

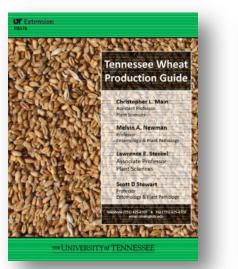
Managing Wheat for Top Yields and Grain Quality

Tyson B. Raper

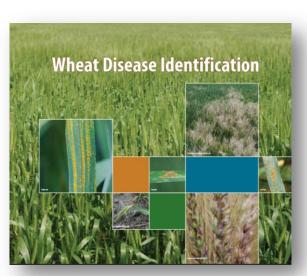
Assistant Professor, Cotton and Small Grains Specialist West Tennessee Research and Education Center Jackson, TN

Additional Materials

| TENNESSEE | A CARGANON | Crops.com |
|-----------------------------|--|---|
| INSTITUTE of AGRICULTURE | Tmail Online@UT A-2 Index | Sasty Carpus V 20 |
| | Institute of Agriculture UT Extension AgResearch 1 | West TN AgReseach Center AgReseach Center at Hilan |
| UT Publications | | |
| Com | Wheat | |
| Cotton | | |
| Sorghum | A CONTRACTOR OF THE OWNER | |
| Soybean | | |
| Wheat | The second s | and the second second second second second |
| Variety Selection | Winter wheat is an important crop for Tennessee; duri | ng the 2013 season the crop was planted on 640,000 acres with an |
| General Agronomics | | I value of production in excess of \$265 million (USOA-NASS, 2013). wheat provides producers with an early-summer cash flow and |
| Weeds | allows many to utilize ground which would otherwise re | emain fallow through the winter months. Additionally, wheat is also |
| Insects & Diseases | production of high-quality, low-protein, soft-red winter | fe food plots. The Tennessee climate is most conducive for wheat and most soft-red varieties commonly grown within the state |
| Marketing | have adequate winter-hardiness to survive normal win | ter temperatures. |
| Weather | | e Wheat Research and/or Recommendations for TN, click one of the e from the guick-link resources listed below, or contact UT's Small |
| Pesticide Use | Grain Specialist for additional information. | e from the quick-link resources raced delaw, or <u>consector's privat</u> |
| Related Sites | | |
| Stored Grain | Quick Link Resources | |
| Other Crops | Wheat Production | Weed Control |
| Field Crops Team | 2014 TN Wheat Quick Facts (W321) | Weed Control Manual P01580 |
| Submit Comments | Wheat Production Guide (PB576) Wheat Variety Test Results 2012 | Sencor Tolerant Wheat Varieties Weed Control Fact Sheets |
| Upcoming Events | Fertility Guidelines Seed Treatments for Disease/Insect Control | |
| Presentations | <u>UT Soil Test Lab</u> | Insect and Disease Control Insect Control Guide P81768 |
| | | Insect Control Galage PD1768 Disease and Insect Management |

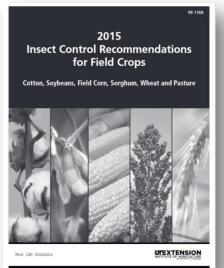


UTcrops.com TN



TN Wheat Disease Identification

TN Wheat Production Guide



2015 Insect Control Recommendations

2014 Tennessee Wheat Quick Facts Upper Cotton and Send Cot

THE UNIVERSITY OF TENNESSEE

A INSTITUTE OF

| Preplant • Soft red winter is the main class planted i o Weil-established market. o Cennesily used for general-purpose n pastry and cake floor. • Adequate winter hardness to survive low winter temperatures. | nilling, | Ryegrass and cheat compete for light Use of week-free seed, proper seeding, seedbed preparation and following a go management program in the summer o in effective weed control. A detailed procedure for controlling will when it contrained in P6 15300 (Jink below) | rate, proper ood weed rop will assist d garlic in | E: (La mill P/ac) / (20% garm) * 100 = 1.75 mill s/a (2).750,000 r/ac)(2)(12,000 cr/hb) = 515 3 lb s/ac) + Up rate by 55-595 if planning in adverse conditions, haradscatting, erif using bin-run seed. Growth Stages • Understanding growth stage is crucial for properly timing introgen, fungicides, berblicides, etc. | | | |
|--|-------------|--|--|---|--------------------------------------|---|--|
| o Very low temperatures may kill above material, but growth should resume | | A burndown prior to planting may be n till production to desiccate remaining s | | Stege | Feekes Scale | Description | |
| Best adapted to well-drained, medium to high in fertility. | heavy soils | and possibly winter annuals. o Application will result in easier plan | | Stem Tillering | 1 | Emergence, one shoot Beginning of tillering | |
| Requires firm seedbed — if conventional, 4") disking following row crops is sufficient seedbed preparation. | | reduce competition with emerging Consult ut Extension PE 1383 for additional information on Nethicide | | | 4 | Tillers formed Beginning of erect growth Sheaths strongly erect | |
| o Some form of minimum till often hely seed/soil contact and, thus, stands in residue. Variety Selection | heavy | Planting • Ideal planting dates in Tennessee typica between October 15 and November 10 | 10111 | | 5 7 8 9 | First node visible Second node visible Flag leaf visible Ligule of flag leaf visible Boot starce | |
| Plant flour to five variable shart represent a range of maturities over multiple planting dates. Certified seed provides insurance against poor germ and contamination with weed seeds. Earlier maturing variables will joint and head earlier and are, therefore, more susceptible to seem and head | | Do not plant prior to fly-free data: Planting during latter half of windo systemic insecticide reduces incide yellow dwarf virus. Late-planted wheat has a shallower and is more susceptible to frost hese | w or applying noe of barley root system | Heading | 10.1 10.2 10.3 10.4 10.5 | Awns visite, heads emerging Heading 1/4 complete Heading 3/4 complete Heading 3/4 complete Heading complete | |
| freeze in spring if planted too early. Consult UT Entension Research Report 15-01: 2014 Wheet Variety Performance Tasts in Tennesses for geody's workey this descriptions and results. | | winterfoll. • Above dates should allow 3-4" top grow prior to the start of winter (December 2 • Target depth is 1-1.5", with deeper dep | 13). the to reach | Rowering | 10.51 10.52 10.53 10.54 | Beginning of flowering Plowering complete at spike top Plowering complete at spike base Kernels watery ripe | |
| Weed Control Wid garlic, senual ryegrass and chest are problem weeds in Tennessee wheat fields. • Wid garlic can result in deckage at harvest. | | moisture during dry conditions. Do not • Target plant population should fall betw million plants/ac. • Determine seeding rate (Ib seed/ac) for | veen 1.2 to 1.5 target plant | Brinnelit | 11.1 11.2 11.3 11.4 | Milky ripe Mealy ripe Kernel hard Harvest ready | |
| | | population (PR/ac) with germination test as follows: (Target PR/ac) / % germi*100 = seed/ac (Rseed/ac)/(Rseed/b)=(Ib seed/ac) | | | | TENNESSEE | |

2014 TN Wheat Quick Facts



2015 Weed Control Manual

Outline

- Seedbed Preparation
- Planting
- Growth stages
 - Tillering
 - Jointing
- Mid-season management
 - Nitrogen
 - Insecticides
 - Fungicides
- 2014 TN Wheat Quick Facts

| 20 | 15 Arkan | sas Wheat Quick Fo | icts | Dr. Jason Kelley – Extension Agronomist – Wheat a Chad Norton and Chris Grimes – Program Associate Wheat Verification | nd Feed Grains s – Scybean and | | ON OF AGRICULTURE REIS & EXTENSION of a distance laws |
|--|----------------------------|---|--|---|-----------------------------------|--|--|
| 201 | Facts: | | | seeding rate if planting no-till, late, or broadcast. | • | Systemic seed applied fur are recommended to con | ngicides applied |
| | 395,000 acr | | | 26 seeds per ft ⁴ = 1.13 million seeds per | | and seedling pathogens. | trol loose smut |
| | | er acre state average (Record) es in 2014 WRVP | | acre. | Weed Co | <u>ntrol:</u> Start clean with a burndo | wn or tillage. For |
| | o Pla | inting: October 30 | Pounds | of Seed Planted – Seed Rate by Seed Size | | severe ryegrass population delaying planting to allow | ons, consider |
| | o En | ergence: November 10 | 2 324 | Seeds per Square Foot 25 30 35 40 | | of first flush of ryegrass t | hat emerges. |
| | | rvest: June 15 i, 13.5% moisture is dry | Seeds/Ib | Paunds of Seed/Acre | | Multiple herbicide applic needed for rvegrass cont | ations may be |
| | | | 12,000 | arge seed) 109 131 152 174 91 109 127 145 | | Refer to MP 44 Recomme | ended Chemicals |
| Gro | th and Develop | | 14,000 (# 16,000 18,000 | 91 109 127 145 https://doi.org/10.00000000000000000000000000000000000 | | for Weed and Brush cont herbicide recommendation | rol for latest |
| | Description ge Feeles G | of Vegetative Stages | 18,000 20,000 (sr | 61 73 85 97 mail seed) 54 65 78 87 | | 1 <u>1</u> 1 1 1 1 1 | |
| Germ | nation 1 | Ervergence through 3-leaf stage | Grain D | rill Calibration - Seeds per foot of row | Herbicide | on Timing for Common V t Timing P Inmediately after | Remarks |
| Ta | edling ring 2-4 | Titlering begins. 4 th leaf is on | Grain Dri | Seeds per Square Foot | | M Immediately after | Only follow with |
| | | first tiller. Tillering ends, plants start | Width | 25 50 35 40 | Finesse Gra | planting for ryegrass as and 2-leaf wheat to prip | Same as above. |
| Jac | ing 6 | Upright growth. First node visible at base of | 6 inches 7.5 inches | | Broadleaf 7 Axiom 68 0 | 0 DF to juinting F Spike to 2-leaf wheat. | Apply to metribusin tolerant |
| | 7 | stem. Second node visible Plag leaf visible, still rolled up. | 8 inches | 17 20 23 27 | | | Apply to metribusin tolerant variety. Seed wheat 1 inch deep or more. No |
| | | | 10 inches | 21 25 29 33 | Anial XL 0.4 | 144 | |
| | Description | of Reproductive Stages | Recomm | mended Planting Dates for Arkansas | Acia/31,0.4 | 2 EC 2-leaf wheat to pre- boot. 1-leaf to 2- tiller ryegrass. | 60 day PHI. Do not tank mix with 2,4-0 |
| 8 | ot 9 10 | Ugule of flag leaf just visible. Flag leaf sheath completely out. Spike swollen but not visible (full | Region North Ark Central Ar South Ark | rkansas October 10 - November 10 | Osprey 4.3 | jointing on wheat. | See label for N restrictions |
| He | fing 30.1-10 | 5 50000 Sint spikes just visible to all spikes out of sheath (full | Determi | ining Final Plant Stands: | Frowi H ₂ O 1 | | Plant seed 0.5 to |
| | 10.5.1 | spikes out of sheath (full heading). | | Count the number of plants in one ft ² in at | Powerflex | silers. | 1.0 inch deep |
| | 10.5.1 10.5.4 | heading). Beginning of flowering. Plowering over, kernel watery | | least 10 random locations in the field. Desired stand is 26 plants per ft ³ . | DP 2,4-D amine | jointing, For LV In late winter between tiller completion and | Apply when restrictions Apply when temporatures are above 60°F and no rain for 12 hours Wid garlic 6°-12° and |
| - Ep | ning 11.1-11 | | | With good tillering and uniform stand, 10 | eaters | between tiller completion and | temperatures are above 6017 and no |
| | 11.4 | aoft dough to hard dough. Ripe for cutting, straw dead. | | plants per ft ⁴ can give optimum yields. | Harmony D | porting stags | rain for 12 hours |
| See | inc: | | Seed To | coments: | SG Zidue ES W | leaf emergence | tall |
| 300 | Plant seed b | etween 1 to 1.5 inches deep | • | Systemic seed insecticides for control of Hessian fly and aphids to control Barley | Zidua 85 W | siller wheat | tall Seed wheat x0.5 linch deep Seed wheat 1 inch |
| | Seeding rate | should be 26 seeds per ft ^a with ider ideal conditions. Increase | | Yellow Dwarf Virus are generally not recommended. | Arthem Fie | x 4.05E Delayed PRE to 4 tiller wheat | Seed wheat 1 inch deep |
| | <u>20</u> | <u>15 AR</u> | W | 'heat Qu | ick | <mark>K Fac</mark> | <u>ts</u> |
| | <mark>20</mark> | <u>15 AR</u> | W | | ick | <mark>. Fac</mark> | <u>ts</u> |
| | <mark>20</mark> | <u>15 AR</u> | W | | ick | <mark>Fac</mark> | <u>ts</u> |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | | Fac | <u>ts</u> |
| | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama | heat |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | w | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | w | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama Winter W | heat |
| UK | 20 | <u>15 AR</u> | W | 'heat Qu | 2023 | Alabama Winter W | heat on Guid |
| UK Martines In 1999 In 1997 In 1999 In 1999 In 1999 In 1999 In 1999 In 1999 In 1999 In 1999 In | 20 | <u>15 AR</u> | W | 'heat Qu | 2073 | Alabama Winter W Productio | heat on Guid |
| UK SENTUCIO Di Di Di | 201 | <u>15 AR</u> | W | 'heat Qu | 2073 | Alabama Winter W Productio | heat on Guid |

INSTITUTE OF

AL Winter Wheat Production Guide

Seedbed Preparation

- Prior crop harvest (very important if in a no-till system)
 - Chop and spread residue evenly behind the combine to the width of the header
 - A 'windrow'-like concentration of the residue behind the combine is difficult to manage
 - Variability will exist in moisture under residue versus 'bare' soil
 - Subsequent issues with trafficability and consistency in seedbed
 - Difficulty placing seed at a consistent depth across planter
 - Even residue spread?
 - More consistent seedbed
 - » Uniform moisture content across planter width
 - » Easier planter set-up, more consistent depth placement of the seed and therefore more uniform stands

INSTITUTE OF

- Very important for maintaining high yield potential
- Seedbed
 - Firm, weed-free, preferably well-drained
 - No-till
 - No-till is an excellent option on many TN acres
 - Less fuel, labor; very similar yields
 - If weeds are present, a burn-down herbicide should be applied
 - Conventional tillage
 - Disking at 2-4" typically sufficient
 - Conduct tillage early enough for seedbed to settle and firm-up
 - Wheat prefers well-drained soils
 - Water requirements for wheat are quite a bit lower than the seasonal rainfall received in TN

Planting

- Variety Selection
 - Arguably, one of the most important decisions made each year
 - Select high yielding, STABLE, disease resistant, adapted variet<u>ies</u>
 - It is almost always a good idea to plant more than one variety!
 - Seasonal characteristics generally favor a given variety over others
 - Planting multiple varieties buffers you from potential loss associated with selecting only one variety
 - The University of Tennessee conducts variety trials throughout the state on 85+ varieties yearly
 - Resist the temptation to select varieties based on one siteyear
 - » The highest yielding variety from a given site-year may not be a consistent performer
 - » 'Stability' is critical and should be considered.
 - Best selection method? Examine state averages and then move to location results.

Wheat Variety Performance Tests in Tennessee

2014

Fred L. Allen, Coordinator, Agronomic Crop Variety Testing & Demonstrations

Virginia R. Sykes, Research Associate, Agronomic Crop Variety Testing & Demonstrations

Robert C. Williams Jr., Extension Area Specialist, Grain Crops

Agronomic Crop Variety Testing and Demonstrations Department of Plant Sciences University of Tennessee Knozville

Telephone: (865)974-8821 FAX: (865)974-1947 email: allenf@utk.edu

Variety test results are posted on UT's website at:

http://varietytrials.tennessee.edu

and

UTCrops.com

varietytrials.tennessee.edu

Planting



- Planting Date
 - TN- between October 15 and November 10
 - Goal is to have a well-rooted plant with 3-4" top growth before December 21 (first day of winter)
 - Should attempt to find the 'sweet spot' between early and late planting
 - early planting
 - » promotes sufficient growth to survive winter
 - Less prone to heaving
 - Established plant can survive lower temperatures
 - » too early?
 - Excessive fall growth
 - Greater chance of spring freeze injury (earlier head emergence)
 - late planting
 - » suppresses some insect and disease infestations
 - Aphid/Barley yellow dwarf virus complex
 - Reduce Hessian fly issues
 - » too late?
 - Insufficient growth to survive winter (issues mentioned above)
 - Push maturity back
 - Potentially reduce yields
- Planting depth
 - 1-1.5 inches
 - Places seminal roots at an ideal depth to support seedling development without overly-stressing the developing seedling's coleoptile

Planting

- Planting Method
 - Function of equipment availability, labor, field trafficability (season), and crop use
 - Target stand is near 25 plants per square ft
 - From an agronomic standpoint, drilling is preferred
 - As a monocot, seminal roots form at the depth of the seed
 - Very important to seedling establishment
 - » Too shallow? Many concerns!
 - Drilling allows for the placement of the seed (&seminal root system) at the ideal depth and spacing
 - Supports rapid, uniform stand establishment
 - Requires less seed to reach target plant population
 - Generally results in higher yields than broadcast/incorporated
 - Utilizing a no-till drill in the no-till system allows for prolonged erosion control without sacrificing consistent stands and high yields
 - Drilling? Target 1.5 to 2 bushels per acre (1.2 to 1.5 million plants per acre)
 - Broadcast/incorporated is typically a faster method
 - Seeding rate should be increased to between 2-3 bushels (increase the drilled rate by 30-35%)
 - This is to compensate fore uneven seed placement which can result in less-than-ideal soil/seed contact, increased potential for animal predation, reduced germination/emergence and susceptibility to frost heaving of seeds.
 - This method typically results in lower yields than drilling
 - If broadcasted with fertilizer, mixture should not be allowed to sit after blending
 - Aerial seeding?
 - Last resort. Increase seed rates from drilling recommendations by 40-50%.

Growth Stage



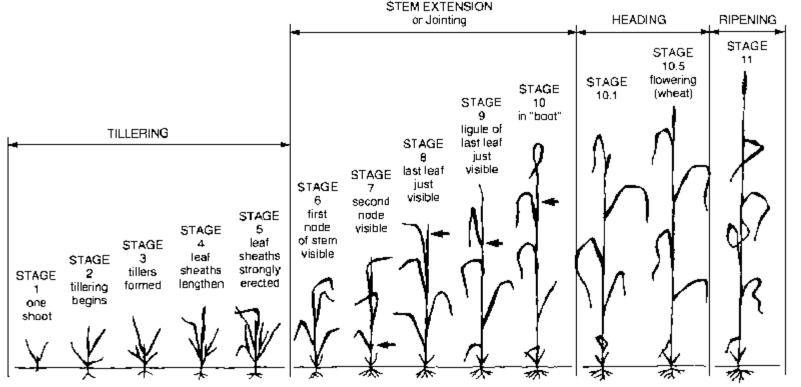


Image courtesy North Carolina State University; http://ipm.ncsu.edu/grain/smgrain521.html

- First step for in-season management for high quality/yield?
 - Understand and be able to identify growth stage
 - This will allow the proper timing of inputs of nitrogen, insecticides, herbicides and fungicides

Identification of Tillers

- 'Tillering' usually begins after three or four leaves have developed.
 - Primary tillers form in the axils of true leaves at the base of the main stem of the plant
 - Secondary tillers may develop from base of primary tillers
 - A coleoptilar tiller may form, but occurs sporadically and is influenced by many parameters
- Base of each tiller is a prophyll
 - Modified leaf which guides/protects developing tiller
 - Similar in function to the coleoptile
 - Identification can help in distinguishing developing tillers from main stem leaves

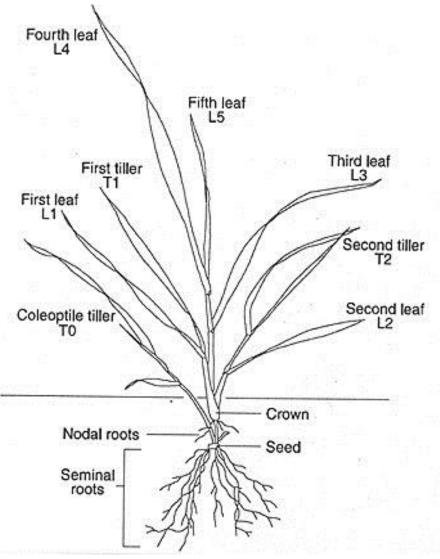


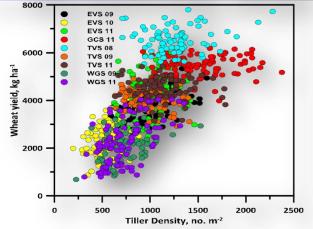
Image courtesy North Dakota State University;

http://www.ag.ndsu.edu/archive/entomology/ndsucpr/Years/2006/may/25/psci2.jpg

Tiller number and Yield

- Tiller number and wheat yield generally correlate very well to each other.
 - This is because tiller number frequently relates very strongly to head number (which in turn relates to wheat yield!)
- Number of tillers per foot (including mainstem) counted in late winter/early spring can be used to fine-tune nitrogen applications
 - Less than 70 tillers/ft at Feekes 3?
 - An additional 20 lb N added to the standard application near greenup can promote tillering and protect yield potential
 - Total of 50 lb N at greenup
 - Between 70 & 100 tillers/ ft at Feekes 3?
 - 30 lb N at green-up
 - In excess of 100 tillers per ft?
 - no green-up fertilizer N needed

Tiller Relationships - Density



Data courtesy Dr. Kip Balkcom, Research Agronomist for the USDA-ARS in Auburn, AL

Recommendations

Wheat Management"

from, "High Yield

by Dr. Chad Lee,

University of

Kentucky

High Yield Wheat Managemen

Chad Lee, University of Kentucky

Management practices to obtain high-yielding wheat are based on some key numbers at key points in the deviopment of the crop [Table 1]. Emergence needs to be about 25 plants per square foot and tillering needs to be about 70 to 100 tiller per square foot. About 60 to 70 heads per square foot and about 35 kernels per head normally will achieve high yields.

Table 1. Key management numbers for high-yielding wheat.

| Crop Stage | Number | Unite |
|------------|-----------|----------------|
| Emergence | 25 | plants/sq.ft. |
| Tillering | 70 to 100 | tillers/sq.ft. |
| Heading | 60 to 70 | heads/sq.ft. |
| Heading | 35 | kernels/head |

Proper emergence is based on accurate seeding trates, proper placement of seed and timely seeding. Most whats seeded in the full of 2000 was not seeded on time. Some of the whate was seeded in poor conditions that reduces the chances of grants good such. This tap painting reduces monity reduces the time basesen emergence, goodh, and dold temperatures that pause shear growth. Going into the dollars pair of white with bloot. 70 times requires for all doll. Les phinting such and mass coder temperatures and slower growth. Joing dollar provements that pairs and about 20 to 20 blocker an improve the bases of getting good flow what the filter exeasing for maintonin yield.

Stands should be assessed again prior to a spring thaw to determine if an early application of nitrogen furtiliser might help increase III counts. An early application would occur when when it about freetes to 3. If thill counts are about 70 times requires that then a early application of integrate freetiliser of about 50 by Jones to warranted. If thill counts are about 70, then only about 30 bs of highers in mediad. If this counts are about 70 times prayare tool, then a early further information in section and about the about the about the section of the about the section of the section for the section of the section are about 10 times prayare tool, then are any information freedom in section about the section application and the section are about the section and the section application of the section about the section are about 10 times prayare tool, then are any information freedom in section and the section are about 10 times prayare tool, then are any information freedom tool the section about the section are about 10 times that the section are about the section about the section are about 10 times are about 10 times to the section about the section are about 10 times that the section are about 10 times to the section are about 10 times to the section about the section are about 10 times are about 10 times are about 10 times to the section about the section are about 10 times the section are about 10 times to the section are

When wheat reaches Feekes 5 (just before jointing) a second application of nitrogen is warranted. The rate of hirogen depends on the earlier application (feekes 2–3 application) rate; the total of both applications should be about 100 to 120 lbs N/acre for no-till wheat and slightly lower for conventionaltill wheat.

While nitrogen can be managed and adjusted to help the growth of whast, weeds, insects, and diseases cannot be allowed to rob the whest of any yield potential. Weed control is often accompliable with helms a single fallowing time of the single so that if and oping spectrators of herbicing fastas in the should not be a problem in 2005b since most of the wheat was plated after the fighter datas. After additional be a problem in 2005b since most of the wheat was plated after the fighter datas. After additional be a problem of fields should be context to determine if an interactive in necessary. Field and the since the matching of the should be context of the matching in necessary. Field and the since the matching of the should be context of the matching in necessary. Field and the since the matching of the should be context of the matching in necessary. Field and the since the matching of the should be context of the matching in necessary. Field and the since the s

Jointing Stage

- 'Jointing' and the beginning of the hollowstem stage
 - Many growth-regulator herbicides cannot be applied after the jointing stage
 - After this growth stage, trafficking the field can decrease yields (wheels break stems)
 - Ideally, all N should be on prior to this stage (Feekes 6)
 - Similarly, for those managing dual-purpose wheat (grazing and harvesting grain) this is the stage grazing should be stopped
 - Best way to determine when this stage has begun?
 - Dig up wheat plant and identify main-stem
 - Feel for swollen bump on base of shoot (node)
 - Slice stem near crown and split stem (vertically up the stem)
 - Look at space between developing head and crown roots
 - ¼-¾"? Hollow stem/jointing stage
 - Typically, no more yield-impacting tillers will develop after this stage
 - Maximum kernel number per head is determined at this stage

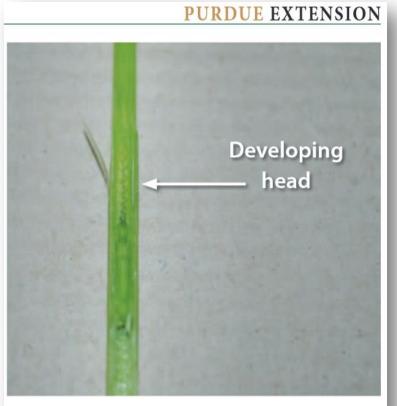
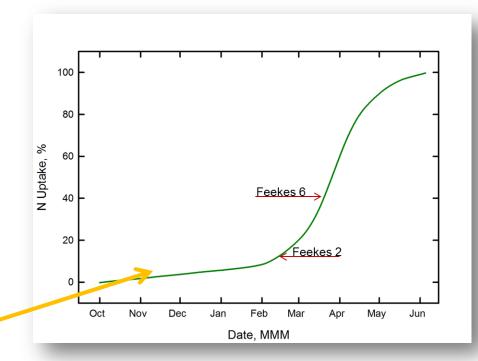




Image courtesy Purdue Extension; https://www.extension.purdue.edu/extmedia/ID/ID-422.pdf

Wheat N Considerations

- N uptake is very low for wheat in TN until after green-up
 - We typically see demand begin to increase by February 15th
 - Still low (relatively speaking) at this date
 - Usually between Feekes 2-3 at this date
 - Although demand is low, N applications in early February can increase tiller number (it is important this small N demand can be met!)
- N uptake has begun to increase exponentially by the jointing stage
 - Typically occurs after March 15th in TN
- Ideally application in time for movement into root zone and uptake
- Large applications in early January? Early February?
 - Far from peak demand
 - Increase potential for N loss
- Most states recommend little to no fall N
- TN recommends 15-30 lb N depending upon prior crop and planting date
 - Why? Little demand early!
- With that said, 2014 was an exceptionally wet year and many observed higher-than-expected yields
 - It is logical that many fields have less available N than they would in a more-normal crop year



2015 Wheat N Considerations

- For acres which did not receive fall N and did not follow beans-
 - Preferred method is to wait until 'greenup' is about to occur and then assess tiller number. If necessary, then apply the first SPLIT of your target spring rate
 - A split will:
 - Support tillering at 'greenup'- thereby protecting yield potential
 - Reduce financial risks of applying entire spring application so early
 - » Minimize potential for N loss
 - Reduce negative physiological impacts of large N applications in late winter
 - » Large N applications in late winter can increase disease, burn, potential for streaking, encourage early heading and therefore potential for freeze damage
 - Allow adjustments to both timing and amount of the later-half of the split based on season

• For acres which received fall N or are following beans

- Again, assess tiller number
- Benefits of split still apply (although many are slightly reduced)
- If applying in a single-shot, target Feekes 4-5

Barley Yellow Dwarf

- Bird Cherry-Oat Aphid
 - Dark green in color
 - Most commonly responsible for transmission of BYDV
 - No thresholds established in TN, but early planted wheat is most susceptible
 - If planting early, insecticide seed treatments such as Gaucho, Cruiser, and NipsIt Inside can reduce transmission of BYDV
 - If no seed treatments are used, foliar applications during fall (within 30 days of planting) or late winter (prior to March) can reduce transmission
 - Trigger application during this period prior to populations exceeding eight aphids per foot of row (purpose of application to prevent the spread of BYDV)



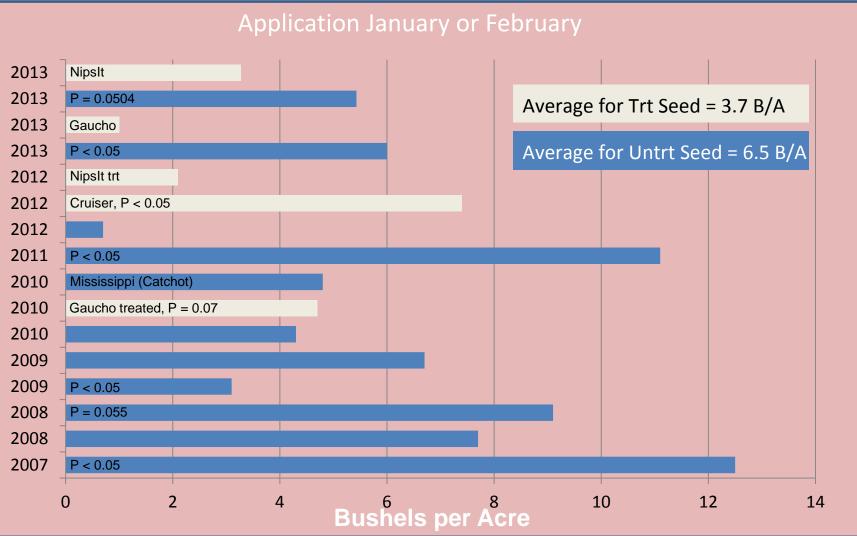
Barley Yellow Dwarf

Yield Response of Wheat to Late Winter Foliar Insecticide

OF

INSTIT

2007 - 2013 Planting Dates (untreated seed unless indicated)



- Lodging can be a major issue in high-yield environments where large applications of N have been applied
- Agitated by high winds and/or excessive rainfall
 - Lodging can:
 - Slow harvest
 - Result in wheat yield loss in excess of 40%
 - Cause difficulty in planting the following crop
 - Standing residue easier to plant into
 - Combine head must run very close to ground
 - » Increases residue which header takes in
 - » Increases residue laying flat on the ground
 - Subsequent consistency issues in surface residue



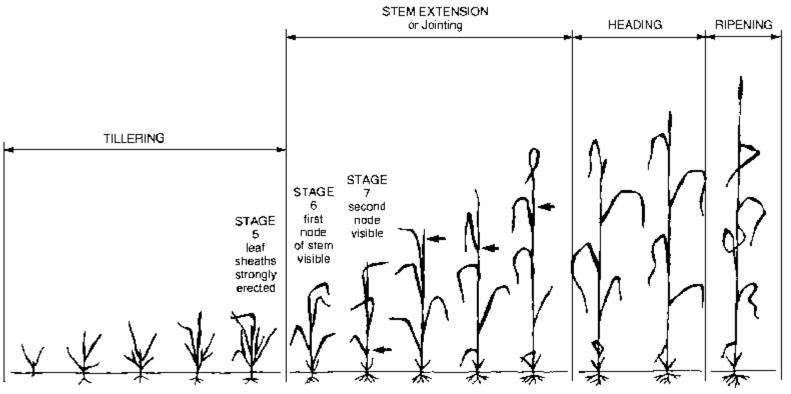


Image courtesy North Carolina State University; http://ipm.ncsu.edu/grain/smgrain521.html

OF

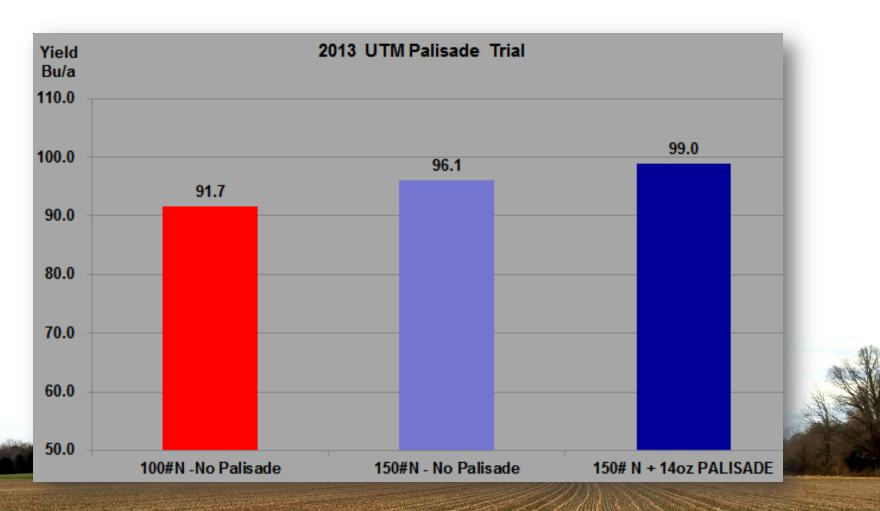
 The ability to increase stem thickness and control plant height during the early stages of wheat development could theoretically reduce lodging potential

- Syngenta has recently introduced a plant growth regulator (PGR) for the purpose of reducing lodging potential
- Palisade EC (Syngenta)
 - Also available as 2EC
 - Active ingredient- Trinexapac-ethyl
 - Proposed benefits:
 - Shorten internode to lower center of gravity.
 - Reduce loss due to lodging
 - » Increase harvest speeds
 - » Allows for increased N rates
 - » Easier planting double crop beans
 - Target application timing: Feekes 4-8, Ideally target Feekes 5-7
 - Target rate: 10.5-14.4 fl oz/ac
 - Maximum rate of 14.4 fl oz/ac
 - 45 day pre-harvest interval

| | | PULL HERE TO OPEN |
|---|---|-------------------|
| M Pa | alisade | |
| For growth management of wheat, triticale, barley, oats, | | ta. |
| Active Ingredient: Trinexapac-ethyl* | , i i i i i i i i i i i i i i i i i i i | |
| Other Ingredients: | 88.0% | |
| Total: | 100.0% | |
| *CAS No. 95266-40-3 Palisade EC is an emulsifiable concentra active ingredient per gallon. | ate containing 1 pound of | |
| | KEEP OUT OF REACH | |
| WARNING/AVISC | | |
| WARNING/AVISC Si usted no entiende la etiqueta, se la explique a usted en detalle the label, find someone to expla | | |
| Si usted no entiende la etiqueta, se la explique a usted en detalle | in it to you in detail.) | |
| Si usted no entiende la etiqueta, se la explique a usted en detalle the label, find someone to expla See additional precautionary sta | in it to you in detail.) itements and directions for | |
| Si usted no entiende la etiqueta, se la explique a usted en detalle the label, find someone to expla See additional precautionary sta use inside booklet. | in it to you in detail.) itements and directions for | \sim |
| Si usted no entiende la etiqueta, se la explique a usted en detalle the label, find someone to expla See additional precautionary sta use inside booklet. EPA Reg. No. 100-949 EPA E Product of Switzerland | in it to you in detail.) itements and directions for | |



- Palisade EC Trial
 - Syngenta



- Palisade EC Trial
 - Syngenta





Lodged Wheat Stubble



Standing Wheat Stubble



A INSTITUTE OF

THE UNIVERSITY OF TENNESSEE

TREATED



UNTREATED

- Dr. Angela McClure conducted a Palisade strip trial in Crockett County during the spring of 2014
 - Objective:
 - evaluate Palisade at N rates of 130 and 160 lb N/ac
 - Treatment
 - Nitrogen
 - 30 lb Urea Fall 2013
 - 60 lb Urea in Jan 2014
 - Remainder (to result in total applications of 130, 160 or 190 lb N/ac –farmer was interested in highest rate) was applied as Ammonium Nitrate on March 26, 2014
 - Palisade EC
 - Applied at Feekes 5- right at the suggested target date
 - Applied with an insecticide, low rate of Stratego and a micronutrient product
 - Non-Palisade receiving controls received the same insecticide, low rate of Stratego and micronutrient product

- UT Extension Crockett County Palisade EC Trial
 - Results
 - All wheat (regardless of treatment) stood well through the season and no lodging was observed in the plots
 - Due to noticeable water damage, one treatment has been omitted.
 - This work will be repeated during the 2015 season

| Treatment | Number Reps | Bu/Acre at 13.5% |
|-------------------------------------|-------------|---------------------|
| Palisade +130 N | 2 | 76.8 |
| No Palisade + 130 N | 3 | 76.3 |
| Palisade +160N | 3 | 81.2 |
| No Palisade + 160 N | 3 | 84.9 |
| | | |
| 130 N (treated and untreated plots) | 6 | 76.9 |
| 160 N (treated and untreated plots) | 7 | 81.3 |
| 190 N (treated and untreated plots) | 3 | 83.5 |

Disease Management



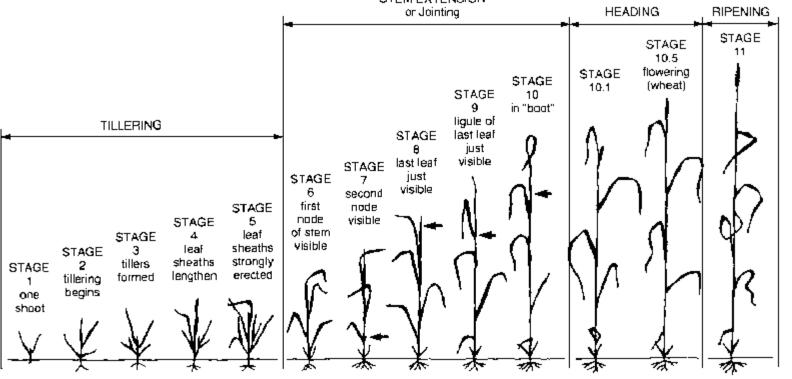


Image courtesy North Carolina State University; http://ipm.ncsu.edu/grain/smgrain521.html

 Understanding growth stage is also critical for determining if fungicide applications are necessary, and if so, when to time these applications.

NSTIT **Fungicides** (2014 Jointing/Heading Applications) Change in Yield (bu/a) 2014 * 10 Non-treated yielded 110 bu/a 8 *Significantly greater than non=treated (at $P \le 0.1$) 6 4 2 N Headline (6) Quilt Xcel (14) Quilt Xcel(14)+ Prosaro (6.5) **Tilt(4)**+ Headline(6)+ Prosaro(6.5) Prosaro(6.5) Prosaro(6.5) Jointing Heading Jointing + Heading

- Trial Conducted by Dr. Heather Young-Kelly
- Two different locations in 2014, but significant response only noted at one location
- Single applications made at two different timings

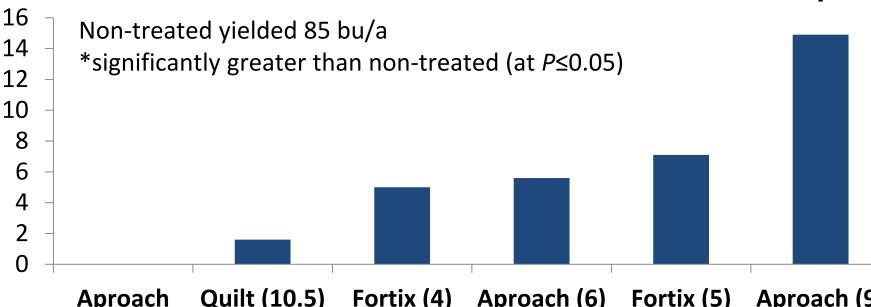
Fungicides

LITA INSTITUTE OF THE UNIVERSITY OF TENNESSE

*

(2014 Flag Leaf Application)

Change in Yield (bu/a) 2014



Aproach Quilt (10.5) Fortix (4) Aproach (6) Fortix (5) Aproach (9) Prima (6.8)

- Trial Conducted by Dr. Heather Young-Kelly
- Two different locations in 2014, but significant response only noted at one location
- Very low disease pressure

Fungicides

Table covering efficacy of fungicides for wheat disease control based on appropriate application timings: UTcrops.com (Wheat→ Insects & Diseases)

TUTE OF

| Fungicide(s) | | | | | | | | | | | | |
|------------------------|--|----------------------------|--------------------|-------------------|-----------------------------------|-------------------------|----------|----------------|-----------|-----------|-----------|----------------------------|
| Class | Active ingredient | Product | Rate/A (fl. oz) | Powdery mildew | Stagonospora leaf/glume blotch | Septoria leaf blotch | Tan spot | Stripe rust | Leaf rust | Stem rust | Head scab | Harvest Restriction |
| ŗ | Picoxystrobin 22.5% | Aproach SC | 6.0 - 12 | G1 | - | VG | VG | E ² | VG | VG | NR | Feekes 10.5 and 45 days |
| Strobilurin | Fluoxastrobin 40.3% | Evito 480 SC | 2.0 - 4.0 | G | - | - | VG | - | VG | | NL | Feekes 10.5 an 40 days |
| St | Pyraclostrobin 23.6% | Headline SC | 6.0 - 9.0 | G | VG | VG | Е | E ² | E | G | NL | Feekes 10.5 |
| | Metconazole 8.6% | Caramba 0.75 SL | 10.0 - 17.0 | VG | VG | - | VG | E | Е | Е | G | 30 days |
| ø | Propiconazole 41.8% | Tilt 3.6 EC ³ | 4.0 | VG | VG | VG | VG | VG | VG | VG | Р | Feekes 10.54 |
| Triazole | Prothioconazole 41% | Proline 480 SC | 5.0 - 5.7 | - | VG | VG | VG | - | VG | VG | G | 30 days |
| F | Tebuconazole 38.7% | Folicur 3.6 F ³ | 4.0 | G | VG | VG | VG | E | E | E | F | 30 days |
| | Prothioconazole19% Tebuconazole 19% | Prosaro 421 SC | 6.5 - 8.2 | G | VG | VG | VG | E | E | Е | G | 30 days |
| - | Metconazole 7.4% Pyraclostrobin 12% | TwinLine 1.75 EC | 7.0 – 9.0 | G | VG | VG | Е | E | Е | VG | NL | Feekes 10.5 |
| of action ⁴ | Fluxapyroxad 14.3% Pyraclostrobin 28.6% | Priaxor | 4.0 - 8.0 | G | VG | VG | E | VG | VG | G | NL | Feekes 10.5 |
| | Propiconazole 11.7% Azoxystrobin 7.0% | Quilt 200 SC ³ | 10.5 - 14.0 | VG | VG | VG | VG | E | E | VG | NL | Feekes 10.5 |
| modes | Propiconazole 11.7% Azoxystrobin 13.5% | Quilt Xcel 2.2 SE | 10.5 - 14.0 | VG | VG | VG | VG | E | E | VG | NL | Feekes 10.5 |
| Mixed | Prothioconazole 10.8% Trifloxystrobin 32.3% | Stratego YLD | 4.0 | G | VG | VG | VG | VG | VG | VG | NL | Feekes 10.5 35 days |
| 4 | Cyproconazole 7.17% Picoxystrobin 17.94% | Aproach Prima SC | 3.4-6.8 | G | - | VG | VG | E | VG | | NR | 45 days |

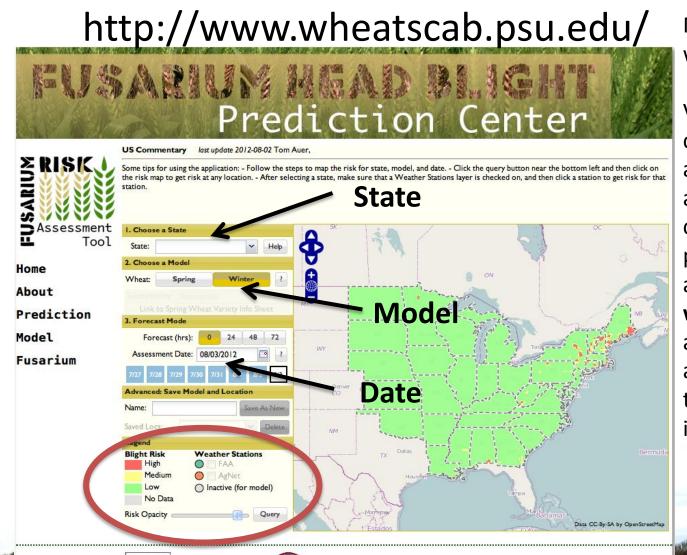
Efficacy categories: NL=Not Labeled; NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent; -- = Insufficient data to make statement about efficacy of this product.

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

³Multiple generic products containing the same active ingredients also may be labeled in some states. Products including 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, Teb

⁴Products with mixed modes of action generally combine triazole and strobilurin active ingredients. Priaxor is an exception to this general statement and combines carboxamide and strobilurin active ingredients.

Disease Management



~KSTATE

PENNSTATE

Many are concerned with DON after 2014.

OF

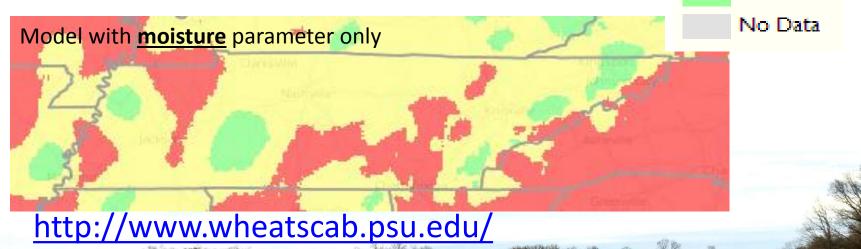
Visit the site as the crop in your area is approaching heading and flowering. You can customize the prediction by selecting a **state**, use the **winter wheat model**. You can also select different assessment **dates** through a calendar interface.

Disease Management

LITA INSTITUTE OF THE UNIVERSITY OF TENNESSEE

FHB Forecasting Model

May 4, 2013
 Winter Wheat Model - model with moisture and temp parameters
 Blight Risk
 High
 Medium
 Low



Disease Management in 2015?

- Watch the weather
 - Relatively warm?
 - Relatively wet?
- Use FHB Forecasting website (<u>http://www.wheatscab.psu.edu/</u>)
- Avoid Qol/Strobilurin fungicides around flowering
 - Can increase DON levels
 - Instead, use a Triazole

Disease Management

- Know your variety's disease resistance/susceptibility level
- Scout for diseases
- Consider foliar fungicides if:
 - Disease is present
 - Can properly time application
 - Application can increase yields at a level to cover application cost and risk
 - Take into account price of wheat
- More information can be found at: <u>UTcrops.com</u>





Tyson B. Raper, PhD

Assistant Professor, Cotton and Small Grains University of Tennessee- Dept. of Plant Sciences West Tennessee Research and Education Center 605 Airways Blvd. Jackson, TN 38301

> cell: (731) 694 – 1387 email: traper@utk.edu news.utcrops.com