RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE

ruma

GUIDELINES

Anthelmintics in Pigs

Shortened version

A farm health planning initiative by RUMA

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RUMA: ANTHELMINTHICS FOR PIGS

Introduction

Parasitic worms in the pig are an important though often overlooked problem that can significantly reduce productivity and growth rates as well as causing noticeable clinical disease in some cases. Worms can affect the digestive system and the respiratory system, the latter by direct damage due to the pig lungworm or more commonly indirectly as migrating worm larvae pass through the lungs on their way back to the gut.

This paper briefly describes the worms relevant to the UK pig population, their biology, worm monitoring techniques, options for treatment and the necessary management procedures that accompany effective treatment programmes.

UK Pig Worms

In practical terms, UK pigs are affected by 6 separate parasites:-

a) *Ascaris suum* – the large roundworm with a migrating larval stage that is associated with milk spot liver, principally affecting growing pigs. Sows can carry small numbers of these large worms (that may occasionally be passed in faeces) which act as a rich source of eggs for young pigs.

Figure 1 *Ascaris suum* in the intestine of a pig*

b) *Hyostrongylus rubidus* – the stomach worm seen particularly in outdoor-kept sows and associated with poor condition

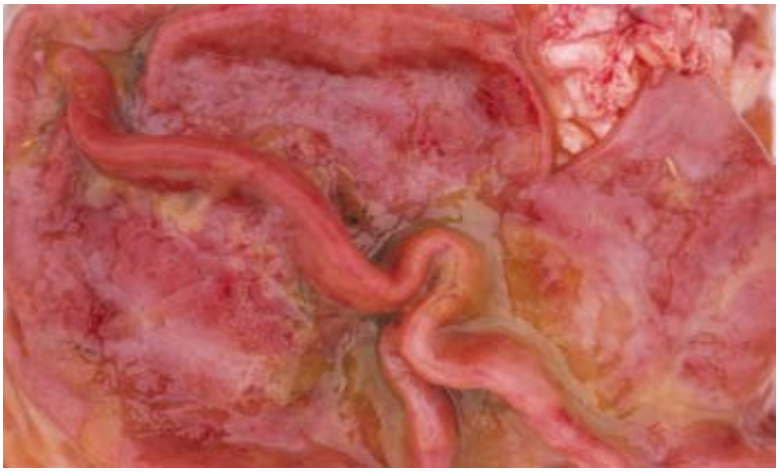

Figure 2 Inflamed gastric mucosa as a result of infestion with *Hyostrongylus rubidus***

c) *Oesophagostomum dentatum* - the nodular worm which has been historically associated with the "thin sow syndrome". Immunity to this worm is poor

d) *Trichuris suis* - the whipworm - residing in the colon (large intestine) and producing colitis in growing pigs that can be confused with Swine Dysentery

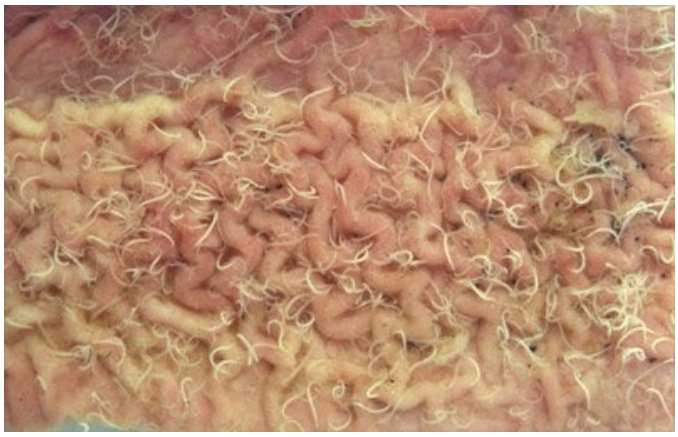

Figure 3 *T suis* attached to the surface of the colon**

e) *Metastrongylus apri* (aka *M. elongatus*) – the pig lungworm which uses an earth worm as an intermediate host and is thus only seen in outdoor situations but can occur in both growing and breeding animals

Figure 4 *M apri* within the airways of the pig*

f) *Strongyloides ransomi* – rarely reported in the UK but capable of passing through the milk of the sow to infest baby piglets and produce a severe enteritis before weaning. Free living forms of the worm can survive in the environment.

Figure 5 Small intestine affected by *St ransomi***

In all cases worms have a life cycle. The adult living in the gut or lungs produce eggs which pass out in the faeces (those in the lungs following coughing up and swallowing). In most cases the egg will embryonate and mature to an infective larva in the environment, at a rate dependent upon temperature, before reinfecting a pig by oral ingestion. The eggs and larvae are variably resilient in the environment with *Ascaris* and *Trichuris* eggs highly resistant to drying, UV light and disinfection, whilst the remainder are vulnerable to environmental decay. The lungworm larvae require an intermediate host – the earthworm – in which they mature to infective stages. Whilst earthworms can survive for many years, lungworm larvae are believed to remain viable in earthworms for three years.

Following ingestion the larvae will either, mature within the gut, migrate around the body, damaging liver and lungs (*Ascaris suum*) before returning to the gut, or simply migrate to their target tissue (lungworm). Once mature the female worm will produce infective eggs to repeat the cycle.

Even in the most favourable conditions the shortest life cycles will be several weeks.

Monitoring

Monitoring of worms can be achieved by two techniques:

1) Abattoir monitoring - particularly with respect to liver damage of growers due to migrating *Ascaris* The British Pig Health Scheme (BPHS) provides regular reports on milk spot liver damage.

Figure 6 Classic moderate milk spot liver in a five month old slaughter pig

2) Worm egg counts on faeces. There are useful procedures for monitoring nodular and stomach worms in sows as part of a long-term strategy. Eggs are floated in salt solution and examined microscopically, with quantitative analysis possible. It should be noted that *Ascaris suum* adults within sows and boars are only very intermittent excretors of eggs and it is less likely that these will be detected in single samplings. Also in growing pigs e.g. with *Trichuris*, clinical disease (scour) may be apparent before worms and mature eggs are produced.

Figure 7 Typical strongyle egg in faeces**

Where clinical disease is seen veterinary diagnostic investigation is appropriate which may involve post mortem examination.

Anthelminthics Available

Two classes of anthelminthics are available for use in pigs in the UK:

1) Benzimidazoles – Flubendazole (e.g. Flubenol: Janssen Animal Health) and Fenbendazole (e.g. Panacur: Intervet Schering Plough Animal Health) are available as oral preparation only, either for incorporation in feed, top dressing of feed or medication via the water. Specific preparations are available which are licensed to be applied directly to individual pigs by way of top dressing; products licensed for incorporation into feed only cannot be used for top dressing.

   These chemicals are solely anthelminthics (wormers) but have the advantage of being effective against eggs, larvae and adult worms.

2) Avermectins – Ivermectin (many preparations available) and Doramectin (Dectomax: Pfizer Animal Health). These products have the dual function of not only killing worms (endoparasites) but also skin parasites such as mange and lice.

   They are available either in injectable form (which tends to have longer meat withdrawal periods than oral products) or for incorporation into feed. The latter are not appropriate for top dressing.

Worming Strategies

Appropriate worming strategies will depend upon the specific worm burden involved. For the breeding herd the following scenarios are possible.

Scenario 1:

> No evidence of any significant parasite challenge. No routine or strategic worming is required but regular monitoring of dung samples (six-12 monthly) and slaughter pig livers, for milk spot damage.

Scenario 2:

> Modest levels (up to 1000 egg per gram of faeces) of Strongyle eggs in sows and/or boars but no other parasites – worm all breeding animals twice yearly. Increase to four times per year in high challenge situations and improve hygiene.

Scenario 3:

> Low levels of strongyles in boar faeces; sows otherwise free. Individual dosing of boars twice, eight weeks apart and continue to monitor dung samples annually/biannually.

Scenario 4:

> Mange positive herds. Treat all sows twice yearly by:
>
> 1) Incorporation of Ivermectin in feed for seven days, twice yearly.
> 2) Injection of whole herd twice yearly (simultaneously) with Ivermectin or Doramectin.
> 3) Injection of sows seven-14 days prior to farrowing each litter.

Scenario 5:

Significant milk spot liver damage in slaughter pigs or known *Trichuris suis* presence in growing pigs but no other parasites present. Worms sows annually and concentrate worming strategy on growing pigs.

Scenario 6:

Strongyloides infection known to exist in young piglets. Worm sows seven-14 days prior to farrowing every litter.

Scenario 7:

Lungworm infection identified in sows. Worm two to three times at four-weekly intervals and move to clean ground not returning for at least three years.

Outdoor herds

In addition to any of the above scenarios – in which Scenario 2 is the most common – treatment of the whole herd prior to moving to fresh ground is advisable. This is complicated by the fact that, unlike with ruminants that tend to be moved in one go, an outdoor commercial pig herd will move over a two to three month period. It is, therefore, wise to worm the whole herd immediately prior to the move and to repeat treatment if the move is not complete within two months – treating both the moved and unmoved pigs. Treatment is usually done via the feed for practical reasons.

Replacement Stock

Replacement gilts and boars can be a source of nematodes for the recipient herd. Some seedstock suppliers will routinely de-worm prior to dispatch but on a precautionary basis if there is any doubt over the worm status of incoming animals, they should be de-wormed on arrival and placed into thoroughly cleaned accommodation.

Worming of the growing pig

Multiple treatment programmes exist depending on the challenges anticipated or presented. In practice the most significant challenges to growing pigs are from *Ascaris suum* (milk spot liver), *Trichuris suis* (colitis) and *Metastrongylus apri* (respiratory distress).

Scenario 1:

No evidence of milk spot livers at slaughter or very low prevalence and no clinical disease suggesting *Trichuris suis* or Metastrongylus apri. No routine worming needed.

Scenario 2:

Significant levels of milk spot livers identified at slaughter. A worming programme must be introduced but will depend on the system of pig keeping.

1) In slatted floored accommodation and ‘all-in, all-out’ situation where accommodation can be thoroughly cleaned before stocking, worm pigs on entry via feed. Further treatments may not be needed but should be assessed on the basis of prevalence of milk spot at slaughter.

2) In contaminated environments repeated dosing is needed using benzimidazoles in feed; following a treatment on entry to finishing over a five to seven day course (depending on product) further courses of treatment should be given every four to five weeks up to slaughter weight – ensuring withdrawal periods are observed. Standard rate inclusions will suffice.

Scenario 3:

Evidence of clinical disease associated with *Trichuris suis* infestation. As above, if pigs enter a thoroughly clean environment – a single double dose treatment with benzimidazoles (10mg/kg total over seven or 10 days with Fenbendazole or Flubendazole respectively) will suffice.

In a heavily contaminated or continually occupied environment 5mg Fenbendazole over seven days or 10mg Flubendazole over 10 days should be administered every six weeks (subject to withdrawal periods).

Scenario 4:

Evidence of clinical disease associated with lungworm (*Metastrongylus apri*). De-worm with Fenbendazole (seven days) or Flubendazole (five days) at standard rates every 4 weeks, remove from infected pasture and do not re-occupy land for three years. (Where Sarcoptic mange is known to be present at significant levels in growing pigs, treatment on entry via the feed with Ivermectin will treat both the ectoparasites and any endoparasites the pigs are carrying. If any of the above scenarios apply, additional worming will be required as detailed.)

Backyard Pigs

Any pigs that are kept on permanently occupied ground that has a long history of pig occupation should be de-wormed regularly. Breeding animals should be wormed every three months (immunity does not develop to strongyles especially *Oesophagostomum*) and growing pigs between 10 weeks and slaughter, monthly. Where worm burden becomes extreme the ground should be abandoned permanently for pig keeping if *Ascaris* or *Trichuris* have been implicated or for three years in other situations where these two worms have not occurred. There is no environmentally acceptable way of sterilising soil if *Ascaris* or *Trichuris* eggs are present and the eggs survive for many years.

Managemental Approaches

Given that all worms require spread by faecal – oral recycling it is no surprise that hygiene forms the basis for control of worms through good management.

Regular cleaning out, having pigs away from their faeces (on slats), all-in, all-out production, moving pigs to clean ground and the avoidance of the build-up of "pig sick" pastures are all appropriate techniques to combine with strategic worming treatments.

With respect to both *Ascaris* and *Trichuris* infection particularly in growing pigs in straw based yards, the eggs will not be readily killed by routine disinfection and in the case of *Ascaris* the sticky nature of the egg means that it is not easily washed away. Where either of these parasites are involved, burning of the floor and wall surfaces with a flare gun, or applying a thick emulsion of hydrated lime following washing, are effective at killing the eggs, although both techniques have significant health and safety implications.

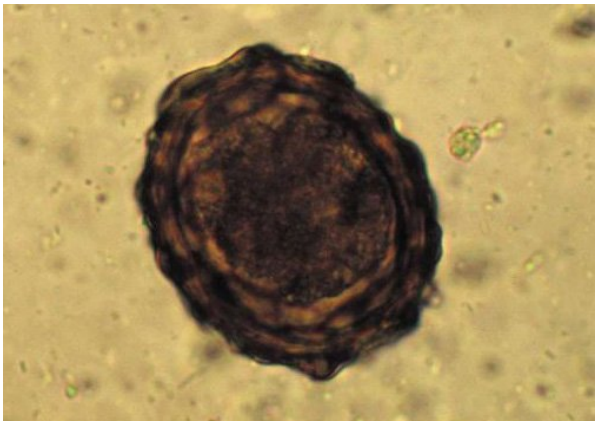

Figure 8 *A suum* egg shed in faeces; note the sticky outer coating**

Figure 9 T. Suis eggs are also highly resistant to disinfection**

Use of Medicines

Anthelminthics used in pigs are licensed veterinary medicines categorised as POM-VPS and as such can be prescribed by a veterinary surgeon, pharmacist or suitably qualified person (SQP) provided they are use within the terms of the license. Any deviation from the Marketing Authorisation can only occur under a veterinary surgeon's direction following the prescribing cascade.

All have meat withdrawal periods which must be strictly observed and as veterinary medicines by law their use must be recorded in medicine record books irrespective of the form of treatment given (This includes in feed usage).

Any unused product and equipment used to supply it must be disposed of safely and correctly in accordance with the appropriate rules pertaining. In particular, Avermectins are highly toxic to aquatic organisms and thus contamination of water causes must be avoided.

Acknowledgements

Figs marked * are courtesy of Merial Animal Health and those annotated ** are courtesy of Janssen Pharmaceutica NV both of whose permission to reproduce is gratefully acknowledged.

The Responsible Use of Medicines in Agriculture Alliance (RUMA) was established in November 1997 to promote the highest standards of food safety, animal health and animal welfare in British livestock farming.

A unique initiative involving organisations representing every stage of the food chain, RUMA aims to promote a co-ordinated and integrated approach to best practice in the use of animal medicines.

RUMA

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website: www.ruma.org.uk

RUMA is made up of the following organisations:

Agricultural Industries Confederation (AIC)
Animal Health Distributors Association (AHDA)
Animal Medicines Training Regulatory Authority (AMTRA)
Assured Food Standards
BPEX & EBLEX
British Poultry Council (BPC)
British Retail Consortium (BRC)
British Veterinary Association (BVA)
DairyCo
Dairy UK
Linking Environment and Farming (LEAF)
National Beef Association (NBA)
National Farmers Union (NFU)
National Office of Animal Health (NOAH)
National Pig Association (NPA)
National Sheep Association (NSA)
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