

SPRING HULLESS FOOD BARLEY PRODUCTION QUICK FACTS

Introduction

Hulless or “naked” food barley is an unrefined whole grain used for human-food consumption. One serving (¼ cup uncooked) of whole grain hulless barley provides 163 calories, 6 grams of protein, 34 grams of carbohydrates, 1 gram of fat, and 8 grams of fiber. In contrast, other barley varieties used for human food contain an indigestible hull that is scraped off, removing most of the bran and nutrients (pearled barley).

Rotation and Seeding

- Barley grows well in rotation but is not recommended after small grains or corn when alternatives are readily available due to disease pressures.
- Good seed-to-soil contact and moisture availability are needed.
- Seed depth: 1.0–1.5 inches.
- Row spacing: 6–8 inches is ideal.
- Seeding rate is similar to wheat and greater than hulled barley. It depends on seed size, purity, percentage germination, and seed viability.
 - » Irrigated: 1–1.2 million seeds/ac (70–120 lb/acre)
 - » Dryland: 700,000 seeds/ac (50–80 lb/acre)
NOTE: Hulless varieties tend to perform poorly under dryland conditions.
- Minimum soil temperature for germination: 40°F.
- Seed treatments can improve stand uniformity and protect the crop from pests, particularly under cold/wet conditions.

Table 1. Spring barley seeding date estimates.

Location	Timing
Treasure Valley	Late February to mid-March
Magic Valley	Mid-March to early April
Upper Snake River Plain	Late March to late April

Growth Stages and Development

Table 2. Spring barley growth stages and development.

Stage	Feekes Scale	Description
Tillering	1	First leaf through coleoptile
	2	Beginning of tillering
	3	Tillers formed
	4	Beginning of erect growth
	5	Sheaths strongly erect
Stem Extension and Booting	6	First node detectable
	7	Second node detectable
	8	Flag leaf just visible
	9	Collar of flag leaf visible
	10	Boot swollen/first awn visible
Heading	10.1	First spikelet visible
	10.2	Heading ¼ complete
	10.3	Heading ½ complete
	10.4	Heading ¾ complete
	10.5	Heading complete
Flowering (May occur while the head is still in the boot)	10.51	Beginning of flowering
	10.52	Flowering ½ complete
	10.53	Flowering complete
	10.54	Kernels watery ripe
Ripening	11.1	Medium milk
	11.2	Soft dough
	11.3	Kernel hard
	11.4	Harvest ripe

Irrigation

- Drought stress prior to soft dough (Feekes 11.2) reduces yield.
- Yield reduction due to moisture stress is greatest at tillering and/or boot to flowering.
- Excessive moisture can cause lodging.
- Irrigate based on soil moisture depletion estimated by evapotranspiration (ET).
- ET: ~15–19 inches of water per season.
- Peak ET: mid-June to mid-July, decreasing after soft dough.
- Water-holding capacity (amount of water in soil for crop use):
 - » Loamy soils: more than 2 inches per foot
 - » Sandy loam soils: 1–2 inches per foot
 - » Sandy soils: less than 1 inch per foot
- Available soil moisture is water held between current soil moisture and the permanent wilting point.
- Center pivot systems.
 - » Early season: Irrigate based on soil moisture reserves needed to meet mid- to late-season demands when the pivot cannot meet ET. Irrigate until the root zone is full or until water has penetrated 2.5–3 feet into the soil.
 - » Late season: Pivot will not supply sufficient water to keep up with ET; soil water reserves will be needed.
- Surface systems
 - » First irrigation should occur when soil moisture declines to 50% at the 0–6-inch depth except on sandy soils.
 - » Maintain soil moisture levels at or above 50% from tillering to soft dough.

Fertilization

Sampling

- Soil testing is required to determine optimal nutrient management strategies.
- Timing: Two weeks prior to planting.
- Depth: To rooting depth (2 feet on most soils)
- Separate samples:
 - » 0–12-inch and 12–24-inch depth for testing ammonium, nitrate, and sulfur.
 - » 0–12-inch depth for other nutrients.

Nitrogen (N)

Irrigated trials from 2019–23 for the hullless barley varieties ‘Goldenhart’ and ‘Julie’ grown at the Kimberly, Aberdeen, and Teton University of Idaho Research and Extension Centers determined that a static-N range of 170–200 lb (fertilizer + residual inorganic soil N 0–2’)/ac maximized yield independent of yield level.

Previous Crop Residue

- Potato/sugar beet/onion residue provides N that is accounted for by soil testing.
- Grain residue has a higher C:N ratio; add 15 lb N per ton of residue returned to the soil, up to 50 lb N/acre.
- Alfalfa provides 60–80 lb N/acre beyond soil test levels.
- Inorganic soil test N: Multiply ppm by 3.6 for lb N/acre.

Phosphorus (P)

Table 3. Phosphorus fertilizer rates for soils with pH >7.

NaHCO ₃ (0–12 inches) (ppm)	Free Lime (%) (lb P ₂ O ₅ /acre)			
	0	5	10	15
0	240	280	320	360
5	160	200	240	280
10	80	120	160	200
15	0	40	80	120
20	0	0	0	40

Potassium (K)

With soil test levels of 0–75 ppm K, apply 0–240 lb/acre K₂O.

Sulfur (S)

- With soil test levels (0–2’) of less than 10 ppm S and low-sulfur irrigation water, apply 20–40 lb/ac of sulfate-sulfur.
- Irrigation water derived from the Snake River or Snake River aquifer can supply 30–70 lb sulfate-sulfur/acre foot of water.
- Elemental sulfur should be applied the fall before planting to help break up the prill. Annually, 33% of the elemental sulfur becomes plant-available.
- Like nitrate, sulfate-sulfur can leach and should be applied near the time of planting.

Plant Growth Regulators

- Used to reduce the occurrence of lodging.
- Ethephon (e.g., Cerone): apply during Feekes 7–10.
- Trinexapac-ethyl (e.g., Palisade 2EC): apply during Feekes 4–7.
- See manufacturer’s label for detailed guidelines/instructions.

Diseases

Most common: scald, root rots, spot blotch, spot form of net blotch, bacterial blight, loose smut, Fusarium head blight, and barley yellow dwarf virus.

Insects

Most common: aphids, cereal leaf beetle, thrips, Haanchen barley mealybug, wireworms, armyworms, and cutworms.

Weeds

- Most common annual species: wild oat, barnyardgrass, green foxtail, kochia, common lambsquarters, prickly lettuce, redroot pigweed, and wild buckwheat
- Most common perennial species: Canada thistle, field bindweed, and quack grass

Further Reading

Idaho Barley Commission. n.d. “Barley: Nature’s Hearty Grain.” For barley recipe suggestions, see <https://www.eatbarley.com>.

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