

PRACTICE:

Parasite Control Year Planner

Cattle



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NADIS
Animal Health Skills

KEY POINTS FOR EFFECTIVE PARASITE CONTROL

Anthelmintics (wormers):

Anthelmintics to treat PGE (gut worms) – there are currently 3 groups of wormers (please see tables at end):

- Group 1-BZ (Benzimidazoles)
- Group 2-LV (Levamisole)
- Group 3-ML (Macrocyclic Lactones)

Reports of resistance in cattle nematodes in the UK are still uncommon although lack of efficacy of Group 3-ML products against Cooperia oncophora may be identified by post-treatment wormer testing.



Lungworm disease is typically seen in youngstock from July onwards

Anthelmintics to treat fluke – There are 6 main compounds:

- Triclabendazole (TCBZ) (treats all stages including immature fluke although activity varies depending on method of application).
- Closantel (effective against adult fluke and immature stages from around 7 weeks’ post-infection).
- Nitroxylin (effective against adult fluke and immature stages from around 7 weeks’ post-infection).
- Oxyclazanide (effective against adult fluke, recommended for use in late winter/spring).
- Clorsulon (effective against adult fluke, recommended for use in late winter/spring).
- Albendazole (effective against adult fluke at increased dose rate, recommended for use in late winter/spring).

Triclabendazole (TCBZ) is highly effective against all stages of immature fluke in cattle from >2weeks when given orally (>8 weeks by pour-on). Since acute fluke is rare in cattle its use should primarily be for the control of acute fluke in sheep and only use TCBZ products in cattle when no other option is suitable.

Combination fluke and worm products should only be used when necessary, as they can lead to off target selection for resistance.

Bio-security:

There are national regulations for quarantine of imported cattle from outside the UK including treatments for parasites such as warble flies (*Hypoderma* spp.), which have been eradicated from the UK.

PGE (gut worms):

- Unlike the situation with sheep, there are no specific recommendations for quarantine treatments for PGE as resistance is still uncommon.
- Where 3-ML resistance is suspected then treat bought-in stock with either levamisole (2-LV) or a benzimidazole (1-BZ).

Lungworm:

- On farms where lungworm is not endemic, or has not previously been encountered then treat all incoming cattle from high-risk farms.
- Resistance has not been reported and all products containing one of the broad-spectrum wormers are effective.

Fluke:

- Resistance to triclabendazole (TCBZ) appears to be an increasing problem and one that needs managing on all livestock farms.
- Assume that brought-in animals are infected with TCBZ resistant liver fluke.
- Keep newly arrived cattle (and sheep) inside, yarded or on snail free pastures and away from other livestock for at least 4 weeks until quarantine treatments have been completed, and the animals have been tested with results showing they are free of infection.
- Treatments should be risk-based depending on time of year and origin of purchased livestock.
- If housed, then treatment with a flukicide, alternative to TCBZ, can be delayed until the fluke are sufficiently mature to be killed, taking into account product variations in activity against immature fluke.
- If cattle are treated immediately upon housing they may need a second treatment to kill off any fluke that were too young to be killed by the first treatment.

Strategic Dosing

- Strategic dosing usually applies to first year grazing calves, although both youngstock in their second grazing season and adult cattle, especially where lungworm and fluke are involved, may also be dosed strategically.



Unless they are on safe grazing, dairy calves and suckled calves born during the previous autumn require preventive treatment in their first full grazing season to control ostertagiosis in the autumn

- Calves grazing contaminated pastures can be wormed at, or around turnout to limit acquired worm burdens and control pasture contamination.
- Thereafter, the aim is to minimise pasture contamination by further strategic treatments, up to mid-July, by which time any over-wintering larvae should have declined to insignificant levels.
- Strategic treatments of either pour-on or injectable MLs are given at defined intervals, as recommended by the manufacturers.
- Alternatively, calves can be dosed with either a pulse or continuous release bolus at turnout (Group 1-BZ).
- Treated calves should remain set-stocked, or moved to safe pastures (aftermaths) when these become available.

Targeted Dosing

- Calves remaining on infective pasture that have not been dosed strategically, will normally be at high-risk of PGE from July to housing.
- The options are to monitor closely and treat as soon as clinical signs appear, or to target treatments by dosing based on monitored lowered liveweight gains or high Faecal egg counts (FECs).
- PGE – worm if mean FEC >200epg based on 10-15 samples.
- Fluke – treat if positive for fluke eggs.



Emaciated spring-calving beef cow with chronic fluke

Resistance:

- Reduced sensitivity and/or incomplete efficacy has been reported in *Cooperia* spp. to Group 3-ML and *Fasciola hepatica* to triclabendazole (TCBZ).
- *Cooperia* spp. are one of the dose-limiting species for several 3-ML actives and at the recommended dosage, efficacy can be ≤95% especially where any under-dosing occurs.
- If lack of efficacy against *Cooperia* spp. is observed, then treatment with either a 2-LV or 1-BZ can be considered.
- You can check for possible resistance by taking faecal egg count (FEC) samples from 15 animals.
- Treat with your usual wormer then repeat FECs post worming: 7 days for 2-LV wormers; 14 days for 1-BZ and 3-ML wormers.
- Resistance is suspected if mean FECs have reduced by less than 95%.

Fluke resistance:

- TCBZ-resistance has predominantly been reported in fluke populations in sheep, but it is important to remember that the same parasite affects both cattle and sheep.
- Other flukicides should be used wherever possible. These include clorsulon, oxyclazanide and albendazole which are effective against adult flukes; and nitroxylin and closantel, which are effective against adult and late immature stages.
- Fluke resistance tests used in sheep have yet to be validated in cattle.

Use the correct product

Wormers should always be administered following the COWS 5 R’s principles –

- Right Product
- Right Animal
- Right Time
- Right Dose
- Given in the Right way

– See the COWS website at www.cattleparasites.org.uk.

Accurate Dosage

Under dosage is a common contributory factor to anthelmintic resistance – so don’t guess.

- Weigh animals individually using scales or a weigh band and dose accordingly. For groups of well-matched cattle weigh some animals and then treat the group based on the heaviest in the group.
- Store wormers securely and away from direct sunlight, according to the manufacturer’s instructions and always check the ‘use by’ date.
- Dose according to manufacturer’s recommendation and use application equipment that is compatible with the formulated product.
- Calibrate dosing equipment regularly to ensure delivery of the correct dose.

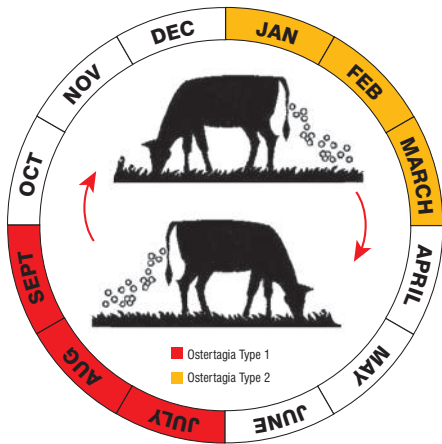


Correct drenching technique for cows, use of scoop makes drenching fractious animals easier and safer

PGE (gut worms)

1st Grazing Season

- Cattle can be infected with several species of roundworms, with *Ostertagia ostertagi* the main parasite associated with disease, and *Cooperia* spp. the most commonly encountered in young cattle in their first grazing season.
- These species of worms are ubiquitous and can be found on all cattle farms where animals have access to pasture, even when grazing for only short periods.
- Other parasites such as *Nematodirus helvetianus* and *Haemonchus contortus* are reported sporadically.
- Worm infections in youngstock can reduce growth rate by around 30% (even with a low level of worm challenge) affecting growth targets for both beef calves and replacement heifers.
- Sustainable control of PGE in growing cattle is best achieved by annual rotational grazing (cattle/sheep/crops) but this is not possible on most farms.
- To control ostertagiosis in a grazing season, dairy calves and suckled calves born during the previous autumn will require preventative treatment in their first full grazing season unless they are on safe grazing.



- For calves on permanent pasture, the Control of Worms Sustainably (COWS) group recommend targeted anthelmintic treatment based upon either poor live weight gain or on high faecal worm egg counts.
- When preventative worming strategies are used (pulse/continuous release bolus, repeated or long-acting anthelmintic injections), pasture egg contamination can be suppressed until at least mid-July (if cattle are set stocked). Most overwintered and spring pasture larvae will have died off by that time and the pasture should remain safe for the rest of the season. Alternatively, calves can be dosed and moved to aftermath in mid-summer.
- Preventative strategies only work when cattle are set-stocked; movement of these cattle onto contaminated pasture later in the season risks disease.
- Preventative strategies based on products with prolonged persistence against *Ostertagia ostertagi* may allow the build-up of pasture populations of other worm species against which they have poorer efficacy or little persistent effect, for example *Cooperia* species, which may cause problems later in the year.

- Spring born calves may benefit from turnout directly onto silage or hay aftermaths thus avoiding the build-up of pasture populations of worms.
- Incidents of clinical PGE occur from mid-July onwards peaking during August/September.
- There is acute onset profuse diarrhoea that quickly affects most cattle in the group.
- Affected cattle rapidly lose weight and body condition.
- Immediate treatment of all cattle in the group is important when first signs of acute profuse diarrhoea appear.



Parasitic gastroenteritis affecting a growing dairy heifer grazing contaminated pasture during its first summer at grass

- During the risk period, not obviously clinically affected groups of calves should be given targeted anthelmintic treatment based upon either sub optimal live weight gain or faecal worm egg counts >200 epg.

Youngstock – 2nd Grazing Season:

- The immune status (resistance to worms) of youngstock in their second grazing year will depend on the exposure to worms in their first grazing season. Cattle that have had little exposure may still be parasite-naïve and susceptible to worm infection, so the worm control programme will depend on the immune status of the animal – consult your vet. Depending on the immune status, worm control can either be targeted or strategic.
- Targeted Worm Control: If youngstock have been exposed to worms in their first grazing year so that resistance is strong, targeted worming can be used to control worms i.e. worm when FEC over 200epg or sub optimal weight gains.
- Strategic: For animals that are parasite naïve and susceptible to worm infection there are no specific manufacturers recommendations for strategic dosing. Pulsed bolus (oxfendazole) or long acting ML treatments can be used – consult your vet.

Dairy Cows

- Dairy cows can be infected with gastrointestinal nematodes and may show production responses to anthelmintic treatment.
- Studies with eprinomectin have shown milk yield responses of around 1kg/day following treatment during lactation and improved fertility when treatment was given at calving.
- Heifers show a particularly marked treatment response, which possibly reflects their relative immaturity and greater susceptibility to gastrointestinal nematodes.

- Anthelmintic treatments in adult milking cows should only be targeted at those herds with a high worm challenge and reduced productivity.
- Production losses have been shown to be down to low levels of GI infection, which may not be detected using faecal egg counts (FECs), so bulk milk tank ELISA for ostertagiosis can be used as a guide to identify those dairy herds with a potential to increase milk yield in response to anthelmintic treatment.
- A positive treatment response can occur with optical density reading (ODR) values greater than the cut-off point of 0.5.
- However, more reliable responses in milk yield generally occur in herds with an ODR value of 0.8 or more.

Housing (1st and 2nd Grazing season)

- *Ostertagia* larvae ingested by susceptible stock during the autumn may have inhibited development and over-winter (as early L4) in the abomasal (stomach) wall.
- These arrested larvae resume their development in late winter/spring and can cause outbreaks of acute scour with subsequent death (type 2 ostertagiosis).
- Susceptible animals exposed to contaminated pastures during the latter part of the grazing season will be at risk from type 2 ostertagiosis unless they have been dosed with an anthelmintic effective against inhibited larvae at housing.
- Growing cattle housed after their first or second season at pasture should be treated with either a Group 1 or Group 3 anthelmintic at housing, which is effective against inhibited larvae.
- Pour-on Group 3 preparations have the added advantage they are also effective against both sucking and chewing lice.
- Autumn-born beef calves should not require anthelmintic treatment at housing.

Lungworm:

- Plan lungworm prevention with your vet.
- Lungworm disease is typically seen in grazing cattle and is caused by *Dictyocaulus viviparus*.



Early clinical signs of lungworm in a naïve beef cow – the source of lungworm was purchased store cattle which had not received any quarantine treatments

- It has been increasingly reported in first-year grazing animals in summer or early autumn and over the past few years more in older animals, including adult cattle that have not built up immunity through natural challenge in previous grazing seasons.

- In areas of the country where lungworm is endemic, COWS recommend vaccination of first year grazers prior to turnout.
- Vaccination of cattle over two months old against lungworm requires two doses four weeks apart with the second dose at least two weeks before turnout.
- Cattle with a history of respiratory disease should not be vaccinated against lungworm.
- All available anthelmintics are highly effective against adult worms and lungworm larvae.
- Preventative worming strategies recommended for PGE worm control (see above) will also help control lungworm outbreaks.
- Lungworm disease appears from June onwards, often peaking in July – September affecting:
 - Unvaccinated calves
 - Cattle without an effective anthelmintic programme
 - Non-immune youngstock and adults (either unvaccinated or lacking previous lungworm exposure)
- Early signs of lungworm include coughing, initially after exercise then at rest, and an increased respiratory rate.
- Affected cattle rapidly lose weight, body condition and in severe cases die.
- Affected cattle should be treated as soon as possible as severely affected animals may either not respond, or signs may be exacerbated as dead or dying larvae block the bronchioles and alveoli.
- Left untreated, if the animal survives, recovery will be prolonged with a marked decrease in body condition causing considerable financial loss and animal welfare concerns.



Large numbers of lungworm in the airways causing death of this steer

- Lungworm outbreaks decrease significantly from November onwards. Coughing in unvaccinated susceptible cattle at pasture, before housing or in undosed stock after housing, should be investigated for the possibility of lungworm larvae in faecal samples.
- Detection of larvae in faeces can be readily undertaken by your veterinary practice, but note that clinical signs of lungworm may be present before the infestation becomes patent.

Liver Fluke (Fasciola hepatica)
(See NADIS fluke Forecast) www.nadis.org.uk

- Fluke control in cattle requires both management and flukicide treatment options, which will depend on prevailing weather conditions, individual farm circumstances and varies year to year so consult your vet.
- Treatment programmes should aim to both prevent disease and reduce pasture contamination with fluke eggs.
- Evasion strategies should also be adopted wherever possible, by not grazing overwintered cattle on potentially contaminated, poorly-drained areas.
- Where flukicide treatment is necessary, cattle should be treated and moved from these pastures on to fluke-free pastures as soon as possible.

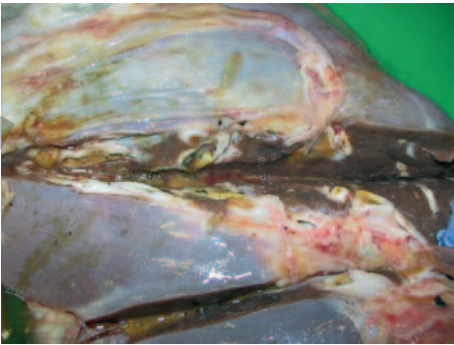


In severe chronic infestations, dairy cows lose excessive weight and have chronic diarrhoea

- Identification of fluke eggs in faeces, coproantigen ELISA, serum or bulk milk ELISA testing and slaughterhouse liver reports are all practical methods of detecting fluke-infected herds. A bulk milk tank ELISA test is an effective way to monitor herd exposure to fluke and efficacy of control programmes.
- Cattle with chronic liver fluke typically show signs of chronic weight loss and diarrhoea.
- More than 25% of bovine livers are condemned because of liver fluke damage; positive results from the slaughterhouse should be discussed with your veterinary surgeon.
- Fluke infestation increases the time taken to reach slaughter weight by several weeks.
- Untreated beef cattle grazing potentially infected pastures, should either be treated or checked for the presence of fluke eggs in faeces.
- Cattle exposed to liver fluke infection should be dosed either at or after housing.
- Dosing at housing will immediately remove the impact of developing and adult flukes on growth and feed efficiency. However where this approach is practised, cattle should be tested later in the housing period for the presence of adult fluke, or given a second treatment to ensure all fluke are removed. The interval between housing and testing or re-treatment will depend on the product used.
- If dosed 6-7 weeks after housing, cattle may be dosed with closantel or nitroxylin or a benzimidazole such as albendazole (when housed for 12 weeks or more), thereby avoiding the use of triclabendazole and reducing the selection pressure for resistance.
- Overwintered cattle considered at risk should be dosed for fluke with a product with activity against immature fluke. Whilst triclabendazole is the most effective against early immature fluke, because acute fluke is rare in cattle, consideration can also be given to using either closantel or nitroxylin later.
- Treatment of milking cattle must be carefully considered. Very few products can be used in dairy cattle, and veterinary advice should be sought for treatments at drying off and only considered if there is evidence of fluke infection in the herd.

| Active | Route | Adult | Immatures Late | Immatures Early | Milk Withdrawal |
|-----------------|---------------|-------|----------------|-----------------|--|
| Triclabendazole | Oral | + | + | >2wks | Not authorised for use in cattle producing milk for human consumption, including during the dry period and in calf heifers (refer to manufacturer's recommendations)** (see below) |
| | Pour-on | + | | | |
| Closantel | S/c injection | + | + | | |
| | Pour-on | + | | | |
| Nitroxylin | S/c injection | + | + | + | |
| Clorsulon | S/c injection | + | | | Do not use in cattle producing milk for human consumption and in non-lactating dairy cows including pregnant heifers within 60 days of calving. |
| Oxyclozanide | Oral | + | | | 72 hrs (except levamisole combination product) |
| Albendazole | Oral | + | | | 60 hrs |

**Only two triclabendazole products (Endofluka and FasineX 240) are licensed for use in milking cattle during the dry period, but not within 41 or 48 days respectively of calving and milk for human consumption may only be taken from 48 hours after calving. If a cow calves earlier than the specified days after treatment, milk for human consumption may only be taken from the specified number of days plus 48 hours after the last treatment is administered. Check product literature for more specific details.



This bovine liver at the slaughterhouse shows extensive liver fluke damage and represents considerable financial loss to the farmer

Rumen Fluke (paramphistomes)

- Eimeria zuerni, E. bovis and E. alabamensis are most common and pathogenic.
- Rumen fluke have been found increasingly in British and Irish cattle and sheep over the past 10 years.
- Rumen fluke are normally only diagnosed through the presence of rumen fluke eggs in faecal samples, or immature and adult fluke in the intestine or rumen respectively, at post-mortem.
- Adult rumen flukes are not associated with clinical disease. Where disease has been reported, it has usually involved large numbers of immature rumen fluke in the duodenum, resulting in severe enteritis characterised by ill-thrift and profuse diarrhoea and in severe cases, death in both cattle and sheep.
- Only oxyclozanide, has reported activity against adult and immature rumen fluke, although none of the commercial products containing oxyclozanide, either on its own or in combination with levamisole, have a specific label claim for rumen fluke.

Coccidiosis

- Eimeria zuerni, E. bovis and E. alabamensis are most common and pathogenic.
- Bovine coccidiosis is primarily a disease of young animals, normally occurring in calves between 3 weeks and 6 months of age but has been reported in cattle aged one year or more.

- High stocking densities and intensive husbandry systems with overcrowding in unhygienic buildings lead to a build-up of infective oocysts and disease outbreaks.
- Stress factors, such as a poor milk supply, weaning, cold weather and transport will reduce any acquired resistance and exacerbate the condition.
- Year-round calving can present problems with constant use of calf pens with successive batches of young calves added to pens or buildings already housing older calves.
- Coccidiosis is common in spring when young calves are born and turned out onto permanent pastures close to the farm buildings. Inclement weather may cause stress; lowering immunity and precipitating disease.
- Cold winters allow survival of overwintering oocysts in large enough numbers to represent sufficient disease challenge at turnout in spring.
- Mild wet springs aid sporulation leading to accumulation of large numbers of infective oocysts.
- Autumn born calves reared indoors may be born into an already heavily contaminated environment.
- E. alabamensis has been reported to cause enteritis in first-season grazing calves in the first week following turnout in some parts of the country.
- Anticoccidial treatment can be administered as a preventative to control possible disease outbreaks.
- In spring-born dairy herds, weaned, bucket-fed calves may experience high oocyst challenge soon after birth and show signs of disease at 3 - 4 weeks of age.



Early weight loss in beef calves with diarrhoea caused by coccidiosis

- Autumn born dairy calves may show signs of coccidiosis at 3-4 weeks of age in the autumn or experience disease in the spring if they are turned out onto oocyst contaminated pasture.
- Preventative treatments with either diclazuril or toltrazuril should begin 1 week before the expected appearance of clinical signs.
- Alternatively, decoquinate may be administered as a creep feed for 28 days.
- In spring calving beef cattle, coccidiosis is usually seen in older animals, particularly after the stress of weaning in the autumn.

| Active | Cocci | Crypto | Babesia | Route | Dose Rate | Product | Company |
|--------------|-------|--------|---------|---------------|---------------------|-----------------------|----------------------|
| Diclazuril | ✓ | | | Oral Drench | 1ml/2.5kg | Vecoxan 2.5mg/ml oral | Elanco Animal Health |
| Toltrazuril | ✓ | | | | 3ml/10kg | Baycox 50mg/ml oral | Bayer Animal Health |
| | | | | | | Cevazuril 50mg/ml | Ceva Animal Health |
| | | | | | | Toltranil 50mg/ml | Virbac |
| | | | | | | Tolracol 50mg/ml | Krka |
| Decoquinate | ✓ | | | In feed | 0.5-1mg/kg daily* | Deccox 6% premix | Zoetis |
| Halofuginone | | ✓ | | Oral Drench | 2ml/10kg for 7 days | Halocur 0.5mg/ml oral | MSD Animal Health |
| Imidocarb | | | ✓ | S/C injection | 1ml-2.5ml/100kg | Imizol 85mg/ml** | MSD Animal Health |

* 0.5mg/kg for treatment or 1mg/kg for prevention (1.67kg or 833gm/tonne of feed)
**Need to inform Divisional Veterinary Manager of use. Higher dose rate for prevention.

- Calves left to suckle with their dam until the following year rarely experience coccidiosis.
- Preventative treatment should usually be given 2 weeks post-weaning or following a period of stress.

Cryptosporidiosis (Cryptosporidium parvum)

- Cryptosporidium infections are very common in young calves characterised by anorexia and diarrhoea, often intermittent, which may result in poor growth rates.
- Infection appears to be age related with seasonal peaks of disease reported to coincide with birth peaks in spring and autumn.
- The first calves to be born often become infected without showing clinical signs but become sources of infection for calves that follow.
- Infection spreads rapidly, and later-born calves can become so heavily infected that clinical disease results.
- There is no known treatment and the infection is difficult to control since the oocysts are highly resistant to most disinfectants.
- Symptomatic treatment may be given in the form of anti-diarrhoeals and fluid replacement therapy.
- Halofuginone administered over 7 days, starting either in the first 24-48 hours of age, or within 24 hours of the onset of diarrhoea, may be used for the prevention of diarrhoea in calves on farms with a history of cryptosporidiosis or diagnosed infection.

Babesiosis

- Babesiosis or “redwater” fever is caused by the piroplasm Babesia divergens.
- Acute disease is characterised by fever and haemoglobinuria (‘redwater’).
- The mucous membranes become jaundiced, the heart and respiratory rates are increased, the heart beat is usually very audible, and if left untreated death may occur.
- Diagnosis can be confirmed by the examination of blood films, stained with Giemsa, which will reveal the characteristic parasites in the red blood cells.
- Babesiosis is transmitted by the sheep tick, Ixodes ricinus, with occasional cases of clinical disease occurring in parts of Britain during the periods of tick activity, primarily in the spring and autumn.
- In tick-infested areas, endemic stability usually develops and no effort is made to control this infection, although cattle recently introduced require surveillance for some months, as a proportion may develop clinical disease and may die if left untreated.
- Infection is usually treated with imidocarb, which is not licensed in the UK and needs to be imported with a special treatment certificate (STC) obtained from the UK Veterinary Medicines Directorate.

Ectoparasites

Lice (Pediculosis)

- Lice infestations are either caused by sucking lice (*Haematopinus*, *Lignonathus*, *Selenopotes*), or chewing lice (*Bovicola* syn *Damalinia*).
- Low burdens of lice are very common in the coats of cattle during the winter months and are not usually of significance.



Rubbing has caused hair losses over the neck and shoulders in this cow

- However, populations can increase rapidly causing intense itching, or anaemia if sucking lice are present.
- Heavy louse infestation may be a sign of other underlying conditions and an indicator of ill-thrift.



Heavy louse infestation present at pasture in the spring - this calf should have been treated at turnout

- A range of pour-on or spot-on synthetic pyrethroid products (containing alpha-cypermethrin, deltamethrin or permethrin) and macrocyclic lactones are commonly used.
- Injectable macrocyclic lactones are effective against sucking lice but may have only limited activity against chewing lice (*Bovicola*).
- It is advisable to use the product most suitable for the time of year and management of the cattle involved.

Mites

- The commonest mange affecting cattle is chorioptic mange, which occurs most often in housed cattle on the feet, legs, base of the tail and udder.



Serum exudation and thickening of the skin at the base of the tail are characteristic of chorioptic mange



Tail head of a dairy cow with serum exudation and thickening of the skin caused by *C. bovis* infestation

- Sarcoptic mange occurs mainly on the neck and tail causing pruritus, scaly skin and intense hair loss.
- Psoroptic mange has only rarely been reported in the UK. Infection causes intense itching, crusting and hair loss.
- Permethrin administered by pour-on is effective against both chorioptic and sarcoptic mange.
- Topically applied (pour-on) products and injectables containing one of the MLs are generally effective against mange mites although activity, particularly against *Chorioptes*, varies with product and route of administration.
- (For more information see the COWS website (www.cattleparasites.org.uk))

Flies

- There are many common species of flies which feed on grazing cattle.
- Biting flies, which include stable flies (*Stomoxys*), horn flies (*Haematobia*), head flies (*Hydrotaea*), horse flies (tabanids), midges (*Culicoides*) and blackflies (*Simulium*) feed by puncturing the skin directly and may act as vectors of various bacterial and viral diseases.
- Midges transmit bluetongue virus (BTV) and Schmallenberg virus (SBV).
- Nuisance flies, such as face flies and sweat flies, scavenge the surface of the skin, wounds, or body orifices feeding on sweat, skin secretions, tears or saliva.
- Face flies are often the most numerous nuisance flies causing serious annoyance to grazing cattle and are linked to the transmission of diseases such as summer mastitis, New Forest Disease ("pinkeye") and possibly BVD virus.
- Insecticide impregnated ear tags should be applied at the start of the grazing season to the whole herd to provide season long protection.
- The alternative is to treat with either spot on deltamethrin, or pour-on (alpha) cypermethrin or permethrin at intervals of 4-8 weeks depending on product and route of application.
- Pour-on ML products provide some protection against horn flies the period of protection varying between 1-5 weeks depending on product.

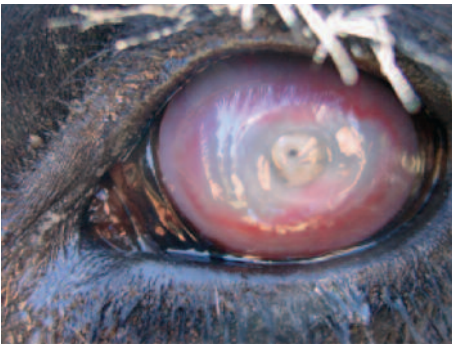


Cows frequently kick at the udder in response to flies feeding on secretions present on the teats



Face flies such as *Musca autumnalis* feed on lachrymal secretions

- Routine fly control methods should be implemented on the farm including use of fly screens, insecticidal strips or electrocution grids in milking parlours; improved sanitation around the farmyard; and by ensuring manure heaps are well stacked to encourage good fermentation, which helps destroy fly eggs and larvae.



Flies may be a mechanical vector for New Forest Eye (IBK). This advanced case of IBK shows deep corneal ulceration and is very painful

| Group | Active | Lice | Mites | Flies | Route | Dose Rate | Product | Company |
|---------------|--------------------|------|-------|-------|----------------|--------------|--------------------------------|--------------------------|
| SP | Alpha-Cypermethrin | ✓ | | ✓ | Pour-on | 10ml | Dysect Cattle Pour-on | Zoetis |
| | Cypermethrin | | | ✓ | Ear Tag | 1-2 Tags | Zermasect Pour-on Cattle | Downland |
| | Deltamethrin | ✓ | | ✓ | Pour-on | 10-30ml | Butox Swish Pour-on 0.75% | MSD Animal Health |
| | | | | | | 100mg (10ml) | Deltanil 10mg/ml Pour-on | Virbac |
| | | | | | Spot on | 10ml | Dectospot 10mg/ml | Bimeda |
| | | | | | | | Flydown Spot on | Downland |
| | | | | | | | Spotinor | Norbrook Laboratories |
| | Permethrin | ✓ | ✓ | ✓ | | 1ml/10kg | Fly & Lice Spot on | Zoetis |
| Miscellaneous | DEET | | | ✓ | Topical Liquid | | Flypor 4% Pour-on | Elanco Animal Health |
| | | | | | | | Horse and Cattle Fly Repellent | Battle Hayward and Bower |

Group 1. Benzimidazoles (1-BZ) Cattle Products

1-BZ

| Active | Gutworms | | | Lung Worms | Tape Worms | Fluke | | | Combination Active | Route | Dose Rate (Fluke rate) | Product | Company | | | | | |
|-----------------|----------|----|----|---------------|---------------|-------|------------|----------|-----------------------|----------------------|-----------------------------|-------------------|------------------------|------------------------|----------------|----------|--------------------|------------------------|
| | Adult | DL | AL | | | adult | late | early | | | | | | | | | | |
| Albendazole | ✓ | ✓ | ± | ✓ | ✓ | ✓ | | | | Oral Drench | 30ml/100kg (40ml/100kg) | Albenil 2.5% SC | Virbac | | | | | |
| | | | | | | | | | | | | Albex 2.5% | Chanelle Animal Health | | | | | |
| | | | | | | | | | | | | Albacert | Downland | | | | | |
| | | | | | | | | | | | | Endospec SC 2.5% | Bimeda | | | | | |
| | | | | | | | | | | | | Tramazole SC 2.5% | Tulivin/Denimex | | | | | |
| Fenbendazole | ✓ | ✓ | ± | ✓ | ✓ | | | | | Oral Drench | 7.5ml/100kg (10ml/100kg) | Endospec SC 10% | Bimeda | | | | | |
| | | | | | | | | | | | | Albex 10% | Chanelle Animal Health | | | | | |
| | | | | | | | | | | | | 15ml/50kg | Zerofen 2.5% | Chanelle Animal Health | | | | |
| | | | | | | | | | | | | 5ml/60kg | Panacur 10% | MSD Animal Health | | | | |
| | | | | | | | | | | | | | Zerofen 10% | Chanelle Animal Health | | | | |
| Oxfendazole | ✓ | ✓ | ± | ✓ | ✓ | | | | | Oral Bolus | One Bolus | Panacur Bolus | MSD Animal Health | | | | | |
| | | | | | | | | | | | | Oral Bolus | One Bolus | Autoworm Finisher | Zoetis | | | |
| | | | | | | | | | | | | | | Autoworm First Grazer | Zoetis | | | |
| Triclabendazole | ✓ | ✓ | ± | ✓ | ✓ | ✓ | ✓ | ✓ | | Oral Drench | 5ml/25kg | Bovex 2.265% | | Chanelle Animal Health | | | | |
| | | | | | | | | | | | | | | | Oral Drench | 6ml/50kg | Fasinex 100 | Elanco Animal Health |
| | | | | | | | | | | | | | | | | | Fasinex 10% | Elanco Animal Health |
| | | | | | | | | | | | | | | | | | Endofluke 100mg/ml | Bimeda |
| | | | | | | | | | | | | | | | | | Tribex 10% | Chanelle Animal Health |
| | | | | | | | | | | | | | | | | | Triclacert 10% | Downland |
| | | | | | | | | | | | | | | | | | 2.5ml/50kg | Fasinex 240 24% |
| | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | | ✓ | | ✓ | ✓ | Levamisole | 1ml/10kg | Combindex Cattle | Elanco Animal Health | | | | | | | | |

DL=Developing larvae; AL= arrested larvae; L4; Late= late immature fluke (>7wk old fluke); Early=early immature fluke (<6 wk old fluke)

Group 2. Levamisole (2-LV) Cattle Products

2-LV

| Active | Gutworms | | | Lung Worms | Tape Worms | Fluke | | | Combination Active | Route | Dose Rate (Fluke rate) | Product | Company |
|------------|----------|----|----|---------------|---------------|-------|------|-------|-----------------------|----------------|---------------------------|--------------------|-------------------------|
| | Adult | DL | AL | | | adult | late | early | | | | | |
| Levamisole | | | | | | | | | | Oral Drench | 1ml/10kg | Chanaverm 7.5% | Chanelle Animal Health |
| | ✓ | ✓ | | ✓ | | | | | | | 2.5ml/10kg | Levacide Low vol | Norbrook Laboratories |
| | | | | | | | | | | S/C Inj | 1ml/10kg | Levacur SC 3% | MSD Animal Health |
| | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | | | 1ml/10kg | Levacide Injection | Norbrook Laboratories |
| | | | | | | | | | | Tridabendazole | 1ml/10kg | Combindex Cattle | Elanco Animal Health |
| | ✓ | ✓ | | ✓ | | ✓ | | | | | Oral Drench | 2.5ml/10kg | Downland Fluke and Worm |
| | | | | | | | | | Oxyclozanide | | | Levafas Diamond | Norbrook Laboratories |

DL=Developing larvae; AL= arrested larvae; Late= late immature fluke (>7wk old fluke); Early=early immature fluke (<6 wk old fluke)

The information in these tables was correct at the time of printing (September 2017). Always check the data sheet before using any product.

Group 3. Macrocyclic Lactones (3-ML) - Cattle Products

3-ML

| Active | Gutworms | | | Lung Worms | Tape Worms | Ectos | Fluke | | | Combination Active | Route | Dose Rate | Product | Company |
|--------------|----------|----|----|---------------|---------------|-------|-------|------|-------|-----------------------|-------------|------------|----------------------------|------------------------|
| | Adult | DL | AL | | | | adult | late | early | | | | | |
| Doramectin | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | I/M inj | 1ml/50kg | Dectomax Injection | Elanco Animal Health |
| | | | | | | | | | | | Pour-on | 1ml/10kg | Dectomax Pour-on | Elanco Animal Health |
| Eprinomectin | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | Pour-on | 1ml/10kg | Eprinex Pour-on | Merial Animal Health |
| | | | | | | | | | | | | | Eprinex Multi | Merial Animal Health |
| | | | | | | | | | | | | | Epizero Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | | Epresic Pour-on | Ceva Animal Health |
| | | | | | | | | | | | | | Neoprnil Pour-on | Virbac |
| | | | | | | | | | | | | | Epromec Pour-on | Chanelle Animal Health |
| | | | | | | | | | | | | | Robonex Pour-on | Downland |
| | | | | | | | | | | | | | Epresic Injection | Ceva Animal Health |
| | | | | | | | | | | | | | Animec Pour-on 0.5% | Chanelle Animal Health |
| | | | | | | | | | | | | | Bimectin Pour-on | Bimeda |
| Ivermectin | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | Pour-on | 1ml/10kg | Enovex Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | | Ecomectin Pour-on | Eco Animal Health |
| | | | | | | | | | | | | | Ivomec Classic Pour-on | Merial Animal Health |
| | | | | | | | | | | | | | Molemec Pour-on | Mole Valley |
| | | | | | | | | | | | | | Noromectin Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | | Paramectin Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | | Premadex Pour-on | Downland |
| | | | | | | | | | | | | | Virbamec Pour-on | Virbac |
| | | | | | | | | | | | | | Animec 1% Injection | Chanelle Animal Health |
| | | | | | | | | | | | | | Bimectin Injection | Bimeda |
| | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | S/C Inj | 1ml/50kg | Ecomectin 1% | Eco Animal Health |
| | | | | | | | | | | | | | Ivomec Classic Injection | MSD Animal Health |
| | | | | | | | | | | | | | Molemec Injection | Mole Valley |
| | | | | | | | | | | | | | Noromectin Multi Inj | Norbrook Laboratories |
| | | | | | | | | | | | | | Panomec Injection | Merial Animal Health |
| | | | | | | | | | | | | | Paramectin Multi Injection | Norbrook Laboratories |
| | | | | | | | | | | | | | Virbamec Injectable | Virbac |
| | | | | | | | | | | | | | Premadex Injection | Downland |
| | | | | | | | | | | | | | Closamectin Injection | Norbrook Laboratories |
| | | | | | | | | | | | | | Closamectin Pour-on | Norbrook Laboratories |
| Moxidectin | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | S/C Inj | 1ml/25kg | Norofas Pour-on | Downland |
| | | | | | | | | | | | | | Animec Super Injection | Chanelle Animal Health |
| | | | | | | | | | | | | | Bimectin Plus | Bimeda |
| | | | | | | | | | | | | | Ivomec Super | Merial Animal Health |
| | | | | | | | | | | | | | Molemec Super | Mole Valley |
| | | | | | | | | | | | | | Supremadex | Downland |
| | | | | | | | | | | | | | Virbamec Super | Virbac |
| | | | | | | | | | | | | | Cydetin 0.5% Pour-on | Zoetis |
| | | | | | | | | | | | | | Zermex Pour-on | Downland |
| | | | | | | | | | | | | | Cydetin 10% LA | Zoetis |
| | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | | S/c inj ear | 0.5ml/50kg | Zermex 10% LA | Downland |
| | | | | | | | | | | | | | Cydetin TriclaMox | Zoetis |

DL=Developing larvae; AL= arrested larvae; Late= late immature fluke (>7wk old fluke); Early

Combination Wormers

| Active | Gutworms | | | Lung Worms | Tape Worms | Ectos | Fluke | | | Combination Active | Route | Dose Rate | Product | Company |
|-----------------|----------|----|----|------------|------------|-------|-------|------|-------|--------------------|-------------|------------|-------------------------|------------------------|
| | Adult | DL | AL | | | | adult | late | early | | | | | |
| Closantel | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | Ivermectin | S/C Inj | 1ml/25kg | Closamectin Injection | Norbrook Laboratories |
| | | | | | | | | | | | Pour-on | 1ml/10kg | Closamectin Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | | Norofas Pour-on | Downland |
| Clorsulon | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | Ivermectin | S/C Inj | 1ml/50kg | Animec Super Injection | Chanelle Animal Health |
| | | | | | | | | | | | | | Bimectin Plus | Bimeda |
| | | | | | | | | | | | | | Ivomec Super | Merial Animal Health |
| | | | | | | | | | | | | | Molemec Super | Mole Valley |
| | | | | | | | | | | | | | Supremadex | Downland |
| | | | | | | | | | | | | | Virbamec Super | Virbac |
| Oxyclozanide | ✓ | ✓ | | ✓ | | | ✓ | | | Levamisole | Oral Drench | 2.5ml/10kg | Downland Fluke and Worm | Downland |
| | | | | | | | | | | | | | Levafas Diamond | Norbrook Laboratories |
| Triclabendazole | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | Levamisole | Oral Drench | 1ml/10kg | Combínex Cattle | Elanco Animal Health |
| | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | Moxidectin | | | Cydetin TriclaMox | Zoetis |

Flukicides

| Active | Gutworms | | | Lung Worms | Tape Worms | Fluke | | | Combination Active | Route | Fluke Dose Rate | Product | Company |
|-----------------|----------|----|----|------------|------------|-------|------|-------|--------------------|-------------|-----------------|-------------------------|------------------------|
| | Adult | DL | AL | | | adult | late | early | | | | | |
| Albendazole | ✓ | ✓ | ± | ✓ | ✓ | ✓ | | | | Oral Drench | 40ml/100kg | Albenil 2.5% SC | Virbac |
| | | | | | | | | | | | | Albex 2.5% | Chanelle Animal Health |
| | | | | | | | | | | | | Albacert | Downland |
| | | | | | | | | | | | | Endospec SC 2.5% | Bimeda |
| | | | | | | | | | | | 10ml/100kg | Tramazole SC 2.5% | Tulivin/Denimex |
| | | | | | | | | | | | | Endospec SC 10% | Bimeda |
| | | | | | | | | | | | | Albex 10% | Chanelle Animal Health |
| | | | | | | | | | | | | Animec Super Injection | Chanelle Animal Health |
| Clorsulon | ✓ | ✓ | ✓ | ✓ | | ✓ | | | Ivermectin | S/C Inj | 1ml/50kg | Bimectin Plus | Bimeda |
| | | | | | | | | | | | | Ivomec Super | Merial Animal Health |
| | | | | | | | | | | | | Molemec Super | Mole Valley |
| | | | | | | | | | | | | Supremadex | Downland |
| | | | | | | | | | | | | Virbamec Super | Virbac |
| | | | | | | | | | | | | | |
| Closantel | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | Ivermectin | S/C Inj | 1ml/25kg | Closamectin Injection | Norbrook Laboratories |
| | | | | | | | | | | Pour-on | 1ml/10kg | Closamectin Pour-on | Norbrook Laboratories |
| | | | | | | | | | | | | Norofas Pour-on | Downland |
| Nitroxynil | ± | | | | | ✓ | ✓ | | | S/C Inj | 1.5ml/50kg | Trodax 34% | Merial Animal Health |
| Oxyclozanide | ✓ | ✓ | | ✓ | | ✓ | | | Levamisole | Oral Drench | 3ml/10kg | Zanil Fluke Drench | MSD Animal Health |
| | | | | | | | | | | | | Rumenil 34mg/ml Oral | Chanelle Animal Health |
| | | | | | | | | | | | 2.5ml/10kg | Downland Fluke and Worm | Downland |
| | | | | | | | | | | | | Levafas Diamond | Norbrook Laboratories |
| Triclabendazole | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | Oral Drench | 6ml/50kg | Fasinex 100 | Elanco Animal Health |
| | | | | | | | | | | | | Fasinex 10% | Elanco Animal Health |
| | | | | | | | | | | | | Endofluke 100mg/ml | Bimeda |
| | | | | | | | | | | | | Tribex 10% | Chanelle Animal Health |
| | | | | | | | | | | | 2.5ml/50kg | Triclacert 10% | Downland |
| | | | | | | | | | | | | Fasinex 240 24% | Elanco Animal Health |
| | | | | | | | | | | | | Cydetin TriclaMox | Zoetis |
| | | | | | | | | | | | | Combínex Cattle | Elanco Animal Health |

NADIS

Animal Health Skills

Plan for health - ask your vet for a veterinary parasite control plan