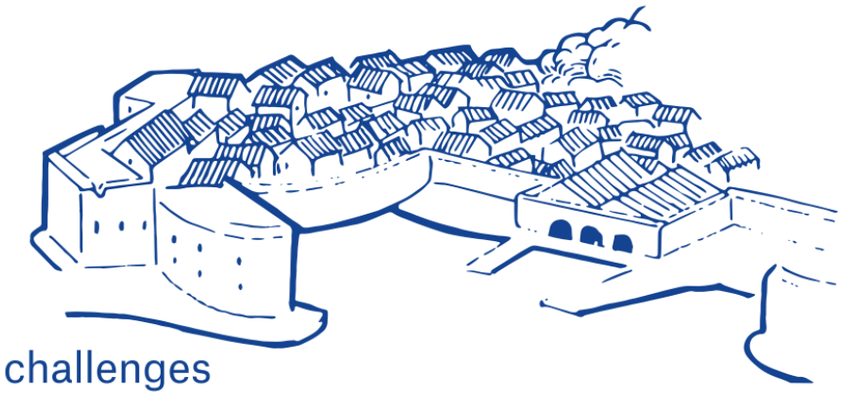
EAAP / 69th ANNUAL MEETING
Dubrovnik, Croatia
27th to 31st August 2018
Conventional and traditional livestock production systems – new challenges



PHENOTYPIC ANALYSIS OF MILK COMPOSITION, MILK UREA NITROGEN AND SOMATIC CELL SCORE OF ITALIAN JERSEY CATTLE BREED

Niero G, Roveglia C, Finocchiaro R, Marusi M, Visentin G, Cassandro M

DAFNAE Department of Agronomy Food Natural resources Animals Environment

ANAFI Fondata nel 1945

INTRODUCTION

Jersey dairy cow breed

Relatively low milk yield (MY)

… but …

Favorable production related traits:

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High milk solids production / unit of feed

Giovanni Niero - giovanni.niero@phd.unipd.it - EAAP Dubrovnik, 27 August 2018 -

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High feed conversion efficiency / kg of live-weight

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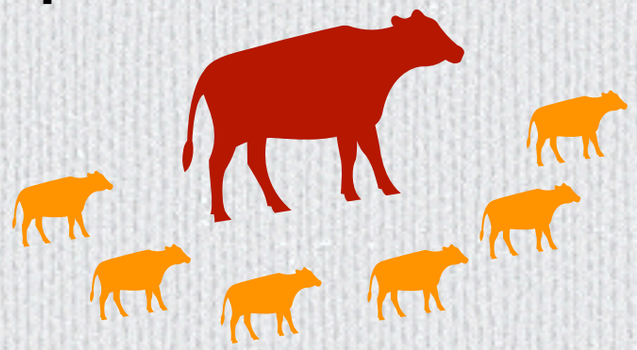
High feed conversion efficiency / kg of live-weight

High reproductive performances



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Once a day milking

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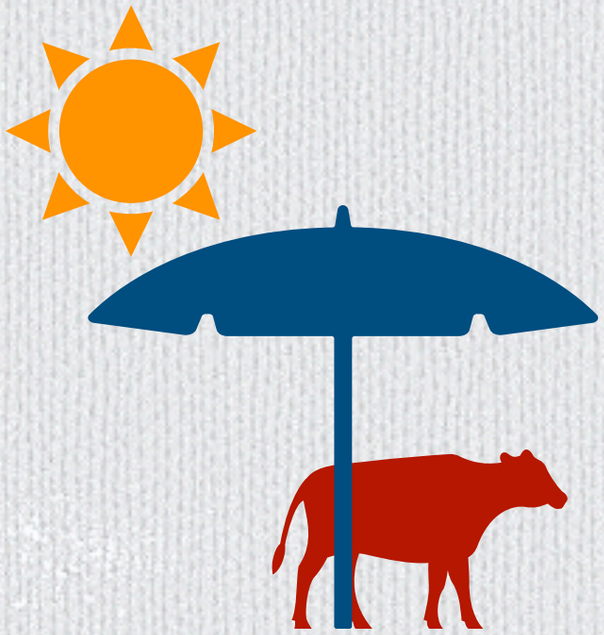


Once a day milking

Less heat stress load

INTRODUCTION

Jersey breed in Italy

ANAFI
Fondata nel 1945

Introduced in Italy in the early 1980's

Italian Holstein Association (ANAFI) is responsible of Italian Jersey (IJ) genetic evaluation and herd book maintenance

From 2007 to 2016 the number of IJ increased from 6391 to 7009
Milk production from 5953 to 6521 kg/lactation
Fat content from 5.20% to 4.93%
Protein content from 4.00% to 3.94%

AIM

To investigate sources of variation of:

MY

Composition traits

Milk urea nitrogen (MUN)

Somatic cell score (SCS)

In IJ cattle

MATERIALS & METHODS

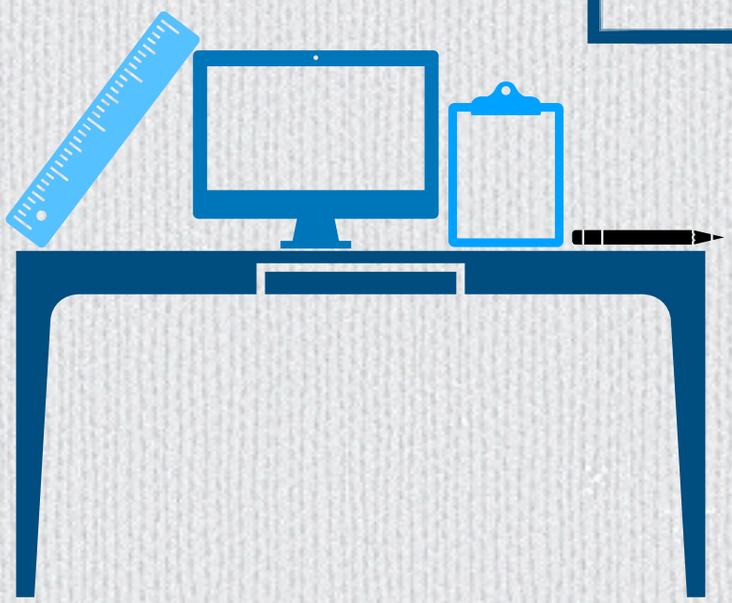
Data collection and editing

Dataset provided by ANAFI included:

527,585 test-day records
24,447 IJ from 1625 herds
Recorded from 1994 to 2016

Final edited dataset included:

417,006 test-day records
20,434 IJ from 600 herds
Recorded from 2005 to 2016
Between 6 and 480 days in milk
Between 1 and 6 parity
MY ≥ 2 kg/d
Lactations ≥ 3 test day records
Herd-test-day ≥ 3 cows



MATERIALS & METHODS

Statistical analysis

Analysis of variance was carried out on a subset:
13,476 test-day records from 1152 cows and 36 herds
According to a herd random sampling approach

$$y_{ijklmno} = \mu + DIM_i + P_j + S_k + N_l + T_m + (DIM \times P)_{ij} + HTD_n + cow_o + e_{ijklmno}$$

Dependent Variable

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Overall mean

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Days in milk

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- $y_{ijklmno}$: Dependent Variable
- μ: Overall mean
- DIM_i: Days in milk
- P_j: Parity

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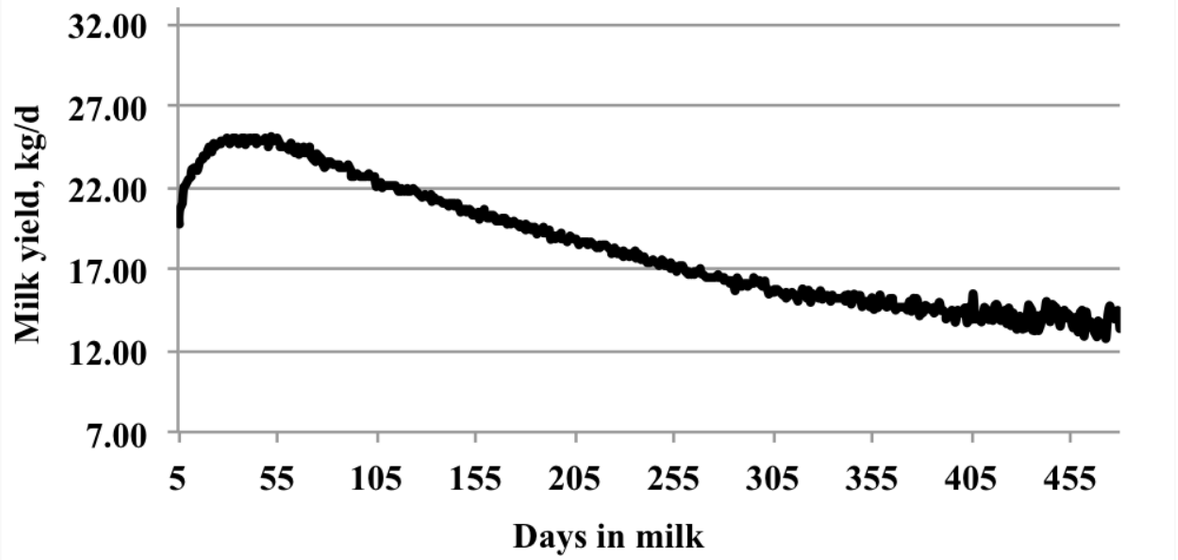
- $(DIM \times P)_{ij}$
- HTD_n: Random Effects
- cow_o: Random Effects
- $e_{ijklmno}$

RESULTS & DISCUSSION

Descriptive statistics of MY, composition, MUN and SCS

Trait	No of records	Mean	SD
Milk yield, kg/d	416,846	20.11	6.61
Fat, %	415,849	5.18	1.13
Protein, %	416,547	4.08	0.49
Casein, %	198,713	3.16	0.39
Lactose, %	324,233	4.77	0.23
MUN, mg/dL	188,294	23.51	8.00
SCS, units	415,794	3.35	1.85



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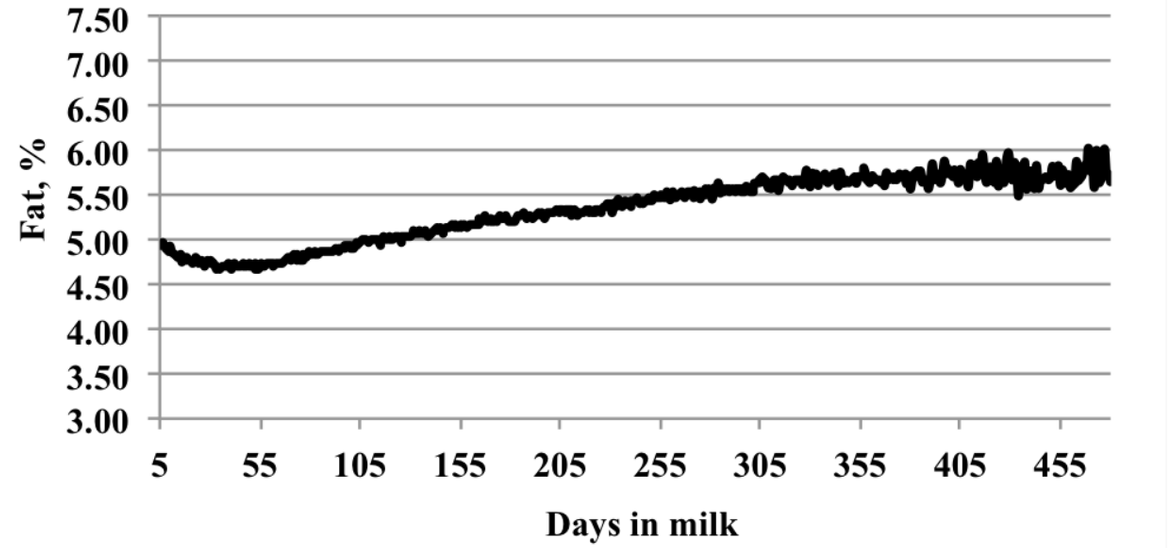

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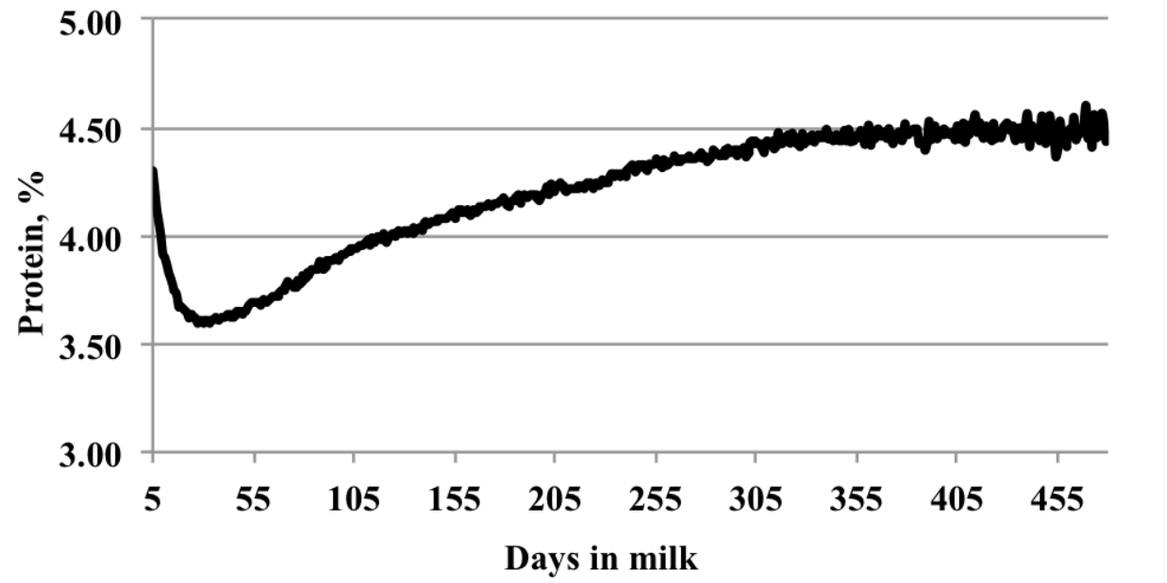

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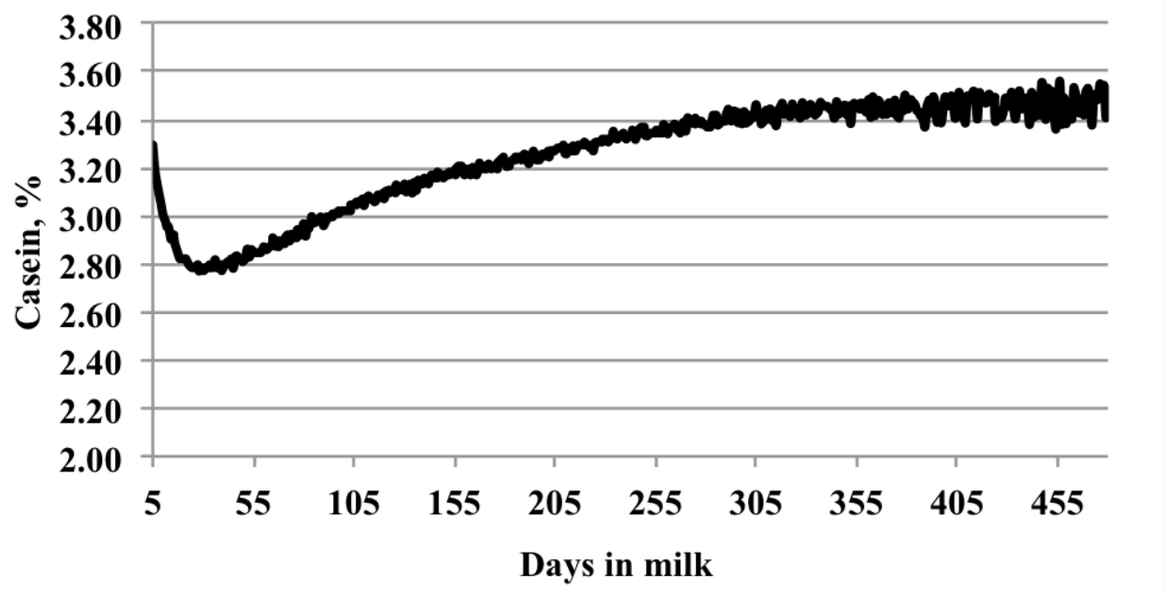

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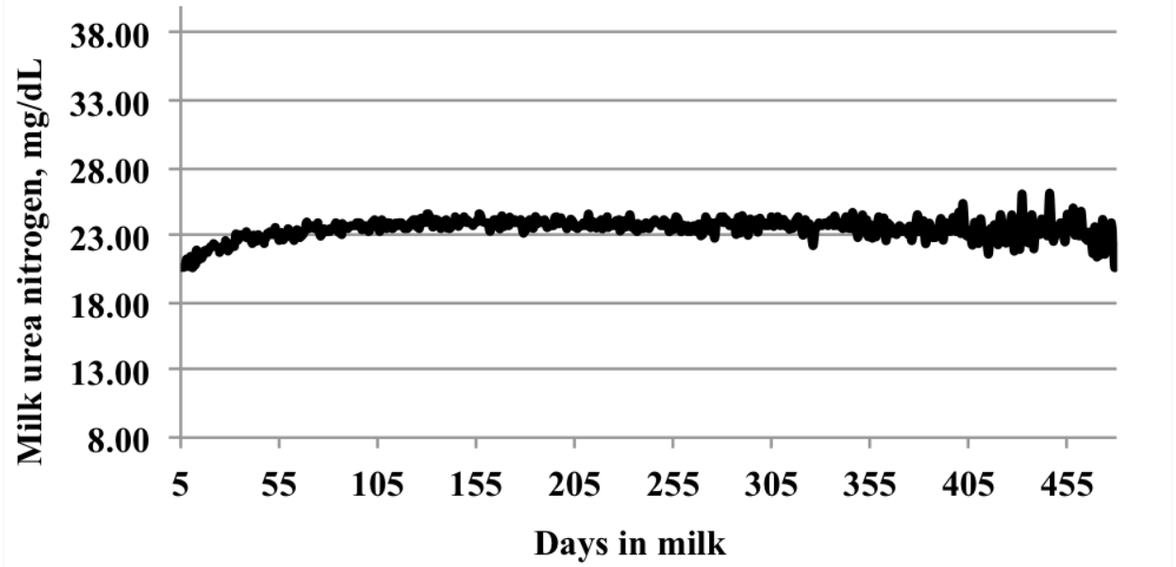

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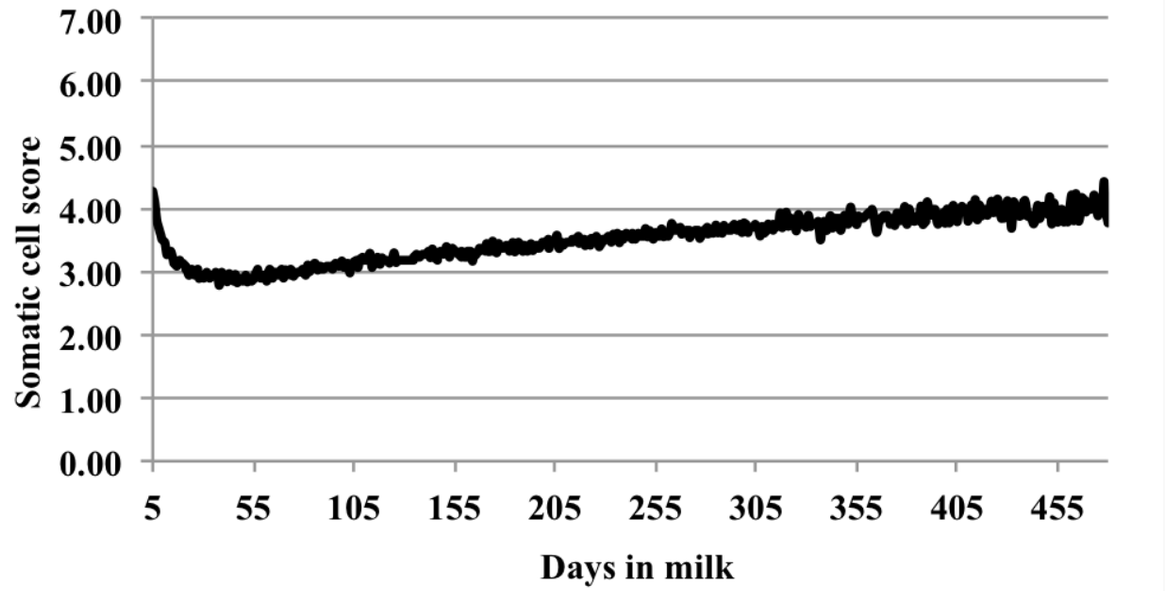

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RESULTS & DISCUSSION

Analysis of variance / fixed effects

Trait	Fixed effects					
	Days in milk (DIM)	Parity (P)	Calving season	Milking frequency	Recording type	DIM × P
Milk yield, kg/d	337.55***	19.41***	5.64***	39.24***	134.77***	7.64***
Fat, %	37.01***	4.12**	6.32***	26.32***	1.01	1.56**
Protein, %	166.38***	7.52***	4.29**	50.61***	3.42	1.64**
Casein, %	106.43***	4.94***	4.82**	23.28***	0.08	1.89***
Lactose, %	59.42***	47.86***	0.90	3.69	5.26*	3.05***
MUN, mg/dL	4.63***	4.32***	5.78***	21.97***	4.06*	1.41*
SCS, units	11.13***	33.05***	2.00	34.91***	0.20	2.26***

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*$p < .05$, **$p < .01$, ***$p < .001$

RESULTS & DISCUSSION

Analysis of variance / random effects

Trait	Random effects		
	σ^2_{HTD}, %	σ^2_{cow}, %	RSD
Milk yield, kg/d	10.94	33.26	4.57
Fat, %	18.27	14.73	0.88
Protein, %	11.31	21.51	0.36
Casein, %	9.77	18.46	0.31
Lactose, %	11.92	17.84	0.19
MUN, mg/dL	53.09	6.28	4.95
SCS, units	5.99	22.36	1.49

MUN: milk urea nitrogen; SCS: somatic cell score; RSD: residual standard deviation

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CONCLUSIONS

- ✓ **The IJ milk showed desirable fat, protein and casein contents**
- ✓ **Phenotypic variances of MY and composition traits were mainly driven by cow effect**
- ✓ **More than 50% of the phenotypic variance of MUN content was due to HTD effect**