A practical guide to differential diagnosis

4 – Gizzard lesions

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The muscular stomach or gizzard is located immediately after the proventriculus in poultry. Unlike the proventriculus, which produces a number of juices or enzymes that are used in the digestion or breaking down of food into its constituent nutrients, the gizzard serves a more mechanical purpose, aiding digestion by particle size reduction and regulation of feed flow. It consists of a number of layers of tissues, some of which contain straight tubular glands. The innermost layer is a strong, flexible skin that is able to withstand the potentially damaging effects of the muscular action grinding the food, often in the presence of stones or other insoluble material. The glands of the gizzard produce a keratinised liquid material which hardens when in the surface to replace tissue worn away by the grinding action of the organ.

In spite of being a fairly strong organ, the occurrence of erosion or lesions in the mucosal lining (koilin) of the gizzard is often reported by field veterinarians in broiler and commercial layers operations. In some cases, these lesions are already observed in day-old chicks before placement in the broiler house and prior to feed consumption. For young chicks, studies point to post-hatch stress or the presence of mycotoxins in breeder diets (which then carry-over into the egg) as possible factors. For older animals, a lot more potential causes are worth consideration. The table, right, gives an overview of some of those.

In terms of mycotoxins, prevention can be undertaken through the use of a proper mycotoxin risk management tool which adsorbs and/or biotransforms mycotoxins, thus eliminating their toxic effects for the 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. ■

References are available upon request

Check list	Corrective action
Potential cause: MYCOTOXINS: Cyclopiazonic acid (CPA) Deoxynivalenol (DON) and/or T-2 toxin (T2)	
• Positive for CPA, DON and/or T-2 in raw materials (ELISA) or feed (HPLC) • Raw materials originated from supplier/region with history of mycotoxin contamination • Histopathology: Proventriculus hyperplasia of mucosa with heavy infiltration of lymphocytes • Decline in flock performance	• Check average contamination levels • Use Mycofix at a correct dosage level • Avoid contamination of feed bins or feed/water lines by stale, wet or mouldy feed
Potential cause: MANAGEMENT: Copper sulphate ($CuSO_4$)	
• Concentration of $CuSO_4$ in premix • Concentration of $CuSO_4$ in water • Water dosing system is working correctly (if applicable)	• Apply group B vitamins and K3 vitamin in water • Correct set up of the water dosing system
Potential cause: NUTRITION: Biogenic amines (gizzerosine)	
• Level of gizzerosine in raw materials (especially fish meal)	• Lower level of fish meal in diet • Avoid use of low quality fishmeal • Replace standard fish meal with low temperature (LT) fishmeal
Potential cause: NUTRITION: Rancid fats	
• Quality of fats in term of peroxide value, rancidity and free fatty acids	• Avoid low quality fats • Use low quality fats in the grower/finisher phases • Replace animal fats with vegetable fats
Potential cause: NUTRITION: Tannins	
• Level of tannins in some raw materials (sorghum) and in tannin-based products	• Use high quality tannin-based product (chestnut better than quebracho) • Reduce % of sorghum in high-tannin diets
Potential cause: MANAGEMENT: Acetylsalicylic acid and sodium salicylate	
• Dosage of salicylates used (check over estimation of feed intake in feed restricted animals) • Mixability of commercial product in water	• Avoid low quality products (low mixability, low homogeneity in water) • Correct feed intake assumption in feed restricted animals
Potential cause: PATHOGENS: Adenovirus serotype I	
• Isolation of serotype I or II or III from the lesions by serological assays	• Use inactivated vaccines (only available for group I) • Check the breeding stock and eliminate the affected birds
Potential cause: PATHOGENS: Infectious bursal disease (IBDV/ Gumboro)	
• Maternal antibody titres are very low in day-old chicks	• Implement/correct vaccination program in breeders • Change from mild to strong-reaction vaccine • Correct vaccination age (Deventer formula) • Increase biosecurity level