

as an added factor of stress. At S2, 5 treatments were established: (1) a negative control (no yeast or antimicrobial drugs); (2) no SC in S1, SC in S2; (3) SC in S1, no SC in S2; (4) SC in S1 and S2 and (5) a control treated with antibiotics. Feed intake was measured daily and body wt gain biweekly. At arrival to S2 and at d-21, 42 and 63, 3 animals per treatment were sacrificed to collect samples for microbial determinations from 5 portions of the digestive tract and to diagnose ileitis. No differences in performance ($P > .05$) were found from weaning to d-112. At S2, histopathology and bacterial findings were similar ($P > .05$), but presence of viable SC was confirmed. Pig ADG was greater ($P < .01$) when SC was fed, notably in S1 (736, 782, 731, 836, and 667 g/pig, for treatments 1 to 5). Pigs fed antibiotics had an ADG similar to those fed SC, but the response dropped after removal of the drugs (d-21 in S2). The experiment was repeated and results were similar. These data suggest that pigs fed SC prior to challenge and through finishing had more resistance to stress.

Key Words: Growing-finishing Pigs, Yeast, Stress, Disease Resistance

1297 Effect of selection for improved piglet survival on prenatal development. J.I. Leenhouders*¹, T. Van der Lende¹, and E.F. Knol², ¹Wageningen Institute of Animal Sciences, Wageningen University, The Netherlands, ²Institute for Pig Genetics, Beuningen, The Netherlands.

The objective of this research was to investigate the effect of selection for improved piglet survival on prenatal development. Estimated breeding values for piglet survival (EBVps) were calculated using data on piglet survival in nucleus herds of the Dutch breeding company TOP-IGS. Piglet survival was defined as an all or none trait between onset of parturition and weaning. Crossbred gilts (n=46) were mated to boars from a boar line (n=14). Both gilts and boars had known EBVps. Mating was performed in such a way that a wide range of EBVps of litters was achieved. On day 111 ± 1 of gestation, fetuses were removed by Caesarian section. Data on fetal length and weight, placental characteristics and various fetal organ weights were collected. Statistical analysis was performed on litter averages. The statistical model included the fixed effect of stage of gestation and the covariables average fetal weight, number of fetuses (excluding mummies and macerated fetuses), percentage of males within the litter and EBVps. Significance was tested by the general linear models procedure, using stepwise elimination of non-significant ($p > 0.05$) effects. Variation in placental weight within the litter decreased with increasing EBVps ($p < 0.05$). EBVps had a negative effect on average fetal length ($p < 0.05$) and a positive effect on average fetal liver weight ($p < 0.05$). Preliminary data on liver glycogen content of 64 fetuses from 34 litters showed that, after adjustment for fetal weight, 49% of the variation in fetal liver weight is explained by variation in liver glycogen concentration. We conclude that selection for improved piglet survival increases uniformity of placental weight within a litter, decreases average fetal length and increases average fetal liver weight. Furthermore, selection may increase fetal liver glycogen content.

Key Words: Genetic Selection, Piglet Survival, Prenatal Development

1298 Non-invasive cryopreservation of zona pellucida intact morulae stage pig embryos: Birth of multiple litters of piglets after embryo transfer. J. R. Dobrinsky*¹, H. Nagashima², V. G. Pursel³, L. L. Schreier¹, and L. A. Johnson¹, ¹USDA-ARS, GGPL, Beltsville, Maryland, USA, ²Meiji University, Tama, Kawasaki, Japan, ³USDA-ARS, GEML, Beltsville, Maryland, USA.

Methods exist to adequately, but not optimally, preserve embryos from genetically superior animals of most of our livestock species except the pig. Whole early stage pig embryos up to the morula stage have not developed after cryopreservation. Our objective was to develop

non-invasive methodology to cryopreserve zona pellucida intact morulae stage pig embryos. After a technologically-protected pre-treatment of pig morula, embryos were cryopreserved by vitrification. After indefinite storage, embryos were recovered and rehydrated. After a technologically-protected post-cryopreservation treatment was applied to the embryos, all embryos were cultured further in vitro. Survival in vitro was $>80\%$. Viable embryos were surgically transferred to recipient females. In the first trial, 3 gilts farrowed 8, 7 and 4 live and healthy offspring. In a validation trial, 6 of 7 gilts farrowed 42 offspring. Total pregnancy rate was 9/11 (82%) with 61 total piglets born averaging over 6 pigs per litter. This research utilizing technologically-protected, novel methodology produced the first live offspring from non-micromanipulated and vitrified, zona pellucida intact morula stage pig embryos. The methodology provides an avenue for the long term preservation of embryos that can be transported and later transferred internationally. Morulae stage embryos are ideal for surgical or non-surgical embryo transfer in the pig, as these are uterine stage embryos that possess a full, non-thinning zona pellucida, ideal for aseptic embryo washing and transfer. Our previous work, and this novel methodology provide procedures that will allow the cryopreservation of all early stages of preimplantation pig embryos, from zygotes to hatched blastocysts. Implementation of methodologies for long-term embryo preservation and transfer in swine would provide a foundation for effective utilization of the world's most valuable genetic resources on a global basis while modernizing pork production and enhancing genetic improvement programs.

Key Words: Pig, Embryo, Cryopreservation

1299 The use of electrical impedance spectroscopy (EIS) for pig meat quality selection. M.A. Oliver*¹, I. Gobantes¹, J. Arnau¹, J.M. Monfort¹, J. Elvira², P.J. Riu³, and N. Gr̄sol⁴, ¹IRTA-CTC, Girona, Spain, ²NTE, S.A. Barcelona, Spain, ³UPC, Barcelona, Spain, ⁴Esteban Espuna, S.A. Girona, Spain.

Meat quality (pHu) and fatness are important characteristics in the production of dry-cured ham. Measurements of meat quality were made on 95 commercial hams (11.06 ± 0.76 kg) to evaluate the relationship between quality characteristics (ham weight, conformation, fat thickness in the rump (1.19 ± 0.61 cm), visual fatness and pHu in the *Semimembranosus* (SM) and electrical parameters, Ro, Rinf, Rinf/Ro, Fc and α obtained with the EIS equipment. Ro and Rinf are the electrical impedance (Ω) of the system at low and high frequencies, respectively. Fc is the frequency (kHz) at which the complex component of the electrical impedance is highest and α is an adjustment parameter. The measurements were carried out at 36 h p.m. in two regions of the ham (SM and *Biceps femoris* (BF)). A general linear model (least square means and SE) of the electrical variables on three different pHu categories were performed: LWHC (low water holding capacity) pHu < 5.65 , IQ (Ideal Quality) $5.65 \geq$ pHu < 5.95 and DFD group pHu ≥ 5.95 . Correlation coefficients between all variables were also determined. Significant differences ($p < 0.01$) were observed between the DFD and IQ groups with respect to LWHC group for Rinf/Ro (0.31 vs 0.49 in SM region, and 0.38 and 0.47 vs 0.57 in the BF region) and Fc variables (32.9 and 29.2 kHz vs 50.6 in SM region, and 39.7 and 53.4 vs 68.0 in the BF region). α parameter was significantly different in the SM region between LWHC and IQ groups (0.31) with respect to DFD group (0.29). pHu values were moderately correlated ($p < 0.05$) in SM region with ratio Rinf/Ro, Fc and α , and in BF region with ratio Rinf/Ro and Fc. In the BF region, visual fatness and fat thickness were significantly correlated ($p < 0.05$) with Ro and Rinf. This study suggests that with EIS we can obtain objective information about the meat quality and fatness of the hams at 36 h p.m. Both parameters are important to optimise dry cured ham selection.

Key Words: Meat quality, Electrical impedance spectroscopy, Dry-cured ham

UNDERGRADUATE AND GRADUATE EDUCATION

1300 A tool for creating online programmed instruction lessons. D.M. Forsyth* and D.L. Lofgren, *Purdue University, West Lafayette, IN.*

A program has been developed for the creation and delivery on the World Wide Web of programmed learning lessons. Programmed learning is an active learning method involving repeatedly delivering a small amount

of information followed by a question, with the answer determining the subsequent path of the lesson. Programmed learning was popular in the 1960's and 70's but was text based, or included graphics requiring high levels of programming. Operating system and programming language changes made many programs inoperable or obsolete and much that was developed fell into disuse. Use of the World Wide Web as a

delivery vehicle helps to alleviate some of the past obstacles. Delivery is possible to a wide and distant audience, and lesson delivery can be independent of the user's particular computer. The use of HTML for lesson development allows a (hopefully) stable and standard, open language for the development of a majority of the lesson material. It also allows incorporation of visual graphics, sound, and hyperlinks to material outside the lesson. The developed program replaces the need for lesson-specific cgi-scripts. The instructor writes the lesson as a series of web pages. The interactive portion of the program aids the instructor in the creation of files which provide the necessary information for lesson delivery, such as: correct answers; incorrect anticipated answers; the response to provide for each answer type; where to continue after a particular answer is received; and how many tries are allowed for a question. The answer types allowed include multiple choice (radio buttons), numeric responses, and string responses that include wildcard matching. In delivery mode, the program evaluates the answer given by the student, returns the appropriate response, and continues the lesson at the correct place. The program registers the student into the lesson at the beginning and logs all responses. Fifteen lessons have been created for an animal nutrition course.

Key Words: Programmed Learning, Internet

1301 Problem-based learning in distance education.

L.G. Griffiths*, S. L. Kitto, J. Pesek, E. Mackenzie, and K. Bauer, *University of Delaware, Newark.*

In 1997, we added distance students to a traditional, classroom-taught agricultural biotechnology course. To reach distance students, we used a multimedia approach: lectures via videotapes and problem-based learning exercises (PBL) via the Internet. About a third of the course was taught using PBL. The major challenge of the course was to teach the PBL segments to distance and traditional students working together in groups. We explored ways to use multimedia technology that would allow distance students to participate in the PBL segments of the course. To assess the effectiveness of the methods used in this project, we compared the distance students with traditional students using measures of perceived and actual knowledge of biotechnology. Group (distance vs traditional students) comparisons were made using cumulative grade point average prior to taking the course as a covariate to adjust for differences in ability between groups. The student-student interactive PBL segments were challenging because the traditional students were working in 'real time' and the distance students were working in 'distance time'. Distance students did as well as in the course as traditional students; however, management of groups composed of distance and traditional students was challenging. PBL could probably be used more effectively/successfully with student groups composed solely of distance students.

Key Words: Problem-based Learning, Distance Education, Biotechnology Education

1302 Development of porcine myology manual on CD-ROM. S.J. Jones¹, D.E. Burson¹, and J. Bulter¹, ¹University of Nebraska, Lincoln.

Understanding of the myology of the pig is important in the pork industry as well as for research and teaching. Today more boneless cuts are being marketed and muscle separation is becoming routine operation in the cutting process. With the advent of technology such as the computer and the internet, it is possible to present information in an organized manner that is easily accessible to a single student or a large number of people. The objective of this project was to develop a porcine myology manual which could be produced in a digitized form stored on a CD-ROM. This could be used on a computer to allow the learner to have more interaction with the manual. A 82 kg carcass was frozen and then separated into right and left sides. The right side was cut into cross-sections 1 inch in thickness then photographed to show the longitudinal progression of muscles and their relationship to the skeleton and to fat deposits. Cross-sectioning began just anterior to the tibiotarsal joint and continued to the atlanto-occipital joint. Fifty six cross-sections were made through the whole carcass. The shoulder section of the left side was cross-sectioned by make cuts parallel to the front limb just above radiocarpal joints. Eighteen cross-sections were made through this portion of the carcass. A second 110 kg pig was slaughtered and chilled then the right side was dissected by removing muscle layers and photographed. A strobe lighting system was used in lighting the cross-sections and lateral

layers during photography. Photographs were digitized to JPEG format for use in the CD-ROM development. Information on each muscle was collected including; name, origin, insertion, action, innervation, blood supply, wholesale and retail cut location. Programming of the CD-ROM was done using HTML language and JAVA script so that the program could be used with a web browser on a computer. Drawings of each cross-section and lateral cuts were drawn, then formatted as a GIF file then linked to each muscle information file. The porcine myology CD will provide a valuable resource for both academia and industry

Key Words: Porcine Myology, HTML, CD-Rom

1303 The organization of the Texas College Equine Teaching Consortium. H.A. Brady*, Texas Tech University, Lubbock.

The Texas College Equine Teaching Consortium was established in 1999 to foster networking among Texas universities, colleges and junior colleges. There are 55 colleges and junior colleges in the state of Texas, over half of which have an equine program or emphasis. Very little communication has existed between these programs. Needs throughout the state have included an awareness of other programs and areas of emphasis. To facilitate this, an internet web page and discussion site have been established for all members. Through this, questions can be posted, ideas can be shared, and events and short courses can be rapidly listed. The consortium goals include a sharing of resources among these equine programs and to develop partnerships in distance teaching. Through this internet association, internship opportunities can be expanded both between colleges and in areas of the equine industry. A yearly meeting is being planned in association with the Texas Equine Industry Conference in College Station to discuss teaching strategies and cooperative efforts. This teaching consortium may develop into a model which may be useful nationally between equine teaching programs.

Key Words: equine, teaching, internet

1304 Undergraduate program curricular challenges and future trends. G. R. Gallagher*, R. L. Gallagher, and B. D. Holder, Berry College, Mt. Berry, GA.

The objective of this study was to evaluate current and future trends in undergraduate animal science programs. A survey was e-mailed to department chairs of 75 public and private institutions offering 4-year degree programs in animal science. Two questions were based on ranking current and 10-year prediction of species emphasis. The remaining two questions requested a list of the three greatest challenges in undergraduate programs currently and in 10-years. The 32 (45%) institutions responding to the survey were divided into 4 geographical regions, North (N)(n=3), South (S)(n=9), Midwest (MW)(n=8) and West (W)(n=12). Nationwide information was derived by combining responses from all regions. The four highest rankings were used for analysis of species emphasis. Currently, 93.4% of institutions responding have beef cattle programs with species emphasis in the highest 4 rankings followed by horse (81.3%), swine (62.5%), sheep (59.4%), dairy (56.3%), poultry (25.0%) and domestic pets (18.9%). Predicted species emphasis in ten-years suggests no change in maintaining beef cattle programs. Decreased emphasis was predicted for swine (-15.6%), dairy (-9.4%) and sheep (-6.3%). Decreased emphasis in swine was predicted for S and W, dairy predominately in the S and sheep in the N and S. Predicted increase in domestic pets (+18.9%) occurred in the S and W, and horse programs (+6.2%) in the N and MW. No changes were predicted for poultry. Challenges facing undergraduate programs were similar for all regions and both time periods. The most frequent responses were: 1. Cost of maintaining livestock facilities, 2. Identification and retention of qualified faculty, particularly those interested in teaching and having livestock experience, 3. Lack of flexibility necessary for timely alteration of curriculum, 4. Students from an urban background and, 5. Identification and recruitment of quality students. This study suggests significant changes are predicted to occur in animal science programs.

Key Words: Survey, Animal science, Undergraduate programs

1305 Pigwatch: a group project for an introductory animal science laboratory. G. Apgar*, *Southern Illinois University, Carbondale.*

An introductory livestock production lab is offered during the fall semester at SIUC. Students were placed into groups of 5-7 and required to spend 12 hr observing a sow and her litter. The group recorded data such as piglet wt, sow activity, suckling placement and piglet activity, and attempted to explain findings. Posters were prepared by each group to outline findings, displayed, and evaluated by students, faculty and staff. Poster scores were a combination of scores from poster evaluations and individual evaluations by group members. The winning poster has been displayed for the year. Students were polled (n=68) using a 5 point scale (1=strongly disagree; 3=no opinion; 5=strongly agree) to measure acceptance of the exercise across the majors in the class. The questions asked were: 1) Exercise helped my understanding of animal behavior 2) I thoroughly enjoyed it 3) My group functioned well as a group 4) Poster evaluations were fair 5) Individual evaluations were fair 6) This is my first experience with a sow 7) I am pleased with my grade 8) Should be continued for future classes 9) Gender 10) Grade-point average 11) Class rank and 12) Major. The class consisted of majors in agribusiness economics (ABE, 4.4%), agriculture education (AGED, 4.4%), animal science (ANS, 39.7%), general agriculture (GNAG, 26.5%), and zoology (ZOO, 13.2%) and other (11.8%). Responses to "group functioned well as a group" ranged from 4.0 to 4.67 across majors indicating that groups fared well in working together. Responses to "poster evaluations were fair" and "individual evaluations were fair" ranged from 4.14 to 4.67, and 4.11 to 5.0, respectively. Response to "this is my first sow experience" showed students in ANS were second to ZOO majors in lacking sow experience (3.7 vs. 4.2), while AGED majors had the most experience (1.33). Student response to "should be continued in future classes" was strongly positive (range 4.6 to 5.0) across majors. This exercise has introduced students to swine behavior, data capture, and allowed the opportunity to teach and/or learn from students in other majors.

Key Words: Swine, Teaching, Group project

1306 Study abroad: A model program in New Zealand. L. G. Griffiths¹, S. E. Truehart*¹, and N. G. Gow², ¹*University of Delaware, Newark,* ²*Lincoln University, Canterbury New Zealand.*

In January 1999, 39 undergraduate students, two faculty members and one teaching assistant arrived in Christchurch, New Zealand to begin a 30 day exploration of "Agriculture Down Under" with Lincoln University serving as the host site. The students enrolled in two courses, both taught by the visiting faculty in Lincoln University facilities. Host faculty from Lincoln University provided occasional guest lectures. In addition to attending two daily lectures, students took approximately three field trips per week. The trips included both agricultural sites and locations where the student could experience New Zealand and Maori culture. Agricultural sites included a high country station with 22,000 acres and 5,500 sheep, a low-country irrigated station with 500 dairy cows and 4,500 sheep, and Mt Peel, one of the oldest stations on the South Island with beef cattle, red deer and sheep. We also visited a dairy, swine farm, red deer farm, Japanese beef feedlot and a equine breeding facility with over 500 brood mares. Cultural and other sites included the French settlement of Akaroa, a Maori village, the botanical gardens, Canterbury Museum and the International Antarctic Centre. Honors students were assigned the role of a documentary film crew and they collected over 10 hours of tape, which were edited, to a one-hour film upon return to the United States. Honors students interviewed each farm host and extended our thanks and a personal gift before we left each station. The daily lecture and field trip schedule provided a fairly rigid structure for the students. They were provided with single dorm rooms and we all ate meals together in the dining halls when on campus. Lincoln University offers an extremely economical package for housing and meals, which made the cost of the trip quite affordable. The faculty and staff at Lincoln arranged and escorted us on all of our agricultural tours. Students commented that the unique combination of agriculture, New Zealand culture and Maori culture made the trip a lifetime experience!

Key Words: Study Abroad, New Zealand, Undergraduate

1307 Using excel spreadsheet to teach feed formulation. V. Pattarajinda*, M. Duanginda, and M. Froetschel, *University of Georgia, Athens.*

Ration formulation programs were developed using Excel Spreadsheets and NRC guidelines to teach Animal and Dairy Science majors applied nutrition in a feeds and feeding course. A fundamental level of programming (FL) is taught initially and then it is advanced to least-cost programming (LC). The FL approach allows students to visualize the equations and improve their conceptual understanding of ration formulation. Separate programs are used for different species of livestock but each operates in a consistent manner and requires minimal time for orientation. Initially students are taught to formulate by setting the amounts of feed ingredients in a ration to equal nutritional requirements by repetitively using the formula: amount fed x nutrient concentration = amount of nutrient. The FL program uses economic replacement values of individual feeds based on the energy and protein content and prices of corn and soybean meal as a guide to select feeds economically. In addition to the spreadsheet, the FL programs contain a one page feed report that contains mixing specifications and a feed inventory. The LC approach was designed specifically for dairy cattle feeding, it is menu driven and displayed in a streamlined design written with visual basic language. There are three main menu sections to the LC program: 1) NRC requirements and 2) feed ingredient inventory that contains, restriction settings, nutrient specifications and cost and 3) least-cost formulation that uses the solver function in EXCEL. The LC program is controlled as other linear least-cost programs and can formulate total mixed rations or concentrates. Teaching the FL and LC programming in feeds and feeding uses readily available software to provide training for students entering careers in both the feed industry or production agriculture.

Key Words: Ration, Feed Formulation, Least cost-program

1308 Usage of hands-on activities to enhance interest and facilitate learning in an undergraduate feeds and feeding course. B. A. Reiling* and J. H. Brendemuhl, *University of Florida, Gainesville.*

Courses in applied nutrition and diet formulation are often perceived by students to be a test of their mathematical ability. In 1999, we incorporated a variety of simple hands-on activities within each laboratory session to motivate and facilitate the learning of basic feeding concepts. Upon conclusion of the course, students (n = 20) were surveyed to determine how the hands-on activities affected their interest and if they effectively enhanced learning. Nineteen of 20 students surveyed indicated that the hands-on activities facilitated their learning, and 98 ± 3% reported that the activities enhanced their interest in the course material. However, 40% of the students indicated that some activities required too much time to complete in relation to the knowledge gained. All activities conducted during the year were scored using a 1 (no educational value) to 5 (extremely valuable) scale. Scores for 10 weekly laboratory activities ranged from 2.95 ± .22 (determination of mineral solubility) to 4.60 ± .11 (feed identification) with an overall average score of 3.61 ± .19. Six different computer applications were used and scores ranged from 3.45 ± .21 (relative feed value spreadsheet) to 3.95 ± .20 (Apollo least cost formulations) with an average score of 3.72 ± .22. In addition, students working in groups conducted both a swine digestibility and chick feeding trial. The swine digestibility project scored 3.95 ± .19, and 95% of the students indicated that the project should be continued. The 3-week chick feeding trial gave students an opportunity to visualize the effect of various nutrient deficiencies. The project scored 3.90 ± .25, and 75% of the students indicated that the project should be continued. In fact, 50% of the students indicated that the chick feeding trial should have been extended another 2-3 wks. In conclusion, it appears that hands-on activities were successful in motivating and facilitating student learning in an undergraduate feeds and feeding course.

Key Words: Experiential learning, Hands-on, Nutrition

1309 Fostering student active-based learning in a senior level meat science course. E. P. Berg*¹, ¹*University of Missouri, Columbia.*

As part of the course requirement for *Physiology and Biochemistry of Muscle as Food*, students are required to organize, prepare, and present

what will become their textbook which is centered on a specific aspect of meat science and (or) muscle biology. On the first day of class students are asked to write down a question pertaining to muscle (meat science, muscle biology, or growth and development). This initial assignment provides the instructor with information regarding the level and area of student interest in the broad field of meat science. From this information, the instructor can pick a broad focal point (such as The role of meat in a healthy diet) and assign a more specific topic to the individual students. The students are asked to prepare a literary review of the assigned topic and consider the paper as a textbook chapter. Students are required to research the topic, prepare an outline, write a 5-6-page paper regarding this topic, and present one 20-minute lecture. All papers are compiled by the instructor, edited, arranged in a book format, and distributed to the class prior to initiation of the student lecture section of the course. The instructor and the students of the course evaluate each student lecture. Students are also responsible for preparing 2 exam questions and answers from their respective lecture. The final exam is then developed from these questions. This format of classroom instruction is built upon the idea that individuals learn more when they have to instruct another. Often the University system is criticized for failing to instill job related skills in its students. Preparation, organization, and oral presentation skills as well as the ability to work as a team member are traits that are strongly sought after by potential employers. This style of active learning provides students with valuable job related skills and a better understanding of meat science.

Key Words: Meat Science, Teaching, Active Learning

1310 Experiences with increasing student responsibility for learning in a low enrollment course. G. E. Shook* and L. Tong, *University of Wisconsin, Madison*.

An innovative teaching approach designed to shift the focus of the classroom toward the students was implemented in a three credit, senior level

WOMEN AND MINORITY ISSUES IN ANIMAL AGRICULTURE

1311 How do we fit into ADSA/ASAS: International, minorities, women. W.A. Samuels*, *Solutia, Inc., St. Louis, MO*.

The need to achieve goes beyond borders, ethnicity and gender. The need to be accepted penetrates deep and is often a need shared by many. Depending on what is driving an individual, one of these needs may be satisfied; if one is left unmet, a void is created. Persistent individuals are driven to fill unmet needs. Whether an Internationalist, a minority or a female, the needs are the same. They have a need to contribute;

course in dairy cattle breeding. Goals included both professional and cognitive development of students. This was accomplished by making learning a collaboration between students and instructor and emphasizing long term learning over short-term recall. Students participated in selection of topics. Daily reading assignments of carefully selected scientific journal articles were accompanied by a writing assignment to stimulate thoughtful study and hold students accountable for the reading. Class periods were devoted to discussion of the reading. Content of the discussions was driven by student-generated questions with answers provided by students. The instructor served as facilitator and resource person. As needed, the instructor corrected misconceptions among students and gave impromptu mini-lectures to clarify concepts and fill information gaps. The course was structured to encourage students to take risks, try out their own ideas, and make mistakes without penalty or embarrassment. To this end, grading was based 60% on participation elements and 40% on quizzes and exams. Throughout the semester, the instructor participated in a teaching circle of six faculty in diverse fields convened by a professional in biology education. One member of the teaching circle observed one class and a member of the departmental faculty interviewed the class collectively to evaluate progress. Students completed an extensive written evaluation at the end of the semester. The following quotations are representative: "The discussion format has proven to be much more effective and thought-provoking than the conventional lecture style. More importantly, I also feel like I will actually remember what I have learned." "It was necessary to be at the class always because discussion is where I learned the most." The grading policy " . . . was good because it didnt scare me away from trying." Students embraced this dynamic, interactive learning environment.

Key Words: Student-Centered Teaching, Active Learning

and when results are accomplished, they have a need to be recognized for their contributions. Our associations can be the vehicle to create the initial launch pad to fill unmet needs. ADSA/ASAS must be an incubator where ideas are shared globally and where individuals, regardless of their accents, ethnicity and gender, can believe that they belong. This presentation will focus on how an Internationalist, like myself (born and grown up in Jamaica), and a minority in my professional organizations, fits into ADSA/ASAS, and lessons learned along the way.

Key Words: Minorities, International, Women

ADDENDUM

The abstracts below were omitted from the following sections but can be found elsewhere in this publication as noted :

BREEDING AND GENETICS

Abstract number 1012 can be found in the Production and Management Section

NONRUMINANT NUTRITION

Abstract number 1232 can be found in the Ruminant Nutrition Section

The following abstracts were inadvertently omitted from the program :

FORAGES AND PASTURES

1312 An evaluation of the feeding value of bluegrass straw pellets for growing beef and dairy heifers. J.J. Michal*, J.A. Jewett, K.A. Johnson, R.L. Kincaid, J.D. Cronrath, and S.M. Smith, *Washington State University, Pullman*.

Three studies were conducted to evaluate the feeding value of bluegrass straw pellets (BP). Holstein heifers (n=36; 247 kg) were assigned to one

of 3 levels of BP (0, 11, and 22% BP). The BP replaced alfalfa silage in the diet (DM basis). Growing beef heifer calves (n=53; 298 kg) were assigned to diets where BP were included at 0, 15 or 30% of DM. The BP replaced alfalfa hay on a DM basis. Dairy and beef heifers were fed these diets for 60d. The BP contained (DM-basis) 11.8% CP, 51.7%