Interactions between milk production and reproduction in Sicilo-Sarde dairy ewes

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Objective

Study milk production and reproductive performances of the Sicilo-Sarde ewe in Tunisia:

- identify major sources of variation
- investigate phenotypic interactions between both groups of traits

Context

- In Tunisia, milk production from sheep provides 2 to 5% of national milk production.
- The Sicilo-Sarde breed is the basis of this production. The production system is semi-intensive. Lambing and milking periods are synchronized with the green season.
- Long time absence of genetic and environmental serious attempts to improve the sector has negatively affected the production potential of the breed.

Material and Methods

- Data:
  - 5,935 lactations of 2,644 ewes, including 5,572 lactations with complete milk information
  - from 8 flocks of Sicilo-Sarde breed during 6 successive productive years (2004 to 2010) in 3 Northern Tunisian farms (flocks 1-5; 6-7; 8)
- Traits studied:
  - total milked yield in the milking-only period
  - interval from the start of mating period to the subsequent lambing
  - pregnancy status (pregnant after mating period or not)
- Methods:
  - sources of variation identified using GLM procedure in SAS
  - estimation of (co)variance components with a 3-trait threshold mixed model (pregnancy status as a categorical trait) using THRGIBBSF90 program

    (**http://nce.ads.uga.edu/~ignacy/newprograms.html**)

Results

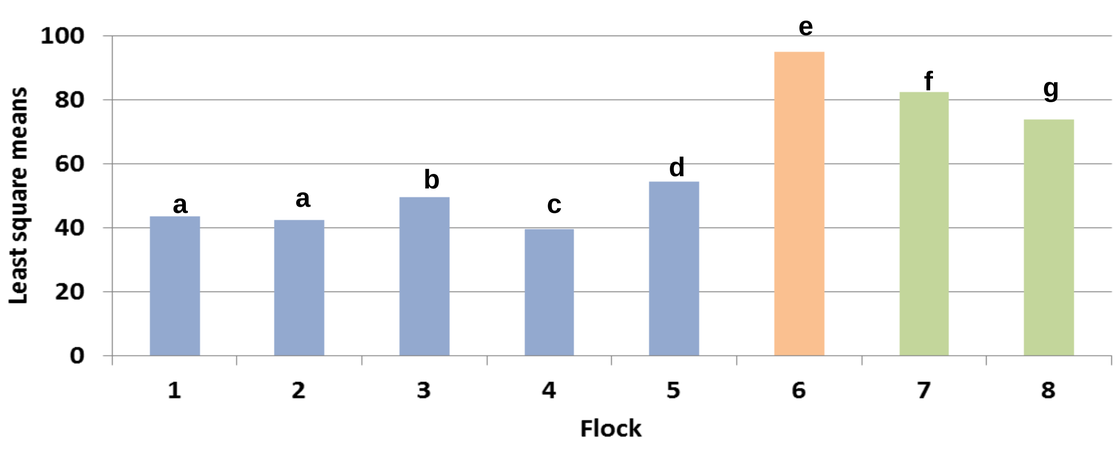
Descriptive statistics of milk production and reproductive traits of Sicilo-Sarde sheep population

	N	Mean	Standard deviation
Total milked milk, L	5572	60.93	44.12
Daily milked milk, L	21157	0.46	0.31
Milking-only length, d	5572	132.80	46.60
Suckling length, d	5573	100.40	24.90
Lactation length, d	5572	233.20	46.50
Interval from the start of mating period and the subsequent lambing, d	2480	165.70	10.80
Pregnancy status	3008	0.82	0.38

Sources of variation of milk production: least square means of various effects on total milk yield

Suckling length, d							
1	2	3	4	5	6	7	8
68.62[a]	65.37[a]	56.50[b]	56.90[b]	57.69[b]	56.73[b]	57.47[b]	61.24[c]

Year of lambing						
2004	2005	2006	2007	2008	2009	2010
41.52[d]	54.87[a]	55.52[a]	69.94[b]	62.47[c]	68.51[b]	67.61[bc]



[a-b-c-d-e-f] *Means with row with same letter do not differ significantly (P-value > 0,05)*

Conclusion

- Flock 6 could be considered as a good model to be followed by Sicilo-Sarde farmers to improve the production of their dairy sheep.
- Orientation of farmers to manage the Sicilo-Sarde breed as a dual-purpose or meat sheep could explain the low milk performances.
- Total milked milk and interval from mating to lambing were found to be favorably associated with the flock x year of lambing effect but unfavorably associated with the animal effect.
  - ➔ Good management practices permitted higher milk production which was associated with shorter interval from mating to lambing and therefore good fertility.

Main sources of variation of the interval between the start of mating period to the subsequent lambing and of pregnancy status

	Interval from mating to lambing		Pregnancy status	
	df	P-value	df	P-value
Flock x month of mating	8	<0.0001	8	<0.0001
Year of mating	5	<0.0001	5	<0.0001
Parity	5	0.0231	5	<0.0001
Litter size	2	0.0217	2	0.2761

Repeatability estimates for total milked milk, interval between the start of mating period and the subsequent lambing, and pregnancy status (diagonal), correlations among traits for the flock x year of lambing effect (above diagonal) and for the animal effect (below diagonal), standard errors are within brackets

	Total milked milk	Interval from mating to lambing	Pregnancy status
Total milked milk	0.21 (0.03)	-0.45 (0.18)	0.00(0.23)
Interval from mating to lambing	0.20 (0.09)	0.09 (0.02)	0.12(0.28)
Pregnancy status	0.08 (0.12)	-0.15 (0.30)	0.10(0.05)

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