

**Distribution and economic impact of coccidiosis on small scale commercial poultry farms in Africa**Fornace, K.<sup>1</sup>, Yrjö-Koskinen, A.<sup>1</sup>, Clark, E.<sup>1</sup>, Macdonald, S.<sup>1</sup>, Thieme, O.<sup>2</sup>, Blake, D.<sup>1</sup> and Rushton, J.<sup>1</sup>,<sup>1</sup>Royal Veterinary College, United Kingdom, <sup>2</sup>FAO, Italy; [kfornace@rvc.ac.uk](mailto:kfornace@rvc.ac.uk)

Coccidiosis, a species-specific intestinal disease caused by *Eimeria* spp. parasites, causes substantial production losses in the poultry industry worldwide. The objective of the study was to examine the distribution and economic impact of *Eimeria* spp. within small-scale commercial poultry farms in Africa. Faecal samples and data on production parameters and farm management were collected from small-scale (less than 2,000 birds per batch) commercial broiler and layer farms within Ghana, Tanzania and Zambia. The gross margin and enterprise budget per bird per year were calculated to assess individual farm profitability. The parasite presence and load was quantified through faecal oocyst counts and confirmed through *Eimeria* specific 5S rDNA PCR. The field samples were screened for the presence or absence of each of the seven *Eimeria* species that cause coccidiosis in the chicken using a diagnostic molecular PCR assay. Pathogenicity of species present was compared with farm profitability. *Eimeria* spp. parasites were found to be widespread within Africa and were present on 75% (60/80) farms sampled. Species complexity was comparable to that of Europe with all seven *Eimeria* species detected and 35% (28/80) farms concurrently infected by multiple *Eimeria* species. Farmers reported awareness of clinical coccidiosis and mortality rates of up to 80%. The profitability of farms varied substantially by country and production type, with gross margins ranging from -21.88 to 52.30 USD per bird per year in layer systems and from -4.01 to 8.01 USD per bird per year in broiler systems. Further studies are required to characterise the *Eimeria* population within Africa and the economic impact on poultry farms and to identify cost effective potential control strategies and interventions.

**Association between first calving age and milk production at first lactation in 100 Dutch dairy farms**Mohd Nor, N.<sup>1,2</sup>, Steeneveld, W.<sup>3</sup>, Mourits, M.C.M.<sup>3</sup> and Hogeveen, H.<sup>2,3</sup>, <sup>1</sup>Universiti Putra Malaysia, Malaysia, <sup>2</sup>Utrecht University, Netherlands, <sup>3</sup>Wageningen University, Netherlands;[Norhariani.mohdnor@wur.nl](mailto:Norhariani.mohdnor@wur.nl)

The total costs of rearing a heifer will be reduced by lowering the first calving age (FCA). A lower FCA could, however, coincide with a lower development of the reared heifer, influencing milk production at first lactation. To establish the possible economic impact of lowering the FCA, the association between FCA and milk production in first lactation needs to be investigated. The objective of this study is to determine this association at cow level. Data on FCA and milk production at first lactation of 8,454 heifers in 100 intensive Dutch dairy herds from 2003 to 2010 were gathered. The average FCA was 26 months and the average 305 d milk production at first lactation was 7,493 kg. The median FCA of the herds ranged between 24 and 32 months of age. The difference between the FCA of the individual heifer and the median FCA of the herd was defined as the relative FCA. The association between relative FCA with 305 d milk production at first lactation was analyzed using a linear mixed effect model and included herd, year and calving season. Relative FCA was categorized monthly, and relative FCA not deviating from the median FCA of the herd was the reference category. Heifers having a FCA one or two months lower than the median FCA of the herd have a 90 kg and 179 kg lower 305 d milk production at first lactation, respectively. Heifers having a FCA one month higher than the median FCA of the herd have a 87 kg higher 305 d milk production at first lactation. Relative FCA gives a deviation of a heifer's FCA from a similar management. The results indicate that a lower FCA on a farm by earlier insemination but not adjusting the management to ensure sufficient development will reduce rearing costs but with a lower milk production at first lactation. A higher FCA results in a higher milk production but with a higher rearing costs. For dairy farmers, there is an economic optimum between rearing costs and FCA with regard to heifer rearing.

**Economic evaluation of air filtration in large sow herds in North America**

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Air filtration systems implemented in large sow herds have been demonstrated to decrease the probability of having a PRRSV outbreak. However, a large economic study comparing real production data from both filtered and non-filtered farms has been never been completed in order to assess the profitability of this investment. In 2010, the 14 filtered and 6 control participant herds were enrolled from a contemporaneous PRRSV epidemiological study. Repeated measures of quarterly production data, weather, PRRSV outbreak in the period together with air filtration status and number of different pig sites within 3 miles, were the variables analyzed in the longitudinal mixed model. Data management and statistical analysis was performed with a Statistical Analysis System (SAS) version 9.1. The retrospective and prospective timeline study was Oct 2004 to June 2011. For the cost analysis, three scenarios were compared in a spreadsheet model of weaned pig cost on a representative 3,000-sow non-filtered farm with feed cost of \$278/sow/year: (1) control; (2) filtered conventional attic; and (3) filtered tunnel ventilation. Scenario 1 was based on the data from control and pre-filtration periods of the future filtered farms. Scenarios 2 and 3 were identical except that the initial filtering equipment cost \$150/sow for the conventional versus \$200/sow for the tunnel. Filtration was assumed to change pigs weaned/sow/year, farrowing rate, female replacement rate, female death rate, veterinary expenses, and the annualized cost of replacing pre-filters every six months and replacing filters every three years. Filtered farm produced 6,028 more piglets than non-filter farm and the payback period for the investment was estimated in the model as 5.5 years for scenario 2 and 6.4 years for scenario 3. However, this could be considered a conservative estimation because no value penalty in selling PRRSV positive piglets was accounted for.

**Modelling climate change impacts on livestock aid**

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Poor livestock keepers are faced with a future of uncertainty. Across the literature, there is broad consensus that current constraints to livestock production are likely to be exaggerated under climate change and the associated Extreme Weather Events (EWEs). This will have important implications for those poor households who rely on livestock for income generation, food security, and as source of investment. Traditionally, restocking programs have been instigated after EWEs to support poor households in the short-term and help break the poverty cycle over the longer-term through the provision of livestock. Other forms of aid such as supplementary feeding, destocking and more recently, cash transfers have also been tried as tools to support the rehabilitation of livestock-dependent populations post-emergency. However, while climate change is likely to change the duration and frequency of EWEs, little is known regarding the robustness of particular forms of livestock aid in meeting these new challenges. Therefore, in the following article, the authors create a simple deterministic model to explore the potential impacts of different forms of livestock aid on a range of livestock keepers across both subsistence and pastoralist production systems. The impact of critical global climate parameters such as the predicted 2 °C temperature rise are explored within the expected production shifts across the systems under review. The model demonstrates the importance of understanding the factors underpinning livestock aid at the household and production system levels and the potential limitations and benefits of a wide range of livestock-related interventions.