ANALYSIS OF BREEDING AND PERFORMANCE OF HORSES IN THE CZECH REPUBLIC BASED ON EVENTING COMPETITIONS

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Abstract: This work deals with riding competitions – eventing and includes statistical evaluation of the effect of the breed, age, year of start and sex on the performance of the horses. Data were taken from the Survey of Sport Horses of 2005 and 2015. These data are issued by the Czech Equestrian Federation. Data were further processed and statistically analysed using the program STATISTICA 2012. Evaluation of the sport performance was based on the auxiliary points (AAP). The breed, age and year of start have a statistically significant effect on performance. The breed with the highest performance was the Irish sport horse with 17.4 AAP. The best results were achieved by horses of 13 to 16 years of age (AAP 11.81). The most frequently used breeds in the Czech Republic are the Czech warm-blood and the English Thoroughbred. The performance of imported breeds was better than of horses born in the Czech Republic. The performance of horses in 2015 was better than in 2005. We can see an increasing tendency in the performance. In conclusion we compared the situation in the Czech Republic over the past ten years by comparing the gradual change in their representation of the sex, breeding and country of birth.

Key words: eventing, sports breeds of horses, performance

INTRODUCTION

The popularity of riding – eventing is steadily increasing. It is an attractive discipline which has its roots in the military. Although it is not so widespread as show jumping, it is still the most attractive and most popular riding discipline and its popularity is continuously increasing.

Eventing is made up of three completely different parts, i.e. dressage, cross-country and show jumping (Pellarová et al. 2015). These three phases take place on separate consecutive days during which a competitor rides the same horse throughout (FEI 2017).

In this three-day event the jumping test takes place on the last day after a veterinary inspection (FEI 2017). The dressage test is executed on the first day of eventing. The starting pair executes the prescribed movements on the dressage rectangle (usually measuring either 20 × 60m or 20 × 40m). For deviations in the respective movements the judges allot penalty points (Grodl 2009). They evaluate the correct sitting position and precise execution of the respective movements (Motyginová 2001). Cross-country is the most demanding phase of the entire three-day event. It is a test of endurance and speed (Micklem 2004). The cross country test constitutes the most exciting and challenging all-round test of riding ability and horsemanship. This part of the competition focuses on the ability of athletes and horses to adapt to different and variable conditions of the competition (weather, terrain, obstacles, etc.) showing jumping skills, harmony and mutual confidence (FEI 2017). After the rider and horse successfully master the cross-country test they are faced with the final test – show jumping (Petrmannová 2013). The show jumping test is executed on the last day of the classical three-day event. It is a test of willingness and concentration of the horse, psychic resistance of the rider and his art of strategy. It puts to test the ability of the horse to regenerate. The winner is the rider with the fewest penalty points for all the three tests (Grodl 2009).

When choosing the horse preference is given to a young, healthy and well-bred horse. Important is also the type of the horse and the body conformation (Dušek 1999). According to Misař and

Jiskrová (2001) when choosing a horse for eventing it is important that the horse has an extended and smooth gait, deftness and courage to master difficult natural fences. The speed of the horse must be sufficient, the constitution hardy and the horse tenacious. The horse of choice should be able to make decisions for himself. Although this is not a prerequisite it helps the horse cope with pitfalls of the course much better (Dillon 2012). Lerche (1956) pointed out the importance of conformity of the body conformation of the horse to prevent unbalanced straining. The greatest emphasis is on the limbs of the horse (Paalman 1998).

Horses of any kind of breed intended for sporting activities can be used in the discipline. In the Czech Republic it is mostly the Czech warm-blood, the Slovakian warm-blood bred in the Czech Republic and the English Thoroughbred (ČJF 2015). In general a very good horse for this discipline is a horse with a greater proportion of blood of the English Thoroughbred.

MATERIAL AND METHODS

Determination of the comparative base

Here we used the Survey of Sport Horses of 2005 and 2015. From the database of the ČJF we selected the horses that started in the respective year at least three times, of which minimally one start was in eventing; 529 horses in total. We also used data from charts of the best horses in eventing competitions in the respective years.

Methods of determination of average auxiliary points (AAP)

The horses in the charts are arranged according to the AAPs per one start. Auxiliary points are obtained by conversion of the actual result of the horse in eventing competitions converted by means of the following matrices, see Table 1.

Table 1 Matrices of calculations of horses in eventing (ČJF 2015)

Difficulty code	Degree of competition		Disability Is subtracted	Penalty points							
				<45	45.01 –55	55.01 –65	65.01 –75	75.01 –85	85.01 –110	110.01 –150	>150
37	CCI4*	TT	0	34	33	32	31	30	29	27	25
36	CNC/CCN/CIC/CCI 3*	TT	0	30	29	28	27	26	25	23	21
35	CNC/CCN/CIC/CCI 2*	ST	-1	26	25	24	23	22	21	19	17
34	CNC/CCN/CIC/CCI 1*	ST	-2	22	21	20	19	18	17	15	13
33	L	L	-3	18	17	16	15	14	13	11	9
32	ZL	ZL	-2	14	13	12	11	10	9	7	5
31	Z	Z	-1	11	10	9	8	7	6	4	2

Statistical analysis

The data were evaluated statistically using the programme STATISTICA 2012.

Descriptive statistics of the AAPs in 2005 and 2015

The following were evaluated: *arithmetical mean, modus, median, maximum, minimum and standard deviation.*

Statistical analysis using the ANOVA method (Analysis of Variance) and following tests

We used multi-factorial analysis. When the effect was statistically significant we assessed the differences among the age groups, sexes, breeds and years of start using the method of Scheffe's multiple comparisons.

Factors followed:

Age

- Group 4–6 years – 140 horses
- Group 7–12 years – 329 horses
- Group 13–16 years – 54 horses
- Group 17 and more years – 6 horses

Breed

- Czech warm-blood – 284 horses
- Slovakian warm-blood + Kinský horse – 33 horses
- English Thoroughbred – 107 horses
- Irish sports horse – 11 horses
- German warm-blood breeds + Swedish warm-blood + Danish warm-blood – 23 horses
- Dutch warm-blood + French riding horse – 13 horses
- Horse of the warm-blood type – 14 horses
- Horses with no pedigree – 23 horses
- Arabian thoroughbred + Shagya Arab – 3 horses
- Hafling – 3 horses
- Others (**) – 15 horses

(**) Wielkopolska and Malopolska horse, Polish noble half-bred horse, Ukrainian riding horse

Sex

- Stallions – 53 horses
- Mares – 203 horses
- Geldings – 273 horses

Year of start

- 2005 – 233 horses
- 2015 – 296 horses

RESULTS AND DISCUSSION

The average AAP points of horses starting in eventing competitions were 10.75 in 2015 and 7.80 in 2005. In 2015 the average AAP points were by 2.95 higher than in 2005. Also the mean values, the minimum and maximum were higher than in 2005. The minimum value was -0.3 in 2005 and 0 in 2015. The value of the maximum value was 22.20 in 2005 and 25.33 in 2015, see Table 2. The higher value of AAP points in 2015 demonstrates that the present-day performance of horses is higher. The same results were achieved by Horká (2016) who evaluated the jumping performance of horses. She stated that from 2005 to 2014 the performance increased by 3.14 points. The results of Ricard and Chanu (2000) suggest that selection on jumping performance will lead to some positive correlated response for eventing performance.

The results of the effect of the respective factors for AAP are presented in Table 3, where the factors were: age, sex, breed and year of start.

Table 2 Descriptive statistics of evaluations of the performance of horses in eventing competitions in 2005 and 2015

AAP variable	Mean	Median	Modus	Modus frequency	Minimum	Maximum	Standard deviation
2005	7.80	7.83	8.00	11.00	-0.30	22.20	4.27
2015	10.75	10.39	9.00	13.00	0	25.33	5.07

Table 3 Effect of the respective factors on the performance of horses in eventing competitions

Performance	Age	Sex	Breed	Year of start
AAP	**	-	**	**

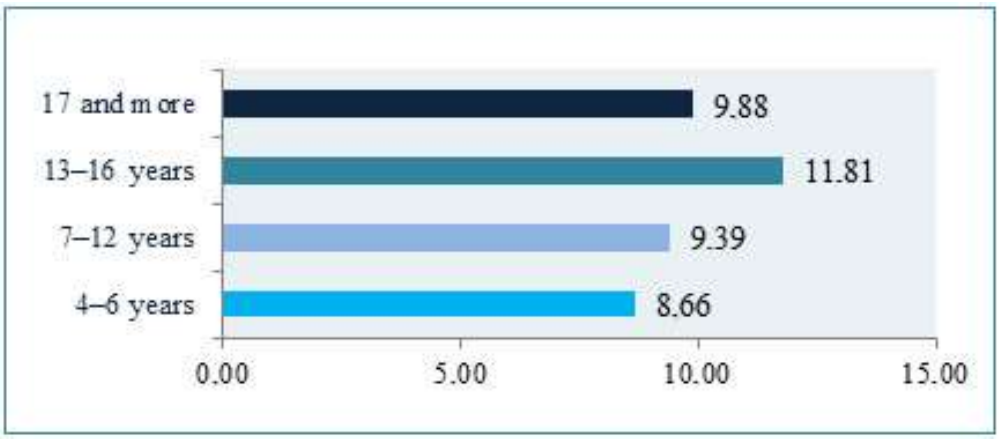
Significance: P ≤ 0.01 (**) statistically highly significant, P ≤ 0.05 (*) statistically significant

The effect of the breed, age and year of start had a statistically highly significant effect on the performance of the horses. The statistically significant effect of the sex was not proved.

Following tests using Scheffe's test

In following tests of the age by means of Scheffe's test it was discovered that performance of the category of horses of the age of 13–16 years was statistically highly significant compared to the youngest age category of 4–6 years and age category of 7–12 years; see Figure 1.

Figure 1 Average values of AAP in the respective age categories



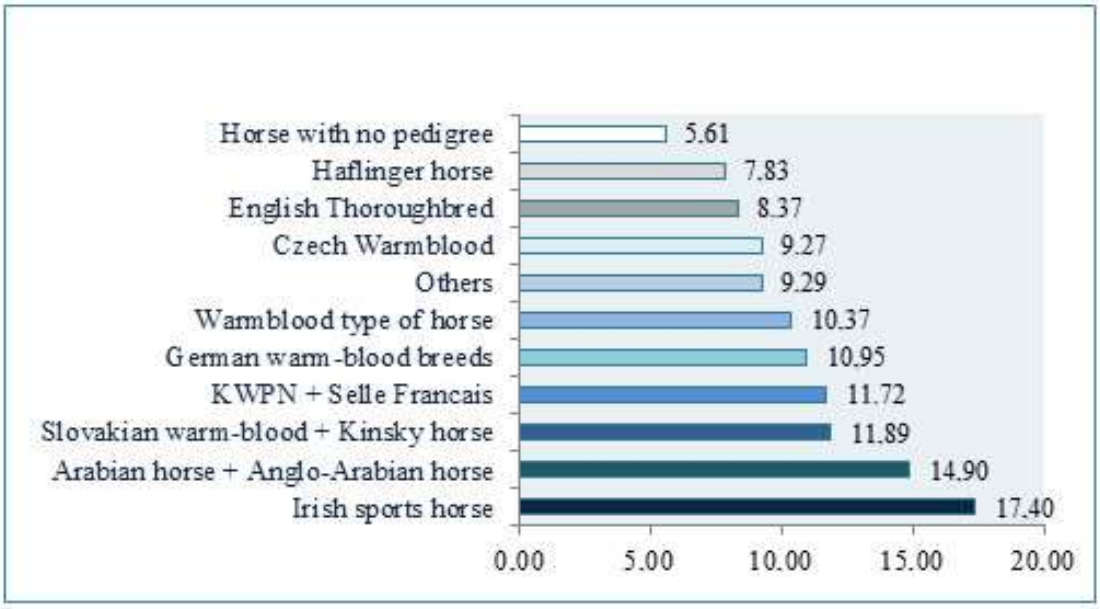
In subsequent tests of the year of start we discovered that performance had increased. In 2005 AAP was 7.8. In 2015 performance increased (by 3 AAP) to AAP 10.8.

Also Dibalová (2009) confirmed that the performance of horses in eventing competitions increased; she reported that performance increased gradually from 2000 to 2007, i.e. by 5.99 points, corresponding with our results and proving the gradual increase in performance.

It was discovered on the base of factor breed that the performance of the Irish sport horse was statistically highly significantly higher than that of the Czech warm-blood (by 8.13 AAP), the English Thoroughbred (by 9.03 AAP) and of horses that had no pedigree (by 11.79 AAP) and was statistically significantly higher than of horses of other breeds (by 8.11 AAP). The performance of the Czech warm-blood was statistically highly significantly higher than of horses that had no pedigree.

The performance of the Irish sport horse was unbeatably the best (AAP 17.4). Dibalová (2009) concluded that worldwide this breed is the most successful breed in eventing competitions due to its high performance and in the Czech Republic its popularity is constantly increasing.

Figure 2 Average values of auxiliary points of the respective breeds



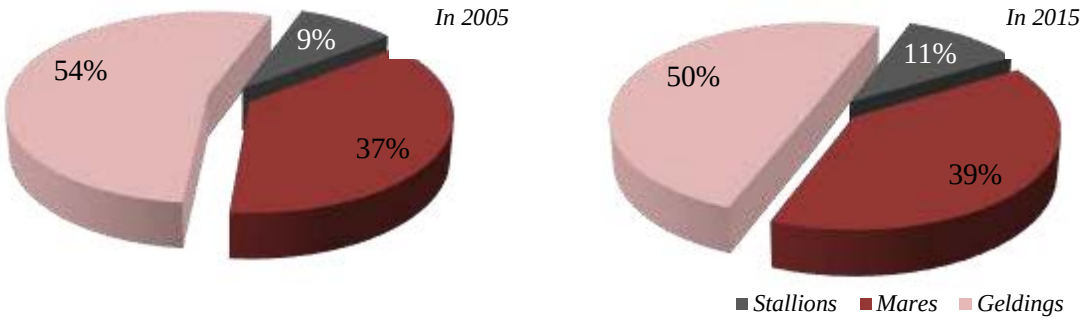
Overall evaluation of eventing competitions in the Czech Republic and across the world

The graphs below show the proportional representation of sex of horses starting in eventing competitions in the Czech Republic in 2005 and 2015. In this competition preference is given to geldings over mares and stallions. The reason for the popularity of geldings is that their temperament is calmer, they are even-tempered and better manageable.

Dibalová (2009) added that geldings are used more frequently for eventing competitions because they are mentally more balanced thanks to which their performance is more stable.

Performance of stallions is considerably better than both that of mares and geldings (Whitaker et al. 2008). However, stallions are used least of all, possibly because they are not manageable easily. According to Krčová (2013) stallions require specific handling and for inexperienced riders they might be dangerous.

Figures 3 and 4 Sex representation of horses starting in eventing competitions



CONCLUSION

The objective of the present study was to evaluate the effects of the individual factors on the performance of horses in eventing competitions. We monitored the results of the individual factors for AAP, they were the following: age, sex, breed and year of start. Other factors in the competitions were country of origin of the horses, the breed and the effect of stallions imported from abroad. We compared a period of ten years (2005–2015) and we found that performance was influenced by the breed, age of horse and year of start.

It was also discovered that at present the reigning horses in eventing competitions are the Irish sport horses. Although these horses do appear in the Czech Republic they are in a minority. The most

easily available horses for Czech breeders are Czech breeds, such as the Czech warm-blood and the Slovakian warm-blood bred in the Czech Republic, followed by the English Thoroughbred.

In terms of the age of the horses the highest performing horses were horses from 13 to 16 years of age (11.81 AAP). Their performance gradually increased up to the age of 15 years (15.01 AAP) and then began to decline. The highest performing breed was the Irish sport horse (17.4 AAP). The performance of the horses increased in 2015 as compared to 2005. Germany has progressed considerably in breeding. Surprising results were achieved with the Czech warm-blood; its performance over the studied period increased ranking it immediately after the German warm-blood breeds and confirming the great progress in breeding of the Czech warm-blood for sports performance.

Another finding (based on our tests) was that sex had no effect on performance. In both of the above mentioned years geldings were the most frequently used horses in eventing competitions, followed by mares and least of all stallions. The other factor was the country of origin of the horse. The overwhelming majority of starting horses was born in the Czech Republic. The number of horses imported to the Czech Republic is increasing. During the monitored period the number of imported horses increased by 8%.

In conclusion I would like to add that if the Czech Republic wants to compete in eventing competitions with riders from abroad, I recommend that they either acquire an imported horse (primarily an Irish sport horse or a German warm-blood breed) or one of our Czech sport breeds (Czech warm-blood). However, a horse competing in an eventing competition must also show speed and stamina. That is the reason why breeders frequently tend to the English Thoroughbred.

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