Effective liver-fluke control

As liver fluke continues to be a threat to livestock farmers across the country, Matthew Colston, ruminant technical consultant veterinary surgeon, Elanco Animal Health, outlines a four-pronged approach to effective control

Despite having effective treatments at our disposal, liver fluke is often not well-managed, leading to significant productivity losses, clinical disease and deaths in severely affected animals.

One of the main reasons behind this, is that the change in weather patterns over the last decade has affected the liver-fluke lifecycle, allowing both the level and timings of fluke challenge to become much more variable.

A quick review of the lifecycle shows how this can be affected by weather patterns, and how this, in turn, can affect the timing and level of challenge to grazing animals. It can also highlight where control measures can be implemented to break that cycle.

AN OVERVIEW OF THE LIVER-FLUKE LIFECYCLE

Adult liver fluke in grazing animals can lay many thousands of eggs per day. These can survive for many months (over winter) and start to develop when the soil temperature reaches 10°C. As temperatures increase through the spring, the rate of development increases, so that most eggs that have accumulated over the winter will hatch in May/June.

The larval stage that hatches from the egg (the miracidium) needs a water film to swim through to find the intermediate snail host, and only has a matter of hours to do this before it runs out of energy. The snail host (*Galba truncatula*), also starts developing when temperatures exceed 10°C, and the snail population increases rapidly when conditions are favourable.

Warm, wet conditions in late spring and early summer will therefore make it much more likely that more fluke eggs will hatch and find snails and carry on the lifecycle to the next stage.

Development and multiplication then takes place within the snail. This is again dependent on temperature and humidity, but, on average, will take around eight weeks.

For every miracidium that finds a snail, several hundred of

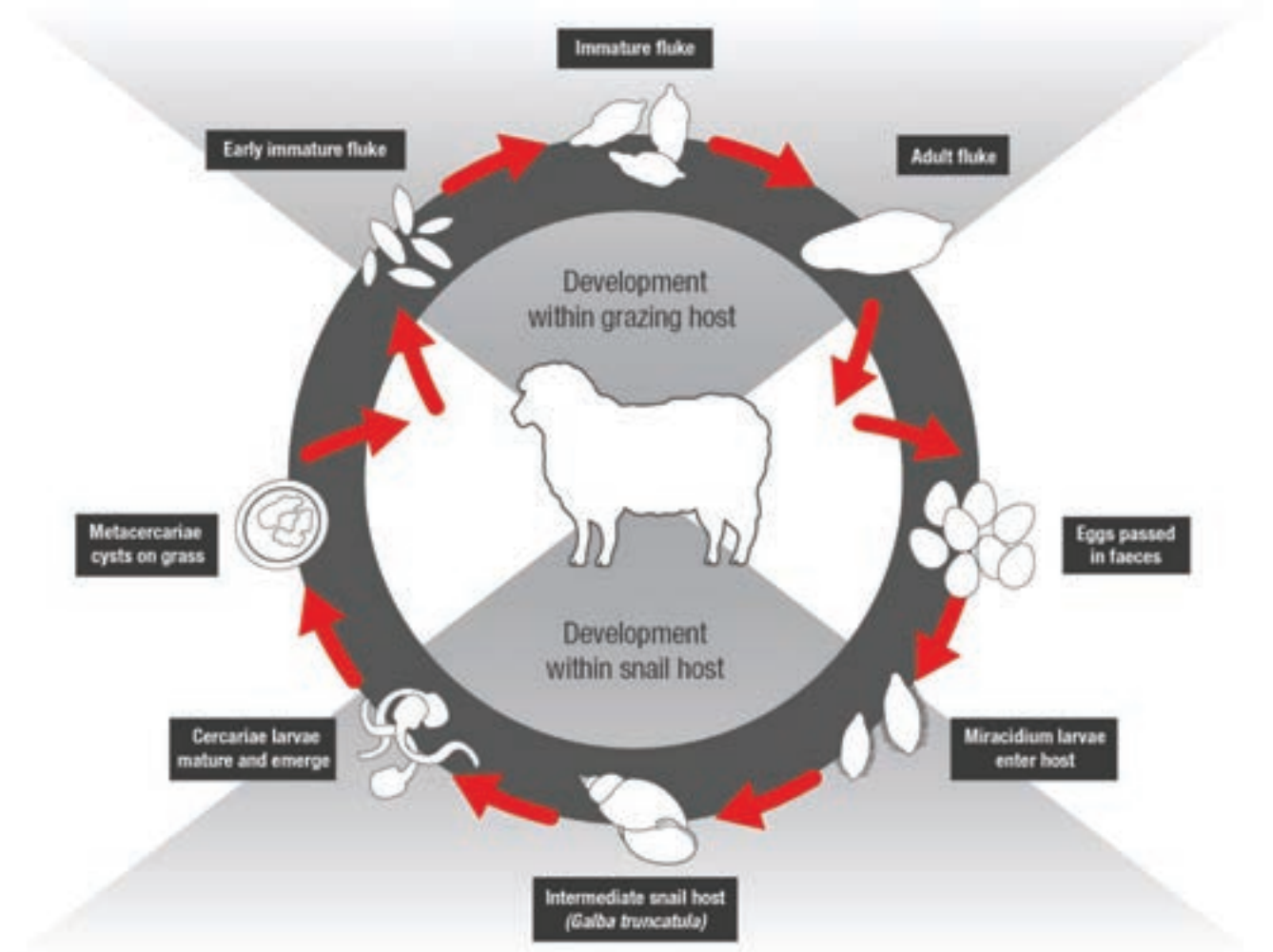

Figure 1: Lifecycle of liver fluke.

the next stage (cercaria) can be released from the snail. These also require a water film to swim up onto forage, where they form a tough cyst (metacercaria) which is the infective stage for grazing animals. In an average year, if snails are infected in June, there will be no risk to grazing stock until metacercariae are present on pasture eight weeks later (August). Cold or dry conditions through the summer slow the development within the snail, so that in some years, this may take 12 weeks or more, moving the start of the risk period later into the autumn. Snails continue to shed cercariae until temperatures drop below 10°C and they hibernate or die. The more snails that are infected in early summer, and the longer they continue to shed cercariae in the autumn, the greater the number of infective metacercariae on pasture. Peak levels of infection were traditionally seen in October, but in recent years, this has happened much later (December/January) due to a combination of cool summers and mild autumn weather.
Once eaten, the metacercaria hatches in the intestine. The tiny fluke penetrates the gut wall and heads straight for the liver, where it eats its' way through the liver substance to the bile ducts, developing through early immature and immature stages to adult in eight to 10 weeks. The degree of damage that occurs depends entirely on the number of fluke hitting the liver at the same time. Large numbers lead to acute disease and sudden death.

FOUR-PRONGED APPROACH TO EFFECTIVE CONTROL

To maintain effective fluke control, the lifecycle should be attacked in all four quadrants:

- Targeted treatment to remove any adult liver fluke still in grazing animals in late spring/early summer. This is aimed at minimising the number of fluke eggs reaching pasture to start the lifecycle for the coming season.
- Minimising fluke habitats by maintaining drainage and avoiding poaching around gateways and feed/water troughs will reduce the number of snails available to carry the liver-fluke lifecycle to the next stage.
- Grazing management to limit exposure to infective metacercariae – if you know where the snails are you know where the metacercariae will be. Monitoring antibody levels in first grazing-season animals will let you know when they arrive.
- Targeted treatments for the right animals at the right time (with the right active for the stages of fluke most likely to be present in the animals at the time of treatment) to prevent deaths, disease and productivity losses. The aim would always be to use two or three different actives during the season to reduce the risk of developing resistance to any one active.

ACTIVES AVAILABLE TO COMBAT EARLY FLUKE ONSET

There are a limited number of flukicide actives available for use in sheep and cattle, and each has a different spectrum of activity against the different stages of liver fluke within the animal. Fasinex contains triclabendazole, which is the only active effective against early immature fluke, and is therefore the treatment of choice when the fluke challenge is highest (usually late autumn and early winter).
Mid-season (usually late winter and early spring), as new infections are declining, relatively few early immature fluke will be present, so moving to an active that kills immature and adult fluke (eg. Closantel, a familiar brand would be Flukiver) will be an effective treatment.
Late season (usually late spring and early summer), the majority of fluke present within the animals will have reached adult stage, and switching again to an active to target adult fluke (oxyclozanide, albendazole or clorsulon in cattle) will remove these remaining adults, and prevent any further egg output, without risking overuse of the actives essential to control earlier stages of liver fluke.
None of these actives have any persistent activity, so, establishing when the fluke challenge starts (and this will differ from farm to farm and year to year as discussed earlier) will avoid any wasted treatments, and allow actives to be switched as the season progresses. Using first-grazing season animals as sentinels, and monitoring fluke-antibody levels will give the earliest indication that metacercaria are present on pasture. Monitoring faecal coproantigen and fluke-egg levels allows the level of challenge to be assessed, and shows when adult fluke are present, allowing treatments to be effectively targeted (animals treated when they need it, but no treatments wasted).
Knowing the level of challenge is also useful when considering housing treatments for cattle. If high burdens are expected, removing as many fluke as possible (ie. kill down to early immature fluke), as soon as possible after housing, would be necessary to avoid any growth checks. When a lower challenge is expected, it may be acceptable to delay treatment for eight weeks or so, to allow the fluke to develop to a point where they can be removed by actives other than triclabendazole.
Regardless of treatment on the way into the house, cattle should be checked before turnout and treated with an adulticide to remove any fluke that may have survived, to minimise pasture contamination with fluke eggs in the spring.