

KEEP LIVER FLUKE AT BAY



**KEEP
LIVER FLUKE
AT BAY**

Liver Fluke Disease of Livestock.

This disease costs farmers over €25 Million, yearly, with deaths and lost production, due to lowered weight gains, milk production and fertility. These very serious losses could be greatly reduced by proper attention to the problem.

The disease primarily affects cattle and sheep but also horses; deer, goats, pigs, dogs and humans are commonly affected. Wildlife, particularly rabbits and hares, act as reservoirs of disease.

The Cause

The cause of the disease is as the name indicates the liver fluke (*Fasciola hepatica*). This is a flat leaf like parasite that lives in the bile ducts of the liver. It measures about two to three centimetres long and one centimetre wide, being broader at the front and tapering to a point at the rear. These can be easily seen in the livers of animals with chronic fluke. Large numbers of flukes can be found in livers and they cause severe damage to this important organ, which is really the factory of the body.



Life cycle



- 1 Adult fluke in liver lays eggs
- 2 Eggs hatch out on grass
- 3 Tiny creature enters MUD SNAIL
- 4 Many tiny fluke emerge from snail
- 5 Young fluke eaten on grass

Life Cycle

The life cycle, or way this parasite multiplies is complicated, for it involves two distinct stages within two different hosts. The primary host is, as mentioned, a warm-blooded animal and the secondary one is a mud snail, (*Lymnea truncatula*). In the liver the adult fluke lays its eggs, which pass through the bile ducts to the animal's intestine and thence to the exterior. On the ground, given temperatures above 10°C, it hatches into a tiny larva, which then has to find a snail within 24 hours. It bores into the snail and once safely inside it continues its development, multiplying many times over inside the snail. One larva entering the snail can result in 600 or more leaving. Those leaving

are called cercariae and these cement themselves onto the herbage to be eaten by a grazing animal. These cercariae form a cyst around themselves, and now as metacercariae, they can survive ten months or more on the pastures. In wet conditions, the snails can also multiply rapidly, with one snail ending up as 100,000 or more in a few months. It can be seen therefore the dreadful potential of such a combination and except for the newly hatched larvae all other stages of the fluke and the snails can survive for long periods even in adverse conditions such as drought or cold. The snails too are resilient and survive droughts buried in mud. They are small, less than half a millimetre, and are usually the colour of the surrounding mud. They are plentiful in ditches, swampy areas and at the sides of streams and ponds. Snails cannot survive on well-drained land or land lacking in lime, as they need calcium for their shells.

The fluke larva (metacercarium) on being eaten by sheep or cattle penetrates the gut wall and then the liver capsule. It then makes its way through the liver substance, leaving haemorrhagic tracts and developing as it goes, to the bile ducts. This migration causes severe damage to the liver, particularly when large numbers of fluke are involved. It takes 10 to 12 weeks from time of ingestion to maturation of the flukes. Once mature they can lay as many as 20,000 eggs a day and live for a number of years.

Liver Fluke Disease (Fasciolosis)

The disease arises from animals picking up metacercariae from the pastures. Over wintering infection (or start-up infection), which, occur in spring, is due to metacercariae that, survive over winter and those arising from snails in which they sheltered over winter. The main source of infection is from eggs, surviving on the pastures and eggs from previously infected livestock. The disease manifests itself mainly in two forms acute and chronic.



Acute Fluke Disease

This form of the disease occurs mainly in sheep and particularly lambs, which develop little immunity to natural infection. The disease occurs, usually in late summer to winter and sheep can be found dead in the fields without outward signs of disease. It occurs due to the effects of large numbers, often thousands, of flukes passing through the liver substance. Those animals that do not die show anorexia, depression and are unwilling to move. They may also be anaemic. Post mortem, examination shows a swollen haemorrhagic liver sometimes ruptured. Flukes will be found in abundance throughout the liver. A slightly less severe or sub-acute form also is common in sheep, slightly less severe signs are evident, but if left untreated some animals die and there is loss of condition with serious production losses. Cattle can, under very heavy challenge suffer from acute fluke, particularly calves, but cattle are more resistant and chronic fluke is more usually the problem.

Chronic Fluke Disease

Chronic disease is very prevalent in Ireland especially in the western side of the country. Sheep, with long-term infections, show signs of anaemia, “Bottle-jaw”, brittle wool and low production and lambing levels. Livers harbour mature fluke, immature forms may or may not be present. The mature flukes are found in the bile ducts and eggs are also found. The liver is fibrotic, the bile ducts are thickened, and in the case of cattle with heavy long-standing infections, calcification of the bile ducts occurs. Chronic fluke has profound effects on production with greatly lowered weight gains and milk yields. High producing dairy cows are particularly at risk, even small numbers of fluke causing drops in milk yields of five percent. Big heavy cattle are the most resistant, which can be borne in mind when devising grazing strategies.

Diagnosis

Acute disease diagnosis is often dependent on knowledge of many factors, such as, time of year, status of fluke forecasts, and area where the problem occurs. Local knowledge is an important factor, type of husbandry, the farm terrain, previous history of the disease, the symptoms, some serological (blood) tests, liver function tests and ultimately post-mortem findings. Some or all of these may be required for an accurate diagnosis.

Chronic fluke is more easily diagnosed, through the history, symptoms, faecal examinations for the fluke eggs, arranged at very low cost by your veterinarian and reports on livers from meat factories.

As the effects of the disease are so costly it is important that diagnosis and advice on control and treatment are entrusted to your veterinary surgeon.

Control

It is important that control of liver fluke disease is not dependent on treatment regimens alone. Husbandry must be adjusted to at least aid control. This fact will be clear in the case of dairy cows, where treatment is permitted only when cows are dried off. Understanding the life cycle helps. It will be obvious that most vulnerable animals such as calves and sheep should not be grazed on heavy low-lying pastures or beside muddy ponds and streams. Where fields have such features or other boggy or swampy areas these should be fenced off, excluded from the grazing area, or used for other purposes. The driest and best-drained pastures should be retained for grazing of the most vulnerable stock.

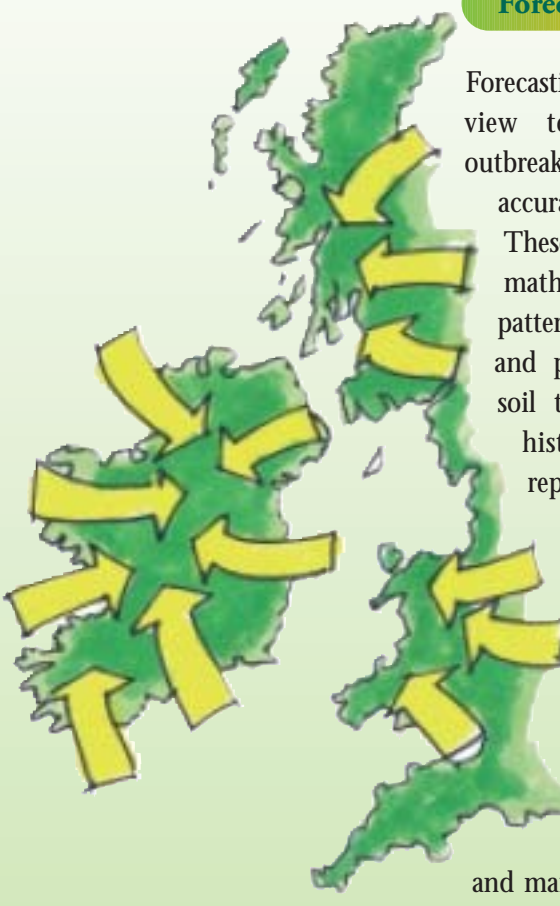
Drainage should be considered, if possible, on farms with an on going fluke problem. Planting of trees around the edges of swampy areas will have a long-term drying affect, and they will be, in themselves, valuable.

The fact that the liver fluke requires two hosts is its strength and its weakness. It gives an opportunity to attack the parasite in the primary and secondary host or its habitat.

Moluscicides (snail killers) have been used as adjuncts to control. Frescon, a useful moluscicide, is no longer available but in controlled situations, copper sulphate is an effective one, but must be used with concern for animal toxicity and the environment.

In areas where liver fluke is an on going problem, farmers should regularly monitor the situation. They should have faecal testing carried out on a number of their animals, by their veterinarian, in the spring, summer and autumn. They should arrange to get reports on the fluke status of livers of animals sent for slaughter and in areas of high prevalence; blood samples should be regularly tested. It is also important that they pay attention to and heed the advice given in the form of national forecasts of disease prevalence and incidence.

Forecasts



Forecasting of disease prevalence with a view to taking precautions against outbreaks has become sophisticated and accurate, in the case of many diseases. These forecasts are usually based on mathematical models of the disease patterns and are linked with preceding and prevailing conditions of weather, soil type, terrain, and recent disease history, including post-mortem reports.

Such forecasts are and have been available for fluke for some time and in this case have proved to be most useful, with a high degree of accuracy and reliability. Using the above parameters, scientists from the universities and main research centres issue a forecast

each autumn as to the expected incidence, with advice on action and treatment. These forecasts are updated as necessary. They are widely propagated through the national and farming media and will be available on relevant web sites. Farmers should pay special attention to these particular forecasts and advice.

Treatment

A control programme has to include anthelmintic treatment. This should ensure the highest efficacy of each treatment, the fewest treatments consistent with success and a rotational use of anthelmintics to limit the pressure for resistance. Even with the best husbandry, treatment will be necessary for this disease; especially in areas of high prevalence; indeed in some areas in Ireland it would be impossible to keep sheep, without frequent treatment for liver fluke. In parts of the west of Ireland unfortunately out wintered sheep require treatment every four to six weeks from autumn to spring, in some years. In areas of less extreme disease intensity treatment is less frequent. In all areas of fluke prevalence, autumn treatment of sheep and cattle is necessary, cattle being dosed after housing. The timing of this post housing treatment should be influenced by the sphere of activity of the product to ensure that all fluke ingested before housing are killed. It must be stressed that the treatment of these autumn treated animals, again at turn out, is a complete waste of money and effort. Out wintered sheep will require at least one other winter treatment. A spring treatment is a most useful one and is strongly recommended, for it cuts down the number of pasture larvae available for entry in to snails and so the autumn/winter levels of metacercariae. This strategic spring treatment has been found to be successful in lowering the incidence at farm level. All animals that are bought in, especially if of immediately unknown geographic origin, should receive a flukeicide, which kills immature and mature, flukes. If fluke is found in the area then all dairy cows should be treated at drying off and if at all possible they should never be grazed on flukey pastures.

Anthelmintics: Prior to the advent of modern anthelmintics in the sixties, the husbandry of sheep and the control of liver fluke disease in some areas of Ireland was extremely difficult. Those products which were available, such as carbon tetrachloride had minimum efficacy and were relatively toxic. There are now safe effective drugs available for cattle and sheep. The two main groups of effective products are the salicylanides and substituted phenols and the benzimidazoles (some only).

It is important to choose the correct drug for the particular problem. For chronic fluke, any of the above products will kill the mature flukes in the bile ducts. Where an on going control programme is in place or sub acute disease is present products such as triclabendazole, closantel, nitroxylnil or rafoxanide are effective as they all remove mature and late immature fluke, but if acute fluke is a problem triclabendazole which kills fluke from under one week post infection onward gives the best control. Closantel has up to 73% effectiveness against flukes 3-4 weeks post infection is highly effective against the later stages and has persistent activity for a number of weeks.

Whatever product is chosen it is important that it is used correctly. The weight of animals is frequently under estimated, dosing equipment is often faulty or miscalibrated. This leads to under dosing which always gives poor results and puts pressure for drug resistance

Anthelmintic Resistance

When treatments are repeated frequently there is a high risk of anthelmintic resistance developing and as so few groups of drugs are available, it is important to protect them. This resistance means that the product no longer works and when multiple resistance develops it then means that the disease can no longer be controlled. This of course would be a very serious situation. Yearly rotation helps to prevent resistance developing. This form of rotation means using the same product for a complete year then changing to another. No changes should be made for particular doses during that year. It must be remembered that yearly changing of products within a group is of no value in a rotational programme. Of course, if inefficacy is suspected then changes must be made and the cause investigated.

Reports of lack of efficacy by triclabendazole in the north west of the country have caused concern. Apart from the resistance found in a few areas to triclabendazole, in cases where there is severe damage, the liver may be unable to metabolise triclabendazole to the active compound to kill fluke. This also causes inefficacy problems. Therefore, it is always important to distinguish between the two situations.

It is most important that every effort is made to prevent further spread of resistance.

Future

At present, control depends on use of anthelmintics and husbandry. It is hoped that breeding of more resistant stock may help. The development of vaccines would be of great benefit. Immune responses have been produced in cattle but these have not always been protective. A considerable amount of work is being done in pursuit of this goal, with expectations of success.

Useful Points

- Fluke kills and costs dearly, so control it.
- Drain or fence off flukey areas.
- Keep young and vulnerable stock off any suspect pastures.
- Check out faeces and blood regularly and livers from the factory.
- Treat after housing.
- Treat bought-ins.
- **Treat cows at drying off.**
- Rotate fukecides to avoid resistance.
- Accurate forecasts of disease prevalence are issued, make use of them.
- Give strategic spring treatment each year.

Compiled by

**Dr. Dermot O'Brien,
Senior Veterinary Research Officer,
Veterinary Laboratory,
Department of Agriculture & Food,
Abbotstown,
Castleknock,
Dublin 15**

**Gerry Scully
Chief Sheep Advisor,
Teagasc,
Athenry,
Co. Galway.**



Department of Agriculture and Food
An Roinn Talmhaíochta agus Bia

September 2002