ARKANSAS ANIMAL SCIENCE DEPARTMENT REPORT 2000

Edited by

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INTRODUCTION

The faculty and staff of the Animal Science Program are pleased to present the third edition of Arkansas Animal Science. We hope you will find the reports of the research, teaching, and extension programs useful.

The Dorothy E. King Equine Pavilion was dedicated on May 9, 2000. This facility, which features a lighted outdoor arena and pastures, was funded through a $440,000 grant from the Carl B. and Dorothy E. King Foundation of Dallas, Texas. This signaled the long-awaited beginning of an equine program at the University of Arkansas. We were pleased that Dr. Nancy Jack (BS, Tarleton State, MS and Ph.D., New Mexico State) joined the faculty to direct the new King Equine Program. The announcement of the $239,000 endowment to fund the Florence E. King Scholarships in Equine Studies capped a very good first year for the equine program. The new complex is located adjacent to the Pauline Whitaker Animal Science Center. A new white fence frames the entire set of facilities and extends the length of the property along Garland Avenue.

Other good news for the program included the announcement by Governor Mike Huckabee that $600,000 had been released for construction of a new swine research and teaching center. We are also pleased to announce the anticipated construction of an off-site grower-finishing barn donated by industry. These new facilities add substantial research and teaching capacity to the department's swine program.

Finally, the Animal Science Building has undergone a thorough renovation. The addition of an atrium provides a formal entrance and a very nice setting for functions in the building. The Department of Animal Science is grateful for the outstanding support it has received from higher administration in the College and Division of Agriculture, from the state government, and from private sources.

While facilities are an absolute requirement for a productive program, it is in the end what the faculty does with them that determines the quality of the program. We are proud of the work recorded in this 2000 report. We are also proud of the students in the department. Particularly, we are proud that the department had the outstanding senior for the Bumpers College at the spring 2000 graduation and that three of the nine Magna cum Laude graduates were from Animal Science.

Animal Science is very much devoted to youth education and development. During the past year, over 20,000 youth were involved in 4-H livestock projects. Two very successful activities that took place last year were the Mid-American Grassland Evaluation Contest and Livestock Judging Camps. The Grassland Contest is designed to teach students about grassland resource management for livestock and wildlife uses. The contest was held in Cape Girardeau, Missouri. First-place honors in the 4-H division went to White County, and second place honors went to Van Buren County. Two Livestock Judging Camps (Fayetteville and Hope) were conducted this past year. A total of 120 youth participated to learn the fundamentals of livestock judging, oral communications through reason, and industry standards for selection of beef, sheep and swine.

Extension programs in Animal Science continue to grow and receive national attention. Arkansas Grazing Schools, the Arkansas Beef Improvement Program, beef quality assurance, dairy management programs, equine training and management, forage demonstrations, and the Arkansas Feedout Program are just a few such programs. Reports of these programs can be found within this publication.

With a totally combined Animal Science Program (teaching, research, and extension), the University of Arkansas is working to meet the needs of the livestock industry.

Sincerely,

Keith Lusby
Department Head
Fayetteville

Tom Troxel
Section Leader
Little Rock

INTERPRETING STATISTICS

Scientists use statistics as a tool to determine which differences among treatments are real (and therefore biologically meaningful) and which differences are probably due to random occurrence (chance) or some other factors not related to the treatment.

Most data will be presented as means or averages of a specific group (usually the treatment). Statements of probability that treatment means differ will be found in most papers in this publication, in tables as well as in the text. These will look like ($P < 0.05$); ($P < 0.01$); or ($P < 0.001$) and mean that the probability (P) that any two treatment means differ entirely due to chance is less than 5, 1, or .1%, respectively. Using the example of $P < 0.05$, there is less than a 5% chance that the differences between the two treatment averages are really the same. Statistical differences among means are often indicated in tables by use of superscript letters. Treatments with the same letter are not different, while treatments with no common letters are. Another way to report means is as mean ± standard error (e.g., 9.1 ± 1.2). The standard error of the mean (designated SE or SEM) is a measure of how much variation is present in the data—the larger the SE, the more variation. If the difference between two means is less than two times the SE, then the treatments are usually not statistically different from one another. Another estimate of the amount of variation in a data set that may be used is the coefficient of variation (CV), which is the standard error expressed as a percentage of the mean.

Some experiments will report a correlation coefficient (r), which is a measure of the degree of association between two variables. Values can range from –1 to +1. A strong positive correlation (close to +1) between two variables indicates that if one variable has a high value then the other variable is likely to have a high value also. Similarly, low values of one variable tend to be associated with low values of the other variable. In contrast, a strong negative correlation coefficient (close to –1) indicates that high values of one variable tend to be associated with low values of the other variable. A correlation coefficient close to zero indicates that there is not much association between values of the two variables (i.e., the variables are independent). Correlation is merely a measure of association between two variables and does not imply cause and effect.

Other experiments use similar procedures known as regression analysis to determine treatment differences. The regression coefficient (usually denoted as b) indicates the amount of change in a variable Y for each one unit increase in a variable X. In its simplest form (i.e., linear regression), the regression coefficient is simply the slope of a straight line. A regression equation can be used to predict the value of the dependent variable Y (e.g., performance) given a value of the independent variable X (e.g., treatment). A more complicated procedure, known as multiple regression, can be used to derive an equation that uses several independent variables to predict a single dependent variable. Associated statistics are r^2, the simple coefficient of determination, and R^2, the multiple coefficient of determination. These statistics indicate the proportion of the variation in the dependent variable that can be accounted for by the independent variables.

Genetic studies may report estimates of heritability (h^2) or genetic correlation (r_g). Heritability estimates refer to that portion of the phenotypic variance in a population that is due to heredity. A genetic correlation is a measure of whether or not the same genes are affecting two traits and may vary from –1 to +1.

COMMON ABBREVIATIONS

ADFI = average daily feed intake
ADG = average daily gain
avg = average
BW = body weight
cc = cubic centimeter
cm = centimeter
CP = crude protein
CV = coefficient of variation
cwt = 100 pounds
d = day(s)
DM = dry matter
DNA = deoxyribonucleic acid
°C = degrees Celsius
°F = degrees fahrenheit
EPD = expected progeny difference
F/G = feed:gain ratio
FSH = follicle stimulating hormone
ft = foot/feet
g = gram(s)
gal = gallon(s)
h = hour(s)
in = inch(es)
IU = international units
kcal = kilocalorie(s)
kg = kilogram(s)
L = liters(s)
lb = pound(s)
LH = lutenizing hormone
m = meters
mg = milligram(s)
mcg = microgram(s)
mEq = millequivalent(s)
min = minutes(s)
mm = millimeter(s)
mo = month(s)
N = nitrogen
ng = nanogram(s)
NS = not significant
ppb = parts per billion
ppm = parts per million
r = correlation coefficient
r^2 = simple coefficient of determination
R^2 = multiple coefficient of determination
RNA = ribonucleic acid
s = second(s)
SD = standard deviation
SE = standard error
SEM = standard error of the mean
TDN = total digestible nutrients
wk = week(s)
wt = weight
yr = year(s)

TABLE OF CONTENTS