

Department of Animal and Range Sciences

Mission

The overall mission of the Department of Animal and Range Sciences parallels South Dakota State University's Land Grant Mission of providing education, research and professional outreach through the Cooperative Extension Service to the Citizens of South Dakota. Two of the specific missions of the Department of Animal and Range Sciences are 1) to conduct research related to the animal and range sciences that will enhance the understanding and development of livestock and related industries and 2) to transfer to the citizens of South Dakota research technology and information on livestock production, range management and related livestock industries, which will enhance the quality of life of all persons. The goal of this Annual Beef Report is to disseminate new knowledge that is discovered at South Dakota State University to the producers and livestock industries of South Dakota.

Biological Variation and Treatment Differences

Variability naturally exists among individual animals and plants. This variation can create problems when interpreting results from experiments. For example: when cattle in one treatment (X) have a numerically higher average daily gain compared to cattle in another treatment (Y), this difference in weight might be due to animal variation and not due to the treatments. Statistical analysis attempts to remove or reduce the natural variation that exists among animals and explains the difference due to the treatments.

In the following research papers, you will see notations similar to ($P < 0.05$). This means that there is less than a 5% chance that the difference between treatments is due to the natural variation that occurs. This indicates that there is greater than a 95% probability that the differences between treatments are the result of the treatments. You will also notice notations similar to ($P = 0.10$). This means that there is a 10% chance that the difference between treatments is due to the natural variation that occurs. This indicates that there is a 90% probability that the differences between treatments are the result of the treatments.

In most of the papers you will see an average, or mean, reported as 25 ± 2.3 . The first number is the average value for the treatment. The second number is the standard error, or the variability that occurred, and explains how accurately the mean is estimated. There is a 68% probability that the true mean will fall within 1 standard error of the listed mean and a 94% probability that the true mean will fall within 2 standard errors. For this example we are 68% certain that the true mean is between the range of 27.3 and 22.7 and 94% certain that the true mean is between 29.6 and 20.4.

Ways we decrease variability and improve the chance of measuring differences due to treatments include: having several animals in each treatment, replicating treatments several times, and using animals that are as similar as possible. The use of statistical analysis in research allows for unbiased interpretation of results. The use of statistical analysis in the research reported here increases the confidence in the results.

Editorial Committee: Dr. G. A. Perry (Editor)
Ms. Betty Knutsen (Word Processor and Formatter)

Conversion Tables

The metric system is frequently used for reporting scientific data. To aid in interpreting these data the following tables have conversions for common measurements from the metric system to the Standard English system.

Metric	English
0 C	32 Fahrenheit
1 milliliter	0.03 ounces
1 Liter	0.26 gallons
100 grams	0.22 pounds
1 kilogram	2.2 pounds
1 meter	3.28 feet

Commonly Used Abbreviations

ADG	Average Daily Gain	mo	months
ADF	acid detergent fiber	MP	Metabolizable protein
AI	Artificial Insemination	NDF	neutral detergent fiber
BCS	Body Condition Score	NE	net energy
BW	Body weight	NEg	Net Energy gain
CIDR	Controlled Internal Drug Releasing device	NEm	Net Energy maintenance
cM	Centimorgan	NEFA	Non-Esterified Fatty Acids
CP	Crude Protein	PCR	Polymerase Chain Reaction
d	days	PG	prostaglandin
DE	Digestible Energy	PSE	Pale, soft, and exudative
DFD	Dark, Firm, and Dry (meat)	ppb	parts/billion parts
DM	Dry matter	ppm	parts/million parts
DMI	Dry Matter Intake	³² P	Phosphorus Radioactive Isotope
DNA	deoxyribonucleic acid	QTL	Quantitative Trait Locus (singular) or Loci (plural)
EDTA	Ethylene Diamine Tetra Acetic Acid	RFLP	Restriction Fragment Length Polymorphism
F/G	feed to gain	RNA	Ribonucleic acid
g	gravity	s	seconds
GH	Growth Hormone	SNP	Single Nucleotide Polymorphism
GnRH	Gonadotropin Releasing Hormone	TDN	total digestible nutrients
GLM	General Linear Model	VFA	Volatile Fatty Acid
h	hours	wk	weeks
HCW	Hot Carcass Weight	wt	weight
Ins	Insulin	WW	Weaning Weight
KPH	Kidney, Pelvic, and Heart Fat	YG	Yield Grade
LMA	Longissimus Muscle Area	yr	years
MAS	Marker Assisted Selection	YW	Yearling Weight
ME	Metabolizable energy		
min	minutes		