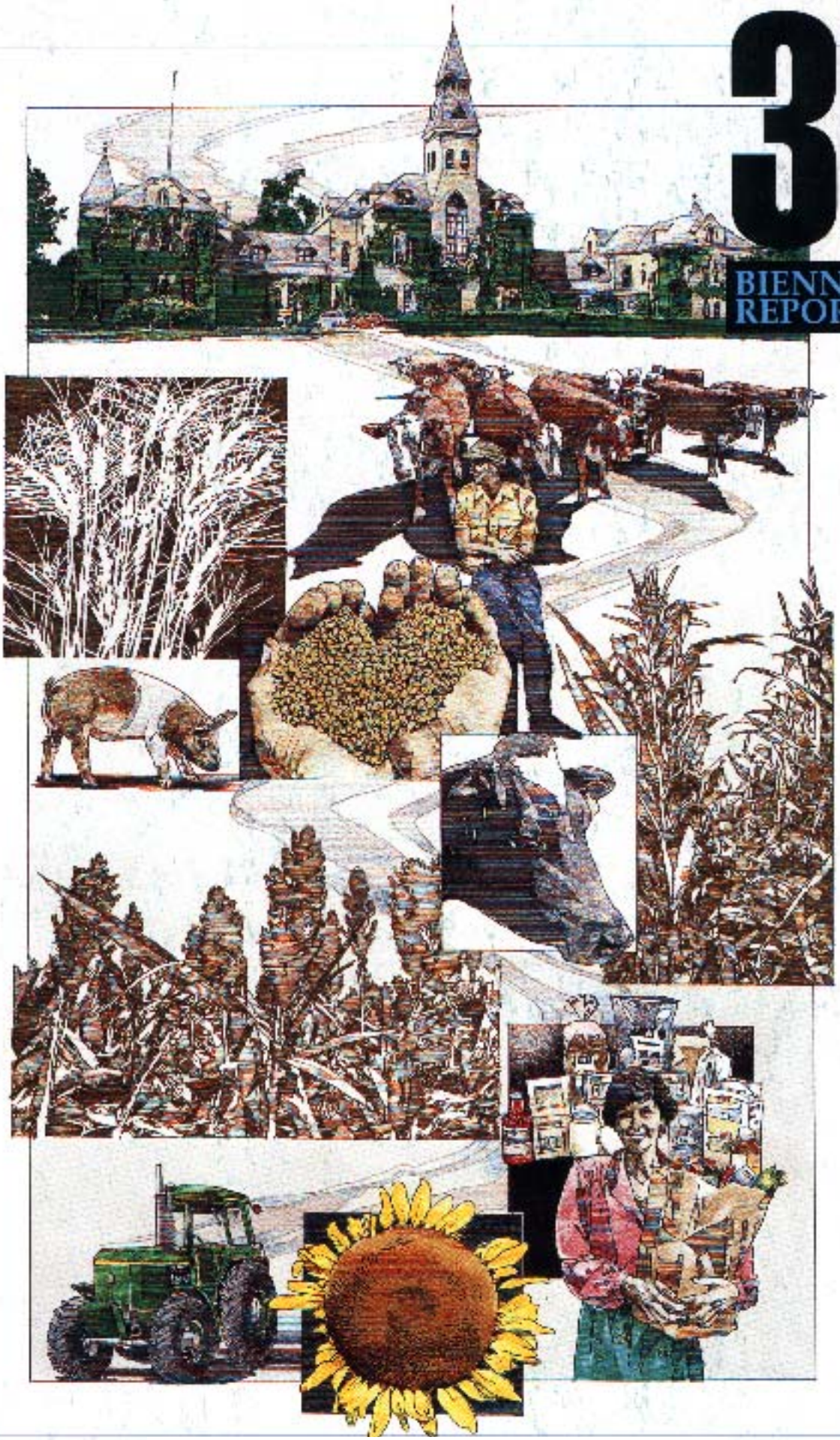
36TH BIENNIAL REPORT



AGRICULTURAL RESEARCH IN KANSAS

Director's Report for the Biennium July 1, 1990 to June 30, 1992

Agricultural Experiment Station, Kansas State University

Letter of Transmittal

Office of the Director

To the Honorable Joan Finney,
Governor of Kansas

It is my pleasure to transmit herewith the report of the Agricultural Experiment Station of the Kansas State University of Agriculture and Applied Science for the biennium ending June 30, 1992. This report emphasizes new technology in agriculture for Kansas. The research highlights include animal and crop production, water resources, environmental studies, animal and human health, and economic aspects of agriculture. In addition, there are lists of publications by Station scientists, lists of research projects still active and those terminated during the biennium, a record of personnel changes, and a financial statement for each year of the biennium.

Marc A. Johnson, Interim Director

Agricultural Research in Kansas

36th Biennial Report of the Kansas Agricultural Experiment Station

Report of the Director for the Biennium Ending June 30, 1992

FRONT COVER

The cover illustration, by Fred Anderson, graphics artist in the KAES Editorial Office of the Department of Communications, won a first place award from Agricultural Communicators in Education.

This report was prepared by the KAES Editorial Staff:

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Contribution no. 93-368-S from the Kansas Agricultural Experiment Station

A Message from the Director

The Kansas Agricultural Experiment Station generates basic and applied research to foster development of Kansas agricultural industries, communities, and families. Rapid changes in technology, industry, and markets make this research more important now than ever before. Research in genetics and production of crops and livestock, as well as marketing and finance, is designed to keep the Kansas agricultural industry competitive. Research in plant breeding, soil and water conservation, and crop and livestock production methods addresses issues where agriculture interfaces with the environment. Research in value-added livestock and grain products and marketing explores ways to use Kansas agricultural products in new markets. Research in food safety contributes to the protection of our food supply and the image of agriculture. Research in community development explores means of maintaining a high quality of life for people in communities that are losing population. Research on families contributes to the happiness and well-being of our younger and older populations.

This 36th Biennial Report of the Kansas Agricultural Experiment Station displays the results of research reported to the public and the scientific community for the period 1990-92. A talented and dedicated research faculty has produced these results. Resourceful research assistants, graduate students, and classified staff also have contributed greatly to this output.

Kansas has been served well by its investment in the Kansas Agricultural Experiment Station. This investment affects the position held in agricultural and food markets by Kansas farmers and agribusiness people, the economic development of the state, the quality of our environment, and the well-being of our families and communities. The mission of the land-grant university is to address contemporary and future issues. As you study this report, you will see work on the major issues of our day.

Marc A. Johnson
Interim Dean and Director
Agricultural Experiment Station

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Research Departments, KAES

COLLEGE OF AGRICULTURE

Agricultural Economics
Agronomy
  provides soil testing service
Animal Sciences and Industry
  includes International Meat and Livestock Program
  provides chemical analyses of feedstuffs
Entomology
  provides Scanning Electron Microscope service
Grain Science and Industry
  includes Food and Feed Grains Institute, International Grains Program, and Agricultural Institute
Horticulture, Forestry, and Recreation Resources
Plant Pathology
  includes Wheat Genetics Resource Center

COLLEGE OF ARTS AND SCIENCES

Biochemistry
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  provides plant identification service
Chemistry
Economics
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Sociology, Anthropology, and Social Work
Statistics
  provides statistical consultation and assistance

COLLEGE OF BUSINESS ADMINISTRATION

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COLLEGE OF ENGINEERING

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Chemical Engineering
Civil Engineering
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COLLEGE OF HUMAN ECOLOGY

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COLLEGE OF VETERINARY MEDICINE

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BRANCH STATIONS/CENTERS

Fort Hays Branch Station
Northwest Research-Extension Center
Southeast Kansas Branch Station
Southwest Kansas Research-Extension Center

EXPERIMENT FIELDS

Cornbelt♠
East Central♠
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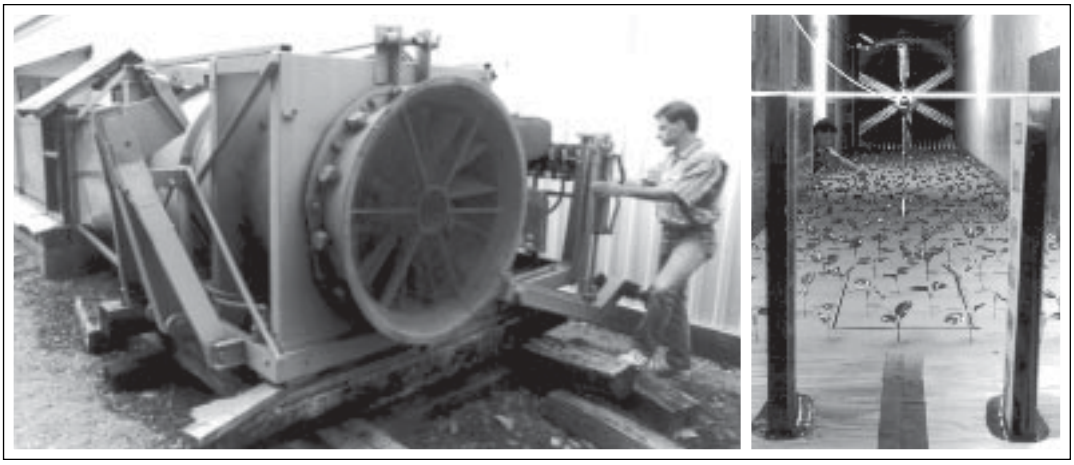
♠Agronomy
♦Agricultural Engineering
♣Horticulture

New Technology in Agriculture

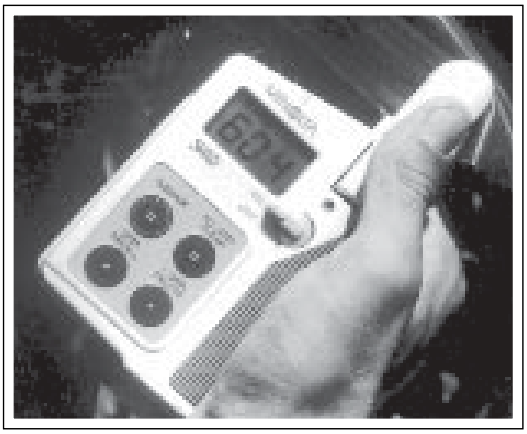
Researchers are developing better ways to predict wind erosion, using a portable wind tunnel (left photo) and a larger tunnel with simulated plants and soil traps (right photo).

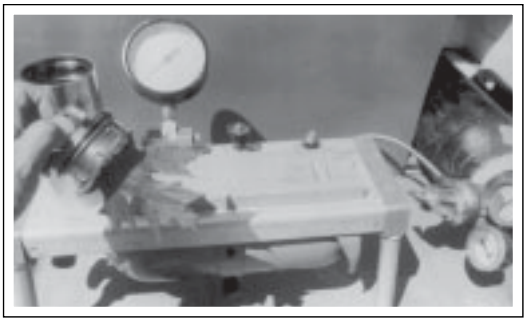


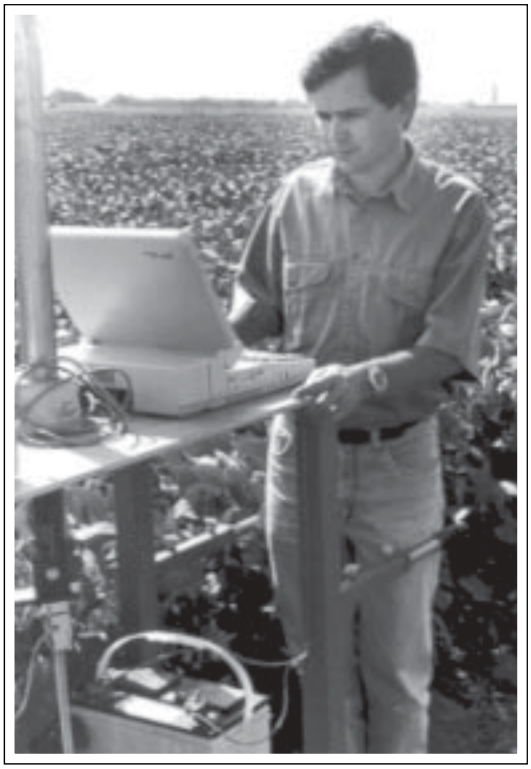
A gravimetric diluter automatically dispenses buffer into a food sample before analysis (left photo).

A plant pathologist uses a DNA synthesizer in research (right photo).

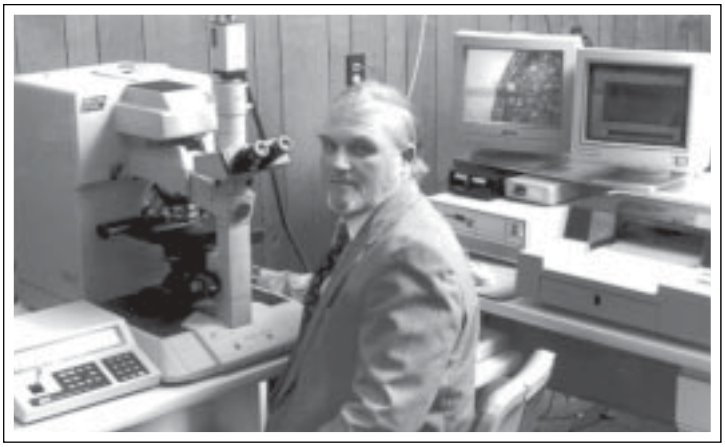
Many sophisticated instruments can be used in the field to evaluate plants: a chlorophyll meter measures green pigment in leaves (upper left photo); a pressure bomb determines water potential of leaves (lower left photo); and a penetrometer records firmness of soil (right photo).

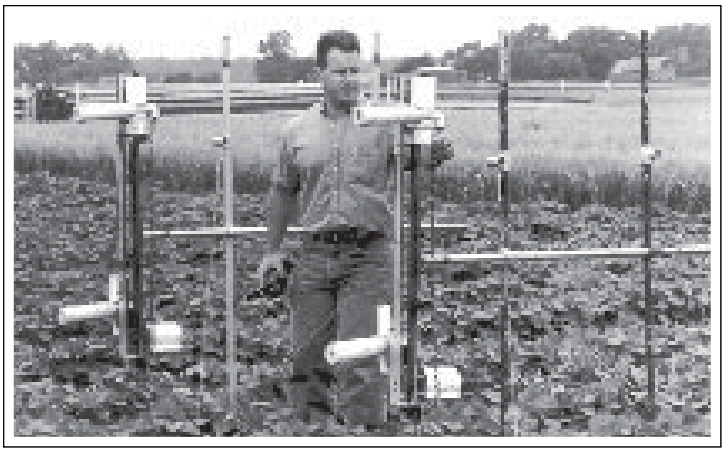






This instrument tests the breaking strength and elongation of fabrics.



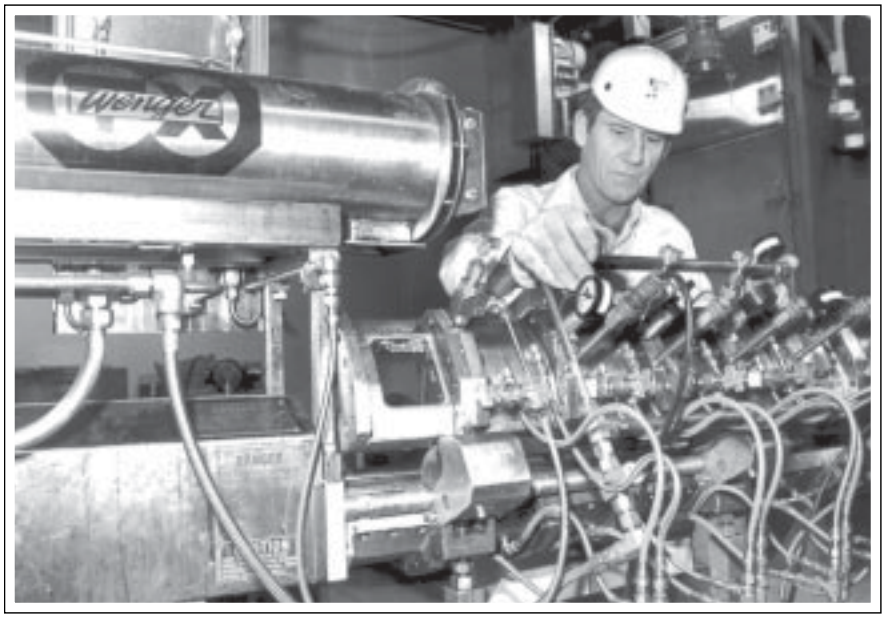


A computerized infrared microspectrometer allows examination of the molecular structure of cells in wheat kernels (upper photo).

An agronomist adjusts an instrument that measures evaporation of water from soil and crops (lower photo).

Weather data are collected by automated stations at several locations.

This extruder blends ingredients with steam and water, then pushes the mixture out to make many value-added products.



Research Highlights 1990 to 1992

■ ANIMAL PRODUCTION

Fat Interacts with Monensin

The potential exists for interactions between ionophores (like monensin) and supplemental fat in affecting ruminal fermentation and performance of finishing cattle. Previous research suggested that supplemental fat might raise the threshold level for ionophore response.

Animal scientists used 96 steers to test two levels of fat (none and 4 percent) combined with three levels of monensin (none or 180 and 360 mg/head/day) in the diet for 77 days. Dry matter intake, daily gain, and feed efficiency were measured.

Monensin depressed feed intake much less when the diet contained fat. Daily gain decreased linearly with increased monensin level for steers fed no fat, but remained constant in those fed 4 percent fat. Feed efficiency also was improved by supplemental fat across all monensin levels.

Carrying capacity of pastures can be increased by grain supplementation to cattle.

Roughage and Fat Levels in Finishing Diets

Grain combinations may improve animal performance by providing more even rates of fermentation and energy utilization throughout the digestive tract. Roughage levels are important in maintaining animal health and rumen function when two rapidly fermentable grains are utilized. Fat also may have a modulating effect on rapid changes in ruminal fermentation rates.

A researcher at the Southwest Kansas Research-Extension Center tested three fat levels (none, 4 percent, and 6 percent) and two roughage levels (6 and 10 percent) in diets containing high-moisture corn and steam-rolled wheat. Feedlot performance, carcass merit, and incidence of liver abscesses were determined in yearling beef steers.

The 4 percent level of fat increased feed intake, average daily gain, and feed conversion and also increased carcass weight. Roughage level had minor effects on feedlot performance but greater effects on carcass merit. The 10 percent roughage level reduced liver abscess scores.

Combined Growing-Finishing Program for Steers

Growing and finishing phases usually are conducted separately, so little research has considered total performance from weaning to slaughter. Producers need to know if carcass weight and quality can be manipulated by postweaning management. The new technique of ultrasound measurements of backfat can be used to predict carcass quality before slaughter. This evaluation was incorporated in a study at the Fort Hays Branch Experiment Station.

Backfat thickness of 292 calves was measured and used to separate three groups. Each group was divided among five treatments involving medium- or low-energy diets for different time periods or immediate placement on full feed. All groups received the same finishing ration until backfat measured 10 mm. Carcasses were evaluated, and percent graded USDA Choice was recorded.

Results included several major observations related to management. Measuring initial backfat on weaned steers enabled sorting them into outcome groups that reached 10 mm carcass backfat over a 140-day period. Using a high-roughage diet in the growing phase enabled steers in the high initial backfat group to gain 53 pounds more before reaching 10 mm carcass backfat than those that were full fed. Compensatory performance during the finishing phase resulted in low- and medium-backfat steers reaching 10 mm at about the same final weight. Management treatments that delayed slaughter date increased USDA quality grades.

Grain Supplementation for Grazing Cattle

Stocker cattle managed under an intensive-early program graze forage during the time of highest nutritive value, but sometimes forage supply may be limited. Thus, low-level supplementation with grain might enhance productivity or help stabilize carrying capacity of pastures. Animal scientists and agronomists conducted a 4-year trial to monitor average daily gain of steers and changes in for-

age production when supplements of sorghum grain were used in an intensive-early stocking program.

Steers received no sorghum (control) or 2 or 4 lbs rolled sorghum per head and grazed pastures from early May through mid-July. Weights were taken at the beginning and the end of the trial and in mid-June. Available forage was measured at the end of the grazing period in July and at the end of the growing season (Oct. 15).

Average daily gain increased in direct proportion to increasing levels of supplement during the second part of the grazing period (early June to mid-July) and for the entire period. Averaged over the entire grazing period, 9 to 10 lbs of grain were required for each additional pound of gain over that of the control group. Forage remaining in pasture in July and October also increased with increasing levels of supplement.

Better Feed for Weanling Pigs

Wheat gluten (WG) is a Kansas product that is used primarily by the baking industry to improve the protein concentration of poor quality flours. However, it has potential as an ingredient in diets for weanling pigs. Animal scientists used spray-dried WG to replace dried skim milk or soybean meal in diets for phase 1 (0 to 14 days postweaning) and to replace dried whey in diets for phase 2 (14 to 21 days postweaning). Over the entire test period, pigs fed WG in phase 1 had improved average daily gain, feed to gain ratio, and average daily feed intake. In phase 1, pigs fed WG had improved average daily gain, feed to gain ratio, and average daily feed intake. In phase 2, pigs fed WG had similar average daily gain but improved feed to gain ratio compared to those fed dried whey. Thus, feeding WG in phase 1 resulted in noticeable improvements in pig performance for the entire nursery period.

Recent research in the Department of Animal Sciences and Industry has shown that spray-dried blood meal (a by-product of the meat-processing industry) is an effective protein source in starter-pig diets. A follow-up study compared three products: spray-dried porcine, spray-dried bovine, and flash-dried bovine blood meals. Each diet contained 10 percent dried whey and 2.5 percent blood meal. Pigs fed diets containing either source of spray-dried blood meal had improved average daily gain and feed efficiency compared to pigs fed diets with the flash-dried blood meal. Apparently, source of blood meal is not important, but it must be spray dried to optimize performance of starter pigs. Another study with spray-dried avian blood meal confirmed these results.

Form and Particle Size of Finishing Diets for Swine

Particle size reduction by grinding and pelleting can improve mixing and handling characteristics of diet ingredients. Animal scientists, a grain scientist, and a veterinarian cooperated in a study comparing corn ground to four particle sizes and fed as meal or pellets to finishing pigs.

Various additives and smaller particle sizes of diets improve swine performance.

In general, reducing particle size increased electrical energy required for milling and decreased production rate. However, reduced particle size decreased feed intake and increased efficiency of gain. Pelleting the diets also increased efficiency of gain and average daily gain. Although stomach lesions were more common with reduced particle size and pelleting, performance was not affected. Particle size reduction and pelleting both decreased daily excretion of dry matter and nitrogen in feces, which could reduce disposal problems. Considering all factors evaluated, a particle size of 600 to 500 micrometers is recommended for both meal and pelleted diets.

Roasted Soybeans for Dairy Calves

Young calves require a diet high in protein and energy, which can be provided by soybeans. However, raw soybeans contain several antinutritional factors that lower their feed value. Heat treatment (roasting) can minimize activity of these factors, but the optimum temperature has not been determined.

In a study in the Department of Animal Sciences and Industry, soybeans were roasted at 270°F, 295°F, or 325°F and fed to Holstein calves in starter diets for 8 weeks. Weekly and overall consumptions were greater for calves fed the diets with soybeans roasted at

270°F or 295°F. Gains and feed to gain ratio were higher for calves fed the diets with soybeans roasted at 295°F. At that temperature, rumen-undegradable protein (which can be utilized in the small intestine) was about 60 percent, and a trace of lipase activity remained. Beans roasted at higher temperatures contain heat-damaged proteins and may be less palatable.

Feeding Sorghum to Sheep

When grain sorghum is affected by drought or frost before seed maturation, test weight of grain can fall below 50 lbs/bushel. The smaller kernels generally have a higher content of crude protein and are priced lower. A test was conducted by animal scientists to compare sorghum of normal, medium, or low test weight and corn in finishing rations for ewe lambs.

Lambs fed the medium and low sorghum consumed more feed and had higher daily gains than those fed normal sorghum or corn. Feed costs per hundredweight of gain favored the low sorghum ($23.06/cwt versus $26.87/cwt for corn). Overall, the low test-weight sorghum was efficiently utilized by finishing lambs and should be considered by producers when a favorable price structure exists.

Can Implants Improve Marketability of Rams?

Implants of zeranol have the potential to modify some of the characteristics that reduce the market value of ram lambs. Animal scientists compared groups of ram and wether lambs with and without zeranol implants at birth.

Implants improved postweaning average daily gain and feed efficiency. Rams grew faster in the postweaning period and were heavier and leaner than wethers at slaughter. Carcass quality traits and total salable cuts were similar for all groups. Implanting had minimal effect on pelt removal, but implanted lambs produced heavier, thicker pelts. A taste panel rated chops from implanted rams as less tender than those from other groups. Thus, this program of zeranol implants produced only minor improvement in performance and carcass quality of ram lambs.

Grain sorghum with low test weight can be fed to sheep.

■ ANIMAL HEALTH

Diagnosis of Swine Dysentery

Swine dysentery represents a significant economic threat to the swine industry in Kansas. Early and specific detection of the organism that causes this enteric disease has been difficult.

Veterinarians recently developed a specific monoclonal antibody to the pathogenic organism and to a related, nonpathogenic species. This provides the diagnostic laboratory with the ability to identify and differentiate these organisms in feces and tissues from infected animals. Early diagnosis is very important in preventing and controlling swine dysentery.

Control of Liver Abscesses

The incidence of liver abscesses in grain-fed cattle is about 25 to 30 percent. Economic losses include liver condemnation at slaughter, reduced weight gain, and reduced feed efficiency. The loss per animal with severe liver abscesses ranges from $25 to $66. The infection is caused by a bacterium that normally inhabits the rumen.

Animal scientists and veterinarians have been conducting research to understand the pathogenic mechanisms of the infection. Evidence indicates that the organism produces a toxin that kills white blood cells and causes the abscesses. This toxin is being studied with the goal of producing a protective vaccine. This

would eliminate the use of antimicrobial feed additives to control liver abscesses.

Vitamin Supplements for Dairy Calves

Previous research has indicated health benefits from increased vitamin E supplementation to young calves. However, studies with other animals suggest that vitamin A, which often is added to milk replacers, can interfere with the absorption of vitamin E. Veterinarians and animal scientists tested this hypothesis by using low and high concentrations of vitamins E and A in four combinations. These were fed to young calves in milk replacers for 6 weeks. Blood samples were analyzed, and several measures of immune functions were made.

Increased supplementation of vitamin A tended to improve responses that rely on a healthy mucous membrane. Simultaneously, the immune functions that utilize vitamin E tended to be improved by increased vitamin E and to be inhibited by the combination of low vitamin E and high vitamin A. Another immune function was enhanced by high vitamin E but inhibited when high vitamin A was fed at the same time. These results provide evidence that vitamin A can interfere with vitamin E, especially when both are fed at high concentrations.

In milk replacers for calves, vitamin A can reduce the health benefits from vitamin E.

■ CROP PRODUCTION

Recent Crop Releases

Three new sources of alfalfa germplasm were released during the biennium. KS220 is resistant to several diseases and three types of aphids. KS221 shows resistance to six diseases and two types of aphids. KS222 is derived from the variety Anchor and has multiple pest resistance.

KS96 sorghum germplasm is partially derived from a grassy type of sorghum originating in Russia and has resistance to a new greenbug, Biotype I. This biotype first appeared in Kansas in 1990 and has potential to disrupt sorghum production. Unfortunately, several years are required for exotic germplasm to find its way into commercially acceptable hybrids.

Weskan winter barley has improved yield, test weight, and winter hardiness compared to other varieties grown in Kansas. Because of its lodging potential, this new barley is recommended mainly for dryland production in western Kansas.

Several new wheats were released from 1990 to 1992. Hamlet hard red winter wheat was derived from a cross with rye. It's a tall, late-maturing variety with resistance to Biotype L of Hessian fly. Arlin is a hard white winter wheat variety with improved adaptation and disease resistance and superior milling and baking quality. Its white color and baking quality should enhance the growth of the fledgling hard white wheat industry in Kansas. KS84HW196 hard white winter wheat performs best under dryland conditions in western Kansas. It is resistant to stem rust and shows very good milling and baking qualities. KS89WGRC9 hard red winter wheat is stress resistant and has better growth, greater kernel weight, and greater yield than its parent line under conditions of heat and drought. KS90WGRC10 is a hard red winter wheat with resistance to leaf rust. Adult plants were immune to infection at four Kansas locations in 1990. KS91WGRC14

The Wheat Genetics Resource Center preserves plant material that is used in developing new and better varieties of wheat.

durum wheat is resistant to stem rust and powdery mildew.

The hard red winter wheat, Karl, was released about 3 years ago and continues to prove itself. In 1992, it was among the top five varieties grown in eastern and central crop reporting districts of Kansas, ranking first in three districts. Its milling and baking qualities are rated as exceptional. Cargill flour mills in Kansas recognized Karl's very high protein content by paying a premium of 5 cents per bushel. The company stressed the importance of identity-preserved varieties that have characteristics vital to their end-use.

Test plots are harvested for evaluation of yield, nitrogen use by plants, and other factors.

Previous Crops Affect Wheat

At the Southeast Kansas Branch Experiment Station, wheat was planted after wheat, soybeans, or grain sorghum, and three rates of nitrogen fertilizer were applied with four different schedules. Yield was highest for wheat following wheat and lowest for wheat following grain sorghum. Apparently, nitrogen fertilizer was immobilized temporarily in the sorghum stalk residue near the soil surface and, thus, was unavailable to the growing wheat plants. Rate of nitrogen application had more significant effects on wheat than time of application. To produce optimum yields, wheat following grain sorghum needed 120 lbs/acre, whereas wheat following soybeans needed only 40 lbs/acre.

These data indicate that deeper placement of nitrogen fertilizer is advisable when wheat follows grain sorghum. Also, nitrogen should be applied to attain maximum yields from wheat following late-maturing soybeans. Although they fix nitrogen in their roots, not enough time is available in late fall or early spring for soil microorganisms to break down this nitrogen into a form that wheat plants can use.

Late-Planted Winter Wheat

Winter wheat in the Great Plains is not always planted at the optimum time. Sometimes replanting is necessary following stand loss to wind, pests, or winter killing. In other cases, the seedbed may be too dry or too wet to plant at the normal time. Additionally, planting may be delayed purposely to avoid disease or insects, to pre-irrigate, or to accommodate a double-cropping sequence. To identify responses to delayed establishment, an agronomist at the Southwest Kansas Research-Extension Center planted wheat at monthly intervals from October 1 to April 1.

The resulting relative grain yields were: October 1–100 percent; November 1–77 percent; December 1–59 percent; January 1–57 percent; February 1–41 percent; March 1–16 percent; and April 1–0 percent. Relative to wheat planted on the optimum date (October 1), that planted on March 1 was the last to produce heads and grain, produced the smallest grain with the lowest test weight, and had the fewest kernels/head. These results can assist farmers, seed sellers, crop insurers, and others to decide when it is too late to plant winter wheat in this area.

Response of Grain Sorghum Hybrids to Herbicides and Seed Safeners

Researchers in the Department of Agronomy conducted greenhouse and field studies for 2 years to determine sensitivity of 20 grain sorghum hybrids to preplant, incorporated treatments of Dual and Lasso herbicides. The safening abilities of Screen, Concep II, and Concep II plus Apron seed treatments also were compared.

These safeners did not slow seedling emergence in the field or greenhouse and generally prevented herbicide injury to all hybrids. The differences in efficacy among seed treatments

Seed safeners can protect grain sorghum from herbicide injury.

were due to hybrid response. Thus, use of seed safeners with Dual and Lasso is still recommended. Wide variations in response to the two herbicides were seen among the sorghum hybrids tested. None of them could be characterized as more tolerant of herbicides. However, sound production practices can reduce the potential for injury.

Comparison of Sunflower and Sorghum

As groundwater from the Ogallala Aquifer dwindles in Kansas, farmers are returning to dryland techniques and becoming more interested in drought-resistant crops like sorghum and sunflower. Agronomists have shown that sunflower uses more water than sorghum, but the physiological reasons were not known. Further research was done to measure differences between the two crops growing on a silt-loam soil.

Sunflower showed a higher rate of evapotranspiration and lost more water per unit of photosynthetically active radiation intercepted. The cooler leaf temperature of sunflower was a further indication that it was losing more water. Sunflower also maintained a high leaf water potential and had a lower photosynthetic rate. Sorghum used water to a soil depth of 1.6 meters throughout the season. However, sunflower roots reached as deep as 2.7 meters to find water late in the season, when dry conditions usually prevail. These results suggested that sunflower would be appropriate in rotations with other crops (like sorghum) that have shallow root systems or after irrigated crops to take advantage of water at lower depths.

Milkweed as a Row Crop

Fifty milkweed ecotypes, including showy milkweed, common milkweed, and Kansas-derived hybrids between these species, were collected from 10 states and tested at the Southwest Kansas Research-Extension Center.

Sunflower roots reach deep into the soil for water not used by other crops.

Milkweed floss (the tufts of hairs on seeds) is composed of hollow cellulose fibers and can be used as insulative batting to supplement or replace imported goose down. Latex from the stems has potential uses in fuel and rubber.

Crop establishment was excellent, with seed germination as high as 80 percent resulting in uniform stands. Starting in the second year, the plants grew each spring from underground buds. Although planting various milkweeds close together provided good conditions for cross pollination, production of pods was low. Over a 4-year period, 15 lines of the two species produced an average yield of 189 pounds of floss per acre, whereas interspecific hybrids produced 312 pounds per acre. Approximately 500 pods were required to collect a pound of floss. Although the hybrids matured later, they had more pods per stem and, thus, higher yield of floss.

A market for milkweed floss already exists and provides a major incentive to solve the remaining production problems and select plants with high yield for further develop-

Milkweed has potential to be a profitable crop in Kansas.

ment. As promising varieties and hybrids are recognized, they are sent to a company in Nebraska that grows milkweed, processes the floss, and makes products. In view of the high value of the floss and a projected use of 2.8 million pounds per year, milkweed could be a profitable row crop in Kansas.

Response of Small Grains to Fertilizer

Changes in the farm program have allowed the use of "Flex-Acres" to plant any field crop adapted to an area. Some producers are planting spring small grains directly into grain or forage sorghum stalks without any tillage. Knowing which small grain to plant and how it responds to fertilizer will help producers to optimize their profits. An agronomist at the Fort Hays Branch Station planted oats, barley, spring wheat, and winter wheat in February. Starter fertilizer (50 lbs 18-46-0) was used alone, with 40 lbs N/acre, or with a combination of N and phosphorus (P).

The highest yields were produced by the starter plus N fertilizer combination. Test weights of barley and spring wheat were higher with all fertilizers. Oats had a slightly higher test weight with starter fertilizer, and winter wheat responded to N and the N-P combination. Overall, crops on this low fertility soil responded best to the N-P combination.

In a follow-up study, five rates of the same starter fertilizer were applied to spring barley planted in February. Yields increased with each higher level of fertilizer (up to 100 lbs/acre). Test weights were not affected. Plant height increased then leveled off at 60 lbs fertilizer per acre. Each producer should determine the cost of the starter fertilizer (including application) and the price for barley in his area. The highest rate of fertilizer may not be the most economical, even though it produced the greatest yield.

Fertilizer for Irrigated Corn and Grain Sorghum

Nitrogen (N) and phosphorus (P) fertilizers were applied for 30 years to irrigated, continuous corn and grain sorghum at the Southwest Kansas Research-Extension Center. An agronomist and an agricultural economist evaluated the effects of long-term fertilization on grain production, soil chemical properties, and production economics.

Grain yields of both crops were increased by N and P applications. The economic, optimal, N rates were about 155 lbs/acre for irrigated corn and 135 lbs/acre for irrigated sorghum. The addition of fertilizer P at 40 lbs/acre was sufficient to maintain soil P levels for sorghum, but a higher rate was needed for corn. Application of P with N decreased nitrate accumulation in the soil, emphasizing the importance of a balanced fertility program. Application of N in excess of that needed for crop growth reduced net income and increased nitrate accumulation and leaching below the zone of active crop roots.

Fertilizers for Bromegrass

Much of the cool-season grass acreage in Kansas is fertilized with urea-containing nitrogen (N) compounds. However, without tillage to incorporate these fertilizers, potential exists for N loss by volatilization and/or immobilization. Agronomists tested two rates of urea ammonium nitrate (UAN) solution either surface broadcast or surface banded on established smooth bromegrass. More forage with higher protein content was produced with the surface band method. Broadcasting fertilizer allowed more opportunity for N loss.

Many questions exist about the need for sulfur (S) fertilizer for cool-season grasses in Kansas. A study compared two S rates and two S sources on smooth bromegrass at two locations. The addition of S significantly increased yields at both locations. An amount of 15 lbs S/per acre seems adequate.

Many acres of established bromegrass in Kansas are on soil that tests low in phosphorus (P). Under these conditions, bromegrass may be unable to utilize applied N fully. Agronomists used two rates of P with 100 lbs N/acre on smooth bromegrass in a soil containing 11 lbs P/acre. The 30 lb level of P plus N produced an additional 710 lbs of forage compared to the treatment receiving only N. This result confirms that use of phosphate on bromegrass is necessary when soil P levels are low.

Nitrogen Placement in No-Tillage Systems

Placement of nitrogen (N) fertilizers is important in fields with high levels of crop residue. Over a 6-year period, agronomists evaluated

Type, amount, and placement of fertilizer all affect crop response.

three placement methods (dribble, broadcast, and knifed into soil) with several rates of urea ammonium nitrate (UAN) for no-tillage grain sorghum.

Grain yields and N concentrations in leaves and grain were increased by N fertilization. Usually, more than 50 lbs/acre were needed to produce optimum yields. Knifed placement of UAN consistently gave the highest grain yields and plant concentrations of N. Greater uptake of N by plants means less N in the soil to be leached into groundwater. The yield increase from the knifed method would provide an additional $30 per acre income for producers. These results emphasize the importance of good N management in high-residue production systems, both to maximize yields and profits and to minimize potential leaching.

Effect of Tillage on Nitrogen Movement

Conservation tillage is being promoted to decrease soil erosion, but it may increase leaching of agricultural chemicals that contaminate groundwater. Agronomists compared no tillage and conventional tillage systems for corn fertilized with two rates of ammonium nitrate or cattle manure. Corn was sampled at various growth stages to measure nitrogen (N) uptake, and yield was determined. Soil samples were taken in 2 years before planting and after harvest and analyzed for nitrate content.

Yields and test weights tended to be higher with no tillage Nitrogen uptake by corn at the V-6 growth stage generally was greater with conventional tillage because of earlier emergence. However, when soil moisture became limiting, the no-till corn was able to use water more efficiently and take up more N. Soil nitrate profiles showed a high amount of residual N in the fall in the manured treatments. They also indicated mineralization of N over winter. These changes were slightly greater with conventional tillage. Mineralized N and residual N in the soil are vulnerable to leaching when rain occurs. Under the conditions of this study, the no-tillage system performed better and did not increase chances of groundwater contamination.

■ *IRRIGATION*

LEPA Irrigation System Conserves Water

A Low Energy Precision Application (LEPA) sprinkler system was installed at the Southwest Kansas Research-Extension Center in 1989. LEPA nozzles deliver water near the ground under the plant canopy, so less water is lost via wind or interception by the plants. An agricultural engineer has been evaluating LEPA performance for irrigating corn and has summarized results for 3 years. Dikes or deep ripping are necessary with LEPA systems to store water for infiltration and prevent excessive runoff, so the field was furrow diked. Four amounts of irrigation and three frequencies were tested. Soil water was measured, and crop yields were determined.

Irrigation frequency did not affect yield significantly. Yields did increase somewhat with greater amounts of water but were not significantly reduced by underirrigation or increased by overirrigation. Total water use by the crop followed similar trends. The long-frequency plots required less irrigation water, because they had more opportunity to capture rainfall. The cost to place an LEPA sprinkler head in a new installation (approximately $5,000) could be paid off in 3 to 5 years, depending on fuel costs and corn prices. The $10,000 price to convert an existing system to LEPA is harder to justify, unless fuel costs are high and water is limiting.

LEPA irrigation delivers water near the ground and reduces loss by wind.

Using Drip Irrigation for Corn

Water is the most limiting factor in crop production in western Kansas. Drip irrigation has been shown to decrease water use, while maintaining high yields and crop quality. It offers the potential to reduce the amount of water applied to corn because it has an application efficiency of nearly 100 percent. Subsurface drip irrigation supplies water to the root zone of crops. The water flows at low pressure through plastic tape and drips out of the tape through emitters located at fixed

intervals. An agricultural engineer at the Northwest Research-Extension Center evaluated the use of subsurface, drip irrigation for corn over 3 years. Treatments included no irrigation and irrigation at 25, 50, 75, 100, or 125 percent of calculated evapotranspiration (ET). Scheduling was based on the amount of calculated depletion of soil water in the root zone. Timing of summer rainfall and high ET resulted in higher than normal irrigation needs in all 3 years. However, yields were excellent. The highest water use efficiency was obtained with irrigation supplying about 25 percent less than the calculated normal, full-irrigation amount. The 3-year average yield for this treatment was 198 bushels/acre. Approximately 7.5 to 8.5 bushels of corn were produced for each inch of water used by the crop when overirrigation and severe underirrigation were avoided. Overirrigation not only increased water use but also decreased yields.

Correct amounts and timing of irrigation are essential for efficient production of corn.

To make drip irrigation feasible for corn in western Kansas, longer dripline laterals may be needed to decrease installation and management costs. Another study at NWREC compared the performance of driplines 330 ft (0.0625 mile) and 660 ft (0.125 mile) in length. Calculations of the hydraulics of these longer driplines indicated that water distribution differences of about 15 to 20 percent would occur along the 660 ft length. However, no effects were observed on crops yields, water use, water use efficiency, or soil water at harvest. These results indicate that, with proper irrigation management on low-slope fields, driplines as long as 660 feet will perform adequately. Their use will reduce installation costs.

Agricultural engineers also investigated drip irrigation for corn at the Southwest Kansas Research-Extension Center. Irrigation water was applied at intervals of 1, 3, 5, and 7 days in the amount consumed since the previous irrigation. Corn yields and water use were measured for two growing seasons. The highest average yield of 202 bushels/acre was obtained with irrigation every day. However, yields for the other irrigation intervals were not statistically different. Water use efficiency was significantly higher for the 7-day interval than for the 1-day and 3-day intervals. The treatments with longer intervals between irrigations utilized rainfall more effectively and lost less water below the crop root zone.

Water Management for Corn

Irrigation scheduling should involve applying water frequently enough to avoid stress on the crop and in amounts adequate to recharge the soil to the depth required by local conditions. When water supply is limited, producers need adequate information on yield response to irrigation water applied at various growth stages. Agronomists compared five timings of irrigation (one, two, or three applications related to growth stage and when 65 percent of available soil water was depleted) for corn. Total water use efficiency was calculated.

Maximum yields (averaged over 10 years) were achieved by irrigating at 65 percent depletion. Irrigating once at tassel gave 82 percent of maximum yield, and irrigating at tassel and again 1 week later gave 92 percent of maximum. Irrigation at 65 percent depletion also gave the highest water use efficiency. The first irrigation for that treatment nearly coincided with the first tassel stage. Thus, results indicate that to attain acceptable corn yields, scheduled irrigation should begin when the first tassels appear in the field.

Transition from Irrigated to Dryland Production

A long-term study at the Northwest Research-Extension Center sought to identify potential problems in the transition from irrigated to dryland cropping systems. Soil pH, residual phosphorus (P) in soil, and yields of

dryland grain sorghum were measured. The nitrogen fertilizer applied several years before was still affecting soil pH and P levels in 1991, but this had no effect on sorghum yields. A logical approach would be to reduce N rates during the last 2 years of irrigated production. Periodic soil testing could identify P buildup and the need to stop applications. In addition, formation of tillage pans, which reduce root volume and available water supply, should be avoided, or the pans should be destroyed before the transition.

■ SILAGE

Inoculants Improve Silage

During 10 years of silage research in the Department of Animal Sciences and Industry, investigators have compared fermentation characteristics, dry matter recovery, and effects on cattle performance of untreated silage; silage treated with lactic acid bacteria; and silage containing nonprotein nitrogen (NPN) sources, including urea, anhydrous ammonia, and a urea-molasses mix. Producers use NPNs to increase protein content.

However, results showed that NPNs, especially anhydrous ammonia and urea, adversely affected fermentation and cattle performance. Inoculating with lactic acid bacteria improved fermentation efficiency, dry matter recovery, and gain per ton of crop ensiled. A major advantage of these bacteria is that they immediately start converting sugar to acid, dropping the pH level of silage to 4 or less. An acid pH favors preservation of good quality silage. The initial costs of inoculating will be compensated by the increased livestock gains.

Losses from Top Spoilage in Horizontal Silos

Kansas produces about 3 million tons of silage annually from corn and sorghum. During the past three decades, large horizontal silos have become the most common means of storage. However, in these structures, a high percentage of the silage is exposed to the environment. A group of animal scientists compared losses in the top layer of horizontal silos that were sealed with plastic sheeting or unsealed and contained corn or sorghum silage. Samples were obtained in 2 years from the top 3 feet in 30 horizontal silos in four areas of western Kansas. The ash content was used to calculate organic matter (OM) loss; pH and dry matter (DM) also were measured.

Estimated spoilage losses of OM in the top 18 inches averaged 39 percent in 1990 and 51 percent in 1991. Sealing reduced these losses by 16 and 37 percent in the top 18 inches and by 4 and 13 percent in the second 18 inches in the 2 years. Dry matter contents were lower in forage sorghum silages and in sealed silages. Generally, pH was higher in the top 18 inches of silage and in the unsealed silos. The higher pH values near the surface of the unsealed silos were typical of severely deteriorated silage. Thus, sealing horizontal silos can significantly reduce spoilage losses.

A follow-up study in small bunker silos confirmed that sealing can significantly reduce OM and also DM losses. Immediate sealing was more effective than delayed sealing (7 days after silos filled). Unsealed silages from both sorghum and corn had much higher temperatures in the top 3 feet.

Silage losses from top spoilage probably are due to an interaction of various chemical, physical, and microbiological processes and need to be studied further. However, results to date show that sealing silos immediately after filling greatly improves storage efficiency and silage quality in the top 3 feet.

Whole plants of grain sorghum are harvested for silage.

Polymers Improve Turf

Research in the Department of Horticulture, Forestry, and Recreation Resources is assessing two uses of a granulated polymer (cross-linked polyacrylamide) in turf: to increase time between waterings and to reduce soil compaction. The granules are used commonly in greenhouses and nursery operations to minimize irrigation. Each small granule can absorb from 50 to 1,000 times its weight in water.

Soil compaction often occurs in turf on athletic practice fields. The hard surface contributes to the many injuries that happen during practice. Polymer granules may increase shock absorbency of turf. As they soak up water and expand, the granules loosen the soil and reduce compaction. They should remain active in soil for 4 to 7 years. A specially designed implement deposits granules in grooves cut 3 to 4 inches deep in turf. Further tests will determine the optimum amount of granules to apply for conserving water and reducing compaction.

Polymer granules in soil hold water and reduce compaction.

Large Patch Disease in Zoysia Grass

Symptoms of patch disease include large, circular patches occurring in the spring and fall. Many (but not all) crowns within the patch are killed, resulting in a thinning of the turf. The patches are much slower to green-up in the spring and often display a bright orange color around the margins. Because these symptoms are variable, more than one organism could be involved in the disease. Horticulturists and a plant pathologist isolated fungi from diseased zoysia grass and then determined which ones caused the patch symptoms.

In greenhouse tests, several fungi caused damage to zoysia plants. In field tests, only two produced patch symptoms. One fungus caused small, circular patches with no living plants in the center. However, *Rhizoctonia solani* caused the typical larger patches with orange margins. Researchers concluded that this organism is the most common agent of cool weather, large patch disease of zoysia grass in Kansas.

Further research showed that several fungicides could prevent large patch disease if they were applied in late September. Spring applications of some fungicides can help suppress further activity of the fungus but may not improve recovery of zoysia within the patches.

New Bermudagrasses Available

Two new cultivars of bermudagrass have been developed and released by the Department of Horticulture, Forestry, and Recreation Resources. Midfield and Midlawn are cold tolerant, high quality, and dependable. They also have fine texture, dark green color, and good sod density. Midlawn has a less aggressive growth habit and is suitable for home lawns and golf courses. Midfield is more aggressive, so it establishes rapidly and can recover from injury. It maintains better turf at lower management levels than Midlawn. Therefore, it is recommended for high traffic areas like playgrounds and athletic fields. Bermudagrass is becoming more popular because it requires little water and crowds out most weeds.

Native Plums: A New Crop

Eight species of native plums are found in Kansas; four of these are collected locally and processed into jams, jellies, and preserves. The sandhill plum (*Prunus angustifolia*) recently has become the basis of a cottage industry in the state. Horticulturists initiated a study in 1990 to measure genetic diversity in sandhill plums. They established a planting of 120 seedlings; 59 of these produced their first fruit crop in 1991.

The shrubs showed sufficient genetic variation in form and fruit size, quality, and yield to allow for rapid crop improvement by selection. Chemical controls exist for the diseases and insects that attack native plums. The dimensions and growth habit of the shrubs are similar to those of highbush blueberry. Therefore, harvesters developed for the blueberry industry could be adapted easily.

Until recently, sandhill jam and jelly were produced only for home consumption. With the rapid rise of consumer interest in regional and specialty foods, two companies in Kansas have begun manufacturing sandhill plum products for national distribution. They purchase fruit collected from wild shrubs. Four new products have been developed by the Value-Added Center at KSU: pancake syrup, ice-cream topping, naturally sweetened spread, and artificially sweetened spread. Selection and cultivation of sandhill plums with large and high quality fruits will allow this new industry to expand.

Trees and Melons: A Profitable Combination

Agroforestry is the practice of growing woody plants (usually trees) with an agricultural crop on the same land. An example is the combination of Scotch pine Christmas trees and muskmelons developed recently by horticulturists.

Production of Christmas trees in Kansas is increasing, although 6 to 10 years may be required before they are marketable. During this time, producers receive no cash returns on their investment. Using the areas between rows of trees to grow an annual crop for a local market could provide needed income.

Melons were planted shortly after Scotch pine seedlings (a procedure called relay intercropping). Drip irrigation with and without black plastic mulch was used in some plots. In each year of the 2-year study, melons were harvested nine times and pine seedlings were measured three times.

Numbers and weights of melons were greater with use of both plastic mulch and drip irrigation. However, the plastic mulch reduced growth of pine seedlings. Thus, the best production system for both crops would be drip irrigation on bare ground. A partial economic analysis showed that annual returns from melon sales could range from $6,880/ha to $26,250/ha, depending on inputs and melon price.

New Flowering Dogwood

The soil and climatic conditions of south central Kansas present major limitations to the establishment of flowering dogwood. These include poor soil drainage; high soil pH; hot summers; and cold, dry conditions in winter that reduce flower bud opening in the spring. Starting with 125 dogwood seedlings in 1975, a horticulturist at the Horticulture Research Center in Wichita has evaluated growth and performance with various soil amendments and exposures to sun and shade.

Muskmelons can be intercropped with Scotch pine seedlings.

One superior seedling consistently flowered in open, sunny conditions after severe winter weather (temperatures as low as -23°F). This selection has been named and registered as *Cornus florida* Ozark Spring. The cultivar is expected to perform best along the western and northern edges of the species' natural range, particularly in Oklahoma, eastern Kansas, and throughout the Ozark region of Missouri and Arkansas. The northern limits of its adaptation will be tested further when plants have been produced on their own roots.

Ozark Spring is a variety of dogwood adapted to the Kansas climate.

■ INSECT PESTS

Outwitting the Hessian Fly

The Hessian fly is a major pest of wheat in the United States, causing 5 to 10 percent losses in production annually. Adults emerge from infested wheat stubble in autumn and deposit eggs in the leaves of emerging seedlings. The eggs hatch, and larvae migrate into the leaf sheaths near the base of the plant to feed. Susceptible wheat seedlings eventually die. In the spring, flies emerge and infest new wheat plants. Because the insect depends on the plant for survival, strong selection pressure has been exerted on it to overcome resistance in wheat. This has forced breeders to search continually for new resistance genes to incorporate into wheat.

Genetic engineering has provided wheat with additional resistance to Hessian fly.

Entomologists and agronomists, working together, have found a new source of resistance in rye. Critical parts of rye and wheat chromosomes were broken apart with X-rays, then a segment of the rye chromosome was inserted into the wheat chromosome. The resulting plants had all the characteristics of wheat plus the Hessian fly resistance of rye. Grain from the plants had good milling and baking qualities. This germ plasm has been made available to plant breeders around the country and may provide more long-term resistance to Hessian fly.

The genetics of Hessian fly are not understood, so entomologists also are preparing a genetic linkage map. This will be used to pinpoint the location of virulence genes on the fly's chromosomes. Ultimately, they hope to clone and characterize the genes responsible for the fly's ability to overcome resistance in wheat and possibly reduce the virulence of this pest.

Effects of Russian Wheat Aphid

A group of KAES researchers has studied the effects of the Russian wheat aphid (RWA) on wheat plants. Tests with single wheat plants in a greenhouse gave the following results. An RWA infestation through the jointing stage significantly reduced shoot weight and number of spikes. Infestation at all stages of growth significantly reduced the ratio of seed weight to plant.

Field studies evaluated the impact of RWA at different times. The RWA uses alternate hosts to survive dry periods between harvest and fall planting of wheat. It also can survive cold temperatures in winter and infest wheat in the spring. Results showed that infestation in fall, spring, or both result in substantial loss of yield, but the worst loss occurs from spring infestation. This also reduces 100-kernel weight and protein content of grain. Baking studies indicated that RWA damage can significantly reduce flour mixing time, but it will still be within the acceptable range for breadmaking.

Greenbug Update

Biotype E has been the most abundant greenbug in Kansas since 1981. However, entomologists have noted significant, recent changes. During the past 4 years, two new pesticide-resistant types and one new biotype have been discovered in the state. The former are showing high levels of resistance to organophosphate insecticides. The new Biotype I greenbug can damage most Biotype E-resistant sorghums. Surveys have indicated that the pesticide-resistant Biotype E greenbugs also occur in Nebraska, New Mexico, Colorado, and Texas. Biotype I occurs in Nebraska, Colorado, and Texas. Both Biotypes E and I have been collected in 12 counties in western and central Kansas. The entomologists are trying to determine if pesticide resistance is present also in Biotype I. It is too early to determine what effect the new biotype will have on sorghum production.

■ BIOLOGICAL CONTROL

Native Soil Bacteria for Weed Control

A laboratory at the Fort Hays Branch Station is one of three in the United States working on biological control of weeds. Few chemical herbicides can selectively control annual, grassy weeds in winter wheat in Kansas. Biological herbicides that fill this gap would increase available control options, possibly reduce control costs, and help protect water quality and the environment. Native bacteria are being evaluated for selective inhibition of germination and root elongation of several problem weeds.

Laboratory bioassays identified over 100 isolates that inhibit root elongation of *Bromus* species or jointed goatgrass without affecting wheat. Further tests using seedlings in pots of soil kept in a growth chamber narrowed the choice to isolates that inhibited growth. These effective isolates are being tested alone

and in combination with metribuzin for control of downy brome in a greenhouse. The final step will be field tests, in which bacteria will be injected in the furrow with the seeds, applied to the seed, or applied as tank mixtures. Survival of the bacteria in the soil will be followed.

This research may result in useful biological control products. However, their effectiveness may be limited to one region, because of the geographical variations in types of weeds present and cultivars of wheat grown.

Soybean-Oil Soap Kills Insects

A biochemist and an entomologist are cooperating to investigate soaps made from vegetable oils as safe and effective insecticides. Soaps have been derived from several oils by the process of saponification, which involves boiling the oil plus a concentrated alkali (potassium hydroxide) for a day. The soap then is neutralized with acid and used at a concentration of 1 percent or less in water. Crude soybean oil has been tested most extensively, because it's readily available for a reasonable price in Kansas.

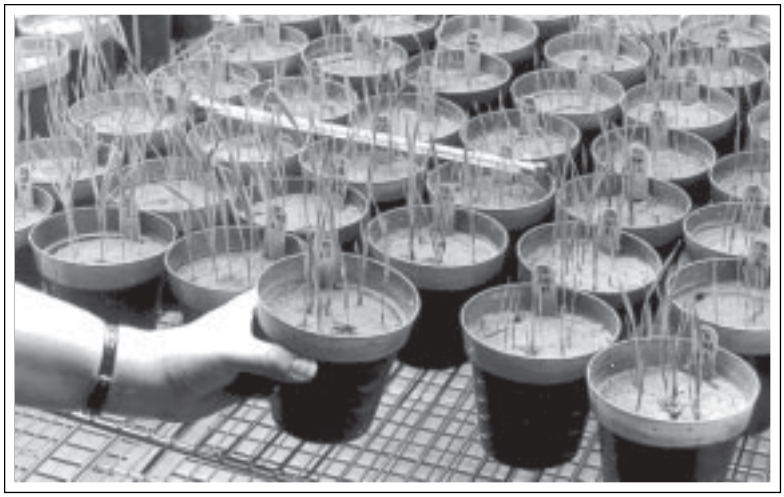
The soap solution must be sprayed directly on plants to cover all surfaces where insects might lurk. It kills a variety of insects on contact, but the mechanism is not yet known. It's very effective against greenbugs, Russian wheat aphids, and spider mites. Beetles with hard surfaces and flying insects that can escape readily are more resistant. Neutral soaps break down naturally in the environment without leaving any residue or poison. Tests with soybeans and sorghum showed no phytotoxicity from four applications spaced 3 to 4 days apart, even in hot weather. Soaps made from vegetable oils also are cheaper than an animal-fat soap already on the market.

Parasites Can Control Feedlot Flies

Commercially available parasites have not been effective against stable flies in cattle feedlots in western Kansas. However, a naturally occurring parasite was found in stable fly pupae in that area. An entomologist at the Southwest Kansas Research-Extension Center is investigating the effects of this parasite when released in large numbers.

In feedlots where the parasite was released, the emergence of stable flies was reduced by 28 percent and numbers of parasites increased by a similar amount. The native parasite also controlled stable flies more effectively than two commercial parasites tested in the previous year.

Stable flies bite cattle and feed on their blood. The irritation of the biting causes weight loss and reduced milk production. Populations of stable flies usually are high for 6 to 8 weeks during May, June, and July, but they can persist longer during cool, wet periods in late summer. Natural populations of the parasite tend to peak in July. Thus, releases of additional parasites at this time would effectively increase their control of stable flies.



Several soil bacteria inhibited growth of weedy grasses in pots.

Controlling Alfalfa Weevils

First-generation larvae of the alfalfa weevil are responsible for most of the damage to the first cutting of alfalfa. The larvae hatch from eggs laid in alfalfa stems during the previous fall. An agronomist at the Southeast Kansas Branch Experiment Station compared removal of early-spring residue by flailing, burning, or chemical sprays.

Burning reduced the number of weevil larvae in early April by 57 percent and increased yields by 13 percent compared to the control. By June 12, the sprayed plots had more larvae than the flailed or burned plots. Nitrogen content of forage from the first cutting was unaffected by spring treatment. A late fall cutting for hay had no effect on first-cutting yields, forage nitrogen, or weevil numbers in spring. Thus, burning was more effective than chemical methods for controlling alfalfa weevils and gave the additional benefit of increasing yields.

Sorghum Resistant to Drought and Spider Mites

The hot, dry weather common in western Kansas, and occasionally throughout the state, imposes drought stress on nonirrigated sorghum and reduces yields. These conditions also favor outbreaks of spider mites. Spider mites are potentially very damaging to sorghum, especially in western Kansas, where yield reductions are 5 to 8 percent in normal years and can reach 20 to 40 percent in drought years. Some research has suggested that sorghum resistance to mites is associated

with resistance to drought. Entomologists and an agronomist are working together to investigate this possibility by identifying drought-resistant sorghum lines, assessing any relationship between drought resistance and mite resistance, and determining the mechanism responsible for mite resistance.

Results showed that mite development and reproduction were correlated positively with leaf temperatures. Under drought conditions, leaf temperatures were significantly cooler on drought-resistant than on drought-susceptible lines. Thus, during drought, the resistant sorghums would sustain less mite damage and maintain higher yields. Development and deployment of drought-resistant sorghums should reduce mite damage and stabilize yields without additional inputs of water or miticides.

■ *ENVIRONMENT*

Waste Management on Dairy Farms

The dairy industry is receiving greater pressure to reduce its potential to pollute the environment. Dairy operators need to control the nutrient and sediment loading of the runoff leaving their farms. The 98,000 milk cows in Kansas produce approximately 2 million tons of manure per year. Annual runoff includes 400 acre-feet from storms and over 500 acre-feet of wash water from milk parlors. The nitrogen left in stored manure and available for land application is worth about $1 million as fertilizer.

Agricultural engineers say that site selection can solve many problems of waste management. A site away from streams or protected by buffer areas or terraces can reduce runoff. A site upwind of and far away from neighboring buildings can decrease odor problems. Also, a site should be large enough to allow spreading of manure in places that will not affect streams or ponds. Existing dairy operations must evaluate the impact of manure storage and management on the environment. Costs of controlling the runoff must be weighed against those of new lot construction in an alternate location.

Columns of soil are used in the laboratory to study movement of water and agricultural chemicals.

Air Quality in Swine-Confinement Buildings

Clouds of pollutants and dust particles in the air of confinement buildings can be detrimental to the health of both producers and pigs. A group of agricultural engineers and veterinarians studied the effects of recirculated air on concentrations of ammonia, endotoxin, and total and respirable dust particles in swine nurseries and grower facilities. They also compared the protection offered by three types of respiratory masks.

Increased ventilation in summer reduced the amount of large, nonrespirable dust particles better than the amount of respirable particles (capable of depositing in the lungs). Total airborne endotoxin correlated to the amount of total suspended particles, so eliminating large particles would also lower levels of endotoxin. Some types of ventilation reduced levels of ammonia, but results were not clear-cut. Overall, the results indicated that controlled recirculation (probably at lower rates) can produce cleaner indoor air, even in summer. The 2-tie masks offered better protection against total particles (96 percent reduction) and small, respirable particles (more than 50 percent reduction) than the 1-tie masks tested. Use of these masks would reduce health risks for workers in swine-confinement buildings.

Atrazine and Alachlor in Kansas Soils

Contamination of groundwater by pesticides applied to agricultural land has been suspected for several years. Although atrazine and alachlor have been detected infrequently in rural Kansas wells, their persistence and potential toxicity cause concern. Field research by soil scientists in the Department of Agronomy has shown that at least 90 percent of applied atrazine and alachlor degrade in most soils. However, in sandy soils, significant quantities of these herbicides cannot be accounted for by plant uptake and degradation. Thus, leaching of chemicals is likely from these soils but is difficult to demonstrate in agricultural settings. The researchers chose to investigate this potential leaching as a func-

tion of time, soil depth, and amount of water applied to soil columns in a laboratory.

They found that, in sandy soils saturated with water, leaching to depths greater than 4 feet was rapid and very little degradation occurred. Under drier conditions (typical of moderate irrigation or light rainfall), percolation was much slower and degradation occurred. Alachlor was undetectable, and atrazine degradation products were present at higher concentrations than atrazine itself. The general conclusions were 1) atrazine and alachlor move readily through the soil under all moisture conditions but more rapidly in very wet soil; 2) degradation of both herbicides proceeds quickly in field-moist soils but undetectably in wet soils; and 3) atrazine and its degradation products can move to depths greater than 5 feet in less than 3 months under all moisture conditions in sandy Kansas soilis.

Effects of Elevated Carbon Dioxide

The concentration of carbon dioxide (CO_2) in the earth's atmosphere is increasing, and no one knows how this will affect vegetation. Research by agronomists continued to investigate the effects of CO_2 on native grasses.

One study evaluated the reactions of big bluestem (growing in natural prairie) to two levels of CO_2 and two watering regimes. With both amounts of water, the doubled CO_2 increased soil-water content, reduced transpiration (water loss) of big bluestem, and increased its stomatal resistance. However, CO_2 concentration did not affect the rate of photosynthesis. Because transpirational cooling was reduced under elevated CO_2, canopy temperature rose. This should be considered along with the predicted increase in air temperature from global warming.

In another study, big bluestem a (C_4 grass) was compared to Kentucky bluegrass a (C_3 grass). These terms refer to different mechanisms for taking in CO_2 from the atmosphere and using it to make food through the process of photosynthesis. In comparison to big bluestem, Kentucky bluegrass reacted to elevated CO_2 with an increased photosynthetic rate, increased stomatal resistance, and reduced transpiration rate. Elevated CO_2 increased the leaf temperature of big bluestem but not of Kentucky bluegrass. It decreased the water requirements of both grasses, but about twice as much for Kentucky bluegrass. Thus, the latter species might have an advantage in conditions of higher CO_2.

Another group of agronomists and an ecologist evaluated plots of tallgrass prairie containing several species of grasses and other plants (forbs) exposed to two levels of CO_2. Aboveground biomass and leaf area were estimated by periodic sampling over three growing seasons. Relative root production also was estimated, latent heat flux was simulated with and without water stress, and botanical composition was determined annually. Elevated CO_2 increased production of C_4 grass species but not C_3 grasses. Species composition among C_4 grasses did not change, but one C_3 grass declined while C_3 forbs increased in plots with more CO_2. These differential responses were related to moisture relationships, i.e., improved water use with CO_2 enrichment. Overall results indicated that ungrazed and unburned tallgrass prairie may have greater aboveground and belowground productivity with additional CO_2, if amounts and distribution of annual precipitation remain near current levels. However, results might differ in other areas with different assortments of plants and dissimilar environmental conditions.

This tallgrass prairie is the site of research to evaluate environmental changes like increasing carbon dioxide and acid rain.

Monitoring Acid Rain

The Konza Prairie Research Natural Area (KPRNA) is part of a network of 200 sites in the United States (including Alaska, Hawaii, Puerto Rico, and American Samoa) that monitor acid rain. By collecting and studying rainfall at so many sites, scientists are able to chart the effects of acid rain on agricultural areas, forests, rangelands, and freshwater streams and lakes. Rainfall has been collected on Konza since 1982. The biologists also monitor wind speed and direction, relative humidity, solar radiation, and soil temperature, so the interactive effects of weather can be assessed. So far, the data have shown no evidence of increased acid rain in this area. Even if more frequent acid rainfall did occur, the dust and soils derived from the limestone layer underlying the prairie probably would neutralize it. A 4-month experiment of applying acid water to prairie grasses had no negative effects. In addition to participating in this network, KPRNA is

also one of several Long-Term Ecological Research sites in the country and has been recognized as part of the International Network of Biosphere Reserves.

Effects of Small Mammals on Prairie Ecology

Research in the Division of Biology has demonstrated that rodents directly harvest flowers and fruits or seeds from prairie forbs and grasses. The proportion of fruits or seeds harvested from most species is low but can range from 20 to 90 percent for some forbs in some years. Losses that high could have negative impacts on populations of those plants. A detailed study of two forbs showed that rodents usually moved fruits or seeds only a short distance, but some were transported over 20 meters. Thus, rodents can influence the abundance and spatial distribution of individual plant species by dispersing some seeds over long distances and by harvesting high levels of other seeds.

Energy Usage on Kansas Farms

Production agriculture accounts for about 3 percent of total energy consumed in the United States but is a major consumer of electrical energy supplied by utilities serving rural areas. Rural power suppliers need information on energy demand and use to run their operations more efficiently. Therefore, researchers in several departments cooperated to conduct a survey of agricultural producers in Kansas.

Questionnaires were completed by 554 grain producers, 519 livestock producers, and 68 dairy producers. The information was analyzed to determine types of equipment and amounts of energy used and to identify variables that might predict electrical energy usage by the various producers.

Results showed that over 70 percent of grain producers used an average of 1,395 kilowatt-hours of electrical energy per month. Less than 20 percent of these producers used both single- and three-phase electricity. The most frequently used grain drying system was natural air. Producers who had bins reported three or fewer of any given size. Twenty percent of producers operated irrigation pumps with electricity, whereas 29 percent and 51 percent used diesel and natural gas fuels, respectively. The electric-powered irrigation pumps operated for an average of 4,500 hrs per year. Potential variables for predicting electrical energy consumption of grain production enterprises included total kilowatt-hours, bushels of grain dried, total storage capacity, number of aeration fans, and hours of operation of irrigation pumps.

Over 70 percent of livestock producers reported using an average of 2,157 kilowatt-hours of electricity per month. Less than 20 percent used both single- and three-phase electricity. An average of 11 ventilation fans (one per 100 head of swine) was used by 42 percent of swine producers. Electricity and liquid petroleum gas were the most common energy sources used to heat on-farm facilities.

Dairy producers reported using an average of 3,989 kilowatt-hours of electricity per month. One third of the producers used both single- and three-phase electricity. Liquid petroleum gas was the most popular energy source for water heaters up to 80 gallons in capacity. Seventy-two percent of producers reported that no heat reclaimer was connected to the water heater to utilize waste heat from the bulk milk tank compressor.

■ *ECONOMICS OF PRODUCTION*

Variability of Feedlot Steer Profits

Net returns to cattle feeders in Kansas vary tremendously over time. Between 1981 and 1991, estimated returns per head for finishing yearling steers ranged from a loss of $115 to a profit of $120. Profits often varied by $50 to $100 a head from one quarter to the next. To determine the factors contributing to this variability, a group of agricultural economists obtained data from a western Kansas feedlot. Feedlot performance, feed costs, and sale prices were considered for monthly closeouts covering 2,600 pens of steers (540,000 head) placed on feed from 1980 to 1989. Other data used in the analysis included estimates of corn prices, hay prices, interest rates, feeder prices, and yardage fees.

Results showed that sale prices, feeder prices, and corn prices explained 90 to 95 percent of the variation in steer profits. About 50 percent of the variation was explained by fed cattle prices alone. Placement weight had a pronounced influence on the relative effects of performance and cost factors on profits. For lighter weight cattle, profit variability was greatly influenced by corn price. Profits for cattle placed on feed at heavier weights were impacted more by feeder prices and daily gains.

Profitability of Cattle Grazing on Fescue

Cattle grazing on tall fescue infected with an endophytic fungus typically experience toxicity symptoms that result in poor performance. However, they can make compensatory gains

Interseeding ladino clover with endophyte-infected tall fescue can increase cattle performance and profits.

during the subsequent finishing period. At the Southeast Kansas Branch Station, an animal scientist and an agricultural economist undertook an economic analysis of three grazing alternatives and subsequent feedlot performance of cattle. The pastures contained endophyte-infected tall fescue (IF), interseeded with ladino clover (IFL), and endophyte-free tall fescue (FF).

In the grazing phase, FF was the most profitable alternative for 2 of the 3 years, but IFL had the highest average profit. In the feedlot phase, cattle that previously grazed IF were most profitable on average and for 2 of the 3 years. When whole-farm analysis was based on 3-year, average, animal performance, IFL was most profitable with or without retained ownership. Thus, interseeding a legume (like ladino clover) dilutes the toxicity of infected tall fescue, increases profits relative to pure fescue pastures, and also adds nitrogen to the soil.

Lean-Value Marketing Program

This program was developed in the Department of Animal Sciences and Industry to assist producers in understanding the quality of their market hogs by marketing on a wholesale-cut basis. It also allowed analysis of the current marketing practices of the producers in relation to sort loss. Gilts from 34 farms in four Kansas counties with large numbers of swine producers were shipped to a processing company in groups of 25. Carcasses were evaluated by KSU personnel, and wholesale cuts were weighed. Then carcass value and sort loss discount were calculated.

Backfat measurements and wholesale-cut marketing indicated a large variation in genetic quality of swine in Kansas. Results demonstrated that hams, loins, and spareribs are most important in determining improved carcass value on a wholesale-cut basis. High levels of pork fat and bellies mean decreased carcass value. Producers lost an average of $1.08 per head from sort loss by not marketing gilts in the proper weight range. The difference between high and low carcass values was $6.16. For a producer with 100 sows who markets 2,000 hogs per year, this represents a difference of $12,320 in income.

Risk Analysis of Nitrogen Use

Agricultural economists and an agronomist determined yields, net returns, and net-return risks for irrigated corn and soybean cropping systems without fertilizer and with three levels of nitrogen.

The results indicated that the average application of 150 lbs nitrogen/acre for corn may be high. Although fertilizer is perceived as risk-reducing, this study showed that more risk-averse producers are less likely to choose higher levels of fertilization. Risk-averse producers preferred a corn-soybean rotation using 75 lbs nitrogen/acre or continuous soybeans without nitrogen fertilization. The analysis also showed that lowering the level of nitrogen used for corn to 75 lbs/acre is reasonable. With the corn-soybean rotation, elimination of nitrogen fertilizer may be possible. These changes would reduce the potential of nitrate leaching from irrigated fields.

Economics of Wheat Cropping Systems

An economic analysis was conducted using grain yields for several years at the Northwest Research-Extension Center to compare the dryland wheat-fallow (WF) system with the dryland wheat-grain sorghum-fallow (WSF) system. Tillage methods included conventional (CT), reduced (RT), minimum (MT), and none (NT). Returns were determined with and without effects of the current

Double-crop soybeans after wheat can provide high yields and income.

government program, and comparisons were made with three acreage reduction plans and two base levels.

Overall results showed that the WSF-RT and WSF-NT cropping systems produced the most income, and the WF-NT produced the least. Participation in government programs had no major effects. Risk analysis indicated that the WSF-RT system would be preferred by farmers regardless of their tolerance for risk. The WSF-NT system was a close second. The most common cropping system in the area, WF-CT, usually placed fifth in risk analysis. Moderately risk-averse farmers currently using WF-CT are spending as much as $13/acre more than they would spend on the WSF-RT system. Thus, a WSF rotation with reduced or no tillage would produce more income with less risk than the traditional WF system with conventional tillage.

Rising prices for natural gas will decrease use of irrigation, especially for corn.

Economic Comparisons of Wheat-Soybean Rotations

Farmers producing wheat and soybeans in southeastern Kansas select a cropping sequence that enables them to manage soil fertility, control weeds, and maximize income. An ongoing experiment at the Parsons Unit of the Southeast Kansas Branch Experiment Station provides biological data about alternative cropping sequences. Agricultural economists cooperated with an agronomist there to compare economic returns from the various sequences. These included 1 year of wheat and double-crop soybeans; 2 years of wheat, double-crop soybeans, and full-season soybeans; and 3 years involving 2 years of wheat followed by full-season soybeans. Four maturity groups of soybeans were considered.

Income above variable costs based on 1991 prices and yields favored a 1-year sequence of wheat followed by double-crop soybeans. However, results could vary in other years, and some producers may not have adequate labor and machinery to double-crop every year. Early-maturing soybeans have shown promise because they take advantage of the normally abundant spring rainfall in southeast Kansas. Budgeted costs for planting them was $18.00 per acre, compared to $8.00 per acre for group III and IV soybeans. However, soybeans harvested early usually have a price advantage. During this study, the spring and summer were extremely dry. In those conditions, group IV of both full-season and double-crop soybeans had the highest returns.

The Cost of Irrigation

Use and patterns of irrigation in western Kansas have changed in recent years. Since 1975, farmers in this area have irrigated about 2 million acres each year. Corn accounted for about 50 percent of the irrigated crops in 1976 but then declined rapidly. Irrigated acreage of wheat and grain sorghum increased until 1984, when corn acreage started to increase again. Total irrigated acreage has declined by 23 percent since then. During this period, prices of natural gas and, thus, costs for irrigation have risen steadily.

Two agricultural economists designed a study to estimate the effect of an increase in the price of natural gas on the number of acres irrigated in western Kansas, the amount of water pumped, and net income at the farm level. Their results showed that, at any natural gas price above $2.00/mcf, corn acreage began to decrease dramatically and was replaced by wheat and grain sorghum planting. Some irrigation probably could be sustained for the life of wells and equipment at a price of $5.00/mcf, but net income would be reduced greatly. If the price rose to $7.00/mcf, only limited irrigation of wheat and sorghum could occur; no corn would be irrigated. Higher commodity prices can offset an increase in the price of natural gas to a certain point. However, as the supply of water continues to diminish, well yield is lowered and lift is increased, exacerbating the adverse effects of an increase in energy price.

Crop Machinery Requirements

The shift to larger farm machinery and equipment has resulted in a decrease in labor required per crop acre but an increase in machinery investment and repair costs. No up-

to-date standards exist for machinery investment, fuel oil, and repair requirements per crop acre for regions of Kansas. Researchers in the Department of Agricultural Economics used a computerized, machinery-investment, generator program to develop these requirements for several crops on small-, average-, and large-sized farms using typical field operations and both sprinkler and flood irrigation. These derived standards were tested for representative farms from western, central, and eastern Kansas and compared favorably to actual costs. The derived requirements should be very useful in several management considerations.

Crop Lease Arrangements

Over 90 percent of the agricultural producers in the Kansas Farm Management Associations (KFMA) lease part or all of their land, frequently from more than one landlord. Therefore, crop lease arrangements are important. A survey was conducted by an agricultural economist to obtain information on current lease arrangements. A total of 905 completed questionnaires was obtained, representing about 34 percent of KFMA farms (799 dryland and 106 irrigated).

One-third sharing of the crop by the landlord was the primary arrangement, except for dryland crops in the northeast, where a 50 percent share was prevalent. Fertilizer was the most commonly shared input, with the shared percentage similar to that for crops. Costs for herbicides and insecticides and their application were shared by the landlord at a lower percentage. Only in the northeast region did the landlord share substantial percentages of variable costs, such as seed, harvesting, and hauling. A basic principle of a good lease is the sharing of production in the same proportion as resources contributed. If sharing of crop production is not determined in this way, then lease adjustments should be made for the sharing of variable costs.

■ VALUE-ADDED

New Food Uses of Soybeans

Soybean proteins have high nutritional quality, but their use in food products often is limited by undesirable flavor or functional properties. Extrusion processing offers an excellent potential for modifying these factors in food systems, as well as enhancing the cholesterol-lowering properties of dietary fiber from soybeans. A researcher in the Department of Grain Science and Industry investigated extrusion technology for processing soybeans and soyflour and the effects on nutritional value of fiber fractions.

The tests produced 15 extruded soy products that contained about 20 percent protein and a minimum of 20 percent dietary fiber. They had crunchy texture and bland flavor that should be highly acceptable for development of soy snack foods. Extrusion processing can be optimized to increase the water-soluble fraction of soy fiber and give a fiber profile even better than that of oat bran. The health benefits of foods have become increasingly important to American consumers. Thus, development of these extruded products could lead to the marketing of good-tasting, nutritious, and popular snack foods using large quantities of soybean products.

New processing methods for soybeans allow development of snack foods.

Success with Hard White Winter Wheat

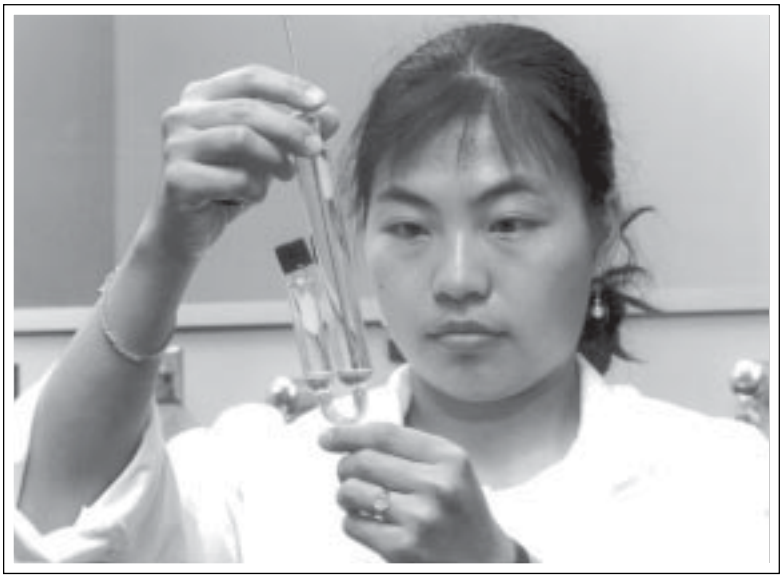
Interest in hard white winter wheat (HWWW) increased greatly in recent years. Cooperative research among several departments sponsored by KAES has developed HWWW varieties with resistance to preharvest sprouting, high yields, and excellent quality. Private citizens from the wheat industry have formed an organization to market HWWW from Kansas. Flour and several baked goods are already available to consumers, restaurants, and food services. White wheat products are lighter colored and milder in flavor than those made from red winter wheat. Because the flavor is naturally sweet, about half the usual amount of sugar can be used in baked goods. However, whole white wheat provides as much fiber and nutrition as traditional, darker colored, whole wheat.

Hard white wheat has potential for use in many other products. Kansas HWWW flour makes good quality tortillas and Chi-

nese steamed bread. It also has been used in Oriental noodles and fried snack noodles. Bran from white wheat can replace that from soft white wheat in breakfast cereals. Farina from HWWW is less expensive than durum semolina and makes acceptable pasta.

The economic impact of HWWW in Kansas will be great. Even a modest premium could increase the value of the state's wheat crop by $20 million. However, HWWW would be worthwhile without a premium, because it is preferred in many important markets and probably would sell when red wheat would not.

■ FOOD



This U-shaped tube allows quick identification of a major food pathogen.

Food Safety

A special grant through the Cooperative State Research Service established the Food Safety Consortium, including Kansas State University, University of Arkansas, and Iowa State University. Research by the Consortium addresses five issues:

1. developing technology for the rapid identification of infectious agents and toxins;

2. developing a statistical framework to evaluate potential health risks;

3. determining the most effective intervention points to control microbiological or chemical hazards;

4. developing risk-monitoring techniques to detect potential hazards in the distribution chain;

5. reducing or eliminating microbial or chemical hazards associated with production.

KSU researchers in the Department of Animal Sciences and Industry are focusing their efforts on beef.

The Rapid Methods and Automation in Microbiology Center is a leader in developing such techniques and sponsors an annual workshop attended by microbiologists from around the world. Rapid methods to estimate kinds and numbers of microbes in meat allow more efficient monitoring of the safety of products going to consumers. Other methods quickly isolate and identify major pathogens that can cause food poisoning. A technique using a U-shaped tube has been perfected to detect *Listeria* in hours instead of days. A double-tube method is faster and more sensitive than old methods for detecting *Clostridium perfringens*.

Another laboratory is developing techniques to detect residues of organophosphate pesticides (OPs) and their metabolites in beef. The use of high performance liquid chromatography with ultraviolet-visible diode-array detection has given promising results. At least 13 common OPs can be detected and separated. Recoveries of pesticides added to meat samples were up to 95 percent in lean muscle and up to 79 percent in fatty muscle tissue.

Other researchers are considering the effects of various ingredients on the activity of lysozyme, a naturally occurring, antimicrobial enzyme. It can destroy *Salmonella* and *Staphylococcus*, two major pathogens found in food. Several amino acids and glucose greatly enhanced the activity. Seasonings often used in processed meats either enhanced activity or decreased it slightly. Lysozyme activity remained high for a year in the presence of several food additives.

Numerous other projects related to food safety are underway. All of these will benefit consumers by assuring a meat supply that is safer and more healthful.

Sensory Analysis of Foods

The Sensory Analysis Center in the Department of Foods and Nutrition is a unique facility supported by KAES and used in many research projects. Volunteers are trained extensively before participation in analyses. Sometimes initial studies are needed to characterize the flavors of foods and establish descriptive terms.

Fish. Increasing kinds of freshwater fish are being marketed, but their success depends mainly on consumer acceptance of their sensory properties. To define these properties, the flavor and textures of 10 types of freshwater fish were compared. These fish offered a

variety of flavors, with some unique attributes and some in common with ocean fish. They typically had a white meat character and much less saltiness. Tilapia, a tank-raised fish receiving much interest recently, was the only one with a roasted meaty flavor. Texture varied even more than flavor. All catfish samples were more gelatinous and juicier than other fish. Several fish were firm and fibrous, reminding testers of chicken breast. With these flavor and texture data, freshwater fish can be compared to more familiar ocean species. This should aid in expanding the market for new fish.

Cheese. Dairy processors, product trade associations, and other agencies use simple score cards to measure sensory quality of cheese. Many terms routinely used to characterize cheese have not been defined clearly. Consequently, no consistent relationship exists between grade of cheese and flavor types. A suggestion has been made to label cheeses with flavor descriptions, but well-defined terms and appropriate references are needed first. The Sensory Analysis Center selected a wide variety of natural cheeses and tried to develop terminology for describing the flavor attributes, define each attribute, determine a reference for each characteristic, and then test the lexicon on the same cheeses. The result was a set of 30 flavor-descriptive terms that can be used to describe aged, natural cheeses. These should be useful in marketing cheese and also in research to more adequately describe cheese flavor and relate it to other sensory, physical, or chemical information.

What Influences Meat Use?

In recent years, consumption of red meat has declined, while that of poultry and seafood has increased. Many factors influence consumers' selection of meat, including cost, nutrition, safety, health concerns, quality, and convenience. Researchers in the Department of Foods and Nutrition recruited consumers to meet in groups and answer questions about meat use. They were allowed to discuss their views and clarify terminology and attitudes. Only people who ate meat at least four times a week were included. They were divided into categories of high, moderate, or low general meat use; moderate red meat use; and moderate poultry use.

Highly trained volunteers analyze flavors and textures of foods for numerous research projects.

The groups varied in their reasons for buying meat; cost and health concerns were important to some and versatility of preparation to others. Only the low general meat consumers and moderate poultry consumers limited their meat intake or selection for health reasons. Convenience was not a major factor, and many consumers expressed dislike of restructured or processed meat products. Most groups were not concerned about safety of meat they purchased, but they were careful in their handling and preparation at home. The ideal piece of meat was characterized as big, thick, juicy, and tender. Ease of preparation, good flavor, and visual appeal also were mentioned. Most consumers had a distinct preference for either dark or white poultry meat.

These results indicate that consumers' decisions about how much meat to eat and what kind are influenced by many subjective factors, as well as more practical items like cost and visual appearance.

■ KANSAS PEOPLE

A Profile of Kansas Hunters

Traditionally, hunters have played a significant role in promoting, directing, and funding conservation efforts. They have a direct effect on wildlife management programs, which receive funding from taxes on equipment and license fees. Although hunters, in general, are well studied, only one previous report focused on Kansas hunters. Therefore, a survey was undertaken by a researcher in the Department of Horticulture, Forestry, and Recreation Resources to develop a profile of Kansas hunters that would enhance our understanding of their characteristics, their activities, and their motivation.

Questionnaires were sent to 1,386 resident Kansas hunters; 842 were completed and returned. Most respondents were male, lived in incorporated cities or towns, earned between $10,000 and $50,000 per year, had high school or some college or vocational/technical education, and were blue-collar or white-collar workers. Respondents spent an average of 34 percent of their free time hunting and had made an average of 17 hunting trips during the previous 12 months. Nearly half of the hunters reported that they hunted with both family and friends. Respondents said that they derived enjoyment and relaxation from hunting.

Pheasant, quail, and deer were the most frequently hunted species. Most hunters had average familiarity with hunting opportunities in Kansas. The average hunter had invested approximately $1,900 in equipment. The majority of respondents (61 percent) said that they would not be willing to pay for access to privately owned hunting areas. Affluent, urban hunters were most willing to pay for hunting access. Therefore, any agency programs to encourage public access to private land should focus on the more urbanized areas of the state.

The bald eagle is an endangered bird that needs protection in Kansas.
Photo by D. Rintoul

Kansans' Attitudes about Wildlife

The Kansas Department of Wildlife and Parks asked KSU to provide an objective assessment of Kansans' feelings about wildlife protection in the state. The Computer-Assisted Telephone Interviewing Laboratory in the Department of Human Development and Family Studies was chosen to do the survey. This facility allowed reporting of initial results within days after the last telephone call was made.

The 550 completed interviews involved 56 percent female and 95 percent white respondents, of which 28 percent had college degrees and 39 percent came from urban areas. A large majority was aware of Kansas laws to protect wildlife and habitat. Almost all supported having an official state list of endangered wildlife, imposing stiff fines for infractions, and buying more lands to protect wildlife. Respondents showed differential support for several developments that might threaten wildlife and also varied in their perceptions of possible threats to wildlife in Kansas. Gender and age, rather than rural/urban differences, affected respondents' answers to many of the questions, including their awareness of the Chickadee Checkoff on the Kansas income tax form.

Although a majority rated Wildlife and Parks programs to manage and protect endangered wildlife as "excellent" or "good," 29 percent indicated that there was room for improvement. These results should provide a firm basis for further efforts to protect endangered wildlife and their habitat in Kansas.

Farmers' Markets

The number of farmers' markets has increased over 450 percent nationwide in the past 20 years. In Kansas, the number has grown from 26 in 1987 to 55 in 1990. What accounts for this surge in popularity? First, the markets require minimal inputs of energy and money; a central and inexpensive location, vendors, and customers are the three essential factors. Second, farmers' markets meet a variety of individual and community needs.

Previous research on farmers' markets has focused mainly on the customers. A study in Kansas, conducted by the Department of Horticulture, Forestry, and Recreation Resources, considered the vendors and market organization. Eleven markets were chosen in towns throughout the state with populations ranging from 10,000 to 25,000. The market in Lawrence (population 66,000) was used for comparison. Two questionnaires were designed to gather detailed information about market organization and backgrounds and opinions of vendors.

The results showed that the majority of vendors were retired people, followed by professional working people and farmers. The mean incomes from farmers' markets were $66 per day and $900 per season. However, farmers earned an average of $99 per day. These figures can be extrapolated to estimate the statewide annual earnings from farmers' markets as $528,660. The state retail sales taxes would amount to $22,468. Vendors participating in markets with written guidelines, a market coordinator, and some form of organization were more satisfied, suggested fewer improvements, and had a more positive outlook for the future of their markets. Offering a variety of products for sale, especially baked goods, had a positive impact on vendors' satisfaction. Through their participation in farmers' markets, vendors benefit-

Farmers' markets provide extra income for vendors and social benefits to the community.

ted socially as well as economically, indicating that the markets serve an important and versatile community function.

Well-Being of Rural Families

The financial conditions of rural communities and families have changed greatly in recent years. The farm crisis, drought, and other economic factors have raised questions about the coping strategies of rural families. Thus, the economic and emotional well-being of rural families in Kansas was studied by a group of researchers in the Department of Human Development and Family Studies. Questionnaires were completed by 312 households in two counties, one in which per capita income had increased recently and one in which it had decreased.

Results showed that the median age of the household financial managers who responded was older than average for the state, their income was higher than the state average, and over a third were retired. Nearly half of the financial managers were satisfied with their current financial situations. Younger respondents indicated a higher rate of financial problems. About 17 percent of these household managers had lost income during the year preceding the survey, which resulted in a decline in self-esteem and satisfaction with family life.

Generally, age, income, and education had more influence on resource utilization patterns and financial and personal satisfaction than did economic conditions of the county. Although most respondents were optimistic, one out of five worried about not having sufficient money to pay monthly bills, and over 20 percent did not have enough money to pay for adequate medical care. These are alarming statistics that should be of concern to all Kansans.

Rural Kansans Express Opinions

A more general poll on rural issues was conducted by KSU researchers and partially funded by KAES. The purpose of the poll was to determine how rural Kansans saw their communities and how those communities might deal with problems. It focused on rural Kansans' opinions about their local economies, their evaluations of community services, and their reactions to several policy alternatives for providing services.

More than 90 percent of respondents said that economic development is a good thing. Nearly as many supported the use of local government funds for such development. A majority (60 to 65 percent) opposed targeting assistance only to communities with the "best chance to prosper" or only to businesses that are locally owned and operated. Respondents also were in favor of merging local government units or schools to consolidate services and save money. About 60 percent of respondents said that their local economy was in "fair" condition, 22 percent said "poor," and 17 percent said "good." Most rural Kansans were satisfied with the quality of several important services, like medical care. However, 36 percent indicated that they go outside their hometown to do weekly shopping.

A significant number of rural families in Kansas lack sufficient income to cover monthly expenses or medical care.

Screening Test for Yeast

A microbiologist in the Department of Animal Sciences and Industry has developed a dye-containing growth medium that screens for *Candida albicans*, a major yeast pathogen of humans. It causes many infections, including one of the first opportunistic infections of AIDS patients.

After 24 hours incubation, the medium is exposed to ultraviolet light; then *Candida* is the only pathogen visible under fluorescent light. Fresh clinical isolates may fluoresce after only 12 to 18 hours of incubation. Further tests of the medium with a large number of samples showed it to be 99 percent specific for *Candida*. Thus, this simple-to-make medium gives clear-cut and definitive results.

Calcium Intake by Women

Women aged 18 to 35 from Kansas State University and the Expanded Food and Nutrition Education Program (EFNEP) were studied by researchers in the Department of Foods and Nutrition. They responded to questionnaires that assessed frequency of consumption of calcium-rich foods, attitudes towards such foods, and risks for osteoporosis.

The EFNEP group has a significantly higher mean intake of calcium than the KSU women, because they consumed more milk, ice cream, and dark green vegetables. Most attitudes toward eating or drinking calcium-rich products were similar between groups. However, differences were noted relating to enjoyment of drinking milk at certain times or with certain foods. Several differences also occurred in attitudes related to health, e.g., drinking milk to have good teeth or to obtain calcium, weight gain caused by eating dairy products, or taking calcium supplements, if needed. Responses to such questions might be influenced by educational or other social factors.

Results showed that most participants were at moderate or high risk for osteoporosis; the high-risk category included 68 percent of KSU women and 52 percent of EFNEP women. Two controllable factors affecting osteoporosis are smoking and alcohol consumption. More EFNEP women smoked, but more KSU women drank alcohol. However, the KSU group also exercised more, and exercise can increase bone density and lower the risk for osteoporosis.

The researchers concluded that strategies should be developed to improve the acceptability of milk, to provide effective information on calcium nutrition, and to help consumers understand the risks for and prevention of osteoporosis.

Cheese is a good source of calcium, which helps prevent osteoporosis in women.

Health Hazards of Insect Traps

An entomologist evaluated electrocuting light traps and a new electronic device that traps insects on a sticky surface. All traps performed equally well in killing flies and moths. However, the electrocuting traps created fragments of insect bodies and particles of solidified body fluids that were distributed in the air. Most fragments remained fairly close to the trap, but their light weight can allow them to stay airborne for long periods of time. Moths caught on the sticky trap often fluttered their wings for some time, which would release scales.

Insect fragments in the air have been identified as causes of several allergic reactions in humans. In addition, the solidified body fluids could harbor pathogens that are infectious. These results should be considered in deciding where to use such insect traps.

Safety of Kansas Water

After 2 years of testing Kansas surface waters, two biologists found an assortment of disease-causing organisms. The water samples came from the river pond area of Tuttle Creek Reservoir, Milford Lake, the Kaw River, and a pond and King's Creek on Konza Prairie Research Natural Area.

Water contained cysts of two major intestinal parasites, *Giardia* and *Cryptosporidium*, as well as numerous bacteria. Surprising numbers of these organisms were resistant to antibiotics; some showed multiple resistance. If ingested by humans, these resistant bacteria could be very hard to eliminate and could transfer their resistance to other bacteria. The Kaw River had the greatest concentration of parasite cysts, but even the samples from Konza Prairie contained some.

The researchers warned that raw, untreated water from any of these sites was not safe to drink. Swimmers also risk infection if they swallow water.

Assessing and Communicating Health Risks

Concern about the human health risks associated with U.S. agricultural production has grown substantially in the past several decades. Attention has centered on the health risks from fertilizers, pesticides, and antibiotics, as well as the consumption of various food products, like red meat. The existing literature on the health risks related to such potentially hazardous agents is controversial, complex, and characterized by uncertainty. A researcher in the Department of Sociology, Anthropology, and Social Work did an extensive review of this literature and wrote a report that explains risk terminology (including a glossary of health risk terms), risk assessment, risk perception, and risk communication. The chronic risks associated with meat/fat consumption (cancer and coronary heart disease) are discussed as examples, with evidence from studies of animals and humans.

The study showed that communication of health risks is hindered by several problems. Public perceptions of risk are often inaccurate. Definitions of risk differ between groups. Risk information can frustrate the public. Modifying strong beliefs is difficult. Risk perception can be manipulated by the presentation format. The report offers recommendations for presenting risk data more accurately and in a way that consumers can understand.

■ *INTERNATIONAL AGRICULTURE*

A team of agronomists, animal scientists, and agricultural economists worked in Botswana as part of an 8-year Agricultural Technology Improvement Project (ATIP). Botswana is an arid country with unpredictable rainfall; fields typically yield less than 10 percent of their agronomic potential. The ATIP team found technological and management options that would improve production and be economically viable, including better water management, new tillage methods, and improved soil fertility.

Researchers worked directly with farmers to diagnose production problems, organize farmer groups, and select improved agricultural practices. Farmers chose innovations to try, then set up experimental plots on their farms next to plots where they used traditional methods. They saw firsthand which techniques worked and then taught each other. This farming systems approach demonstrated that farmers were more likely to

KSU researchers worked with farmers in Botswana to improve production of crops and animals.

accept an innovation if they knew someone had used it successfully.

A major goal of the ATIP was to build closer relationships between government agencies, researchers, extension personnel, and farmers. The team found that information had not been moving freely from those who generated it to the end user, the farmer.

Although most of the team has returned to Kansas, the work they started will continue with the help of students trained in the United States and an agronomist who remained for 2 years as an advisor to the Ministry of Agriculture. The government has placed research teams similar to the ATIP groups in several areas of the country to help farmers.

■ EDITORIAL OFFICE

A total of 1,281 manuscripts received contribution numbers during the biennium, and 918 (72 percent) were edited. The average number processed per month was 54. A record number of 691 manuscripts was received in 1992. The categories of manuscripts were:

Journal articles	893
Proceedings of meetings	150
Books or chapters	65
Station publications including 2 Bulletins	65
Department reports	62
Trade publications	28
Extension publications	13
Computer programs	5

Many KAES publications about current research are distributed at field days.

In 1992, KAES publications produced by the editorial staff won 10 awards from various regional and national, professional organizations. These included three third-place awards for the 1988-1990 Biennial Report from the National Association of Government Communications and Agricultural Communications in Education.

During the biennium, formation of a new Department of Communications was approved. It includes the KAES Editorial Office, Extension Communications, Extension Computer Systems Office, and the agricultural journalism program. Robert R. Furbee from the Ohio Agricultural Research and Development Center was appointed department head. Organizational plans and funding for the department should be implemented in 1993.

This new addition to Throckmorton Hall will provide additional space for research in plant science by several departments.

Personnel Changes

■ APPOINTMENTS

Laura Andersson, biochemistry
Mark J. Arns, biology
John M. Blair, biology
Gary W. Brester, agricultural economics
Paraq R. Chitnis, biology
Schafiqul Chowdhury, laboratory medicine
Randall Currie, southwest Kansas research-extension center
Walter K. Dodds, biology
Michael Dryden, laboratory medicine
Jon D. Dunn, head, anatomy and physiology
Thomas P. Eck, southwest Kansas research-extension center
John Fritz, agronomy
Jack D. Fry, horticulture
W. Richard Goe, sociology, anthropology, and social work
David M. Grieger, animal sciences and industry
*Thomas J. Herald, f*oods and nutrition
Michael J. Horak, agronomy
Chi-Tai Huang, agricultural engineering
Michael Kanost, biochemistry
Sun I. Koo, foods and nutrition
Michael R. Langemeier, agricultural economics
Robert Leedle, pathology
James H. Long, southeast Kansas branch experiment station
Brian H. Marsh, agronomy
Victor L. Martin, agronomy
Joseph S. Murray, biology
James F. Ragan Jr., head, economics
Kraig Roozeboom, agronomy
Peter M.A. Sherwood, chemistry
C. Michael Smith, head, entomology
John C. Tracy, civil engineering
Emin T. Ulug, biology
Xuemin Wang, biochemistry
Stephen M. Welch, agronomy
Naiqian Zhang, agricultural engineering

■ RESIGNATIONS

Max L. Allison, horticulture
William C. Black IV, entomology
Gerald Buonopane, foods and nutrition
David Cox, head, biochemistry
Glenn S. Elliot, laboratory medicine
Robert Fry, chemistry
Casey B. Frye, animal sciences and industry
Roch E. Gaussoin, horticulture
Mary B. Gregoire, hotel, restaurant, institution management and dietetics
S. Mark Hall, pathology
David L. Harmon, animal sciences and industry
David Hensley, horticulture
Marion O. Harris, entomology
Reinee Hildebrandt, forestry
Guy H. Kiracofe, animal sciences and industry
Jeff L. Nus, horticulture
Elieser S. Posner, grain science and industry
Prasad Potnis, clothing, textiles, and interior *design*
P.G. Reddy, anatomy and physiology

■ RETIREMENTS

Albert W. Adams, animal sciences and industry
Francis L. Barnett, agronomy
Lawrent L. Buschman, entomology
George W. Cole, USDA wind erosion research unit
Frank E. Cunningham, animal sciences and industry
Robert D. Klemm, anatomy and physiology
Frank Orazem, agricultural economics
Walter H. Smith, animal sciences and industry
Ted Walter, agronomy
Clyde E. Wassom, agronomy

■ STAFF CHANGES

Paul H. Jennings
from: head, horticulture
to: professor; horticulture, forestry, and recreational resources
Judy B. Miller
from: professor; hotel, restaurant, institution management and dietetics
to: head; hotel, restaurant, institution management and dietetics
Thomas E. Roche
from: professor, biochemistry
to: head, biochemistry
Thomas D. Warner
from: head, forestry
to: head; horticulture, forestry, and recreation resources

■ DEPARTMENT CHANGES

Forestry and horticulture were merged into *horticulture, forestry, and recreation resources*
Surgery and medicine became *clinical sciences*

Station Publications

■ BULLETINS

658 Assessing Communicating Health Risks: The Case of Meat/Fat Consumption
659 Grain Sorghum Hybrid Response to Lasso and Dual Herbicides and Efficacy of Screen, Concep II, and Concep II/Apron Seed Safeners

■ REPORTS OF PROGRESS

605 1990 Performance Tests with Winter Wheat Varieties
606 Big Bluestem Evaluations in the Eastern Plains
607 Final Report of the Wheat Quality Council
608 Dairy Day 1990
609 Economic and Emotional Well-Being of Rural Families in Kansas
610 Swine Day 1990
611 Effects of Energy and Commodity Prices on Irrigation in the Kansas High Plains
612 1991 Chemical Weed Control
613 Crop Machinery Investment, Repair, and Fuel-oil Requirements for Irrigated and Dryland Crops in Kansas
614 1990 Corn Performance Tests
615 Evaluation of Woody Ornamentals for Kansas
616 Crop Lease Arrangements on Kansas Farms
617 1990 Kansas Grain Sorghum Performance Tests
618 Kansas Fertilizer Research 1990
619 1990 Kansas Variety Tests. Spring Oats, Spring and Winter Barley, Spring Wheat, and Winter Triticale
620 1990 Kansas Sunflower Performance Tests
621 1990 Kansas Soybean Performance Tests
622 Forage Utilization
623 Cattlemen's Day 1991
624 Kansas Sheep Research 1991
625 1990 Vegetable Investigations
626 A Profile of Kansas Hunters
627 Roundup 1991
628 1991 Agricultural Research. Southeast Kansas Branch Station
629 Forage Sorghums. Summary of Nutritive Value and Agronomic Performance
630 1991 Field Day Report. Southwest Kansas Research-Extension Center
631 1990 Bedding Plant Field Trials
632 1991 Cattle Feeders' Day
633 1991 Turfgrass Research
634 A Proportionate Mortality Study of Cancer and Accidents among Kansas Farmers, 1983-1989
635 1991 Agricultural Research. Northwest Research-Extension Center
636 1991 Woody Ornamental Evaluations
637 1991 Kansas Performance Tests with Winter Wheat Varieties
638 Kansas Attitudes Regarding Threatened and Endangered Wildlife
639 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
640 Dairy Day 1991
641 Swine Day 1991
642 1991 Kansas Performance Tests with Corn Hybrids
643 1992 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland
644 1991 Kansas Performance Tests with Grain Sorghum Hybrids
645 Final Report of the Wheat Quality Council, 1990
646 1991 Vegetable Investigations
647 Kansas Fertilizer Research 1991
648 1991 Kansas Performance Tests with Sunflower Hybrids
649 1991 Kansas Performance Tests with Soybean Varieties
654 1991 Kansas Performance Tests with Alfalfa Varieties
651 Cattlemen's Day 1992
652 Milling and Baking Test Results for Hard Winter Wheats Harvested in 1991
653 Roundup 1992
654 1992 Agricultural Research. Southeast Kansas Branch Station
655 Field Days 1992. Agronomy and Agricultural Engineering Experiment Fields
656 1991 Bedding Plant Field Trials
657 1992 Field Day Report. Southwest Kansas Research-Extension Center
658 Farmers Markets in Kansas: A Profile of Vendors and Market Organizations
659 1992 Cattle Feeders' Day
660 1992 Agricultural Research. Northwest Research-Extension Center

■ KEEPING UP WITH RESEARCH

101 Influence of Seed Size on Winter Wheat Performance Tests
102 Winter Wheat Performance following Seed Treatment in South Central Kansas
103 Days Suitable for Field Work in Kansas

■ SPECIAL PUBLICATIONS

- Agricultural Research in Kansas: Thirty-fifth Biennial Report of the Agricultural Experiment Station, 1988-90
- Ag Facts

SUFFIX LETTERS FOR CONTRIBUTION NUMBERS *(pages 33—84)*

A Proceedings of Meeting or Symposium
B Bulletin published by KAES; Book or Chapter for Book
C Computer Program
D Department Report
E Extension Publication (co-authored by a KAES researcher but published by Cooperative Extension or externally as educational material) or research by an Extension person to be published in a refereed journal.
J Journal
S Station Publication: Report of Progress, Keeping Up With Research, Special Publication
T Trade Publication

Categories are based on information received before manuscripts are published. Place of publication sometimes changes later. Numbers are deleted if authors cannot supply publication data.

Station publications including Bulletins are available from KAES Editorial Office. Department Reports are available only from the appropriate department office. Copies of journal articles or other outside publications must be obtained from the authors.

Publications of Station Scientists *(By Department and Station Contribution Number)*

1. Agricultural Economics

89-117-J An Economic Analysis of Season-Long and Intensive-Early Grazing Systems in a Whole Farm Situation
J. Webb, O. Buller, G. Posler, C. Owensby, and R. Cochran
J. Am. Soc. Farm Managers and Rural Appraisers 55:83-89, 1991

90-317-J Modeled Crop Water Use and Soil Water Drainage
O.H. Buller, H.L. Manges, L.R. Stone, and J.R. Williams
Agric. Water Manag. 19:117-134, 1991

91-7-J Earnings of Kansas State University Agriculture Graduates: 1978-1988
A.P. Barkley
Am. J. Agric. Econ. 74(3):215-222, 1992

91-11-D An Investigation of International Trade in a Processed Agricultural Product: The U.S. Import Demand for Wheat Gluten
F. Ortalo-Magne and B.K. Goodwin
Agric. Econ. Dept. Rep. (Staff Pap. 91-1):1-14, 1990
(available from dept. only)

91-12-D The World Wheat Gluten Industry. An Econometric Investigation of the U.S. Wheat Gluten Import Demand
F. Ortalo-Magne and B.K. Goodwin
Agric. Econ. Dept. Rep. (Res. Rep. 12):1-65, 1990
(available from dept. only)

91-13-D Price Dynamics in International Wheat Markets
T.C. Schroeder and B.K. Goodwin
Agric. Econ. Dept. Rep. (Staff Pap. 91-2):1-21, 1990
(available from dept. only)

91-32-D Systematic and Unsystematic Risk Costs for Southeastern Kansas Farm Enterprises
K.N. Amegbeto and A.M. Featherstone
Agric. Econ. Dept. Rep. (Staff Pap. 91-3):1-18, 1990
(available from dept. only)

91-43-D Forecasting in the Presence of Structural Change: An Analysis of Cattle Prices with a Gradual Switching VAR System
B.K. Goodwin
Agric. Econ. Dept. Rep. (Staff Pap. 91-4):1-18, 1990
(available from dept. only)

91-44-D Impact of Changes in U.S. Grain Standards on Discounts for Insects in Stored Grain
R. Fleming, B. Schurle, S. Duncan, and C. Reed
Agric. Econ. Dept. Rep. (Staff Pap. 91-5):1-12, 1990
(available from dept. only)

91-46-D A Comparison of Risk Preference Measurements with Implications for Extension Programming
B. W. Schurle and W.I. Tierney, Jr.
Agric. Econ. Dept. Rep. (Staff Pap. 91-6):1-9, 1990
(available from dept. only)

91-60-D Use of a Crop Simulation Model to Provide Long-Term Data for Economic Analysis: The Case of Early Maturing Soybeans
R.O. Burton, Jr., G. van der Hoeven, A.M. Featherstone, and G.V. Granade
Agric. Econ. Dept. Rep. (Staff Pap. 91-7):1- 15, 1990
(available from dept. only)

91-88-D Derived Labor Requirements for Eastern Kansas Crops
L.N. Langemeier, K. Witt, and C. Akhimien
Agric. Econ. Dept. Rep. (Staff Pap. 91-8):1-19, 1990
(available from dept. only)

91-89-D Derived Labor Requirements for Central Kansas Crops
L.N. Langemeier, C. Akhimien, and K. Witt
Agric. Econ. Dept. Rep. (Staff Pap. 91-9):1-19, 1990
(available from dept. only)

91-95-J Kansas State Survey: What Skills Do Agriculture Graduates Need?
A.P. Barkley
Natl. Agric. College Teachers Assoc. J. 35(1):53-57, 1991

91-96-D The College and Career Experiences of Graduates of the College of Agriculture at Kansas State University, 1979-1988
A.P. Barkley and J.-I. Perng
Agric. Econ. Dept. Rep. (Staff Pap. 91-10):1-31, 1990
(available from dept. only)

91-97-D Reduction of Yield and Income Risk under Alternative Crop Insurance and Disaster Assistance Plans
G.L. Carriker, J.R. Williams, G.A. Barnaby, and R. Black
Agric. Econ. Dept. Rep. (Staff Pap. 91-11):1-21, 1990
(available from dept. only)

91-100-J Labor Mobility among Agriculture College Graduates: A Human Capital Approach
A.P. Barkley
West. J. Agric. Econ. 16:315-325, 1991

91-122-D The College and Career Experiences of Graduates of the College of Agriculture at KSU, 1978-1988: Results by Major Field of Study, Autumn, 1990
A.P. Barkley and D.C. McIntosh
Agric. Econ. Dept. Rep. (Res. Rep. 13):1-276, 1990
(available from dept. only)

91-165-D Theory and Practice of Ecological Economics of Agriculture
X. Jiang
Agric. Econ. Dept. Rep. (Res. Rep. 15):1-53, 1990
(available from dept. only)

91-167-S Effects of Energy and Commodity Price on Irrigation in the Kansas High Plains
Kans. Agric. Exp. Stn. Rep. Prog. 611:1-22, 1990

91-189-S Swine Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 610:1-123, 1990

91-219-S Crop Machinery Investment, Repair, and Fuel-Oil Requirements for Irrigated and Dryland Crops in Kansas
Kans. Agric. Exp. Stn. Rep. Prog. 613:1-30, 1990

91-263-D Dockage Treatment at 1990 Kansas Wheat Harvest
H.L. Kiser and D. Frey
Agric. Econ. Dept. Rep. (Res. Rep. 14):1-17, 1990
(available from dept. only)

91-313-D Risk Analysis of Nitrogen Fertilization for Corn and Soybeans: Incentives for Lower Use
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
Agric. Econ. Dept. Rep. (Staff Pap. 91-12):1-21, 1991
(available from dept. only)

91-329-S Crop Lease Arrangements on Kansas Farms
Kans. Agric. Exp. Stn. Rep. Prog. 616:1-25, 1990

91-332-D Price Discovery and Cointegration in Live Hog Markets
T.C. Schroeder and B.K. Goodwin
Agric. Econ. Dept. Rep. (Staff Pap. 91-14):1-21, 1991
(available from dept. only)

91-345-D Alternative Crop Insurance and Disaster Aid Designs for Central Plains Wheat and Grain Sorghum
J.R. Williams, G.L. Carriker, G.A. Barnaby, J.K. Harper, and J.R. Black
Agric. Econ. Dept. Rep. (Staff Pap. 91-15):1-35, 1991
(available from dept. only)

91-349-D Determinants of Cash Fed Cattle Prices: Does Quality Matter?
R. Jones, T. Schroeder, J. Mintert, and F. Brazle
Agric. Econ. Dept. (Staff Pap. 91-16):1-26, 1991
(available from dept. only)

91-352-C Economic Impact Analysis for Agroindustrial Development
R. Phillips
Food and Feed Grains Inst. Tech. Rep. 30:1-173, 1991

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

Publications of Station Scientists (Continued)

91-358-A Where We Stand Today: U.S. Grain Exports - Acreage, Yields, Production, Consumption, Exports, Beginning Stocks, and Prices
H.L. Kiser
Proc. Grain Export Marketing Seminar at K-State, pp. 1-26, 1990

91-430-C Programme pour l'Analyse de Faisabilité TRI pour Microordinateurs MS DOS
R. Phillips and J.D. Lea
Food and Feed Grains Inst. Spec. Rep. 32:1-156, 1991 (in French)

91-431-J Yield and Income Risk Reduction under Alternative Crop Insurance and Disaster Assistance Designs
G. Carriker, J. Williams, A. Barnaby, and R. Black
W. J. Agric. Econ. 16(2):238-250, 1991

91-435-C Suplememto con Casos de Estudio para el Progama para el Analysis de Factibilidad Economica para USO en Microcomputadores con MS-DOS
R. Phillips and R.A. Flores
Food and Feed Grains Inst. Res. Rep. 23:1-157, 1991 (in Spanish)

91-442-D Publications in Agricultural Economics, Kansas State University 1990
V. Kaul
Agric. Econ. Dept. Rep. (Staff Pap. 91-17):1-24, 1991
(available from dept. only)

91-445-S 1991 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 628:1-117, 1991

91-464-D Mathematical Formulas for Calculating Net Returns from Participation in Government Farm Programs: Provisions of the Food, Agricultural, Conservation and Trade Act of 1990
P.T. Berends, J.R. Williams, and G.A. Barnaby
Agric. Econ. Dept. Rep. (Staff Pap. 91-18):1-27, 1991
(available from dept. only)

91-489-D Grading Grain under the U.S. Grain Standards
H.L. Kiser
Agric. Econ. Dept. Rep. (Staff Pap. 91-19):1-42, 1991
(available from dept. only)

91-580-D Area-Measured Crop Insurance and Disaster Aid for Wheat and Grain Sorghum
J.R. Williams, G.L. Carriker, G.A. Barnaby, J.K. Harper, and J.R. Black
Agric. Econ. Dept. Rep. (Staff Pap. 91-20):1-22, 1991
(available from dept. only)

91-587-D The Role of the Unit Administrator: Roles, Powers, and Responsibilities
M.A. Johnson
Agric. Econ. Dept. Rep. (Staff Pap. 91-21):1-11, 1991
(available from dept. only)

91-588-D The Department's Role in Preparing Individuals and Teams for the Challenge of the 1990s
M.A. Johnson
Agric. Econ. Dept. Rep. (Staff Pap. 91-22):1-12, 1991
(available from dept. only)

92-19-D A Nonparametric Analysis of Cost Minimization and Profit Maximization Behavior for a Sample of Kansas Farms
G.A. Moghnieh, A.M. Featherstone, and B.K. Goodwin
Agric. Econ. Dept. Rep. (Staff Pap. 92-1):1-15, 1991
(available from dept. only)

92-30-D Farming Systems Research in a Declining Donor Environment
D.W. Norman
Agric. Econ. Dept. Rep. (Staff Pap. 92-2):1-39, 1991
(available from dept. only)

92-38-D Futures Market Reaction to *Cattle on Feed* Reports
O. Grunewald, M.S. McNulty, and A.W. Biere
Agric. Econ. Dept. Rep. (Staff Pap. 92-3):1-34, 1991
(available from dept. only)

92-40-D The Economic Impacts of a Ban on Subtherapeutic Antibiotics in Swine Production
M.A. Wade and A.P. Barkley
Agric. Econ. Dept. Rep. (Staff Rep. 92-4):1-27, 1991
(available from dept. only)

92-44-A Household Economics and Community Dynamics
D.W. Norman
Proc. SR-CRSP Symp., Sustainable Crop-Livestock Systems for the Bolivian Highlands, pp. 39-69, 1992

92-74-D Integrating the Technical and Marketing Approaches for Profitable Utilization of Grain Post-Harvest Technology
C. Hugo, R. Maxon, and U. Acasio
Food and Feed Grains Res. Rep. 33:1-39, 1991

92-75-D Low-Input Agriculture as a Groundwater Protection Strategy
P.L. Diebel, D.B. Taylor, and S.S. Batie
Agric. Econ. Dept. Rep. (Staff Pap. 92-6):1-14, 1991
(available from dept. only)

92-106-D The Consequences of Using Disappearance Data as Proxies for Actual Consumption Data on Demand Elasticity Estimates
G.W. Brester and M.K. Wohlgenant
Agric. Econ. Dept. Rep. (Staff Pap. 92-7):1-25, 1991

92-111-D Factors Influencing Change in Western Kansas Irrigated Acres
O. Buller
Agric. Econ. Dept. Rep. (Staff Pap. 92-8):1-15, 1991

92-127-D Potential Economic Effects of a Zero Depletion Policy for the Ogallala Aquifer in Northwest Kansas
O. Buller
Agric. Econ. Dept. Rep. (Staff Pap. 92-9):1-21, 1991

92-144-J Organizational Considerations in Implementing FPR in a Harsh Environment: Farmer Involvement in Botswana
F. Worman, G. Heinrich, and D. Norman
J. Farming Syst. Res. - Ext. 2(3):119-137, 1991

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-182-B Farming Systems Research Handbook for Botswana (ATIP RP3)
F. Worman, D. Norman, and others
Agricultural Information Services, Ministry of Agriculture, Gaborone, Botswana, 306 pp., 1992

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-200-J Risk Costs and the Choice of Market Returns Index
K.N. Amegbeto and A.M. Featherstone
J. Agric. and Res. Econ. 17:80-87, 1992

92-242-S Days Suitable for Field Work in Kansas
O. Buller
Kans. Agric. Exp. Stn. Keeping Up With Res. 103:1-7, 1991

92-262-J The Structure and Development of the International Wheat Gluten Market and U.S. Imports
F. Ortalo-Magne and B.K. Goodwin
Cereal Foods World 36(12):990-1002, 1991

92-267-J An Econometric Analysis of U.S. Vital Wheat Gluten Imports
F. Ortalo-Magne and B.K. Goodwin
Agric. Econ. 7:65-75, 1992

92-288-J The Impact of Quality Characteristics on the Price of Land: A Case Study of the Kansas Farmland Market
K.D. Postier, A.M. Featherstone, B.W. Schurle, S.S. Duncan, and J.R. Schlender
J. Am. Soc. Farm Managers and Rural Appraisers 56:53-60, 1992

92-305-J Economies of Scale and Scope for Agricultural Supply and Marketing Cooperatives
T.C. Schroeder
Rev. Agric. Econ. 14(1):93-103, 1992

92-306-J Price Discovery and Cointegration for Live Hogs
T.C. Schroeder and B.K. Goodwin
J. Futures Markets 11(6):685-696, 1992

92-308-J An Analysis of Factors Associated with Consumers' Use of Grocery Coupons
B.K. Goodwin
J. Agric. and Res. Econ. 17(1):110-120, 1992

92-326-J Multivariate Cointegration Tests and the Law on One Price in International Wheat Markets
B.K. Goodwin
Rev. Agric. Econ. 14(1):117-124, 1992

92-323-J Risk Analysis Fertilization Rates for Corn and Soybeans
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
J. Prod. Agric. 5(2):226-232, 1992

92-375-D A Whole-Farm Risk Analysis of Double-Cropping and Alternative Crop Systems under Farm Commodity Programs: An Application of Crop and Market Simulation Models
M.F. Crisostomo, R.O. Burton, Jr., A.M. Featherstone, and K.W. Kelley
Agric. Econ. Dept. Rep. (Staff Pap. 92-11):1-20, 1992
(available from dept. only)

92-390-D Tradeoffs between Water Quality and the Economic Impacts of Low-Input Agriculture in the Coastal Plain of Virginia
P.L. Diebel, D.B. Taylor, S.S. Batie, and C.D. Heatwole
Agric. Econ. Dept. Rep. (Staff Pap. 92-12):1-21, 1992
(available from dept. only)

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-411-J The Capitalization of Wheat Subsidies into Agricultural Land Values
B.K. Goodwin and F. Ortalo-Magne
Can. J. Agric. Econ. 40:37-54, 1992

92-425-D Publications in Agricultural Economics 1991
V. Kaul
Agric. Econ. Dept. Rep. (Staff Pap. 92-14):1-25, 1992

92-517-S 1992 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 654:1-110, 1992

92-558-A Does Farm Size Matter in Wheat Yield Variability? A Proposed Approach
M. Marra and B. Schurle
Proc. Reg. Res. Proj. S-232, Ann. Meeting, pp. 1-13, 1992

92-580-D The Farm Family's Propensity to Consume Disposable Income from Different Sources
G.L. Carriker, M.R. Langemeier, T.C. Schroeder, and A.M. Featherstone
Agric. Econ. Dept. Rep. (Staff Pap. 92-17):1-17, 1992
(available from dept. only)

92-600-D Estimation of a Wheat Acreage Response Function for Kansas
G.D. Cho
Agric. Econ. Dept. Rep. (Staff Pap. 92-18):1-14, 1992
(available from dept. only)

92-625-D Removing Nonwheat Material from Kansas Wheat
H.L. Kiser
Agric. Econ. Dept. Rep. (Res. Rep. 16):1-27, 1992
(available from dept. only)

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

92-647-S Kansas Farmland Sales and Characteristics: 1971-1990
Kans. Agric. Exp. Stn. Rep. Prog. 663:1-24, 1992

92-660-D Nonparametric Analysis of Optimizing Behavior of Midwestern Cooperatives
Md.H. Rahman and A.M. Featherstone
Agric. Econ. Dept. Rep. (Staff Pap. 92-16):1-15, 1992

92-689-D An Economic Analysis of the IFMPO
J.R. Williams and P.L. Diebel
Agric. Econ. Dept. Rep. (Staff Pap. 93-2):1-25, 1992

2. Agricultural Engineering

89-394-J Moisture Adsorption of Bagged Grain under Tropical Conditions
P. Guritno, E. Haque, and D.S. Chung
Trans. Am. Soc. Agric. Engin. 34(5):2131-2134, 1991

89-407-J Simulation of Control Systems for Agricultural Tractor Engines and Transmissions
M.D. Schrock and Y. Liu
Trans. Am. Soc. Agric. Engin. 33(6):1785-1789, 1990

89-451-C PC-Based Data Acquisition Program for an Electric Motor Dynamometer
L.E. Wagner, A.J. Heber, and J.P. Harner
Appl. Engin. in Agric. 6(5):643-646, 1990

89-456-J A Stochastic Compartmental Model Simulating a Grain Cleaning Process
A. Song, R. Nassar, and D.S. Chung
Trans. Am. Soc. Agric. Engin. 33(3):877-884, 1990

89-462-C PC-Based Data Acquisition Interface and Expansion System
L.E. Wagner, K.D. Funk, and M.D. Schwarz
Appl. Engin. in Agric. 6(4):499-506, 1990

89-519-J Equipment for Teaching Pesticide Application Technology
J. Slocombe, D. Kuhlman, and A.J. Broxterman
Appl. Engin. in Agric. 6(3):262-266, 1990

89-543-J Wind Erosion Prediction Systems: Concepts to Meet User Needs
L.J. Hagen
J. Soil and Water Cons. 46(2):105-111, 1991

90-19-J Electrical Power Harmonics at Rural Substations and Farms
J. Li, A.J. Heber, and G.L. Johnson
Trans. Am. Soc. Agric. Engin. 33(6):2051-2057, 1990

90-135-J Fate of Broadcast and Subsurface-Banded Urea N Applied to Corn
L.D. Maddux, C.W. Raczkowski, D.E. Kissel, and P.L. Barnes
Soil Sci. Soc. Am. J. 55:264-267, 1991

90-191-J An Instrumented Water Source Heat Pump Demonstration Unit
T.C. Kolb, D.K. Matteson, J.W. Slocombe, and J.P. Harner
Appl. Engin. in Agric. 7(1):124-128, 1991

90-317-J A Model for Managing Crop Water Use and Soil Water Drainage
O.H. Buller, H.L. Manges, L.R. Stone, and J.R. Williams
Agric. Water Manag. 19:117-134, 1991

90-335-J Prediction of Moisture Changes in Stored Corn
L.G. Obaldo, J.P. Harner, and H.H. Converse
Trans. Am. Soc. Agric. Engin. 34(4):1850-1858, 1991

90-466-J Isolation of Gluten and Starch from Ground, Pearled Wheat versus Flour
O. Zhuge, E.S. Posner, C.W. Deyoe, P.A. Seib, and D.S. Chung
Cereal Chem. 68(4):336-339, 1991

90-589-J Digitization of Profile Meter Photos Using Image Analysis
L.E. Wagner and Y. Yu
Trans. Am. Soc. Agric. Engin. 34(2):412-416, 1991

91-16-J Facility for Testing Exhaust Ventilation Fans
A.J. Heber, S.E. Cole, and J.P. Murphy
Appl. Engin. in Agric. 7(5):599-605, 1991

91-28-D Field Day 1990. Kansas River Valley Experiment Field
L.D. Maddux, D.A. Whitney, and P.L. Barnes
Agron. Dept. Rep., pp. 1-13, 1990
(available from dept. only)

91-29-D Field Day 1990. Irrigation Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-14, 1990
(available from dept. only)

91-30-D Field Day 1990. North Central Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-12, 1990
(available from dept. only)

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-136-A A Review of Principles and Parameters for Grain Cleaning and Separation
D.S. Chung and C.-H. Lee
Proc. Intl. Workshop on Maize and Soybean Quality, *Uniformity by 2000*, pp. 103-125, 1991

91-205-J Wind Erosion Mechanics: Abrasion of Aggregated Soil
L.J. Hagen
Trans. Am. Soc. Agric. Engin. 34(4):838-891, 1991

91-223-S 1990 Kansas Corn Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 614:1-40, 1990

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-261-J Electrical Energy Usage on Kansas Grain Farms
J.W. Slocombe, A.M. Feyerherm, and L.E. Stetson
Appl. Engin. in Agric. 8(2):263-266, 1992

91-262-S Kansas Fertilizer Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 618:1-132, 1991

91-264-S 1990 Kansas Variety Tests Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Triticale
Kans. Agric. Exp. Stn. Rep. Prog. 619:1-16, 1991

91-266-J Energy Usage on Kansas Livestock and Dairy Farms
J.W. Slocombe, A.M. Feyerherm, and L.E. Stetson
Appl. Engin. in Agric. 8(3):389-392, 1992

91-281-S 1990 Kansas Sunflower Performance Test
Kans. Agric. Exp. Stn. Rep. Prog. 620:1-16, 1991

91-300-D Field Day 1991. Sandyland Experiment Field
G.R. TenEyck, R.G. Greenland, and D. Fjell
Agron. Dept. Rep., pp. 1-18, 1991
(available from dept. only)

91-309-S 1990 Kansas Alfalfa Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 622:1-8, 1991

91-313-D Risk Analysis of Nitrogen Fertilization for Corn and Soybeans: Incentives for Lower Use
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
Agric. Econ. Dept. Rep. (Staff Pap. 91-12), pp. 1-21, 1991
(available from dept. only)

91-328-A Sunflower Yield Differences Related to Row Orientation
G.E. Thierstein
Proc. Natl. Sunflower Assoc., Res. Workshop, pp. 34-43, 1991

91-460-S 1991 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 630:1-52, 1991

91-566-A Atrazine Movement in Soil Compared with PRZM and GLEAMS Models
S.M. Siegele, J.M. Steichen, and P.L. Barnes
Proc. Conf. on Hazardous Waste Res., pp. 12-29, Kansas State University, 1991

91-575-J Tillage-Induced Soil Aggregate Status as Influenced by Water Content
L.E. Wagner, N.M. Tangie, and P. Barnes
Trans. Am. Soc. Agric. Engin. 35(2):499-504, 1992

92-11-A Development of New Wind Erosion Prediction System
L.J. Hagen
Proc. Intl. Wind Erosion Workshop of CIGR, Section I, J. Koracsony and G. Szalai, eds., Budapest, Hungary, 1991

92-17-A Relationship between Shelter Angle Surface Roughness and Cumulative Sheltered Storage Depth
L.E. Wagner and L.J. Hagen
Proc. Intl. Wind Erosion Workshop of CIGR, Section I, J. Koracsony and G. Szalai, eds., Budapest, Hungary, 1991

92-50-D Field Day 1991. Kansas River Valley Experiment Field
L.D. Maddux, P.L. Barnes, and R.E. Lamond
Agron. Dept. Rep., pp. 1-19, 1991
(available from dept. only)

92-71-D Field Day 1991. Irrigation Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-15, 1991
(available from dept. only)

92-72-D Field Day 1991. North Central Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-11, 1991
(available from dept. only)

92-135-J Assessment of a Computer Simulation Model for the Flour-Milling Industry
M.C. Liu, R.A. Flores, C.W. Deyoe, and E.S. Posner
Cereal Foods World 37(8):649-654, 1992

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-170-J Precision Pesticide Application
T.A. Rokey, D.K. Kuhlman, and J.W. Slocombe
J. Agric. Mech. 6(2):8-12, 1991

92-236-S 1991 Kansas Performance Tests with Corn Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 642:1-40, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-323-J Risk Analysis of Fertilization Rates for Corn and Soybeans
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
J. Prod. Agric. 5(2):226-232, 1992

92-366-S 1991 Kansas Performance Tests with Alfalfa Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 650:1-19, 1992

92-463-T Predicting Wind Erosion
L.J. Hagen
Agric. Engin. July:20-21, 1992

92-518-S Field Days 1992. Agronomy and Agricultural Engineering Experiment Fields
Kans. Agric. Exp. Stn. Rep. Prog. 655:1-126, 1992

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

■ 3. Agronomy

88-264-B Water Percolation: An Indicator of N Leaching Potential
J.R. Williams and D.E. Kissel
In: *Managing Nitrogen for Groundwater Quality and Farm Profitability*, R.F. Follett, ed., pp. 59-84, Am. Soc. Agron., Madison, WI, 1991

88-566-J Callus Induction and Plant Regeneration from Anther and Inflorescence Culture of Sorghum
F. Wen, F.L. Barnett, E.L. Sorensen, and G.H. Liang
Euphytica 52:177-181, 1990

89-39-B Modified EPIC Wind Erosion Model
E.L. Skidmore and J.R. Williams
In: *Modeling Plant and Soil Systems*, R.J. Hanks and J.T. Ritchie, eds., Agron. Monograph 31:447-459, 1991

89-82-J Net Carbon Exchange in Canopies of Burned and Unburned Tallgrass Prairie
W.J. Gale, M.B. Kirkham, E.T. Kanemasu, and C.E. Owensby
Theor. Appl. Climatol. 42(4):237-244, 1990

89-117-J An Economic Analysis of Season-Long and Intensive-Early Grazing Systems in a Whole Farm Situation
J. Webb, O. Buller, G. Posler, C. Owensby, and R. Cochran
J. Am. Soc. Farm Managers and Rural Appraisers 55:83-89, 1991

89-220-J Forage Sorghum Silage Dry Matter Disappearance as Influenced by Plant Part Proportion
J.S. White, K.K. Bolsen, G.L. Posler, and J. W. Neill
J. Anim. Feed Sci. and Tech. 33:313-322, 1991

89-276-J Factors Affecting Plant Recovery of Cultured Embryos of Three *Glycine* Genotypes and an Interspecific Hybrid
C. Coble and W.T. Schapaugh, Jr.
Euphytica 50:127-133, 1990

89-283-J Effect of Cultivar, Incubation Temperature, and Developmental Stages of Microspores on Wheat and Triticale Anther Culture
D. Hassawi and G.H. Liang
Plant Breeding 105:332-336, 1990

89-469-A Wind in the Great Plains: Speed and Direction Distributions by Month
E.L. Skidmore and J. Tatarko
Proc. Sustainable Agric. Symp., J.D. Hanson, M.J. Schaffer, D.A. Ball, and C.V. Cole, eds., pp. 195-213, ARS-89, U.S. Dept. Agric., 1991

89-475-J Forage Quality of Genetically Diverse Alfalfa Germplasms at Four Phenological Growth Stages
A.W. Lenssen, E.L. Sorensen, and G.L. Posler
Euphytica 51:53-57, 1990

89-517-J Field Resistance of Perennial Glandular-Haired *Medicago* Strains and Alfalfa Cultivars to the Alfalfa Weevil
S.D. Danielson, G.R. Manglitz, and E.L. Sorensen
Euphytica 49:177-182, 1990

89-540-A Novel Approaches to the Development of Sorghum Germplasm Resistant to Greenbugs
J.C. Reese, P. Bramel-Cox, A.G.O. Dixon, D. Schmidt, R. Ma, S. Noyes, W.C. Black IV, and D.C. Margolies
Insect-Plants '89, Symp. Biol. Hung. 39:523-526, 1991

89-541-J Rapid Measurement of Canopy Cover
D.V. Armbrust
Agron. J. 82:1170-1171, 1990

89-542-A Wind Erosion in Stressed Environments
E.L. Skidmore
In: *Soil Physics Application under Stress Environments*, E. Akhker and M.I. Nizami, eds., pp. 313-322, Pakistan Agric. Res. Counc., Islamabad, 1990

89-543-J Wind Erosion Prediction System: Concepts to Meet User Needs
L.J. Hagen
J. Soil and Water Cons. 46(2):105-111, 1991

90-83-J Relay Intercropping Soybeans into Wheat in Non-Traditional Double-Cropping Areas of Kansas
S.R. Duncan, J.P. Shroyer, and W.T. Schapaugh, Jr.
J. Prod. Agric. 3:576-581, 1990

90-106-J Complementarity of Genes for Resistance to Greenbug [*Schizaphis graminum* (Rondani)] Biotype E in Sorghum [*Sorghum bicolor* (L.) Moench]
A.G.O. Dixon, P.J. Bramel-Cox, and T.L. Harvey
Theor. Appl. Genet. 81:105-110, 1991

90-118-J Detection of Pectinesterase and Polygalacturonase from Salivary Secretions of Living Greenbugs, *Schizaphis graminum* (Homoptera: Aphididae)
R. Ma, J.C. Reese, W.C. Black IV, and P. Bramel-Cox
J. Insect Physiol. 36(7):507-512, 1990

90-135-J Fate of Broadcast and Subsurface-Banded Urea N Applied to Corn
L.D. Maddux, C.W. Raczkowski, D.E. Kissel, and P.L. Barnes
Soil Sci. Soc. Am. J. 55:264-267, 1991

90-137-J Flow Injection Analysis of Urea Nitrogen in Soil Extracts
D.M. Sullivan and J.L. Havlin
Soil Sci. Soc. Am. J. 55(1):109-113, 1991

90-147-J Water Status of Drought-Resistant and Drought-Sensitive Sorghum Treated with Ethephon
J. Zhang and M.B. Kirkham
J. Plant Growth Reg. 9:189-194, 1990

90-172-J Resistance to Anthracnose Protects Forage Quality of Alfalfa
A.W. Lenssen, E.L. Sorensen, G.L. Posler, and D.L. Stuteville
Crop Sci. 31:147-150, 1991

90-185-J Interference of Shattercane (*Sorghum bicolor*) with Corn (*Zea mays*) in Herbicide-Treated Soil
R.F. Camacho, L.J. Moshier, and D.L. Devlin
Appl. Agric. Res. 5:285-288, 1990

90-206-B The Contribution of Introduced Germplasm to the Development of U.S. Wheat Cultivars
T.S. Cox
In: *Use of Plant Introductions in Cultivar Development, Part I.*, H.L. Shands, ed., pp. 25-47, Crop Sci. Soc. Am., Madison, WI, 1991

90-227-J Mouthparts and Feeding Mechanism of the Larval Hessian Fly, *Mayetiola destructor* (Diptera: Ceciodomyiidae)
J.H. Hatchett, G.L. Kreitner, and R.J. Elzinga
Ann. Entomol Soc. Amer. 83:1137-1147, 1990

90-255-J Soil Permeability in an Ammonium and Phosphorous Application Zone
R. Myers and S.J. Thien
Soil Sci. Soc. Amer. J. 55:866-871, 1991

90-260-J Chromosomal Location of Genes Influencing Grain Protein Concentration and Mixogram Properties in the Hard Red Winter Wheat 'Plainsman V'
I.S. Stein, R.G. Sears, R.C. Hoseney, T.S. Cox, and B.S. Gill
Crop Sci. 32:573-580, 1992

90-261-J Heterogeneity of the Wichita Wheat Monasomic Set for Grain Protein Concentration and Mixogram Properties
I.S. Stein, R.G. Sears, B.S. Gill, R.C. Hoseney, and T.S. Cox
Crop Sci. 32:581-584, 1992

90-264-J Computer Acquisition and Analysis of Insect Feeding Monitor Data
S. Noyes, D.C. Margolies, J.C. Reese, A. Dixon, and P. Bramel-Cox
Ann. Entom. Soc. Am. 83:1224-1231, 1990

90-279-J Microspore Development in Anther Culture of Wheat (*Triticum aestivum* L.)
D.S. Hassawi, T.G. Sears, and G.H. Liang
Cytologia 55:475-478, 1990

90-282-J Three Years' Experience with an On-Farm Macrocatchment Water Harvesting System in Botswana
D.C. Carter and S. Miller
Agric. Water Manag. 19:191-203, 1991

90-288-B Sustainability of Genetic Resistance
H.M. Alexander and P.J. Bramel-Cox
In: *Plant Breeding and Sustainable Agriculture: Considerations for Objectives and Methods*, Spec. Pub. No. 18, pp. 11-27, Crop Sci. Soc. Am., 1991

90-289-B Selection and Testing Environments for Improved Performance under Reduced-Input Conditions
P.J. Bramel-Cox, T. Barker, R. Zavala-Garcia, and J.D. Eastin
In: *Plant Breeding and Sustainable Agriculture: Considerations for Objectives and Methods*, Spec. Pub. No. 18, pp. 29-56, Crop Sci. Soc. Am., 1991

90-290-B Contributions of Introduced Sorghum Germplasm to Hybrid Development in the U.S.
R.R. Duncan, P.J. Bramel-Cox, and F.R. Miller
In: *Contributions of Plant Introductions to U.S. Crop Development, Vol. I.*, Spec. Pub. No. 17, pp. 69-102, Crop Sci. Soc. Am., 1991

Publications of Station Scientists (Continued)

90-291-J Relationship of Pod-Wall Characteristics to Seed Damage and Resistance to the Alfalfa Seed Chalcid (Hymenoptera: Eurytomidae) in *Medicago* Species
T.L. Springer, S.D. Kindler, and E.L. Sorensen
Envir. Entomol. 19:1614-1617, 1990

90-292-J Blue Alfalfa Aphid (Homoptera: Aphididae) Depresses Forage Quality of Alfalfa Leaves and Stems
A.W. Lenssen, E.L. Sorensen, G.L. Posler, and S.L. Blodgett
Envir. Entomol. 20(1):71-76, 1991

90-293-J Chloroplast DNA Polymorphism in Fertile and Male-Sterile Cytoplasms of Sorghum [*Sorghum bicolor* (L.) Moench]
Z. Chen, G.H. Liang, S. Muthukrishnan, and K.D. Kofoid
Theor. Appl. Genet. 80:727-731, 1990

90-294-J Pollen Tube Growth in Reciprocal Interspecific Pollinations of *Sorghum bicolor* and *S. versicolor*
Y. Sun, K. Suksayretrup, M.B. Kirkham, and G.H. Liang
Plant Breeding 107:197-202, 1991

90-306-J Basic Alfalfa Germplasms Differ in Nutritive Content of Forage
A.W. Lenssen, E.L. Sorensen, G.L. Posler, and L.H. Harbers
Crop Sci. 31:293-296, 1991

90-307-J Soil Temperatures Recorded at Sebele and Etsha 6 in the 1986/87 Planting Season
M.Y. Mortlock
Botswana Agric. Res. Bull. 7:25-35, 1991

90-317-J A Model for Managing Crop Water Use and Soil Water Drainage
O.H. Buller, H.L. Manges, L.R. Stone, and J.R. Williams
Agric. Water Manag. 19:117-134, 1991

90-332-J Direct Generation of Maize Haploids via Anther Culture
H. Ma, C.E. Wassom, and G.H. Liang
Cytologia 56:103-106, 1991

90-340-J Registration of KS89WGRC3 and KS89WGRC6 Hessian Fly-Resistant Hard Red Winter Wheat Germplasm
B.S. Gill, D.L. Wilson, W.J, Raupp, J.H. Hatchett, T.S. Cox, A. Amri, and R.G. Sears
Crop Sci. 31:245, 1991

90-341-J Registration of KS89WGRC4 Hard Red Winter Wheat Germplasm with Resistance to Hessian Fly, Greenbug, and/or Soilborne Mosaic Virus
B.S. Gill, D.L. Wilson, W.J. Raupp, J.H. Hatchett, T.L. Harvey, T.S. Cox, and R.G. Sears
Crop Sci. 31:246, 1991

90-343-J Registration of KS89WGRC7 Leaf Rust-Resistant Hard Red Winter Wheat Germplasm
B.S. Gill, W.J. Raupp, L.E. Browder, T.S. Cox, and R.G. Sears
Crop Sci. 31:246, 1991

90-344-J Registration of KS87UP9, A Winter Wheat Germplasm Segregating for a Dominant Male-Sterility Gene
T.S. Cox, R.G. Sears, and B.S. Gill
Crop Sci. 31:247, 1991

90-365-J Soil Sampling under No-Till Banded Phosphorus
N.R. Kitchen, J.L. Havlin, and D.G. Westfall
Soil Sci. Soc. Am. J. 54:1661-1665, 1990

90-376-J Stochastic Wind Simulation for Erosion Modeling
E.L. Skidmore and J. Tatarko
Trans. Am. Soc. Agric. Engin. 33:1893-1899, 1990

90-383-J A Field Study of Potato Leafhopper (Homoptera: Cicadellidae) Abundance and Damage on Alfalfa Cultivars and Perennial Glandular-Haired *Medicago* Strains
S.D. Danielson, G.R. Manglitz, and E.L. Sorensen
J. Kans. Entomol. Soc. 64(2):152-155, 1991

90-384-J Effect of Growth Regulators and Genotypes on Callus and Embryoid Induction from Maize Anther Culture
H. Ma, G.H. Liang, and C.E. Wassom
Plant Breeding 106:47-52, 1991

90-385-J Field Crop Recovery of N Mineralized from ^{15}N-labeled Sorghum Residues
M.E. Vigil, D.E. Kissel, and S.J. Smith
Soil Sci. Soc. Am. J. 55:1031-1037, 1991

90-391-J The C/N Ratio and N Concentration as Predictors for N Mineralization
M.F. Vigil and D.E. Kissel
Soil Sci. Soc. Am. J. 55:757-761, 1991

90-392-J Plant-Available Iron and Zinc in a Calcareous Soil as Affected by Additions of Sulfur and Micronutrient Fertilizer
A. Falatah and A.P. Schwab
J. Fert. Issues 7:35-40, 1990

90-402-J Agronomic Performance of Hexaploid Wheat Lines Derived from Direct Crosses between Wheat and *Aegilops squarrosa*
T.S. Cox, J.H. Hatchett, B.S. Gill, W.J. Raupp, and R.G. Sears
Plant Breeding 105:271-277, 1990

90-405-J Evaluation of Corn Growth Models for Use with Weed and Insect Stresses
A. Retta, R.L. Vanderlip, R.A. Higgins, L.J. Moshier, A.M. Feyerherm
Agron. J. 83:757-765, 1991

90-410-J High Molecular Weight Glutenin Genes: Effects on Baking Quality in Wheat
H. Dong, T.S. Cox, R.G. Sears and G.L. Lookhart
Crop Sci. 31:974-979, 1991

90-431-J Repetitive DNA Sequences as Markers of Sorghum Speciation I. A Diagnostic DNA Probe for *S. halepense*
S.K. Dube Hoang-Tang, G.H. Liang, and S.-K. Kung
Genome 34(2):241-250, 1991

90-442-J Genotypic Response of Corn to Aluminum Stress I. Seedling Tests for Measuring Aluminum Tolerance Response in Nutrient Solutions
F. Kasim and C.E. Wassom
Indonesian J. Crop Sci. 5:41-51, 1991

90-443-J Genotypic Response fo Corn to Aluminum Stress. II. Field Performance of Corn Varieties in Acid Soils
F. Kasim. W.L. Haag, and C.E. Wassom
Indonesian J. Crop Sci. 5:53-65, 1991

90-445-B Quantitative Genetics Applied to Haplodiploid Insects and Mites
D.C. Margolies and T.S. Cox
In: *Evolution and Diversity of Sex Ratio in Arrhenotokous Insects and Mites*, D.L. Wrensch and D.A. Krainacker, eds., pp. 548-559, Chapman Hall, New York, 1992

90-453-J Residual Value of Fertilizer Phosphorus in Selected Kansas Soils
J.V. Pothuluri, D.A. Whitney, and D.E. Kissel
Soil Sci. Soc. Am. J. 55:399-404, 1991

90-479-J Genotypic Tolerance to Metals as Indicated by Ethylene Production
W.P. Lu and M.B. Kirkham
Water, Air, and Soil Pollution 57-58:605-615, 1991

90-480-J Changes in Aluminum and Phosphorus Chemistry in Response to Long-Term Fertilization
J.A. Hetrick and A.P. Schwab
Soil Sci. Soc. Am. J. 56:755-761, 1992

90-484-E Interaction between Nitrogen Level and Hessian Fly Protection of Wheat in Morocco
M.A. Monem, J. Ryan, and J.P. Shroyer
J. Farming Syst. Res. Ext. 2:47-55, 1991

90-487-J Relationships between Protein Composition and End-Use Quality Characteristics in Wheat
H. Dong, R.G. Sears, T.S. Cox, R.C. Hoseney, G.L. Lookhart, and M.D. Shogren
Cereal Chem. 69(2):132-136, 1992

90-488-J A Leaf Dark-Adapter for Measuring Chlorophyll Fluorescence *In Situ* during Daytime
A. Selmani and C.E. Wassom
Agron. J. 83:652-654, 1991

90-494-J Effect of Mild Drought on Some Physiological and Morphological Traits in Young Seedlings of Maize
A. Selmani and C.E. Wassom
Trans. Kans. Acad. Sci. 94:85-94, 1991

90-509-J Separation of Dissolved Inorganic and Organic Phosphorus Using Acidified Molybdate and Isobutanol
K. Jayachandran, A.P. Schwab, and B.A.D. Hetrick
Soil Sci. Soc. Am. J. 56:758-764, 1992

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31:1386, 1991

90-530-A Plant Availability of Lead, Cadmium, and Boron in Amended Coal Ash
A.P. Schwab, M.B. Tomecek, and P.D. Ohlenbusch
Water, Air, and Soil Pollution 57-58:297-306, 1991

90-545-J Genotypic Variation in Ethylene Production by Maize Grown under Nutrient Deficiency
W.P. Lu, M.B. Kirkham, Z.-R. Long, and C.E. Wassom
J. Plant Physiol. 137(4):483-487, 1991

90-550-A Phosphorus Solid Phases in Excessively Fertilized Soils
G.M. Pierzynski and T.J. Logan
Proc. 1990 Phosphorus Res. Workshop, Tenn. Valley Auth. Bull. Y-224, pp. 14-16, 1992

90-557-J Effect of Antimitotic Agents on Double Haploid Production in Wheat (*Triticum aestivum* L.)
D.S. Hassawi and G.H. Liang
Crop Sci. 31:723-726, 1991

90-563-J Water and Osmotic Potentials of Ethephon-Treated Maize Genotypes Varying in Drought Resistance
W.P. Lu and M.B Kirkham
Biol. Plant. 33(5):354-357, 1991

90-564-J An Unstable Mutation for Pigmentation in Kernels of 'Calico' Sorghum
G. Hu, K.D. Kofoid, and G.H. Liang
Hereditas 115:163-167, 1991

90-570-A Sampling and Evaluating Residual Value of Band-Applied Phosphorus
J.L. Havlin, N.R. Kitchen, and D.G. Westfall
Proc. Future Directions for Agric. Phosphorus Res., pp. 121-124, Tenn. Valley Auth.-Natl. Fert. Envir. Res. Center, 1992

90-586-J N- and C-Banding Analyses of *Sorghum* Chromosomes
H. Yu and G.H. Liang
Crop Sci. 32:649-653, 1992

90-587-J Ethylene Production by Two Genotypes of Sorghum Varying in Drought Resistance
J. Zhang and M.B. Kirkham
Cereal Res. Comm. 19(3):357-360, 1991

90-588-J Separability of Soils in a Tallgrass Prairie Using SPOT and DEM Data
H. Su, E.T. Kanemasu, M.D. Ransom, and S.-S. Yang
Remote Sensing Environ. 33:157-163, 1990

90-600-J Pollen Surface Sculpture of Wheat, Rice, Maize, and Five *Sorghum* Species
Y. Sun and G.H. Liang
Cytologia 56:659-664, 1991

91-19-J Absorption, Translocation, and Activity of CGA-136872, DPX-V9360, and Glyphosate in Rhizome Johnsongrass (*Sorghum halepense*)
R.F. Camacho and L.J. Moshier
Weed Sci. 39:354-357, 1991

91-28-D Field Day 1990. Kansas River Valley Experiment Field
L.D. Maddux, P.L. Barnes, and R. Lamond
Agron. Dept. Rep., pp. 1-13, 1990
(available from dept. only)

91-29-D Field Day 1990. Irrigation Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-14, 1990
(available from dept. only)

91-30-D Field Day 1990. North Central Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-12, 1990
(available from dept. only)

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-55-A Detection of Plant Cell Wall-Degrading Enzymes in Greenbug Saliva
R. Ma, J.C. Reese, W.C. Black IV, and P. Bramel-Cox
Proc. Aphid-Plant Interactions: Populations to Molecules, p. 291, 1991

91-61-J Evaluation of P Sources and Rates of Application for Grain Sorghum Production
R.E. Lamond and D.A. Whitney
J. Fert. Issues 8(1):20-24, 1991

91-67-J Separating Ion Exchange Resin from Soil
S.J. Thien and R. Myers
Soil Sci. Soc. Am. J. 55:890-892, 1991

91-71-J Soil Properties, Crop Water Use, and Cereal Yields in Botswana after Additions of Mulch and Manure
D.C. Carter, D. Harris, J.B. Youngquist, and N. Persaud
Field Crop Res. 30:97-109, 1992

91-103-A Transit Time for Oxygen Flow along Streamlines in Vertical and Horizontal Tillage: A Model Study
M.B. Kirkham
Proc. 14th Intl. Cong. Soil Sci. 14:I-298—I-299, 1990

91-123-J Soil and Environmental Effects on Urease Inhibition by Ammonium Thiosulfate
D.M. Sullivan and J.L. Havlin
Soil Sci. Soc. Am. J. 56(3):950-956, 1992

91-124-J Effect of Thiosulfate Oxidation Products on Inhibition of Soil and Jackbean Urease
D.M. Sullivan and J.L. Havlin
Soil Sci. Soc. Am. J. 56(3):957-960, 1992

91-130-J Increasing the Efficiency of Crop Selection for Unpredictable Environments
F. Zavala-Garcia, P.J. Bramel-Cox, J.D. Easton, M.D. Witt, and D.J. Andrews
Crop Sci. 32:51-57, 1992

91-132-A Genotype X Weather Interactions in Grain Yields of Wheat
A.M. Feyerherm, R.G. Sears, and G.M. Paulsen
Proc. 1990 KSU Conf. Appl. Stat. in Agric., pp. 62-70, 1990

91-141-J Predicting Field Prospects for the 1989 Kansas Grain Sorghum Crop Based upon Soil Moisture Levels Prior to Planting
R.W. Heiniger, R.L. Vanderlip, S.A. Staggenborg, and A. Coulibaly
Trans. Kans. Acad. Sci. 94:58-66, 1991

91-146-J Nitrogen Rate and Placement for Grain Sorghum Production under Conservation Tillage
R.E. Lamond, D.A. Whitney, J.S. Hickman, and L.C. Bonczkowski
J. Prod. Agric. 4(4):531-535, 1991

91-201-J Dry Soil-Aggregate Stability as Influenced by Selected Soil Properties, Management, and Weather
E.L. Skidmore and J.B. Layton
Soil Sci. Soc. Am. J. 56(2):557-561, 1992

91-202-J Water Use and Growth of Big Bluestem under Elevated Carbon Dioxide and Two Watering Regimes
M.B. Kirkham, H. He, T.P. Bolger, D.J. Lawlor, and E.T. Kanemasu
Crop Sci. 31(6):1589-1594, 1991

91-205-J Wind Erosion Mechanics: Abrasion of Aggregated Soil
L.J. Hagen
Trans. Am. Soc. Agric. Engin. 34(4):837-891, 1991

Publications of Station Scientists (Continued)

91-218-S 1991 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland
Kans. Agric. Exp. Stn. Rep. Prog. 612:1-49, 1990

91-223-S 1990 Kansas Corn Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 614:1-40, 1990

91-225-E An Extension Methodology Class: A Component of an International Agricultural Development Project
M.G. Shroyer, J.P. Shroyer, and D.R. Hicks
J. Nat. Res. and Life Sci. Educ. 21:175-177, 1992

91-226-E Using Visual Assessment of Nutrient Deficiency in Dryland Cereals as a Basis for Action in Morocco
J. Ryan, M. Abdel Monem, and J.P. Shroyer
J. Nat. Res. and Life Sci. Educ. 21:31-33, 1992

91-227-J Soil Properties after 20 Years of Fertilization with Different Nitrogen Sources
Darusman, L.R. Stone, D.A. Whitney, K.A. Janssen, and J.H. Long
Soil Sci. Soc. Am. J. 55:1097-1100, 1991

91-231-J Variation of Molecular Markers among Geographically Diverse Accessions of *Triticum tauschii*
E.L. Lubbers, K.S. Gill, T.S. Cox, and B.S. Gill
Genome 34:354-361, 1991

91-233-J Registration of KS90WGRC10 Leaf Rust-Resistant Hard Red Winter Wheat Germplasm
T.S. Cox, R.G. Sears, and B.S. Gill
Crop Sci. 32:506, 1992

91-240-J Utilizing Genotype X Weather Interactions in Cultivar Selection
A.M. Feyerherm, R.G. Sears, and G.M. Paulsen
Agron. J. 84:391-394, 1992

91-243-J Rhizome Johnsongrass (*Sorghum halepense*) Control in Corn with CGA-136872 and DPX-V9360
R.F. Comacho, L.J. Moshier, D.W. Morishita, and D.L. Devlin
Weed Tech. 5:789-794, 1991

91-244-J Inheritance of Some Drought-Adaptive Traits in Maize: I. Interrelationships between Yield, Flowering, and Ears per Plant
R. Guei and C.E. Wassom
Maydica 37:157-164, 1992

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-262-S Kansas Fertilizer Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 618:1-132, 1991

91-264-S 1990 Kansas Variety Tests Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Triticale
Kans. Agric. Exp. Stn. Rep. Prog. 619:1-16, 1991

91-273-J Effects of Genotype and Water Limitation on Phenology, Growth, and Transpiration Efficiency in Grain Sorghum
M. Donatelli, G.L. Hammer, and R.L. Vanderlip
Agron. J. 32:781-786, 1992

91-276-A Effect of Seed Treatment Fungicides on Stand and Yield of Soybeans, 1990
D.J. Jardine, J.H. Long, and K. Kelley
Fungicide and Nematicide Tests 46:278, 1991

91-277-A Effect of Seed Treatment Fungicides on Stand and Yield of Grain Sorghum, 1990
D.J. Jardine, G.L. Kilgore, J.H. Long, and M. Claassen
Fungicide and Nematicide Tests 46:277, 1991

91-281-S 1990 Kansas Sunflower Performance Test
Kans. Agric. Exp. Stn. Rep. Prog. 620:1-16, 1991

91-285-A Recent Studies on Chinch Bug Resistance in Sorghum
G.E. Wilde and P. Bramel-Cox
Proc. 45th Ann. Meeting - Amer. Seed Trade Assoc. Publ. 45, pp. 121-130, 1991

91-289-S 1990 Kansas Soybean Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 621:1-33, 1991

91-290-J A Genetic Linkage Map of *Triticum tauschii* (DD) and Its Relationship to the D Genome of Bread Wheat (AABBDD)
K.S. Gill, E.L. Lubbers, B.S. Gill, W.J. Raupp, and T.S. Cox
Genome 34:362-374, 1991

91-300-D Field Day. Sandyland Experiment Field
G.R. TenEyck, R.G. Greenland, and D. Fjell
Agron. Dept. Rep., pp. 1-18, 1991
(available from dept. only)

91-309-S 1990 Kansas Alfalfa Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 622:1-8, 1991

91-312-J Small-Grain Equivalent of Mixed Vegetation for Wind Erosion Control and Prediction
E.L. Skidmore and R.G. Nelson
Agron. J. 83(1):98-101, 1992

91-313-D Risk Analysis of Nitrogen Fertilization for Corn and Soybeans: Incentives for Lower Use
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
Agric. Econ. Dept. Rep. (Staff Pap. 91-12), pp. 1-21, 1991
(available from dept. only)

91-321-J Chemical Induction of Apomictic Seed in Maize
G. Hu, G.H. Liang, and C.E. Wassom
Euphytica 56:97-105, 1991

91-323-J Reproductive Behavior of Hexaploid/Diploid Wheat Hybrids
T.S. Cox, L.G. Harrell, P. Chen, and B.S. Gill
Plant Breeding 107:105-118, 1991

91-336-J Reclamation Effects on Mycorrhizae and Productive Capacity of Flue Gas Desulfurization Sludge
G.W.T. Wilson, B.A.D. Hetrick, and A.P. Schwab
J. Envir. Qual. 20:777-783, 1991

91-341-J Registration of Hamlet, a Hessian Fly-Resistant Hard Red Winter Wheat Germplasm
R.G. Sears, J.H. Hatchett, T.S. Cox, and G.S. Gill
Crop Sci. 32:506, 1992

91-342-J Registration of KS89WGRC9 Stress-Tolerant Hard Red Winter Wheat Germplasm
R.G. Sears, T.S. Cox, and G.M. Paulsen
Crop Sci. 32:507, 1992

91-343-J Determination of Bioavailalbe Phosphorus in Soil
S.J. Thien and R. Myers
Soil Sci. Soc. Am. J. 56:814-818, 1992

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

91-366-E BONANZA CLUB: 35 Years of Maximum Crop Production and Extension Education in Southwestern Kansas
D. Henson, M. Walker, and J.P. Shroyer
J. Nat. Res. and Life Sci. Educ. 21:27-30, 1992

91-368-A Fluid Fertilizer Management for Alfalfa: Dryland - 1990
D.W. Sweeney, J.L. Moyer, and J.L. Havlin
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 215-222, 1991

91-378-J The Chemistry and Mineralogy of Phosphorus in Excessively Fertilized Soils
G.M. Pierzynski
Crit. Rev. Envir. Control 21:265-295, 1991

91-380-J Field Microplot and Laboratory Evaluation of Urea Hydrolysis Inhibition by Ammonium Thiosulfate
J.L. Havlin and D.M. Suillivan
Soil Sci. 153(5):373-381, 1992

91-381-J Corn Responses to Ammonium- and Nitrate-Nitrogen Fertilization
K.L. Barber, L.D. Maddux, D.E. Kissel, G.M. Pierzynski, and B.R. Bock
Soil Sci. Soc. Am. J. 56:1166-1171, 1992

91-382-J Grain Sorghum Response to Ammonium- and Nitrate-Nitrogen Fertilization
K.L. Barber, L.D. Maddux, D.E. Kissel, G.M. Pierzynski, and B.R. Bock
J. Fert. Issues 8:25-33, 1991

91-389-J Farmers' Perceptions of County Wheat Cultivar Demonstration Plots and Tours
J.P. Shroyer, D.L. Fjell, M.E. Mikesell, D.G. Mosier, and R.G. Sears
J. Nat. Res. and Life Sci. Educ. 21:171-174, 1992

91-398-A Management of Split Nitrogen Applications of Various NH_4:NO_3 Ratios for Optimum Corn Production
L.D. Maddux, G.M. Pierzynski, and R.E. Lamond
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 151-164, 1991

91-403-S 1990 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 625:1-28, 1991

91-417-D Field Day 1991. South Central Kansas Experiment Field
W.F. Heer and J.P. Shroyer
Agron. Dept. Rep., pp. 1-16, 1991
(available from dept. only)

91-424-J Using Reduced Rates of Postemergence Herbicides in Soybeans (*Glycine max*)
D.L. Devlin, J.H. Long, L.D. Maddux
Weed Tech. 5:834-840, 1991

91-429-A Nitrogen and Phosphorus Management Effects on Nutrient Recovery in Grain Sorghum and Winter Wheat
J.L. Havlin and D.W. Sweeney
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 115-122, 1991

91-445-S 1991 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 628:1-117, 1991

91-456-S Forage Sorghums 1990: Summary of Nutritive Value and Agronomic Performance
Kans. Agric. Exp. Stn. Rep. Prog. 629:1-13, 1991

91-457-J Registration of KS219 Alfalfa Germplasm with Resistance to Eight Pests
E.L. Sorensen, D.L. Stuteville, E.K. Horber, and D.Z. Skinner
Crop Sci. 32:502-503, 1992

91-459-J On the Measurement of Soil Surface Temperature
J.M. Ham and R.S. Senock
Soil Sci. Soc. Am. J. 56:370-377, 1992

91-460-S 1991 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 630:1-52, 1991

91-462-J Ammonium and Nitrate Source Effects on Field Crops
K.L. Barber and G.M. Pierzynski
J. Fert. Issues 8:57-62, 1992

91-482-D Field Day 1991. Harvey County Experiment Field
M.M. Claassen and D.L. Fjell
Agron. Dept. Rep., pp. 1-18, 1991
(available from dept. only)

91-504-J Analysis of C-Banding Chromosome Patterns of *Sorghum*
H. Yu, G.H. Liang, and K.D. Kofoid
Crop Sci. 31:1524-1527, 1991

91-513-J Agronomic Traits and Chromosome Behavior of Autotetraploid Sorghums
Y.W. Luo, X.C. Yen, G.Y. Zhang, and G.H. Liang
Plant Breeding 109:46-53, 1992

91-524-A Effects of Aging on the Optical Properties of Plastic Mulches
G.J. Kluitenberg, J.M. Ham, and W.J. Lamont, Jr.
Proc. 23rd Cong. Am. Soc. Plasticulture, pp. 149-154, 1991

91-525-J Comparison of Grain Sorghum and Pearl Millet Responses to Date and Rate of Planting
Y.O. M'Khaitir and R.L. Vanderlip
Agron. J. 84:579-582, 1992

91-532-A Potential Impact of Plastic Mulches on the Aboveground Plant Environment
J.M. Ham, G.J. Kluitenberg, and W.J. Lamont, Jr.
Proc. 23rd Cong. Am. Soc. Plasticulture, pp. 63-69, 1991

91-560-A Cytogenetic Mapping of Alfalfa
D.W. Goad, S.A. Massoud, L.B. Johnson, B.S. Gill, and D.Z. Skinner
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 20, 1991

91-569-A Genetic Diversity among *Stemphylium* Species Causing Leaf Spot of Alfalfa
C. Chaisrisook, D.Z. Skinner, and D.L. Stuteville
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 22, 1991

91-570-A Host Range of an Isolate of *Uromyces* Causing Rust of Alfalfa
D.Z. Skinner and D.L. Stuteville
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 21, 1991

91-581-A Characterization of Lead and Zinc Mine Tailings and Heavy-Metal Contaminated Soils in Southeast Kansas
G.M. Pierzynski and A.P. Schwab
Proc. Conf. on Hazardous Waste Res., pp. 511-520, 1991

91-586-B Grain Sorghum Hybrid Response to Lasso and Dual Herbicides and Efficacy of Screen, Concep II, and Concep II/Apron Seed Safeners
D.L. Wright, R.L. Vanderlip, D.L. Regehr, L.J. Moshier, and O.G. Russ
Kans. Agric. Exp. Stn. Bull. 659:1-28, 1991

92-10-D Field Day 1991. East Central Experiment Field
K.A. Janssen and G.L. Kilgore
Agron. Dept Rep., pp. 1-15, 1991
(available from dept. only)

92-11-A Development of New Wind Erosion Prediction System
L.J. Hagen
Proc. Intl. Wind Erosion Workshop of CIGR, Section I, J. Koracsony and G. Szalai, eds., Budapest, Hungary, 1991

92-17-A Relationship between Shelter Angle Surface Roughness and Cumulative Sheltered Storage Depth
L.E. Wagner and L.J. Hagen
Proc. Int. Wind Erosion Workshop of CIGR, Section I, J. Koracsony and G. Szalai, eds., Budapest, Hungary, 1991

92-32-J A PCR-Based Method of Identifying Species-Specific Repeated DNAs
D.Z. Skinner
BioTechniques 13(2):210-212, 1992

92-36-J *In Situ* Measurements of the Effective Transport Volume for Solute Moving through Soil
B.E. Clothier, M.B. Kirkham, and J.E. McLean
Soil Sci. Soc. Am. J. 56(3):733-736, 1992

92-45-S 1991 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 637:1-22, 1991

92-50-D Field Day 1991. Kansas River Valley Experiment Field
L.D. Maddux, P.L. Barnes, and R.E. Lamond
Agron. Dept. Rep., pp. 1-19, 1991
(available from dept. only)

92-60-E Potential for Adopting Triticale in Morocco
M. Mergoum, J. Ryan, and J.P. Shroyer
J. Nat. Res. and Life Sci. Educ. 21:137-141, 1992

92-71-D Field Day 1991. Irrigation Experiment Field
W.B. Gordon, D.A. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-15, 1991
(available from dept. only)

92-72-D Field Day 1991. North Central Experiment Field
W.B. Gordon, D.W. Whitney, and G.E. Thierstein
Agron. Dept. Rep., pp. 1-13, 1991
(available from dept. only)

92-104-J Tebuthiuron Application for Brush Control in the Northern Flint Hills
D.L. Nolte and W.H. Fick
Trans. Kans. Acad. Sci. 95(1-2):100-108, 1992

Publications of Station Scientists (Continued)

92-105-J Mineralization of Organic Phosphorus by Vesicular-Arbuscular Mycorrhizal Fungi
K. Jayachandran, A.P. Schwab, and B.A.D. Hetrick
Soil Biol. Biochem. 24(9):897-903, 1992

92-161-J Effect of Crop Rotation and Residue Management Practices on Severity of Tan Spot of Winter Wheat
W.W. Bockus and M.M. Claassen
Plant Dis. 76:633-636, 1992

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-169-B Use of Sorghum Grain for Feeding Livestock and Poultry
J.D. Hancock and P.J. Bramel-Cox
In: *Expected Impact of Sorghum Farm Program Target Price Policies and Other Factors Affecting Demand*, R.D. Lacewell and B.R. Eddleman, eds., pp. 47-70, Texas Agric. Exp. Stn., 1992

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-195-A Response of Corn to Ammonium- and Nitrate-Nitrogen Fertilization
L.D. Maddux and K.L. Barber
In: *Effects of Enhanced Ammonium Diets on Growth and Yield of Wheat and Corn*, pp. 46-53, Potash and Phosphate Inst., Atlanta, GA, 1991

92-202-A Starter N and P Effects on Early Maturing Corn Planted Early
G. Pierzynski, D. Fjell, and J. Havlin
Proc. Twenty-first N.-Cent. Ext.-Ind. Soil Fert. Conf., pp. 44-53, 1991

92-230-S Winter Wheat Performance Following Seed Treatment in South Central Kansas
W.F. Heer
Kans. Agric. Exp. Stn. Keeping Up With Res. 102:1-6, 1991

92-236-S 1991 Kansas Performance Tests with Corn Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 642:1-40, 1991

92-244-J Photosynthesis and Water Relations of Big Bluestem (C_4) and Kentocky Bluegrass (C_3) under Elevated Carbon Dioxide
H. He, M.B. Kirkham, D.J. Lawlor, and E.T. Kanemasu
Trans. Kans. Acad. Sci. 95(1-2):139-152, 1992

92-247-S 1992 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland
Kans. Agric. Exp. Stn. Rep. Prog. 643:1-51, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-266-S 1991 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 646:1-43, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-286-S 1991 Kansas Performance Tests with Sunflower Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 648:1-15, 1992

92-307-S 1991 Kansas Performance Tests with Soybean Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 649:1-30, 1992

92-321-J Resistance to Foliar Diseases in a Collection of *Triticum tauschii* Germ Plasm
T.S. Cox, W.J. Raupp, D.L. Wilson, B.S. Gill, S. Leath, W.W. Bockus, and L.E. Browder
Plant Dis. 76:1061-1064, 1992

92-323-J Risk Analysis Fertilization Rates for Corn and Soybeans
J.R. Williams, L.D. Maddux, P.L. Barnes, and C.P. Rowell
J. Prod. Agric. 5:226-232, 1991

92-357-A Sulphur Fertilization of Bromegrass in Kansas
R.E. Lamond and D.A. Whitney
Proc. 1992 Great Plains Soil Fert. Conf., pp. 91-94, 1992

92-366-S 1991 Kansas Performance Tests with Alfalfa Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 650:1-19, 1992

92-372-A Soil Tests for Phosphorus Bioavailability
G.M. Pierzynski, S.J. Thien, and R.G. Myers
Proc. 1992 Great Plains Soil Fert. Conf., pp. 100-105, 1992

92-373-J Root Growth in a Tallgrass Prairie under Elevated Carbon Dioxide
G. Mo, D. Nie, M.B. Kirkham, H. He, L.K. Ballou, F.W. Caldwell, and E.T. Kanemasu
Environ. and Exper. Bot. 32(3):193-201, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-418-A Response of Dryland Winter Wheat to Residual P
A.D. Halvorson and J.L. Havlin
Proc. Great Plains Soil Fert. Conf., pp. 201-206, 1992

92-419-A P and K Fertilizer in Alfalfa
C.A. Grant, R.G. Simons, L.D. Bailey, J.L. Havlin, D.W. Sweeney, and J.L. Moyer
Proc. Great Plains Soil Fert. Conf., pp. 219-224, 1992

92-421-A Thirty Years of Nitrogen and Phosphorus Fertilization of Irrigated Corn and Grain Sorghum
A.J. Schlegel, J.L. Havlin, and K.C. Dhuyvetter
Proc. Great Plains Soil Fert. Conf., pp. 177-187, 1992

92-422-A An Alternative Crop Rotation for the Eastern Great Plains
W.F. Heer, J.L. Havlin, and D.L. Fjell
Proc. Great Plains Soil Fert. Conf., pp. 147-152, 1992

92-423-A Nitrogen Management in No-Till Corn
G.J. Carlson, J. Ojiem, J.L. Havlin, and R.E. Lamond
Proc. Great Plains Soil Fert. Conf., pp. 117-121, 1992

92-424-A Soil Erosion-Productivity Relationships for Dryland Winter Wheat
J. Havlin, H. Kok, and W. Wehmueller
Proc. Great Plains Soil Fert. Conf., pp. 60-65, 1992

92-443-A Resistance to Leaf Rust and Soilborne Mosaic in Winter Wheat in Kansas, 1991
R.L. Bowden and K.L. Roozeboom
Biol. and Cult. Tests 7:85, 1992

92-445-A Evaluation of Biological Seed Treatments for Control of Seedling Diseases on Soybeans, 1991
D.J. Jardine and K.A. Janssen
Biol. and Cult. Tests 7:67, 1992

92-446-A Effect of Seed Treatment Fungicides on Standard Yield of Soybeans, 1991
D.J. Jardine, J.H. Long, and B. Marsh
Fungicide and Nematicide Tests 47:254, 1992

92-447-A Effect of Seed Treatment Fungicides on Stand and Yield of Grain Sorghum
D.J. Jardine, J.H. Long, M. Claassen, and B. Marsh
Fungicide and Nematicide Tests 47:253, 1992

92-463-T Predicting Wind Erosion
L.J. Hagen
Agric. Engin. July:20-21, 1992

92-469-A Management of Split Nitrogen Applications of Various NH_4:NO_3 Ratios for Optimum Corn Production
L.D. Maddux, G.M. Pierzynski and R.E. Lamond
1992 Fluid Fertilizer Foundation Symp. Proc., pp. 134-142, 1992

92-483-A Starter N and P Effects on Early Maturing Corn Planted Early
G.M. Pierzynski, M.J. Wilber, D.L. Fjell, and J.L. Havlin
1992 Fluid Fertilizer Foundation Symp. Proc., pp. 178-186, 1992

92-502-A Nitrogen and Phosphorus Management Effects on Nutrient Recovery in Grain Sorghum and Winter Wheat
J.L. Havlin, A.J. Schlegel, D.W. Sweeney, and G.M. Pierzynski
1992 Fluid Fertilizer Foundation Symp. Proc., pp. 68-75, 1992

92-517-S 1992 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 654:1-110, 1992

92-518-S Field Days 1992. Agronomy and Agricultural Engineering Experiment Fields
Kans. Agric. Exp. Stn. Rep. Prog. 655:1-126, 1992

92-529-A Identifying Strategies to Minimize Climatic Risk for Grain Sorghum, Using the SORKAM Model
L.J. Wade, T.J. Gerik, W.D. Rosenthal, and R.L. Vanderlip
Proc. 6th Aust. Agron. Conf., pp. 210-213, 1992

92-531-J Optimizing Cultural Practices for Grain Sorghum in Relation to Climatic Risk at Three Locations in the United States, Using the SORKAM Model
T.J. Gerik, L.J. Wade, W.D. Rosenthal, and R.L. Vanderlip
Math. and Comp. Sci. 33:415-419, 1992

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

4. Anatomy and Physiology

88-448-J Effects of Exercise-Stress on Leukocytes in Cattle with Experimental Pneumonic Pasteurellosis
N.V. Anderson, Y.D. Youanes, J.G.E. Vestweber, C.A. King, and R.D. Klemm
Vet. Res. Comm. 15:189-204, 1991

88-546-J Effect of Exercise Conditioning on Red Blood Cell Volume and Erythropoietin Concentration in the Beagle Dog
H.U. Magerlein, S.A. Heffner, and M.R. Fedde
J. Sports Med. Phys. Fitn. 30:231-234, 1990

89-296-J Pulmonary Artery and Aortic Pressure Changes during High Intensity Treadmill Exercise in the Horse: Effect of Fursemide and Phentolamine
B.K. Erickson, H.H. Erickson, and J.R. Coffman
Equine Vet. J. 24(3):215-219, 1992

89-413-J Experimental *Pasteurella haemolytica* Pneumonia: Clinical and Pathological Studies
J.G. Vestweber, R.D. Klemm, H.W. Leipold, D.E. Johnson, and W.E. Bailie
Am. J. Vet. Res. 51:1792-1798, 1990

89-450-J Multifunctional Features of a Gastrodermal Sensory Cell in *Hydra*: A Three-Dimensional Study
J.A. Westfall, J.D. Wilson, R.A. Rogers, and J.C. Kinnamon
J. Neurocytol. 20:251-261, 1991

89-458-J Effect of Acute Stressors on Endocrinological and Immunological Functions in Lambs
J.E. Minton and F. Blecha
J. Anim. Sci. 68:3145-3151, 1990

89-478-J Experimental *Pasteurella haemolytica* Pneumonia in Gnotobiotic and Conventional Calves
J.G. Vestweber, R.D. Klemm, and H.W. Leipold
Am. J. Vet. Res. 51:1799-1805, 1990

89-518-J *In Vitro* and *in Vivo* Evaluation of Effects of an Acyl Tripeptide, FK-565, on Porcine Macrophage and Lymphocyte Function
C.G. Chitko, S.K. Chapes, R.C. Thaler, J.L. Nelssen, G.A. Anderson, E.R. Clough, and F. Blecha
Am. J. Vet. Res. 52:169-173, 1991

90-33-J Evaluation of Attributes that Affect Longissimus Muscle Tenderness in *Bos taurus* and *Bos indicus* Cattle
G. Whipple, M. Koohmaraie, M.E. Dikeman, J.D. Crouse, M.C. Hunt, and R.D. Klemm
J. Anim. Sci. 68:2716-2728, 1990

90-34-J Cytokines: Applications in Domestic Food Animals
F. Blecha
R. Dairy Sci. 4:328-339, 1991

90-75-J Pituitary-Adrenocortical and Immune Responses to Bromocriptine-Induced Hypoprolactinemia, Adrenocorticotropic Hormone, and Restraint in Swine
H.G. Klemcke, F. Blecha, and J.A. Nienaber
Proc. Soc. Exp. Biol. Med. 195:100-108, 1990

90-127-J Interleukin-1 Stimulates Catecholamine Release from the Hypothalamus
D.L. Palazzolo and S.K. Quadri
Life Sci. 47:2105-2109, 1990

90-169-J High Altitude Bird Flight: Exercise in a Hostile Environment
M.R. Fedde
News in Physiol. Sci. 5:191-193, 1990

90-231-J Antigenic Variations in Bovine Viral Diarrhea Viruses Detected by Monoclonal Antibodies
W. Xue, F. Blecha, and H.C. Minocha
J. Clin. Microbiol. 28:1688-1693, 1990

90-246-J The Effect of Cranial Sympathectomy on Circadian Rhythms of Cortisol, Adrenocorticotropic Hormone, and Melatonin in Boars
J.E. Minton and W.C. Cash
J. Anim. Sci. 68:4277-4284, 1990

90-254-J Antiidiotypic Antibodies to Bovine Herpesvirus-1 Inhibit Virus Infection in Cell Cultures
O.Y. Abdelmagid, D.J. Orten, F. Blecha, and H.C. Minocha
Arch. Virol. 122:163-173, 1992

90-280-J Endocrine Changes in the Aging Dog
S.K. Quadri
Vet. Med. 86:692-702, 1991

90-375-J Measuring Suitability of Soybean Products for Early-Weaned Pigs with Immunological Criteria
D.F. Li, J.L. Nelssen, P.G. Reddy, F. Blecha, R.D. Klemm, D. Geisting, J.D. Hancock, G.L. Allee, and R.D. Goodband
J. Anim. Sci. 69:3299-3307, 1991

90-393-J New Approaches for Increasing Immunity in Food Animals
F. Blecha
Vet. Med. 85:1241-1250, 1990

90-414-J A Rapid Method for DNA Extraction Applied to an Acid-Fast and Five Gram-Negative Bacteria
D.L. Troyer, A. Reed, D. Oberst, and M.M. Chengappa
Vet. Res. Comm. 14:447-451, 1990

90-415-A Indices of Performance in the Racing Quarter Horse
H.H. Erickson, C.S. Lundin, B.K. Erickson, and J.R. Coffman
In: *Equine Exercise Physiology 3*, S.G.B. Persson, A. Lindholm, and L.B. Jeffcott, eds., ICEEP Publications, Davis, CA, 1991

90-434-A Cardiopulmonary Effects of Acute Blood Volume Alteration prior to Exercise
M.K. Hopper, R.L. Pieschl, N.G. Pelletier, and H.H. Erickson
In: *Equine Exercise Physiology 3*, S.G.B. Persson, A. Lindholm, and L.B. Jeffcott, eds., ICEEP Publications, Davis, CA, 1991

90-469-J Interrelationship between Hypersensitivity to Soybean Protein and Growth Performance in Early-Weaned Pigs
D.F. Li, J.L. Nelssen, P.G. Reddy, F. Blecha, R. Klemm, and R.D. Goodband
J. Anim. Sci. 69:4062-4069, 1991

90-486-J Genetic Markers and Maps: Implications for Veterinary Medicine
D.L. Troyer, J.E. Smith, and H.W. Leipold
J. Am. Vet. Med. Assoc. 197(10):1376-1380, 1990

90-496-J Removal of Nocturnal Secretion of Melatonin Fails to Reduce Antibody Synthesis and Interleukin-2 Production in Lambs
J.E. Minton, P.G. Reddy, and F. Blecha
J. Anim. Sci. 69:565-570, 1991

90-498-J Induction of Immune Response to Bovine Herpesvirus-1 with Anti-Idiotypic Antibodies
D.J. Orten, H.C. Minocha, F. Blecha, and P.G. Reddy
Viral Immunol. 4:111-122, 1991

90-501-A Alleviation of Exercise-Induced Hypoxemia Utilizing Inspired 79% Helium 21% Oxygen
B.K. Erickson, R.L. Pieschl, and H.H. Erickson
In: *Equine Exercise Physiology 3*, S.G.B. Persson, A. Lindholm, and L.B. Jeffcott, eds., ICEEP Publications, Davis, CA, 1991

90-503-J Bovine Cell Lines for Collaborative Gene Mapping Studies
D. Troyer, H.J. Minocha, D. Hertzke, and H.W. Leipold
In Vitro Cell Dev. Biol. 27A:435-436, 1991

90-505-J Performance Indices for Evaluation of the Equine Athlete
H.H. Erickson, B.K. Erickson, C.S. Lundin, J.R. Gillespie, and J.R. Coffman
Proc. 36th Ann. Conv. Am. Assoc. Equine Pract., pp. 457-469, 1991

90-556-J Lysosomal Interconnections and Horseradish Peroxidase Compartmentalization in Three-Dimensionally-Reconstructed Bovine Alveolar Macrophages
R.A. Rogers and J.A. Westfall
Eur. J. Cell Biol. 53:212-221, 1990

90-572-J Response of Young Dairy Calves with Lasolocid Delivery Varied in Feed Sources
S.D. Pruiett, J.L. Morrill, T.J. Nagaraja, N.V. Anderson, P.G. Reddy, and J.J. Higgins
J. Dairy Sci. 75:857-862, 1992

91-41-J Porcine Alveolar and Pulmonary Intravascular Macrophages: Comparison of Immune Functions
C.G. Chitko-McKown, S.K. Chapes, R.E. Brown, R.M. Phillips, R.D. McKown, and F. Blecha
J. Leukocyte Biol. 50:364-372, 1991

91-74-J Interleukin-1 Stimulates the Release of Dopamine and Dihydroxyphenylacetic Acid from the Hypothalamus in Vivo
P.S. Mohankumar, S. Thyagarajan, and S.K. Quadri
Life Sci. 48:925-930, 1991

91-77-J Physical Conditioning: Effect on the Myoglobin Concentration in Skeletal and Cardiac Muscle of Bar-Headed Geese
D.K. Saunders and M.R. Fedde
Comp. Biochem. and Physiol. 100A:349-352, 1991

91-93-J Repeated Restraint and Isolation Stress in Lambs Increases Pituitary-Adrenal Secretions and Reduces Cell-Mediated Immunity
J.E. Minton, T.R. Coppinger, P.G. Reddy, and F. Blecha
J. Anim. Sci. 69:2808-2814, 1991

91-189-S Swine Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 610:1-123, 1990

91-198-J Cell-Mediated Immune Function in Lambs Chronically Treated with Dexamethasone
J.E. Minton and F. Blecha
J. Anim. Sci. 69:3225-3229, 1991

91-234-J Inhibition of Equine Mononuclear Cell Proliferation and Leukotriene B_4 Synthesis by a Specific 5-Lipoxygenase Inhibitor, A-63162
S.C. Olsen, D. Atluru, S. Atluru, D.S. McVey, H.H. Erickson
Am. J. Vet. Res. 53(6):1015-1018, 1992

91-236-J Neutrophil and Lymphocyte Response to Supplementation with Vitamins C and E in Young Calves
S.D. Eicher-Puuiett, J.L. Morrill, F. Blecha, J.J. Higgins, N.V. Anderson, and P.G. Reddy
J. Dairy Sci. 75:1635-1642, 1992

91-252-J Blood Gas Analyses of Equine Blood: Required Correction Factors
M.R. Fedde
Equine Vet. J. 23:410-412, 1991

91-292-J Physiological Changes in the Running Greyhound (*Canis domesticus*): Influence of Race Length
J.L. Nold, R.L. Pieschl, Jr., L.J. Peterson, and M.R. Fedde
Comp. Biochem. Physiol. 100A:623-627, 1991

91-303-J Influence of Furosemide on Hemodynamic Responses during Exercise in Horses
S.C. Olsen, C.P. Coyne, B.S. Lowe, N. Pelletier, E.M. Raub, and H.H. Erickson
Am. J. Vet. Res. 53(5):742-747, 1992

91-325-J Anti-idiotypic Antibodies Mimic Bovine Viral Diarrhea Virus Antigen
W. Xue, D.J. Orten, O.Y. Abdelmagid, M. Rider, F. Blecha, and H.C. Minocha
Vet. Microbiol. 29:201-212, 1991

91-326-J Microcontroller-Based System for Collecting Anaerobic Blood Samples from a Running Greyhound
R.T. Schmalzried, P.W. Toll, J.J. Devore, and M.R. Fedde
Comp. Meth. and Prog. in Biomed. 37:183-190, 1992

91-488-J Clinical Studies of Bovine Progressive Degenerative Myeloencephalopathy in Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, and W. Cash
Prog. Vet. Neurol. 2(3):159-165, 1991

91-508-J Exercise-Induced Pulmonary Hemorrhage in the Equine Athlete
H.H. Erickson
The Kansas Vet. J. June:17-19, 1991

91-526-J Repeated Restraint and Isolation Stress Alters Adrenal and Lymphocyte Functions and Some Leukocyte Differentiation Antigens in Lambs
J.E. Minton, T.R. Coppinger, P.G. Reddy, W.C. Davis, and F. Blecha
J. Anim. Sci. 70:1126-1132, 1992

91-583-A Cardiopulmonary Mechanisms of Exercise-Induced Pulmonary Hemorrhage and Action of Furosemide
H.H. Erickson, M.K. Hopper, S.C. Olsen, N. Pelletier, B.S. Lowe, and C.P. Coyne
Proc. 37th Ann. Conv. Am. Assoc. Equine Pract., pp. 735-745, 1992

92-13-J Laboratory Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, D. Johnson, and H.D. Stowe
Bovine Pract. 26:77-83, 1991

92-14-J Electrophysiological Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, W. Cash, D. Troyer, H.W. Leipold, and D. Johnson
Prog. Vet. Neurol. 2(4):243-251, 1991

92-100-J Histochemical and Morphometric Studies of Peripheral Muscle in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, and D. Johnson
J. Vet. Med. (A) 39:321-327, 1992

92-128-J Les Cytokines: Leur Role dans la Régulation du Système Immunitaire, Leur Utilisation Potentille chez l'Animal
B. Charley and F. Blecha
Le Point Vet. 23:731-737, 1991 (in French)

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-209-J Immunomodulation of Mastitis with Bovine Recombinant Interleukin-2
P.G. Reddy, D.N. Reddy, S.E. Pruiett, M.J. Daley, J.E. Shirley, M.M. Chengappa, and F. Blecha
Cytokine 4:227-231, 1992

92-337-J Pulmonary Intravascular Macrophages: A Review of Immune Properties and Functions
C.G. Chitko-McKown and F. Blecha
Annal. Rech. Vet. 23:201-214, 1992

■ 5. Animal Sciences and Industry

89-71-J Comparison of Redigel, Petrifilm, Spiral Plate System, ISOGRID, and Standard Plate Count for the Aerobic Plate Count on Selected Foods
V.S. Chain and D.Y.C. Fung
J. Food Prot.54:208-211, 1991

89-117-J An Economic Analysis of Season-Long and Intensive-Early Grazing Systems in a Whole Farm Situation
J. Webb, O. Buller, G. Posler, C. Owensby, and R. Cochran
J. Am. Soc. Farm Managers and Rural Appraisers 55:83-89, 1991

89-167-J In Vitro Synthesis of Prostaglandins by Pig Blastocysts Cultured in Medium Containing Oestradiol or Catechol Oestrogens
C.F. Rosenkrans, Jr., D.L. Davis, B.C. Paria, S.K. Dey, and G. Milliken
Prostaglandins 43:309-319, 1992

89-220-J Forage Sorghum Silage Dry Matter Disappearance as Influenced by Plant Part Proportion
J.S. White, K.K. Bolsen, G.L. Posler, and J.W. Neill
J. Anim. Feed Sci. and Tech. 33:313-322, 1991

89-311-B Pattern Recognition Techniques for Food Research and Quality Assurance
I.J. Jeon
In: *Instrumental Methods for Quality Assurance and Research in Foods*, D.Y.C. Fung and R.F. Mathews, eds., pp. 271-298, Marcel Dekker, N.Y., 1991

89-319-B Modern Methods of Analyzing Mycotoxins in Foods
W.G. Ikins
In: *Instrumental Methods for Quality Assurance and Research in Foods*, D.Y.C. Fung and R.F. Mathews, eds., pp. 117-154, Marcel Dekker, N.Y., 1991

89-355-J Soymilk Yogurt: Sensory Evaluation and Chemical Measurement
M.A. Buono, C. Setser, L.E. Erickson, and D.Y.C. Fung
J. Food Sci. 55:528-531, 1990

89-357-J Performance, Carcass, Cartilage Calcium, Sensory, and Collagen Traits of Longissimus Muscles of Open and 30-Month Old Heifers that Produced One Calf
A.W. Waggoner, M.E. Dikeman, J.R. Brethour, and K. Kemp
J. Anim. Sci. 68:2380-2386, 1990

89-425-J Effects of Porcine Somatotropin and Dietary Lysine on Growth Performance and Carcass Characteristics of Finishing Swine
R.D. Goodband, J.L. Nelssen, R.H. Hines, D.H. Kropf, R.C. Thaler, B.R. Schricker, G.E. Fitzner, and A.J. Lewis
J. Anim. Sci. 68:3261-3276, 1990

89-427-J Effects of Hay Quality, Breed, and Ovarian Development on Onset of Puberty and Reproductive Performance of Beef Heifers
R.C. Perry, L.R. Corah, R.C. Cochran, J.R. Brethour, K.C. Olson, and J.J. Higgins
J. Prod. Agric. 4:13-18, 1991

89-439-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers: Effects of Postweaning Energy Manipulation
D.J. Patterson, L.R. Corah, J.R. Brethour, M.F. Spire, J.J. Higgins, G.H. Kiracofe, J.S. Stevenson, and D.D. Simms
J. Anim. Sci. 69(6):2349-2361, 1991

89-440-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers: Relationship of Age at Puberty to Length of the Postpartum Interval to Estrus
D.J. Patterson, L.R. Corah, J.R. Brethour, J.J. Higgins, G.H. Kiracofe, and J.S. Stevenson
J. Anim. Sci. 70(7):1994-1999, 1992

89-442-J Aeromicrobiology—A Review
M. Al-Dagal and D.Y.C. Fung
Food Sci. and Nutr. 29(5):333-340, 1990

89-458-J Effect of Acute Stressors on Endocrinological and Immunological Functions in Lambs
J.E. Minton and F. Blecha
J. Anim. Sci. 68(10):3145-3151, 1990

89-476-J Steam-Rolled Wheat Finishing Diets for Cattle: Effects of Dietary Roughage and Feed Intake on Finishing Steer Performance and Ruminal Metabolism
K.K. Kreikemeier, D.L. Harmon, R.T. Brandt, Jr., T.G. Nagaraja, and R.C. Cochran
J. Anim. Sci. 68(7):2130-2141, 1990

89-483-B Rapid Methods and Automation
P.A. Hartman, B. Swaminathan, M.S. Curiale, R. Firstenberg-Eden, A.N. Sharpe, N.A. Cox, D.Y.C. Fung, and M.C. Goldschmidt
In: *Compendium of Methods for the Microbiological Examination of Foods*, C. Vanderzant and D. Splittstoesser, eds., pp. 665-745, American Public Health Assoc., 1992

89-518-J *In Vitro* and *in Vivo* Evaluation of FK-565, an Acyl Tripeptide, on Porcine Macrophage and Lymphocyte Function
C.G. Chitko, S.K. Chapes, R.C. Thaler, J.L. Nelssen, G.A. Anderson, F. Blecha, and E.R. Clough
Am. J. Vet. Res. 52:169-173, 1991

89-520-J Influence of Dietary Forage and Feed Intake on Pancreatic and Small Intestinal Carbohydrase Activities and Small Intestinal Morphology in Calves
K.K. Kreikemeier, D.L. Harmon, J.P. Peters, K.L. Gross, C.K. Armendariz, and C.R. Krehbiel
J. Anim. Sci. 68:2916-2929, 1990

89-535-J Ruminal Ciliated Protozoa in Cattle Fed Finishing Diets
G. Towne, T.G. Nagaraja, R.T. Brandt, Jr., and K.E. Kemp
J. Anim. Sci. 68:2150-2155, 1990

90-25-J Effect of Liquamycin^{R} and Syntabal Plus ^{R} on Gain and Health of Stockers Purchased as Steers or Bulls
F.K. Brazle and G.L. Kuhl
Agri-Practice 11(6):18, 1990

90-26-J Effects of Supplemental Tallow on Ruminal Ciliated Protozoa in Feedlot Cattle
G. Towne, T.G. Nagaraja, R.T. Brandt, Jr., and Steve Gramlich
Arch. Anim. Nutr., Berlin 41:203-207, 1991

90-33-J Evaluation of Attributes that Affect Longissimus Muscle Tenderness in *Bos taurus* and *Bos indicus* Cattle
G. Whipple, M. Koohmaraie, M.E. Dikeman, J.D. Crouse, M.C. Hunt, and R.D. Klemm
J. Anim. Sci. 68:2716-2728, 1990

90-43-J Cage- and Floor-Rearing Effects on Subsequent Behavior of White Leghorn Layers in Multiple-Bird Cages
P. Na-Lampang and J.V. Craig
Poultry Sci. 69:1652-1658, 1990

90-51-J Effect of Various Proportions of Propionate and Glucose on Portal-Drained Visceral Nutrient Flux and Concentration of Hormones in Sheep Maintained by Total Intragastric Infusion
K.L. Gross, D.L. Harmon, J.E. Minton, and T.B. Avery
J. Anim. Sci. 68(8):2566-2574, 1990

90-59-J Predicting Beef-Longissimus Tenderness from Various Physical, Chemical, and Histological Muscle Traits
G. Whipple, M. Koohmaraie, M.E. Dikeman, and J.D. Crouse
J. Anim. Sci. 68:4193-4199, 1990

90-60-J The Effects of High-Temperature Conditioning on Enzymatic Activity and Tenderness of *Bos indicus* Longissimus Muscle
G. Whipple, M. Koohmaraie, M.E. Dikeman, and J.D. Crouse
J. Anim. Sci. 68:3654-3662, 1990

90-72-J Supplemental Fat Source Affects Feedlot Performance and Carcass Traits of Finishing Yearling Steers and Estimated Net Energy Value
R.T. Brandt, Jr. and S.J. Anderson
J. Anim. Sci. 68:2208-2216, 1990

90-79-J Double Insemination and Gonadotropin-Releasing Hormone Treatment of Repeat-Breeding Dairy Cattle
J.S. Stevenson, E.P. Call, R.K. Scoby, and A.P. Phatak
J. Dairy Sci. 73(7):1766-1772, 1990

90-81-J Critical Review of Isolation, Detection, and Identification of Yeasts from Meat Products
D.Y.C. Fung and C. Liang
Crit. Rev. Food Sci. 29(5):341-375, 1990

Publications of Station Scientists (Continued)

90-98-J Cage- and Floor-Rearing Effects on Productivitiy, Nervousness, Feather Condition, and Livability of White Leghorn Layers
P. Na-Lampang and J.V. Craig
Poultry Sci. 69:902-909, 1990

90-109-J Comparison of SBM/Sorghum Grain, Alfalfa Hay, and Dehydrated Alfalfa Pellets as Supplemental Protein Sources for Beef Cattle Consuming Dormant Tallgrass
T. DelCurto, R.C. Cochran, T.G. Nagaraja, L.R. Corah, A.A. Beharka, and E.S. Vanzant
J. Anim. Sci. 68:2901-2915, 1990

90-116-J Syncro-Mate B Induces Estrus in Ovariectomized Cows and Heifers
W.J. McGuire, R.L. Larson, and G.H. Kiracofe
Theriogenology 34:33-38, 1990

90-119-J Effects of Number of Nipple Waterers on Waterer Usage and Body Weight of White Leghorn Pullets
P. Na-Lampang and J.V. Craig
Poultry Sci. 69:1020-1022, 1990

90-134-J Effect of Fat Source and Combination on Starter Pig Performance, Nutrient Digestibility and Intestinal Morphology
D.F. Li, R.C. Thaler, J.L. Nelssen, D.L. Harmon, G.L. Allee, and T.L. Weeden
J. Anim. Sci. 68:3694-3704, 1990

90-142-J Omasal Ciliated Protozoa in Cattle, Bison, and Sheep
G. Towne and T.G. Nagaraja
Appl. and Envir. Microbiol. 56:409-412, 1990

90-157-J Rapid Methods and Automation in Microbiology: Ten Years of Excellence
D.Y.C. Fung
Dairy and Food Sanit. 10:551-552, 1991

90-167-J Small Intestinal Starch Digestion in Steers: Effect of Various Levels of Abomasal Glucose, Corn Starch, and Corn Dextin Infusion on Small Intestinal Disappearance and Net Glucose Absorption
K.K. Kreikemeier, D.L. Harmon, R.T. Brandt, Jr., T.B. Avery, and D.E. Johnson
J. Anim. Sci. 69:328-338, 1991

90-176-J Activity of Egg White Lysozyme in Various Food Systems
V.A. Proctor and F.E. Cunningham
In: *Quality of Poultry Products 2. Eggs and Egg Products*, A. Oosterwoud and A.W. deVries, eds., Spelderholt Centre for Poultry Res. and Infor. Serv., Beekbergen, The Netherlands, 1991

90-186-J Flushing and Altrenogest Affect Litter Traits in Gilts
M.T. Rhodes, D.L. Davis, and J.S. Stevenson
J. Anim. Sci. 69(1):34-40, 1991

90-217-J The O-Methylation of Catechol Oestrogens by Pig Blastocysts and Endometria during the Peri-implantation Period
C. Chakraborty, D.L. Davis, and S.K. Dey
J. Endocrinol. 127:77-84, 1990

90-228-A Ruminal Ciliated Protozoa in Relation to Ruminal Acidosis and Lactic Acid Metabolism
T.G. Nagaraja and G. Towne
In: *The Rumen Ecosystem*, S. Hoshino, et al., eds., Springer Verlag, N.Y., 1992

90-230-J Effect of Number and Location of Nipple Waterers on the Performance of Caged Layers
A.G. Gernat and A.W. Adams
Poultry Sci. 69:2086-2091, 1990

90-246-J The Effect of Cranial Sympathectomy on Circadian Rhythms of Cortisol, Adrenocorticotropic Hormone, and Melatonin in Boars
J.E. Minton and W.C. Cash
J. Anim. Sci. 68(2):4277-4284, 1990

90-285-J Influence of Hydrocortisone Acetate on Pancreas and Mucosal Weight, Amylase and Disaccharide Activities in 14-Day-Old Pigs
K.K. Kreikemeier, D.L. Harmon, and J.L. Nelssen
Comp. Biochem. and Physiol. 97A:45-50, 1990

90-286-J Rapid and Effective Methods for Isolation and Enumeration of *Clostridium perfringens* in Meat
M.S. Ali, D.Y.C. Fung, and C.L. Kastner
J. Food Sci. 55:367-370, 1991

90-306-J Basic Alfalfa Germplasms Differ in Nutritive Content of Forage
A.W. Lenssen, E.L. Sorensen, G.L. Posler, and L.H. Harbers
Crop Sci. 31:293-296, 1991

90-324-B Food Fermentation
D.Y.C. Fung
In: *Encyclopedia of Food Science and Technology*, Y.H. Hui, ed., Vol. 3:1034-1041, John Wiley and Sons, Inc., 1992

90-325-B Food Microbiology
D.Y.C. Fung
In: *Encyclopedia of Food Science and Technology*, Y.H. Hui, ed., Vol. 3:1097-1102, John Wiley and Sons, Inc., 1992

90-326-B Foodborne Diseases
D.Y.C. Fung
In: *Encyclopedia of Food Science and Technology*, Y.H. Hui, ed., Vol. 3:984-990, John Wiley and Sons, Inc., 1992

90-327-B Microbiology
D.Y.C. Fung
In: *Encyclopedia of Food Science and Technology*, Y.H. Hui, ed., Vol. 3:1770-1772, John Wiley and Sons, Inc., 1992

90-337-J Hepatic Ultrasonography and Blood Changes in Steers with Experimentally Induced Hepatic Abscesses
K.F. Lechtenberg and T.G. Nagaraja
Amer. J. Vet. Res. 52:803-809, 1991

90-375-J Measuring Suitability of Soybean Products for Early-Weaned Pigs with Immunological Criteria
D.F. Li, J.L. Nelssen, P.G. Reddy, F. Blecha, R.D. Klemm, D. Geisting, J.D. Hancock, G.L. Allee, and R.D. Goodband
J. Anim. Sci. 69:3299-3307, 1991

90-377-J The Effect of Antibiotics and Ionophores on the Gain of Stocker Cattle Grazing Native Grass Pastures
F.K. Brazle, G. Kuhl, and D. Harmon
Prof. Anim. Sci. 6(3):19-23, 1990

90-389-J Effects of Feeding Endophyte-Infected Fescue Hay on Portal and Hepatic Nutrient Flux in Steers
D.L. Harmon, K.L. Gross, K.K. Kreikemeier, K.P. Coffey, T.B. Avery, and J. Klindt
J. Anim. Sci. 69(3):1223-1231, 1991

90-397-J TBA Values, Sensory Characteristics, and Volatiles in Ground Pork during Long-Term Frozen Storage: Effects of Packaging
W.S. Brewer, W.G. Ikins, and C.A.Z. Harbers
J. Food Sci. 57(3):558-563, 580, 1992

90-446-A Factors Affecting Preweaning Lamb Death Losses
F.J. Schwulst and L.C. Martin
Proc. West. Sect. Am. Soc. Anim. Sci. 41:141-143, 1990

90-449-J Beak Trimming Effects on Behavior Patterns, Fearfulness, Feathering, and Mortality among Three Stocks of White Leghorn Pullets in Cages of Floor Pens
H.-Y. Lee and J.V. Craig
Poultry Sci. 70:211-221, 1991

90-469-J Interrelationship between Hypersensitivity to Soybean Protein and Growth Performance in Early-Weaned Pigs
D.F. Li, J.L. Nelssen, P.G. Reddy, F. Blecha, R. Klemm, and R.D. Goodband
J. Anim. Sci. 69:4062-4069, 1991

90-496-J Removal of Nocturnal Secretion of Melatonin Fails to Reduce Antibody Synthesis and Interleukin-2 Production in Lambs
J.E. Minton, P.G. Reddy, and F. Blecha
J. Anim. Sci. 69(2):565-570, 1991

90-502-J Characteristics of Low-Fat, High-Added Water Bologna Formulated with Textural Modifying Ingredients
J.R. Claus and M.C. Hunt
J. Food Sci. 56:643-647, 1991

90-510-J Rapid Methods in Food Microbiology
D.Y.C. Fung
Proc. Tokyo and Kobe Rapid Methods Symp. (in Japanese), pp. 1-5, 1990

90-516-J Fat Source and Calcium Level Effects on Finishing Steer Performance, Digestion, and Metabolism
B.J. Bock, D.L. Harmon, R.T. Brandt, Jr., and J.E. Schneider
J. Anim. Sci. 69:2211-2224, 1991

90-539-J Dynamics of Ruminal Ciliated Protozoa in Feedlot Cattle
G. Towne, T.G. Nagaraja, R.T. Brandt, Jr., and K.E. Kemp
Appl. Envir. Microbiol. 56:3174-3178, 1990

90-544-J Acriflavine Violet Red Bile Agar for the Isolation and Enumeration of *Klebsiella pneumoniae*
S.-P. Chein and D.Y.C. Fung
Food Microbiol. 7:73-79, 1990

90-568-J Shelf-Life of Raw and Cooked Fiber-Formulated Pork Nuggets
S.J. Goetsch, F.E. Cunningham, and E.Chambers IV
J. Sensory Stud. 5:145-157, 1990

90-572-J Response of Young Dairy Calves with Lasalocid Delivery Varied in Feed Sources
S.D. Pruiett, J.L. Morrill, T.J. Nagaraja, N.V. Anderson, P.G. Reddy, and J.J. Higgins
J. Dairy Sci. 75:857-862, 1992

90-573-J Effects of Type of Cage Front and Feed Trough Partitions on the Productivity and Ingestive, Agonistic, and Fearful Behaviors of White Leghorn Pullets
K.E. Anderson and A.W. Adams
Poultry Sci. 70:770-775, 1991

90-574-J Deacylation of Endotoxin during Natural Cases of Bovine Mastitis
C.M. McDermott, J.L. Morrill, and B.W. Fenwick
J. Dairy Sci. 74:1227-1234, 1991

90-596-J Poor Reproductive Response of Anoestrous Suffolk Ewes to Ram Exposure Is Not Due to Failure to Secrete Luteinizing Hormone Acutely
J.E. Minton, T.R. Coppinger, C.S. Spaeth, and L.C. Martin
J. Anim. Sci. 69(8):3314-3320, 1991

91-1-J Influence of Protein Supplementation on Site and Extent of Digestion, Forage Intake, and Nutrient Flow Characteristics in Steers Consuming Dormant, Bluestem-Range Forage
S.M. Hannah, R.C. Cochran, E.S. Vanzant, and D.L. Harmon
J. Anim. Sci. 69:2624-2633, 1991

91-4-B Rapid Methods in the Food Industry
D.Y.C. Fung
In: *Rapid Methods and Automation in Microbiology and Immunology*, pp. 503-511, Springer-Verlag, NY, 1991

91-5-B Rapid Methods and Automation for Food Microbiology
D.Y.C. Fung
In: *1990 Instrumental Methods for Quality Assurance and Research in Food*, D.Y.C. Fung and R. Matthews, eds., pp. 1-38, Marcel Dekker, Inc., 1991

91-17-J Influence of Supplementation Method of Forage Use and Grazing Behavior by Beef Cattle Grazing Bluestem Range
S.D. Brandyberry, R.C. Cochran, E.S. Vanzant, T. DelCurto, and L.R. Corah
J. Anim. Sci. 69:4128-4136, 1991

91-18-J Effectiveness of Different Methods of Continuous Marker Administration for Estimating Fecal Output
S.D. Brandyberry, R.C. Cochran, E.S. Vanzant, and D.L. Harmon
J. Anim. Sci. 69:4611-4616, 1991

91-24-J Effects of Calcium Soaps of Fatty Acids on Postpartum Reproductive Function in Beef Cows
R.B. Hightshoe, R.C. Cochran, L.R. Corah, G.H. Kiracofe, D.L. Harmon, and R.C. Perry
J. Anim. Sci. 69:4097-4103, 1991

91-25-J Influence of Source and Level of Rumen-Escape Lipid In Supplement on Forage Intake, Digestibility, Digesta Flow and Fermentation Characteristics in Beef Cattle
R.B. Hightshoe, R.C. Cochran, L.R. Corah, D.L. Harmon, and E.S. Vanzant
J. Anim. Sci. 69:4974-4982, 1991

91-26-J Evaluation of the Potential of Wheat Middlings as a Supplement for Beef Cattle Consuming Dormant, Bluestem-Range Forage
G.D. Sunvold, R.C. Cochran, and E.S. Vanzant
J. Anim. Sci. 69:3044-3054, 1991

91-27-J Evaluation of Acid Detergent Lignin, Alkaline Peroxide Lignin, Acid Insoluble Ash and Indigestible Acid Detergent Fiber as Internal Markers for Prediction of Alfalfa, Bromegrass and Prairie Hay Digestibility
G.D. Sunvold and R.C. Cochran
J. Anim. Sci. 69:4951-4955, 1991

91-40-J Microbiological Study of Tofu
K. Tuitemwong and D.Y.C. Fung
J. Food Prot. 54:212-216, 1991

91-45-J Selection and Beak-Trimming Effects on Behavior, Cannibalism, and Short-Term Production in White Leghorn Pullets
R.-L. Kuo, J.V. Craig, and W.M. Muir
Poult. Sci. 70:1057-1068, 1991

91-59-J Free-Running Rhythms of Adrenocorticotropic Hormone (ACTH), Cortisol, and Melatonin in Pigs
M.K. Griffith and J.E. Minton
Domestic Anim. Endocrinol. 8(2):201-208, 1991

91-75-J Comparative Analysis of Redigel and Standard Plate Count Methods for Viable Cell Counts of Selected Foods
D.Y.C. Fung and V.S. Chain
Food Microbiol. 8:249-301, 1991

91-76-J Evaluation of FDA and USDA Procedures for Enumerating *Listeria monocytogenes*
L.S.L. Yu and D.Y.C. Fung
Food Microbiol. 8:69-74, 1990

91-78-B Dietary Management of the Beef Breeding Herd
L.R. Corah
In: *Current Veterinary Therapy - Food Animal Practice*, J.L. Howard, ed., pp. 210-253, W.B. Saunders-Harcourt B. Javonovich, Inc., Philadelphia, 1992

91-79-J First Postpartum Luteal Function in Dairy Cows after Ovulation Induced by Progestogen and Gonadotropin-Releasing Hormone
M.O. Mee, J.S. Stevenson, and J.E. Minton
J. Dairy Sci. 74(5):1573-1581, 1991

91-80-J Endocrine Changes and Ultrasonography of Ovaries in Suckled Beef Cows during Resumption of Postpartum Estrous Cycles
R.C. Perry, L.R. Corah, G.H. Kiracofe, J.S. Stevenson, and W.E. Beal
J. Anim. Sci. 69(8):2548-2555, 1991

91-81-J Pig Endometrial Cells in Primary Culture: Morphology, Secretion of Prostaglandins and Proteins, and Effects of Pregnancy
Z. Zhang, B.C. Paria, and D.L. Davis
J. Anim. Sci. 69(7):3005-3015, 1991

91-93-J Repeated Restraint and Isolation Stress in Lambs Increases Pituitary-Adrenal Secretions and Reduces Cell-Mediated Immunity
J.E. Minton, T.R. Coppinger, P.G. Reddy, and F. Blecha
J. Anim. Sci. 69(7):2808-2814, 1991

Publications of Station Scientists (Continued)

91-106-J Pregnancy and Lactation in Beef Heifers Grazing Tallgrass Prairie in the Winter: Influence on Intake, Forage Utilization, and Grazing Behavior
E.S. Vanzant, R.C. Cochran, and D.E. Johnson
J. Anim. Sci. 69:3027-3028, 1991

91-114-J Videotaped Food Science Courses for the Food Industry
F.E. Cunningham and S.J. Goetsch
Natl. Agric. College Teachers' Assoc. J. 35:17-19, 1991

91-128-J Influence of Dietary Energy on Follicular Development, Serum Gonadotropins, and First Postpartum Ovulation in Suckled Beef Cows
R.C. Perry, L.R. Corah, R.C. Cochran, W.E. Beal, J.S. Stevenson, J.E. Minton, D.D. Simms, and J.R. Brethour
J. Anim. Sci. 69(9):3762-3773, 1991

91-129-E Application of Ultrasound for Feeding and Finishing Animals: A Review
P.L. Houghton and L.M. Turlington
J. Anim. Sci. 70:930-941, 1992

91-144-J Mixtures of High Moisture Corn and Wheat in Finishing Diets: Feedlot Performance and in Situ Rate of Starch Digestion in Cattle
B.J. Bock, R.T. Brandt, Jr., D.L. Harmon, S.J. Anderson, J.K. Elliott, and T.B. Avery
J. Anim. Sci. 69:2703-2710, 1991

91-150-J Comparative Analysis of Trypan Blue Agar and Congo Red Agar for the Enumeration of Yeast and Mold Using the HGMF System
R.A. Hart, O. Mo, F. Borius, and D.Y.C. Fung
J. Food Safety 11:227-230, 1991

91-151-J Chemical, Physical, and Sensory Characterization of Ground Beef Containing 5 to 30 Percent Fat
E.S. Troutt, M.C. Hunt, D.E. Johnson, J.R. Claus, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57:25-29, 1992

91-152-J Characteristics of Low-Fat Ground Beef Containing Texture-Modifying Ingredients
E.S. Troutt, M.C. Hunt, D.E. Johnson, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57:19-24, 1992

91-148-S Dairy Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 608:1-45, 1990

91-161-J Performance and Ruminal Fermentative Development of Young Calves Fed Diets Containing *Aspergillus oryzae* Extract
A.A. Beharka, T.G. Nagaraja, and J.L. Morrill
J. Dairy Sci. 74:4326-4336, 1991

91-175-J Occurrence of *Clostridium perfringens* in Ground Beef and Ground Turkey Evaluated by Three Methods
M.S. Ali and D.Y.C. Fung
J. Food Safety 11:197-203, 1991

91-176-J Effects of Finaplix®, Synovex-S® and Ralgro® Implants, Singularly or in Combinations, on Performance, Carcass Traits and Longissimus Palatability of Holstein Steers
J.K. Apple, M.E. Dikeman, D.D. Simms, and G. Kuhl
J. Anim. Sci. 69:4437-4448, 1991

91-188-J Effects on Glucose and Internal Cooking Temperature on the Characteristics of Low Fat, Pre- and Post-Rigor Restructured Beef Roasts
S.J. Goll, C.L. Kastner, M.C. Hunt, and D.H. Kropf
J. Food Sci. 57:834-840, 1992

91-189-S Swine Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 610:1-123, 1990

91-193-J Spiral System and Laser Counter for Enumeration of Microorganisms
M.T. Manninen, D.Y.C. Fung, and R.A. Hart
J. Food Safety 11:149-162, 1991

91-198-J Cell-Mediated Immune Function in Lambs Chronically Treated with Dexamethasone
J.E. Minton and F. Blecha
J. Anim. Sci. 69(8):3225-3229, 1991

91-210-J Influence of Dietary Forage and Energy Intake on Metabloism and Acyl-CoA Synthetase Activity in Bovine Rumen Epithlial Tissue
D.L. Harmon, K.L. Gross, C.R. Krehbiel, K.K. Kreikemeier, M.L. Bauer, and R.A. Britton
J. Anim. Sci. 69:4117-4127, 1991

91-236-J Neutrophil and Lymphocyte Response to Vitamins C and E Supplementation in Young Calves
S.D. Eicher-Pruiett, J.L. Morrill, F. Blecha, J.J. Higgins, N.V. Anderson, and P.G. Reddy
J. Dairy Sci. 75:1635-1642, 1992

91-246-J New Analine Blue Dye Medium for Rapid Identification and Isoaltion of *Candida albicans*
M.C. Goldschmidt, D.Y.C. Fung, R. Grant, J. White, and T. Brown
J. Clin. Microbiol. 29(6):1095-1099, 1991

91-247-J Oxyrase Enzyme and Motility Enrichment Fung-Yu Tube for Rapid Detection of *Listeria monocytogenes* and *Listeria* spp.
L.S.L. Yu and D.Y.C. Fung
J. Food Safety 11:149-162, 1991

91-265-B Rapid Methods and Applied Microbiology: An Update
D.Y.C. Fung
In: *Biodeterioration VIII*, H. Rossmore, ed., pp. 119-134, Elsevier Science, 1991

91-283-J Determining Beef Carcass Retail Product and Fat Yields within One Hour Postmortem
J.K. Apple, M.E. Dikeman, L.V. Cundiff, and J.W. Wise
J. Anim. Sci. 69:4845-4857, 1991

91-286-J Feedlot Performance and Prolactin Response of Lambs to Supplemental Lighting and Implantation with Zeranol
F.J. Schwulst and J.E. Minton
Sheep Ind. Dev. Res. J. 7(2):8-11, 1991

91-298-B Hay and Silage in the 1990s
K.K. Bolsen, B.E. Brent, and J.T. Dickerson
In: *A Field Guide for Hay and Silage in the 1990s*, pp. 1-12, National Feed Ingredients Assoc., West Des Moines, IA, 1991

91-305-J Comparison of Flavor and Tenderness between Dry-Aged and Vacuum-Aged Beef Strip Loins
K.E. Warren and C.L. Kastner
J. Muscle Foods 3:151-157, 1992

91-306-B Silage Preservation and Silage Additive Products
R. Muck and K.K. Bolsen
In: *A Field Guide for Hay and Silage in the 1990s*, pp. 105-126, National Feed Ingredients Assoc., West Des Moines, IA, 1991

91-308-B Forage Evaluation
K.K. Bolsen
In: *A Field Guide for Hay and Silage in the 1990s*, pp. 147-152, National Feed Ingredients Assoc., West Des Moines, IA, 1991

91-311-J Effects of Steam-Flaked Sorghum Grain or Corn and Supplemental Fat on Feedlot Performance, Carcass Traits, Longissimus Composition, and Sensory Properties of Steers
R.T. Brandt, Jr., G.L. Kuhl, R.E. Campbell, C.L. Kastner, and S. Stroda
J. Anim. Sci. 70:343-348, 1992

91-316-E Effect of Long-Acting Penicillin and Levamisole on Gain and Health of Stocker Calves Purchased as Steers or Bulls
F.K. Brazle
Agri-Practice 13:8-12, 1992

91-317-J Prostaglandin E and $F_{2\alpha}$ Secretion by Glandular and Stromal Cells of the Pig Endometrium in Vitro: Effects of Estradiol-17B, Progesterone and Day of Pregnancy
Z. Zhang and D.L. Davis
Prostaglandins 42(2):151-162, 1991

91-320-J Pregnancy Rates in Beef Cattle after Administering a GnRH Agonist 11 to 14 Days after Insemination
I. Rettmer, J.S. Stevenson, and L.R. Corah
J. Anim. Sci. 70(1):7-12, 1992

91-324-A Meat Evaluation-Composition
M.E. Dikeman
Proc. 21st Century Concepts Important to Meat Animal Evaluation, Publ. No. 285, pp. 121-135, Univ. Wisconsin, 1991

91-348-J Effects of Rearing Density and Feeder and Waterer Spaces on the Productivity and Fearful Behavior of Layers
K.E. Anderson and A.W. Adams
Poultry Sci. 71:53-58, 1992

91-349-D Determinants of Cash Fed Cattle Prices: Does Quality Matter?
R. Jones, T. Schroeder, J. Mintert, and F. Brazle
Agric. Econ. Dept. (Staff Pap. 91-16), pp. 1-26, 1991
(available from dept. only)

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

91-385-S Kansas Sheep Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 624:1-39, 1991

91-387-J Use of Gravimetric Diluter in Microbiological Work
M.T. Manninen and D.Y.C. Fung
J. Food Proc. 55:59-61, 1992

91-392-J Influence of Genotype and Yield and Composition of Milk on Interval to First Postpartum Ovulation in Milked Beef and Dairy Cows
B.S. Masilo, J.S. Stevenson, R.R. Schalles, and J.E. Shirley
J. Anim. Sci. 70(2):379-385, 1992

91-415-J Genetic Adaptation to Multiple-Bird Cage Environment Is Less Evident with Effective Beak Trimming
J.V. Craig and W.M. Muir
Poult. Sci. 70:2214-2217, 1991

91-423-J Effect of Oxyrase Enzyme of *Listeria monocytogenes* and Other Facultative Anaerobes
L.S.L. Yu and D.Y.C. Fung
J. Food Safety 11:163-175, 1991

91-443-J Supplementation of Ammoniated Wheat Straw: Performance and Forage Utilization Characteristics of Gestating Beef Cows and Steers Receiving Energy and Protein Supplements
T.J. Beck, D.D. Simms, R.C. Cochran, E.S. Vanzant, R.T. Brandt, Jr., and G.L. Kuhl
J. Anim. Sci. 70:349, 1992

91-447-J Impact of Nutrition on Pancreatic Exocrine and Endocrine Secretion in Ruminants
D.L. Harmon
J. Anim. Sci. 70:1290-1301, 1992

91-455-J Growth Kinetics of *Listeria* in the Presence of Oxyrase Enzyme in a Broth Model System
L.S.L. Lu and D.Y.C. Fung
J. Rapid Meth. and Automation in Microbiol. 1(1):15-28, 1992

91-456-S Forage Sorghums 1990: Summary of Nutritive Value and Agronomic Performance
Kans. Agric. Exp. Stn. Rep. Prog. 629:1-13, 1991

91-476-J Pregnancy Rates of Holstein Cows after Postinsemination Treatment with a Progesterone-Releasing Intravaginal Device
J.S. Stevenson and M.O. Mee
J. Dairy Sci. 74(11):3849-3856, 1991

91-481-J Endocrine Responses and Ovarian Changes in Inseminated Dairy Heifers after an Injection of a GnRH Agonist 11 to 13 Days after Estrus
I. Rettmer, J.S. Stevenson, and L.R. Corah
J. Anim. Sci. 70(2):508-517, 1992

91-491-J Effect of Light Intensity on Circadian Profiles of Melatonin, Prolactin, ACTH and Cortisol in Pigs
M.K. Griffith and J.E. Minton
J. Anim. Sci. 70(2):492-498, 1992

91-506-S 1991 Cattle Feeders' Day
Kans. Agric. Exp. Stn. Rep. Prog. 632:1-32, 1991

91-507-A Growth, Carcass Characteristics and Meat Quality
M.E. Dikeman
Proc. 37th Intl. Cong. Meat Sci. and Tech. 1:1-15, 1991

91-515-J Factors Affecting the Leukotoxin Activity of *Fusobacterium necrophorum*
Z.L. Tan, T.G. Nagaraja, and M.M. Chengappa
Vet. Microbiol. 32:15-28, 1992

91-517-J Cell-Type Specific Responses in Prostaglandin Secretion by Glandular and Stromal Cells from Pig Endometrium Treated with Catecholestrogens, Methoxyestrogens, and Progesterone
Z. Zhang and D.L. Davis
Prostaglandins 44:53-64, 1992

91-522-J Use of Spiral Plater and Laser Colony Scanner for Enumeration of Microorganisms in Meat
M.T. Manninen and D.Y.C. Fung
J. Rapid Meth. and Automation in Microbiol. 1(2):117-132, 1992

91-526-J Repeated Restraint and Isolation Stress Alters Adrenal and Lymphocyte Functions and Some Leukocyte Differentiation Antigens in Lambs
J.E. Minton, T.R. Coppinger, P.G. Reddy, W.C. Davis, and F. Blecha
J. Anim. Sci. 70(4):1126-1132, 1992

91-530-J Epidermal Growth Factor Receptors in Porcine Endometrium: Binding Characteristics and the Regulation of Prostaglandin E and $F_{2\alpha}$ Production
Z. Zhang, M. Krause, and D.L. Davis
Biol. Reprod. 46:932-936, 1992

91-538-J Effects of Muscle Washing and Raw Material Source on Quality and Physicochemical Attributes of Low-Salt, Low-Fat, Precooked, Restructured Beef
P.B. Kenney, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57:545-550, 1992

91-539-J Effects of Raw and Preheated Epimysium and Gelatin on the Properties of Low-Salt, Low-Fat, Precooked, Restructured Beef
P.B. Kenney, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57:551-557, 1992

91-545-A Guidelines for Meat Color Evaluation
M.C. Hunt, J.C. Acton, R.C. Benedict, C.R. Calkins, D.P. Cornforth, L.E. Jeremiah, D.G. Olson, C.P. Salm, J.W. Savell, and S.D. Shivas
Proc. Recip. Meat Conf. 44:1-17, 1991

91-562-J Estimation of Microbial Numbers from Pure Bacterial Cultures and from Minced Beef Samples by Reflectance Colorimetry
M.T. Manninen and D.Y.C. Fung
J. Food Safety 1(1):41-57, 1992

91-571-J Swine Manure Characterization as Affected by Environmental Temperature, Dietary Intake Level, and Dietary Fat
C.J. Clanton, D.A. Nichols, R.L. Moser, and D.R. Ames
Trans. Am. Soc. Agric. Engin. 34(5):2164-2170, 1991

91-577-A Volatile Fatty Acid and Glucose Utilization by the Portal-Drained Viscera in Ruminants
D.L. Harmon
Proc. 12th Symp. on Energy Metabolism of Farm Anim., EAPP Publ. No. 58:16-17, 1991

92-9-J Beak Trimming and Holding Time Effects on Fearfulness of Pullets as Estimated by Tonic Immobility
M. Mielnik, J.V. Craig, and G.A. Milliken
Poultry Sci. 71:391-394, 1992

92-29-B Food-Borne Illness
D.Y.C. Fung
In: *Encyclopedia of Microbiology*, J. Lederberg, ed., pp. 1859-1862, Academic Press, Inc., 1992

Publications of Station Scientists (Continued)

92-31-J Measuring Social Behavior in Poultry
J.V. Craig
Poultry Sci. 71:650-657, 1992

92-39-J Characterization of Epidermal Growth Factor Receptor in the Preimplantation Pig Conceptus
Y. Zhang, B.C. Paria, S.K. Dey, and D.L. Davis
Dev. Biol. 151:617-621, 1992

92-59-J Solid Phase Extraction of Less Volatile Flavor Compounds from Ultra-High-Temperature Processed Milk
K. Coulibaly and I.J. Jeon
J. Agric. and Food Chem. 40(4):612-616, 1992

92-63-J Rapid Methods and Automation in Food Microbiology (in Chinese)
D.Y.C. Fung and H.-L. Chen
Food Ind. and Res. Dev. Inst. J. (Taiwan) 24(1):8-14, 1992

92-85-J Comparisons of Selected Methods with the Fung-Yu Tube Procedure for Determining *Listeria monocytogenes* and Other *Listeria* spp. in Meats
L.S.L. Yu and D.Y.C. Fung
J. Food Prot. 55:349-355, 1992

92-96-J Modified-Atmosphere Packaging with 100% Carbon Dioxide for Bone-In Pork Loins
K.E. Warren, M.C. Hunt, C.L. Marksberry, O. Sörheim, D.H. Kropf, and M. Windisch
J. Muscle Foods 3:283-299, 1992

92-131-J A Case Study of the Influence of Microbial Quality of Air on Product Shelf Life in a Meat Processing Plant
M. Al-Dagal, O. Mo, D.Y.C. Fung, and C.L. Kastner
J. Dairy, Food, and Envir. Sanitation 12(2):69-70, 1992

92-137-J Effects of Zeranol Implants in Wether Lambs on Performance Traits, Carcass Characteristics, and Subprimal Yield and Distribution
R.A. Nold, J.A. Unruh, C.W. Spaeth, and J.E. Minton
J. Anim. Sci. 70(6):1699-1707, 1992

92-139-J Effects of Implanting Ram and Wether Lambs with Zeranol at Birth and Weaning on Palatability and Muscle Collagen Characteristics
R.A. Nold, J.A. Unruh, C.W. Spaeth, and M.C. Hunt
J. Anim. Sci. 70:2752-2757, 1992

92-166-J Relationship of Milk Production, Milk Expected Progeny Difference and Calf Weaning Weight in Angus and Simmental Cow-Calf Pairs
T.T. Marson, D.D. Simms, R.R. Schalles, K.O. Zoellner, and L.C. Martin
J. Anim. Sci. 70:3304-3310, 1992

92-169-B Use of Sorghum Grain for Feeding Livestock and Poultry
J.D. Hancock and P.J. Bramel-Cox
In: *Expected Impact of Sorghum Farm Programs Target Price Policies and Other Factors Affecting Demand*, R.D. Lacewell and B.R. Eddleman, eds., pp. 47-70, Texas Agric. Exp. Stn., 1992

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-204-B Undesirable Flavours in Dairy Products
I.J. Jeon
In: *Food Taints and Off-Flavours*, M.J. Saxby, ed., pp. 122-149, Blackie and Son Limited, Glasgow, Scotland, 1992

92-209-J Immunomodulation of Mastitis with Bovine Recombinant Interleukin-2
P.G. Reddy, D.N. Reddy, S.E. Pruiett, M.J. Daley, J.E. Shirley, M.M. Chengappa, and F. Blecha
Cytokine 4:227-231, 1992

92-217-J Detection of Enterotoxigenic *Clostridium perfringens* in Ground Beef
M.S. Ali and D.Y.C. Fung
J. Rapid Meth. and Automation in Microbiol. 1(2):165-170, 1992

92-224-J The Effect of Exercise on Heart, Lung, and Diaphragm Muscle Development in Weanling Horses
R.H. Raub, J.A. Warren, and K. Pool-Anderson
J. Equine Vet. Sci. 12(2):106-108, 1992

92-226-J Procedures for Harvesting and Culturing Satellite Cells from Equine Skeltal Muscle
E.A. Greene and R.H. Raub
J. Equine Vet. Sci. 12(1):33-35, 1992

92-227-J Reproductive Response of Yearling Beef Heifers to a Melengestrol Acetate-Prostaglandin F_{2a} Estrous Synchronization System
J.R. Jaeger, J.C. Whittier, L.R. Corah, J.C. Meiske, K.C. Olson, and D.J. Patterson
J. Anim. Sci. 70:2622-2627, 1992

92-245-J Epiphytic Microflora on Alfalfa and Corn
C. Lin, K.K. Bolsen, B.E. Brent, R.A. Hart, J.T. Dickerson, A.H. Feyerherm, and W.R. Aimutis
J. Dairy Sci. 75:2484-2493, 1992

92-252-J Effect of Number of Hens per Nipple Waterer on the Performance of Several Strains of Layers in Cages
A.G. Gernat and A.W. Adams
Poultry Sci. J. 71:1292-1295, 1992

92-281-A Advances in Rapid Microbial Detections
D.Y.C. Fung
Proc. of Food Develop. and Marketing USA Conf. B, pp. 61-68, 1992

92-316-A Extrusion Processing in Preparation of Ingredients and Diets for Swine
J.D. Hancock
Proc. Distillers Feed Conf. 47:33-49, 1992

92-332-J Historical Review of Rapid Methods and Automation in Microbiology
D.Y.C. Fung
J. Rapid Meth. and Automation in Microbiol. 1(6):1-16, 1992

92-336-J Understanding Bacteriocins and Their Uses in Foods
K. Kone and D.Y.C. Fung
J. Dairy, Food, and Envir. Sanitation 12(5):282-285, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-491-J Moderation of Ruminal Fermentation by Ciliated Protozoa in Cattle Fed a High-Grain Diet
T.G. Nagaraja, G. Towne, and A.A. Beharka
Appl. and Environ. Microbiol. 58:2410-2616, 1992

92-516-J New Development in Rapid Methods for Food Microbiology
D.Y.C. Fung
Trends in Food Sci. and Tech. 3(6):127-181, 1992

92-518-S Field Days 1992. Agronomy and Agricultural Engineering Experiment Fields
Kans. Agric. Exp. Stn. Rep. Prog. 655: 1-126, 1992

92-524-A Fat in Diets for Feedlot Cattle
R.T. Brandt, Jr.
Proc. 1992 Southwest Nutr. Conf., pp. 27-42, 1992

92-565-J Beak-Trimming Effects on Beak Length and Feed Usage for Growth and Egg Production
J.V. Craig, J.A. Craig, and G.A. Milliken
Poultry Sci. 71:1830-1841, 1992

92-566-J Beak-Trimming and Genetic-Stock Effects on Rate of Mash Consumption and Feeding-Related Behavior of Egg-Strain Pullets
J.V. Craig, W.S.M. Winkler, and G.A. Milliken
Poultry Sci. 71:1959-1962, 1992

92-569-A Histochemical Properties of Four Bovine Muscles as Influenced by Compensatory Gain and Growth Impetus
C.A. Payne, M.C. Hunt, K.E. Warren, J.M. Hayden, J.E. Williams, and H.B. Hedrick
Intl. Cong. Meat Sci. and Technol. 38(2):121-124, 1992

92-583-S 1992 Cattle Feeders' Day
Kans. Agric. Exp. Stn. Rep. Prog. 659:1-24, 1992

92-595-A Lean, Fat, and Connective Tissue from Beef Shanks Processed with a Baader[tm] Desinewer
M.C. Hunt and R.E. Campbell
Proc. Intl. Cong. Meat Sci. and Technol. 38(6):1219-1221, 1992

Misc. Fung, D.Y.C. amd R.F. Mathews, eds.
Instrumental Methods for Quality Assurance in Foods, Marcel Dekker, Inc., NY, 310 pp., 1991

6. Biochemistry

89-143-B Catecholamine Metabolism and the Integument
T.L. Hopkins and K.J. Kramer
In: *Physiology of Insect Epidermis*, K. Binnington and A. Netnakaran, eds., pp. 213-239, CSIRO, Melbourne, 1991

89-473-J A cDNA Clone that Encodes the Corn Inhibitor of Trypsin and Activated Hageman Factor
L. Wen, J.-K. Huang, K.-C. Zen, B.H. Johnson, S. Muthukrishnan, and G.R. Reeck
Plant Molec. Biol. 18:813-814, 1992

89-474-J A Cloned cDNA that Encodes Alpha-Globulin, a Storage Protein of Rice Endosperm
B.S. Shorrosh, L. Wen, K.-C. Zen, J.-K. Huang, J.S. Pan, M.A. Hermodson, K. Tanaka, S. Muthukrishnan, and G.R. Reeck
Plant Molec. Biol. 18:151-154, 1992

90-87-J Cuticular Strength and Pigmentation of Five Strains of Adult *Blattella germanica* (L.) during Sclerotization: Correlations with Catecholamines, β-Alanine, and Food Deprivation
T.H. Czapla, T.L. Hopkins, and K.J. Kramer
J. Insect Physiol. 36:647-654, 1990

90-151-J N-β-Alanydopamine and N-Acetyldopamine Occurrence and Synthesis in the Central Nervous System of *Manduca sexta* (L.)
R.A. Krueger, K.J. Kramer, T.L. Hopkins, and R.D. Speirs
Insect Biochem. 20:605-610, 1990

90-293-J Chloroplast DNA Polymorphism in Fertile and Male-Sterile Cytoplasms of Sorghum [*Sorghum bicolor* (L.) Moench]
Z. Chen, G.H. Liang, S. Muthukrishnan, and K.D. Kofoid
Theoret. and Appl. Genet. 80:727-731, 1990

90-295-J Variation in the Hexane-Extracted Oils of Three *Echinacea* Species
C.C. Smith-Jochum and L.C. Davis
Trans. Kans. Acad. Sci. 94(1-2):12-21, 1991

90-296-J Build Your Own Air Displacement Pipetter
L.C. Davis
J. Chem. Educ. 68:355-356, 1991

90-316-J Changes in the Core of the Mammalian Pyruvate Dehydrogenase Complex upon Selective Removal of the Lipoyl Domain from the Transacetylase Component but Not from the Protein X Component
M. Rahmatullah, G.A. Radke, P.C. Andrews, and T.E. Roche
J. Biol. Chem. 265:14512-14517, 1990

90-582-J Sequence and Expression of Two cDNAs Encoding Methionine-Rich Storage Proteins of *Manduca sexta*
L.M. Corpuz, H. Choi, S. Muthukrishnan, and K.J. Kramer
Insect Biochem. Molec. Biol. 21:265-276, 1991

90-584-J Alpha-Amylase Inhibitors from Rice: Fractionation and Selectivity towards Insect, Mammalian, and Bacterial Alpha-Amylases
G.-H. Feng, M. Chen. K.J. Kramer, and G.R. Reeck
Cereal Chem. 68:516-521, 1991

91-15-J Electrochemical Studies of the Mechanism of Oxidative Decarboxylation of 3,4-Dihydroxymandelic Acid to 3,4-Dihydroxybenzaldehyde: Electrochemical and HPLC Analysis of the Reaction Mechanism
T.H. Czapla, M. R. Claeys, T.D. Morgan, K.J. Kramer, T.L. Hopkins, and M.D. Hawley
Biochem. Biophys. Acta 1077:400-406, 1991

91-34-J Identification of the Retinal Cyclic *GMP* Phosphodiesterase Inhibitory (Gamma) Subunit Interaction Site on the Catalytic (Alpha) Subunit
B. Oppert, J.M. Cunnick, D. Hurt, and D.J. Takemoto
J. Biol. Chem. 266:16607-16613, 1991

91-50-J Molecular Biology and Biochemistry of Pyruvate Dehydrogenase Complexes
M.S. Patel and T.E. Roche
Fed. Am. Soc. Exper. Biol. J. 4:3224-3233, 1990

91-56-J A New Protein-Inhibitor of Trypsin and Activated Hageman Factor from Pumpkin (*Cucurbita maxima*) Seeds
R. Krishnamoorthi, Y.-X. Gong, and M. Richardson
FEBS Letters 273:163-167, 1990

91-68-A Insect Cuticle Tanning: Enzymes and Cross-Link Structure
K.J. Kramer, T.D. Morgan, T.L. Hopkins, A.M. Christensen, and J. Schaefer
In: *Naturally Occuring Pest Bioregulators*, No. 449, P.A. Hedin, ed., pp. 87-105, Am. Chem Soc. Symp. Ser., 1991

91-69-J Analysis of Cockroach Oothecae and Exuviae by Solid State ^{13}C-NMR Spectroscopy
K.J. Kramer, A.M. Christensen, T.D. Morgan, J. Schaefer, T.H. Czapla, T.L. Hopkins
Insect Biochem. 21:149-156, 1991

91-83-J Barley Aleurone Layer Cell Protoplasts as a Transient Expression System for Analysis of Hormonal Regulation of Alpha-Amylase Genes
B. Gopalakrishnan, B. Sonthayanon, R. Rahmatullah, and S. Muthukrishnan
Plant Molec. Biol. 16:463-467, 1991

91-183-J Inhibition of Digestive Proteinases of Stored Grain Coleoptera by Oryzacystatin, a Cysteine Proteinase Inhibitor from Rice Seed
C. Liang, G. Brookhart, G.H. Feng, G.R. Reeck, and K.J. Kramer
FEBS Letter 278:139-142, 1991

91-220-A Subdomain Roles of the Lipoyl-Bearing Components of Mammalian Pyruvate Dehydrogenase Complex
T.E. Roche, M. Rahmatullah, C.L. Chang, G.A. Radke, S. Powers-Greenwood, S. Gopalakrishnan, L. Li, and S. Liu
In: *Biochemistry and Physiology of Thiamine Diphosphate Enzymes* (Proc. Third Intl. Meeting on the Function of Thiamine Diphosphate Enzymes), pp. 164-169, VCH Publishers, Weinheim, Germany. 1991

91-268-J Spectroscopic Analysis of Models for Heme d_1: Isomeric Copper (II) Porphyrindiones
M. Mylrajan, L.A. Andersson, T.M. Loehr, W. Wu, and C.K. Chang
J. Am. Chem. Soc. 113(13):5000-5005, 1991

91-270-J A Chimeric Open Reading Frame in the 5' Flanking Region of coxI Mitochondrial DNA from Cytoplasmic Male Sterile Wheat
H.B. Rathburn and C. Hedgcoth
Plant Molec. Biol. 16:909-912, 1991

91-401-J Hydrogen-1 NMR Studies of *Cucurbita maxima* Trypsin Inhibitors: Evidence for pH-Dependent Conformational Change and His25—Tyr27 Interaction
R. Krishnamoorthi, C.-L. Sun Lin, Y. Gong, D. VanderVelde, and K. Hahn
Biochemistry 31:905-910, 1992

91-439-J Cryoelectron Microscopy of Mammalian Pyruvate Dehydrogenase Complex
T. Wagenknecht, R. Grassucci, G.A. Radke, and T.E. Roche
J. Biol. Chem. 266:24650-24656, 1991

91-440-J Two-Dimensional NMR Studies of Squash Family Inhibitors. Sequence-Specific Assignments and Secondary Structure of Reactive-Site Modified *Cucurbita maxima* Trypsin Inhibitor III
R. Krishnamoorthi, Y.-X. Gong, C.-L. Sun Lin, and D. VanderVelde
Biochemistry 31:898-904, 1992

91-466-J Insect Cuticle Sclerotization
T.L. Hopkins and K.J. Kramer
Ann. Rev. Entomol. 37:273-302, 1992

91-479-J Identification of the Gamma-Subunit Interaction Sites in the Retinal Cyclic-GMP Phosphodiesterase Beta-Subunit
B. Oppert and D.J. Takemoto
Biochem. Biophys. Res. Comm. 178:474-479, 1991

91-573-J Rice Cystatin: Bacterial Expression, Purification, Cysteine Proteinase Inhibitory Activity, and Insect Growth-Suppressing Activity of a Truncated Form of the Protein
M.-S. Chen, B. Johnson, L. Wen, S. Muthukrishnan, K.J. Kramer, T.D. Morgan, and G.R. Reeck
Protein Expression and Purification 3:41-49, 1992

91-584-J α-Amylases from Three Species of Stored Grain Coleoptera and Their Inhibition by Wheat and Corn Proteinaceous Inhibitors
M.-S. Chen, G. Fend, K.C. Zen, M. Richardson, S.Valdez-Rodriguez, G.R. Reeck, and K.J. Kramer
Insect Biochem. Molec. Biol. 22:261-268, 1992

92-68-J Retinal Cyclic-GMP Phosphodiesterase Gamma-Subunit: Use of Mutant Synthetic Peptides to Define Function
B. Oppert, K. Gonzalez, D. Hurt, J. Cunnick, and D. Takemoto
Biochem. Biophys. Res. Comm. 181:306-309, 1992

92-115-J Immunoblot Analysis of Chitinolytic Enzymes in Integuments and Molting Fluids of the Silkworm, *Bombyx mori,* and the Tobacco Hornworm, *Manduca sexta*
D. Koga, T. Funakoshi, K. Mizuke, K.J. Kramer, K.C. Zen, H. Choi, and S. Muthukrishnan
Insect Biochem. Molec. Biol. 22:305-311, 1992

92-162-J Domain Mapping of the Retinal Cyclic GMP Phosphodiesterase Gamma Subunit: Function of the Domains Encoded by the Three Exons of the Gamma Subunit Gene
D.J. Takemoto, D. Hurt, B. Oppert, and J. Cunnick
Biochem. J. 281:637-643, 1992

92-180-J Properties of Barley Seed Chitinases and Release of an Embryo-Associated Isoform during Inhibition
M. Swegle, K.J. Kramer, and S. Muthukrishnan
Plant Physiol. 99:1009-1014, 1992

92-234-J Retinal Cyclic-GMP Phosphodiesterase-Subunit: Identification of Functional Residues in the Inhibitory Region
K. Gonzalez, J. Cunnick, and D. Takemoto
Biochem. Biophys. Res. Comm. 181:1094-1096, 1992

92-298-J Additional Binding Sites for the Pyruvate Dehydrogenase Kinase but Not for Protein X in the Assembled Core of the Mammalian Pyruvate Dehydrogenase Complex Binding Region for the Kinase
L. Li, G.A. Radke, K. Ono, T.E. Roche
Arch. Biochem. Biophy. 296(2):497-504, 1992

92-380-J Structural Consequences of the Natural Substitution, E9K, on Reactive-Site-Hydrolyzed Squash (*Cucurbita maxima*) Trypsin Inhibitor (CMTI), as Studied by Two-Dimensional NMR
R. Krishnamoorthi, C.-L.S. Lin, and D. Vandervelde
Biochemistry 31:4965-4969, 1992

92-479-J Assignment of the Natural Abundance ^{15}N NMR Spectra of Intact and Reactive-Site Hydrolyzed *Cucurbita maxima* Trypsin Inhibitor III
R. Krishnamoorthi, S. Nemmers, and B. Tobias
FEBS Letters 304:149-152, 1992

■ 7. Biology

87-517-J Influence of Handling Time and Metabolizable Energy on Seed Selection by Four Emberizids
T.W. Shuman, R.J. Robel, J.L. Zimmerman, and A.D. Dayton
Southwest. Nat. 35(4):466-468, 1990

88-358-J Chromosome Mobilization during Conjugation by *Staphylococcus aureus* Is Mediated by Transposon-Facilitated Recombination
V.G. Stout and J.J. Iandolo
J. Bacteriol. 172:6148-6150, 1990

89-59-J Effect of Select Media Supplements on Motility and Development of *Eimeria nieschulzi* in Vitro
S.J. Upton and M. Tilley
J. Parasitol. 78(2):329-333, 1992

89-405-J Short-Term Responses of Small Mammals to Experimental Fire in Tallgrass Prairie
B.K. Clark and D.W. Kaufman
Can. J. Zool. 68:2450-2454, 1990

89-414-J Time Budgets of Confined Northern Cardinals and Harris' Sparrows in Flocks of Different Size and Composition
T.W. Shuman, R.J. Robel, K.E. Kemp, and J.L. Zimmerman
J. Field Ornithol. 63(2):129-137, 1992

89-516-J Electrophoretic Characterization of *Cryptosporidium parvum* (KSU-1) Isolate (Apicomplexa: Cryptosporidiiidae)
M. Tilley and S.J. Upton
Can. J. Zool. 68(7):1513-1519, 1990

89-518-J *In Vitro* and *in Vivo* Evaluation of FK-565, an Acyl Tripeptide, on Porcine Macrophage and Lymphocyte Function
C.G. Chitko, S.K. Chapes, R.C. Thaler, J.L. Nelssen, G.A. Anderson, F. Blecha, and E.R. Clough
Am. J. Vet. Res. 52:169-173, 1991

90-8-J Influence of Time Postmortem, Feeding Activity, and Diet Influences on Digestive Organ Morphology of Two Emberizids
R.J. Robel, M.E. Barnes, K.E. Kemp, and J.L. Zimmerman
The Auk 107(4):669-677, 1990

90-48-J Influence of Plant Litter on Patch Use by Foraging *Peromyscus maniculatus* and *Reithrondontomys megalotis*
D.W. Kaufman and G.A. Kaufman
Amer. Midl. Nat. 124:195-198, 1990

90-54-J Extruded Wild Bird Food
J.F. Keating, R.J. Robel, K.C. Behnke, and K.E. Kemp
Feed Manage. 42(1):18-24, 1991

90-74-J The Effects of Competitors, Distance to Food, and Food Perishability on Caching Behavior of the Eastern Woodrat (*Neotoma floridana*)
D.M. Post and O.J. Reichman
J. Mamm. 72(3):513-517, 1991

90-103-J Effects of Simulated Leaf and Root Herbivory on Mortality, Biomass, Reproduction, and Nutrient Allocation in a Biennial, *Tragopogon dubius*
O.J. Reichman and S.C. Smith
Ecology 72:116-124, 1991

90-129-J Modulation of Growth-Related Gene Expression and Cell Cycle Synchronization by a Sialoglycopeptide Inhibitor
H.K. Fattaey, C.C. Bascom, and T.C. Johnson
Exper. Cell Res. 194:62-68, 1991

90-204-J Prevalence of Botfly (*Cuterebra* sp.) Parasitism in Populations of Small Mammals in Eastern Kansas
B.K. Clark and D.W. Kaufman
Am. Midl. Nat. 124:22-30, 1990

90-236-J A Drosophila Ribosomal Protein Functions in Mammalian Cells
C.G. Maki, D.D. Rhoads, J.-J. Diaz, and D.J. Roufa
Molec. Cell Biol. 10:4524-4528, 1990

90-257-J Activation of C3H/HeJ Macrophage Tumoricidal Activity and Cytokine Release by R Chemotype LPS Preparations: Differential Effects of Interferon-Gamma
L.M. Flebbe, S.K. Chapes, and D.C. Morrison
J. Immunol. 145:1505-1511, 1990

90-258-J Macrophage Binding of Cells Resistant and Sensitive to Contact-Dependent Cytotoxicity
C.F. Rosenkrans, Jr. and S.K. Chapes
Cellular Immunol. 133:187-195, 1991

90-348-J High-Frequency Transformation of *Staphylococcus aureus* by Electroporation
G.R. Kraemer and J.J. Iandolo
Current Microbiol. 21:373-376, 1990

90-357-J Interaction of Lens Crystallins with Reconstituted Lipid Vesicles
F. Ifeanyi and L. Takemoto
Exper. Eye Res. 52:535-538, 1991

90-378-J A Quantitative Study of the Competitive Interactions between *Pyrenophora tritici-repentis* and *Septoria nodorum* in the Wheat Leaf by Use of de Wit Replacement Series
S.R. Adee, W.F. Pfender, and D.C. Hartnett
Phytopathology 80:1177-1182, 1990

90-396-J Size-Dependent Allocation to Sexual and Vegetative Reproduction in Four Clonal Composites
D.C. Hartnett
Oecologia 84:254-259, 1990

90-426-J Influence of Illumination and Surface Structure on Space Use by Prairie Deer Mice (*Peromyscus maniculatus bairdii*)
D.B. Brillhart and D.W. Kaufman
J. Mammalogy 72:764-768, 1991

90-428-J Local Distribution of Termites in Mixed-Grass Prairie
D.E. Brillhart and D.W. Kaufman
Trans. Kans. Acad. Sci. 93:110-112, 1990

90-440-J Local Dispersal and Deposition of Fungal Spores from a Wheat Plot Source Area
M.G. Eversmeyer and C.L. Kramer
Grana 31:53-59, 1992

90-451-J Murine Macrophage Activation by Staphylococcal Exotoxins
S.D. Fleming, J.J. Iandolo, and S.K. Chapes
Infection and Immun. 59:4049-4055, 1991

90-455-J Evidence for Protein Deamidation during Human Cataractogenesis
L. Takemoto, T. Emmons, and D. Granstrom
Current Eye Res. 9:793-797, 1990

90-456-J Estimating Aboveground Biomass in Tallgrass Prairie with the Harvest Method: Determining Proper Sample Size Using Jackknifing and Monte Carlo Simulations
J.M. Briggs and A.K. Knapp
Southwest. Nat. 36:1-6, 1991

90-473-J *Cryptosporidium parvum* (Apicomplexa: Cryptosporidiidae) Oocyst and Sporozoite Antigens Recognized by Bovine Colostral Antibodies
M. Tilley, R. Fayer, A. Guidry, S. Upton, and B. Blagburn
Infection and Immun. 58(9):2966-2971, 1990

90-490-J Influence of Plant Size on the Carbon and Water Relations of *Curcurbita foetidissima*
A.K. Knapp and J.T. Fahnestock
Funct. Ecol. 4:789-797, 1990

90-499-J Response of *Andropogon gerardii* to Simulated Acid Rain
J.T. Fahnestock and A.K. Knapp
Trans. Kans. Acad. Sci. 93:85-90, 1990

90-519-J Involvement of the N-terminal Region in Alpha Crystallin-Lens Membrane Recognition
F. Ifeanyi and L. Takemoto
Exper. Eye Res. 53:305-308, 1991

90-528-J Changes in Lens Membrance MIP26K during Cataractogenesis of the Aged Rat
L. Takemoto, D. Steward, C. Morin, and W. Gorthy
Invest. Ophthalmol. and Visual Sci. 32:556-561, 1991

90-543-J Genetic Analysis of Vital Mammalian Housekeeping Locus Using CHO Cells that Express a Transfected Mutant Allele
J.J. Diaz, D.D. Rhoads, and D.J. Roufa
Somatic Cell and Molec. Genet. 16:517-528, 1990

90-548-J Ticks (Acari: Ixodidae) from Raccoons (*Procyon lotor*) in Eastern Kansas, with a New State Record for *Ixodes texanus*
D.E. Mock, D.B. Brillhart, L.B. Fox, and S.J. Upton
J. Kans. Entom. Soc. 64(3):344-345, 1991

91-14-J Whole Body Weights Estimated from Morphological Measurements of White-Tailed Deer
R.M. Bundy, R.J. Robel, and K.E. Kemp
Trans. Kans. Acad. Sci. 94(3-4):95-100, 1991

91-38-J A Comparative Study on the Biology of *Cryptosporidium serpentis* and *Cryptosporidium parvum* (Apicomplexa: Cryptosporidiidae)
M. Tilley, S.J. Upton, and P.S. Freed
J. Zoo and Wildl. Med. 21(4):463-467, 1990

91-41-J Porcine Alveolar and Pulmonary Intravascular Macrophages: Comparison of Immune Functions
C.G. Chitko-McKown, S.K. Chapes, R.E. Brown, R.M. Phillips, R.D. McKown, and F. Blecha
J. Leukocyte Biol. 50:364-372, 1991

91-42-J Effects of Plant Litter on Foraging and Nesting Behavior of Prairie Rodents
B.K. Clark and D.W. Kaufman
J. Mammalogy 72:502-512, 1991

91-47-J Cell Cycle Arrest and Cellular Differentiation Mediated by a Cell Surface Sialoglycopeptide
G.D. Edson, H.K. Fattaey, and T.C. Johnson
Life Sci. 48:1813-1820, 1991

91-52-J New Taxa in *Senecio* from Mexico
T.M. Barkley
Phytologia 69(3):138-149, 1990

91-54-J Mechanism for the Variations in Electrophoretic Mobility of *Phaseolus vulgaris* Root Nodule Glutamine Synthetase
X. Cai and P.P. Wong
Plant Sci. 72:199-206, 1990

91-58-J Effects of Corticosterone and Zero-G on Inflammatory Cell Production of Superoxide
S.D. Fleming, L.S. Edelman, and S.K. Chapes
J. Leukocyte Biol. 50:69-76, 1991

91-66-J First Records for *Ixodes brunneus* (Acari: Ixodidae) in Kansas
D.B. Brillhart and R.D. McKown
J. Wildl. Dis. 27(4):727, 1991

91-70-J Identification of a 15-Kilodalton Surface Glycoprotein on Sporozoites of *Cryptosporidium parvum*
M. Tilley, S.J. Upton, R. Fayer, J.R. Barta, C.E. Chrisp, P.S. Fred, B.L. Blagburn, B.C. Anderson, and S.M. Barnard
Infection and Immun. 59(3):1002-1007, 1991

91-85-J Two Morphologically Distinct Types of *Giardia* spp. Occur in Cotton Rats, *Sigmodon hispidus*
S.J. Upton, D.B. Brillhart, and C.T. McAllister
Texas J. Sci. 43(4):373-376, 1991

91-102-J Molecular Evolution of the Mammalian Ribosomal Protein Gene, *RPS14*
D.D. Rhoads and D.J. Roufa
Molec. Biol. Evol. 9(4):503-514, 1991

91-109-J *Cryptosporidium* and *Giardia* in Surface Waters in and around Manhattan, Kansas
S.C. Todd, M.S. Phillips, and G.L. Marchin
Trans. Kans. Acad. Sci. 94(3-4):101-106, 1991

91-116-J The Effects of a Sialoglycopeptide on Early Events Associated with Signal Transduction
W.E. Toole-Simms, D.K. Loder, H.K. Fattaey, and T.C. Johnson
J. Cell. Physiol. 147:292-297, 1991

91-126-J New Records for Kansas Mosses, II
G.L. Smith Merrill
Trans. Kans. Acad. Sci. 94:22-29, 1991

Publications of Station Scientists (Continued)

91-137-J Incorporation of Exogenous Uracil by *Cryptosporidium parvum in Vitro*
S.J. Upton, M. Tilley, R.R. Mitschler, and B.S. Oppert
J. Clin. Microbiol. 29(5):1062-1065, 1991

91-138-J Description of the Oocysts of *Eimeria arnyi* (Apicomplexa: Eimeriidae) from the Eastern Ringneck Snake, *Diadophis punctatus arnyi* (Serpentes: Colubridae)
S.J. Upton and C.J. Oppert
Syst. Parasitol. 20(3):195-197, 1991

91-140-J A Comparative Study on the Biology of *Cryptosporidium* sp. from Guinea Pigs and *Cryptosporidium parvum* (Apicomplexa)
M. Tilley, S.J. Upton, and C.E. Chrisp
Can. J. Microbiol. 37(12):949-952, 1991

91-174-J Identification of a Cell Surface Component of Swiss 3T3 Cells Associated with an Inhibition of Cell Division
S.S. Lakshmanarao, W.E. Toole-Simms, H.K. Fattaey, R.J. Leach, and T.C. Johnson
Exper. Cell Res. 195:412-415, 1991

91-186-J Effects of Gangliosides Gm3 and De-N-acetyl Gm3 on Epidermal Growth Factor Kinase Activity and Cell Growth
W. Song, M.F. Vacca, R. Welti, and D.A. Rintoul
J. Biol. Chem. 266:10174-10181, 1991

91-230-J Characterization of the Major Cyanogen Bromide Fragment of Alpha-A Crystallin
F. Ifeanyi and L. Takemoto
Current Eye Res. 10:529-535, 1991

91-255-J PCR-Mediated Chemical Mutagenesis of Cloned Duplex DNAs
J.-J. Diaz, D.D. Rhoads, and D.J. Roufa
Biotechniques 11(2):204-211, 1991

91-257-J Effects of Murine in Leukemia Virus *env* Gene Proteins on Macrophage-Mediated *in Vitro*
S.K. Chapes and L.J. Takemoto
Life Sci. Adv. 10:9-21, 1991

91-288-J Truncation of Alpha-A Crystallin from the Human Lens
L. Takemoto and T. Emmons
Exper. Eye Res. 53:811-813, 1991

91-357-J New Records for Kansas Mosses, III
G.L. Smith Merrill
Evansia 8:25-31, 1991

91-408-J Bryphotyes of Konza Prairie Research Natural Area, Kansas
G.L.S. Merrill
The Bryol. 94:383-391, 1991

91-412-J Age-Dependent Deamidation of the Major Intrinsic Polypeptide from Lens Membrane
L. Takemoto and T. Emmons
Biochem. Biophys. Res. Comm. 10:865-869, 1991

91-413-J An Immune Cell Population that Responds to β-Endorphin and Is Responsible for Protecting Nude Mice from the Fatal Consequences of a Virus Infection of the Central Nervous System
W.J. Coons, R.W. Vorhies, and T.C. Johnson
J. Neuroimmunol. 34:133-141, 1991

91-518-J Gas Exchange Responses to Variable Sunlight in Two Sonoran Desert Herbs: Comparison with Subalpine Species
A.K. Knapp and W.K. Smith
Bot. Gaz. 152:269-274, 1991

91-554-J Effect of Temperatures on Germination and Germ-Tube Development of *Puccinia recondita* and *P. graminis* Urediniospores
C.L. Kramer and M.G. Eversmeyer
Mycol. Res. 96(8):689-693, 1992

91-567-J *Oligotrichum denudatum* (Polytrichaceae), a New Moss Species from Minas Geraes, Brazil
G.L. Smith Merrill
Novon 1:107-109, 1991

92-22-A Population Ecology of Thirteen-Lined Ground Squirrels in Ungrazed Tallgrass Prairie Manipulated by Fire
B.K. Clark, D.W. Kaufman, G.A. Kaufman, S.K. Gurtz, and S.H. Bixler
Proc. 12th N. Am. Prairie Conf., pp. 51-54, 1992

92-47-J Identification of Nuclear Localization Sequence in the Polyomavirus Major Capsid Protein VP1
D. Chang, J.I. Haynes Jr., J.N. Brady, and R.A. Consigli
Virology 189:821-827, 1992

92-51-B Bryophytes of the Kansas Ecological Reserves
G.L. Smith Merrill and S.L. Timme
Multidisciplinary Guidebook 4. Ecology and Hydrogeology of the Kansas Ecological Reserves and the Baker University Wetlands, W.D. Kettle and D.O. Whittemore, eds., Open-File Rep. 91-35, pp. 46-51, Kansas Geological Survey, 1991

92-53-J Identification of a Major Continuous Epitope of Human Alpha Crystallin
L. Takemoto and T. Emmons
Invest. Ophthalol. and Visual Sci. 33:2024-2028, 1992

92-56-J A Fine Structure Genetic Map of Human Ribosomal Protein S14
J.-J. Diaz and D.J. Roufa
Molec. and Cellular Biol. 12:1680-1686, 1992

92-94-J Effects of Antiorthostatic Suspension and Corticosterone on Macrophage and Spleen Cell Function
K.M. Kopydlowski, D.S. McVey, K.M. Woods, and S.K. Chapes
J. Leukocyte Biol. 52:202-208, 1992

92-120-J Evidence for Zinc Binding by Two Structural Proteins of the *Plodia interpunctella* Granulosis Virus
C.J. Funk and R.A. Consigli
J. Virol. 66:3168-3171, 1992

92-130-J Testicular Myxosporidiasis in the Flat-Backed Toad, *Bufo maculatus* (Amphidia: Bufonidae), from Cameroon, Africa
S.J. Upton, P.S. Freed, D.A. Burdick, C.T. McAllister, and S.R. Goldberg
J. Wildl. Dis. 28(2):326-329, 1992

92-146-J Antipeptide Antibodies that Can Distinguish Specific Polypeptides of Glutamine Synthetase from Bean (*Phaseolus vulgaris* L.)
X. Cai, R.L. Henry, L.J. Takemoto, J.A. Guikema, and P.P. Wong
Plant Physiol. 98:402-405, 1992

92-147-J Immunocytochemical Localization of Glutamine Synthetase in Organs of *Phaseolus vulgaris* L.
D.B. Datta, X. Cai, P.P. Wong, and E.W. Triplett
Plant Physiol. 96:507-512, 1991

92-185-J Notes on North American Polytrichaceae
G.L. Smith Merrill
The Bryol. 95:270-273, 1992

92-186-J Characterization of the Interaction of Polyoma Virus Middle T Antigen with Type 2A Protein Phosphatase
E.T. Ulug, A.J. Cartioright, and S.A. Courtneidge
J. Virol. 66:1458-1467, 1992

92-194-J The Role of a Cell Surface Inhibitor in Early Signal Transduction Associated with the Regulation of Cell Division and Differentiation
T.C. Johnson, D.J. Enebo, P.J. Moos, and H.K. Fattaey
Trans. Kans. Acad. Sci. 95:11-15, 1992

92-205-J Glucocorticoid Effects on Immune Cell Activation by Staphylococcal Exotoxins and Lipopolysaccharide
S.K. Chapes, K.M. Kopydlowski, S.D. Fleming, and J.J. Iandolo
Trans. Kans. Acad. Sci. 95:23-28, 1992

92-206-J Early Events of Polyoma Infection: Adsorption, Penetration, and Nuclear Transport
R.A. Consigli, J.I. Haynes, Jr., D. Chang, L. Grenz, and D. Richter
Trans. Kans. Acad. Sci. 95:62-69, 1992

92-279-J Subunit Analysis of Glutamine Synthetase Isozymes from Root Nodules of Tepary Bean (*Phaseolus acutifolium*)
P.D. Green and P.P. Wong
Plant Sci. 82:179-186, 1992

92-313-J The Ecology of *Cladophora*
W.K. Dodds and D.A. Gudder
J. Phycol. 28:415-427, 1992

92-334-J Characterization of Photosystem 1 Chlorophyll a/b- Binding Apoprotein Accumulation in Developing Soybean Using Type-Specific Antibodies
R.L. Henry, T. Armbrust, G.L. Gallegos, and J.A. Guikema
Plant Physiol. Biochem. 30:115-122, 1992

92-335-J Development and Use of Domain-Specific Antibodies in a Characterization of the Large Subunits of Soybean Photosystem 1
R.L. Henry, L.J. Takemoto, J. Murphy, G.L. Gallegos, and J.A. Guikema
Plant Physiol. Biochem. 30:105-114, 1992

92-430-J Phosphorylation of the Budgerigar Fledgling Disease Virus Major Capsid Protein $VP1^{+}$
J.I. Haynes, Jr. and R.A. Consigli
J. Virol. 66:4551-4555, 1992

92-490-J Leaf Gas Exchange in *Quercus macrocarpa* (Fagaceae): Rapid Stomatal Responses to Variability in Sunlight in a Tree Growth Form
A.K. Knapp
Am. J. Bot. 79:599-604, 1992

92-607-J Additional Records of the Southern Bog Lemming and Meadow Vole in North Central Kansas
D.E. Brillhart and D.W. Kaufman
Prairie Nat. 24:205-210, 1992

■ 8. Chemical Engineering

89-339-A Equilibrium Modeling of a Downdraft Gasifier I - Overall Gasifier
S.-M. Chern, W.P. Walawender, and L.T. Fan
Chem. Engin. Comm. 108:243-265, 1991

90-128-A Equilibrium Modeling of a Downdraft Gasifier II - Flaming-Pyrolsis Zone
S.-M. Chern, W.P. Walawender, and L.T. Fan
Chem. Engin. Comm. 108:267-287, 1991

90-196-A Surface Fractal Dimension of Rice Hull-Derived Charcoal from a Fluidized-Bed Reactor
L.T. Fan, A.A. Boateng, and W.P. Walawender
Can. J. Chem. Engin. 70: 387-390, 1992

90-271-A A Kinetic Model of Single Particle Biomass Pyrolysis in a Downdraft Gasifier
S.-M. Chern, W.P. Walawender, and L.T. Fan
In: *Energy from Biomass and Wastes XIV*, D.L. Klass, ed., pp. 701-726, Institute of Gas Technology, Chicago, IL, 1991

90-323-J Stochastic Analysis of a Three-Phase Fluidized-Bed Reactor: Fractal Approach
L.T. Fan, D. Neogi, M. Yashima, and R. Nassar
Am. Inst. Chem. Engin. J. 36:1529-1535, 1990

90-338-J Control of a Downdraft Gasifier for Biomass Conversion with a Fuzzy Controller
H. Zhao, L.T. Fan, C.S. Chee, and W.P. Walawender
Powder Technol. 69:53-59, 1992

91-94-J Hierarchically Structured Knowledge Representation Scheme for a Flour Milling System
K. Takahashi, J. Hosokoschi, Y. Chen, Y.W. Huang, and L.T. Fan
Assoc. Oper. Millers Bull. Dec.:5793-5800, 1990

91-224-J An Approximation Formula for Evaluating the Number of Possible Schemes for IFMP Separation Problems
Y.-M. Chen, Y.W. Huang, and L.T. Fan
Separations Tech. 1:222-230, 1991

92-28-J On Transformation of the Product Set in Separation Sequence Synthesis
Y.-M. Chen and L.T. Fan
Am. Inst. Chem Eng. J. 37(11):1753-1757, 1991

■ 9. Chemistry

91-15-J Oxidative Decarboxylation of 3,4-Dihydroxymandelic Acid; to 3,4-Dihydroxybenzaldehyde: Electrochemical and HPLC Analysis of the Reaction Mechanism
T.H. Czapla, M. R. Claeys, T.D. Morgan, K.J. Kramer, T.L. Hopkins, and M.D. Hawley
Biochem. Biophys. Acta 1077:400-406, 1991

92-90-J A Resin with Selectivity for the Removal and Recovery of Chromate from Contaminated Water
M.W. Heininger and C.E. Meloan
Solvent Extraction and Ion Exchange 10(11):159-172, 1992

92-91-J A Selective Reagent for the Removal and Recovery of Chromate, Molybdate, Tungstate and Vanadate from Aqueous Solution
M.W. Heininger and C.E. Meloan
Separation Sci. 27(5):663-671, 1992

92-465-A Photodegradation of High Performance Fibers
L.E. Hamilton, B.M. Reagan, and P.M.A. Sherwood
In: *Book of Papers*, Intl. Tech. Conf. Am. Assoc. Textile Colorists and Chemists, pp. 222-227, 1992

■ 10. Civil Engineering

91-284-J Expected Live of CMP Principal Spillway Conduits
J.K. Koelliker and A.N. Lin
Appl. Engin. Agric. 8(2):229-235, 1992

92-333-J The Movement of Nonpoint Source Contaminants through Heterogeneous Soils
J.C. Tracy
J. Irrig. and Drainage Engin. 118(1):88-103, 1992

■ 11. Clinical Sciences

88-448-J Effects of Exercise-Stress on Leukocytes in Cattle with Experimental Pneumonic Pasteurellosis
N.V. Anderson, Y.D. Youanes, J.G.E. Vestweber, C.A. King, R.D. Klemm, and J.A. Westfall
Vet. Res. Comm. 15:189-204, 1991

89-157-J Surgical Management of Tracheal Collapse in Two Calves
R.B. Fingland, D.M. Rings, and J.G. Vestweber
Vet. Surg. 19:371-379, 1990

89-413-J Experimental *Pasteurella haemolytica* Pneumonia: Clinical and Pathological Studies
J.G. Vestweber, R.D. Klemm, H.W. Leipold, D.E. Johnson, and W.E. Bailie
Am. J. Vet. Res. 51:1792-1798, 1990

89-439-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers I. Effects of Postweaning Energy Manipulation
D.J. Patterson, L.R. Corah, J.R. Brethour, M.F. Spire, J.J. Higgins, G.H. Kiracofe, J.S. Stevenson, and D.D. Simms
J. Anim. Sci. 69:2349-2361, 1991

89-478-J Experimental *Pasteurella haemolytica* Pneumonia in Gnotobiotic and Conventional Calves
J.G. Vestweber, R.D. Klemm, and H.W. Leipold
Am. J. Vet. Res. 51:1799-1805, 1990

90-14-J Detection of *Eperythrozoon suis* DNA from Swine Blood by Whole Organism DNA Hybridizations
R.D. Oberst, S.M. Hall, and D.A. Schoneweis
Vet. Microbiol. 24:127-134, 1990

90-51-J Effect of Various Proportions of Propionate and Glucose on Portal-Drained Visceral Nutrient Flux and Concentration of Hormones in Sheep Maintained by Total Intragastric Infusion
K.L. Gross, D.L. Harmon, J.E. Minton, and T.B. Avery
J. Anim. Sci. 68(8):2566-2574, 1990

90-167-J Small Intestinal Starch Digestion in Steers: Effect of Various Levels of Abomasal Glucose, Corn Starch, and Corn Dextin Infusion on Small Intestinal Disappearance and Net Glucose Absorption
K.K. Kreikemeier, D.L. Harmon, R.T. Brandt, Jr., T.B. Avery, and D.E. Johnson
J. Anim. Sci. 69:328-338, 1991

90-305-J The Effect of Glucocorticoid Treatment on Phagocytosis and EA-Rosette Formation in Three Populations of Canine Mononuclear Phagocytes
L.J. DeBowes and N.V. Anderson
Proc. 9th Am. Coll. Vet. Int. Med. Forum, p. 895, 1991

90-313-J Post-Transfusion Survival of $_{50}$Cr-Labeled Erythrocytes in Neonatal Foals
J.E. Smith, J. Smith, M. Dever, and R.W. DeBowes
J. Vet. Int. Med. 6(3):183-185, 1992

90-374-J Hematological and Blood Chemistry Parameters of American Bison Grazing on Konza Prairie of Kansas
J.D. Vestweber, D.E. Johnson, G.E. Merrill, and J. Staats
J. Wildl. Dis. 27:417-420, 1991

90-389-J Effects of Feeding Endophyte-Infected Fescue Hay on Portal and Hepatic Nutrient Flux in Steers
D.L. Harmon, K.L. Gross, K.K. Kreikemeier, K.P. Coffey, T.B. Avery, and J. Klindt
J. Anim. Sci. 69(3):123-1231, 1991

90-394-J Serological Survey for Selected Microbial Pathogens in Kansas Bison
J.G. Vestweber, D.E. Johnson, G.E. Merrill, and J. Staats
J. Wildl. Dis. 27:473-476, 1991

90-505-J Performance Indices for Evaluation of the Equine Athlete
H.H. Erickson, B.K. Erickson, C.S. Lundin, J.R. Gillepsie, and J.R. Coffman
Proc. 36th Ann. Conv. Am. Assoc. Equine Pract., pp. 457-469, 1991

90-572-J Response of Young Dairy Calves with Lasalocid Delivery Varied in Feed Sources
S.D. Pruiett, J.L. Morrill, T.J. Nagaraja, N.V. Anderson, P.G. Reddy, and J.J. Higgins
J. Dairy Sci. 75:857-862, 1992

90-602-B Pathophysiology of the Respiratory Tract
J.G. Vestweber
In: *Current Veterinary Therapy: Food Animal Practice III*, J.L. Howard, ed., pp. 633-637, W.B. Saunders, Philadelphia, 1992

91-31-B Pneumonia in Cattle, Sheep, and Swine
J.G. Vestweber
In: *Current Veterinary Therapy: Food Animal Practice III*, J.L. Howard, ed., pp. 640-643, W.B. Saunders, Philadelphia, 1992

91-144-J Mixtures of High Moisture Corn and Wheat in Finishing Diets: Feedlot Performance and in Situ Rate of Starch Digestion in Cattle
B.J. Bock, R.T. Brandt, Jr., D.L. Harmon, S.J. Anderson, J.K. Elliott, and T.B. Avery
J. Anim. Sci. 69:2703-2710, 1991

91-170-B Respiratory Tract Diagnostic Methods
J.G. Vestweber
In: *Current Veterinary Therapy: Food Animal Practice III*, J.L. Howard, ed., pp. 675-678, W.B. Saunders, Philadelphia, 1992

91-236-J Neutrophil and Lymphocyte Response to Vitamins C and E Supplementation in Young Calves
S.D. Eicher-Puuiett, J.L. Morrill, F. Blecha, J.J. Higgins, N.V. Anderson, and P.G. Reddy
J. Dairy Sci. 75:1635-1642, 1992

91-303-J Influence of Furosemide on Hemodynamic Responses during Exercise in the Horse
S.C. Olsen, C.P. Coyne, B.S. Lowe, N. Pelletier, E.M. Raub, and H.H. Erickson
Am. J. Vet. Res. 53(5):742-747, 1992

91-583-A Cardiopulmonary Mechanisms of Exercise-Induced Hemorrhage and Action of Furosemide
H.H. Erickson, M.K. Hopper, S.C. Olsen, N. Pelletier, B.S. Lowe, and C.P. Coyne
Proc. 37th Ann. Conv. Am. Assoc. Equine Pract., pp. 735-745, 1992

92-58-J Atlanto-Occipital Fusion in Two Polled Hereford Calves
T.J. Engelken, H.W. Leipold, M.F. Spire, and W. Cash
J. Vet. Med. (A) 39:236-238, 1992

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-394-T Scrapie in Kansas Sheep
J.G. Vestweber, N.V. Anderson, and H.W. Leipold
Kans. Vet. Med. Assoc. News 2(3):10-11, 17, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-530-J Difficult Dermatologic Diagnosis
J.G. Vestweber and G. Kennedy
J. Am. Vet. Med. Assoc. 201:1695-1696, 1992

■ 12. Clothing, Textiles, and Interior Design

92-465-A Photodegradation of High Performance Fibers
L.E. Hamilton, B.M. Reagan, and P.M.A. Sherwood
In: *Book of Papers*, Intl. Tech. Conf. Am. Assoc. Textile Colorists and Chemists, pp. 222-227, 1992

■ 13. Director's Office

91-364-D 1991 Report on Grains Research and Educational Programs Supported by Kansas Corn, Grain Sorghum, Soybean, and Wheat Commissions
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-52, 1991

91-396-D Margin of Excellence Report 1991
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-16, 1991

91-397-S 35th Biennial Report. Agricultural Research in Kansas
Kans. Agric. Exp. Stn. Spec. Publ., pp. 1-96, 1991

91-463-D Hard White Winter Wheat Research. 1990 Update
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-12, 1991

92-212-D 1992 Report on Grains Research and Educational Programs Supported by Kansas Corn, Grain Sorghum, Soybean, and Wheat Commissions
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-56, 1991

92-277-D Hard White Winter Wheat Research: 1991 Report
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-13, 199

92-318-D Water Research in Kansas 1991
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-41, 1992

92-508-D Kanas Fertilizer Research Fund
Kans. Agric. Exp. Stn. Dept. Rep., pp. 1-8, 1992

■ 14. Economics

91-493-J Public Policy Impacts on Transportation Employment
M.W. Babcock and H.W. German
S. Econ. J. 58(1):155-170, 1991

92-141-J How Can Railroads Recapture Their Lost Market Share?
H.W. German and M.W. Babcock
J. Transp. Res. Forum 32(2):355-368, 1992

92-142-A Transportation and Great Plains Agriculture
M.W. Babcock
Proc. 1991 Ann. Meeting of the Great Plains Agric. Counc., pp. 178-210, 1991

92-664-B Economic Development and Transportation Impacts of Railroad Branchline Abandonment in South Central Kansas
M.W. Babcock, E.R. Russell, and R.E. Burns
Report - Kansas Department of Transportation, pp. 1-181, 1992

■ 15. Entomology

88-234-J Aphid Predators Associated with Conventional and Conservation Tillage Winter Wheat
M.E. Rice and G.E. Wilde
J. Kans. Entomol. Soc. 64:245-250, 1991

89-98-J Two New Species of *Planodiscus* (Acari: Uropodina), Range Extensions, and a Synonomy within the Genus
R.J. Elzinga
Acarologia 31(3):229-233, 1990

89-143-B Catecholamine Metabolism and the Integument
T.L. Hopkins and K.J. Kramer
In: *Physiology of Insect Epidermis*, K. Binnington and A. Netnakaran, eds., pp. 213-239, CSIRO, Melbourne, 1991

89-223-J Genetics of Sex Determination in the Hessian Fly, *Mayetiola destructor*
J.J. Stuart and J.H. Hatchett
J. Hered. 82:43-52, 1991

89-236-D A History of the Department of Entomology, Kansas State University, 1897 to 1990
H. Knutson
Entomol. Dept. Rep., pp. 1-50, 1991
(available from dept. only)

89-385-J Plant Resistance to Twospotted Spider Mite (Acarina: Tetranychidae) in Raspberry Cultivars
G. Wilde, W. Thomas, and H. Hall
J. Econ. Entomol. 84:251-255, 1991

89-386-J Resistance to Raspberry Bud Moth (Lepidoptera: Carponsinidae) in Raspberry Cultivars
G. Wilde, H. Hall, and W. Thomas
J. Econ. Entomol. 84:247-250, 1991

89-387-J Management of Banks Grass Mites in Field Corn: Evaluation of Aerial Applications of Propargite
L.L. Buschman and M.A. Chowdhury
Southwest. Entomol. 15(3):317-325, 1990

89-455-J Utilizing High Airflow Rates for Aerating Wheat
J.P. Harner and D.W. Hagstrum
Appl. Engin. Agric. 6:315-321, 1990

89-477-J Greenbug (Homoptera: Aphididae) Resistance to Parathion and Chlorpyrifos-Methyl
P.E. Sloderbeck, M.A. Chowdhury, L.J. DePew, and L.L. Buschman
J. Kans. Entomol. Soc. 64(1):1-4, 1991

89-526-B Soybean Pest Management
R.B. Hammond, R.A. Higgins, T.P. Mack, L.P. Pedigo, and E.J. Bechinski
In: *Handbook of Pest Management in Agriculture*, Vol. III, 2nd Edition, D. Pimentel, ed., pp. 343-472, CRC Press, Boca Raton, FL, 1991

89-540-A Novel Approaches to the Development of Sorghum Germplasm Resistant to Greenbugs
J.C. Reese, P. Bramel-Cox, A.G.O. Dixon, D. Schmidt, R. Ma, S. Noyes, W.C. Black IV, and D.C. Margolies
Insect-Plants '89, Symp. Biol. Hung. 39:523-526, 1991

90-20-J Influence of Temperature and Plant Growth Stage on Development, Reproduction, Life Span, and Intrinsic Rate of Increase of the Russian Wheat Aphid (Homoptera: Aphididae)
M. Girma, G. Wilde, and J. Reese
Environ. Entomol. 19:1438-1442, 1990

90-40-J Pitfall Traps and Grain Samples as Indicators of Economically Important Insect Populations in Farm-Stored Wheat
C.R. Reed, V.F. Wright, T.W. Mize, J.R. Pedersen, and J. Brockschmidt Evans
J. Econ. Entomol. 84(4):1381-1387, 1991

90-67-J Effect of Sunflower Planting Date on Infestation and Damage by the Sunflower Moth (Lepidoptera: Pyralidae)
M. Aslam, G.E. Wilde, T.L. Harvey, and W.E. Stegmeier
J. Agric. Entomol. 8(2):101-108, 1991

90-70-J Factors Influencing the Onset of Egglaying in a Cecidomyid Fly
M.O. Harris and S. Rose
Physiol. Entomol. 16:183-190, 1991

90-80-J Landing Pattern of Stable Flies (Diptera: Muscidae) on the Alsynite Cylinder Trap: Effect of Wind Speed and Direction
A.B. Broce, J. Schwenke, and K.E. Hampton
J. Med. Entomol. 28:730-733, 1991

90-87-J Cuticular Strength and Pigmentation of Five Strains of Adult *Blattella germanica* (L.) during Sclerotization: Correlations with Catecholamines, β-Alanine, and Food Deprivation
T.H. Czapla, T.L. Hopkins, and K.J. Kramer
J. Insect Physiol. 36:647-654, 1990

90-99-J Alfalfa Stem Removal Methods and Their Efficiency in Predicting Actual Numbers of Alfalfa Weevil Larvae (Coleoptera: Curculionidae)
R.A. Higgins, M.E. Rice, S.L. Blodgett, and T.J. Gibb
J. Econ. Entomol. 84:650-655, 1991

90-102-J Aboveground Dry Weight and Yield Responses of Irrigated Field Corn to Defoliation and Root Pruning Stresses
T.J. Gibb and R.A. Higgins
J. Econ. Entomol. 84:1562-1576, 1991

90-106-J Complementarity of Genes for Resistance to Greenbug [*Schizaphis graminum* (Rondani)] Biotype E in Sorghum [*Sorghum bicolor* (L.) Moench]
A.G.O. Dixon, P.J. Bramel-Cox, and T.L. Harvey
Theor. Appl. Genet. 81:105-110, 1991

90-118-J Detection of Pectinesterase and Polygalacturonase from Salivary Secretions of Living Greenbugs, *Schizaphis graminum* (Homoptera: Aphidae)
R. Ma, J.C. Reese, W.C. Black IV, and P. Bramel-Cox
J. Insect Physiol. 36:507-512, 1990

90-123-J Transmission of Wheat Streak Mosaic Virus to Sorghum by the Wheat Curl Mite (Acari:Eriophyidae)
T.L. Harvey and D.L. Seifers
J. Kans. Entomol. Soc. 64:18-22, 1991

90-132-J Allozyme Variation among Populations of the Hessian Fly (*Mayetiola destructor*) in the United States
W.C. Black IV, J.H. Hatchett, and L.J. Krchma
J. Hered. 81(4):331-337, 1990

90-151-J N-β-Alanyldopamine and N-Acetyldopamine Occurrence and Synthesis in the Central Nervous System of *Manduca sexta* (L.)
R.A. Krueger, K.J. Kramer, T.L. Hopkins, and R.D. Speirs
Insect Biochem. 20:605-610, 1990

90-152-J Infection of Chinch Bug, *Blissus leucopterus leucopterus* (Hemiptera: Lygaeidae) Adults from *Beauveria bassiana* (Deuteromycotina:Lygaeidae) Conidia in Soil under Controlled Temperature and Moisture Conditions
S.R. Krueger, J.R. Nechols, and W.A. Ramoska
J. Invert. Pathol. 58:19-26, 1991

Publications of Station Scientists (Continued)

90-153-J Habitat Distribution and Infection Rates of the Fungal Pathogen, *Beauveria bassiana* (Balsamo) Vuillemin, in Endemic Populations of the Chinch Bug, *Blissus leucopterus leucopterus* (Say) (Hemiptera: Lygaeidae) in Kansas
S.R. Krueger, J.R. Nechols, and W.A. Ramoska
J. Kans. Entomol. Soc. 65(2):115-124, 1992

90-160-J Quantitative Analysis of Onion Fly Egglaying Behavior: Effects of a Host-Plant Chemical
M.O. Harris and J.R. Miller
J. Insect Behav. 4:773-792, 1991

90-181-J Temporal Patterns of Hessian Fly, *Mayetiola destructor* (Diptera:Cecidomyiidae) Emergence and Reproductive Behavior and Correlates of Reproductive Potential
J.C. Bergh, M.O. Harris, and S. Rose
Ann. Entomol. Soc. Am. 83:998-1004, 1990

90-214-J Mortality of Second Generation Immatures of the Southwestern Corn Borer (Lepidoptera: Pyralidae)
M.E. Moulton, R.A. Higgins, S.M. Welch, and F.L. Poston
J. Econ. Entomol. 85:963-966, 1992

90-215-J Attraction of the Grasshopper, *Melanoplus sanguinipes*, to Host Plant Odors and Volatile Components
T.L. Hopkins and H. Young
Entomol. Exper. Appl. 56:249-258, 1990

90-225-J Potential Insect Pests of Sunflowers in Kansas
M. Aslam and G. Wilde
J. Kans. Entomol. Soc. 64:109-112, 1991

90-226-J Monitoring Flight Activity of Sunflower Moth (Lepidoptera: Pyralidae) in Kansas
M. Aslam, G. Wilde, and T.L. Harvey
Environ. Entomol. 19(5):1639-1645, 1990

90-227-J Larval Mouthparts and Feeding Mechanism of the Hessian Fly (Diptera: Cecidomyiidae)
J.H. Hatchett, G.L. Kreitner, and R.J. Elzinga
Ann. Entomol. Soc. Am. 83:1137-1147, 1990

90-251-J Two New Elongate Species of *Planodiscus* (Acari: Uropodina) with a Key to the Known Species
R.J. Elzinga
Acarologia 32(2):109-114, 1991

90-262-J Cantharidin Content of Blister Beetles (Coleoptera: Meloidae: *Epicauta*) Collected from Kansas Alfalfa and Implications for Inducing Cantharidiasis
S.L. Blodgett, J.E. Carrel, and R.A. Higgins
Environ. Entomol. 20:776-780, 1991

90-263-J Cantharidin Contamination of Alfalfa Hay
S.L. Blodgett, J.E. Carrel, and R.A. Higgins
J. Med. Entomol. 29:700-703, 1990

90-264-J Computer Acquisition and Analysis of Insect Feeding Monitor Data
S. Noyes, D.C. Margolies, J.C. Reese, A. Dixon, P. Bramel-Cox
Ann. Entomol. Soc. Am. 83:1224-1231, 1990

90-266-J Sunflower Moth Control on Sunflower Planted on Different Dates in Kansas
M. Aslam and G. Wilde
J. Kans. Entomol. Soc. 64:51-59, 1991

90-292-J Blue Alfalfa Aphid (Homoptera: Aphididae) Depresses Forage Quality of Alfalfa Leaves and Stems
A.W. Lenssen, E.L. Sorensen, G.L. Posler and S.L. Blodgett
Environ. Entomol. 20(1):71-76, 1991

90-308-J Resistance to Russian Wheat Aphid, *Diuraphis noxia*, in Wheat (*Triticum aestivum*)
T.L. Harvey and T.J. Martin
Cereal Res. Commun. 18:127-129, 1990

90-340-J Registration of KS89WGRC3 and KS89WGRC6 Hessian Fly-Resistant Hard Red Winter Wheat Germplasm
B.S. Gill, D.L. Wilson, W.J. Raupp, J.H. Hatchett, T.S. Cox, A. Amri, and R.G. Sears
Crop Sci. 31:245, 1991

90-341-J Registration of KS89WGRC4 Hard Red Winter Wheat Germplasm with Resistance to Hessian Fly, Greenbug, and/or Soilborne Mosaic Virus
B.S. Gill, D.L. Wilson, W.J. Raupp, J.H. Hatchett, T.L. Harvey, T.S. Cox, and R.G. Sears
Crop Sci. 31:246, 1991

90-382-J New Iassinae (Homoptera: Cicadellidae) from Mexico and Peru
H.D. Blocker
Entomol. News 101:207-210, 1990

90-402-J Agronomic Performance of Hexaploid Wheat Lines Derived from Direct Crosses between Wheat and *Aegilops squarrosa*
T.S. Cox, J.H. Hatchett, B.S. Gill, W.J. Raupp, and R.G. Sears
Plant Breeding 105:271-277, 1990

90-405-J Suitability of Corn Growth Models for Incorporation of Weed and Insect Stresses
A. Retta, R.L. Vanderlip, R.A. Higgins, L.J. Moshier, and A.M. Feyerherm
Agron. J. 83:757-765, 1991

90-445-B Quantitative Genetics Applied to Haplodiploid Insects and Mites
D.C. Margolies and T.S. Cox
In: *Evolution and Diversity of Sex Ratio in Arrhenotokous Insects and Mites*, D.L. Wrensch and M.A. Ebbert, eds., pp. 548-559, Chapman and Hall, New York, 1992

90-471-J Developmental Consistency between Geographically Separate European Corn Borer Populations
D.D. Calvin, R.A. Higgins, M.C. Knapp, F.L. Poston, S.M. Welch, W.B. Showers, J.F. Witkowski, C.E. Mason, H.C. Chiang, and A.J. Keaster
Environ. Entomol. 20:441-449, 1991

90-472-J Within-Plant Dispersal of Banks Grass Mite (Acari: Tetranychidae) on Corn
J.A. Barron and D.C. Margolies
J. Kans. Entomol. Soc. 64:209-215, 1991

90-497-J Diel Activity Pattern of the Squash Bug Egg Parasitoid *Gryon pennsylvanicum* Ashmead (Hymentoptera: Scelionidae)
E.A. Vogt and J.R. Nechols
Ann. Entomol. Soc. Am. 84:303-308, 1991

90-508-J The Leafhopper Genus *Bythonia* (Homoptera: Cicadellidae)
H.D. Blocker and M.D. Webb
Entomol. News 101:293-296, 1990

90-548-J Ticks (Acari: Ixodidae) from Raccoons (*Procyon lotor*) in Eastern Kansas with a New State Record for *Ixodes texanus*
D.E. Mock, D.B. Brillhart, L.B. Fox, and S.J. Upton
J. Kans. Entom. Soc. 64(3):344-345, 1991

90-569-J Factors Inducing Mated Behaviour in Female Hessian Flies (Diptera:Cecidomyiidae)
J.C. Bergh, M.O. Harris, and S. Rose
Ann. Entomol. Soc. Am. 85:224-233, 1992

90-597-J A New Leafhopper Genus, *Cocrassana* (Homoptera:Cicadellidae), from *Tripsacum* and a Synopsis of Related Genera
H.D. Blocker and K.J. Larsen
J. Kans. Entomol. Soc. 64:123-126, 1991

91-15-J Oxidative Decarboxylation of 3,4-Dihydroxymandelic Acid to 3,4-Dihydroxybenzaldehyde: Electrochemical and HPLC Analysis of the Reaction Mechanism
T.H. Czapla, M. R. Claeys, T.D. Morgan, K.J. Kramer, T.L. Hopkins, and M.D. Hawley
Biochem. Biophys. Acta 1077:400-406, 1991

91-55-A Detection of Plant Cell Wall-Degrading Enzymes in Greenbug Saliva
R. Ma, J.C. Reese, W.C. Black IV, and P. Bramel-Cox
Proc. Aphid-Plant Interactions: Populations to Molecules, p. 291, 1991

91-62-A Use of Molecular Probes to Characterize Aphid Populations
W.C. Black IV
Proc. Intl. Aphid Symp., D.C. Peters, J.A. Webster, C.S. Chlouber, eds., pp. 137-151, 1990

91-68-A Insect Cuticle Tanning: Enzymes and Cross-Link Structure
K.J. Kramer, T.D. Morgan, T.L. Hopkins, A.M. Christensen, and J. Schaefer
In: *Naturally Occurring Pest Bioregulators*, P.A. Hedin, ed., pp. 87-105, Am. Chem. Soc. Symp. Ser. No. 449, 1991

91-69-J Analysis of Cockroach Oothecae and Exuviae by Solid State ^{13}C-NMR Spectroscopy
K.J. Kramer, A.M. Christensen, T.D. Morgan, J. Schaefer, T.H. Czapla, T.L. Hopkins
Insect Biochem. 21:149-156, 1991

91-117-J Transfer of Hessian Fly Resistance from Rye to Wheat via Radiation-Induced Terminal and Intercalary Chromosome Translocations
B. Friebe, J.H. Hatchett, Y. Mukai, B.S. Gill, and E.E. Sebesta
Theor. Appl. Genet. 83:33-40, 1991

91-142-J Possible Ecological Consequences of Mating Behavior in Two Tetranychid Mites
R.D. Collins and D.C. Margolies
Exp. Appl. Acarol. 13:97-105, 1992

91-154-J Registration of Ten Biotype E Greenbug-Resistant Restorer Germplasm Lines of Sorghum
K.D. Kofoid, H.L. Hackerott, T.L. Harvey, and D.L. Seifers
Crop Sci. 31:1099-1100, 1991

91-157-A X-Ray Induced Transfer of Hessian Fly Resistance from 'Balbo' Rye to Hexaploid Wheat Analyzed by the C-Banding Technique
B. Friebe, J.H. Hatchett, B.S. Gill, Y. Mukai, and E.E. Sebesta
Proc. Second Intl. Symp. on Chromosome Engin. in Plants, pp. 189-194, 1990

91-171-J Ability of *Musca autumnalis* (Diptera: Muscidae) to Acquire and Transmit Bovine Herpesvirus-1
G.D. Johnson, J.B. Campbell, H.C. Minocha, and A.B. Broce
J. Med. Entomol. 28:841-846, 1991

91-172-J Visual Behaviors of the Migratory Grasshopper, *Melanoplus sanguinipes*
E.V. Bailey and M.O. Harris
J. Insect Behav. 4:707-726, 1991

91-177-J Russian Wheat Aphid [*Diuraphis noxia* (Mordvilko)] Feeding Behavior on Host and Nonhost Plants
M. Girma, G. Wilde, and J. Reese
J. Econ. Entomol. 85:395-401, 1992

91-179-J Reproduction and Feeding Behavior of Greenbug Biotype E (Homoptera: Aphididae) on Wheat Previously Fed upon by Aphids
E. Formusoh, G. Wilde, and J. Reese
J. Econ. Entomol. 85:789-793, 1992

91-191-J Choice of Location on Corn Leaf by Banks Grass Mite, *Oligonychus pratensis* (Acari: Tetranychidae)
J. Li and D.C. Margolies
Exp. Appl. Acarol. 12:27-34, 1991

91-206-J Flavonoid Wing Pigments in Grasshoppers
T.L. Hopkins and S.A. Ahmad
Experientia 47:1089-1091, 1991

91-238-J Wind Tunnel Studies of Sex Pheromone-Mediated Behavior of the Hessian Fly (Diptera: Cecidomyiidae)
M.O. Harris and S.P. Foster
J. Chem. Ecol. 17:2421-2435, 1991

91-285-A Recent Studies on Chinch Bug Resistance in Sorghum
G.E. Wilde and P. Bramel-Cox
Proc. 45th Ann. Meeting - Amer. Seed Trade Assoc. Pub. 45, pp. 121-130, 1991

91-287-J A New Greenbug Virulent to E-Biotype-Resistant Sorghum
T.L. Harvey, K.D. Kofoid, T.J. Martin, and P.E. Sloderbeck
Crop Sci. 31(6):1689-1691, 1991

91-341-J Registration of Hamlet, a Hessian Fly-Resistant Hard Red Winter Wheat Germplasm
R.G. Sears, J.H. Hatchett, T.S. Cox, and G.S. Gill
Crop Sci. 32:506, 1992

91-359-J Laboratory Evaluation of Food Baits for Their Relative Ability to Retain Three Species of Stored-Product Beetles (Coleoptera)
B.H. Subramanyam, V.F. Wright, and E.E. Fleming
J. Agric. Entomol. 9(2):117-127, 1992

91-403-S 1990 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 625:1-28, 1991

91-453-J DNA Fingerprinting to Study Spatial and Temporal Distributions of an Aphid, *Schizaphis graminum* (Homoptera: Aphididae)
K.A. Shufran, W.C. Black IV, and D.C. Margolies
Bull. Entomol. Res. 81:303-313, 1991

91-457-J Registration of KS219 Alfalfa Germplasm with Resistance to Eight Pests
E.L. Sorensen, D.L. Stuteville, E.K. Horber, and D.Z. Skinner
Crop Sci. 32:502-503, 1992

91-460-S 1991 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 630:1-52, 1991

91-466-J Insect Cuticle Sclerotization
T.L. Hopkins and K.J. Kramer
Ann. Rev. Entomol. 37:273-302, 1992

92-15-J Use of the Random Amplified Polymorphic DNA Polymerase Chain Reaction (RAPD-PCR) to Detect DNA Polymorphisms in Aphids
W.C. Black IV, N.M. DuTeau, G.J. Puterka, J.R. Nechols, and J.M. Pettorini
Bull. Entomol. Res. 82:151-159, 1992

92-41-J Genome Size and Organization in an Aphid (*Schizaphis graminum*)
R.Z. Ma, W.C. Black IV, and J.C. Reese
J. Insect Physiol. 38:161-165, 1992

92-66-J A New Genus and Species of Iassinae (Homoptera: Cicadellidae) from Brazil
H.D. Blocker and M.D. Webb
Entomol. News 103:12-14, 1992

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-176-J Two New Species of *Athysanella* (Homoptera: Cicadellidae) from California
H.D. Blocker and A.L. Hicks
Entomol. News 103:41-43, 1992

92-274-A A New Greenbug, Biotype I, Damages Sorghum
K.D. Kofoid, T.L. Harvey, and P.E. Sloderbeck
Proc. 46th Ann. Corn and Sorghum Ind. Res. Conf., pp. 130-140, 1992

92-294-A Corn Borer Insecticide Efficacy Trial, 1991
G.L. Dick, P.E. Sloderbeck, L.G. Wildman, and S.C. Posler
Insecticide and Acaricide Tests 17:194-195, 1992

92-295-A Miticide Efficacy Trial, 1990
G.L. Dick, P.E. Sloderbeck, and S.C. Posler
Insecticide and Acaricide Tests 16:152-153, 1991

92-296-A Corn Borer Insecticide Efficacy Trial, 1990
G.L. Dick, P.E. Sloderbeck, and S.C. Posler
Insecticide and Acaricide Tests 16:151-152, 1991

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

■ 16. Foods and Nutrition

87-47-J Effects of Casein, Soy, and Whey Proteins and Amino Acid Supplementation on Cholesterol Metabolism in Rats
N.S. Aljawad, E.B. Fryer, and H.C. Fryer
J. Nutr. Biochem. 2:150-155, 1991

87-296-J Self-Concept as a Factor in the Quality of Diets of Adolescent Girls
G.K. Newell, C.L. Hammig, A.P. Jurich, and D.E. Johnson
Adolescence 25:117-130, 1990

87-477-J *Lactobacillus plantarum* and *Enterobacter cloacae* Growth in Cucumber Extracts Containing Various Salts
J.O. Naewbanij, M.B. Stone, and E. Chambers IV
J. Food Sci. 55(6):1634-1637, 1990

89-65-J Application of Sensory Texture Profiling to Baked Products: Some Considerations for Evaluation, Definition of Parameters, and Reference Products
N.P. Bramesco and C.S. Setser
J. Texture Stud. 21:235-251, 1990

89-355-J Soymilk Yogurt: Sensory Evaluation and Chemical Measurement
M.A Buono, C. Setser, L.E. Erickson, and D.Y.C. Fung
J. Food Sci. 55(2):528-531, 1990

89-365-J Use of ^{13}C and ^{17}O NMR to Study Wheat Starch-Water-Sugar Interactions with Increasing Temperatures
D. Sobczynsk, C. Setser. H. Lim, L. Hansen, and J. Paukstelis
In: *NMR Applications in Biopolymers*, J.W. Finley, S.J. Schmidt, and A.S. Serianni, eds., pp. 461-480, Plenum Press, NY, 1990

90-32-J Effect of Total Soymilk Solids on Acid Production by Selected Lactobacilli
C.Y. Chang and M.B. Stone
J. Food Sci. 56(6):1643-1646, 1678, 1991

90-224-J Effect of Packaging on Physical and Sensory Characteristics of Ground Pork in Long-Term Frozen Storage
M.S. Brewer and C.A.Z. Harbers
J. Food Sci. 56(3):627-631, 1991

90-245-J Effects of Skim Milk, Skim Milk Yoghurt, Orotic Acid, and Uric Acid on Lipid Metabolism in Rats
K.P. Navder, E.B. Fryer, and H.C. Fryer
J. Nutr. Biochem. 1:640-646, 1990

90-281-J Effect of Packaging on Color and Physical Characteristics of Ground Pork in Long-Term Frozen Storage
M.S. Brewer and C.A.Z. Harbers
J. Food Sci. 56(2):363-366, 1991

90-329-J Water Retention and Solubility of Soy Proteins and Corn Germ Proteins in a Model System
C.R. Wang and J.F. Zayas
J. Food Sci. 56(2):455-458, 1991

90-339-J College Students' Knowledge and Consumption of Sorbitol
H.R. Oberrieder and E.B. Fryer
J. Am. Diet. Assoc. 91(6):715-717, 1991

90-349-J Sensory Detection and Population Thresholds for Sodium Tripolyphosphate in Cooked Ground Turkey Muscle
B. Chambers, E. Chambers IV, J.A. Bowers, and J.A. Craig
J. Food Sci. 56(1):206-209, 1991

90-397-J TBA Values, Sensory Characteristics, and Volatiles in Ground Pork during Long-Term Frozen Storage: Effects of Packaging
M.S. Brewer, W.G. Ikins, and C.A.Z. Harbers
J. Food Sci. 57(3):558-563, 580, 1992

90-406-J Comparative Quality Characteristics of Chymosin Extracts Obtained by Ultrasound Treatment
S.M. Kim and J.F. Zayas
J. Food Sci. 56(2):406-410, 1991

90-429-J The Effects of Ultrasound Treatment on the Properties of Chymosin
S.M. Kim and J.F. Zayas
J. Food Sci. 56(4):926-930, 1991

90-437-J Influence of Ultrasound on the Properties of Chymosin and the Ultrastructure of Abomasum during Chymosin Extraction
S.M. Kim and J.F. Zayas
J. Food Proc. and Preserv. 15:89-100, 1991

90-523-J Wheat Starch Gelatinzation in the Presence of Polydextrose or Hydrolyzed Barley Beta-Glucan
S.S. Kim and C.S. Setser
Cereal Chem. 69:447-452, 1992

90-559-J Weight-for-Height Measurement and Saturated Fatty Acid Intake Are Predictors of Serum Cholesterol Level in Children
D.K. Weidenbach and N.M. Lewis
J. Am. Diet. Assoc. 92(2):192-198, 1992

90-579-J Sodium Tripolyphosphate and Sodium Ascorbate Monophosphate as Inhibitors of Off-Flavor Development in Cooked, Vacuum-Packaged, Frozen Turkey
J. Craig, J.A. Bowers, and P. Seib
J. Food Sci. 56(6):1529-1531, 1561, 1991

91-187-J Aroma Quality of Corn Germ Protein Flours Determined by Sensory and Gas Chromatographic Profiles
C.J. Huang and J.F. Zayas
J. Food Qual. 14:377-390, 1991

91-228-J Comparataive Study of Corn Germ and Soy Protein Utilization in Comminuted Meat Products
C.R. Wang and J.F. Zayas
J. Food Qual. 15(2):153-167, 1992

91-241-J Emulsifying Capacity and Emulsion Stability of Soy Proteins Compared with Corn Germ Protein Flour
C.R. Wang and J.F. Zayas
J. Food Sci. 57(3):726-731, 1992

91-248-J Emulsifying Capacity and Emulsion Stability of Milk Proteins and Corn Germ Protein Flour
S.C. Hung and J.F. Zayas
J. Food Sci. 56(5):1216-1218, 1223, 1991

91-249-J Phenolic Acid Contributions to Taste Characteristics of Corn Germ Protein Flour Products
C.J. Huang and J.F. Zayas
J. Food Sci. 56(5):1308-1310, 1315, 1991

91-256-T Meat Consumption Patterns and Influence
J. Bowers
Muscle Foods Div. Newsletter, Inst. Food Tech. 17(1):1-4, 1991

91-310-J Product Claims and Guidelines for Evaluating Their Content
M.R. Bowers and E. Chambers, IV
J. Home Econ. 84(3):25-30, 1992

91-339-J Dietary Soluble Fiber and Cholesterol Concentration, Hepatic Portal Venous Short Chain Fatty Acid Concentrations, and Fecal Sterol Excretion in Rats
B. Arjmandi, J. Ahn, S. Nathani, and R.D. Reeves
J. Nutr. 122:246-253, 1992

91-340-J Soluble Dietary Fibers and Cholesterol Influence on in Vivo Hepatic and Intestinal Cholesterol Biosynthesis in Rats
B.H. Arhmandi, J. Craig, and R.D. Reeves
J. Nutr. 122:159-165, 1992

91-365-J Protein Solubility, Water Retention, and Fat Binding of Corn Germ Protein Flour Compared with Milk Proteins
S.C. Hung and J.F. Zayas
J. Food Sci. 57(2):372-376, 1992

91-492-B A Comparison of Acceptability Scaling Methods for Use with Children
E.E. Spaeth, E. Chambers IV, and J.R. Schwenke
In: *Product Testing with Special Consumer Populations for Research Guidance*, L.S. Wu and A.D. Gelinas, eds., pp. 65-77, Am. Soc. Testing and Materials, Philadelphia, 1992

91-509-J Comparisons of Water Mobility Using ^{17}O Nuclear Magnetic Resonance for Four Sugars: Glucose, Maltose, Maltotriose, and Sucrose
H. Lim, C.S. Setser, and J.V. Paukstelis
Cereal Chem. 69:387-390, 1992

91-510-J ^{17}O Nuclear Magnetic Resonance Studies of Wheat Starch-Sucrose-Water Interactions with Increasing Temperature
H. Lim, C. Setser, J. Paukstelis, and D. Sobczynska
Cereal Chem. 69:382-386, 1992

91-533-J Flavor of Cooked, Ground Turkey Patties with Added Sodium Tripolyphosphate as Perceived by Sensory Panels with Differing Phosphate Sensitivity
E. Chambers IV, J.R. Bowers, and E.A. Smith
J. Food Sci. 57(2):521-523, 1992

91-540-J Functionality of Milk Proteins and Corn Germ Protein Flour in Comminuted Meat Products
S.C. Hung and J.F. Zayas
J. Food Qual. 15(2):139-152, 1992

91-579-J Comparative Study of Shelf Life of Frankfurters Containing Plant Protein Additives
C.R. Wang and J.F. Zayas
J. Food Qual. 15(1):211-224, 1992

92-49-J Sensory, Chemical, and Bacteriological Stability of Frankfurters
S.C. Hung and J.F. Zayas
J. Food Proc. Preserv. 15:413-431, 1992

92-98-J Food Choices of Young College Women Consuming Low or Moderate Calcium Diets
N.M. Lewis and M. Hollingsworth
Nutr. Res. 12:943-948, 1992

92-112-J Optimizing Texture of Reduced-Calorie Yellow Layer Cakes Using Response Surface Methodology
A.M. Frye and C.S. Setser
Cereal Chem. 69:338-343, 1992

92-117-J Consumer Acceptability of Cooked Stored Ground Turkey Patties with Differing Levels of Phosphate
L. Chambers, E. Chambers IV, amd J.R. Bowers
J. Food Sci. 57:1026-1028, 1992

92-136-J Replacement of Shortening by Maltodextrin-Emulsifier Combinations in Chocolate Layer Cakes
D. Sobczynska and C.S. Setser
Cereal Foods World 36(12):1017-1018, 1023-1026, 1991

92-191-J Flavor Characterization of Breads Made from Hard Red Winter Wheat and Hard White Winter Wheat
C.-Y. Chang and E. Chambers IV
Cereal Chem. 69(5):556-559, 1992

92-215-J Functionality of Wheat Germ Protein in Communited Meat Products as Compared with Corn Germ and Soy Proteins
R. Gnanasambandam and J.F. Zayas
J. Food Sci. 57:829-833, 1992

92-416-J Macromolecule Replacers in Food Products
C.S. Setser and W.L. Racette
Crit. Rev. Food Sci. and Nutr. 32:275-297, 1992

92-476-B Sensory Evaluation
C.S. Setser
In: *Advances in Baking Technology*, B. Kamel and C. Stauffer, eds., pp. 254-291, Blackie and Son Ltd., Bishopbriggs, Glasgow, UK, 1992

■ 17. Grain Science and Industry

88-136-A Determination of Ferulic Acid in Grain by HPLC and Microspectrofluoremetry
D.L. Wetzel, V. Pussayanawin, and R.G. Fulcher
In: *Frontier of Flavor*, Elsevier Science Publisher, 1990

88-567-J Thin-Boiling and Nongelling Adhesive Prepared from Maize and Wheat Starches
K.M. Chung and P.A. Seib
Starch/Starke 43(1):5441-5446, 1991

89-264-J A Technique for Separation of Wheat Germ by Impacting and Subsequent Grinding
E.S. Posner and Y.Z. Li
J. Cereal Sci. 13(1):49-70, 1991

89-269-J Poured Feed Blocks Using Distillery By-Products as Supplements for Ruminants
X. Zhu, C.W. Deyoe, K.C. Behnke, and P.A. Seib
J. Food Sci. and Agric. 54:535-547, 1991

89-337-J Mechanical Separation of a High Dietary Fiber Fraction from Wheat Bran
E.S. Posner
Cereal Foods World 36(7):553-556, 1991

89-394-J Moisture Adsorption of Bagged Grain under Tropical Conditions
P. Guritno, E. Haque, and D.S. Chung
Trans. Am. Soc. Agric. Eng. 34(5):2131-2134, 1991

89-434-J The Effect of Water-Extracted Solubles from Gluten on Its Baking and Rheological Properties
P.C. Dreese and R.C. Hoseney
Cereal Chem. 67:400-404, 1990

89-486-J Use of Fluorometry for the Determination of Uric Acid in Grain: Elimination of Interfering Fluorescence
W.M. Lamkin, N.C. Unruh, and Y. Pomeranz
Cereal Chem. 68(7):81, 1991

89-488-A Factors Affecting the Stickiness of Wheat Flour Doughs
R.C. Hoseney, D.E. Rogers, L. Krishnarau, and C.Z. Chen
In: Proc. Fifth Intl. Symp. on Pre-Harvest Sprouting in Cereals, K. Ringlund, E. Mosleth, and D.J. Mares, eds., pp. 338-343, Westview Press, Boulder, CO, 1990

89-514-J Nutritional Properties of Coarse and Fine Sugar Beet Fiber and Hard Red Wheat Bran. I. Effects on Rat Serum and Liver Lipids and Fecal Characteristics
C.F. Klopfenstein
Cereal Chem. 67:538-541, 1990

89-515-J Nutritional Properties of Coarse and Fine Sugar Beet Fiber and Hard Red Wheat Bran. II. Effects on Calcium and Iron Utilization
C.F. Klopfenstein
Cereal Chem. 67:542-544, 1990

90-28-B Sugar in Bakery Foods
J.G. Ponte, Jr.
In: *Sugar: A Sugar User's Guide to Sucrose*, N.L. Pennington and C.W. Baker, eds., pp. 130-151, Van Nostrand Reinhold, New York, 1990

90-40-J Pitfall Traps and Grain Samples as Indicators of Economically Important Insect Populations in Farm-Stored Wheat
C.R. Reed, V.F. Wright, T.W. Mize, J.R. Pedersen, and J. Brockschmidt Evans
J. Econ. Entomol. 84(4):1381-1387, 1991

90-41-B Wheat Gluten: Rheological and Gas-Retaining Properties
R.C. Hoseney
In: *Water Relationships in Foods*, H. Levine and L. Slade, eds., pp. 657-666, Plenum Press, N.Y., 1991

90-54-J Extruded Wild Bird Food
J.F. Keating, R.J. Robel, K.C. Behnke, and K.E. Kemp
Feed Manage. 42(1):18-24, 1991

90-65-J Bread Crumb Amylograph Studies. I. Effects of Storage Time, Shortening, Flour Lipids, and Surfactants
A. Xu, O.K. Chung, and J.G. Ponte, Jr.
Cereal Chem. 69(4):495-501, 1992

Publications of Station Scientists (Continued)

90-155-A Three-Roller Cereal Mill and Milling Using Triangular Roll Configuration
E. Haque
Trans. Am. Soc. Agric. Engin. 34(5):2104-2109, 1991

90-158-J A Comparison of Couscous Made from Hard White and Hard Red Winter Wheats
C.E. Lang and C.E. Walker
Assoc. Oper. Millers Bull. Apr.:6033-6037, 1992

90-216-J Oscillatory Rheometry of Starch-Water Systems: Effect of Starch Concentration and Temperature
L.M. Hansen, R.C. Hoseney, and J.M. Faubion
Cereal Chem. 68(4):347-351, 1991

90-220-J Glycine Derivatives as the Carbon Dioxide Source in Cake Formulations
J.A. Delcour, C. De Geest, K. Shelke, and R.C. Hoseney
Cereal Chem. 68(4):369-371, 1991

90-240-B Leaching of Amylose from Wheat and Corn Starch
Y.-C. Shi, P.A. Seib, and S.P.W. Lu
In: *Water Relationships in Foods*, H. Levine and L. Slade, eds., pp. 667-686, Plenum Press, New York, 1991

90-260-J Chromosomal Location of Genes Influencing Grain Protein Concentration and Mixogram Properties in the Hard Red Winter Wheat 'Plainsman V'
I.S. Stein, R.G. Sears, R.C. Hoseney, T.S. Cox, and B.S. Gill
Crop Sci. 32:573-580, 1992

90-261-J Heterogeneity of the Wichita Wheat Monosomic Set for Grain Protein Concentration and Mixogram Properties
I.S. Stein, R.G. Sears, B.S. Gill, R.C. Hoseney, and T.S. Cox
Crop Sci. 32:581-584, 1992

90-298-J The Dynamics of Cake Baking as Studied by a Combination of Viscometry and Electrical Resistance Oven Heating
K. Shelke, J.M. Faubion, and R.C. Hoseney
Cereal Chem. 67(6):575-580, 1990

90-318-J Physico-Chemical and Functional Properties of Rye Non-Starch Polysaccharides. Part II. The Impact of a Fraction Containing Water-Soluble Pentosans and Proteins on Gluten-Starch Loaf Volumes
J.A. Delcour, S. Vanhamel, and R.C. Hoseney
Cereal Chem. 67:72-76, 1991

90-347-D The Mixograph: A Historical Perspective and Promising Future
M.D. Shogren and C.E. Walker
Grain Sci. Dept. Rep., pp. 1-12, 1990
(available from dept. only)

90-363-J Gas Retention of Different Cereal Flours
H. He and R.C. Hoseney
Cereal Chem. 68(4):334-336, 1991

90-364-J A Critical Look at the Electric Resistance Oven
H. He and R.C. Hoseney
Cereal Chem. 68:151-154, 1991

90-369-J Changes in Bread Firmness and Moisture during Long-Term Storage
H. He and R.C. Hoseney
Cereal Chem. 67:603-605, 1990

90-373-B Physical Properties of Cereal Grains
R.C. Hoseney and J.M. Faubion
In: *Storage of Cereal Grains and Their Products*, D.B. Sauer, ed., pp. 1-38, Am. Assoc. Cereal Chem., St. Paul, MN, 1992

90-410-J High Molecular Weight Genes: Effects on Baking Quality in Wheat
H. Dong, T.S. Cox, R.G. Sears, and G.L. Lookhart
Crop Sci. 31:974-979, 1991

90-420-J Review of the Significance of Starch and Protein to Kernel Hardness
F.M. Anjum and C.E. Walker
J. Food Sci. Agric. 56:1-13, 1991

90-462-J Modeling the Milling of Hard Red Winter Wheat: I. Estimation of Cumulative Ash and Protein Recovery
R.A. Flores, E.S. Posner, G.A. Milliken, and C.W. Deyoe
Trans. Am. Soc. Agric. Engin. 34(5):2117-2122, 1991

90-466-J Isolation of Gluten and Starch from Ground Pearled Wheat Compared to Isolation from Flour
O. Zhuge, J.N. Persaud, E.S. Posner, C.W. Deyoe, P.A. Seib, and D.S. Chung
Cereal Chem. 68(4):336-339, 1991

90-468-J Evaluation of a Laboratory Dockage Removal Device
R.A. Flores, E.S. Posner, and C.W. Deyoe
Cereal Foods World 36(6):513-516, 1991

90-487-J Relationships between Protein Composition and End-Use Quality Characteristics in Wheat (*Triticum aestivum*)
H. Dong, R.G. Sears, T.S. Cox, R.C. Hoseney, G.L. Lookhart, and M.D Shogren
Cereal Chem. 69:132-136, 1992

90-491-J Studies of the Breakdown and Reformation of SDS Insoluble Glutenin Proteins with Dough Mixing and Resting
G.I.J. Wang, J.M. Faubion, and R.C. Hoseney
Lebensm.-Wiss. Technol 25:228-231, 1992

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31:1386, 1991

90-579-J Sodium Tryipolyphosphate and Sodium Ascorbate Monophosphate Salts as Inhibitors of Off-Flavor Development in Cooked, Vacuum-Packaged, Frozen Turkey
J. Craig, J.A. Bowers, and P. Seib
J. Food Sci. 56(6):1529-1531, 1561, 1991

90-580-J Semi-Wet Milling of Pearl Millet for Reduced Goitrogenicity
C.F. Klopfenstein, H.W. Leipold, and C.E. Cecil
Cereal Chem. 68:177-179, 1991

90-591-J A Mechanism of Bread Firming I. Role of Starch Swelling
M.L. Martin, K.J. Zeleznak, and R.C. Hoseney
Cereal Chem. 68(5):498-503, 1991

90-592-J A Mechanism of Bread Firming II. Role of Starch Hydrolyzing Enzymes
M.L. Martin and R.C. Hoseney
Cereal Chem. 68(5):503-507, 1991

90-593-J Gas Retention in Bread Dough during Baking
H.He and R.C. Hoseney
Cereal Chem. 68(5):521-525, 1991

90-594-J Differences in Gas Retention, Protein Solubility, and Rheological Properties between Flours of Different Baking Quality
H. He and R.C. Hoseney
Cereal Chem. 68(5):526-530, 1991

90-595-J Differences between Flours in the Rate of Wheat Protein Solubility
H. He, G. Feng, and R.C. Hoseney
Cereal Chem. 68(5):641-644, 1991

91-2-A Gluten, A Theory of How It Controls Bread Making Quality
H.He and R.C. Hoseney
In: *Gluten Proteins*, W. Bushuk and R. Trachuk, eds., pp. 1-10, Am. Assoc. Cereal Chem., St. Paul, MN, 1991

91-21-J Effects of Sugars and Emulsifiers on Starch Pasting Properties in the Rapid Visco-Analyzer
C.S. Kim and C.E. Walker
Cereal Chem. 69(2):212-217, 1992

91-23-J Interactions between Starches, Sugars, and Emulsifiers in High-Ratio Cake Model Systems
C.S. Kim and C.E. Walker
Cereal Chem. 69(2):206-212, 1992

91-44-D Impact of Changes in U.S. Grain Standards on Discounts for Insects in Stored Grain
R. Fleming, B. Schurle, S. Duncan, and C. Reed
Agric. Econ. Dept. Rep. (Staff Pap. 91-5), pp. 1-13, 1990
(available from dept. only)

91-107-J The Effect of Fiber on Dough Rheology
C.E. Lang, K.J. Neufeld, and C.E. Walker
Amer. Inst. Baking Bull. 12(11):1-6, 1991

91-111-S Final Report of the Wheat Quality Council 1989
Kans. Agric. Exp. Stn. Rep. Prog. 607:1-162, 1990

91-115-A Physico-Chemical Properties of Complex Systems
R.C. Hoseney
In: *Interaction of Cereal Components and Their Implications for the Future*, R. Lasztity and R.C. Hoseney, eds., Tech. Univ., Budapest, Hungary, 1990

91-121-J Comparison of Alternative Recording Mechanisms (Mobile vs. Fixed Bowl) for the 35g and 10g Mixographs
A.R. Wooding and C.E. Walker
Cereal Chem. 69(3):249-253, 1992

91-133-J Effect of Nonchaotropic Salts on Flour Breadmaking Properties
H. He and R.C. Hoseney
Cereal Chem. 69(4):366-370, 1992

91-134-J Factors Controlling the Gas Retention in Nonheated Doughs
H. He and R.C. Hoseney
Cereal Chem. 69(1):1-6, 1992

91-149-J Evaluating the Quality of Experimental Wheat Varieties
S. Curran
Assoc. Oper. Millers Bull. April:5851-5854, 1991

91-153-C Practicum in Multivariate Techniques for Quantitative Spectroscopic Analysis
D.L. Wetzel and A.J. Eilert
Counc. for Near Infrared Spectroscopy Bull. 1:112, 1991

91-156-J Wheat and Flour Ash as a Measure for Millability
E.S. Posner
Cereal Foods World 36(8):626-629, 1991

91-158-J Age Related Changes in the Cake-Baking Quality of Flour Milled from Freshly Harvested Soft Wheat
K. Shelke, R.C. Hoseney, J.M. Faubion, and S.P. Curran
Cereal Chem. 69(2):141-144, 1992

91-196-J Bread Crumb Amylograph Studies, II. The Cause of Unique Properties
A. Xu, J.G. Ponte, Jr., and O.K. Chung
Cereal Chem. 69(4):502-507, 1992

91-209-J Application of Size Reduction Theory to Roller Mill Design and Operation
E. Haque
Cereal Foods World 36(4):368-375, 1991

91-232-A Overview of Derivatives of L-Ascorbic Acid
W.Y. Wang and P.A. Seib
Proc. Symp. Ascorbic Acid in Domestic Animals, C. Wenk, R. Fenster, and L. Volker, eds., pp. 469-492, Inst. fur Naturwissenshaften, Zurich, Switzerland, 1991

91-242-J Age-Related Changes in Properties of Batters Made with Flour Milled from Freshly Harvested Soft Wheat
K. Shelke, R.C. Hoseney, J.M. Faubion, and S.P. Curran
Cereal Chem. 69(2):145-147, 1992

91-271-J Effect of Starch Granule Protein on Wheat Hardness (Endosperm Tensile Strength)
R.M. Malouf, W.D.A. Lin, and R.C. Hoseney
Cereal Chem. 69(2):169-173, 1992

91-272-J A Method to Measure Wheat Hardness (Endosperm Tensile Strength) Using Tablets Made from Flour
R.B. Malouf and R.C. Hoseney
Cereal Chem. 69(2):164-168, 1992

91-291-J Identification of Moroccan Common and Durum Wheats by Reversed-Phase High Performance Liquid Chromatography and Electrophoretic Procedures
M. Bakhella, G.L. Lookhart, and R.C. Hoseney
Actes Inst. Agron. Vet. (France) 11(2):5-19, 1991

91-299-J Granular Cold Water-Soluble Starches Prepared at Atmospheric Pressure
S. Rajagopalan and P.A. Seib
J. Cereal Sci. 16:13-28, 1992

91-322-J Effect of the Protein Quantity of Wheat Flour on Bread Loaf Volume
H. He and R.C. Hoseney
Cereal Chem. 69(1):17-19, 1992

91-344-J Synthesis of D-Erythroascorbic Acid from D-Glucose
L.-X. Gan and P.A. Seib
J. Carbohydrate Res. 220:117-125, 1991

91-434-J Comparison of the Cholesterol-Lowering Properties of Milled Fractions of Oats, Barley, and Wheat
R.K. Newman, C.F. Klopfenstein, C.W. Newman, N. Guritno, and P.J. Hofer
Cereal Chem. 69(3):240-243, 1992

91-454-J 2-Phosphorylation of D-Erythorbic Acid
H. Yang and P.A. Seib
J. Carbohydrate Chem. 11(4):485-498, 1992

91-500-J Properties of Granular Cold Water-Soluble (GCWS) Starches Prepared at Atmospheric Pressure
S. Rajagopalan and P.A. Seib
J. Cereal Sci. 16:29-40, 1992

91-501-J Air Impingement Drying and Toasting of Ready-to-Eat Cereals
C.E. Walker
Cereal Foods World 36(10):871-877, 1991

91-520-A Physical Chemistry of Bread Dough
R.C. Hoseney
Proc. IFT Basic Symp., *Physical Chemistry of Foods*, H.G. Schwartzberg and R.W. Hartel, eds., pp. 443-457, Marcel Dekker, NY, 1992

91-523-J Origin of Color in Vital Wheat Gluten
W. Kim, P.A. Seib, and O.K. Chung
Cereal Foods World 11(36):954-959, 1991

91-542-J Isolation of Oat Starch from Oat Flour
W.J. Lim, Y.T. Liang, P.A. Seib, and C.S. Rao
Cereal Chem. 69(3):233-236, 1992

91-543-J Cationic Oat Starch: Preparation and Effect on Paper Strength
W.J. Lim, Y.T. Liang, and P.A. Seib
Cereal Chem. 69(3):237-239, 1992

91-546-A Chinese Steamed Bread - Effect of Flour and Processing
J.G. Ponte, Jr. and R. Lu
Proc. ICC Symp. Cereal Based Foods: New Developments, p. 26, Prague, 1991

91-550-B Insects: Identification, Damage, and Detection
J.R. Pedersen
Am. Assoc. Cereal Chem. In: *Storage of Cereal Grains and Their Products*, D.B. Sauer, ed., Am. Assoc. Cereal Chem. St. Paul, MN, 1992

92-16-J The Structure of Four Waxy Starches Related to Gelatinization and Retrogradation
Y.-C. Shi and P.A. Seib
Carbohydrate Res. 227:131-145, 1992

92-33-B Yeast-Raised Products
J.G. Ponte, Jr. and J. Payne
In: *Kirk-Othmer Encyclopedia of Chemical Technology Vol. 3*, pp. 876-892, Wiley Publishing Co., NY, 1992

92-135-J Study and Assessment of a Computer Simulation Model for the Flour Milling Industry
M.C. Liu, R.A. Flores, C.W. Deyoe, and E.S. Posner
Cereal Foods World 37(8):649-654, 1992

92-159-A Firming of Bread Crumb - A New Concept
R.C. Hoseney, M.L. Martin, and H. He
In: *Cereal International*, D.J. Martin and C.W. Wrigley, eds., pp. 99-106, Royal Aust. Chem. Inst., 1991

92-167-J Firming of Bread Crumb with Cross-Linked Waxy Barley Starch Substituted for Wheat Starch
T. Inagaki and P.A. Seib
J. Cereal Sci. 69(3):321-325, 1992

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-197-J Brain Mapping by FT-IR Microspectroscopy
D.L. Wetzel and S.M. LeVine
Proc. Soc. Photo-Optical Instr. Engin.-Int. Soc. Opt. Engin. 1575:435, 1992

92-198-J Quantitative FT-NIR of Thermochemical Properties of Industrial Organic Fluids
D.L. Wetzel and A.J. Eilert
Proc. Soc. Photo-Optical Instr. Engin.-Int. Soc. Opt. Engin. 1575:523, 1992

92-258-S Final Report of the Wheat Quality Council, 1990
Kans. Agric. Exp. Stn. Rep. Prog. 645:1-150, 1991

92-410-S Milling and Baking Test Results for Hard Winter Wheats Harvested in 1991
Kans. Agric. Exp. Stn. Rep. Prog. 652:1-56, 1992

92-510-J Location of Amylose in Normal Starch Granules. I. Susceptibility of Amylose and Amylopectin to Cross-Linking Reagents
J. Jane, A. Xu, M. Radosavljevic, and P.A. Seib
Cereal Chem. 69(4):405-408, 1992

92-626-C Stepwise Statistical Wavelength Selection for Near-Infrared Analytical Methods Development
D.L. Wetzel and A.J. Eilert
Counc. for Near-Infrared Spectroscopy Bull. 2:23, 1992

92-629-J Pilot Flour Mill Profile of Bran Carryover by Ferulic Acid HPLC Determination
D.L. Wetzel and V. Pussayanawin
Assoc. Oper. Millers Bull. 5:5451, 1992

92-630-A Composition Profile of Grain Thin Sections by Fourier Transform Infrared Microspectroscopy
D.L. Wetzel and J.A. Reffner
In: Proc. Intl. Cereal Chem. Conf., R. Lasztity, ed., p. 41, ICC and Technical University of Budapest, Hungary, 1992

Misc. Study Guide for Videotape of Cereal Science 602
D. Rogers
Continuing Education, Kansas State University, 1990

■ 18. Horticulture, Forestry, and Recreation Resources

87-443-J Heat-Induced, Reversible and Irreversible Alterations in the Structure of *Phaseolus vulgaris* Thylakoid Proteins
K. Al-Khatib and S.C. Wiest
J. Therm. Biol. 15:239-244, 1990

89-173-B Eastern Black Walnut: Potential for Commercial Nut-Producing Cultivars
W. Reid
In: *New Crops: Research, Development, Economics*, J. Janick and J.E. Simon, eds., pp. 327-331, Timber Press, Portland, OR, 1990

89-190-A Equipment for the Small Vegetable Grower to Grow and Pack Produce
C.W. Marr
Proc. Oklahoma Hort. Ind. Conf. 8:108-111, 1990

89-416-J Comparative Growth of Agroforestry Trees in Midhill Region of Himachal Pradesh, Inida
G.K. Sharma and W.A. Geyer
Intl. Tree Crops J. 6:101-112, 1990

90-10-J The Use of Windbreaks by Hunters
T.T. Cable and Philip S. Cook
J. Soil and Water Cons. 45(3):575-577, 1990

90-71-J The Economic Value of Windbreaks for Hunting
P.S. Cook and T.T. Cable
Wildlife Soc. Bull. 18(2):337-342, 1990

90-111-J Clinoptilolitic Geolite as an Amendment for Establishment of Creeping Bentgrass on Sandy Media
J. Nus and S. Brauen
HortScience 26(2):117-119, 1991

90-125-J Daylength, Cold Storage, and Plant-Production Method Influence on Growth and Flowering of *Asclepias tuberosa*
M.L. Albrecht and J.T. Lehmann
HortScience 36(2):120-122, 1991

90-138-J Germination and Establishment of *Echinacea* spp. (Asteraceae)
M.L. Albrecht and C. Smith-Jochum
J. Natl. Wildflower Res. Ctr. 3(2):6-11, 1990

90-177-B Wildlife and Windbreaks
T.T. Cable
In: *Wildlife in Managed Landscapes*, J.E. Rodiek, ed., pp. 33-55, Island Press, 1990

90-187-T Pollen Competition in Muskmelon and Effects on Seed and Fruit Vigor
C.D. Clayberg
Cucurbit Genet. Coop. 14:63-65, 1991

90-242-J Plastic Mulches to Establish Seedling Asparagus Transplants
C.W. Marr and W.J. Lamont, Jr.
HortScience 25(12):1661, 1990

90-252-J In Vitro Morphogenesis Derived from Leaf Callus Tissue of 'Tiffany' Rose
M.B. Arif and H. Khatamian
HortScience 25(9):1085, 1990

90-295-J Variation in the Hexane-Extracted Oils of Three *Echinacea* Species
C.C. Smith-Jochum and L.C. Davis
Trans. Kans. Acad. Sci. 94(1-2):12-21, 1991

90-315-J A Planting Template for Plug Flats
C.W. Marr
HortTechnology 1(1):120-121, 1991

90-351-A Pumpkin Diseases
C.W. Marr and N. Tisserat
Proc. Nebraska Fruit and Vegetable Growers Conf., Univ. of Nebraska Spec. Pub. pp. 27-36, 1990

90-352-A Organic Vegetable Production
C.W. Marr
Proc. Nebraska Fruit and Vegetable Growers Conf., Univ. of Nebraska Spec. Pub. pp. 1-9, 1990

90-353-A Sweetcorn Earworm
C.W. Marr, B. Bauernfeind, and M. Allison
Proc. Nebraska Fruit and Vegetable Growers Conf., Univ. of Nebraska Spec. Pub. pp. 30-35, 1990

90-386-J American Elm Site-Index Growth Curves
W.A. Geyer and K.D. Lynch
Trans. Kans. Acad. Sci. 93(3-4):113-117, 1990

90-467-J Preplant Incorporation of Nitrogen Fertilizer to Spring- and Fall-Planted Bareroot Scotch Pine
D.L. Hensley and E.G. Aldridge
Sci. Hort. 45:175-180, 1990

90-507-J Response of Seedling and Mature Creeping Bentgrass to Low Levels of Atrazine Supplied in Daily Irrigation Water
J.L. Nus and M.A. Sandburg
HortScience 26(4):392-394, 1991

90-549-A The Nonagricultural Benefits of Windbreaks
T.T. Cable and P.S. Cook
Proc. 1990 Great Plains Agric. Counc. pp. 70-77, 1990

90-551-J Tolerance of Tree Seeds to Combinations of Preemergent Herbicides
W.A. Geyer and C.E. Long
J. Envir. Hort. 9:44-46, 1991

90-575-J 'Wichita' Osage Orange
J.C. Pair
Am. Nurseryman 174(8):146, 1991

90-578-J Fertilization of 'Angelika Red' Poinsettia Using Commercially Prepared Formulations
M.L. Albrecht, J.T. Lehmann, and D.M. Crockett
HortScience 27(1):79, 1992

91-53-T Effects of Time-Release Fertilizers and Growing Media on Growth of *Acer* and *Euonymus* in Containers
H. Khatamian and J.C. Pair
Am. Nurseryman 173:93, 1991

91-98-J 'Norton' and 'Cynthiana' - Premium Native Wine Grapes
J.M. Tarara and E.W. Hellman
Fruit Var. J. 45(2):66-69, 1991

91-99-J Overcoming a Teaching Obstacle: Simplified, Inexpensive, and Rapid Slide Duplication
J.L. Nus
HortScience 26(4):423, 1991

91-119-A Developing Low-Input Management Strategies for Native Pecan Orchards
W.Reid and R.D. Eikenbary
Proc. First Nat. Pecan Workers Workshop, B.W. Wood, and J.A. Payne, eds., USDA Misc. Pub. ARS-96, pp. 69-76, 1991

91-139-T Reactions by Consumers in a Farmers' Market to Prices for Seedless Watermelon and Ratings of Eating Quality
C. Marr and K.L.B. Gast
HortTechnology 1(1):105-106, 1991

91-155-J Characterization of Heat Injury in Grapes Using ^{1}H NMR Methods: Changes in Transverse Relaxation Times
M. Abass and C.B. Rajashekar
Plant Physiol. 96:957-961, 1992

91-164-T Management Information Systems: A Requirement for Today's Grower/Manager
A. Stevens, K. Litzenberg, and D. Reed
Greenhouse Manager 9(9):80-84, 1991

91-184-J Row Covers Improve Seedless Watermelon Yields in an Intensive Vegetable Production System
C.W. Marr, W.J. Lamont, Jr., and M. Allison
HortTechnology 1(1):103-104, 1991

91-229-J In Vitro Propagation of 'Petite Folie' Miniature Rose
M. Arif and H. Khatamian
Trans. Kans. Acad. Sci. 94:116-124, 1991

91-235-S Evaluation of Woody Ornamentals for Kansas
Kans. Agric. Exp. Stn. Rep. Prog. 615:1-33, 1991

91-237-J Abscisic Acid Accumulation during Heat Acclimation of Grapes
M. Abass and C.B. Rajashekar
HortScience 27:742-744, 1992

91-279-A Evaluation of Fungicides for Control of Spring Dead Spot of Bermudagrass, 1990
N.A. Tisserat, J. Pair, and A. Nus
Fungicide and Nematicide Tests 46:306, 1991

91-301-A The Use of Drip Irrigation Systems for Vegetable Production
W.J. Lamont, Jr.
Proc. Intl. Workshop on Vegetable Production through the Use of Fertilizer, Mulching, and Irrigation Systems, pp. 1-13, 1991

91-302-A The Use of Plastic Mulches for Vegetable Production
W.J. Lamont, Jr.
Proc. Intl. Workshop on Vegetable Production through the Use of Fertilizer, Mulching, and Irrigation Systems, pp. 14-27, 1991

91-307-A Fertigation of Vegetable Crops
W.J. Lamont, Jr.
Proc. Nebraska Fruit and Vegetable Growers Conf., pp. 3-13, 1991

91-333-J Using Legumes Alone and in Combination with Manure as Fertilizers in an Intensive Muskmelon Production System
W. Singogo, W.J. Lamont, Jr., and C.W. Marr
HortScience 26(1):1431, 1991

91-334-J Black Walnut Provenance Performance in Kansas
D.F. Bresnan, W.A. Geyer, G.R. Rink, and D.D. Lynch
N. J. Appl. Forestry 9:1-3, 1992

91-362-A Agroforestry in the Midhill Region of Himachal Pradesh, India
W.A. Geyer, G.K. Sharma, and S.K. Sharma
Proc. 3rd Intl. Windbreak and Agroforestry Symp., pp. 206-208, 1991

91-388-E Retaining Master Gardener Volunteers
L. Stouse and C. Marr
HortTechnology 2(2):244-245, 1992

91-395-T Fertilizers Work with Plasticulture
W.J. Lamont, Jr.
Am. Veg. Grower 39(5):57-61, 1991

91-402-A Coppice Response to Cut Stump Height of Three Hardwood Tree Species
W.A. Geyer and D.F. Bresnan
Proc. 9th Eur. Conf. for Energy, Ind., and Envir., pp. 207-211, 1991

91-403-S 1990 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 625:1-28, 1991

91-405-J Evaluation of Ten Ornamental Trees for Kansas
D.L. Hensley, S.C. Wiest, C.E. Long, J.C. Pair, and F.D. Gibbons III
J. Envir. Hort. 9(3):149-155, 1991

91-414-T Looking for Shorter Crop Time? Think Pink Film
M.L. Albrecht
Greenhouse Growers Mag. 9(4):71-72, 1991

91-418-J Evaluation of Trees for the Central Plains
D. Hensley, S. Wiest, C. Long, J. Robbins, J. Pair, and A. Schlegel
J. Arboricult. 18:49-55, 1992

91-432-S A Profile of Kansas Hunters
Kans. Agric. Exp. Stn. Rep. Prog. 626:1-14, 1991

91-433-T Drip Irrigation—Part of a Complete Vegetable Production Package
W.J. Lamont, Jr.
Irrig. J. 41(4):10-15, 1991

91-450-J The Precocity of Selected Northern Pecan Cultivars
W. Reid
Fruit Var. J. 46:111-114, 1992

91-473-A Using Plastic Mulch, Drip Irrigation, and Legumes and Winter Wheat Alone or in Combination with Manure for the Production of Muskmelons
W.J. Lamont, Jr., W. Singogo, and C.W. Marr
Proc. 23rd Cong. Am. Soc. Plasticulture, pp. 161-164, 1991

91-474-S 1990 Bedding Plant Field Trials
Kans. Agric. Exp. Stn. Rep. Prog. 631:1-41, 1991

91-512-A Low-Input Management Systems for Native Pecans
W.R. Reid
Proc. 2nd Conf. on Agroforestry in N. Am., G.E. Garrett, ed., pp. 140-150, 1991

91-516-A Characteristics and Uses of Black Locust for Energy
W.A. Geyer and D.F. Bresnan
Proc. Int. Conf. on Black Locust, pp. 221-236, 1991

91-519-S 1991 Turfgrass Research
Kans. Agric. Exp. Stn. Rep. Prog. 633:1-47, 1991

91-524-A Effects of Aging on the Optical Properties of Plastic Mulches
G.J. Kluitenberg, J.M. Ham, and W.J. Lamont, Jr.
Proc. 23rd Cong. Am. Soc. Plasticulture, pp. 149-154, 1991

Publications of Station Scientists (Continued)

91-529-A Benefits of Selective Thinning in Native Pecan Groves
W.R. Reid
Proc. Oklahoma Pecan Growers Assoc. 61:30-32, 1991

91-532-A Potential Impact of Plastic Mulches on the Aboveground Plant Environment
J.M. Ham, G.J. Kluitenberg, and W.J. Lamont, Jr.
Proc. 23rd Cong. Am. Soc. Plasticulture, pp. 63-69, 1991

92-6-S 1991 Woody Ornamental Evaluations
Kans. Agric. Exp. Stn. Rep. Prog. 636:1-33, 1991

92-8-A How to Develop an On-Farm Extension Demonstration of Drip Irrigation Systems
W.J. Lamont, Jr.
Proc. Drip Irrig. of Vegetable Crops Short Course, ASHS Ann. Meeting, pp. 74-88, 1991

92-124-T Greenhouse Strawberries and Tomatoes Hit Niche Markets
W.J. Lamont, Jr.
Am. Veg. Grower 39(12):23,33, 1991

92-151-T Color Your World with Bulbs
D. Hensley
Nursery Manager 7(10):73-74, 1991

92-152-T Choosing the Right Name: Logo for Your Company
D. Hensley and J. Rathlef
Nursery Manager 7(9):97-98, 1991

92-153-T A Summary of Ornamental Trials in Kansas
D. Hensley, C. Long, S. Wiest, J. Robbins, and J. Pair
Nursery Manager 8(3):84, 86, 92, 1992

92-154-T Employee Theft: An Avoidable Problem
D. Lehmann and D. Hensley
N. Turf Manag. 2(8):37-38, 40, 1991

92-155-T Hydrogels
D. Hensley
N. Turf Manag. 2(9):8-9, 30, 1991

92-156-T Easy Money, Tough Sell
D. Hensley
N. Turf Manag. 2(9):6-7, 1991

92-157-T Trailer-Mounted Filter Units Make Drip Irrigation Mobile
W.J. Lamont, Jr.
Irrig. J. 41(7):12, 23, 33, 1991

92-190-J Effects of Uniconazole, Paclobutrazol, and Flurprimidol on the Control of Young Apple Tree Growth
T.E. Numbere, F.D. Morrison, and R.W. Campbell
Plant Growth Regul. Soc. Am. Quart. 20(2):65-75, 1992

92-223-A Drip Irrigation for Plasticulture Strawberry Production
W.J. Lamont, Jr.
Proc. 21st Ann. Conf. N.C. Strawberry Assoc., pp. 2-7, 1991

92-228-D Pecan Harvest Tour 1991
W.R. Reid
Hort. and Forestry Dept. Rep., pp. 1-15, 1991
(available from dept. only)

92-229-A Potential for Greenhouse Strawberry Production
W.J. Lamont, Jr.
Proc. 21st Ann. Conf. N.C. Strawberry Assoc., pp. 7-10, 1991

92-240-J Introduction to Drip Irrigation of Vegetable Crops and the Short Course
W.J. Lamont, Jr.
HortTechnology 2(1):24-25, 1992

92-266-S 1991 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 646:1-43, 1991

92-289-A Advantages of Drip Irrigation and Fertigation
W.J. Lamont, Jr.
Proc. Pennsylvania Vegetable Conf. and Trade Show, pp. 39-43, 1992

92-297-A Successful Melon Production
W.J. Lamont, Jr.
Proc. Pennsylvania Vegetable Conf. and Trade Show, pp. 47-50, 1992

92-300-J Heritability and Expected Gain Estimates for Traits of Scotch Pine Christmas Tree Sources
K.E. Diebel, W.A. Geyer, and K.D. Lynch
W. J. Appl. Forestry 7:82-85, 1992

92-311-E Recommended Vegetable Varieties for Kansas
C.W. Marr, W.J. Lamont, Jr., C.D. Clayberg, and M. Allison
Kans. Coop. Ext. Serv. Leaflet L-41 (Revised), pp. 1-4, 1992

92-312-E Fertigation of Vegetable Crops
C.W. Marr and W.J. Lamont, Jr.
Kans. Coop. Ext. Serv. Production Guide, pp. 1-4, 1992

92-352-T Profits, Profits, Profits—Three Good Reasons to Try Triple Cropping
C.W. Marr and W.J. Lamont, Jr.
Am. Veg. Grower 40(2):18, 20, 1992

92-349-A Improving Melon Production by Using Trickle Irrigation and Plastic Mulch
W.J. Lamont, Jr.
Proc. SE Mich. Melon School, pp. 1-9, 1992

92-395-J Wildlife Species Richness in Shelterbelts: Test of a Habitat Model
R.L. Schroeder, T.T. Cable, and S.L. Haire
Wildlife Soc. Bull. 20(3):264-273, 1992

92-396-J The Use of Kansas Windbreaks by Breeding Birds
T.T. Cable, R.L. Schroeder, V. Brack, Jr., and P.S. Cook
The Prairie Nat. 24(3):175-184, 1992

92-448-A Resistance of Perennial Ryegrass Cultivars and Selections to Pink Snow Mold, 1991
J. Pair and N. Tisserat
Biol. and Cult. Tests 7:112, 1992

92-449-A Reaction of Bermudagrass Selections to Spring Dead Spot, 1989-1991
N.A. Tisseerat and J. Pair
Biol. and Cult. Tests 7:106, 1992

92-450-A Control of Powdery Mildew of Pumpkin with Fungicide Sprays, 1991
C. Marr, N. Tisserat, and T. Schaplowsky
Fungicide and Nematicide Tests 47:123, 1992

92-537-A Program of Participatory Research/On-Farm Demonstration of Intensive Vegetable Production Systems
W.J. Lamont, Jr.
Natl. Conf. Participatory On-Farm Res. and Educ. for Agric. Sust., pp. 227-228, 1992

92-548-S 1991 Bedding Plant Field Trials
Kans. Agric. Exp. Stn. Rep. Prog. 656:1-30, 1992

92-564-T Breaking into Windbreaks
W.J. Lamont, Jr.
Am. Veg. Growers Mag. 40(9):20-23, 1992

92-605-S 1992 Turfgrass Research
Kans. Agric. Exp. Stn. Rep. Prog. 661:1-43, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

Misc. *81st Annual Report of the Northern Nut Growers Association*
W.R. Reid (editor)
Northern Nut Growers Association, 145 pp., 1990

82nd Annual Report of the Northern Nut Growers Association
W.R. Reid (editor)
Northern Nut Growers Association, 193 pp., 1991

19. Hotel, Restaurant, Institution Management and Dietetics

88-586-J Labor Utilization in School Foodservice Systems
M.F. Nettles, C.G. Partlow, and M.C. Spears
School Food Serv. Res. Rev. 14:108-113, 1990

92-370-J The National School Lunch Program: Factors Influencing Participation
S. Morcos and M. Spears
School Food Serv. Res. Rev. 16(1):11-22, 1992

20. Human Development and Family Studies

87-296-J Self-Concept as a Factor in the Quality of Diets of Adolescent Girls
G.K. Newell, C.L. Hammig, A.P. Jurich, and D.E. Johnson
Adolescence 25:117-130, 1990

87-414-J Health Practices of Rural Adult Women in Kansas
C.A. Holcomb
Kans. Assoc. Health, Phys. Educ., Rec. and Dance J. 60(1):29-35, 1991

88-132-J Young Adults' Preferences for Premarital Preparation Program Design: An Exploratory Study
B. Silliman, W.R. Schumm, and A.P. Jurich
Cont. Family Therapy 14(1):89-100, 1992

88-408-J Family Satisfaction in Korean/American Marriages: An Exploratory Study of the Perceptions of Korean Wives
G.J. Jeong and W.R. Schumm
J. Comp. Family Stud. 21:325-336, 1990

90-345-J Mobility Effect Models: Comment on Glenn, McRae, and Brody
W.R. Schumm, G.H. Milliken, A.P. Jurich, S.R. Bollman, G.J. Jeong, and D.P. Hawkinson
Social Forces 69:617-620, 1990

91-135-J Factorial Validity of Brief Satisfaction Scales in Surveys of Mormon, Roman Catholic, and Protestant Fathers
K.R. Canfield, W.R. Schumm, J.J. Swihart, and E.E. Eggerichs
Psychol. Rep. 67:1319-1322, 1990

91-166-S Economic and Emotional Well-Being of Rural Families in Kansas
Kans. Agric. Exp. Stn. Rep. Prog. 609:1-13, 1990

92-149-S Attitudes Regarding Threatened and Endangered Wildlife
Kans. Agric. Exp. Stn. Rep. Prog. 638:1-10, 1992

21. Laboratory Medicine

88-348-J Use of Multiple Antigen Substrates to Detect Antinuclear Antibody in Canine Sera
D.S. McVey and W. Shuman
Vet. Immunol. Immunopath. 28:37-43, 1991

89-413-J Experimental *Pasteurella haemolytica* Pneumonia: Clinical and Pathological Studies
J.G. Vestweber, R.D. Klemm, H.W. Leipold, D.E. Johnson, and W.E. Bailie
Am. J. Vet. Res. 151:1792-1799, 1990

90-82-J Efficacy of Pryantel Pamoate against Ascarids and Hookworms in Cats
R.K. Ridley, K.S. TerHune, and D.E. Granstrom
Vet. Res. Comm. 15:37-44, 1991

90-108-J Efficacy of Denagard Soluble against Experimentally Induced *Streptococcus suis* Type-2 Infection in Swine
M.M. Chengappa, L.W. Pace, J.A. Williams, C.H. Herren, and S.E. Ascher
J. Am. Vet. Med. Assoc. 197:1467-1470, 1990

90-231-J Antigenic Variations in Bovine Viral Diarrhea Viruses Detected by Monoclonal Antibodies
W. Xue, F. Blecha, and H.C. Minocha
J. Clin. Microbiol. 28(8):1688-1693, 1990

90-254-J Antiidiotypic Antibodies to Bovine Herpesvirus-1 Inhibit Virus Infection in Cell Cultures
O.Y. Abdelmagid, D.J. Orten, W. Xue, F. Blecha, and H.C. Minocha
Arch. Virol. 122:163-173, 1992

90-321-J Diagnosis of Bovine Viral Diarrhea Virus Infection Using Monoclonal Antibodies
M.L. Vickers and H.C. Minocha
J. Diag. Invest. 2:300-302, 1990

90-404-J In Vitro Inhibition of 5-Lipoxygenase Metabolite (LTB_4) in Bovine Mononuclear Cells by Bovine Viral Diarrhea Virus
D. Atluru, S. Gudapaty, W. Xue, F. Gurria, M.M. Chengappa, D.S. McVey, H.C. Minocha, and S. Atluru
Clin. Immunol. Immunopath. 31:49-59, 1992

90-414-J A Rapid Method for DNA Extraction Applied to an Acid-Fat and Five Gram-Negative Bacteria
D.L. Troyer, A. Reed, D. Oberst, and M.M. Chengappa
Vet. Res. Comm. 14:447-451, 1990

90-498-J Induction of Immune Response to Bovine Herpesvirus-1 with Anti-Idiotypic Antibodies
D.J. Orten, H.C. Minocha, F. Blecha, and P.G. Reddy
Virol. Immunol. 4(2):111-122, 1991

90-503-J Bovine Cell Lines for Collaborative Gene Mapping Studies
D. Troyer and D. Hertzke
In Vitro Cell. Dev. Biol. 27A:435-436, 1991

90-547-J Rapid Diagnosis of Bovine Cryptosporidiosis with a Commercial Acid-Fast Staining Procedure
R.K. Ridley and R.M. Olsen
J. Vet. Diag. Invest. 3:182-183, 1991

90-565-J Efficacy of Lasalocid in Feeder Lambs for Increased Weight Gains and Feed Efficiency
F.J. Schwulst, D.D. Simms, and R.K. Ridley
Sheep Ind. Dev. Res. J. 7(1):28-32, 1991

91-127-J Production and Characterization of Monoclonal Antibodies against Excretory-Secretory Products of *Fasciola hepatica*
M. Solano, R.K. Ridley, and H.C. Minocha
Vet. Parasitol. 40:227-239, 1991

91-171-J Ability of *Musca autumnalis* (Diptera: Muscidae) to Acquire and Transmit Bovine Herpes Virus-1
G.D. Johnson, J.B. Campbell, H.C. Minocha, and A.B. Broce
J. Med. Entomol. 28(6):841-846, 1991

91-234-J Inhibition of Equine Mononuclear Cell Proliferation and Leukotriene B_4 Synthesis by a Specific 5-Lipoxygenase Inhibitor, A-63162
S.C. Olsen, D. Atluru, S. Atluru, D.S. McVey, and H.H. Erickson
Am. J. Vet. Res. 53:1015-1018, 1991

91-325-J Anti-Idiotypic Antibodies Mimic Bovine Viral Diarrhea Virus Neutralizing Antigen
W. Xue, D.J. Orten, O.Y. Abdelmagid, M. Rider, F. Blecha, and H.C. Minocha
Vet. Microbiol. 29:201-212, 1991

91-350-J Congenital Dyserythropoietic Anemia in Polled Hereford Calves: Ultrastructural Findings
D.J. Steffen, H.W. Leipold, G.S. Elliott, and J.E. Smith
J. Vet. Path. 29:203-209, 1992

91-451-J Congenital Dyserythropoiesis and Progressive Alopecia in Polled Hereford Calves. Hematologic, Biochemical, Bone Marrow Cytologic, Electrophorectic, and Flow Cytometric Findings
D.J. Steffen, G.E. Elliott, H.W. Leipold, and J.E. Smith
J. Vet. Diag. Invest. 4:31-37, 1992

91-515-J Leukotoxin Activity of *Fusobacterium necrophorum* Isolated from Bovine Liver Abscesses
Z.L. Tan, T.G. Nagaraja, and M.M. Chengappa
Vet. Microbiol. 32:15-28, 1992

92-94-J Effects of Antiorthostatic Suspension and Corticosterone on Macrophage and Spleen Cell Function
K.M. Kopydlowski, D.S. McVey, K.M. Woods, and S.K. Chapes
J. Leukocyte Biol. 52:202-208, 1992

92-118-B Antiprotozoan, Antihelmintic, and Other Pest Management Compounds
S.E. Leland, Jr.
In: *Disinfection, Sterilization, and Preservation*, S.S. Block, ed., pp. 482-492, Lea and Febiger, Philadelphia, 1991

92-119-B Methods of Testing Protozoacides and Antihelmintics
S.E. Leland, Jr.
In: *Disinfection, Sterilization, and Preservation*, S.S. Block, ed., pp. 1094-1096, Lea and Febiger, Philadelphia, 1991

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-209-J Interleukin-2 Treatment of *Stahylococcus aureus* Mastitis
P.G. Reddy, D.N. Reddy, S.E. Pruiett, M.J. Daley, J.E. Shirley, M.M. Chengappa, and F. Blecha
Cytokine 4:227-231, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-525-J Immunotoxicity in the Bovine: A Review
R.D. Black and D.S. McVey
Vet. Human Toxicol. 34:438-442, 1992

■ 22. Marketing

91-446-D Kansas Dealers' Selling Decisions Related to Seeds and Pesticides
W. Norvell
Marketing Dept. Rep., pp. 1-19, 1991
(available from dept. only)

■ 23. Pathology

85-452-J Primary Adrenocortical Atrophy in a Dog
P.R. Schoning
Canine Pract. 15(3):27-29, 1990

86-360-J Rectovaginal Constriction in Jersey Cattle: Genetics and Breed Dynamics
H.W. Leipold, K. Huyston, E.P. Barton, J.R. Holman, and S. Koenig
J. Dairy Sci. 73:2516-2524, 1990

89-204-J In Vitro and in Vivo Glucose Consumption in Swine Eperythrozoonosis
J.E. Smith, J.E. Cipriano, and S.M. Hall
J. Vet. Med. (B) 37:587-592, 1990

89-364-J Ultrastructural Changes in the Spinal Cord of Brown Swiss Cattle Affected with Bovine Progressive Degenerative Myeloencephalopathy (Weaver)
M. El Hamidi and H.W. Leipold
J. Vet. Med. (A) 37:729-736, 1990

89-413-J Experimental *Pasteurella haemolytica* Pneumonia: Clinical and Pathological Studies
J.G. Vestweber, R.D. Klemm, H.W. Leipold, D.E. Johnson, and W.E. Bailie
Am. J. Vet. Res. 51:1792-1798, 1990

89-420-J Experimental Frost-Bite in Hanford Miniature Swine. III. Sweat Gland Changes
P. Schoning
Intl. J. Exp. Path. 71:713-716, 1990

89-478-J Experimental *Pasteurella haemolytica* Pneumonia in Gnotobiotic and Conventional Calves
J.G. Vestweber, R.D. Klemm, and H.W. Leipold
Am. J. Vet. Res. 51:1799-1805, 1990

90-14-J Detection of *Eperythrozoon suis* DNA from Swine Blood by Whole Organism DNA Hybridizations
R.D. Oberst, S.M. Hall, and D.A. Schoneweis
Vet. Microbiol. 24:127-134, 1990

90-53-J Recombinant DNA Probe Detecting *Eperythrozoon suis* in Swine Blood
R.D. Oberst, S.M. Hall, R.A. Jasso, T. Arndt, and L. Wen
Am. J. Vet. Res. 51(11):1760-1764, 1990

90-145-J Ganglioneuroma of the Large Intestine in a Feedlot Steer
D.E. Cole, G. Migaki, and H.W. Leipold
Vet. Path. 27:461-462, 1990

90-299-J Congenital Anemia, Dyskeratosis, and Progressive Alopecia in Polled Hereford Calves
D.J. Steffen, H.W. Leipold, J. Gibb, and J.E. Smith
Vet. Path. 28:234-240, 1991

90-313-J Post-Transfusion Survival of ^{50}Cr-Labeled Erythrocytes in Neonatal Foals
J.E. Smith, J. Smith, M. Dever, and R.W. DeBowes
J. Vet. Int. Med. 6(3):183-185, 1992

90-388-A Present State of Genetic Nomenclature of Visible Trail Loci in Cattle
K. Huston and H.W. Leipold
Proc. 4th World Congr. Genet. Appl. to Livestock 14:525-528, 1990

90-414-J A Rapid Method for DNA Extraction Applied to an Acid-Fast and Five Gram-Negative Bacteria
D.L. Troyer, A. Reed, R. Oberst, and M.M. Chengappa
Vet. Res. Comm. 14:447-451, 1990

90-486-J Genetic Markers and Maps: Implications for Veterinary Medicine
D.L. Troyer, J.E. Smith, and H.W. Leipold
J. Am. Vet. Med. Assoc. 197:1376-1380, 1990

90-503-J Bovine Cell Lines for Collaborative Gene Mapping Studies
D. Troyer and D. Hertzke
In Vitro Cell. Dev. Biol. 27A:435-436, 1991

90-518-A Genetic Abnormalities of Current Concern
H.W. Leipold, D. Steffen, and S.M. Dennis
Proc. Thirteenth NAAB Tech. Conf. 13:15-23, 1990

90-574-J Deacylation of Endotoxin during Natural Cases of Bovine Mastitis
C.M. McDermott, J.L. Morrill, and B.W. Fenwick
J. Dairy Sci. 74:1227-1234, 1991

90-580-J Semi-Wet Milling of Pearl Millet for Reduced Goitrogenicity
C.F. Klopfenstein, H.W. Leipold, and C.E. Cecil
Cereal Chem. 68:177-179, 1991

90-598-J Mechanisms Responsible for Increases in Bovine Neutrophil Acyloxyacyl Hydrolase (AOAH) Activity during Inflammation
C.M. McDermott and B.W. Fenwick
Am. J. Vet. Res. 53:803-807, 1992

90-603-J Intracellular and Extracellular Enzymatic Deacylation of Bacterial Lipopolysaccharide (Endotoxin) during Bovine Mastitis: A Model for Localized Inflammation
C.M. McDermott, J.S. Cullor, and B.W. Fenwick
Infect. and Immun. 59(2):478-485, 1991

91-84-B Erythrocytes
J.E. Smith
In: *Advances in Veterinary Science and Comparative Medicine* 36:9-55, 1991

91-350-J Congenital Dyserythropoietic Anemia in Polled Hereford Calves: Ultrastructural Findings
D.J. Steffen, H.W. Leipold, G.S. Elliott, and J.E. Smith
Vet. Path. 29:203-209, 1992

91-409-J Frozen Cadaver: Antemorten vs. Postmortem
P. Schoning
Am. J. Forensic Med. and Pathol. 13(1):18-20, 1992

91-410-J Reactivity of Lectins with Feline Erythrocytes
M. Butler, G.A. Andrews, and J.E. Smith
Comp. Haematol. Intl. 1:217-219, 1991

91-411-J Thin Layer Chromatography of Erythrocyte Membrane Glycolipids from Type A and Type B Cats
M. Butler, G.A. Andrews, J.E. Smith, and P.S. Chavey
Comp. Haematol. Intl. 1:196-199, 1991

91-451-J Congenital Dyserythropoiesis and Progressive Alopecia in Polled Hereford Calves. Hematologic, Biochemical, Bone Marrow Cytologic, Electrophorectic, and Flow Cytometric Findings
D.J. Steffen, G.E. Elliott, H.W. Leipold, and J.E. Smith
J. Vet. Diag. Invest. 4:31-37, 1992

91-488-J Clinical Studies of Bovine Progressive Degenerative Myeloencephalopathy in Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, and W. Cash
Prog. Vet. Neurol. 2(3):159-164, 1991

91-514-J Sclerosing Peritoneal Mesothelioma in a Dog Confirmed by Electron Microscopy and Immunoperosicase Techniques
P. Schoning, C.E. Layton, W.D. Fortney, L.H. Willard, and J.E. Cook
J. Vet. Diag. Invest. 4:217-220, 1992

92-572-J Ectopic Canine Fetus Simulating a Teratoma
P. Schoning and V.D. Carlson
Canine Pract. 17(4):13-15, 1992

91-576-J N-Glycolylneuraminic Acid and N-Acetylneuraminic Acid Define Feline Blood Group A and B Antigens
G.A. Andrews, P.S. Chavey, J.E. Smith, and L. Rich
Blood 79(9):2485-2491, 1992

92-13-J Laboratory Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, D. Johnson, and H.D. Stowe
Bovine Pract. 26:77-83, 1991

92-14-J Electrophysiological Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, W. Cash, D. Troyer, H.W. Leipold, and D. Johnson
Prog. Vet. Neurol. 2(4):243-251, 1992

92-42-J Implant and Copper Oxide Needles for Steers Grazing *Acremonium coenophialum*-Infected Fescue Pastures. Effects on Grazing and Subsequent Feedlot Performance and Serum Constituents
K.P. Coffey, J.L. Moyer, L.W. Lomas, J.E. Smith, D.C. La Rue, and F.K. Brazle
J. Anim. Sci. 70:3203-3214, 1992

92-58-J Atlanto-Occipital Fusion in Two Polled Hereford Calves
T.J. Engelken, H.W. Leipold, M.F. Spire, and W. Cash
J. Vet. Med (A) 39:236-238, 1992

92-100-J Histochemical and Morphometric Studies of Peripheral Muscle in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, and D. Johnson
J. Vet. Med. (A) 39:321-327, 1992

92-114-J Reactivity of Seed Lectins with Blood Typed Canine Erythrocytes
G.A. Andrews, P.S. Chavey, and J.E. Smith
Comp. Haematol. Intl. 2:68-74, 1992

92-178-J An Improved Ferritin Assay for Canine Sera
G.A. Andrews, J.E. Smith, M. Gray, P.S. Chavey, and B.R. Weeks
Vet. Clin. Path. 21:57-60, 1992

92-205-J Glucocorticoid Effects on Immune Cell Activation by Staphylococcal Exotoxins and Lipopolysaccharide
S.K. Chapes, K.M. Kopydlowski, S.D. Fleming, and J.J. Iandolo
Trans. Kans. Acad. Sci. 95:23-28, 1992

92-251-J Iron Metabolism in Dogs and Cats
J.E. Smith
Compend. Cont. Educ. Pract. Vet. 14(1):39-43, 51, 1992

92-319-A Congenital Defects of Current Concern in Beef Cattle
H.W. Leipold, T. Hiraga, D.J. Steffen, S.M. Dennis, and N. Woollen
Proc. Bovine Pract. 24:87-95,1991

92-394-T Scrapie in Kansas Sheep
J.G. Vestweber, N.V. Anderson, and H.W. Leipold
Kans. Vet. Med. Assoc. News 2(3):10-11, 17, 1992

■ 24. Plant Pathology

87-459-J Effects of Ancestry and Geographical Origin of Alfalfa Accessions on Resistance to Downy Mildew
D.Z. Skinner and D.L. Stuteville
Crop Sci. 32:1467-1470, 1992

88-323-A Bacterial Diseases of Sorghum
L.E. Claflin, B.A. Ramundo, J.E. Leach, and M. Qhobela
In: *Sorghum and Millet Diseases: A Second World Review*, W.A.J. De Milliano, R.A. Frederiksen, and G.D Bengston, eds., pp. 135-151, Intl. Crops Res. Inst. for the Semi-Arid Tropics, Patancheru, India, 1992

89-219-J Demonstration of Synonymy between the Plant Pathogens *Pseudomonas avenae* and *Pseudomonas rubilineans*
B.A. Ramundo and L.E. Claflin
J. Gen. Microbiol. 136:2029-2033, 1990

90-69-B Genetic Mechanisms in Fungal Adaptation
J.B. Anderson, L.M. Kohn, and J.F. Leslie
In: *The Fungal Community: Its Organization and Role in the Ecosystem*, 2nd ed., G.C. Carroll and D.T. Wicklow, eds., pp. 73-98, Marcel Dekker, Inc., New York, Basel, Hong Kong, 1992

90-172-J Resistance to Anthracnose Protects Forage Quality of Alfalfa
A.W. Lenssen, E.L. Sorensen, G.L. Posler, and D.L. Stuteville
Crop Sci. 31:147-150, 1991

90-194-B Cephalosporium
W.W. Bockus
In: *Methods for Research on Soilborne Phytopathogenic Fungi*, pp. 100-102, Am. Phytopathol. Soc. Press, 1992

90-212-J Mycorrhizas and Root Architecture
B.A. Daniels Hetrick
Experientia 47:355-361, 1991

90-247-J Evidence for Cytoplasmic Determinants in the Reaction of Wheat Cultivars to Tan Spot
A. Shabeer, W.W. Bockus, and B.L. Norman
Sarhad J. Agric. 7(1):101-104, 1991

90-256-J Evidence that *Xanthomonas campestris* pv. *zeae* Can Be Distinguished from Other Pathovars Capable of Infecting Maize by Restriction Fragment Length Polymorphism of Genomic DNA
M. Qhobela, L.E. Claflin, and D.C. Nowell
Can. J. Plant Pathol. 12:183-186, 1990

90-260-J Chromosomal Location of Genes Influencing Grain Protein Concentration and Mixogram Properties 'Plainsman V' Winter Wheat
I.S. Stein, R.G. Sears, R.C. Hoseney, T.S. Cox, and B.S. Gill
Crop Sci. 32:573-580, 1992

90-261-J Heterogeneity of the 'Wichita' Wheat Monosomic Set for Grain Quality and Agronmic Traits
I.S. Stein, R.G. Sears, B.S. Gill, R.C. Hoseney, and T.S. Cox
Crop Sci. 32:581-584, 1992

90-276-J Characterization of Strains of *Xanthomonas campestris* pv. *holcicola* by PAGE of Membrane Proteins and by REA and RFLP Analysis of Genomic DNA
M. Qhobela, J.E. Leach, L.E. Claflin, and D.L. Pearson
Plant Dis. 75:32-36, 1991

90-277-J Eastern and Southern African Strains of *Xanthomonas campestris* pv. *vasculorum* Are Distinguishable by Restriction Fragment Length Polymorphism of DNA and Polyacrylamide Gel Electrophoresis of Membrane Proteins
M. Qhobela and L.E. Claflin
Plant Pathol. 41:113-121, 1992

Publications of Station Scientists (Continued)

90-297-J Effect of Water Potential on Microbial Antagonism to *Pyrenophora tritici-repentis* in Wheat Residue
W.F. Pfender, U. Sharma, and W. Zhang
Mycol. Res. 95:308-314, 1991

90-328-J C-Banded Karyotype of *Hyoscyamus muticus* L.
B.R. Tyagi and B.S. Gill
J. Hered. 81:401-402, 1990

90-340-J Registration of KS89WGRC3 and KS89WGRC6 Hessian Fly-Resistant Hard Red Winter Wheat Germplasm
B.S. Gill, D.L. Wilson, W.J, Raupp, J.H. Hatchett, T.S. Cox, A. Amri, and R.G. Sears
Crop Sci. 31:245, 1991

90-341-J Registration of KS89WGRC4 Hard Red Winter Wheat Germplasm with Resistance to Hessian Fly, Greenbug, and Soilborne Mosaic Virus
B.S. Gill, D.L. Wilson, W.J. Raupp, J.H. Hatchett, T.L. Harvey, T.S. Cox, and R.G. Sears
Crop Sci. 31:246, 1991

90-343-J Registration of KS89WGRC7 Leaf Rust-Resistant Hard Red Winter Wheat Germplasm
B.S. Gill, W.J. Raupp, L.E. Browder, T.S. Cox, and R.G. Sears
Crop Sci. 31:246, 1991

90-344-J Registration of KS87UP9, A Winter Wheat Germplasm Segregating for a Dominant Male-Sterility Gene
T.S. Cox, R.G. Sears, and B.S. Gill
Crop Sci. 31:247, 1991

90-351-A Pumpkin Diseases
C.W. Marr and N. Tisserat
Proc. Nebraska Fruit and Vegetable Growers Conf., Univ. of Nebraska Spec. Pub., pp. 27-36, 1990

90-370-J A Canker Disease of Cupressaceae in Kansas and Texas Caused by *Seiridium unicorne*
N.A. Tisserat, A. Nus, and L.W. Barnes
Plant Dis. 75:138-140, 1991

90-378-J Competition between *Pyrenophora tritici-repentis and Septoria nodorum* in the Wheat Leaf as Measured with de Wit Replacement Series
S.R. Adee, W.F. Pfender, and D.C. Hartnett
Phytopathology 80:1177-1182, 1990

90-402-J Agronomic Performance of Hexaploid Wheat Lines Derived from Direct Crosses between Wheat and *Aegilops squarrosa*
T.S. Cox, J.H. Hatchett, B.S. Gill, W.J. Raupp, and R.G. Sears
Plant Breeding 105:271-277, 1990

90-403-J Expression and Fine Structure of the Gene Encoding N^{ϵ}-(indole-3-acetyl)-Lysine Synthetase from *Pseudomonas savastanoi*
F.F. Roberto, H. Klee, F. White, R. Nordeen, and T. Kosuge
Proc. Natl. Acad. Sci. 87:5797-5801, 1990

90-440-J Local Dispersal of Fungal Spores from a Wheat Canopy
M.G. Eversmeyer and C.L. Kramer
Grana 31:53-59, 1992

90-454-J Relationship of Native and Introduced Mycorrhizal Fungi to Mycorrhizal Dependence of *Andropogon gerardii* and *Koeleria pyramidata*
B.A.D. Hetrick and G.W.T. Wilson
Mycologia 82(6):779-782, 1990

90-460-J Recombination at the *Rpl* Locus of Maize
S.H. Hulbert and J.L. Bennetzen
Mol. Gen. Genet. 226:377-382,1991

90-465-J Effects of Mycorrhizal Fungus Species and Metalaxyl Application on Microbial Suppression of Mycorrhizal Symbiosis
B.A.D. Hetrick and G.W.T. Wilson
Mycologia 83:97-102, 1991

90-506-J Root Architecture of Warm- and Cool-Season Grasses: Relationship to Mycorrhizal Dependence
B.A.D. Hetrick, G.W.T. Wilson, and J.F. Leslie
Can. J. Bot. 69:112-118, 1991

90-509-J Partitioning Dissolved Inorganic and Organic Phosphorus Using Acidified Molybdate and Isobutanol
K. Jayachandran, A.P. Schwab, and B.A.D. Hetrick
Soil Sci. Soc. Am. J. 56:762-765, 1992

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31:1386, 1991

90-515-J Identification of Alien Chromatin Specifying Resistance to Wheat Streak Mosaic Virus and Greenbug in Wheat Germ Plasm by C-Banding and in Situ Hybridization
B. Friebe, Y. Mukai, H.S. Dhaliwal, T.J. Martin, and B.S. Gill
Theor. Appl. Genet. 81:381-389, 1991

90-529-J Use of Dual-Strain Fluorescence Microscopy to Observe Antagonism of *Pyrenophora tritici-repentis* by *Limonomyces roseipellis* in Wheat Straw
W.F. Pfender, L.G. King, and J.R. Rabe
Phytopathology 81:109-112, 1991

90-566-J The Iowa Soybean Pod Test for Predicting *Phomopsis* Seed Decay in Kansas
D.J. Jardine
Plant Dis. 75:523-525, 1991

91-35-B Rust
D.L. Stuteville
In: *Standard Tests to Characterize Alfalfa Cultivars*, 3rd Ed., C.C. Fox, R. Berberet, F.A. Gray, C.R. Grau, D.L. Jessen, and M.A. Peterson, eds., p. D-9-10, N. Am. Alfalfa Improv. Conf., 1991

91-36-B Downy Mildew
D.L. Stuteville
In: *Standard Tests to Characterize Alfalfa Cultivars*, 3rd Ed., C.C. Fox, R. Berberet, F.A. Gray, C.R. Grau, D.L. Jessen and M.A. Peterson, eds., p. D-5-6, N. Am. Alfalfa Improv. Conf., 1991

91-57-A Problems in the Production of Somatic Hybrids between Alfalfa and Two Annual *Medicago* Accessions
L.B. Johnson, M.R. Thomas, F.F. White, and D.W. Goad
Rep. 32nd N. Am. Alfalfa Improv. Conf., p. 61, 1990

91-63-J Physical Mapping of the 18S.26S rRNA Multigene Family in Common Wheat: Identification of a New Locus
Y. Mukai, T.R. Endo, and B.S. Gill
Chromosoma 100(2):71-78, 1991

91-64-A Heterochromatic Mapping of Alfalfa Chromosomes
S.A. Masoud, B.S. Gill, and L.B. Johnson
Rep. 32nd N. Am. Alfalfa Improv. Conf., p. 60, 1990

91-86-J Cloning of the Genes for Indoleacetic Acid Synthesis from *Pseudomonas syringae* pv.*syringae*
F.F. White and S.F. Ziegler
Molec. Plant-Microbe Interact. 4(2):207-210, 1991

91-87-B Molecular Probes for Disease Diagnosis and Monitoring
J.E. Leach and F.F. White
In: *Rice Biotechnology,* G.S. Khush and G.H. Toenniessen, eds., pp. 281-307, C·A·B· Intl. and Intl. Rice Res. Inst., 1991

91-113-J Nitrate Non-Utilizing Mutants of *Colletotrichum* and Their Use in Studies of Vegatative Compatibility and Genetic Relatedness
N.L. Brooker, J.F. Leslie, and M.B. Dickman
Phytopathology 81:672-677, 1991

91-117-J Transfer of Hessian Fly Resistance from Rye to Wheat via Radiation-Induced Terminal and Intercalary Chromosomal Translocations
B. Friebe, J.H. Hatchett, B.S. Gill, Y. Mukai, and E.E. Sebesta
Theor. Appl. Genet. 83:33-40, 1991

91-157-A X-Ray Induced Transfer of Hessian Fly Resistance from 'Balbo' Rye to Hexaploid Wheat Analyzed by the C-Banding Technique
B. Friebe, J.H. Hatchett, Y. Mukai, B.S. Gill, and E.E. Sebesta
Proc. Second Intl. Symp. on Chromosome Engin. in Plants, pp. 189-194, 1990

91-163-J C-Banding of Alfalfa Chromosomes: Standard Karyotype and Analysis of a Somoclonal Variant
S.A. Masoud, B.S. Gill, and L.B. Johnson
J. Hered. 82:335-338, 1991

91-181-J Reactions of Maize Lines Carrying *Rp* Resistance Genes to Isolates of the Common Rust Pathogen, *Puccinia sorghi*
S.H. Hulbert and J.L. Bennetzen
Plant Dis. 75:1130-1133, 1991

91-200-J Race-Specific Resistance to *Xanthomonas oryzae pv. oryzae* Conferred by Bacterial Blight Resistance Gene *Xa-10* in Rice (*Oryza sativa*) Involves Accumulation of a Lignin-Like Substance in Host Tissues
P.J. Reimers and J.E. Leach
Physiol. Molec. Plant Pathol. 38:39-55, 1991

91-221-J Mating Populations in *Gibberella fujikuroi (Fusarium* Section *Liseola)*
J.F. Leslie
Phytopathology 81:1058-1060, 1991

91-231-J Variation of Molecular Markers among Geographically Diverse Accessions of *Triticum tauschii*
E.L. Lubbers, K.S. Gill, T.S. Cox, and B.S. Gill
Genome 34:354-361, 1991

91-233-J Registration of KS90WGRC10 Leaf Rust-Resistant Hard Red Winter Wheat Germplasm
T.S. Cox, R.G. Sears, and B.S. Gill
Crop Sci. 32:506, 1992

91-253-J A DNA Fragment Mapped within the Submicroscopic Delection of *Ph1*, a Chromosome Pairing Regulator Gene in Polyploid Wheat
K.S. Gill and B.S. Gill
Genetics 129:257-259, 1991

91-258-J Detection of Barley Chromatin Added to Wheat by Genomic *in Situ* Hybridization
Y. Mukai and B.S. Gill
Genome 34:448-452, 1991

91-274-J Repetitive DNA Sequences from Polyploid *Elymus trachycaulus* and the Diploid Progenitor Species: Detection and Genomic Affinity of *Elymus* Chromatin Added to Wheat
H. Tsujimoto and B.S. Gill
Genome 34:782-789, 1991

91-275-A Effect of Shading Inoculum on Carryover of *Gaeumannomyces graminis* var. *tritici*, 1990
W.W. Bockus
Biol. and Cult. Tests 6:76, 1991

91-276-A Effect of Seed Treatment Fungicides on Stand and Yield of Soybeans, 1990
D.J. Jardine, J.H. Long, and K. Kelley
Fungicide and Nematicide Tests 46:278, 1991

91-277-A Effect of Seed Treatment Fungicides on Stand and Yield of Grain Sorghum, 1990
D.J. Jardine, G.L. Kilgore, J.H. Long, and M.Claassen
Fungicide and Nematicide Tests 46:277, 1991

91-278-A Evaluation of Fungicides for Therapeutic Control of Zoysia Patch, 1990
N.A. Tisserat
Fungicide and Nematicide Tests 46:331, 1991

91-279-A Evaluation of Fungicides for Control of Spring Dead Spot of Bermudagrass, 1990
N.A. Tisserat, J. Pair, and A. Nus
Fungicide and Nematicide Tests 46:306, 1991

91-280-J Fate of DNA Encoding Hygromycin Resistance after Meiosis in Transformed Strains of *Gibberella fujikuroi (Fusarium moniliforme)*
J.F. Leslie and M.B. Dickman
Appl. Envir. Microbiol. 57:1423-1429, 1991

91-290-J A Genetic Linkage Map of *Triticum tauschii* (DD) and Its Relationship to the D Genome of Bread Wheat (AABBDD)
K.S. Gill, E.L. Lubbers, B.S. Gill, W.J. Raupp, and T.S. Cox
Genome 34:362-374, 1991

91-297-J Identification of *Leptosphaeria korrae* by Cloned DNA Probes
N. Tisserat, S.H. Hulbert, and A. Nus
Phytopathology 81:917-921, 1991

91-315-J Point Mutations in the Turnip Crinkle Virus Capsid Protein Affect the Symptoms Expressed by *Nicotiana benthamiana*
L.A. Heaton, T.C. Lee, N. Wei, and T.J. Morris
Virology 183:143-150, 1991

91-323-J Reproductive Behavior of Hexaploid/Diploid Wheat Hybrids
T.S. Cox, L.G. Harrell, P. Chen, and B.S. Gill
Plant Breeding 107:105-118, 1991

91-336-J Reclamation Effects on Mycorrhizae and Productive Capacity of Flue Gas Desulfurization Sludge
G.W.T. Wilson, B.A.D. Hetrick, and A.P. Schwab
J. Envir. Qual. 20:777-783, 1991

91-337-J Standard Karyotype and Nomenclature System for Description of Chromosome Bands and Structural Aberrations in Wheat (*Triticum aestivum*)
B.S. Gill, B. Friebe, and T.R. Endo
Genome 34(5):830-839, 1991

91-341-J Registration of Hamlet, a Hessian Fly Resistant Hard Red Winter Wheat Germplasm
R.G. Sears, J.H. Hatchett, T.S. Cox, and G.S. Gill
Crop Sci. 32:506, 1992

91-376-J Effect of Cropping Regime on Populations of *Belonolaimus* sp. and *Pratylenchus scribneri* in Sandy Soil
T.C. Todd
J. Nematol. (Suppl.) 23(4S):646-651, 1991

91-377-A Fertility and Fumonisin B_1 Production by Strains of *Fusarium moniliforme (Gibberella fujikuroi)*
J.F. Leslie and R.D. Plattner
Proc. 17th Bienn. Grain Sorghum Res. and Utiliz. Conf., pp. 80-84, 1991

91-386-J Effects of Wheat Genotype, Time after Inoculation, and Leaf Age on Conidia Production by *Drechslera tritici-repentis*
M. Riaz, W.W. Bockus, and M.A. Davis
Phytopathology 81:1298-1302, 1991

91-403-S 1990 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 625:1-28, 1991

91-404-J A Simple, Rapid Procedure for the Isolation of DNA for PCR from *Gibberella fujikuroi (Fusarium* Section *Liseola)*
N.M. DuTeau and J.F. Leslie
Fungal Genet. Newsl. 38:72, 1992

91-419-J Fumonisin B_1 Production and Vegetative Compatibility of Strains from *Gibberella fujikuroi* Mating Population 'A' *(Fusarium moniliforme)*
J.F. Leslie, F.J. Doe, R.D. Plattner, D.D. Shackelford, and J. Jonz
Mycopathologia 117:37-45, 1992

91-445-S 1991 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 628:1-117, 1991

91-457-J Registration of KS219 Alfalfa Germplasm with Resistance to Eight Pests
E.L. Sorensen, D.L. Stuteville, E.K. Horber, and D.Z. Skinner
Crop Sci. 32:502-503, 1992

91-469-J Relationship between Mycorrhizal Activity, Burning, and Plant Productivity in Tallgrass Prairie
S.P. Bentivenga and B.A.D. Hetrick
Can. J. Bot. 69:2597-2602, 1991

Publications of Station Scientists (Continued)

91-486-J *Glomus mortonii* sp. nov., a Previously Undescribed Species in the Glomaceae Isolated from the Tallgrass Prairie in Kansas
S.P. Bentivenga and B.A.D. Hetrick
Mycotaxon 42:9-15, 1991

91-502-J First Reports of Sclerotium (Southern) Blight and Rhizoctonia Aerial Blight of Soybeans in Kansas
J.A. Appel and D.J. Jardine
Plant Dis. 76:539, 1992

91-519-S 1991 Turfgrass Research
Kans. Agric. Exp. Stn. Rep. Prog. 633:1-48, 1991

91-527-J C-Banding Polymorphisms in Several Accessions of *Triticum tauschii* (*Aegilops squarrosa*)
B. Friebe, Y. Mukai, and B.S. Gill
Genome 35:192-199, 1992

91-531-A The Basis and Utility of Chromosome Banding in Plants
B.S. Gill
Proc. 2nd Intl. Symp. on Chromosome Engin. in Plants, pp. 65-79, 1992

91-554-J Effect of Temperatures on Germination and Germ-Tube Development of *Puccinia recondita* and *P. graminis* Urediniospores
C.L. Kramer and M.G. Eversmeyer
Mycol. Res. 96:689-693, 1992

91-560-A Cytogenetic Mapping of Alfalfa
D.W. Goad, S.A. Masoud, L.B. Johnson, B.S. Gill, and D.Z. Skinner
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 20, 1991

91-561-J C-Banding and in-Situ Hybridization Analyses of *Agropyron intermedium*, a Partial Wheat x *Ag. intermedium* Amphiploid, and Six Derived Chromosome Addition Lines
B. Friebe, Y. Mukai, B.S. Gill, and Y. Cauderon
Theor. Appl. Genet. 84:899-905, 1992

91-565-A Susceptiblity of *Xanthomonas campestris* pv. *holicola* to Various Antibiotics
P. Zvoutete, L.E. Claflin, and B.A. Ramundo
Proc. 17th Bienn. Grain Sorghum Res. and Utiliz. Conf., pp. 96-98, 1991

91-569-A Genetic Diversity among *Stemphylium* Species Causing Leaf Spot of Alfalfa
C. Chaisrisook, D.Z. Skinner, and D.L. Stuteville
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 22, 1991

91-570-A Host Range of an Isolate of *Uromyces* Causing Rust of Alfalfa
D.Z. Skinner and D.L. Stuteville
Proc. 22nd Cent. Alfalfa Improv. Conf., p. 21, 1991

91-582-J The Sequence within Two Primers Influences the Optimum Concentration of Dimethyl Sulfoxide in the PCR
S.A. Masoud, L.B. Johnson, and F.F. White
PCR Methods and Appl. 2:89-90, 1992

92-6-S 1991 Woody Ornamental Evaluations
Kans. Agric. Exp. Stn. Rep. Prog. 636:1-33, 1991

92-15-J Use of the Random Amplified Polymorphic DNA Polymerase Chain Reaction (RAPD-PCR) to Detect DNA Polymorphisms in Aphids (Homoptera: Aphididae)
W.C. Black IV, N.M. DuTeau, G.J. Puterka, J.R. Nechols, and J.M. Pettorini
Bull. Entomol. Res. 82:151-159, 1992

92-35-J Fumonisin B_1 Production by Strains from Different Mating Populations of *Gibberella fujikuroi (Fusarium* Section *Liseola)*
J.F. Leslie, R.D. Plattner, A.E. Desjardins, and C.J.R. Klittich
Phytopathology 82:341-345, 1992

92-93-J Soil Invertebrate and Plant Responses to Mowing and Carbofuran Application in a North American Tallgrass Prairie
T.C. Todd, S.W. James, and T.R. Seastedt
Plant and Soil 144:117-124, 1992

92-105-J Mineralization of Organic Phosphorus by Vesicular-Arbuscular Mycorrhizal Fungi
K. Jayachandran, A.P. Schwab, and B.A.D. Hetrick
Soil Biol. Biochem. 24(9):897-903, 1992

92-129-J Comparison of C-banding Patterns and *in Situ* Hybridization Sites Using Highly Repetitive and Total Genomic Rye DNA Probes of 'Imperial' Rye Chromosomes Added to 'Chinese Spring' Wheat
Y. Mukai, B. Friebe, and B.S. Gill
Jap. J. Genet. 67:71-83, 1992

92-161-J Effects of Crop Rotation and Residue Management Practices on Severity of Tan Spot of Winter Wheat
W.W. Bockus and M.M. Claassen
Plant Dis. 76:633-636, 1992

92-163-A Nucleo-Cytoplasmic Interaction (NCI) Hypothesis of Genome Evolution and Speciation in Polyploid Plants
B.S. Gill
Proc. Dr. H. Kihara Memorial Intl. Symp. Cytoplasmic Engin. in Wheat, *Nuclear and Organellar Genomes of Wheat Species*, T. Sasakuma and T. Kinoshita, eds., Kihara Memorial Yokohama Foundation, Japan, 1991

92-208-J Identification of a Second Mating Population within the *Fusarium moniliforme* Anamorph of *Gibberella fujikuroi*
C.J.R. Klittich and J.F. Leslie
Mycologia 84(4):541-547, 1992

92-239-J Relationships of Mycorrhizal Symbiosis, Rooting Strategy, and Phenology among Tallgrass Prairie Forbs
B.A.D. Hetrick, G.W.T. Wilson, and T.C. Todd
Can. J. Bot. 70:1521-1528, 1992

92-246-J Increased Activity of a Cationic Peroxidase Associated with an Incompatible Interaction between *Xanthomonas oryzae* pv *oryzae* and Rice (*Oryza sativa*)
P.J. Reimers, A. Guo, and J.E. Leach
Plant Physiol. 44:1044-1050, 1992

92-253-A Evaluation of Foliar Fungicides on Winter Wheat for Control of Tan Spot and Leaf Rust, 1991
W.W. Bockus
Fungicide and Nematicide Tests 47:181, 1992

92-254-A Effect of Seed Treatment Fungicides on Pythium Root Rot of Winter Wheat, 1991
W.W. Bockus
Fungicide and Nematicide Tests 47:260, 1992

92-255-A Influence of Seed Treatment Fungicides on Take-All of Winter Wheat, 1991
W.W. Bockus
Fungicide and Nematicide Tests 47:259, 1992

92-266-S 1991 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 646:1-43, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-276-J Seasonal and Temperature Effects on Mycorrhizal Activity and Dependence of Cool- and Warm-Season Tallgrass Prairie Grasses
S.P. Bentivenga and B.A. Hetrick
Can. J. Bot. 70(8):1596-1602, 1992

92-280-J Aggressiveness of *Gibberella fujikuroi* (*Fusarium moniliforme*) Isolates to Grain Sorghum under Greenhouse Conditions
D.J. Jardine and J.F. Leslie
Plant Dis. 76:897-900, 1992

92-284-A Effect of Shading and Volunteer on Carryover of Inoculum of *Gaeumannomyces graminis* var. *tritici*
W.W. Bockus
Biol. and Cult. Tests 7:81, 1992

92-290-J *Rf* Genes Restore Fertility in Wheat Lines with Cytoplasms of *Elymus trachycaulus* and *E. ciliaris*
J. Jiang, W.J. Raupp, and B.S. Gill
Genome 35(4):614-620, 1992

92-321-J Resistance to Foliar Diseases in a Collection of *Triticum tauschii* Germ Plasm
T.S. Cox, W.J. Raupp, D.L. Wilson, B.S. Gill, S. Leath, W.W. Bockus, and L.E. Browder
Plant Dis. 76:1061-1064, 1992

92-330-J Use of Agarose Gel Electrophoresis to Monitor Conformational Changes of Some Small, Spherical Plant Viruses
L.A. Heaton
Phytopathology 82:803-807, 1992

92-331-J The Effect of Prairie Management Practices on Mycorrhizal Symbiosis
S.P. Bentivenga and B.A.D. Hetrick
Mycologia 84(4):522-527, 1992

92-341-J Assessment of Genetic Diversity and Population Structure of *Xanthomonas oryzae* pv. Oryzae with a Repetitive DNA Element
J.E. Leach, M.L. Rhoads, C.M. Vera Cruz, F.F. White, T.W. Mew, and H. Leung
Appl. Envir. Microbiol. 58:2188-2195, 1992

92-368-A Recombination between *Rpl-G* and *Rp5*
M.A. Sudupak, K.S. Hong, and S.H. Hulbert
Maize Genet. Coop. Newsl. 66:71-72, 1992

92-369-A Mechanism of Instability of *RplJ*
M.A. Sudupak and S.H. Hulbert
Maize Genet. Coop. Newsl. 66:72, 1992

92-408-J Cytology of Recessive Sexual-Phase Mutants from Wild Strains of *Neurospora crassa*
N.B. Raju and J.F. Leslie
Genome 35:815-826, 1992

92-415-A Reaction of Rice Cultivars from Ifugao Province, Philippines, to Indigenous Strains of the Bacterial Blight (BB) Pathogen
C.M. Vera Cruz, R. Nelson, H. Leung, J. Leach, and T.W. Mew
Intl. Rice Res. Inst. Newsl. 17:8-9, 1992

92-439-J Identification of a Family of Avirulence Genes from *Xanthomonas oryzae* pv. *oryzae*
J.E. Leach, C.M. Hopkins, S.-H. Choi, A. Guo, and F.F. White
Molec. Plant-Microbe Interact. 5:451-459, 1992

92-441-A Response of Eleven Winter Wheat Cultivars to a Single Application of Bayleton, 1991
R.L. Bowden and K.W Kelley
Fungicide and Nematicide Tests 47:183, 1992

92-442-A Evaluation of Fungicides for Control of Wheat Leaf Rust in Western Kansas, 1991
R.L. Bowden and M.D. Witt
Fungicide and Nematicide Tests 47:182, 1992

92-443-A Resistance to Leaf Rust and Soilborne Mosaic in Winter Wheat in Kansas, 1991
R.L. Bowden and K.L. Roozeboom
Biol. and Cult. Tests 7:85, 1992

92-444-A Reaction of Sunflower Hybrids to Rust and Premature Ripening, 1991
D.J. Jardine and J.R. Lawless
Biol. and Cult. Tests 7:97, 1992

92-445-A Evaluation of Biological Seed Treatments for Control of Seedling Diseases on Soybeans, 1991
D.J. Jardine and K.A. Janssen
Biol. and Cult. Tests 7:67, 1992

92-446-A Effect of Seed Treatment Fungicides on Stand and Yield of Soybeans, 1991
D.J. Jardine, J.H. Long, and B. Marsh
Fungicide and Nematicide Tests 47:254, 1992

92-447-A Effect of Seed Treatment Fungicides on Stand and Yield of Grain Sorghum
D.J. Jardine, J.H. Long, M. Claassen, and B. Marsh
Fungicide and Nematicide Tests 47:253, 1992

92-448-A Resistance of Perennial Ryegrass Cultivars and Selections to Pink Snow Mold, 1991
J. Pair and N. Tisserat
Biol. and Cult. Tests 7:112, 1992

92-449-A Reaction of Bermudagrass Selections to Spring Dead Spot, 1989-1991
N.A. Tisserat and J. Pair
Biol. and Cult. Tests 7:106, 1992

92-450-A Control of Powdery Mildew of Pumpkin with Fungicide Sprays, 1991
C. Marr, N. Tisserat, and T. Schaplowsky
Fungicide and Nematicide Tests 47:123, 1992

92-451-A Preventive Fall Applications for Control of Zoysia Patch, 1991
N.A. Tisserat
Fungicide and Nematicide Tests 47:319, 1992

92-452-A Evaluation of Fungicides for Control of Spring Dead Spot of Bermudagrass, 1991
N. Tisserat
Fungicide and Nematicide Tests 47:293, 1992

92-472-J Heritability of Fumonisin B_1 Production in *Gibberella fujikuroi* Mating Population A
A.E. DesJardins, R.D. Plattner, D.D. Shackelford, J.F. Leslie, and P.E. Nelson
Appl. Envir. Microbiol. 58:2799-2805, 1992

92-549-J A Strategy to Identify Probes that Detect a High Degree of Polymorphism in Bread Wheat
K.S. Gill and B.S. Gill
J. Plant Biochem. and Biotechnol. 1:71-85, 1992

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

92-605-S 1992 Turfgrass Research
Kans. Agric. Exp. Stn. Rep. Prog. 661:1-44, 1992

■ 25. Sociology, Anthropology, and Social Work

90-15-J A Method for Assessing Water Management Policies
R.S. Frey and D. Freeman
J. Envir. Syst. 20:375-404, 1990

91-528-J Accidental Deaths among Male Kansas Farmers, 1983-1989
R.S. Frey
Sociol. and Social Res. 75:210-211, 1991

91-535-S A Proportionate Mortality Study of Cancer and Accidents among Kansas Farmers, 1983-1989
Kans. Agric. Exp. Stn. Rep. Prog. 634:1-8, 1991

91-578-B Assessing and Communicating Health Risks
R.S. Frey
Kans. Agric. Exp. Stn. Bull. 658:1-20, 1991

■ 26. Statistics

87-268-J On the Calibration Problem Extended to Nonlinear Models
J.R. Schwenke and G.A. Milliken
Biometrics 47:563-574, 1991

87-296-J Self-Concept as a Factor in the Quality of Diets of Adolescent Girls
G.K. Newell, C.L. Hammig, A.P. Jurich, and D.E. Johnson
Adolescence 25:117-130, 1990

87-517-J Influence of Handling Time and Metabolizable Energy on Seed Selection by Four Emperizids
T.W. Shuman, R.J. Robel, J.L. Zimmerman, and A.D. Dayton
Southwest. Nat. 35(4):466-468, 1990

89-167-J In Vitro Synthesis of Prostaglandins by Pig Blastocysts Cultured in Medium Containing Oestradiol or Catechol Oestrogens
C.F. Rosenkrans, Jr., D.L. Davis, B.C. Paria, S.K. Dey, and G. Milliken
Prostaglandins 43:309-319, 1992

Publications of Station Scientists (Continued)

89-220-J Forage Sorghum Silage Dry Matter Disappearance as Influenced by Plant Part Proportion
J.S. White, K.K. Bolsen, G.L. Posler, and J.W. Neill
J. Feed Sci. and Tech. 33:313-322, 1991

89-357-J Performance, Carcass, Cartilage Calcium, Sensory, and Collagen Traits of Longissimus Muscles of Open and 30-Month Old Heifers that Produced One Calf
A.W. Waggoner, M.E. Dikeman, J.R. Brethour, and K. Kemp
J. Anim. Sci. 68:2380-2386, 1990

89-413-J Experimental *Pasteurella haemolytica* Pneumonia: Clinical and Pathological Studies
J.G. Vestweber, R.D. Klemm, H.W. Leipold, D.E. Johnson, and W.E. Bailie
Am. J. Vet. Res. 51:1792-1798, 1990

89-414-J Time Budgets of Confined Northern Cardinals and Harris' Sparrows in Flocks and Variability of Observer Data
T.W. Shuman, R.J. Robel, K.E. Kemp, and J.L. Zimmerman
J. Field Ornithol. 63(2):129-137, 1992

89-427-J Effects of Hay Quality, Breed, and Ovarian Development on Onset of Puberty and Reproductive Performance of Beef Heifers
R.C. Perry, L.R. Corah, R.C. Cochran, J.R. Brethour, K.C. Olson, and J.J. Higgins
J. Prod. Agric. 4:13-18, 1991

89-439-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers I. Effects of Postweaning Energy Manipulation
D.J. Patterson, L.R. Corah, J.R. Brethour, M.F. Spire, J.J. Higgins, G.H. Kiracofe, J.S. Stevenson, and D.D. Simms
J. Anim. Sci. 69:2349-2361, 1991

89-440-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers II. Relationship of Age at Puberty to Length of the Postpartum Interval to Estrus
D.J. Patterson, L.R. Corah, J.R. Brethour, J.J. Higgins, G.H. Kiracofe, and J.S. Stevenson
J. Anim. Sci. 70:1994-1999, 1992

89-535-J Ruminal Ciliated Protozoa in Cattle Fed Finishing Diets
G. Towne, T.G. Nagaraja, R.T. Brandt, Jr., and K.E. Kemp
J. Anim. Sci. 68:2150-2155, 1990

90-8-J Influences of Time Postmortem, Feeding Activity, and Diet on Digestive Organ Morphology of Two Emberizids
R.J. Robel, M.E. Barnes, K.E. Kemp, and J.L. Zimmerman
The Auk 107:669-677, 1990

90-54-J Extruded Wild Bird Food
J.F. Keating, R.J. Robel, K.C. Behnke, and K.E. Kemp
Feed Manage. 42:18-24, 1991

90-80-J Landing Pattern of Stable Flies (Diptera: Muscidae) on the Alsynite Cylinder Trap: Effect of Wind Speed and Direction
A.B. Broce, J. Schwenke, and K.E. Hampton
J. Med. Entom. 28(5):730-733, 1991

90-167-J Small Intestinal Starch Digestion in Steers: Effect of Various Levels of Abomasal Glucose, Corn Starch, and Corn Dextin Infusion on Small Intestinal Disappearance and Net Glucose Absorption
K.K. Kreikemeier, D.L. Harmon, R.T. Brandt, Jr., T.B. Avery, and D.E. Johnson
J. Anim. Sci. 69:328-338, 1991

90-345-J Mobility Effect Models: Comment on Glenn, McRae, and Brody
W.R. Schumm, G.H. Milliken, A.P. Jurich, S.T. Bollman, G.H. Jeong, and D.P. Hawkinson
Social Forces 69:617-620, 1990

90-374-J Hematological and Blood Chemistry Parameters of American Bison Grazing on Konza Prairie of Kansas
J.D. Vestweber, D.E. Johnson, G.E. Merrill, and J. Staats
J. Wildl. Dis. 27:417-420, 1991

90-394-J Serological Survey for Selected Microbial Pathogens in Kansas Bison
J.G. Vestweber, D.E. Johnson, G.E. Merrill, and J. Staats
J. Wildl. Dis. 27:473-476, 1991

90-405-J Evaluation of Corn Growth Models for Use with Weed and Insect Streses
A. Retta, R.L. Vanderlip, R.A. Higgins, L.J. Moshier, and A.M. Feyerherm
Agron. J. 83:757-765, 1991

90-539-J Dynamics of Ruminal Ciliated Protozoa in Feedlot Cattle
G. Towne, T.G. Nagaraja, R.T. Brandt, Jr., and K.E. Kemp
Appl. Envir. Microbiol. 56:3174-3178, 1990

90-572-J Response of Young Dairy Calves with Lasolocid Delivery Varied in Feed Sources
S.D. Pruiett, J.L. Morrill, T.J. Nagaraja, N.V. Anderson, P.G. Reddy, and J.J. Higgins
J. Dairy Sci. 75:857-862, 1992

91-14-J Whole Body Weights Estimated from Morphological Measurements of the White-Tailed Deer
R.M. Bundy, R.J. Robel, and K.E. Kemp
Trans. Kans. Acad. Sci. 94(3-4):95-100, 1991

91-106-J Pregnancy and Lactation in Beef Heifers Grazing Tallgrass Prairie in the Winter: Influence on Intake, Forage Utilization, and Grazing Behavior
E.S. Vanzant, R.C. Cochran, and D.E. Johnson
J. Anim. Sci. 69:3027-3038, 1991

91-132-A Genotype X Weather Interactions in Grain Yields of Wheat
A.M. Feyerherm, R.G. Sears, and G.M. Paulsen
Proc. 1990 KSU Conf. Appl. Stat. in Agric., pp. 62-70, 1990

91-148-S Dairy Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 608:1-45, 1990

91-151-J Chemical, Physical, and Sensory Characterization of Ground Beef Containing 5 to 30 Percent Fat
E.S. Troutt, M.C. Hunt, D.E. Johnson, J.R. Claus, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57(1):25-29, 1992

91-152-J Characteristics of Low-Fat Ground Beef Containing Texture-Modifying Ingredients
E.S. Troutt, M.C. Hunt, D.E. Johnson, C.L. Kastner, and D.H. Kropf
J. Food Sci. 57(1):19-24, 1992

91-189-S Swine Day 1990
Kans. Agric. Exp. Stn. Rep. Prog. 610:1-123, 1990

91-236-J Neutrophil and Lymphocyte Response to Vitamins C and E Supplementation in Young Calves
S.E. Eicher-Pruiett, J.L. Morrill, F. Blecha, J.J. Higgins, N.V. Anderson, and P.G. Reddy
J. Dairy Sci. 75:1635-1642, 1992

91-240-J Utilizing Genotype X Weather Interactions in Cultivar Selection
A.M. Feyerherm, R.G. Sears, and G.M. Paulsen
Agron. J. 84:391-394, 1992

91-261-J Electrical Energy Usage on Kansas Grain Farms
J.W. Slocombe, A.M. Feyerherm, and L.E. Stetson
Appl. Engin. in Agric. 8(2):263-266, 1992

91-266-J Energy Usage on Kansas Livestock and Dairy Farms
J.W. Slocombe, A.M. Feyerherm, and L.E. Stetson
Appl. Engin. in Agric. 8(2):389-392, 1992

91-441-J Longevity of Rabies Antibody Titer in Recipients of Human Diploid Cell Rabies Vaccine
D.J. Briggs and J.R. Schwenke
Vaccine 10:125-129, 1992

91-492-B A Comparison of Acceptability Scaling Methods for Use with Children
E.E. Spaeth, E. Chambers IV, and J.R. Schwenke
In: *Product Testing with Special Consumer Populations for Research Guidance*, L.S. Wu and A.D. Gelinas, eds., pp. 65-77, Am. Soc. Testing and Materials, Philadelphia, 1992

92-9-J Beak Trimming and Holding Time Effects on Fearfulness of Pullets as Estimated by Tonic Immobility
M. Mielnik, J.V. Craig, and G.A. Milliken
Poultry Sci. 71:391-394, 1992

92-13-J Laboratory Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, D. Johnson, and H.D. Stowe
Bovine Pract. 26:77-83, 1991

92-14-J Electrophysiological Studies in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, W. Cash, D. Troyer, H.W. Leipold, and D. Johnson
Prog. Vet. Neurol. 2:243-251, 1991

92-96-J Modified-Atmosphere Packaging of Bone-In Pork Loins
K.E. Warren, M.C. Hunt, C.L. Marksberry, O. Sörheim, D.H. Kropf, D.E. Johnson, and M. Windisch
J. Muscle Foods 3:283-299, 1992

92-100-J Histochemical and Morphometric Studies of Peripheral Muscle in Bovine Progressive Degenerative Myeloencephalopathy of Brown Swiss Cattle
R. Oyster, H.W. Leipold, D. Troyer, W. Cash, and D. Johnson
J. Vet. Med. (A)39:321-327, 1992

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-245-J Epiphytic Microflora on Alfalfa and Corn
C. Lin, K.K. Bolsen, B.E. Brent, R.A. Hart, J.T. Dickerson, A.H. Feyerherm, and W.K. Aimutis
J. Dairy Sci. 75:2484-2493, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-565-J Beak-Trimming Effects on Beak Length and Feed Usage for Growth and Egg Production
J.V. Craig, J.A. Craig, and G.A. Milliken
Poultry Sci. 71:1830-1841, 1992

92-566-J Beak-Trimming and Genetic-Stock Effects on Rate of Mash Consumption and Feeding-Related Behavior of Egg-Strain Pullets
J.V. Craig, W.S.M. Winkler, and G.A. Milliken
Poultry Sci. 71:1959-1962, 1992

■ 27. Veterinary Diagnosis

90-145-J Ganglioneuroma of the Large Intestine in a Feedlot Steer
D.E. Cole, G. Migaki, and H.W. Leipold
Vet. Path. 27:461-462, 1990

91-41-J Porcine Alveolar and Intravascular Macrophages: Comparison of Immune Functions
C.G. Chitko-McKown, S.K. Chapes, R.E. Brown, R.M. Phillips, R.D. McKown, and F. Blecha
J. Leukocyte Biol. 50:364-372, 1991

91-327-J Enzyme Immunofiltration Assay for Measurement of Antibodies to Transmissible Gastroenteritis Virus of Swine: Comparison with Enzyme Immunoadsorbence Assay, Serum Neutralization, and Indirect Immunofluorescence Antibody Techniques
R.M. Phillips and R.B. Westerman
J. Vet. Diag. Invest. 3:346-348, 1991

91-441-J Longevity of Rabies Antibody Titer in Recipients of Human Diploid Cell Rabies Vaccine
D.J. Briggs and J.R. Schwenke
Vaccine 10(2):125-129, 1992

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

■ 28. Fort Hays Branch Experiment Station

89-357-J Performance, Carcass, Cartilage Calcium, Sensory and Collagen Traits of Longissimus Muscles of Open versus 30-Month-Old Heifers that Produced One Calf
A.W. Waggoner, M.E. Dikeman, J.R. Brethour, and K.E. Kemp
J. Anim. Sci. 68:2380-2386, 1990

89-389-J Partial Characterization of a Colorado Isolate of Agropyron Mosaic Virus
D.L. Seifers
Plant Dis. 76(6):564-569, 1992

89-427-J Effects of Hay Quality, Breed, and Ovarian Development on Onset of Puberty and Reproductive Performance of Beef Heifers
R.C. Perry, L.R. Corah, R.C. Cochran, J.R. Brethour, K.C. Olson, and J.J. Higgins
J. Prod. Agric. 4(1):13-18, 1991

89-439-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers: Effects of Postweaning Energy Manipulation
D.J. Patterson, L.R. Corah, J.R. Brethour, M.F. Spire, J.J. Higgins, G.H. Kiracofe, J.S. Stevenson, and D.D. Simms
J. Anim. Sci. 69:2349-2361, 1991

89-440-J Evaluation of Reproductive Traits in *Bos taurus* and *Bos indicus* Crossbred Heifers: Relationship of Age at Puberty to Length of the Postpartum Interval to Estrus
D.J. Patterson, L.R. Corah, J.R. Brethour, J.J. Higgins, G.H. Kiracofe, and J.S. Stevenson
J. Anim. Sci. 70:1994-1999, 1992

90-24-J The Relationship of Ultrasound Speckle to Marbling Score in Cattle
J.R. Brethour
J. Anim. Sci. 68(9):2603-2613, 1990

90-67-J Effect of Sunflower Planting Date on Infestation and Damage by the Sunflower Moth (Lepidoptera: Pyralidae) in Kansas
M. Aslam, G.E. Wilde, T.L. Harvey, and W.D. Stegmeier
J. Agric. Entom. 8(2):101-108, 1991

90-106-J Complementarity of Genes for Resistance to Greenbug [*Schizaphis graminum* (Rondani)] Biotype E in Sorghum [*Sorghum bicolor* (L.) Moench]
A.G.O. Dixon, P.J. Bramel-Cox, and T.L. Harvey
Theor. Appl. Genet. 81:105-110, 1991

90-123-J Transmission of Wheat Streak Mosaic Virus to Sorghum by the Wheat Curl Mite (Acari: Eriophyidae)
T.L. Harvey and D.L. Seifers
J. Kans. Entom. Soc. 64(1):18-22, 1991

90-226-J Monitoring Flight Activity of Sunflower Moth (Lepidoptera: Pyralidae) in Kansas
M. Aslam, G. Wilde, and T.L. Harvey
Envir. Entomol. 19(5):1639-1645, 1990

90-293-J Chloroplast DNA Polymorphism in Fertile and Male-Sterile Cytoplasms of Sorghum [*Sorghum bicolor* (L.) Moench]
Z. Chen, G.H. Liang, S. Muthukrishnan, and K.D. Kofoid
Theor. Appl. Genet. 80:727-731, 1990

90-308-J Resistance to Russian Wheat Aphid, *Diuraphis noxia*, in Wheat (*Triticum aestivum*)
T.L. Harvey and T.J. Martin
Cereal Res. Commun. 18(1-2):127-129, 1990

Publications of Station Scientists (Continued)

90-341-J Registration of KS89WGRC4 Hard Red Winter Wheat Germplasm with Resistance to Hessian Fly, Greenbug, and/or Soilborne Mosaic Virus
B.S. Gill, D.L. Wilson, W.J. Raup, J.H. Hatchett, T.L. Harvey, T.S. Cox, and R.G. Sears
Crop Sci. 31(1):246, 1991

90-401-J The Repeatability and Accuracy of Ultrasound in Measuring Backfat on Cattle
J.R. Brethour
J. Anim. Sci. 70:1039-1044, 1992

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31:1386, 1991

90-515-J Identification of Alien Chromatin Specifying Resistance to Wheat Streak Mosaic Virus and Greenbug in Wheat Germ Plasm by C-Banding and in Situ Hybridization
B. Friebe, Y. Mukai, H.S. Dhaliwal, T.J. Martin, and B.S. Gill
Theor. Appl. Genet. 81:381-389, 1991

90-564-J An Unstable Mutation for Pigmentation in Kernels of 'Calico' Sorghum
G. Hu, K.D. Kofoid, and G.H. Liang
Hereditas 115:163-167, 1991

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-128-J Infleunce of Dietary Energy on Follicular Development, Serum Gonadotropins, and First Postpartum Ovulation in Suckled Beef Cows
R.C. Perry, L.R. Corah, R.C. Cochran, W.E. Beal, J.S. Stevenson, J.E. Minton, D.D. Simms, and J.R. Brethour
J. Anim. Sci. 69:3762-3773, 1991

91-154-J Registration of Ten Biotype E Greenbug-Resistant Restorer Germplasm Lines of Sorghum
K.D. Kofoid, H.L. Hackerott, T.L. Harvey, and D.L. Seifers
Crop Sci. 31:1099-1100, 1991

91-212-A Efficacy of Fluroxypyr for Control of Large Kochia
P.W. Stahlman
N. Cent. Weed Sci. Soc. Res. Rep. 47:109, 1990

91-213-A Timing of CGA-131036 Applications in Winter Wheat
P.W. Stahlman
N. Cent. Weed Sci. Soc. Res. Rep. 47:96-97, 1990

91-214-A Use of Postemergence Tribenuron Tank Mixtures in Winter Wheat
P.W. Stahlman
N. Cent. Weed Sci. Soc. Res. Rep. 47:107, 1990

91-215-A Reducing Foliar Burn by Herbicides Applied in Nitrogen Solution
P.W. Stahlman
N. Cent. Weed Sci. Soc. Res. Rep. 47:438-439, 1990

91-216-A Effects of Grain Drill Type and Preplant Herbicides on Winter Wheat
P.W. Stahlman
N. Cent. Weed Sci. Soc. Res. Rep. 47:106, 1990

91-218-S 1991 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland
Kans. Agric. Exp. Stn. Rep. Prog. 612:1-49, 1990

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-269-J Diet Sample Collection by Esophageal Fistula and Rumen Evacuation Techniques
K.C. Olson
J. Range Manage. 44(5):515-519, 1991

91-281-S 1990 Kansas Sunflower Performance Test
Kans. Agric. Exp. Stn. Rep. Prog. 620:1-16, 1991

91-287-J A New Greenbug Virulent to E-Biotype-Resistant Sorghum
T.L. Harvey, K.D. Kofoid, T.J. Martin, and P.E. Sloderbeck
Crop Sci. 31(6):1689-1691, 1991

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

91-373-S Influence of Seed Size on Winter Wheat Performance Tests
T.J. Martin, J.E. Berg, and J.R. Lawless
Kans. Agric. Exp. Stn. Keeping Up With Res. 101:1-8, 1991

91-421-J Growth and Reproductive Performance of Heifers Overwintered in Range or Drylot Environments
K.C. Olson, J.R. Jaeger, and J.R. Brethour
J. Prod. Agric. 5(1):72-76, 1992

91-444-S Roundup 1991
Kans. Agric. Exp. Stn. Rep. Prog. 627:1-30, 1991

91-456-S Forage Sorghums 1990: Summary of Nutritive Value and Agronomic Performance
Kans. Agric. Exp. Stn. Rep. Prog. 629:1-13, 1991

91-504-J Analysis of C-Banding Chromosome Patterns of *Sorghum*
H. Yu, G.H. Liang, and K.D. Kofoid
Crop Sci. 31:1524-1527, 1991

91-541-A Predicting Digestibility of Mixed Cool- and Warm-Season Grass Diets with Internal Markers
K.C. Olson and G.D. Sunvold
Proc. W. Sect. Am. Soc. Anim. Sci. 42:197-200, 1991

92-2-J Resistance to the Wheat Curl Mite (Acari: Eriophyidae) in Common Wheat
T.L. Harvey and T.J. Martin
Cereal Res. Comm. 20(1-2):63-66, 1992

92-45-S 1991 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 637:1-22, 1991

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-227-J Reproductive Response of Yearling Beef Heifers to Melengestrol Acetate-Prostaglandin F_{2a} Estrous Synchronization System
J.R. Jaeger, J.C. Whittier, L.R. Corah, J.C. Meiske, K.C. Olson, and D.J. Patterson
J. Anim. Sci. 70:2622-2627, 1992

92-247-S 1992 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland
Kans. Agric. Exp. Stn. Rep. Prog. 643:1-51, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-274-A A New Greenbug, Biotype I, Damages Sorghum
K.D. Kofoid, T.L. Harvey, and P.E. Sloderbeck
Proc. 46th Ann. Corn and Sorghum Ind. Res. Conf., pp. 130-140, 1992

92-286-S 1991 Kansas Performance Tests with Sunflower Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 648:1-15, 1992

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-515-S Roundup 1992
Kans. Agric. Exp. Stn. Rep. Prog. 653:1-24, 1992

92-567-A Weed Control in Wheat Production Systems in Semi-Arid Regions of the North American Great Plains
P.W. Stahlman
Proc. Intl. Symp. on Cons. Tillage Practices for Grain Farming in Semi-Arid Regions, Shortandy, Kazakhstan, pp. 55-71, 1992

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

■ 29. Northwest Research-Extension Center

90-419-J Preplant Irrigation in the Central and Southern High Plains — A Review
J.T. Musick and F.R. Lamm
Trans. Am. Soc. Agric. Engin. 33(6):1834-1842, 1990

90-446-A Factors Affecting Preweaning Lamb Death Losses
F.J. Schwulst and L.C. Martin
Proc. West. Sect. - Am. Soc. Anim. Sci. 41:141-143, 1990

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31(5):1386, 1991

90-565-J Efficacy of Lasalocid in Feeder Lambs for Increased Weight Gains and Feed Efficiency
F.J. Schwulst, D.D. Simms, and R.K. Ridley
Sheep Ind. Dev. Res. J. 7(1):28-32, 1991

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-129-E Application of Ultrasound in Feeding and Finishing Animals: A Review
P.L Houghton and L.M. Turlington
J. Anim. Sci. 70:930-941, 1992

91-223-S 1990 Kansas Corn Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 614:1-40, 1990

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-262-S Kansas Fertilizer Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 618:1-132, 1991

91-264-S 1990 Kansas Variety Tests Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Triticale
Kans. Agric. Exp. Stn. Rep. Prog. 619:1-16, 1991

91-281-S 1990 Kansas Sunflower Performance Test
Kans. Agric. Exp. Stn. Rep. Prog. 620:1-16, 1991

91-282-J Municipal Water Use in Northwest Kansas
F.R. Lamm
Trans. Kansas Acad. Sci. 94(3-4):125-136, 1991

91-286-J Feedlot Performance and Prolactin Response of Lambs to Supplemental Lighting and Implantation with Zeranol
F.J. Schwulst and J.E. Minton
Sheep Ind. Dev. Res. J. 7(2):8-11, 1991

91-373-S Influence of Seed Size on Winter Wheat Performance Tests
T.J. Martin, J.E. Berg, and J.R. Lawless
Kans. Agric. Exp. Stn. Keeping Up With Res. 101:1-8, 1991

91-385-S Kansas Sheep Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 624:1-39, 1991

91-564-S 1991 Agricultural Research. Northwest Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 635:1-90, 1991

92-45-S 1991 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 637:1-22, 1991

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-236-S 1991 Kansas Performance Tests with Corn Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 642:1-40, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-266-S 1991 Vegetable Investigations
Kans. Agric. Exp. Stn. Rep. Prog. 646:1-43, 1991

92-286-S 1991 Kansas Performance Tests with Sunflower Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 648:1-15, 1992

92-307-S 1991 Kansas Performance Tests with Soybean Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 649:1-29, 1992

92-444-A Reaction of Sunflower Hybrids to Rust and Premature Ripening, 1991
D.J. Jardine and J.R. Lawless
Biol. and Cult. Tests 7:97, 1992

92-584-S 1992 Agricultural Research. Northwest Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 660:1-89, 1992

■ 30. Southeast Kansas Branch Experiment Station

90-104-J Grazing and Subsequent Feedlot Performance by Steers that Grazed Different Types of Fescue Pasture
K.P. Coffey, L.W. Lomas, and J.L. Moyer
J. Prod. Agric. 3(4):415-420, 1990

90-389-J Effects of Feeding Endophyte-Infected Fescue Hay on Portal and Hepatic Nutrient Flux in Steers
D.L. Harmon, K.L. Gross, K.K. Kreikemeier, K.P. Coffey, T.B. Avery, and J. Klindt
J. Anim. Sci. 69(3):1223-1231, 1991

90-430-J Sampling Technique and Drying Method Effects on Chemical Composition of Tall Fescue or Fescue-Ladino Clover Pasture Samples
K.P. Coffey, J.L. Moyer, L.W. Lomas, and K.E. Turner
J. Anim. Sci. 69(1):423-428, 1991

91-37-T Suspension Fertilizer Placement for Conservation Tillage Grain Sorghum
D.W. Sweeney
Better Crops with Plant Food 75:30-31, 1991

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-60-D Use of a Crop Simulation Model to Provide Long-Term Data for Economic Analysis: The Case of Early Maturing Soybeans
R.O. Burton, Jr., G. van der Hoeven, A.M. Featherstone, and G.V. Granade
Agric. Econ. Dept. Rep. (Staff Pap. No. 91-7), pp. 1-16, 1990 (available from dept. only)

91-92-S Big Bluestem Evaluation in the Eastern Plains
Kans. Agric. Exp. Stn. Rep. Prog. 606:1-9, 1990

91-203-J Performance and Internal Parasite Burden of Stocker Steers Treated Continuously with Morantel Tartrate
K.P. Coffey, J.L. Moyer, D.J. Walstrom, F.K. Brazle, and L.W. Lomas
Prof. Anim. Sci. 7(2):35-40, 1991

91-223-S 1990 Kansas Corn Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 614:1-40, 1990

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-262-S Kansas Fertilizer Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 618:1-132, 1991

91-264-S 1990 Kansas Variety Tests Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Triticale
Kans. Agric. Exp. Stn. Rep. Prog. 619:1-16, 1991

91-276-A Effect of Seed Treatment Fungicides on Stand and Yield of Soybeans, 1990
D.J. Jardine, J.H. Long, and K. Kelley
Fungicide and Nematicide Tests 46:278, 1991

91-309-S 1990 Kansas Alfalfa Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 622:1-8, 1991

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

91-368-A Fluid Fertilizer Management for Alfalfa: Dryland - 1990
D.W. Sweeney, J.L. Moyer, and J.L. Havlin
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 215-222, 1991

91-369-A Effect of Sulfur Fertilization on Winter Wheat in Ridge- and Reduced-Tillage Systems in Southeastern Kansas - 1990
D.W. Sweeney and J.L. Moyer
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 233-239, 1991

91-370-A Effect of Sulfur Fertilization on Tall Fescue in Southeastern Kansas - 1990
D.W. Sweeney and J.L. Moyer
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 223-232, 1991

91-375-J Amount and Diurnal Distribution of Grazing Time by Stocker Cattle under Different Tall-Fescue Management Strategies
K.P. Coffey, J.L. Moyer, F.K. Brazle, and L.W. Lomas
Appl. Anim. Behav. Sci. 33:121-135, 1992

91-391-A Stocker Cattle Performance on Interseeded Rye/Bermudagrass versus Monocultural Rye and Bermudagrass Pastures
J.L. Moyer and K.P. Coffey
Am. Forage and Grassland Counc. Proc., pp. 137-140, 1991

91-424-J Using Reduced Rates of Postemergence Herbicides in Soybeans (*Glycine max*)
D.L. Devlin, J.H. Long, L.D. Maddux
Weed. Technol. 5:834-840, 1991

91-429-A Nitrogen and Phosphorus Management Effects on Nutrient Recovery in Grain Sorghum and Winter Wheat
J.L. Havlin and D.W. Sweeney
1991 Fluid Fertilizer Foundation Symp. Proc., pp. 115-122, 1991

91-445-S 1991 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 628:1-117, 1991

91-456-S Forage Sorghums 1990: Summary of Nutritive Value and Agronomic Performance
Kans. Agric. Exp. Stn. Rep. Prog. 629:1-13, 1991

91-467-J Effect of Zeranol on Performance of Steers Grazing High- and Low-Endophyte Tall Fescue Pastures
F.K. Brazle and K.P. Coffey
Prof. Anim. Sci. 7(3):39-42, 1991

91-499-J Placement of Sulfur Fertilization Solutions for Winter Wheat in Ridge- and Reduced-Tillage Systems
D.W. Sweeney and J.L. Moyer
J. Fert. Issues 8:45-51, 1991

91-506-S 1991 Cattle Feeders' Day
Kans. Agric. Exp. Stn. Rep. Prog. 632:1-32, 1991

92-42-J Implant and Copper Oxide Needles Grazing *Acremonium coenophialum*-Infected Tall Fescue Pastures. Effects on Grazing and Subsequent Feedlot Performance and Serum Constituents
K.P. Coffey, J.L. Moyer, L.W. Lomas, J.E. Smith, D.C. LaRue, and F.K. Brazle
J. Anim. Sci. 70:3203-3214, 1992

92-45-S 1991 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 637:1-22, 1991

92-55-T Multi-Nutrient Fertilization of Tall Fescue
D. Sweeney and J. Moyer
Solutions 35(6):46-47, 1991

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-236-S 1991 Kansas Performance Tests with Corn Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 642:1-40, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-307-S 1991 Kansas Performance Tests with Soybean Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 649:1-29, 1992

92-366-S 1991 Kansas Performance Tests with Alfalfa Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 650:1-19, 1992

92-375-D A Whole-Farm Risk Analysis of Double-Cropping and Alternative Crop Systems under Farm Commodity Programs: An Application of Crop and Market Simulation Models
M.F. Crisostomo, R.O. Burton, Jr., A.M. Featherstone, and K.W. Kelley
Agric. Econ. Dept. Rep. (Staff Pap. 92-11) 1-20, 1992
(available from dept. only)

92-407-S Cattlemen's Day 1992
Kans. Agric. Exp. Stn. Rep. Prog. 651:1-151, 1992

92-419-A P and K Fertilizer in Alfalfa
C.A. Grant, R.G. Simons, L.D. Bailey, J.L. Havlin, D.W. Sweeney, and J.L. Moyer
Proc. Great Plains Soil Fert. Conf., pp. 219-224, 1992

92-441-A Response of Eleven Winter Wheat Cultivars to a Single Application of Bayleton, 1991
R.L. Bowden and K.W. Kelley
Fungicide and Nematicide Tests 47:184, 1992

92-446-A Effect of Seed Treatment Fungicides on Stand and Yield of Soybeans, 1991
D.J. Jardine, J.H. Long, and B. Marsh
Fungicide and Nematicide Tests 47:254, 1992

92-447-A Effect of Seed Treatment Fungicides on Stand and Yield of Grain Sorghum
D.J. Jardine, J.H. Long, M. Claassen, and B. Marsh
Fungicide and Nematicide Tests 47:253, 1992

92-502-A Nitrogen and Phosphorus Management Effects on Nutrient Recovery in Grain Sorghum and Winter Wheat
J.L. Havlin, A.J. Schlegel, D.W. Sweeney, and G.M. Pierzynski
Fluid Fertilizer Foundation Symp. Proc., pp. 68-75, 1992

92-517-S 1992 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 654:1-110, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

■ *31. Southwest Kansas Research-Extension Center*

89-387-J Management of Banks Grass Mites in Field Corn: Evaluation of Aerial Applications of Propargite
L.L. Buschman and M.A. Chowdhury
Southwest. Entomol. 15(3):317-325, 1990

89-477-J Resistance to Parathion and Chlorpyrifos-Methyl in Greenbugs (Homoptera:Aphididae) in Southwestern Kansas
P.E. Sloderbeck, M.A. Chowdhury, L.J. DePew, and L.L. Buschman
J. Kans. Entomol. Soc. 64(1):1-4, 1991

90-120-B Biological Control of Filth Flies in Confined Cattle Feedlots Using Pteromalid Parasites
G.L. Greene
In: *Biocontrol of Arthropods Affecting Livestock and Poultry*, D.A. Rutz and R.S. Patterson, eds., pp. 29-42, Westview Press, Boulder, CO, 1990

90-512-J Registration of 'Karl' Wheat
R.G. Sears, E.G. Heyne, T.J. Martin, T.S. Cox, L.E. Browder, D.L. Wetzel, M.D. Shogren, L.C. Bolte, S.P. Curran, J.R. Lawless, and M.D. Witt
Crop Sci. 31:1386, 1991

91-48-S 1990 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 605:1-32, 1990

91-130-J Increasing the Efficiency of Crop Selection for Unpredictable Environments
F. Zavala-Garcia, P.J. Bramel-Cox, J.D. Eastin, M.D. Witt, and D.J. Andrews
Crop Sci. 32:51-57, 1992

91-144-J Mixtures of High Moisture Corn and Wheat in Finishing Diets: Feedlot Performance and in Situ Rate of Starch Digestion in Cattle
B.J. Bock, R.T. Brandt, Jr., D.L. Harmon, S.J. Anderson, J.K. Elliott, and T.B. Avery
J. Anim. Sci. 69:2703-2710, 1991

91-223-S 1990 Kansas Corn Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 614:1-40, 1990

91-243-J Influence of Postemergence Application Methods on Rhizome Johnsongrass (*Sorghum halepense*) Control with CGA-136872, DPX-V9360, and KIH-2665
R.F. Comacho, L.J. Moshier, D.W. Morishita, and D.L. Devlin
Weed Tech. 5:789-794, 1991

91-245-S 1990 Kansas Grain Sorghum Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 617:1-48, 1990

91-262-S Kansas Fertilizer Research 1990
Kans. Agric. Exp. Stn. Rep. Prog. 618:1-132, 1991

91-264-S 1990 Kansas Variety Tests Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Triticale
Kans. Agric. Exp. Stn. Rep. Prog. 619:1-16, 1991

91-296-J Milkweed as New Cultivated Row Crop
M.D. Witt and L.A. Nelson
J. Prod. Agric. 5:167-171, 1992

91-309-S 1990 Kansas Alfalfa Performance Tests
Kans. Agric. Exp. Stn. Rep. Prog. 622:1-8, 1991

91-355-S Cattlemen's Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 623:1-111, 1991

91-361-J Composted Manure and N Utilization by Irrigated Grain Sorghum and Effects on Soil Chemical Properties
A. Schlegel
J. Prod. Agric. 5:153-157, 1992

91-418-J Evaluation of Trees for the Central Plains
D. Hensley, S. Wiest, C. Long, J. Robbins, J. Pair, and A. Schlegel
J. Arboricult. 18:49-55, 1992

91-425-J Reduction in Phytotoxicity from Urea Fertilizer by the Urease Inhibitor N-(n-butyl) Thiophosphoric Triamide
A. Schlegel
J. Fert. Issues 8:40-44, 1991

91-445-S 1991 Agricultural Research. Southeast Kansas Branch Station
Kans. Agric. Exp. Stn. Rep. Prog. 628:1-117, 1991

91-456-S Forage Sorghums 1990: Summary of Nutritive Value and Agronomic Performance
Kans. Agric. Exp. Stn. Rep. Prog. 629:1-13, 1991

91-460-S 1991 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 630:1-52, 1991

91-465-J Tillage and Cropping System Effects on Winter Wheat and Grain Sorghum
C.A. Norwood
J. Prod. Agric. 5:120-126, 1992

91-506-S 1991 Cattle Feeders' Day
Kans. Agric. Exp. Stn. Rep. Prog. 632:1-32, 1991

92-45-S 1991 Kansas Performance Tests with Winter Wheat Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 637:1-22, 1991

92-164-S 1991 Kansas Performance Tests with Spring Oats, Spring and Winter Barley, Spring Wheat, Winter Canola
Kans. Agric. Exp. Stn. Rep. Prog. 639:1-17, 1991

92-175-S Dairy Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 640:1-60, 1991

92-193-S Swine Day 1991
Kans. Agric. Exp. Stn. Rep. Prog. 641:1-155, 1991

92-236-S 1991 Kansas Performance Tests with Corn Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 642:1-40, 1991

92-264-S 1991 Kansas Performance Tests with Grain Sorghum Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 644:1-48, 1991

92-273-S Kansas Fertilizer Research 1991
Kans. Agric. Exp. Stn. Rep. Prog. 647:1-151, 1992

92-286-S 1991 Kansas Performance Tests with Sunflower Hybrids
Kans. Agric. Exp. Stn. Rep. Prog. 648:1-15, 1992

92-294-A Corn Borer Insecticide Efficacy Trial, 1991
G.L. Dick, P.E. Sloderbeck, L.G. Wildman, and S.C. Posler
Insecticide and Acaricide Tests 17:194-195, 1992

92-295-A Miticide Efficacy Trial, 1990
G.L. Dick, P.E. Sloderbeck, and S.C. Posler
Insecticide and Acaricide Tests 16:152-153, 1991

92-296-A Corn Borer Insecticide Efficacy Trial, 1990
G.L. Dick, P.E. Sloderbeck, and S.C. Posler
Insecticide and Acaricide Tests 16:151-152, 1991

92-307-S 1991 Kansas Performance Tests with Soybean Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 649:1-29, 1992

92-366-S 1991 Kansas Performance Tests with Alfalfa Varieties
Kans. Agric. Exp. Stn. Rep. Prog. 650:1-19, 1992

92-421-A Thirty Years of Nitrogen and Phosphorus Fertilization of Irrigated Corn and Grain Sorghum
A.J. Schlegel, J.L. Havlin, and K.C. Dhuyvetter
Proc. Great Plains Soil Fert. Conf., pp. 177-187, 1992

92-442-A Evaluation of Fungicides for Control of Wheat Leaf Rust in Western Kansas, 1991
R.L. Bowden and M.D. Witt
Fungicide and Nematicide Tests 47:182, 1992

92-502-A Nitrogen and Phosphorus Management Effects on Nutrient Recovery in Grain Sorghum and Winter Wheat
J.L. Havlin, A.J. Schlegel, D.W. Sweeney, and G.M. Pierzynski
Fluid Fertilizer Foundation Symp. Proc., pp. 68-75, 1992

92-575-S 1992 Field Day Report. Southwest Kansas Research-Extension Center
Kans. Agric. Exp. Stn. Rep. Prog. 657:1-70, 1992

92-583-S 1992 Cattle Feeders' Day
Kans. Agric. Exp. Stn. Rep. Prog. 659:1-24, 1992

92-639-S Conservation Tillage Research 1992
Kans. Agric. Exp. Stn. Rep. Prog. 662:1-79, 1992

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Dikeman, M.E. (5) 89-357-J, 90-33-J, 90-59-J, 90-60-J, 91-176-J, 91-189-S, 91-283-J, 91-324-A, 91-355-S, 91-385-S, 91-507-A, 92-407-S

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Hunt, M.C. (5)	90-33-J, 90-502-J, 91-151-J, 91-152-J, 91-188-J, 91-189-S, 91-355-S, 91-385-S, 92-96-J, 91-139-J, 92-569-A, 92-595-A
Iandolo J.J. (7)	88-358-J, 90-348-J, 90-451-J, 92-205-J
Jaeger, J.R. (28)	91-444-S, 92-407-S, 92-515-S
Janssen, K.A. (3)	91-48-S, 91-223-S, 91-227-J, 91-245-S, 91-262-S, 91-264-S, 92-10-D, 92-45-S, 92-164-S, 92-236-S, 92-264-S, 92-273-S, 92-307-S, 92-445-A, 92-518-S, 92-639-S
Jardine, D.J. (24)	90-566-J, 91-276-A, 91-277-A, 91-502-J, 92-280-J, 92-444-A, 92-445-A, 92-446-A, 92-447-A
Jeon, I.J. (5)	89-311-B, 92-59-J, 92-204-B
Johnson, D.E. (26)	87-296-J, 89-413-J, 90-167-J, 90-374-J, 90-394-J, 91-106-J, 91-151-J, 91-152-J, 92-13-J, 92-14-J, 92-96-J, 92-100-J
Johnson, L.B. (24)	91-57-A, 91-64-A, 91-163-J, 91-560-A, 91-582-J
Johnson, M.A. (1)	91-587-D, 91-588-D
Johnson, T.C. (7)	90-129-J, 91-47-J, 91-116-J, 91-174-J, 91-413-J, 92-194-J
Jurich, A.P. (20)	87-296-J, 88-132-J, 90-345-J, 91-166-S
Kastner, C.L. (5)	90-286-J, 91-151-J, 91-152-J, 91-188-J, 91-189-S, 91-305-J, 91-311-J, 91-355-S, 91-538-J, 91-539-J, 92-131-J, 92-407-S
Kaufman, D.W. (7)	89-405-J, 90-48-J, 90-204-J, 90-426-J, 90-428-J, 91-42-J, 92-22-A, 92-607-J
Kelley, K. (30)	91-48-S, 91-223-S, 91-245-S, 91-262-S, 91-264-S, 91-276-A, 91-445-S, 92-264-S, 92-273-S, 92-375-D, 92-441-A, 92-517-S, 92-639-S
Kemp, K.E. (26)	89-357-J, 89-414-J, 89-535-J, 90-8-J, 90-54-J, 90-539-J, 91-14-J
Kenney, P.B. (5)	91-538-J, 91-539-J
Khatamian, H. (18)	90-252-J, 91-53-T, 91-229-J, 92-6-S
Kiracofe, G.H. (5)	89-439-J, 89-440-J, 90-116-J, 91-24-J, 91-80-J, 91-355-S
Kirkham, M.B. (3)	89-82-J, 90-147-J, 90-294-J, 90-479-J, 90-545-J, 90-563-J, 90-587-J, 91-103-A, 91-202-J, 92-36-J, 92-244-J, 92-373-J, 92-517-S
Kiser, H.L. (1)	91-263-D, 91-358-A, 91-489-D, 92-625-D
Klemm, R.D. (4)	88-448-J, 89-413-J, 89-478-J, 90-33-J, 90-375-J, 90-469-J, 91-189-S
Klopfenstein, C.F. (17)	89-514-J, 89-515-J, 90-580-J, 91-434-J, 92-193-S
Knapp, A.K. (7)	90-456-J, 90-490-J, 90-499-J, 91-518-J, 92-490-J
Koelliker, J.K. (10)	91-284-J
Kofoid, K.D. (28)	90-293-J, 90-564-J, 91-154-J, 91-245-S, 91-287-J, 91-456-S, 91-504-J, 92-264-S, 92-274-A
Kramer, C.L. (7)	90-440-J, 91-554-J
Kramer, K.J. (6)	89-143-B, 90-87-J, 90-151-J, 90-582-J, 90-584-J, 91-15-J, 91-68-A, 91-69-A, 91-183-J, 91-466-J, 91-573-J, 92-115-J, 92-180-J
Krishnamoorthi, R. (6)	91-56-J, 91-401-J, 91-440-J, 92-380-J, 92-479-J
Kropf, D.H. (5)	89-425-J, 91-151-J, 91-152-J, 91-188-J, 91-189-S, 91-355-S, 91-538-J, 91-539-S, 92-96-J, 92-193-S
Kuhl, G.L. (5)	90-25-J, 90-377-J, 91-176-J, 91-311-J, 91-385-S, 91-443-J, 91-506-S, 92-407-S, 92-518-S, 92-583-S
Lamm, F.R. (29)	90-419-J, 91-282-J, 91-564-S, 92-584-S
Lamond, R.E. (3)	91-28-D, 91-61-J, 91-146-J, 91-262-S, 91-398-A, 92-50-D, 92-273-S, 92-357-A, 92-423-A, 92-469-A, 92-517-S, 92-639-S
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Langemeier, M.R. (1)	91-355-S, 91-189-S, 92-193-S, 92-407-S, 92-580-D
Lawless, J.R. (29)	90-512-J, 91-48-S, 91-223-S, 91-245-S, 91-264-S, 91-281-S, 91-373-S, 91-564-S, 92-45-S, 92-164-S, 92-236-S, 92-264-S, 92-286-S, 92-307-S, 92-444-A, 92-584-S
Lea, J.D. (1)	91-430-C
Leach, J.E. (24)	88-323-A, 90-276-J, 91-87-B, 91-200-J, 92-246-J, 92-341-J, 92-415-A, 92-439-J
Leipold, H.W. (23)	86-360-J, 89-364-J, 89-413-J, 89-478-J, 90-145-J, 90-299-J, 90-388-A, 90-486-J, 90-503-J, 90-518-A, 90-580-J, 91-350-J, 91-451-J, 91-488-J, 92-13-J, 92-14-J, 92-58-J, 92-100-J, 92-319-A, 92-394-T
Leland, S.E. (21)	92-118-B, 92-119-B
Leslie, J.F. (24)	90-69-B, 90-506-J, 91-113-J, 91-221-J, 92-280-J, 91-377-A, 91-404-J, 91-419-J, 92-35-J, 92-208-J, 92-280-J, 92-408-J, 92-472-J
Liang, G.H. (3)	88-566-J, 89-283-J, 90-279-J, 90-293-J, 90-294-J, 90-332-J, 90-384-J, 90-431-J, 90-557-J, 90-564-J, 90-586-J, 90-600-J, 91-321-J, 91-504-J, 91-513-J
Lomas, L.W. (30)	90-104-J, 90-430-J, 91-203-J, 91-375-J, 91-445-S, 92-42-J, 92-407-S, 92-517-S
Long, C.E. (18)	90-551-J, 91-235-S, 91-405-J, 91-418-J, 92-153-T
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McVey, D.S. (21)	88-348-J, 90-404-J, 91-193-S, 91-234-J, 92-94-J, 92-525-J
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Thompson, C.A. (28)	92-273-S, 92-515-S, 92-639-S
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Vanderlip, R.L. (3)	90-405-J, 91-141-J, 91-273-J, 91-525-J, 91-586-B, 92-529-A, 92-531-J
Vestweber, J.A. (11)	88-448-J, 89-157-J, 89-413-J, 89-478-J, 90-374-J, 90-394-J, 90-602-B, 9-31-B, 91-170-B, 92-394-T, 92-530-J
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Walawender, W.P. (8)	89-339-A, 90-128-A, 90-196-A, 90-271-A, 90-338-J
Walker, C.E. (17)	90-158-J, 90-347-D, 90-420-J, 91-21-J, 91-23-J, 91-107-J, 91-121-J, 91-501-J, 92-193-S
Wassom, C.E. (3)	90-332-J, 90-384-J, 90-442-J, 90-443-J, 90-488-J, 90-494-J, 90-545-J, 91-244-J, 91-321-J, 92-518-S
Westfall, J.A. (4)	89-450-J, 90-556-J
Wetzel, D.L. (17)	88-136-A, 90-512-J, 91-153-C, 92-197-J, 92-198-J, 92-626-C, 92-629-J, 92-630-A
White, F.F. (24)	90-403-J, 91-57-A, 91-86-J, 91-87-B, 91-582-J, 92-341-J, 92-439-J
Whitney, D.A. (3)	90-453-J, 91-29-D, 91-30-D, 91-61-J, 91-146-J, 91-227-J, 91-262-S, 91-445-S, 92-71-D, 92-72-D, 92-273-S, 92-357-A, 92-517-S, 92-518-S, 92-639-S
Wiest, S.C. (18)	87-443-J, 91-235-S, 91-405-J, 91-418-J, 92-153-T
Wilde, G.E. (15)	88-234-J, 89-385-J, 89-386-J, 90-20-J, 90-67-J. 90-225-J, 90-226-J, 90-266-J, 91-177-J, 91-179-J, 91-285-A, 92-575-S
Williams, J.R. (1)	90-317-J, 91-97-D, 91-167-S, 91-313-D, 91-345-D, 91-431-J, 91-464-D, 91-580-D, 92-323-J, 92-639-S, 92-689-D
Witt, M.D. (31)	90-512-J, 91-48-S, 91-130-J, 91-223-S, 91-245-S, 91-264-S, 91-296-J, 91-309-S, 91-460-S, 91-456-S, 92-45-S, 92-164-S, 92-193-S, 92-236-S, 92-264-S, 92-273-S, 92-286-S, 92-307-S, 92-366-S, 92-442-A, 92-575-S
Wong, P.P. (7)	91-54-J, 92-146-J, 92-147-J, 92-279-J
Worman, F. (1)	92-144-J, 92-182-B
Wright, V.F. (15)	90-40-J, 91-359-J
Zayas, J.F. (16)	90-329-J, 90-406-J, 90-429-J, 90-437-J, 91-187-J, 91-228-J, 91-241-J, 91-248-J, 91-249-J, 91-365-J, 91-540-J, 91-579-J, 92-49-J, 92-215-J

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520005 Studies in Professional Farm Management and Rural Appraisals (Training, Practices, Fees)
520452 Management of Stored Grain Insect Problems
520462 Impacts of Federal Farm Policies on the Great Plains States
520463 The Kansas Agricultural Economy: Trends and Perspectives
520464 Optimal Capital Structure of Local Grain Marketing
520465 Economic Impact of Zero Depletion in Northwest Kansas
522872 Management of Stored-Grain Insect Problems
526372 Agronomic Effects, Profitability, and Riskiness of Long-Term Crop Rotations in Southeastern Kansas
F003 Regulatory, Efficiency, and Management Issues Affecting Rural Financial Markets
R014 Successful Coping Strategies of Rural Communities
R020 Potential for Incorporating the Kansan Farmer in the Agricultural Research Process
F071 Organization and Performance of World Food Systems: Implications for United States Policies
H073 An Economic Analysis of Farm Management Issues and Resource Use of Kansas Farms
F634 Policy Implications for Farm Household and Rural Community Responses to Economic Change
F691 Domestic and International Marketing Strategies for U.S. Beef
H698 Innovative Red Meat Production and Processing Systems for the Modern Consumer
F707 Performance of the U.S. Grain Marketing System
R754 Use of a Legume-Grain Sorghum Rotation in a Crop-Livestock System
F767 Quantifying Long-Run Agricultural Risks and Evaluating Farmer Responses to Risk
H775 Impact of Agricultural Policy on Producers, Consumers, and Taxpayers
H781 Forage Management and Utilization
H824 Economic Analysis of the Impact of USDA Farm Programs Cropping Systems and Rural Income in Kansas
F835 Changing Patterns of Food Demand and Consumption Behavior
H887 Economic Analysis of Alternative Production Practices for Soybeans and Beef
H900 Irrigation Management to Conserve Water and Maintain Income
H917 Enhancing Export Opportunities for Processed Kansas Wheat and Meat Products
H943 Measuring Economic Impacts of Groundwater Protection Policies on the Great Plain States
H950 Pricing and Marketing in the Livestock Sector under Structural Change
H984 Diversification and Specialization Benefits for Livestock Producers
H997 Commercial Greenhouse Crops to Complement Spring-Grown Bedding Plants

Agricultural Engineering

520716 Row Crop Pollution-Control Demonstration Project: Atrazine Analyses
520726 Variable Nitrogen Managment for Improving Groundwater
520729 Effect of Row Width, Planting Population, Planting Date, Variety, and Different Weed Control Levels on Soybean
522899 Single-Kernel Physical Properties and Wheat Millability Hardness
522906 Utilization of Corn, Grain Sorghum, and Wheat
522907 in the Production of Plastic Goods
522918 Starch Thermoplastic Project KVAC
527653 Temperature Control as a Means to Control Insect Infestation in Corn and Grain Sorghum
527663 Alleviating Drought Problems in Kansas and Drip Irrigation of Corn
527667 Effects of Prime Mover Soil Compaction on Soil Physical Properties and Winter Wheat and Grain Sorghum Yields
527671 Bi-Rotor Combine Cylinder Testing
527673 The Development of the Value-Added Thermal Processing Laboratory in the Department of Agricultural Engineering
527676 Effect of Single-Kernel Physical Properties of Wheat on Milling and Energy Requirements
527677 Evaluation of Kansas Value-Added Products
527678 Value-Added Thermal Processing Laboratory
527679 Evaluating Field-Scale Atrazine and Alachlor Movement in Surface and Groundwater in Northeast Kansas
527681 Development of Small-Scale Wet Processing Lab Facilities for Wheat and Other Kansas Grains for Food and Nonfood Use
527682 Evaluating Field-Scale Atrazine and Alachlor Movement in Surface and Groundwater as Related to Conservation in Ag Practices
527683 Vegetable Crop Drying
527684 Evaluating Field-Scale Atrazine and Alachlor
527685 Movement in Surface Water in Northeast
527686 Kansas
527687 *(number applies to title above)*
527688 *(number applies to title above)*
527689 *(number applies to title above)*
527690 Evaluating Field-Scale Atrazine and Alachlor
527691 Movement in Surface and Groundwater in Northeast Kansas
538724 FANSYS: A Design Program for Single- and Variable-Speed Fans
F773 Conservation Tillage Systems
R847 Forestry Investigations in the Great Plains of Kansas
H893 Single-Kernel Physical Properties and Wheat Millability Hardness
H007 Irrigation Water Movement in Silty Clay Loam Soil
H053 Bioenvironmental Control System for Enclosed Spaces
H066 Quantifying the Spatial Variation of Yield for Kansas Crops
F195 Improvement of Thermal Processes for Foods
H721 Gathering, Cleaning, and Yield Mapping Processes in Grain Harvesting
H735 Air Quality in Agricultural Buildings
H820 Improve Methods for Agricultural Chemical Application
H862 Efficient Irrigation and Drainage Systems
H896 Crop Sequences, Fertilizer N, and Weed Control Effects on Corn and Soybean
H899 Evaluating Practices for Water Quality Enhancement
H916 An Experimental Stubble Mulch Tillage Device for Sandy Soil
H946 Effects of Soil Compaction on Soil Physical Properties and Crop Growth
H962 Analysis of Soybean Meal Flow Characteristics
R993 Agronomy/Agricultural Engineering Experiment Fields Research

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520007 Breeding White Corn for Milling Use
520033 Soil Fertility and Soil Management Investigations
520035 Crop Physiology - Production Research
520040 Crop Performance
520044 Range and Pasture Brush and Weed Control
520046 Corn and Grain Sorghum Production and Management
520050 Seed and Plant Parts Certification
520052 Field Herbicidal Evaluations
520053 Fertilizer Tests and Demonstrations
520333 Pioneer Plant Breeding Fellowships
520412 Breeding Sorghum for Tolerance to Fusarium Stalk Rot
520663 Breeding Grain Sorghum for Improved Dryland Production
520667 Ash Reclamation for Kansas City Power and Light
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528120 Mushroom Product Development
528122 Research on the Wheat Gluten Film Project
528123 Modified Atmosphere Equipment for the Value-Added Processing Laboratory
528124 Copper on Cholesterol Metabolism in Ovartectomized Rats
528125 Utilization of Wheat Protein in Films and Coatings
R017 Factors Affecting Functional Independence of the Oldest-Old in Rural Kansas
H070 Sucrose Loading Effects on Cognitive Function in Young Adults
F195 Improvement of Thermal Processes for Foods
F628 Development of New Processes and Technologies for the Processing of Poultry Products
H698 Innovative Red Meat Production and Processing Systems for the Modern Consumer
H714 Nutritional Implications of Exercise
H830 Effect of Selected Dietary Fibers on Cholesterol Metabolism
H851 Nutritional Status and Physical Activity of Older Rural Women Living Alone
F891 Food Quality Changes and Energy Consumption Associated with Thermal Processing in Food Service Systems
H934 Effect of Zinc Deficiency on the Metabolism of Retinol
F945 Health Maintenance Aspects of Dietary Recommendations Designed to Modify Lipid Metabolism

Grain Science and Industry

520150 Large-Scale Milling and Baking Trials of New Wheat Varieties
520452 Management of Stored-Grain Insect Problems
521733 Effects of Alternative Processing Techniques on the Nutritional Value of Soybeans
522262 Managment of Stored-Grain Insect Problems
522861 Factors Controlling the Viscosity of Batter Systems
522872 Management of Stored-Grain Insect Problems
522877 Computer Interface to the Mixograph
522883 Effect of Particle Size and Other Factors on Cake Flour Quality
522885 Evaluation of End-Use Properties of Hard Winter Wheat Breeder's Progenies
522886 Effect of Fatty Materials on Swelling of Starch
522888 Isolation and Characterization of a Baking Factor from Rye
522894 Extrusion Technology for Food Applications of Soybeans
522896 International Grains Program Support Project
522897 Factors Affecting the Firming of Bread
522898 Prediction of Wheat Milling Performance
522899 Single-Kernel Physical Properties and Wheat Millability Hardness
522900 Predicting Wheat Mixing Properties and Sprout Damage by Near Infrared Reflectance
522902 Optimization of Technical Parameters for Milling of Debranned Wheat
522906 Utilization of Corn, Grain Sorghum, and Wheat
522907 in the Production of Plastic Goods
522908 High Erucic Acid Development Effort—Crambe and Rapeseed
522909 Determination of Factors Controlling Crumb Grain of Bread
522910 Thermal and Mechanical Properties of Dough-Based Foods
522911 Removal of Bran from Wheat Flour
522915 White Wheat Utilization
522916 Kansas Hard Red and White Winter Wheat Flours in Frozen Dough Production (1) Comparison to Hard Red Spring Wheat Flour and (2) Increased Versatility by Air Classification
522918 Starch Thermoplastic Project KVAC
522920 Chlorine Replacement of Cake Flour
522922 Utilization of Honey in Ready-to-Eat (RTE) Breakfast Cereals
522923 Studies to Control Grain Dust with Tandem 552
522924 Effect of a Fat Replacer on Bread Firming
522925 Reducing Stability Problems Associated with High Urea Pellets
522926 Canola Research
522927 Effect of Moist Extrusion of Soy Products on Starter Pig Growth Performance
522928 Development of Mechanisms for the Rapid Loss of Mixing Tolerance
522929 Wheat Starch Modification

522930 Utilization of Honey in Ready-to-Eat Breakfast Cereals
522931 Thermal Mechanical Analysis of Corn Meals
522932 Research on Milling of Grain Sorghum
522933 Evaluation of a Treated Flour
522934 Novel Bread Baking Via the HTST Extruder
522935 Use of Kansas Wheat in Chinese-Style Noodles: Heat-Moisture Treatment of Wheat
525169 Field Trials of Iprodione on Stored Corn in Kansas
525170 Database of Funded Research on Corn Quality and Utilization
525173 Postharvest Grain Systems Research and Development
525176 Extension of Storage Technology Development and Transfer Project-Pakistan
525177 El Salvador Basic Grains and Edible Bean Market
525178 Egyptian Agricultural Policy Analysis Project Subcontract
525179 National Food Security Stock Policies and Procedures in Africa
525181 Ponteiro and Domestic Rice Market Study (Guinea Bissau)
525183 Storage of Grains in the NIS (Russia)
525754 Canola Research
525958 *(number applies to title above)*
H018 Optimum Processing to Maximize Utilization of Cereal Grains in Swine Feeding
H051 Improvement of Bread Quality: Kansas High Protein Wheats for Frozen Dough and Specialty Breads
H063 Development of Hard White Winter Wheat Varieties for Kansas
F072 Behavioral and Health Factors that Influence the Food Consumption in Young Adults
F124 Occurrence of Mycotoxins and the Implications to Animal Health and Human Health
F196 Marketing and Delivery of Quality Cereals and Oilseeds
R600 Agriculture Institute - International Grains Program
H668 Functional Properties of Certain Components from Cereals in Baked Products
H696 Effect of Kernel Hardness on Wheat Millability
F711 Market Quality of Hard Wheat for Domestic and International Foods
H778 Improvement of Bread Quality: Role of Fats in Bread Staling
H822 Kansas Wheat Quality Profile
H823 Large-Scale Milling and Baking
H827 Influence of Wheat Type, Flour Extraction, and Formulation on Quality of Leavened Flat Bread
H844 Effects of Processing on the Nutritional Impact of Dietary Fiber
H867 Wheat Utilization: Nonfood and Nonfeed Uses
H868 Infrared Wheat Protein Screening
H883 New and Nutritionally Improved Food Products from Wheat and Other Cereal Grains
H888 Factors Affecting the Baking Quality of Whole Wheat Bread
H893 Single-Kernel Physical Properties and Wheat Millability Hardness
H898 Modern Systems Techniques for Value-Added Processes of Grain and Grain Products
H959 End-Use Objective Quality Determination in Grain Processing
H960 Utilization of Cereal Co-Products in Animal Feed Processing
H962 Analysis of Soybean Meal Flow Characteristics

■ Horticulture, Forestry, and Recreation Resources

520152 Turfgrass Investigations
520159 Horticultural Herbicides
520161 Fertilization of Woody Landscape Plants
520163 Herbicides for Weed Control around Woody Plants
520164 Provenance Variation in Native Populations of *Pinus virginiana* for Christmas Trees in Kansas
520165 Evaluation of Garlon 3A Herbicide and Related Formulation
520166 Great Plains Energy Forest
523851 Human Physiological Responses to Plants in Indoor Work Environments
523860 Pecan Cultivar Evaluation
523861 Assembly of Data for the IR-4 Program
523862 Efficacy of Insecticides against Vegetable-Feeding Insect Pests
523864 Effects of Slow-Released Fertilizers on Growth Hardiness and Turf Quality of Warm- and Cool-Season Grasses
523865 Consumer Marketing Preferences of Nursery Stock
523866 Reduction of Underline Pruning Costs in the Urban Environment
523867 Evaluation of Spring Dead Spot and Zoysia Patch Resistance among Bermudagrass and Zoysiagrass Clones and Cultivars in NTEP
523868 Production and Management of Landscape Plants
524050 Transmission Line Right-of-Way Vegetation Control
H012 Solid Waste Management in the Foodservice and Hospitality Industry
H023 A Study of Chilling Injury in Susceptible Plant Species
H044 Climate and Weather Effects on Woody Plant Growth and Development
H065 Sustainable Intensive Vegetable Production Using Legumes, Manures, and Municipal Compost as Fertilizer Sources
H067 Turfgrass Water Conservation in Kansas
H203 Genetic Improvement of Beans (*Phaseolus*)
H640 Herbaceous Ornamental and Native Perennial Plant Species as Florist Crops
F710 Improved Systems of Control for Pecan Arthropod Pests
H719 Thermal Inhibition of Crop Growth and Development
R731 Fruit and Vegetable Adaptation and Production Systems for South-Central Kansas
R732 Adaptation, Propagation, and Stress of Ornamentals and Turfgrass in South-Central Kansas
M742 Tree Improvement for Kansas
H774 Micro-Environment Modification for Field/Greenhouse Vegetable Production
H783 Evaluation of Landscape Plants for Kansas
H802 Stress-Induced Dormancy in Turfgrass and Its Alleviation
R814 East Central Kansas Horticulture Field
H843 Genetic Improvement of Melon (*Cucumis melo*)
H850 Plastic Mulch and Drip Irrigation in Nursery Production
H855 Grapevine Managment and Value-Added Potential of Grapes and Brambles
H856 Studies on the Cold Hardiness of Peach Flower Buds and Grapes
H866 Kansas Turfgrass Drought Tolerance and Water Use
M876 Woody Biomass Energy Plantations: Seedling Production, Establishment, and Growth
M892 Kansas Landowner's Rationale for Windbreak Establishment, Maintenance, or Removal
H901 In Vitro Propagation and Culture of Ornamental Plants
F938 Freeze Damage and Protection of Fruit and Nut Crops
H979 Overcoming Iron Chlorosis and Planting Shock in Oak Species Using Polyacrylamide
F991 Rootstock and Interstem Effects on Pome and Stone Fruit Trees
H997 Commercial Greenhouse Crops to Complement Spring-Grown Bedding Plants

■ Hotel, Restaurant, Institution Management and Dietetics

528201 Comparison of Service Quality in Hospitals Using Dietary versus Nursing Employees to Deliver Patient Meals
528202 Standards for Quality Assurance and Quality Improvement in School Food Service Operations
H012 Solid Waste Management in the Foodservice and Hospitality Industry
H069 Applying Expert Systems Technology to the Implementation of a Forecasting Model in Foodservice
H908 Development of a Model for Selecting a Hospital Foodservice System

■ Human Development and Family Studies

R014 Successful Coping Strategies of Rural Communities
R017 Factors Affecting Functional Independence of the Oldest-Old in Rural Kansas
H028 Identification and Assessment of a Rural Helping Network
F631 Family Resource Utilization as a Factor in Determining Economic Well-Being of Rural Families
H828 Family Therapy Services in Urban and Rural Areas of Kansas: A Needs Assessment
H915 Ecological Factors Affecting Rural Children's Mental and Social Development
H930 Monitoring the Pulse of Kansas Families
H931 Factors Affecting the Transition to Adulthood in Comtemporary Rural Settings

■ International Agriculture

520171 Training of Personnel of Northeastern State-Nigeria
520172 Training of Personnel of Northwestern State-Nigeria
520177 Benue State-Nigeria
520179 IAP Borno State Nigeria
520343 AID Joint Memorandum of Understanding
524252 Morroco/MIAC Dryland Agricultural Applied Research Project

■ Kansas Water Resources Research Institute

525403 Field Evaluation of a Practical Drainage Determination Technique
525404 Determining the Mechanism of Nitrate Removal by Vegetated Filter
525405 Administration of Water Rights in Basins with Interconnected Surface and Groundwater Supplies
525406 Center Pivot Sprinkler Package Comparison under Various System Capacities
525407 Slug Tests in Unconfined Aquifers
525408 Evaluation of the Role of Stream-Aquifer Hydraulics in the Administration of Water Rights and Minimum Streamflow Standards
525409 Sources, Fate, and Residence Time of Nitrate in Groundwater: A Comparison of Carbonate and Alluvial Aquifers

Laboratory Medicine

481874 Eradication of Economically Important Swine Diseases by Medicated Early Weaning
481876 Bovine Pneumonic Pasteurellosis: Immunity and Pathogenesis
481877 Mediation of Bovine Herpes Virus I Infection by Growth Factor Binding Proteins
528254 Efficacy of a *Streptococcus suis* Vaccine for the Prevention of Experimentally Induced *S. suis* Syndrome in Swine
528255 Characterization of *Salmonella*, *C. jejuni*, and *E. coli* Recovered from Greyhounds and Greyhound Diets
528256 Molecular Mechanisms of Immunosupression in Bovine Respiratory Disease
528257 Anti-Idiotypic Immunity and Receptor Interactions in Bovine Respiratory Disease
528258 Efficacy of Flea Membranes Supernatant Antigen Adminstered to Cats against Adult *Ctenocephalides felis felis*
528259 Determination of Anthelmintic Resistance to Roundworms (*Toxocara* sp.) and Hookworms (*Ancyclospora* sp.) in Greyhound Kennels
528260 Virulence Factors of Salmonellas in Greyhound Dogs
481868 Vaccine Potential of *P. haemolytica* Growth Condition-Dependent Antigens
481872 Imunologic Intervention against *Streptococcus suis* Infections
481873 Molecular Biological Investigations of Bovine Herpesvirus Type I Pathogenesis
H010 Bovine Herpesvirus Type I Molecular Pathogenesis
H055 Resistance to Bacterial Respiratory Diseases: Efficacy of Local Immunization
H059 Temperature Regulation of Virulence of *Salmonella typhimurium*
H060 Transmission and Control of Nematode Parasites in Kansas Greyhounds
F644 Integrated Methods of Parasite Control for Improved Livestock Production
H796 Differentiation and Activation of Macrophage Cytokine Genes after Immune Stimulation
H821 Expression of Antigens and Toxins by *Pasturella haemolytica* A1 in an Iron-Variable Environment
F831 Bovine Respiratory Diseases: Risk Factors, Pathogens, Diagnosis, and Managment
H994 Serotype Specific Antigens of *Rhodococcus corynebacterium equi*

Pathology

481860 Identification of Important Protein of *Actinobacillus pleuropneumoniae*: A Molecular Approach
481876 Bovine Pneumonic Pasteurellosis: Immunity and Pathogenesis
520321 Pathogenesis and Diagnosis of Congenital Defects in Cattle
528354 Eradication of Porcine Pleuropneumonia: The First Steps
528356 Identification of Infection-Dependent Antigens of *Actinobacillus pleuropneumoniae*
528357 Pathogenesis and Diagnosis of Congenital Defects in Llamas
528358 Identification and Documentation of Diseases in Kansas Greyhounds
528359 Purification of Bovine Neutrophil Acyloxacyl Hydrolase
528360 *Cryptosporidium parvum*-Enterocyte Interactions
528361 Identification and Documentation of Disease in Kansas Greyhounds:Addendum
528362 Discovery of the Etiology and Pathogenesis of
528363 "Alabama Rot/Greentrack" Disease of Greyhounds
H050 Identifying BRSV by RNA Polymerase Chain Reactions and Hybridizations
F068 Genetic Enhancement of Health and Survival for Dairy Cattle
F285 Improving Dairy Cattle Genetically
H739 Cow/Calf Nutrition and Management in Kansas
H769 Determination of the Inheritability of Episodic Weakness due to Hyperkalemia
H777 Immunological Expression of Proteins Pertinent to Bovine Respiratory Syncytial Virus
H794 A Search for Restrictive Fragment Length Polymorphisms (RFLP) in Bovine Genome
F831 Bovine Respiratory Diseases: Risk Factors, Pathogens, Diagnosis, and Managment
H904 Immunomodulation as Affected by Combinations of Vitamins A, C, E, and B-Carotene
H907 Development of an Assay for Porcine Transferrin Receptors
H947 Increased Reproductive Efficiency in Beef Cattle
H958 Antigens Responsible for Infection-Acquired Immunity to Porcine Pleuropneumonia

Plant Pathology

520187 Testing Alfalfa Introductions for Pathogens
520190 Wheat Rust Fungicide Field Tests
520194 Characterization of *Fusarium moniliforme* Populations Isolated from Corn in Kansas
520199 Soybean Foliar Fungicide and Seed Treatment Tests
520201 Evaluations and Testing of Fungicides and Nematicides on Horticultural Crops
520202 Seed Treatment
520205 Chemical Control of Phytoparasitic Nematodes
520412 Breeding Sorghum for Tolerance to Fusarium Stalk Rot
520669 Breeding Soybeans for Increased Productivity
523867 Evaluation of Spring Dead Spot and Zoysia Patch Resistance among Bermudagrass and Zoysiagrass Clones and Cultivars in NTEP
524460 Use of Oligonucleotide Synthesizer
524470 Breeding Soybeans for Increased Productivity
524477 Wheat Genetics Resource Center at Kansas State University
524478 Fusarium Research
524484 Rockefeller Foundation Unrestricted Grant
524486 Isolation and Characterization of Avirulence Genes from *Zanthomonas campestris* pv. *oryzae*
524490 Increasing Soybean Production through the Use of Cyst Nematode-Resistant Cultivars
524492 Wheat Genetics Resource Center and Its Contributions to Kansas Wheat Industry
524493 Interactions among Soybean Charcoal Rot, Phytophtora Rot, and the Cyst Nematode
524494 Analysis of the RPL Locus of Maize
524495 Fate and Stability of Foreign DNA in Fungal Phytopathogens
524496 Microbial Antagonism and Biocontrol of Wheat Tan Spot in Conservation-Till Straw
524498 Identification and Quantification of Nematodes in Interaction with Bacterial and Fungal Incitants in Stalk Rot Complexes of Millet
524501 Construction of Chromosome Jumping Libraries in Maize
524502 Winter Wheat Seed Treatment Tests
524503 Microbial Antagonism and Biocontrol of Wheat Tan Spot in Conservation-Till Straw
524504 Molecular Diagnostics for *Xanthomonas campestris* pv. *oryzicola*
524505 Analysis of the RPL Locus of Maize
524506 Ecological Effects of Microorganisms Applied to Crop Residues
524507 Construction and Utilization of Chromosome Jumping Libraries in Maize
524508 Sorghum/Millet Collaborative Research Program with the Egyptian National Ag Research Program (NARP)
524509 Rockefeller Foundation Unrestricted Grant
524510 Molecular Cytogenetic Analysis in Wheat
524515 Genetic Engineering as Applied to Biological Control
524516 The Turnip Crinkle Virus Capsid Protein as a Plant Pathogenic Determinant
524517 Cultivar Identification Using DNA Fingerprinting in Wheat
524519 Molecular Basis of Production of Fumonisin on Corn Infected with *Fusarium moniliforme*
524520 Cyst Nematode Control—A Biotechnological Approach
524521 Using Cultural Practices to Reduce Soybean Cyst Nematode and Charcoal Rot Damage in Soybeans
524523 Cytogenetically Based Physical Map of Wheat Genome
526396 Using Cultural Practices to Reduce Soybean Cyst Nematode and Charcoal Rot Damage in Soybeans
527954 Bioremediation of Hydrocarbon-Contaminated Soils Using Vegetation: A Field and Greenhouse Study
F005 Interaction of Nematode - Host Variability and Abiotic Factors on Crop Losses
H021 Development of Productive, Disease Resistant Soybean Varieties
H022 Crop Improvement through Cell Culture and Genetic Engineering
H058 Molecular and Genetic Characterization of a Gene Controlling Avirulence
H416 Plant Cell Culture for Disease Physiology and Crop Improvement
H547 Genetics and Physiology of *Fusarium* spp.
H686 Breeding Soybeans for Increased Productivity
H720 Cytogenetic Analysis of Host Plant Resistance in Common Wheat
H725 DNA Restriction Fragment Length Polymorphism Analysis
R732 Adaptation, Propagation, and Stress of Ornamentals and Turfgrass in South-Central Kansas
H772 Fungal Diseases of Wheat and Their Control
H792 Characterization of the MI Locus Conferring Resistance to *Meloidobyne incognita* in Tomato
H845 Race-Specific Probes for *Xanthomonas camestris* pv. *oryzae*
H857 Ecology and Management of Nematode Populations in Kansas
H858 Genetic Analysis of Disease Resistance in Maize
H895 Etiology, Epidemiology, and Control of Sorghum Diseases
F923 Biocontrol of Soil-Borne Plant Pathogenes
H961 Genetic Investigations of Pest Resistance in Alfalfa
H971 Interaction of Wheat Fungal Diseases on Yield Determinations
H975 Mycorrhizal Symbiosis: Potential for Bioremediation of Heavy Metal-Contaminated Soil
H977 Assessment of Yield Losses to Multiple Diseases of Winter Wheat
H986 Assessment of Grain Sorghum Yield Loss by Sooty Stripe (*Ramulispora sorghi*)
H989 Pathogenicity Determinants Carried by TCV and WSMV Capsid Proteins
H992 Reduction of Straw-Borne Tan Spot Inoculum in Conservation-Tillage Residue

Sociology, Anthropology, and Social Work

527620 Local Self-Development Strategies
527623 From Research Knowledge to Community Action: Toward the Application of Research Knowledge to Effective Community Action
R020 Potential for Incorporating the Kansan Farmer in the Agricultural Research Process
H034 Cancer Morbidity among Kansas Farmers
H805 A Proportionate Mortality Study of Cancer among Kanss Farmers
R839 The Impact of Non-Traditional Immigrants on Kansas Communities
F939 Community Change and Resistance: A Restudy of the Rural Life Study Series

Statistics

527606 Analysis and Interpretation of Insect Ecology and Control
527607 SIRG Public Information Assistance Contract (Statistical Analysis of Radon Survey Data)
R825 Statistical Laboratory

Veterinary Diagnosis

481874 Eradication of Economically Important Swine Diseases by Medicated Early Weaning
528900 Eradication of Swine Respiratory Pathogens by Medicated Weaning
H018 Optimum Processing to Maximize Utilization of Cereal Grains in Swine Feeding
H799 Respiratory Disease and Environmental Stress in Food Animals
F990 Prevention and Control of Enteric Diseases of Swine

Veterinary Medicine

528950 Determination of the Immunoenhancing Effects of Recombinant Bovine Interleukin-1B in Cattle Utilizing *P. haemolytica* Challenge Model
R650 Exploratory Research in Animal Health and Disease

Fort Hays Branch Experiment Station

520239 Breeding for Wheat Improvement and Wheat Pest Control in South-Central Kansas
525953 An Alternative to Landfills for Disposal for Yard Waste and Newspaper
525954 Genetic Development of Higher Disease Resistance and Grain Protein in New Wheat Varieties
525955 Pearl Millet Breeding KS-101
525956 Triasulfuron in Winter Wheat in Kansas
525957 Broadleaf Weed Interference in Winter Wheat
525958 Canola Research
525959 Native Soil Bacteria as Selective Weed Control Agents in Wheat
525960 Development of Sorghum Germplasm with Enhanced Tolerance to Greenbug and Dwarf Mosaic Virus
525961 Biological Control of Winter Annual Grass Weeds in Winter Wheat
H046 Genetics and Breeding of Sorghum
H062 Improvement of Pearl Millet, Sunflower, and Rape
R252 Beef Cattle Feeding Investigations
R255 Beef Cow Herd Management
R291 Management of Soil in Dryland Regions
R645 Managing Range to Increase Forage-Conversion Efficiency
H739 Cow/Calf Nutrition and Management in Kansas
F773 Conservation Tillage Systems
H846 Genetic Improvement of Wheat
R847 Forestry Investigations in the Great Plains of Kansas
H869 Pathogen-Host Investigations in Wheat, Sorghum, and Sunflower
H978 Weed Management and Control Investigations

Northwest Research-Extension Center

520365 Sunflower Performance Testing Program
520722 Canola Research
520727 Tillage, Irrigation, and Hybrid Maturity Class Effects on Corn Production
522926 Canola Research
525752 Winter Rape Testing Project
525753 Spray Nozzle Comparison under Various System Capacities
525754 Canola Research
525755 Characterization of Overwinter Nitrate Nitrogen Leaching Potential in Northwest Kansas
525756 Sunflower Date of Planting and Plant Population Studies
525757 Tillage, Irrigation, and Hybrid Maturity Class Effects on Corn Production
R121 Horticultural Investigations in Northwest Kansas
R293 Crop Improvement in Northwest Kansas
R294 Soil Management in Northwestern Kansas
H790 Improvements in Irrigated Water Management for the Central Great Plains
R847 Forestry Investigations in the Great Plains of Kansas
F865 Increased Prolificacy in Sheep and Its Impact on Nutritional Needs
H911 Production Methods for Increased Efficiency of Ewe-Lamb Enterprises
R956 Improving N Fertilization for a WSF Rotation in a Reduced-Tillage Environment
H974 Optimum Spacing of Driplines for Drip-Irrigated Corn

Southeast Kansas Branch Experiment Station

520254 Weed Control in Farm Crops
520336 Yield and Quality of Hay from Sudangrass and Pearl Millet Lines
526366 Kansas Crop Performance Test of Short-Season Soybeans in Southeastern Kansas
526367 Effect of Sulfur Fertilization on Tall Fescue and Winter Wheat in Southeastern Kansas
526372 Agronomic Effects, Profitability, and Riskiness of Long-Term Crop Rotations in Southeastern Kansas
526381 Digestibility of Fescue Diets Supplemented with Amaferm (*Aspergillus oryzae* Fermentation Extract)
526390 Increasing Soybean Production through the Use of Cyst Nematode-Resistant Cultivars
526393 Efficacy of Laidlomycin Propionate for Improving Weight Gain of Growing Cattle on Pasture
526394 Consumption of Free-Choice Grain Supplements Containing Magnesium Mica
526395 Protein-Sparing Effect of Magnesium Mica
526396 Using Cultural Practices to Reduce Soybean Cyst Nematode and Charcoal Rot Damage in Soybeans
H015 Evaluation of Cropping Systems for Southeastern Kansas
H030 Forage Production and Use in Southeastern Kansas
H031 Evaluations of Alternatives in Soil and Water Management Practices in Southeast Kansas
R174 Beef Cattle Production and Management in Southeast Kansas
R718 Soybean Cultivar Evaluation in Southeastern Kansas
R754 Use of a Legume-Grain Sorghum Rotation in a Crop-Livestock System
H914 Use of a Tall Fescue with Different Rates of *Acremonium coenophialum* Infections
R957 Phosphorus, Potassium, and Chloride Effects on Alfalfa and Birdsfoot Trefoil Establishment, Yield, and Quality

Southwest Kansas Research-Extension Center

520247 Management of Fertilizer and Irrigation Water in High Plains
520249 Evaluation of New Products to Improve the Efficiency of Production in Feedlot Cattle
520251 Herbicides for Weed Control on Fallow Ground
526151 Weed Control Research in Southwest Kansas
526152 Quality Testing of Fly Parasites for Cattle Feedlots
526154 Variety Testing of Alternative Crops
526155 Soil Fertility and Soil Management Research for Western Kansas
526156 Yield Appraisal of Crops for Southwest Kansas
526157 Water Management for Southwest Kansas
526161 Frost-Damaged Grain Sorghum-An Evaluation of Varying Grain Test Weight Sorghums as Livestock Feed
526162 Energy Conservation Benefits of Improved Irrigation Efficiency
526163 LEPA Irrigation Management for Soybeans in Western Kansas
526164 Effect of a Previous Soybean Crop and Nitrogen Fertilizer on Irrigated Corn and Grain Sorghum Production and Profitability
526165 Cattle Feedlot Managment Program
526166 Integrated Management of Stable Flies in Cattle Feedlots
526167 Tillage, Irrigation, and Hybrid Maturity Class Effects on Corn Production
H029 Efficient Resource Management for Dryland and Irrigated Soils
H101 Biology and Control of Arthropod Pests on Corn in Southwestern Kansas
R834 Irrigation Management for Southwest Kansas
R847 Forestry Investigations in the Great Plains of Kansas
H905 Measuring Changes in Body Composition and Meat Quality in Growing Holstein Steers
R952 Maximizing Nutrient Use Efficiency in Dryland Cropping Systems
R955 Agronomic, Environmental, and Economical Effects of Long-Term Fertilizer Applications
H967 Dryland Cropping Systems for Southwest Kansas
H969 Crop Improvement for Southwest Kansas
H973 Developing Weed Management Systems for Southwest Kansas
H981 Pest Management of Livestock Insects in Western Kansas

F = Regional projects
H = Hatch projects
M = McIntire-Stennis projects
R = State projects
Numbers = Sponsored projects

Research Projects Terminated

Agricultural Economics

520002 Management Information System for Local Governments
520453 An Economic Comparison of the Kansas State Data Bank Farm Records and Those Randomly Surveyed by USDA
520455 Soybean Cultivar Development for Southeastern Kansas
520458 Impacts of Forward Contracting and Market Structure in the Fed Cattle Industry
520459 Cleaning Non-Wheat Material from Kansas Wheat
520460 Measuring the Costs and Benefits of Cleaning Hard Red Winter Wheat in Kansas
520461 Evaluation of the Actuarial Soundness of Multiple Peril Crop Insurance
F587 Determinants of Farm Size and Structure in North Central Areas of the United States
F635 Financing Agriculture in a Changing Environment: Macro, Market, Policy, and Management Issues
H663 Livestock Price Analysis and Marketing Strategies
H793 Changing Characteristics and Structure of Kansas Farms

Agricultural Engineering

527650 Development of a Wheat Hardness Tester
527655 Evaluation of Laboratory Model Grain Cleaning and Separating Equipment
527656 Soil and Cropping Management Effects on Atrazine Movement in Soil Water
527658 Harmonics Produced by Variable-Speed Fan Systems
527660 Popcorn Pericarp Studies
527664 Biomass Resource Assessment
527665 Grain Harvesting Technology
527668 Hay Preservative Coatings
538527 Design Optimization of Variable-Speed Fan
538687 Systems
H656 Grain Cleaning and Separation for Grading
R712 Water Vapor Movement in Stored Grain
H745 Electrical Energy Use and Load Management for Grain Processing and Handling
R749 Transport of Agricultural Chemicals through Soil
R753 Sustaining Irrigated Agriculture in Kansas with Drip Irrigation
R808 Irrigation Experiment Field, Scandia, Kansas
R810 North Central Kansas Experiment Field, Belleville
R811 Sandyland Experiment Field

Agronomy

520021 Measurements of Micrometeorological Parameters for Testing Large-Scale Models
520024 Genetic Improvement of Sorghum for Sustainable Agroecosystems
520656 Estimation of Nitrogen Mineralization from Soil Organic Matter
520672 In Vitro Production of Haploids via Anther Culture and Artificial Induction of F1 Hybrid Seeds in Corn
520674 Study to Estimate Plant Residue from Spectral Reflectance Measurements
520677 Assessing Soil Phosphorus Availability in Low-Input Systems
520681 Improving Wheat Varietal Development by Selecting for High Photosynthesis during Grain Filling
520683 Development of a System to Double-Crop Corn after Corn for Southeastern Kansas
520686 Dryland Corn Management for Western Kansas
520687 Degradation of Atrazine in Soil Columns
520689 Cooperative Trueness to Variety Testing of Seed
520693 Development of Autotetraploid Hybrid Sorghums for Higher Yields, Better Quality, and Wider Adaptation
520710 Literature Search for Southern High Plains Project-Kansas
529146 Modeling Wheat Response to Direct CO_2 Enrichment
538538 Development of the Hard White Winter Wheat Industry in Kansas
538711 Improvement of Market Quality of Kansas Wheats by Breeding
538713 Improvement of Hard Winter Wheat
538720 Development of Hard White Wheat for Kansas
F500 Characterization and Management of Soil Water and Solutes in Field Soils
F586 Environmental and Genotypic Control of Assimilate Allocation in Crops
H642 Crop Production in Stressful Environment
H673 Development of Multiple Pest-Resistant Alfalfas
R749 Transport of Agricultural Chemicals through Soil
F803 Nutrient Management in Conservation Tillage to Improve Productivity and Environmental Quality
R806 Cornbelt Experiment Field
R807 East Central Kansas Experiment Field
R808 Irrigation Experiment Field, Scandia, Kansas
R809 Harvey County Experiment Field
R810 North Central Kansas Experiment Field, Belleville
R811 Sandyland Experiment Field
R812 South Central Kansas Experiment Field

Anatomy and Physiology

481861 Immunomodulation of Mastitis with Bovine Recombinant Cytokines
528553 Cytokine Immunomodulation in Bovine Respiratory Disease
528554 Role of Arachidonic Acid Metabolites in Immunosuppression
528559 The Role of Furosemide and Prostaglandins in Exercise-Induced Pulmonary Hemorrhage
528560 Evaluation of Bovine Recombinant Interuekin-1B and Interleukin-2 in Cattle
528561 Influence of Dietary Carnitine on Sprint Performance in the Racing Greyhound
528562 Dietary Potassium Involvement in Exertional Performance in the Racing Greyhound
528563 Immunomodulation of Mastititis with Bovine Recombinant Interleukin
528564 Requirements for Sprint Performance in the Racing Greyhound: Influence of Carnitine
528565 Mechanisms of Exercise-Induced Pulmonary Hemorrhage: The Role of Atrial Natriuretic Peptide
529037 Electron Microscopy of Neurons, Axons, and Synapses
529134 Role of Endogenous Leukotriene Production in Lymphocytes
529173 Neuroendocrinology of Reproductive Aging in Rats
H832 Morphometric Analyses of Experimentally Induced Lesions in Cattle and Swine

Animal Sciences and Industry

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FY91 and FY92 Kansas Agricultural Experiment Station Income and Disbursement Statement

	8.0%	49.9%	14.9%	27.2%		
FY91 FUNDING	**$3,240,910**	**$20,300,648**	**$6,046,080**	**$11,034,188**	**$40,621,826**	
	Federal	**State***	**Fees**	**Sponsors**	**Total**	
FY91 EXPENDITURES						
Faculty & Administrative Salaries	$2,136,802	$12,155,390	$317,823	$4,818,558	**$19,428,573**	**47.8%**
Classified & Student Salaries	$245,443	$5,232187	$664,548	$1,025,803	**$7,167,981**	**17.6%**
Contract Services & Travel	$310,501	$1,368,495	$913,964	$2,660,530	**$5,253,490**	**12.9%**
Supplies & Material	$335,091	$947,057	$2,223,858	$1,273,626	**$4,779,632**	**11.8%**
Equipment	$213,073	$596,726	$1,912,337	$1,194,772	**$3,916,908**	**9.6%**
Other	$0	$793	$13,550	$60,899	**$75,242**	**0.3%**
Totals	**$3,240,910**	**$20,300,648**	**$6,046,080**	**$11,034,188**	**$40,621,826**	**100%**

	8.2%	50.6%	14.8%	26.4%		
FY92 FUNDING	**$3,381,663**	**$20,813,057**	**$6,073,124**	**$10,839,717**	**$41,107,561**	
	Federal	**State***	**Fees**	**Sponsors**	**Total**	
FY92 EXPENDITURES						
Faculty & Administrative Salaries	$2,311,046	$12,261,132	$273,810	$5,025,874	**$19,871,862**	**48.3%**
Classified & Student Salaries	$225,709	$5,288,327	$886,368	$1,080,483	**$7,480,887**	**18.2%**
Contract Services & Travel	$260,820	$1,340,154	$1,036,739	$2,387,324	**$5,025,037**	**12.2%**
Supplies & Material	$359,855	$994,748	$2,451,038	$1,102,141	**$4,907,782**	**11.9%**
Equipment	$224,233	$928,646	$1,412,932	$1,096,879	**$3,662,690**	**8.9%**
Other	$0	$50	$12,237	$147,016	**$159,303**	**0.5%**
Totals	**$3,381,663**	**$20,813,057**	**$6,073,124**	**$10,839,717**	**$41,107,561**	**100%**

*Includes MOE, IGP, and ILP

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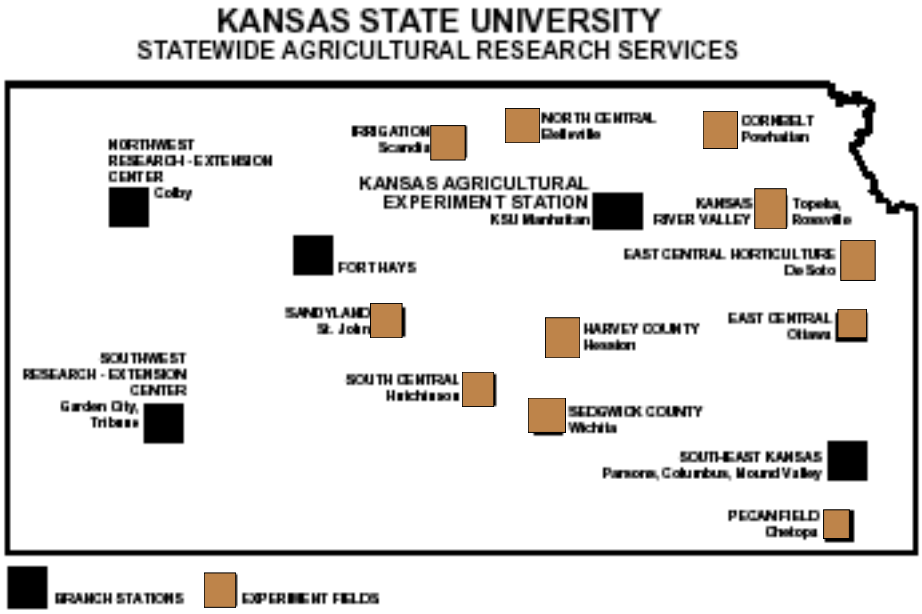

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