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Morphological characterisation of Spanish Assaf dairy sheep breed

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Introduction

The Assaf breed introduced into Spain in 1977, is actually managed under one unique breeding organization officially recognized by the Spanish government. Nowadays there are about 700,000 heads from which 200,000 owned by roughly 300 farmers are registered in the official flockbook (http://www.assafe.es/).

The introduction of the Assaf sheep breed has occurred basically by the male-mediated absorption of Spanish native dairy sheep breeds such as Castellana, Churra, Manchega or, to a lesser extent, Latxa (Ugarte et al., 2002), but the maternal breed of these mates have mainly been dependant on the geographical point of introduction which makes difficult the establishment of a standardized phenotype.

Objective

Analyzing body measurements to establish an standard of the breed.

Material and Methods

Data

18 random flocks
- 9 provinces of the central Spain
- 2 regions: Castilla-León (85%) and Center (15%).
- 280 female individuals (217 and 63 for the two zones) from 2 to 4 years old
  61 male individuals (53 and 8 for the two zones) from 2 to 5 years old
- 17 body measurements and also 8 udder traits for the females:

Live Weight (LW)
Head Width (HW)
Chest Width (CW)
Anterior Croup Width (ACW)
Posterior Croup Width (PCW)
Croup length (CL)
Thorax Perimeter (TP)
Cane Perimeter (CP)
Head Length (HL)
Cross Height (CH)
Croup Height (CrH)
Longitudinal Diameter (LD)
Dorsoesternal Diameter (DD)
Bicostal Diameter (BD)
Tail Width (TW)
Ear Length (EL)
Ear Width (EW)

Udder Length (UL)
Udder Depth (UD)
Udder Width (UW)
Cistern Height (CiH)
Teat Placement (TP)
Teat Length (TL)
Teat Width (TW)
Teat Angle (TA).

Statistical analyses (SAS, 1999)
- Descriptive statistics
- General Linear Model (Age and flock as fixed effects)
- Mahalanobis distances
- Discriminant analysis

Results

Table 1. Raw means, coefficient of variation (CV) and significance level ($p < 0.05$. ** Significance level: $p < 0.01$. *** Significance level: $p < 0.001$. NS: Non-significant) of flock and age effects for each of the seventeen measured traits both in males and females.

	MALES				FEMALES			
	Mean	CV	Flock	Age	Mean	CV	Flock	Age
LW	110.47	11.32%	NS	NS	75.74	14.82%	***	***
HW	14.52	4.75%	**	*	13.01	4.11%	***	**
CW	26.85	7.45%	*	NS	22.86	6.23%	**	***
ACW	21.83	8.34%	**	NS	20.43	5.57%	***	**
PCW	18.41	7.30%	**	NS	17.18	5.81%	***	NS
CL	23.97	4.41%	*	*	22.25	5.53%	*	NS
TP	117.30	4.83%	NS	NS	105.68	6.31%	***	***
CP	10.82	7.41%	NS	NS	8.95	5.51%	**	NS
HL	31.11	4.69%	NS	NS	26.60	4.08%	*	*
CH	83.51	3.82 %	**	*	74.10	4.52%	***	NS
CrH	84.18	3.73%	*	*	75.94	4.31%	***	NS
LD	82.16	4.81%	**	NS	73.09	4.83%	***	*
DD	38.82	5.61%	NS	*	34.65	5.70%	***	**
BD	27.89	7.97%	NS	NS	25.51	9.93%	***	**
EL	17.90	9.99%	NS	NS	18.19	9.28%	***	NS
EW	10.33	11.23%	NS	NS	10.12	8.00%	NS	NS
TW	14.45	14.12%	***	NS	12.35	15.00%	** *	**

Table 2. Raw means, standard deviation (SD), coefficient of variation (CV) and significance of flock and age effects for each of the eight udder trais.

	Mean	CV	Flock	Age
UL	11.26	13.73%	***	NS
UD	19.53	16.30%	***	***
UW	9.81	13.67%	***	NS
CiH	4.67	31.68%	***	**
TP	2.78	21.96%	NS	NS
TL	3.06	23.43%	***	NS
TW	1.75	18.55%	***	NS
TA	63.25	16.85%	***	*

Figure 1. Bi-dimensional representation of the canonical variables associated to the individuals sampled considering morphological measurements.

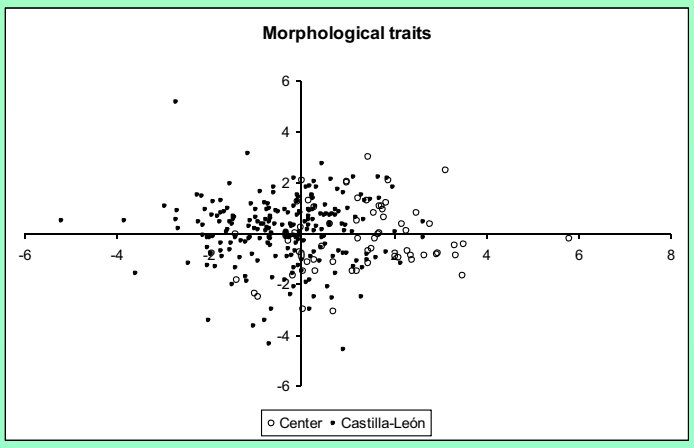

Table 3. Significant Mahalanobis distances between the flocks, based on morphological measurements. Flocks belonging to the Center zone are in bold.

Flock	DGM	AV	HFM	OG	FA	HVV	HMG	EFR	SC	HP	MV	OLM	HBA	EC	RAC	SGA	AP	SLL	Mean
DGM		3.628	3.612			3.291	3.781	7.432	**6.325**	4.486	3.927	8.191	5.141	**4.242**	7.696	5.903	**8.487**	**8.355**	5.633
AV	3.628		4.995	6.459	3.254	5.932	7.476	6.828	**4.567**	6.749	6.165	6.157	7.361	**7.316**	7.290	8.814	**7.603**	**6.400**	6.294
HFM	3.612	4.995		5.043	4.466	6.622	3.469	6.107	**5.857**	9.429	6.567	5.701	7.458	**9.480**	6.356	4.456	**9.488**	**9.441**	6.385
OG		6.459	5.043		3.467		3.441	3.685	**7.991**	5.683		8.767		**5.832**	8.709	7.280	**9.799**	**9.545**	6.592
FA		3.254	4.466	3.467		3.295	4.062	5.723	**7.459**	7.926	3.999	10.320	5.838	**8.453**	7.250	7.733	**12.764**	**10.196**	6.638
HVV	3.291	5.932	6.622		3.295			4.523	**9.005**	3.883	4.136	11.850	7.043	**5.889**	7.942	11.874	**10.058**	**8.725**	6.938
HMG	3.781	7.476	3.469	3.441	4.062			6.099	**7.483**	6.463	4.312	10.418	6.633	**9.739**	8.980	6.701	**13.301**	**12.962**	7.207
EFR	7.432	6.828	6.107	3.685	5.723	4.523	6.099		**8.341**	8.318	7.541	7.618	5.141	**10.184**	9.380	10.344	**8.261**	**7.799**	7.254
SC	**6.325**	**4.567**	**5.857**	**7.991**	**7.459**	**9.005**	**7.483**	**8.341**		**8.849**	**6.314**	**3.950**	**10.146**	**9.272**	**6.925**	**6.821**	**6.239**	**9.565**	**7.359**
HP	4.486	6.749	9.429	5.683	7.926	3.883	6.463	8.318	**8.849**		7.914	9.827	6.488	**7.526**	9.346	11.101	**6.751**	**7.069**	7.518
MV	3.927	6.165	6.567		3.999	4.136	4.312	7.541	**6.314**	7.914		9.694	6.676	**7.660**	9.698	10.873	**12.943**	**15.451**	7.742
OLM	8.191	6.157	5.701	8.767	10.320	11.850	10.418	7.618	**3.950**	9.827	9.694		8.046	**11.433**	7.732	6.320	**5.355**	**9.415**	8.282
HBA	5.141	7.361	7.458		5.838	7.043	6.633	5.141	**10.146**	6.488	6.676	8.046		**12.150**	14.835	5.534	**12.784**	**13.006**	8.392
EC	**4.242**	**7.316**	**9.480**	**5.832**	**8.453**	**5.889**	**9.739**	**10.184**	**9.272**	**7.526**	**7.660**	**11.433**	**12.150**		**9.952**	**14.398**	**6.233**	**7.615**	**8.669**
RAC	7.696	7.290	6.356	8.709	7.250	7.942	8.980	9.380	**6.925**	9.346	9.698	7.732	14.835	**9.952**		12.589	**6.614**	**6.750**	8.708
SGA	5.903	8.814	4.456	7.280	7.733	11.874	6.701	10.344	**6.821**	11.101	10.873	6.320	5.534	**14.398**	12.589		**13.383**	**13.933**	9.298
AP	**8.487**	**7.603**	**9.488**	**9.799**	**12.764**	**10.058**	**13.301**	**8.261**	**6.239**	**6.751**	**12.943**	**5.355**	**12.784**	**6.233**	**6.614**	**13.383**			**9.379**
SLL	**8.355**	**6.400**	**9.441**	**9.545**	**10.196**	**8.725**	**12.962**	**7.799**	**9.565**	**7.069**	**15.451**	**9.415**	**13.006**	**7.615**	**6.750**	**13.933**			**9.764**

Conclusions

At present, the Spanish Assaf breed can be considered as a homogeneous population at the morphological level. However, slight differences still remain between subpopulations belonging to different Spanish regions.

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