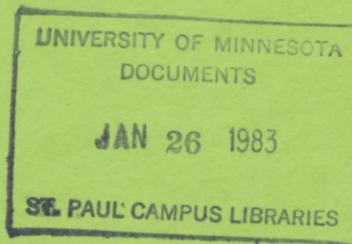


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1982 Minnesota Cattle Feeders' Report

DEPARTMENT OF ANIMAL SCIENCE
in cooperation with
Agricultural Extension Service and
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University of Minnesota

TABLE OF CONTENTS

	<u>Page no.</u>
An investment in the future..... Faculty, Animal Science Department	1
Managing returns and price risk in cattle feeding..... Paul Hasbargen and Kenneth Egertson	7
Comparison of various implants on feedlot performance of yearling steers. B-286..... R. E. Smith, H. E. Hanke, L. K. Lindor, R. D. Goodrich, J. C. Meiske, S. D. Plegge and J. E. Garrett	15
Chemical analyses of ethanol plant by-products. B-287..... D. A. Larson, R. D. Goodrich, J. C. Meiske, H. E. Hanke and L. K. Lindor	21
Influence of feeding thin stillage as a replacement for water on feedlot performance of yearling steers. B-288..... H. E. Hanke, L. K. Lindor, R. E. Smith, R. D. Goodrich, J. C. Meiske, S. D. Plegge and J. E. Garrett	23
Pressed distillers grains in diets of finishing yearling steers. B-289..... H. E. Hanke, L. K. Lindor, J. C. Meiske, R. D. Goodrich, D. A. Larson, J. E. Garrett and S. D. Plegge	28
Chemical preservation of wet distillers pressed grain. B-290... D. A. Larson, M. Diallo, R. D. Goodrich and J. C. Meiske	31
Preservation of corn fiber and corn gluten feed. B-291..... D. A. Larson, R. D. Goodrich and J. C. Meiske	36
Treatment of high moisture corn with sodium diacetate. B-292... D. W. Crawford, S. R. Burghardi, R. D. Goodrich and J. C. Meiske	50
Influence of sodium diacetate treatment of high moisture corn grain. B-293..... M. Lazaar, J. C. Meiske and R. D. Goodrich	55
Effect of supplemental potassium on performance of finishing steers. B-294..... H. F. Windels, J. C. Meiske and R. D. Goodrich	60
Evaluation of dried rumen contents in diets of growing steers. B-295..... T. M. Peters, R. D. Goodrich and J. C. Meiske	65
Sources of supplemental nitrogen for young Holstein calves. B-296..... K. P. Miller, R. D. Goodrich, J. E. Garrett and J. C. Meiske	68

Evaluation of aspen leaves as a ruminant feedstuff. B-297....	73
F. M. Bas, R. D. Goodrich, F. R. Ehle and J. C. Meiske	
Sire evaluation by progeny performance. B-298.....	75
J. C. Meiske and R. D. Goodrich	

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CARCASS VALUES AND CALCULATIONS USED IN THE VARIOUS RESEARCH REPORTS

Quality grades	
<u>Grade</u>	<u>Score</u>
Choice +	14
Choice 0	13
Choice -	12
Good +	11
Good 0	10
Good -	9

Marbling scores	
<u>Degree</u>	<u>Score</u>
Abundant	10
Moderately abundant	9
Slightly abundant	8
Moderate	7
Modest	6
Small	5
Slight	4
Traces	3
Practically devoid	2
Devoid	1

$$\begin{aligned}
 \text{Yield grade} = & 2.50 + (0.0038) (\text{hot carcass wt., lb}) \\
 & + (0.20) (\% \text{ KHP fat}) \\
 & + (2.5) (\text{fat depth, in.}) \\
 & - (0.32) (\text{rib eye area, sq. in.})
 \end{aligned}$$

AN INVESTMENT IN THE FUTURE

Faculty, Animal Science Department
University of Minnesota

Agriculture is the No. 1 industry in Minnesota. Cash receipts in 1980 totaled \$6.6 billion. Of this amount, 53.1% was from the sale of livestock (including poultry) and livestock products. Milk sales accounted for 18.5% of total farm income, cattle and calves for 16.6% and hogs for 11.9%. Each dollar of sales from livestock and livestock products in Minnesota generates from \$2.50 to \$3.00 of income from agricultural related industries. Minnesota is sixth in total livestock production and sixth in production of red meat in the country, first in turkeys, third in swine, fourth in milk production and eighth in cattle and calves. Of the 105,000 farms in Minnesota, 62,000 have cattle, 30,000 have swine, 26,000 keep milk cows and 8,000 have sheep. This important livestock industry of Minnesota must continue to be served by strong teaching, extension and research programs.

MAJOR ADVANCES IN ANIMAL PRODUCTION

During the past 50 years significant increases in production per animal and reduced costs of producing livestock and poultry products have resulted from the application of new techniques produced by University research and implemented through University extension and education programs.

- . Eggs produced per hen have doubled
- . Beef produced annually per cow has increased from 220 to 490 pounds
- . Average milk production per cow has more than doubled
- . Production of pork per sow has more than doubled
- . Pounds of lard per pig has decreased 50%
- . Pounds of feed/pound of broiler has been reduced from 4 to 2
- . Pounds of lamb produced per ewe has increased three-fold
- . Time required to produce a unit of food has declined 50% or more

BENEFITS TO PRODUCER AND CONSUMER

While advancements in agriculture have been beneficial to producers, the consumer also has been a major beneficiary. Without University extension, research and teaching, food would be a scarce rather than a plentiful commodity.

Livestock and poultry food products provide a large portion of nutrients in the human diet and add to the enjoyment of eating.

Percentage of nutrients in the American diet
derived from animal products

<u>Nutrient</u>	<u>%</u>
Protein	70
Calcium	70
Phosphorus	60
Iron	60
Energy	33

Plus significant amounts of vitamins and trace minerals

Food is provided in ample quantities in the U.S. at a reasonable cost. The percentage of disposable income spent for food in 1960 was 20%, in 1970 was 17.2% and 1980 was decreased to 16.6%. Other valuable products derived from animals are clothing, leather goods, pharmaceuticals, medical aids, soaps, waxes, glues, cosmetics, animal feeds and fertilizers.

HOW HAS THE ANIMAL SCIENCE DEPARTMENT CONTRIBUTED
TO ADVANCES IN ANIMAL AGRICULTURE?

Extension

Information on latest technologies in animal agriculture is made available to Minnesotans. Meetings, written materials and individual consultation benefit Minnesota farmers, processors, suppliers and consumers in making animals and animal products profitable for producers and preferred items for consumers.

Extension education programs have impacted heavily on Minnesota's livestock industries' prominence in the national and international agricultural scene. Examples of programs are:

- . Integration of economically feasible husbandry environmental and cultural practices
- . Dairy, Beef and Swine Herd Improvement Programs
- . Sound nutrition programs for all species
- . Improved milk production practices
- . Improved Reproductive Management
- . Improved Pasture and Forage Utilization
- . 4-H Youth Development
- . Improved quality, wholesomeness and consumer acceptance of animal food products

Research

Over the years, scientists of the Animal Science Department have contributed significant technology to the animal industry. Examples are:

a. Beef

- . Development of two-phase feeding program for feedlot cattle
- . Initiated concept of feeding whole grain to beef
- . Economics of housing and management systems
- . Improved use of high moisture grains
- . Developed year-round confinement management for cow-calf herds
- . Improved microbiological safety in modern cooking of roast beef

b. Dairy

- . Instrumental in development of frozen semen for A.I.
- . Demonstrated effectiveness of modern sire evaluation techniques
- . Development of technology for successful use of freeze-dried semen
- . Development of storage and feeding systems of colostrum and waste milk for calves
- . First to determine effects of stray voltage on animal performance

c. Sheep

- . Formulation of successful milk replacers for lambs
- . Pioneered early weaning system for lambs
- . Infusion of genetic material for improved lamb production
- . Developed practical feeding programs for ewes and feeder lambs
- . Developed restricted-time grazing concept and less frequent feeding schemes

d. Swine

- . Initiated cross breeding concepts for commercial pork production
- . Development of technology for successful use of frozen boar semen
- . Development of simple pig starters
- . Pioneered efforts in improving amino acid balance of swine diets
- . Reduction in incidence of porcine stress syndrome

e. Poultry

- . Pioneered light management of turkey breeders for year-round production-adopted world wide
- . Developed methods for successful A.I. in turkeys
- . Pioneered basic amino acid studies with turkeys
- . Determined that the W chromosome controlled sex in birds
- . Major contributions on effects of mycotoxins on poultry
- . Pioneered cytogenetic work in birds and determined chromosome numbers in 50 species

In addition extensive work has been done in forage utilization for beef, dairy and sheep; in preservation of silages and high moisture grains; in breed development; in determining factors affecting behavior; in understanding endocrinological and physiological processes in growth and develop-

ment; in practical feeding and management systems for all species; in improvement of semen processing and artificial insemination practices; basic information concerning animal metabolism, and many others.

The future holds great promise. Projects now underway will continue to lead to further improvement in efficiency and rate of production. Success of these projects will be enhanced by investment in new improved facilities.

Examples of projects are:

- . Genetic engineering to produce specific disease resistant animals
- . Cloning of fertilized ova from superior animals to produce identical offspring.
- . Maximizing microbial growth from nonprotein and poor quality protein in the rumen. Protein needed from plant sources from ruminant livestock will decrease and production costs will be reduced.
- . Improved preservation of nutrients in grains and forages
- . Control of sex in offspring. Separation of male and female sperm will permit choices
- . Out-of-season breeding of sheep. Frequency of lambing per year will increase reproduction rate in sheep and even-out lamb supply which will facilitate more orderly marketing.
- . Selection for efficient growth will improve efficiency of beef production
- . Control of broodiness in turkeys will increase egg production
- . Increased numbers of lambs per ewe per year from genetic and endocrine control
- . Improved knowledge of digestion and metabolism of farm animals. Improvement in efficiency and increased yield of product per animal will result

What are the returns from investment in research?

EACH DOLLAR ADDED TO PRODUCTION RESEARCH ADDS \$20, \$26 AND \$42 TO OUTPUT OF POULTRY, DAIRY AND MEAT ANIMALS, RESPECTIVELY.

TEACHING

The number of students in Animal Science increased four-fold over 10 years. Animal Science, with its nearly 300 students, has the largest undergraduate enrollment in the College of Agriculture. Graduate student enrollment also has increased and currently includes about 85 students.

Graduates of the undergraduate program in Animal Science are leaders in the livestock industry of Minnesota. Many are top farmers in the state and also are active community leaders. Others occupy significant positions in the feed and pharmaceutical industries, breed organizations, artificial insemination firms, extension services, farm cooperatives and related organizations, bank and credit associations, the meat packing industry and in media-related organizations. Many graduates have entered veterinary medicine and are now serving the animal industry. Many have completed graduate school at Minnesota and have given distinguished service in industry, academic work and in governmental agencies.