Interreg North-West Europe
HappyMoo
European Regional Development Fund

LAMENESS : ANYTHING BUT FATALITY !

Solutions at all levels

INNOVATION

Lameness : a profound economic and welfare impact, often of multifactorial origin

Lameness is a symptom of a locomotor system failure. It is the **second most important disease** in dairy farming. The average economic impact of a lameness ranges from 69€ to 483€ per lameness (Dolecheck, 2018), with the impact varying greatly depending on the nature and severity of the injury or disease present. The economic impact must take into account:

- economic losses due to lameness, i.e. the loss of income resulting from the effect of diseases on affected animals (e.g reduced intake, production, increased risk of mastitis, reduced overlapping, fertility,....),
- health costs or expenses related to lameness (e.g. trimming, treatment, etc.).

Longevity is also affected, not to mention the significant repercussions in terms of animal welfare (**pain**, restriction of natural behaviours such as heat, difficulties in moving around and therefore in feeding and drinking, bedsores, etc.). Lameness is also detrimental because of the **extra workload**, the need to restrain the animal in order to examine it when it is in pain...

This impact is worsening as the number of cases increases. So what can be done to stop or prevent this disease?

The 1st step in combating this health problem is to **identify the lame animals and then the affected limbs. Lifting the feet will be essential to diagnose the origin of** the lameness and adapt the care. The identification of biomarkers in milk would also be an interesting avenue to provide a complementary tool for screening for lameness. This is what has been explored in the HAPPYMOO project. The results of these 4 years of research are available on the Happymoo website (link at the end of this document) although linking the composition of milk and its spectrum to lameness does not seem so simple.

90% of lameness involve the foot, and in 80% of cases the hindquarters. When the lameness does not affect the foot, there are many possible causes (bone, joint, muscle, nerve damage, etc.). Lameness of podal origin may be due to infectious or non-infectious lesions. The table on page 2 lists the **main foot diseases**, their causes and associated risk factors.

	Milk production	Reproduction	Longevity
Average impact of lameness	From -0,5 kg to -1,8 kg/day From -100 kg to -350 kg per lactation So, -32 euros to -112 euros	+ 40 days on calving interval	Number of cullings x 3 So -2 100 euros (3 x 700 euros)

Source: CASDAR Lamenesses, 2017

Duration of lameness	< 15 days	1 month	> 1 month
Average impact of lameness	Ingestion : -3% Milk production : -5% Low losses : -5 euros	Ingestion : -7% Milk production : -17% Medium losses : -40 to -60 euros + 25 days on calving and 1st insemination interval	Ingestion : -16% Milk production : -36% High losses : 260 euros to 350 euros Number of cullings x 5

Source: CASDAR Lamenesses, 2017

The main foot diseases

	Laminitis	Fork	Mortellaro's disease	Panicitis	Sole abscess
Examples of photos of injuries	 White line opening Dirty yellow horn Bleime	 Erosion of the heel (V shaped lesion)  Slug		Swelling and heat of the foot 	
Classification	Non infectious	Infectious		Infectious and traumatic	
Origin	Blood circulation disorder and abnormal position of the 3rd phalanx	Bacterial attack			
		by *Fusobacterium necrophorum* and *Dichelobacter nodosus*	by *Treponema*	on an interdigital wound	following trauma to the sole
Housing	Decrease in lying time Sloping floors or frequent steps	Damp or dirty living areas			
				Trauma areas	
Feeding	Inadequate energy intake (deficit with melting of the fat pad, sub-acidosis...)				
Animal control and monitoring	Under-detection, lack of awareness of lesions				
	Trimming defect				Trimming defect
		Foot baths not used properly			

Lameness is generally multifactorial in origin. The main risk factors for lameness are related to:

- **Housing**: soiled areas, wet, abrasive, or slippery floors ; overcrowding ; inadequate size and/or adjustment of cubicles ; inadequate ventilation ; presence of obstacles or areas at risk of trauma (overly stony access road to the pasture, etc.) ; excessive slope, too many steps, etc.
- **Feeding**: energy deficiency leads to a melting of the plantar fat pad, which can no longer absorb shocks ; acidic rations lead to blood circulation disorders, and therefore to a weakening of the horn ; mineral deficiencies have an impact on lameness, only if they are marked, but this point remains secondary in most cases,
- **Herd management**: insufficient housing maintenance measures, excessive blocking time at the feed fence, lack of activity for the animals, purchase of animals from farms affected by Mortellaro disease,
- **Monitoring and care of the animals**: sous-détection, parage excessif ou inadapté, méconnaissance des lésions, mesures préventives absentes (pas de parage préventif...) ou mal utilisées (solutions de pédiluves insuffisamment renouvelées...).

The golden rules of lameness detection : observe regularly, lift the foot, and take note

The earlier the detection, the better the prognosis for the animal and the herd.

Detection of lameness requires regular observation of the animals:

- **At the feed fence**: a curved top line, rotated legs, tight hocks, partial or total suppression of support are warning signs ; a support only in pinch can evoke Mortellaro,

- **In the parlour**: spot cows seeking relief from a limb, flush feet with a low-pressure water jet to facilitate observation,
- **When cleaning living areas**: identify animals that have difficulty getting up,
- **On the move**: cows that are unusually late in arriving may suffer from lameness. Warning criteria to bear in mind are unusual slow movement, irregular rhythm, weight shift to a specific (healthy) limb, arched back, abnormally low head positioning or excessive head swing (to compensate for lameness-induced imbalance).

Lameness detection videos and lameness severity scoring grids are available on the Internet (see bibliographic sources).

Don't forget to look at heifers (and even bulls if there are any**)!**

Treatment: what care should be given in case of lameness? STOP the antibiotic reflex

The management of a lame animal should be done **AS SOON AS POSSIBLE**. Delayed detection and management result in the development of severe lesions that are difficult to treat, thus reducing animal welfare and increasing direct and indirect economic losses. **Lameness should be treated as quickly as mastitis**.

The 1st reflex is to **observe and lift the foot**. A trimming will be carried out to identify the lesions and adapt the treatment. This trimming is carried out by the veterinarian, the trimmer or the trained breeder. **It is almost NEVER necessary to inject antibiotics** when an animal is limping. The only lesion concerned by this treatment in 1st intention is panicitis. This is only present in 2% of lame cows. If it is a high lameness (= not podal), an examination by a veterinarian will be *a fortiori* unavoidable given the multiplicity of possible causes.

Before any intervention on the animal, participation in a «trimming» training course is an essential prerequisite. Trimming is practiced in 2 stages:

- a functional trimming which will allow to rebalance the weight between hooves,
- then a curative trimming to eliminate the lesions and reduce the support of the diseased hoof.

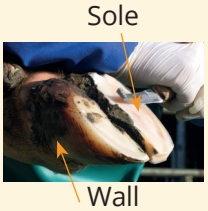
If the animal is no longer limping or has at least improved its posture on leaving the squeeze chute, the trimming has worked well. **If the lameness has not disappeared after 3 to 4 days, a new examination** is essential.

INFO+

Points of attention on trimming

- **Do not work on the animals until a trimming course has been completed.**
- Think of the **trimming kit**: goggles, kevlar gloves (NF standard EN 388 - cut protection), sharpened knife, nail clippers, 8.5» gauge cm to check the length of the wall, heels of different sizes, bandages...).
- Ensure **proper restraint** (e.g. dedicated hoof trimming chute) for the **safety of** workers and animals.

- **Do not trim within 4 weeks before and after calving.**
- Do not trim **within 15 days before and after turn out**.
- **Do not trim too much : don't thin the sole or the wall.**
- The electric grinder should only be used by very experienced hoof trimmers.
- Bandages should be used only when necessary, without tightening and never leaving them on more than 3 days.



When to be concerned at the herd level and what strategy to adopt?

The minimum target is to **have 85% healthy cows and less than 5% severe lameness**, especially in the first three months of lactation and in primiparous cows. When the rate of lame cows exceeds 30% and/or the frequency of severe lameness exceeds 8%, the impact on the farm is already too high. A global approach to the disease must be implemented with the veterinarian and the advisor before the situation reaches such proportions. It will be based on:

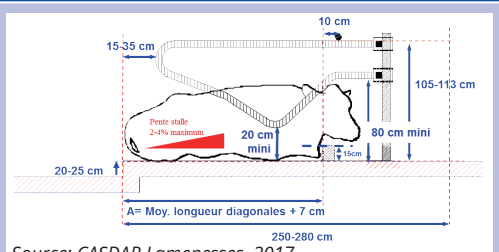
- a **herd diagnosis**, via trimming, to identify the main diseases involved,
- **identification of the main risk factors** for these diseases and their elimination,,
- the **establishment of a personalised individual and collective treatment and prevention protocol**.

Prevention: how to prevent or reduce the frequency of lameness?

The prevention of lameness requires the elimination of the risk factors listed in 1st part of this document. Classic prevention measures are required, such as suitable housing, daily maintenance of the resting and exercise areas, but also an appropriate balance of energy and nitrogen in the ration...

The attached table summarises the main preventive measures to be implemented. These recommendations are not exhaustive and should be adapted in consultation with the veterinarian and the livestock advisor.

The main preventive measures to be implemented

Means of prevention	Some key points
Housing	 *Source: CASDAR Lamenesses, 2017* • **Regularly clean** the exercise and living areas (trimming, mulching, etc.). • Make sure that **the cubicles** are well **adjusted**. • **1 cubicle/cow**, sufficient space at the feed fence and water troughs. • The use of **mats or mattresses** improves comfort, but can lead to poor hoof wear, especially if the animal does not go out. Ensure that mats are positioned correctly so that animals do not injure themselves on the sill. • Flooring systems at pasture entrances now exist. • Do not forget to **neutralise new concrete** whose basic pH can be aggressive for the sole. Use vinegar at a rate of 5 L of diluted solution per 100 m2. The solution should be diluted 1/10 (1 L of vinegar for 10 L of water). To be done within 4 weeks after casting. Do not introduce the animals until 10 days later. • **Do not have floor slopes > 5%, slippery or abrasive floors** (holes...).
Livestock management	• **Daily observation** of animal **postures and movements** for early detection. • Systematically check the **absence of Mortellaro's disease on the selling farm and on the animals to be introduced.** • **Do not let animals to trample for more than 1.5 hours** either at milking or at the feed fence.
Trimming	• **Have a regular functional trimming of the whole herd.** Every 2 months, a part of the herd can be trimmed, for example by taking the animals at the end of lactation (lame and non-lame) and adding the lame animals or those suspected of being lame. Check once a year that all cows have been seen at least once. • Participate in a **«trimming» training** before any intervention on the animals.
Footbaths	**Improperly used foot baths** are a **vector for contamination** and are therefore less and less recommended. Avoid foam mats that are impossible to clean/disinfect and rarely allow sufficient impregnation of the foot to the accessory hooves. Prefer low pressure water jetting systems at the parlour exit to clean feet.
Power supply	• Ensure an energy and nitrogen balanced and mineralized diet • If the horn is too soft, **biotin treatments** are interesting if they are done over a minimum of 6 months at a rate of 20 mg per cow per day. • **Do not neglect access to water** in terms of quantity (10 cm per cow, at least 1 trough for every 10 cows) and quality. Poorly laid out or limited watering areas become competition areas, resulting in traumatic risks and prolonged standing time. In addition, water contributes to the proper functioning of rumen fermentation.

To go further

- **Identification of lesions** :
  ICAR Atlas of Claw Health

- **Website (in French)** :
  boiteries-des-bovins.fr

- **English website**:
  https://www.dairynz.co.nz/animal/cow-health/lameness/lameness-scoring

and **grille ICAR lameness scoring grid**
https://www.icar.org/Guidelines/07-05-Functional-traits-Lameness-Guidelines.pdf

The HappyMoo project: monitoring tools for happy cows

This document was produced in the framework of the Interreg NWE HappyMoo project, financed by the European Union and co-funded by the Walloon Region in Belgium. The aim of this project was to identify molecules whose monitoring in particular by mean infrared spectroscopy in milk would help to detect health problems in livestock.

Find all the results of the HappyMoo program on the website

https://www.nweurope.eu/projects/project-search/happymoo/

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Photo credits: Marc Delacroix, Isabelle Delaunay, Jean Prodhomme, Gouttebelin
November 2022 - Reference IDELE n° 0022 403 020 - ISBN : 978-2-7148-0238-5