Nuscience
Booiebos 5 • B-9031 Ghent (Drongen), Belgium
T +32 (0)9 280 29 00 • F +32 (0)9 282 00 27
E info@nusciencegroup.com • **www.nusciencegroup.com**

Blackhead in turkeys, and the consequences for broiler and layer poultry

Blackhead (or histomoniasis) is a globally occurring disease caused by the protozoan parasite *Histomonas meleagridis*. The disease mainly affects domesticated turkeys but chickens, quails, pheasants and other gallinaceous birds can also be susceptible.

- **Transmission:** The disease usually arrives on a farm via the introduction of infective parasite eggs. These can be brought onto the farm in the droppings of wild bird species (partridge, pheasant) or can be carried on vehicles or equipment. The disease can also spread within a turkey flock, as infective eggs excreted in the birds' faeces end up in the water and feed. A third transmission route is cloacal drinking, in which parasite eggs are transferred into the caecum (blind gut) via reverse peristalsis. This third route does not occur in chickens.
  Broiler chickens infected with the parasite may act as carriers without displaying any visible symptoms. Farmers should therefore exercise caution when housing turkeys in sheds which have previously been used for broiler chickens, as this can lead to turkeys becoming contaminated with surviving infective eggs.

- **Virulence:** After intake by one of the transmission routes described above, the parasite migrates to the caecum where it may go on to cause disease. For full virulence, *H. meleagridis* needs to interact with caecal bacteria which produce a particular heat-dependent factor. Bacteria which increase the virulence of the parasite include *E. coli* and *Clostridium perfringens*. This interaction is why otherwise healthy turkeys infected with parasite eggs do not show symptoms of the disease.

- **Hosts:** The roundworm *Heterakis gallinarum* is the main host in which *H. meleagridis* survives outside of its poultry host (see Figure 1). *H. gallinarum* is a moderately pathogenic caecal worm found in turkeys and other poultry. Its importance is mainly due to the delicate nature of *H. meleagridis*, whose eggs survive in faeces for only a few hours in the outside world. If contained inside the embryonated eggs of *H. gallinarum*, however, they can survive for years.

- **Symptoms in turkeys:** *H. meleagridis* damages the wall of the colon and may also invade and attack the liver, causing the faeces to turn yellow. Poor oxygenation can lead to a blackish-blue discolouration of the skin, mainly on the head, hence the common name of "blackhead". Turkeys appear listless with drooping wings, and the outcome is death. Mortality in turkeys is often high, sometimes approaching 100 %.

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- **Blackhead in broiler and layer poultry:** Chickens are also susceptible to *H. meleagridis*, but much less so than turkeys. A reduction in feed intake and lower weights may be seen in broiler chickens, while poorer feed conversion rates also appear to be a symptom of *H. meleagridis* infection. In addition, greater numbers of lesions are found on the liver. Recent research in turkeys has shown that not only broilers are susceptible – so are broiler breeders, layer breeders and layers. The results can include reduced egg production, high mortality, high morbidity and poor uniformity.

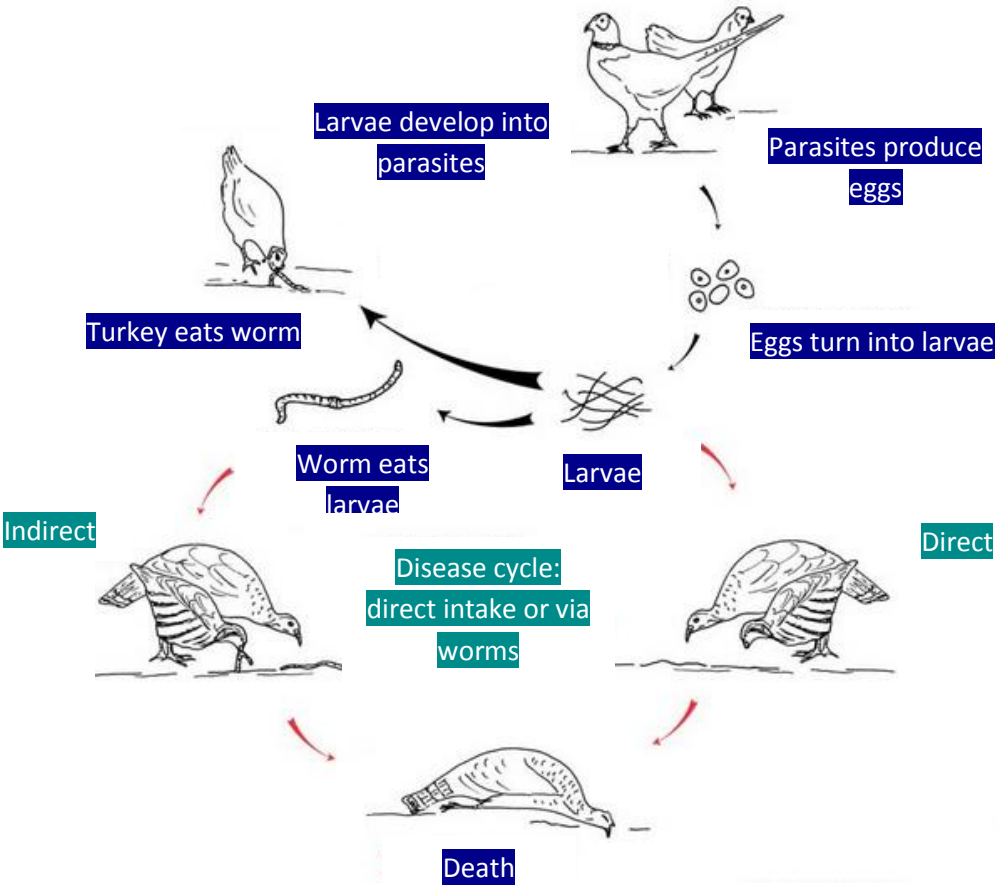

Figure 1: life cycle of the parasite *Histomonas meleagridis* in poultry

- **Avoiding blackhead:** Some veterinary medicines with proven effectiveness against blackhead that were used in the past have now been banned in both the EU and the USA. They include nitroimidazole (dimetridazole) and nitrofuran (nifursol). As a result, there are no longer any drug treatments available for blackhead. However, medium chain fatty acids (MCFAs) are known for their antimicrobial action. MCFAs used as a functional ingredient stabilise the gut microflora and result in optimum intestinal morphology. In addition, MCFAs have already proven effective against *E. coli* and *Clostridium perfringens*, showing very low minimum inhibitory concentrations (MICs). If MCFAs are used to inhibit the growth of these bacteria, *H. meleagridis* has less opportunity to become virulent and go on to invade the liver. Financial catastrophe can therefore be avoided.