AGRICULTURAL
GUIDE
Published by the University of Missouri-Columbia Extension Division

Barley

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Barley production in Missouri usually increases following a drought. Livestock producers need feed if corn supplies are low or need pasture if grass is not recovered.

As a feed grain, barley is considered to have 95 percent of the feed value of corn. Barley acreage has not been estimated by the Crop Reporting Service since 1977, but estimates range from 5,000 to 20,000 acres each year.

Barley is used in the malting industry as well as for livestock feed. However, attempts to produce barley for malting in Missouri have failed because malting barley requires bright sunshine with little disease during grain filling — a condition most often found in more arid regions of the United States.

Winter and spring barleys are available, but testing in Missouri indicates spring barley does poorly. If you want to plant a spring crop, spring oats are the best choice. Therefore, this guide won't discuss spring barley. Two types of winter barley — two-row or six-row — are available. Because two-row barleys have not achieved the yield potential of the six-row barleys in Missouri, this guide will deal only with the six-row barleys.

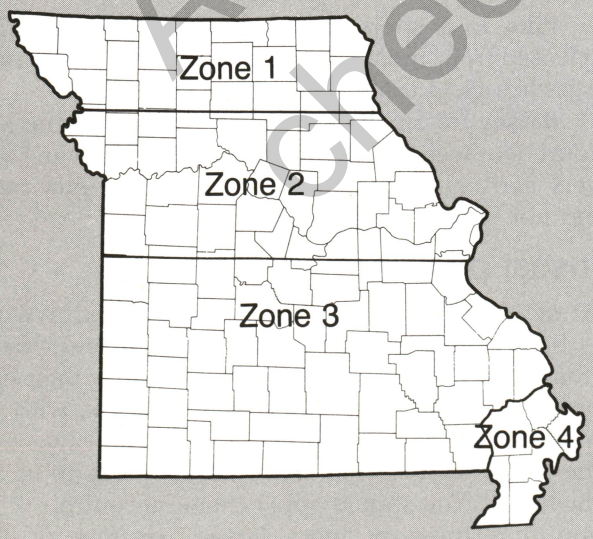
Site selection

The best soils for barley are well drained loams and clay loams. Barley cannot stand "wet feet," so you should avoid flat sites with poor internal drainage, such as claypan. Barley does best at a soil pH of 6.0 or above and is often considered one of the most salt-tolerant crops.

Planting dates

Barley requires a good, firm seedbed. It is less winter-hardy than wheat, so you should plant it 1 to 1½ inches deep and seed it earlier than wheat. That ensures good establishment and root development prior to winter dormancy. Appropriate seeding dates for barley are shown in Figure 1.

You shouldn't plant barley north of U.S. Highway 36 because winter injury would be severe in most years. Use the earlier planting dates only if you want barley for pasture. If you plant barley for feed, you should use later planting dates to help avoid barley yellow dwarf virus (BYDV) injury.



	Purpose	
	Fall grazing	Grain
Zone 1	Not Recommended	Not Recommended
Zone 2	Aug. 25–Sept. 15	Sept. 15–Oct. 1
Zone 3	Sept. 1–Sept. 30	Sept. 15–Oct. 15
Zone 4	Sept. 1–Sept. 30	Oct. 1–Oct. 30

Figure 1. Planting dates for winter barley in Missouri.

Table 1. Summary of barley performance test yield results

Variety	1978 Col.	1978 M.V.	1978 Port.	1979 Col.	1979 M.V.	1980 Col.	1980 M.V.	1981 Col.	1982 Col.	1983 Col.	1984 Col.	1985 Col.	1985 Nov.
Perry	54.5	67.0	62.1	88.1	84.7	64.2	30.3	71.2	51.8	40.1	75.5	38.8	75.1
Pike					76.6						71.1	31.1	79.0
Post	30.1	69.6	44.0	91.3	79.7	84.8	36.0	72.0	42.2	76.0	76.9	30.7	70.7
Dundy												29.8	78.2
Kanby	60.4	55.4	71.1	96.9	61.9	83.3	34.5	72.6	45.9				

Col. – Columbia
M.V. – Mt. Vernon
Port. – Portageville
Nov. – Novelty

Planting rates

Because barley seed is larger in volume and weighs less than wheat, you should plant 2 to 2½ bushels per acre of vigorous seed with germination exceeding 85 percent. If you try extremely late plantings or if you want pasture, use the higher rate to help ensure good root growth which helps prevent heaving damage and enhances winter survival.

Fertility requirements

Barley has fertility requirements similar to those of wheat and should be fertilized accordingly. Because barley tends to lodge (fall down) more readily than wheat, pay special attention to nitrogen and phosphorus fertilization. Too much nitrogen increases the possibility of lodging and encourages luxuriant fall growth which, unless grazed, aggravates winter injury and reduces winter survival. Apply a maximum of 80 pounds of nitrogen per acre and try to apply one-half of that or less in the fall. Spring-applied nitrogen is most essential where barley has been pastured the previous fall. Adequate phosphorus is important in developing good early root growth and should enhance winter survival.

Pasturing barley

One of the attractions of barley is that it must be planted early and it frequently can provide a source of early fall pasturing. In fact, barley generally provides more fall pasture than wheat or rye. Again this has been most important in drought years when other pastures are less productive.

Barley provides excellent forage as a pasture, especially in the fall. Barley is not grazed as often as wheat in the spring because it usually loses foliage to winter kill, has slower early growth, and "joints" sooner than wheat. You should remove cattle from barley pastures prior to the onset of jointing — the growth stage in which the first node and head emerge above ground level.

Plant development

Barley flowers and matures as much as one to two weeks before wheat. This allows those producers who intend to follow barley with a second crop a head-start over wheat producers who double crop.

Variety selection

Few barley varieties are adapted to Missouri. Yield results from tests conducted at Columbia are listed in Table 1.

Perry, an early variety released by Missouri, has good winter hardiness and some resistance to BYDV. This variety is well adapted to all the barley growing regions of Missouri.

Post is somewhat later in maturity but has better BYDV resistance. This Oklahoma release is less tolerant to winter injury than Perry, but in the presence of severe BYDV, it survived better than Perry.

Kanby is a variety released by Kansas and has performed respectably in Missouri. It is later in maturity and is more susceptible to lodging than Perry.

Pike is a short, early maturing barley variety released from Indiana and has been only adequate in Missouri yield trials.

Barsoy might show some adaptation for the Missouri Bootheel. A Kentucky release, it is known for its very early maturity and good straw strength, but it has not yielded well in Missouri.

Insect pests of barley

Armyworms (Pseudaletia unipuncta). The armyworm is barley's major pest in Missouri. Moths emerge from overwintering pupae in April and lay their eggs on barley. They deposit the eggs in areas with the most growth. Armyworm larvae feed on leaves until the barley starts to mature. Then they cut off or clip the heads. You should apply chemical controls when you find three or more larvae per foot of drill row.

Aphids (greenbug, oat bird cherry aphid, and corn leaf aphid). All of these aphids are vectors of BYDV. The most common species found in barley is the greenbug. Greenbugs occasionally overwinter in Missouri, but most spring infestations arise from winged females migrating on prevailing winds from the Southwest. Colonies of this aphid occur on leaves and in crowns of barley. Damage results from feeding, from toxins injected into the plant, and from diseases vectored. You should apply chemical controls when greenbug counts exceed 100 per foot of drill row in the spring. In the fall, when plants are much smaller and BYDV is more serious, apply the controls when counts show 50 or more aphids per foot of drill row.

Fall armyworm (Spodoptera frugiperda). The fall armyworm is an important pest on fall seedings of barley. The moths migrate into Missouri (usually in June) from the south and go through several generations until the first killing frost. They lay eggs on the seedling plants, and the larvae, after hatching, spend about three weeks feeding. You should apply chemical controls when you find one or more larvae per foot of drill row.

Grasshoppers. Grasshoppers can severely damage fall-seeded small grains, especially following a dry growing season. If grasshopper populations are high, you should treat the fence rows and other areas before the barley germinates. Treating the margins of the field after the barley emerges sometimes gives adequate control. But if you find one or more grasshopper per square yard throughout the field, apply chemical controls.

Other insects. Other insects found in barley but which rarely develop to economic proportions are chinch bugs, variegated cutworms, wireworms, Hessian flies, and false chinch bugs.

Diseases and their control

Barley diseases are a major limiting factor to barley production in Missouri. They cause significant losses through reduced yield and quality.

Four general types of diseases are: (1) seed and seedling diseases that are responsible for poor germination and seedling death; (2) foliar diseases, caused by fungi and bacteria, that destroy leaf tissues and reduce optimum productivity; (3) virus diseases that infect systemically and seriously reduce production; (4) head diseases that damage the kernels and decrease quality.

It is important to recognize the common and damaging diseases so you can apply appropriate control measures.

Seed and seedling diseases

Several fungi are responsible for head blights that affect kernels. Black point and scab cause shriveled and lightweight seed that germinate poorly. Both pre-emergent and post-emergent seedling losses can come from seed-borne and soil-borne organisms.

Take-all is a disease that prematurely kills the roots and lower stems, causing unfilled, bleached, and sterile heads. Rhizoctonia root rot may affect barley at any growth stage, but may be severe in the seedling stage. Seed treatment fungicides help reduce seed and seedling infections.

Foliar diseases

Leaf diseases may range in severity from small, unimportant spots to large lesions that prematurely destroy large areas of the leaves. The relative severity of leaf infections often varies with weather conditions. Leaf diseases are generally favored by warm and humid conditions — typical of Missouri.

Leaf rust is seen as small, yellow-orange pustules on leaves and sheaths. Heavily infected leaves die prematurely, reducing kernel size and number. Early barley varieties generally escape serious rust attacks.

Powdery mildew is a common disease of barley. The fungus forms white to light gray powdery growth on the leaves, sheaths, stems, and glumes. In heavy infections, powdery mildew can cause premature death of leaves, especially lower leaves. No varieties adapted to Missouri have resistance, but in most years the disease is not serious.

Net blotch is a common fungus disease of the leaves. The symptoms include a cross-hatched brown "netting" appearance. It can be quite serious in seasons of high moisture.

Septoria leaf blotch causes yellowish to light brown leaf spots. Black pycnidia form in the spots. Although this fungus disease is similar in symptoms to the Septoria leaf blotch of wheat, it is caused by a different Septoria species. It can be serious in moist and humid weather.

Bacterial stripe blight appears as water-soaked dots on the leaves and sheaths. The dots can enlarge into dark brown streaks. It is serious in very wet springs.

Virus disease

By far the most important virus disease of barley is barley yellow dwarf virus. This disease is prevalent in Missouri on wheat, oats, and many forage grasses. But barley is especially susceptible, and BYDV can be devastating to barley survival.

Infected plants are often stunted and turn a golden yellow. Leaves become strap-like and plants may tiller excessively and become rosette-like. Heads fill poorly. About a dozen aphid species transmit the virus. Oatbird cherry aphid, corn leaf aphid, and greenbug are common vectors in Missouri.

Fall infections of BYDV are much more serious than spring infections. Yield reductions of up to 15 percent from fall infections result from fewer heads and smaller head size.

Head diseases

Two smut diseases affect kernels: loose and covered smuts. Loose smut replaces all the kernels of the head with masses of smut spores that are released at the time of flowering, causing new infection in the field. The loose smut fungus overseasons *inside* normal-appearing seed.

The covered smut fungus mostly survives as spores on the surface of seed.

To control smut diseases, use clean seed from uninfected fields and, if necessary, use a fungicide seed treatment.

For loose smut, you must use a systemic fungicide because the fungus is inside the embryo. A carboxin seed treatment (Vitavax) provides effective control of loose smut.

For covered smut, use a seed treatment with one of several approved fungicides. Approved fungicides include captan, maneb, mancozeb, thiram, Vitavax, and Vitavax 200.

Scab, caused by Fusarium species, causes spikelets to prematurely bleach by infecting the bases of the spikelets. You may notice pink or salmon-colored infections at the bases. Kernels seriously shrivel and the fungus produces a toxin that can be harmful to non-ruminant animals. Because the same fungus causes stalk and ear rots of corn and scab of wheat, the disease on barley can show up more readily when barley follows these crops.

Summary of disease control

The basic principle of the control of barley diseases is prevention. Several simple and effective practices follow:

1. Use only high-quality seed, preferably certified seed of adapted varieties that have been properly treated with an approved seed-treatment fungicide.
2. Follow at least a two-year rotation with crops other than small grains.
3. When available and adapted, use varieties resistant to the foliar diseases.
4. When the weather conditions favor foliar diseases, the use of foliar fungicides may be justified.
5. Control insects that may serve as vectors and time planting and harvest to reduce hazards from insects.

■ Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914 in cooperation with the United States Department of Agriculture. John W. Oren, Director, Cooperative Extension Service, University of Missouri and Lincoln University, Columbia, Missouri 65211. ■ An equal opportunity institution.

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