Laminitis in dairy cows:

relationships with production and functional traits

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Designed field-study

Fixed team: veterinarian, professional hoof trimmer, technician

Holstein heifers: N=1,962, recorded once, focus: 50-150 dim

Similar housing & management : indoor housing, loose-housing system, standard slatted flooring, TMR

Collection of records

- Diagnosis of the claw disorders at the time of trimming

- Recording of bcs, backfat thickness, height at sacrum, weight

- Collection of horn clips

- Taking of blood samples
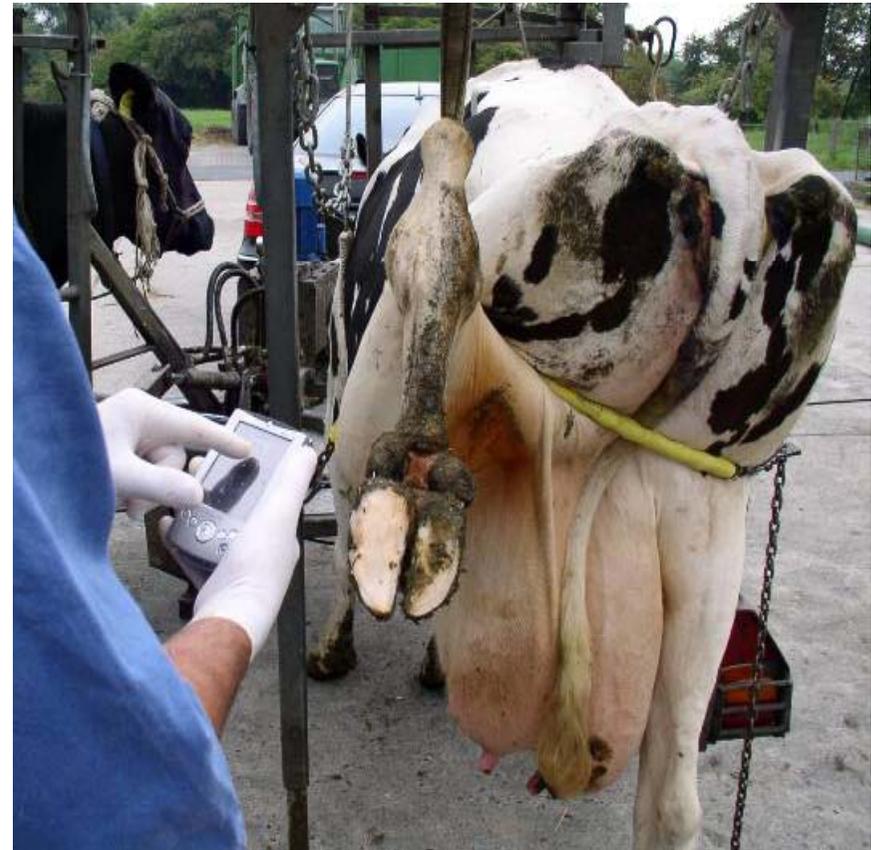
Frequencies for the most relevant diseases

Disorder	All observations in %
Laminits	57.29 (1.124)
Dermatitis Digitalis (Mortellaro)	17.02 (334)
Dermatitis Interdigitalis	6.93 (136)
White line disease	12.64 (248)
Sole Ulcer	7.08 (139)
Interdigital hyperplasia	5.45 (107)

> Clinical and subclinical cases are recorded

> Recording focused on the 1st trimester of lactation

Laminitis

chemical-toxic agents

leg and foot conformation

exposure

metabolism

condition

infectious diseases

genetics

endotoxin

feeding
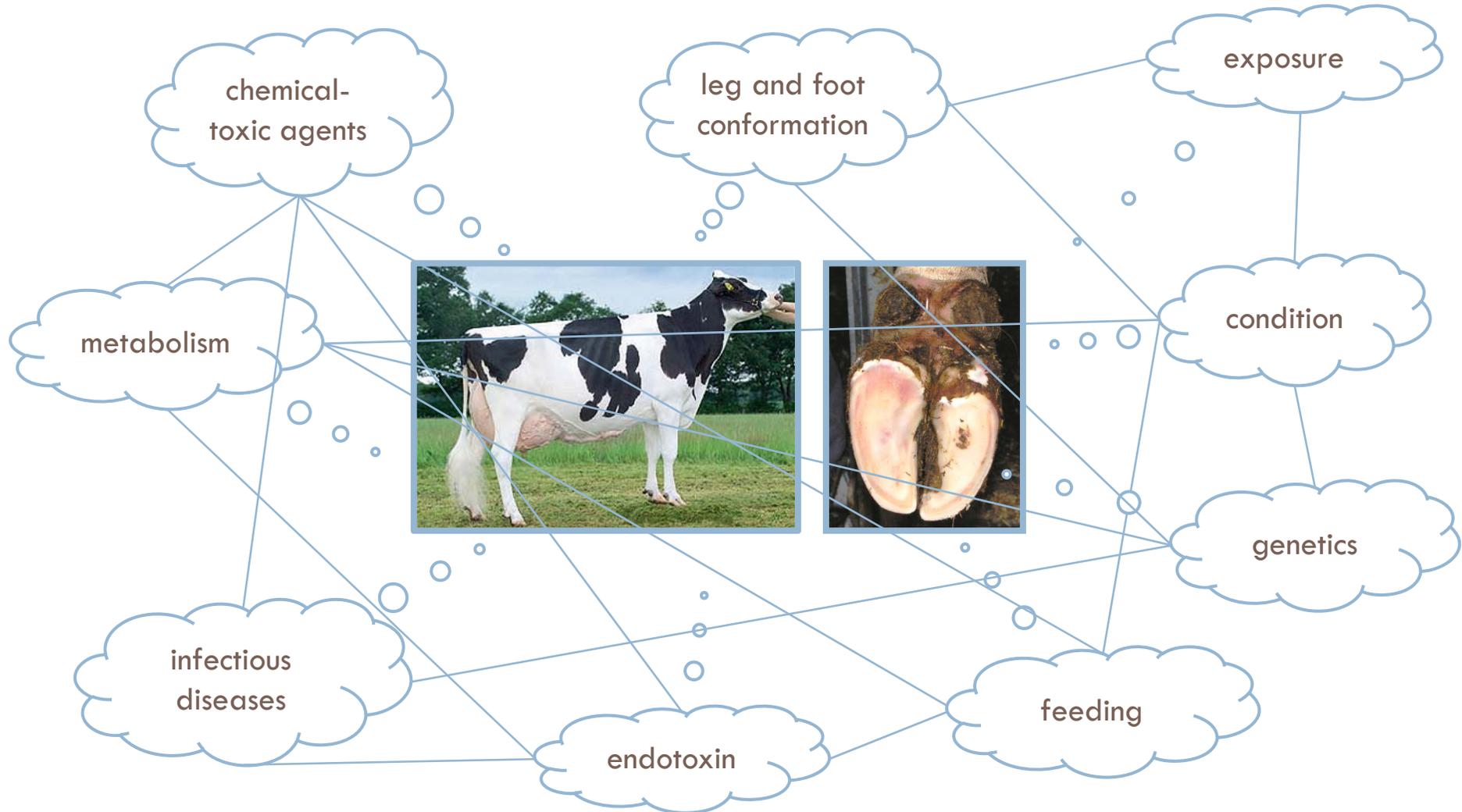
Relationships between laminitis and conformation traits

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Trait	Rear leg set side view				
Laminits	1-2	3-4	5	6-7	8-9
0 - negative	15	199	238	254	19
1 - positive	9	177	321	408	45

**

Trait	Rear leg set rear view				
Laminits	1-2	3-4	5	6-7	8-9
0 - negative	27	367	181	135	5
1 - positive	50	555	206	125	24

***

Trait	Locomotion				
Laminits	1-2	3-4	5	6-7	8-9
0 - negative	43	188	277	190	26
1 - positive	107	269	388	184	12

Relationships between laminitis and functional traits

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Trait	Rear leg set side view				
Laminits	1-2	3-4	5	6-7	8-9
0 - negative	15	199	238	254	19
1 - positive	9	177	321	408	45

*** Feet-and-legs-index

Influence of different body condition traits

Least squares means (LSM) and standard error (SE) for prevalence of claw horn disorders

weight [kg]	Laminitis	
	LSM (%)	SE
< 500	51.13[b]	2.79
500-549	57.04[ab]	2.00
≥ 550	60.86[a]	2.29

BCS	Dermatitis Digitalis	
	LSM (%)	SEM
< 2.5	19.24[a]	1.97
2.5-3.0	11.1[b]	1.22
> 3.0	14.11[ab]	2.03

BCS	Sole Ulcer	
	LSM (%)	SEM
< 2.5	9.64[a]	1.48
2.5-3.0	5.97[b]	0.92
> 3.0	3.09[c]	0.82

Considerations

➜ exposure

➜ over-conditioning

➜ „too good" feeding ?

➜ DD is infectious

➜ negative energy balance

➜ metabolic optimum ?

➜ crushing of the tissue

➜ increasing biomechanical stress for low-rank cows ?

Relationships between claw health and production traits

☐ Classification of disorders

Disorder	All observations in %	Min [%] within herd-visit date	Max [%] within herd-visit date
Laminits	57.29 (1.124)	25	92
Dermatitis Digitalis (Mortellaro)	17.02 (334)	0	44
Dermatitis Interdigitalis	6.93 (136)	0	37
White line disease	12.64 (248)	2	32
Sole Ulcer	7.08 (139)	0	25
Interdigital hyperplasia	5.45 (107)	0	20

Laminitis-related 56.8%

LS-Means of fat and protein percentage in months before diagnosing for heifers with (♦) or without (▲) "*laminitis related claw horn disorders*"

p < 0.05
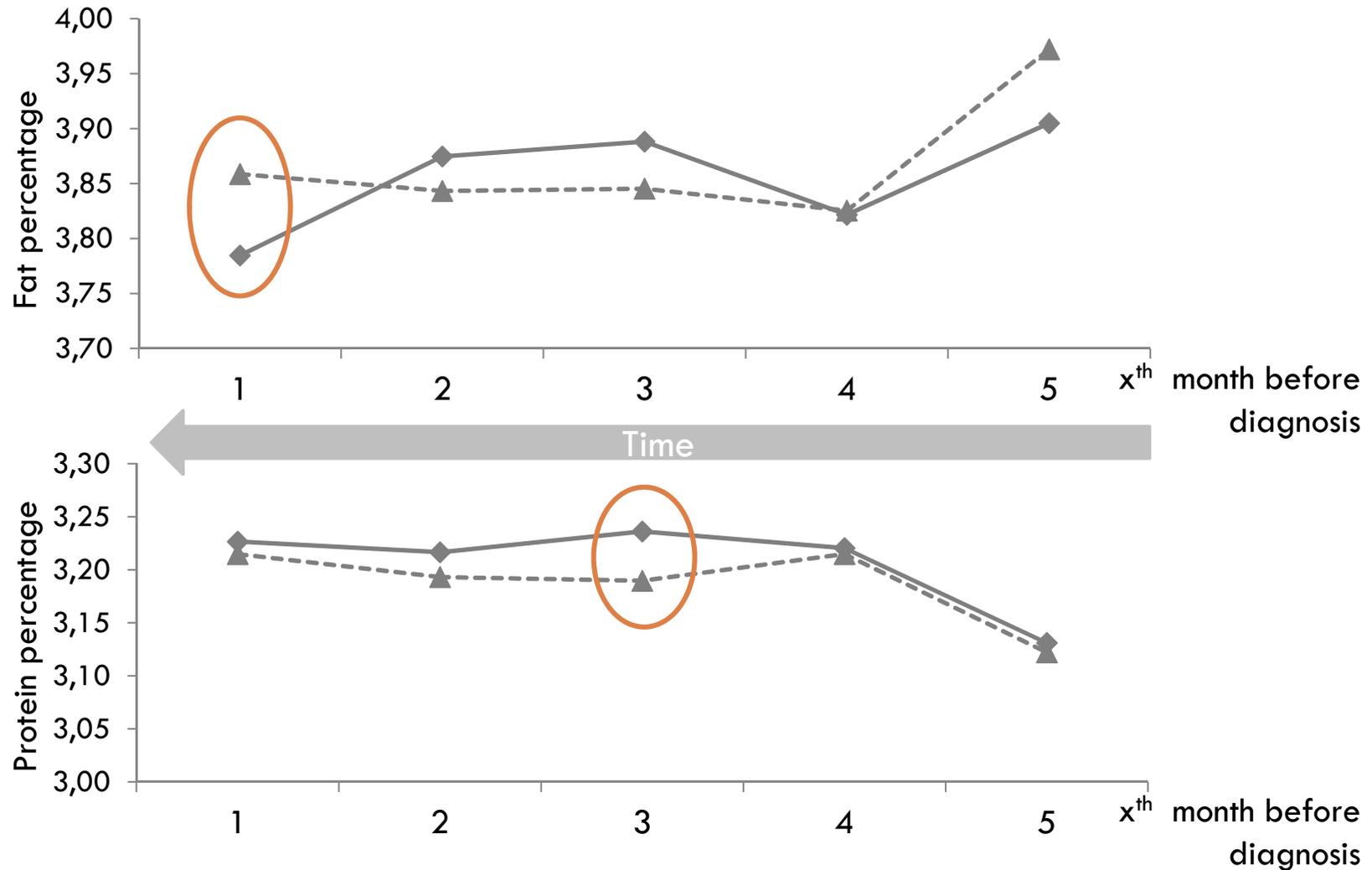
LS-Means of fat and protein percentage in months before diagnosing for heifers with (♦) or without (▲) *"laminitis related claw horn disorders"*
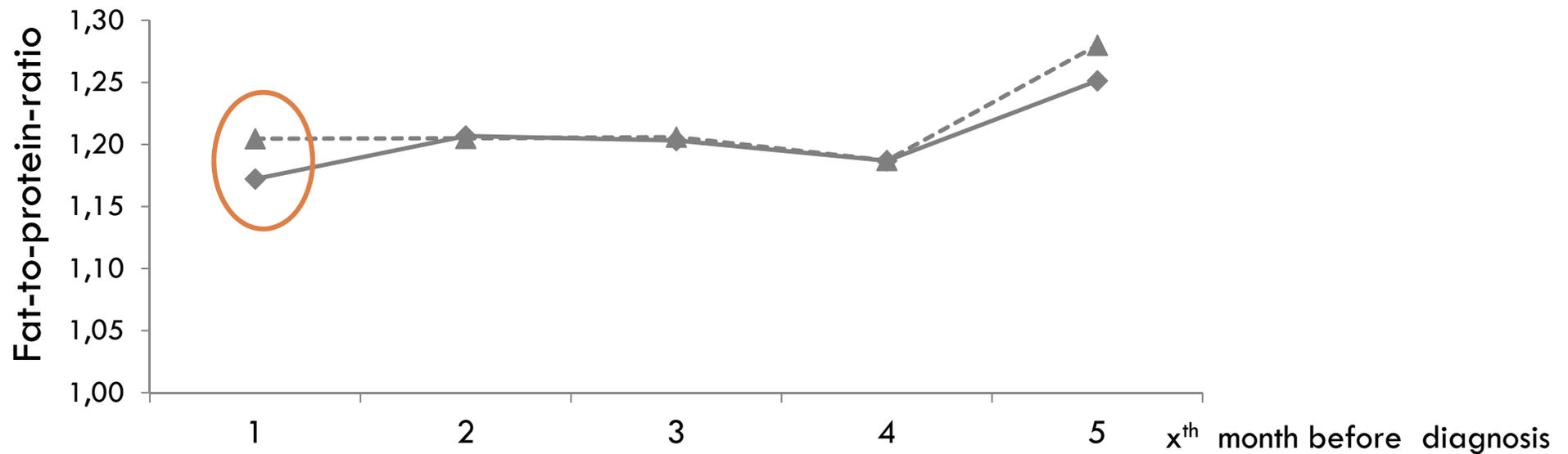
?! Sign of subacute ruminal acidoses (SARA)

Conclusions

□ Multifactorial aetiopathology is confirmed

➜ Treating/regarding in an interdisciplinary context is required

□ Aetiopathology reflects the current state of the dairy cow, but also has a retrospective side

□ Key role of energy balance and condition status (Optimum?)

➜ Management !

□ Improvements by genetic selection are possible ($h^2_{Lam} \sim 0,1$)

! Therefore consistent monitoring is required

Thank you!

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