

parents, maintaining optimal inbreeding level, especially keeping inbreeding lower than 20%. The concept of the theory of optimum genetic contribution (OGC) uses the relationships between individuals as weights. The objective of this study was to compare simulated results of the OGC algorithm in different conditions for 30 generations. Results showed this algorithm could effectively control inbreeding

maintaining a consistent increase in selection responses. The difference of breeding values between selection based on the OGC algorithm compared with with EBV was only 13%, but the rate of inbreeding could be controlled as much as ~67% after 30 generations, indicating that the OGC algorithm can be effectively used for long-term selection programs.

Key Words: Inbreeding, Simulation, Litter Size

Contemporary & Emerging Issues - Livestock and Poultry: Contemporary and Emerging Issues

949 Avian H5N1: Still an animal virus? F. C. Leung*, *The University of Hong Kong, Hong Kong, HK-SAR, China.*

As of Feb 6, 2007, the cumulative number of confirmed human cases of avian influenza A/(H5N1) reported to World Health Organization (WHO) is 272 with 166 deaths. Avian influenza including H5N1 refers to a large group of different influenza viruses of which the primary host is birds. Only on rare occasions do these viruses cross over and infect other species including pigs and humans. Pandemic influenza happens when a new subtype emerges that has not previously circulated in humans. Since H5N1 is a strain of such potential, WHO and other health experts, for this reason, have been priming the world to prepare for this threat along with OIE and FAO calling for culling million of poultry world-wide. During my presentation, I will present a model based on the most recent event of an animal virus 'crossing over' to become a human virus, SARS, and argue that the scale of the warnings appears to outstrip the magnitude of the real threat. Culling millions of chicken may not have actually lowered the actual risk and efforts and resources should be directed to research in understanding the molecular and genetic mechanisms underlying the virus-crossing species event. Only then can effective barriers be set up to limit the direct contact of susceptible species; to lower the transmission rate; and avoid establishing/adaptation to a new host. In addition, I shall review recent scientific findings that avian H5N1 remains as an animal virus and the probability and possibility for H5N1 successfully adapting to humans as a new host remains low at this particular moment!

Key Words: Avian Influenza, H5N1, Virus

950 Bovine spongiform encephalopathy in the United States. J. A. Richt*, *National Animal Disease Center-ARS-USDA, Ames, IA.*

Transmissible spongiform encephalopathy (TSE) agents or prions induce fatal neurodegenerative diseases in humans and in other mammalian species. They are transmissible among their species of origin, but they can also cross the species barrier and induce infection with or without disease in other species. In animals, four distinct TSE diseases are recognized: scrapie in sheep and goats, transmissible mink encephalopathy (TME) in mink, chronic wasting disease (CWD) in cervids, and bovine spongiform encephalopathy (BSE) in cattle. BSE was first identified as a TSE of cattle in the mid 1980s in the U.K. and more than 180,000 positive cases have been diagnosed in the U.K. to date. Using epidemiological surveillance programs, many European and non-European countries have discovered BSE-positive animals within the last decade. In the U.S., the first BSE case (case 1) was identified in December 2003; this animal was determined to be imported from Canada. After this animal was identified, the USDA

began its enhanced BSE surveillance program in June 2004. Since then, two additional animals (cases 2 and 3) have been identified as being positive for BSE. Both animals were born and raised in the U.S. Case 1 showed molecular features similar to typical BSE isolates, whereas cases 2 and 3 revealed unusual features referred to as atypical BSE isolates. Unusual cases of BSE are an unexpected finding since it was previously believed that BSE disease in cattle is caused by a single strain of infectious agent, which has been shown to be very consistent and uniform in appearance, even after transmission to other species. The appearance of unusual phenotypes of BSE in cattle suggests that different BSE strains exist in cattle.

Key Words: Prion Diseases, U.S BSE Cases, BSE Strains

951 Scenario and economic analysis of a hypothetical link between MAP and Crohn's disease. H. Groenendaal* and F. Z. Zagmutt, *Vose Consulting, Boulder, CO.*

Johne's disease (JD) is an infectious disease of cattle caused by the agent *Mycobacterium avium* subspecies *paratuberculosis* (MAP). Crohn's disease is a disease of unknown etiology that causes chronic bowel inflammation in humans. No causal link between MAP and Crohn's disease in humans has been scientifically established but given the potential for such discovery, it is important to understand its possible impacts on society. In this presentation, we will show the implications and the possible economic impacts on the dairy industry and to provide a framework for further discussion among stakeholders. Three scenarios were developed based on the effectiveness of possibly risk mitigation strategies. In the first scenario, it was assumed that an effective strategy would exist, resulting in negligible demand effects. In the second scenario it was assumed that new risk mitigation would need to be implemented, in which case a small milk demand was expected, with the potential of being large. The third scenario assumes that no fully effective risk mitigation would be available, which more likely results in a considerable demand decrease and a reduction in milk supply as a result of government regulations. With milk demand of 1% or 5%, a reduction in consumer surplus of \$600 million and \$2.9 billion and a reduction in dairy farm income of \$270 million and \$1.3 billion respectively was found. The true shift in demand is however impossible to predict. An decrease in milk supply would slightly increase total losses, but would cause great losses to MAP positive dairy farms. Given the current scientific knowledge about the link between MAP and Crohn's and the effectiveness of risk mitigation methods, it is concluded that in case a link would be established, it is most likely that the first scenario or potentially the second scenario could occur. Consumer response and economic consequences to discovery of such link are therefore expected to be limited, but could

be large if the consumer's perception of risk turns out to be large or if risk mitigation strategies appear not fully effective.

Key Words: Mycobacterium Avium Subspecies Paratuberculosis, Crohn's Disease, Economic Analysis

952 Tuberculosis: A re-emerging disease at the interface of domestic animals and wildlife. M. V. Palmer*, *National Animal Disease Center, ARS, USDA, Ames, IA.*

In the early twentieth century there were large numbers of tuberculous cattle in many countries. An association was made between the number of *Mycobacterium bovis* infected humans and the prevalence of tuberculosis in cattle. Mandatory pasteurization of milk and advances in public health caused the prevalence of human tuberculosis due to *M. bovis* to decline dramatically in developed countries. However, in some countries eradication has been prevented by several factors not least of which is the presence of a wildlife reservoir of *M. bovis*. In Great Britain evidence suggests that *M. bovis* is endemic among badgers (*Meles meles*), and that tuberculous badgers are the source of

infection for cattle. In New Zealand, brushtail possums (*Trichosurus vulpecula*), first taken to New Zealand from Australia in the mid-nineteenth century now occupy over 90% of New Zealand's land mass and serve as a source of *M. bovis* for domestic livestock. In Michigan, USA free-ranging white-tailed deer (*Odocoileus virginianus*) represent the first known reservoir of *M. bovis* in free-living wildlife in the United States. Deer to cattle transmission of *M. bovis* has been documented. Wildlife reservoirs of *M. bovis* represent a serious challenge to the eradication of *M. bovis*. The presence of wildlife reservoirs is the direct result of spill-over of *M. bovis* from domestic livestock and efforts to eradicate *M. bovis* from domestic livestock are impeded by spill-back from wildlife reservoirs. The test and slaughter policies of tuberculosis control, effectively used with domestic livestock, are insufficient in areas where wildlife reservoirs exist. Complete removal of wildlife is impractical, and often impossible. It will not be possible to eradicate *M. bovis* from livestock until transmission between wildlife and domestic animals is halted. Such an endeavor will require a collaborative effort between agricultural, wildlife, environmental and political interests.

Key Words: Mycobacteria, Tuberculosis, Wildlife

Nonruminant Nutrition: Poultry Nutrition - Phosphorus and Phytase

953 Early response of young breeder source broilers to combined xylanase-amylase-protease-phytase supplementation of a high performance feed and when both ME-available phosphorus (AP) are reduced. E. T. Moran* and R. Lehman, *Auburn University, Auburn University, AL.*

Reserve body fat and calcium-phosphorus of chicks at hatch suffer when from small eggs of young breeders. Supplemental enzymes that focused on energy and AP recovery were examined as a means to relieve early inadequacies of these source broilers. Chicks (1600; 64 pens) originating from a 26 week old R X 708 flock were either directly placed (34g/bird) in litter pens or delayed 24 hours (30 g), respective of sex. Corn-soybean meal feed for next 3 weeks was crumbed and either high performance (23% CP, 1.38% lysine, 0.98% TSAA, 3.19 Kcal ME/g, 0.44% AP, 0.99% Ca) or low ME-AP (omission of 2% fat and 0.25% dicalcium phosphate for corn: 3.11 Kcal/g, 0.34% AP, 0.87% Ca) formulations were used. Crumbed feeds were either fed "as is" or supplemented "on top" to provide units/kg of xylanase, 300; amylase, 400; protease, 4000; phytase, 5000 (0.05% Avizyme 1502 + 0.01% Phyzyme XP). The enzyme mixture did not improve gain during the subsequent 3 weeks of birds given high performance feed as much as improve F/G ($P < .05$). Low ME-AP feed adverse affected live performance that was rectified by supplemental enzymes to the same level as those receiving high performance feed with enzymes ($P < .05$). Adding enzymes also reduced within pen standard deviation of body weights, regardless of feed ($P < .05$). Delayed placement decreased body weight when placed in pens and accentuated the loss in performance from low ME-AP and benefit from enzyme supplementation. Most advantages from added enzymes were exhibited similarly by both sexes, but improved F/G was more apparent with males than females. Supplementation with feed enzymes that improve recovery of energy and phosphorus was of distinct advantage to chicks derived from young breeder hens.

Key Words: Broiler Chick, Feed Supplement, Incubation

954 The effects of supplemental Quantum Phytase on second cycle Hyline W-36 hens. M. Lilburn¹ and C. Wyatt*², ¹*Ohio State University, Wooster*, ²*Syngenta Animal Nutrition, Research Triangle Park, NC.*

A flock of Hyline W-36 hens was molted using the non-feed withdrawal program developed by the University of Illinois. During the molt period, all hens were fed a diet containing primarily ground corn (23%) and wheat midds (71.1%) and the hens never completely ceased production. At the onset of second cycle production, 7 replicate blocks of hens (n=4 cages per block; 2 hens per cage) were fed one of 5 diets. The diets were a positive control containing 0.50 total phosphorus (TP), a negative control diet (NC) containing 0.28% TP and the NC diet with either 200, 400, or 600 units of QuantumTM phytase. All hens were limit fed 95 g/hen/d. Hen-day egg production was measured over four consecutive 28-day periods and egg weight and shell weight were determined on all eggs collected on two consecutive days during the second and last 28-d production periods. Only the data from the second 28-d period will be reported. The NC diet was numerically lower in hen-day egg production during the first 28-d compared with the mean of the PC and Quantum treatments (47.9 vs. 51.0) but the variability precluded any significant treatment differences. Over the subsequent three production periods, however, hen-day production in the NC treatment was significantly lower than the PC and Quantum supplemented treatments (Pd 2, 68.5 vs 82.0; Pd 3, 67.4 vs 79.7; Pd 4, 70.2 vs 77.3). There were no significant differences between the PC and Quantum treatments during any of the four production periods. Egg weight (63.7 vs 66.4 g) and shell weight (5.89 vs 6.08 g) were both significantly lower in the NC compared with the PC and Quantum supplemented treatments. In summary, a diet containing 0.28% TP resulted in a significant reduction in both hen-day egg production, egg weight, and shell weight compared with a diet containing 0.50% TP or the NC diet supplemented with as little as 200 units of Quantum phytase.

Key Words: Phytase, Laying Hens, Molt