

Plant Identification: Preparing Samples and Using Keys

What can gardeners do when they admire a plant in a neighbor's garden and want to purchase one of their own, but don't know its name? Or if a gardener finds that a weed has "taken over the yard" and needs to identify it before properly applying an herbicide? This can be difficult, especially if gardeners don't recognize the plant and don't know how to identify it. Gardeners, however, do have some resources that can help with this task.

Most Pennsylvania counties have a Master Gardener program through which volunteer Master Gardeners educate consumers about gardening-related topics. Contact your county extension office and ask if Master Gardeners are available to assist you. The Master Gardener will need a plant sample (see sample preparation information below) and photographs of the plant that show key characteristics such as height and shape. This is especially important when the entire plant cannot be submitted, as with trees and shrubs. Many gardeners will find that they are not able to accurately describe simple characteristics such as form, leaf size, and shape from memory. To aid with proper identification, prepare your sample as follows.

Preparing your sample

Herbaceous plants (Including annuals, perennials, grasses, or weeds with green and/or soft growth that dies back to the ground each winter.)

- A useful plant sample should include samples of the roots or underground structures such as tubers, corms, or runners.
- To prevent plant leaves from drying out too quickly, place the roots in a plastic bag. If roots are dry, moisten them, but do not overwater them.

- Do not try to remove any soil that is attached or stuck to the roots; you may accidentally remove roots as well.
- Stems and leaves should be placed between two paper towels and gently patted to remove any moisture.
- Stems, leaves, flowers, or seedpods should be placed between newspaper or tinfoil for protection.
- Any fruit that is available should also be dried and wrapped separately in paper.
- Avoid wrapping any plant material that grows above the soil in plastic. Plant material may rot if wrapped in plastic for too long.
- Place all of the plant samples in a box to prevent them from being crushed, and keep the box in a cool location out of direct sunlight.

Trees, shrubs, and vines

- For proper identification, samples should include any plant material visible above the soil such as branches, leaves, flowers, seedpods, and fruit.
- Branch and leaf orientation are important identification characteristics, so include a section of stem containing several buds (1 to 2 feet of branch growth).
- Place the material in a box and store it in a cool location.
- Transport the sample within a short period of time after removing it from the tree, shrub, or vine so that leaves will not wilt.

To help the Master Gardeners with the identification process, be prepared to answer several questions about the plant. Before visiting with the Master Gardener, take notes on the following.

- Plant form or shape: Is the plant growing upright or is it spreading? Is it round or oblong in shape?
- Plant size: Is the plant only a few inches tall, or is it 10, 20, 30 feet, or taller?
- Where the plant is growing: Is the plant growing in your yard, a field, or a wooded area?
- Site characteristics: Is the plant growing in wet or dry conditions, or in a sunny or shady area?
- Characteristics not available at time of sampling: What are the color and sizes of any seeds or fruit? What is the fall color of the plant?
- Bark characteristics: Is the bark smooth, or does it have a rough or flaky texture? What is the color of the bark? Does the color change seasonally?

Using identification keys

A second plant identification method uses identification “keys”. These tools are found in many plant manuals or plant identification or field guides.

A key is a list of questions or statements about a plant characteristic. You must determine if they are “true” (if the description in the key matches the physical appearance of the plant) or “false” (if the description does not match the physical appearance of the plant). A key will begin with statements or questions about more noticeable or visible characteristics, such as branch or leaf orientation, or foliage color. As you work through the key, statements or questions become concerned with smaller components, such as presence or absence of leaf hairs or floral parts. A very simplified example, for the purpose of explaining this tool, follows.

Master Key

- A. Plant’s foliage is not green (See Key I)
- A. Plant’s foliage is green
 - B. Plant is woody (See Key II)
 - B. Plant is herbaceous
 - C. Plant does not have hairy leaves (See Key III)
 - C. Plant has hairy leaves
 - D. Plant does not have flowers (See Key IV)
 - D. Plant has blue flowers
 - E. Plant has flowers smaller than 2 cm. (See Key V)

- E. Plant has flowers larger than 2 cm. (See Key VI)
- D. Plant has pink flowers
 - E. Plant has flowers smaller than 2 cm. (See Key VII)
 - E. Plant has flowers larger than 2 cm. (See Key VIII)

For a plant that appears to be herbaceous with green foliage, hairy leaves, and small pink flowers, gardeners would only accept as “true” the statements that describe the plant’s characteristics.

In other words, look at the choices for the first plant characteristic described in the key: foliage color. There are two options:

- A. Plant’s foliage is not green or
- A. Plant’s foliage is green.

Since the plant’s foliage is green, the second choice is correct. Ignore any key that is associated with “plant foliage is not green,” and continue with the second set of statements.

The next step is to move to question statement “B”: The plant is woody or herbaceous. Since the plant material is herbaceous (plant material above ground dies back to the ground each winter), any questions under woody plants would be ignored. For example:

B. “Plant is woody (See Key II)”
does not describe the plant; do not go to Key II.

B. “Plant is herbaceous”
does describe the plant; go to the next step.

Now a decision will need to be made whether the leaves are hairy or not. After looking at the plant, the second choice for “C” is chosen because the plant does have hairy leaves.

This process continues as statements about flower color and size are considered true or not. The flower color of the plant being identified is pink and the flower size is smaller than 2 cm. Based on this information, the next step is to go to Key IIV and begin the process again with a new key until the plant species is identified.

Purchasing or borrowing a field guide will be necessary for this procedure. Most books will have several line drawings to help gardeners classify the various plant parts for identification. This step becomes a process of comparing the drawing in the book with the plant and picking the description or picture that most closely matches.

When looking through the book or field guide, gardeners will be able to understand how complex plant identification is. There are many variations for each plant part (leaves, buds, flowers, fruit, etc.). Gardeners identifying plants will learn that describing the shape of a leaf is not as simple as categorizing it as “round” or “oblong” or “thin.” Instead, terms such as “broad,” “narrow,” “heart-shaped,” “oval,” and others are used. Understanding the leaf arrangement on the stem, the type of leaf (evergreen or deciduous [leaves that are shed each fall/winter]), form, color, texture, and other characteristics will be important, and examples are included in most books or guides. In addition, gardeners will find that field guide manuals refer to plants by their scientific name (genus and species, see fact sheet entitled: Nomenclature) rather than common name, as many plants have multiple common names.

Plant identification has been described as a puzzle where the plant parts are pieces. Use the tools that are available in books and guides to help characterize each plant part correctly while working through the keys. As with any puzzle, putting the first two pieces together may be a little intimidating. With a little practice and some determination, you can accomplish the task and say, with great satisfaction, “I know what the name of the plant is.”

Sources

Dirr, A. M. 1998. Manual of woody landscape plants: Their identification, ornamental characteristics, culture, propagation and uses. Stipes Publishing LLC, Champaign, IL.

Rhoads, A. F. and T. A. Block. 2000. The plants of Pennsylvania: An illustrated manual. University of Pennsylvania Press. Philadelphia, PA.

Prepared by Kathleen M. Kelley, assistant professor of consumer horticulture

Penn State College of Agricultural Sciences
Department of Horticulture
102 Tyson Bldg
University Park PA 16802
September 21, 2002

The Horticulture Fact Sheet series is produced for home gardeners and professionals by the Consumer Horticulture Center at Penn State. The complete series is available on the Web at www.hortweb.cas.psu.edu.

Visit Penn State's College of Agricultural Sciences on the Web: www.cas.psu.edu.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.

Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T. R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

This publication is available in alternative media on request.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901, Tel 814-865-4700/V, 814-863-1150/TTY.

© The Pennsylvania State University 2003