



# turning the worm

ISSUE 24, DECEMBER 2008

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## FROM THE EDITOR



Welcome to this issue of TTW.

Best wishes to all 'Worm Turners' for Christmas and the New Year.

## SUMMER DRENCHING FOR SHEEP WORMS IN SOUTH-EASTERN AND WESTERN AUSTRALIA

Below are two perspectives on summer drenching: an article from Bruce Watt (District Veterinarian, Bathurst), representing a south eastern Australian view, and the other from Dr RB Besier, Principal Veterinary Parasitologist, Albany WA, sharing the latest on summer drenching in Western Australia

'Summer drenching' refers to one or two strategic drenches (in summer), based on work by CSIRO scientists such as Norm Anderson and others in non-seasonal and winter rainfall sheep raising areas of Australia. The idea is to 'kick 'em when they are down': that is, drench the sheep when worms on pasture are in rapid decline due to hostile conditions (hot, dry summer weather).

The upside is good worm control, and this is achieved with just one or two summer drenches, as opposed to the several drenches that may be required if worm control was based on a tactical rather than a strategic approach once the rains began in autumn.

The downside, with the benefit of hindsight, is that summer drenching in these climactic zones may increase selection for drench resistance, particularly in Mediterranean climates and when sheep are drenched and moved onto cereal stubbles. This is because there are relatively few

worms '*in refugium*' (mostly those on pasture and thus escaping exposure to the drench) in the hot, dry summers of south eastern and western Australia.

One of the first widely adopted strategic programs employing summer drenching was the DrenchPlan program for central and southern NSW, launched in 1985; one year after WormKill in northern of NSW. These ground breaking strategic programs were a cooperative effort involving CSIRO, Pastures (now Rural Lands) Protection Boards, NSW Agriculture (now DPI), as well as the private sector (still the private sector).

Initially there were two summer drenches in DrenchPlan, one when pasture was haying off around November, and the second in February. In the version for lower rainfall areas (<350 mm p.a.), such as the Riverina (Deniliquin and other districts), the second summer drench was deleted, except in unseasonably wet summers.

As drench resistance escalated, DrenchPlan morphed into a modified strategic program around 1997, with the second summer drench being made conditional on the results of worm egg count monitoring.

About the same time in WA, there were moves afoot to modify the strategic program there as well, with a view to finding a better balance between worm control and selection for drench resistance.

Ivermectin resistance of *Ostertagia (Teladorsagia)*, small brown stomach worm) developed very quickly, despite the drench being used only once a year. In some cases, resistance was detected after just 4 years.

Ways of increasing the number of worms '*in refugium*' were explored, including leaving a small percentage of adult sheep un-drenched at the summer drench. More recently attention has focussed on not drenching adults at the beginning of summer, and drenching them instead in April. This approach has been tested by Dr Rob Woodgate and others in WA as part of the AWI-supported 'IPM-S project'.

And now for the articles by Bruce Watt and Brown Besier. Keep in mind, as discussed by Love



(2007), that while the principles may apply widely, the practicalities may not apply to all of the climatic types within non-seasonal and winter rainfall areas of Australia.

### **SUMMER DRENCHING: SOUTH-EASTERN AUSTRALIA**

*Bruce Watt, District Veterinarian,*

*Central Tablelands RLPB, Bathurst, NSW*

*[This article was a newspaper article, published recently throughout the Central West of NSW, and is republished with permission]*

With pastures haying off especially in the more western and southern areas of the tablelands now is the time to plan summer drenching. Summer drenching has been the mainstay of sheep worm control in southern Australia for nearly thirty years. It has been a popular program as it has been highly effective and is easy to understand and to recommend to farmers. However, it has been criticised as contributing to worms developing drench resistance.

Parasite control in sheep is a compromise between effective control to prevent disease and production loss in the short term and management to prevent resistance developing in the long term. As each producer has a different set of priorities as well as a different farm and environment, blanket recommendations are a bit tricky. I caught up with some veterinary colleagues from a diversity of higher rainfall environments to get their opinions.

John Evers, District Veterinarian at Young, and parasitologists Stephen Love with NSW DPI at Armidale and John Larsen from the McKinnon Project at the University of Melbourne may not be keen on admitting it but between them, I estimate they have a century of experience in parasite control in higher rainfall areas of south-eastern Australia.

All agree that in the temperate parts of SE Australia a first summer drench for all sheep is close to mandatory. Give this drench after pastures have hayed off. For ewes with lambs at foot, this is most practical at weaning.

An alternate approach for producers with good management skills who are more concerned about the development of resistance is to sample some mobs of ewes before the first summer drench. Mobs with an egg count below 100 epg could be omitted from the drenching program. Producers taking this option need to monitor their sheep especially if it rains over the summer.

Another strategy to delay resistance is to leave a small percentage of the mob un-drenched. To

many this sounds crazy but the theory is that a small number of un-drenched ewes carry their unselected worms through into the autumn and winter so the subsequent worm population is composed mostly of non-resistant worms. (This is potentially not good in areas with more *Haemonchus* and you get a wet summer).

John, Stephen and John agreed that this idea is most appropriate for good managers and in areas with hot dry summers. Further east we know that some worms survive quite well on pastures over the summer anyway and leaving a portion of the mob un-drenched may increase the risk of worm build-up either in a wet summer or in the following autumn or winter.

Even though we sometimes find very low egg counts in lambs at weaning, they should always be drenched. This is because we can't be sure that they are harbouring immature worms, because little weaners need all the help they can get to survive the summer and autumn and because we can't risk contaminating the weaning paddock.

Consider an egg count from a mob just before and 10-14 days after you drench to check the effectiveness of your drench. It is a quick and easy way of checking to see if you have some resistance, as an effective drench should reduce the egg count by 95%. If you have relied on the ML group of drenches consider drenching with a mix including an organo-phosphate such as Rametin® or Colleague®. I will discuss the OP drenches in a later article.

### **NEW RULES FOR SUMMER DRENCHING OF ADULT SHEEP: SIMPLE AND SUSTAINABLE (WESTERN AUSTRALIA)**

*Brown Besier, Principal Veterinary Parasitologist*

*Dept. Ag WA, Albany WA*

*[This article was written for 'AgMemo' in WA, October 2008, and is republished with permission].*

For some years we have known that while summer drenching gives very effective sheep worm control, it enables resistant worms to survive in preference to others. Over time, this can lead to an increase in the level of drench resistance across a farm.

Research shows that a small change to the time of drenching adult sheep will significantly reduce the risk of this disadvantage. By deliberately ensuring that some non-resistant worms survive on the farm, resistant ones will no longer be in the majority and the development of resistance will decrease.

## SUMMER DRENCHING RECOMMENDATIONS

**WEANERS AND HOGGETS:** *No change*, give a drench to all sheep once the pasture becomes dry, or as they move onto a crop stubble. These sheep are still growing and no risk with worms should be taken.

**ADULT SHEEP (2 ½ YEARS ONWARD):** *do not drench* in summer, but give a drench in early April. Mature animals in WA rarely have significant worm burdens in summer, but immature worms sometimes develop to the adult stage by autumn and often justify removing.

**EWES BEFORE LAMBING:** no drench if lambing from April to June, but later lambing ewes may need a pre-lamb drench 2-3 weeks before lambs are due to drop.

All drenches should be given with a fully-effective drench, ideally after a test to confirm that it will work.

## MORE EFFICIENT CONTROL

Worm egg counts show whether a worm burdens justifies drenching, and this enables farmers to fine-tune worm control programs. This is especially useful to check whether an autumn drench to adult sheep is needed, or whether ewes need a pre-lamb drench. Scouring or poor growth is common in winter as worm burdens increase, and the need for a drench is easily seen with a worm egg count.

Other non-chemical methods of worm control should also be used as a routine. Pasture movements planned so young sheep do not graze paddocks with high levels of worm larvae will reduce the need for drenching. Sheep in good nutritional condition are less susceptible to worms, and buying rams selected for a superior resistance to worms will lead to a long-term reduction in drenching. Consulting an animal health adviser or private veterinarian is recommended to develop the most efficient worm control plan for a particular property.

## REFERENCES AND FURTHER READING

Love S (2005). DrenchPlan 2005. Primefact 14, 1<sup>st</sup> Edition, September 2005. Retrieved December 2008 from <http://www.dpi.nsw.gov.au/agriculture/livestock/sheep/health/internal/drenchplan-2005>

Love S and Evers J (2005). DrenchPlan: the basics. Primefact 54, September 2005. Retrieved December 2008 from [http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0011/38828/drenchplan-the-basics.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/38828/drenchplan-the-basics.pdf)

Love S (2007). Sheep worm control: summer versus winter drenching in southern NSW. Primefact 479, 1<sup>st</sup> Edition, June 2007. Retrieved December 2008 from <http://www.dpi.nsw.gov.au/agriculture/livestock/sheep/health/internal/sheep-summer-winter-drenching>

## TREATING COCCIDIOSIS IN LAMBS AND KIDS IN NSW

*Dr LG Cook, NSW DPI, Orange*

Here is the latest update on this subject from Lee Cook, NSW DPI. It is intended primarily for registered veterinarians.

If you are like me, you will have trouble keeping up with what is available to use to treat coccidiosis, so this article from Lee is a keeper.

Sulfonamides have traditionally been used as an effective treatment for coccidiosis in lambs and calves. There are now no sulfonamide products registered specifically for treatment of coccidiosis in sheep following the 2000 review of sulfonamides by the Australian Pesticides and Veterinary Medicines Authority (APVMA)

All such uses were removed from labels, largely because the sheep industry was apparently not willing to fund residue studies or obtain data to set withholding periods (WHP) at the time the APVMA undertook the review. Some of the deleted uses also lacked efficacy studies. In most cases, the affected products are no longer available.

There are still some sulfonamide products registered for use in sheep or other species, all of which are prescription animal remedies (Schedule 4 poisons).

Given that the oral sheep sulfonamide registrations were mostly withdrawn because of lack of residue data at coccidiosis dose rates, veterinarians using these products to treat lambs or kids should only do so in situations where an appropriately longer WHP can be recommended and implemented after treatment.

*Restrictions:* all off-label use by veterinarians is subject to any restrictions imposed under a "Restraint" or "Restrictions" heading. Such restrictions cannot be over-ridden by veterinarians.

Products registered for horses may generally not be used for food producing animals.

## SULFONAMIDE TREATMENT OPTIONS FOR COCCIDIOSIS

### REGISTERED INJECTABLES

The APVMA has set Maximum Residue Limits (MRLs) for sulfadimidine, sulfadiazine, sulfadoxine and trimethoprim in mammalian meat and offal, which includes sheep and goat (meat and offal) products. These relate to the injectable combination products containing one of these sulfonamides plus trimethoprim. These injectables may have a place in coccidiosis treatment in some cases.

The existence of these MRLs also helpfully means that trace residues in sheep or goats following treatment with other products containing these actives are not illegal.

### OFF-LABEL SHEEP PRODUCTS

One sulfonamide product is still registered for oral treatment of sheep. The product is *Keymix® Sulphatrim™ Oral Sulfadiazine and Trimethoprim Medication*. It comes in 500g and 25kg packs, is manufactured by International Animal Health Products of Blacktown, NSW and distributed by CCD Animal Health (now Ridley Agriproducts) of Somerton VIC). It contains 400g/kg sulfadiazine and 80g/kg trimethoprim and is registered for treatment of bacterial infections in sheep at a dose of 62.5mg product / kg bodyweight. For the sulfadiazine this dose rate works out at 250mg /10 kg BWt, which is the lower range of those recommended for coccidiosis treatment (see below). MRLs exist in sheep tissues for sulfadiazine and trimethoprim, thus reducing the problem of residues. The label WHP at this dose is 14 days. This product could be used off-label to treat coccidiosis.

*Please note that this product is only manufactured to order and may not be readily available. Stocks could be purchased in advance of anticipated needs.*

Two other products are registered as intra-uterine treatments for sheep but for oral treatments in other species. The first, *Trimazine Bolus A Sulphonamide Trimethoprim Preparation* (in packs of 50 tablets manufactured by Apex Laboratories of Somersby, NSW) contains 1000mg of sulfadiazine and 200mg of trimethoprim. The second, *VR Tribactral Duals antibacterial pessary/bolus* (in packs of 20 tablets manufactured by Schering Plough of Baulkham Hills, NSW but not available at the time of writing [Nov 2008]) contains the same actives. They are registered for treatment of uterine infections in sheep at a dose of one tablet / 40 kg bodyweight. For the sulfadiazine this dose rate works out at 250mg /10 kg BWt, as above. The label WHP at

this dose is 14 days. These products could potentially be used off-label to treat coccidiosis but the relative degree of absorption following their oral use is unknown.

### OFF-LABEL SULFADIMIDINE PRODUCTS FOR OTHER SPECIES

Three pure sulfadimidine products are registered for other species, and they could also be legally prescribed by a veterinarian to treat sheep or goats off-label for coccidiosis. MRLs exist for mammalian tissues for sulfadimidine, thus reducing the problem of residues. There are three products containing only sulfadimidine:

- *Sulfa FG Premix medication for pigs* containing 200g/kg sulfadimidine (in 25kg packs from Agribusiness (Lienert) of Macclesfield, South Australia).
- *SD333 sulfadimidine solution* containing 333g/L sulfadimidine (in 500mL bottles from Agvantage of Dandenong, Victoria).
- *CCD Sulfadimidine sodium soluble* containing 1000g/kg sulfadimidine (in 1kg and 25kg packs from CCD Animal Health, Girraween, New South Wales).

The second product is similar to the old Coccee Drench.

One problem the APVMA review found was that historically recommended dose rates for oral treatment of coccidiosis in sheep with sulfadimidine have varied markedly. For example:

- 110 mg / kg BWt / day for 3 days (previously registered Coccee solution)
- 25mg / kg BWt daily for 7 days (Veterinary Medicine, Radostits *et al*)
- 150 mg / kg BWt daily for 3 days (Antimicrobial Prescribing Guidelines)
- 5-10 mL of 333g/L solution (1665-3330 mg) per lamb per day (Hungerford).

The current label for the Agvantage product above has a cattle WHP of 14 days. The (oral) cattle dose is 740 mg / 10kg BWt for three days.

### OFF-LABEL COMBINATION SULFONAMIDE/TRIMETHOPRIM PRODUCTS FOR OTHER SPECIES

There are a number of other oral (liquid and solid) sulfonamide products registered for other food producing species which could also be legally prescribed by a veterinarian to treat sheep off-label for coccidiosis. These products contain both a sulfonamide (sulfadimidine and/or sulfadiazine) and trimethoprim. Products for calves containing streptomycin or neomycin are not recommended as they provide unnecessary antibiotics.

Appropriate WHPs must still be provided by the prescribing veterinarian.

Example products (this list may not be complete) include:

- *GAH Formula Trimethosul Dispersible Powder* containing sulfadiazine and trimethoprim (in ½, 1, 5, 10 and 20kg packs).
- *Agrotech Trimethosol* (in 500g packs).
- *AFS Trimsul* containing sulfadiazine and trimethoprim (500 g packs).
- *Trimetsulpha Water Soluble®* containing sulfadiazine and trimethoprim (in 4, 10, 15 and 30kg packs).
- *Trimidine Powder* containing sulfadimidine and trimethoprim (in 250g packs).
- *Sulprim Oral Powder* containing sulfadimidine and trimethoprim (in 250g packs).

A literature review in 1982 suggested that a single dose of a sulphonamide was as effective as repeat doses in producing clinical recovery (though not in reducing shedding of oocysts).

(*Medication Against Ovine Coccidiosis – A Review* Gregory MW, Joyner LP & Catchpole J, *Veterinary Research Communications*, 5 (1981/1982) 307-325).

#### OTHER CHEMICAL PRODUCTS - TOLTRAZURIL

Toltrazuril is a very effective coccidiostat which has been registered for some time for use in poultry and more recently for use in piglets and now calves. In order for it to be used in lambs/sheep/kids there would need to be an official Maximum Residue Limit (MRL) set for the residues in sheep/goat tissue and no such MRL exists. Even in calves there are still relatively high residues after the 56 day label WHP but an MRL has been set to cover this. Only if a prescribing veterinarian can supply a WHP sufficiently long to ensure that no detectable residue remains should they recommend its use off-label for lambs/sheep or other meat producing animals.

An Export Slaughter Interval (ESI) and a re-treatment interval of 75 days is provided for calves. Literature references suggest no residues above the limit of quantification are present by this time in calves, but this may not apply to sheep or goats.

#### COCCIDIOSIS PREVENTION

If sheep are being raised “in confinement” then lasalocid sodium is registered for adding to their feed to *prevent* coccidiosis. It is not prescription only.

Several Bovatec® and Lasalocid products in various concentrations and pack sizes are registered by Ozbiopharm (Alpharma) to treat sheep “in confinement”. As a result MRLs exist for use in sheep (but also meat mammalian generally).

If sheep are at pasture, rather than in confinement, then lasalocid would strictly require written directions from a veterinarian for use while at pasture, since the use would be off-label.

Off-label use of lasalocid as a single dose treatment (as in calves) may also be useful but veterinarians would have to satisfy themselves regarding its efficacy and residue profile for this use.

#### OFF-LABEL DIRECTIONS

In NSW, users who are not veterinarians must follow the label directions. Written off-label directions can be provided to a client by a veterinarian and these must include animal species, dose rate, frequency of treatment, length of treatment and manner of administration, as well as a WHP. Since there are no WHPs for off-label uses the period should be equal to, and advised to the potential user as, an ESI. The written directions must be signed and dated by the directing veterinarian. This is dealt with in Sections 39, 39A, 39C and 39D of the *Stock Medicines Act 1989*.

Using any product off-label is at the discretion of the prescribing veterinarian. If any problems result such as treatment failure or illegal residue detections, the prescribing veterinarian may be held liable (see Section 40(2) of the Stock Medicines Act in relation to illegal residue issues).

Revised November 2008 by:

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## WEANERS FOR LIFE

Jonathan England, Sheep Development Officer at Narrogin WA, has written a nice article entitled 'Weaners for life', which is about improving merino weaner survivability. The work he reports was supported by the Australian Sheep CRC and AWI.

It appears in the October 2008 issue of 'Agricultural Memo' (Vol 33, Issue 6, page 12) for the Narrogin Agricultural District. This can be found at the Dept Ag WA website.

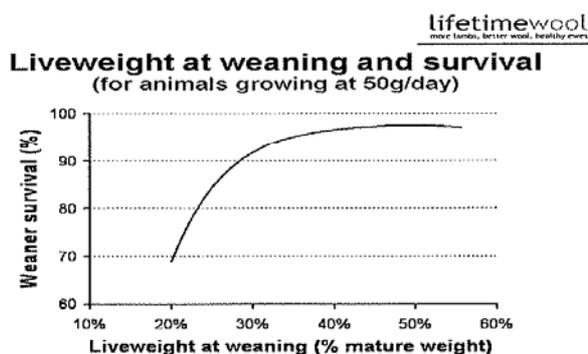
The article is also of interest because employing the recommendations will also improve worm management in Merino weaners.

### Weaners for life

Jonathan England, Sheep Development Officer, Narrogin

Many people say that a Merino weaner was put on this earth to die. However, this is only the case if weaners are underweight or underfed. Lambs weaned at 20% of their potential mature weight and growing at 50 g/day have only a 70% likelihood of survival,

compared to above 95% survival rates for lambs weaned at 40% of mature weight (see graph below). If the average mature weight of the mob is 55 kg, lambs weaned at 11 kg (20% of mature weight) have only a 70% chance of survival.



A paper delivered at the 2008 Agribusiness Livestock Updates, titled '*Improving Weaner Sheep Survival*', by Angus Campbell and Ralph Behrendt, documented weaner mortality data from two field trials conducted under commercial conditions on a wool-producing farm located 15 km west of Geelong, Victoria (average annual rainfall 535 mm), from 1996 to 2003.

Over the seven years, the lightest 20% of weaners at weaning were 3.5 times more likely to die than weaners from the middle 20% of weaning weights, regardless of the average weight of the mob in any one year. The next lightest 20% of weaners were at 1.5 times the risk of dying of the middle 20% but mortality risk amongst weaners heavier than the median did not vary.

These results clearly show that the lightweight tail of a weaner flock should be drafted off at weaning for different management. Currently, many farmers would draft off the tail of the weaner flock at some

time over summer, but the persistent association between weaning weight and mortality suggests that benefits would be derived from doing this sooner. Increasing the weaning weight of the lightest fifth of weaners might eliminate 71% of the deaths amongst this group and 31% of deaths across the entire weaner flock. In other words, increasing the weight of just one fifth of the flock could address nearly one third of all mortalities among weaners.

Key messages for weaner survival are:

- aim to wean at 40% of mature weight
- separate the tail from the mob as soon as possible as this is where most mortalities occur
- aim to achieve weaner growth rates of 0.5kg/month
- increasing the weight of just one fifth of a flock may stop one third of all weaner mortalities.

*If you are interested in taking part in a weaner management program, running on-farm in small groups during 2008/09, please register your interest with Jonathan England on 9881 0222.*

*Ag. Memo, Narrogin district, WA,  
Jonathan England*

## FILARIOID WORMS IN KANGAROOS AND TRICHINELLOID WORMS IN POTORIDS

Now for something a little different from worms of livestock:

Recently I had an inquiry from a veterinary colleague about worms he found in a kangaroo. If you have ever cut up a kangaroo, you might have noticed parasites under the skin or in the muscles of the legs or hindquarters. I told my colleague I

thought they were *Dipetalonema*, from cases I had seen in the Walgett district, but contacted one of the experts.

Following are snippets from recent correspondence (October 2008) I had with from Dr Dave Spratt of CSIRO.

Dr Spratt, an expert in parasites of Australian fauna, said that these worms may be "what is now known as *Pelecitus romeri* (formerly *Dirofilaria*

and before that *Dipetalonema*) which occurs in subcutaneous and intermuscular connective tissues of the legs and hind quarters and often immediately under the sartorius muscle of many species of kangaroos and wallabies.'

'As you correctly noted, Stephen, they are transmitted by a number of genera and species of "march fly" (Diptera: Tabanidae). Microfilariae (immature stages) circulate in the peripheral blood with peak numbers in daytime. Following uptake by the fly during a blood meal the microfilariae enter the fat cells of the fly and undergo obligatory development through three larval stages before the infective third-stage larva is "deposited" into another animal during a subsequent blood meal by the fly.'

'Ingestion of the adult worms by animals is not a problem as the worms will simply be digested. The only manner in which the life cycle of the worm can be propagated is through the intermediate host tabanid fly'.

'Animals and humans are only infected through the bite of an infected fly, however, there is no record of this ever occurring and I did not become infected myself following inoculation of third-stage infective larvae dissected from the mouthparts of an infected fly'.

Now we get more technical:

'However, there is another filarioid which occurs in the subcutaneous tissues of kangaroos and wallabies, ***Johnstonema annulipapillatum***. Originally, I thought there were two species, that one described by Johnston and Mawson in 1938 from *Macropus dorsalis*, *Wallabia bicolor* and *Onychogalea fraenata* and, and one that I called *J. andersoni* (Spratt & Varughese, 1975) from *Macropus rufus*, *M. robustus*, *M. giganteus* and *W. bicolor*, but which I have now seen from both species of *Onychogalea* as well as *M. parryi*. I am now certain that they are one and the same species and the specific epithet *annulipapillatum* has precedence'.

'*P. roemeri* in some hosts, especially grey kangaroos, is often encapsulated in a fibrous capsule while *J. annulipapillatum* is not. As noted by Jonathon, your inquirer, Stephen, female *P. roemeri* looks much like dog heartworm, fairly robust, although the males are very much smaller. *J. annulipapillatum* on the other hand is a finer nematode; females in particular not nearly as wide and males double the length of those of *P. roemeri*.

For guidance, see the next table.

'For anybody looking at these under the microscope, the spicules in *J. annulipapillatum* are similar, heavy robust things 0.3 - 0.4 mm long

while those in *P. roemeri* are very dissimilar, fine and delicate, the left 0.16 - 0.17 mm and the right one 0.06 - 0.07 mm long.'

Width (mm)	Length (mm)
<i>P.roemeri</i> males 0.3 - 0.6	20-30
<i>P.roemeri</i> females 0.7-1.6	72-150
<i>J.annulipapillatum</i> males 0.3 - 0.5	50-65
<i>J.annulipapillatum</i> females 0.4 - 0.6	130-160

'*J. annulipapillatum* probably uses mosquitoes as obligatory intermediate host, and as with *P. roemeri*, accidental ingestion of adult worms with the meat would not be a problem for dogs, cats or people.'

Extra information from Dave Spratt PM 17/10/08:

'I forgot to mention a third subcutaneous filarioid in grey kangaroos and red 'roos known only from Qld at this stage, ***Breinlia dentonensis***, which occurs unencapsulated, males are 19-25 mm long by 0.16-0.22 mm wide, females 35-44 mm long by 0.25 - 0.30 mm wide, spicules dissimilar, left spicule 0.44 - 0.47 mm long, right spicule 0.18 - 0.20 mm long. It occurs in subcut tissues of legs, arms and abdomen.' - DS

#### ***EUCOLEUS POTOROI* SP. NOV (FORMERLY *CAPILLARIA* SP NOV) IN POTOROIDS**

Of possibly less interest to some of you, GL Reddacliff and I published the first report of a new parasite (then designated *Capillaria* sp nov 7 by Dr Spratt) causing verminous lung disease in potoroid marsupials (rufous bettongs, brush-tail bettongs and long-nosed potoroos) in captive colonies at Armidale and Cowan, NSW.

(There are some nice pictures of the eggs and lung pathology in Love SCJ and Reddacliff GL (1992). 'Verminous bronchitis and bronchiolitis in potoroid marsupials associated with a new *Capillaria* sp. Journal of Wildlife Diseases, 28(4), pp. 643-645).

Dr Spratt kindly updated me on that front as well.

"Here's your *Capillaria* sp. nov. 7: Spratt D.M. (2007). *Eucoleus potoiroi* sp. nov. (Nematoda: Trichinelloidea: Capillariidae) from the bronchi and bronchioles of captive potoroid marsupials. Transactions of the Royal Society of South Australia 131: 116-121."

[WormMail 20081017; amended]

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