

# Wheat Varietal Differences in Deer Browsing Damage

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In many regions of the United States, crop damage from deer browsing is a perennial problem. Deer are primarily associated with damage to soybean and corn, but are also known to damage wheat. According to the National Agricultural Statistics Service, deer cause \$359 million in field crop damages in the U.S. annually. Wheat foliage provides a good source of high protein forage throughout winter and spring. Foliage browsing typically does not affect grain yield. Wheat seedheads are also eaten by deer from the soft-sough stage to maturity, which directly affects yield. Most browsing damage on grain crops occur near woodlot/field edges.

Managing deer population numbers by state wildlife agencies is the primary way to limit deer damage to crops. Use of chemical retardants, taste retardants, fencing, and frightening devices may also discourage browsing, but wheat variety selection may be the simplest and most cost effective way to minimize potential yield losses by planting unpalatable bearded (awned) varieties. Alternatively, when selecting wheat varieties to enhance habitat for hunting, awnless headed varieties are recommended for deer plots. Wheat awns are unpalatable and consumption of mature awns has been shown to be detrimental to deer health.

The objective of this study is to evaluate varietal differences in deer damage observed at the 2019 University of Kentucky Ohio Valley Region Wheat Variety Trial.

## Methodology

Late season deer damage (head browsing) was recorded at the 2019 University of Kentucky Wheat Variety Trial in Crittenden County, KY. The trial was located approximately 50 meters from a forest edge. The trial was surrounded with wheat planted by the cooperating grower. There were 84 wheat entries (59 bearded [awned], 23 awnless and 2 tip-awned [relatively smooth heads, with the exception of a whirl of awns attached near the tip of the head]) in the trial. The trial was set up in a randomized complete block design with four replicated plots per entry. Plots were 4 feet wide and 15 feet in length and planted under conventional tillage. Deer were observed in the variety trial and footprints indicated heavy deer traffic throughout the field. Deer damage ratings were recorded at maturity for each plot as the percentage of heads removed. The results were averaged across reps and summarized. Plant height and heading date were recorded. Due to the extensive deer damage, this trial was not harvested for grain yield. Since damage occurred late in the growing season, it can be assumed that the damage percentage would be comparable to yield reductions.

## Results and Discussion

Fifty-six of the 59 bearded entries had no deer damage (Table 1). The damage was minimal (ranging from 1 to 3%) for the 3 affected bearded entries. The average level of de-heading damage for all bearded varieties was 0.08%. All 23 awnless varieties showed deer damage ranging from 5 to 88% and averaged 54% (Image 1). The two tip-awned varieties had 0 and 21% damage indicating some “poor” palatability protection. These results indicate that deer avoided browsing on bearded heads and caused considerable browsing damage to the awnless varieties.

**Table 1. 2019 Deer Damage - Kentucky Wheat Variety Trial - Ohio Valley Region.**

<b>VARIETY</b>	<b>Deer Damage (%)</b>	<b>Head Type</b>	<b>VARIETY</b>	<b>Deer Damage (%)</b>	<b>Head Type</b>
Dyna-Gro 9862	88	Awnless	CROPLAN CP8550	0	Bearded
AgriMAXX 485	86	Awnless	CROPLAN CP8800	0	Bearded
Pioneer variety 26R45	83	Awnless	CROPLAN CP9415	0	Bearded
Truman	76	Awnless	CROPLAN CP9606	0	Bearded
Bess	75	Awnless	Liberty 5658	0	Bearded
Go Wheat 4059S	71	Awnless	Dyna-Gro 9701	0	Bearded
SYNGENTA SX 8186	71	Awnless	Dyna-Gro 9932	0	Bearded
PROGENY #WARRIOR	70	Awnless	Dyna-Gro 9941	0	Bearded
AgriMAXX 463	69	Awnless	Dyna-Gro 9980	0	Bearded
LOCAL LW 2867	68	Awnless	Dyna-Gro 9002	0	Bearded
SYNGENTA SY 100	63	Awnless	Dyna-Gro WX19711	0	Bearded
KAS Lincoln	61	Awnless	Dyna-Gro WX19713	0	Bearded
GoWheat 2059	58	Awnless	Dyna-Gro WX19714	0	Bearded
KY09C-1245-99-12-3	58	Awnless	Go Wheat 4010	0	Bearded
SYNGENTA SY VIPER	51	Awnless	GoWheat 2058	0	Bearded
KY07C-1145-94-12-5	38	Awnless	KAS 19X9EX	0	Bearded
Pioneer variety 26R59	38	Awnless	KAS Roosevelt	0	Bearded
KY09C-0128-72-2-1	32	Awnless	KWS 19X09	0	Bearded
SYNGENTA SY 547	26	Awnless	KY06C-1178-16-10-3-34	0	Bearded
DH12SRW057-006	23	Awnless	LCS L11713	0	Bearded
KY10-0178-1-2-5	21	Tip-Awned	LCS L11719	0	Bearded
KWS 19X03	16	Awnless	LOCAL LW 2848	0	Bearded
KY09C-1245-99-1-5	11	Awnless	LOCAL LW 2937	0	Bearded
X10-0594-7-1-3	5	Awnless	LOCAL LW 2958	0	Bearded
KAS Truman 18X6	3	Bearded	LOCAL LW Ex19D	0	Bearded
PROGENY #BLAZE	1	Bearded	PEMBROKE 2008	0	Bearded
PROGENY PGX 18-2	1	Bearded	PEMBROKE 2014	0	Bearded
AgriMAXX 454	0	Bearded	PEMBROKE 2016	0	Bearded
AgriMAXX 473	0	Bearded	Pioneer variety 26R10	0	Bearded
AgriMAXX 486	0	Bearded	Pioneer variety 26R36	0	Bearded
AgriMAXX 495	0	Bearded	Pioneer variety 26R41	0	Bearded
AgriMAXX 496	0	Bearded	PROGENY #BULLET	0	Bearded
AgriMAXX EXP 1906	0	Bearded	PROGENY PGX 17-16	0	Bearded
AgriMAXX 492	0	Bearded	PROGENY PGX 18-8	0	Bearded
ARMOR ARW1766	0	Bearded	SYNGENTA SX 8146	0	Bearded
ARMOR ARW1815	0	Bearded	USG 3316	0	Bearded
ARMOR ARW1816	0	Bearded	USG 3329	0	Bearded
ARMOR ARW1819	0	Bearded	USG 3404	0	Bearded
ARMOR MAYHEM	0	Bearded	X11-0420-120-13-3	0	Bearded
ARMOR/KAS RAGE	0	Bearded	X12-3010-3-5-3	0	Tip-Awned
ARMOR SPIRIT	0	Bearded	X12-619-205-14-1	0	Bearded
ARMOR VELOCITY	0	Bearded	<b>Average</b>	<b>15</b>	

Deer Damage = percent of seedheads removed by deer browsing. Location: Crittenden Co.

There was no relationship between deer damage and plant height or heading date (data not shown). It is not clear why the range in damage among awnless entries was so wide (5 – 88%). There was spatial variability across the trial area (Figure 1 - shows the distribution and degree of plot damage across the trial). White boxes indicate plots with no deer damage. Colored boxes with values indicate damaged plots (darker colors correspond with higher levels of damage). With the exception of 3 plots marked with a star, all other bearded plots were white (0% damage). Almost all awnless plots had damage. The left side of the trial faced the forest line and the right side bordered a road. There were a greater number of awnless plots with lower damage ratings near the “right” road side, which is would be expected given deer tendency to browse near forest edges. These awnless plots with lower levels of damage on the right side of the trial did draw down some average damage values, but did not account for the large range in damage among awnless entries. Though the differences may be random, it is theoretically possible that there may also be a flavor component involved, but no conclusions can be made for the data presented.



**Image 1. The bearded variety on the right had 0% deer damage and the awnless variety on the left had 95% of seedheads selectively eaten.**

		80	30									5			40				
		99					20			30		50	60	60					80
					95	90		80			70	70	90		50	95		10	50
	90																95		
						70		20				40	95					80	
40					60			10		80				5	20				5
95	70				95			60	10								50		20
		40	★	10								40	10		50				
		60			80	95	95					10			5				60
	30								60						40				5
					80					50	95		95						5
85	90				95								50						60
★	5																	5	
	70					90	30		50	60	20	65	90					5	
															40	60	5	5	25
						50		80						80			40		50
									90		70		95						5

Figure 1. Distribution and degree of deer browsing damage to plots within variety trial.