



## PLANT DISEASE AND INSECT ADVISORY

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### Effect of Planting Date and Seed Treatment on Diseases and Insect Pests of Wheat

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Winter wheat is often used as a “dual-purpose” crop in Oklahoma because it is grazed by cattle in the fall and winter and then harvested for grain in the early summer. In a “grain-only” system, wheat is generally planted in October, but in a “grazing + grain” system wheat is planted in early to mid-September to maximize forage production. Planting wheat this early significantly increases the likelihood that diseases such as wheat streak mosaic virus, high plains virus, the aphid/barley yellow dwarf virus complex, and root and foot rots will be more prevalent and more severe.

**Wheat streak mosaic virus (WSMV) & the high plains virus (HPV):** (Fig. 1) are transmitted by the wheat curl mite. Mites and these viruses survive in crops such as wheat and corn, as well as many grassy weeds and volunteer wheat. In the fall, mites spread to emerging seedling wheat, feed on that seedling wheat, and transmit the virus to the young wheat plants. Wheat infected with WSMV or HPV in the fall is either killed by the next spring or will be severely damaged. No seed treatments are effective in controlling WSMV/HPV. However, planting late in the fall (after October 1 in northern OK and after October 15 in southern OK) and controlling volunteer wheat are two practices that provide some control of WSMV and HPV. It is critical to completely destroy volunteer wheat at least two weeks prior to emergence of seedling wheat because wheat curl mites have a life span of 7-10 days. Thus, destroying volunteer wheat at least two weeks prior to emergence of seedling wheat should greatly reduce mite numbers in the fall. For more information on WSMV and HPV, see OSU Extension Facts 7636 (WSMV) or go to the PDIDL web page at: <http://entopl.p.okstate.edu/ddd/hosts/wheat.htm>.

**Aphid/barley yellow dwarf virus (BYDV) complex:** BYDV (Fig. 2) is transmitted by many cereal-feeding aphids. Fall infections by BYDV are the most severe because the virus has a longer time to damage the plant as compared to infections that occur in the spring.

Several steps can be taken to help control BYDV. First, a later planting date (after October 1 in northern OK and after October 15 in southern OK) helps to reduce the opportunity for fall infections. Second, some wheat varieties (e.g., Custer, 2174, and Ok102) seem to tolerate aphids and/or BYDV better than other varieties; however, be aware that no wheat variety has

absolute resistance to the aphid/BYDV complex. Third, control the aphids that transmit BYDV. This can be done by applying contact insecticides to kill aphids, or by treating seed before planting with a systemic insecticide. Unfortunately, by the time contact insecticides are applied, aphids frequently have already transmitted BYDV. Systemic seed-treatment insecticides (Table 1) can control aphids during the fall after planting, but in some years aphids are sparse in the fall and planting insecticide-treated seed in a year with no or sparse aphids in the fall would not be as beneficial as in years when aphids are numerous. Be sure to thoroughly read the label before applying any chemical. For more information on the aphid/barley yellow dwarf virus complex, see: <http://entopl.p.okstate.edu/ddd/hosts/wheat.htm>.



**Fig. 1.** Wheat infected with high plains virus (HPV, left) and wheat streak mosaic virus (WSMV, right).



**Fig. 2.** Wheat infected with barley yellow dwarf virus (BYDV).

**Root and foot rots:** These include several diseases caused by fungi such as dryland (Fusarium) root rot, take-all (Fig. 3), Rhizoctonia root rot (sharp eyespot), common root rot, and eyespot (strawbreaker). Controlling root and foot rots is difficult. There are no resistant varieties, and although fungicide seed treatments with activity toward the root and foot rots are available (see Table 1), their activity usually involves early season control or suppression rather than control at a consistently high level throughout the season. Often, there also are different "levels" of activity related to different treatment rates, so again, CAREFULLY read the label of any seed treatment to be sure activity against the diseases and/or insects of concern are indicated, and be certain that the seed treatment(s) is being used at the rate indicated on the label for activity against those diseases and/or insects.



**Fig. 3.** Wheat infected with fungal diseases tan spot (left) and Fusarium root rot (dryland root rot, above).

Late planting (after October 1 in northern OK, and after October 15 in southern OK) also can help reduce the incidence and severity of root rots, but planting late will not entirely eliminate the presence or effects of root rots. If you have a field with a history of severe root rot, consider planting that field as late as possible or plan to use it in a “graze-out” fashion if that is consistent with your overall plan.

For some root rots, there are specific factors that contribute to disease incidence and severity. For example, a high soil pH (>6.5) greatly favors disease development of the root rot called take-all. Thus, when liming fields to correct for acid soils, be sure not to raise the pH above this level. Another practice that can help limit take-all and some of the other root rots is the elimination of residue. However, elimination of residue by tillage or burning does not seem to affect the incidence or severity of eyespot (strawbreaker). For more information on wheat root rots, take-all and eyespot (strawbreaker), see OSU Extension Facts F-7622 or go to: <http://entopl.p.okstate.edu/ddd/hosts/wheat.htm>.

Seed treatments: There are several reasons to consider planting treated seed including:

1. Control of common bunt (also called stinking smut) and loose smut. The similarity of these names can be confusing. Both affect the grain of wheat, but whereas common bunt spores carryover on seed or in the soil, loose smut carries over in the seed. Seed treatments are highly effective in controlling both diseases. If common bunt was observed in a field and that field is to be planted again with wheat, then planting certified wheat seed treated with a fungicide effective against common bunt is strongly recommended. If either common bunt or loose smut was observed in a field, grain harvested from that field should not be used as seed the next year. However, if grain harvested from such a field is to be used as seed wheat, treatment of that seed at a high rate of a systemic or a systemic + contact seed treatment effective against common bunt and loose smut is strongly recommended. For more information on common bunt & loose smut, see: <http://entopl.p.okstate.edu/ddd/hosts/wheat.htm>, consult the “2008 OSU Extension Agents’ Handbook of Insect, Plant Disease, and Weed Control (OCES publication E-832),” and/or contact your County Extension Educator.
2. Enhance seedling emergence, stand establishment and forage production by suppressing root, crown and foot rots. This was discussed above under “Root and Foot Rots.” Refer to Table 1 for a more detailed description.
3. Control the aphid/BYDV complex. Again, this was discussed previously; refer to Table 1 for a more detailed description of seed treatments useful for this objective.
4. Control fall foliar diseases including leaf rust and powdery mildew. Seed treatments are effective in controlling foliar diseases (especially leaf rust and powdery mildew) in the fall, which may reduce the inoculum level of these diseases in the spring. However, this control should be viewed as an added benefit and not necessarily as a sole reason to use a seed treatment.

Often a combination of chemicals is present in seed treatments, which can include a combination of fungicides for a broader spectrum of activity, or a combination of fungicides

with an insecticide so activity against diseases and insects is achieved. One such seed treatment is Gaucho XT, which is composed of an insecticide and fungicides so control of aphids (and hence BYDV), Hessian fly, wireworms, smuts and bunts, and seedling root rots is available in one treatment (Table 1). Other seed treatments such as Raxil MD, Dividend Extreme and Charter PB contain only fungicides, but can easily be mixed with an insecticide such as Gaucho 600 or Crusier to obtain activity against bunts, smuts and seedling root rots as well as insects. Therefore again, I would emphasize that if a seed treatment is used, *be sure to carefully read the label to ensure that the treatment is intended (and labeled) for your desired goal, and that it is applied at a rate labeled for the desired activity.* For more information on seed treatments, their intended uses and rates consult the "2008 OSU Extension Agents' Handbook of Insect, Plant Disease, and Weed Control (OCES publication E-832)," and/or contact your County Extension Educator.

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**Table 1. Seed treatment rates, costs and activities against various wheat diseases and pests. This information is provided only as a guide. It is the responsibility of the pesticide applicator by law to read and follow all current label directions. No endorsement is intended for products listed, nor is criticism meant for products not listed.**

**NOTE:** Many seed treatments have a required post-planting interval before grazing is allowed; check the label!

Product & (Company)	Active ingredients	Rate (oz/cwt)	Approx. cost/oz <sup>B</sup>	\$1.65-2.15	Activity against diseases/pests <sup>A</sup>		
					Ins/BYDV	Sm/Bu	RR
Raxil MD ..... tebuconazole (Gustafson)	metalaxy	5-6.5	\$0.55		NA	A	DO
Gaucho 600 ..... imidacloprid (Gustafson)		0.8-2.4	\$8.33	\$4.00-\$12.00	A	NA	A
Gaucho XT ..... imidacloprid (Gustafson)	metalaxy tebuconazole	3.4*	\$1.91	\$3.90	A	A	A
Cruiser 5FS..... thiamethoxam (Syngenta)		.75-1.33	\$8.79	\$3.96-\$7.01	A	NA	NA
Dividend Extreme ... difenoconazole (Syngenta)	mefenoxam	1.0-4.0 <sup>c</sup>	\$1.05	\$0.63-\$2.54	NA	A	A
Charter PB..... triticonazole (BASF)	thiram	5.5	\$0.50	\$1.65	NA	A	A
						A	??

<sup>A</sup> Ins/BYDV=insects (aphids, Hessian fly, wireworms)/barley yellow dwarf virus; Sm/Bu=smuts/bunts; RR=root rots; DO=damping-off

<sup>B</sup>Fol=fall (early season) foliar diseases; A=active (indicates a range of control from partial to complete); NA=not active

<sup>c</sup>Costs are estimates as of July, 2008, are for cost of chemical only, and may vary with time, dealer, rebate offers, etc.

Activities listed are for the 4 oz rate.