COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

WHEAT "CHEAT SHEET" FOR 2020 – 2021 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 Richie is an awnletted, early-mid maturity, variety with good resistance to leaf rust and mildew. Richie has demonstrated high yield potential and test weight has been good.

AgriMAXX 481 is another 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 9811 is a medium in height, bearded, early-med maturity, with good mildew and good rust resistance. 9811 has shown high yield potential with fair to good test weight as well. Try some of this one as well.

Pioneer 26R41, wasn't in the challenge this year but it 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.

Pioneer 26R59 is a short, non bearded, early-med maturity variety with good mildew and fair rust resistance. It could be a little better on test weight, but it is a consistent performer.

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.

USG 3118 is a bearded, early-med maturity and short-med, height with good mildew and rust resistance as well as HF. This one has good test weight and yield in it, a steady performer.

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-[a] URITY	H.[b] FLY	POWDERY MILDEW [c]	LEAF RUST[c]	STRIPE RUST[c]	SBM[c]	HEIGHT[d]	STRAW STREN.	TEST WT.	TEST[e] WT. INDEX	YIELD (BU/AC) 15	16	17	18	19	20	YIELD[e] INDEX
AGS 2024	Y	E/M	Fair	Fair/Good	Good	Good	Good	Short	Fair	Good	**+1.1[5]**	--	111	80	105	96	96	**+2.9[5]**
AGS 3030	Y+	E	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Good	**+1.0[2]**	--	--	--	--	108	81	**+1.4[2]**
AGS 3040	Y+	M/L	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Fair	**-0.6[2]**	--	--	--	--	104	89	**+3.7[2]**
AgriMaxx 415	Y	M/L	Fair	Fair/Good	Good	Good	Good	Med/Tall	Good	Fair	**- 0.2[8]**	84	84	83	88	96	73	**-3.0[8]**
AgriMaxx 473	Y	M	Good	Good	Good	Good	?	Med/Tall	Good	Fair/Poor	**-1.5[4]**	--	--	64	85	105	99	**+1.5[4]**
AgriMaxx 481	Y	E	Good?	Good	Fair/Good	Fair/Good	?	Med	Good	Good	**+2.5[2]**	--	--	--	--	116	76	**+2.9[2]**
AgriPro SY 547	N	M	Poor	Good	Good	V. Good	?	Med/Tall	Good	Fair	**-0.5[3]**	--	--	--	82	87	69	**+1.4[3]**
AgriPro SY Richie	Y+	E/M	Poor	Good	V. Good	V. Good	?	Med	Good	Good	**+0.1[2]**	--	--	--	--	112	86	**+6.3[2]**
AgriPro SY Viper	N	E/M	Poor	Fair	Fair	Good	Fair	Med	Good	Good	**+1.1[4]**	--	94	--	98	94	76	**0.1[4]**
Dyna-Gro 9070	Y	E/M	Good	Good	Good	Good	Fair	Med/Tall	Good	Fair	**-0.8[1]**	--	--	--	--	--	77	**-8.0[1]**
Dyna-Gro 9811	Y	M	Fair?	Good	Good	Good	?	Med/Tall	Good	Fair	**+0.1[3]**	--	--	--	97	97	90	**+3.2[3]**
Dyna-Gro Laverne	N	E/M	Poor	Good	Good	Fair	?	Short/Med	Good	Fair	**-1.1[1]**	--	--	--	--	--	80	**-5.5[1]**
Pioneer 26R45	N	M	Good	Fair/Good	Fair/Good	Good	Fair	Med	Good	Fair	**-0.2[1]**	--	--	--	--	--	93	**+8.1[1]**
Pioneer 26R59	N	E/M	Poor	Good	Fair	Good	Fair	Short	Good	Fair/Poor	**-1.0[5]**	--	81	73	101	97	93	**+1.8[5]**
S. Harvest 5550	N	E/M	Good?	Good	Good	Good	Good	Med/Tall	Good	Good	**+0.8[3]**	--	--	60	--	98	70	**-11.0[3]**
S. Harvest 7510	Y	M/L	Fair?	Good	V. Good	Good	Fair	Med	Good	Fair/Good	**+0.3[3]**	--	--	--	90	107	91	**+4.5[3]**
S. Harvest 9310	Y	M	Good	Good	Good	Good	Good	Med	Good	Good	**+3.1[1]**	--	--	--	--	--	86	**+1.0[1]**
C. Winfield 8081	Y	E/M	Good+L?	Fair	V.Good	Good	?	Med/Tall	Good	Fair	**-0.3[1]**	--	--	--	--	--	109	**+23.5[1]**
C. Winfield 9606	Y	M/L	Good+L?	Good	Fair	V. Good	?	Med/Tall	Good	Fair	**-0.8[3]**	--	--	79	85	106	89	**+2.3[4]**
USG 3118	Y	E/M	Good+L?	Good	V. Good	Good	?	Short/Med	Good	Fair/Good	**+0.1[2]**	--	--	--	--	119	86	**+9.8[2]**
USG 3329	Y	M	Poor	Fair	Fair	Good	Good	Med	Good	Fair	**-2.6[1]**	--	--	--	--	--	73	**-12.1[1]**
USG 3539	Y	M	Good+L?	Fair	Good	Good	Fair	Med/Tall	Good	Fair	**+0.3[2]**	--	--	--	--	94	90	**-2.1[2]**

^ 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 2.8^3 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^2. **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^2) 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.**

Small Grain Seeding Rates
Use Seed Per Row Foot, Bu/ac only an Estimate

Crop	lb/ bu	Seed/ft^2		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		150	2.5
Oats	32	Grain	24	8	12	14	16	20	13,000	80	2.5
		Graze	28	9	14	17	19	24		96	3.0
*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		112	2.0
Triticale	48	Grain	26	9	13	15	17	22	12,000	95	2.0
		Graze	36	12	18	21	24	30		131	2.75
*Hulless barley requires a substantially higher seeding rate: 40 seed/ft^2 (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^2 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_2SO_4 : 40 lb K_2O. 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_2SO_4 : 32 lb K_2O.**

Tiller Counts: A rule of 50 tillers per ft^2 is sometimes used to decide whether to make an early ("split") N application in late January. However, a goal of 50 tillers per ft^2 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^2. Multiply the stems per row ft by 1.7 to get stems per ft^2 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^2 (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. Chiselplows 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^2), 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.