

Johnsongrass

<http://extension.psu.edu/pests/weeds/weed-id/johnsongrass>

Johnsongrass (*Sorghum halapense*) is an extremely competitive perennial grass that commonly reaches heights of 7 to 9 feet (2 to 3 m) and forms thick, dense patches. Johnsongrass reproduces by seed and by its scaly, jointed rhizomes.

Seedling Description

The emerging sheath (coleoptile) of johnsongrass is maroon and grows to ½ inch (1.2 cm) long. Johnsongrass ligules are membranous, measure 3/16 inch (0.5 cm) long, and have ragged, hairy upper edges.



1. Emerging seedlings; note purple sheaths.
2. Four-leaf stage.

The first true leaf blade is smooth and green. The first leaf is about ½ to ¾ inch (1.2 to 2 cm) long and ¼ inch (0.6 cm) wide. Leaf blades are creased along a third of their length. Creases indicate the midveins, but the veins themselves are not visible at this stage. The leaf sheath (the underside of the leaf blade where the blade attaches to the stem) is maroon and green with overlapping margins. The second leaf blade is 1 to 1½ inches long and ¼ inch wide (2.5 to 4 cm long and 6 mm wide), and its midvein crease is visible as a whitish green line.



3. Membranous, fringed ligule.

4. Mature plant with maroon and green leaf sheaths.

Biology

Johnsongrass is an extremely competitive perennial grass that commonly reaches heights of 7 to 9 feet (2 to 3 m) and forms thick, dense patches. Johnsongrass reproduces by seed and by its scaly, jointed rhizomes. Found in all major agricultural regions, it is considered one of the ten most troublesome weeds in the world. Because johnsongrass seed is dormant when it matures, nearly all seed over-winters. Emergence begins in mid-May when soil temperatures approach 57° F (14° C); the optimum germination temperature is close to 75° F (24° C). Plants that emerge when the soil temperature is 75° F flower in six weeks and have viable seeds two to three weeks later. Early-emerging plants take at least twelve weeks to flower.

Seedling johnsongrass can produce rhizomes as early as three weeks after emergence. At this stage, the ratio of rhizome growth to top growth is small. But once the plant reaches boot stage, rhizomes can comprise fully 25 percent of the plant's weight. Johnsongrass produces 90 per-cent of its rhizomes after flowering. Rhizomes grow most

rapidly (2 feet to 300 feet) in the year following seed development. This growth occurs in three stages: primary, secondary, and tertiary.

Primary rhizomes overwinter and in spring develop the buds that produce new plants. When the new growth is 8 to 18 inches (20 to 45 cm) tall, secondary rhizomes grow at the base of the plants and the primary rhizomes decay. Secondary rhizomes grow vigorously and produce shoots that develop into plants by late summer. When above-ground growth ceases, mature plants develop tertiary rhizomes from the base of the plant. Tertiary rhizomes grow until frost and overwinter to become the primary rhizomes that start the next spring growth.

New growth can develop from buds along the rhizomes and at the ends. This new growth produces crowns and tillers. Crowns grow more quickly on plants developed from rhizomes than on those developed from seed. Most of the rhizomes are found in the top 8 inches (20 cm) of soil. Rhizomes are thick, scaly, and spotted with purple. In addition, johnsongrass has a free-branching, fibrous root system and can develop roots at lower stem nodes.

Established johnsongrass is a more severe problem than seedling johnsongrass because of its increased vigor (ability to draw on rhizomes for energy) and reproductive capacity. The rhizomes release chemicals that inhibit the growth of other plants, causing yield reductions in competing crops.

Johnsongrass produces slender to moderately stout, unbranched, erect stems. Stems are 2 to 7 feet (0.6 to 2 m) tall and tend to grow in patches. Leaves of mature plants are 12 to 2 inches (1.2 to 5 cm) wide and 8 to 24 inches (20 to 60 cm) long. They are wide at the base, v-shaped, and taper to the tip. Leaves are alternate, light to medium green, and have a prominent white midvein. The leaf surface and edges are smooth.



5. Panicle seed heads.

Flowers appear in late July. They are loosely arranged, hairy, purple, and form a pyramid 6 to 20 inches (15 to 50 cm) long.

The principal means of dissemination is by seed. A plant produces 100 to 400 seeds that shatter easily when mature. Seeds are reddish brown, oval, glossy, and have fine lines on the surface. They can remain viable in the soil for as long as three years. Up to 10 percent of the seed can withstand ensilage and passage through an animal's digestive tract. Seeds can germinate from a depth of 6 inches (15 cm), but most arise from a depth of 2 to 3 inches (5 to 7 cm) or less.

Johnsongrass is extremely competitive. It can cross with *S. sudanese* (cultivated sorghum) to produce a plant with vigorous rhizomes. Rapid growth on young leaves, drought, freezing, cutting, wilting due to frost, or any other interruption of normal growth may cause the release of hydrocyanic acid (a cyanide poison).

Similar Species

Shattercane (*Sorghum bicolor*) is closely related¹ to johnsongrass. The two weeds are difficult to tell apart in early growth stages. In later stages, however, shatter-cane develops a stem about the diameter of a pencil, while the johnsongrass stem is much stouter. In addition, shattercane forms a dense, fibrous root system, whereas johnsongrass produces large, scaly rhizomes (rootstocks).

Natural History

Johnsongrass is named for Colonel William Johnson of Selma, Alabama. In 1840, Johnson went to visit John H. Means, future governor of South Carolina, who gave him forage grass seed. Johnson planted the seed on his plantation and eventually grew large amounts of it for forage. It became locally known as "Johnson grass."

In South Carolina, the grass was known as "Means grass" and, after a number of years, as "that damned Means grass." It seems that Thomas Means, John's father, accidentally introduced the grass to this country. While in Egypt, after the Revolutionary War, Thomas Means purchased hemp seed contaminated with johnsongrass seed. This was the source of another of the common name for the grass: Egypt grass. At one point, the weed was known by as many as forty common names. But in the late nineteenth century, *johnsongrass* became the accepted name. Although johnsongrass was once a popular forage in the South, by the end of the nineteenth century it was considered more a weed than a crop.

Control

Before effective herbicides were introduced, control measures for johnsongrass ranged from multiple-tillage operations and summer fallow to harvesting it for forage. The farmer's most economical method was to graze it heavily or mow frequently for one to two years to reduce the number of weeds, their depth, and the energy reserves of the rhizomes. The farmer then plowed the field to a depth of 3 to 4 inches (7.5 to 10 cm) and planted winter grains to expose the rhizomes to freezing temperatures and vigorous competition in the spring. Unless this or some other method of depleting the rhizome energy reserves is used, johnsongrass is impossible to control without herbicides. Deep tillage is ineffective as a cultural control method, because it establishes the rhizomes even deeper and stimulates them to sprout secondary shoots.

Although ineffective alone, tillage does improve the effectiveness of herbicides in controlling established johnsongrass. Cutting the rhizomes into smaller pieces increases the number of shoots. The greater the number of shoots, the greater the energy drain, because more shoots are competing for the same finite energy reserves. Tillage also shortens the rhizomes and creates more leaf area for herbicide absorption. Herbicide movement throughout the plant is more likely when the rhizomes are shortened.

Crop rotation is another important factor in johnsongrass control. Control is easiest in broadleaved crops, such as soybeans, when effective postemergence herbicides can be used.

For specific recommendations, consult your county Extension agent or the most recent *Weed Control Manual and Herbicide Guide*, available through Meister Publishing

Company, 37841 Euclid Avenue, Willoughby, Ohio 44094. Follow label instructions for all herbicides and observe restrictions on grazing and harvesting procedures.

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