

## CORN (FIELD) – FOLIAR DISEASES

Terry Kirkpatrick

**NOTE: Fungicides should not be applied prior to 100% tassel and should not be applied later than 14 days after brown silk. We do not recommend the use of fungicides on field corn in Arkansas except under extraordinary circumstances. Preventative use will likely not result in an economic return on current hybrids grown in the state in most years. In rare cases where they might be needed – such as years favorable to Southern Rust, late-planted corn, or corn following corn in the same field – the following foliar fungicides are registered for use in Arkansas.**

Disease	Fungicide	Active Ingredient	FRAC Code*	Rate/Acre	Days to Harvest	Comments
Rusts, northern and southern corn leaf blights, gray leaf spot	Tilt 3.6EC	propiconazole	3	4 fl oz	30	See current label for RESTRICTIONS.
	Propimax EC	propiconazole	3	4 fl oz	30	See current label for RESTRICTIONS.
	Stratego	trifloxystrobin + propiconazole	11 3	12 fl oz	30	Additional triazole (1 - 2 fl oz) may be needed for maximum control.
	Stratego YLD	trifloxystrobin + prothioconazole	11 3	4 - 5 fl oz	30	See current label for RESTRICTIONS.
	Quilt	azoxystrobin + propiconazole	11 3	10.5 - 14 fl oz	30	Additional triazole (1 fl oz) may be needed when applying less than the high rate.
	Quilt Xcel	azoxystrobin + propiconazole	11 3	10.5 - 14 fl oz	30	Additional triazole (1 fl oz) may be needed when applying less than the high rate.
	Headline	pyraclostrobin	11	6 - 12 fl oz	7	Rust and gray leaf spot: 6 - 9 fl oz; corn leaf blights: 9 - 12 fl oz
	Headline AMP	pyraclostrobin + metconazole	11 3	10 - 14.4 oz	20	See current label for RESTRICTIONS.
	Quadris 2.08FL	azoxystrobin	11	6 - 15.5 fl oz	7	See current label for RESTRICTIONS.
	Folicur 3.6F	tebuconazole	3	4 - 6 fl oz	36	See current label for RESTRICTIONS.
	Evito 480SC	fluoxastrobin	11	2 - 5.7 fl oz		See current label for RESTRICTIONS.
	Domark 230ME	tetraconazole	3	4 - 6 fl oz	See label.	No more than one application per year. Do not apply after corn growth stage R-3 (milk).

\***FRAC Code** – Fungicides with the same FRAC Code have the same mode of action. See <http://www.frac.info/frac/index.htm> for an explanation of the FRAC Codes. Rotation of fungicides with different FRAC Codes could minimize the development of fungicide-resistant strains.

## VEGETABLE DISEASES (Commercial Production) – continued

Disease	Product	Active Ingredient	FRAC Code*	Rate/Acre	Days to Harvest	Comments
<b>WATERMELON (cont.)</b>						
Downy Mildew ( <i>cont.</i> )	Curzate 60DF	cymoxanil	27	3.2 oz	3	REI = 12 hours. Tank mix with chlorothalonil or mancozeb. See label.
	Acrobat 50WP	dimethomorph	40	6.4 oz	0	Allow sprays to dry before harvest begins. REI = 12 hours. See label.
	Reason 500SC	fenamidone	11	5.5 oz	See label.	Rates may vary. Follow label.
	Forum 4.18F	dimethomorph	40	6 fl oz	0	
	Gavel 75DF	mancozeb + zoxamide	M3 22	1.5 - 2 lb	5	Some varieties are sensitive to Gavel – see label.
	Presidio 4SC	fluopicolide	43	3 - 4 oz	2	
	Reason 500SC Revus 2.08SC	fenamidone mandipropamid	11 40	5.5 oz 8 fl oz	14 0	
Powdery Mildew	Flint 50WG	trifloxystrobin	11	1.5 - 2 oz	0	Apply at first sign of disease on 7 day schedule. Alternate with Bravo or other fungicides with different modes of action. Quadris has the same mode of action.
	Pristine	boscalid + pyraclostrobin	7 11	12.5 - 18.5 oz	See label.	Follow label. Best if applied at first evidence of disease.
	Quadris 2.08FL	azoxystrobin	11	11 - 15.4 fl oz	1	
Pythium Damping-Off	Ridomil Gold SL	mefenoxam	4	8 - 16 fl oz		Apply to the soil at planting or transplanting.
	Uniform	azoxystrobin + mefenoxam	11 4	0.34 oz/ 1,000 row ft		In-furrow spray. Also effective for Rhizoctonia seedling blight.

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## VEGETABLE NEMATODES (Commercial Production)

Terry Kirkpatrick and Cliff Coker

Nematode	Nematicide	Formulation	Active Ingredient	Rate/Acre	Comments
Root Knot, Lesion, Stubby Root and Reniform	Telone II	Liquid	1,3-dichloropropene	See label.	Inject 12 inches below planting depth and seal immediately with appropriate bedding equipment. Wait 7 - 14 days before planting.
	K-Pam or Vapam	Liquid	potassium N-methyldithiocarbamate or sodium methyldithiocarbamate	See label.	Inject 12 inches below planting depth and seal immediately 14 - 21 days before planting.

**RESTRICTED USE PESTICIDES** – For sale and use only by licensed/certified applicators or persons under their direct supervision. **These are dangerous pesticides – use caution in handling and read and follow current label directions.** If nematodes are suspected to be causing problems, a diagnostic soil sample should be taken to the county agent for submission to the Cooperative Extension Service Nematode Diagnostic Laboratory. **A small fee is required.**

**VEGETABLE DISEASES (Home Garden)**

Stephen Vann

<b>Disease</b>	<b>Product</b>	<b>Active Ingredient</b>	<b>Amt/ Gal Water</b>	<b>Days to Harvest</b>	<b>Comments</b>
Fungal Leaf Spots, Powdery and Downy Mildew, Fungal Blights	Ortho Garden Disease Control	chlorothalonil	1 tbs	Label	Apply in early morning or late evening using 1 gal spray per 250 sq ft of garden (10' x 25'). Good coverage is essential. Apply at first sign of disease and every 7 - 14 days as needed.
	Bonide Fung-onil RTU	chlorothalonil	1 tbs	Label	Same as above.
	Hi-Yield Daconil Vegetable and Flower Fungicide	chlorothalonil	See label.	Label	Apply at first sign of disease and 7 - 10 days.
	Natural Guard Copper Soap Liquid Fungicide	copper soap	0.5 - 2 oz	Label	Apply at first evidence of disease.
	Garden Tech Daconil Concentrate	chlorothalonil	See label.	Label	Apply at first sign of disease and 7 - 10 days.
	Hi-Yield Copper Fungicide	copper hydroxide	2 - 4 tsp	Label	Begin at first evidence of disease, then 7 - 10 day intervals.
	Safer Brand Concern Copper Soap Fungicide	fixed copper	RTU*	Label	
	Fertilome Dusting Sulfur	sulfur	---	Label	Begin applications at first sign of disease. Repeat at 7 - 10 day intervals. Sulfur may burn foliage when temperature is high (90-95 degrees F).
	Serenade Garden Disease Control**	<i>Bacillus subtilis</i>	RTU*	0	See label. Begin at disease onset.
	Bonide Remedy**	potassium bicarbonate	1.5 - 2.5 tbs	Label	Potassium bicarbonate is a <u>contact</u> fungicide which primarily targets powdery mildew on many vegetables. PHI usually 1 day. Application interval often 7 days. Follow label instructions.
	GreenCure**	potassium bicarbonate	1 - 2 tbs	Label	
	Kaligreen**	potassium bicarbonate	2.5 - 3 lb/A	Label	
	Milstop**	potassium bicarbonate	2.5 - 3 lb/A	Label	
Bonide Mancozeb Flowable w/Zinc	mancozeb + zinc	See label.	Label		
Schultz Garden Safe Fungicide 3 in 1**	neem oil	See label.	Label		
Bacterial and Fungal Spots and Blights	Bonide Copper Fungicide	copper sulfate	4 tbs	Label	See label for instructions.
Powdery Mildew	Bonide Sulfur Plant Fungicide**	sulfur	1 - 3 tbs	Label	Good coverage is essential. See label.
	Safer Brand Garden Fungicide	sulfur	4 - 8 tbs	0	
Virus Diseases	No chemicals available.				

\* RTU = Ready To Use

\*\* Approved for organic gardening. See publication FSA7562, *Alternative Plant Disease Management Practices for the Home Garden*, for additional materials.

## WHEAT – SEED TREATMENTS

Gene Milus and Stephen Vann

Disease	Fungicide	Active Ingredient	FRAC Code*	Rate/cwt Seed	Comments
Loose Smut Stagonospora Blotch (glume blotch)	Raxil MD	tebuconazole + metalaxyl	3 + 4	5 - 6.5 fl oz	On-farm or commercial seed treaters. Dilute 1:1 with water before application to seed. Already contains dye. Do not graze for 38 days after seeding. Also controls loose smut of oats – see label.
	Gaucht XT	tebuconazole + metalaxyl + imidacloprid	3 4 ---	3.4 fl oz	See label.
	Dividend Extreme	difenoconazole + mefenoxam	3 + 4	2 - 4 fl oz	On-farm or commercial seed treaters. Wheat cannot be grazed until 55 days after planting. See label for other restrictions. Labeled only for wheat and triticale.
	Incentive RTA	difenoconazole + mefenoxam	3 + 4	2.5 - 10 fl oz	See label for details.
	Dividend XL RTA	difenoconazole + mefenoxam	3 + 4	2.5 - 10 fl oz	See label for details.
	Charter	triticonazole	3	3.1 fl oz	On-farm or commercial seed treaters. See label for details.
	Charter F2	triticonazole + metalaxyl	3 + 4	5.4 fl oz	See label.
	Proceed MD	prothioconazole + tebuconazole + metalaxyl	3 3 4	5 - 7.5 fl oz	Standard slurry application or mist-type equipment.
	Proceed Concentrate	prothioconazole + tebuconazole + metalaxyl	3 3 4	1 fl oz	Standard slurry application or mist-type equipment.

\*FRAC Code – Fungicides with the same FRAC Code have the same mode of action. See <http://www.frac.info/frac/index.htm> for an explanation of the FRAC Codes. Rotation of fungicides with different FRAC Codes could minimize the development of fungicide-resistant strains.

**NOTE:** Wheat seed producers in Arkansas should always plant seed treated for prevention of loose smut and Stagonospora glume blotch to prevent a buildup of these diseases in the seed supply. Growers that plant saved seed should have it treated with one of the above, especially if the seed came from a field with these diseases or if either of the diseases was at epidemic levels in nearby fields during the spring.

Metalaxyl and mefenoxam are fungicides active against Pythium root rot and come prepackaged with tebuconazole and difenoconazole – the active compounds against loose smut and glume blotch. We do not recommend metalaxyl or mefenoxam to control Pythium root rot for wheat or for other stand establishment diseases since numerous field trials in Arkansas have not shown any benefit from the use of metalaxyl or mefenoxam on wheat seed. However, prepackaging prevents us from listing only the needed components.

## WHEAT – FOLIAR FUNGICIDES

Gene Milus and Stephen Vann

*Fungicides are beneficial only if certain diseases are present at high enough levels and early enough in the season to cause yield and quality losses. The most important times for application of foliar fungicides are usually between GS 8 (flag leaf emergence) and GS 10.5 (full heading). In most years, GS 10 (full boot) is considered the ideal timing for a single fungicide application to control leaf rust and Septoria leaf blotch. Fields with stripe rust should be sprayed when the disease is first observed. Finally, the higher the yield potential of the field, the more likely an economic return from fungicide use.*

Disease	Fungicide	Active Ingredient	FRAC Code*	Rate/Acre	Comments
Leaf Rust	Tilt	propiconazole	3	4 fl oz	Do not apply after Feekes GS 10.5. Do not apply more than 8 fl oz per acre per crop per season.
Stagonospora (Glume) Blotch <sup>1</sup>	Propimax	propiconazole	3	4 fl oz	
	Bumper	propiconazole	3	4 fl oz	
Septoria Leaf Blotch	Quadris**	azoxystrobin	11	6 fl oz	Do not apply after Feekes GS 10.5. Do not harvest treated wheat for forage. Do not apply within 14 days of harvest for hay or 45 days for grain or straw. See label for other restrictions.
Powdery Mildew				(8.5 fl oz for powdery mildew)	
Tan Spot <sup>2</sup>	Alto 100 SL Caramba Twinline Quilt Quilt Xcel Stratego 250EC Stratego YLD Headline** Absolute 500SC Prosaro Folicur Orius Tebustar Muscle 3.6F	cyproconazole	3	4 - 5.5 fl oz	Do not exceed 5.5 fl oz/A/yr. See label.
Stripe Rust <sup>3</sup>		metconazole	3	10 - 14 fl oz	No more than 2 applications/season. See label.
		pyraclostrobin + metconazole	11 + 3	7 - 9 fl oz	Use high rate for stripe rust. Do not apply after Feekes GS 10.5. See label.
		azoxystrobin + propiconazole	11 + 3	10.5 - 14 fl oz	Do not apply after Feekes GS 10.5. Tank mixes with certain herbicides and fertilizers may result in crop injury – see label for all restrictions.
		azoxystrobin + propiconazole	11 + 3	10.5 - 14 fl oz	
		trifloxystrobin + propiconazole	11 + 3	10 fl oz	Do not apply after Feekes GS 10.5.
		trifloxystrobin + prothioconazole	11 + 3	4 fl oz	See label for restrictions.
		pyraclostrobin	11	6 - 9 fl oz	Do not apply after Feekes GS 10.5 (beginning of flowering). See label. Headline is also labeled for control of black point of wheat.
		tebuconazole + trifloxystrobin	3 + 11	5 fl oz	Do not apply more than 5 fl oz per season. Do not use adjuvants. See label.
		prothioconazole + tebuconazole	3 + 3	6.5 - 8.2 fl oz	
	tebuconazole	3	4 fl oz	See label.	
	tebuconazole	3	4 fl oz		
	tebuconazole	3	4 fl oz		
	tebuconazole	3	4 fl oz		
	tebuconazole	3	4 fl oz		
Fusarium Head Blight (Scab) (suppression only) and control of other diseases listed above	Prosaro	prothioconazole + tebuconazole	3 + 3	6.5 - 8.2 fl oz	Apply at early flowering for optimal head blight suppression. See label.
	Caramba	metconazole	3	13.5 - 17 fl oz	Apply at early flowering for optimal head blight suppression. See label.
	Folicur	tebuconazole	3	4 fl oz	See label.
	Orius	tebuconazole	3	4 fl oz	
	Tebustar	tebuconazole	3	4 fl oz	
Muscle 3.6F	tebuconazole	3	4 fl oz		

\* **FRAC Code** – Fungicides with the same FRAC Code have the same mode of action. See <http://www.frac.info/frac/index.htm> for an explanation of the FRAC Codes. Rotation of fungicides with different FRAC Codes could minimize the development of fungicide-resistant strains.

\*\* Only effective as a preventative treatment for stripe rust.

<sup>1</sup> Stagonospora (glume) blotch is more effectively controlled by seed treatment fungicides because it is primarily seedborne under Arkansas conditions and foliar symptoms are difficult to scout for in the spring. See Wheat Seed Treatment Table for details.

<sup>2</sup> Tan spot is generally rare in Arkansas but appears to be increasing in no-till fields in recent years. The identity of the disease should always be confirmed before a fungicide is considered since tan spot symptoms can be confused with herbicide injury and other non-disease problems.

<sup>3</sup> All fields with active hot spots of stripe rust should be sprayed immediately if found prior to Feekes GS 10.5.

## Efficacy of Fungicides for Wheat Disease Control Based on Appropriate Application Timing (Revised 4-6-11)

The North Central Regional Committee on Management of Small Grain Diseases (NCERA-184) has developed the following information on fungicide efficacy for control of certain foliar diseases of wheat for use by the grain production industry in the U.S. Efficacy ratings for each fungicide listed in the table were determined by field testing the materials over multiple years and locations by the members of the committee. Efficacy is based on proper application timing to achieve optimum effectiveness of the fungicide as determined by labeled instructions and overall level of disease in the field at the time of application. Differences in efficacy among fungicide products were determined by direct comparisons among products in field tests and are based on a single application of the labeled rate as listed in the table. The table includes the most widely marketed products and is not intended to be a list of all labeled products.

Fungicide(s)				Powdery Mildew	Stagonospora Leaf/Glume Blotch	Septoria Leaf Blotch	Tan Spot	Stripe Rust	Leaf Rust	Stem Rust	Head Scab	Harvest Restriction
Class	Active Ingredient	Product	Rate/A (fl oz)									
Strobilurin	Azoxystrobin 22.9%	Quadris 2.08 SC	6.2 - 10.8	F(G) <sup>1</sup>	VG	VG	E	E <sup>2</sup>	E	VG	NL	45 days
	Fluoxastrobin 40.3%	Evito 480 SC	2.0 - 4.0	G	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	VG	-- <sup>3</sup>	NL	40 days
	Pyraclostrobin 23.6%	Headline SC	6.0 - 9.0	G	VG	VG	E	E <sup>2</sup>	E	G	NL	Feekes 10.5
Triazole	Cyproconazole 8.9%	Alto 100 SL	3.0 - 5.5	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	30 days
	Metconazole 8.6%	Caramba 0.75 SL	10.0 - 17.0	VG	VG	-- <sup>3</sup>	VG	E	E	E	G	30 days
	Propiconazole 41.8%	Tilt 3.6 EC <sup>4</sup>	4.0	VG	VG	VG	VG	VG	VG	VG	P	Feekes 10.5
	Prothioconazole 41%	Proline 480 SC	5.0 - 5.7	-- <sup>3</sup>	VG	VG	VG	-- <sup>3</sup>	VG	VG	G	30 days
	Tebuconazole 38.7%	Folicur 3.6 F <sup>5</sup>	4.0	G	VG	VG	VG	E	E	E	F	30 days
	Prothioconazole 19% Tebuconazole 19%	Prosaro 421 SC	6.5 - 8.2	G	VG	VG	VG	E	E	E	G	30 days
Mixed Mode of Action	Metconazole 7.4% Pyraclostrobin 12%	TwinLine 1.75 EC	7.0 - 9.0	G	VG	VG	E	E	E	VG	NL	Feekes 10.5
	Propiconazole 11.7% Azoxystrobin 7.0%	Quilt 200 SC	14.0	VG	VG	VG	VG	E	E	VG	NL	Feekes 10.5
	Propiconazole 11.7% Azoxystrobin 13.5%	Quilt Xcel 2.2 SE	14.0	-- <sup>3</sup>	VG	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	VG	-- <sup>3</sup>	NL	Feekes 10.5
	Propiconazole 11.4% Trifloxystrobin 11.4%	Stratego 250 EC	10.0	G	VG	VG	VG	VG	VG	VG	NL	35 days
	Tebuconazole 22.6% Trifloxystrobin 22.6%	Absolute 500 SC	5.0	G	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	E	-- <sup>3</sup>	NL	35 days

<sup>1</sup> Efficacy Categories: NL=Not Labeled and Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent. Efficacy designation with a second rating in parenthesis indicates greater efficacy at higher application rates.

<sup>2</sup> Efficacy may be significantly reduced if solo strobilurin products are applied after stripe rust infection has occurred.

<sup>3</sup> Insufficient data to make statement about efficacy of this product.

<sup>4</sup> Multiple generic products containing the active ingredient propiconazole may also be labeled in some states. Products containing propiconazole include Bumper 41.8 EC, Fitness, Propiconazole E-AG and PropiMax 3.6 EC.

<sup>5</sup> Multiple generic products containing the active ingredient tebuconazole may also be labeled in some states. Products containing tebuconazole include Embrace, Monsoon, Muscle 3.6 F, Onset, Orius 3.6 F, Tebucon 3.6 F, Tebustar 3.6 F, Tebuzol 3.6 F, Tegrol and Toledo.

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. Members or participants in the NCERA-184 committee assume no liability resulting from the use of these products.

## WHEAT DISEASE THRESHOLDS

Gene Milus and Stephen Vann

*The following threshold system is a general guide for whether or not there is adequate disease pressure to justify fungicide use. The relative susceptibility of the variety, favorable weather conditions during the spring and location in Arkansas should also be considered. Check the weekly Arkansas Wheat Newsletter – published during March, April and May each year – for current information on these factors. The newsletter is available through your local Cooperative Extension Service Office, by email or on the Internet at [www.uaex.edu](http://www.uaex.edu).*

Feekes Growth Stage	Disease	Indicator Leaf	Treatment Threshold
GS 8	Leaf Rust	Flag-3 and above	1 pustule/leaf
	Septoria tritici leaf blotch	Flag-3 and above	25% of leaves infected
	Powdery Mildew	Flag-2 and above	5 pustules/leaf
	Stagonospora blotch <sup>1</sup>	Flag-2 and above	10% of leaves infected
	Tan Spot <sup>2</sup>	Flag-2 and above	25% of leaves infected
	Stripe Rust <sup>3</sup>	Any leaf	1 pustule/20 leaves
GS 9 - GS 10.5	Leaf Rust	Flag-2 and above	1 pustule/leaf
	Septoria tritici leaf blotch	Flag-2 and above	25% of leaves infected
	Powdery Mildew	Flag-1 and above	5 pustules/leaf
	Stagonospora blotch <sup>1</sup>	Flag-2 and above	10% of leaves infected
	Tan Spot <sup>2</sup>	Flag-2 and above	25% of leaves infected
	Stripe Rust <sup>3</sup>	Any leaf	1 pustule/20 leaves

<sup>1</sup>Stagonospora (glume) blotch is more effectively controlled by seed treatment fungicides because it is primarily seedborne under Arkansas conditions and foliar symptoms are difficult to scout for in the spring. See Wheat Seed Treatment Table for details.

<sup>2</sup>Tan spot is rare in Arkansas. Fields with lots of infected residue (no-till wheat) are more likely to have the disease; however, the identity of the disease should always be confirmed before a fungicide is considered since tan spot symptoms can be confused with herbicide injury and other non-disease problems.

<sup>3</sup>All fields with active hot spots of stripe rust should be sprayed if found prior to Feekes GS 10.5.

# Notes

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*This publication printed with soybean ink on recycled paper.*