

concentrations of folates and vitamin B<sub>12</sub> between d 9 and d 21 suggests that they could play a role for lactation, but in other metabolic pools. Arterial and venous plasma concentrations of glucose, lactate and  $\alpha$ -amino N increased after the meal ( $P < 0.01$ ), whereas concentrations of NEFA, glycerol and TG decreased ( $P < 0.01$ ). Arterio-venous differences increased after the meal for glucose, lactate and  $\alpha$ -amino N ( $P < 0.01$ ), remained constant for TG, and decreased for NEFA ( $P < 0.01$ ) and glycerol ( $P < 0.05$ ). Arterial concentrations of all AA increased after the meal but changes of A-V with the meal differed among AA. The pattern of AA uptake was affected by the nutritional status. For instance

the valine:lysine ratio was higher (1.11) in fasted than in fed sows (.82). Arterio-venous difference of energy (7.7 kJ/L plasma) was similar in fasted and fed sows. The relative contributions of glucose, TG, lactate, NEFA, and AA to energy uptake by the mammary gland amounted to 24.0, 25.5, 2.1, 34.1 and 13.9% in fasted sow and, 51.0, 26.7, 3.9, 0 and 18.5% in fed sows, respectively. These results indicate that the mammary uptake of nutrient is greatly depending on the nutritional status of the sow.

**Key Words:** Sow, Lactation, Milk precursor

## Undergraduate and Graduate Education

**655 The use of peer review in an animal science course focusing on societal issues.** W. A. Scheer\* and J. N. Spain, *University of Missouri, Columbia, MO.*

This study was a post-facto analysis of the use of peer reviews to evaluate student research papers. Students ( $n=72$ ) in a sophomore-level animal science course were assigned a research paper. Each student selected a topic that they considered to be the most critical societal issue facing animal agriculture. Students were expected to write the paper using the format of the *Journal of Animal Science* and to utilize a minimum of 15 refereed journal articles. The first edition of the paper was graded by the instructor or graduate teaching assistant. Three copies of the second edition were submitted with only student identification numbers identifying the author. Students were randomly allocated three papers to evaluate. Each student completed a review sheet and awarded up to 50 points with 20 points available for topic development, 20 points for grammar and spelling, and 10 points for proper citation format. Students were given 3 days to complete the evaluations. Peer reviews were then returned to the student writers for final revision. Students were asked to evaluate reviewers in three categories using a scale of zero to one in each category, with up to 3 total points available. The final edition of the paper was then graded by the instructor or graduate teaching assistant. The relationships between average peer review grade, grade as a reviewer, and final edition grade were evaluated. A significant ( $P < 0.05$ ) positive correlation was found when comparing average peer review grade and final edition grade. As students' peer review grades and final edition grades increased, their grade as a peer reviewer also increased. Students who wrote papers that received higher second (peer-assigned) and final edition (instructor-assigned) grades were considered to be better reviewers as scored by their peers, indicating that students who wrote better papers provided more meaningful feedback. Peer review of research papers was a useful and effective component of this sophomore-level animal science course that allowed students to improve their writing skills and become more actively involved in the evaluation process.

**Key Words:** Teaching, Peer Review

**656 Practical student experiences aid in the education on controversial animal topics.** K. D. Ange\*, *North Carolina State University, Raleigh, NC.*

The animal rights versus animal welfare conflict is an important issue for all animal scientists involved in undergraduate education. Students need to be taught the difference between animal rights and animal welfare so they can understand the current issues facing the field of animal science. Some animal rights groups frequent the media spreading propaganda about animal industries and it is important that animal science students are taught the facts so that they can form their own opinions. Undergraduate students enrolled in NCSU's Companion Animal Management course were given the opportunity to examine a current controversial animal topic first hand. The animal rights groups People for the Ethical Treatment of Animals and Humane Society of the United States have been criticizing circus animal treatment in the mainstream media (NBC News). The opinions of these animal rights groups were discussed in class and then the students were allowed to tour the animal compound of a very large traveling circus and meet with the animal care staff. The animals in this compound included alpacas, camels, elephants, horses, tigers, and zebras. After visiting the circus, students were asked to complete a questionnaire regarding their opinion of animal care in circuses. Fifteen of 18 students completed the survey. Prior to the tour, the average student opinion of circus animal care was 2.6 and their average opinion of circus animal staff (trainers and veterinarians)

was 2.9 on a 1 (very poor) to 5 (very good) point scale. After their tour, student opinion of animal care and the animal staff improved to 4.4 and 4.5, respectively ( $P < 0.001$ ). Although all 15 students stated that they felt the circus tour improved their opinion of animal care at circuses, a few students listed enlarging animal cages, increasing exercise and changing elephant restraints as ways to improve animal care. In addition to classroom education, the results from this tour show that personal experiences dramatically affect what students think about controversial animal issues.

**Key Words:** Teaching, Active learning, Welfare

**657 A novel method for teaching animal welfare concepts: animal welfare judging teams.** C.R. Heleski\*<sup>1</sup>, A.J. Zanella<sup>1</sup>, and E.A. Pajor, <sup>1</sup>*Michigan State University, East Lansing MI, USA*, <sup>2</sup>*Purdue University, West Lafayette, IN, USA.*

Examining the welfare of animals in various production systems and making ethical evaluations of which is most appropriate continues to be a priority issue affecting many levels of animal agriculture. We have developed a model to increase education of animal welfare issues, while aligning ourselves with a traditional curriculum feature within animal science departments; i.e. judging teams.

We proposed one year ago that developing teams to educate young people about farm animal welfare then establishing competitions to assess their skill level would be one way to integrate welfare science into the mainstream of animal science curricula. Three other universities opted to join Michigan State in this pilot endeavor: Purdue University, University of Guelph and University of Wisconsin. Each team is being coached in the basics of understanding farm animals# evolutionary biology, their biological needs, indicators of differing levels of welfare and how to holistically evaluate different facilities, stockmanship and management.

Based on pedagogical principles, the concept of integrating learning with competition is known to enhance learning and retention. Students are currently preparing for a competition, March 1, 2002. The competition will use CD-ROM#s with indicators of animal welfare ranging from physiological data, video and still clips, to behavioral responses and time budgets. Students will evaluate two scenarios for each species being judged, prepare their analysis, then make an oral presentation. The knowledge of welfare science, the integration of multiple measures and the persuasion of the oral presentation will be key in scoring the students.

Preliminary observations indicate that preparing the students for this competition has increased their knowledge base and has enhanced networking with university farm managers. It should be noted that while the assessment of various aspects of animal welfare can be objective and quantifiable, judgment decisions of what threshold level on the continuum between poor and good welfare is acceptable still come down to ethically examined choices.

**Key Words:** Animal Welfare, Welfare Assessment, Judging Teams

**658 A pre-capstone seminar to foster student interaction to improve educational quality of independent learning experiences.** M. A. Wattiaux\*, *University of Wisconsin-Madison.*

Our objective was to develop a class to facilitate communication among students and better prepare sophomores to take full advantage of independent learning experiences (ILE) typically available to juniors or seniors such as internships, team projects in capstone courses, summer research programs and study abroad. Thus, a one credit seminar series

was designed based on the Kolb's model of experiential learning under the premise that the sharing of concrete experiences gained by those who completed ILEs, would benefit sophomores in their conceptualization and planning for their own future ILEs. Seminar speakers included primarily juniors, seniors and recently graduated students. Guidelines were developed to help them share their experiences, educational gains and personal growth. Sophomores (n=24) were expected to submit a weekly report in the form of an e-mail journal entry. Guidelines were developed to help focus the writing on analysis and assessment of the ILE discussed in class in relation to their personal interests and aspirations. Sophomores were surveyed with a questionnaire focusing on aspects of the class that helped the learning process. Possible scores (S) were on a 1-to-5 Likert-type scale (1 = strongly disagree and 5 = strongly agree). Positive aspects of the class (S>4.0) included: (a) an increased awareness of the variety of ILE opportunities, (b) learning directly from other students' experiences, and (c) better understanding of the processes involved in the realization of a successful ILE. Disliked aspects of the class (S<3.0) included: (a) the amount of time and work involved in writing a weekly journal entry and (b) the lack of an 'objective' grading system. Despite reluctance to accept writing as a part of this class, the pre-capstone helped some students to identify deficiencies in their writing skills. In summary, the pre-capstone seminar creates an educational cycle among students in which they first observe and reflect on experiences of others, then, engage in an ILE of their own, and finally, become mentors to those who follow them.

**Key Words:** Undergraduate education, Experiential learning, Independent learning experiences

**659 "The Quail Project": Integrating fundamental nutrition concepts with cross-disciplinary skills.** D.J.R. Cherney\*, A.W. Bell, W.R. Butler, and E.A. Oltenacu, *Cornell University, Ithaca, NY.*

Successful graduates of animal science programs should have technical competence. Increasingly, they also are expected to develop broad skills that allow them to synthesize knowledge and contribute their expertise effectively through communication and the ability to work with others. A 2-wk study using Japanese quail (*Coturnix coturnix Japonica*) was conducted with the objective of demonstrating the effect of dietary protein level on voluntary feed intake, average daily gain and efficiency of feed utilization in growing quail to the students in our animal nutrition class (142 students). Students were responsible for daily animal care and data collection. Further objectives of "The Quail Project" were for students to learn to read scientific papers and summarize the data (by writing an abstract), and to work in groups (four students/group). Groups summarized the data from the trial, and presented the data in oral and written formats. Nineteen of 34 groups used Powerpoint presentations, suggesting that many of our students are comfortable with computer-generated formats for data presentation. A survey was conducted at semester's end to evaluate the quail project. Response rate was 65% (93 of 142; 43% transfer students, 57% non-transfers). Transfer students were less likely to indicate veterinary medicine (45% of respondents) as a vocational objective than were non-transfers (62%). Transfer students were more comfortable with a group grade (83%) than were non-transfers (67%) and more likely to think grading was fair (83% vs. 72% for transfers and non-transfers, respectively). Both groups of students reported that the project was at least somewhat useful in helping them understand protein nutrition concepts presented in lecture, although transfer students were more likely to indicate that the quail project did not help their understanding of lecture materials (15% vs. 4%, respectively for transfer and non transfer). "The Quail Project" was successful in furthering technical competence in animal nutrition, but also furthered the cross-disciplinary skills of oral communication and group cooperation.

**Key Words:** Teaching, Nutrition

**660 Ecology of grazing lands systems: A multi-disciplinary and multi-university course.** J. C. Waller\*<sup>1</sup>, R. Mitchell<sup>2</sup>, O. Abaye<sup>3</sup>, and V. G. Allen<sup>2</sup>, <sup>1</sup>University of Tennessee, <sup>2</sup>Texas Tech University, <sup>3</sup>Virginia Polytechnic Institute and State University.

This field-oriented graduate level course immerses students in diverse grazing lands and ecosystems across several states. Students learn about: (a) the components and functions of grazing lands and how

these vary in different ecoregions; (b) research needs, objectives and techniques in soil-plant-animal research; (c) forage-livestock ecology and systems in grazing lands (cropland, pastureland, rangeland, and forestland); (d) the role of forages in conservation practices, wildlife habitat, and sustainable agriculture; and (e) industries allied with forages and livestock. The objectives of the course are to provide students with an opportunity to: (1) experience first-hand the ecology of grazing lands in various ecoregions, and observe techniques to address the researchable needs, and (2) interact with individuals active in the areas of forage-livestock research, teaching, extension, industry and production. Instead of a textbook, students are given reading assignments to familiarize them with sites to be visited and professionals they will meet. The course requires students to: (a) participate fully in the two-week field trip with at least two multi-disciplinary faculty; (b) prepare a forage species collection of at least 50 plants accompanied by a description of each; (c) take notes during the course and write a trip report that summarizes information learned and descriptions of grazing lands systems observed; and (d) undergo an oral examination designed to facilitate summarizing and synthesizing the information gained on the trip. During the last four years (1998 - 2001), 46 students from 12 states in the US and 10 foreign countries (representing five American and two Mexican universities) have visited sites in Texas, Oklahoma, Kansas, Missouri, Nebraska, New Mexico, Arizona, Nevada, Utah, Florida, Georgia, Alabama, Tennessee, Virginia, Delaware, Maryland, Pennsylvania, South Dakota, Montana, Idaho, Wyoming, and Colorado.

**Key Words:** Ecosystems, Grazing systems, Experiential learning

**661 SheepSim: Teaching genetic and economic management of a flock of sheep.** M. L. Thonney\*, K. T. Egan, and D. O. Maizon, *Cornell University, Ithaca, NY.*

SheepSim was developed to teach genetic and economic management of a flock for a course in sheep management and to enable potential farmers to evaluate economies of sheep farming. The economic component includes acres and yields of forages; amount and cost of buildings, equipment, fencing, and purchased feed; prices of lambs, sheep, and wool; and the cost of financing borrowed capital. The genetic component models litter size, birth weight, 60-d weight, mature weight and fleece weight for Dorset and Finnsheep breeds and their crosses along with the offspring of terminal Suffolk sires. The offspring genetic values are the average of their parents' genetic values plus a random term that models Mendelian segregation. Heterosis adds a constant value, which depends on the type of cross, to the phenotypic value. Fertility is dependent upon breed and season of the year defined by date in the northern hemisphere; death losses of lambs and adults are included in the simulation. The model operates in 73-d increments to allow simulation of the STAR management system with five lambing seasons per year. Four, 3, 2, or 1 lambing seasons per year can also be modeled. Although the simulation can be started with any reasonable number of Dorset and Finnsheep ewes and rams, the suggested starting numbers are 1 ram and 10 ewes of each breed to demonstrate how fast ewe numbers can be accumulated and to allow for crossbreeding. Additional breeding animals can be purchased and sheep can be sold at the end of each 73-d period. Economic information available after simulating one year shows the lambs born, lambs born alive, and lambs weaned per ewe lambing and includes an annual income statement showing current animal, building, and equipment inventory; sheep, wool, and hay sales; purchased feed; and cash and depreciation costs. Net farm income, return to unpaid operator's labor, capital, and management, and return to operator's labor and management are reported. Students change default values to fit a model farm that they operate for 10 to 15 years and write a report based upon tables and graphs they create from annual animal performance and economic information.

**Key Words:** Sheep, Management, Simulation

**662 Meat judging as a learning tool:gender comparison.** Paul Berg\*<sup>1</sup>, *North Dakota State University.*

Abstract: Discussion of differences between male and female students or workers range from arbitrary stereotypes to formal evaluation of performance. Meat judging tests a students' visual acuity, technical knowledge, application of logic, critical thinking, decision making and ability to communicate. Judging scores allow objective comparison of gender differences. Category (CAT) point (pt) totals between male (M) and female (F) contestants were evaluated for beef quality grading (QG),

yield grading (YG), fabrication specifications (SP), placing of classes (PL), reasons (RS) and total score (CN). Data were from the National Western (NW), Southeastern (SE), Iowa State Invitational (IS), American Royal (AR) and International (IN) contests from 1993 through 1999. A change in contest format in 2000 precludes addition of comparable data. A total of 2112 (1302 M and 810 F) observations were evaluated. Comparison by CAT revealed M advantage in YG (1.6 pt,  $P=0.02$ ); SP (1.3 pt,  $P=0.11$ ); PL (2.3 pt,  $P=0.002$ ) and CN (1.0 pt,  $P=0.66$ ). F advantage was shown in QG (0.2 pt,  $P=0.71$ ) and RS (4.2 pt,  $P=0.0001$ ). Contests are designed to be progressively more difficult. Difference between contests were significant ( $P>0.001$ ). For QG, YG, RS, and CN a positive linear affect was shown ( $P>0.001$ ). Cubic affects were observed for SP and PL ( $P>0.001$ ). To test if the affect of the judging experience carries over into other academic areas, cumulative academic grade point averages (GPA) for judging team (JT) members were compared to a random sample of the general student population (RS) and to a random sample of scholarship athletes (SA). Comparison was based on individual students who matriculated and graduated from NDSU by academic year and gender. Academic status was determined by the number of completed class hours (ch) ( $FR \leq 32$  ch,  $SO \leq 64$  ch,  $JR \leq 96$  ch,  $GRAD > 128$ ch). GRAD GPA was higher than FR for all groups ( $FR=2.79$ ,  $SO=2.88$ ,  $JR=2.92$ ,  $GRAD=2.98$ ). Average GPA raised 0.18pt from FR to GRAD. Only JT students exceeded the average increase (F JT = 0.24 and M JT = 0.22pt).

**Key Words:** meat judging, gender comparison

**663 Travel as a teaching method.** M.A. Russell<sup>\*1</sup>, M.A. Latour<sup>1</sup>, J.C. Forrest<sup>1</sup>, G.N. Hinch<sup>2</sup>, and R.S. Jessop<sup>2</sup>, <sup>1</sup>*Purdue University, W. Lafayette, IN*, <sup>2</sup>*University of New England, Armidale, NSW, AU*.

Fieldtrips are well-known methods to gain exposure to resources not available on campus, however the travel time is often viewed as an obstacle, rather than a method. It is the purpose of this paper to share examples of the actual travel as a teaching method. The inclusion of travel experiences must match the specific learning objectives of the exercise. The Purdue University ANSC 181, "Orientation to Animal Sciences", includes an overnight industry trip with the objectives of social and academic integration of students into the university. Thus, students visit examples of production units, agribusinesses and just as importantly, become acquainted with each other on the trip. Both the University of New England AGEX 310, "Agricultural Extension" and Purdue ANSC 393 "Animal Industry Travel Course" are built around the travel experience of students with many assignments. Objectives not only include developing industry contacts, applying information and principles from classes, hearing philosophies of industry leaders, and seeing animal agriculture methods specific to different climates, but also written correspondence, public speaking, critical thinking, travel skills, and relationship building are expected outcomes. As globalization of agriculture increases both students and extension professionals need more international experiences and multicultural sensitivity education. Purdue's ANSC 295K, "Exploring International Animal Agriculture" adds to the above objectives the awareness of cultures, challenges, and agricultural practices in developing countries with the positive experience of international travel. Travel becomes a way for participants to know each other better, interact on a more personal level, and build relationships that are not possible in the classroom. Because technology transfer and content knowledge acquisition are not the only expected outcomes of education, travel can provide great opportunities if carefully planned to match learning objectives.

**Key Words:** Travel, International, Teaching

**664 Recruitment value of an on-campus animal science youth program.** J. S. McCann<sup>\*1</sup>, *The University of Georgia, Athens, GA*.

For the past six yr, the Animal and Dairy Science (ADS) Department invited youth who had actively exhibited livestock or horses to a two d

summer program called "Animal Science In Action" (ASIA). The goal of ASIA is to introduce the Animal and Dairy Science major as an area of study and the career options in the livestock industry. To enhance student comfort level of attending The UGA campus, students stayed in dormitories and interacted with faculty, graduate, and undergraduate students. Parents were invited to the initial and ending program sessions. Since the first ASIA in 1995, a variety of activities have been assessed. Youth experienced the evaluation and fabrication of carcasses; process of making hot dogs or hamburgers that students consumed; pig nursery practices and basics for moving pigs; ultrasound evaluation for pregnancy, loin eye size, or finish; ground driving or longing horses; working in the milking parlor; and visiting a cloning lab. Parents were more interested in the application and financial aid processes; thus, the program evolved to having separate parent sessions. A total of 373 high school students have attended the program with 51.2% being rising seniors, 44.5% rising juniors, and 4.3% rising sophomores. From the first four classes of ASIA, a mean 27.3% of the youth became UGA students. The ADS Department undergraduate numbers increased an average 61% above mean enrollment in 1992-1994. More importantly, the ADS undergraduate numbers have remained steady, averaging 155% above pre-ASIA years. The ADS students currently represent 16.3% of the College of Agriculture and Environmental Science (CAES), up from 10% of the CAES mean enrollment in 1992-1994. Comparing CAES fall 1995 to 2001 undergraduate enrollment, student enrollment decreased 26%. Surveys of 2001 participants indicated the overall educational value was 1.16 while their interest in studying ADS averaged 1.35 (scale from 1 to 5 where 1=strongly agree, 5=strongly disagree). In the wake of declining CAES enrollment, ASIA has helped the ADS Department grow and sustain undergraduate enrollment.

**Key Words:** Recruitment, Undergraduate

**665 Participation by the Animal and Poultry Sciences Department in the University Core Curriculum.** C. M. Wood<sup>\*</sup>, *Virginia Tech, Blacksburg, VA*.

In 1992, Virginia Tech implemented the University Core Curriculum (Core) to broaden the general education of all undergraduates. Two major changes from previous general education requirements were to define categories as Areas of Study rather than as departmental divisions, and colleges other than Arts and Sciences can offer core courses. All departments were required to have at least one in-major writing intensive (WI) course available for students entering the university in 1995. By 1999, the Core had been fully implemented. With 500 majors, the Department of Animal and Poultry Sciences (APSC) modified the required, two-credit Junior Seminar course to meet WI standards. Three to six sections of the course (15 students/section) are offered each semester. The choice presented two challenges. First was to convince the university that a two-credit course would suffice when the standard was three credits. The second was to coordinate the efforts of different instructors teaching multiple sections of the seminar so that student effort is equitable across sections. The APSC department has also gone beyond minimum compliance with the Core. In Fall 2001, the five senior-level capstone production courses gained approval as WI courses using the Writing Across the Curriculum model. Minimal modification of these courses was needed, but the challenge was to handle revision and response in large ( $n=75$ ) classes. A college-wide course, Agriculture, the Arts and Society, was also developed by an APSC faculty member to meet Area 6 (Creativity and Aesthetic Experience) goals and gained core approval in 1999. That one-credit course is offered P/F and is open to 40 students per semester. It has been oversubscribed the past three semesters, and receives an average rating of 3.7/4.0 on student evaluations. Additionally, one APSC faculty member teaches a section of the required freshman biology course, which is included in Area 4 (Scientific Reasoning and Discovery) of the Core. In total, 14 APSC faculty teach in courses that fulfill Core requirements.

**Key Words:** Teaching, General Education, Writing Intensive