



IT-Solutions for
Animal Production



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Recording of claw disorders in dairy cattle: overview and prospects of international harmonization

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Background

- lameness as major issue of dairy production
 - impaired animal health and welfare
 - significant proportions of lame cows
not rarely > 50% (e.g. Van der Waaij et al. 2005), large variation between herds
 - considerable economic impact
estimated annual costs of up to 450 Euro per lame cow
- foot and claw disorders as primary causes of lameness
- claw traits as new phenotypes in dairy breeding
 - relevant genetic basis (e.g. Häggman et al. 2013)
 - possible data sources:
documented health events (herd management, veterinary data),
trimming data ('test day structure' → valuable source of information)
⇒ **standardization? accessibility? logistics? data quality?**



Initiative on claw data recording

- harmonization of data recording within and across countries as basis of reliable and comparable genetic and genomic evaluations
→ **International Committee for Animal Recording working group for functional traits**
- survey on the recording and use of functional traits (2012): worldwide interest in foot and leg conditions
- expert involvement
 - exchange of experiences from different countries (May 2014)
 - worldwide overview: survey on recording and use of claw data (August / September 2014)
 - standard for the recording of claw data in dairy cattle (October 2014 to May 2015)



Picture: ICAR WGFT and claw health expert (Vienna, 23 October 2014)

Status quo of claw data recording (I)

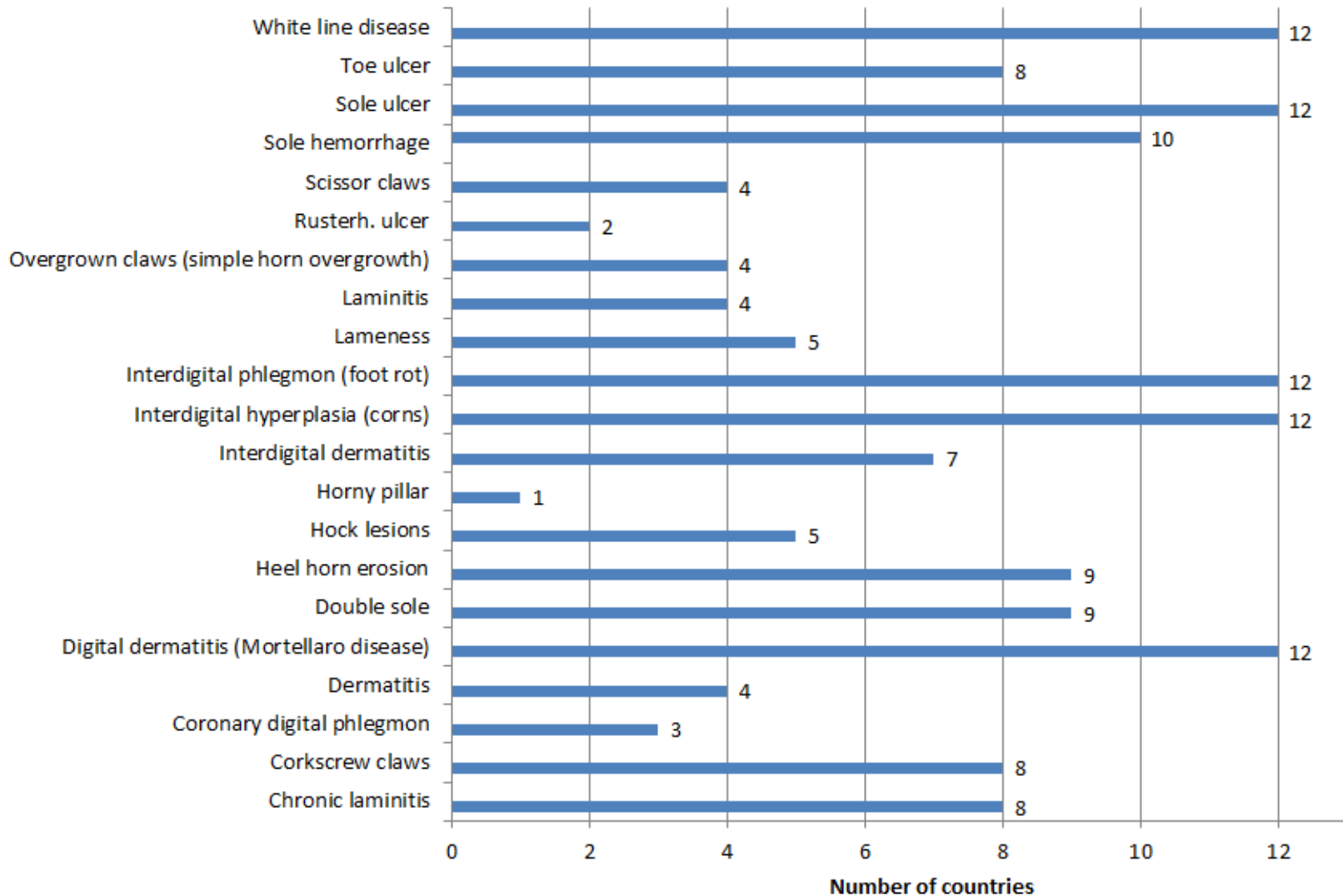
- survey (online questionnaire, ICAR members, 08/09 2014) on recording of claw health and foot and leg conditions
- questions on
 - current documentation practices, logistics around claw data recording
 - organization, education and training of claw trimmers
 - data usage, national programs on claw health
- overall response rate of 60% (32 of 53 ICAR member countries)
 - completed surveys (N=22) from 18 countries
answers provided by scientists, claw experts, veterinarians, representatives from performance recording and breeding organizations
 - partial information (e-mail contacts) from 14 countries



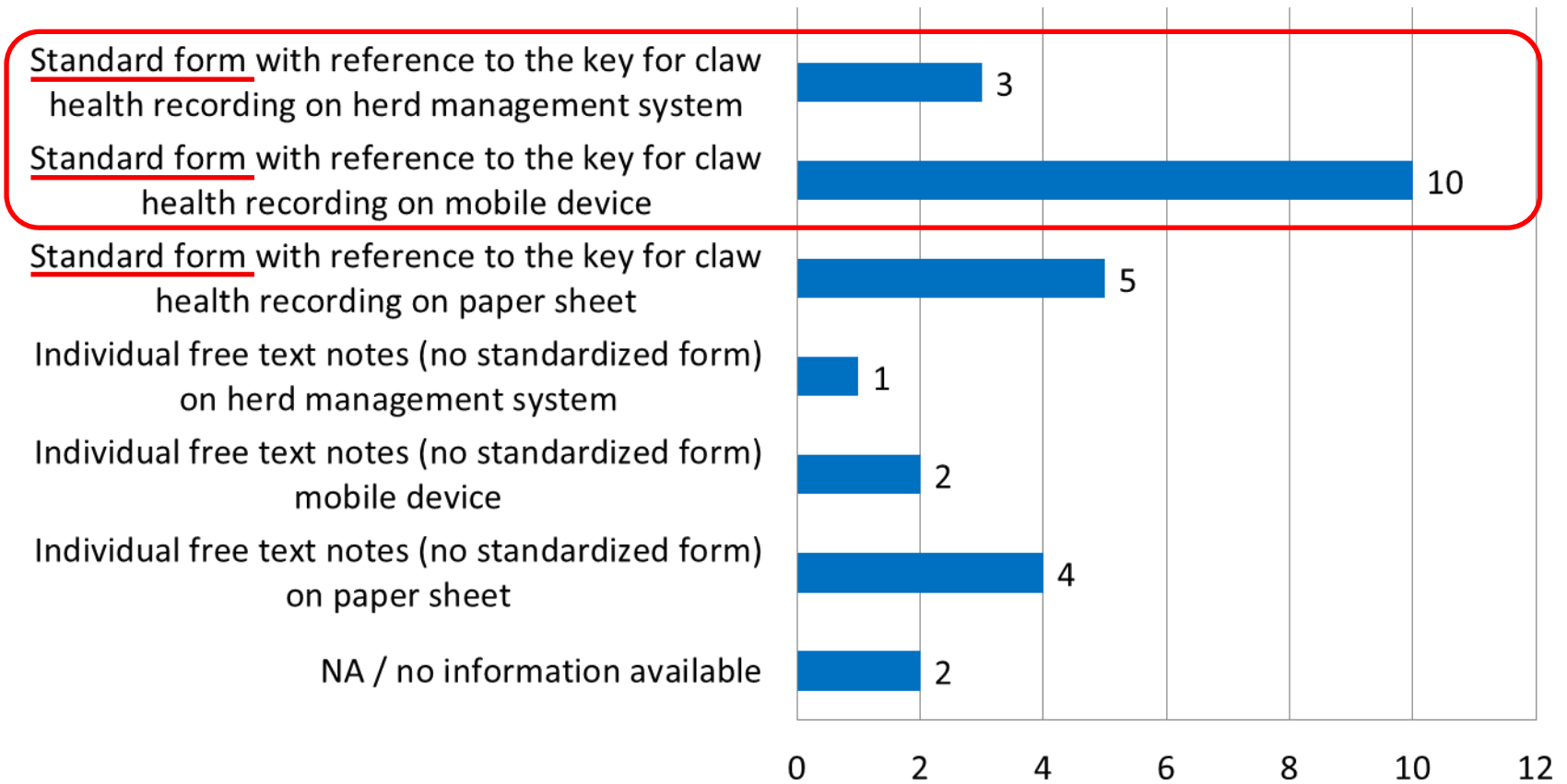
Status quo of claw data recording (II)

- single key for claw data recording in 10 countries, harmonization across the Nordic countries (Nordic Claw Atlas, 2013)
- heterogeneity of recording
 - number of disorders:
 - 6-20 claw disorders plus up to 10 foot and leg conditions
 - detailedness of recording:
 - leg (N=9) > individual claw (N=4) > cow (N=2)
 - common severity grading:
 - all disorders (N=7) > certain disorders (N=5) > no disorders (N=2)
- role of claw trimmers and claw trimming data
 - substantially higher coverage than veterinary data (severe cases)
 - professional trimmers: 40-60% (N=8), 60-80% (N=2), 80-100% (N=3)
 - no routine trimming in pasture based systems (New Zealand, Australia)

Currently recorded claw disorders



Documentation practices



REMARK: large proportions of claw trimmings probably not documented at all!



Use of claw data

■ central data storage

- precondition for benchmarking and breeding use
- not common standard (yet)

electronic documentation \neq data transfer to central data base (limited statistical analyses, accessibility for research purposes)

- established in countries with routine genetic evaluations (NL, Scand.)

■ status of genetic evaluation for claw health

- routines in NL and DK-FIN-SWE since 2010, in NOR since 2014
- genomic breeding values in DK-FIN-SWE since 2014 (10,000 cows with G+P)
- several R&D projects, regional and national activities:
infrastructure for claw trimming data (ESP, FRA; 25-30% of cows),
genetic research using data from commercial dairy farms (e.g. CAN, DE)

⇒ **few routine applications so far, but many things under way**

(http://www.icar.org/Documents/Berlin_2014/functional_traits_meeting.htm)



Recording standard for claw data

- need for international harmonization / standardization
 - many different documentation schemes and recording practices
 - highly important and dynamic field of worldwide R&D
 - joint initiative started and coordinated by ICAR WGFT
 - invitation of internationally respected claw experts
(claw health experts, hoof trimmers, bovine practitioners, geneticists)
 - great engagement, fruitful interdisciplinary collaboration
 - key factors (of success):
 - agreed aim of providing a universal tool for the practice → claw trimmers (!), veterinarians; support of on-farm interventions, basis for breeding applications
 - focus solely on standardization and harmonization of data recording
→ comparability of claw data within and across countries
 - purely descriptive trait definitions → clear and accurate classification (data quality)
- ⇒ **harmonized descriptions of 27 conditions** (approved by ICAR in June 2015)

ICAR Claw health atlas (2015)

- basis: new recording standard for claw data (ICAR) as first internationally agreed reference with harmonized descriptions of foot and claw disorders in cattle
- illustration for further increased value for the practice
- original (English) version freely available for download:
https://www.icar.org/Documents/ICAR_Claw_Health_Atlas.pdf
- promotion and distribution of the ICAR Claw Health Atlas
 - hard copies
(high quality electronic version for printing available on request by ICAR)
 - translations in other languages
(forms for providing translated text)



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ICAR CLAW HEALTH ATLAS



Overview of Foot and Claw Disorders

Name	Code	Description	Synonymous Terms	P
Asymmetric claws	AC	Significant difference in width, height and/or length between outer and inner claw which cannot be balanced by trimming		12
Concave dorsal wall	CD	Concave shape of the dorsal wall		13
Corkscrew claws	CC	Any torsion of either the outer or inner claw. The dorsal edge of the wall deviates from a straight line		14
Digital dermatitis	DD	Infection of the digital and/or interdigital skin with erosion, mostly painful ulcerations and/or chronic hyperkeratosis/proliferation	Mortellaro disease, Strawberry disease	15
Interdigital/superficial dermatitis	ID	All kind of mild dermatitis around the claws, that is not classified as digital dermatitis		18
Double sole	DS	Two or more layers of under-run sole horn	Underrun sole	19
Heel horn erosion	HHE	Erosion of the bulbs, in severe cases typically V-shaped, possibly extending to the corium	Slurry heel, Erosio unguiae	21
Horn fissure	HF	Crack in the claw wall		
Axial horn fissure	HFA	Vertical (longitudinal) crack in the inner claw wall		23
Horizontal horn fissure	HFH	Horizontal crack in the claw wall		24
Vertical horn fissure	HFV	Vertical (longitudinal) crack in the outer or dorsal claw wall		25
Interdigital hyperplasia	IH	Interdigital growth of fibrous tissue	Corns, Tyloma, Interdigital fibroma	26
Interdigital phlegmon	IP	Symmetric painful swelling of the foot commonly accompanied with odorous smell with sudden onset of lameness	Foot rot, Foul in the foot, Interdigital necrobacillosis	28
Scissor claws	SC	Tip of toes crossing each other		30
Sole hemorrhage	SH	Diffused and/or circumscribed red or yellow discoloration of the sole and/or white line	Sole bruising	
Sole hemorrhage diffused form	SHD	Diffused light red to yellowish discoloration		31
Sole hemorrhage circumscribed form	SHC	Clear differentiation between discolored and normal colored horn		32

ICAR CLAW HEALTH ATLAS



Overview of Foot and Claw Disorders

Name	Code	Description	Synonymous Terms	P
Swelling of coronet and/or bulb	SW	Uni- or bilateral swelling of tissue above horn capsule, which may be caused by different conditions		33
Ulcer	U	Ulceration of the sole area specified according to localization (zones) such as bulb ulcer, sole ulcer, toe ulcer, toe necrosis		
Sole ulcer	SU	Penetration through the sole horn exposing fresh or necrotic corium		35
Bulb ulcer	BU	Ulcer located at the bulb	Heel ulcer	36
Toe ulcer	TU	Ulcer located at the toe		37
Toe necrosis	TN	Necrosis of the tip of the toe with involvement of bone tissue		38
Thin sole	TS	Sole horn yields (feels spongy) when finger pressure is applied		40
White line disease	WL	Separation of the white line with or without purulent exudation		
White line fissure	WLF	Separation of the white line which remains after balancing both soles		41
White line abscess	WLA	Necro-purulent inflammation of the corium		42

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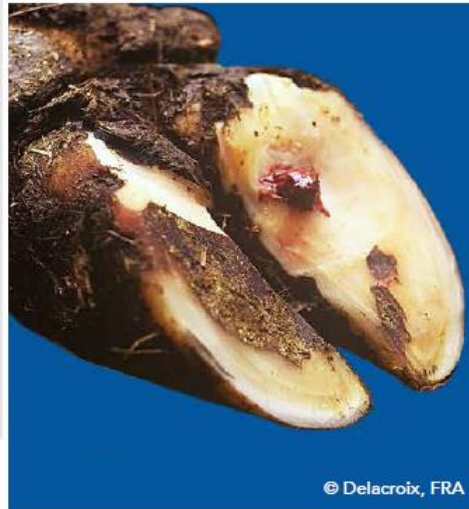
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<u>Sole ulcer</u>	SU
Bulb ulcer	BU
Toe ulcer	TU
Toe necrosis	TN
Thin sole	TS
White line disease	WL
White line fissure	WLF
White line abscess	WLA

Sole ulcer (SU)

Penetration through the sole horn exposing fresh or necrotic corium



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HEALTH ATLAS



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<u>White line fissure</u>	WLF			
White line abscess	WLA			

White line fissure (WLF)

Separation of the white line which remains after balancing both soles



HEALTH ATLAS



Conclusions & perspectives

- worldwide increased awareness (→ focus of R&D) of the important role of foot and claw health in dairy
- maximum use of the potential of genetic improvement of claw health
 - claw trimming data as important source of information
 - large enough quantity of high quality phenotypes as crucial factor for implementing genomic applications for novel traits → support of the practice (data recording)!
 - data standardization across countries allowing international cooperation → harmonized descriptions of foot and claw disorders as major step forward, but reference availability ≠ use ⇒ **continuing engagement needed!**
- ICAR Claw health atlas as example for the benefits of international and interdisciplinary exchange and collaboration
We can do better when we work together!





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Thank you!

Acknowledgement

The ICAR Working Group on Functional Traits acknowledges the **excellent cooperation with the international experts** on claw health and expresses its gratitude for their support and proposals for the elaboration of new standards for the recording of claw health information.

Without their expertise and their great support, it would have been impossible to succeed with the ambitious plans of making available this new ICAR Claw Health Atlas.

ICAR CLAW HEALTH ATLAS



http://www.icar.org/Documents/ICAR_Claw_Health_Atlas.pdf

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Education & training of claw trimmers

- 'free market' of claw trimmers:
no education required to work as trimmer in most countries
- existing organization for licensing and/or certification of claw trimmers
(e.g. Austria, Denmark, France, Germany, Italy, Sweden, Finland, Norway)
- special education programs and/or regular professional training by
claw trimming experts
(e.g. Canada, Denmark, Finland, Israel, Spain, The Netherlands or United Kingdom)
- quality control in claw trimming:
organization of regular training sessions, measures to ensure
comparability of the results between the different hoof trimmers
(e.g. Charfeddine 2014, Van Pelt 2015)

