

Know Your Foxtails

Foxtails are grasses in the genus *Setaria*. Their genus name is derived from the Latin word “seta” meaning “bristle” or “hair,” and defines their distinct bristled or hairy seedhead. Yellow, green and giant foxtail are the three most common weedy foxtail species in Maryland. They are found in lawns as well as in pastures and cultivated crops. Their presence in lawns can disrupt property aesthetics; however, their presence in cultivated crops can be problematic because they can reduce crop yield and affect harvest efficiency. It is imperative to be able to effectively identify foxtails, especially when found in pastures, as their awns (bristles/hairs) can get lodged in the mouths and gums of equine or livestock causing major discomfort if consumed in dry hay.

Yellow, green and giant foxtail share some similarities. For example, each is a summer annual that tends to emerge from mid-spring to early summer, although emergence throughout the growing season is not uncommon. Consequently, they have a very low tolerance to frost and turn brown and die after the first frost event in the fall. They have a fibrous root system and a clumping growth habit. They grow best in full sun, do not tolerate shade, and display moderate drought tolerance. Also, they thrive in fertile soil, with yellow foxtail being more common in lawns, and green and giant foxtail appearing more frequently in agronomic fields and waste areas. Furthermore, studies have shown that green foxtail prefers more acidic soils, and its presence may indicate a low soil pH.

Distinguishing Between Foxtail Species

Distinguishing between foxtail species may be challenging, especially since they tend to occupy similar ranges and may look identical to the untrained eye. To make an accurate identification, observers need to note both the vegetative and reproductive characteristics. When identifying grasses, it is always prudent to begin with a structure called the ligule. This is a thin outgrowth



Figure 1. Hairy ligule found on foxtails. Photo by Dwayne Joseph, University of Maryland.

in the collar region (junction of leaf and leafstalk) of grasses. The type of ligule present (or absent in some cases) can assist with grass identification through the process of elimination. Because each of the weedy foxtails has a hairy, fringe-like ligule (Figure 1), its presence will determine if you are indeed looking at a foxtail. Next, observe traits on the leaf blades. Yellow foxtail has sparse, long, silky hairs on the upper part of the leaf surface near its base (Figure 2). The base of the stem (near the soil surface) of yellow foxtail is often flattened (Figure 3) and, unlike the other two foxtail species, it will not roll smoothly between the fingers. Furthermore, the base of the stem of yellow foxtail may be red or purplish in color. However, stem color may not be the most reliable for identification because plant stress



Figure 2. Long, silky hairs at the base of yellow foxtail leaf surface. Photo by Dwayne Joseph, University of Maryland.



Figure 3. Flattened stems near soil surface on yellow foxtail. Photo by Dwayne Joseph, University of Maryland.



Figure 4. Yellow foxtail seedhead. Photo by Dwayne Joseph, University of Maryland.



Figure 5. Drooping/nodding seedhead of giant foxtail. Photo by Dwayne Joseph, University of Maryland.



Figure 6. Short, fine hairs on the upper leaf surface of giant foxtail. Photo by Dwayne Joseph, University of Maryland.



Figure 7. Green foxtail seedhead. Photo by Katy Chayka, Minnesotawildflowers.info.

and other factors can contribute to this trait. Consequently, stem color should not be used as a primary trait for identification, but may serve as secondary confirmation. A summary of the distinguishing traits is presented in Table 1.

Foxtail identification becomes less complicated if a seedhead is present. Yellow foxtail has a small (0.75 – 6 inches long by 0.5 inches wide), erect seedhead which is the smallest of the three species (Figure 4). Moreover, at maturity, the awns turn yellow, giving the species its common name. Giant foxtail has the largest seedhead (1.5 – 8 inches long by up to 1.25 inches wide) of the three species and is taller in stature (typically 2.5 – 5 feet) with larger leaves. It can be easily identified by its distinctive droopy or nodding seedhead (Figure 5). Also,

the leaves of giant foxtail have dense, short, fine hairs on the upper surface (Figure 6) unlike the other two species. The base of giant foxtail's stem is cylindrical and will easily roll between the fingers.

Green foxtail can be distinguished from the other two foxtails because its leaf surface is hairless and often rough to the touch. It can be distinguished from yellow foxtail because the base of its stem is round instead of being flattened. Furthermore, green foxtail has an erect seedhead (Figure 7) that is broader (0.5 – 1 inch wide) and greener than yellow foxtail. It is important to note that of the three species, green foxtail usually exhibits the most variability in seedhead size and shape, so proper identification should be made by observing the vegetative traits.

Table 1: Identifying traits of three weedy foxtails, timothy, and crabgrass.

	Giant Foxtail <i>Setaria faberi</i>	Green Foxtail <i>Setaria viridis</i>	Yellow Foxtail <i>Setaria glauca</i>	Timothy <i>Phleum pratense</i>	Crabgrass <i>Digitaria spp.</i>
Leaves	Short, fine hairs densely arranged on upper leaf surface.	Hairless, often rough to the touch.	Sparse, long, silky hairs on the upper leaf surface, near the base.	Flat, smooth and hairless leaves that taper to a point.	Dense hairs on leaf blade and sheath (hairy crabgrass). Smaller, hairless leaves and sheath (smooth crabgrass).
Ligule	A fringe of hairs	A fringe of hairs	A fringe of hairs	Membranous	Membranous
Seedhead	A drooping, cylindrical, bristly panicle. Largest seedhead of the three weedy foxtails.	Cylindrical panicle. Seedhead can be as large as giant foxtail but without the drooping appearance.	Erect, cylindrical, and bristly. Awns develop yellow color at maturity. Smallest seedhead of three weedy foxtails.	Cylindrical, spike-like panicle with no awns.	Finger-like branching with 2-6 spikes per stem.
Stem & plant height	Base of stem is cylindrical. Can reach 6.5 feet in height but usually 2.5-4 feet tall	Base of stem is cylindrical and hairless. Can reach 3 feet in height.	Base of stem is flattened and can be purplish in color (not consistently). Can reach 2-4 feet in height.	Corm (bulbous structure) present at the base of stem. Can reach 2-4 feet tall.	Prostrate growing stems, rooting at nodes (hairy crabgrass). No roots at the nodes (smooth crabgrass). Can reach 2 ft. tall (hairy crabgrass) and 6 inches tall (smooth crabgrass)
Life cycle & preferred environment	Summer annual Prefers agronomic fields and waste areas.	Summer annual Prefers acidic soils, agronomic fields, and waste areas.	Summer annual Agronomic fields and waste areas. Most common foxtail found in lawns.	Cool season perennial Prefers cool and moist conditions.	Summer annual Agronomic fields and waste areas. Common in lawns.

Foxtail Look-alikes

The seedhead of foxtail may be easily mistaken for the popular forage timothy. Fortunately, the two grasses have distinguishing characteristics to aid identification. Foxtails are annual grasses whereas timothy is a perennial. Because of this difference, timothy has an enlarged bulbous structure (similar to an onion) at the base of its stem called a corm (Figure 8), while foxtails don't have corms. Further, timothy has a long membranous ligule unlike the hairy ligule of foxtails. If a seedhead is present, those of timothy are erect and may

resemble yellow or green foxtail; however, a closer look will reveal the seedhead of timothy has no awns (Figure 9), unlike the foxtails.

Another look-alike grass that might be confused with foxtail (if a seedhead is not present) is crabgrass. This grass was originally brought to the U.S. as a possible forage but is now widespread as one of the most troublesome grassy weeds of multiple habitats. There are two problematic crabgrass species in the U.S., smooth crabgrass and hairy crabgrass (also known as large crabgrass), with the latter being more prevalent in



Figure 8. Bulb-like corm of timothy. Photo by Randall Prostak, University of Massachusetts Amherst.



Figure 9. Seedheads of timothy. Photo by Randall Prostak, University of Massachusetts Amherst.

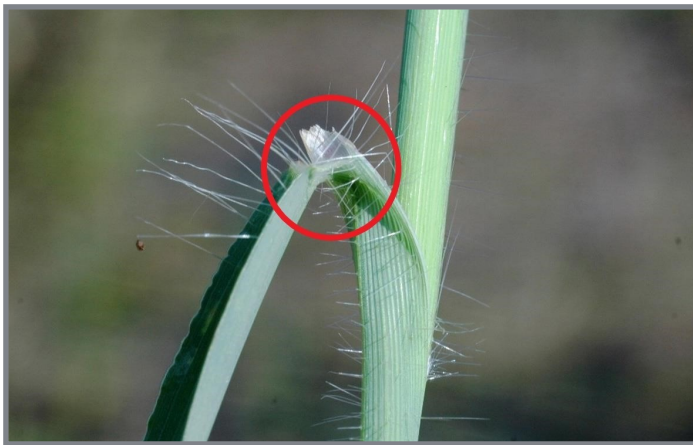


Figure 10. Membranous ligule of hairy crabgrass. Photo by Lambert McCarty, Clemson University.



Figure 11. Hairy crabgrass seedhead with finger-like branching. Photo by Lambert McCarty, Clemson University.

Maryland. Like the foxtails, crabgrasses are summer annuals. Therefore, these weeds will emerge at similar times. During the vegetative stage, crabgrass can be differentiated from foxtail by its membranous ligule (Figure 10) compared to the hairy ligule of foxtail. Furthermore, crabgrass has a prostrate growth habit with the roots of hairy crabgrass developing at the nodes of stems, allowing them to spread across the ground. Consequently, this growth habit allows crabgrass to be very adaptable to mowing as the plants are able to set seed below the average mowing height. During the reproductive stage, the spiked seedhead arrangement of crabgrass (spikes resembling the fingers of a hand; see Figure 11) is easily distinguished from foxtail.

Knowing these traits can aid in the identification of these problematic grassy weeds. In so doing, property owners

and managers can implement effective weed management through cultural, mechanical, and chemical methods.

Resources

CABI. *Setaria faberi* (giant foxtail), CABI Compendium. CABI International. <https://doi.org/10.1079/cabicompendium.49767>

Forage Identification: Timothy. Department of Plant Sciences, University of Wyoming. <http://www.uwyo.edu/plantsciences/uwplant/forages/grasses/timothy.html>

Penn State Extension. Lawn and Turfgrass Weeds: Yellow Foxtail and Green Foxtail. Lawn and Turfgrass Weeds: Yellow Foxtail and Green Foxtail (psu.edu)

Rakesh Chandran. Don't Let Crabgrass Make You Crabby! West Virginia University Extension. <https://extension.wvu.edu/lawn-gardening-pests/weeds/crabgrass>

UC IPM. Foxtails (*Setaria spp.*). <http://ipm.ucanr.edu/PMG/WEEDS/foxtails.html>

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