TECHNICAL NOTES

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The purpose of this Technical Note is to provide current information on the inter-relationship of seeding date, rotation, varieties, and residue to disease in winter wheat.
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SEEDING DATE EFFECT ON DISEASE

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The time of seeding winter wheat has a major influence on the performance of the crop. Different production areas in Washington have different recommended dates for seeding.

Research work at the Dryland Research Unit near Lind has shown the last week in August and the first week in September to be the ideal seeding time. In Pullman September 20 is the best seeding date if soil moisture is available following an early harvested crop, or when planting on summer fallow. For each 10 miles west of Pullman the best seeding time is two days earlier than September 20. For example, 50 miles west of Pullman September 10 is the best seeding time.

The advantages to early seeding are: 1) higher yield potential; 2) better established plants going into the winter months; 3) well established plants reduce soil loss; 4) larger plants are more winter-hardy.

Disadvantages: 1) increased possibility of disease such as straw-breaker foot rot, Cephalosporium stripe, barley yellow dwarf; 2) soil moisture may be too low for good stand establishment; 3) warm soils increase dormancy of certain varieties.

In the wheat/summer fallow area it is important for growers to place the seed in moist soil for uniform stand establishment. If seed zone moisture is lacking growers should delay seeding until adequate moisture is present near the soil surface or until about the 1st of October. When seeding is delayed the seed should be placed in dry soil about 1 to 1 ½ inches deep. Early seeding, when the seed can be placed in moist soil, may be seeded 4 to 5 inches deep. Varieties such as Moro will germinate, emerge and establish stands under moisture stress conditions where it is not possible to obtain stands with many of the newer short strawed wheat varieties.

Early seeding is especially important on summer fallow fields lacking adequate amounts of residue for soil protection. A late seeding with 10% plant cover would have

51% more erosion than an early seeded stand with 30% plant cover, e.g. 10 tons per acre versus 4.9 tons per acre soil loss.

In areas with above 18 inches annual precipitation and under re-crop situations, moisture may not be available for germination and emergence form early seeding. If moisture is not available by October 10, growers should place the seed in dry soil, covered with only and inch to 1 ½ inch of soil.

Cephalosporium or fungus stripe occurs in many wheat producing areas of Washington including the wheat/summer fallow area. The disease organism enters the roots damaged by freezing and thawing, and is likely to be severe in wetter, heavier soils. Small, late seeded wheat with short root systems is less damaged by frost heaving and usually has less fungus stripe than early seeded, larger wheat plants.

The varieties Nugaines, Luke, and Lewjain are more tolerant of fungus stripe than Daws, Hill 81, and the club wheat varieties. Stephens is very susceptible to fungus stripe.

In fields where fungus stripe is known to be a problem, use one of the varieties that is less damaged by the disease and delay the seeding date for 10 days to two weeks. Rotate out of winter wheat for two seasons using spring grain and legume crops such as peas and lentils to help reduce the amount of fungus stripe. There are no chemicals available to control fungus stripe.

Cercosporella, or straw breaker root rot, enters the plant during the winter months, and the larger plants shade the soil and prevent the soil from drying out as rapidly as a thin strand, resulting in an ideal moisture situation for straw breaker infection, as well as providing larger targets for the rain-splashed spores. Late seeded small plants are less likely to be infected by Cercosporella. Steven, Luke, and Lewjain are the varieties most tolerant to straw breaker, while Nugaines, Daws, and Hill are more susceptible to the disease.

On fields known to have a foot rot history, a more tolerant variety should be planted. Benlate and Mertect are two chemicals that can be used to reduce straw breaker. If a field has a straw breaker history and is early seeded, growers should be prepared to spray Mertect or Benlate in mid- February through April to control this disease.

Yellow dwarf virus is transmitted to healthy plants by aphids but destroying the aphid may not control the disease. Once the aphids feed and acquire the virus, they can inoculate healthy plants with yellow dwarf virus. Early seedings are more likely to be infected because the plants emerge while aphids are still active. On early seeded wheat in wheat/summer fallow areas adjacent to irrigated crops in the Columbia Basin, Di-Syston applied with the seed may delay aphid buildup and decrease the amount of yellow dwarf virus transmitted.

Yellow dwarf virus can affect spring and winter seeded crops of wheat, oats and barley. Research at Washington State University does not warrant the recommendation of Di-Syston on spring seeded grain or late seeded winter grain.

Burning of wheat stubble is not recommended in the management of diseases in Washington. Burning would not be effective in controlling barley yellow dwarf or Cercosporella foot rot, and its benefits in reducing Cephalosporium stripe are not proven.

Burning eliminates protective residue from the soil surface. Without this surface residue slopes are susceptible to accelerated erosion. Annual burning will also adversely affect surface soil structure. Soils without residue can seal, reducing moisture intake, and also crust more readily after seeding.

Yield studies in the Palouse have shown a 2 bu/ac decline in yield, compounded annually, for each inch of topsoil lost.

Residues are worth money in terms of nutrients. Burning residues from a 70 bushel crop would mean a loss of 45 lbs/ac N, worth $12/ac. The moisture-conserving effect of the surface mulch would also be lost. This could reduce soil moisture available for crop production as well as the success or failure of stand establishment at seeding time.

The following points should be considered for fall seeding.

1. Determine if there is enough moisture available for standing establishment.
2. Seed disease-tolerant varieties.
3. Seed late and shallow on soils that do not have adequate moisture fro stand establishment.
4. Use crop rotations to help reduce disease.
5. Use chemicals that are available and recommended for disease control.
6. Retain surface residue for moisture conservation and erosion control.
7. Seed early when residue is inadequate to get green growth for erosion protection.