EM 8692
January 1998
50¢

Barley, Oats, Triticale, Wheat

(Hordeum vulgare, Avena sativa, Triticosecale X, Triticum aestivum)

R. Sattell, R. Dick, R. Karow, D. Kaufman, J. Luna, D. McGrath, and E. Peachy

Cereal grains are grasses and may have a prostrate, semierect, or erect physical stature. All have fibrous root systems.

Barley, oats, triticale, and wheat are each comprised of hundreds of varieties whose growth characteristics vary considerably. Since there is considerable overlap in growth characteristics among these grains, they are discussed together here.

New varieties constantly are being developed to meet the needs of grain producers. Usually, the seed available for cover cropping is limited to seed marketed for grain production and changes from year to year. Although these varieties have not been produced specifically for cover cropping purposes, they are adapted to Oregon's climate and soils.

Specialty varieties that are well adapted to cover cropping may be difficult to purchase if they are not popular varieties in your local area. Plan ahead and secure specialty seed sources early.

Uses

Cereal grains generally are used as fall-planted cover crops. They protect the soil surface, smother weeds, improve soil tilth, and scavenge nitrogen from the soil before it is leached below the root zone by winter rains.

Cereal grain cover crops also have been successfully relay interplanted into short-statured summer crops (e.g., broccoli, cauliflower). That is, they are planted into a standing summer crop, usually at the time of the final cultivation. Cereal grains do not seem to be appropriate for relay planting into tall-statured summer crops such as sweet corn, because they do not tolerate shade and heavy harvest residue.

Winter-killed or herbicide-killed cereal grain cover crops produce protective surface mulches, which may be followed by no-till or reduced-tillage planting of the following crop.

Cereal grains often are planted in mixtures with legumes. When they are, they act as nurse crops in the fall and provide structural support to viny legumes in the spring.

When planted between berry rows, cereal grains suppress weeds, increase infiltration, and improve vehicular access.

Dry matter and N accumulation

The potential dry matter and N accumulation of a cereal grain cover crop depends on the variety planted. However, provided that the cereal grain is adapted to the area and survives the winter, the dry matter and N accumulation probably depend more on planting and kill dates than on the variety used.

Excessive dry matter production can slow soil warming and drying in spring, clog planters, and reduce N availability to following crops. Experiments in the Willamette Valley suggest that a yield of approximately 2–3 tons dry matter/acre provides the benefits of cover cropping without the problems caused by excessive dry matter. Yields as low as 1–1.5 tons/acre are desirable if direct seeding into herbicide-killed grain without tillage in spring.

Although cereal grains are capable of accumulating large amounts of N in their tissues, in general very little or none of the accumulated N is available for subsequent crops due to the relatively high carbon:nitrogen ratio of residues. The ratio of young and succulent cereal grains is intermediate but increases greatly in mature plants that contain high percentages of cellulose and lignin.

Management

Plant winter cereal grain cover crops from September 15 to October 15 to increase winter hardiness and maximize winter soil protection. Note, however, that they may be planted any time of year in western Oregon and are a good choice as a late-sown cover crop.

Quick facts: Barley, oats, triticale, wheat

Hardiness zone	Varies (see Figure 1)
pH tolerance	Varies
Best soil type	Varies
Flood tolerance	Varies
Drought tolerance	Varies
Shade tolerance	Varies
Mowing tolerance	High until maturity
Dry matter accumulation	Kill at 2–3 tons/acre in vegetable rotations
N accumulation	60 lb/acre at 3 tons/acre
N to following crop	Very little or none
Uses	Use as winter cover crop to protect soil, smother weeds, scavenge N, and improve tilth. Often planted with legumes.
Cautions	May provide overwintering habitat for cereal diseases that attack nearby cereal fields the following spring.

Spring cereal susceptibility to winter-kill varies considerably, even among varieties of a particular species, and usually depends largely on planting date. Early planting dates increase the likelihood of winter-kill. Many spring cereals survive the winter in western Oregon when planted after September 21.

Best results are obtained when cereal grains are drilled into a firm, well-prepared seedbed. Alternative seeding methods that can reduce seedbed preparation but require higher seeding rates are: drill into a rough seedbed prepared by disking, or broadcast over a rough or smooth seedbed and then disk lightly to cover the seed.

Suggested seeding rates vary with seed size, germination rate, and planting method. Generally a rate of 70–90 lb/acre is adequate, but winter weed suppression can be improved considerably by increasing those rates by 50 percent. A seeding rate of 45 seeds/ft^2 is good for weed suppression—seeding rates can be calculated after measuring the average seed weight. Reduce seeding rates when planting in mixtures with legumes.

Immediately after the summer crop harvest, there may be sufficient moisture near the soil surface for cereal grains to germinate without irrigation. If the soil is dry, irrigating speeds germination and fall growth. Where irrigation is not available, plant before a fall rain.

Relay-interplanted cereal grains are broadcast into a standing summer crop, usually before the final cultivation, which incorporates the seed into the soil. Grains may go to seed before winter if relay-interplanted too early. Increasing irrigation frequency during cover crop establishment can improve the stand.

Kill and/or incorporate cereal grains in spring when total aboveground dry matter is about 2–3 tons/acre, and plants still are relatively succulent. Generally, incorporation should occur a minimum of 3 weeks before planting to allow sufficient time for residues to decompose.

Moldboard plows are more effective at killing cereal grains than disks, but they also place the residue in a layer well below the soil surface. Disking or chisel plowing keeps residues closer to the surface, but the cover crop may need to be herbicide-killed first to prevent grow-back.

Consult your county agent of the OSU Extension Service for herbicide recommendations. Always apply herbicides in accordance with label instructions and restrictions.

Mowing usually doesn't kill immature cereal grains. Although mowing may kill cereal grains that are approaching physical maturity, they rarely are allowed to grow that long.

Pest interactions

When used for weed suppression between rows of berries, mow fall-planted cereal grains before seed matures. Residues and stubble continue to suppress weeds throughout harvest.

Cereal grain cover crops may provide habitat for overwintering diseases (e.g., stripe rust) that may attack nearby grain fields the following spring.

Varieties/cultivars

Late-maturing and short-statured varieties may decrease the likelihood of excess dry matter production and offer more flexibility in the timing of spring residue management operations.

The physical stature of cereal grains varies from fully erect to nearly prostrate. Erect or semierect varieties work best as nurse or companion crops when planted in mixtures with legumes. Prostrate varieties quickly cover the soil surface, maximizing soil protection.

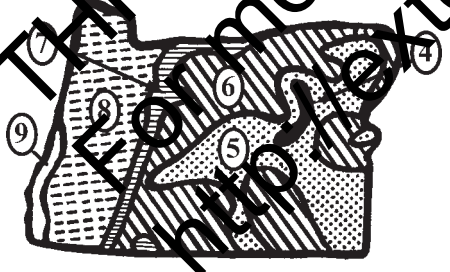

Figure 1.—Oregon plant hardiness zone map. Hardiness of barley, oats, triticale, and wheat varies. (Extracted from the USDA's national plant hardiness zone map, based on average annual minimum temperature in °F.)
Zone 4 = -30 to -20; Zone 5 = -20 to -10
Zone 6 = -10 to 0; Zone 7 = 0 to 10
Zone 8 = 10 to 20; Zone 9 = 20 to 30

For more information

World Wide Web

- Orchard floor management information—http://www.orst.edu/dept/hort/weeds/floormgt.htm
- OSU Extension Service publications—eesc.orst.edu
- The University of California, Davis cover crop information—http://www.sarep.ucdavis.edu/sarep/ccrop/
- OSU Extension cereals Web page—http://www.css.orst.edu/crops/cereals/home.htm

Oregon Cover Crop Handbook

This publication also is part of *Using Cover Crops in Oregon*, EM 8704, which contains an overview of cover crop usage and descriptions of 13 individual cover crops. To order copies of EM 8704, send your request and $5.50 per copy to:

Publication Orders
Extension & Station Communications
Oregon State University
422 Kerr Administration
Corvallis, OR 97331-2119
Fax: 541-737-0817

Robert Sattell, faculty research assistant in crop and soil science; Richard Dick, professor of soil science; Russ Karow, Extension cereals specialist; Diane Kaufman, Extension agent, North Willamette Research and Extension Center; John Luna, professor of horticulture; Dan McGrath, Extension agent, Willamette Valley; and Ed Peachey, research assistant in horticulture; Oregon State University.

Funding for this project was provided by the Oregon Department of Agriculture.