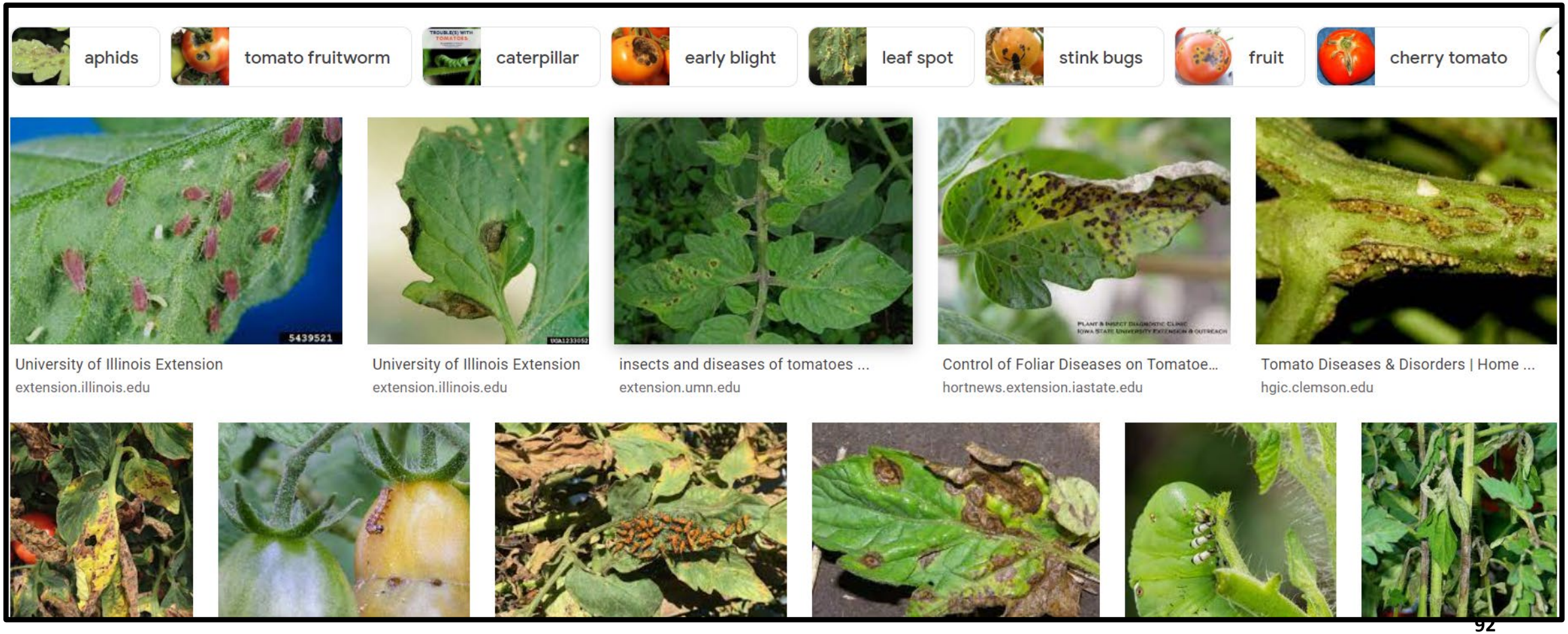
- Casts a wide net – useful if you don't know where to begin.
- Book, host index or internet searches.
- Appropriate for a rule-out search.

Example 3:

You've been observing browning leaves on your tomato plant. You think you have a problem but don't know where to start. You therefore use the term "common pests" in your internet search term. You also include "extension" in your search term bring up trustworthy Extension resources with information on many things that affect tomatoes.

You enter the following search term:
"**Common pests diseases problems tomato extension**"
into the Google search bar:

Google Images displays the photographs below, which you can compare with your plant's leaves. Hopefully you will find a photo that matches your plant leaves, which can narrow down your search.



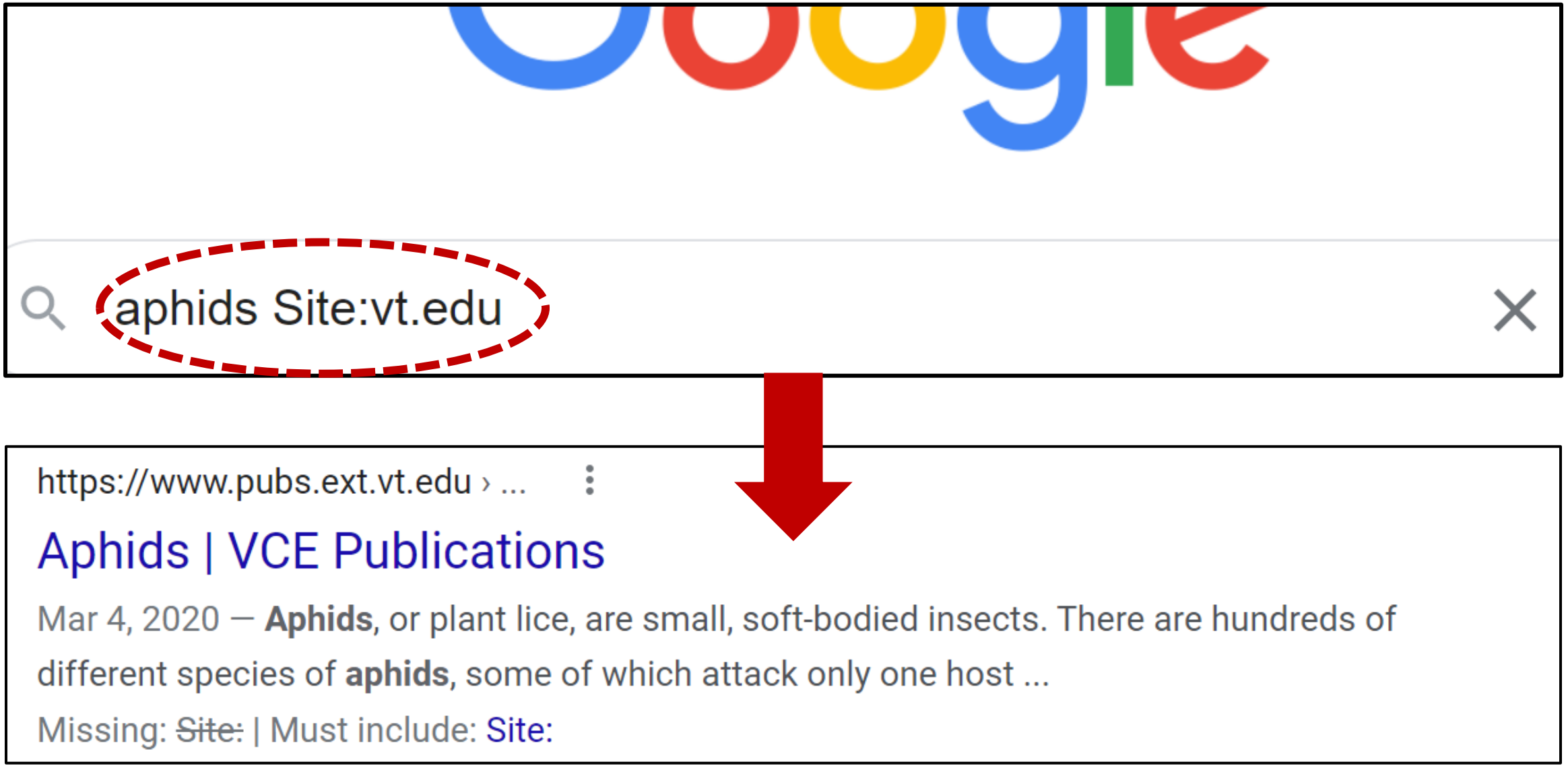
Summary of Research Tips:

- Use the following:
  - Information you've gathered about the problem,
  - The plant you identified, and
  - A research strategy
    - Rule-In Search
    - Rule-Out Search
- These will help you consult tools and resources to diagnose what is causing your plant problem.

Internet Searching – Obtaining Unbiased, Research-Based Sources:

- Remember: Not everything found on the Internet is research-based and appropriate to Virginia gardening conditions.
- Always consider the information source and who prepared it.
- To limit online searches to information from Virginia Tech, add “Site:.vt.edu” to the search string in the search box (see next page) to limit your search about aphids from Virginia Tech-VCE.
- To search all universities, add “Site:.edu”
- To search for Extension publications and resources nationwide, visit https://extension.org/search/

Internet Searching Restricted to VCE Publications:



Rule-In and Rule-Out Research Strategies

Rule-In Strategy

If you have a pretty good idea of what type of problem you have or even think you know the specific diagnosis already, you can do a targeted search.

A targeted, or **rule-in,** search is where you focus on a particular area and go from there.

Rule-Out Strategy

When you are not sure about what is the problem affecting your plant, you should consider a **rule-out search**, where you:

- Begin with a wide list of possibilities, both biotic and abiotic;
- Rule out possibilities as you proceed through the research process.

Diagnostic Case Scenario

- A neighbor's plum tree has been looking sick for a few years.
- Recently she noticed big black and whitish colored growths (look like dog droppings) on the branches.
- **What do you do next?**

What do you do next?

Ask for photos of the tree

Assume it’s a plum tree

Yes! First step in the process is to correctly identify plant.

Hold on! Assuming this may lead to an incorrect diagnosis.

Next Step

- Your neighbor emails photos of the tree to you
- You confirm it’s a plum tree
- You now know plant type and:
  - It's looked sick for a couple years;
  - There are black & white colored growths on tree that look like dog droppings
- **What do you do next?**

What do you do next?

Do an internet search for plum tree problems

Hold on! You want to find out as much as possible about the tree before starting research.

Ask your neighbor to elaborate on tree's problems

Yes! You want to obtain as much information about the tree before researching.

- You ask your neighbor to elaborate on what's wrong with her tree. She responds:
  - The leaves have been wilting, browning, and dying for a couple of years
  - It's been happening intermittently throughout the tree canopy
  - She thinks it's been happening for the last two years
  - This was the first year she noticed the black, knobbly growths on the branches
  - Her plum tree is by a hackberry tree that looks normal
- Is this an abiotic or biotic problem?

Is this an abiotic or biotic problem?

Abiotic
(Non-living)

Biotic
(Living)

Hang on! Abiotic problems often affect more than one species.

Probably so, as the problem has progressed over time & is affecting *only* the plum tree.

Next Steps:

- You've identified the plant as a plum tree
- You believe there may be a problem that is biotic (living)
- You now want to make sure this actually is a problem for the tree.
- You review a resource book at a Help Desk:
  - There is no information stating that branch growths & leaf wilting / death is part of the tree's "normal growth."
- You therefore conclude *there is a problem* with the plum tree.

What is causing the problem?

What Category is the Cause?

Insect?

Disease?

Wildlife?

Abiotic?

What Category is the Cause?

Insect?

You don't see any feeding damage or common insect signs

Disease?

The gall is one of the <u>SYMPTOMS</u> you're seeing and is a <u>SIGN</u> of a disease

Wildlife?

You don't see any feeding damage or common wildlife signs

Abiotic?

You just decided the issue was biotic, so that rules out abiotic causes

Step 4: Researching Potential Diagnoses

- You've completed the first three steps:
  1. Identified the plant
  2. Identified the problem
  3. Started collecting information

Now, in Step 4, you research potential diagnoses

- You use a rule-out search process on the internet:
  - Consider many options
  - Remove any that don't match what you're seeing

What is your internet search term?

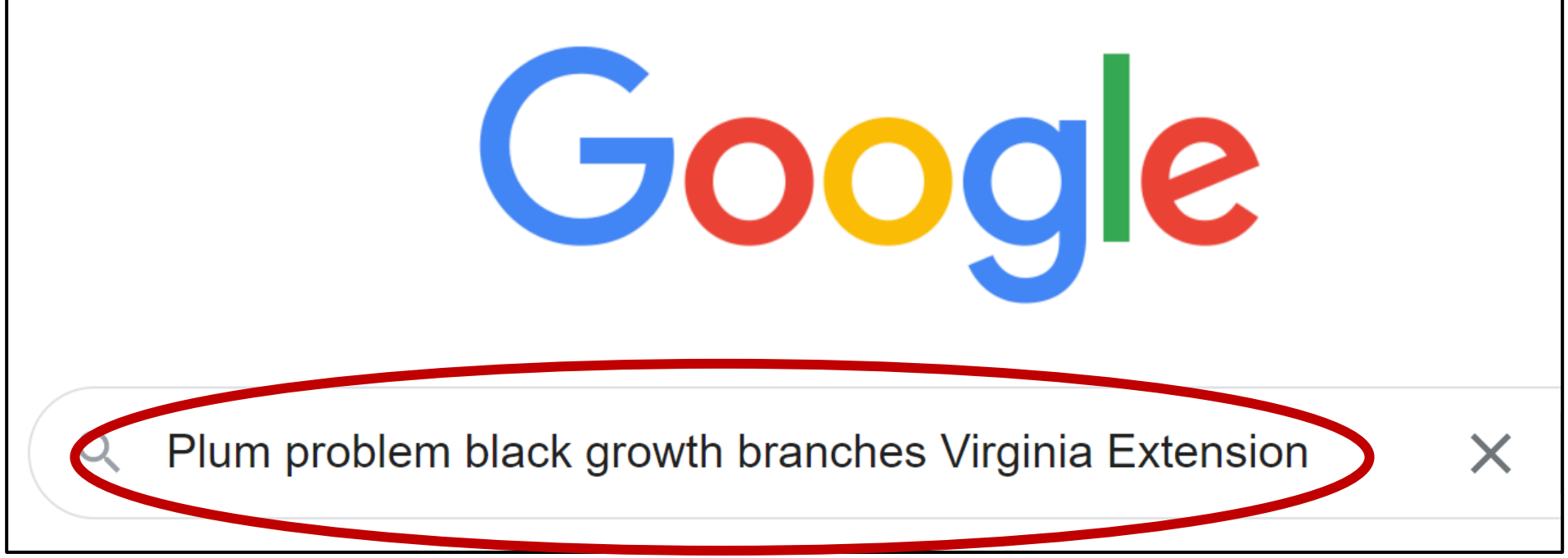
Your Internet Search:

"Plum problem black growth branches Virginia Extension"

Good choice! The next slide explains why.

"Plum tree problems"

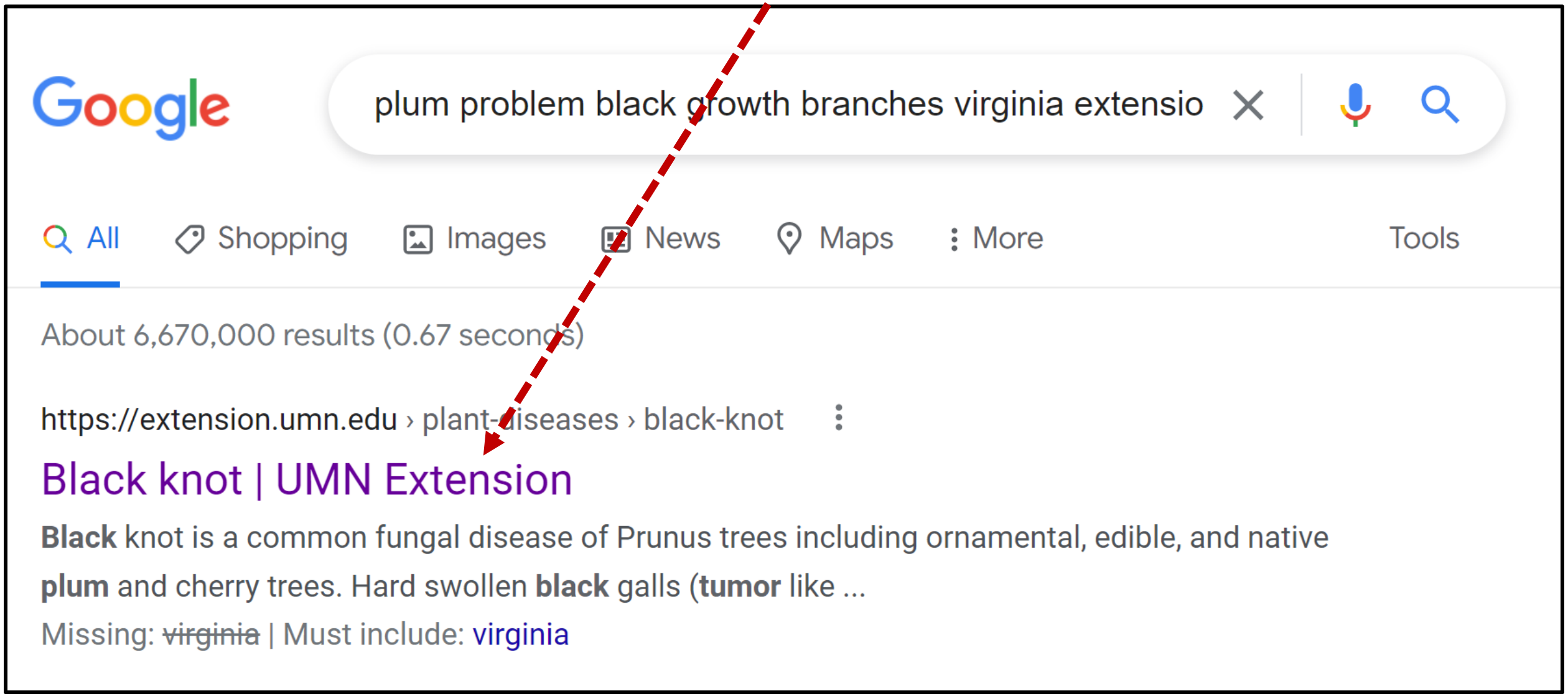
Hold on! This general search may do more harm than good.



This search term does the following:

a) Includes the symptoms you're seeing ("Plum problem black growth branches")
b) Specifies you want results for Virginia (because of "Virginia" in the term)
c) Obtains trustworthy Extension resources (because of "Extension")

Google Search Results:



Black knot

Quick facts

- Black knot is a common fungal disease of *Prunus* trees including ornamental, edible, and native plum and cherry trees.
- Hard sv…nd occasionally on trun…
- Many P…galls throughout the tre…
- Some P…ese trees, leaves and shoots wilt and die on branches with galls.
- Management will vary depending on how severely the tree is affected by black knot.

With this publication, what is your next step?

How to identify black knot

Next Step?

Stop research here; tell neighbor to spray with any available pesticide

Wait! Do the tree's symptoms match with the publication's info?

Match up the tree's symptoms with the publication's info

Good idea! It's important to match up what you're seeing with the publication's information.

Success and Thank You!

Success!

- You have matched the tree's symptoms with the information in the extension publication's information.
- You can feel confident that the plum tree has black knot.
- You can now proceed to research management options (Step 5).

Thank You!

- This concludes my presentation.
- Thank you for reading this, and please email me at rielyh@gmail.com if you ever have questions about the Help Desk.