

## **Analysis of performance of horses in the Czech Republic and in the world based on dressage competitions**

**Katarina Souskova, Eva Sobotkova**

Department of Animal Breeding

Mendel University in Brno

Zemedelska 1, 61300 Brno

CZECH REPUBLIC

souskovakatarina@gmail.com

*Abstract:* This work is focused on horses participating in dressage competitions in Czech Republic and in the whole world. We tested statistical evaluation of the effect of the age, breed, sex and year of start on performance in dressage competitions. The data were taken from rankings of the best dressage horses that are issued by the Czech Equestrian Federation and from world dressage rankings that are issued by Fédération Équestre Internationale. We focused on the year 2010 and 2016. The dressage performance has been evaluated on the basis of reached auxiliary points (AAP) in Czech rankings and points in world rankings. We have processed and evaluated the data using programmes STATISTICA 2012 and UNISTAT 6.5. Factor of the age, sex and breed have a statistically highly evaluated influence on dressage performance of the best dressage horses in Czech Republic. The highest performance have the horses at the age of 17 and higher (5.59 AAP), stallions (6.08 AAP) and breed KWPN (6.15 AAP). Factor of age, breed and year of start have a statistically highly evaluated influence on dressage performance of the best dressage horses in the world. Horses at age from 7 to 12 years (1340.21 points) and group of Scandinavian Warmblood Breeds (1448 points) have the highest dressage performance in the world rankings. Performance of the horses included in dressage rankings increased from the 2010 to year 2016 in Czech Republic and also in the world.

*Key Words:* dressage, performance, competition

### **INTRODUCTION**

Dressage, the highest expression of horse training, is considered to be the most artistic of the equestrian sports and can be traced back to the ancient Greece. The horse has to perform at a walk, trot and canter, and all tests are ridden from memory and follow a prescribed pattern of movements. The only exception is the Freestyle which is specially choreographed for each horse and is performed to music. The popularity of Dressage has increased rapidly in recent years and the sport now regularly attracts huge crowds. Dressage is undoubtedly the most aesthetically pleasing of the disciplines in the FEI stable (FEI 2016).

The object of dressage is the harmonious development of the physique and ability of the horse. As a result, it makes the horse calm, supple, loose and flexible, but also confident, attentive and keen, thus achieving perfect understanding with his rider (Loch 1990).

These qualities are demonstrated by the freedom and regularity of the paces, the harmony, lightness and ease of the movements, the lightness of the forehand and the engagement of the hindquarters, originating from a lively impulsion, the acceptance of the bit, with submissiveness, thoroughness without any tension or resistance (FEI 2018).

Equestrian sports have become more popular over the last decades. Success at the highest level of competition requires an intensive preparation. Horses therefore are competing more and more in only one of the disciplines to maximize the chance of winning. Breeders increasingly focus on one specific discipline in their breeding and mating decisions. (Rovere et al. 2017)

Rating dressage performance is a current worldwide theme that is debated from the point of genetics (Steward et al. 2009), veterinary (Jongersen 1996) and breeding (Popovici et al 2014, Koenen and Aldridge 2002).

## MATERIAL AND METHODS

For the determination of a comparative base we used Ranking of the Best Dressage Horses of 2010 and 2016 that is issued by the Czech Equestrian Federation. Horses included in this rankings started in dressage competitions at least 6 times during evaluated years in Czech republic. The horses in the rankings are arranged according to the average auxiliary points (AAP). Auxiliary points are obtained by a conversion of the actual result of the horse in dressage competitions converted by means. We also used Dressage World Ranking of 2010 and 2016 that is issued by Fédération Équestre Internationale. The horses in the rankings are arranged according to points. Matrices for calculation of auxiliary points and points are different so we cannot compare them between each other. From each ranking we eliminated a pony.

For statistical analysis we used the programme STATISTICA 2012 and UNISTAT 6.5. In descriptive statistic we evaluated arithmetical mean, modus, median, maximum, minimum and standard deviation. For statistical analysis we used the method (Analysis of Variance) ANOVA and following tests by Scheffe's multiple comparisons. We used the multi-factorial analysis.

## RESULTS AND DISCUSSION

We can see from the Table 1 and Table 2 that average dressage performance is growing in Czech Republic (from 3.97 to 5.22 AAP) and in the world (from 1103.15 to 1565.9 points). Median, minimum and maximum values was higher in 2016 than in 2010. Increasing values show improved dressage performance among best dressage horses in both, Czech Republic and the world.

*Table 1 Descriptive statistic of evaluations of the performance (according to auxiliary points) of best dressage horses in Czech Republic in 2010 and 2016*

AAP variable	Mean	Median	Minimum	Maximum	Standard deviation	Variable coefficient
2010	3.97	3.06	1.25	14.78	2.96	74.51
2016	5.22	4.25	1.88	21.11	3.61	69.2

*Table 2 Descriptive statistic of evaluations of the performance (according to points) of best dressage horses in the world in 2010 and 2016*

Points variable	Mean	Median	Minimum	Maximum	Standard deviation	Variable coefficient
2010	1103.15	1082	542	2771	383.35	0.35
2016	1565.9	1499	1105	2928	332.26	0.21

Thanks to the statistic method ANOVA we found out that factor of the age, sex and breed had statistically higher significance effect on the performance of best dressage horses in Czech Republic. In the world factor of the age, breed and year of start was statistically highly significant. We did not prove effect of the sex.

*Table 3 Effect of the respective factors on the performance of best dressage horses in Czech Republic*

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

$P \leq 0.01$  (\*\*) statistically highly significant,  $P \leq 0.05$  (\*) statistically significant

*Table Effect of the respective factors on the performance of best dressage horses in the world*

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

$P \leq 0.01$  (\*\*) statistically highly significant,  $P \leq 0.05$  (\*) statistically significant

Factor of the age had statistically highly significant effect on dressage performance in Czech Republic and in the world. Stewart et al. (2009) also state that age of the horse was significantly associated with performance.

Figure 1 Average values of points of the respective age groups

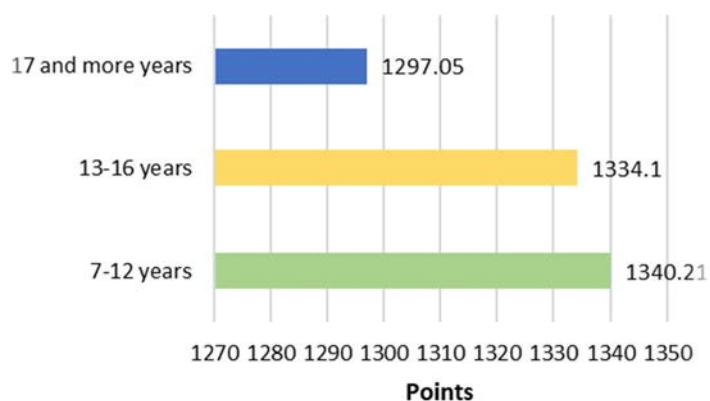
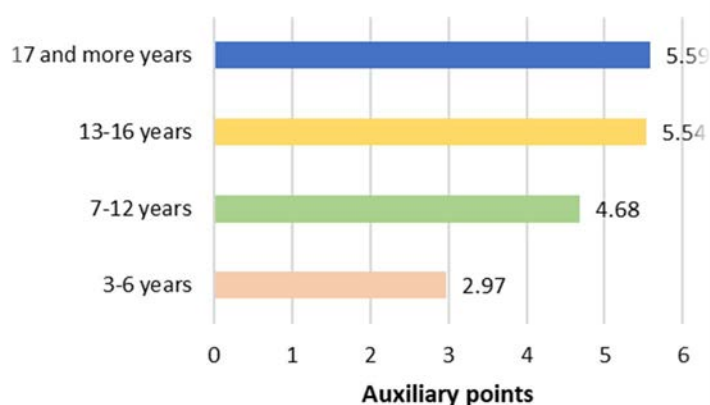


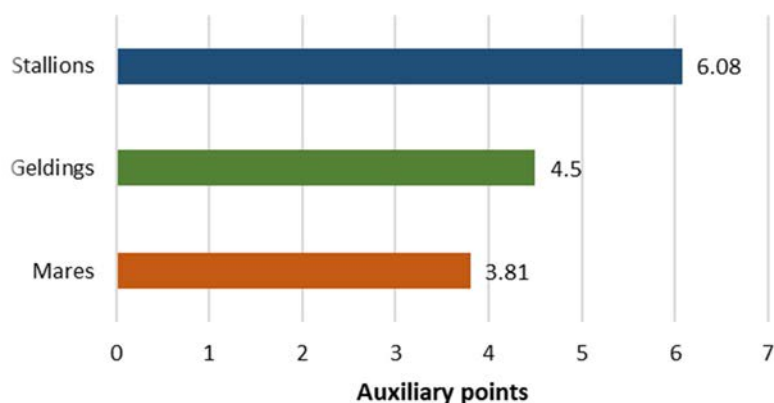
Figure 2 Average values of auxiliary points of the respective age groups



In world dressage ranking, there are only horses which are older than seven years due to the highest level of the competitions. Compare to this in Czech Republic there is also a younger group from 3 to 6 years and these horses compete in lower level competitions. In the world the highest performance is reached by the group from 7 to 12 years (1340.21 points). In Czech Republic the oldest group had the highest performance (5.59 AAP). Due to higher level and requirement in world rankings more successful are horses in most productive age. The highest performance of the oldest group in Czech Republic is mostly caused by few individuals with really good results. Stewart et al. (2009) state that it is unusual for horses to compete at advanced ages and only the most consistent horses will continue to compete. We can state that in dressage sport the experience is very important but on the Grand Prix level the horses from 7 to 12 years are the most successful.

We statistically proved the effect of sex on performance of best dressage horses in Czech Republic but not in the world. This can be caused by the fact that all horses in world rankings compete in the highest level. Contrary to this, there are also some horses among the best dressage horses in Czech Republic that compete in lower level competitions. In the world rankings higher standards are required and there are stallions, geldings and mares with similar dressage performance. In Czech Republic group of stallions had highest performance (6.08 AAP), than it was in group of geldings (4.5 AAP), and group of mares (3.81 AAP) had lowest dressage performance. This can be caused by problematical behaviour of mares. Jongersen (1996) states that trainers who are involved in various components of equine industry frequently report variations in the performance of a mare apparently related to the estrus cycle. Pryor and Tibary (2005) state that estrus has long been considered an important factor in reduced athletic performance. Budzynska et al. (2014) state that sex has an effect on behavioural reactivity of horses and it is important to consider this factor during selection for a particular type of riding. Brudňáková (2018) stated that group of stallions had the highest performance in show jumping competitions.

Figure 3 Average values of auxiliary points of the respective sexes



Factor of the breed was proved as statistically highly significant in both rankings. Stewart et al. (2009) state that breed significantly affects dressage competition performance.

Figure 4 Average values of points of respective breed

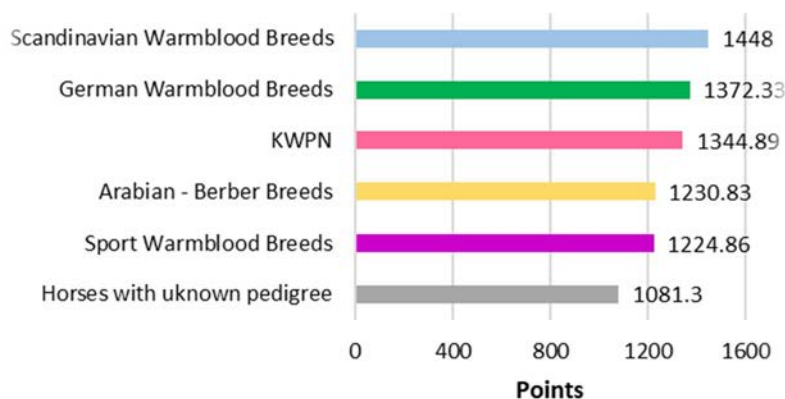
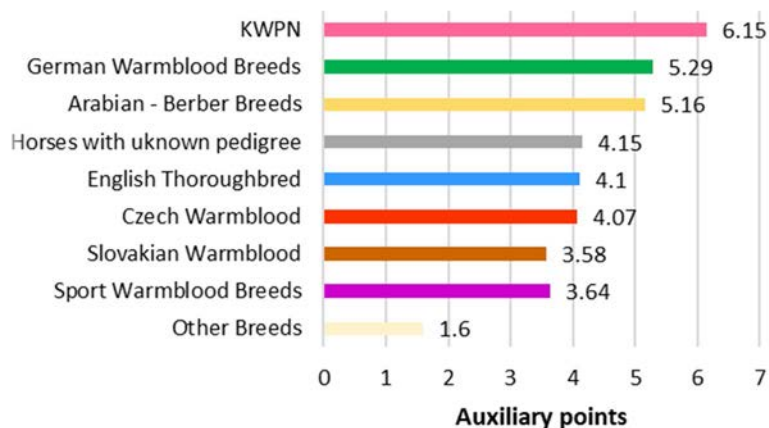


Figure 5 Average values of auxiliary points of respective breeds



As we can see from Figure 4, the highest dressage performance in the world was reached by group of Scandinavian Warmblood Breeds (1448 points) such as Danish Warmblood, Finnish Warmblood, Estonian Sport Horse and Swedish Warmblood. German Warmblood Breeds and KWPN had high performance in both, world and Czech rankings. Rovere et al. (2015) state that most warmblood horse stud books aim to improve the performance in sport and that the Dutch Royal Warmblood Studbook (KWPN) includes the highest score achieved in competition by a horse to evaluate its genetic ability

of performance. Arabian - Berber Breeds are still on a higher position in dressage sport but due to extended paces that are very important in modern dressage these breeds have lower performance. In Ranking of the Best Dressage Horses of Czech Republic there are also other breeds represented, mostly English Thoroughbred and Czech Warmblood horses. In Czech Republic group of other breeds (1.6 AAP) had the smallest number of reached points. Stewart et al. (2009) found out in their study that breeds that are not breeding for dressage had lower performance in this discipline.

## CONCLUSIONS

In the present study we evaluated the effects of the individual factors on the dressage performance of horses included in Czech and world rankings. Evaluation of the sport performance was based on the auxiliary points in Czech ranking and points in world ranking. We tested statistical evaluation of the factor of the age, breed, sex and year of start on dressage performance of the horses. We used data from year 2010 and 2016.

When we compare year 2010 and 2016, we can see increasing values that show improved dressage performance among the best dressage horses in both, Czech Republic and the world.

We found out that factor of the age, sex and breed had statistically highly significant effect on the performance of the best dressage horses in Czech Republic. In the world factor of the age, breed and year of start was statistically highly significant.

Our results show that group from 7 to 12 years had the highest dressage performance in world ranking. In Czech ranking it was the oldest group. We can conclude that because of the higher level and requirement in world rankings horses in the most productive age are more successful. The youngest group is not represented in the world ranking because of the Grand Prix level of competitions and in Czech ranking this group had the lowest performance. This can be caused by the fact that this horses compete in lower level competitions and are not experienced enough. We can state that dressage sport experiences are very important but on the top level competitions horses from 7 to 12 year are the most successful.

We statistically proved the effect of the sex on dressage performance just in Czech ranking. In Czech Republic group of stallions had the highest performance, than it was group of geldings and group of mares had the lowest dressage performance. Such a good results of stallions can be caused by the fact that dressage is subjectively marked discipline so temperament and presentation of stallions can have an effect on its rating. There can be also some problems with mares such as problematical behaviour and back pain related to their estrous cycle.

Our statistical analysis showed that group of Scandinavian breeds had the highest dressage performance in world ranking. German Warmblood Breeds and KWPN had high performance in both, world and Czech rankings. In Czech ranking there are also other breeds represented, mostly Czech Warmblood, Slovakian Warmblood and English Thoroughbred. These breeds are successful in lower level competitions but only a few individual horses compete in Grand Prix level.

Our results show some differences in Czech and world dressage sport caused by different standards that are set for its rankings. In world ranking, there are higher requirements than in Czech Republic so the results are different.

In conclusion I want to recommend to riders, who want to compete in the top level dressage competitions, to choose one of the foreign breeds that are selected for sport performance such as Scandinavian Warmblood Breeds, German Warmblood Breeds and KWPN and horses from 7 to 12 years.

## REFERENCES

Budzynska, M. et al. 2014. Behavioural and physiological reactivity of mares and stallions evaluated in performance tests. *Acta Veterinaria-Beograd*, 64(3): 327-337. [Online]. Available at: <https://content.sciendo.com/view/journals/acve/64/3/article-p327.xml>. [2018-10-25].

- Brudňáková, M. 2018. Analysis of Performance of Horses in Czech Republic Based on Show Jumping Competitions. In *Animal Breeding 2018* [Online]. Mendelova univerzita v Brně, pp. 11-19. Available at: <https://is.mendelu.cz/auth/lide/clovek.pl?id=69038;zalozka=5;podrobnosti=266409>. [2018-08-09].
- ČJF. 2010. Přehled o sportovních koních ČR 2010 [Online]. Available at: <http://www.cjf.cz/files/stranky/dokumenty/prehledy-o-sportovnich-konich/roc-2010-web.pdf>. [2018-08-08].
- ČJF. 2016. Přehled o sportovních koních ČR 2016 [Online]. Available at: <http://www.cjf.cz/files/stranky/dokumenty/prehledy-o-sportovnich-konich/rocenka2016-05-zebricky.pdf>. [2018-08-11].
- FEI 2016. About Dressage. [Online]. Available at: <https://inside.fei.org/fei/disc/dressage/about-dressage>. [2018-08-12].
- FEI Dressage World Ranking. [Online]. Available at: [https://data.fei.org/Ranking/Search.aspx?rankingCode=D\\_WR](https://data.fei.org/Ranking/Search.aspx?rankingCode=D_WR). [2018-08-23]
- FEI 2018. Dressage Rules [Online]. Available at: [https://inside.fei.org/sites/default/files/DRE-Rules\\_2018\\_Clean\\_Version\\_0.pdf](https://inside.fei.org/sites/default/files/DRE-Rules_2018_Clean_Version_0.pdf). [2018-08-04].
- Jongersen, J.S. 1996. Effect of the estrous cycle on performance in athletic mares. *Compendium on Continuing Education for the Practicing Veterinarian* [Online], 18: 692–698. Available at: [https://www.researchgate.net/publication/281595909\\_Effect\\_of\\_the\\_estrous\\_cycle\\_on\\_performance\\_in\\_athletic\\_mares](https://www.researchgate.net/publication/281595909_Effect_of_the_estrous_cycle_on_performance_in_athletic_mares). [2018-08-10].
- Koenen, E.P.C., Aldridge, L.I. 2002. Testing and Genetic Evaluation of Sport Horses in an International Perspective. In *Conference at the 7<sup>th</sup> World Congress Genetic Applied to Livestock Production* [Online]. Montpellier, France, 19–23 August, pp. 1–5. Available at: <https://www.biw.kuleuven.be/genlog/livgen/research/interstallion/publications/wcgalp-paper.pdf>. [2018-08-10].
- Loch, S. 1990. *Dressage: The Art of Classical Riding*. Hampshire: The Sportsman's Press.
- Popovici, A.R. et al. 2014. Competition dressage horses: Effect of age, sex and breed on the FEI/WBFSH world ranking. *Journal of Biotechnology*. 185: 39. [Online]. Available at: <https://www.sciencedirect.com/science/article/pii/S0168165614004763>. [2018-08-16].
- Pryor, P., Tibary, A. 2005. Management of Estrus in the Performance Mare. *Clinical Techniques in Equine Practise* [Online], 4: 197-209. Available at: <https://www.sciencedirect.com/science/article/pii/S153475160500065X>. [2018-10-25].
- Rovere, G. et al. 2015. Analysis of competition performance in dressage and show jumping of Dutch Warmblood horses. 2015. *Journal of Animal Breeding and Genetics* [Online], 133: 503-512. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27237865>. [2018-10-25].
- Rovere, G. et al. 2017. Genetic correlations between dressage, show jumping and studbook-entry traits in a process of specialization in Dutch Warmblood horses. *Journal of Animal Breeding and Genetics* [Online], 134: 162–171. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27678258>. [2018-10-25].
- Steward, I.D. et al. 2009. Genetic evaluation of horses for performance in dressage competitions in Great Britain. *Livestock Science* [Online], 128: 36–45. Available at: <https://www.sciencedirect.com/science/article/pii/S1871141309003424>. [2018-08-16].