



## WHEAT “CHEAT SHEET” FOR 2019 – 2020 SEASON



**Variety selection:** The ideal variety would get a “5-star rating”: 1) consistently high yield potential; 2) high test weight; 3) Hessian fly resistance; 4) resistance to leaf rust, mildew, and glume blotch; and 5) straw strength. Five-star wheats are rare for S. C. conditions and we usually settle for 3 to 4 out of 5. Moderate height is also desirable (except for straw production) to reduce lodging and residue for double-cropping.

### Selected Variety Notes:

**AGS 2024** is a short, bearded, early-med maturity, variety with good mildew and rust resistance. This variety has demonstrated above average yield potential and good test weight.

**AGS 3030** is med-tall, awnletted, early maturity, variety with mildew and good stripe and leaf rust resistance. This variety looks to be the next one in line from AGS with lots of promise for SC growers.

**AgriPro SY Viper** is a non bearded, early-mid maturity, variety with decent resistance to leaf rust and mildew. Viper has demonstrated high yield potential and test weight has been very good.

**AgriMAXX 481** is another new, early, bearded variety with mildew and rust resistance. With its med height and positive yields and test weight ratings, this would be a good one to try.

**Dyna-Gro 9701** is a medium in height, non bearded, early-med maturity, with good mildew and good rust resistance. 9701 has shown high yield potential with fair to good test weight as well. Try some of this one as well.

**Pioneer 26R41** is a mid-height, bearded, late variety with above average test weight. Good rust resistance with very good HF resistance as well. I would plant this in the Santee area of the state and any other area with HF pressure.

**S. Harvest 7510** is a bearded, med-late maturity variety with good mildew and rust resistance. In two years, it has shown to have good yield and above average test weight. It also has some HF resistance.

**C. Winfield 9606** is a bearded, med-late maturity variety with above average yields. This variety is good on stripe rust and mildew, but fair on leaf rust and SBM.

**Diversify:** Unless only a small acreage is involved, it is always a good idea to plant more than one variety to spread risk. Try at least 2 - 3 of the top varieties for your area depending on your acreage. Variations in pest severity and weather conditions will favor one variety over another in any given year. When trying a new variety for the first time, you should usually keep the majority of your acreage in a proven performer.

**Certified Seed:** Use of certified seed provides a level of insurance against poor germination, seedborne diseases, and weeds. Since we are dependent on the continued development and release of specialized varieties adapted to our climate and pest complex, it benefits everyone to obey all seed laws. PVP varieties (covered under the plant variety protection act) can only be saved for seed by the grower for use on their own farm. Patented varieties cannot be saved for seed.

### VARIETAL CHARACTERISTICS

**Maturity:** Maturity can be defined in different ways, and depending on the growing season, a medium maturity variety is often harvest ready within two - three days of an early variety planted on the same date. The most important consideration is that early varieties will joint and head earlier. Therefore, early varieties are more susceptible to stem freeze in March and head freeze in April if planted too early.

**Hessian Fly Resistance:** Varietal resistance has worked well in suppressing Hessian fly in S. C., but Hessian fly is a moving target. A “poor” rating indicates susceptibility throughout the state; “fair” indicates some resistance which may be inadequate under heavy pressure; “good” indicates resistance to the predominant fly races in the southern coastal plain (roughly below Lake Marion); Good +L indicates some resistance to race “L” Hessian fly found in the northern Coastal Plain (above Lake Marion). However, even varieties with race L resistance can fail north of the lakes. If a previously resistant variety fails on your farm you will need to protect it with insecticide or change varieties in the future.

## S. C. SELECTED WHEAT VARIETY CHARACTERISTICS AND PERFORMANCE - 2019

VARIETY	AWNS (beard)	MAT- <sup>a</sup> URITY	H. <sup>b</sup> FLY	POWDERY MILDEW <sup>c</sup>	LEAF RUST <sup>c</sup>	STRIPE RUST <sup>c</sup>	SBM <sup>c</sup>	HEIGHT <sup>d</sup>	STRAW STREN.	TEST WT.	TEST <sup>e</sup> WT. INDEX	YIELD (BU/AC)						YIELD <sup>e</sup> INDEX
												14	15	16	17	18	19	
AGS 2024	Y	E/M	Fair	Fair/Good	Good	Good	Good	Short	Fair	Good	+1.2 <sup>4</sup>	--	--	111	80	105	96	+0.9 <sup>4</sup>
AGS 2038	Y	M	Fair	Fair/Good	Good	Good	Good?	Med/Tall	Good	Good	+0.3 <sup>4</sup>	74	82	--	67	82	--	-6.6 <sup>4</sup>
AGS 3030	Y+	E	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Good	+2.5 <sup>1</sup>	--	--	--	--	--	108	+6.7 <sup>1</sup>
AGS 3040	Y+	M/L	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Fair	-0.9 <sup>1</sup>	--	--	--	--	--	104	+3.1 <sup>1</sup>
AgriMaxx 415	Y	M/L	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Fair	-0.3 <sup>7</sup>	80	84	84	83	88	96	-1.7 <sup>7</sup>
AgriMaxx 473	Y	M	Good?	Good	Good	Good	?	Med/Tall	Good	Fair/Poor	-1.8 <sup>3</sup>	--	--	--	64	85	105	-2.6 <sup>3</sup>
AgriMaxx 481	Y	E	Good?	Good	Fair/Good	Fair/Good	?	Med	Good	Good	+3.1 <sup>1</sup>	--	--	--	--	--	116	+14.5 <sup>1</sup>
AgriPro SY 547	N	M	Poor	Good	Good	V. Good	?	Med/Tall	Good	Fair	-0.4 <sup>2</sup>	--	--	--	--	82	87	+10.2 <sup>2</sup>
AgriPro SY Richie	N	E/M	?	Good	V. Good	V. Good	?	Med	Good	Good	+1.0 <sup>1</sup>	--	--	--	--	--	112	+11.2 <sup>1</sup>
AgriPro SY Viper	N	E/M	Poor	Fair	Fair	Good	Fair	Med	Good	Good	+1.2 <sup>3</sup>	--	--	94	--	98	94	+3.2 <sup>3</sup>
Dyna-Gro 9701	Y	E/M	Good?	Good	Good	Good	Good	Med/Tall	Good	Fair	-0.8 <sup>3</sup>	--	--	--	89	85	104	+4.7 <sup>3</sup>
Dyna-Gro 9811	Y	M	Fair?	Good	Good	Good	?	Med/Tall	Good	Fair	-0.2 <sup>2</sup>	--	--	--	--	97	97	+2.4 <sup>2</sup>
Dyna-Gro TV8861	Y	M/L	Poor	Good	Good	Good	Fair	Med	Good	Fair	-0.5 <sup>1</sup>	--	--	--	--	--	83	-18.6 <sup>1</sup>
Pioneer 26R41	Y	L	Good+L	Fair/Good	Fair	Good	?	Short/Med	Good	Fair	-0.1 <sup>7</sup>	82	89	97	97	77	97	+3.5 <sup>7</sup>
Pioneer 26R59	N	E/M	Poor	Good	Fair	Good	Fair	Short	Good	Fair/Poor	-1.2 <sup>4</sup>	--	--	81	73	101	97	+0.1 <sup>4</sup>
Pioneer 26R94	Y	E	Good	Good	Good	Good	Good	Med/Tall	Good	Ex	+2.4 <sup>5</sup>	--	--	93	80	95	102	+7.8 <sup>5</sup>
S. Harvest 5550	N	E/M	Good?	Good	Good	Good	Good	Med/Tall	Good	Good	+0.9 <sup>2</sup>	--	--	--	60	--	98	-8.7 <sup>2</sup>
S. Harvest 7200	Y	E/M	Good+L?	Good	V. Good	Good	Fair	Med/Tall	Good	Good	+1.5 <sup>3</sup>	--	--	--	63	87	104	-3.3 <sup>3</sup>
S. Harvest 7510	Y	M/L	Fair?	Good	V. Good	Good	Fair	Med	Good	Fair/Good	+0.3 <sup>2</sup>	--	--	--	--	90	107	+3.7 <sup>2</sup>
C. Winfield 8550	N	M/L	Good+L?	Good	Good	V. Good	?	Med/Tall	Good	Fair/Poor	-1.9 <sup>2</sup>	--	--	--	--	88	105	+1.6 <sup>2</sup>
C. Winfield 8800	Y	M/L	Good+L?	Good	Good	V. Good	?	Med	Good	Fair/Poor	-2.6 <sup>1</sup>	--	--	--	--	--	107	+5.8 <sup>1</sup>
C. Winfield 9606	Y	M/L	Good+L?	Good	Fair	V. Good	?	Med/Tall	Good	Fair	-0.5 <sup>3</sup>	--	--	--	79	85	106	+1.9 <sup>3</sup>
USG 3118	Y	E/M	Good+L?	Good	V. Good	Good	?	Short/Med	Good	Fair	-0.7 <sup>1</sup>	--	--	--	--	--	119	+18.2 <sup>1</sup>
USG 3539	Y	M	Good+L?	Fair	Good	Good	Fair	Med/Tall	Good	Fair	-0.2 <sup>1</sup>	--	--	--	--	--	94	-7.5 <sup>1</sup>
USG 3895	Y	M	?	Fair/Good	Good	Good	Fair	Short/Med	Good	Fair	-0.3 <sup>4</sup>	--	--	100	91	95	91	+6.6 <sup>4</sup>

<sup>^</sup> Since there wasn't a wheat challenge, the yields were taken from the OVT trial at both Blackville and Clemson.

+ Awnletted-small Awns, a new way of reporting the "beard" on these varieties now.

a. Maturity based on jointing / heading dates and harvest maturity. Plant early varieties last to reduce freeze risk.

b. Hessian fly: Poor = no resistance; Fair = resistance under low pressure: Good = Resistant to most races below Lake Marion; Good+L = also resistant to race L but may fail above Lake Marion.

c. Powdery mildew, leaf rust, stripe rust resistance varies by region and can change rapidly; SBM = soilborne mosaic virus; ratings based on observations at Blackville if available, or other states.

d. Tall = over 41" (105 cm); short less than 37" (95 cm) under high yield conditions.

e. **Yield Index or Test Weight Index** shows in one number the percent above or below average in a series of tests (not all tested varieties shown). Superscript shows number of years compared.

**Disease Resistance:** Rust and mildew resistance can change even more rapidly than insect resistance, and disease ratings are always relative. The ratings used in the table are based on our latest observations at Blackville, when available, and neighboring states. Even varieties given only a “fair” rating exhibit a significant level of resistance when compared with highly susceptible varieties.

**Test Weight and Test Weight Index:** Test weight ratings are based on performance over a period of years, but this is one characteristic that is very stable. That is, test weights may vary greatly depending on field conditions, but high test weight varieties maintain consistently better test weights over many years. The test weight index shows the percent above or below average test weight in a series of trials. The superscript number shows how many years the variety was evaluated. For example, a TW index of 2.8<sup>3</sup> means that over a 3-year period the variety’s test weight was 2.8 % above the average of other varieties tested. This would be exceptional out-performance.

**Yield Index:** The yield index indicates the percent above or below test average yield and the superscript shows the number of years compared. Consistent yielders have a positive index over several years. A high or low number based on only one year’s information is less meaningful.

**Height:** A value over 41” (105 cm) is a tall wheat for our area and under 35” (90 cm) is relatively short. These heights are taken under high yield conditions. Keep in mind that some tall varieties have excellent straw strength and standability.

**Straw Strength:** Based on lodging comparisons (when available) at N rates of 90 - 120 lbs / ac.

### AGRONOMIC CONSIDERATIONS

**Seeding Rate:** Plant seed per foot, not bu. per acre. There can easily be a 30% to 40% difference in seed size dependent on variety and lot; but on average it takes about 120 lb seed/ac to reach the maximum seeding rate. Calibrate drill on hard ground where you can count seed. Shoot for a maximum of 21-22 seed per row ft. on 7” rows (12/ft. on 4”, 18/ft. on 6”, 24/ft. on 8”). For broadcast seeding, shoot for 36 - 40 seed/ft<sup>2</sup>. **These are maximum wheat seeding rates, even for high management. Wheat compensates well for reduced seed rates and even skips in plant stands. Equivalent yields have been obtained with half seeding rates (18/ft<sup>2</sup>) and even with 18-inch row skips on 15 % of the field area. Don’t give up on reduced stands.** Maximum seeding rates can reduce barley yellow dwarf yield loss and provides some insurance against poor emergence.

Some seed companies now list seed size (seed/lb) on the bag. The following table is useful for determining how much seed to purchase, checking whether the drill is putting out the correct rate, and for calibrating broadcast seeding. **If no information is available on seed size, a good mid-range guess for the amount of wheat seed to purchase is 120 lb per acre.**

<b>Small Grain Seeding Rates</b>											
<b>Use Seed Per Row Foot, Bu/ac only an Estimate</b>											
Crop	lb/bu	Seed/ft <sup>2</sup>		Seed per row ft. by row spacing (inches)					Average seed/lb	Approx. Lb/ac	Approx Bu/ac
				4	6	7	8	10			
Wheat	60	Grain	36	12	18	21	24	30	13,000	120	2.0
		Graze	45	15	23	28	30	38			
Oats	32	Grain	24	8	12	14	16	20	13,000	80	2.5
		Graze	28	9	14	17	19	24			
*Barley	48	Grain	26	9	13	15	17	22	12,000	95	2.0
Rye	56	Grain	40	13	20	24	27	33	21,000	84	1.5
		Graze	53	18	27	32	36	45			
Triticale	48	Grain	26	9	13	15	17	22	12,000	95	2.0
		Graze	36	12	18	21	24	30			
*Hullless barley requires a substantially higher seeding rate: 40 seed/ft <sup>2</sup> (23 seed/row ft on 7” rows).											

## Maximum Wheat Seeding Rates For Grain Production (Lbs per Acre)

Seed Size (seed/lb)	% Germination		
	90 %	80 %	70 %
10,000	157	177	202
11,000	142	160	182
12,000	131	147	168
13,000	121	136	155
14,000	112	126	144
15,000	104	117	134
16,000	98	110	126
17,000	92	103	118
18,000	87	98	112
19,000	82	92	105
20,000	78	88	100

\*Rates for 90 % germination are equivalent to 36 seed/ft<sup>2</sup> or: 18 seed/row ft (6" rows); 21 seed/ft (7" rows); 24 seed/row ft (8" rows).

Consider increasing seeding rate 10 % for reduced tillage or broadcast (40 seed/ft).

For grazing wheat, increase seeding rate 25%.

**Seeding Depth:** Depth matters. A good target is 1" to 1.5" deep in moist soil. Over 2" can reduce tiller vigor, particularly if heavy rain prior to emergence washes more soil over the seed.

**Planting Date:** Planting date is always a compromise between yield potential and frost / pest risks. Early planting can raise yield potential by increasing productive tiller count, promoting a larger plant, and prolonging the grain fill period; but early planting also exposes you to greater risk from spring freezes, Hessian fly, and aphid-transmitted barley yellow dwarf virus. For example, at Blackville it is risky to plant before Nov. 15, and we should try to finish by Dec. 1. In the northern coastal plain of S.C. the optimal planting date is about two weeks earlier (Nov. 1). Plant earlier-maturing varieties last to reduce freeze risk.

**Fertility:** A soil test is fundamental. **pH 5.8 - 6.4.** Over liming causes Mn deficiency and potential winter kill.

**Nitrogen:** 20 lb at-plant + 70 to 80 lb early to mid-February topdress (90 to 100 lbs total) is a good starting point for dryland wheat. Alternatively, initial N application can be delayed until mid-January. Typically there is adequate residual N to carry seedling wheat with adequate tillering until 30 units is applied in January. The balance of the N can then be applied in mid-February. There is no substitute for experience with N response on your soil and rotation. N application is critical prior to jointing in early March. Splitting spring N applications (Feb and Mar) can reduce leaching, but usually does not increase yield. Excessive N can increase disease, lodging and drought stress during head fill. Apply 10 - 15 lb sulfur; ideally about 1/3 at planting and the rest at topdress. If clay is within 12" of surface, there is little chance of a response to applied S.

**Phosphorus and potash** should be applied pre-plant by soil test (apply 80 lb/ac P or K if soil test is low; 40 lb/ac P or K if soil test is medium). K can be split fall and early spring on sandy soil. Breaking the hardpan greatly reduces S and N deficiency risk.

**Manganese** deficiency can be a significant problem in coastal plain wheat, even causing death of tillering wheat during cold snaps. Mn deficiency is often caused by high pH from over liming or excessive poultry litter. Foliar apply 0.5 lb elemental Mn (2 - 2.5 lb manganese sulfate) to correct Mn deficiency. A second application may be necessary in that Mn does not translocate to new foliage.

**Copper** deficiency can occur on poorly drained coastal plain soils and is corrected with foliar 0.25 – 0.5 lb copper (1-2 lb /ac copper sulfate) at first appearance (pale wheat with dry, twisted or "pigtailed" leaf tips) or preventatively on known deficient soils. High pH and phosphorus levels are also correlated with Cu deficiency.

**Poultry Litter** – Litter nutrient content can vary widely so have analysis from your source. Average litter analysis is about 3 : 3 : 2, so 1 ton of litter contains about 60 lb N : 60 lb P<sub>2</sub>SO<sub>4</sub> : 40 lb K<sub>2</sub>O. Using availability coefficients of 0.6 – 0.8 – 0.8, the **nutrient value of 1 ton of litter on average is about 36 lb N : 48 lb P<sub>2</sub>SO<sub>4</sub> : 32 lb K<sub>2</sub>O.**

**Tiller Counts:** A rule of 50 tillers per ft<sup>2</sup> is sometimes used to decide whether to make an early ("split") N

application in late January. However, a goal of 50 tillers per ft<sup>2</sup> is seldom a problem for November planted wheat in the S. C. coastal plain. Even if we get less than half a stand (10 plants per row ft out of 21 seed per row ft on 7" rows), it only takes a main stem and two tillers (3 stems) per plant to exceed 50 tillers per ft<sup>2</sup>. Multiply the stems per row ft by 1.7 to get stems per ft<sup>2</sup> on 7" rows (multiply stem count by 2 on 6" rows).

**Growth Regulator:** Cerone (ethephon 4lb/gal) is labeled at 0.5-0.75 pt/ac (applied from flag leaf emergence to early boot) to prevent lodging. This product should only be considered on irrigated wheat because drought stress during headfill will result in severe yield loss from Cerone application.

**Head Population:** Our target head population is 60 heads per ft<sup>2</sup> (6" rows = 30 heads/row ft, 7" rows = 35 heads/row ft, 8" rows = 40 heads/row ft. The typical reasons for falling short on head count include N deficiency due to rate, timing, leaching, or hardpan; and poor seedling vigor from deep planting. Water-logged soils during tillering also reduce stem count by depriving the roots of oxygen.

**Land Preparation:** Broadcast deep tillage is a key to high yield wheat in the S. C. coastal plain. Breaking the hardpan improves winter drainage and allows roots to reach nutrients and water held by the subsoil. Chiselplovers often can't reach hardpan. A Terramax or Paratill provides near broadcast deep tillage; V-ripper with 20" spacing is another option. Ripping between previous subsoil furrows after corn harvest is efficient and results in a firmer seedbed when done in advance. A firm seedbed is needed to control planting depth. Deep-tillage implements can also be used with a roller to firm and level the seedbed. Deep tillage operations are more effective when soils are dry.

**Broadcast Seeding:** Although grain drills result in much more consistent stands by precisely controlling seed placement; adequate stands and yields can be attained with broadcast seeding when seeding rate (approx. 36 – 40 ft<sup>2</sup>), a uniform distribution pattern, and soil incorporation depth are reasonably controlled. Seed should be lightly incorporated (up to 2") into adequate soil moisture for best results.

Surface broadcasting of small grain seed without any covering by either soil incorporation or crop residue usually results in complete failure or erratic stands and therefore is not a recommended practice for grain production or cover crop establishment. Soil incorporation of seed is recommended for grain crop production.

Where small grains are intended only as a cover crop, broadcast seeding and covering with crop residue can produce adequate stands. For example seed covering and germination for a cover crop can be attained by surface seed broadcast followed by shredding of standing crop residue or broadcast seeding prior to cotton defoliation or soybean leaf drop.

**Irrigation:** Wheat yield responds to irrigation when drought stress is prevented during April (kernel formation and kernel fill). A soil tensiometer or a simple device to measure evapotranspiration (atmometer) can be used to measure weekly soil moisture water loss and replace evapotranspiration with irrigation (minus weekly rain). Sensors which directly measure soil water content are also now available. Avoid unnecessary irrigation particularly during flowering to reduce the risk of scab.

## WEED CONTROL IN SMALL GRAINS

*Mike Marshall, Extension Weed Specialist*

## Preplant/Burndown Herbicides for Weed Management in Small Grains

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			

Gramoxone SL ( <i>paraquat</i> )	2.0-4.0 pt	0.5-1.0 lb	22	60 days	12 hours
-------------------------------------	------------	------------	----	---------	----------

Firestorm 3 S Parazone 3 S	1.5-2.0 pt				
-------------------------------	------------	--	--	--	--

**Comments:** Labeled for use in barley and wheat only. GRAMOXONE is a RESTRICTED USE PESTICIDE. Add non-ionic surfactant at 1 pt per 100 gal of spray solution or crop oil concentrate at 1 gal per 100 gal of spray solution. Rate dependent on weed size.

Glyphosate acid equivalent (ae)				7 days	4 hours
------------------------------------	--	--	--	--------	---------

5.5 SL (4.5 lb ae)	11-32 fl oz	0.38-1.13 lb ae	9		
--------------------	-------------	-----------------	---	--	--

**Comments:** Labeled for use in oats, wheat, barley, and rye. Apply 2 to 4 weeks before planting date to control existing summer annual grass and broadleaf weeds and reduce competition with small grain seedlings.

Glyphosate (several brands)	see glyphosate	0.38-1.13 lb ae	9	45 days	4 hours
--------------------------------	----------------	-----------------	---	---------	---------

+ Harmony Extra SG ( <i>thifensulfuron</i> )	0.45-0.9 oz	0.0094-0.0188	2		
--	-------------	---------------	---	--	--

+ <i>tribenuron</i> )		0.0047-0.0094	2		
--------------------------	--	---------------	---	--	--

**Comments:** Harmony Extra SG labeled for burndown use in wheat, triticale, and barley only. GLYPHOSATE + HARMONY EXTRA SG may be used as a burndown treatment prior to, or shortly after planting (but before crop emergence). Consult glyphosate product to determine if an adjuvant is needed. If an adjuvant is needed, then add NIS (80% active or greater) at 1 qt/100 gallons of spray solution plus urea ammonium nitrate (28-32% N) or ammonium sulfate (AMS) at 2 lb/A.

Sharpen 2.85 SC ( <i>safinopyracil</i> )	1.0-2.0 fl oz	0.022-0.045 lb	14	30 days	12 hours
---	---------------	----------------	----	---------	----------

**Comments:** SHARPEN is labeled for use in wheat, oats, barley, rye, and triticale. Apply SHARPEN for early burndown and/or limited residual control of broadleaf weeds. For optimum burndown activity, add methylated seed oil (MSO) at 1 gal per 100 gal plus ammonium sulfate (AMS) at 8.5 to 17 lbs per 100 gals or urea ammonium nitrate (UAN) at 1.25 to 2.5 gals per 100 gals of spray volume. Do not apply more than 4.0 fl oz/A of SHARPEN per cropping season.

Valor SX 51WDG ( <i>flumioxazin</i> )	2.0 oz	0.064 lb	14	--	12 hours
--	--------	----------	----	----	----------

Valor EZ 4SC	2.0 fl oz				
--------------	-----------	--	--	--	--

**Comments:** VALOR SX is labeled for use in wheat only. For preplant weed control use only in no-till or minimum tillage fields where previous year's crop residue has not been incorporated into the soil. Plant wheat no sooner than 7 days after VALOR SX application. Do not irrigate between emergence and spike growth stage. Wheat must be planted a minimum of 1 inch deep. Do not graze until wheat has reached 5 inches in height. Do not apply more than 2.0 oz/A of VALOR SX during a single growing season.

## Weed Response to Herbicides for Small Grain Weed Management<sup>1</sup>

	PRE	POSTEMERGENCE																				
	Sharpen	Anthem FLEX	Axial XL	Axiom	Banvel/Clarity	Beyond <sup>2</sup>	Express	Fierce	Finesse	Harmony Extra	Huskie	MCPA	Osprey	Peak	PowerFlex HL	Quelex	Sentrallas	Starane Ultra	Valor SX	WideMatch	Zidua	2,4-D
barley, little	P	G	P	G	P	G	P	---	---	P	P	P	---	P	---	P	P	P	---	P	---	P
bluegrass, annual	P	G	P	G	P	G	P	---	P	P	P	GE	P	P	P	P	P	P	---	P	---	P
buttercup	---	---	P	---	F	P	---	---	G	GE	G	---	---	G	---	G	---	---	---	G	---	G
cheat	P	F	P	E	P	G	P	---	---	P	P	P	P	P	FG	P	P	P	---	P	---	P
chickweed, common	F	GE	P	G	G	F	G	GE	G	FG	GE	P	F	G	FG	E	GE	GE	GE	GE	GE	P
cornflower	---	---	P	---	FG	---	---	---	F	P	---	---	P	G	P	G	G	---	---	G	---	G
cudweed	---	---	P	G	GE	G	---	---	---	E	GE	GE	---	---	---	E	---	---	---	GE	---	GE
dock, curly	---	---	P	P	F	P	E	FG	---	E	G	P	P	---	P	---	G	---	F	F	---	P
eveningprimrose, cutleaf	---	G	P	GE	G	---	F	FG	---	F	GE	E	P	G	P	---	F	---	FG	G	G	E
garlic, wild	---	---	P	P	F	P	P	P	P	E	P	P	P	GE	P	---	P	P	---	P	---	F
geranium, Carolina	---	---	P	F	G	G	G	---	GE	G	---	G	---	---	---	G	G	---	---	G	---	F
henbit	F	GE	P	GE	F	G	F	GE	G	G	GE	P	G	GE	FG	E	F	F	GE	G	GE	P
horseweed	G	GE	P	---	GE	---	F	GE	---	F	GE	F	P	---	P	E	F	F	GE	GE	GE	G
knawel	---	---	P	---	G	---	---	---	---	G	---	---	---	---	---	G	GE	---	---	---	---	P
mustard, wild	G	GE	P	G	F	F	G	GE	G	E	GE	GE	GE	GE	GE	GE	G	F	G	F	GE	GE
pepperweed, Virginia	---	G	P	---	F	---	---	GE	---	G	GE	---	---	---	---	GE	---	---	G	---	G	E
pennycress, field	---	---	P	---	F	---	F	---	G	G	GE	---	GE	G	---	G	---	F	---	F	---	G
radish, wild	---	GE	P	G	F	F	F	GE	G	E	GE	GE	G	GE	GE	P	F	---	G	F	GE	GE
ryegrass, Italian	P	E	E	G	P	G	P	E	F	P	P	P	E	P	E	P	P	P	E	P	E	P
ACCcase-resistant	P	E	P	G	P	G	P	E	F	P	P	P	E	P	E	P	P	P	E	P	E	P
ALS-resistant	P	E	E	G	P	G	P	E	P	P	P	P	P	P	P	P	P	P	E	P	E	P
shepherdspurse	---	GE	P	---	FG	---	G	GE	G	E	GE	GE	---	GE	---	E	G	---	G	P	GE	GE
spurry, corn	---	---	---	P	GE	---	GE	GE	---	GE	---	---	---	---	---	F	---	---	---	---	---	G
swinecress	---	---	P	G	---	---	---	---	---	E	GE	G	E	---	---	E	G	---	---	---	---	G
thistles	---	---	P	G	GE	G	---	---	GE	FG	E	G	---	GE	---	E	---	F	---	GE	---	G
vetch	---	---	P	G	E	P	F	---	GE	P	E	---	PF	---	P	E	---	---	---	GE	---	G

<sup>1</sup>Key to Response Ratings: E = excellent control, 90% or better; G = good control, 80 to 90%; F = fair control, 70 to 80%; P = less than 70% control; --- = Insufficient Data.

<sup>2</sup>Use only on Clearfield wheat varieties.

## Preemergence Herbicides for Weed Management in Small Grains

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			

Sharpen 2.85 SC  
(saflufenacil)

1.0-2.0 fl oz

0.022-0.045 lb

14

30 days

12 hours

**Comments:** SHARPEN is labeled for use in wheat, oats, barley, rye, and triticale. Apply SHARPEN right after planting small grains for controlling emerged broadleaf weeds and/or limited residual control of broadleaf weeds. For optimum activity of emerged weeds, add methylated seed oil (MSO) at 1 gal per 100 gal plus ammonium sulfate (AMS) at 8.5 to 17 lbs per 100 gals or urea ammonium nitrate (UAN) at 1.25 to 2.5 gals per 100 gals of spray volume. Do not apply more than 4.0 fl oz/A of SHARPEN per cropping season. Do not apply after small grain emergence or crop injury will occur.

## Early Postemergence Herbicides for Weed Management in Small Grains

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Anthem FLEX 4SE (pyroxasulfone + carfentrazone)	2.0-2.7 fl oz	0.058-0.082 lb + 0.004-0.006 lb	15  14	7 days	12 hours
<b>Comments:</b> Labeled for wheat only. Apply ANTHEM FLEX from spiking up to 4 <sup>th</sup> tiller growth stage. Wheat must be planted at least 1 inch deep. Under high moisture conditions, crop may experience temporary injury response, but will rapidly outgrow these effects and develop normally with no reduction in yield. Controls little barley, annual bluegrass, rattail fescue, and annual ryegrass. Do not apply to durum wheat. Do not apply preplant incorporated in wheat. Do not apply more than 4.55 fl oz/A of ANTHEM FLEX per cropping season. Do not seed wheat deeper than 1.5 in after a preplant application or before a preemergence or delayed preemergence application. Do not apply preplant, preemergence, or early postemergence to broadcast seeded wheat. Do not harvest, feed, or graze treated wheat within 7 days of application of ANTHEM FLEX. Do not irrigate fields after a preemergence or delayed preemergence application until the spike growth stage. <b>Rainfast interval = 1 hour.</b>					
Axiom 68 WDG (flufenacet + metribuzin)	4.0-8.0 oz	0.14-0.27 lb + 0.03-0.07 lb	15  5	30 days	12 hours
<b>Comments:</b> Labeled for wheat only. AXIOM contains metribuzin, which may injure certain wheat varieties, consult label for details. Apply AXIOM from spike to 2-leaf growth stage. Wheat must be planted at a depth of 1.0-2.0 in deep or injury may occur. Controls henbit, wild radish, chickweed, and annual bluegrass. Activity on annual ryegrass is good (up to the 1 leaf growth stage), depending on timely rainfall after application. For sequential applications, do not apply more than 10 oz/A of AXIOM per growing season. Do not graze winter wheat within 30 days of an Axiom application.					
Fierce 76 DF (flumioxazin + pyroxysulfone)	1.5 oz	0.040 lb + 0.031 lb	14  15	---	12 hours
<b>Comments:</b> Labeled for wheat only. Apply FIERCE when 95% of wheat is in the spike to 2-leaf growth stage. Controls emerged ryegrass up to 0.5 in in height. Wheat must be planted a minimum of 1.0 in deep or crop injury may occur. Do not apply to fields where wheat seed has been broadcast and shallow incorporated. Do not tank mix FIERCE with any adjuvant, fertilizer, or other pesticide or severe wheat injury will occur. Apply FIERCE in 10 to 15 gallons per acre of water to ensure adequate coverage of emerged ryegrass. Do not apply more than 1.5 oz/A of FIERCE per growing season.					
Zidua 85 WG (pyroxysulfone)	1.0-2.5 oz	0.053-0.133 lb	15	7 days	12 hours
Zidua SC 4.17SC	1.75-4.0 fl oz	0.057-0.130 lb			
<b>Comments:</b> Labeled for wheat only. Apply ZIDUA when wheat is in the early spike (at least 0.5 in shoot) to 4 <sup>th</sup> tiller growth stage. Do not apply ZIDUA early preemergence (0.5 in shoot to full spike stage) to broadcast seeded wheat fields. Do not irrigate after a ZIDUA application during the early spike growth stage until wheat is at the full spike stage. Do not plant wheat deeper than 1.5 inches before an early preemergence application of ZIDUA. Do not apply ZIDUA to flood prone fields or fully saturated soils. Do not apply more than 2.5 oz/A of ZIDUA per growing season. Wheat forage or hay maybe grazed or fed 7 or more days after application.					



## Postemergence Herbicides for Weed Management in Small Grains

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			

Axial XL 0.42 SL (pinoxaden)	16.4 fl oz	0.054 lb	1	60 days (grain)	48 hours
---------------------------------	------------	----------	---	--------------------	----------

**Comments:** Labeled for wheat and barley only. Apply from 2-leaf to the pre-boot stage. No other surfactants are required. See label for tank mix partners. Do not graze livestock or harvest forage for hay from treated wheat and barley for a minimum of 30 days following application. Wheat and barley straw may be fed to livestock 60 days after application. AXIAL may be mixed in a spray solution containing up to 50% liquid nitrogen fertilizer. **Rainfast interval = 30 minutes.**

**Resistance Management:** ACCase-resistant (MOA=1) Italian ryegrass populations are well documented in South Carolina. Tank mix additional modes-of-action, such as AXIOM, FIERCE, ZIDUA, or PROWL H2O, to your herbicide program for resistance management.

Banvel 4SL (dicamba)	2.0-4.0 fl oz	0.0625-0.125 lb	4	7 days (grain/hay/forage)	24 hours
-------------------------	---------------	-----------------	---	------------------------------	----------

Clarity 4SL

**Comments:** Labeled for wheat, barley, and oats. Apply BANVEL or CLARITY after tillering but before crop reaches the jointing growth stage. Do not tank mix 2,4-D with BANVEL or CLARITY in oat. Best results are obtained if applied when daytime temperatures are above 50 F. Applications of BANVEL or CLARITY to small grains during periods of rapid growth may result in crop leaning. This condition is temporary and will not impact yields. Liquid nitrogen may be used as the carrier. **Rainfast interval = 4 hours.**

Beyond 1 AS (imazamox)	4.0-6.0 fl oz	0.031-0.047 lb	2	0 days	4 hours
---------------------------	---------------	----------------	---	--------	---------

**Comments: FOR USE ONLY on CLEARFIELD and CLEARFIELD PLUS WHEAT VARIETIES!** Apply BEYOND early postemergence when weeds are actively growing from the two to four leaf stage to control wild radish and henbit. BEYOND will provide limited suppression of emerged Italian ryegrass but does not provide residual control of Italian ryegrass. Apply with NIS at 1 qt per 100 gal of spray solution and a nitrogen fertilizer solution such as UAN at 1-2 qt/A or AMS at 1.5-3 lbs/A. Do not apply BEYOND to CLEARFIELD or CLEARFIELD PLUS wheat when cold temperatures (<40 F maximum daily temperatures) are expected within 1 week of application. Do not apply more than 8 oz/A per season. Do not make sequential applications of BEYOND less than 14 days apart because of increased potential for crop response. **Rainfast interval = 1 hour.**

Express 75 WDG (tribenuron)	0.25-0.5 oz	0.012-0.023 lb	2	45 days (grain/straw)	12 hours
--------------------------------	-------------	----------------	---	--------------------------	----------

**Comments:** Labeled for wheat and barley only. Apply EXPRESS from the 2-leaf stage up to flag leaf emergence. Add 0.5 to 4 pt of NIS per 100 gal of spray solution plus 2 qt/A of UAN or 2 lb/A of AMS. EXPRESS alone provides partial control of wild garlic, henbit, and wild radish. Tank mix with 0.25 to 0.375 lb a.i. of MCPA for improved control of wild radish (less than 6" diameter rosette) Do not apply EXPRESS within 60 days of an in-furrow organophosphate insecticide application. **Rainfast interval = 2-3 hours.**

Finesse 75 WDG (chlorsulfuron + metsulfuron)	0.2-0.4 oz	0.0078-0.0156 lb + 0.0016-0.0031 lb	2  2	None	4 hours
---	------------	---	------------	------	---------

**Comments:** Labeled for wheat and barley only. Apply FINESSE from the 1-leaf stage up to just before the boot stage. Add NIS at 0.125 to 0.5% v/v (0.5 to 2 qt per 100 gal of spray solution). Do not apply FINESSE within 60 days of an in-furrow organophosphate insecticide application. Plant only STS-soybeans following wheat/barley harvest. Do not apply more than one application of FINESSE per growing season. Do not use low rates of liquid nitrogen fertilizer solution as a substitute for surfactant (NIS). **Rainfast interval = 6 hours.**

## Postemergence Herbicides for Weed Management in Small Grains (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Harmony Extra 50SG ( <i>thifensulfuron</i> + <i>tribenuron</i> )	0.45-0.9 oz	0.0094-0.0188 lb + 0.0047-0.0094 lb	2	45 days (grain)	12 hours
Nimble 75 WDG	0.3-0.6 oz		2		

**Comments:** Labeled for wheat, barley, and oats. The maximum is rate for HARMONY EXTRA SG in oats is 0.6 oz/A (0.4 oz/A NIMBLE/HARMONY EXTRA XP). For control of small (2-4 inches), actively growing broadleaf weeds including wild radish and henbit. Apply when wild garlic is less than 12 inches tall. Apply to crop after the 2-leaf stage but before flag leaf is visible. Add NIS at 1 qt/100 gallons of spray solution. For wild radish control in barley and wheat, use 0.6-0.9 oz/A rate of HARMONY EXTRA 50 SG with TotalSol (0.5-0.6 oz of HARMONY EXTRA XP 75 DF or NIMBLE 75 WDG). Do not tank mix with MALATHION insecticide or severe crop injury will occur. If liquid nitrogen is the carrier, reduce surfactant rate to 0.5-1.0 pt per 100 gal of solution (to reduce potential foliar burn). For improved control of wild radish, tank mix HARMONY EXTRA with 2,4-D or MCPA. Do not use surfactant if applying with 2,4-D or MCPA in a nitrogen fertilizer carrier. Do not harvest treated crop for forage within 7 days or hay within 30 days of HARMONY EXTRA application. **Rainfast interval = several hours of dry weather.**

Huskie 2.06EC ( <i>pyrasulfotole</i> + <i>bromoxynil</i> )	11-15 fl oz	0.027-0.036 lb + 0.15-0.20 lb	27 6	60 days (grain/straw)	24 hours
---	-------------	-------------------------------------	---------	--------------------------	----------

**Comments:** Labeled for wheat, barley, rye, and triticale. HUSKIE is a RESTRICTED USE PESTICIDE. Apply HUSKIE in a minimum of 10 gallons of water per acre from the fully expanded first true leaf up to flag leaf emergence. See HUSKIE label for instructions on aerial applications. Add NIS at 1 qt per 100 gal of spray solution plus AMS at 1 lb/A. Do not use air induction or flood jet nozzles for ground applications of HUSKIE. Treat broadleaf weeds when they are small and actively growing. Do not apply more than 15 fl oz/A of HUSKIE per application. Do not make more than one application of HUSKIE per season. Do not apply HUSKIE in a tank mixture with a TEBUCONAZOLE fungicide. Tank mixing HUSKIE with fungicides may cause temporary yellowing, leaf burn, and/or height reduction of the crop. Do not graze or harvest forage within 25 days after application. **Rainfast interval = 1 hour.**

MCPA amine 4L	0.5-1.0 pt	0.25-0.5 lb	4	7 days	48 hours
MCPA ester 4L	0.5-1.0 pt	0.25-0.5 lb			

**Comments:** Labeled for wheat, barley, oats, and rye. For control of winter weeds, such as wild mustard, wild, and shepherdspurse apply after crop has reached to 3- to 4-leaf stage up to the boot stage. Do not graze or harvest forage on treated areas within 7 days of slaughter. **Rainfast interval = N/A (suggest 1 hour).**

Osprey 4.5SC ( <i>mesosulfuron</i> )	4.75 oz	0.013 lb	2	60 days (grain/straw/hay)	4 hours
---	---------	----------	---	------------------------------	---------

**Comments:** Labeled for wheat only. For control ACC-ase annual ryegrass and other broadleaf weeds. Applications may be made from time of emergence up to the jointing stage of development. Apply with NIS at 2 qt/100 gal and UAN at 1-2 qt/A or AMS at 1.5-3 lb/A. MSO at a rate of 1.5 pt/A in a minimum of 10 gallons carrier per acre may be substituted for the NIS and nitrogen additives. OSPREY may be applied in a fertilizer solution; however, nitrogen must not exceed 15% of the total volume (1.5 gallons of Nitrogen in 10 gallons of spray solution). A NIS at 1 qt/100 gal is required for fertilizer carrier applications. The use of a fertilizer/water carrier will increase potential for crop response. Tank mix partners include MCPA, BUCTRIL, EXPRESS, FINESSE, HARMONY EXTRA, STRATEGO, TILT, TOPSIN M, WARRIOR, SEVIN XLR, Z-CYPE. Do not apply more than 4.75 oz/A per season. Do not apply OSPREY within 30 days of harvest wheat for forage. Do not tank mix and apply OSPREY with MALATHION, MANCOZEB, DI-SYSTON, or METHYL PARATHION insecticides. **Rainfast interval = 4 hours.**

**Resistance Management:** ALS-resistant (MOA=2) Italian ryegrass populations are well documented in South Carolina. Tank mix additional mode-of-actions such as AXIOM, FIERCE, ZIDUA, or PROWL H2O to your herbicide program for resistance management.

## Postemergence Herbicides for Weed Management in Small Grains (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Peak 57DG ( <i>pro sulfuron</i> )	0.5 oz	0.0178 lb	2	60 days (grain)	12 hours
<p><b>Comments:</b> Labeled for wheat, barley, triticale, rye, and oats. Apply to crop after spike stage but before the 2<sup>nd</sup> node (Feekes scale 7) is detectable during elongation. For control of small (2-6 inches), actively growing winter weeds including wild radish, wild mustard, shepherdspurse, and wild garlic. Apply when wild garlic is less than 8 inches tall. Add NIS at 1 qt/100 gallons of spray solution. Do not make foliar or soil application of any organophosphate insecticide within 15 days before or 10 days after PEAK application. Do not irrigate with 4 hours of PEAK application. Do not apply PEAK to crops that under severe stress due to drought, cold weather, hail, wind damage, sand blasting, flooding, or nutrient deficiency. Do not graze or feed forage from treated areas to livestock until 30 days after application. Tank mix partners include BANVEL, BUCTRIL, MCPA, and 2,4-D. <b>Rainfast interval = 4 hours.</b></p>					
PowerFlex 7.5DF ( <i>pyroxsulam</i> )	3.5 oz	0.016 lb	2	60 days (grain)	12 hours
PowerFlex HL 13DF	2.0 oz				
<p><b>Comments:</b> Labeled for wheat only. For control of ACCase-resistant annual ryegrass and other annual grass and broadleaf weeds. Apply from 3-leaf to jointing stage. Apply with NIS at 1 to 2 qt/100 gal of spray solution or COC at 1.0-1.25 gal/ 100 gal of spray solution. Application of ammonium nitrogen fertilizer (topdress) 7 days before or after an application of POWERFLEX/HL can result in stunting and foliar crop burn; therefore, do not apply topdress during this time period. If applied in fluid fertilizer, reduce NIS rate to 1 qt/100 gal of spray solution. Do not apply an organophosphate insecticide within 5 days before or 5 days after an application of POWERFLEX/HL. Do not apply more 0.016 lb ai of PYROXSULAM per acre per growing season. Do not cut treated crop for hay within 28 days following application. Do not graze treated crop within 7 days of application. <b>Rainfast interval = 4 hours.</b></p>					
<p><b>Resistance Management:</b> ALS-resistant (MOA=2) Italian ryegrass populations are well documented in South Carolina. Tank mix additional mode-of-actions such as AXIOM, FIERCE, ZIDUA, or PROWL H2O to your herbicide program for resistance management.</p>					
Prowl H2O 3.8 CS ( <i>pendimethalin</i> )	1.5-3.0 pt	0.71-1.43 lb	3	60 days	24 hours
<p><b>Comments:</b> Labeled for wheat only. Apply PROWL H2O prior to weed emergence from the 1-leaf growth stage up to before the flag leaf is visible. Emerged weeds will not be controlled by PROWL H2O. Plant wheat seed at least 1/2-inch to 1-inch deep to avoid crop injury. Do not apply more than 3.0 pt of PROWL H2O per acre per season.</p>					
Quelex 20DF ( <i>halauxifen-methyl</i> + <i>florasulam</i> )	0.75 oz	0.00047 lb + 0.00047 lb	2  4	60 days (grain)	12 hours
<p><b>Comments:</b> Labeled for wheat, barley, and triticale. Apply QUELEX from the 2-leaf growth stage up to flag leaf emergence. Target the QUELEX application when broadleaf weeds are actively growing and in the 2 to 4 leaf growth stage (less than 4 inches tall or diameter). Applications during warm, wet conditions will enhance QUELEX activity on broadleaf weeds; however, cold and/or dry conditions may result in erratic control and subsequent weed regrowth. QUELEX may be applied in a fluid fertilizer spray solution (nitrogen). Use a non-ionic surfactant at a maximum rate of 0.25 %v/v when applying QUELEX in a liquid nitrogen carrier solution. Do not apply more than 0.75 oz of QUELEX per acre per growing season. Do not apply QUELEX within 21 days of cutting small grains for hay. Do not allow livestock to graze on treated crops for 7 days following application of QUELEX. Do not use compost plant material from the treated area. <b>Rainfast interval = 4 hours.</b></p>					

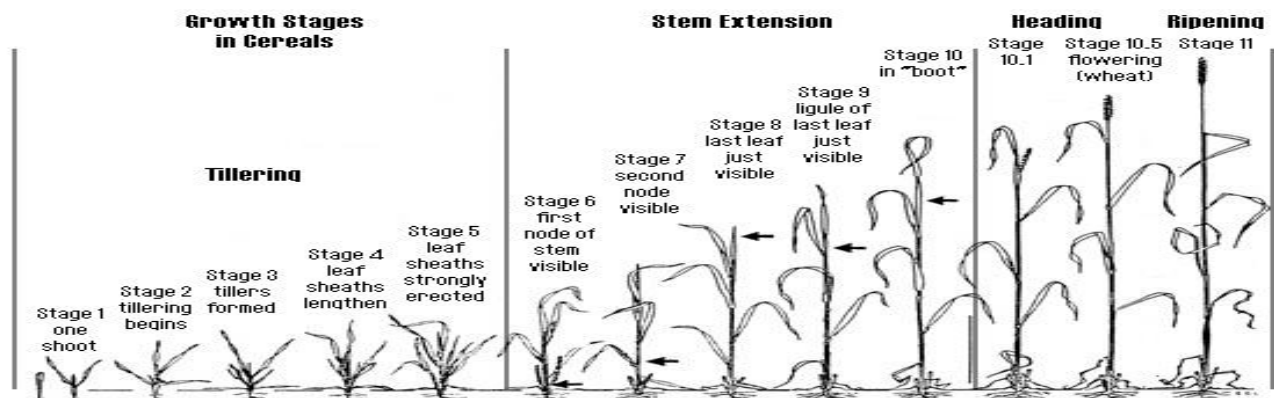
### Postemergence Herbicides for Weed Management in Small Grains (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Sentrallas 1.550D (thifensulfuron + fluroxypyr)	7-14 fl oz	0.014-0.027 lb + 0.07-0.14 lb	2  4	45 days (grain)	24 hours
<p><b>Comments:</b> Labeled for wheat, barley, and oats. The maximum use rate for oats is 9 fl oz/A. Apply SENTRALLAS from the 2-leaf growth stage up to just before flag leaf emergence. Add non-ionic surfactant at 0.5 to 2.0 pt per 100 gallon of spray solution plus an ammonium containing fertilizer, such as AMS at 2 qt/A or UAN at 2 lb/A. Target application when broadleaf weeds are actively growing and less than 4 inches tall or diameter. Warm and moist conditions will promote weed growth and enhance SENTRALLAS activity on broadleaf weeds; however, cold or drought stress may result in poor control and subsequent weed regrowth. Do not apply SENTRALLAS to wheat, oat, or barley that is stressed by drought, low fertility, water saturated soil, disease or insect damage, as crop injury may occur, particularly during the 2- to 5-leaf growth stage. Do not make more than one application of SENTRALLAS per year in oats. Tank mix partners include 2,4-D, MCPA, DICAMBA, EXPRESS, ALLY, WIDEMATCH, or STINGER. Do not use SENTRALLAS plus MALATHION insecticide because crop injury may occur. Do not graze or harvest treated forage within 7 days of application. Do not harvest treated hay within 30 days of application. <b>Rainfast interval = 1 hour.</b></p>					
Starane Ultra 2.8EC (fluroxypyr)	0.3-0.4 pt	0.105-0.14 lb	4	40 days (grain/straw)	24 hours
<p><b>Comments:</b> Labeled for wheat, barley, oats, and triticale. Apply STARANE ULTRA from the 2-leaf growth stage up to and including flag leaf emergence for control of broadleaf weeds, such as chickweed and bedstraw. STARANE ULTRA provides suppression of mustard and marestail. Tank mix with 2,4-D or MCPA for improved control of mustards and marestail. Apply to susceptible weeds before they reach 8 inches tall or vining. Do not allow livestock to graze treated areas or harvest treated forage within 7 days of application. Do not apply STARANE ULTRA within 14 days of cutting for hay. Do not apply more than 0.7 pint per acre of STARANE ULTRA per season. Do not apply under conditions which favor drift onto nearby, sensitive crops. <b>Rainfast interval = 1 hour.</b></p>					
WideMatch 1.5EC (clopyralid + fluroxypyr)	1.0-1.33 pt	0.09375-0.125 lb + 0.09375-0.125 lb	4  4	40 days (grain/straw)	12 hours
<p><b>Comments:</b> Labeled for wheat, barley, and oats. Apply from the 3-leaf growth stage up to flag leaf emergence. For control of weeds (less than 4 inches tall), such as chickweed, red sorrel, and thistles. Do not apply more than 1.33 pt of WIDEMATCH per acre per growing season. Apply to susceptible weeds before they reach 4 inches tall or vining. Do not allow livestock to graze treated areas or harvest treated forage within 7 days of application. WIDEMATCH may be tank mixed with other products labeled for postemergence applications in wheat, barley, and oats. Do not apply under conditions which favor drift onto nearby, sensitive crops. <b>Rainfast interval = 6 hours.</b></p>					
2,4-D 4L amine/ester	0.5-1.0 pt	0.25-0.5 lb	4	14 days	12 hours
<p><b>Comments:</b> Labeled for wheat, barley, oats, and rye. Oats are less tolerant of 2,4-D than barley, wheat, or rye. For fall seeded oats, use the lower rate to avoid injury. For control of weeds such as vetch, wild mustard and radish, apply after crop is fully tillered but before jointing. Do not apply under conditions which favor drift onto nearby, sensitive crops. <b>Rainfast interval = N/A (suggest 1 hour).</b></p>					

## Harvest Aids for Small Grains

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Glyphosate acid equivalent (ae)			9	7 days	12 hours
5.5 SL (4.5 lb ae)	22 fl oz	0.75 lb ae			
<b>Comments:</b> Labeled for wheat and barley. Apply GLYPHOSATE after hard dough stage of grain (30% or less grain moisture) at least 7 days before harvest. Do not apply to wheat or barley grown for seed. Do not apply more than 0.75 lb ae/A for a preharvest application. <b>Rainfast interval = N/A (suggest 1 hour).</b>					
Valor SX 51WDG (flumioxazin)	1.5-2.0 oz	0.048-0.064 lb	14	10 days	12 hours
Valor EZ 4SC	1.5-2.0 fl oz				
<b>Comments:</b> Labeled for wheat only. Apply VALOR SX after wheat reaches the hard dough stage and grain moisture is less than 30%. GLYPHOSATE is the recommended tank mix partner to control existing weeds and aid in harvest. Apply in a minimum of 10 gallons spray solution per acre by ground application and a minimum of 5 gallons per acre by aerial application. For proper desiccation, add a methylated seed oil which contains at least 15% emulsifiers and 80% oil at 1 qt/A plus a spray grade nitrogen source (either ammonium sulfate at 2-2.5 lb/A or 28-32% nitrogen solution at 1-2 qt/A). <b>Rainfast interval = N/A (suggest 1 hour).</b>					
Sharpen 2.85 SC (saflufenacil)	1.0-2.0 fl oz	0.022-0.045 lb	14	3 days	12 hours
<b>Comments:</b> Labeled for use in wheat, barley, and triticale. Apply SHARPEN after crop has reached physiological maturity (hard dough stage and grain moisture is less than 30%). Thorough spray coverage is essential for optimum desiccation and weed control. Apply in a minimum spray volume of 10 gallons per acre by ground and 5 gallons per acre by air. Add methylated seed oil (MSO) at 1 gal per 100 gal plus ammonium sulfate (AMS) at 8.5 to 17 lbs per 100 gals or urea ammonium nitrate (UAN) at 1.25 to 2.5 gals per 100 gals of spray volume. Do not apply more than 2.0 fl oz/A of SHARPEN per cropping season for desiccation uses. SHARPEN may be tank mixed with GLYPHOSATE for additional preharvest weed desiccation (increases PHI to 7 days). Do not apply SHARPEN to barley, wheat, or triticale grown for seed production. SHARPEN treated barley, wheat, and triticale straw may be grazed or fed to livestock.					
2,4-D 4L amine/ester	1.0 pt	0.5 lb	4	14 days	12 hours
<b>Comments:</b> Labeled for wheat, barley, oats, and rye. Apply 2,4-D when grain is in the hard dough stage or later to control weeds that may interfere with harvest or to suppress perennial weeds at least 14 days before harvest. Do not apply from early boot to milk stage of growth development. Do not apply more than 1.0 pt/A per application or under conditions which favor drift onto nearby, sensitive crops. <b>Rainfast interval = N/A (suggest 1 hour).</b>					

## Feekes Growth Stages of Cereals:



## Plant-back Restrictions Following Herbicide Application in Small Grains

	Corn	Cotton	Grain Sorghum	Peanuts	Soybeans	Sunflower	Tobacco	Wheat
<i>M = months, D = days, Spring = The spring following application, --- = no information</i>								
Anthem FLEXX								
1.82 oz/A	0 D	0 D	6 M	4 M	0 D	4 M	18 M	0 D
3.64 oz/A	0 D	2 M	6 M	4 M	0 D	4 M	18 M	1 M
5.46 oz/A	0 D	4 M	10 M	4 M	0 D	4 M	18 M	4 M
6.38 oz/A	0 D	4 M	10 M	4 M	4 M	4 M	18 M	6 M
7.28 oz/A	0 D	4 M	12 M	4 M	4 M	4 M	18 M	6 M
Axial XL	90 D	90 D	90 D	90 D	90 D	90 D	90 D	0 D
Axiom	0 D	8 M	12 M	12 M	0 D	12 M	12 M	7 D/4 M <sub>1</sub>
Banvel	120 D	120 D	120 D	120 D	120 D	120 D	120 D	7.5 D
Beyond	0 D <sub>2</sub> /8.5 M <sub>3</sub>	9 M	9 M	9 M	0 D	0 D <sub>2</sub> /9 M <sub>3</sub>	9 M	0 D <sub>2</sub> /3 M <sub>3</sub>
Clarity								
8 fl oz/A	0 D	21 D	15 D	120 D	14 D	120 D	120 D	15 D
16 fl oz/A	0 D	120 D	120 D	120 D	28 D	120 D	120 D	30 D
24 fl oz/A	120 D	120 D	120 D	120 D	120 D	120 D	120 D	45 D
25-64 fl oz/A	120 D	120 D	120 D	120 D	120 D	120 D	120 D	120 D
Express	14 D	14 D	14 D	45 D	14 D	45 D	45 D	0 D
Fierce								
3.0 oz/A	7 D <sub>4</sub> /1 M <sub>5</sub>	30 D <sub>4</sub> /45 D <sub>5</sub>	18 M	4 M	0 D	4 M	18 M	30 D
3.75 oz/A	30 D	2 M	18 M	4 M	0 D	4 M	18 M	2 M
Finesse	18 M	18 M	18 M	---	18 M/6 M <sub>6</sub>	---	---	0 D
Glyphosate	0 D	0 D	0 D	0 D	0 D	0 D	1 M	0 D
Gramoxone SL	0 D	0 D	0 D	0 D	0 D	0 D	0 D	0 D
Harmony Extra	21 D	21 D	21 D	45 D	14 D	45 D	45 D	0 D
Huskie	4 M	*** <sub>7</sub>	7 D	*** <sub>7</sub>	4 M	9 M	*** <sub>7</sub>	7 D
MCPA	None	None	None	None	None	None	None	None
Osprey	90 D	90 D	90 D	90 D	90 D	30 D	10 M	7 D
Peak	30 D	10 M	30 D	10 M	10 M	22 M	10 M	0 D
PowerFlex/HL	9 M	9 M	9 M	9 M	5 M	9 M	12 M	30 D
Prowl H <sub>2</sub> O	Spring	0 D	10 M	0 D	0 D	0 D	0 D	4 M
Quelex	3 M	3 M	3 M	9 M	3 M	3 M	15 M	0 D
Sentrallas	0 D	120 D	0 D	120 D	120 D	120 D	120 D	0 D
Sharpen								
1.0 oz/A	0 D	1.5 M	0 D	4 M	0-1M <sub>8</sub>	4 M	4 M	0 D
2.0 oz/A	0 D	3 M	0 D	5 M	1-2 M <sub>8</sub>	5 M	5 M	0 D
3.0 oz/A	0 D	4 M	0 D	6 M	2-3 M <sub>8</sub>	6 M	6 M	0 D
Starane Ultra	0 D	120 D	0 D	120 D	120 D	120 D	120 D	0 D
Valor SX/Valor EZ								
1.0 oz/A	7-30 D <sub>9</sub>	7-28 D <sub>10</sub>	30 D	0 D	0 D	30 D	30 D	30 D
1.5-2.0 oz/A	7-30 D <sub>9</sub>	7-28 D <sub>10</sub>	30 D	0 D	0 D	30 D	30 D	30 D
2.1-3.0 oz/A	14-30 D <sub>9</sub>	2 M	30 D	0 D	0 D	2 M	2 M	2 M
WideMatch	0 D	18 M	12 M	10.5 M	10.5 M	10.5 M	10.5 M	0 D
Zidua								
1.0 oz/A	0 D	1 M	6 M	4 M	0 D	4 M	18 M	1 M
2.0 oz/A	0 D	2 M	6 M	4 M	0 D	4 M	18 M	1 M
3.0 oz/A	0 D	4 M	10 M	4 M	0 D	4 M	18 M	4 M
4.0 oz/A	0 D	4 M	12 M	4 M	4 M	4 M	18 M	6 M
Zidua SC								
1.75 fl oz/A	0 D	1 M	6 M	1 M	0 D	1 M	18 M	1 M
3.25 fl oz/A	0 D	2 M	6 M	2 M	0 D	2 M	18 M	1 M
5.00 fl oz/A	0 D	4 M	10 M	4 M	0 D	3 M	18 M	4 M
6.50 fl oz/A	0 D	4 M	12 M	4 M	4 M	3 M	18 M	6 M
2,4-D	Only replant in the same growing season with crops registered for 2,4-D use							

<sup>1</sup>Rotation is 7 days when rates of 10 oz/A of Axiom or less have been applied; otherwise, wait 4 months to plant wheat; <sup>2</sup>Clearfield corn, sunflower, and wheat; <sup>3</sup>Non-Clearfield corn, sunflower, and wheat; <sup>4</sup>Reduced tillage production; <sup>5</sup>Conventional tillage production; <sup>6</sup>STS tolerant soybeans only; <sup>7</sup>A field bioassay must be conducted for crops not listed on the label. <sup>8</sup>Use the longer interval within the ranges listed for replanting soybeans (i.e., 2 months for coarse textured soils with organic matter less than 2.0% and a 1 month for coarse textured soils with organic matter greater than or equal to 2.0%); <sup>9</sup>For **corn**: Plant a minimum of 14 days (minimum or strip-till) or 30 days after VALOR SX (conventional tillage system); <sup>10</sup>For **cotton**: After Valor SX (2.0 oz/A or less) application, conduct strip till operation a minimum of 7 days before planting (regardless of crop residue levels). After conducting strip-till operation, apply Valor SX herbicide a minimum of 28 days before planting (<30% crop residue levels) or 21 days before planting (>30% crop residue levels)

# Small Grain Disease Control

Updated by David Gunter, Extension Feed Grain Specialist

Diseases	Product	Rate fl oz/Ac	Comments
<b>Smuts and Seedling Blights</b>	Charter 0.21 FS	3.1 fl oz	Farm or commercial seed treaters. See label for details
	CruiserMaxx Vibrance Cereals	5 oz	Multiple seed and seedling diseases. Also labeled for oats and triticale.
	Dividend Extreme	2-4 fl oz	Also labeled for triticale.
	Gaucho	3.4 fl oz	See label.
	Maxim 4 FS	0.08-.016 fl oz	See label.
	Rancona V RTU FS	4.6 fl oz	Do not graze or feed livestock on treated areas for 6 weeks.
	Raxil MD 11.6 S	5-6.5 fl oz	On-farm or commercial seed treaters. Do not graze for 38 days.
	Vibrance Extreme	2.8- 5.6 fl oz	Also labeled for oats and triticale. See label.
<b>Powdery Mildew, Leaf Rust, Leaf /Glume Blotch, Tan Spot, Stripe Rust</b>	<i>Single MOA</i>		<b>The most effective preventative fungicide timing for wheat yield response is usually just after the flag leaf has fully emerged (boot stage).</b> This flag leaf application usually controls the two greatest yield threats – leaf rust and glume blotch. If head scab is a concern, a slightly later timing (see comments below) still provides some rust and glume blotch protection. Wheat with 60 bu/ac yield potential is most likely to respond to fungicide treatment.  Treat <b>powdery mildew</b> if 20 % of leaf area is infected on leaf below flag leaf, and cool (high < 75 F), wet weather predicted.  <b>NOTE:</b> Early treatments for powdery mildew during tillering do not provide adequate residual control of rust infections.  <b>Leaf Rust</b> susceptible varieties should be treated preventatively at fully emerged flag leaf, or at the first sign of rust if earlier.  Treat for <b>leaf/glume blotch</b> or <b>tan spot</b> if 25 % of stems have a lesion on leaf below flag leaf.  Thus far, economic injury from <b>stripe rust</b> has been rare in SC. Stripe rust is a very aggressive disease which responds best to preventative treatment of the emerged flag leaf. Standard preventative treatment at flag leaf emergence should prevent damage under S. C. conditions. If a rescue treatment is needed for stripe rust (not common leaf rust) use Tilt.
	Aftershock 480 SC	3-5.5 fl oz	
	Alto 100	3-5.5 fl oz	
	Bumper, Propriamax (generic Tilt)	4 fl oz	
	Caramba	10-14 fl oz	
	Tebuconazole (generic Folicur)	4 fl oz	
	Headline 2.09 SC	4-8 fl oz	
	Quadris 2.08 F	6 fl oz	
	<i>Multiple MOA</i>		
	Absolute 500 SC	5 fl oz	
	Approach Prima	3.4-6.8 fl oz	
	Fortix	4 – 6 fl oz	
	Priaxor 4.17 SC	4 – 8 fl oz	
	Prosaro	6.5 fl oz	
	QuiltXcel	7 - 14 fl oz	
	Stratego YLD	4fl oz	
Trivapro 1.75 EC	9.4-13.7 fl oz		
Twinline 3.72 SC	9 fl oz		
<b>Head Scab</b>	Caramba	14 – 17 oz	Applications for head scab should be made when 50% of the heads are fully emerged. Scab suppression requires excellent coverage of the heads. See label for nozzle and spray volume recommendations. Harvest Restriction is 30 days.
	Tebuconazole	4 oz	
	Proline	5.0 – 5.7 oz	
	Prosaro	6.5 – 8.5 oz	

## Disease Response to Small Grain Fungicides

	Rate (fl oz)	Powdery Mildew	Leaf and Glume Blotch	Tan Spot	Stripe Rust	Leaf Rust	Head Scab
Approach Prima	3.4 - 6.8	G - E	G	G	E	G - E	P
Caramba	10 - 17	G	G	F	G - E	E	G
Tebuconazole (generic Folicur)	4	F	G	G	G - E	E	F
Headline	6 - 9	F	G-E	E	G - E	E	P
Proline	4.3 - 5.7	G	G	G	G - E	E	G
Prosaro	6.5 - 8.5	G	G	G	G - E	E	G
Priaxor	4 - 8	G	G	G	G - E	E	F
Quadris	6.2 - 10.8	F	G	E	G - E	E	P
Fortix	4 - 6	--	--	G-E	E	G - E	P
QuiltXcel	7 - 14	G-E	G	E	E	E	P
Stratego YLD	4	E	G	E	G	G	P
Tilt	4	E	G	G	G	G	P
Trivapro	9.4 - 13.7	G - E	G - E	G-E	E	E	P
Twinline	7 - 9	G - E	G	E	E	E	F

E=excellent, G=good, F=fair, P=poor, --=insufficient data

## Small Grain Fungicide Use Precautions

Active Ingredient	Brand Name	Application Restriction	Small Grains Labeled
<b>Foliar Fungicides</b>			
azoxystrobin	Quadris	up to flowering	wheat, barley
metconazole	Caramba	30-day preharvest	wheat, barley, oats, rye triticale
metconazole + pyraclostrobin	Twinline, Multiva	30-day preharvest	wheat, barley, oats, rye triticale
picoxystrobin	Approach	up to flowering	wheat, barley, oats, rye triticale
picoxystrobin + cyproconazole	Approach Prima	45-day preharvest	wheat, triticale
propiconazole	Tilt, PropiMax, Bumper	up to flowering	wheat, barley, rye, oats
propiconazole + azoxystrobin	Quilt, QuiltXcel	up to flowering	wheat, barley, triticale
prothioconazole + trifloxystrobin	Stratego, Stratego YLD	up to fully emerged flag leaf	Wheat, barley
prothioconazole	Proline	30-day preharvest	wheat, barley, oats, rye, triticale
prothioconazole + tebuconazole	Prosaro	30-day preharvest	wheat, barley,oats
pyraclostrobin	Headline	up to flowering	wheat, rye, barley
tebuconazole	Orius, Monsoon, Tebuzol, etc.	30-day preharvest	wheat, barley
<b>Seed Treatments</b>			
carboxin + captan	Enhance AW	seed treatment	wheat, barley, oats
carboxin-thiram	Vitavax 200, RTU Vitavax-Thiram	seed treatment	wheat, oats, barley, rye
difenoconazole + metalaxyl	Dividend XL, Dividend Extreme	seed treatment	wheat, barley
fludioxonil	Maxim 4FS	seed treatment	wheat, oats, barley, rye, triticale
mefenoxan	Apron XL, Apron XL-LS	seed treatment	wheat, oats, barley, rye, triticale
sedaxane + difenoconazole + mefenoxam	Vibrance Extreme	seed treatment	wheat, oats, barley, rye, triticale
tebuconazole	Raxil	seed treatment	wheat oats, barley
imidacloprid	Gaucho	seed treatment	wheat, oats, barley, rye

# SMALL GRAIN INSECT CONTROL



**Updated by David Gunter, Extension Feed Grain Specialist**

<b>Pest</b>	<b>Product</b>	<b>Rate /acre</b>	<b>Comments</b>
<b>aphids</b>	<b>Seed Treatments</b>		
	Enhance AW	4.0 oz / 100 lb	Preventative aphid treatment for barley yellow dwarf virus suppression is recommended for high yield wheat and oat production under SC conditions. Either seed treatment or foliar pyrethroid application are both effective.
	Gaicho 600, Axxess, Attendant 600	0.8 fl oz/100 lb	
	Gaicho XT	3.4 fl oz/100 lb	Seed treatments provide early season control of aphids and barley yellow dwarf. Seed treatments also suppress Hessian fly, but will not control heavy HF infestations. For Hessian fly suppression, Enhance AW 4 oz / 100 lb, 1.6 fl oz / 100lb Gaicho 600, or 1.33 fl oz / 100lb Cruiser is recommended.
	Cruiser 5FS	1.0 fl oz/100 lb	
	Cruiser Maxx plus Cruiser 5FS	5.0 fl oz/100lb + 0.5fl oz/100lb	
	NipsIt Inside	0.75-1.79 fl oz/ 100 lb	A foliar pyrethroid application in topdress N by mid-February (early Feb. better yet ) is also highly effective in suppressing aphid virus transmission.
	<b>Foliar</b> Karate Z, others	1.3 – 1.9 oz 1 gal/100-66 ac	Aphid treatments are most likely to be profitable on early-planted high-yield-potential wheat (60+ bu/ac). The key pest is the <b>oat-bird cherry aphid</b> which is the major vector or carrier of barley yellow dwarf virus. This aphid typically has a dark green body with reddish area on the “rear end”.
	Warrior, Silencer, others, 1EC	2.6 – 3.8 oz (1 gal /50-33 ac)	If preventative treatment was not previously applied, aphid treatment is recommended if you find 8 oat-bird cherry aphids per row foot prior to jointing.
	Baythroid XL 1EC	2.4 fl oz (1 gal / 53 ac)	
	Declare 1.25	1.0 – 1.5 fl oz 1 gal/128-85 ac	<b>Oats are more susceptible to barley yellow dwarf than wheat. Enhance AW hopper box seed treatment is recommended to control aphids and smut on oats. If a foliar pyrethroid is used to control aphids on oats, treatment should be earlier (Dec. – Jan.) than on wheat.</b>
	Proaxis 0.5	2.6 – 3.8 fl oz (1 gal/49-33 ac)	
	Sivanto Prime	7 – 10 fl oz	Karate, Warrior, Silencer have been particularly effective in suppressing barley yellow dwarf virus on oats and wheat and giving season-long protection against later head infestation by English grain aphids on wheat.
Transform	0.75 fl oz	<b>English grain aphids</b> (light green bodies with long black “exhaust pipes” protruding upward from rear end) increase during jointing and move to heads as they emerge in April.  <b>The treatment guideline for English grain aphid is 2-3/stem during jointing; 5/stem at head emergence to blooming; 10/stem at milk; dough stage is too late to spray. Wheat treated earlier for virus prevention should not have significant aphid infestation of the heads.</b>	
<b>Pest</b>	<b>Product</b>	<b>Rate /acre</b>	<b>Comments</b>

<b>Cereal Leaf Beetle</b>	Baythroid XL	1.0 – 1.8 fl oz	Cereal leaf beetles first hatch out in March and peak feeding occurs in April. <b>Treat if you have 1 larva on every other stem (average of 0.5 larvae / stem).</b>  Karate, Warrior, Silencer also provide season-long aphid control.  Do not make more than 2 applications of Blackhawk per season. If additional treatments are required, rotate to another effective class of insecticides.
	Malathion 57EC, 5EC	1.5 pt	
	Warrior, Silencer, others, 1EC	2.6 – 3.8 fl oz	
	Mustang MAX	2.6 – 3.2 floz	
	Respect 0.8 EC	1 – 1.5 fl oz	
	Declare, Proaxis 0.5	2.6 – 3.8 fl oz	
	Tombstone 2.0	1.0 – 1.8 fl oz	
	Blackhawk	1.1 – 3.3 fl oz	
Fastac CS 0.83	1.8 – 3.8 fl oz		
<b>Armyworm True, Fall, Beet, Yellowstriped Armyworm and Cutworms</b>	Baythroid XL 1 EC	1.8 – 2.4 fl oz	<b>Treat when armyworm populations reach 2 per drill ft.</b> True armyworm infestations usually occur after flag leaf emergence.  Karate or Warrior treatment also provides season-long aphid control.  Do not make more than 2 applications of Blackhawk per season. If additional treatments are required, rotate to another effective class of insecticides.  <b>Treat if the stand is threatened before frost.</b> Fall armyworm infestations may occur on early planted seedling stage small grain.
	Karate Z, others	1.9 fl oz	
	Warrior, Silencer, others, 1EC	3.8 fl oz	
	Lannate LV	1.5 pt	
	Lannate 90 SP	0.5 lb	
	Mustang MAX	3.2 fl oz	
	Respect 0.8 EC		
	Declare	1-1.5 fl oz	
	Proaxis 0.5	3.8 fl	
	Radiant 1 SC	3 – 6 fl oz	
	Tombstone 2.0	2.4 fl oz	
	Blackhawk	1.1 – 3.3 fl oz	
	Coragen 1.67SC	3.5 – 7.5 fl oz	
Prevathon 0.43	14 – 20 fl oz		
Fastac CS 0.83	1.8 – 3.8 fl oz		
Sevin 80S	1.75 lb		
Sevin XLR	1.5 qt		
Sevin 4F	1.5 qt		

Pest	Product	Rate /acre	Comments
Grasshoppers	Baythroid XL	2.4 fl oz	Grasshoppers typically attack wheat after flag leaf emergence. There are no well-established thresholds for

	Karate Z, others Warrior, Silencer, others, 1 EC	1.9 oz 3.8 oz	grasshopper treatment. Prevent flag leaf defoliation.
	Malathion 8 EC Malathion 57 EC	1.25 pt 2.0 pt	Correct timing to nymphal stages and thorough coverage is critical for optimum control. Performance is improved with Methylated Seed Oil (MSO) at 1 gal/100 gal
	Coragen 1.67SC Prevathon 0.43	2 – 5 fl oz 8 – 20 fl oz	
	Fastac CS 0.83	1.8 – 3.8 fl oz	
	Mustang MAX , Respect 0.8 EC	3.2 – 4.0 oz	
	Declare Proaxis 0.5	1.5 fl oz 3.8 fl oz	
	Tombstone 2.0	2.4 oz	
<b>Spider Mites / Winter Grain Mite</b>	Methyl Parathion 4 EC PennCap-M	1 – 1.5 pt 2 -3 pt	Treat when mites are present and causing leaf discoloration. Late season (dough stage) populations are unlikely to cause economic injury.
<b>Hessian Fly</b>	<b>Varietal resistance is the most economical way to manage Hessian fly.</b> HF resistance declines over time and varies by location depending on the predominant races of Hessian fly present. Treat susceptible varieties on farms with a history of economic damage. Proximity to wheat stubble from previous crop increases HF risk. <b>When possible, try to rotate wheat blocks at least 1/3 – 1/2 mile away from previous year’s stubble. Wheat planted in the coastal plain before 15 Nov is most susceptible to HF.</b> Wheat, barley, and triticale are susceptible to HF. Rye has low susceptibility to Hessian fly and oats are immune to any injury.		
<b>Hessian Fly (continued)</b>	Seed Treatment Gaucho 600, Axxess Attendant 600 Cruiser 5FS	2.4 fl oz/100 lb	Barley is tolerant. Damage only occurs under severe infestations. Rye is highly resistant and oats are immune to Hessian fly. Seed treatments will suppress but not control Hessian fly. Seed treatments also provide early season control of aphids and barley yellow dwarf. Enhance AW and Gaucho XT also control smut and certain seedling diseases. Gaucho XT only has one-half the insecticide active ingredient of the 1.6 oz rate of Gaucho 600. Adding 0.8 oz Gaucho 600 to Gaucho XT gives the same level of a.i. as 1.6 oz Gaucho 600.
	Gaucho XT + Gaucho 600	3.4 fl oz + 1.0 fl oz/100 lb	
	Cruiser 5FS	1.3 fl oz/100 lb	Foliar treatment at early post emergence (2-4 leaf stage) may reduce fall infestation on susceptible varieties. March treatment (jointing) timed to spring HF egg laying is recommended if 10% of stems are infested by February.
	Cruiser Maxx plus Cruiser 5FS	5.0 fl oz/100lb + 0.5fl oz/100lb	
	NipsIt Inside	1.8 fl oz/100lb	
	Foliar Karate Z, others Warrior, Silencer, others, 1EC	1.9 oz 3.8 oz	
	Declare, Proaxis	1.54 oz 3.84 oz	

## Small Grain Insecticide Use Precautions

Active Ingredient	Brand Name	Pre-Harvest (Days)	Pre-Grazing (Days)	Small Grains Labeled
alpha-cypermethrin	Fastac CS	14	3	wheat, triticale
beta-cyfluthrin	Baythroid XL 1 EC	30	7	wheat
carbaryl	Sevin	21	7	wheat, triticale
chlorantraniliprole	Prevathon	1	No grazing restriction	Wheat, oats, barley, rye, triticale
cyfluthrin	Tombstone 2.0	30	7	wheat, triticale
flupyradifurone	Sivanto 200 SL	21	no grazing restriction	wheat, oats, barley, rye, triticale
imidacloprid	Enhance AW, Gaucho	45	45	wheat, oats, barley
lambda-cyhalothrin	Karate Z 2.08 Warrior	30	7	wheat, oats, barley, rye, triticale
gamma cyhalothrin	Declare,	30	7	wheat, triticale
malathion	Malathion	7	7	wheat, oats, barley, rye, triticale
methomyl	Lannate	7	10	wheat, oats, barley, rye, triticale
methyl parathion	Methyl 4EC Pennacap-M	15	15	wheat, oats, barley, rye, triticale
clothianidin	NipsIt Inside	Seed treat.	no grazing restriction	wheat, oats, barley, rye, triticale
spinetoram	Radiant 1 SC	21	3	wheat, oats, barley, rye, triticale
spinosad	Blackhawk	21	once material dries	wheat, oats, barley, rye, triticale
sulfoxaflor	Transform 50WG	14	7	wheat, barley, triticale
thiamethoxam	Cruiser 5FS	seed treat.	no grazing restriction	wheat, barley, triticale
zeta-cypermethrin	Mustang MAX Respect 0.8 EC	14	14	wheat, triticale

## Acknowledgements

**Dr. James Camberato (Research / Extension Agronomist, Purdue University) has provided invaluable assistance with small grain fertility issues over many years.**

**Information on disease pest control was taken from sections of the 2019 Arkansas Plant Disease Control Products Guide (Dr. Terry Spurlock).**

**Information on insect pest control was taken from sections of the 2019 Georgia Pest Management Handbook (Dr. David Buntin).**

**However, responsibility for any errors in reproduction, rewording, or other use of their information rests solely with David Gunter.**

**Prepared by: David Gunter, Extension Feed Grain Specialist (803) 284-3343 ext. 276  
dgunter@clemson.edu  
and  
Mike Marshall, Extension Weed Scientist. (803) 284-3343 ext. 228 marsha3@clemson.edu  
Edisto REC, 64 Research Rd., Blackville, SC 29817**

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, sex, religion, national origin, disability, political beliefs, sexual orientation, marital or family status and is an equal opportunity employer. Clemson University Cooperating with U.S. Department of Agriculture, South Carolina Counties, Extension Service, Clemson, SC. Issued in Furtherance of Cooperative Extension Service Work in Agriculture and Home Economics, Acts of May 8 and June 30, 1914.