Boiler lameness is one of the top economic and animal welfare issues facing the modern broiler industry. Despite improvements in nutrition, health genetics over the past decades, too many flocks end up with birds that are partially or completely immobile, according to Dr. R. Mitchell, vice president of technical services for Perdue Farms Inc.

Mitchell presented his views on broiler lameness in the U.S. during the Australian Poultry Nutrition Symposium in February.

Mitchell said the incidence of birds with leg problems has been estimated to be between 2% and 6%. A recent large study in the U.K. found that more than 27% of birds, on average, had poor walking ability, and 3.2% were completely clinically lame. It is hard to infer the same level of leg problems for the U.S. broiler industry, however, due to the many differences in management, genetics and environmental issues between the regions.

Mitchell’s presentation looked at the causes of infectious and non-infectious leg problems in the U.S. and explored how integrators have changed their perspective from leg problems being a production-related issue to a welfare issue.

Non-infectious issues
Rickets is the classic nutrition-related problem. Most cases of field rickets are due to some error in feed manufacturing. Clinical rickets is not common in the U.S. due to improvements in nutrition and feed manufacturing.

The incidence of subclinical rickets is difficult to assess but still periodically appears with little or no specific cause. Subclinical rickets has been linked to other conditions such as femoral head necrosis, osteomyelitis, bone fractures and others.

In Mitchell’s experience, subclinical rickets is often associated with “soft bone” conditions which are normally observed around two to three weeks of age and are picked up at routine health surveys. These cases do seem to respond to water-soluble vitamins. Mitchell has linked this condition to one that is related to fat-soluble vitamin absorption. Some poultry companies that are using coccidiosis vaccines routinely use water-soluble vitamin D as a preventive for rickets and soft bones.

Phillips et al. has suggested that the phosphorus requirement from 0 to 10 days of age in current commercial strains of broiler is much higher than the National Research Council bulletin recommends or the industry is currently practicing.

Tibial dyschondroplasia (TD) is a lesion characterized by a mass of avascular cartilage in the metaphysis of the proximal end of the tibia or the tarsometatarsus. TD has long been associated with fast-growing broilers. This condition was once considered a major cause of lameness in broilers.

Genetically selected with the use of a lassocline, it has greatly reduced the incidence of TD. TD is frequently associated with other deformities such as valgus-varus and rotated tibia.

Valgus-varus deformity (VVD) — tibia rotated out or in, twisted legs or spraddle legs — are an angular deformation of the long bones. Primary breeders have selected against VVDs through various methods; however, VVD is still common in many broiler flocks.

Varus may be observed early (less than two weeks of age), usually due to the displacement of the epiphysial growth plate. TD has long been linked to other conditions such as Bovine chondrodysplasia, which points to some common link such as nutrition, malabsorption or genetics.

Mitchell noted that VVD, including rotated tibia, is the most common form of non-infectious lameness in broilers 5 days on his experience and is exacerbated by weight. Many integrators have started using the ultrasound bone density of a large bird processing plant is a good way to gauge how much VVD is present.

Infectious lameness
Bacterial chondronecrosis (BOC), frequently referred to as femoral head necrosis, is probably the most common cause of lameness in the U.S. broiler industry today, according to Mitchell.

BOC is thought to be initiated by a micro-trauma to poorly mineralized columns of cartilage cells in the developing growth plates of the leg bones. The condition normally starts to develop clinical signs after five weeks of age and becomes worse as the birds add more weight.

The incidence of BOC has increased with the increase in average bird size in the U.S. broiler industry. A major breakthrough in the prevention of BOC is the development of BOC vaccines for deboning plants that approach or exceed 4.0 kg liveweight. Most of these plants are grown as straight-run birds, so many of the males will exceed 4.5 kg (9.9 lb.). Dr. Widdowson of the University of Arkansas, using the wire floor model, has developed theories on the role of stress and immunosuppression in the development of BOC. It is thought that bacteria translocate from the gastrointestinal tract or respiratory system and settle into the areas of the growth plate with poor blood flow. This model has suggested new research into preventive strategies for BOC.

Kinky back (spondylolisthesis) is a disease of importance in the U.S. in 2008. Affected birds become completely lame and unable to access feed and water. This condition is associated with arthrosis in the free thoracic vertebrae (T4). Enterococcus cecorum is normally isolated from the abscess, although species of staphylococcus are frequently present. The only treatment available is culling.

Mitchell stated, in his experience, kinky back frequently repeats on the same farms and in the same houses. The industry has combated this problem by increasing layout time, using between-floor cleanout or composting litter and disinfection. The kink back seen in flocks today is not the same as the classical genetic condition that carries the same common name.

Tenosynovitis, viral arthritis caused by reovirus infection, has been relatively rare in broiler flocks in recent years. However, birds are not frequently vaccinated for the common strains of reovirus. Recently, a novel strain of reovirus emerged in the U.S. broiler industry, and available strains of vaccine are not providing protection, according to Mitchell.

Mitchell noted that until this past year, he personally has had very little experience with reovirus in broiler flocks. One Perdue Farms operation reported severe leg problems, including soft bones and legs that were completely stuck out to the side. In the worst-affected broiler flocks, up to 40% of the birds had to be culled. The affected flocks were traced back to specific breeder flocks in one area. Affected breeder flocks shed the virus for six to eight weeks, normally around peak production, and no clinical symptoms are present in the hens.

Other integrators in the same area experienced a similar problem a few months earlier.

Economic losses in the affected breeder flocks are large. Broiler industry produces birds for deboning plants that approach or exceed 4.0 kg liveweight. Most of these plants are grown as straight-run birds, so many of the males will exceed 4.5 kg (9.9 lb.). Dr. Widdowson of the University of Arkansas, using the wire floor model, has developed theories on the role of stress and immunosuppression in the development of BOC. It is thought that bacteria translocate from the gastrointestinal tract or respiratory system and settle into the areas of the growth plate with poor blood flow. This model has suggested new research into preventive strategies for BOC.

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Mitchell noted that his company has been on the forefront of animal welfare in the U.S. and was the first broiler company to receive Humanely Raised Process Verified Program approval from the U.S. Department of Agriculture.

Mitchell went on to note that Perdue has learned a lot from the acquisition of a smaller company that specializes in the production of organic or free-range chickens. This company complies with some of the most rigid welfare practices in North America.

These practices include growers keeping detailed records of birds culled for leg abnormalities and performing leg assessments at key times during the flock. Daily culling of lame birds using proper euthanasia techniques is not only encouraged; it is required as a part of the grower contract, and growers that do not comply risk losing their contract. Most, if not all, integrators encourage euthanizing lame and unthrifty birds. It is in their best interest since these birds will typically end up being condemned in the processing plant.

The act of culling lame birds, however, can be tedious and difficult. The average age of poultry growers continues to rise, and the physical demand of the work can be taxing. Also, since lameness frequently develops in the last weeks prior to marketing, many growers may see culling as reducing their profits. This reluctance to cull is not limited to the U.S. In a large-scale assessment of lameness in U.K. breeder flocks, Knowles et al. noted that more than 3% of the birds classified as lame, according to the U.K. gait assessment method, were allowed to persist in the flock despite...