

RELATIONSHIP BETWEEN LINEAR CONFORMATION TRAITS AND MORPHOLOGICAL SCORES IN SPANISH PUREBRED

Sánchez. M.J., Azor. P.J., Gómez. M.D., Bartolomé. E., Valera. M.

University of Seville. Ctra. Utrera km1. 41013 Seville. Spain. v32sagum@gmail.com



Introduction

The conformation assesses the structure of an animal in relation to its function and its breed. However, in the Spanish Purebred horses (SPB), beauty has also become a very important economic parameter for horse breeders, being of high relevance the score that the animal gets in morphological horse shows. In previous analyses, a linear evaluation methodology has been developed successfully for this breed.

Therefore, the aim of this work was to study the relationship between the different classes obtained for the linear conformation traits (by a linear evaluation methodology) and the beauty morphological scores (MSC) obtained in the morphological horse shows for the SPB.

Material and Methods

A total of 31 linear conformation traits, collected between 2003 and 2010, were included in the analysis. MSC were obtained in the morphological horse shows for the SPB between 2006 and 2010.

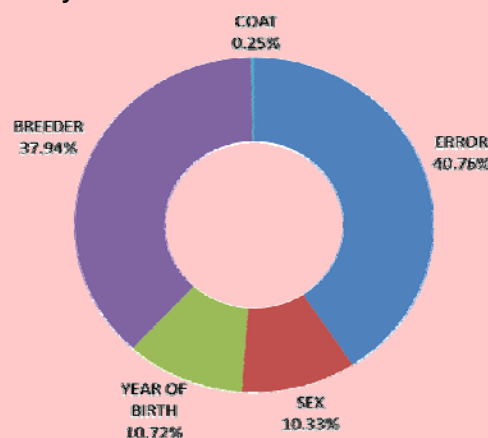
The relationship between MSC and the linear conformation traits was analyzed for 2,485 records belonging to 1,321 horses (654 males and 667 females) born between 1990 and 2007. Breeder (540), sex (2), owner (558), coat color (9) and year of birth (17) were analyzed as environmental factors.

A GLM analysis and a variance components analysis ascertained the influence of environmental factors. An ANOVA was made with the 31 conformation traits, in order to evidence the relationship between the different classes of the linear conformation traits and the MSC.

Table 1. Significant conformation traits in the MSC (p<0.05).

Factors	SS	df	MS	F	p
Head length (HL)	1766.6	7	353.32	4.7556	0.000254
Width of head (WH)	1171.6	5	234.31	3.1537	0.007709
Length of neck (LN)	1499.6	8	214.23	2.8834	0.005355
Neck-body Junction (NBJ)	2028.9	7	289.85	3.9012	0.000314
Length of shoulder (LS)	4931.8	7	704.55	9.4829	0.000000
Angle of shoulder (AS)	1334.5	7	222.42	2.9937	0.006501
Lateral angle of knee (LAK)	1391.3	6	231.88	3.1211	0.004793
Cannon Bone Perimeter (CBP)	1884.7	7	269.25	3.6240	0.000691
Angle of croup (AC)	1520.6	8	190.07	2.5583	0.008967
Breed quality (BQ)	1534.0	8	166.75	2.8984	0.036812
Harmony (H)	1109.3	7	158.47	2.1329	0.037430

Figure 1. Analysis of variance of the environmental factors in MSC.



Results and Discussion

Figure 1 shows the contributions of each environmental factor to MSC. The breeder showed the highest influence (37.94%). The year of birth and the sex explained between 10% and 15% of the variance, whereas the coat color and the owner were not significant (<0.3%). This could be due to the pre-selection made by the breeder and to the preferences of each judge.

There were 11 linear conformation traits (Table 1) with significant influence on MSC, being the LS and the HL the traits that the judges were able to differentiate best.

In general, classes 6-7 on linear conformation traits achieved a higher average values for MSC in males; whereas classes 4-5 achieved the highest values for females (Table 2).

Table 2. Basic statistics and the "ideal class" for MSC.

Trait	Type	C.M.	Dif.M.	C.F.	Dif.F.	Mean±SE.	Mode	Freq.	Range	CV (%)	Class 1	Class 9
HL	Prim	7	3.95	4	5.15	5.16±0.020	5	1006	8	18.2	<50	>71
WH	Prim	6	12.39	2	12.84	3.27±0.013	3	1580	6	17.8	<17	>39
LN	Prim	9	4.04	3	4.93	5.94±0.031	5	743	8	24.4	<62	>84
NBJ	Prim	7	7.36	7	4.49	3.87±0.027	4	762	9	31.9	<2	>23
LS	Prim	9	9.89	4	25.46	5.37±0.038	4	446	8	32.6	<59	>73
AS	Prim	8	6.07	7	4.23	6.93±0.022	7	1047	8	14.6	<35	>57
LAK	Sec	7	13.27	7	3.59	5.01±0.016	5	1348	8	14.7	Very buck-kneed	Very calf-kneed
CBP	Prim	8	6.57	3	7.59	5.14±0.024	5	804	8	22.0	<16	>24
AC	Prim	8	4.02	3	6.75	4.59±0.042	4	418	9	42.0	<5	>29
BQ	Sec	7	11.80	8	7.44	3.87±0.033	3	805	9	39.6	No racial	Very racial
H	Sec	9	2.27	7	7.15	4.05±0.029	5	669	8	33.4	No harmonious	Very harmonious

Dif. = Difference between the average MSC of ideal class and MSC average with worse outcomes for each trait (M=Male, F=Female)
 C.M.= Linear class with higher average value in males
 C.F. = Linear class with higher average value in females



Conclusions

- ✓ Our results highlighted that in general the "ideal class" for the linear conformation traits in males is higher than in females.
- ✓ Linear conformation traits and the environmental factors play a fundamental role in MSC results.
- ✓ The eleven significant linear conformation traits could be used as objective traits in an indirect genetic evaluation for beauty selection.