

Comparison of the interior characteristics of Slovak warmblood horses and Lipizzan horses

Porovnanie interiérových vlastností koní slovenského teplokrvníka a lipicana

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Abstract

One of the important factors that significantly affects the intensity and content of training and determines the performance of the horse interior. Character and temperament traits are described in the breeding goals of each breed of horse. The aim of this study was to analyze the horse interior and compare the interior characteristics of two studied horse breeds Slovak warmblood horses and Lipizzan horses. Into the analysis were included 65 horses from National Stud Farm Topoľčianky, Slovak warmblood horses ($n_1 = 33$) and Lipizzan horses ($n_2 = 32$). Interior was analyzed through a questionnaire with 13 indicators with 10 point system, where 10 being the highest rating. Slovak warmblood horses became the highest ratings (average 89.1 pt, 74.42%) and Lipizzan horses (86.1 pt, 66.2%), so both breeds of horses can be considered as the breeds with balanced characteristics of temperament and character. But Lipizzan horses are more balanced, because their results had lower variability. There were insignificant differences between the analyzed horses in the studied breeds. Nevertheless, a several analyzes of individual indicators showed that between the Slovak warmblood horses and Lipizzan horses there is a significant difference in a single indicator of interior - 10 - Stress managing. In particular, it has been shown that Lipizzan horses manage stress significantly better than Slovak warmblood horses.

Keywords: character, horse, interior, Lipizzan, Slovak warmblood, temperament

Abstrakt

Jedným z dôležitých faktorov, ktorý podstatne ovplyvňuje intenzitu a náplň tréningu a udáva výkonnosť koní je interiér. Vlastnosti charakteru a temperamentu sú popísané v chovných cieľoch jednotlivých plemien koní. Cieľom našej práce bolo analyzovať interiér koňa a porovnať interiérové vlastnosti dvoch skúmaných plemien koní, slovenského teplokrvníka a lipicana. Do analýzy bolo zahrnutých 65 koní z

Národného žrebčína Topoľčianky, slovenský teplokrvník (n1 = 33) a lipican (n2 = 32). Interiér sme analyzovali prostredníctvom dotazníka s 13 ukazovateľmi 10 bodovým systémom, kde 10 bola najvyššia známka. Kone plemena slovenský teplokrvník získali najvyššie hodnotenie (priemerne 89,1 bodov, 74,42%) a kone plemena lipican (86,1 bodov, 66,2%), takže obe plemená môžeme považovať za plemená s vyrovnanými vlastnosťami charakteru a temperamentu. Avšak kone plemena lipican sú viac vyrovnané, pretože ich výsledky majú nižšiu variabilitu. Zaznamenali sme štatisticky nevýznamné rozdiely medzi analyzovanými plemenami koní. Avšak niekoľko analýz jednotlivých ukazovateľov ukázalo, že medzi koňmi slovenského teplokrvnika a lipicana je štatisticky významný rozdiel v jedinom ukazovateli interiéru – 10 – Zvládanie stresu. Konkrétne sa ukázalo, že kone plemena lipican zvládajú stres významne lepšie ako kone plemena slovenský teplokrvník.

Kľúčové slová: charakter, interiér, kôň, lipican, slovenský teplokrvník, temperament

Introduction

Personality traits such as character, temperament, and willingness to work are anchored in the breeding goals for riding horses in most breeds (Koenen et al., 2004). Additionally, the breeding goal specifies that horses, based on their character, temperament, and rideability, have to be suitable for riding purposes of any type (Deutsche Reiterliche Vereinigung, 2010). These traits are thus the most important ones in riding horses. The current assessment of character and temperament in riding horses takes place during performance testing over several weeks (station) especially in stallions in most European countries (Mills, 1998). In the practical horse breeding only a few breeding programs such as Hessen, Freiburger or KWPN (Baumgartner et al., 2009; Visser et al., 2009) use evaluation of interior based on temperament tests. With several breeding associations such as the Franches Montagnes horses, the German association for Arabian Sport horses, the Hanoverians and formerly the Hessian Warmblood horses, these tests are already mandatory (Beuing et al., 1998; Burger et al., 2003; Schweizerischer Freiburgerzuchtverband, 2007; Zuchtverband für Sportpferde Arabischer Abstammung, 2011) or provided on a voluntary basis (Christmann, 2005).

The bond between human and horse is particularly important in sports, whether it is a race horse or riding horse. A positive bond can lead to increased performance. In order to create a good relationship between human and horse, it is imperative to understand the horse temperament, so studies that examine it using behavioral tests or questionnaire research have gained in the last decade (Hausberger and Muller, 2002). Personality traits play an important role in horses for various reasons. First of all, the behavior of horses influences their quality as a riding partner (Visser et al., 2010). Horses with balanced temperament simplify daily work, make handling more comfortable, and are important for sporting aspects according to various horse enthusiasts (Graf et al., 2013). Another reason is the efficiency in training of horses with balanced temperament and character. Heird et al. (1986) found that horses with a calmer temperament learn faster. As a consequence, the training

could be more effective, and the education of these horses would be more economical. Horse temperament has been assessed qualitatively and quantitatively both by using rating scores from assessors and by performing behavioral tests, although it has been questioned whether some aspects of these methods provide a true picture of the horse's temperament (Seaman et al., 2002; McCall et al., 2006). Temperament tests are generally designed to yield information on a few selected traits such as fear reactivity and ease of handling, but other important traits such as willingness to work may not be reflected adequately. Thus, an additional strategy for making personality assessment more objective could include the development of new guidelines including concrete descriptions of behavior patterns and/or physiological measurements shown during regular training and relating them to specific personality trait scores. However, to date little information on specific behavior patterns and their relationship with personality traits is available. In behavioral tests is temperament assessed by horse behavior, changes in autonomic functions and changes in endocrine functions induced by certain stimuli. By assessing the questionnaires, respondents such as grooms and trainers who know the horses evaluate the temperament on basis of normal observation (Hada et al., 2001).

Although various aspects of horse behavior and temperament have been studied (Visser, 2002), horse behavior while being ridden has only rarely been investigated (Weeks and Beck, 1996; Rivera et al., 2002; Zetterqvist et al., 2007). Although not systematically investigated and validated, scientists use a range of evasive behaviors to show stress in horses while being ridden (Goodwin, 1999).

In general, these methods have proved to be feasible and useful in practice. To analyze the horse's temperament qualitatively, familiar and unfamiliar persons (riders, trainers, handlers, and judges) have been used as assessors. The situation and condition in which a horse is being assessed is of major importance to the outcome. In order to get a full picture of the horse's temperament, the horse needs to be challenged in many different ways. Another way of measuring horse temperament is by the use of behavioral tests, in which horses are challenged to show their responsiveness and motivations. These tests are being used in many animals on the farm and in the laboratory and have been adapted to accommodate the horse's specific behavioral repertoire and responses. High means with low variation in horses' personality traits result in an inefficient selection and no genetic improvement. To improve this situation in horses many efforts have been made, under experimental conditions, especially to measure fear reactivity, activity, reactivity, emotionality, and exploration (Christensen et al., 2005; Lansade and Bouissou, 2008; König von Borstel et al., 2011).

Materials and methods

In this work, 65 horses were analyzed, Slovak warmblood ($n_1 = 33$) and Lipizzan ($n_2 = 32$) to compare the interior characteristics of horses. All horses come from the breeding of the National stud farm Topoľčianky, state company. Thus, the same conditions of education, stabling, nutrition and training were ensured. All horses are stabled in one training centrum in separate inside boxes and they are

ridden by professional riders. Horses are trained daily in the riding hall or in outside riding area. The horses were analyzed in 13 indicators: 1 - reaction to a new object – some new objects like boxes, chairs, flowers that are usually at competition area, 2 - reaction to social isolation – how the horse reacts when is alone in riding hall during the training, 3 - reaction to manipulation – cleaning, saddling, 4 - willingness to work, 5 - willingness to learn, 6 - ability to maintain the concentration, 7 – rideability – reaction to the rider's aids, 8 – rideability in riding hall, 9 – rideability in outside area, 10 - stress managing, 11 - fear managing, 12 - speed of excitement, and 13 - speed of attenuation. The test was conducted individually with each of the examined horses through a questionnaire filled together with the rider of the horse. In analysis there were rated a point system with a scale of 1-10 points, with 1 being the lowest and 10 highest marks. These statistical methods were used: ANOVA, Games-Howell post hoc tests, Kruskal-Wallis scattering analysis and Mann-Whitney U tests.

Results and discussion

Within the breed of the Slovak warmblood, were examined 33 horses, of which 16 were mares, 5 stallions and 12 geldings (Table 1). The average age was 5.97 years. Total 32 Lipizzan horses, including 7 mares, 23 stallions and 2 geldings were analyzed. Average age was 7.94 years.

Table 1. Number of individual categories of horses rated by breed

| Breed | Slovak warmblood | Lipizzan |
|------------------------|------------------|----------|
| All horses | 33 | 32 |
| Mare | 16 | 7 |
| Stallion | 5 | 23 |
| Gelding | 12 | 2 |
| Average age (in years) | 5.97 | 7.94 |

The assumption of the existence of significant differences in the interior characteristics of horses, depending on their breed, was verified using the parametric multivariate analysis of ANOVA variance. The results showed that there were insignificant differences among the studied breeds of horses, $F = 2.452$, $P = 0.094$ (Table 2). Highest ratings of the interior characteristics were achieved by the Slovak warmblood horses (average 89.1 pt, 74.42%), which means that the horses of this breed can be called more peaceful. The Slovak warmblood is a typical sports breed of horses, and its breeding is aimed at ensuring that these horses, in addition to their high performance, have a good character and a calm temperament. According to Hučko (2005a), the Slovak warmblood horse is a type

of riding horse with good character and temperament, also suitable for work in the driving.

Only a slightly lower temperament rating had Lipizzan horses (86.1 pt, 66.2%), so this breed can also be considered as a breed with balanced interior qualities. This is confirmed by Horný et al. (2006) that the Lipizzan horse is characterized by solid health, hardiness, excellent character characteristics, nobleness, good temperament and easy rideability.

Table 2. Differences in the interior characteristics of horses - ANOVA

| Breed | n | Final evaluation | | | | | | | |
|------------------|---|------------------|-------|-----|--------|-----------|-----|-----|-------|
| | | AM | SD | Min | Max | F | df1 | df2 | P |
| Slovak warmblood | 3 | 89.1 | 18.44 | 52 | 124 | 2.45 2 | 2 | 67 | 0.094 |
| | 3 | 74.42% | 6 | 40% | 95.38% | | | | |
| Lipizzan | 3 | 86.1 | 13.49 | 65 | 111 | | | | |
| | 2 | 66.2% | 5 | 50% | 85.38% | | | | |

AM – arithmetic mean, % - percentage, SD – standard deviation, Min – Minimum, Max – Maximum, F – ANOVA, df – degrees of freedom, P – significance level

The results of post-hoc tests (Games-Howell) also confirmed that the Slovak warmblood and Lipizzan horses were not significantly different in the final evaluation of the interior characteristics ($P = 0.735$). The results are summarized in Table 3 and graphically depicted in Figure 1.

Table 3. Differences in the interior characteristics of horses - Games-Howell post hoc tests

| (I) Breed | (J) Breed | Δ AM (I-J) | SE | P |
|------------------|-----------|-------------------|----|-------|
| Slovak warmblood | Lipizzan | 2.998 | 4 | 0.735 |

Δ AM – difference in arithmetic means, SE – standard estimation error, P – significance level

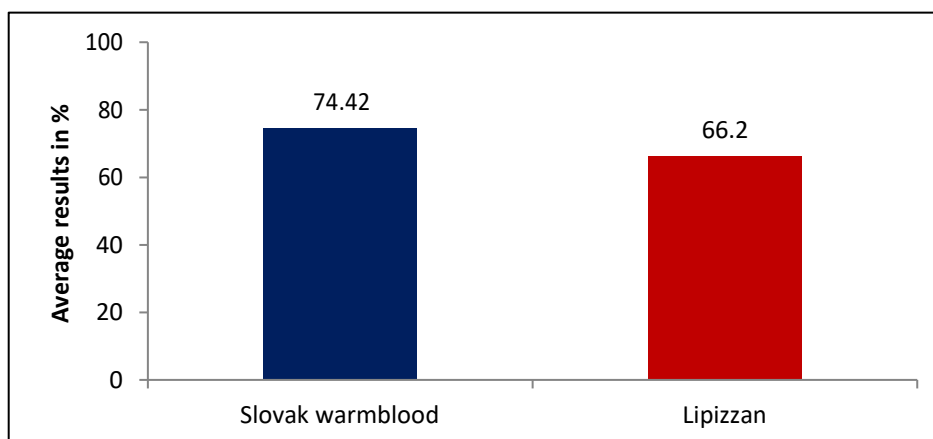


Figure 1. Results of the evaluation of interior characteristics according to the breed

Figure 2 shows the results of the assessment of interior characteristics of individual horses. Although the previous results showed that the Slovak warmblood horses were higher on average results than the Lipizzan horses, their results ranged from 52 to 124 points (40 - 95.38%). That indicating their lower stability in the interior properties and thus greater diversity. On the other hand, Lipizzan horses can be considered more homogeneous in interior characteristics because their results are less variable, ranging from 65 to 111 points (50 - 85.38%). Hučko (2005b) claims that Lipizzan are of a mild character, teachable and obedient.

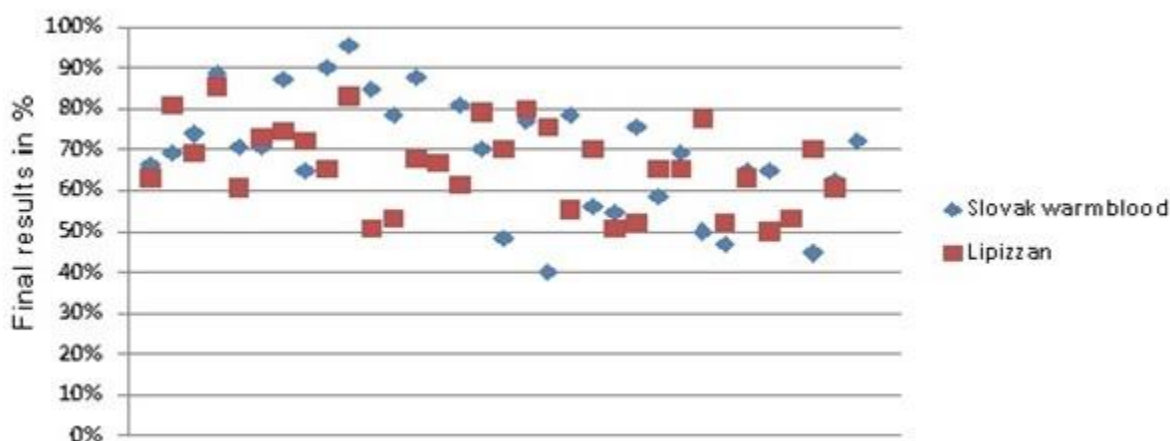


Figure 2. Results of the evaluation of the interior characteristics of individual horses

In terms of assessed horses' interior characteristics in individual indicators, potential differences between these breeds of horses were investigated using a nonparametric Kruskal-Wallis analysis of variance. Based on its results, were found that among the horses of different breeds there are statistically significant differences in the following indicators - 3 – reaction to manipulation $H(2) = 5.977$, $P = 0.05$, 4 - willingness to work $H(2) = 8.65$, $P = 0.013$, 5 - willingness to learn $H(2) = 6.015$, $P = 0.049$, 10 - stress managing, $H(2) = 7.535$, $P = 0.047$ and 13 - speed of attenuation, $H(2) = 6.197$, $P = 0.045$. (Table 4, Figure 3). Breed differences in fear-related behaviour have been described earlier (Hausberger et al., 2004; Lloyd et al., 2008; Lesimple et al., 2011) and were expected. Janiszewska et al. (2004) found in their timidity test conducted during the performance test for Polish sport horses that, for example, horses of the Holsteiner breed were less reactive than Thoroughbreds or Thoroughbred crosses, although these results have to be taken with care due to small numbers of horses (5–20) per breed. As described by other authors (Wolff and Hausberger, 1996; Hausberger et al., 2004; Lesimple et al., 2011) differences in the breeds could be found also in this study. Janiszewska et al. (2004) show a higher reactivity in Thoroughbreds than in Warmbloods. These findings could not be confirmed here, possibly because a small number of Thoroughbreds were tested. The greatest differences were between Warmbloods and Ponies or draft horses and heavy Warmbloods, as also shown by König von Borstel et al. (2011). One explanation why especially the Ponies show low reactivity (high reactivity scores) in the test could be that ponies are mostly ridden by young children or teens. Therefore, there is perhaps an indirect and subconscious selection for personality traits in these breeds for years.

Table 4. Differences in assessed interior indicators of horses - Kruskal-Wallis scattering analysis

| Breed Indicat | Slovak warmblood (n ₁ =33) | | | Lipizzan (n ₂ =32) | | | Kruskal-Wallis scattering analysis | | |
|---|--|-----|------|----------------------------------|-----|------|---------------------------------------|----|------|
| | AM | Mdn | MR | AM | Mdn | MR | H(χ^2) | df | P |
| 1 Reaction to new objects | 6.4 | 7 | 35.6 | 6.5 | 6 | 36.2 | 0.42 | 2 | 0.81 |
| 2 Reaction to social isolation | 7.1 | 7 | 35.1 | 7.3 | 7.5 | 37.7 | 1.99 | 2 | 0.37 |
| 3 Reaction to manipulation | 7.3 | 8 | 38.6 | 7.2 | 7 | 35.5 | 5.98 | 2 | 0.05 |
| 4 Willingness to work | 7.4 | 7 | 40.7 | 6.8 | 7 | 33.6 | 8.65 | 2 | 0.01 |
| 5 Willingness to learn | 7.1 | 7 | 40 | 6.6 | 7 | 33.7 | 6.02 | 2 | 0.05 |
| 6 Ability to maintain the concentration | 6.7 | 7 | 37.9 | 6.6 | 6 | 35.1 | 2.88 | 2 | 0.24 |
| 7 Rideability | 7.2 | 7 | 40.3 | 6.7 | 7 | 32.7 | 4.91 | 2 | 0.09 |
| 8 Rideability in riding hall | 7.6 | 8 | 38.9 | 7.3 | 7 | 34.9 | 5.18 | 2 | 0.08 |
| 9 Rideability in outside area | 6.7 | 7 | 38.2 | 6.4 | 6 | 35.3 | 3.98 | 2 | 0.14 |
| 10 Stress managing | 6.7 | 7 | 41.4 | 6.2 | 6 | 32 | 7.54 | 2 | 0.02 |
| 11 Fear managing | 6.7 | 7 | 40.2 | 6.3 | 6 | 33.4 | 6.13 | 2 | 0.05 |
| 12 Speed of excitement | 6 | 6 | 37.2 | 5.9 | 6 | 35.9 | 2.59 | 2 | 0.27 |
| 13 Speed of attenuation | 6.4 | 6 | 37.8 | 6.4 | 6 | 36.4 | 6.2 | 2 | 0.05 |

AM – arithmetical mean, Mdn – median, MR – average rank, H(χ^2) – Kruskal-Wallis scattering analysis, df - degrees of freedom, P – significance level

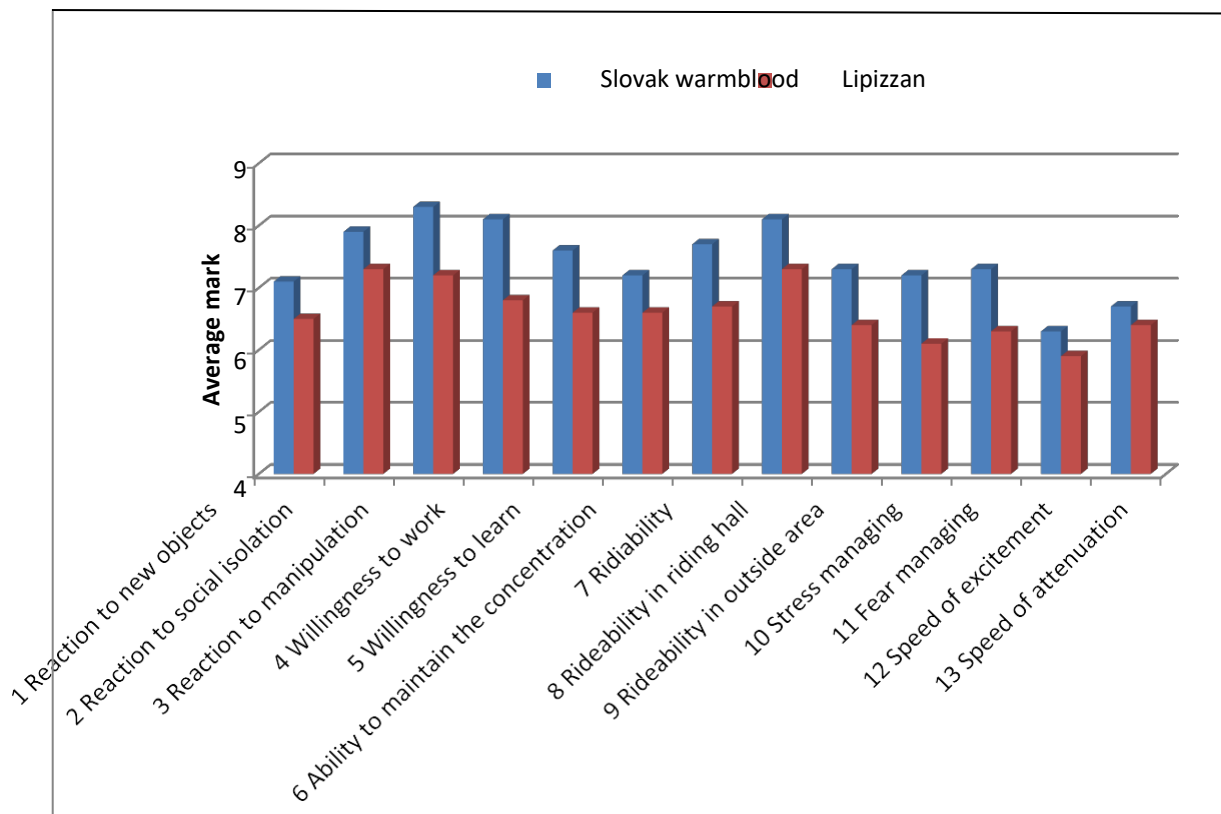


Figure 3. Differences in assessed interior indicators of horses

The statistically significant indicators (3, 4, 5, 10, 11, 13) were further examined by comparing the studied breeds. Results of Mann-Whitney's tests showed that between the Slovak warmblood horses and Lipizzan horses there is a significant difference in a single indicator of interior - 10 - Stress managing. In particular, the Lipizzan horses were able to manage stress significantly better than the Slovak warmblood horses, $U = 382$, $P = 0.05$ (Table 5).

Table 5. Comparison of Slovak warmblood horses and Lipizzan horses in individual statistically significant indicators - Mann-Whitney U-tests

| Breed Indicators | Slovak warmblood (n1=33) | | | Lipizzan (n4=31) | | | Mann-Whitney U-tests | | |
|----------------------------|-----------------------------|-----|------|---------------------|-----|------|----------------------|--------|------|
| | AM | Mdn | MR | AM | Mdn | MR | U | Z | P |
| 3 Reaction to manipulation | 7.3 | 8 | 34.6 | 7.16 | 7 | 31.3 | 474 | -0.72 | 0.47 |
| 4 Willingness to work | 7.36 | 7 | 36.4 | 6.84 | 7 | 29.5 | 416.5 | -1.498 | 0.13 |
| 5 Willingness to learn | 7.06 | 7 | 35.9 | 6.63 | 7 | 30 | 431 | -1.314 | 0.19 |
| 10 Stress managing | 6.7 | 7 | 37.4 | 6.16 | 6 | 28.4 | 382 | -1.963 | 0.05 |
| 11 Fear managing | 6.7 | 7 | 36.2 | 6.31 | 6 | 29.7 | 422 | -1.425 | 0.15 |
| 13 Speed of attenuation | 6.39 | 6 | 33.7 | 6.41 | 6 | 32.3 | 505 | -0.311 | 0.76 |

AM – arithmetical mean, Mdn – median, MR - average rank, U – Mann-Whitney U-test, Z – z-score for Mann-Whitney U-test, P – significance level

Conclusion

The results of comparison of the interior characteristics of Slovak warmblood horses and Lipizzan horses showed that there are no statistically significant differences between the evaluated horses in the studied breeds. The highest ratings were achieved by the Slovakian warmblood horses (average 89.1 pt, 74.42%). Only a slightly lower interior rating had Lipizzan horses (86.1 pt, 66.2%), so both breeds of horses can be considered as the breeds with balanced characteristics of temperament and character, suitable for riding horses. However, the variability of the resulting assessments has shown that Lipizzan horses are more balanced in these properties than Slovak warmblood horses and do not have such great fluctuations. When examining individual indicators, a series of several analyzes showed that between the Slovak warmblood horses and Lipizzan horses there is a significant difference in a single indicator of interior - 10 - Stress managing. In particular, it has been shown that Lipizzan horses manage stress significantly better than Slovak warmblood horses.

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