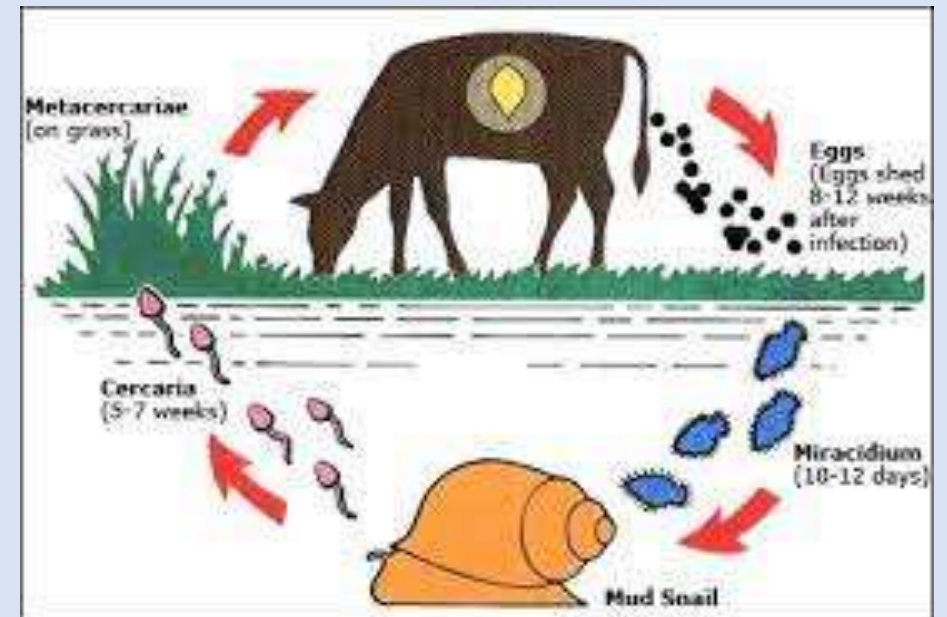


WORM INFECTIONS , PREVENTION AND TREATMENT (Level 2)

Topic	Training & information Content
9.1	Introduction to Animal health (Prevention vs curative health care)
9.2	Health signals
9.3	Biosecurity of dairy farms
9.4	Tick born diseases (Prevention and treatment)
9.5	Worm infections (Prevention and treatment)
9.6	Vaccination schedule and planning
9.7	Mastitis prevention and treatment
9.8	California Mastitis Test
9.9	Usage and storage of veterinary medicines on dairy farms
9.10	Administering of medicines to dairy cows
9.11	Instruction use of injectors into teat canal
9.12	Key performance indicators (KPIs) for monitoring health status of dairy herd



1. You will learn about (learning objectives):

- How do cattle get worm infections?
- What damage do they do?
- Why is it important?
- How to prevent worm infections?
- How to treat worm infections?



Tip!!!

Young stock developing a rough hair coat is often a sign of a worm infection . It can also be a sign of mineral deficiencies, so make sure mineral salt (lick blocks) are present.

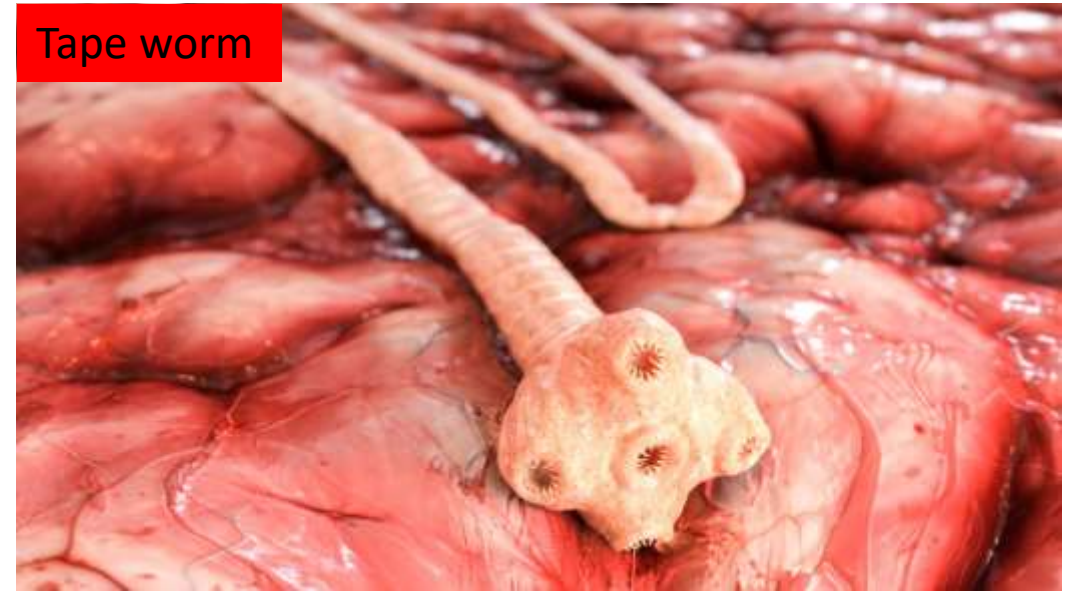
2. Background

- Worm infections are an important reason for health problems in cattle, although cattle often do not die due to worm infections, the health problems give serious problems, resulting in decreased growth and loss of milk production.
- In a free range grazing system, prevention by treatment is often the only solution to tackle the problem. This brings considerable cost with it.
- Proper diagnosis (when possible) and good pasture management (rotational grazing) can help to decrease the problem.



3. Worms in cattle

- There are many different worms living in the lungs, liver, stomachs and gut of cattle.
- The two kinds of worms that affect cattle are:
 - Flat worms (platyhelminthae) for example fluke like worms (trematoda) and tapeworms (cestodes).
 - Round worms nematodes (nematelminthes) for example Trichostrongylus, Oesophagostomum, Cooperia, Ostertagia, Haemonchus and Dictiocaulus



4. Worms in other ruminants

- Most worms that can live inside cattle can also live in goats and sheep.
- The way they affect the animal can vary. For instance fluke can be mortal for sheep, while in cattle most of the times only develop 'mild' symptoms.
- This is one of the reasons why it is not recommended to graze cattle together with other small ruminants, or even grazing young stock cattle grazing after sheep and goats.



5. What's the problem?

- 'Gut worm' refers to roundworm species that can cause disease in cattle by infesting the abomasum and small intestine.
- Young stock are particularly at risk.
- But young animals need some light exposure to be able to develop immunity.



*Picture shows, Infections cause diarrhoea and rough hair

6. Clinical signs of a round worm infections includes

- Reduced growth rate and ultimately weight loss,
- Loss of appetite,
- Rough hair,
- Decreasing body condition,
- Diarrhea (only in severe cases).



7. Round worms in cattle.

Where do they live?

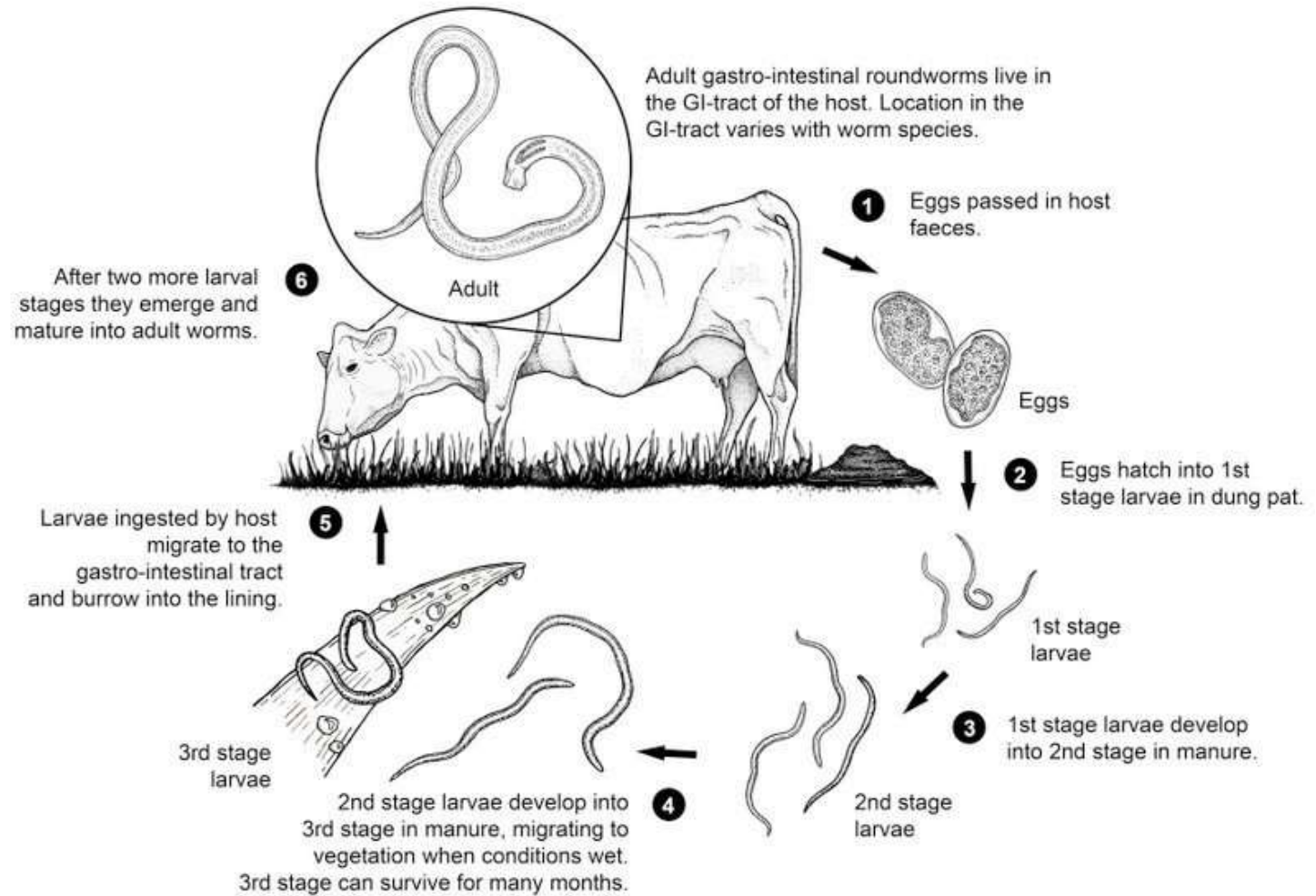
- Rumen
Paramphistomum
- Abomasum
Ostertagia
Haemonchus
Trichostrongylus
- Small intestine
Cooperia
Trichostrongylus sp.
Capillaria
Nematodirus
- Colon
Oesophagostomum
Trichuris



*Paramphistomum flukes in the rumen and a picture of an adult worm

8. The life cycle of a round worm

1. Eggs are excreted in manure,
2. Eggs hatch to larvae,
3. Larvae migrate to pasture,
4. Infective larvae in water droplets on grass,
5. Cattle eat grass,
6. Larvae develop to adult worms in stomach or gut. Adult worms lay eggs.



9. Prevention of round worms

9.1. Pasture management

- Practice rotational grazing. Make sure that young animals graze on regrowth of pastures which have been used for hay or grass silage making.
- Do not graze cows together with small ruminants (sheep and goats) or even worse after them.
- Suckling calves of dual purpose cows are exposed to lower levels of gut worm challenge, depending on the age of weaning, in their first grazing season as the bulk of their nutrition is still derived from their dams' milk.
- For calves which have been bucket fed good young stock management is important and a well planned introduction to grazing.



* Calves have who have not developed immunity to worm infections are infected fast.

9.2. Biosecurity measures

- Purchased or new cattle with an unknown treatment history could be carrying significant worm and fluke burdens, and may introduce resistant parasites and other diseases.
- A quarantine protocol, developed with a vet, should be implemented.
- Treat them and keep them separated.



* Spots are round worm in gut

10. Treating worm infections

- Three groups of medicines are available:
 - Benzimidazoles, (e.g. albendazole, fenbendazole, oxfendazole, etc.)
 - Levamisole group (e.g. pyrantel, morantel, levamisole)
 - Avermectines (e.g. ivermectine)
- All these medicines except for the avermectines, work also against fluke infections.
- Respect withdrawal times for beef and milk.
- Avermectines should not be given to dairy cattle.



*Medicines like levamisole on these pictures can be given orally by drench, bolus or by injection

10.1. Treating worm infections

- Young stock is most vulnerable for worm infections.
- Older cattle may have gained immunity by getting infections during their lifetime.
- Mostly cattle and calves are treated preventively, 3 or 4 times a year.
- Preferably only treat when necessary (as therapy) so young stock will gain immunity and treating as adult is no longer necessary.
- Treating 4 times a year will be expensive and often unnecessary.



*Image of two types of drenching guns.

10.2. How to treat worm infection as a therapy?

- Measure heart girth to monitor calf and young stock weight and calculate the growth rate.
- Ideally you can take manure samples, examine them under a microscope to do an egg counts.
- When the animals gets rough hair coat and loses weight (animal appear skinny) this an indicator for the presence of a worm infection.



*Deworming using a drenching guns

10.3. Weighing an animal for medicine administration

- Measuring heart girth gives a good weight estimate, so you can calculate your dose of medicine more adequately.
- See table to the right for conversion from centimeters(Cm's) to kilograms (Kg's)



Cm's	Kg's	Cm	Kg's	Cm's	Kg's	Cm's	Kg's
75	41	108	114	142	236	176	435
76	42	109	117	143	240	177	440
77	44	110	120	144	245	178	445
78	46	111	123	145	250	179	452
79	48	112	126	146	255	180	460
80	49	113	129	147	260	181	467
81	51	114	132	148	268	182	474
82	53	115	135	149	276	183	480
83	54	116	139	150	283	184	487
84	56	117	142	151	290	185	493
85	58	118	145	152	295	186	500
86	60	119	148	153	300	187	508
87	62	120	151	154	305	188	516
88	64	121	154	155	310	189	523
89	66	122	158	156	315	190	530
90	68	123	162	157	320	191	538
91	70	124	166	158	325	192	546
92	72	125	170	159	330	193	554
93	74	126	173	160	335	194	562
94	77	127	176	161	340	195	570
95	79	128	179	162	345	196	578
96	81	129	183	163	350	197	586
97	84	130	187	164	357	198	594
98	86	131	191	165	364	199	600
99	88	132	195	166	370	200	608
100	91	133	198	167	377	201	616
101	93	134	202	168	384	202	624
102	96	135	208	169	390	203	632
103	99	136	212	170	397	204	640
		137	216	171	404	205	645
104	102	138	220	172	410	206	650
105	104	139	224	173	417	208	654
106	107	140	228	174	424	209	657
107	110	141	232	175	430	210	660

10.4. Measuring the heart girth

- The easiest place to do this is in the crush with a specially designed tape measure.
- If you do not have tape measure, take a rope and measure the length corresponding with the weight equal to 100kg (103.5cm), 150kg(120cm), 200kg(133.5), 250kg(145cm) and put tape on the rope on these spots. For the difference (in centimeters) between the spots see table in the prior sheet.
- Make sure that the cow stands square when measuring as in the picture on the right.
- No need to pull the tape or rope tight when measuring!
- Make sure you calculate the dose well. Under dosing does not work well because it may develop resistance against the active ingredient, while overdosing is too expensive.



11. Fluke

- Fluke is an infection caused by a trematode (flat worm) damaging the liver of the cow.
- Snails are a host to fluke.
- The fluke worms live in the liver of the cow.



*Picture left of a damaged liver. The worms live in the bile canals, which are swollen and white as in the picture.



*Picture above of the fluke worms. They have a size of 2-4 cm.

11.1. Fluke worm

- Two types of flat worms can cause fluke (faciolasis) in Africa.
- Fasciola Hepatica which is found nearly all around the world
- Fasciola Gigantica which lives in warmer climates in Africa and Asia



*Picture above is eggs and adults of Fasciola Gigantica

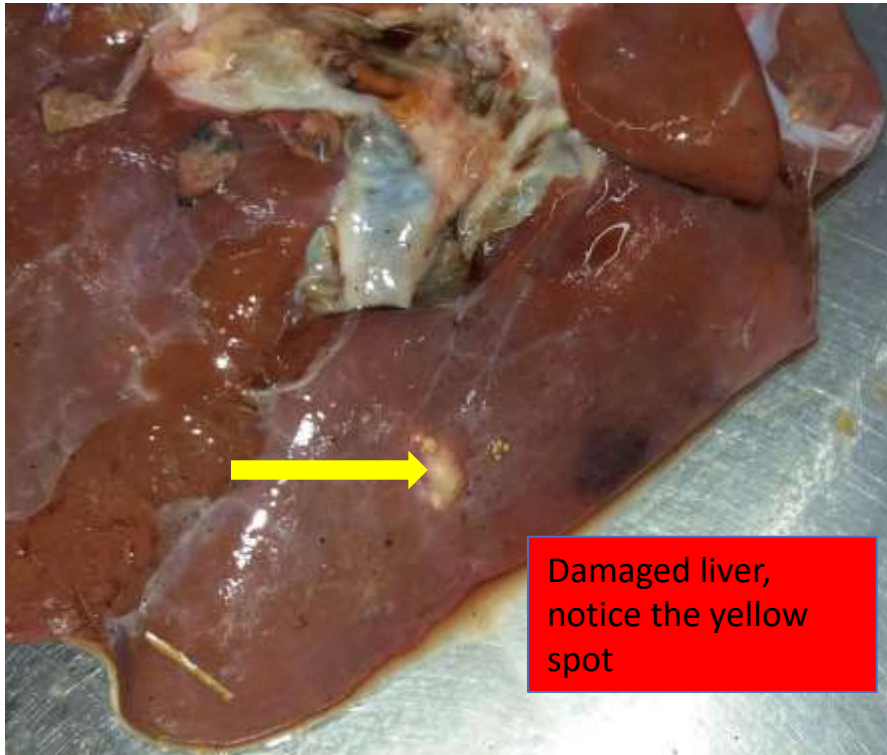


* Picture of Fasciola Hepatica



11.2. Fluke the worm

- Damaged livers due to fluke infection
- The adult fluke worms live in the bile ducts in the liver



11.3. Clinical signs of a fluke infection include

- Reduced growth and ultimately weight loss.
 - Reduced milk yields.
 - Reduced fertility.
 - Bottle Jaw (oedema).
 - Diarrhea.
 - Anemia.
 - Severe cases can lead to death.
-
- Furthermore the disease can be complicated by Black Leg
-
- It is a herd problem, so in case of infection many cattle will be infected. Before clinical signs production loss can already be present.



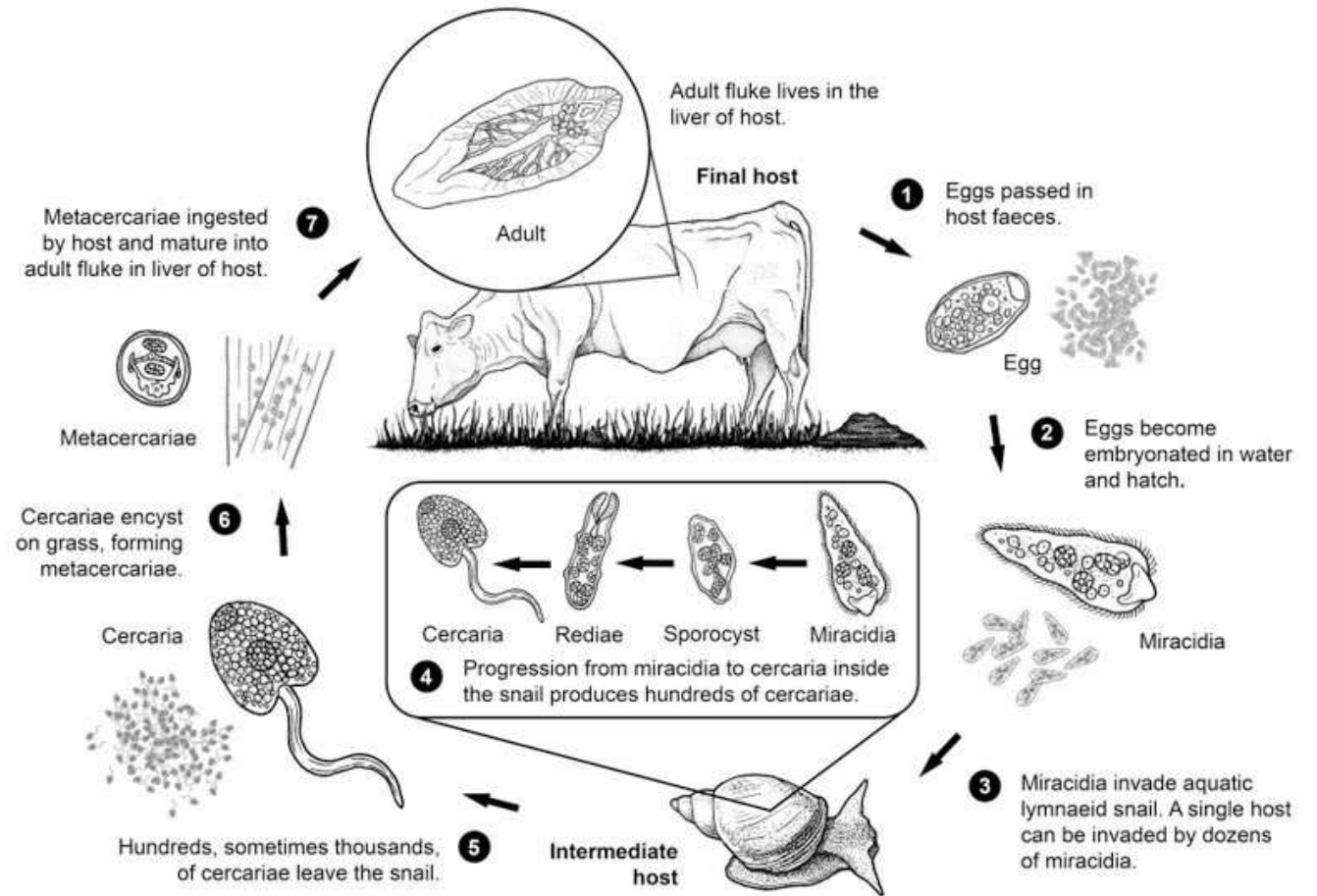
*Bottle jaw on a cow



*Fluke is not only a problem in cattle but also in small ruminants. Also other diseases can cause bottle jaw

11.4. The life cycle of fluke

1. Eggs are excreted in manure,
2. Eggs hatch to miracidia,
3. These are ingested by snails. In the snail they multiply to become cercariae,
4. These cercaria leave the snail and attach to grass leaves.
5. There they become metacercariae,
6. When the grass is eaten by the cow the metacercariae migrate to the gut wall to the liver,
7. In the liver they mature and start to produce eggs.



12. Prevention of fluke

12.1. Pasture management

- Cattle are most likely to be infected when grazing near to the living area with snail, the intermediate host for liver fluke.
- Snails feed on algae that can be found in wet, muddy areas around dams and water troughs, and other poached areas.
- They can also be found in swampy low-lying areas of land.
- So keep these areas as dry as possible or do not give cattle access to these areas.



*A foot pump is an excellent tool to keep the area around the dam dry.

12.2. New animals

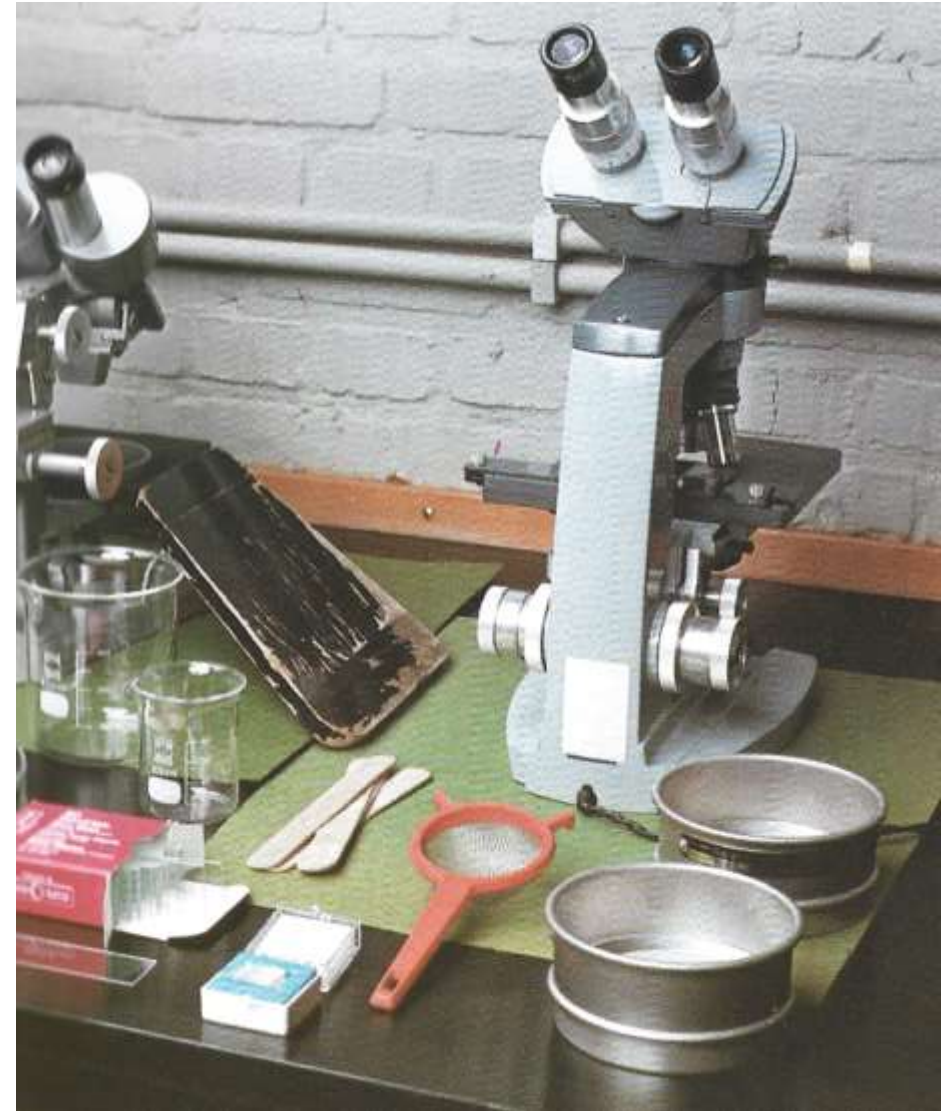
- Fluke control should be a part of any quarantine plan to reduce the risk of fluke being introduced to uninfected farms.
- Treatment may be required as part of a quarantine strategy to ensure that all stages of the fluke carried by an animal are effectively removed.
- Farmers should discuss this with their vet to determine the most appropriate approach for their farm.



*Biosecurity; Some birds will eat snails

13. Diagnosis of worm and fluke infection

- The symptoms are non-specific, so to be sure a manure sample has to be taken to see if worm and fluke eggs are present.



*Screening for eggs needs a good laboratory

13.1. Treatment of fluke infection.

- Most medicines used to kill round worms are also effective against fluke.
- Triclabendazole looks to be the flukicide of first choice
- There is one important exception, Avermectines (e.g. ivermectine) is not effective.



Active ingredient	Effectiveness in weeks after infection														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
triclabendazol (tribex)		90-95%		95-100%											
clorsulon (ivomec plus, virbamec F)									50-70%		80-90%		90-100%		
oxyclozanide (oxyfluke, distocur, rumenil)												80-90%		90-99%	