NSW DPI primefacts
PROFITABLE & SUSTAINABLE PRIMARY INDUSTRIES www.dpi.nsw.gov.au
JUNE 2007 PRIMEFACT 419 (REPLACES AGNOTE DAI-312)

Cattle worm control – the basics

Stephen Love

Veterinarian/State Worm Control Coordinator, Extensive Industries Development, Armidale

Dr Gareth Hutchinson

Research Officer (Parasitology), Health Science, Strategic Alliances & Evaluation, Menangle

Abbreviations used

AR: anthelmintic resistance

ML: macrocyclic lactones

BZ: benzimidazole

LEV: levamisole

IVM: ivermectin

EPI: eprinomectin

This Primefact outlines the basics of worm control for grazing beef cattle in New South Wales. The same general principles apply to dairy cattle, although the details may vary and, in addition, milk withholding periods of anthelmintics (especially flukicides) also need to be considered. The importance of various cattle worms in different climatic zones is summarised in Table 1.

A brief outline follows.

Round Worms (Nematodes)

Gastrointestinal. The small brown stomach worm *(Ostertagia ostertagi)* is the most important roundworm of cattle in temperate regions worldwide, including NSW. Other gastrointestinal worm species, however, including *Haemonchus placei*, *Cooperia* spp., *Trichostrongylus* spp., *Oesophagostomum* and *Bunostomum* (hookworm) add to the total impact on host animals.

Lungworms. Cattle can be infected with lungworms (*Dictyocaulus viviparus*), but these parasites are usually not a problem in NSW.

Flukes (Trematodes)

Liver fluke (*Fasciola hepatica*) is an important parasite of cattle in certain areas (where conditions are suitable for the intermediate host, an aquatic snail). 'Fluky' areas occur mainly in the eastern third of NSW, but also in some western irrigation areas.

Stomach fluke (such as *Paramphistomum spp*. or *Calicophoron spp.*) occasionally cause disease, mainly in coastal areas. Adult stomach flukes do little damage; most problems are caused by large numbers of migrating immature flukes in the small intestine.

Table 1. Harmful cattle worms and their distribution (Source: Love & Hutchinson 2003, adapted from Cole 1986)

Common / significant
Summer rainfall areas of NSW
Haemonchus placei
Ostertagia ostertagi (Small brown stomach worm)
Cooperia punctata – C. pectinata (Intestinal worm), as a complex, often with *Ostertagia* and *Bunostomum phlebotomum* (Hookworm)
Oesophagostomum radiatum (Nodular worm)
Non-seasonal to winter rainfall areas
Ostertagia ostertagi
Trichostrongylus axei (Stomach hair worm)
Cooperia oncophora
Occasionally significant, mainly subclinical, or sometimes present in large numbers
Fasciola hepatica (Liver fluke)
Paramphistomum spp. (Stomach fluke)
Calicophoron calicophorum (Stomach fluke)
Strongyloides spp. (Threadworm)

Integrated parasite management (IPM)

Producers should manage worms by using 'non-chemical' as well as 'chemical' control options. 'Non-chemical' options include improved nutrition and providing 'worm-safe' pastures for young cattle. Strategies include the following.

Immunity and nutrition

Well-fed animals develop immunity faster and are better able to expel parasites and to withstand the effects of those that remain.

Young cattle are most susceptible to worms, but usually develop useful immunity by around 20–24 months. In general, cattle develop better immunity to worms than sheep and goats. Although adult cattle often require little or no drenching for roundworms (as opposed to liver fluke), some animals can become wormy. Susceptible animals may include bulls, first-calf heifers, and severely-stressed individuals.

Pasture/grazing management

Dung pats can provide shelter for worm larvae for several months, even in very dry conditions. Therefore, paddocks continually grazed by young cattle in autumn and winter can become very wormy.

It is important to prepare a number of 'worm-safe' pastures, particularly in higher-rainfall areas of NSW. This is so young, susceptible cattle can be moved every few months to paddocks with fewer worm larvae. Aim to graze weaners from early August through to summer on the least contaminated pastures available.

Begin preparing 'low-worm' pastures for spring four months ahead (i.e. in April). The table below shows different low-worm pastures.

Best	New sown pasture or crop.
	Pasture grazed by sheep for previous 4 months.
	Pasture *not* grazed by any cattle for previous 4 months.
Good	Pasture grazed by adult dry cattle or cattle older than 18 months of age.
High-risk	Pasture grazed by young cattle such as weaners.

Drenching

For the timing and frequency of drenching, see the section on 'Putting it all together'.

Roundworms

Anthelmintic treatments may be necessary to control round worms in young cattle, particularly in higher-rainfall areas (the Coast and Tablelands). In low-rainfall areas of western NSW, drenching of cattle of any age is rarely required. (If in doubt, check young cattle using a worm egg count.)

For most of NSW, regular treatment of adult cattle is not required.

Fluke

On liver fluke-affected farms, treatment of all cattle with a flukicide will be required one or more times a year, depending on the severity of the problem. The most important liver fluke treatment is usually in late autumn (April/May) when both immature and adult flukes are present. Some flukicides are only effective against adults. Consider rotating from one flukicide type to another in order to slow the development of resistance. Warning: flukicides containing triclabendazole must not be used in lactating dairy cattle.

Stomach fluke can affect cattle under certain conditions, particularly in coastal areas.

For more information on stomach and liver fluke, see the relevant Primefacts on the NSW DPI website at www.dpi.nsw.gov.au/primefacts .

Drench types

See Table 3

Drench resistance

In an earlier worldwide review of AR in cattle worms, Hutchinson (2003) states that: 'although evidence of resistance in cattle worms is only slowly coming to light and has so far been restricted to the less-pathogenic species of *T. axei* and *Cooperia,* it should be expected that resistance to MLs is likely to become established in Australia'. A more recent international review (Kaplan 2004) noted that clinical case reports basing bovine nematode resistance on treatment failures were insensitive. However, some cattle nematodes were reported to have proven resistant to BZ and ML in other parts of the world: *Haemonchus* and *Cooperia* in Argentina (Anziani et al 2004); and *Cooperia* in Europe (Coles 2002).

In New Zealand there have been reports from the early 1990s of resistance to BZs principally in *Cooperia* but also in *Ostertagia* and *Trichostrongylus* (Hosking & Watson 1991, McKenna 1996). ML resistance has been reported more recently, again principally in *Cooperia* (Vermunt et al 1996).

With growing concern over the apparent level of resistance in cattle nematodes, a major systematic survey to assess the situation in beef cattle in NZ was recently completed (reviewed by Pomeroy 2006), Based on faecal egg count reduction tests at only 7–10 days after treatment (a possible weakness in the design) it used only oral drenches

on 62 randomly selected farms in the North Island. The two types of system examined were intensive bull-beef rearing systems (hand reared bull calves or purchased as weaners 10–12 weeks old) and 'cow-calf' where calves were reared on mothers until weaning at 28–30 weeks then grown out on the same or separate finishing farms. The study was restricted to the North Island as bull-beef rearing had only recently been introduced to the South Island.

The estimated prevalence of IVM resistance in *Cooperia* was 92% and 62% for albendazole (Waghorn et al 2006). Fortunately LEV was still effective against these resistant strains of *Cooperia*. However, it is normally poorly effective against inhibited *Ostertagia*.

Ostertagia in cattle had albendazole resistance with a prevalence of 35% but only 9% of farms had IVM or LEV resistance in this species.

Risk factors for anthelmintic resistance were examined in a concurrent interview and questionnaire of farmers' opinions and practices regarding AR on these same farms (Jackson et al 2006). This revealed that the median number of treatments was five. One in four farms used anthelmintics on calves on 8–12 occasions in their first year of life (a much higher frequency than would ever be considered in Australian conditions). Most anthelmintics used for the past five years were ML or their combinations, rather than BZ, LEV or BZ/LEV combinations (Jackson et al 2006).

Why there is ML resistance in *Cooperia* but not in *Ostertagia* in mixed infections when MLs are the main drenches used is not explained. Most farmers, although aware of AR, did not perceive it to be a major problem in cattle. It was concluded that all cattle farms should now be using combinations on most occasions to achieve effective control of all parasites.

Another study (Mason and McKay 2006) investigated the efficacies of pour-on anthelmintics on five New Zealand farms with suspected resistance. The study was against field strains of parasitic nematodes in young cattle. Resistance to IVM and EPI was confirmed in *C. oncophora* on all farms. There was limited emergence of *Ostertagia* resistant to IVM, but not EPI; in other (short-tailed) *Cooperia* species there was resistance to both IVM and EPI; and in *Trichostrongylus* there was resistance to IVM, EPI and LEV used separately. It was concluded that simultaneous administration of LEV and IVM pour-on is likely to control both ML-resistant *C. oncophora* and stages of *Ostertagia* that are not controlled by LEV.

On a positive note, there have been no case reports of clinical parasitism in cattle in NZ where the effect of resistant nematodes has been quantified (Jackson et al 2006).

Australia has had only two confirmed cases of drench resistance in cattle – both involving BZ ('white') drenches. One case involved oxfendazole-resistant *Trichostrongylus axei* (stomach hair worm) in western Victorian cattle (Eagleson and Bowie 1986). The other was for oxfendazole and febantel-resistant *T axei* in the New England region of NSW (Eagleson et al. 1992).

Some factors which may increase the selection of resistant worms include:

- increased exposure of the worm population to anthelmintics (through frequent drenching);
- exposure of worms to sub-lethal doses of anthelmintics (through under-dosing);
- drenching unnecessarily in dry seasons or dry environments when there are very few worm larvae on pasture. (Note, however, that cattle worm larvae can survive for some time in the protected conditions of a dried dung pat, unlike in sheep faecal pellets).

In many areas of NSW, especially drier areas, cattle are drenched too often, particularly adult cattle. (Seek local expert advice on how much drenching is required). Also, unlike the situation in sheep, the three main broad-spectrum families – BZs, LEV and ML drenches – are still effective on the majority of cattle properties. However, many producers use just one family of drenches – rarely, if ever, rotating.

Quarantine drenching

When introducing cattle from other properties, consider 'cleaning them out' with a 'quarantine' drench, at least for roundworms, and possibly also for liver fluke.

Currently, the need for a 'quarantine' drench in cattle is somewhat less than in sheep. Anthelmintic resistance is much less common in cattle worms, so the risk of importing resistant worms is less. Also, cattle, especially adult cattle, tend to have far fewer problems with worms than sheep.

Fine tuning

In consultation with your adviser, fine-tune an integrated parasite management program to suit your property. Use WormTest (worm egg counts) to monitor your worm control program.

Cattle (especially adult cattle) can be drenched too often. WormTest can help with decisions about drenching; however, faecal worm egg counts can be an unreliable indicator of actual worm burdens in cattle – especially cattle older than 9–12 months.

In yearling or adult cattle that appear to be wormy but have low worm egg counts, consider a 'diagnostic drench', that is, drenching a small

number of cattle in the mob and monitoring the response to treatment. Clinical disease or reduced performance can sometimes be present when egg counts are very low.

Putting it all together

Table 2 (below) gives an example of a cattle worm control program. Remember that cattle in many areas of NSW will require fewer treatments than are included here.

Always read the label

Users of agricultural (or veterinary) chemical products must always read the label, and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

References and further information

See related Primefacts on the NSW Department of Primary Industries website: www.dpi.nsw.gov.au/primefacts

Anziani OS, Suarez V, Guglielmone AA, Warnke O, Grande H and Coles GC (2004). *Resistance to benzimidazole and macrocyclic lactone anthelmintics in cattle nematodes in Argentina.* Veterinary Parasitology 122: 58-59

Boray JC (1999). *Liver fluke disease in sheep and cattle*. Primefact 446, revised by Dr GW Hutchinson and Stephen Love (July 2003). NSW DPI.

Cole VG (1986). Helminth parasites of sheep and cattle. *Animal Health in Australia*, Volume 8. Australian Agricultural Health and Quarantine Service, Department of Primary Industry, Canberra, pp. 255

Coles GC. Sustainable use of anthelmintics in grazing animals. *Veterinary Record* 151:165-169.

Eagleson JS and Bowie JY (1986). Oxfendazole resistance in *Trichostrongylus axei* in cattle in Australia. *Veterinary Record* 119, 604.

Eagleson JS, Bowie JY, and Dawkins HJS (1992). Benzimidazole resistance in *Trichostrongylus axei* in Australia. *Veterinary Record* 131, 317-318.

Freeman P. *Beef cattle on the North Coast.* Rural Lands Protection Board, Casino, NSW.

Hosking BC and Watson TG (1991). Benzimidazole- resistant nematodes in cattle. *Journal of the New Zealand Institute of Agricultural*

Table 2. An example of a beef cattle worm control program (higher rainfall Tablelands area)[1].

Date	Class of stock		Management	Additional treatments	
	Young (< 20 months)	Adults		Liver fluke[3]	Stomach fluke[4]
Feb	Drench for inhibited *Ostertagia* [2].	Regular drenching may not be required.		+	
April/May	Drench at weaning.		Begin preparation of 'safe' pastures for spring[5].	+	
Early August	Drench and move to safe pasture. Move again later in spring, if possible.			+	+

1 This is a guide only. Fewer drenches may be required in many areas. Drenching may rarely be required on the Western Plains. More drenches are generally required in high-rainfall areas with productive pastures, especially if no sheep are grazed and/or grazing management is not practised.

2 The February drench for roundworms – if required – should be highly-effective and aimed at inhibited *Ostertagia* (small brown stomach worm). MLs are most effective, followed by BZs. Levamisole has limited activity against inhibited *Ostertagia*.

3 Only treat for liver fluke if its presence is confirmed on your property. Between 1–3 fluke treatments for all ages of cattle may be necessary. The most important of these is the April treatment, followed by the August treatment, then the February treatment. Consider rotating from one flukicide to another (unrelated) flukicide. Use a highly-effective flukicide at the April treatment.

4 Stomach fluke can be a problem in certain coastal areas. Seek veterinary advice. Treatment of all cattle in these localities in August to reduce pasture contamination may be appropriate.

5 Methods of producing 'safe'; or 'low-worm' pasture include cropping, hay aftermath, and grazing beforehand with sheep or adult cattle, or cattle older than 18 months.

Science 26: 53.

Hutchinson GW (2003). Cattle nematodes and resistance with particular reference to MLs. *Turning the Worm* Newsletter, Issue 11, May 2003, NSW DPI, 4-8. Retrieved 30 January 2007 from http://www.agric.nsw.gov.au/reader/ttwnews

Jackson R, Rhodes AP, Pomroy WE, Leathwick DM, West DM, Waghorn TS and Moffat JR (2006). Anthelmintic resistance and management of nematode parasites on beef cattle-rearing farms in the North Island of New Zealand. *New Zealand Veterinary Journa*l 54: 289-296.

Kaplan RM (2004). Drug resistance in nematodes of veterinary importance: a status report. *TRENDS in Parasitology* 20:477-481.

Lloyd JB, Boray J and Campbell N (2003). *Identifying liver fluke snails*. Primefact 476, NSW DPI.

Lloyd JB and Boray J (2003). *Stomach fluke (paramphistomes) in ruminants.* Primefact 452, revised by Stephen Love. NSW DPI.

Love SCJ and Hutchinson GW (2003). 'Pathology and diagnosis of internal parasites in ruminants'. *Gross Pathology of Ruminants,* Proceedings 350, 9–11 April 2003, Elizabeth Macarthur Agricultural Institute, Camden, NSW, Australia. Post-Graduate Foundation in Veterinary Science, University of Sydney, 309–338.

Mason PC and McKay CH (2006). Field studies investigating anthelmintic resistance in young cattle on five farms in New Zealand. *New Zealand Veterinary Journal* 54: 318-322.

McKenna PB (1996). Anthelmintic resistance in cattle nematodes in New Zealand. Is it increasing? *New Zealand Veterinary Journal* 44: 76.

Pomroy WE (2006). Anthelmintic resistance in New Zealand: A perspective on recent findings and options for the future. *New Zealand Veterinary Journal* 54: 265-270.

Smeal MG (1995). 'Parasites of Cattle', *Veterinary Review* No.32, The University of Sydney, Post-Graduate Foundation in Veterinary Science, pp. 358.

Spence S (2001). *Dung beetles – working for you.* Primefact 442, NSW DPI

Vermunt JJ, West DM and Pomroy WE (1996). Inefficacy of moxidectin and doramectin-resistant *Cooperia* spp. in New Zealand. *New Zealand Veterinary Journal* 44: 188-193.

Waghorn TS, Leathwick DM, Rhodes AP, Jackson R, Pomroy WE, West DM and Moffat JR (2006). Prevalence of anthelmintic resistance on 62 beef cattle farms in the North Island of New Zealand. *New Zealand Veterinary Journal* 54: 278-282.

Acknowledgements

This Primefact was drawn from a variety of sources, including research, notes and publications by:

- Dr Malcolm Smeal, formerly of NSW Agriculture, currently with 'Southern Beef Advisory', Sydney.
- Dr Paul Freeman, NSW Department of Primary Industries, formerly District Veterinarian, Casino, NSW.
- Dr Stephen Jagoe, formerly District Veterinarian, Bega (South Coast), NSW.
- Dr Roy Everett, formerly of NSW Agriculture.

Suggestions and assistance from John Seaman, Lee Cook, Belinda Walker, John Evers, Shaun Slattery, Rod Hoare, Malcolm Smeal, and John Macfarlane are also acknowledged.

ISSN 1832-6668

Replaces Agnote DAI-312

Check for updates of this Primefact at:
www.dpi.nsw.gov.au/primefacts

Job number 7298

Table 3-Registered cattle drenches (anthelmintics)

Sources: Infopest, January 2007; Australian Pesticides and Veterinary Medicines Authority (www.apvma.gov.au)

Constituents	Product name	Company
Broad-spectrum roundworm drenches – benzimidazoles ('BZ', 'white') (Check label for efficacy and persistency of activity against different worm species)		
Albendazole (112.5 g/L)	Albendazole Cattle Mini-Drench	WSD
	Nuwhite CC	Captec
	Strategik Mini-Dose (Cattle)	Jurox
	Valbazen Mini-Dose Cattle	Pfizer
Fenbendazole (100 g/L)	Fenbendazole 100	WSD
	Fencare 100	Virbac
	Panacur 100	Intervet
Fenbendazole (25 g/L)	Fenbendazole	4Farmers
	Fenbendazole	WSD
	Fencare 25	Virbac
	Panacur 25	Intervet
Oxfendazole (100 g/L)	Worma Drench	Farnam
Oxfendazole (45.3 g/L)	Combat White Anthelmintic	Virbac
	Oxazole LV - Sheep, Cattle Goats	Jurox
	Oxfen LV	Virbac
	Systamex Oral	Coopers
Oxfendazole (75 g/L)	Alternate	Bomac/Elanco
	Bomatak Pour-On	Bomac
Oxfendazole (90.6 g/L)	Bomatak.C	Bomac/Pharm tech
	Oxazole - Cattle & Horses	Jurox
	Oxfen C	Virbac
	Parafend LV	Norbrook
	Systamex Concentrated Drench	Coopers
Broad-spectrum roundworm drenches – levamisole ('LEV', 'clear') (Check label for efficacy and persistency of activity against different worm species)		
Levamisole (base) (125 g/L)	Nilverm Pour-On	Coopers
Levamisole (base) (200 g/L)	Big-L Pour-On	Sykes
	Citarin Pour-On	Bayer
	Levamisole Pour-On	Virbac
	Levipor	Novartis
Levamisole as HCl (27 g/L)	Big L	Sykes
	Levamisole	4Farmers

Constituents	Product name	Company
	Levamisole	WSD
	Nilverm Oral Drench	Coopers
	Nulev	Captec
	Rycozole	Novartis
Levamisole as HCl (340 g/L)	Levamisole Gold Mixadrum Concentrate	Virbac
Levamisole as HCl (63.6 g/L)	Combat Clear (Oral Drench)	Virbac
	Levamisole Gold LV	Virbac
Levamisole as HCl (67.8 g/L)	Rycozole RV	Novartis
Levamisole as HCl (67.8 g/L)+Se as sod.selenate (1 g/L)	Rycozole RV Plus Selenium	Novartis
Levamisole as HCl (67.9 g/L)	Clear LV	Bayer
	Low Volume Levamisole	WSD
Levamisole as HCl (68 g/L)	Nilverm LV	Coopers
Levamisole HCl (32 g/L)	Levamisole Gold	Virbac
Levamisole HCl (80 g/L)	Nulev LV	Merial
Broad-spectrum roundworm drenches – macrocyclic lactones ('MLs', 'mectins') (Check label for efficacy and persistency of activity against different worm species)		
Abamectin (10 g/L)	Avomec	MSD Agvet
	Paramectin RV	Jurox
Abamectin (10 mg/ml)	Genesis Abamectin Pour-On	Ancare
	Genesis Injection Abamectin	Ancare
	Paramectin Injection	Dover
	Rycomectin - Cattle Injection	Novartis
	Vetmec - Cattle Injection	Youngs
	Virbamec Injection - Cattle	Virbac
Abamectin (10 mg/ml) + cyanocobalamin (2 mg/ml)	Genesis Injection Abamectin Plus Vit B12	Ancare
Abamectin (5 g/L)	Paramectin Pour-On	Jurox
Abamectin (5 mg/ml)	Beefmec Pour-On (Abamectin)	Virbac
	Virbamec Pour-On	Virbac
	Virbamec Pour-On Endectocide	Virbac
Doramectin (10 mg/ml)	Dectomax Injectable	Pfizer
Doramectin (5 mg/ml)	Dectomax Pour-On	Pfizer
Eprinomectin (5 mg/ml)	Ivomec Eprinex Pour-On	Merial
Fluazuron (15 g/L) + ivermectin (5 g/L)	Acatak Duostar Tick Development Inhibitor And Broad Spectrum Pour-On	Novartis
Ivermectin (10 mg/ml)	Bomectin (Injection)	Pharm Tech
	Dairymec - Pour-On	Virbac

Constituents	Product name	Company
	Ecomectin - Injection	Eco Animal Health
	Genesis Injection Ivermectin	Ancare
	Genesis Pour-On	Ancare
	Imax CD	Pharm Tech
	Ivomec Injection - Cattle	Merial
	Noromectin Injectable - Cattle	Norbrook
	Noromectin Injection - Cattle & Pigs	Norbrook
	Vetimec Injection	C-Corp
	Virbamax Pour-On	Virbac
	Virbamec LA Injection	Virbac
	Virbamec LV Pour-On	Virbac
Ivermectin (5 g/L)	Ivermectin Baymec Pour-On	Bayer
	Ivermectin Pour-On	Virbac
	Paramax Pour-On	Coopers
	Phoenectin (Ivermectin) Pour-On	Phoenix Scientific
Ivermectin (5 mg/ml)	Ausmectin Cattle Pour-On	IAH Sales
	Bovimectin	Norbrook
	Ecomectin Cattle Pour-On	Eco Animal Health
	Ivomec Pour-On - Cattle	Merial
	Noromectin Pour-On	Norbrook
	Vetimec Pour-On	C-Corp
Moxidectin (10 g/L)	Cydectin Injection - Cattle/Sheep	Fort Dodge
	Cydectin Injection for Cattle	Fort Dodge
Moxidectin (5 g/L)	Cydectin Pour-On	Fort Dodge
Broad-spectrum (roundworms) + flukicide (Check label for efficacy against different roundworms as well as various stages of fluke: adult, immature, and early immature)		
Abamectin (5 mg/ml) + triclabendazole (300 mg/ml)	Anfluke Pour-On	Ancare
	Fasimec Cattle Pour-On	Novartis
	Genesis Ultra Pour-On	Ancare
	Triclamec Cattle Pour-On	Youngs
Ivermectin (10 mg/ml) + clorsulon (100 mg/ml)	Genesis Ultra Injection	Ancare
	Ivomec Plus	Merial
	Noromectin Plus Broad-Spectrum Antiparasitic Injection for Cattle	Norbrook
	Vetmec F	Chemvet
Ivermectin (10 g/L) + clorsulon (100 g/L)	Virbamax Plus Injection	Virbac
	Virbamec Plus Injection	Virbac

Constituents	Product name	Company
Ivermectin (15 g/L) + triclabendazole (240 g/L)	Sovereign	Coopers
Levamisole as HCl (64 g/L) + oxyclozanide (150 g/L)	Nilzan LV	Coopers
Triclabendazole (120 g/L) + ivermectin (2 g/L)	Fasimec Cattle	Novartis
	Triclamec Cattle	Novartis
	Triclamec Cattle	Youngs
Triclabendazole (120 g/L) + oxfendazole (45.3 g/L)	Flukazole C	Virbac
Triclabendazole (120 g/L) + oxfendazole (45.3 g/L) + Se as sod.selenate (1 g/L)	Flukazole C Plus Selenium	Virbac
Flukicide (Check label for efficacy against different stages of fluke: adult, immature, and early immature)		
Nitroxynil as eglumine (340 g/L)	Trodax	Fort Dodge
Triclabendazole (100 g/L)	Fasinex 100 Oral	Novartis
	Exifluke Oral Flukicide for Sheep, Cattle and Goats	Bomac
Triclabendazole (120 g/L)	Fasicare 120	Novartis
	Fasinex 120	Novartis
	Flukare C	Virbac
	Tremacide 120	Jurox
	Tricla 120	Youngs
Triclabendazole (120 g/L) + Se as sod.selenate (1 g/L)	Flukare C with Selenium	Virbac
Triclabendazole (240 g/L)	Fasinex 240	Novartis
Triclabendazole (50 g/L)	Fasinex 50	Novartis
	Flukare S	Virbac
	Tricla 50	Youngs
Triclabendazole (50 g/L) + Se as sod.selenate (0.5 g/L)	Flukare S with Selenium	Virbac
Other (Label claim for trichlorfon: control of bot in horses and intestinal worms in cattle. Check label for details).		
Trichlorfon (800 g/kg)	Neguvon	Bayer