ations than their US sibs for milk (Australia, Czech Republic, Germany, France, Great Britain, Japan, and South Africa), fat (Australia, New Zealand, and South Africa), and protein (Australia, Czech Republic, Germany, Japan, and South Africa). In contrast, bulls from the United States had significantly favorable evaluations for milk relative to Italy and SCS relative to South Africa. Largest biases involved bulls from South Africa where only 8 to 9 families were in common with the United States (thus giving indirect data greater importance), but other significant differences were based on hundreds of direct ties. The reason for these inequities is unknown but elimination of biases is important to maintaining confidence in international evaluations.

Key Words: Genetic Evaluation, Interbull, Evaluation Bias

351 Multiple-trait multiple-country genetic evaluations of dairy bulls for udder health traits. T. Mark*[1] and P. G. Sullivan[2,3], [1]*Interbull Centre*, *SLU, Uppsala, Sweden*, [2]*Canadian Dairy Network*, *Guelph, Ontario, Canada*, [3]*Beef Improvement Ontario*, *Guelph, Ontario, Canada*.

Udder health is an economically important trait group and several measures of clinical and sub-clinical mastitis describe this trait complex. Interbull routinely computes two separate single-trait-by-multiple-country genetic evaluations (ST-Mace) for clinical mastitis (CM) and milk somatic cell (SC), for bulls from more than 20 countries. Separate evaluations are sub-optimal and it is desirable to extend ST-Mace to allow more than one trait per country. The aim of this study was to quantify the expected gains for Multiple-Trait-by-Multiple-country genetic evaluations (MT-Mace) compared with the current ST-Mace for udder health. For this purpose national SC (and CM) results from 8 (and 3) Holstein populations were considered. In MT-Mace, weighting factors were adjusted to account for residual correlations, while within country genetic correlations were considered in a multivariate deregression procedure. Predicted international genetic merits, of all bulls evaluated, were highly correlated between MT-Mace and ST-Mace, for SC in all 8 countries (>.99), and for CM in all 3 countries (>.98) when SC from the remaining 5 countries was included in the ST-Mace analysis for CM. Among several groups of bulls studied, the international predictions were most strongly affected for bulls that had national evaluations for both CM and SC in the same country. The genetic correlations from the ST-Mace model were also used for MT-Mace, so these results may change once correlations are re-estimated for the MT-Mace model, based on observations generated by the multivariate deregression procedure. Essentially the same results that required two 8-trait ST-Mace analyses, for these 11 traits of interest, were generated with a single 11-trait MT-Mace analysis. Additional traits for some or all countries could also be added into the MT-Mace system, for example udder depth, fore udder attachment, dairy form or milking speed. However, reduced-rank algorithms or other computational techniques may be needed to implement MT-Mace for a very large number of country-by-trait combinations, especially for the estimation of required covariances.

Key Words: International Evaluation, Clinical Mastitis, Milk Somatic Cell

ADSA Southern Section: Innovative Approaches to Address the Changing Needs of Our Dairy Industry

352 Innovative staffing models to enhance dairy educational programs. V. Ishler*, L. Holden, and R. Stup, *Pennsylvania State University*, *University Park*.

Universities are challenged with having fewer resources available to conduct educational programming. Dairy extension programs provide educational opportunities, but the complex planning processes, numerous departmental and geographic divisions and multiple academic responsibilities of traditional specialists make effective coordination of programs difficult. Penn State's department of dairy and animal science recognized that progressive dairy producers were being faced with challenges that were outside the discipline oriented programs of tenure-track dairy faculty. Critical gaps in educational programs for dairy producers and the agricultural industry were not being addressed in a timely manner. In-depth focus groups were conducted with agribusiness and producers to determine their educational needs. These groups identified four areas of critical need: information management, human resource management, business management and nutrient management. A new initiative, "Dairy Alliance", was launched to provide a system to integrate all available resources and to responds to the identified needs of the dairy industry. It was designed so highly skilled individuals could be hired in a timely manner with a specific expertise in a particular area. Positions were non-tenure track for a fixed-term basis giving greater flexibility to make program changes compared to traditional tenure-track positions. Dairy Alliance is organized as a self-managing team with specialists in the key program areas and a program manager who organizes activities and resources. A tenure-track faculty member and the department head of Dairy and Animal Science guide Dairy Alliance. The results of this new initiative have surpassed expectations. New relationships have been forged with key members of the dairy industry. An additional specialist has been hired to coordinate a dairy certification program and to address producer needs in milking management. Dairy Alliance is positioned to be a leading dairy extension/outreach program in the United States.

Key Words: Dairy, Education, Outreach

353 A dairy consultant's perspective on the changing needs of our dairy industry. N. Ohanesian*, *Consulting Nutritionist*, *Clovis, CA*.

Dairymen in the western states have become dependent on nutrition consultants to assure that their herds are properly fed and supplemented to achieve maximum production and health. In addition to the nutrition and feeding aspects of their herds, dairymen have become dependent on the nutritional consultant for advice on management aspects such as herd record analysis, breeding, disease, environmental issues, labor utilization, equipment evaluation, etc. Therefore, a professional nutritional consultant must become proficient in all management aspects of the industry. Proficiency means staying current in feeding strategies, current events, new products, new equipment, university and industry research and record keeping programs. The most precious commodity the consulting nutritionist has is time, he or she must balance their schedule with continuing education. Professional meetings must be evaluated for the information being offered along with the locations and time so that the consultant can schedule efficiently. Professional organizations such as American Dairy Science Association (ADSA) and American Registry of Professional Animal Scientists (ARPAS) are the foundation for continuing education. ADSA meetings offer the broadest spectrum of current research and techniques utilized by the consulting nutritionist. Membership in ARPAS and a regional chapter bring professional animal scientists together. Continuing education seminars such as those offered by the California chapter of ARPAS, are shorter in duration and target a specific technical topic. The consulting nutritionist has the opportunity to interact with industry and university professionals on a friendly and informal basis. This interaction is valuable in that professionals are able to exchange ideas and experiences that are helpful in increasing the knowledge base for those participating. Recent trends in the dairy industry have been larger dairy farms with integration of farming and milk. The consulting nutritionist of the future will have a larger roll in the management team of the dairy farm if he or she has a solid academic background and the ability to bring together theory with practicality.

Key Words: Consultant, Professional, Dairy

354 Meeting the changing needs of the dairy industry: perspective from an AI company. M. A. Faust*, A. Knuth, C. Marti, N. Michael, and A. Storch, *ABS Global, Inc.*, *DeForest, WI.*

Internal and external factors constantly influence the socioeconomic climate in which dairy farms operate. Successful dairy farms achieve sustainability and profitability within these dynamic conditions. The current result of changing socioeconomic conditions appears to be more distinct segmentation in dairy demographics with large, specialized dairies producing a commodity product and growth in importance of niche segments such as organic dairies, low input dairies, and cottage-industry operations. AI companies also are influenced by market forces, including industry success in generating genetic progress; thus high genetic merit is a customer expectation and it is difficult for AI companies to produce a differentiated product. Furthermore, semen expense represents <1% of dairy operating expense. The marketplace approach adopted by ABS Global which serves an international customer base has been to tailor products and services to individual market segments - using service and science to solve customer problems. Specifically, ABS sources and develops genetics appropriate for all market segments from three different continents. These genetics include elite breeder quality, mainline including a subset of European sourced bulls with higher milk components, show type, and grassland bulls. To further individualize sire selection, inbreeding, and breeding goals for dairies, sire selection and mate assignment programs are offered. Also, ABS and others offer specialized expertise and problem solving for herd reproduction management. Dairies can tailor the reproductive program further by selecting from a list of services such as heat detection, breeding and data entry, technical service consultation, performance monitoring, and evaluating measures of synchronization success. Acceptance of these programs by ABS customers has been great - during 2004, >2 million dairy cows were mated through the company's proprietary program while professionally trained reproductive management representatives walked behind >500,000 breeding eligible cows daily. Dairies expect products and services that meet their unique needs.

Key Words: Industry segmentation, Genetic improvement, Reproductive management

Breeding and Genetics: Genetics of New and Emerging Traits

355 Emerging traits of interest to the livestock industries: scrapie resistance in sheep. R. M. Lewis*[1] and B. Villanueva[2], [1]*Virginia Polytechnic Institute and State University*, *Blackburg*, [2]*Scottish Agricultural College*, *Edinburgh, UK*.

Many loci with major effects on performance, including fitness, have been identified in livestock. Where genotype tests characterizing polymorphisms at such loci are available, breeders have opportunity to use such information to increase the frequency of beneficial alleles. A clear example is the Prion Protein (PrP) locus in sheep, which is associated with resistance to the fatal transmissible spongiform (TSE) scrapie. Five main haplotypes have been identified for this locus resulting from polymorphisms at codons 136, 154 and 171. Animals homozygous for the ARR haplotype are considered resistant while animals carrying the VRQ haplotype are considered highly susceptible. Genetic strategies based on PrP genotyping have thus been adopted to eradicate scrapie in infected flocks while increasing the resistance of national flocks. The voluntary National Scrapie Plan (NSP) in Great Britain is one of the earliest PrP genotyping programs. It began in 2001 by genotyping rams registered with breed societies favoring rams with beneficial genotypes for breeding. Since other TSE diseases may be present in sheep, another aim of NSP is to remove the theoretical risk of bovine spongiform encephalopathy naturally affecting sheep. Although increasing genetic resistance to TSEs is clearly important, the path to achieving resistance requires care. For instance, limited evidence suggests ARR homozygosity may not unequivocally result in scrapie resistance, perhaps reflecting variable strains of scrapie. Semen banks designed to preserve alleles currently disfavored are needed to ensure flexibility to manage future TSEs. Furthermore, if favored alleles are antagonistic to other economically important traits or are sufficiently rare that selection increases inbreeding and reduces genetic variability, a focus on scrapie alone may prove risky. The careful integration of scrapie resistance into the overall breeding goal is thus central.

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Key Words: Scrapie, Genotyping, Risk

356 Effects of different strategies for breeding towards scrapie resistance in East Friesian milk sheep on inbreeding levels and production traits. F. de Vries*, H. Hamann, C. Drogemuller, and O. Distl, *University of Veterinary Medicine*, *Hannover, Germany*.

The European Union forces each member state to introduce a breeding programme for all sheep flocks of high genetic merit to breed towards scrapie resistance. The objective of the study was to assess the effects of different strategies to breed towards the scrapie resistant ARR/ARR homozygous genotype of the ovine prion protein gene in East Friesian milk sheep on inbreeding, drift variance, possible negative side effects, bottleneck effects and breeding costs. A simulation programme was developed, in which different population structures could be used. In this study the population structure of the region of origin of the East Friesian milk sheep was selected because of its low ARR allele frequency (10%) and an observed negative effect on withers height.

The simulation parameters were the allele frequencies of male and female founder animals, the population size, the age structure, the mating ratio, the effect of a QTL, a polygenic component associated or not with the QTL, the genetic distance between QTL and prion protein gene locus. Breeding strategies were optimized based on the mean inbreeding coefficients, the genetic distribution of founder rams to later generations, and the distributions of phenotypic and breeding values.

Based on the results, the strategy for East Friesian milk sheep should be to breed initially towards ARR heterozygous sheep until a threshold value of 30% for the ARR allele is reached in order to avoid a genetic bottleneck. After this the strategy should change and only ARR homozygous sheep should be selected. The higher cost of this strategy should be accepted in respect to minimal loss in genetic diversity. The developed simulation programme allows optimizing breeding schemes for other breeds.

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Key Words: Scrapie, Breeding Programme, Inbreeding

357 Association analyses between the prion protein locus and reproductive and weight traits in Ripollesa sheep. J. Casellas*[1], J. Piedrafita[1], G. Caja[1], R. Bach[2], and O. Francino[1], [1]*Universitat Autònoma de Barcelona*, *Bellaterra, Spain*, [2]*Associació Nacional de Criadors d'Ovins de Raça Ripollesa*, *Monells, Spain*.

The aim of this study was to analyze the association between the alleles of the prion protein locus (PrP) and performance traits in the Ripollesa sheep, an autochthonous breed of Catalonia (Spain). PrP genotypes were analyzed by the SnaPShot Multiplex technique in blood samples from 121 adult rams and ewes and 68 lambs from the experimental flock of the Universitat Autònoma of Barcelona. The genotype of 24 descendants of the genotyped adult individuals was also reconstructed, since both parents were homozygous for PrP alleles. Reproductive traits of ewes (n = 88) included conception rate (CR; n = 408) and litter size (LS; n = 364) whereas the lamb traits studied were birth weight