A practical guide to differential diagnosis

6 – Avian gout /kidney failure

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Avian gout is a consequence of kidney damage which can occur from a number of potential causes leading to the accumulation of uric acid/urates in the renal tubules and serous coats of the heart, the liver, the mesentery, the air sacs or the peritoneum. Due to its complex aetiology, it is difficult to diagnose; however, the most common signs are dehydration, pale combs, depression and swelling and reddening of the feet which impair bird movement. In layers, where it is mainly observed, avian gout can lead to mortalities up to 50%, with 19-35 week-old hens mostly affected.

The causes for this condition are varied (see table right), ranging from management- and/or nutrition-related, to pathogens and/or the presence of mycotoxins in feed. In terms of nutrition, special attention must be paid to the calcium/phosphorus balance, sodium and vitamin D3.

In general, any condition favouring an increase of uric acid in blood favours precipitation in tissue and, as a consequence, development of gout. Excess dietary calcium with low available phosphorus results in the precipitation of sodium-urate crystals and calcium pyrophosphate (pseudogout). In younger birds, gout due to sodium intoxication may be observed at sodium levels exceeding 0.4% in water and 0.8% in feed.

Likewise, high levels of vitamin D3 can increase calcium absorption from the intestine favouring the formation and deposition of urate crystals. Also nutrition-related is the protein level in feed which in excess of 30% causes uric acid production leading to excretory loads in kidneys. Concurrently, sulphates decrease calcium resorption causing excess calcium secretion through the urine. This favours gout, as well as any other factor contributing to urine alkalinity. Water deprivation falls in this category as it leads to increased concentrations of uric acid and other minerals in the blood and later on in the kidneys and urine.

Viruses such as infectious bursal disease (IBDV) and/or infectious bronchitis can enhance mortalities in the presence of pre-existing kidney damage.

In terms of mycotoxin contamination of feeds, the nephrotoxic aflatoxins (Afla), ochratoxin A (OTA) and citrinin are of major concern. The impairment of the kidney function which results from the action of these mycotoxins reduces uric acid excretion and results in the accumulation of uric acid in the body.

For mycotoxin-related problems, prevention can be undertaken through a proper mycotoxin risk management tool which adsorbs and/or biotransforms mycotoxins, thus eliminating their toxic effects for animals, while guaranteeing liver and immune protection. The Mycofix product line from Biomin combines the three strategies – adsorption, biotransformation and bioprotection – which work together to prevent the hazardous effects of mycotoxins in poultry flocks. ■

Check list	Corrective action
Potential cause: MYCOTOXINS: Ochratoxin A (OTA), citrinin, aflatoxins (Afla)	
• Positive for Afla, citrinin and/or OTA in raw materials (ELISA) or feed (HPLC) • Raw materials originating from supplier/ region with history of mycotoxin contamination • Histopathology: Check other target organs of these mycotoxins (e.g. kidneys, liver) • Decline in overall flock performance	• Check average contamination levels. • Use Mycofix at the correct dosage level. • Avoid feed bins or feed/water lines becoming contaminated by stale, wet or mouldy feed.
Potential cause: NUTRITION: Calcium, sodium, vitamin D3	
• Level of minerals and vitamins in diets	• Correct level of minerals and vitamin D3. • Control fish meal usage (rich in salt). • Control total sodium chloride content in feed (<0.3%).
Potential cause: NUTRITION: Protein	
• Protein level in feeds	• Correct protein level in feeds.
Potential cause: MANAGEMENT: Water deprivation	
• Observe animal behaviour to understand the cause of water deprivation • Transportation and vaccination procedures • Drinkers in terms of number, position and blockages that may impede access. • Chemicals added to water (disinfectants, copper sulphate, etc) may result in water refusal, dehydration and gout	• Improve transportation condition of birds (access to water). • Adjust number, position and access to drinkers. • Avoid overcrowding. • Correct blockages in nipples.
Potential cause: PATHOGENS: Infectious bursal disease (IBDV/Gumboro)	
• Maternal antibody titres are very low in day-old chicks	• Adapt vaccination program to the demands of the field situation in each particular area/epidemiology. • Increase biosecurity level.
Potential cause: PATHOGENS: Infectious bronchitis (IB)	
• Laboratory tests to confirm the presence of the coronavirus in a swab or tissue sample	• Adapt vaccination program to the demands of the field situation in each particular area/epidemiology.

References are available from the authors on request