

Efficient Water Use: Utilizing Water Captured by an Alternative Forage - Failed Wheat/Kochia/Palmer Amaranth

Adam King^{||}, Dr. Keith Harmony[†], Dr. Jim Drouillard^{||}, Dr. Emma Briggs[†]

^{||}Department of Animal Sciences and Industry, Kansas State University, [†]Agricultural Research Center-Hays, Kansas State University,

Introduction

In 2023, 29% of Kansas wheat fields were not harvested, leaving 2.35 million acres abandoned (USDA-NASS, 2024).

Many abandoned wheat fields then became infested with invasive species: kochia and Palmer amaranth.

Objective

Determine if failed wheat with kochia and Palmer amaranth weeds can be utilized as a forage for finishing rations in the Great Plains region.

Methods

Experimental Design

- Treatments: failed wheat/kochia (WHT-KCHA)
- Control: sorghum-sudan (SOR-SUD)
- Animals: 300 Angus and Angus cross steers were housed in 20 pens with 10 pens per treatment
- Cattle were fed a finish ration for 148 days, consisting of rolled corn (64%), wet distillers grain (29%); failed wheat/kochia or sorghum-sudan roughage (7%); and a premix containing vitamins, minerals, monensin, and tylosin.

Statistical Analyses

- Data were analyzed as mixed models (SAS 9.4) intake, gain, hot carcass weight, dressing %, carcass yield grade, ribeye area, marbling score
- LS means separated by PDIF
- Binomial proportions analyzed using GLIMMIX procedure in SAS 9.4: Instance of abscessed livers
- Fixed effect=treatment; random effect=replication

Table 1: Feed Analysis

Feed Type	Hay WHT-KCHA	Hay SOR-SUD	Ration WHT-KCHA	Ration SOR-SUD
DM%	84.40	83.80	67.83	70.72
CP%	9.42	7.58	9.15	9.20
ADF%	42.98	34.93	6.50	6.53
NDF%	56.88	54.28	11.10	11.97
TDN%	38.55	46.90	60.03	62.70
NEm, Mcal/lb	0.31	0.45	0.68	0.71
NEg, Mcal/lb	0.11	0.23	0.46	0.49

TMR= Total Mixed Ration, DM= Dry Matter, CP= Crude Protein, ADF= Acid Detergent Fibers, NDF= Neutral Detergent Fibers, TDN= Total Digestible Nutrients, NEm= Net Energy for Maintenance, NEg= Net Energy for Gain

Results

Table 2 Body Weight

TRT	Initial BW, lbs	Midpoint BW, lbs	Final BW, lbs
SOR-SUD	817	1217	1510
WHT-KCHA	811	1215	1492

TRT= Treatment, BW= Body Weight

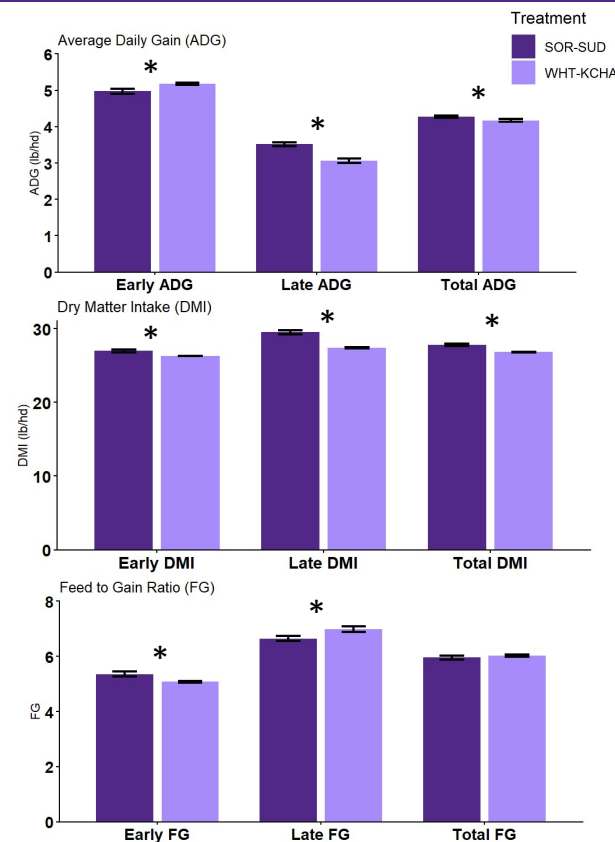
* Indicates statistically different values at $P \leq 0.05$

Table 3: Carcass Data

TRT	HCW, lbs	Dressing	Marble	CYG	REA, in ²	ABS
SOR-SUD	980	65%	594	3.8	14.0	37.8%
WHT-KCHA	972	65%	593	3.9	13.9	42.9%

TRT= Treatment, HCW= Hot Carcass Weight, Marble: 500-599= Choice CYG= Calculated Yield Grade, REA= Ribeye Area, ABS= Abscessed Liver

* Indicates statistically different values at $P \leq 0.05$



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Conclusion

Water captured by growth of weedy species in failed crop rotations may still be useful to add protein and value to animal agriculture. While wheat/kochia shows some differences in the dynamics of feed-to-gain (F/G) and slight variations in average daily gain and dry matter intake, overall F/G and carcass performance were comparable.