Texas A&M AgriLife Extension

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Winter Wheat Management Calendar
for the Rolling Plains and High Plains of Texas

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Winter wheat producers in the Rolling Plains and High Plains have a tight crop management schedule year-around. For the period between harvest and planting, growers often have only one to two months to make a range of decisions. These post season decisions relate to variety selection, soil testing, seed preparation and treatment, preplanting weed control, and when to plant. Other important decisions pertain to in-season weed control, nitrogen topdressing, harvesting, seed storage, and postharvest weed control. In-season field scouting (which takes time to do properly) affects decisions regarding replanting; management of diseases, insects, and weeds; possible freeze injury; and preharvest sprouting. This publication charts the aforementioned management practices in calendar format to help winter wheat producers plan year-around for successful crop production in the Rolling Plains and High Plains of Texas.

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How to use this calendar

The calendar timings in this guide are approximate—they reflect typical optimum timing for numerous wheat management parameters. These will vary based on the cropping season and planting date. This is especially true for wheat planted well into the fall and even early winter—these calendars do not reflect timing for late-planted wheat. Keep in mind that delaying certain management practices will decrease wheat forage and grain potential. These delays include: seeding late by several weeks or more, late removal of grazing cattle if going to grain, topdressing N on wheat after jointing, or delayed spraying of fungicides to control rusts. To ensure proper timing, it is highly recommended you base management decisions on the wheat growth stage as described by the Feekes Scale (Fig. 1).

Variety selection

All wheat varieties are genetically different. When choosing a variety, it is important to consider grain and forage yield, insect and disease resistance, plant height, maturity, seed size, and tolerance to acid soils. For example, under full irrigation and aggressive nitrogen management, tall varieties can lodge, leading to a decrease in yield. Small seeded varieties can suffer reduced seedling emergence and crop stand if they are planted too deep. Acid tolerance can be important if your soils are acidic (as determined by soil sampling and pH testing).

You should select a variety based on your wheat production objective—the selection should address its greatest limitations. An increasing number of wheat producers in the Rolling Plains are growing wheat for dual purpose or grazing only. Depending on maturity, some wheat varieties produce more forage dry matter in the fall than others.

On the other hand, some varieties have a higher grain yield potential than others. When planting for grain, it is important to choose a variety that performs well over multiple years and across a range of environments. To help you with variety selection, by early August the Texas A&M AgriLife Research and Extension Service releases an annual Wheat Picks List for each wheat-growing region in Texas. Regional wheat picks are based on Uniform Wheat Variety Trial data from multiple years and locations within a region. Please consult with your County Extension Agent or AgriLife websites to find the picks list for your area.

For details regarding variety selection, please consult the following Texas A&M AgriLife publications.

- *How to Select a Wheat Variety* at http://publication.tamu.edu/
- *Wheat Variety Results – Statewide* at http://varietytesting.tamu.edu/wheat/#VarietyTrials

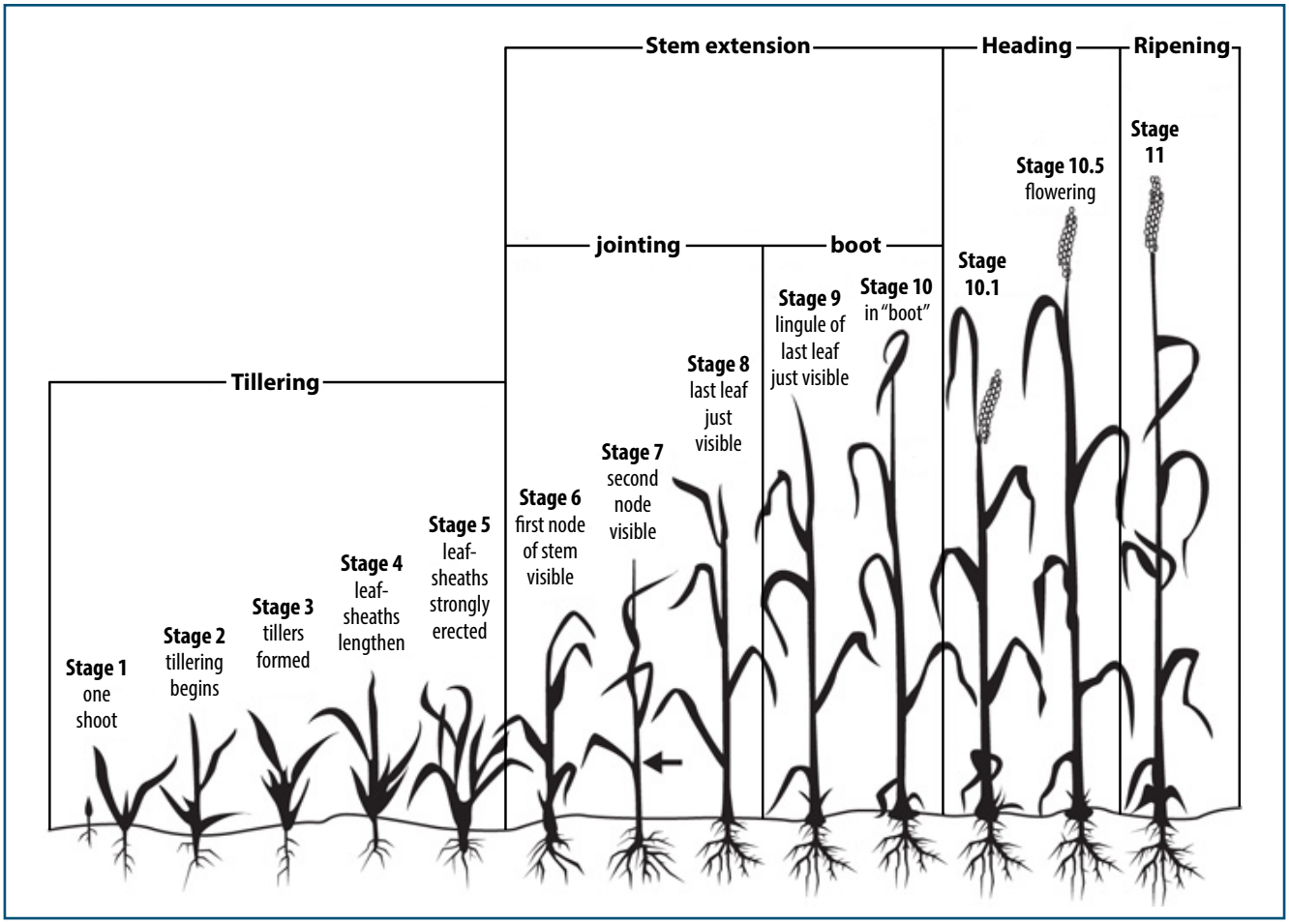
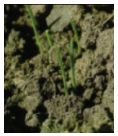


Figure 1. Feekes Scale of growth stages of wheat.

Winter Wheat Management Calendar for the Rolling Plains of Texas

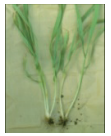

Feekes 1.0


Feekes 2.0


Feekes 3.0


Feekes 4.0


Feekes 5.0


Feekes 6.0


Feekes 7.0


Feekes 8.0


Feekes 10.0


Feekes 10.5.1


Feekes 11.4

	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Production practices	Prepare seed bed		Optimum planting for forage/dual-purpose wheat (p. 5)						Graze and/or bale prior to heading for high quality forage			
				Optimum planting for grain (p. 5)							Grain harvest	
Replanting decision				Check seedling emergence and uniformity (p. 6)								
Grazing					Feekes 4.0: Grazing starts when wheat are fully tillered			Feekes 6.0: Livestock should be removed before joining for dual-purpose wheat production				
Variety selection and seed preparation	Choose varieties that fit your objectives (p. 2) Check seed quality for bin-saved seed (p. 5)			Observe how the varieties selected performed in your environment (e.g., seedling vigor, maturity, height, and rust issues)							Reevaluation of variety selection	
Soil test	Soil sampling and testing (p. 5)											Soil sampling and testing (p. 5)
Weed control	Preplant soil residual weed control (p. 6)				After Feekes 2.0–9.0: Post-emergence weed control (p. 6)						Postharvest weed control (p. 6)	
			Pre-emergence (p. 6)									
Fertility management		Fertilizer application before or at planting (p. 6)			Observe any nutrient deficiencies						Plan for fertility program for fall planting based on soil test result	
							Feekes 5.0: N top dressing application (p. 7)					
Insects	Seed treatment (p. 7)		Scout for armyworm				Scout for insects					
Diseases							Scout and spray for strip rust (p. 7)					
									Scout and spray for leaf rust (p. 7)			
Freeze injury								Assess freeze damage if needed (p. 7)				
Preharvest sprouting (PHS)										Scout field for PHS (p. 7)		

Winter Wheat Management Calendar for the High Plains of Texas

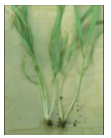

Feekes 1.0


Feekes 2.0


Feekes 3.0


Feekes 4.0


Feekes 5.0


Feekes 6.0


Feekes 7.0


Feekes 8.0


Feekes 10.0


Feekes 10.5.1


Feekes 11.4

	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Production practices	Prepare seed bed		Optimum planting for forage/dual-purpose wheat (p. 5)							Graze, bale, and/or cut haylage prior to heading for high quality forage		
				Optimum planting for grain (p. 5)								Grain harvest
Replanting decision				Check seedling emergence and uniformity (p. 6)								
Grazing					Feekes 4.0: Grazing starts when wheat are fully tillered		Feekes 6.0: Livestock should be removed before joining for dual-purpose wheat production					
Variety selection and seed preparation	Choose varieties that fit your objectives (p. 2) Check seed quality for bin-saved seeds (p. 5)			Observe how the varieties selected performed in your environment (e.g., seedling vigor, maturity, height, and rust issues)							Reevaluation of variety selection	
Soil test	Soil sampling and testing (p. 5)						Soil sampling and testing for topdress N requirement (p. 5)					
Weed control	Preplant soil residual weed control (p. 6)						Preharvest weed control (p. 6)					
			Preemergence (p. 6)									
Fertility management		Fertilizer application before or at planting (p. 7)			Observe any nutrient deficiencies						Plan for fertility program for fall planting based on soil test result	
								N top dressing application before jointing (p. 7)				
Insects	Seed treatment (p. 7)		Scout for armyworm				Scout for insects					
Diseases									Scout and spray for stripe and leaf rust (p. 7)			
Freeze injury								Assess freeze damage if needed (p. 7)				
Preharvest sprouting (PHS)										Scout field for PHS (p. 7)		

Seed preparation

Many wheat producers in the Rolling Plains and High Plains keep their own seeds for planting the following year. However, planting certified seed is the surest way to successfully establish a stand of wheat. Certified seed is commonly tested for germination, thoroughly inspected for purity, and monitored for contamination, such as inert matter, weed seeds, and disease. If you choose to plant farmer-saved seed, harvest that seed from weed- and disease-free fields to avoid pest contamination the following year. Bear in mind that continuous rain on mature wheat before harvest can create disease pressure and preharvest sprouting issues that reduce the quality of saved seeds. Stand establishment with such seeds is likely to be poor. The cost of seed cleaning, treatment, and germination testing can equal or exceed that of certified seeds.

Seeds treated with a fungicide or insecticide, or both, improve stand establishment and reduce disease and insect pressure. The greatest benefit of seed treatment is that it protects seed that is planted too deep or too shallow, exposed to extreme soil environments, or planted late due to the lack of soil moisture. All these situations can damage unprotected seed and reduce seedling emergence in the fall. In these cases, the benefit of seed treatment can be significantly higher than its cost. Though seed treatments may not economically improve yield every year, they should be viewed as a risk management strategy.

For details regarding seed preparation, please consult the following Texas A&M AgriLife publications.

- *Seed Treatment and Foliar Insecticides* at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Seed Treatment Decisions* at http://amarillo.tamu.edu/amarillo-center-programs/extension-plant-pathology/wheat-publications/
- *Suggested Seed Testing Laboratories for Texas Wheat* at http://publication.tamu.edu/

Soil sampling and testing

Soil sampling and testing can improve soil fertility and help you avoid over- or under-applying important nutrients. Though soil sampling for winter wheat can be done any time before planting, it's preferable to do it one month prior. Test results from samples 0- to 6-inches deep will provide all nutrient and pH levels in your soil except for some mobile nutrients, such as nitrogen (N). Nitrogen is the second most yield-limiting factor after soil moisture in the Rolling Plains and High Plains. Sampling for N should be conducted to a depth of 24 inches to accurately estimate soil residual N. There is often residual N that can be credited toward your fall application or late-winter top dressing. This is especially true in the High Plains and even under dryland conditions, if the previous wheat was not harvested and plowed under as a result of strong storms or hail.

On intensively managed and dryland fields in the High Plains, soil or tissue samples are recommended in late winter to accurately access the nitrogen top dress requirement. On irrigated and dryland fields, many producers refrain from applying nitrogen in the fall to avoid excessive fall growth that over utilizes soil moisture. Consequently, if winter moisture favors above-average yield potentials, it is recommended to evaluate fertility recommendations.

For details regarding soil sampling and testing, please consult the following Texas A&M AgriLife website and publication.

- *Texas A&M Nutrient recommendation for the small grains* (website) at http://soiltesting.tamu.edu/webpages/recommendations.html
- *Testing Your Soil: How to Collect and Send Soil Samples* (E-534) at http://publications.tamu.edu

Planting

The right time to plant winter wheat varies because proper germinations requires adequate soil moisture. For wheat that is not irrigated, when you plant is influenced by rainfall. However, you should not delay planting too long. For wheat to survive the winter it needs adequate tiller growth and root development before the cold sets in. Planting for forage production and dual-purpose wheat generally takes place six weeks earlier than wheat planted for grain only—this maximizes fall forage production. Low germination, including

seed dormancy due to hot conditions, may occur if wheat is planted before the soil temperature drops in the fall (especially in the Rolling Plains). Planting too early also increases the risk of Hessian fly or army worm damage. As well, it can lead to excessive moisture use which is inefficient under hot conditions. In contrast, particularly for dryland wheat for grain, don't let good soil moisture get away—you might not get another rain for weeks. Planting some wheat early to ensure a better stand has merits.

Seeding depth needs to be carefully adjusted, especially for small seeded varieties. Seeds contain carbohydrate reserves that serve as an energy source for germination and emergence. Wheat seedlings depend on these reserves until the plant can make its own carbohydrates through photosynthesis. If small seeded varieties are planted too deep, seedlings run out of energy before they reach the surface. This causes lower seedling emergence compared to the larger seeded varieties.

For details regarding planting, please consult this Texas A&M AgriLife publication.

- *Stand Establishment of Small Grains and Annual Grasses for Grain and Winter Pasture* (SCS-1999-23) at http://lubbock.tamu.edu/programs/crops/wheat/

Replanting decision

Wheat produces its most productive tillers in the fall, which influences grain productivity the following spring. Therefore, scouting fields for proper seedling emergence and stand uniformity is critical to successful forage as well as grain production. Generally, target seedling density is 10 to 25 plants per square foot.

For details regarding replanting decisions, consult the the following Texas A&M AgriLife publication.

- *Wheat Replanting Consideration* at http://varietytesting.tamu.edu/wheat/#VarietyTrials

Weed control

Weeds are opportunistic and can spread exponentially once they invade a field. Consequently, effective weed control is critical to yield and quality in wheat grain and forage. Maintaining dense stands through cultural practices such as proper seeding rate, row width, planting time, and variety selection will help you reduce your dependance on chemical control. The four principal times that chemical control is used are preplant, preemergence, postemergence, and postharvest. The active ingredients that are available for these application times are listed in Weed Control Recommendations in Texas Wheat (2016). Always read and follow product labels—carefully check the application rate, timing, incorporation method, and crop rotation restriction for subsequent crops.

For details regarding weed control, please consult the following websites and Texas A&M AgriLife publications.

- *Weed Control Recommendations in Texas Wheat, 2016* (ESC-037) at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *CDMS pesticide label database* (Webpage) at http://www.cdms.net/Label-Database
- *Perennial weed control during fallow periods in the Texas High Plains* (L-5102) at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *An IPM Approach to Managing Herbicide Resistant Ryegrass in Northeast Texas – 2014* at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Wild oat control in Texas* (website) at http://sanangelo.tamu.edu/extension/agronomy/agronomy-publications/wild-oat-control-publication/

Fertility management

Wheat requires about 1.25 pounds of N and 0.45 to 0.5 pounds of P per bushel of grain produced. Applied N can be lost though volatilization if left on the soil surface, especially on moist soil, soil with high pH, and at temperatures 70° F and higher. Applied N can also be lost through leaching or denitrification before it can be used by the crop. To account for these environmental losses, the recommended N is calculated at 1.5 lbs of N per bushel of grain (for grain only) and 2 lbs of N per bushel of yield for dual purpose wheat production. Remember to credit residual soil N for your N application. You can determine soil residual N through soil sampling and testing at 0 to 6 inches, 6 to 12 inches, or 12- to 24-inch depths. Nitrogen utilization is most efficient when you split appli-

cations at one third before or at planting and two thirds at topdress. Topdressing should applied during or just before jointing (Feekes 5.0), otherwise you can lose significant yield potential. With the exception of N, all other fertilizers can be applied strictly in the fall.

For details regarding fertility management, please consult the following Texas A&M AgriLife publications.

- *Deep P Placement in Wheat in the Texas Rolling Plains* at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Phosphorus Fertility in Wheat* at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Nitrogen and Wheat Grain Production – Topdressing Timing is Critical* at http://varietytesting.tamu.edu/wheat/#VarietyTrials

Pest control

Stripe rust has increased throughout Texas in recent years and can start as early as the end of January in the Rolling Plains. Resistant wheat varieties can reduce yield damage from this disease; however, they cannot completely eliminate infection or yield loss. This is particularly true under early season infection and high disease pressure. You can use one or more timely applications of fungicide to reduce yield losses caused by this disease.

Leaf rust is another major disease that routinely affects Texas wheat. Texas A&M AgriLife Extension pathologists regularly update available fungicide products for controlling rust diseases in wheat. Timely scouting is critical for identifying and applying appropriate fungicides to maintain healthy wheat stands and yield potential.

Insect vectored viruses are also of significant concern in these regions. Barley yellow dwarf virus (BYDV) and a complex of mosaic viruses including wheat streak mosaic (WSMV), Triticum mosaic (TriMV), and wheat mosaic (WMoV) viruses are among the most important viral diseases encountered in Texas wheat. Several aphids vector BYDV while the wheat curl mite is responsible for the spread of the three mosaic viruses listed above. Control of the wheat curl mite with miticides is inconsistent, but aphids can be effectively controlled using insecticides. Both diseases are more likely in early-planted wheat grown for forage, but are less likely in later planted wheat for grain. Because mites and aphids move by wind and can migrate from nearby fields, planting dates are not a dependable means of control. Seed treatments and resistant varieties can reduce these pests and the diseses they vector.

For details regarding weed control, please consult the following Texas A&M AgriLife publications.

- *Registered Fungicide Products for Rust Control in Wheat* at (PLPA-Wh016-01a): http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Identifying Rust Diseases of Wheat and Barley* at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Potential Causes of Yellowing During the Tillering Stage of Wheat in Texas* (ESC-040) at http://varietytesting.tamu.edu/wheat/#VarietyTrials

Freeze injury

The vegetative stages of winter wheat (Feekes 2 to 4) tolerate cold temperatures best. Susceptibility increases once the plant begins to joint and the growing point is above the soil. Frequent scouting when temperatures drop below seasonal norms can help you estimate potential damage to wheat. Symptoms can take up to a week or more to be visible, so be patient when scouting.

For details regarding freeze injury, please consult the following Texas A&M AgriLife publication.

- *Wheat Freeze Injury in Texas* at http://varietytesting.tamu.edu/wheat/#VarietyTrials

Preharvest sprouting

Preharvest sprouting may occur when ripened wheat (Feekes 11.4) is exposed to adequate moisture and temperature for extended periods. Once the preharvest sprouting begins, quality decreases in terms of use for baking, test weight, and the viability and vigor of seed for planting. Such seeds should not be used for the subsequent year's planting as they are susceptible to disease and insect pressure while in storage. If you do use them for the following year, you should test them

for germination just before planting. Sprouted seed can be fed to cattle—there is little impact on its nutritional value.

For details regarding weed control, please consult the following Texas A&M AgriLife publications.

- *Preharvest Sprouting in Wheat* (E-336) at http://varietytesting.tamu.edu/wheat/#VarietyTrials
- *Sprouted Wheat for Feeding Cattle* at http://varietytesting.tamu.edu/wheat/#VarietyTrials

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