urban base. The plentiful supply of food and animal products brought about by the rise of science, the economic success of market economy capitalism and adoption of democracy have also dramatically affected values and ethical standards applied to the food chain. Today Western society sees livestock as a disposable resource, science has joined forces with business, decision making is based solely on economic criteria and the farmer/livestock producer has little influence in shaping the food chain. Thus a new plausibility structure has been accepted by Western society leading to a redefinition of what is normal and acceptable behavior with livestock and animal products. A radical shift in both power and vulnerability in the food chain is occurring which affects livestock, small farmers, the environment, life science companies, rural society, consumers, rich and poor, perceptions of risk, health and safety, etc. Newer and fewer centers of decision making now control the quantity and quality of animal products. The role and nature of agriculture is being redefined, resulting in an unplanned consequence-a lost sense of the Community of Life. Consequently society has a deepening concern about values and ethics in animal science and livestock production. Into this matrix biotechnology has recently been inserted as the major research interest of life scientists and is impacting the food chain in ways not yet fully understood. The paper examines these emerging issues in the context of how contemporary Western society forms its values, views social justice and defines ethical expectations.

Key Words: ethics, issues, sustainable agriculture

574 Value-added Agriculture:Inclusion of Race and Gender in the Professional Formula. M.M. Beck*[1] and J.C. Swanson[2], [1]*Univ of Nebraska, Lincoln, Nebraska,* [2]*Kansas State Univ, Manhattan, Kansas.*

The Morrill Act establishing the land grant university system required that admission to the state universities be available to both women and racial minorities. Today women are close to 50% of the undergraduate population in a number of animal science departments but racial minorities lag far behind, in part because the schools created under the 1890 legislation provided a diversion away from the state universities. In the faculties of the animal science departments, both women and minorities are seriously underrepresented; causative factors underlying this phenomenon are similar. Althought historical adherence to role stereotypes and divisions of labor explain some of the underrepresentation, these assumptions do not hold across all economic classes. Other factors contributing to the scarcity of women and faculty of color in animal science include assumptions and mechanisms of scientific research itself; the very neutrality and disinterestedness of researchers, inherent in the scientific method, prevent recognition that values and personal biases affect decisions of hiring selections and mentoring effectiveness. We will explore the cultural factors that underlie these values and biases that are common not only to agriculture but also to science more broadly.

Key Words: Race and agriculture, Gender and agriculture, Role stereotytpes

575 Rethinking relationships in wretched contexts: the power of privilege. C. Cuomo*, *University of Cincinnati, Cincinnati, Ohio, USA.*

Even a minimal ethical commitment to the interests of animals provides what appears to be a devastating critique of common human/nonhuman relations, including many forms of domestication. If we accept ethical critiques of basic social institutions, but those institutions and practices apparently cannot be simply "abolished," is our participation in them inevitably collusion with oppression?
In agreement with some of the best work in science, feminist and postcolonial ethics begin with the recognition that the boundaries between individuals, and between species, are not as ontologically absolute or morally defensible as anthropocentric and liberal traditions take them to be. Instead, relationships are ontologically and ethically fundamental. For example, right relations provide moral models and make evident the role of empathy, connection, and care in ethical life.
How can these models provide insight regarding participation in institutions that seem to cause so much suffering? Is it possible to be true to our good relationships with nonhuman animals in the context of animal science?
In this paper I will explore what it means to take right relationships to be the starting place for agriculture and animal science. I will emphasize the positive tools at our disposal, and how even institutional practices can be informed by the wisdom generated in cross species relationships guided by empathy and other forms of connection

Key Words: ethics, feminism, empathy

Goat Species

Potent Solutions for Impotent Dewormers: Controlling Resistant Internal Parasites

576 The development of dewormer resistance in small ruminants and consequences. W.E. Pomroy*[1], [1]*Institute of Veterinary, Animal and Biomedical Science, Massey University, Palm/North, NZ.*

Anthelmintic resistance is an increasing problem around the world and has already reached serious levels in areas of South America, South Africa and Australia. The problem is also rapidly emerging in the US, especially in the southern states and greater awareness of the issue is required to attempt to slow its development before the problem becomes unmanageable. The majority of the available evidence suggests that once anthelmintic resistance to any anthelmintic has developed in a population the gene frequency is stable and does not decline. There are only 3 broad spectrum action families of anthelmintics available and no new ones likely to be available in the near future so every effort needs to be made to preserve their efficacy for as long as possible. There are some narrow spectrum anthelmintics available for *Haemonchus contortus* but most of these are not available in the USA. This review will summarise the arguments for and against the commonly promoted recommendations to delay the onset of anthelmintic resistance: to decrease the number of times animals are dewormed, to quarantine drench all incoming animals, to rotate between action families on an annual basis and to avoid underdosing. The advantages and disadvantages of long acting anthelmintics such as moxidectin will be discussed as will the additional challenges of worm control in goats by comparison with sheep. It is well recognised that goats metabolise anthelmintics more rapidly than sheep and this has implications for the choice of dose rate.

Key Words: Goats, Internal parasites, Dewormer resistance

577 Emerging issues in control of nematode parasites of goats: anthelmintic resistance and biological control using nematophagous fungi. T.H. Terrill*[1], R.M. Kaplan[2], M. Larsen[3], and J.E. Miller[4], [1]*Fort Valley State University, Fort Valley, GA,* [2]*The University of Georgia, Athens, GA,* [3]*The Royal Veterinary and Agricultural University, Copenhagen, Denmark,* [4]*Louisiana State University, Baton Rouge, LA.*

Gastrointestinal nematode (GIN) parasitism is the most important disease of goats throughout the world. Infection with GIN parasites causes significant losses in growth and productivity and may lead to animal deaths if not controlled. The conventional method of controlling GINs in goats is frequent deworming with anthelmintics, which increases selection for drug resistance in the parasites. As a result, prevalence of multiple-drug resistant GINs in goats is reaching alarming proportions in many parts of the world. Recent reports from the southern United States show that GIN resistance to all three available classes of anthelmintics is an emerging problem, suggesting that alternatives/additions to anthelmintic control of goat parasites are needed. A novel approach to controlling goat GINs is using the nematode-trapping fungus *Duddingtonia flagrans* as a biological control agent. Spores of this fungus are fed to the animal, pass onto pasture in feces, and then trap and kill developing parasite larvae in the fecal pellet. This technique has been shown to reduce development of GIN larvae in feces by over 90% in goats and sheep in confinement. This reducing effect in feces has been confirmed in controlled field trials with sheep and preliminary grazing experiments with goats. Successful control of goat GINs in the future may require use of both novel (biological control, GIN vaccines, etc.), and conventional (strategic use of effective anthelmintics plus grazing management) strategies in an integrated program.

Key Words: Goats, Gastrointestinal nematodes, Anthelmintic resistance, Biological control

578 Tannins for suppression of internal parasites. B.R. Min* and S.P. Hart, *E (Kika) dela Garza Institute for Goat Research, Langston University, OK, 73050, USA.*

Condensed tannins (CT) have biological effects that may aid in the control of dewormer-resistant internal parasites (IP). It is increasingly evident that control programs based on dewormers are failing to control IP as dewormer resistance has become more prevalent. Thus, alternative IP control strategies are necessary. The CT in forages have potential to be a component of IP control programs. The CT bind proteins and other molecules tightly at near neutral pH, such as occurs in the rumen, with dissociation in the acidic pH of the abomasum, freeing them for digestion. Effects of CT on parasitism can be assessed by grazing ruminants on forages that contain different levels of CT but otherwise are of similar nutritive value. Plant CT may have direct or indirect effects on IP. Direct effects might be mediated through CT-nematode interactions affecting physiological functioning of IP. Recently, *in vitro* and *in vivo* studies have shown that CT in several temperate and tropical forages (*Hedysarum coronarium, Onobrychis viciifolia, Lotus pedunculatus, L. corniculatus, Lespedeza cuneata*, and Quebracho CT) can inhibit infective gut worm larvae of sheep and goats and both gut and lung worms in farmed deer, with effects influenced by both concentration and structure of CT. Furthermore, preliminary research showed a 57% reduction in fecal egg counts (2,722 *vs* 1,162 eggs/g) and a 74% reduction in total fecal egg output (173 *vs* 45 x 10^4 eggs/d) in goats consuming forage Sericea lespedeza (4.6% extractable CT/kg DM) compared with rye/crabgrass. Indirectly, CT can improve protein nutrition by binding to plant proteins in the rumen and preventing microbial degradation, thereby increasing amino acid flow to the duodenum. Several ovine studies have shown that improved protein nutrition reduces parasite infestation. This is assumed to be mediated by enhanced host immunity, which may be especially important with selection for immunity to IP. In conclusion, CT in forages may have potential to aid in the control of IP.

Key Words: Condensed tannins, Internal parasites

579 Pasture and animal management for control of gastrointestinal nematodes. Daniel Miller*[1] and T. M. Craig[2], [1]*E (Kika) de la Garza Institute for Goat Research, Langston Univ. OK,* [2]*Texas A & M University.*

Parasitism is a numbers game, a few parasites may stimulate a level of resistance to greater numbers. However, an excessive number of parasites will cause disease. Weather conditions determine how successfully parasites are transmitted. Sufficient moisture for the movement of infective larvae from the fecal pellet onto the vegetation is essential. Tactical treatment 2 weeks following rain may aid in controlling worms. Daily management of the flock results in different levels of exposure to parasites. Exposure may be limited by strategies that use alternate species grazing or resting of pastures. A diversity of forage producing plants and the commingling of grazing species may serve to dilute the number of gastrointestinal parasites ingested. Rotational grazing systems may result in greater numbers of parasites to which animals are exposed, however, the effects on the host may be lessened due to improved nutrition. In the humid tropics rotation is useful in controlling parasitic disease. However, in conditions of drought or cool weather, larvae may survive 6 months or longer on pasture. Therefore, if there is going to be a meaningful reduction of parasite numbers in a pasture the susceptible goats must remain off the pasture for 2 to 6 months. A pasture on which animals may safely graze during the winter becomes dangerous during the spring. Worms which infect goats in the spring are those which survive on pasture or are the progeny of arrested larvae that overwintered inside the goats. Larvae acquired during autumn grazing cease development but remain in the digestive tract without feeding or reproducing. Parturition and spring grass growth are associated with emergence of arrested larvae. Eggs passed in the feces and subsequent development of infective larvae coincide with the time when kids begin to graze. Strategic (winter) use of anthelmintics protects goats from catastrophic numbers of worms. A few individuals have a large portion of the entire worm population and selective removal or treatment of these goats may aid in controlling disease in the entire flock.

Key Words: goats

Physiology
Developmental Endocrinology

580 Integration of nutrient supply and growth during fetal life: roles of leptin and the IGF system. R.A. Ehrhardt*[1], A.W. Bell[1], and Y.R. Boisclair[1], [1]*Dept. of Animal Science, Cornell University, Ithaca, NY.*

Extracellular signals integrate somatic growth with nutrient supply growth during fetal life. Several components of the IGF system are regulated by nutrient supply during late fetal life in sheep and are likely to be important determinants of size at birth. Conversely, nutrient supply regulates maturation of the endocrine IGF system. For example, underfed fetuses have lower hepatic expression of the ALS and IGF-1 genes than well fed fetuses. The novel hormone leptin has been suggested as a possible regulator of fetal growth. To address this, we examined the spatial and developmental regulation of leptin in fetal sheep as well as the nutritional regulation of leptin during late pregnancy and early postnatal life. Fetal plasma leptin concentration increased steadily from early fetal life to near term and was not related to fetal or placental weight. Leptin mRNA was detected in fetal brain and liver during most of pregnancy and in fetal adipose tissue during the last trimester, suggesting that fetal plasma leptin originates mostly from non-adipose sources early in pregnancy and in addition, from fetal adipose tissue nearer term. Moderate maternal undernutrition during late pregnancy did not alter fetal plasma leptin despite an acute reduction in maternal concentration. In contrast, during early postnatal life, plasma leptin was acutely regulated by energy status and closely associated with the rate of fat accretion. Overall, these data do not support the hypothesis that leptin is a growth factor during fetal life. Instead, leptin expression in non-adipose tissue may promote developmental processes such as hematopoiesis and angiogenesis. In summary, the IGF system has an important functional interplay with nutrient supply during late fetal in regulating fetal growth and development. The role of fetal plasma leptin is less certain but the sheep fetus provides an ideal model to test its functional role(s).

Key Words: Fetal life, Leptin, IGF system

581 Integrated roles of growth factors, integrins, and matrix proteins in conceptus development and implantation. Laurie A. Jaeger*[1], Greg A. Johnson[2], Robert C. Burghardt[1], and Fuller W. Bazer[1], [1]*Texas A&M University, College Station, Texas, USA,* [2]*University of Idaho, Moscow, Idaho, USA.*

Maternal recognition of pregnancy, conceptus elongation, attachment, and implantation are critical for embryonic survival in domestic swine and ruminant species. Steroid hormones, growth factors, and cytokines play important in roles in controlling conceptus development and implantation in these species, in part through effects on and interactions with extracellular matrix proteins (ECMs) and their integrin receptors. Results from immunoflourescence and RT-PCR analyses indicate the presence of multiple integrin subunits and potential integrin heterodimers, on conceptus and maternal cells, that are capable of binding ECMs present at the conceptus-maternal interface. TGFβs appear to play multiple roles in implantation; evidence suggests that TGFβs can modulate expression of ECMs as well as participate directly in adhesion. Fibronectin (FN) is present at porcine and ovine conceptus-maternal interface in vivo. Porcine trophectoderm produces FN, and TGFβ1 increases levels of FN mRNA in porcine trophectoderm cells (pTr2). Results of in vitro adhesion assays in which integrin activation is detected by monitoring aggregation of cytoskeletal molecules indicate that FN, the latency-associated peptide (LAP) that comprises part of the latent TGFβ complex, and osteopontin (OPN), a molecule expressed by porcine and ovine endometrial cells during early pregnancy, activate apically-expressed integrins in porcine and ovine uterine and trophectoderm. Mechanisms of the ECM-integrin interactions in the conceptus have been further studied using the pTr2 cells. Integrin β1 is expressed on the apical surface of pTr2 cells, and pTr2 attachment to immobilized LAP is decreased specifically by Arg-Gly-Asp peptide and monoclonal antibody to integrin β1, suggesting that trophectoderm adhesion to LAP is, in part, due to interactions with integrin β1. We hypothesize