

BODY MEASUREMENTS OF CROATIAN COLD-BLOODED HORSE IN SOME AREAS OF THE REPUBLIC OF CROATIA

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Summary

The objective of these studies was to determine influence of the locality upon development of Croatian cold-blooded horse. The investigations included 301 breeding mares older than three years at nine localities of lowland and highland area of the Republic of Croatia. Since the investigated Croatian cold-blooded horse belongs to the undersized type, withers, height ranged between 139.00 and 144.84 cm. Chest volume was between 185.52 and 195.29 cm, and cannons circumference between 20.28 and 21.64 cm. Individual differences were considerably higher, which indicates the unconsolidated breeding material. Differences between mean values of highland and lowland area breeding turned out to be highly significant.

Introduction

Regarding Croatian horse-breeding, cold-blooded horse breed and its crosses domineer with around 80%. Lipizzaner horse and its crosses are represented with around 6%, whereas the rest belongs to sports-breeds. The larger type of cold-blooded horse prevails in the north-western part of the Republic of Croatia. The undersized type is to be found in Gornja Posavina (lowland area) and in highland area southwards from the river Sava (Banovina, Kordun, Lika and Gorski Kotar). Horse breeding and keeping in these areas is going on at pastures, these areas abound in, for the most part of the year. Some imported stallions, primarily Arden breeds, were often used aimed to improve autochthonous breeds (horse from Posavina region, so called Posavski konj), which contributed to a notable increase of body measurements. Croatian cold-blooded horse was subject of some investigations by Romić (1965, 1975), Benčević (1950), Ljubešić et al. (1982, 1993, 1994).

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Material and Methods

The investigations were carried out in the undersized-type breeding areas, at nine localities in Gornja Posavina (lowland area) and Lika (highland area). The investigations included 301 breeding mares older than three years, at nine localities of lowland and highland area of the Republic of Croatia. The measurements of withers height, chest volume and cannons circumference have been performed. The obtained values were elaborated according to a method recommended by Barić (1964) and differences in mean values between particular breeding areas were tested.

Results and Discussion

Withers height, presented in the table 1, indicates that it is the question of the undersized type of Croatian cold-blooded horse. Withers height varied between 139,00 and 144,96 cm, whereas individual differences ranged from 131 up to 155 cm, which points at a high individual variability. In Karst areas of Lika withers height was from 139,00 to 142,12 cm, and in the lowland area of Gornja Posavina it ranged between 142,57 and 144,96 cm. The testing estimated highly significant differences in withers height mean values between the lowland and highland area. Differences within the mentioned areas are negligible and non-significant. According to researches conducted by Romić (1965), withers height was smaller for 3-8 cm than that found by our investigations, whereas the values obtained by Ljubešić and Sukalić (1993) correspond to results of our investigations.

Table 1. - WITHERS HEIGHT OF CROATIAN COLD-BLOODED MARES

Area	Location	n	\bar{x}	s	v	Variations
Lowland	I	39	144.12±0.61	3.85	2.67	137-156
	II	27	144.96±0.64	3.36	2.32	141-152
	III	47	142.57±0.57	3.93	2.77	132-150
	IV	15	143.40±0.72	2.82	1.96	139-148
	V	25	143.68±0.84	4.21	2.93	134-150
	VI	44	144.84±0.57	3.79	2.62	135-151
Total		197	143.54±0.27	3.79	2.64	132-156
Highland	VII	26	139.00±0.79	4.04	2.91	134-150
	VIII	42	142.12±0.61	3.97	2.79	135-150
	IX	36	141.80±0.65	3.98	2.81	135-152
Total		104	141.23±0.38	3.85	2.73	134-152

The values for chest volume, presented in the table 2, ranged between 185,50 and 195,29 cm, whereas individual differences were from

169 to 208 cm. Chest volume in the highland area was between 185,52 and 189,03 cm, and between 190,53 and 195,29 cm at the lowland locality. The testing showed highly significant differences between mean values of highland and lowland area breeding. Within the investigated areas no significance between particular groups was estimated. According to the investigations of Romić (1965), chest volume was smaller for 30 cm compared to our investigations, whereas the values obtained by Ljubešić and Sukalić (1993) concur with the results of our investigations.

Table 2. - CHEST VOLUME OF CROATIAN COLD-BLOODED MARES

Area	Location	n	\bar{x}	s	v	Variations
Lowland	I	39	194.25±1.54	9.62	4.95	180-222
	II	27	192.03±1.24	6.47	3.37	183-203
	III	47	191.00±1.07	7.37	3.87	177-206
	IV	15	190.53±2.45	9.50	4.99	176-209
	V	25	193.56±1.66	8.31	4.29	180-212
	VI	44	195.29±1.66	11.04	5.65	179-226
Total		197	192.65±0.66	9.33	4.84	176-226
Highland	VII	26	189.03±1.43	7.28	3.85	178-209
	VIII	42	185.52±1.21	7.86	4.23	172-204
	IX	36	186.97±1.56	9.36	5.00	172-202
Total		104	186.65±0.75	7.63	4.09	172-209

Table 3. - CANNONS CIRCUMFERENCE OF CROATIAN COLD-BLOODED MARES

Area	Location	n	\bar{x}	s	v	Variations
Lowland	I	39	21.21±0.19	1.24	5.84	19-25
	II	27	21.05±0.22	1.17	5.59	19-24
	III	47	21.45±0.13	0.95	4.51	19-23
	IV	15	21.50±0.30	1.18	5.48	19-23
	V	25	21.64±0.15	0.75	3.49	20-23
	VI	44	21.30±0.14	0.98	4.61	19-23
Total		197	21.37±0.09	1.21	5.66	19-25
Highland	VII	26	21.15±0.24	1.24	5.86	19-24
	VIII	42	20.28±0.14	0.93	4.62	18-22
	IX	36	20.33±0.17	1.06	5.23	18-23
Total		104	20.52±0.12	1.18	5.75	18-24

Cannons circumference indicates poorer bone development compared to other cold-blooded horses. From the table 3 it may be seen that smaller cannons circumference was found in mares from the highland area, rather than in those from the lowland one. From one locality to another cannons circumference was wellbalanced with a difference between

the lowest and the highest mean value of 1,36 cm, whereas individual differences ranged from 19 and 25 cm. In respect of cannons volume, highly significant differences between the lowland and highland area were found. Cannons circumference throughout the studied areas showed no significant differences between particular groups.

Values of cannons circumference obtained throughout the investigations correspond to those presented by Ljubešić and Sukalić (1993), whereas, according to Romić (1965), cannons circumference is smaller for 3 cm, which indicates that the influence of horse-improvement aimed cross-breeding with Arden stallions was expressed through developed bones of cold-blooded horse in Croatia.

Conclusion

On the basis of the conducted investigations the following conclusions have been reached:

- Withers height of cold-blooded mares in the lowland area ranged from 142,57 up to 144,96 cm and in the highland area it was from 139,00 to 142,12 cm.
- Chest volume is also larger in mares from the lowland area in contrast to the highland area.
- Regarding cannons circumference, higher values were found in mares bred in the lowland area, compared to those bred in the highland area.
- Differences between mean values of the two breeding areas are highly significant.

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TJELESNE MJERE HRVATSKOG HLADNOKRVNOG KONJA U NEKIM PODRUČJIMA HRVATSKE

Sažetak

Cilj ovih istraživanja bio je utvrđivanje utjecaja područja na razvijenost hrvatskog hladnokrvnjaka. Istraživanja su provedena na 301 rasplodnoj kobili u devet lokaliteta sjeverozapadnog i brdskog područja Republike Hrvatske. Kako se ovdje radi o manjem tipu hrvatskog hladnokrvnjaka visina grebena se kretala između 139,00 i 144,96 cm. Opseg prsa bio je između 185,52 i 195,29 cm, a opseg cjevanice između 20,28 i 21,64 cm. Individualne razlike su bile znatno veće što ukazuje na nekonsolidirani rasplodni materijal. Razlike između pojedinih grupa bile su signifikantne i visoko signifikantne.