kg/d) for HA, LA, and LR, respectively, were similar across dietary treatments. Milk yield ($P<0.002$) and energy-corrected milk yield ($P<0.03$) [kg/kg DMI] were greater for LR (1.5 and 1.6) compared with HA (1.3 and 1.4). Milk net energy secretion (Mcal/100 kg BW) was similar across treatments. Yield and concentration of fat, protein, and total solids were similar across dietary treatments. A trend for NE balance (NE_Lbalance = NE_Lintake - NE_Lmilk ± NE_Ltissue) was observed; NE balance was lower for LR (0.01 Mcal/d) compared with HA (3.9 Mcal/d) and LA (5.7 Mcal/d). There was a minor trend for improved efficiency of energy use for the low heat increment diet. Additional research is needed to elucidate differences in energy efficiency in relation to HI during heat stress.

Key Words: Dairy nutrition, Heat stress, Heat increment

ADSA-SAD – Undergraduate Competition: Dairy Production

137 The use of copper sulfate to improve hoof health in dairy cattle. M. Konzelman*, *Louisiana State University*, *Baton Rouge*.

One of the most important parts of a dairy cow is her feet. If a herd is experiencing hoof health problems, then the producer will have more than sore feet when the milk check arrives. Diseases such as foot rot and hairy heel warts should not be taken lightly as they can have a major impact on a herd's overall performance. Decreased production occurs as a result of the cows' unwillingness to walk to the feed, and consequently they do not obtain the proper nutrition to maximize milk production. Poor hoof health may also result in decreased reproductive efficiency because sore feet lead to reduced signs of estrus. One way to improve hoof health is by using copper sulfate. Copper sulfate is a compound formed when sulfuric acid reacts with copper oxide. It is used on dairy farms in foot baths to form a solution that works wonders on diseases such as foot rot and hairy heel warts. Although copper sulfate is effective in improving hoof health, producers must be careful with the amount used as it can cause copper toxicity in soil. The waste from the foot bath is generally washed out with the manure into lagoons or some form of waste management system. When water from the lagoons is pumped out, the waste copper pumped with it onto the field. Over time this can cause a copper buildup that could be toxic to some crops. If a digester type manure system is used, the copper could actually kill the bacteria that digest the manure. When used properly, copper sulfate is a relatively inexpensive management tool for improving hoof health. In the long run, this expense will bring savings to the producer through increased milk production.

Key Words: Copper sulfate, Hoof health

138 The agricultural workforce: Changing times and issues. K. Connelly*, *Pennsylvania State University*, *University Park*.

One of the most challenging obstacles facing animal agriculture is finding skilled and qualified labor. The sustainability and productivity of the industry is closely related to the strengths and abilities of its workers. The U.S. Census of Agriculture reported that more than 550,000 farms hired laborers in 2002, with the workforce accounting for one in every eight dollars spent on farm production. The dependence upon international workers has increased significantly in the U.S. in recent years. This influx of new workers has significantly altered the demographics of rural communities. For example, New York's farm worker population shifted from mainly African-American to Hispanic over an eleven year period. Farm employers must now give greater consideration to the health and safety of workers, as well as to employer/employee communication. According to The Bureau of Labor Statistics, Hispanic workers have a 25% higher fatality rate than non-Hispanic workers. Cornell University's Agriculture Health & Safety Worker Training Program is an example of recent initiatives devoted to the issue of the evolving animal agriculture workforce. Much can be learned from the western farms that first began hiring Hispanic workers from Mexico. The University of California, Berkeley, created the Agricultural Personnel Management Program, which is used as a resource by producers dealing with common problems such as a migrant workforce. Dairy producers throughout the rest of the country are beginning to realize the significance of dealing effectively with international labor force. The number of programs and publications for dairy employees available in Spanish and other languages has increased dramatically. With constant changes in agricultural industry demographics, attention devoted to workforce development will continue to influence U.S. productivity.

Key Words: Laborers, Workforce development, Safety

139 Dairy production in south China: Challenges and opportunities. L. Schultz*[1], and B. Moss[3], [1]*Iowa State University*, *Ames*, [2]*Agricultural Trade Office, U.S. Consulate General*, *Guangzhou, China*, [3]*Auburn University*, *Auburn, AL*.

The Chinese dairy industry is developing rapidly as domestic demand skyrockets. Per-capita consumption of dairy products has more than doubled over the last five years, and producers in South China are struggling to keep up. Average annual production in the six-province region hovers at 4 MT per cow, much lower than in the developed world. Although a large percentage of cattle in the region are imported from New Zealand, Australia and the U.S., management challenges limit the genetic potential of these animals. Specific problems in the region include a lack of high-quality forages, poor cow comfort and inadequate heifer raising programs. Milk quality also remains a key issue as several food safety scares have shaken consumer confidence in the industry. Education plays a key role in addressing these concerns and ensuring the future success of China's dairy sector. Improving domestic production also has many global implications, creating an opportunity for more international cooperation and trade.

Key Words: China, Education, Forage quality

140 Methane digestion- same manure- more energy and nutrients- less odor. A. Offenheiser*, *University of Kentucky*, *Lexington*.

A new light is shining on the dairy industry, or shall we say, because of it. With the opportunity to produce most, if not all of the electricity needed to run the farm, many dairies are investing in methane digesters. The use of a digester allows farmers to turn manure into a versatile source of energy. In absence of oxygen, bacteria transform volatile solids into biogas which is 50-70% methane. Methane gas can be used, like any other flammable gas, to generate electricity, heat, or even as a fuel on which to run motors. Not only have dairies been able to sufficiently power their operations and save considerable amounts of

money each year, many have found a second income by selling the excess power they produce. But the production of electricity is by no means the only benefit of using a methane digester. Along with making dairy farms self-sufficient on energy, it also solves one of the industry's biggest problems- odor. Because of this problem, many restrictions are placed on the location and size of a dairy. Since manure placed into the digester is sealed off from the outside air, it reduces odor by an incredible 97% and prevents the release of methane gas into the atmosphere. The high temperature in which the digester is held also kills many pathogens and weed seeds and any digested manure applied as fertilizer will be less hazardous to water sources and retains more nitrogen than typical manure. Although installation of the system is rather expensive, state and federal grants as well as possible tax credits provide help in initial set-up costs allowing for a 3-10 year payoff. With such benefits available, methane digestion should be strongly considered by the dairy industry as both a manure management system as well as a secondary source of income.

Key Words: Digester, Manure, Energy

141 Why crossbreed dairy cattle? J. Yoder*, *Virginia Polytechnic Institute and State University*, *Blacksburg*.

In the last several years crossbreeding has reappeared as a management tool for dairy farmers. Historically, crossbreeding dairy cattle has not been as popular as it is in other species, because it did not appear to be economically useful. Producers have focused on increased production as the primary economic factor in breeding programs. In most cases this focus favors pure Holsteins. Recently, producers have begun to expand their focus to add management traits (such as health and fertility traits), to breeding programs to control costs. Purebred breeds are growing increasingly inbred, as producers heavily use a small number of elite bulls. Inbreeding impacts many traits negatively, especially the management traits. Crossbreeding seeks to form beneficial heterozygous gene combinations, along with the benefit of heterosis. Heterosis raises performance above the average of the two parents. Three studies have looked at performance of crossbreds in commercial herds. A Wisconsin study surveyed producers who had crossbreds in their herds. The producers gave high scores to crossbreds for traits such as components, survivability and fertility compared to Holsteins, while citing conformation to facilities, value of selling stock and production as negatives. A USDA study found that while Holsteins produce more fluid milk, crossbreds are competitive on a Net Merit or Cheese Merit basis. A University of Minnesota study compared purebred Holsteins to crosses of Scandanavian Red, Montebeliarde, and Normande sires on Holstein dams. The study shows that crossbreds may be competitive with Holsteins for production, particularly combined fat and protein, while improving fertility, calving ease and survival rates. Crossbreeding could be an effective tool for dairy managers. The trade-off in many cases will be giving up some production while cutting the costs of managing the herd. Crossbreds will be most beneficial in high stress climates and in areas that favor higher components. Crossbreeding programs do not eliminate the need for good management. It is critical to use high quality breeds and to select intensely within the breeds utilized. It will also be important to have accurate record-keeping to insure the success of the program.

Key Words: Crossbreeding

142 The effect of selenium source on the health and performance of dairy cattle. R. J. Mast* and E. H. Jaster, *California Polytechnic State University*, *San Luis Obispo*.

One of the trace minerals that has gained recognition in animal nutrition, specifically dairy cattle, is selenium because of the role that it plays in immune, reproductive, and cellular function. Research has indicated that the source of selenium can have an affect on the health and performance of dairy cattle. Recent studies have demonstrated that there are increased benefits to feeding organic forms of selenium compared to inorganic forms. These studies have focused on the concentrations of selenium in whole blood, milk, and colostrum, as well as whole blood glutathione peroxidase (GSH-PX) activity that can be achieved by feeding various forms and amounts of selenium. Selenium status is determined by the level of selenium in blood, milk, and tissue, and by enzyme activity of glutathione peroxidase. The bio-ability of the cow to transfer selenium to the calf is essential for calf health and reduced mortality. The majority of this research points to the conclusion that organic sources of selenium are more easily absorbed and able to be utilized more fully than inorganic sources by the dairy cow. Such findings make this topic important for further study in order to determine how to achieve the highest level of herd health and productivity. Comparison of the results from studies that have measured the effects of supplementing organic versus inorganic selenium to dairy cattle is important in evaluating the feeding value of this mineral in dairy cattle rations.

Key Words: Selenium, Dairy cattle

Women and Minority Issues in Animal Agriculture Luncheon

143 Mutual mentoring: A strategy for success in academia and industry. M. Lederman*, *Virginia Tech*, *Blacksburg*.

Those who attend this session will have the opportunity to hear about mutual mentoring, a strategy by which individuals come together to support each others efforts to succeed in the academy and in industry. We will present several examples of mutual mentoring groups whose members have been successful in achieving the goals they set for themselves. The strengths and weakness of these groups and the mechanics of how they operated will be discussed. During this meeting, we will offer the opportunity for those present to form new mutual mentoring groups, based on whatever criteria (discipline, geographical proximity, seniority) the participants deem appropriate. We ask the participants to articulate their personal and professional goals for a time period they select, define the topics appropriate for group discussion, set up the procedure(s) by which they are accountable to each other, and decide how they will communicate. The sub-groups will report back to the whole and develop strategies by which they will continue to be in contact with each other.

Key Words: Women in agriculture, Minorities in agriculture, Mentoring