

Unit D: Controlling Pests and Diseases in the Orchard

Lesson 4: Identify and Control Weeds in the Orchard

Terms

- Annual
- Artificial weed dispersal
- Auricles
- Biennial
- Collar
- Cotyledons
- Herbaceous perennials
- Hypocotyl
- Internode
- Ligule
- Natural weed dispersal
- Nodes
- Perennial
- Post-emergent
- Pre-emergent
- Rhizomes
- Sheath
- Stolons
- Weed
- Woody perennials

I. A **weed** is a plant growing where it is not wanted or a plant out-of-place. Weeds can be divided into three categories based on their life spans and their periods of vegetative and reproductive growth.



- A. An **annual** weed is a plant that completes its life cycle within one growing season. Annuals reproduce from seeds only. Two types of annual weeds occur, depending upon the time of year in which they germinate.
1. Winter annuals germinate in the fall and will actively grow until late spring when they produce seed, and they will die during periods of heat and drought stress.
 2. Summer annuals germinate in the late spring and actively grow during the summer months. They produce seed by late summer and die during periods of low temperatures and frost.

- B. A **biennial** weed is a plant that will live for two growing seasons.
1. During the first summer the plant develops a root system and a compact, low-growing cluster of leaves called a rosette.
 2. Biennials flower and produce seed during the second summer and die before winter.
- C. A **perennial** weed can live for more than two growing seasons and may reproduce by seed and/or vegetative growth. Perennials are classified as either herbaceous or woody, depending whether the stems over winter.

1. ***Herbaceous perennials*** die back to the ground each fall, but their root systems overwinter and the plants resprout the following spring from buds on the root systems.
2. ***Woody perennials*** have persistent aboveground stems that remain from season to season, although their leaves may die in autumn.
3. A noxious weed is a plant that causes great harm to other organisms by weakening those around it.
 - a. Most noxious weeds are very difficult to control and require extended periods of treatment followed by close monitoring.

II. Most weeds grow in isolated locations.

A. Dispersal spreads them over wide areas and into places where they have not been a problem before. Dispersal occurs in two major ways: natural and artificial.

1. *Natural weed dispersal* is the movement of weeds by wind, water, and wildlife. Weed seeds often have stickers or feathery features that make natural dispersal easy. Lighter seeds may be blown by the wind. Heavier seeds may be washed by water runoff or carried in the hair of animals. Seeds eaten by birds, rodents, and other animals may pass through the digestive tract undigested and viable. They may be dropped on the land in feces and germinate when conditions are right.

2. *Artificial weed dispersal* is accomplished by people and the activities they carry out in producing and harvesting crops. Both seed and vegetative parts of weeds may be dispersed. Machinery can transport weeds as they move from one field to another. Mulch materials may contain weed seed.

III. The ability to identify weeds shortly after emergence is an important part of an integrated weed control program.



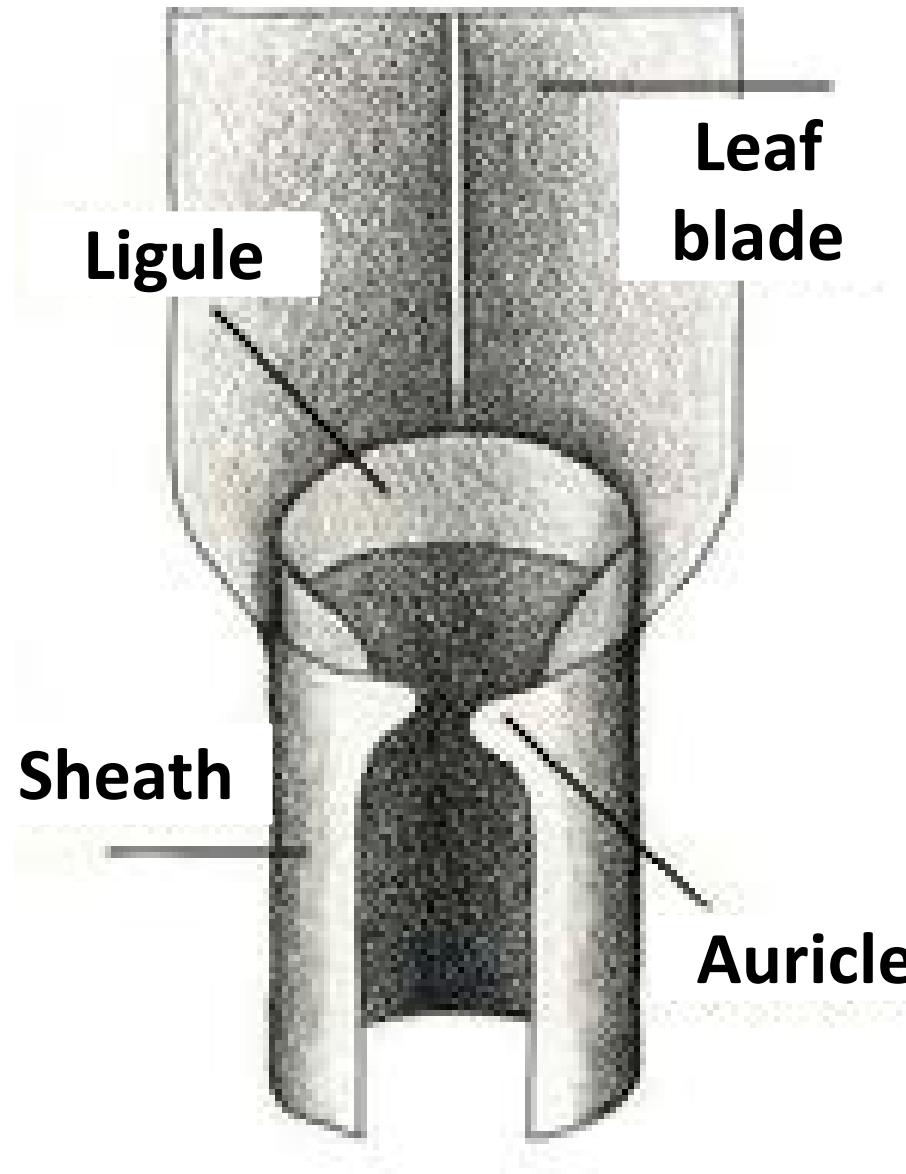
- A. Seedling identification is needed for the most effective use of postemergence herbicides to control weeds before they cause crop yield losses.
1. Weed seedlings are very small, so identification requires close examination of the plants, often with the aid of a hand lens.
 2. Most crop scouts are not expert taxonomists, but by knowing the key vegetative features of the major weeds found in field crops, the scout can learn to identify most of the problem weeds shortly after their emergence.

B. Weeds are separated into the categories of grass, grasslike, and broadleaf plants. Knowing the differences between these categories is important because most herbicides control one type of weed more effectively than another.

1. Grass plants have long narrow leaves with parallel veins. The stems are round or flattened and hollow except at the nodes (joints), where they are solid.
 - a. Grasslike plants resemble grasses, but they are not susceptible to all of the same herbicides as grasses.
2. The leaves of broadleaf plants are not generally as long and narrow as those of grass or grasslike plants, although the shapes vary considerably among species. The veins of most broadleaf plants are netlike.

C. Vegetative identification of grass weeds. The major vegetative parts of the grasses used in identification include the blade, sheath, ligule, auricles, collar, stolons, bud-shoot, and rhizomes. The leaf is composed of the sheath and the blade.

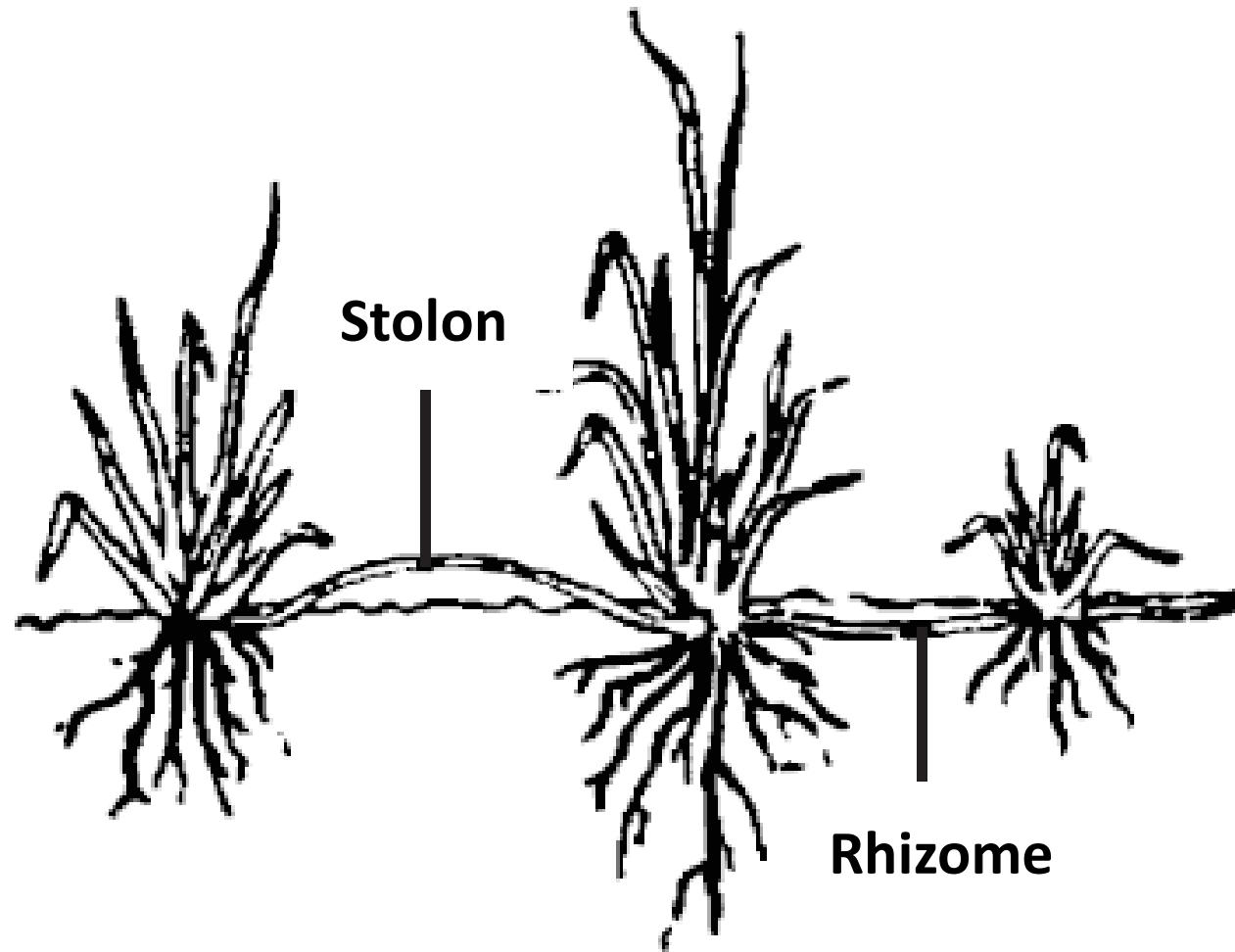
1. The *sheath* encloses the stem and is connected to the blade at the junction formed by the collar. The *collar* is located on the outer side of the leaf and the ligule points upward on the inner side of the leaf. The *ligule* resembles a continuation of the sheath where it joins the blade.



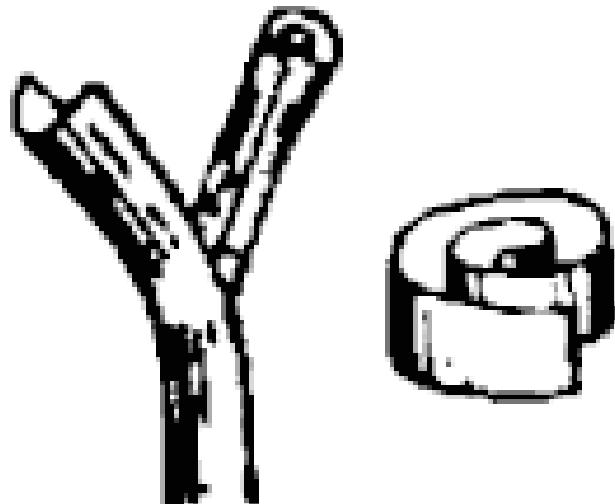
2. *Auricles*, which are present in only a few species, are fingerlike projections of the collar that extend around the shoot.



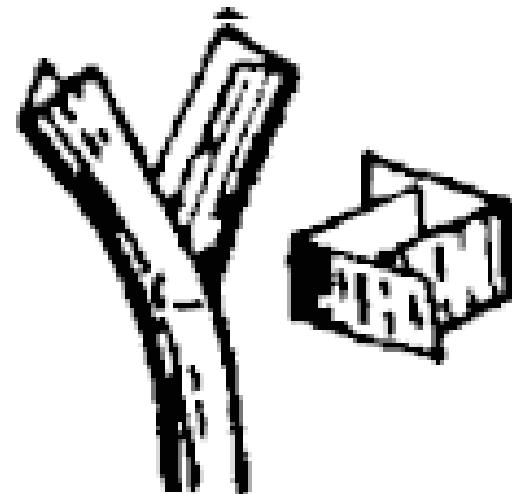
3. ***Stolons*** are modified above-ground stems that grow horizontally over the ground. Stolons develop roots at the nodes, giving rise to new plants. Joints of the stems are called ***nodes***. The part between two adjacent nodes is called an ***internode***. ***Rhizomes*** are modified underground stems that produce new plants from the nodes.



4. The arrangement of the leaf or leaves in the budshoot can also be used to identify grasses. The leaf or leaves are classified as rolled or folded in the budshoot.

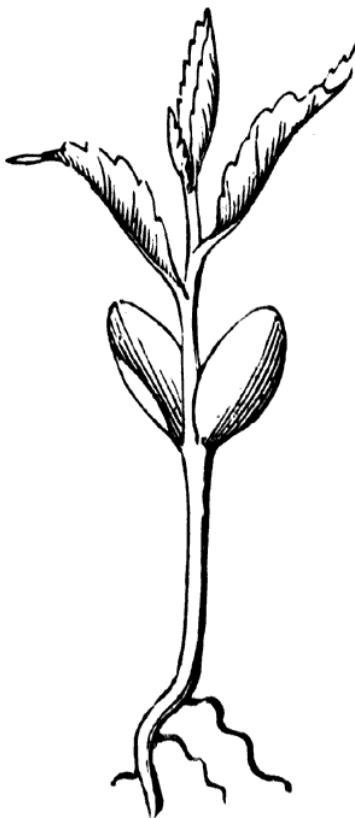


Rolled

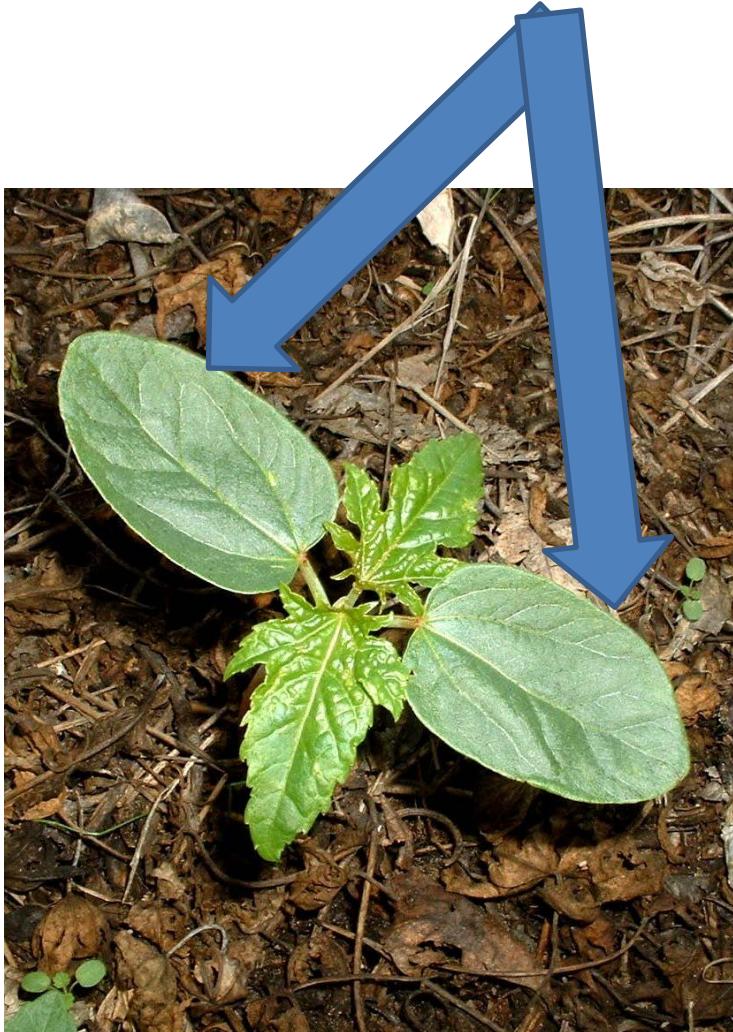


Folded

D. Vegetative identification of broadleaf weeds. The major vegetative parts of the seedling broadleaves include the cotyledons, true leaves, hypocotyl, and roots.



1. ***Cotyledons*** are the seedling leaves of the broadleaf plant, which are two in number with dicotyledonous weeds. They appear opposite each other on the stem. If a plant is a perennial and emerges from vegetative parts, the shoot will lack cotyledons because these are found only in seedlings.



2. The rhizomes, tubers, bulbs, or budding roots of perennials can help identify the plants.
3. The true leaves consist of all leaves produced after the cotyledon leaves.
4. Leaf arrangement and shape of the cotyledons and true leaves are generally the first characteristics used to separate weed species.

5. The *hypocotyl* is the portion of the stem between the cotyledons and the seedling roots.



IV. Just as insects need to be controlled in the orchard, weeds need to be controlled too. Weeds can have just as much of an impact on the productivity of an orchard as insects can. Following are some reasons to control weeds in the orchard.



- A. Reduced competition:** trees may be much larger than most weeds, but they have root systems that do not compete well with other plants.
1. Where a cover crop or weeds grow, the bulk of tree roots form in the second and third foot of soil.
 2. If competition is reduced, the trees form the highest percentage of their roots in the much more biologically active first two feet of soil depth.
 3. In areas with poor quality soils, the orchardist should not give the best foot of soil to the weeds.

B. Nutrient Management: Weeds can greatly out-compete the trees for nutrients, especially nitrogen.

1. This complicates the growers attempts to create an efficient nutrient balance in the trees, as it is never certain from one application to the next what percentage of the applied nutrient will enter the trees, or when it will get there.
2. Trying to compensate for weed growth by applying higher rates of nitrogen fertilizer may increase the nutrient in the tree, but more often leads to greatly increased weed growth.

- C. Irrigation and Water Management: Weeds use water, which would have been much more beneficial to maintain fruit quality during the hot portion of the Summer.
1. Perhaps even more important, weeds block the sprinkler pattern, which may greatly decrease the efficiency of water application.
 2. Blocked sprinklers over-water some areas of the orchard, and under-irrigate others, leading to leaching and drought stress in the same orchard block.
 3. Weeds also have the aggravating ability to lean over and tangle the mechanisms of sprinkler heads, preventing their rotation.

D. Rodent Management: mice can cause great damage to an orchard.

1. During snowy winters, they sometimes chew the bark off of the lower portions of trunks, especially on younger trees.
 - a. While growers try to save these damaged trees with approach grafts or bridge grafts, these methods are very slow and expensive, and do not always work well.
2. Mouse control is a season-long effort, with reduction of mouse cover as the key component.
 - a. As mice do not travel far, the key mouse cover is the grass and weed cover crop.
3. Well mowed grass and a fairly clean weed strip is the most effective mouse management program.

- V. There are multiple methods of weed control available for use in the orchard.
- A. Selection of the correct method depends upon the size of the orchard, number of trees, and the orchard layout.
 - B. The best weed control technique should take the type of weed into account. This is why identification of the weed's growth and reproduction is very important when deciding how to treat a weed.

1. Mechanical control—This method involves weed control by hand pulling or hoeing. This is a very low cost and effective control method although it is very labor intensive.



2. Herbicides—This method involves the use of a group of chemicals that prevent weed germination or kill actively growing weeds. Herbicides can be divided into several major groups, depending on how and when they kill weeds. Two of the major groups are:
 - a. ***Pre-emergent*** herbicides are applied before the weed seeds germinate. This group of herbicides stops or prevents seed germination.
 - b. ***Post-emergent*** herbicides kill actively growing weeds. These chemicals require careful application to prevent the killing of desirable plants.

3. Mulching- This method involves placing materials such as wood chips or plastic around the base of a tree to prevent weed growth. Care should be taken to keep the mulch away from the base of the tree as this could cause rot or serve as a breeding ground for fungus, molds and insects which can damage the tree.



Review/Summary

1. What are some examples of perennial, annual and biennial weeds?
2. What are some ways weeds are spread?
3. How are weeds identified?
4. Why is it important to control weeds in the orchard?
5. What are some weed control methods?