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## INFLUENCE OF SEX ON LIPIZZANER BREED FOALS DEVELOPMENT

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### SUMMARY

*The offspring's development especially in the first months after foaling is crucial for further development. If favourable conditions of feeding, keeping and fancying as well as other important conditions are ensured, a homogenous growth and development of the offspring is obtained. Research was conducted on 44 male and 42 female Lipizzaner breed foals in the first six months after foaling. The measuring of the withers height, chest girth and cannon bone circumference were done seven days after foaling and at the age of six months. Measuring data were processed by the statistical program SPSS/PC (Nie et al., 1975). The processed data of the obtained measurings indicate homogeneity for both male and female foals. The male foals had a little higher values than the female in both measurings, but the differences between sexes were highly significant only in the cannon bone circumference. Correlations among obtained values were positive and ranged between low and very high, with correlation coefficients between  $r=0.379$  and  $r=0.843$  for male and  $r=0.338$  and  $r=0.723$  for female foals. The differences between the obtained values were significant and highly significant and a little more marked in male foals.*

*Key words: foals, male, female, Lipizzaner, development, correlation*

### INTRODUCTION

The offspring's growth and development is very important in the first months after foaling, for it has a positive influence on the later development. It is important to ensure a quality feeding of both mares and foals, keeping and fancying and other factors which influence a normal growth and development of the offspring. The offspring raised in this way ensures a successful selection. The observation of the offspring's development and the correlation between some qualities, as well as the influence of sex were elaborated in research by Butler et al. (1986), Green (1961), Romić (1951), Baban Mirjana et al. (1995), Rastija et al. (1986, 1988, 1995, 2001, 2002) and others.

The aim of this research was to establish the influence of sex on the development of the Lipizzaner foals in the first six months after foaling, as well as the correlation between elaborated physical measures.

### MATERIAL AND METHODS

Research was conducted on 44 male and 42 female Lipizzaner breed foals. The measurings of withers height were done seven days after foaling and at the age of six months by the Lydtin stick, and the measurings of the chest girth and the cannon bone circumference by cattle-ribbon. Measuring data were processed by the statistical program SPSS/PC (Nie et al. 1975). The correlation between the named data were also processed separately for male and female foals, as well as the statistical significance.

### RESULTS AND DISCUSSION

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The obtained values of measuring the Lipizzaner foals seven days after foaling are shown in Table 1.

**Table 1. Physical measures of the Lipizzaner breed foals after foaling**

*Tablica 1. Tjelesne mjere ždrebadi lipicanske pasmine nakon ždrijebljenja*

| Measure - Mjere  | Male - Muški<br>n = 44 |      |      | Female - Ženski<br>n = 42 |      |      | Difference (m:f)<br>Razlike (m:ž) |
|--|------------------------|------|------|---------------------------|------|------|-----------------------------------|
|  | $\bar{x}$              | s    | vk   | $\bar{x}$                 | s    | vk   |                                   |
| <b>The withers height</b><br><i>Visina grebena</i>             | 101.5<br>5             | 3.65 | 3.59 | 100.67                    | 2.99 | 2.97 | 0.88                              |
| <b>The chest girth</b><br><i>Opseg prsa</i>                    | 80.75                  | 3.13 | 3.87 | 80.48                     | 2.42 | 3.01 | 0.27                              |
| <b>The cannon bone circumference</b><br><i>Opseg cjevanice</i> | 11.75                  | 0.44 | 3.73 | 11.49                     | 0.47 | 4.13 | 0.26**                            |

\*\*( $P < 0.01$ )

The withers height of the male foals was higher for 0.88 cm than the female's. The chest girth of the male foals was higher for 0.27 cm than the female's, and the cannon bone circumference for 0.26 cm. A highly significant thicker cannon bone of male foals was established by testing, while the differences at the withers height and cannon bone circumference were not statistically justified. Rastija et al. (1986) got in their researches the withers height of the male foals 102.70 cm, and of the female 103.85 cm.

The chest girth of the male foals was 81.45 cm, and of the female 83.15 cm, while the cannon bone circumference for male foals amounted to 11.92 cm, and for the female 11.80 cm. Rastija et al. (1995) research imply a lower height of male foals for 1.81 cm, and female 1.99 cm. The chest girth was smaller for 0.24 cm in male foals, 0.10 cm in female foals, while the cannon bone circumference was higher for 0.17 cm by male foals, and 0.33 cm by female in relation to our researches. Romić (1951) got considerably lower withers height and chest girth, while the cannon bone circumference corresponds to our research.

The research values correspond to values of the mentioned authors, only Romić (1951) got remarkably lower values of the withers height and chest girth.

**Table 2. Physical measures of the Lipizzaner breed foals after subtraction**

*Tablica 2. Tjelesne mjere ždrebadi lipicanske pasmine nakon odbića*

| Measure - Mjere  | Male- Muški<br>n = 44 |      |      | Female - Ženski<br>n = 42 |      |      | Difference (m:f)<br>Razlike (m:ž) |
|--|-----------------------|------|------|---------------------------|------|------|-----------------------------------|
|  | $\bar{x}$             | s    | vk   | $\bar{x}$                 | s    | vk   |                                   |
| <b>The withers height</b><br><i>Visina grebena</i>             | 137.11                | 2.17 | 1.58 | 136.40                    | 1.17 | 0.86 | 0.71                              |
| <b>The chest girth</b><br><i>Opseg prsa</i>                    | 136.43                | 2.76 | 2.02 | 136.00                    | 1.27 | 0.93 | 0.43                              |
| <b>The cannon bone circumference</b><br><i>Opseg cjevanice</i> | 15.84                 | 0.58 | 3.65 | 15.27                     | 0.66 | 4.29 | 0.57**                            |

\*\*( $P < 0.01$ )

The data in Table 2 indicate a higher withers height of the six-month-old male foals for 0.71 cm, the chest girth for 0.43 cm, and the cannon bone circumference for 0.57 cm. The male foals had a highly significant thicker cannon bone than the female foals. In the first six months the male foals increased their height for 35.02%, female for 34.16%, the chest girth of the male foals was increased for 68.95%, female for 68.99%, and the cannon bone circumference of the male foals for 34.81% and female for 32.90% in relation to the values of the seven-day-old foals. According to Romić's research (1951) the male foals were larger and bonier than the female. Rastija et al. (1986) established for the six-month-old male foals the wither height of 134.60 cm, for the female 137.05 cm, the chest girth of the male foals was 132.90 cm, for the female 136.45 cm, and also the cannon bone circumference of the male foals was lower (16.05 cm) than the female (16.32 cm). Rastija et al. (1995) indicate equal for both male and female foals according to the withers height, chest girth and cannon bone

circumference, while the same authors (2001) state a bigger withers height of the male foals for 1.26 cm, female for 2.71 cm, the chest girth of the male for 1.27 cm, female for 3.66 cm and the cannon bone circumference of the male for 0.79 cm, and female for 1.67 cm in relation to our researches. The same authors got higher values for female than male foals.

**Table 3. The correlation of physical measures by male and female Lipizzaner breed foals**

*Tablica 3. Korelacijska povezanost tjelesnih mjera muške i ženske ždrebadi lipicanske pasmine*

| <b>Ratio - Odnos</b> | <b>Male - Muški</b> | <b>Female - Ženski</b> |
|----------------------|---------------------|------------------------|
| 1:2                  | r = 0.805**         | r = 0.691**            |
| 1:3                  | r = 0.776**         | r = 0.608**            |
| 1:4                  | r = 0.463**         | r = 0.459**            |
| 1:5                  | r = 0.455**         | r = 0.444**            |
| 1:6                  | r = 0.432**         | r = 0.509**            |
| 2:3                  | r = 0.751**         | r = 0.578**            |
| 2:4                  | r = 0.453**         | r = 0.464**            |
| 2:5                  | r = 0.385*          | r = 0.508**            |
| 2:6                  | r = 0.379*          | r = 0.461**            |
| 3:4                  | r = 0.418**         | r = 0.338*             |
| 3:5                  | r = 0.415**         | r = 0.385*             |
| 3:6                  | r = 0.413**         | r = 0.364*             |
| 4:5                  | r = 0.843**         | r = 0.723**            |
| 4:6                  | r = 0.629**         | r = 0.488**            |
| 5:6                  | r = 0.650**         | r = 0.513**            |

1-the withers height of foals after foaling; 2-the chest girth after foaling; 3-the cannon bone circumference after foaling; 4-the withers height after subtraction; 5-the chest girth after subtraction; 6-the cannon bone circumference after subtraction

1 – Visina grebena ždrebadi nakon ždrijebljenja; 2 – Opseg prsa nakon ždrijebljenja; 3 – Opseg cjevanice nakon ždrijebljenja; 4 – Visina grebena nakon odbića; 5 – Opseg prsa nakon odbića; 6 – Opseg cjevanice nakon odbića  
\*(P<0,05); \*\*(P<0,01)

The correlation (Table 3) between the mentioned physical measures after foaling and subtraction were positive with correlative coefficients for male foals between  $r=0.379$  and  $r=0.834$ , and for female foals  $r=0.338$  and  $r=0.723$ . Although the correlation was positive for both male and female foals, it was slightly more marked in male foals. Rastija et al. (2001) also established a positive correlation among attained values, slightly more pronounced in male foals. Saastamoinen (1990) points at a high correlation of physical measures of the offspring. Green (1961) states the withers height and the chest girth as the most reliable indicator of the offspring's development. The research of McCann et al. (1988) shows a variation of correlations between physical measures of young horses between  $r=0.34$  and  $0.74$ , and according to Hintz et al. (1979) the correlation was between a very weak and strongly positive in the foal's first age.

## CONCLUSION

Based on the carried out research on the influence of sex on Lipizzaner foals physical measures development the following can be concluded:

The withers height of the seven-day-old male foals was higher for 0.71 cm, the chest girth for 0.43 cm and the cannon bone circumference for 0.57 cm.

The withers height of the six-month-old male foals was higher for 0.88 cm, the chest girth for 0.27 cm and the cannon bone circumference for 0.26 cm.

The correlation among attained values of the physical measures of the Lipizzaner foals was positive and significant and highly significant, slightly more pronounced in male foals, what corresponds to values in elaborated works cited.

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## UTJECAJ SPOLA NA RAZVOJ ŽDREBADI LIPICANSKE PASMINE

### SAŽETAK

*Razvoj podmlatka, naročito u prvim mjesecima nakon ždrijebljenja, odlučujući je i za kasniju razvijenost. Ukoliko se u fazi sisanja osiguraju povoljni uvjeti hranidbe, držanja i njege, kao i ostalih uvjeta bitnih za normalan rast i razvoj, dobiva se ujednačeni rast i razvoj podmlatka. Istraživanja su obavljena na 44 muške i 42 ženske ždrebadi lipicanske pasmine u prvih šest mjeseci nakon ždrijebljenja. Izvršena su mjerenja visine grebena, opsega prsa i opsega cjevanice sedam dana nakon ždrijebljenja i u dobi od šest mjeseci. Podaci mjerenja obrađeni su prema statističkom programu SPSS/PC (Nie i sur., 1975.). Obradeni podaci dobivenih mjerenja ukazuju na ujednačenost, kako za mušku tako i za žensku ždrebadi. Muška ždrebadi imala su nešto veće vrijednosti nego ženska u oba mjerenja, no razlike između spolova bile su visoko signifikantne samo u opsegu cjevanice. Korelacijske povezanosti između dobivenih vrijednosti bile su pozitivne i kretale su se između slabe i vrlo jake, s korelacijskim koeficijentima između  $r=0,379$  i  $r=0,843$  za mušku te  $r=0,338$  i  $r=0,723$  za žensku ždrebadi. Razlike između dobivenih vrijednosti bile su signifikantne i visoko signifikantne te nešto jače izražene kod muške ždrebadi.*

**Ključne riječi:** ždrebadi, ženska, muška, lipicanac, razvitak, korelacija

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