A Guide to Good Practice

September
2020

BIOSECURITY

# Protecting against bovine tuberculosis

GDS France
L'action sanitaire ensemble

MINISTÈRE
DE L'AGRICULTURE
ET DE L'ALIMENTATION
*Liberté*
*Égalité*
*Fraternité*

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| **Photo credits:** | | |
|---|---|---|
| Patrick Bardoux | GDS 01 | Stéphanie Philizot |
| Jean-luc Chevalier | GDS 23 | Didier Raboisson |
| DDPP 01 | Sébastien Girard | Edouard Réveillaud |
| DDPP 24 | Antoine Guidici | Jean-Luc Simon |
| Franck Etcheverry | Anne Legoupil | Françoise Garapin |
| Ariane Payne | | |
| **Editors:**Jean-Luc Chevalier – GDS France | **Layout and illustrations**:Nina Chevalier | |

# Foreword: Biosecurity and tuberculosis, why a guide to good practice?

Biosecurity is the main sanitary prevention tool available to livestock farmers. It is based on a strategic approach to the analysis and management of the risks that threaten the health of the animals on a livestock farm. It is embodied in an action plan that sets out all the steps taken by the farmer to prevent the entry, circulation and development of pathogens on his or her farm, as well as seeking to prevent the spread of disease.

**Farmers are responsible for sanitary prevention on their farms.**

An EU regulation of 2016 restates the role and responsibilities of farmers in safeguarding the health of their livestock by applying prevention and control measures to counter the spread of disease.

The **2017-2022 national control plan** for bovine tuberculosis defines the development of biosecurity as one of four core objectives, stating: "a national working group will draft a Guide to Good Practice focusing on the risk of tuberculosis on bovine livestock farms based on current knowledge and experience in the field."


**The main goal of the present Guide to Good Practice** is to help livestock farmers improve their knowledge of the core risk factors where tuberculosis is concerned, and to describe the steps to be taken to address them.

It is therefore a reference document produced for farmers and the organisations advising them. Its application is voluntary. However, some measures may be imposed by government on farms with disease outbreaks and in certain geographical areas (through official orders issued by Prefectures).

The Guide is intended to provide **a robust foundation** for building training and technical support tools that may be needed by cattle farmers in order to protect their operations and limit the migration of mycobacteria to other farms and to wild fauna.

It is intended to be **evolve over time**. Scientific knowledge and field observations must be exploited to keep this Guide up to date.

The **scope of application** of the Guide covers bovine livestock farms, as well as those holding ruminants, located in regions where the presence of bovine tuberculosis has been detected, in addition to farms with epidemiological links to tuberculosis outbreaks.

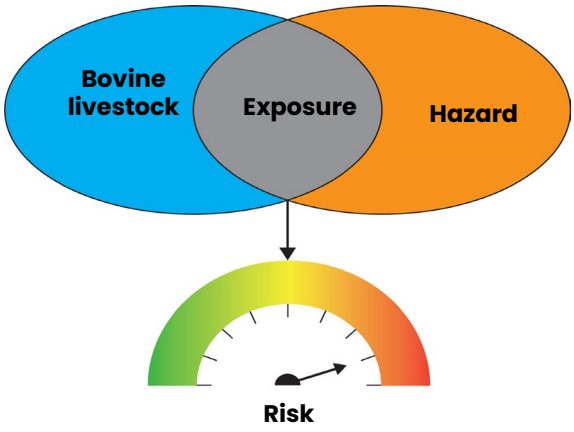
**Towards a holistic approach to biosecurity.**

This Guide to Good Practice deals with issues on livestock farms for which the farmer is responsible. This must not lead to underestimation of the major importance of the roles played by a range of other actors to whom biosecurity is just as relevant: other farmers, livestock dealers, government agencies, carcass disposal, veterinarians and other service providers on farms, as well as the official bodies responsible for the surveillance and control of wild fauna. Prevention of bovine tuberculosis is everybody's concern.

This Guide does not describe measures for the protection of the health of human beings and non-ruminant species on farms: e.g. dogs or cats. It covers risk factors relating to the introduction, circulation and spread of bovine mycobacteria on the livestock farms involved.

**Avoidance of confusing *risks* and *hazards*.**

The presence of mycobacteria capable of transmitting bovine tuberculosis in the environment or in the organisms of domestic or wild animals in the area around the farm represents a **hazard** capable of causing harm. The **risk** of infection will depend on the level of **exposure** to that hazard (e.g. intensity, repetition, duration). The purpose of biosecurity measures is to eliminate or limit that exposure, thereby reducing the risk.




Another term used is **"hazard source"**, e.g. a bovine animal or a badger infected by tuberculosis or a contaminated environment. **Risk factors** are the main practices and circumstances that lead to a higher probability of exposure of bovine livestock to the hazard.
In geographical areas where tuberculosis is known to exist, the hazard is actual. It is therefore imperative to control the risks by implementing the whole range of biosecurity measures.

**Biosecurity as part of a holistic control plan.**

The purpose of this Guide is to help livestock farmers protect against bovine tuberculosis. It must however be recalled that the steps taken by others, most notably government, either in the form of its own measures, or through mandatory regulations, contribute to a large extent to reducing the risk of circulation of tuberculosis, thereby enhancing the efficacy of on-farm biosecurity plans.

For example, the following are important:

- Systematic screening in abattoirs.
- Mandatory screening on farms (prophylaxis and movement controls).
- The livestock traceability system (on farms and in commercial transactions).
- Management of tuberculosis outbreaks (epidemiological surveys, culling of reactive livestock, speed of outbreak management).
- Wild fauna screening and management programmes.

**The central role of the farmer in assessing risk and implementing a farm biosecurity plan.**

This Guide is a reference manual for good preventive practice. It should not be seen as offering a list of measures to be applied in every situation irrespective of the level of risk.

Awareness of bovine tuberculosis and the risk factors for transmission of mycobacteria is a key first step for farmers in obtaining agency in preventing tuberculosis.

Farmers must be able to identify the risk factors specific to their own operations, to rank them and to determine the basic measures to be applied, following a timetable to suit their specific constraints. Not only this Guide, but also the training, communication, audit and self-assessment tools produced by the expert group all contribute to achieving this goal.

Faced with a risk factor, there is often more than one way of limiting or eliminating the risk concerned. It is up to farmers to decide which is most appropriate for their own farms among all the solutions either proposed or conceived by themselves. However, measures must be effective and practical.

**Biosecurity for protection against tuberculosis… as well as other sanitary hazards.**

The main goal of this Guide is to help farmers to protect against tuberculosis. However, tuberculosis is only one of the sanitary hazards that farmers face.

**Most of the preventive measures against tuberculosis are highly effective in protecting against other diseases.** That fact can only heighten the attractiveness of the measures proposed.

**The right approach**

Under the joint leadership of DGAL and GDS France, a group of experts from the following official bodies has been formed: ANSES, DDecPP, DGAL, DRAAF, ENVT, GDS, GTV, INRA and ONCFS.

Making use of the available scientific knowledge and experience gained in the field, the group has endeavoured to identify the main risk factors and to determine the steps to be taken to curb each. The efficacy and feasibility of those measures were evaluated.

This Guide is in four parts: the first sets out some known facts regarding tuberculosis, the second surveys the various risk factors specific to bovine tuberculosis and makes recommendations aimed at limiting the risks of the introduction, circulation and spread of bovine tuberculosis.

The third part of the Guide contains a reminder of the core foundation of cattle farm biosecurity, and the fourth, published separately, comprises technical datasheets and tools for evaluating the gravity of risks and the effectiveness of measures, along with audit and self-assessment tables.

**List of members of the Biosecurity & Tuberculosis group:**

**ANSES:** Benoit Durand, Maud Marsot

**DGAI:** Fabrice Chevalier, Nadia Ihadadene, Pierre Jabert (Sylvatub), Louise Veron (IPEF intern)

**DDCSPP 24:** Franck Martin

**DDPP 21:** Elisa Baudon, Kamel Benhabria, Marie-Eve Terrier

**DRAAF NA:** Françoise Garapin, Edouard Reveillaud

**DRAAF BFC:** Sébastien Girard

**ENVT:** Didier Raboisson

**GDS France:** Jean-Luc Chevallier, Kristel Gache, Isabelle Tourette

**GDS 21:** Gilles Rabu

**GDS 16:** Elodie Chovaux

**GDS 24:** Stéphanie Depraz

**GDS 14:** Jean-François Rouland

**INRA Dijon:** Alain Hartmann

**OFB/GDS 21:** Ariane Payne

**SNGTV:** Marina Beral (OVVT BFC), Eric Perigaud, Stéphanie Philizot

**The following also contributed to the group's work:**

Patrick Bardoux (GDS 24), Julie Blaziot (GDS 64), Maria-Laura Boschiroli (LNR), Floriane Boucher (GDS France), Anne Bronner (DGAI), Lisa Cavalerie (DGAI), Eric Collin (SNGTV), Alexandre Desjours (Farago), Estelle Fournier (Farago), Anne Legoupil (GDS 14), Mikaël Moussu (DRAAF NA), Paul Perié (SNGTV), Jean-Pierre Vernozy (DDPP 64).

# 1. Bovine tuberculosis

## 1.1 • Tuberculosis is a human health hazard.

Tuberculosis is an infectious disease common to human beings and numerous animal species. It is caused by various species of bacteria in the genus *Mycobacterium*.

It is among the worst known sanitary scourges. Despite a sharp retreat of human tuberculosis over the course of the 20th century, it is estimated that each year it continues to kill more than one million, two hundred thousand people around the world (WHO 2019).


Bovine tuberculosis is caused mainly by *Mycobacterium bovis,* and to a more limited extent by *Mycobacterium tuberculosis* and *Mycobacterium caprae.* Human infection by *Mycobacterium bovis* was common a century ago.

This is still the case in some countries, especially in Africa, where farmers have been unable to eradicate it from their herds.

Today in France, patients suffering from tuberculosis are almost always infected by the "human" *Mycobacterium tuberculosis* strain, and in most cases have caught the disease outside metropolitan France.

Instances of human tuberculosis caused by the bovine bacillus are still rare (around 2%) and in the vast majority of cases have been imported from abroad. Nevertheless, close attention needs to be paid to individuals who may be exposed to risks of transmission of bovine tuberculosis: livestock farmers, abattoir workers, veterinarians.

## 1.2 • France is free of bovine tuberculosis – an advantage for trade.

In the 1950s, tuberculosis was present on one quarter of all French cattle farms (DGAL).

From the 1960s onwards, substantial efforts led to healthier herds, thereby protecting the public. In 1965, 10% of all herds were infected, compared with 1% in 1980 and 0.1% in 1994.

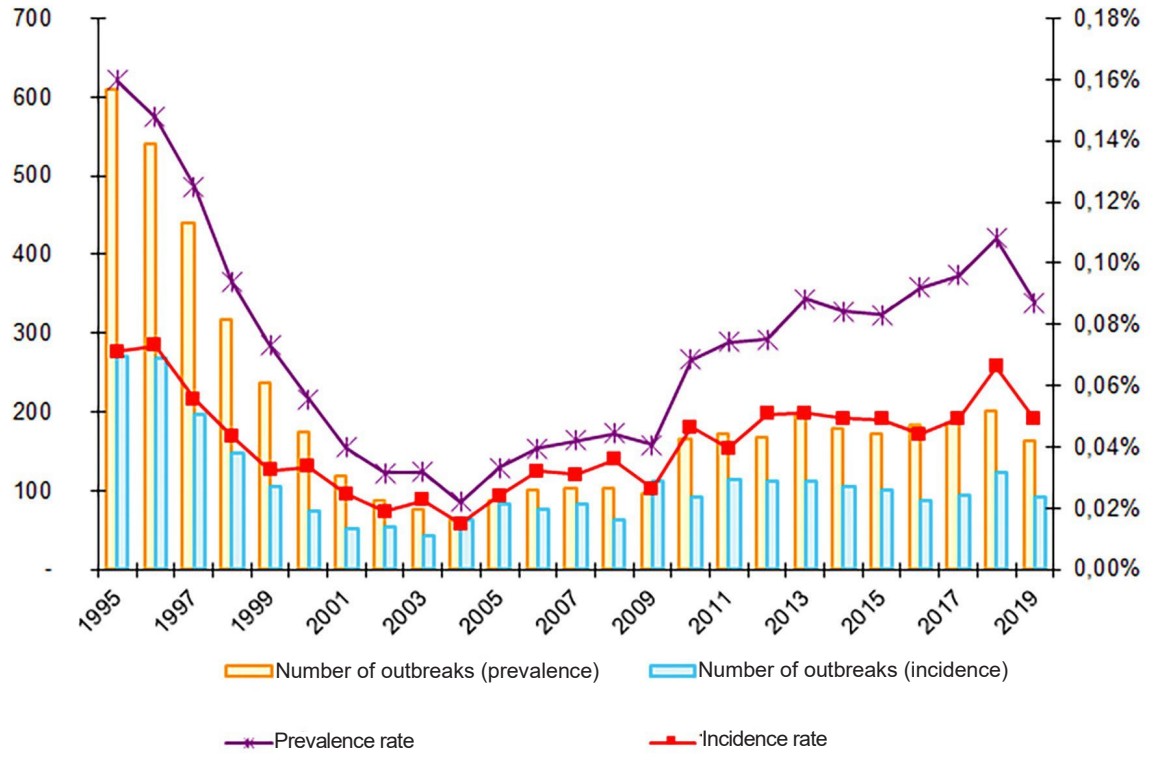

In 2001, France obtained disease-free status for tuberculosis. This was beneficial to trade with neighbouring countries (removing the need to screen grazing stock before despatch to Italy).

Thanks to this status, prophylactic measures have been relaxed across most of the country, leading to major savings for French farming as well as winning new markets for the agrifood industry.

For the last ten years, France has been faced with a resurgence of tuberculosis involving a hundred or so new outbreaks each year.

France's disease-free status is under threat. The purpose of the efforts made in the past, and particularly the intention of the decisions taken in the context of the 2017-2022 national control plan, is to maintain it.

Its loss would be a substantial impediment to the export trade in grazing and breeding stock, as well as in international trade in dairy products.




**Incidence** is the number of new disease outbreaks in a calendar year. The incidence rate is calculated by dividing the incidence by the number of French herds in the relevant period.

**Prevalence** is the number of outbreaks at a specific time, for example as of 31 December of a given year. Prevalence therefore includes, as of that date, all outbreaks that are still covered by an official declaration of infection, whether declared recently or the year before (but not "outbreaks" that have been fully cleared).

▲ **Numbers of outbreaks of bovine tuberculosis over the period 1995-2019 (source: DGAL).**

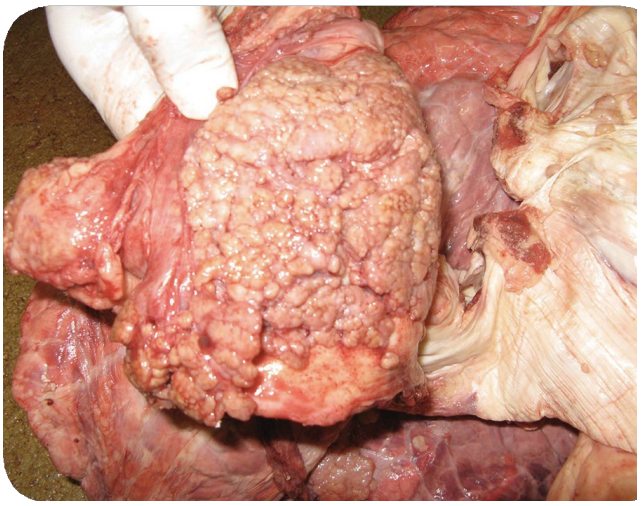
## 1.3 • Bovine tuberculosis: a latent infection.

*Mycobacterium bovis* is capable of infecting many mammalian species. It is resistant to the open-air environment, especially if it is protected from light since it is vulnerable to UV.

The tuberculosis bacillus can survive In cow dung for up to two months in summer, and five months in winter.

It is able to multiply only in living cells. **Cattle become infected via the respiratory tract or by ingestion. Only a very small quantity of mycobacteria is enough to infect bovine livestock if inhaled.** The greater quantity is required in the case of ingestion, but repeated contact will increase the risk. Where the infection is under control in the organism, the mycobacteria have either been destroyed or are contained inside tissue cysts.

In the latter case, they are nevertheless still viable and it remains possible for the lesions to open up and spread the mycobacteria inside (and outside) the organism.



▲ **Bovine tuberculosis lesions (source: DGAL).**

The immune reaction in an animal infected with mycobacteria leads to sensitivity that can be detected using a tuberculin skin test. Immunity is partial and relative. It can be easily overcome if the animal's general health deteriorates as well as in the case of massive or repeated infection.

**Tuberculosis an infectious disease whose development is chronic. Its progress is slow and gradual, taking months or years.**

However, even cattle that are latent carriers, i.e. animals that show no symptoms and, in some cases, do not react to screening tests, can excrete the bacillus. Such excretion will reach very high levels if the lesions have opened up.

In cattle, in which lung damage is predominant, nasal discharge, saliva and expectoration lead to atmospheric dispersal of aerosols responsible for airborne transmission. Dung, urine and milk are also capable of transmitting the infection.

## 1.4 • Biosecurity: one of the tools in the bovine tuberculosis control plan.

Improvements in the procedures and the efficacy of screening, better management of suspected infection and elimination of infections, efforts to identify every farm linked to an infected herd, improved knowledge of the role of wild fauna and regulation of the populations infected: all these are measures in the 2017-2022 plan that accelerate a return to satisfactory sanitary status in regions confronted with tuberculosis.

On-farm biosecurity is part of this disease control plan. All livestock farmers, especially if they are located in geographical areas where outbreaks are numerous and the wild fauna is infected, must protect themselves by limiting the risk of seeing tuberculosis enter and establish itself on their farms. Where a farm is infected, further spread of the disease must be avoided.

## 1.5 • Risk factors associated with tuberculosis.

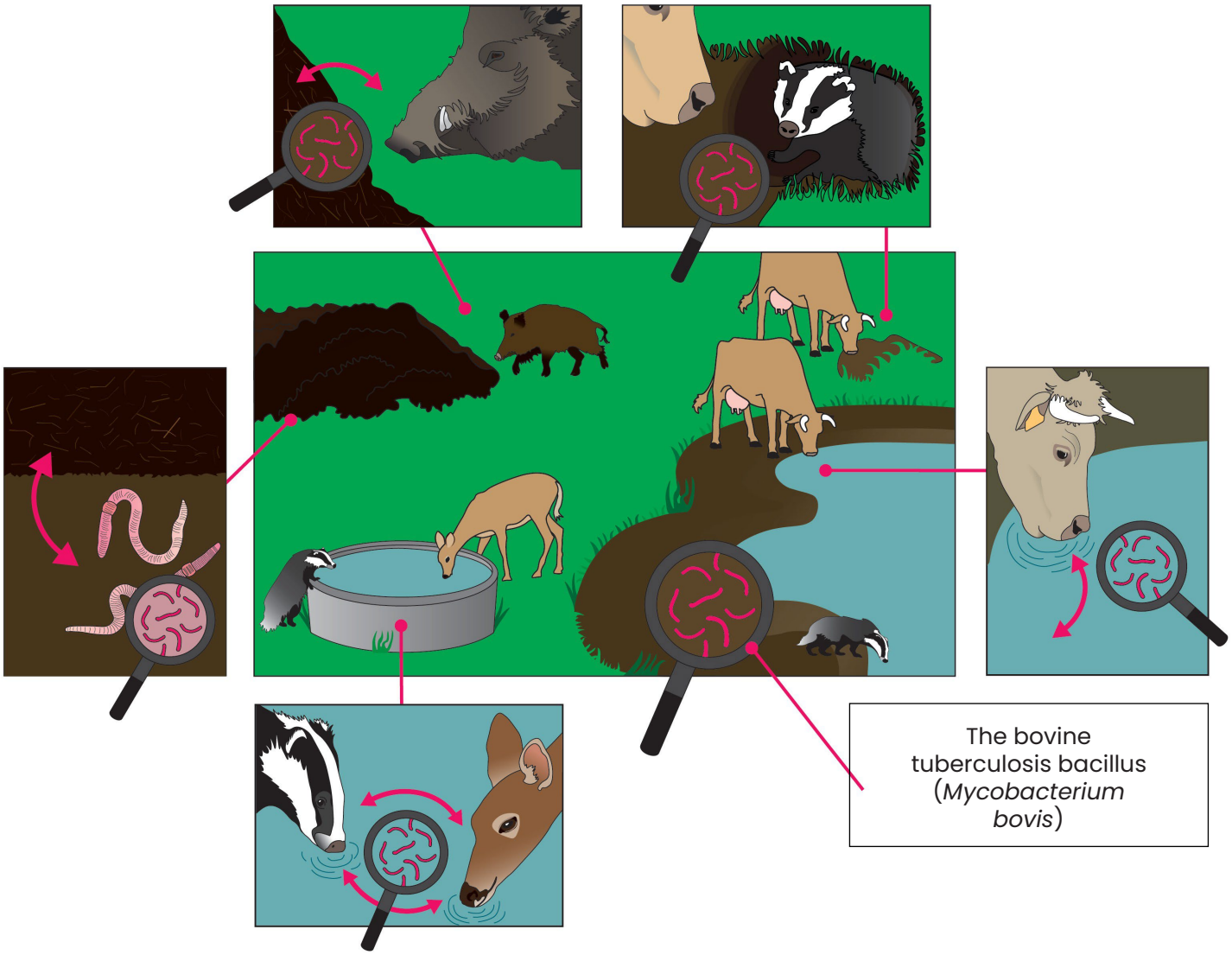
French and international research (see appended bibliography) has been able to identify the main risk factors associated with bovine tuberculosis:

- **Direct contacts between cattle:** common grazing, contact over or through fencing, strays, etc.
- **Addition of infected cattle to a herd.**
- **Indirect contact between cattle** on different farms: contact via slurry or manure, shared equipment, shared grazing, watering and feeding points, etc.
- **Direct and indirect contact with wild fauna:** shared feed and watering points, presence of wild fauna in grazing areas, intrusion of wild fauna into farm buildings, etc.

## 1.6 • The role of wild fauna in the multi-host system.

The causative agent of bovine tuberculosis is capable of surviving in the environment and infecting a range of domestic and wild species. In some situations, *Mycobacterium bovis* is in circulation and is established in populations that are receptive to tuberculosis while playing diverse epidemiological roles.

Such populations are interconnected directly and/or indirectly via the environment: the result is described as a **multi- host system.**




▲ **In a multi-host system, cattle, wild fauna and the environment all contribute to the persistence and circulation of tuberculosis.**

The various species may play a variety of roles in ensuring the circulation and persistence of the disease:

- **Maintenance or reservoir hosts** can allow the infection to remain present due to infections within the species and represent a source of infection for other, receptive species.
- **Bridge hosts** are incapable alone of maintaining the presence of the infection on a long-term basis without a source of infection from outside the population, but they can transmit the pathogen to another population.
- Some species are **epidemiological dead-ends** and play no role in maintaining or transmitting the infection.

Cervids, wild boar and badgers are considered in France to act as bridge hosts capable of playing a role in infecting livestock farms. These species are subject to surveillance as part of the national "Sylvatub" programme. The role played by foxes will be more accurately determined in 2021.

The role of a maintenance host has been demonstrated only in the very specific instance of cervids in Brotonne Forest (Seine Maritime). Direct and indirect contacts between wild populations and cattle are a key factor in determining the transmission of tuberculosis between wild and domesticated animals.

Biosecurity measures can limit the intensity and frequency of such contacts. When used in combination, if necessary, with regulation of the populations of certain wild species, they can reduce the risk of infection of bovine livestock and wild animals by reducing exposure to the sources of infection.

The tuberculosis bacillus can last for months in an outdoor environment, especially in damp conditions sheltered from direct light. Badger setts provide highly favourable conditions for its survival.

Infected badgers may shed the bacillus via a number of pathways: respiratory, faecal and, more rarely, urinary. The presence of the bacillus has been detected at entrances to badger setts and in "latrines" used by infected badgers.

Trampling areas around ponds and watering points provide a highly favourable medium for the survival and exchange of the bacillus between wild animals and cattle.

The multi-host system in which wild fauna, cattle and the environment all contribute to the maintenance of the infection greatly complicates preventive action against tuberculosis.

For more information, please consult the technical datasheet entitled *"The epidemiological role of wild fauna in France".*

## 1.7 • Biosecurity for reducing infection risk.

Reinforcement of biosecurity measures will limit the risk of the circulation of tuberculosis but will not always eliminate it.

Such measures do not provide certainty that no infection is possible. On the other hand, by combining steps aimed at reducing exposure to the bacillus, it is possible to reduce the risk of infection to an acceptable level.

That is why there should not be a focus on a single risk factor or a single preventive measure, but rather the farm's risk factors should be identified, evaluated and ranked by seriousness and probability, followed by an effort to define the steps to be taken, emphasizing efficacy and feasibility.

## 1.8 • Biosecurity: the transition from risk analysis to preventive measures.

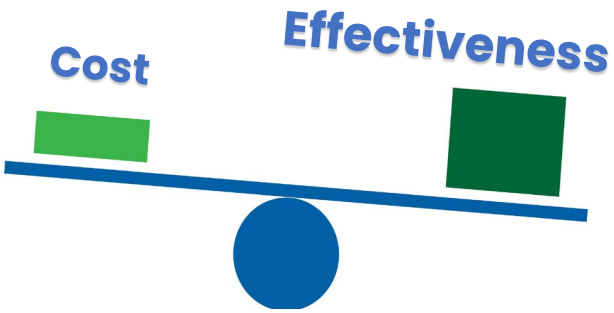
This Guide to Good Practice enables the main risk factors for tuberculosis infection to be listed. Depending on the farm's circumstances, not all possible risks will be equally serious or likely. In the case of each risk factor, its gravity (level of exposure to the tuberculosis bacillus; impact) and probability must be considered alongside the risk.

For example, badger setts are quite often located in grazing areas, but the seriousness of that presence will depend on the level of infection in the local badger population. In a region where tuberculosis is no longer detected, the likelihood of exposure to the bacillus of the disease for a cow grazing near a sett would be virtually zero. On the other hand, it would be high if selective trapping has revealed the presence of tuberculosis in the badgers.

This approach makes it possible to highlight the risk factors that present the highest probability and the greatest seriousness. They represent critical points that will need to be addressed with preventive measures. These concepts of gravity, efficacy and feasibility may vary according to the situation on each livestock farm.

Risk factor score tables can help in building a customised biosecurity plan.

Each preventive measure can be evaluated on the basis of its cost/effectiveness ratio.




## 1.9• The farm biosecurity plan.

All livestock farmers need to define the preventive measures they will put in place in consideration of the types of hazards the farm faces and the risk factors specific to its operations.

Given the resources available, farmers need to make choices, prioritising the most effective steps for the highest-probability, most serious risk factors. They must be able to answer the following questions: *What needs to be done? Starting when?* and *For how long?*

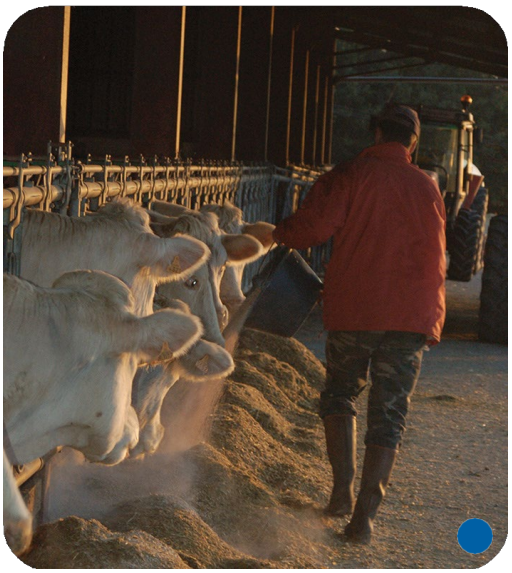
While some measures are best implemented on a permanent basis, it is acceptable for other, more highly demanding measures to be applied only provisionally, during a crisis, and later abandoned once the level of risk relating to neighbouring livestock farms or wild fauna has diminished.

The relevant programme of actions is set out in detail in the *Farm Biosecurity Plan*.

## 1.10 • Involvement of all individuals working on the farm.

The involvement of all individuals on the farm is essential if the biosecurity plan is to be effective. The measures must be followed by everybody on the farm irrespective of their status.

Particular attention should be paid to individuals with ties to other livestock farms: employees shared between farms, interns, family helpers (e.g. a grandparent who has kept a few animals). They should use boots and overalls reserved for use on the farm and kept on site. If not, the boots used must be washed and disinfected and overalls must be clean before entering the farm.



## 1.11 • The farm and surrounding area.

Biosecurity quickly comes up against its limitations when implemented on a single livestock farm located in a highly infected environment, especially if its neighbours take no precautions to protect themselves and to protect others.

In such circumstances, it is recommended that all livestock farms in the geographical area "at risk" should be educated and informed to encourage them to put their own biosecurity measures in place and to do so, if possible, in coordination with the others.

# 2. Biosecurity: appropriate measures for tuberculosis

Most contagious bovine diseases are transmitted from one animal to another either directly by contact between them or indirectly through contact with soiled materials and equipment. In our part of the world, wild mammals are only rarely implicated in the spread of cattle diseases. This is not the case with bovine tuberculosis, which is transmitted via a multi-host system involving bovine livestock on the farm (latent infection) or other livestock farms (e.g. livestock bought in, herd intermixing, adjacent pasturage), and various wild species through direct contact or, more especially, contamination of the cattle's environment.

For greater effectiveness, **it is essential not to focus exclusively on one source of transmission but to consider all factors.** This is particularly true in areas most at risk of tuberculosis, where the need is not simply to protect one's own farm but also to protect neighbouring herds and wild fauna that, once infected, could contribute to subsequent reinfection of the farm.

**The objective is to avoid contamination of grazing land and to limit the risks arising from intrusion into farm buildings, from slurry and manure, and from cattle movements.**

## 2.1 • Avoidance of pasture contamination.

Numerous studies (see appended bibliography) confirm the major importance of the infection of cattle via pasturage. In "infected areas", it is essential to prevent contact between herds grazing on adjacent pastures and to reduce contact with wild fauna.

Tuberculosis can be transmitted through direct contact between cattle by inhalation of infective particles (e.g. coughing), or ingestion: muzzle-to-muzzle contacts, licking, nasal discharge, etc. Transmission may also occur through indirect contact, soiled drinking water, feed, salt licks and areas adjacent to where cattle are housed and fed.

### 2.1.1 • Avoidance of herd intermixing due to stray animals

This is a key measure for limiting the risks of infection by most diseases transmissible by direct contact between cattle, particularly tuberculosis.

In order to reduce this risk, it is necessary to ensure regular fence maintenance and refrain from putting bulls and females out to graze in close proximity. The obligation to maintain fencing and prevent livestock from straying applies to all farms (cf. the French Rural Code).

Fines may be levied where an animal representing a hazard for human beings or livestock strays from its designated area.

Where a neighbour regularly allows their cattle to stray, and if that neighbour will not listen to reason, the local mayor should be asked to intervene using mayoral policing powers as necessary to oblige the uncooperative farmer to comply.

Where herds intermix by accident, the group of animals concerned should not be returned to the herd without first isolating and possibly screening them (the veterinarian should be consulted).

▲ **Stray livestock constitute a hazard.**

This is also a measure that can prevent diseases potentially transmitted through environmental contamination: e.g. tuberculosis, paratuberculosis, digital dermatitis.

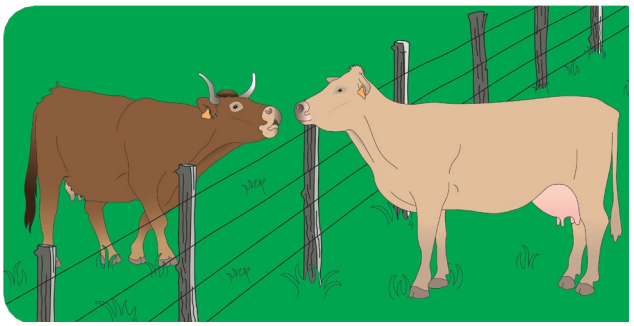
### 2.1.2 • Prevention of "over the fence" contact between neighbouring herds.

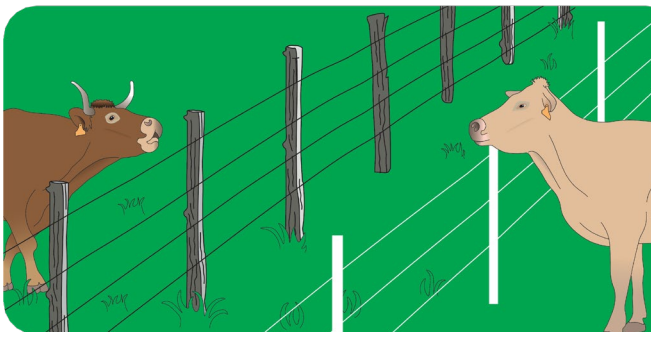
"Over the fence" refers to contact between cattle grazing on two adjacent fields where they can approach sufficiently closely over or through the fencing to allow transmission of disease by direct contact.

Where herds are placed on adjacent fields, bovine social behaviour will lead the animals to devote significant time to seeking contact with the cattle grazing on the other side of the fence. It is for this reason that "over the fence" contact is one of the main risk factors for inter-farm infection.

A number of possible solutions exist for protection where herds are grazing on adjacent pastures.

**Erection of double fences** will prevent muzzle-to-muzzle contact. This is highly effective on condition that both fences are robust, regularly maintained and adequately spaced (at least 1.5 metres). They may be permanent or temporary.





▼ **The distance between the two fences must be sufficient to prevent contact between the cattle.**

**Pasture rotation:** the aim here is to reach an arrangement with neighbouring farmers to ensure that each farm's cattle do not graze side by side with another's at the same time. This is a highly effective step but requires good relations, coordination and considerable mutual consultation.

**Pasture swapping** based on amicable agreement or as part of a land reparcelling process may also allow contact between cattle to be limited. This is a very effective measure that requires good relations between the farmers concerned.

Similarly, sufficiently impenetrable **hedges** can prevent contact between cattle. This is effective but requires time to put in place.

**Fencing off areas** deemed to present a risk, or their use for crops or fodder may be envisaged where the risk of infection is too high and preventive steps would be too costly or insufficiently effective.

### To avoid high-risk grazing:

▲ **Crops adjacent to an infected neighbour.**

▲ **Haymaking in a field surrounded by woods.**

Such measures need to be applied flawlessly given that just a few metres of inadequate fencing are enough to permit contact between cattle on adjacent fields.

The risk is increased in areas where a number of livestock farms are infected. In areas where the risk is highest, common grazing should be totally excluded.

Choosing which cattle to put out to graze on the highest-risk fields may make it possible to limit the risk of infecting the entire herd. For example, in the vicinity of a herd at risk, it will be preferable to put out to graze cattle scheduled for rapid despatch to the abattoir, and which it is not planned to return to the herd.

> The above measures are also effective in avoiding infection by other pathogens (e.g. IBR, BVD, paratuberculosis). Rotational grazing is recommended for protection from neighbouring farms where the cattle are infected with besnoitiosis (the parasite is passed between animals by gadfly and stable fly bites).

### 2.1.3 • Prevention of watering-related risks.

Mycobacteria can remain viable by forming a biofilm in watering troughs. They can be carried by water over short distances.

Cattle watering points may attract wild fauna, especially when natural water sources have dried up.

Damp areas (springs and "wetland") in grazing land favour the continued presence of mycobacteria.

▲ **A grazing/watering configuration with several risk factors.**

### 2.1.3.1 • Avoidance of sharing watering points with other herds.

Watering troughs should be provided for specific use by each individual herd.

### 2.1.3.2 • Avoidance of watering directly from natural water bodies.

Ponds and streams with limited flow shared by more than one herd and accessible to wild fauna should be avoided.

### 2.1.3.3 • Prevention of cattle access to wetland areas in pasture,

by fencing off wetland areas (or draining them if this is feasible). Fencing off wetland is essential if the wild fauna is infected.

### 2.1.3.4 • Protection of the approaches to watering points.

Stagnant water and mud allow mycobacteria to survive. The solutions should match the circumstances: e.g. changes to the path down to the watering point, installation of a remote-discharge water take-off system to ensure that the trough does not overflow directly, installation of a cut-off float, laying a crushed rock surface under artificial watering points.

### 2.1.3.5• Prioritisation of suitable troughs, ideally with a raised water outlet, over 75cm high if possible, or a nose pump,

plus a float guard to prevent access by wild boar and badgers. Troughs should be cleaned (due to biofilms, soiling and scaling), and if possible disinfected, twice yearly.

Different solutions for safe access to water:

▲ **Water course fenced off, installation of a watering trough and a layer of crushed rock.**


▲ **Nose pump.**

▲ **Electric pump.**

▲ **Changes to site to avoid creating muddy areas.**

### 2.1.4 • Avoidance of risks linked to outdoor feed dispensing.

**Feed concentrates, minerals and salt licks attract wild fauna that may soil and contaminate the immediate area.**

This can also be a source of infection of wild fauna by cattle

### 2.1.4.1 • Feed concentrates should not be dispensed at ground level; dispense feed in the morning

and sufficiently only for the day in order to avoid feed remaining during the night. Excess feed will attract wild fauna.

### 2.1.4.2 • Salt licks and mineral tubs should be raised off the ground by more than 75cm.

▲ **Feed should be placed out of reach of wild animals.**

### 2.1.5• Limitation of open-air contact with wild fauna.

Where wild species are likely to be infected, it will be necessary to ensure that cattle do not come into contact with their droppings, secretions or habitat.

Farmers can also take steps by facilitating the work of people with responsibility for wild fauna, specifically by providing valuable assistance to those laying traps: notifying the presence of wild fauna, monitoring traps, etc.

#### 2.1.5.1 • Prevention of contact between cattle and badger setts and latrines in grazing areas.

It is an acknowledged fact that badger setts may act as environmental reservoirs for *Mycobacterium bovis* (stable temperatures, ideal humidity levels, UV protection). Fencing can be set up around setts to keep cattle at a distance in order to prevent them inhaling aerosols from soil in the sett.

▲ **Cattle near a badger sett.**

This measure may be combined witrh trapping if this is authorised and necessary.

Badger latrines can be fenced off or disinfected (liming: lay 0.5kg/m² and then dampen the soil).

▲ **Badger latrines.**

If preventing cattle from approaching setts in a field is problematic, and if it is known that the setts are or have been used by infected badgers, it is preferable to avoid using the field for grazing, e.g. by mowing it, for the time required to restore it safe sanitary status.

#### 2.1.5.2 • Discouragement of wild boar and cervids on grazing land

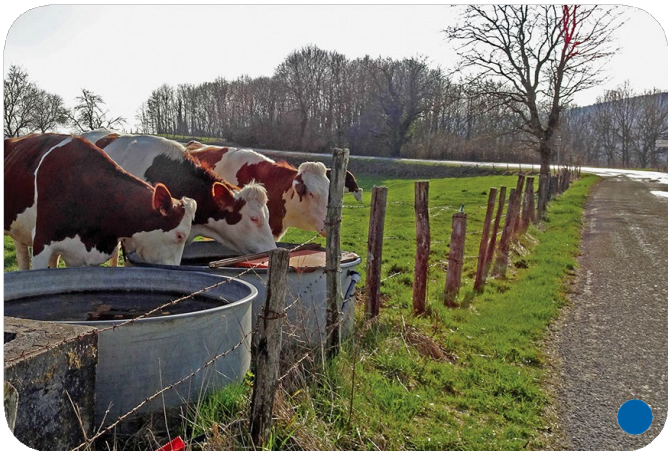
by reducing its attractiveness (access to water and feed) and, where feasible, by setting up suitable fencing.

#### 2.1.5.3 • Prevention of cattle access to dense wooded areas

that may be home to wild fauna, especially if it has been demonstrated that infected wild animals are present in the area and badger setts have been found.


**Night photography has revealed that wild animals are attracted to watering and feed points on pastures.**

**2.1.5.4 • Watering and feed points should be located in less accessible areas**
for wild animals (distant from wooded areas, for example).



## 2.2 • Limitation of risks linked to intrusion into farm buildings.

Badgers, foxes and wild badgers are capable of entering farm buildings, drawn there by the availability of feed and water. This has been demonstrated by CCTV footage.

A study of typical cases for tuberculosis risk factors (Marsaud *et al.*) shows that in an infected area the risk of tuberculosis infection in a herd increases significantly where the farm is using a building located more than 300 metres from living accommodation.

This may be explained by the fact that in such circumstances animal intrusion into a building is easier and more frequent.

The recommended measures are intended to limit access of wild fauna to farm buildings, feed stores and dispensed feed.

Such measures are all the more essential if the relevant buildings are isolated from living accommodation and wild fauna are known to be infected.

### 2.2.1 • Prevention of entry of wild fauna (and stray cattle) into closed farm buildings.

Intrusion by badgers, foxes and wild boar is made possible by exploitable gaps: holes in walls, doors left open and doors that do not reach ground level (10-15cm between floor and door can be enough to allow a badger to enter).

The simplest solution is to close such gaps or, if it turns out to be a better solution, to close off the farm site.

### 2.2.2 • Prevention of entry of wild fauna (and stray cattle) into partly open farm buildings.

The aim in this case is to prevent intrusion by badgers, foxes and wild boar into feed dispensing alleys, stalls and feed stores.

A solution to be considered might be to close the building if this would not lead to negative consequences, especially with regard to building ventilation and the organisation of farm work. Closure of the bottom part of an open door panel or fencing around the farm are worth considering.

### 2.2.3 • General measures for wild fauna.

A decision may be taken to close the site only at night, using electric fences or gates in order to limit the risk from wild fauna, which has a nocturnal pattern of behaviour, a solution that will also involve fewer constraints on farm work.

NB: badgers are diggers and can, ground permitting, create passages under fences.

It is recommended that excess feed should be collected before nightfall where it is not possible to proceed otherwise (feed bunks at ground level). A mobile system for protecting the feed bunk can be set up.

If the feed bunk dispenses hay alone, the risk from wild fauna will be more limited.

The presence of dogs on the farm at night can effectively discourage intrusion by wild fauna.

### 2.2.4 • Prevention of access by wild fauna to stored feed concentrate.

Stored grain, cattle cake and other concentrated feedstuffs are highly attractive to wild fauna. It is suggested that storage buildings should be closed up to a height of one metre from ground level or the site should be completely closed off.

▲ **Night photo of a badger on a pile of grain.**

The use of cell silos is recommended.

▼ **The floor under feed chutes should be cleaned regularly.**

### 2.2.5• Prevention of access by wild fauna to silage and hay stores.

The risk is that badgers will gain access to the hay and soil it with droppings and other excreta. Silage, and especially maize silage, can be highly attractive to wild animals and they will seek to eat it (boar) or look for the worms and rodents it may contain (foxes, badgers, boar).

The aim must be therefore to prevent wild fauna gaining access to silage silos, hay and straw (e.g. electric fences, bales stored at height). Piles of straw, hay and silage can be covered with a tarpaulin when not in use. Generally speaking, feed stores should be surrounded by a wall at least one metre high on three sides and access prevented in the evening with a physical barrier or electric fence. The recommendation is that silage should not be stored far from the farm building (at the other end of a field, for example), otherwise the silo will need to be closed off.

▲ **Protection of silage using an electric fence.**

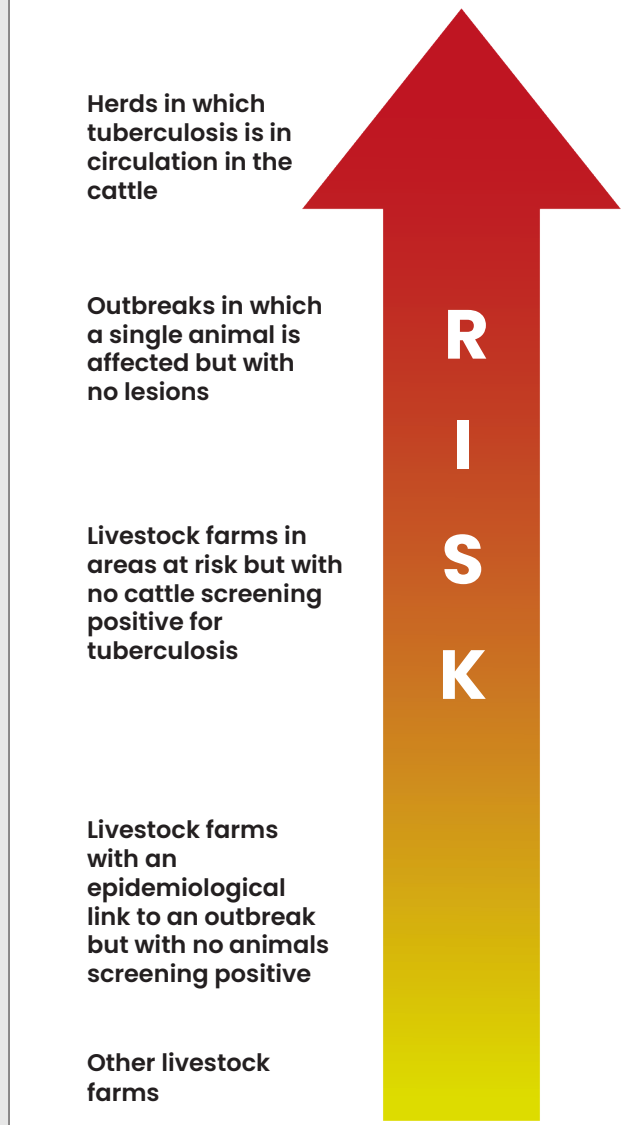
### 2.2.6 • Limitation of risks of introduction of infection by visitors, equipment, vehicles and new livestock.

This aspect is developed further in the section "*General Biosecurity*".

## 2.3 • Limitation of risks linked to manure and slurry.

The level of risk will depend on the specific status of the herds producing the manure and slurry. The herds most at risk are those in which circulation of tuberculosis between cattle has been established because mycobacteria are highly likely to be shed in their dung.

Next come disease detections in which only one animal is affected and it has no open lesions (low excretion risk), followed by livestock farms with no animals screening positive for tuberculosis but the site is located in an area at risk, followed next by livestock farms with an epidemiological link to a disease outbreak, but with no animals screening positive, and lastly all other livestock farms. This risk gradient should be considered in relation to the recommendations provided below.




▲ **The level of risk linked to manure and slurry will depend on the source farm.**

### 2.3.1 • Manure-related risks.

#### 2.3.1.1 • Protection of storage.

Manure is attractive to both domestic and wild fauna and they will be drawn to its location. Badgers, wild boar and foxes will seek in it insect larvae, along with earthworms, which can carry mycobacteria in their digestive tracts for several days if they have consumed infected material.

Where manure is considered to be potentially contaminated, and in order to prevent further contamination, it is strongly recommended that access be prevented for both domestic and wild animals.

To achieve this, the manure pile can be covered, or it can be closed off (e.g. with an electric fence). Manure must be located as far as is possible from wooded areas.

**Manure piles can be protected from wild fauna by a fence or a tarpaulin cover.**

#### 2.3.1.2 • Storage period.

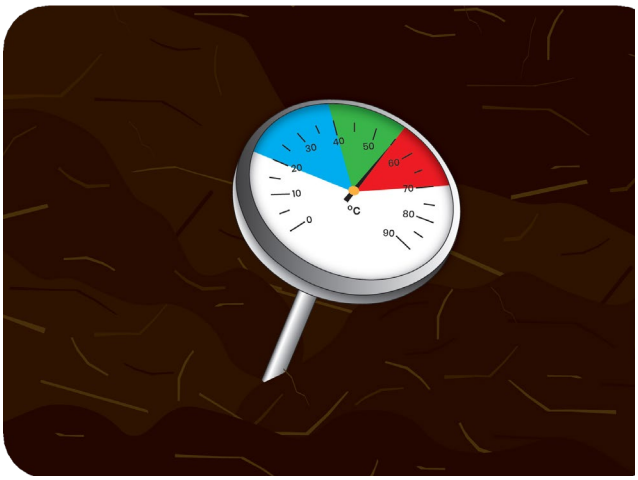
The period between the final addition to a manure pile and its spreading on fields must be sufficiently extended if the elimination of the mycobacteria is to be assured: four months would be a minimum (if risk is low) but six months is preferable (if risk is high).

#### 2.3.1.3 • Composting.

If composting is to destroy mycobacteria, the pile must be turned and humidified to ensure a rise in temperature throughout its mass to at least 55°C for more than two weeks (alternatively 60°C for seven days or 65° for three days). As a practical matter, this will be difficult to achieve by the farmer without the right equipment.

If possible, composting in a dedicated facility in accordance with European sanitary standards is recommended. The use of specialised compost turners is also an option (farm machinery cooperatives (CUMA)).

In the latter case, the equipment utilised must be cleaned, and if possible disinfected, prior to use on other farms. Regular monitoring of manure core and peripheral temperatures is necessary.




**It is imperative to monitor the temperature of the compost.**

#### 2.3.1.4 • Manure spreading area.

Manure from farms with detected disease cannot be spread on fields other than those under crops (pasture, fodder-producing areas and market gardening crops are therefore excluded).

Where no disease has been detected, but the farm is in a location subject to risk, although it may not be prohibited, it is nevertheless recommended that non-sanitised manure not be spread on pasture where it is intended to place cattle, or a period of at least three weeks should elapse before cattle are put out to graze on the relevant field. If the field is harrowed this may diminish the risk by breaking up the blocks of manure.

Where the manure is spread on land to be used for crops, it must be dug in without delay, within 24 hours.

If a farm with a disease outbreak is not growing crops, a solution must be found in consultation with government agencies.

### 2.3.2 • Slurry-related risks.

Compliance is required with regulations applicable to installations of environmental importance and vulnerable areas as well as with regional official orders laying down rules for the in-field storage of manure and the spreading of slurry and manure:

- Manure piles must not be placed at locations prohibited in the manure spreading plan or at locations possibly subject to flooding or where infiltration is likely: e.g. land faults and swallets.
- Storage duration must not exceed nine months, or ten months where the area is not vulnerable.
- At least three years must elapse before placing such stored material at the same location.

#### 2.3.1.5 • Cleaning/disinfection of shared equipment.

Shared farm equipment, when used on a farm with detected disease to pick up and spread manure, must be cleaned and disinfected before it leaves the farm. Where no disease has been detected, it must at least be cleaned.

#### 2.3.1.6 • Manure exchanges, purchases and sales.

If the manure produced on an outbreak farm has not been sanitised, it cannot be sold or exchanged (other than subject to a derogation issued by a government agency for certain use cases).

Where no disease has been detected on a farm, but it is located in an area at risk, it is inadvisable to sell the manure (this also applies to purchases of manure from livestock farms in the area).

It is not easy to disinfect and sanitise slurry. On a farm with detected disease, slurry cannot be spread on fields other than those used for crops, and this is also strongly recommended where there is no detected disease, but the farm is in an area at risk. Slurry should be dug in on bare ground in accordance with regulatory timeframes (within 12 or 24 hours).

Buying, selling and exchanging slurry are generally prohibited where a disease has been detected and is inadvisable in areas at risk.

For both slurry and manure, methanisation allows both to be sanitised only if the facility is officially approved and applies a sanitisation protocol (70°C for one hour), which is not often the case where "agricultural" installations are concerned.

In the absence of such sanitisation, the risk may even be increased if the digestates are spread on fields belonging to more than one farm. Digestates must not be spread on grazing land; they should be dug in without delay.

#### 2.3.3 • Risks linked to organic waste.

The storage area for rendering waste must not be too close to farm buildings or on routes used regularly by farm machinery. Domestic and wild animals must not have access to such waste or to carcasses.

Solutions can be suggested: e.g. a carcass bin or construction of a concrete platform surrounded by a wall more than one metre in height.

## 2.4 • Limitation of risks linked to cattle movements.

Buying, boarding and intermixing cattle all increase pathogen transmission risks.

Those risks are:

- Addition to the herd of an animal carrying *Mycobacterium bovis* following infection on a previous farm.
- Addition to the herd of an animal that has been infected in the course of a commercial transaction.
- Contact between the farm's own cattle and infected livestock from other farms.

Tuberculosis screening when livestock is added to the herd is no longer mandatory in the vast majority of situations. It is however recommended.

Screening prior to departure is obligatory for farms at risk of tuberculosis if the animals are going to a livestock farm. TB skin test results remain valid for four months.

Farmers buying cattle are not generally aware of the status of the previous herd (i.e. whether or not it presents a risk) nor of whether a TB skin test has been done, and if so, on what date. They must request this information from their GDS (*Groupe de défense sanitaire* / Livestock Health Defence Group). While awaiting a response, the animal must be kept strictly isolated. This information is also important if it is intended to test the animal on arrival in the herd, given that there must be a six-week interval between skin tests. This is because an animal ceases to react after a test for approximately 42 days. It is said to be "anergic".

**The specific case of livestock farms with epidemiological links to a disease outbreak:**

When a herd is declared to constitute a disease outbreak, all farms that have purchased cattle from that farm in previous years will be contacted by government staff. The cattle from the outbreak farm, if still present, are then tested. If they test negative, the farmer can either keep them or have them slaughtered for diagnostic purposes, the latter being the preferred option. If the farmer retains the cattle, the herd will be classified as presenting a risk of tuberculosis and prophylactic measures, the cost of which is to be borne by the farmer, will be imposed, generally for a period of three years (between one and five years) for bovine livestock more than 12 months in age. Animals sold to other livestock farms will need to be tested prior to departure.

There is always a risk in keeping cattle from a declared infected herd, even if the animal has had a negative response to a tuberculin skin test. This is so because the characteristics of the test (and the infection) do not provide 100% certainty that an animal that has "tested negative" is not carrying tuberculosis mycobacteria. For that reason, it is often preferable to agree to diagnostic slaughter where cattle test negative, against payment of government compensation.

In this case, if the animals continue to test negative in the course of prophylactic procedures the livestock farm will not be deemed to present a tuberculosis risk.

### 2.4.1 • Buying and boarding.

Farmers can add to their herds only bovine livestock from herds officially declared to be free of tuberculosis. Generally speaking, screening on the seller's farm is always preferable.

**Tuberculosis screening:**

If an animal has not been tested prior to departure (although this should have been done given that it comes from a farm at risk), the screening will need to be carried out on the buyer's farm. Where it is not known whether a test has been done, a wait of six weeks must be observed before testing the animal on the receiving farm. During that period it must be kept in isolation.

**Injection of tuberculin.**

**It is recommended that a limit be placed on the number of suppliers of bovine livestock** from areas at risk. If cattle are added to the herd from a small number of suppliers with known working practices and sanitary status, this will reduce the risk of infection. It is strongly recommended that **there should be no contact** between cattle brought in for fattening or boarding and cattle in the farm's original herd.

**IPI livestock in a heifer fattening unit.**

Where a building is subject to successive uses, **disinfection** and a sanitary break (lasting as long as possible) will be necessary following departure of the fattening livestock.

**Direct transportation** of purchased livestock should be preferred. The intermixing of cattle on trucks, at livestock assembly centres and in markets constitutes a risk that the farmer cannot control other than by requiring sellers to use well-organised, direct transportation.

An animal infected during a commercial transaction will be positive to a tuberculin skin test only after a fairly long interval (at least six weeks). Such a delay is incompatible with legal timeframes sale cancellation and exceeds isolation periods deemed acceptable by most farmers.

In all cases, the cattle transporter must be able to demonstrate good hygiene practice, especially regarding the cleaning and disinfection of trucks.


▲ **Transit through an assembly centre or a cattle market constitutes a sanitary risk that needs to be addressed.**

**Bull loans** should be avoided. If not, it will be necessary to enhance screening and movement traceability for these animals (e.g. high genetic value animals owned collectively).

### 2.4.2 • Transhumance, summer pasturage

Official registration of the locations of collective transhumance in mountain areas is mandatory. The associated livestock movements must be declared by farmers.

Other seasonal assemblies may be handled in the same manner as summer mountain transhumance if desired by the local managers (GDS, DDPP, EdE). For example, marshland or riverbank locations, transhumance through pasturage and winter lowland transhumance can all be registered, and the relevant cattle movements declared.

Depending on the mountain range and its agrarian history, types of terrain and livestock, and the manner in which grassland resources are utilised, the circumstances can differ extremely widely. What might be considered in certain locations (fencing, isolation on return, etc.) may be completely unthinkable elsewhere. The recommendations provided below are in many cases suited to the most favourable conditions and are general in character. They should be adapted to match specific circumstances.

Livestock farms in “high tuberculosis risk” areas must limit participation in herd intermixing if no precautions are taken against tuberculosis.

There should a set of sanitary rules to make it possible to restrict access to cattle assembly areas to ensure that only herds that are up to date with prophylactic measures can be intermixed. The person in charge of the "transhumance" site must act as the guarantor of observance of those rules.

A requirement may be imposed that all admitted cattle must have been tuberculin skin tested less than six months prior to the date of herd intermixing (including animals too young at the time prophylactic measures were applied). In territorial *départements* with high incidence rates, this rule could be made mandatory even for livestock farms located outside the enhanced prophylaxis area.

Farmers must be in a position to obtain verified information on the sanitary status of the herds whose cattle are to be intermixed with their own during transfer to or from the transhumance site, as well as at the site itself.

Contact with herds at adjacent transhumance sites must be avoided, if possible, (e.g. fencing, no shared watering points, prevention of straying).

Circumstances permitting, it is preferable to intermix only those animals that can be isolated on return to the farm, up to the point of application of prophylactic measures (non-gestating heifers for example).

### 2.4.3 • Off-site grazing, grass sales, etc.

This relates to cattle movements not subject to declaration in the national livestock identification database (BDNI) and which involve taking livestock to areas distant from the rest of the farm in the absence of sanitary constraints. Where identified, the farms concerned should be subject to prophylactic measures for the detection of bovine TB. It is recommended that livestock farmers neighbouring on the grazing land used by non-local farmers should apply strict protective measures to counter the risks linked to grazing and watering due to the unknown sanitary status of the grazing herd.

It is strongly recommended that herds from areas free of tuberculosis outbreaks should not be put out to graze in areas at risk.

It should be recalled that regulations allow for the creation of more than one farm identification number for the same livestock holder where operating sites are separated by more than five kilometres. This regulatory provision provides traceability for livestock movements between sites.

▲ **Off-site grazing: double fencing is a necessity.**

### 2.4.4 • Competitions and agricultural shows.

Agricultural events, even those of short duration, can present a risk of tuberculosis infection. Only cattle from herds certified free of tuberculosis, accompanied by green ASDA sanitary certificates, can take part in agricultural competitions and shows. Only farms up to date with prophylactic measures should be admitted and participation should be restricted to cattle that have screened negative less than four months previously if they come from an area at risk.

▲ **The rules at agricultural competition and shows must provide strong sanitary safeguards.**

▲ **Cattle access to clear, clean drinking water is imperative. Watering troughs must be regularly cleaned and disinfected.**

# 3. General biosecurity on livestock farms

This chapter describes the steps that should be taken on all livestock farms to protect against the numerous pathogens in circulation **to form a core foundation for all biosecurity plans.**

**⋄ Stopping pathogens entering the farm:**
- Ascertainment of the traceability and sanitary status of livestock added to the herd.
- Isolation and testing of new and returning livestock.
- Addressing the risks linked to farm visitors.
- Addressing the risks linked to farm equipment.
- Addressing the risks linked to rodents.

**⋄ Prevention of pathogens becoming permanently present and circulating on the farm:**
- Separation of farm production units subject to different risks.
- Maintenance of cattle in good health: feed, watering, welfare, good housing, the right treatments; implementation of a preventive programme (vaccination, worming, feed supplements).
- Limitation of cattle stress during transportation and handling.
- Enhancement of screening effectiveness by means of appropriate livestock restraint.

**⋄ Stopping pathogens leaving the farm.**

## 3.1 •Verification of the traceability and sanitary status of added livestock.

All sanitary protection systems are reliant on fully accurate identification of bovine livestock and information on their movements. Consistency checks on ear tag numbers, passport data, and the ASDA sanitary certificate (*Attestation Sanitaire à Délivrance Anticipée* – ASDA) are mandatory for each consecutive holder of the bovine livestock. Rapid notification of the movement of arriving cattle makes it possible (through the national livestock identification database - *Base de Données Nationale d'Identification* – BDNI) that there are no traceability issues for an animal. The ASDA certificate must be signed and dated by the previous farmer at the time of despatch. Any anomaly may lead to doubt as to the sanitary status of the animal concerned.


ATTESTATION SANITAIRE

N° Travail | Code Pays | Numéro National | Sexe | Type Racial | Date de Naissance | Nom du Bovin
M 39 20.07.2020

Type racial des parents 38 46 | Numéro d'Exploitation | Numéro national de la mère porteuse

Provient d'un troupeau :
OFFICIELLEMENT INDEMNE DE LEUCOSE, DE BRUCELLOSE ET DE TUBERCULOSE

Troupeau indemne en IBR
Cheptel assaini en varron

J'atteste que ce bovin - **ne présente aucun** - ~~présente un~~ risque nécessitant la transmission d'informations sur la chaîne alimentaire (rayer la mention inutile (1)).

Jour Mois Année

Signature de l'éleveur (2)

Je m'engage à ne pas envoyer, à l'abattoir, cet animal s'il est sous délai d'attente de traitement médicamenteux.

**Utilisable jusqu'à la mort du bovin** s'il ne quitte pas son exploitation de détention **OU valable 30 jours** à compter de la date de sortie du bovin de l'exploitation de détention.

The ASDA certificate provides no information on commercial movements (transportation, assembly, consecutive sales). The elapsed time between the departure date indicated by the previous holder and the date of arrival on the livestock farm may nevertheless provide an indication of risk.

## 3.2 • Isolation and testing of new and returning livestock.

Isolation of livestock added to a farm's herd is a regulatory obligation. It is also, and above all, a key recommendation applicable to all purchased livestock as well as to livestock returning from a situation subject to risk (e.g. return from summer pasturage, from an agricultural show, from pasture in an area at risk).

▲ **A livestock isolation area.**

There are two reasons for isolation.

First is to allow animals or groups of animals to rid themselves of a recent infection (e.g. influenza viruses, transient viraemia, BVD). The period of isolation must cover the incubation period and

and the period during which the sick animal remains contagious. Such animals must not infect the rest of the herd.

The second objective is to keep the animal separate while awaiting the results of screening and/or information on its status, the status of the seller's farm and that of the sales channel. This provides an opportunity to observe the animal's general condition, any worrying symptoms (e.g. diarrhoea, nasal discharge, coughing, high body temperature), possible lesions (e.g. CDD) and signs of internal or external parasitic infestation. It is also an opportunity to treat and vaccinate the animal if required.

By providing proof of the effectiveness of isolation, it may in some cases be possible to retain the farm's sanitary qualification in the event of an issue concerning an animal added to the herd (e.g. IBR).

It is always more efficient to prevent a pathogen from entering a livestock farm than trying to prevent it circulating on the site. For that reason, it is preferable to take precautions upstream in the process by doing the screening at the seller's location and prioritising direct transportation.

This is even more imperative where isolation of the new livestock is very difficult to achieve, notably in the case of lactating dairy cows.

**What is effective isolation?**

An animal must be isolated on arrival and kept in isolation for a period sufficiently long to allow elimination of recent infections and so that the farmer can obtain the results of mandatory or optional screening carried out at the time of arrival.

The chosen location for this isolation must eliminate any possibility of infection of the rest of the farm. It must be kept strictly separate from other livestock locations. Depending on the disease concerned, transmission may be airborne, by direct contact (e.g. licking), or by contact with slurry or manure. The isolation area must exclude all these modes of infection.

Specific steps must be taken to avoid carrying pathogens from the isolation area to the rest of the farm (e.g. boots must be cleaned and disinfected, overalls reserved for use in "dirty" areas must be worn). Care must be provided to new animals after that provided to other groups of livestock. The isolation area must be cleaned and disinfected after each period of use.

## 3.3 • Farm sectorisation: "preventing people from going wherever they want on the farm".

In most cases, cattle farms are easily accessed by visitors, welcome or unwelcome. This can probably be put down to a number of factors: ease of manoeuvring for tractors and cattle trucks, existence of local tracks and roads, nearby residential areas, and so on. But is this desirable? Numerous pathogens can be brought in by visitors, mainly on footwear, the tires of vehicles and agricultural machinery, clothing and hands.

The pig and poultry industries protect their operations by dividing their sites into distinct sectors. This practice can be highly recommended for cattle farms.

Farm sectorisation means providing protection by limiting access to the most sensitive areas. This is a common-sense approach that involves determining who may enter the various parts of the farm and on what terms.


A distinction is made between **public, professional and husbandry areas.**

The **public area** is the location for car parking, possibly the living accommodation and, if possible, the rendering area. There are no restrictions on access to it. Vehicles arriving from outside the farm must park here.

The **working area** comprises the areas of the farm used by professionals and for animal husbandry. People and outside vehicles not required for farm operations are kept out of the working area.

In the **professional area** only authorised vehicles are permitted: tractors, trucks making deliveries or loading items and the vehicles of professionals who need to park as close as possible to the husbandry area.

The **husbandry area** comprises at least the livestock buildings (e.g. stabling, milking parlour). The farmer's permission is required for entry by outside visitors, whether professionals or not. Strict sanitary conditions apply: boots to be changed or washed and disinfected, foot baths, biosecurity airlock, etc.

**Typical sector configuration on a beef cattle farm.** The boundary between the public and professional areas is physically indicated only by chain on which a "no entry" sign is hung. A foot bath is provided at the entrance to the cow stables.

For practical reasons, the building for male livestock(dotted lines), which is considered to be less sensitive, is protected only by its location in the professional area.


An ideal division into sectors is not always easy: for example, a track may cross the site; it may be necessary to put some distance between the rendering area and neighbouring residences; the living accommodation may be in the middle of the farm buildings, etc. But it is usually possible to at least define and indicate a public area (for parking) and to restrict access to the livestock buildings. Any new construction should be considered in light of the requirements of sanitary prevention.

## 3.4 • Addressing visitor-related risks.

It is necessary to be strict with visitors irrespective of their status. It is recommended that a list of potential visitors should be drawn up with an indication of the level of risk presented by each. For every visitor, the farm areas he or she can enter should be designated (e.g. cleaning and disinfection of footwear, clean clothing), along with their vehicle and equipment.

As a general consideration, situations must be avoided where visitors could bring in fragments of manure or mud from another farm on their footwear, clothing or vehicle and machinery wheels. This also includes the risk that arises when the farmer returns from a visit to another farm.

▲ **Individuals working on the farm must arrive with clean boots and overalls.**

Close attention must be paid to vehicles carrying deadstock (for rendering) or livestock (e.g. a dealer loading cattle into a truck already carrying animals). The deadstock area and the cattle loading dock must be located in parts of the farm where the risk of crossover to "clean" farm locations can be limited. They must be easily washed down and disinfected.

To facilitate organising the farm in this way, each farmer must find the right solutions for their site:

- Signage: "no entry", "all footwear to be disinfected", etc.
- Site fenced off, barriers to movement: (e.g. chains).
- A biosecurity airlock to be used before entry into buildings and containing changes of boots and clothing, or foot baths, provision of the means to clean footwear (in practice, at least a source of water, a brush and disinfectant for cleaning boots).

▲ **Farm boots may be loaned to visitors.**

**The four areas most at risk are, as a minimum, the following:**

- **The sick bay:** sick animals must be isolated from the rest of the herd in a separate area.
- **The isolation area** (or quarantine area).
- **The loading dock:** this area is considered to be potentially infected since it is directly accessed by cattle trucks arriving from other farms or from livestock assembly centres.
- **The deadstock area,** this being the location where carcasses of dead animals are placed for pickup by the renderer. It must be located as far as possible from the livestock buildings and routes taken by cattle.

There must be no movement from the above areas into the rest of the farm without taking precautions (at a minimum: washing and disinfection of footwear).

The above four areas must be cleaned after each use and disinfected if a sick animal has spent time there. They must not be located on a route taken by cattle to go out to pasture.


## 3.5 • Addressing equipment-related risks.

Movements of farm machinery, whether or not they come from other farms, represents a risk due to soiled wheels, particularly if they travel through areas with livestock feed.

It is recommended that wheels be cleaned if the machinery has been on the site of another livestock farm. It is imperative that such cleaning be carried out, in addition to disinfection, where the equipment may have come from a location at which disease has been detected (not only tuberculosis, but also BVD, etc.).

Particular attention should be paid to equipment in collective use.

◀ **Disinfection is effective only on already clean boots.**

## 3.6• Addressing risks linked to rodents.

Rats and mice can carry and transmit diseases such as leptospirosis and salmonellosis. It is therefore advisable to control their numbers.

They may be infected with tuberculosis, but their role in infecting bovine livestock by shedding mycobacteria or as passive vectors for pathogens in their fur has not been demonstrated in the conditions of our livestock farms.

## 3.7 • Separation and protection of farm production units subject to different risks.

A livestock farm may be made up of various different locations, production units and herds not subject to the same levels of risk of disease, and specifically tuberculosis.

This may for example be the case where there is a core herd with few or no added animals, and a fattening unit with rapid rotations of livestock bought in from outside.

In the latter case, it is recommended (and mandatory if fattening is based on a derogation with a yellow ASDA sanitary certificate) to ensure that the two parts of the farm are kept rigorously separate so that the animals in each are not in contact neither directly (e.g. in housing, at pasture) nor indirectly (e.g. dung carried on boots, equipment).

If it is not feasible to equip each production unit with its own specific resources, it will nevertheless be possible to organise improvements going forward to ensure that livestock care procedures always terminate with the group most at risk, followed by the cleaning of soiled equipment prior to all subsequent use.

A number of tuberculosis infections in cattle have been notified on livestock farms holding captive wild species, notably cervids, the latter being difficult to screen. Strict separation between species is essential (no collective grazing or consecutive grazing on the same land, no mud or manure to be carried on tires, boots or equipment between livestock groups, separate watering facilities, and so on).

**Farms raising cervids have in some cases been sources of tuberculosis infection in cattle.**

On farms raising both cattle and small ruminants, close attention needs to be paid to protecting goats, a species vunerable to tuberculosis. Recommended measures for captive wild species must be implemented. Kids must not be given cow colostrum.

## 3.8 • Enhancement of screening effectiveness by means of appropriate livestock restraint.

Farms must ensure that cattle are satisfactorily restrained during treatment and screening procedures. Tuberculin skin tests, if these are necessary, also require effective restraint. Rapid screening of cattle carrying tuberculosis before they become excreters is a key condition to be met for a successful sanitary programme. To achieve this, the veterinarian must be in a position to carry out the procedure in satisfactory conditions.

**Measuring skin folds using a skin thickness gauge requires the animal to be appropriately restrained.**

## 3.9 • Maintenance of cattle in good health (feed and watering, welfare, good housing, the right treatments).

The fact that cattle are in good health does not mean they will never be sick. However, what is certain is that cattle suffering from dietary deficiencies will have much greater difficulty in withstanding pathogens. In the specific case of tuberculosis, the animal's immune system may to some extent defend against mycobacteria and limit development towards transmissible forms. Deficiencies limit the effectiveness of the immune system and represent a risk.

In particular, in a context of infection (a former disease outbreak, nearby outbreaks, infection in wild fauna) it is essential to prevent deficiencies with balanced feed and by dispensing the right mineral supplements for the condition of the herd.

It will be necessary to avoid bringing on to a potentially contaminated site animals that present deficiencies or which are in poor nutritional condition.

Clean water requirements must be met. Stress should be avoided for cattle during transportation and handling. Housing floor area and building ventilation must meet technical animal welfare standards.

Where there is BVD infection, and as required by regulations, the herd must be swiftly returned to satisfactory sanitary status because this virus has immunosuppressive effects, which would constitute a highly negative factor in the event of exposure to tuberculosis.

Building walls must be cleaned and disinfected at least once a year.

Watering troughs must be regularly cleaned and disinfected. Cattle must receive antiparasitic treatment and any diseases should be treated.

**Cleaning and disinfecting buildings.**
(source: IFIP)

Satisfactory disinfection always requires effective preliminary cleaning.

The building must be empty, manure must have been removed and the floor scraped down. Dust can be removed from upper areas with a long-range water jet. Soaking organic material to restore its water content will facilitate cleaning. Failing this, a detergent may be used at this stage and later.

Medium- to high-pressure jet washing should be used to eliminate organic materials.

After washing, the use of detergent will reduce biofilms and improve the effectiveness of the washing process. Rinsing down will eliminate any small organic particles that remain. On completion of this phase, walls and concrete surfaces must appear clean to visual examination. Nearly 80% of all pathogens will have already been eliminated.

Disinfection will destroy any pathogens that persist. After rinsing, sufficient drying time must be allowed prior to disinfection (1-4 hours). The disinfectant must be chosen according to the desired result: it is recommended that it should be approved as a bactericide (also mycobactericide), virucide and fungicide. Observance of the correct product concentration and quantity is essential. The disinfectant should be applied to a surface that is damp but not soaking wet.

### 3.10 • Stopping pathogens spreading outside the livestock farm:

• Carry out screening prior to the departure of cattle for the farm, in accordance with the buyer's request and the possible presence of pathogens on the farm (e.g. besnoitiosis, BVD, neosporosis... as well as tuberculosis).

• Inform buyers of the farm's sanitary status, whether favourable or unfavourable. Do not sell for livestock farming purposes cattle with an unfavourable sanitary status and check that where sold the animals will be taken directly to the abattoir.

• Do not put out to collective grazing or take to an agricultural show cattle with an unfavourable sanitary status (or where pathogens are in circulation on the farm);

• In the event of infection (or strong suspicion of infection) by a contagious disease, inform neighbours, potential buyers and users of collective equipment; clean and, if necessary, disinfect, the wheels of vehicles leaving the farm.

• Avoid visiting other livestock operations with footwear and clothing from the farm unless these have been satisfactorily cleaned and disinfected.

• Do not lend (or rent out) breeding stock.

• Avoid putting males (for fattening) out to graze near herds of cows or heifers.


# Protecting against bovine tuberculosis

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