

Post-Harvest Dormancy in Wheat

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Post-harvest dormancy refers to the inability of seed to germinate after it has been harvested. Some seeds undergo a biochemical process that must occur before germination is initiated. This may be just a matter of time or other factors may interact with time. Post-harvest dormancy is sometimes nature's way of preventing seed from germinating at the wrong time of year.

In wheat, the germination conditions influence the level of post-harvest dormancy expressed. With higher soil temperature, more post-harvest dormancy is expressed. It is common for laboratories conducting wheat germination analyses within six weeks of harvest to place the moist seed in a refrigerator for two to three days prior to placing them in the germination chamber. This breaks most post-harvest dormancy. The level of post-harvest dormancy is genetically controlled, meaning some varieties could have a high level of post-harvest dormancy while others have very little post-harvest dormancy.

Influence of Post-Harvest Dormancy on Fall Forage Production

The level of post-harvest dormancy is important to Oklahoma wheat producers who emphasize fall forage production, because they are planting into high-temperature soils which may cause post-harvest dormancy to be expressed. They are also planting earlier than producers planting for grain only. This means there is less time from maturity until planting and the post-harvest dormancy may not have dissipated. Under such conditions, varieties with the genetic potential for high post-harvest dormancy may have low germination, even if adequate soil moisture is present for germination. Once soil temperature decreases (e.g., after a cool rain), the remaining seed are likely to germinate and emerge. Just a few days delay in germination can result in a significant reduction in fall forage production.

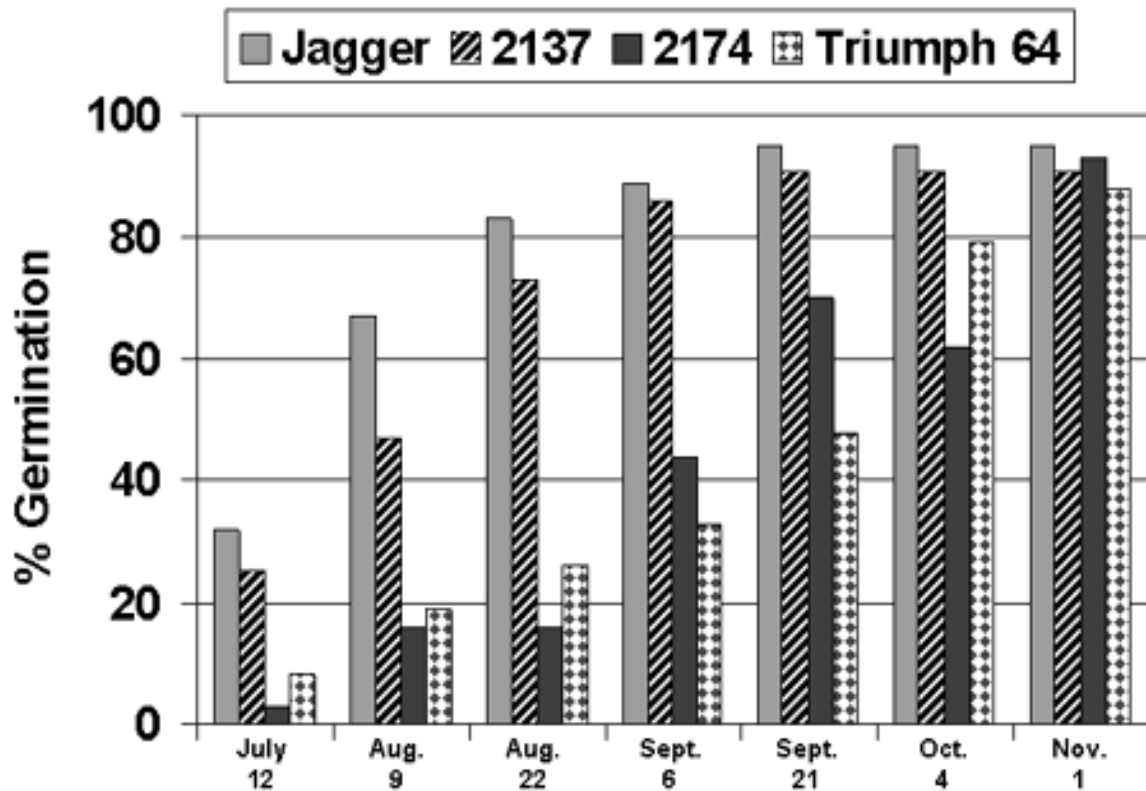


Figure 1. Variety differences in post-harvest dormancy when germinated at 95° F day temperature.

Determining Post-Harvest Dormancy Level

For three years, seeds harvested from all varieties planted in the Stillwater variety demonstration strips have been germinated in growth chambers to evaluate post-harvest dormancy. The initial germination is conducted immediately after the July 4th weekend in a chamber set at 95° F day and 75° F night (Fig. 1). At two-week intervals we repeated the germination until all varieties had germinated 90% or more. Using the results of these tests, we assign varieties a post-harvest dormancy rating of low, medium, high, or very high if they germinated above 90% by the first of August, September, October, or later, respectively.

Field Demonstration of Post-Harvest Dormancy

We were able to demonstrate the impact of post-harvest dormancy on fall forage production in the wheat variety trials at Perkins and Chickasha in 2000. At Chickasha the wheat was dusted in on September 19, and rain occurred on September 23. The high temperature on Sept. 23 was 85, but dropped to 56, 63, 73, 80, 83, and 83° F the next six days. We would expect with these temperatures that post-harvest dormancy would not be expressed, and it was not. However, at Perkins we pre-irrigated because of lack of soil moisture. Wheat was planted on October 2 and the high temperature for that day and subsequent days was 94, 95, 91, 76, 57, and 55° F. These above 90-degree days were hot enough to cause the post-harvest dormancy to be expressed.

When the Perkins plots were observed 10 days after planting, all varieties appeared to have an excellent stand except 2174 and Cutter, which appeared to have about 35% stand. By 20 days after planting all plots were up to an excellent stand. At Chickasha, all plots appeared to have a good stand 10 days after germination was initiated by the rainfall.

The following table summarizes fall forage data from these two trials. Varieties are ranked from 1 (highest fall forage yield) to 28 (lowest fall forage). Note that if the post-harvest dormancy rating for a variety was medium or low, then that variety performed relatively well at Perkins compared with Chickasha (e.g., Intrada and Lockett). In contrast, if the post-harvest dormancy rating was very high, then that variety performed relatively poor at Perkins (e.g., Cutter and 2174). The only exceptions were varieties that were either very good (2158) or very poor (Ogallala) forage producers regardless of the location. We conclude that wheat varieties with a very high post-harvest dormancy may not produce maximum fall forage. In addition to 2174 and Cutter, Cimarron, Ok102, and Triumph 64 have high post-harvest dormancy.

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Post Harvest Dormancy Rating and Fall Forage Yield

Source	Entry	2000 Fall Forage (lb/a)		Dormancy
		Chickasha	Perkins	Rating ¹
GOERTZEN	ENHANCER	1930(22) ²	2080(15)	L
GOERTZEN	KALVESTA	1990(19)	2080(15)	L
TAES	LOCKETT	1960(21)	2360(4)	L
AGRIPRO	TOMAHAWK	2040(14)	2210(7)	L
TAES	TAM 302	1790(26)	2120(13)	L
KAES	2137	1800(25)	1910(25)	M
KAES	2158	2220(5)	2400(2)	M

AGRIPRO	CORONADO	2090(11)	1980(20)	M
OAES	CUSTER	2000(18)	2150(11)	M
GOERTZEN	G1878	2020(16)	2330(5)	M
HARDEMAN	HG-9	1680(27)	1980(21)	M
OAES	INTRADA (W)	2060(13)	2410(1)	M
KAES	JAGGER	2140(9)	2100(14)	M
AGSECO	ONAGA	2200(8)	2310(6)	M
OAES	TONKAWA	2020(16)	2210(7)	M
GOERTZEN	VENANGO	1970(20)	2370(3)	M
OAES	CHISHOLM	2500(3)	2130(12)	H
AGRIPRO	OGALLALA	1650(28)	1890(26)	H
AGRIPRO	THUNDERBOLT	1860(23)	2010(17)	H
KAES	TREGO (W)	2520(1)	2170(10)	H
AGRIPRO	Cutter	2090(12)	1780(28)	VH
OAES	Ok102	2110(10)	2010(17)	VH
OAES	2174	2220(5)	1940(24)	VH
MEAN		2070	2090	
LSD (0.05)		350	240	

¹ Dormancy is post-harvest dormancy rating VH = Very High, H = High, M = Medium, and L = Low.

² Number in () is rank within column.

Perkins planted Oct. 2 and Chickasha planted Sept. 23 both at 120 lb/a.

KAES, OAES, TAES = Kansas, Oklahoma, Texas Agricultural Experiment Stations, respectively.

(W) indicates a Hard White Wheat variety.

Variety Rating for Post-Harvest Dormancy

Low ¹	Medium	High
Big Dawg	2137	Akron
Dumas	2158	Chisholm
Enhancer	AGSECO 7853	Ogallala
Heyne (W) ²	Coronado	Prowers
Kalvesta	Custer	Thunderbolt
Lakin (W)	Dominator	Trego (W)
Lockett	G1878	
Ok101	Ike	
Tomahawk	Intrada (W)	
TAM 110	Jagger	
TAM 202	Onaga	
TAM 302	TAM 107	
	Tonkawa	
	Vernango	

¹ Post-harvest dormancy rating under laboratory conditions:

Very High = May not reach >90% germination in 95°F soil until 105 or more days after harvest

High = May not reach >90% germination in 95°F soil until 75 or more days after harvest

Medium = May not reach >90% germination in 95°F soil until 45 or more days after harvest

Low = Likely to reach >90% germination in 95°F soil prior to 45 days after harvest

²(W) indicates a hard white wheat variety

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