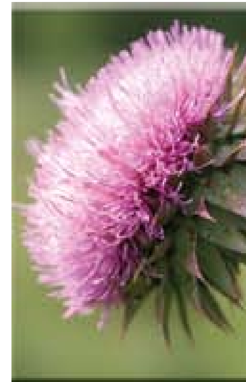
Plant Protection Programs University of Missouri

Integrated Pest & Crop Management



Minimizing Stand Establishment Diseases in 2011

By Laura Sweets

It is difficult at this point in the year to know what conditions will be like during the upcoming planting season. However, much of the state was unusually wet during much of the 2010 growing season and has received substantial amounts of snow this winter. If spring conditions are wet or the spring is a cool, wet one, the potential for seed decay, seedling blights and root rot problems in both corn and soybeans could be higher than normal.

Many of the seed decay, seedling blight and root rot problems on both corn and soybean are caused by fungi present in the soil. *Pythium* species can cause early-season diseases on both corn and soybean. Many of the *Pythium* species are favored by cool, wet conditions at planting. Seed decay and seedling blight tend to be more severe in low-lying areas in a field, and in soils that have been compacted or remain wet for an extended period of time. Low soil temperatures (below 50-55 degrees F) favor seed rot and seedling blight. Disease severity is also affected by planting depth, soil type, seed quality, mechanical injury to seed, crusting, herbicide injury or other factors which delay germination and emergence of seedlings. Planting under good seedbed conditions and using an appropriate fungicide seed treatment (products containing either metalaxyl or mefenoxam as an active ingredient are particularly effective against water mold fungi such as *Pythium spp.*) are important management options.

Phytophthora sojae is another soil-inhabiting fungus that causes seed decay, preemergence or postemergence damping-off and seedling blight of soybean but not of corn. Phytophthora root rot is more severe in areas that are low or poorly drained, in compacted areas or in clay or heavy soils, but the disease can appear on plants growing in lighter soils or higher ground if the soil remains wet after planting. When soils are flooded or saturated, the fungus releases spores which are attracted to the growing soybean root tip where infection occurs. Planting varieties with either race-specific resistance or tolerance or a combination of race-specific resistance and tolerance in fields with a history of Phytophthora is a critical management strategy. Planting under good seedbed conditions and using an appropriate fungicide seed treatment (products containing either metalaxyl or mefenoxam as an active ingredient are particularly effective against water mold fungi such as *Phytophthora sojae*) are also important management options.

Rhizoctonia solani and several *Fusarium* species may also cause seedling blights on corn and soybean. *Rhizoctonia solani* can survive under a wide range of soil moistures and soil temperatures but may decline when soils are flooded or soil temperatures are unusually high. Fusarium root rots may be most severe when the soil is saturated and soil temperatures are around 57 degrees F. Crusting, hard pan layers, herbicide injury, deep planting, poor seed quality, insect damage, mechanical injuries, poor fertility or other factors which delay germination and emergence favor the development of these early-season diseases. Planting under good seedbed conditions and using an appropriate fungicide seed treatment (products containing active ingredients other than metalaxyl or mefenoxam such as captan,

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Commercial Seed Treatments and Transgenic Corn Bt Hyrbids Available for 2011

By Wayne Bailey

Table 1. 2011 Commercial Seed Treatments for Corn

Comments: The insecticides thiamethoxam (Cruiser) and clothianidin (Poncho) are labeled for use as commercially applied corn seed treatments. These seed treatments provide early season protection against injury by several pest insects depending on the rate of insecticide applied to the corn seed.

Common Name	Trade Name	Rate of formulated material per acre	Target Insect Pests
clothianidin	**Poncho 600 (250)**	0.250 to 0.50 mg a.i./kernel	(Chinch bug, corn flea beetle, black cutworm, grape colaspis, seedcorn maggot, Southern corn leaf beetle, Southern corn rootworm, Southern green stinkbug, white grub, thrips, wireworm, stored grain pests)
thiamethoxam	**Cruiser 5FS (250)** **Cruiser Extreme 250**	0.250 to 0.80 ng a.i./kernal	(Wireworm, seed corn maggot, Southern corn leaf beetle, chinch bug, corn flea beetle, grape colaspis, white grub, black cutworm, thrips, Southern green stink bug, seedcorn beetle, corn leaf aphid, seedcorn maggot)
clothianidin	**Poncho 600 (1250)**	1.250 mg a.i./kernel	(Corn rootworms - Northern, Western, Southern, Mexican and Southern Corn billbug)
thiamethoxam	**Cruiser 5FS (1250)**	1.250 mg/kernel	(Corn rootworms - Northern, Western, Souther, Mexican and corn billbug)
imadacloprid plus metalaxl fungicide	**Concur**	1.8 oz/50 lbs seed	(seed corn beetle, seedcorn maggot, wireworm, white grub, flea beetle)
imadacloprid plus metalaxyl fungicide	**Latitude**	3.5 oz/100wt.	(seed corn beetle, seed corn maggot, wireworm)

a.i.= active ingredient

**Designates a restricted-use pesticide. use is restricted to certified applicators only.*

Read the label and falllow all insecticide rate information, directions, precautions and restrictions.

Table 2: 2011 Transgenic Corn Hybrids and Bt Traits

Comments: Management of several insect pests of corn may be accomplished by using corn hybrids which have been genetically engineered to produce Bacillus thuringiensis (Bt) and certain insect toxins. Bt hybrids events and their toxins target specific insect pests. Be sure to match these hybrids to the pests requiring control. Follow all refuse requirements associated with these Bt hybrids.

Product Trade Name	Events	Bt Protein	Insects Controlled or Suppressed
For above-ground Lepidopterous moths and caterpillars			
Agrisure Viptera	**MIR 162 + Bt 11**	**Vip3A**	Corn earworm, Western bean cutworm, black cutworm, fall armyworm, stalk borer
Agrisure CB/LL	**Bt 11**	**Cry1Ab**	European and Southwestern corn borers, fall armyworm, corn earworm, stalk borer
Agrisure GT/CB/LL	**Bt 11**	**Cry1Ab**	European and Southwestern corn borers, black cutworm, fall armyworm, corn earworm, stalk borer
Agrisure Viptera 3110	**Bt 11**	**Vip3A + Cry1Ab**	European and Southwestern corn borers, black cutworm, fall armyworm, corn earworm, Western bean cutworm, stalk borer
Genuity VT Double Pro	**MON 89034**	**Cry1A.105 + Cry2Ab**	European and Southwestern corn borers, fall armyworm, corn earworm

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(Continued) Table 2: 2011 Transgenic Corn Hybrids and Bt Traits

Product Trade Name	Events	Bt Protein	Insects Controlled or Suppressed
Herculex I	**TC 1507**	**Cry1F**	European and Southwestern corn borers, black cutowrm, fall armyworm, Western bean cutworm, corn earworm
Optimum Intrasect Insect Protection	**TC1507 + Bt11**	**Cry1F + Cry1Ab**	European and Southwestern corn borers, black cutworm, fall armyworm, Western bean cutworm, corn earworm
YieldGard CB	**MON810**	**CryIAb**	European and Southwestern corn borers, fall armyworm, corn earworm, stalk borer
For below-ground Western and Northern rootworm larvae			
Agrisure RW	**MIR 604**	**mCry3A**	corn rootworm
Agrisure GT/RW	**MIR 604**	**mCry3A**	corn rootworm
Herculex RW	**DAS 59122-7**	**Cry34Ab1 + Cry35Ab1**	corn rootworm
***Optimum AcreMax RW**	**DAS 59122-7**	**Cry34Ab1 + Cry35Ab1**	corn rootworm
YieldGard RW	**MON 863**	**Cry3Bb1**	corn rootworm
YieldGard VT RW	**MON 88017**	**Cry3Bb1**	corn rootworm
For above-ground lepidoterous moths and caterpillars andbelow-ground Western and Northern rootworm larvae			
Agrisure CB/LL/RW	**Bt 11 + MIR 604**	**Cry1Ab + mCry3A**	European and Southwestern corn borers, corn rootworm, fall armyworm, corn earworm, stalk borer
Agrisure 3000GT	**Bt 11 + MIR 604**	**Cry1Ab + mCry3A**	European and Southwestern corn borers, corn rootworm, fall armyworm, corn earworm, stalk borer
Agrisure Viptera 3111	**Bt 11 + MIR 604**	**Vip3A + Cry1Ab + mCry3A**	European and Southwestern corn borers, corn rootworm, black cutworm, fall armyworm, Western bean cutworm, stalk borer
Genuity VT Triple Pro	**MON 89034 + MON 88017**	**Cry1A.105 + Cry2Ab + Cry3Bb1**	European and Southwestern corn borers, corn rootworm, fall armyworm, corn earworm
Genuity SmartStax	**MON 89034 + MON 88017 + TC 1057 + DAS 59122-7**	**Cry1A.105 + Cry2Ab + Cry1F + Cry3Bb + Cry34Ab1 + Cry35Bb1**	European and Southwestern corn borers, corn rootworm, black cutworm, fall armyworm, corn earworm, Western bean cutworm
Herculex Extra	**TC 1507 + DAS 59122-7**	**Cry1F +Cry34Ab1 + Cry35Ab1**	European and Southwestern corn borers, corn rootworm, black cutworm, fall armyworm, Western bean cutworm, corn earworm
***Optimum AcreMax 1**	**TC 1507 + DAS 59122-7**	**Cry1F + Cry34AB1 + Cry35Ab1**	European and Southwestern corn borers, black cutworm, fall armyworm, Western bean cutworm, corn earworm
YieldGard Plus	**MON 810 + MON 863**	**Cry1Ab + Cry3Bb1**	European and Southwestern corn borers, corn rootworm, fall armyworm, corn earworm, stalk borer
YieldGard VT Triple	**MON 810 + MON 88071**	**Cry1Ab + Cry3Bb1**	European and Southwestern corn borers, corn rootworms, fall armyworm, corn earworm, stalk borer
YieldGard VT Pro-Triple	**MON 89034 + MON 88017**	**Cry3Bb1 + Cry1A.105 + Cry2Ab**	European and Southwestern corn borers, corn rootworm, corn earworm, fall armyworm
Genuity SmartStax or Mycogen SmartStax	**MON 89034 + MON 88017 + TC 1057 + DAS 59122-7**	**Cry1A.105 + Cry2Ab + Cry1F +Cry3Bb + Cry34Ab1 + Cry35Bb1**	European and Southwestern corn borers, corn rootworm, fall armyworm, corn earworm, Western bean cutworm

* Denotes "refuge in a bag" product that uses seed mixtures to prevent development of insect resistence.

Be sure to follow specific refuge restrictions which apply to these trasgenic hybrids.

Note: Table 2 modified from information provided by Drs. Chris DiFonzo (Michigan State University), Eileen Cullen (University of Wisconsin-Madison) and Bruce Hibbard (USDA-ARS Corn Insects Project, Columbia, Missouri

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Rotation is Important in Managing Diplodia Ear Rot of Corn

By Laura Sweets

Diplodia ear rot was unusually widespread and severe on corn throughout most of Missouri during the 2009 season. It developed again during the 2010 season in much of the state although perhaps not as severe as in 2009. Since the primary source of inoculum for the disease is diseased corn debris left in the field and since corn debris may remain in a field for several years, planting corn in a field which had high levels of Diplodia ear rot in 2009 or 2010 increases the risk of the disease occurring in 2011 corn. The risk for Diplodia ear rot will also be greatly influenced by weather conditions after silking with the risk being the greatest if wet weather occurs after silking. The following article covers symptoms, factors favoring disease development and management options for Diplodia ear rot of corn.

Diplodia ear rot is caused by the fungus *Stenocarpella maydis* formerly known as Diplodia maydis. When infection occurs just after silking, the ear leaf and husks on the ear may appear prematurely bleached or straw-colored. The bleached ear leaf and husks stand out in a very striking pattern against the green foliage of the rest of the plant. When the husk is peeled back, dense white to grayish-white mold growth will be matted between the kernels and between the ear and the husks. In fact, husks may be difficult to peel back on ears with severe infections of Diplodia ear rot. Small, black fungal fruiting bodies may be scattered on husks or embedded in cob tissues and kernels. The entire ear may be grayish-brown, shrunken, very lightweight and completely rotted.

Stenocarpella maydis (Diplodia maydis) can also cause a stalk rot of corn. With the stalk rot, affected plants may wilt, the foliage may appear off-color or gray- green in color, the lower leaves may become bleached in color and the internal pith tissues of the stalk deteriorate and disintegrate. Small, black fungal fruiting bodies similar to those formed on ears and cobs may also be found in stalk tissues.

The primary source of inoculum is diseased corn debris left in the field. The small, black fungal fruiting bodies embedded in stalk, cob and kernels contain spores of the fungus. These spores can be released the following season to cause infection of the current season's corn crop. Wet weather favors spore release and spread. During wet weather the following season, the fungal fruiting bodies produce spores which may be spread to silks on current season corn plants by splashing rain. The fungus then grows down the silks into the ears. The fungus may also enter the husk by growing between the ear shoot and the sheath of the ear leaf. In this case infection may be heaviest at the base of the ear. Insect damage and bird damage may also predispose corn plants to infection. Ears tend to be most susceptible to infection for three weeks after silking when silks are senescing. Diplodia ear rot is favored by wet weather just after silking and is more severe when corn is planted following corn.

Crop rotation is extremely important in attempting to reduce the risk of Diplodia ear rot. Because of the high level of fungal fruiting bodies which may remain in infested corn debris left in the field, the disease may be much more severe if corn follows corn which had Diplodia ear rot.

Hybrids do vary in their susceptibility to Diplodia ear rot and stalk rot. Although published ratings for Diplodia ear rot may be difficult to find, most companies should have a good idea of susceptible and more resistant hybrids. Visit with your seed dealer about the reaction of their hybrids to Diplodia ear rot, especially if it is necessary to plant corn on corn in 2011.

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fludioxonil, azoxystrobin, carboxin, PCNB, thiram, trifloxystrobin, etc. are effective against *Rhizoctonia* and *Fusarium spp*.) are also important management options.

The bottom line is that 2011 may be a season to take precautions to minimize stand establishment problems caused by diseases in both corn and soybean. Planting high quality seed with a high germination rate is always recommended but may be especially important this season. Corn seed comes with fungicide seed treatments already applied. Be sure that the fungicides on the seed purchased are active ingredients and rates that will be effective against the early-season diseases described above. Seed treatment fungicides are not as standard on soybean seed but are becoming more common. If the soybean seed purchased is not treated, it may be wise to consider appropriate fungicide seed treatments applied prior to seed delivery or to use on-farm treatments. The 2011 Missouri Pest Management Guide University of Missouri Extension Publication M171 contains tables of fungicides labeled for use as seed treatments on corn and on soybean. Monitoring soil temperatures and soil moisture conditions as planting approaches will also be important. Ideally, corn and beans would be planted under the best possible seedbed conditions. Mother Nature doesn't always allow that luxury but following field conditions and weather forecasts may lead to planting under the best possible conditions for 2011. Finally, avoiding any other stresses which delay germination or emergence may reduce the incidence and severity of the early-season diseases. Proper planting depth, avoiding conditions that would lead to crusting or herbicide injury, proper fertility and preventing insect damage can reduce the damage from early-season diseases.

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Weather Data for the Week Ending February 20, 2011

By Pat Guinan

Station	County	Weekly Temperature (ºF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Feb. 1 - Feb. 20	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	59	34	72	28	46	+14	0.14	-0.48	*	*
St. Joseph	Buchanan	58	36	72	30	47	+13	0.10	-0.63	*	*
Brunswick	Carroll	55	35	71	27	45	+11	0.13	-0.92	*	*
Albany	Gentry	57	33	72	28	45	+13	0.07	-0.77	*	*
Auxvasse	Audrain	60	39	74	32	48	+14	0.63	-0.60	*	*
Vandalia	Audrain	58	36	71	29	46	+13	0.41	-0.77	*	*
Columbia-Bradford Research and Extension Center	Boone	60	38	73	29	49	+13	0.41	-1.00	*	*
Columbia-Jefferson Farm and Gardens	Boone	61	41	74	33	50	+14	0.39	-1.02	*	*
Columbia-Sanborn Field	Boone	61	42	75	34	51	+14	0.83	-0.56	*	*
Columbia-South Farms	Boone	60	40	75	32	50	+14	0.47	-0.94	*	*
Williamsburg	Callaway	61	39	76	32	50	+15	0.31	-1.13	*	*
Novelty	Knox	54	35	69	31	45	+12	0.16	-0.79	*	*
Linneus	Linn	55	36	71	29	45	+12	0.10	-0.87	*	*
Monroe City	Monroe	57	36	72	29	46	+12	0.43	-0.61	*	*
Versailles	Morgan	62	42	75	35	52	+14	0.70	-0.62	*	*
Green Ridge	Pettis	59	40	72	33	49	+13	0.47	-0.66	*	*
Lamar	Barton	62	45	71	33	53	+14	0.21	-1.11	*	*
Cook Station	Crawford	64	37	74	27	52	+13	2.19	+0.45	*	*
Round Spring	Shannon	66	37	74	27	51	+12	1.79	+0.20	*	*
Mountain Grove	Wright	64	44	72	36	53	+16	0.84	-1.13	*	*
Delta	Cape Girardeau	61	42	70	32	52	+12	1.37	-1.09	*	*
Cardwell	Dunklin	65	45	73	35	54	+12	1.40	-1.39	*	*
Clarkton	Dunklin	*	*	*	*	*	*	*	*	*	*
Glennonville	Dunklin	63	44	72	33	54	+13	1.29	-1.07	*	*
Charleston	Mississippi	63	43	73	32	53	+12	1.32	-1.60	*	*
Portageville-Delta Center	Pemiscot	64	46	73	35	55	+13	1.56	-1.31	*	*
Portageville-Lee Farm	Pemiscot	64	46	74	33	55	+13	1.37	-1.42	*	*
Steele	Pemiscot	65	45	73	35	55	+13	1.28	-1.66	*	*

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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