Naturally acquired worms in layers

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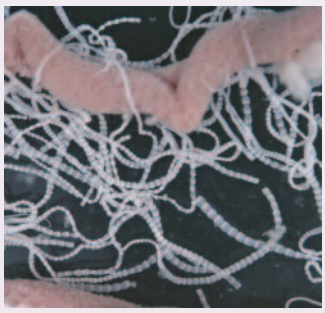
Animal welfare issues and changes in consumer demands have resulted in recent legislation of the EU for the protection of laying hens (Council Directive 1999/74/EC).

As a consequence, an increased number of birds are kept in alternative production systems, such as, free-range and floor husbandry. Because animals in these systems are not separated from their droppings, the prevalence of worm infections in chickens has increased, with subsequent economical considerations.

Raillietina cesticillus attached to the intestine.

Raillietina cesticillus.



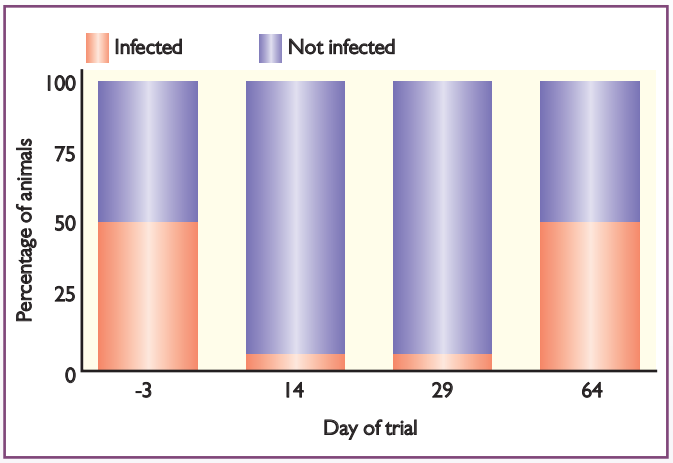


Fig. 1. Worm count for Raillietina. Percentage of infected birds.

Parasite infections are reported to cause direct and indirect damages, reduced feed intake and performance and changes in behaviour.

Even sub-clinical Ascaridia galli infections have an impact on some behavioural patterns and the impact is directly related to the worm burden.

This is of importance when hens are brought into an environment with a higher risk of infection, as there will be a tendency to higher worm burdens and faecal egg output in the hens, with likely negative impacts on animal welfare and total economics.

Strategic programmes

Common roundworm infections like Ascaridia and Heterakis are relatively easy to control when a strategic worming programme is in place. Worming programmes should always be based on the life cycle of the parasites present.

The respective prepatent periods; for example, the time needed for the next generation of parasites to reach maturity and produce eggs, for the roundworms Ascaridia is 50-56 days, for Heterakis 24-30 days and for Capillaria 20-60 days.

These worms have a direct life cycle, meaning that they will directly contaminate the environment by releasing infectious material, without an intermediate host organism.

Tapeworm infections like Raillietina are a serious, and a more frequently emerging problem in layers and breeders. Effective anthelmintic treatments usually require higher dosage. This, however, often has a negative impact on egg production.

Furthermore, this strategy can have important implications towards possible residues in eggs intended for human consumption and, therefore, it is not the best approach from either a safety or economical perspective.

Most tapeworms require a 2-3 week period in the bird for the worm to mature before the first gravid proglottids are released in the faeces and a new cycle can start.

Tapeworms require an intermediate host, for example, insects, crustaceans, earthworms or snails.

Floor layers, breeders and broilers are infected with Raillietina cesticillus by ingestion of the intermediate host (small beetles that breed in contaminated litter) that carry the immature stage of the parasite called cysticercoids.

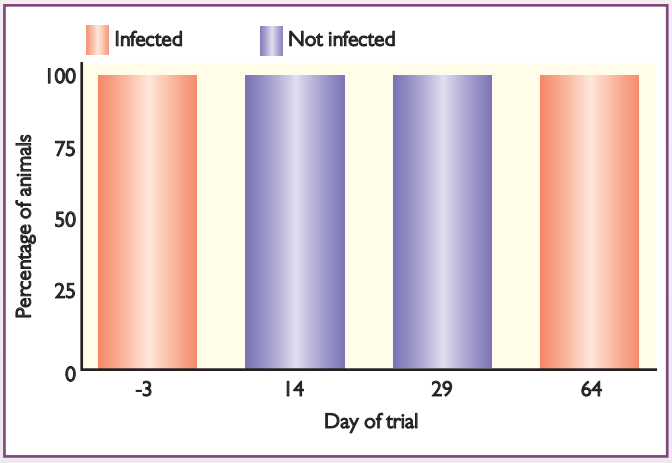
Preventive measures

To interrupt the life cycle, treatment intervals should initially be slightly shorter than the prepatent period of the involved worm species and only when the infection pressure decreases, can intervals between dewormings be prolonged.

Preventive measures such as regular replacement of litter, good hygiene and control of possible transmitters and intermediate hosts will strongly contribute to the success of the deworming programme.

Flubendazole does not require an egg discard period (zero withdrawal) when administered at the prescribed 30ppm dosage of one week via the feed, or at the equivalent of 10mg flubendazole per kg body weight, spread over a week,

Fig. 2. Worm count for Heterakis. Percentage of infected birds.



Species	Percentage	Day of trial		
		-3	14	29
Raillietina	Infected	40	0	0
	Not infected	60	100	100
Heterakis	Infected	80	0	0
	Not infected	20	100	100
Ascaridia	Infected	80	0	0
	Not infected	20	100	100

Table 1. Faecal egg count.

through the drinking water. This dosage has an established record of effectively controlling most roundworms, but is reported not to be fully effective in controlling heavy tapeworm infections.

In such cases, it would be recommended to double the dose during the one week administration period, but this could possibly cause residue issues in eggs.

Therefore, a deworming programme with flubendazole, repeating the therapeutic schedule (30ppm in the feed or 10mg/kg in the water) after a one week interval, thus avoiding residue issues, was tested using both commercially available formulations of flubendazole.

Species	Percentage	Day of trial			
		-3	14	29	64
Raillietina	Infected	50	5	5	45
	Not infected	50	95	95	55
Heterakis	Infected	100	0	0	100
	Not infected	0	100	100	0
Ascaridia	Infected	85	0	0	35
	Not infected	15	100	100	65

Table 2. Worm count.

Dutch trial

In a first trial in the Netherlands, Flubenol 5% was used to supplement the feed at a dose of 30ppm and was administered for seven days. This treatment was followed by a seven day period in which the animals received blank feed, again followed by a 30ppm treatment for seven days.

The flock consisted of 5,600 laying hens and was naturally infected with Heterakis gallinarum, Ascaridia galli and Raillietina cesticillus. Production was severely affected and the flock was scheduled for replacement.

A 100% efficacy against H. gallinarum and A. galli was obtained after both the first and the second treatment.

Results were based on intestinal worm counts as well as on faecal egg counts.

The efficacy against Raillietina, which was determined one week after the end of the treatment in a representative number of necropsies, was based on the reduction of the geometric mean worm burden compared to the worm burden before treatment.

This reduction reached 95% as Raillietina was still present in 5% of the necropsied birds.

However, the worms that were recovered were only uniformly small (<1cm), indicating a recent re-infection rather than a remaining infection.

Efficacy was also confirmed by total negative faecal egg counts, indicating full eradication of adult worms. The treatment reversed the decline in the overall zootechnical performance and the flock stayed in production for six additional weeks. Additional necropsies four weeks after the end of treatment, demonstrated fast re-infection with Raillietina.

This fast re-infection underlined the high infection pressure present in the environment and also stressed the need for additional measures to control intermediate hosts.

In another trial, conducted in France, 8,000 layer breeders were treated at a total dose of 10mg flubendazole per kg body weight via the drinking water, administered over seven days and repeated after one week in which the birds were not treated.

The flock was naturally infected with Ascaridia, Heterakis and Capillaria spp, and the trial was started when the prevalence of Raillietina in the flock reached a 50% level. The treatment proved to be 100% effective against Ascaridia, Heterakis and Capillaria.

The efficacy of using this treatment schedule against Raillietina was also 100% in this trial.

Additional necropsies four weeks after treatment showed re-infection with Raillietina, although at lower prevalence. Again, this is an indication that one has to eliminate the intermediate host if persistent effect is envisaged.

Efficacy of flubendazole

Both trials document the efficacy of the flubendazole treatment against roundworms and tapeworms with this alternate week treatment programme.

However, without additional measures against the intermediate host, fast re-infection with tapeworms occurred and this is often mistakenly explained in the field as inefficacy of the worming programme.

Good hygiene, rigorous execution of a strategic worming programme and, in case of tapeworm infection, combined with treatment against the intermediate host, will eventually bring the infection pressure down and effectively cut the life cycle of the parasites. Eradication of a worm problem cannot be expected from a single anthelmintic treatment as this presents only a minor and temporary set back in the opportunistic life style of parasites. ■

References are available from the author on request
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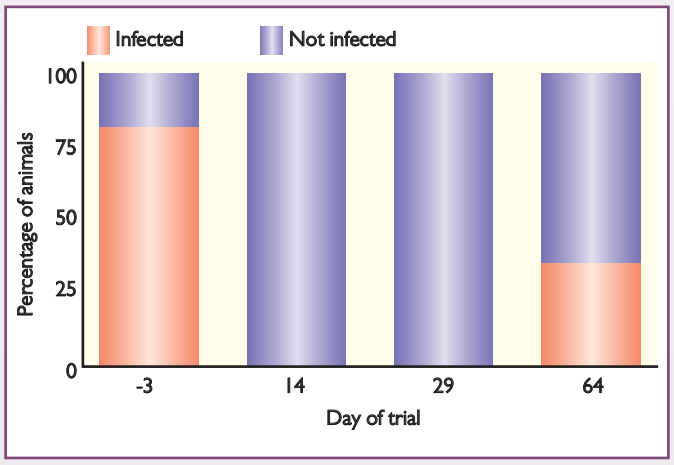
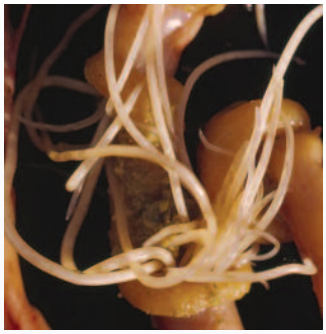
Fig. 3. Worm count for Ascaridia. Percentage of infected birds.



Ascaridia galli.



Close up view of Ascaridia galli worms in intestine.

Heterakis.

Ascaridia and Heterakis worms.

Capillaria in a petri dish.