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Conference paper

MORPHO-PHYSIOLOGICAL CHARACTERIZATION OF AMIATAN DONKEY

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Summary

The Amiatan donkey is a typical italian breed, derived from Equus asinus Africanus (1), once utilized as working, burden or mine animal and today used as working and grazing in marginal areas or employed in local competitions, normally called "Palio". It is also used in children riding and as effective aid in horse therapy for disables. Normally its hair is a crossed mouse-grey, with striped limbs, dark bordered ears and light grey muzzle and abdomen.

This population is today considered at risk of extinction, being present in total national territory not more than one or two hundreds heads, Horse Breeding Institute of Pisa, Amiatan Donkey National Breeding Association, and our Department of Animal Production of Pisa University's aim is to evaluate a careful morpho-phisiological characterization of these donkeys to gain a better settlement of breed standards and get an effective contribution to the exploitation of italian breeding.

Introduction

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Materials and methods

The study has been carried out to examine the main morphological traits in 74 Amiatan donkeys and metabolic profile in 27 ones, from a single breeding Center located in the province of Grosseto (Tuscany - Italy); the animals were fed with the same feeding system. The aim of this further investigation is to supply better phisiological informations on the way of donekey's breeding and nutritional management improvement, as we can compare about athletic-horses fitness (2, 3, 4, 5, 6) parameters.

In detail we have examined: head length, head width, neck length, neck girth, trunk length, chest depth, chest girth, chest height, head width, back length, rump length, front rump width, back rump width, knee-hip trait, knee-buttock trait, wirthers height, cross height, back height, tail height, front limb length, shin-bone girth.

We have also examined these physiological parameters: CPK, LDH, AST, ALT, ALP, y-GT, total bilirubin, azotemia, creatinine, Ca, P, Na, K, Cl, Fe, total protein, RBC, WBC, Hb, MVC, WBC formula.

Comparison between males and females about evaluated parameters was made using "t" Student test.

Reults and discussion

In the table 1 the averages of all considered morphological parameters, with the comparison between males and females are reported. We can observe strong differences between sexes: particularly higher results male withers heights (cm 135.5 vs cm 130) cross heights (cm 135.8 vs cm 131.3), back heights (cm 132.6 vs cm 126.8) and tail heights (cm 118.8 vs cm 115.2). Chest girth (cm 156.4 vs cm 150.8) and shin-bone girth (cm 18.9 vs cm 17.5) also mean an higher male skeletal growth.

Head lengt is higher in the females (cm 68 vs cm 65); head width doesn't show significant differences between sexes.

Most of lengths are significantly higher in males, like trunk length (cm 144.6 vs cm 141.3), chest depth (cm 62.1 vs cm 59.9) and rump length (cm 42.4 vs cm 46.8); on the contrary, some of the widths, in the back, are higher in the females: front rump width is cm 51.5 in the females and cm 48.5 in the males; knee-buttock traits measures cm 47.9 in the females and cm 47.8 in the males (not significant).

In conclusion, we can observe two different morphological sex linked models, with an higher, more massive skeletal constitution for male Amiatan donkey, and a light, longer head and with a good developed pelvis, female.

Table 1. - MORPHOLOGICAL PARAMETERS

Traits	Males n°	Males mean ± S.D.	Females n°	Females mean ± S.D.	Significance
Head l.	17	65.0 ± 0.72	46	68.0 ± 0.44	**
Head w.	17	24.2 ± 0.46	46	24.6 ± 0.28	ns
Neck l.	17	61.1 ± 0.74	46	63.6 ± 0.45	**
Neck g.	17	92.0 ± 0.84	46	86.8 ± 0.51	**
Trunk l.	17	144.6 ± 0.97	44	141.3 ± 0.60	**
Chest d.	16	62.1 ± 0.73	46	59.9 ± 0.43	*
Chest g.	26	156.4 ± 1.22	46	150.8 ± 0.92	**
Chest h.	17	67.1 ± 0.52	46	62.8 ± 0.30	**
Breast w.	17	31.6 ± 0.91	46	31.2 ± 0.55	ns
Back l.	17	89.6 ± 0.87	46	84.4 ± 0.52	**
Rump l.	17	42.4 ± 0.70	46	36.8 ± 0.42	**
Front rump w.	17	48.5 ± 0.61	46	51.5 ± 0.37	**
Back rump w.	17	20.9 ± 0.21	46	20.8 ± 0.13	ns
Knee-hip.t	17	37.5 ± 0.36	46	38.5 ± 0.21	*
Knee-buttock t.	17	47.8 ± 1.12	46	47.9 ± 0.68	ns
Withers h.	28	135.5 ± 0.68	46	130.0 ± 0.53	**
Cross h.	16	135.8 ± 0.83	46	131.3 ± 0.49	**
Back h.	17	132.6 ± 0.88	46	126.8 ± 0.53	**
Tail h.	17	118.8 ± 0.62	46	115.2 ± 0.38	**
Front limb l.	17	68.0 ± 0.66	46	67.1 ± 0.40	ns
Shin-bone g.	28	18.9 ± 0.19	46	17.5 ± 0.14	**

** $P < 0.01$

* $P < 0.05$

In the table 2 the averages of all considered parameters concerning the metabolic profile are reported. No significant differences between sexes underline, with the exception of total proteins, higher in the females (7.3 g/l vs 6.7 g/l). Althought not significantly, RBC are higher in males (5.6 millions vs 5.2 millions), WBC are higher in the females (13021 vs 8237). No significant differences show for the enzyme parameters and for minerals between sexes.

The research will be completed with more physiological data and we'll report, about these, in the future: we want to check if, as in the horse (4, 6, 7, 8), we can find any other differences between males and females and moreover between young and old donkeys.

Table 2. - METABOLIC PROFILE PARAMETERS

Labels	U	Males n°	Males mean ± S.D.	Females n°	Females mean ± S.D.	Significance
CPK	IU/l	12	116.4 ±18.38	15	110.9 ±16.44	ns
LDH	IU/l	12	381.5 ±42.00	15	368.3 ±37.60	ns
AST	IU/l	12	224.3 ±24.00	15	183.0 ±21.50	ns
ALT	IU/l	12	5.8 ± 0.99	15	5.1 ± 0.89	ns
ALP	IU/l	12	193.2 ±18.80	15	208.9 ±16.80	ns
γGT	IU/l	12	43.8 ± 3.68	15	43.8 ± 3.29	ns
Tot.bilir.	µmol/l	12	0.1 ± 0.02	15	0.1 ± 0.01	ns
Azotemia	µmol/l	12	42.2 ± 2.11	15	39.8 ± 1.89	ns
Creatinine	µmol/l	12	1.3 ± 0.08	15	1.1 ± 0.07	ns
Ca	mmol/l	12	10.9 ± 0.46	15	11.6 ± 0.41	ns
P	mmol/l	12	6.5 ± 0.73	15	4.8 ± 0.65	ns
rapp.Ca/P		12	2.2 ± 0.21	15	2..6 ± 0.18	ns
Na	mmol/l	12	138.1 ± 1.31	15	137.8 ± 1.17	ns
K	mmol/L	11	4.3 ± 5.44	14	4.5 ± 4.82	ns
Cl	mmol/l	12	106.3 ± 0.92	15	102.1 ± 0.82	ns
Fe	µmol/l	12	110.3 ± 8.59	15	112.3 ± 7.68	ns
Tot.prot.	g/l	11	6.7 ± 0.15	15	7.3 ± 0.14	*
RBC	$x10^9$/l	8	5.6 ± 2.47	13	5.2 ± 1.35	ns
WBC	$x10^3$/l	8	8237 ± 5236	13	13021 ± 2855	ns
Hb	g/dl	8	13.2 ± 0.72	13	13.0 ± 0.57	ns
MVC		8	0.7 ± 0.03	13	0.8 ± 0.02	ns
Neutr.	%	8	50.0 ± 1.28	13	53.0 ± 1.00	ns
Eosin.	%	8	1.8 ± 0.33	13	1.6 ± 0.26	ns
Basoph.	%	8	0.0	13	0.0	ns
Lymph.	%	8	46.4 ± 1.38	13	43.5 ± 1.08	ns
Monoc.	%	8	1.9 ± 0.28	13	2.0 ± 0.21	ns

* $P < 0.05$

Conclusions

On the basis of our firs observations, we note two different morphological sex llinked models, with an higher, more massive male and a light, longer head and good developed pelvis female.

No significant differences, at the moment, underline between sexes abot the parameters of metabolic profile, except for total protein, higher in the females.

We are checking up larger physiological data and examining the evolution with reference to the age of the animals.

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MORFO-FIZIOLOŠKA KARAKTERIZACIJA AMIATANSKOG MAGARCA

Sažetak

Amiatanski magarac je tipična talijanska pasmina, podrijetlom od Equus asinus Africanus (1), što se nekoć iskorištavao kao radna, teretna i rudarska životinja, a danas služi za rad i pasenje u pasivnim područjima ili na lokalnim natjecanjima, obično pod nazivom "Palio". Isto tako se upotrebljava za jahanje djece i kao djelotvorna pomoć u terapiji za invalide. Dlaka mu je obično mišje siva, prugastih udova, tamno obrubljenih ušiju, svijetlosive njuške i trbuha.

Ta se populacija danas smatra ugroženom s ne više od sto do dvjesto grla u čitavoj zemlji. Cilj je Instituta za uzgoj konja u Piui, Nacionalnog udruženja za uzgoj aviatanskog magarca i našeg Odjela za proizvodnj životinja Sveučilišta u Pizi pažljivo ocijeniti morfološke značajke tih magaraca radi boljeg određivanja standarda pasmine te tako dobiti djelotvoran prilog iskorištavanju talijanskog uzgoja.

Na osnovi prvih promatranja primjećujemo dva različita morfološka modela u vezi sa spolom, s višim, masivnijim mužjakom i laganijom ženkom dulje glave i dobro razvijene zdjelice.

Za sada nema značajnih razlika između spolova u parametrima metaboličkog profila, osim ukupnih bjelančevina, viših u ženki.

Pregledava se veći broj fizioloških podataka i istražuje se evolucija u vezi starosti životinja.

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