

Spring Barley Quick Facts

2014 Idaho barley crop

Harvest: 515,000 acres Yield: 95.0 bu/acre
Production: 48.9 million bu

Growth stages and development

Spring barley growth stages and development.

| Stage | Feekes scale | Description |
|-------------------------------------|--------------|------------------------------|
| Tillering | 1 | 1st 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/1st awn visible |
| Heading | 10.1 | 1st spikelet visible |
| | 10.2 | Heading ¼ complete |
| | 10.3 | Heading ½ complete |
| | 10.4 | Heading ¾ complete |
| | 10.5 | Heading complete |
| Flowering (prior to head emergence) | 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 |

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 to 1.5 inches.
- Row spacing: 6 to 8 inches is ideal.
- Seeding rate: approximately 800,000 seeds per acre is ideal. Actual seeding rate depends on seed size, purity, % germination, and seed viability.
 - Irrigated: 70 to 100 lb/acre
 - Dryland: 60 to 80 lb/acre
- Minimum soil temperature for germination: 40°F.
- Seed treatments can improve stand uniformity and protect the crop from pests, particularly under cold/wet conditions.

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 |

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 ET.
- Evapotranspiration (ET): ~ 15 to 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 to 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 to 3 feet into the soil.
 - Late season: Pivot will not supply sufficient water to keep up with ET, and soil water reserves will be needed.
- Surface systems
 - 1st irrigation should occur when soil moisture declines to 50% at the 0- to 6-inch depth except on sandy soils.
 - Maintain soil moisture levels at or above 50% from tillering to soft dough.

Fertilization

Sampling

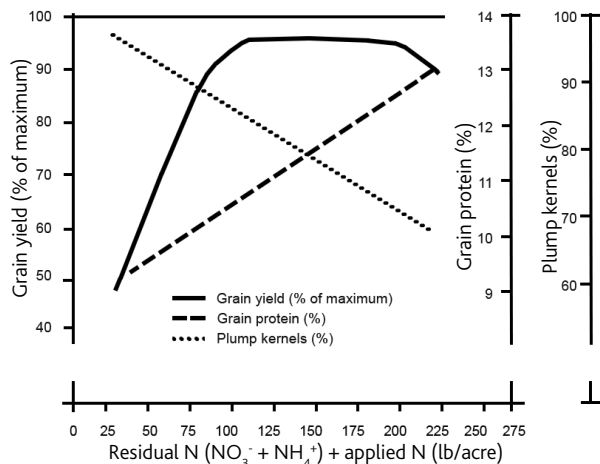
- Soil testing is required to determine optimal nutrient management strategies.
- Timing: 2 weeks prior to planting.
- Depth: to rooting depth (2 feet on most soils)
- Separate samples:
 - 0- to 12-inch and 12- to 24-inch for testing ammonium, nitrate, and sulfur.
 - 0- to 12-inch for other nutrients.

Nitrogen (N)

$$\text{Fertilizer N needed} = \left(\begin{array}{c} \text{N needed} \\ \text{based on} \\ \text{potential} \\ \text{yield} \end{array} + \begin{array}{c} \text{N needed} \\ \text{for} \\ \text{residue} \\ \text{breakdown} \end{array} \right) - \left(\begin{array}{c} \text{Mineral-} \\ \text{izable} \\ \text{N} \end{array} + \begin{array}{c} \text{Soil} \\ \text{test} \\ \text{N} \end{array} \right)$$

- N needed based on potential yield estimate = lb N/bu X realistic potential yield estimate.
 - Malt-irrigated: ~1.1 to 2.0 lb N/bu
 - Feed-irrigated: ~1.7 to 2.3 lb N/bu
 - Dryland: ~1.1 to 1.4 lb N/bu
- Crop residues
 - Potato/sugarbeet/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 to 80 lb N/acre beyond soil test levels.
- Mineralizable N
 - Typically estimated at 45 lb N/acre.
 - Conservative estimates range from 30 to 60 lb N/acre.
 - Can exceed 100 lb N/acre at select locations
- Inorganic soil test N: Multiply ppm by 3.6 for lb N/acre.

Grain quality response in malting varieties as a function of nitrogen.



Phosphorus (P)

Phosphorus fertilizer rates based on soil testing.

| NaHCO ₃ soil test P (0–12 inches) (ppm) | Free lime (%) | | | |
|--|---------------|-----|-----|-----|
| | 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 to 75 ppm K, apply 0 to 240 lb/acre K₂O.

Sulfur (S)

- With soil test levels of less than 10 ppm S and low-sulfur irrigation water, apply 20 to 40 lb/acre of S.

Plant growth regulators

- Used to reduce the occurrence of lodging.
- Ethephon (e.g., Cerone): apply during Feekes 7 to 10.
- Trinexapac-ethyl (e.g., Palisade 2EC): apply during Feekes 4 to 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, 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, green foxtail, Kochia, common lambsquarters, redroot pigweed, wild buckwheat, and various mustards.
- Most common perennials: Canada thistle and quackgrass.

For more information



Soil Sampling University of Idaho Extension bulletin 704, <http://www.cals.uidaho.edu/edComm/pdf/EXT/EXT0704.pdf>.



Idaho Spring Barley Production Guide University of Idaho Extension bulletin 742, <http://www.cals.uidaho.edu/edComm/pdf/BUL/BUL0742.pdf>.



Irrigation Scheduling Using Water-Use Tables University of Idaho Extension CIS 1039, <http://www.cals.uidaho.edu/edComm/pdf/CIS/CIS1039.pdf>.

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