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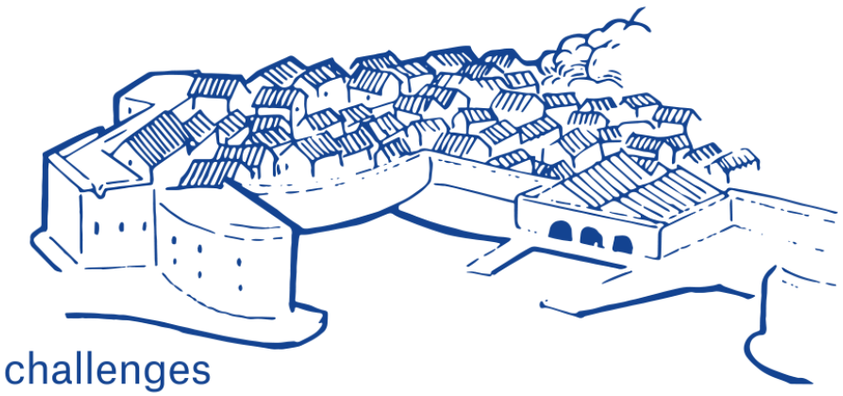
Conventional and traditional livestock production systems – new challenges



COMPARING CHEESE MAKING PROPERTIES OF MILK FROM LOWLAND AND HIGHLAND FARMING SYSTEMS

Niero G, Koczura M, De Marchi M, Currò S, Kreuzer M, Turille G, Berard J

DAFNAE
Department of Agronomy Food Natural resources Animals Environment

ETH zürich
Department of Environmental Systems Science

INTRODUCTION

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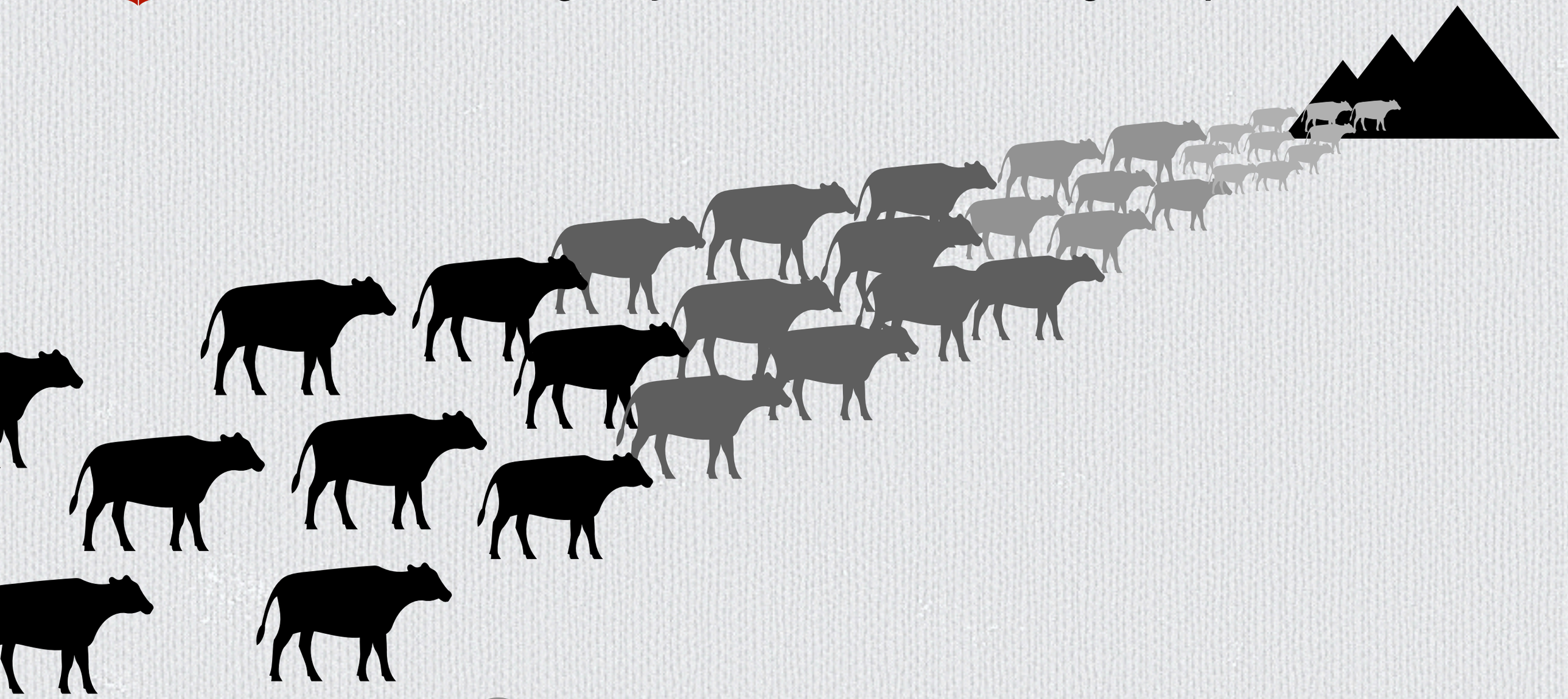
- **It includes moving dairy cows from lowland to highland pastures**



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The maintenance of this activity is threatened by high labor load and low income

However producing milk and cheeses on HI pastures is gaining attention again:

- **Presumed higher health value**
- **Specific sensory properties**
- **Preservation of marginal areas, landscapes and biodiversity**

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- **Specialized dairy cows are susceptible to the HI conditions, resulting in the impairment of milk coagulation properties (MCP)**

- **It is unclear if this also applies to more adapted regional cow types**

- **This research question was investigated through the case study of Aosta Red Pied (ARP), an autochthonous dual purpose cattle breed reared in northwestern Italy**

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Giovanni Niero - giovanni.niero@phd.unipd.it - EAAP Dubrovnik, 28 August 2018 -

AIM

To investigate the effect of HI sojourn

on cheese-making properties of Aosta Red Pied cows dual purpose cattle type

MATERIALS & METHODS

Milk sample collection

Milk samples were collected from a single herd of 47 ARP cows (Institut Agricole Regional, Aosta, Italy)

The same animals were repeatedly sampled during morning and evening milking, before transhumance and after transhumance

Montfleury (Aosta, Italy)
580 m a.s.l.
May 2016
122 milk samples

Val di Rhemes (Rhemes, Italy)
1800 to 2100 m a.s.l.
June and July 2016
150 milk samples

MATERIALS & METHODS

Analysis of milk composition and milk coagulation properties

Fat, protein, casein, lactose and milk urea nitrogen (MUN) contents were determined using a MilkoScan FT6000 (Foss Electric)

Somatic cell count (SCC) was accomplished through a Fossomatic (Foss Electric). Values of SCC were transformed to somatic cell score (SCS) as $3 + \log_2(SCC/100{,}000)$

The MCP were determined using the Formagraph (Foss Electric) as lactodynamographic tool

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MATERIALS & METHODS

Statistical analysis

Dependent variables: milk chemical composition, milk acidity, MCP

Fixed effects: parity, site, milking time, parity x site

Cow was nested within site, and used as subject for repetition

RESULTS & DISCUSSION

Descriptive statistics of production and milk-related traits

Item	No of samples[a]	Mean	SD	Minimum	Maximum
Production-related traits					
Days in milk, d	264	176	48	42	269
Parity, n	271	3.29	2.33	1.00	10.0
Milk yield, kg/d	197	15.5	4.6	5.6	27.8
Milk chemical composition					
Fat, %	258	3.80	0.81	1.84	8.09
Protein, %	258	3.34	0.25	2.79	4.00
Casein, %	258	2.62	0.21	2.12	3.15
Lactose, %	258	4.74	0.20	4.06	5.12
MUN, mg/dL	257	19.2	5.4	4.0	35.3
SCS	258	2.73	1.70	-1.64	7.79
Milk acidity (pH)	258	6.62	0.06	6.44	6.83
Milk coagulation traits					
RCT, min	236	18.8	4.9	4.5	29.0
k_{20}, min	164	5.16	1.44	2.45	9.15
a_{30}, mm	237	27.4	12.9	2.4	58.4

MUN milk urea nitrogen; SCS somatic cell score; RCT rennet coagulation time; k_{20} curd firming time; a_{30} curd firmness 30 min after rennet addition

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RESULTS & DISCUSSION

Least squares means of different parity at different sites

Parity status	Primiparous		Multiparous		
Site	Lowland	Highland	Lowland	Highland	SEM
No of cows	10	10	37	37	
No of samples	40	40	74	74	
Milk yield (kg/day)	13.3^{bc}	10.8^{c}	19.6^{a}	14.2^{b}	1.10
Milk composition					
Fat, %	3.33^{b}	4.19^{a}	3.44^{b}	3.99^{a}	0.183
Protein, %	3.28	3.34	3.28	3.31	0.070
Casein, %	2.57	2.65	2.54	2.58	0.060
Lactose, %	4.87^{a}	4.80^{a}	4.81^{a}	4.57^{b}	0.041
MUN, mg/dL	22.2^{a}	15.5^{b}	22.2^{a}	16.1^{b}	0.82
SCS	0.96^{c}	2.88^{ab}	2.15^{bc}	3.91^{a}	0.404
pH	6.63^{ab}	6.59^{b}	6.64^{a}	6.59^{b}	0.013
Milk coagulation traits					
RCT, min	16.4^{b}	18.5^{ab}	17.5^{b}	21.1^{a}	1.17
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Non coagulating (NC) milk samples increased from 8.5 % at LO to 15.0 % at HI

The NC milk samples had slightly lower contents of fat, protein and CN but considerably greater SCS (3.35 vs. 2.42)

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CONCLUSIONS

Are cheese-making properties of dual purpose cattle impaired by HI grazing?

- ✓ **Highland sojourn compromised MCP in terms of RCT**
- ✓ **Along with an increase in SCS, the percentage of NC milk samples increased**
- ✓ **Hygienic standards are more difficult to maintain in highland**
- ✓ **Cows are more exposed to situations resulting in mammary injuries**
- ✓ **Morning and evening milk appear similarly suitable for cheese-making**