Worms: the forgotten disease in poultry

by J. Agneessens, Janssen Animal Health, Beerse, Belgium.

Poultry accounts for just over 30% of the world meat production, with a worldwide mean per capita consumption of 12.6kg in 2005. In Asia, production raised, on average, annual gains of 5% over the last five years (FAO).

High mortality, avian influenza induced culling, and high feed prices over the course of recent years in many disease affected areas in Asia, particularly in Thailand, Vietnam and Indonesia, have put the market under pressure.

Next to all these, a sometimes overlooked reality is that parasites are also taking their share wherever poultry are raised, whether in large commercial operations or in small backyard flocks.

In this article, the major helminth species in poultry, their relation to economical losses, the diagnostic tools and possible control strategies will be briefly reviewed.

Confinement rearing tends to favour those helminths with short life cycles and direct transmission, such as Ascaridia, Heterakis and Capillaria.

Nematodes are the most important group of poultry helminths, both in terms of number and pathology, with sometimes very high prevalence rates. The rearing of free-range birds or backyard flocks also provides opportunities for parasites requiring an intermediate host, such as tapeworms.

Ascaridia as well as Capillaria can cause production losses in breeders housed on floor, and commercial layers, while Heterakis is known to play an important role in the transmission of Histomonas meleagridis.

Most worm species have a direct life cycle.

The losses due to helminth infections constitute reduced weight gain, reduced egg weight and later point of lay.

Cestodes are also commonly encountered in poultry from free range flocks. Even in commercial operations, high farm prevalence rates (up to 70%) have been found.

Their presence is strongly related to the presence of the intermediate hosts such as

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Fig. 1. Major infection sites and helminth species in poultry.

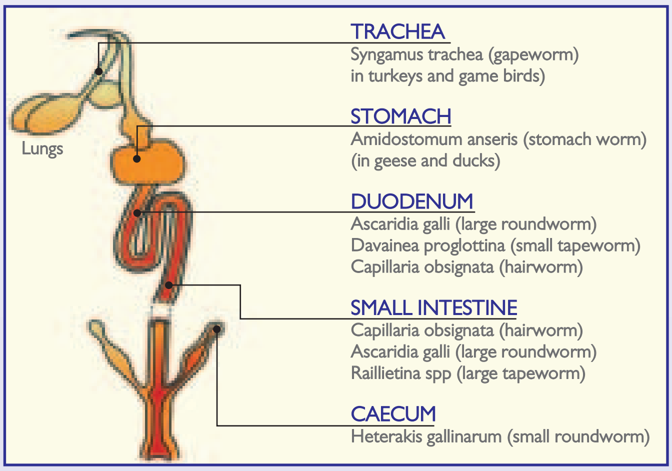
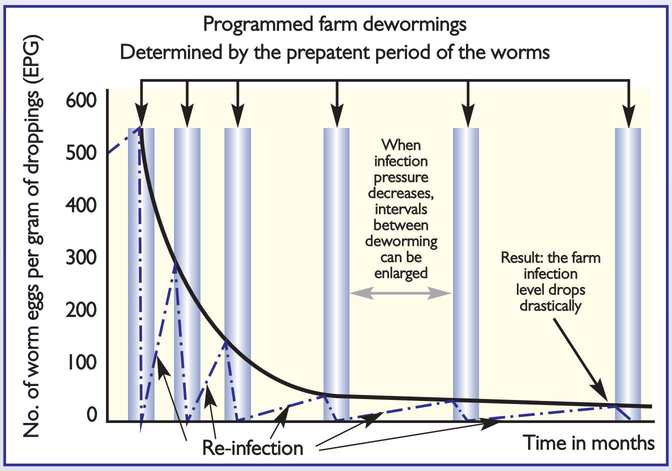


Fig. 2. Effect of strategic deworming programme for poultry.



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flies, ants, beetles, earthworms or slugs, known to be present in a free-range environment. From a large number of cestode species present, mainly Davainea and Raillietina are linked to decreased weight gain and egg production. Mortality has been observed in cases of heavy infections.

Diagnosis of verminosis can be done by examination of mucosal scrapings, or by coprological examination. Most handbooks display the bi-operculated Capillaria eggs, the easily confused Ascaridia and Heterakis eggs, and the hexacanth cestode eggs.

However, a number of confounding factors can result in the under estimation of the worm problem.

	Pre treatment	Post treatment	Efficacy (%)
No. examined	20	20	95
Prevalence (%)	50	50	–
Worm count	0->50	0-26	–

Table 1. Field trial 1 (2 x 30ppm flubendazole for seven days with one week interval).

Proper faecal sampling (time, quantity and quality) and proper processing of the faecal samples are crucial.

With respect to post mortem finding, one should bear in mind that the build up of immunity generally results in lower parasite counts in older birds.

No threshold for treatment has been defined, but it is known that once present, a worm population will most likely start to propagate. Therefore, it is good practice to install control measures preventing the introduction of parasites or controlling the disease, if already present.

Although little worm prevalence data are available from highly integrated poultry production units in Asia, published data from both wild birds and smaller scale free range units usually show a prevalence between 70 and 100% of one or more helminth species.

This means that in commercial poultry, the infection pressure will also be substantial. Compared to Europe and North America, the high prevalence of cestodes in the more tropical countries is remarkable.

Control measures, such as good sanitation, all in-all out, clean out of contaminated litter and disinfection, control of intermediate hosts and reducing the contact with wild birds are essential to reduce infection pressure, but are usually insufficient for complete worm control.

A successful helminth control programme should also include a targeted anthelmintic strategy. The cost for a total helminth eradication is not economically justified and probably not even necessary.

Helminth infections can be controlled by simultaneous implementation of management practices and treatment strategies.

Due to the high infection pressure in most environments, a single random treatment will usually not be sufficient to adequately control the infections. On individual units, the treatment frequency could, for example, be based on the pre-patent period of the most important species. In case of a very heavy infection, for example, with Raillietina, massive reinfection has been observed as soon as two weeks after treatment.

The excellent efficacy of flubendazole against tapeworms was confirmed in two recent field trials (see Tables 1 and 2).

Only a limited number of anthelmintics are available for poultry, of which only flubendazole has an excellent safety profile and a well known efficacy against poultry nematodes at the dose of 30ppm. Additionally, it is the only compound registered for layers with a proven efficacy against cestode infections.

Field trial 1

On a first trial site, a flubendazole (Flubenol) treatment at the recommended dose of 30ppm for seven days was given twice with one week interval to a flock of about 2000 layers of 67 weeks age. Upon selection of this site, the prevalence of R. cesticillus was 50%, with individual counts of more than 50 worms. After the first week of treatment, the cure rate was 90%. One week after the end of the second treatment, cestodes were only found in one bird, while the size of the worms (<2cm) indicated that this was due to re-infection.

On this trial site, the pretreatment prevalence of Ascaridia and Heterakis was 85 and 100% respectively, with worm counts of more than 200 for both species. As expected, the efficacy of flubendazole 30ppm for seven days against both species was 100%. As the legislations on medicated feed are becoming more stringent, alternative administration routes, for example, via the drinking water, are becoming more popular.

Next to the ease of use, drinking water administration also provides a more flexible methods of treatment.

Recently, a novel flubendazole drinking water formulation (Solubenol) has been developed, having the same anthelmintic efficacy profile as the flubendazole premix.

As for the Flubenol premix, the recommended treatment dose for nematodes of 10mg per kg BW over seven days should be doubled for a successful treatment of tapeworm infections.

This new flubendazole drinking water formulation has the same safety profile as the premix formulation and no egg discard time has to be imposed to guarantee consumer safety.

Field trial 2

On a second trial site, three treatment schedules with Solubenol, a novel flubendazole formulation for administration with the drinking water, were compared in three breeder flocks of 8,000 hens and 900 roosters each. At the start of the study animals were 55 weeks of age. One flock was treated at the recommended cestocidal dose of 20mg per kg BW over seven days. In a second flock the 20mg per kg dose was given over 14 days, and a third flock was treated with two doses of 10mg per kg BW over seven days, with one week interval.

Two weeks before the start of the treatments, the prevalence of cestode infection was about 50% in each of the flocks, with individual cestodal counts of more than 50.

On the first day of treatment, and again one week after the last day of treatment, 10 birds were sacrificed per group. The intestines were opened for a cestodal count.

One week after the end of the treatment, a cure rate and an efficacy of 100% was observed for each of the treatment schedules.

Conclusion

From all this it is clear that worm problems should not be ‘forgotten’. Flubendazole, both as Flubenol premix and as Solubenol drinking water formulation, provides an excellent safety and efficacy profile for those taking worm problems seriously. ■

Group		Pre treatment	Post treatment	Efficacy (%)
2.86mg/kg/ day for seven days	Birds examined	10	10	100
	Prevalence (%)	60	0	
	Worm count (range)	0-14	0	
1.43mg/kg/ day for 14 days	Birds examined	10	10	100
	Prevalence (%)	50	0	
	Worm count (range)	0-10	0	
2 x 1.43mg/ kg/day for seven days with one week interval	Birds examined	10	10	100
	Prevalence (%)	40	0	
	Worm count (range)	0-8	0	

Table 2. Field trial 2 with a flubendazole drinking water formulation.