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Foxtail barley: biology and management

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Quick Facts

Foxtail barley is a native, short-lived perennial grass that is very opportunistic but not highly competitive with other dominant species.

Foxtail Barley is a serious threat to livestock utilizing infested hay or pasture since the barbed awns can cause serious eye and mouth problems.

Control of foxtail barley infestations is only as good as the correction of the management problem that allowed the edaphic conditions favoring this grass.

Descriptions and Variants

Foxtail barley is a native, short-lived perennial that spreads by seed and grows in dense bunches with shallow fibrous roots. The bunches can expand over time to an 8-inch diameter for a single plant. The stems (growing from 6 inches to 2 feet tall) are smooth and usually erect. Occasionally they recline at the plant base. The leaf sheaths are loose, shorter than the internodes, and range from smooth to hairy. The leaves are erect, rough, narrow, flat or U-shaped, gray-green, 2 to 5 inches long, and 0.25 to 0.5 inches wide. The pale green heads or spikes are 2 to 4 inches long and nodding with spreading, slender, **barbed awns** that are 1 to 2.50 inches long. The nodding head is an identifying characteristic of the plant. The mature head is yellow, sometimes with a slight red

Foxtail Barley, *Hordeum jubatum* L., is a member of the Barley tribe in the Grass family. The most common name for this weedy grass is foxtail barley. Other names include wild barley, skunk-tail grass, flicker-tail grass and tickle grass. Though commonly referred to as "foxtail", this name is confused with giant, green and yellow foxtail (various species of the genus *Setaria*) are weedy grasses with very different characteristics.

This information provided by:

1. Colorado State University Cooperative Extension area agent, Tri-River Area, soil and crop sciences. 11/94. ©Colorado State University Cooperative Extension. 1994. For more information contact your county Cooperative Extension office. Some recommendations change regularly. Please contact your Colorado State University Cooperative Extension county office for current recommendations.

highlight, and breaks up readily into three spikelet clusters of which only one is fertile. The seeds are yellow, hairy at the tip, and about 0.125 inches long.

Closely related species, plus hybrids of foxtail barley have been noted in various regions. For instance, *Hordeum pusillum* Nutt., known as little wild barley, is a native annual sometimes behaving as a winter annual. This grass is similar to foxtail barley but usually much smaller. In most cases, the characteristics of these species are similar so that management considerations are similar. One exception can be in managing new biotypes of foxtail barley. A biotype is an adaptation of a plant to a specific environment, as in resistance to a specific herbicide.

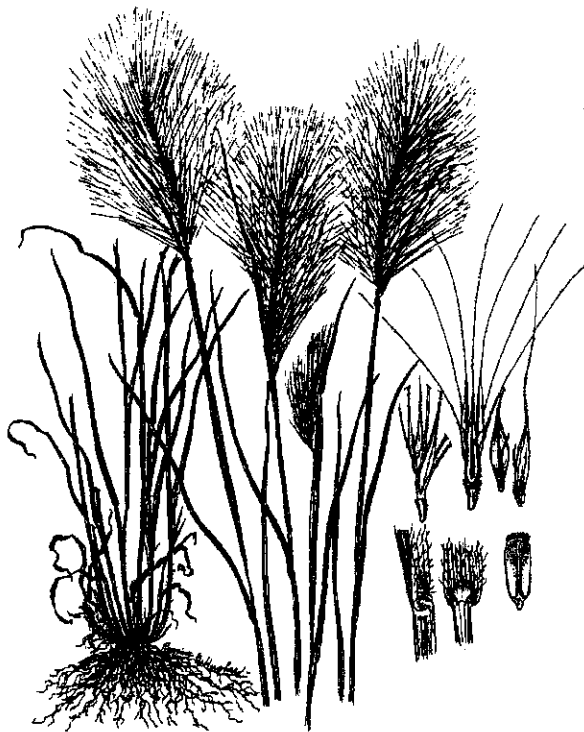


Figure 1: Growth habit and selected plant parts of Foxtail Barley, *Hordeum jubatum* L. Drawing is from Selected Weeds of the United States, USDA, Agriculture Handbook No. 366.

Distribution and Habitat

Foxtail barley is acclimated well to a wide array of environmental conditions allowing for a broad geographical distribution. Infestations have been noted

throughout the world. The species is indigenous to most of North America except in the southern Atlantic and Gulf Coast areas. Colorado infestations have been found at elevations from 3,400 to 10,000 feet.

Typical of many grasses, foxtail barley prefers fertile, wet, non-alkaline soils. However, infestations can be found under many broad edaphic conditions. Alkaline and saline soils commonly have infestations especially if the conditions limit other grass species. Tolerance to salinity and alkalinity is moderate. The soil texture can range from light sands to heavy clays with the best germination occurring in heavier soils. The moisture regime can be as equally broad, from dry to wet. Therefore, infestation sites can vary greatly from cultivated fields and pastures to disturbed lands and waste areas.

Life Cycle

Emergence and development. Foxtail barley emerges from seeds and vegetative buds. The buds are located in the crown slightly below the soil surface. Shoots appear from the crown early in spring. Typically, the number of stems increase each year, enlarging the crown. Tillering also is common, increasing the potential number of seed heads.

Seeds generally germinate in the fall, though some spring germination occurs. Seeds on the soil surface or only slightly buried will have the highest germination rate. Seed survival is greatest on the soil surface. Seeds on the surface remain viable for approximately one year. Only a few buried seeds survive beyond the initial year, but some seeds remain viable for seven or more years.

Reproduction and dispersal. Foxtail barley produces a spike inflorescence (head) that is self compatible but also can cross pollinate. The potential seed production for a single plant is greater than 200 seeds. The seed heads readily shatter when mature. At maturity, the plant stems break off encouraging the heads to be wind blown and scatters the seeds. If a stem breaks off before maturity, but seed development has begun, viable seed production is still possible. Seeds do not need to experience cold temperatures to germinate.

Production Impact

Foxtail barley can be grazed in the early vegetative stage. Palatability is fair. However, when the heads are present, the barbed awns can cause serious problems.

Livestock and game animals generally avoid the grass when heads are present. However, if eaten, the awns can lodge in the mucous membranes as in the mouth and nose. This concern is especially true for horses that have soft mucous membranes in the mouth. The eyes also can be subject to injury from the awns.

Infested hay also can be a threat to animals since the awns remain a problem even after harvesting. The economic impact of an infestation to a high quality pasture or hay field can be substantial. For example, an infested bale would grade "very poor" regardless of the quality of the remaining hay components. A secondary concern is the awns lodging in wool, hair and clothing.

Integrated Control Management

An integrated management approach is the best means of controlling any weed infestation. The general control classifications are cultural, mechanical, biological, and chemical. The site and environment of the infestation dictates what combinations of controls can be implemented properly and safely. Also, control treatments may need to be repeated to overcome an infestation.

Cultural. Though foxtail barley is not highly competitive, this grass can be opportunistic. Any open area is subject to an infestation due to the broad range of suitable conditions for growth of this grass. Therefore, poor management of a site, as in wet spots in a pasture, can offer an opportunity for infestation. If unchecked for three to four years, the infestations can become a serious problem.

Good management of a site will maintain desirable competitive species and minimize foxtail barley infestation opportunities. Adequate drainage and proper grazing are good management practices that should be in place. After controlling foxtail barley, any existing field problems need to be corrected as in leveling, improving irrigation practices and renovating old plant stands. Otherwise, a new infestation will occur again.

Desirable species also need to be introduced after controlling an infestation. On sites with excessive water and salinity, tall wheatgrass, western wheatgrass, slender wheatgrass, wild rye, reed canary grass and tall fescue can be successful. A wet site with moderate salinity is suitable for Garrison creeping foxtail and orchardgrass tolerates a wet site with low salinity. For dry conditions, wild rye, tall wheatgrass, and alkali sacaton are suitable

for high salinity sites and crested wheatgrass and galleta are suited for low to moderate salinity.

Burning has been used for control of foxtail barley with limited success. When mature, the yellowed plant will readily burn, which can limit spread of the infestation. However, burning is fast and completed in a short time. Therefore, the duration and temperature needed to kill the seeds is seldom attained adequately. Also, the crown is rarely affected by burning.

Grazing is possible in the early stages of foxtail barley. Sheep and goats are especially effective in slowing plant development through grazing. Research has been successful in limiting head development through use of chemicals to extend the grazing period. The crown generally is unaffected by grazing unless uprooted.

Mechanical. Foxtail barley is not a serious problem when cultivation is practiced annually. Survival is poor when seeds are buried greater than 3 inches deep for more than one year. If the crown is completely uprooted, established plant survival is low due to the shallow root system. Plowing can be effective to bury seed and break up the crown. Chiseling is only fair since the soil is not turned over. Secondary tillage as in harrowing will control many late spring seedlings.

Mowing is a short term control. Repeated mowing has been shown to limit infestation spread. Timing of the mowing must be within 10 days after head emergence to inhibit any seed development. However, under repeated mowing management, the lower stems can develop a prostrate growth habit and develop heads below the mowing height. In addition, infestations show greater competitiveness after repeated mowing.

Biological. Foxtail barley is a host to numerous pests. However, many of these pests are also associated with many desirable grasses including small grains. Therefore, the biological control potential is limited, unless a pest is identified that is very host specific to foxtail barley. Foxtail barley pests include numerous insects, various rusts, and powdery mildew.

Chemical. Fair to good control of foxtail barley can be accomplished with herbicides. Research data is limited concerning effective control of foxtail barley with herbicides. The selection of herbicides varies according to the desirable plants present and the site of application (Table 1). Typically, the best control occurs when the grass is in an early growth stage except for pre-plant incorporated (PPI) herbicides. View current labels and pesticide guides for up-to-date formulations and rates of

application. Read herbicide labels before using, then follow instructions, precautions and limitations completely.

Table 1: Herbicides used for foxtail barley control.

Alfalfa
EPTC* (Eptam) - PPI
Pronamide (Kerb) - dormant alfalfa; fall treatment
Metribuzin (Sencor) - dormant alfalfa
Terbacil (Sinbar) - dormant alfalfa
Hexazinone (Velpar)- dormant alfalfa
Paraquat ^R (Gramoxone)-established alfalfa

Pasture and Range
Paraquat ^R (Gramoxone)
Glyphosate (Roundup) - general control

Non-cropland
Glyphosate (Roundup) - general control

* - Limited supporting data ^R - Restricted Use chemical
