AVIAN INTESTINAL SPIROCHAETOSIS ASSOCIATED WITH *BRACHYSPIRA* SPP. IN THE UNITED KINGDOM AND ITS CONTROL WITH TIAMULIN (DENAGARD® – NOVARTIS)

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Introduction

Since the important work on the differentiation and identification of various avian spirochaetes in the 1990's (McLaren *et al*, 1997) and the demonstration of *Brachyspira pilosicoli* and *B. intermedia* as the cause of Avian Intestinal Spirochaetosis (AIS) in laying and breeding hens in Australia (Stephens & Hampson, 2002; Hampson & McLaren, 1999), further work has been carried out in the UK to look at the extent of the problem and its control, following the report of the isolation of *B. pilosicoli* in caged birds (Burch *et al*, 2006) and *B. intermedia* in free-range hens, which comprise 38% of the UK layer flock. AIS is an important, chronic condition in layers, with *B. pilosicoli* associated with a mild infection and a drop in egg production of 5-6% and *B. intermedia* with a more severe infection and an egg drop of 10-12%.

Material and Methods

a. Pilot survey:

As cases were reported and investigated in caged layer flocks, samples were submitted to Scottish Agricultural College, Veterinary Services, Penicuik, for initial polymerase chain reaction (PCR) multiplex testing followed by culture and typing by biochemical means. A survey of 10 free-range flocks, with reported drops in egg production and an associated increase in loose faecal droppings was also carried out.

b. Effect on egg production:

A free-range flock's egg production, where *B. intermedia* infection only was demonstrated, was compared with the breed standard to assess the effect of the chronic infection up to 46 weeks of age, when it was treated.

c. Treatment and prevention:

Where other infections were ruled out and only pathogenic spirochaetes were identified, treatment with tiamulin at 12.5mg/kg bodyweight for 3 days via the drinking water was normally initiated. Although a single tiamulin treatment appeared very effective in cases associated with *B. pilosicoli* in caged birds and most cases of *B. intermedia* in free-range flocks, occasionally, some cases in free-range flocks, succumbed to repeated infections 3-4 weeks after treatment. It was thought to be associated with re-infection from a heavily contaminated field environment. An additional preventive medication was also applied with tiamulin at 4mg/kg bodyweight, 2 days/week for 5 weeks. The effect on egg production was monitored to see if it would stabilise production.

Results

a. Survey

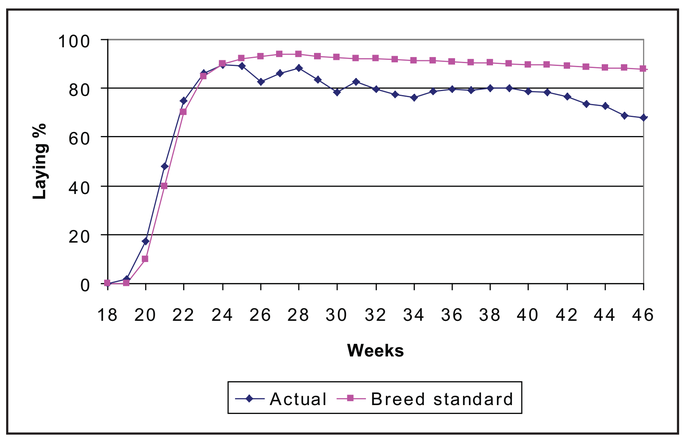
In our surveys, *B. pilosicoli* was found in 83% of clinical cases of AIS in caged birds but to date, no *B. intermedia.* In free-range flocks, however, *B. intermedia* were recovered in 60% of the cases, *B. pilosicoli* in 10% and *B. innocens*, a non-pathogenic species, in 90% of flocks (see Table 1).

Table 1. Pilot survey results of free-range flocks and caged-hen cases

	Free-range flocks	Caged-hen cases
No of flocks	10	6
B. innocens	90%	17%
B. intermedia	60%	0%
B. pilosicoli	10%	83%

b. *B. intermedia* – effect on production:

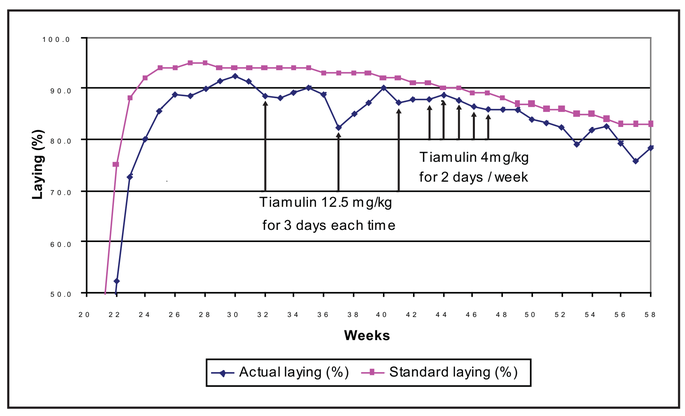
The flock showed a 10.6% drop in weekly egg production from point of lay to 46 weeks of age in comparison with the breed standard. However the mortality was increased from 2% to 6.4%, an increase of 4.4%, and the effect on egg production on a hen/housed (HH) basis was reduced from 140.4 to 120.1eggs/HH, a fall of 12.6% (see Graph 1).



Graph 1. *Effect of B. intermedia on egg production in a free-range flock*

c. Treatment and prevention of *B. intermedia* infections:

A refractory flock was put onto preventive medication for 5 weeks at 4mg/kg bodyweight 2 days/week following a clean up treatment at 12.5mg.kg for 3 days (see Graph 2).



Graph 2. *Treatment and prevention of AIS caused by B. intermedia infection with tiamulin*

Preventive medication with tiamulin was highly effective during the 5 week treatment period and the flock maintained consistent performance for an additional 5 weeks before fluctuations in production occurred.

Discussion

The prevalence of pathogenic *Brachyspira* spp in free-range flocks (70%) was surprisingly high, as other authors (Stephens and Hampson, 1999; Bano *et al*, 2005) had described the presence of pathogenic bacteria in laying flocks, in general, at 34 and 31% respectively. In a recent report, Thomson *et al* (2007) showed a much more even spread in the spirochaete submissions in the UK, but the source flock types were not identified (see Table 2). At least 50% of the submissions were associated with pathogenic spirochaetes.

Table 2. Results of Brachyspira culture of faecal samples from layers with 'wet droppings' (Thomson *et al,* 2007)

Isolate	Case submissions (n = 96)	Pathogenicity
Negative	29%	-
B. intermedia	24%	++
B. pilosicoli	25%	+
B. innocens	28%	-
B. hyodysenteriae	4%	++?
B. alvinipulli	1%	+
Atypical Brachyspira	6%	+?

The recurrence of infection with *B. intermedia* in free-range flocks is possibly less surprising, as hygiene and re-infection from contaminated paddocks is difficult to control. In those cases a more preventive approach to therapy would appear to be helpful.

References

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