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BEEF FARMER EVENTS

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ANIMAL HEALTH

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Avoid Antimicrobial Resistance (AMR)

Pilot IBR Programme

Parasite Control Strategies

Animal Welfare: Best Practice

Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co Leitrim N41 WN27.
Phone 071 9671928 Email nmorgan@animalhealthireland.ie Web www.animalhealthireland.ie

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CONTENTS

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Antimicrobial resistance and the beef farmer

Main points

- Everyone who uses antibiotics has a responsibility to use them wisely.
- Follow the 6 “rights” of responsible antibiotic use: right diagnosis, right animal, right drug, right dose, right duration, right disposal.
- Minimise the need for antibiotics with good farm management, biosecurity, hygiene, husbandry, and vaccination practices.

What is antimicrobial resistance?

Antimicrobials have become essential in modern medicine in treating diseases. Antimicrobials are medicines that are effective against micro-organisms and include antibiotics, antiparasitics, and antifungals. Antimicrobial resistance often refers to resistance to antibiotics specifically and is also the focus of this article.

Antimicrobial resistance occurs when medicines that are used to treat diseases which are caused by bacteria are no longer effective. Bacteria developing resistance is a natural process that occurs as a survival mechanism when they are exposed to antimicrobials. We cannot stop this from happening completely, but we can try to prevent circumstances where resistance is likely to develop, for example by limiting the use of antibiotics.

In any infection, there may be some bacteria that have genes that make them resistant to one or more different antibiotics. When we use antibiotics, susceptible bacteria are harmed but the resistant ones are unaffected and can continue to multiply. Antibiotics will no longer work in this situation and these resistant bacteria can be passed on to other animals or people. The more often bacteria are exposed to antibiotics, the higher the risk that resistance will develop.

Why is antimicrobial resistance (AMR) important to farmers?

Many of the same antibiotics are used in both human and animal medicine and we need to ensure they continue to work by using them wisely. Farmers have the responsibility of reducing the risk of the development of AMR in the animals that enter the food chain.

What can be done to reduce the use of antimicrobials?

Antibiotics should not be used to compensate for poor farm management practices. The best steps to take to reduce antimicrobial resistance involve reducing the need for antibiotics by preventing the introduction and spread of diseases:

- Have a vaccination plan against preventable diseases.
- Follow good biosecurity and hygiene practices;
    - Clean and disinfect housing and farm equipment
    - Clean feed and water troughs regularly
    - Quarantine animals that are brought onto farm
    - Diagnose and treat sick animals promptly
    - Isolate sick animals and ensure clothes, boots and equipment are changed or cleaned and disinfected before handling healthy animals
    - Ensure calves receive enough, good quality colostrum
- Talk to your veterinary practitioner to develop a herd health plan.
- Keep records to monitor herd health over time.

For more information on preventing the spread of disease look at the biosecurity leaflets on the AHI website. http://animalhealthireland.ie/?page_id=397

Avoid Antimicrobial Resistance (AMR)

What should be done to ensure responsible use of antimicrobials?

The 'Six rights' should be applied when using antibiotics:

1. **Right veterinary diagnosis;** Accurate diagnosis is essential to identify if an animal is suffering from a bacterial infection that will benefit from treatment with an antibiotic. Veterinary practitioners are best placed to make this decision.
2. **Right animal;** Only the animal that has a bacterial disease should be treated with an antibiotic.
3. **Right Veterinary Medicine;** Antibiotics should only be used when absolutely necessary, and when the vet has diagnosed that there is a bacterial disease present. The antibiotic chosen for treatment should be effective to treat against the particular bacteria causing the disease. Bacterial isolates should ideally be tested for antibiotic resistance in the laboratory to ensure the chosen antibiotic will work.
4. **Right dose;** Antibiotics should be administered as per the instructions on the prescription. Animal weights should be estimated as accurately as possible. Underdosing animals accelerates the rate of resistance development.
5. **Right duration;** Antibiotics should be given as directed by the veterinary practitioner. Do not stop the course prematurely as this will not fully treat the disease and may result in resistance to this antibiotic in the future.
6. **Right storage and disposal;** All medicines should be stored according to the manufacturer's instructions in order to maintain their efficacy. All out-of-date medicines, containers and application equipment (including needles into a sharps container) should be placed in appropriate clinical waste containers. Antibiotics should never be disposed of with domestic rubbish or poured down the drain or toilet as this leads to development of resistant bacteria in the environment.

Keep records of animal treatments with the name of the medicines and treatment dates. This can help for future treatment decisions and ensure withdrawal periods are followed.

What are Highest Priority Critically Important Antibiotics (HP-CIAs)?

There are certain classes of antibiotics that are considered critically important in human health and are used as a last resort when treating disease if other antibiotics fail. To ensure that these antibiotics remain effective, they should **not** be used as a first line of treatment in animals and used only under veterinary advice if no other antibiotics are effective for the specific situation. A list of these antibiotics is given in the table below. More information on antibiotics that should not be used in other species are available on the AHI website http://animalhealthireland.ie/wp-content/uploads/2019/02/Code-of-Good-Practice-Regarding-the-Responsible-Prescribing-and-Use-of-Antibiotics-in-Farm-Animals.pdf.

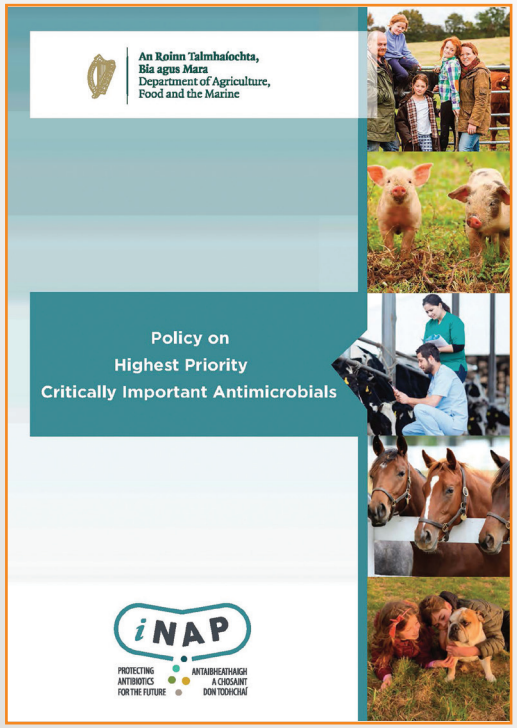
Antimicrobial class	Active ingredient	Examples of product trade names
3rd and 4th Generation Cephalosporins	Ceftiofur	Alfacef, Cefavex, Cefenil, Cefokel, Ceftiocyl, Cemay, Cevaxel, Curacef, Eficur, Excenel, Naxcel
	Cefquinome	Ceffect, Cefimam, Cefquinome, Cephaguard, Cobactan, Plenix, Qivitan
Fluoroquinolones	Enrofloxacin	Baytril, Colmyc, Doraflox, Enrocare, Enrodexil, Entrotril, Enrotron, Enroxil, Fenoflox, Floxibac, Kariflox, Quinoflox, Roxacin, Unisol
	Marbofloxacin	Boflox, Forcyl, Kelacyl, Marbim, Marbocare, Marbocyl, Marbonor, Marbosyva, Marbox, Marfloxin
Polymyxins	Colistin	Coliscour, Colfive, Hidrocol, Sogecoli
Macrolides	Erythromycin	Erythrocin
	Gamithromycin	Zactran
	Tildipirosin	Zuprevo
	Tilmicosin	Hymatil, Keytil, Micotil, Milbotyl, Pulmotil, Pulmovet, Tilmodil, Tilmovet
	Tulathromycin	Tulaxa, Tuloxxin, Draxxin
	Tylosin	Bilovet, Pharmasin, Tylan, Tyljet, Tylo, Tylosin, Tylovet, Tylucyl

Examples of HP-CIAs antibiotics classes and product trade names relevant to cattle. These antibiotics should never be given as a first line of treatment. (Source HPRA.ie Accessed May 2019)

Avoid Antimicrobial Resistance (AMR)

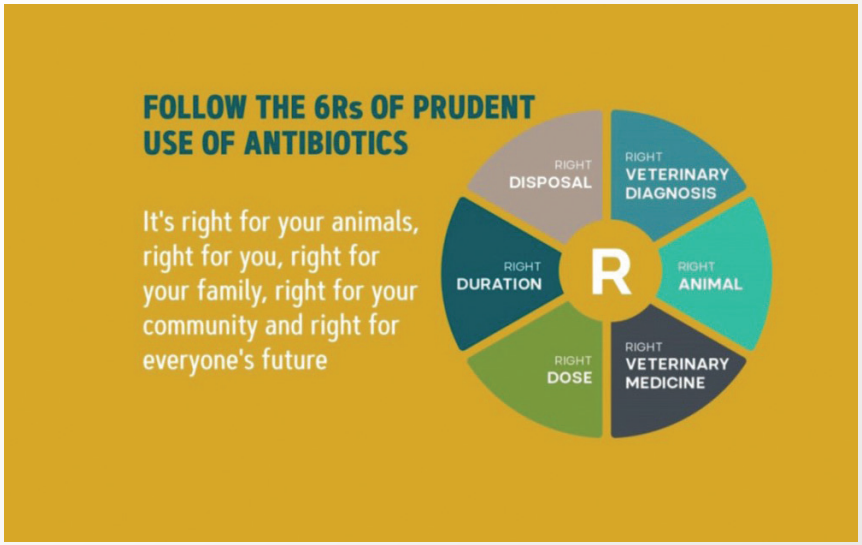
Residues are not the same as resistance

Meat and milk residues are related to the time that antibiotics remain in the animal. The withdrawal time is the minimum amount of time it takes for the animal to clear the drug from its body so that people consuming the meat and milk are not exposed to trace levels of the antibiotics. If farmers comply with the withdrawal periods for medicines, there is no risk of antibiotic residues in the meat or milk. Antibiotic resistance can still develop even if farmers are correctly following withdrawal periods, as any exposure to antibiotics favours the selection of resistant bacteria. When using antibiotics, use 'as little as possible and as much as necessary'.



Use antibiotics responsibly

- Everyone who uses antibiotics has a responsibility to use them wisely.
- Highest Priority Critically Important Antibiotics (HP-CIAs) should only be used as a last resort.



Infectious Bovine Rhinotracheitis (IBR)

Summary

- IBR is a highly infectious disease of cattle that affects the respiratory tract.
- Infected animals recover but become antibody-positive lifelong carriers which, despite appearing healthy, may shed virus when under stress.
- Approximately 75% of Irish herds contain animals that have been exposed to IBR and are carriers.
- Bulls with antibodies to IBR (including vaccination) are prohibited from semen collection centres to avoid introduction of carriers.
- IBR-positive carrier animals are not allowed to be exported to European countries or regions which have approved eradication programmes in place or that are recognised as free.
- A Pilot IBR Programme is under way through the Teagasc/Irish Farmers' Journal BETTER Farm beef programme.
- Vaccination programmes that aim to control the disease at herd level must include all breeding animals.

IBR (Infectious bovine rhinotracheitis) is a highly infectious respiratory disease of cattle caused by bovine herpes virus-1 (BoHV-1). Clinical signs include high temperature, watery discharge from the nose and eyes and a red, crusty nose. Infection in adults is also associated with milk drop, conception failure and abortion, while in calves it may cause inflammation of the throat or nervous signs. Not all infected animals show obvious signs of disease (sub-clinical infection).

The virus is shed in respiratory secretions and is mainly spread directly by close contact between animals. It can also be shed from the reproductive tract, including semen, resulting in venereal transmission. Airborne spread may also occur over distances of up to 5m. Indirect transmission within or between herds can also occur through movement or sharing of contaminated facilities, equipment or personnel.

Once an animal becomes infected, it remains infected for life despite developing immunity. The virus establishes a lifelong latent infection (carrier status) in the nerve cells within the animal's brain. During this period the latent carrier is not shedding virus. However, at times of stress such as transport, calving, nutritional stress, mixing stock etc, the virus may be reactivated and can begin to multiply and be re-excreted, generally from the nose and eyes. This leads to new infection in other susceptible cattle, which in turn will also become latent carriers (Figure 1). These latently infected carriers play a central role in maintaining IBR in infected herds, where they act as a reservoir of infection, and in spreading infection between herds.

Non-breeding herds which buy animals from different sources are at particular risk for infection as they may introduce carriers. This, together with the stress from mixing

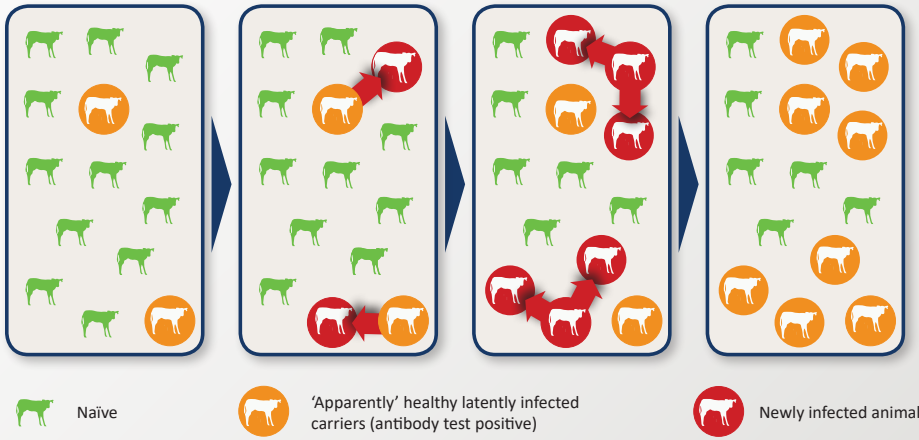


Figure 1. Spread of IBRV following reactivation and shedding of virus from carrier to naïve (susceptible) animals.

Pilot IBR Programme

animals may result in IBR outbreaks. Vaccination can be used to minimise the impact of IBR in these herds.

Vaccination

IBR vaccination is commonly used for control or eradication of the disease. There are several IBR vaccines containing either killed (inactivated) or live virus licensed for use in Ireland. These are all 'marker' vaccines, meaning that when used with an appropriate test it is possible to distinguish those animals that test positive due to vaccination from those that are positive due to infection.

Vaccines are good at preventing clinical signs and reducing the amount of virus shedding following infection but will not prevent exposure to wild virus from causing a limited infection. Therefore, good management in addition to vaccination is required in order to control infection.

When used as part of a control strategy, the percentage of infected cattle in a herd should decrease over a period of time as older, positive cattle are displaced by younger, uninfected stock. For this strategy to be effective, all breeding animals must be included in the vaccination protocol so that there is a reduction in the risk of re-activation of the virus by positive, typically older cattle. Decisions on which product and vaccination strategy to use in a particular situation should be made with your veterinary practitioner.

It should be noted that European legislation specifies that artificial insemination and embryo transfer centres must be free of BoHV-1. Therefore, bulls going into AI stations must test negative for antibodies to both the wild and vaccine virus, indicating that they are not carrier animals.

IBR control: international and national level

Although IBR is endemic in cattle populations across the world, seven European countries (Austria, Germany, Denmark, Finland, Norway, Sweden and Switzerland) and regions in several others have implemented control programmes and are recognised by the EU as being 'IBR-free'. Other European countries also have national control programmes including Belgium and the Czech Republic.

These countries are granted additional guarantees by the EU when cattle are traded into these states or regions. These include amongst other measures, that animals must come from holdings that have been free from IBR for 12 months, must have been isolated for 30 days prior to movement and tested negative for antibodies to IBR.

In Ireland, infection is widespread, with approximately 75% of both beef and dairy herds containing animals that have been exposed to IBR. Animal Health Ireland is currently working with industry stakeholders to investigate options for a national approach to IBR control.

Irish Pilot IBR Programme

A pilot IBR eradication programme was developed by Animal Health Ireland's IBR Technical Working Group for Irish suckler herds including those participating in Phase Three of the Teagasc/Irish Farmers Journal BETTER Farm Beef Programme. A total of 29 herds are involved.

The pilot comprised the sampling and testing of a proportion of the herd for IBR, application of an IBR on-farm veterinary risk assessment and management plan (VIBRAMP), and provision of biosecurity and disease control advice. The VIBRAMP consists of a questionnaire that captures details of the farm structure, animal movements, biosecurity and vaccination history, with the vet and herd owner agreeing up to three changes to improve biosecurity.

Pilot IBR Programme

Herds were initially screened by applying a herd 'snap shot' which requires the sampling of 30 randomly selected animals over 9 months-old that are used or intended for breeding. Samples were tested with an IBR gE (marker) ELISA to detect exposure to IBR on the herd.

Pilot IBR Programme results to date

Between 15 and 45 samples per herd were submitted. 59% (17) of the herds had a negative (0 or 1 antibody-positive animals) 'snap shot' test. If the 'snap shot' test is negative, the likely prevalence of infection within the herd is estimated to be between 0-15%. These herds have the option to test the remainder of the herd and either confirm freedom or remove antibody positive carriers and to review vaccination and biosecurity measures.

41% (12) of the herds had a positive (2 or more antibody positive animals) 'snap shot' test. The estimated proportion of positive animals in the herd (within herd prevalence) for positive

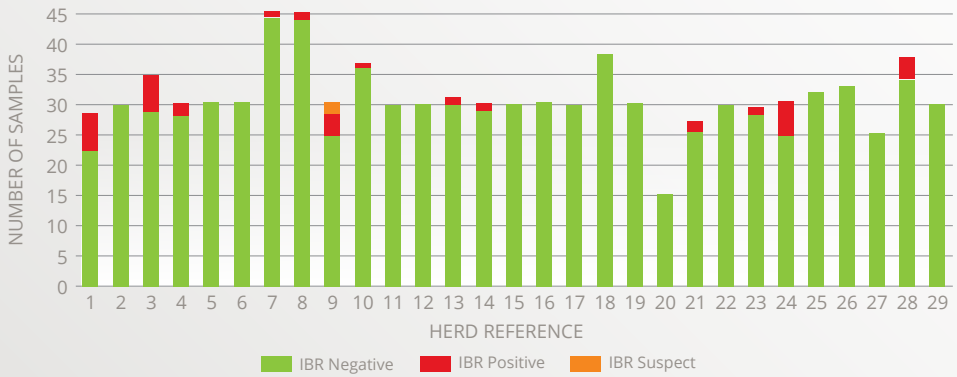


Figure 2. Results of the 'snap shot' for the IBR Pilot Programme herds.

'snap shot' herds is over 15%. For these herds it may not be feasible to immediately achieve freedom by herd testing and removing positive animals, but a vaccination and biosecurity plan can be put in place to control the disease, leading to a reduction in prevalence until the point where this does become feasible.

Analysis of results show that on average, positive 'snap shot' herds were larger than negative herds and had a higher number of animals introduced directly from other herds (moves from farm) than negative 'snap shot' herds. Positive herds experienced a higher degree of expansion over the previous three years, on average almost doubling in size, while negative herds had increased in size by only 20% on average.

41% of participating herds were vaccinating for IBR. Most of the vaccinating herds reported carrying out the vaccination to prevent clinical disease and to be vaccinating young stock only. Whilst this will help to control respiratory disease in the young stock, if the purpose of vaccination is to reduce the level of infection in the herd, the vaccination programme should include cows and bulls.

Further information

Detailed information leaflets on IBR and herd biosecurity, along with answers to frequently asked questions on IBR and specific guidance for herds with bull calves that are potential AI sires, are available on at http://animalhealthireland.ie/?page_id=377.

Parasite Control

Grazing cattle are naturally exposed to gut worms. The main species are ***Ostertagia*** and ***Cooperia*** which are found in the abomasum and small intestine respectively. Infection can cause scour and ill thrift as well as suppressing appetite which reduces growth rates. With continual exposure over their first grazing season cattle generally tend to build up immunity to these worms for subsequent grazing seasons but farmers should monitor animal performance.

Control

Control of these worms is usually through administration of anthelmintics of which there tends to be three main groups.

Class	Common Name	Admin Route
Benzimidazole	White Drenches	Oral
Levamisole	Yellow	Oral, Inject, Pour on
Macrocyclic lactones	Clear	Inject, Pour on

The ease of administration and reduced cost of these products have led to their widespread use within the industry. This has led to the development of anthelmintic resistant worms to each of the drug classes.

Anthelmintic class	No. farms tested	No. farms with resistance	Prevalence of resistance
Benzimidazole (1-BZ)	17	12	71%
Levamisole (2-LV)	12	3	25%
Macrocyclic lactone (3-ML; Ivermectin)	17	17	100%
Macrocyclic lactone (3-ML; Moxidectin)	12	9	75%

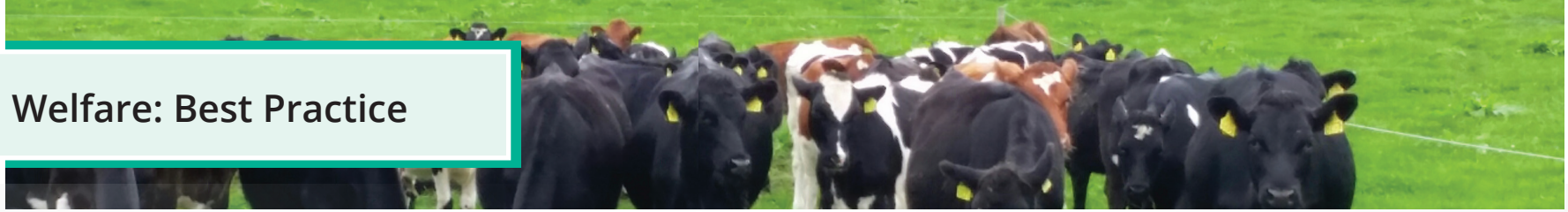
The table shows the levels of resistance to anthelmintics in a study looking at Irish cattle farms.

Such results means that we will need to implement a more targeted sustainable approach to gut worm control slowing down any further anthelmintic resistance.

Worm control tips

- Know what anthelmintics work on your farm- Rotate anthelmintic classes.
- Use anthelmintics only when needed – Use Faecal Egg Counts to monitor worm burdens.
- Use at the recommended dose rate, give correctly – Do not under dose.
- Use pasture management to limit exposure of naïve calves to worms where possible.
- Be conscious of biosecurity when buying in animals.

More information on parasite control is available on the AHI website.



Castration

What are the legislative requirements aimed at ensuring humane castration of cattle?

Castration of cattle is usually performed in order to prevent sexual behaviour, reduce aggression, and increase handling safety.

In Ireland cattle can be castrated, other than by a veterinary practitioner, before they attain 6 months of age using a Burdizzo or before they attain 8 days of age using a rubber ring (S.I. 127 of 2014), in both cases without the use of anaesthesia and analgesia (S.I. 107 of 2014). Over these age limits, local anaesthesia, using a prescription only medicine (POM), must be administered by a veterinary practitioner to animals intended for castration.

What are the main methods used for castrating bulls?

Techniques used to castrate male cattle include the application of rubber rings or tightened latex bands, surgical removal of the testicles, and use of a Burdizzo instrument to crush the testicular cords.

Burdizzo castration is based on the principle that crushing destroys the spermatic cord carrying blood to the testicles but that the skin of the scrotum remains intact. Each spermatic cord is crushed twice (second crush below the first) for 10 seconds each along the neck of the scrotum with the Burdizzo to ensure completeness of the castration procedure. The Burdizzo must be in good condition. The jaws must be parallel and close uniformly across their width so pressure will be even across the jaws. Leave the Burdizzo slightly open when not in use. With the Burdizzo technique, the testicle is left to atrophy in the scrotum, and because of the lack of open wounds the potential for haemorrhage or infection is minimised. Infection or maggot infestation seldom occurs.

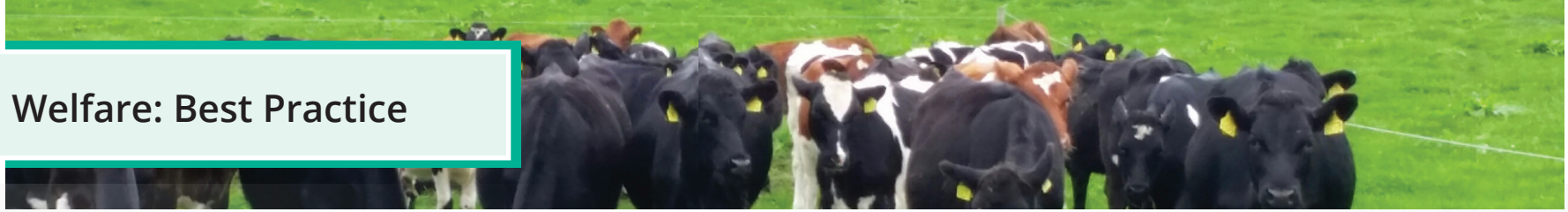
Banding castration involves the application of a specially designed elastic band with the aid of an applicator (Bander) around the neck of the scrotum, above the testicles. This will cause ischaemic necrosis of the testicles, eventually leading to testicular atrophy and sloughing of the scrotum.

Tetanus has been reported in banded calves; therefore animals should receive tetanus prophylaxis to minimise the risk. Proper immunization controls tetanus risk and Tetanus toxoid (not anti-toxin) must be used. It is important to read and follow vaccine instructions carefully and to vaccinate animals at least one-month before carrying out the procedure and again administer a booster vaccine on the day of banding.

Small rubber rings are used for calves less than one month of age (rubber ring castration), and for older calves, a heavy wall latex band is used along with a grommet to securely fasten the tubing at the appropriate tension. A small rubber ring is placed around the neck of the scrotum to cut off the blood supply to the scrotum and testicles. All tissue below the ring will die and fall off.

Is there any advantage in delaying castration of cattle?

There is a general perception among producers that delaying castration could extend the production advantages of keeping animals as bulls beyond puberty or weaning. While after puberty, bulls always grow faster than castrates, the live-weight advantage is largely lost when the bulls are ultimately castrated. A number of studies have shown no advantage in delaying castration up to 17 months of age in terms of slaughter weight or carcass weight at 22 months.



Disbudding Procedures

By definition, disbudding is the removal of an area of skin including the horn bud in a young calf prior to solid attachment of the horn bud to the skull. Disbudding is performed for economic and practical reasons:

- to prevent bullying and injury to other animals (with implications for productivity and carcass damage respectively).
- Human safety during handling.

Cautery is recommended by the European Food Safety Authority (EFSA) and other authority organisations, and is the only method of disbudding allowed in Ireland under S.I. 127 of 2014, which permits disbudding of calves up to 28 days old by thermal cauterisation. Local anaesthetic (LA) is required for disbudding of calves that have attained the age of 15 days.

Note: Caustic dehorning chemicals must not be used. They can spread into the eyes if the skin gets wet.

What is the best age to disbud calves at?

Where practical, calves should be disbudded while horn development is still at the horn bud stage, or at the first available handling opportunity beyond this age. This is because the procedure involves less tissue trauma when horn development is still at the horn bud stage, and there is no attachment of horn to the skull of the animal.

What are the main methods used for disbudding of calves?

A cauterisation method (i.e. using a heated disbudding iron) is used to remove the horn buds.

The best location to anaesthetise is halfway between the base of the ear and the corner of the eye. Feel for a bony ridge in this area; the cornual nerve runs under that ridge. Insert a 5/8" needle up to its hub under the ridge and inject 2ml of the local anaesthetic (Adrenacaine).

Pull back while still injecting so that the last bit of local is injected just below the skin. Then repeat on the other side.

Successful disbudding

Because the horn grows from the skin around its base, you must remove or destroy a **complete ring** of hair (1cm wide) around the horn base. Check that the excised ring is wide enough because some horn will grow if the ring is not complete.

A 1cm wide ring of hair is enough – any more will make a larger wound, cause avoidable pain, and delay healing.

Checklist for hot-iron disbudding

- No matter if the cauterizing iron is heated by fire, propane, battery or AC current, the barrel must be larger than the horn bud so that a complete ring of tissue around the horn bud base is cauterized. Workers should wear gloves to protect their hands.
- If the calf is not sedated, then its head must be completely restrained by a halter or other device in head locks. Inadequate restraint results in excessive tissue damage and increased processing time. The calf's ear should be held out of the way.
- Preheat the cauterizing iron to a dull red colour. The iron should be hot enough to produce an even and complete circle when applied to a piece of wood for 2-3 seconds.
- Place the hot iron over the horn, hold it with firm pressure. After the hair starts burning, rotate the iron around the bud to evenly distribute the heat.
- Continue the application until a copper-coloured ring of cauterized tissue encircles the bud, but no longer than about 10-20 seconds. Excessively long application may allow enough heat to be transferred through the skull to damage the brain.
- Inspect the calves and cauterize any arteries that are still bleeding. Following removal of the horn bud spray the wound with aluminium spray. The scab should fall off within 4 to 6 weeks.
- Watch calves carefully for at least 10 days after disbudding for signs of infection or fly strike and treat if necessary.

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AHI Animal Health Ireland.ie
Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co Leitrim N41 WN27.
Phone 071 9671928 Email nmorgan@animalhealthireland.ie Web www.animalhealthireland.ie