

Avian Intestinal Spirochaetosis

Veterinary Information Note



The term avian intestinal spirochaetosis (AIS) refers to disease in chickens and sometimes other avian species associated with the presence of *Brachyspira* species spirochaetes in the large intestine.

Clinical signs

In the UK the disease is mainly seen in layer chickens from approximately 20 weeks of age onwards, in which there are mild to moderate clinical signs typically including diarrhoea (particularly slimy or slightly frothy, caramel coloured droppings), pasty vents, faecal staining of egg shells and a drop in egg production, and the birds may appear lethargic.

Other signs including delayed onset of egg laying, retarded growth rates, reduced mean egg weights and reduced egg carotenoid content have also been reported. The disease has also been described in broiler breeders, and weak chicks, poor feed conversion and digestion and retarded growth may be seen in the broiler progeny. In other species a variety of signs can be seen, including severe disease and death in rheas.

Causative agents

A variety of *Brachyspira* species can be detected in birds, but the pathogenic species in chickens are considered to be *B. pilosicoli*, *intermedia* and *alvinipulli*. In contrast, colonisation of the intestine with *B. innocens* and *murdochii* is considered subclinical and non-pathogenic, with the organisms acting as commensals.

Natural infection of chickens with *B. hyodysenteriae* is rarely reported, but this organism can cause severe ulcerative typhlitis in the rhea. *B. alvinipulli* has been reported to be associated with severe disease in geese.

Pathogenicity

Intestinal spirochaetes are transmitted directly between birds by the faecal-oral route, and can also potentially be carried mechanically by rodents, other mammals such as dogs, insects such as flies and on footwear.

The effect on the bird varies according to the weight of infection and on other factors including diet (for example the quality of wheat or other feed),

management related factors (such as onset of egg laying, moulting, floor housing, overcrowding and other stresses), genetics and concurrent infection with other disease agents. The presence of other anaerobic bacteria such as *Clostridium perfringens* as part of the flora of the large intestine may influence the expression of pathogenicity.

In chickens, gross or histological lesions are often absent or minimal. The caeca may be filled with slimy to frothy, yellowish brown fluid contents. No inflammation or a mild lymphocytic typhlitis may be seen. *Brachyspira* species are primarily detected in the caeca, and persistent caecal colonisation can occur. There is no colonisation of the small intestine. Histologically, spirochaetes may be visible in the caecal lumen or, in the case of *B. pilosicoli*, colonising the epithelium. Penetration between and below caecal epithelial cells or caecal epithelial cell erosion/necrosis has been described for *B. intermedia*.



Sampling

The diagnosis is based on the detection of the *Brachyspira* organisms in association with clinical signs of disease. Currently culture is the preferred method for identifying *Brachyspira* species; PCR tests developed for pigs are of limited value in identifying species other than *B. hyodysenteriae* and *pilosicoli*, and although PCRs for avian *Brachyspira* species have been developed, the differentiation of the 'non-pathogenic' species remains problematic.

Fresh caecal droppings or caecal contents are the optimal samples for isolation or direct demonstration of intestinal spirochaetes. Fresh intact caecum may be the preferred sample, if available; for live birds, cloacal swabs or faeces are practical alternatives but there may be less success in isolating organisms than from caecal content. *Brachyspira* organisms are strict anaerobes and samples should be kept as anaerobic as possible.

Not all birds in an infected flock are necessarily positive on culture and samples from a number of birds, or pooled samples, may need to be examined.

Control

Good standards of biosecurity should be maintained to minimise the risk of transmitting *Brachyspira* between flocks, including good standards of rodent control. Outbreaks of AIS can occur in any management system but tend to be most frequent, and most problematic to resolve, in free range layers.

Efforts should be made to minimise the impact of diet and other infectious and non-infectious factors which may underlie *Brachyspira* infection. No antimicrobials are specifically licensed for the control of *Brachyspira* in poultry, but several products are routinely used under the cascade.

However the long term response to treatment may be disappointing; in addition, resistance to some antimicrobials is increasingly reported in porcine *Brachyspira* strains, and may also become more prevalent in avian strains. No licensed vaccines are available but autogenous vaccines have been used in an attempt to control the disease, but the effectiveness of these is uncertain.

