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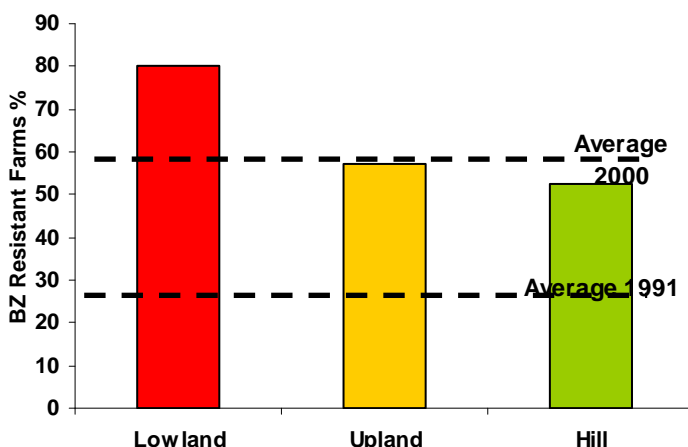
Sustainable Worm Control in Sheep

A big thank-you to all who attended the meeting at the Tiverton hotel on the 26th of April. There was a very good turnout and some good questions afterwards. We thought it might be useful to provide a summary of the information given out on the night for those unable to attend.

The first part of the presentations discussed the SCOPS guidelines now in place. Sustainable Control Of Parasites is an initiative part funded by Defra, NSA, NFU, Eblex and other groups to combat the increasing threat to the viability of the UK sheep industry posed by worms resistant to drugs.

Over the last 30 years we have become increasingly reliant on wormers to control parasites whilst being able to intensify sheep keeping practices, and due to this, resistance has developed to these wormers. As the understanding of how resistance develops has improved it has become apparent that some worming practices previously recommended actually increased the rate at which problems develop.

White drench resistance has become especially prevalent. The following graph shows the percentage of farms in different parts of the UK which have worms on them resistant to white drenches:



What is Anthelmintic Resistance, and how does it develop?

Resistance is defined as "...the heritable ability of the parasite to tolerate a normally effective dose of the anthelmintic" i.e. Anthelmintic resistant worms are those which can survive treatment and then pass this ability on to their offspring.

Resistance is measured by faecal egg count reduction tests, where the change in egg count before and after drenching is measured – in the normal, non-resistant situation egg counts should reduce by over 95% after treatment with wormers.

The development of resistance is based on a few simple principles:

- Genes for resistance are present in all worm populations at very low levels
- When wormers are used worms with these genes survive to breed
- Resistance genes are passed onto new generation
- This means that there are fewer susceptible worms in next generation

As number of resistance genes in population increases, the rate of development of resistance increases

Unfortunately once resistance develops on a farm, the situation cannot be reversed by stopping the use of that wormer, as resistant worms will continue to breed and multiply, maintaining the population.

Several factors affect the rate at which resistance develops, and an understanding of these can help in devising a worm control plan which will reduce the development of resistance:

The relative size of the *in-refugia* population.

Refugia means the worm population not exposed to the effect of any drenches – that is worms on pasture and untreated sheep. The greater the proportion of the total worm population exposed to wormer, the faster resistance will develop i.e. the greater the population *in refugia* the slower resistance will

develop. Moving treated sheep immediately to clean pasture reduces the *in refugia* population and increases the rate of development of resistance.

Frequency of treatment

Treatment gives resistant worms a reproductive advantage over susceptible worms, and more frequent treatment means resistance can develop faster, especially if treatment interval approaches the pre-patent period of 3 weeks.

Rate of re-infection after dosing

After dosing, resistant parasites have a period of reproductive advantage and this period is shorter if the sheep become quickly re-infected. If re-infection is delayed, resistant survivors have this advantage for longer. Re-infection is influenced by:

- Infectivity of pasture
- Susceptibility of the host (Lambs >>> Ewes)

Worming of immune ewes is a significant factor in the development of resistance. Worming ewes at tugging is a good way of increasing the levels of resistant worms on your farm!

Dose rates

Underdosing allows partially resistant worms to survive, and increases number of resistant genes being passed on and also increases speed at which resistance develops

So how can we manage the development of resistance on farms to ensure long term viability of the sheep farming enterprise?

Proper use of wormers

Dose for the heaviest animals in the group, and always check dose rates as formulations do sometimes change. Check the calibration of dosing equipment as drench guns can be inaccurate. Remember the correct use of different classes: holding off pasture before and after using white drenches. Annual rotation of wormers delays development of resistance to a specific class, but overall you will eventually end up in same situation! So it may be better to rotate within a season

Avoid 'Buying-in' resistance

Not everyone looks for resistance, so it is possible that sheep for sale are carrying resistant worms inside like a "Trojan horse"!

Proper quarantine procedures:

- Treat bought in animals to try to remove all resistant worms
- Use multiple classes, with least resistance
- Post treatment hold off pasture 48hrs to 'empty out' worm eggs
- Then put on 'dirty' pasture
- The latest recommendation is to use Monepantel (Zolvix) and Moxidectin (Cydectin) used sequentially. (Moxidectin also treats for scab)

Using different classes in same season

Mid season lambs have highest worm burden and will have highest number of resistant worms. Treatment with Monepantel (Zolvix) at this point will remove maximum number of resistant worms. After this, return to normal class to reduce the chances of developing Monepantel resistance!

Other useful strategies include

- leaving a proportion of any group untreated, e.g. the best 10% who will have less to gain from worming.
- Using monitoring to aid decision making and avoid pointless use of wormers and
- avoiding 'off target' use for example using combination worm / fluke treatment.

A brief discussion was made on the development of resistance to liver fluke in the area. Although rare this is an increasing problem and Triclabendazole resistance has been reported. Farmers should remember fluke control in quarantine to avoid buying fluke in and also rotate products other than Triclabendazole when only adult fluke are expected to be present e.g. very early spring or after housing.

The second part of the meeting discussed further the use of Zolvix in the above recommendations and also introduced the new drenching system which has been specially developed to accompany Zolvix to market. It would be fair to say that whilst the drenching was well received as a useful tool it certainly needs to be considered an investment rather than a throwaway!

If you would like to discuss developing a worm control program for your flock, or to investigate possible resistance in your flock then please contact the surgery.

8 SCOPS Recommendations

Work out a control strategy with your vet or advisor.

Use effective quarantine strategies to prevent the importation of resistant worms in introduced sheep and goats

Test for resistance on your farm

Administer anthelmintics effectively

Use anthelmintics only when necessary

Select the appropriate anthelmintic for the task

Adopt strategies to preserve susceptible worms on the farm

Reduce dependence on anthelmintics

The Role of the Beef Bull

The bull only has one role to fill and that is to achieve pregnancies. This is not solely down to the bull but also depends on good nutritional management of cows and heifers, effective disease control, successful heifer integration and a fully fertile bull.

What is crucial for economic beef production is the **rate** at which he achieves these pregnancies. This requires all 4 components above plus: power and stature, excellent mobility, full large testes and strong libido.

How much does a bull cost?

- Previous figures suggest an annual cost to keep a bull of £1600 per year

- The individual figures can be debated but they do cost a surprisingly large amount to keep (and factor in insurance of 10% of purchase price)
- Sires 30 calves = £55 per calf born
- Sires 50 calves = £32 per calf born

Any alternatives to a bull?

Triple synchrony and AI, no natural service

- 46 day breeding period
- 1st service conception rates 64-74%
- Calving rates of 84-89%
- Barren rates of 12-15%
- Basic costs will be in the range of £40-50 per calf born (vet and AI)

How do you assess overall beef herd reproductive performance? Pregnancy rate or calving rate of females exposed to bulls - often meaningless unless you consider the percentage of females conceiving in the first 21 days of mating period and percentage pregnant after 63 days.

Key Targets

Key Figures	Targets
Mating Period	< 70 days
Pregnancy Rate	> 95%
Abortion Rate	< 2%
Calving Rate	> 93%
21 Day Calving Rate	> 65%
Perinatal Mortality	< 5%
Calf Death 1 month - Weaning	< 2%

Minimum target of 88% calves weaned from cows put to the bull in a mating period of 63-70 days.

A compact calving period has many advantages including:

- Larger and uniform groups of calves for sale – improves efficiency of feeding, finishing and marketing
- Improved disease control and vaccine

management – rotavirus, coccidiosis, PGE and pneumonia.

- Improves breeding heifer selection
- Improves herd fertility – many more cows fit to breed when mating begins.
- Dystocia rates reduced
- Eases calving workload and management.
- Reduces bull costs per calf born

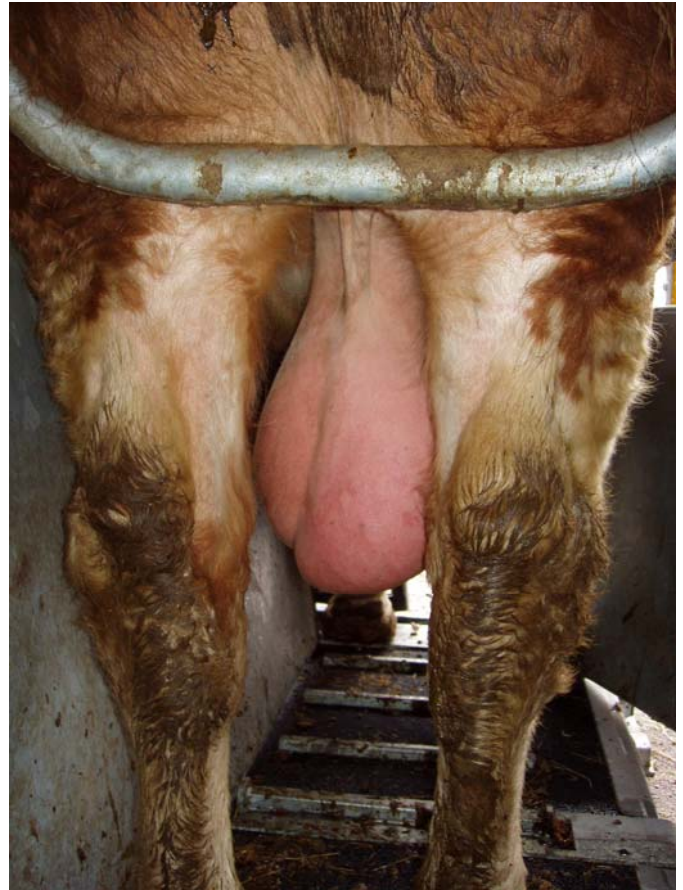
A bull's "Breeding Soundness" can fall into 1 of the following 3 categories:

- Fertile – Targets >65% cows in calf in 21 days, 95% in 63 days in a group of 50 disease free, cycling cows
- Sub-fertile – able to achieve pregnancies but not at the volume or rate as a fertile bull – often referred to as inefficient breeders
- Infertile or sterile – such bulls are very rare

There are 3 main criteria required to pass a 'breeding soundness examination'.

- Scrotal circumference > 34 cms at 24 months of age (breed dependent)
- Individual progressive sperm motility > 60%
- > 70% normal sperm on spermogram

Semen samples are collected by electro-ejaculation. Most bulls can be collected efficiently, quickly and safely



A sub-fertile bull can have a serious impact on your herd's reproductive performance resulting in significant economic losses. Around 20% of bulls are sub-fertile usually due to poor libido, physical defects or substandard semen quality leading to increased calving intervals and a prolonged calving pattern.

Bull examinations can be used to identify the most fertile bulls in the herd and use them to best advantage. The annual stud check, for breeding soundness, should occur 4-6 weeks before mating, and in new bulls infectious disease status should also be clarified (BVD virus, Johnes, *Campylobacter*, IBR, *Leptospiriosis*).

Your gold standard and aim must be to test all bulls on the farm every year or before each mating period. Often just single "problem" bulls, new purchases and insurance claims are tested. Aim for testing 4-6 weeks pre-mating to allow time for a retest and bull replacement.

We offer a comprehensive 'bull breeding soundness evaluation' service which includes:

- Physical examination of the bull
- Analysis of a semen sample
- Assessment of mating ability (if required)
- Advice on bull management and nutrition.