

Agricultural Weed Pests

Weeds

Weeds are plants that are growing where they are not wanted. They compete with crops for water nutrients, lights, and space. These plants can contaminate products at harvest, harbor pest insects, mites, vertebrates, or be a source of plant disease agents. Some can poison livestock or release toxins into the soil that inhibit growth of desirable plants. Weeds in cultivated crops are usually those that are favored by the crop production practices.

Many weeds produce large quantities of seeds that are easily carried by wind, rain, machinery, animals, and people. **Weed seeds can germinate after being dormant for long periods of time.** They also can tolerate extremes in weather such as temperature and moisture. **It is best to control weeds before they produce seeds.** A typical weed has one or more of the following characteristics:

- Produces lots of seed
- Populations establish rapidly
- Seeds can lie dormant for a long time
- Have vegetative reproductive structures
- Adapted for easy spread
- Plant development stages

Plant Development Stages

Most plants undergo four stages of growth and development.

1. **Seedlings** emerge from the soil soon after germination.
2. Leaves, stems, and roots grow rapidly during the **vegetative** stage; water and nutrient demands are relatively high.
3. After a period of vegetative growth, the plant enters the **reproductive** stage where most of the energy production in the plant is devoted to seed formation. Seed production is critical for survival of annual and biennial species.
4. Little or no energy production occurs during **maturity** when seed production is nearly finished. During this stage, the plant typically sheds its seeds and dies.

Plant Life Cycles

Annual plants complete their life cycle in one growing season, often in as little as 45 days. Biennials require two seasons while **perennials** live for more than two years.

Summer annuals grow from seeds that germinate in the spring. They grow, mature, produce seed, and die before winter. Examples include: crabgrass, foxtail, common cocklebur, pigweed, and common lambsquarters.

Winter annuals sprout from seeds that germinate in the fall. They grow, mature, produce seed, and die before summer. Examples: henbit and annual bluegrass.

Biennial plants complete their life cycles over **two growing seasons**. Most start from seeds that sprout in the fall or spring and grow through the summer, fall, winter, and following spring. During the first year, biennials develop a heavy root and compact cluster of leaves (called a rosette) that survives the winter. They mature, produce seed, and die during the second year. Examples include wild carrot, thistles, and mullein.

Perennials - Most perennials grow from seed but many species also produce tubers, bulbs, rhizomes (belowground rootlike stems), or stolons (aboveground stems that produce roots).

Simple perennials normally reproduce by seeds. However, root pieces left by cultivation can produce new plants. Examples: dandelions, plantain, trees, and shrubs.

Bulbous perennials may reproduce by seed, bulblets, or bulbs. Wild garlic produces seed and bulblets above ground and bulbs below ground.

Creeping perennials produce seeds but also produce rhizomes (below-ground stems) or stolons (above-ground stems that produce roots). Examples: Johnson grass, field bindweed, and Bermuda grass.

Woody species generally go dormant in the winter and resume growing from aboveground stems in spring. Aboveground parts of herbaceous perennials may die back but their underground storage organs survive the winter. Many are deep rooted so they continue to grow during summer droughts. Perennials can spread from seed and often from roots, tubers, bulbs, and rhizomes. Weeds in this group include quackgrass and field bindweed. **Perennials are often are the most difficult weeds to manage.**

Plant Classification

Weeds can be grouped into the following categories:

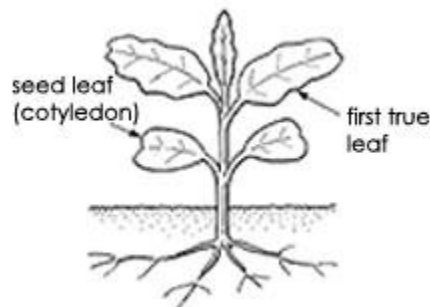
- grasses
- sedges
- lilies
- broadleaves.



Grasses have only one leaf as they emerge from the soil. Their leaves are two-ranked and typically upright, narrow with parallel veins. Grass stems are round and hollow. The root system of a grass is fibrous with the growing point located at or below the soil surface (surrounded by several layers of leaves). Perennial grasses can produce new shoots from growing points located on rhizomes (belowground) and/or stolons (aboveground).

Sedges resemble grasses but they have triangular stems with three rows (ranks) of leaves. Typically, sedges are listed under the grass section of an herbicide label. They prefer moist, poorly drained soils, but can grow in fertile, well-drained soils. Yellow nutsedge, is a perennial that reproduces by tubers and rhizomes. It is the principle sedge found in Kentucky.

Lilies resemble grasses and sedges but they have long, linear leaves and reproduce from underground bulbs. Two common species found in Kentucky are wild garlic and Star-of-Bethlehem.



Broadleaf seedlings have two leaves (cotyledons) as they emerge from the soil. The leaves are generally broad with net-like veins. Broadleaves typically have a taproot surrounded by a relative coarse root system. Actively growing broadleaf plants have exposed growing points at the end of each stem and in each leaf axil. Perennial broadleaves may have growing points on roots and stems above and below the surface of the soil.

Examples



photo: Howard F. Schwartz, Colorado State University, Bugwood.org

Redroot pigweed is a summer annual broadleaved weed that usually grows about 2 to 3 feet tall but sometimes up to 6 feet. Seed leaves are narrow with pointed ends on smooth red-purple stems. True leaves are oval or long and narrow. Upper surfaces are green; lower surfaces can be green with a tinge of red or completely red. The plant has a shallow pink to red taproot. A single redroot pigweed plant can produce up to one million seeds, 95 percent of which are viable.

Most pigweeds are tall, erect-to-bushy plants with simple, oval- to diamond-shaped, alternate leaves, and dense flower clusters made up of many small, greenish flowers. The erect stems are green to slightly reddish and have many branches. Lower portions of the stem are thick and relatively smooth; upper portions are very hairy.

Pigweeds grow naturally in open, sunny areas with disturbed soil. Like other small-seeded annuals, they need to germinate close to the soil surface so they **do well in no-till fields**. They thrive in hot weather, tolerate drought, respond to high levels of available nutrients, and are adapted to avoid shading through rapid stem elongation. They compete aggressively against warm season crops, and reproduce by prolific seed production.



photo: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Buttercups flourish in overgrazed pastures with poor stands of desirable forages. Buttercups often grow as winter annuals, emerging during the fall or late winter. New seed are produced while petals are showy. Waiting until after flowers appear can be too late to implement control tactics. This is one reason buttercups can survive year to year and new plants emerge each year.

Pasture management practices that improve and promote growth of desirable plants during the fall and winter is one of the best methods to help compete against the emergence and growth of this plant. Overgrazing by livestock is one of the main factors that contribute to buttercup problems.



photo: Mary Ellen (Mel) Harte, Bugwood.org

Marestalk (horseweed) can follow either a winter or summer annual life cycle. The majority of plants emerge in the fall but some emerge in the spring, perhaps even into early summer. Spring-emerging plants do not mature until late summer so they compete with soybean during the growing season and interfere with harvest. One plant can produce up to 200,000 wind-borne seeds. Multiple-resistant plants may survive applications of glyphosate and ALS inhibitor herbicides.



photo: Bruce Ackley, The Ohio State University, Bugwood.org

Jimsonweed is a summer annual plant. Mature plants are erect with coarse stems that are often deep purple. The football to egg-shaped leaves have wavy toothed or lobed edges that are hairless or nearly hairless. Mature plants can be up to 4 feet tall with single, white, trumpet-shaped flowers. Jimsonweed seedlings have hairy, purple stalks and thick, narrow cotyledons.



Yellow foxtail seedling with hairy ligule

photo: Pennsylvania State University

Yellow foxtail is a shallow-rooted summer annual grass that tends to grow in clumps because the stems often tiller, or root, at the lower joints. This grass has a hairy ligule and smooth sheath. There are many long straggly hairs on the upper surface of leaves near the base. Leaf blades often appear to have a spiral twist. Stems grow 1 to 2 feet tall and branch at the base.

In addition to competing with crops for nutrients, yellow foxtail can cause abnormal growth in certain crops, including corn and some vegetables.



photo: Clemson University - USDA Cooperative Extension Slide Series

Fall panicum is an upright branching summer annual but some of the outer stems lie flat. Germination begins in the spring and continues throughout the summer. This native grass thrives in wet, open areas of fields and tolerates flooding. It does not tolerate shade. Establishing a crop canopy before the weed emerges is an effective control and will greatly improve crop yield. Fall panicum is susceptible to barley yellow dwarf virus and has been blamed for causing nitrate poisoning and extreme sensitivity to light in livestock (called photosensitivity) of any skin that is not protected from the sun.



photo: Ohio State Weed Lab, The Ohio State University, Bugwood.org

Honeyvine milkweed or climbing milkweed is a perennial vine with opposite heart-shaped leaves with white veins. The stem starts as a single vine but will branch, trailing and climbing as it grows. It does not have the milky sap of other milkweeds.

Honeyvine milkweed is common along fencerows and in minimum-tillage or no-till fields. This plant can reproduce by seeds or spreading taproots. It can be mistaken for field bindweed. Honeyvine milkweed has opposite heart-shaped leaves; field bindweed has alternate arrowhead-shaped leaves.



photo: University of Missouri IPM

Ivyleaf morningglory is a summer annual twining or climbing vine with distinctive 3-lobed leaves and large showy purple to blue or white flowers. It is a common weed of agronomic, horticultural, and nursery crops found throughout the southeastern and into the north central and northeastern United States.



photo: Jan Samanek, Phytosanitary Administration, Bugwood.org

Common cocklebur is a broadleaved annual plant with dull green coarsely toothed leaves with 3 to 5 shallow lobes. Seeds germinate from early spring through summer, from depths of up to 6 inches. The plant grows along roadsides; in cultivated fields, bottomlands, abandoned land, and poor pastures. It is very competitive in many crops, especially in soybeans, because of similarities in emergence time and growth habit.



photo: Steve Dewey, Utah State University, Bugwood.org



photo: courses.missouristate.edu

Johnsongrass is a non-native warm season perennial that forms dense, thick patches of plants that can grow to over 6 feet tall. It reproduces from rhizomes and seeds. Seedlings can initiate rhizomes as early as 19 days following emergence. Plants can produce an extensive system of rhizomes in the top 10 inches of soil.

Established Johnsongrass is a more severe problem than seedlings because of its increased vigor and reproductive capacity. The rhizomes release chemicals that inhibit the growth of other plants, causing yield reductions in competing crops. This weed can reduce corn and soybean yields over 30% and 40%, respectively.

Maize Dwarf Mosaic Virus (MDMV) and Maize Chlorotic Dwarf Virus (MCDV) can survive between crops in underground rhizomes. MCDV is moved between corn, Johnsongrass, and sorghum by leafhoppers. Symptoms only appear in corn. MDMV, carried by aphids, infects over 250 species of grasses.