



EB 0916

IRRIGATED WINTER WHEAT PRODUCTION

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Irrigated wheat is 25% of the total crop in Washington. New winter wheat varieties have increased the profit potential for the irrigated farmer. Winter wheat protects the soil from wind erosion during late winter and early spring, and the wheat residue protects the soil when row crops follow winter wheat.

Winter wheat can be seeded after late harvested crops such as potatoes and corn silage. Water and labor requirements for winter wheat are less than for most other crops.

Winter Wheat Varieties

The yield potential of semidwarf winter wheats is much higher than that of the standard

height varieties. Semidwarf varieties have stiff straw that is less subject to lodging. Hard red winter wheats are not recommended for production because they yield less and lodge more than soft white winter wheat varieties.

The following varieties are adapted to irrigated conditions in central Washington.

Nugaines

Nugaines is a soft white semidwarf winter wheat with excellent test weight, milling, and baking properties. The variety has a bearded, common-type head with white chaff.

It is not as winterhardy as Daws but is hardier than other soft white winter wheat varieties.



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Nugaines has mature plant resistance to the local races of stripe rust but is susceptible to stripe rust in the seedling stage. It is susceptible to leaf rust, dwarf bunt, snowmold, and *Cercospora* foot rot.

It is resistant to most races of common bunt and has moderate resistance to flag smut and *Cephalosporium* stripe (fungus stripe). This variety was developed by SEA-USDA and Washington State University.

Daws

Daws is a soft white common semidwarf winter wheat with about a 5% yield advantage over Nugaines and is more winterhardy than Nugaines.

Daws has good milling property and the flour quality is satisfactory but its test weight is about 1 pound less than Nugaines. The variety emerges more slowly than Nugaines. Daws has good stripe, common bunt, and rust resistance but is susceptible to *Cercospora* foot rot, snowmold, dwarf smut, and *Cephalosporium* stripe (fungus stripe). It is moderately susceptible to leaf rust. Daws was developed by SEA-USDA and Washington State University.

Stephens

Stephens is a soft white common wheat that is resistant to stripe rust and common bunt. It is moderately resistant to *Cercospora* foot rot, but it is susceptible to leaf rust, dwarf smut, flag smut, snowmold, and *Cephalosporium* stripe (fungus stripe). Stephens is similar to Nugaines in emergence and yields slightly more than Nugaines, Daws, McDermid, and Hyslop. Stephens has about the same winterhardiness as Hyslop. This variety has the same milling and flour qualities as Nugaines. Stephens performs better from early seeding than from late seeding. Other varieties should be used if seeding is after October 15. Stephens was developed by Oregon State University.

McDermid

McDermid is a semidwarf soft white common winter wheat. It has weaker straw than Hyslop. McDermid is hardier than Hyslop but is not as hardy as Nugaines.

McDermid is similar to Nugaines in resistance to common bunt but is susceptible to most races of dwarf smut and *Cephalosporium* stripe (fungus

stripe). The variety is moderately resistant to stripe rust and leaf rust. It yields slightly lower than Nugaines in Washington. The variety has performed best in the southern areas of Washington. Milling and flour characteristics of McDermid are similar to Nugaines. McDermid was developed by Oregon State University.

Hyslop

Hyslop is a soft white semidwarf winter wheat that yields well in high rainfall areas or with irrigation. It has a slightly better yield record than Nugaines where winter injury is not a factor. Insufficient winterhardiness limits the use of Hyslop in eastern Washington.

Hyslop is resistant to common bunt, stripe rust, and susceptible to dwarf smut, flag smut, leaf rust, and *Cephalosporium* stripe (fungus stripe).

Milling and baking qualities of Hyslop are similar to Nugaines. Hyslop was developed by Oregon State University.

Walladay

Walladay has an awned common white-chaffed head. Kernels are white and mid-size. The variety is adapted to fall seedings in southeast Washington wheat-producing areas. The winterhardiness is not adequate to recommend growing Walladay in the other areas as a winter wheat.

From fall seedings in southeast Washington, yields of Walladay are competitive with Nugaines.

Walladay is very susceptible to *Cercospora* foot rot. The variety is moderately resistant to stripe rust but susceptible to a new leaf rust race found in the area. Walladay is slightly earlier than Luke but is later than most other winter wheat varieties. It is later maturing than Urquie or Fielder or other spring wheat varieties.

Walladay is a soft white, semidwarf, facultative wheat developed by Washington State University and SEA-USDA.

FERTILIZER REQUIREMENTS

Nutrient requirements are high for high yields of winter wheat. Use soil tests to determine the nitrogen, phosphorus, potash, and zinc requirements.

Soil tests for residual nitrogen will indicate the amount of nitrogen remaining from the previous crop. Adjust nitrogen rates accordingly. On

sandy soils, a number of nitrogen applications can be made to avoid leaching. On heavier soils, it may be advisable to apply the nitrogen in two applications to avoid leaching.

Fertilizer Guide 31, *Winter Wheat (Irrigated)*, available from county Extension offices, provides fertilizer recommendations according to past cropping and fertility management practices.

There is no useful soil test for sulfur for irrigated areas. Areas irrigated with water from most of the major streams east of the Cascades usually do not require sulfur because of the sulfur in the water. Exceptions are the Roza district, areas above Yakima including the Kittitas Valley, and the Wenatchee Valley. Occasionally, on sandy soils and after heavy winter rainfall, sulfur deficiency may appear even where sulfur content of irrigation water is high.

If sulfur is known to be deficient, apply sulfur at a rate which will supply 40 pounds of sulfur per acre.

SEEDBED

The seedbed should be firm enough to provide good seed-soil contact and the moisture should be adequate for rapid germination and seedling establishment. Preirrigation of fields before they are seeded to winter wheat will increase seed germination and emergence.

Seed winter wheat 1 to 2 inches deep in moist soil. September or early October seedings may require deeper seeding to place the seed in moisture for rapid germination and emergence. Plant later seeding about 1 to 1½ inches deep.

SEEDING DATE

Winter wheat can be seeded in central Washington from the middle of September until the middle of February if the fields can be worked without soil compaction. Sow spring wheat after the middle of February in the lower Columbia Basin area because winter wheat may not vernalize and yields are likely to be reduced.

Winter wheat must go through a vernalization period of about 6 weeks with soil temperatures below 45° at that time. If winter wheat is not exposed to this vernalization period, the plants remain in a vegetative stage and do not produce seed. The following table indicates the yields from different planting dates at the Irrigated Agriculture Research and Extension Center at Prosser, Washington.

Yields of Winter Wheat as Affected by Date of Seeding at Prosser*

Seeding Date	Bu/A	Seeding Date	Bu/A
February 9	120	March 16	53
February 16	118	March 23	28
February 23	95	March 29	0
March 1	105	April 5	0
March 8	70		

* The stand was 16 plants per square foot.

SEEDING RATE

The seeding rate should be determined by seeding dates. For mid-September to mid-October plantings, 60 pounds of seed on a properly prepared seedbed will yield as well as higher seeding rates. Increase the rate to about 80 pounds per acre when late seedings are made.

Seeding Rates Recommended at Different Dates

Seeding Date	Seeding Rate Lbs/Acre
Sept 15-Oct. 15	60- 70
Oct. 15-Nov. 15	70- 80
Nov. 15-Dec. 31	80- 90
Dec. 31-Feb. 15	90-120

WEED CONTROL

The *Washington State Weed Control Handbook* lists chemicals available for control of weeds on irrigated wheat fields. Growers should use cultivation and crop rotations to help control weeds.

Herbicide regulations dictate the time, type, and rate of application in much of central irrigated Washington. Check with your local county Extension agent for up-to-date information on herbicide application. *Weed control in Irrigated Wheat*, Extension Bulletin 760, is available from county Extension offices.

IRRIGATION

Irrigation is most critical on winter wheat during jointing, flowering, and early soft dough stages. Moisture stress during these periods of growth may reduce wheat yield 30 to 50%.

Use evaporation pan data to determine when and how much to irrigate. Sprinkler irrigation will not wash the pollen from the heads, so there is no reason to stop watering during the flowering

period. Wheat fields should be irrigated on schedule until the wheat stems have turned yellow. Pulling irrigation water off before this stage will reduce yields and lower test weight. Irrigating beyond this stage is of no value and could reduce quality by causing sprouting.

Evaporation pan data at the research center at Prosser have shown that wheat may remove as much as .4 inch of moisture per day during hot, windy days. If the irrigation system cannot replace the water used, the crop may show drought stress, and reduced yields can occur on sandy soils that do not have high moisture-holding capacity.

DISEASES

Extension Miscellaneous 3497, *Seed Treatment of Small Grains*, indicates the recommended seed treatment materials to control stinking or common smut.

Seed treatment materials are not available to control leaf or stem rust, mildew, *Cercospora* (strawbreaker) foot rot, or take-all foot rot.

Most varieties are resistant to stripe rust. Leaf rust and mildew are seldom heavy enough even in infected fields to recommend treatment.

Chemicals are available for *Cercospora* or strawbreaker foot rot when this disease is present. The chemicals must be applied very early in the spring for best control.

Cephalosporium stripe occurred in many wheat fields in 1980 but is usually not a major problem. Nugaines has the most tolerance to *Cephalosporium* stripe, followed by Daws, Hyslop, McDermid, and Stephens. Crop rotations with fields being out of winter wheat for 2 years will keep *Cephalosporium* "fungus stripe" at a low level.

Take-all root rot can reduce wheat yields un-

der irrigation. Growing wheat every 3 years in rotation with potatoes, corn, alfalfa, and/or beans is the best control for take-all.

If winter wheat follows wheat or barley, a firm seedbed should be prepared. Incorporate the stubble remaining from the preceding crop so that it will break down rapidly. Plant the wheat crop after the end of October and see that the field has adequate fertilizer, particularly phosphorus.

On center-pivot systems, water only as often as necessary as drying out the soil surface between irrigations helps to reduce the amount of take-all.

Take-all can drastically reduce yields. Decline from take-all may occur in fields after 4 to 7 years of continuous wheat.

County Extension agents have information and recommendations on susceptibility of wheat varieties to disease and the best methods of control.

HARVESTING

Proper operation of the combine prevents loss of grain during the harvest. Combines should be adjusted according to the operation manual, then checked to determine if the proper amount of wind is blowing across the screens to separate the straw from the grain and still not blow the grain out the back of the combine. In high-yielding irrigated wheat, it may be necessary to operate the combine at very slow ground speed to limit the amount of materials going into the cylinder. A winter wheat crop will usually produce about 2 pounds of straw for each pound of grain. A 100-bushel wheat crop would have approximately 6 tons of straw. With heavy straw, it is necessary to operate a combine properly to separate the grain and avoid plugging.