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**The influence of certain factors on the results obtained
by horses classified in show jumping ranks
of international federation for equestrian sports**

Wpływ niektórych czynników na wyniki koni sklasyfikowanych w rankingu międzynarodowej federacji jeździeckiej w dyscyplinie skoków przez przeszkody

Summary. The aim of the present work was to analyse the results of horses classified in the ranks of International Federation for Equestrian Sports (FEI) in show jumping. 3303 sport horses were examined. They participated in international competitions between 1.01.2008 and 30.09.2009 obtaining the results that allowed them to be classified in the above mentioned ranking. With the use of variation analysis (ANOVA GLM) the influence of breed, age and sex on the number of ranking points was determined. It was found out that the most numerous breed group were kwpn horses (613 pcs), however, the best results were obtained by Westphalian horses ($\bar{X} = 144.5$ pts.), which together with Belgian and Danish horses were better than other breed groups in a statistically significant number of the average number of ranking points. It was also established that contemporary horse breeding for show jumping discipline is primarily based on Holsteiner paternal lines („C1”, „C2”, „L”, „Q”) originating from a common ancestor Arabian horse (Darley Arabian).

Key words: horses, jumping competitions, use value

INTRODUCTION

Show jumping is an equestrian discipline which is particularly interesting for the spectators, particularly at international level. On the other hand, it is an important stage of horses' use value evaluation [Tavernier 1991, Janssens *et al.* 1997]. International Federation for Equestrian Sports (FEI) and World Breeding Federation for Sport Horses (WBFSH) run detailed ratings, in which horse's location is an important hint for the breeders and riders as well as supplementing traditional method of horse value evaluation – BLUP Animal Model [Zurovacová 2008, Silvestrelli *et al.* 2007]. Despite the fact there are numerous methods of young horse evaluation [Marsalek *et al.* 2010, Thorén-Hellsten *et al.* 2006], it is the sports results of the offspring that show full potential of the sire. In the world there are numerous horse breeds selected for bravery in show jumping compe-

titions and the results obtained at international level allow assuming that a given selection level was obtained. Despite the actions of breeding associations supported by numerous scientific researches [Wallin *et al.* 2003, Dubois and Ricard 2007] the use value of different horse races is not equal, what is manifested in their turnout in the top-class competitions and the popularity of sires among horse breeders in the whole world. Horses starting in international show jumping competitions which were listed in FEI ranking are undoubtedly counted as top sport horses and constitute a result of well considered and appropriately conducted breeding procedures. They make a valuable pool of genes which will be used in sport horse breeding in the coming years. The aim of this work was to analyse the origin of horses classified in FEI ranking. It is also an attempt to define such factors as breed, age and sex on horses' results in FEI rankings. The analysis of the problem seems justified due to ongoing discussions of scientists and practitioners on the legitimacy of premises behind individual stages of breeding as well as attempts to standardise the systems of horse use and breeding value [Ruhlmann *et al.* 2006].

MATERIALS AND METHODS

3303 sport horses were examined. They participated in international competitions between 1.01.2008 and 30.09.2009 obtaining the results that allowed being classified in the ranking of International Federation for Equestrian Sports (FEI) – table 1.

Table 1. List of the examined horses
Tabela 1. Zestawienie liczebności badanych koni

Breed Rasa	No of specimens Liczba sztuk	%
Dutch(kwpn)/Holenderska gorącokrwista	613	18,56
Selle francais (sf)	463	14,02
Holsteiner (hol)/Holsztyńska	432	13,08
Belgian (bwp)/Belgijska gorącokrwista	394	11,93
Without breed/Bez rasy	373	11,30
Other/Pozostałe	317	9,60
Oldenburger (old)/Oldenburska	156	4,72
Hanoverian (han)/Hanowerska	152	4,60
Zangersheide (z)	123	3,72
Westphalian (westf)/Westfalska	100	3,03
Swedish (swb)/Szwedzka gorącokrwista	64	1,94
Irish (ish)/Irlandzka sportowa	54	1,63
Danish (dwp)/Duńska gorącokrwista	32	0,97
Anglo-arabian (xxoo)/Angloarabska	14	0,42
Thoroughbred (xx)/Pełna krew angielska	10	0,30
Trakehner (trk)/Trakeńska	6	0,18
Σ	3303	100

The origin of horses was analysed with the data of fathers, mothers and mothers' fathers. With Statistica 7.0, with a single factor analysis of variation (ANOVA GLM) the influence of breed, age and sex on the number of ranking points was defined. The significance of differences between averages were defined with Tukey test.

The analyses covered the breeds with a minimum number of specimens was 6. Few specimens of different breeds were ranked as "other", whereas the specimens without the data on their origin were marked as "without breed".

RESULTS AND DISCUSSION

The most numerous breed in 3303 horses classified in FEI ranking were the specimens of Royal Warmblood Studbook of the Netherlands (613) – Table 1, which accumulated the largest total number of ranking points (73847). In the group there was a stallion Hicksted (Hamlet – Jomara by Ekstein), which obtained the top location, and the runner-up gelding Robin Hood W (Animo – Melisimo by Libero-H). The second most numerous breed group were selle francais horses (463 specimens), whereas the best location in the group (eight position) was obtained by gelding Itot de Chateau Isoulas (Ce tot de Semily – Sophie by Galoubet A). The third and fourth positions were held by Holstein horses (432 specimens) and Belgian warmblood horses (394 specimens) respectively. Other breeds were much less numerous.

In the range of average number of ranking points per horse (Tab. 2). Westphalian horses, which are considered one of the best show jumping breeds [Ducro *et al.* 2007], gained noticeable advantage over others ($\bar{X} = 144.5$). The first runner-up was Belgian breed and the third position was held by Danish warmblood horses.

The analysis of differences between average numbers of ranking points (Tab. 2) of individual breed groups proved that they were statistically highly significant for Westphalian, bwp, dwp and the group of Thoroughbred, Anglo-Arabian, horses characterised as „without breed” and “other”. Four last groups appeared also statistically worse in terms of obtained ranking points than kwpn, Holsteiner, swb and Oldenburger.

The analysis of sex of the classified horses showed that geldings were most numerous and made nearly 50% (Tab. 3). The least numerous group were stallions – nearly 22%. The influence of sex as a significant factor influencing average number of ranking points was not proved, what coincides with the researches by other authors [Gómez *et al.* 2006].

It was concluded that nearly half of the examined jumping horses were 9–11 years old, however, the highest average number of points was obtained by 13-year-olds and the lowest by 7 year-old horses – 25.9 (Tab. 4). The analysis of the data in table 4 showed that the best results in FEI rankings were obtained by horses aged 11–15. Older and younger specimens obtained lower numbers of ranking points. This issue can be significant for evaluating breeding value of the specimen.

In the origin analysis of horses there were 61 stallions whose offspring was classified in FEI between 10 (Polydor westf., Limbus holst., Graf Grannus han.) points and 63 (Darco bwp). Undoubtedly, Dutch breed horse Heartbraker (Nimmerdor – Barcelona by Silvano), has a high breeding value. It begot 49 offspring classified in the analysed ranking. Another such example is one of the leading sires in the world Quidam de Revel – selle france (Jalisco B – Dirka by Nankin) – 42 classified offspring.

Table 2. Statistical characteristics of different breeds' performance
in ranking points (R)

Tabela 2. Statystyczna charakterystyka dzielności w punktach rankingowych (R) koni różnych ras

Breed Rasa	R Sum Suma R	\bar{X}	SD	Min	Max
Westphalian (westf) Westfalska	14449	144,5 A	273,62	1	1700
Belgian (bwp) Belgijska gorącokrwista	50437	128 A	207,04	1	1636
Danish (dwp) Duńska gorącokrwista	4085	127,7 A	165,92	1	610
Dutch (kwpn) Holenderska gorącokrwista	73847	120,5 a	204,45	1	1865
Holsteiner (hol) Holsztyńska	50060	115,9 a	188,98	1	1465
Swedish (swb) Szwedzka gorącokrwista	7090	110,8 a	151,4	5	725
Oldenburger (old) Oldenburska	17217	110,4 a	188,98	1	1465
Trakehner (trk) Trakeńska	650	108,3	133,78	5	335
Hannoverian (han) Hanowerska	16069	105,7	205,8	3	1556
Selle francais (sf) Selle francais	48839	105,5	200,53	1	1458
Zangersheide (z) Zangersheide	11791	95,9	155,05	1	943
Irish (ish) Irlandzka sportowa	5062	93,7	144,5	5	890
„without breed” „bez rasy”	24428	65,5 Bb	10478	1	695
„other” „pozostałe”	19601	61,8 Bb	112,49	1	1125
Thoroughbred (xx) Pełna krew angielska	403	40,3 Bb	37,38	2	115
Anglo-arabian (xxoo) Angloarabska	480	34,3 Bb	37,41	1	115
\sum / \bar{X}	344508	104,3	183,1	1,94	1043,63

A B – significant difference of average for $P \leq 0.01$ /średnie różnią się istotnie przy $P \leq 0,01$.

a b – significant difference of average for $P \leq 0.05$ /średnie różnią się istotnie przy $P \leq 0,05$.

As for average number of ranking points per offspring, the first location was held by stallion Emilion (kwpn), $\bar{X} = 286.6$, which is a father to numerous highly-ranked horses including Seldan, Emmerdon and Tomboy. The first runner-up was Westphalian Polydor ($\bar{X} = 277.8$), father to Peu a Peu (13 position in the ranking), Opium and Paudaur 292.

In the leading group of fathers of the examined horses there was also a two-time winner of The Show Jumping World Cup – Achil – Libero H ($\bar{X} = 197.4$).

Table 3. Statistical characteristics of performance in ranking points (R) with regards to sex

Tab. 3. Statystyczna charakterystyka dzielności w punktach rankingowych (R) badanych koni z uwzględnieniem płci

Sex Płeć	Number of specimens Liczba sztuk		ΣR	\bar{X}	SD	Min	Max
	n	%					
Stallion Ogier	713	21,59	81178	113,90	190,36	1	1865
Gelding Wałach	1636	49,53	169136	103,40	188,36	1	1787
Mare Klacz	954	28,88	94194	98,70	167,69	1	1636
Σ / \bar{X}	3303	100	344508	104,30	183,10	1	1762,67

Table 4. Statistical characteristics of performance in ranking points (R) with regards to age

Tab. 4. Statystyczna charakterystyka dzielności w punktach rankingowych (R) badanych koni z uwzględnieniem wieku

Horse's age Wiek konia	Number of specimens Liczba sztuk		ΣR	\bar{X}	SD	Min	Max
	n	%					
13	310	9,39	43627	140,70 Bb	271,61	1	1865
12	395	11,96	50836	128,70 Bb	200,30	1	1353
15	103	3,12	13128	127,50 Bb	180,92	1	935
14	204	6,18	25823	126,60 Bb	213,65	1	1636
11	517	15,65	63386	122,60	205,14	1	1787
10	614	18,59	69752	113,60	177,56	1	1285
16	71	2,15	6391	90,00	229,47	1	1556
9	558	16,89	45976	82,40	128,34	1	850
17	34	1,03	2270	66,80	89,52	1	385
18	21	0,64	1285	61,20	91,70	1	325
8	381	11,53	19481	51,10 a	73,32	1	585
20	1	0,03	40	40,00	0,00	40	40
19	6	0,18	238	39,70	49,37	1	110
6	4	0,12	152	38,00	24,34	2	55
7	80	2,42	2072	25,90 A	26,84	1	160
21	2	0,06	43	21,50	2,12	20	23
5	2	0,06	8	4,00	1,41	3	5
$\Sigma \bar{X}$	3303	100	20265,71	82,37	115,62	4,59	762,06

A B – significant difference of average for $P \leq 0.01$ /średnie różnią się istotnie przy $P \leq 0,01$

a b – significant difference of average for $P \leq 0.05$ /średnie różnią się istotnie przy $P \leq 0,05$

Analysing the breed membership of the best fathers of the jumping horses it was noticed that they belonged to kwpn, Holstein, Selle Francais and Zangersheide in most cases. Significant number of horses originated from a famous Holstein "C₁" line, which was initiated by French Anglo-Normand Cor de la Bryere and "C₂" line, which was set up by Cottage Son xx. Numerous specimens originated from Holstein line "L" initiated by stallion Ladykiller (xx) – a father to 135 recognised stallions, including Landgraf I, the best sire among jumping horses, in many experts' opinions. "Q" line – from Quidam de Revel (sf) was also significant.

Due to large number of fathers to mothers of the jumping horses, the focus is on the sires which were fathers to at least 15 mothers. The largest average number of points ($\bar{X} = 162.5$) was obtained by horses, whose mothers originated from stallion Jalisco B – sf (Alme Z – Tangara by Furioso). The second location was held by horses whose mothers originated from stallion Laudanum (xx) and the third from Holstein stallion Lord (Ladykiller xx – Viola by Cottage son xx).

CONCLUSIONS

The most numerous group in among the classified horses were kwpn's (613 specimens), yet Westphalian horses obtained the best results ($\bar{X} = 144.5$ pts.). Together with Belgian and Danish horses they were statistically better than other breeds in the average points obtained in the ranking.

As for average number of ranking points stallions were better than mares and geldings, however, the differences between sexes of the horse groups were not statistically significant.

It was concluded that the most numerous group of horses was 9–11 years-olds, whereas the best sports results were obtained by the specimens aged 11–15.

Belgian Darco and Dutch Heartbreaker were fathers of the largest number of classified jumping horses (63 and 49 respectively), whereas, the best in terms of performance were stallion Emilion (kwpn) and Westphalian Polydor.

As a result of the research, it can be stated that contemporary jumping horse breeding is primarily based on Holstein father lines („C₁”, „C₂”, „L”, „Q”) originating from a common ancestor Darley Arabian (oo), what is proved in the research by other authors [Thorén-Hellsten *et al.* 2008].

REFERENCES

- Dubois C., Ricard A., 2007. Efficiency of past selection of the French Sport Horse, Selle Français breed and suggestions for the future. *Livest. Sci.* 112, 161–171.
- Ducro B.J., Koenen E.P.C., Tartwijk J.M.F.M., Bovenhuis H., 2007. Genetic relations of movement and free-jumping traits with dressage and show-jumping performance in competition of Dutch Warmblood horses. *Livest. Sci.* 107, 227–234.
- Gómez M.D., Cervantes I., Bartolomé E., Molina A., Valera M., 2006. Genetic evaluation of show jumping performances in young spanish sport horse breed. Book of abstracts or the 57th annual meeting of the EAAP, 17–20 of September 2006, Antalya, 351.
- Janssens S., Geysen D., Vandepitte W., 1997. Genetic parameters for show jumping in Belgian sporthorses. 48th Annual Meeting of the EAAP, 25–28 of August 1997, Vienna, 25–28.

- Marsalek M., Blazkova K., Sedlackova M., Kasna E., 2010. Evaluation of improvement in jumping ability of young horses. *Livest. Sci.* 1, 1–8.
- Ruhlmann C., Bruns E., Fraehr E., Koenen E.P.C., Philipsson J., Janssens S., Quinn K., Thorén E., Ricard A., 2006. Connectedness between 7 European countries for horse jumping competition, the Interstallion pilot project II. 57th Annual Meeting of the EAAP, 17–20 of September 2006, Antalya.
- Silvestrelli M., Lucchetti L., Scacco L., Buttazzoni L., Pieramati C., 2007. Application of an AM-BLUP to the station test results of Italian Saddle horse stallions. *Ital. J. Anim. Sci.* 6, 208–210.
- Tavernier A., 1991. Genetic evaluation of horses based on ranks in competitions. *Genet. Sel. Evol.* 23, 159–173.
- Thorén Hellsten E., Jorjani H., Philipsson, J., 2008. Connectedness among five European sport horse populations. *Livest. Sci.* 118, 147–156.
- Thorén Hellsten E., Viklund Å., Koenen E.P.C., Ricard A., Bruns E., Philipsson, J., 2006. Review of genetic parameters estimated at stallion and young horse test and their correlations with later results in dressage and show-jumping competition. *Livest. Sci.* 103, 1–12.
- Wallin L., Strandberg E., Philipsson J., 2003. Genetic correlations between field test results of Swedish Warmblood Riding Horses as 4-year-olds and lifetime performance results in dressage and show jumping. *Livest. Sci.* 82, 61–71.
- Zurovacová B., 2008. Performance of Slovak show jumping horses evaluated using BLUP – *Anim. Model. J. Agrobiol.* 25, 1–4.

Streszczenie. Celem pracy była analiza wyników pochodzenia koni sklasyfikowanych w rankingu Międzynarodowej Federacji Jeździeckiej (FEI) w dyscyplinie skoków przez przeszkody. Zbadano 3303 konie sportowe, które w okresie od 1 stycznia 2008 r. do 30 września 2009 r. startowały w zawodach rangi międzynarodowej i osiągnęły wyniki pozwalające im znaleźć się w wymienionym rankingu. Wykorzystując analizę wariancji (ANOVA GLM), określono wpływ rasy, wieku i płci na liczbę punktów rankingowych. Stwierdzono, że najliczniejszą grupę rasową stanowiły konie kwpn (613 sztuk), jednak najlepsze wyniki osiągnęły konie westfalskie ($\bar{X} = 144,5$ pkt.), które wraz z końmi belgijskimi i duńskimi pod względem średniej liczby punktów rankingowych były w wielu przypadkach istotnie statystycznie lepsze od innych grup rasowych koni. Stwierdzono także, że współczesna hodowla koni startujących w dyscyplinie skoków przez przeszkody jest głównie oparta na holsztyńskich liniach ojcowskich („C1”, „C2”, „L”, „Q”) wywodzących się od wspólnego przodka czystej krwi arabskiej (Darley Arabian).

Słowa kluczowe: konie, skoki przez przeszkody, wartość użytkowa