

EVALUATION OF CZECH WARM-BLOOD STALLIONS BASED ON PERFORMANCE OF THEIR DAUGHTERS

Barbora Kubištová¹, Iva Jiskrová¹, Zuzana Kubíková¹

¹Department of Animal Breeding, Mendel University in Brno, Zemědělská 1, 613 00 Brno, Czech Republic

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Abstract

The objective of the present study was to assess the Czech warm-blood stallions based on results of basic performance tests of their daughters. We evaluated 1140 daughters of 51 fathers. On the basis of calculations we eliminated the following effects: year of the test, registration of the mare in the appropriate section of the Stud Book and group of commissioners. Data were evaluated using the GLM procedure and included the effect of the stallion, year of the performance test of the mares and filing in the respective section of the Stud Book. We discovered that the impact of all three effects was statistically significant. The effect of the stallion was just below the margin of significance $P \leq 0.05$, the other two effects were below $P \leq 0.01$. We compared the stallions – fathers, according to the average performances of their daughters in the basic performance tests. The performances of daughters of stallions 1850 Cannavaro, 2901 Lancelot, 1659 Jimtown, 1028 Manillon Rouge and 1053 Guidam Sohn were the highest; the performances of daughters of stallions 1260 Askano-T, 718 Mineral 1599 Norman, 2726 Cartouche and 1358 Lord Caletto were the lowest.

Keywords: horses, Czech warm-blood, mare performance tests, stallions, mares

INTRODUCTION

Recently we have seen a considerable increase in the numbers of horses. Mares performance tests of mares filed in the Stud Book Code of Czech warm-blood horses are an important method used to mare performance test of Czech warm-blood horses. Mares of the age of 3 years have to undergo this test; it is a selective test for the mares and at the same time it is the first piece of information about their performance that the breeder obtains (Svaz chovatelů českého teplokrevníka 2016).

Other methods of selection in the breeding of the Czech warm-blood horse are the following: rating

on registration of foals; foal shows; enter into the Stud Book; the above-mentioned performance tests of mares; mare shows; jump in freedom of 4-year-old mares; criteria of young horses; own sport performance; and information about the offspring (Svaz chovatelů českého teplokrevníka 2016).

At the present time, according to Jiskrová (2017), the results of sports tests is the only method that can be applied to assess the breeding value of the Czech warm-blood stallions which go in for breeding. The term assessment of the breeding value, in fact, means that we estimate how the horse is genetically disposed of for its performance to

depart from the average performance of its peers. At the present amount of available data it is not possible to establish the genetic disposition for the horse's performance. However, what we can identify are the differences in performance that are caused by the genetic disposition.

Subsequently, the elaborated and evaluated results of the individual methods applied to test performance should be used for progeny testing which shows the degree to which the stallion passes on its traits to the offspring (Svaz chovatelů českého teplokrevníka 2016). Dušek (2011) characterised heredity as the ability to preserve and transfer specific traits to the future generation. Differences exist among individuals which are characterised as unstableness as a result of exogenous factors.

The body conformation and performance of the horse must be evaluated consistently if we are to breed high-quality horses; only horses which meet the required breeding standard should be entered in the top sections of the Stud Book. In 2013 it was therefore explicitly specified that to be entered in the Main Stud Book the mare must win more than 7.1 points in the mare performance test (Civišová 2015). The Stud Book Code for the Czech warm-blood divides the Stud Book into sections. The Main Stud Book should contain ratings between 7.1 and above. A component of the Main Stud Book is the higher section, i.e. The Main Stud Book tested at a higher level where the rating is around 8.1. At the same time these mares accomplish the so-called Acceleration Programme which we shall specify later. The ratings of the next section of the Stud Book range between 6.1 and 7.09. The bottom section of the Stud Book is the Subsidiary Stud Book with a rating of 6.09 and lower down are mares which failed the basic performance test. Or mares that have 2 generations of pedigree and their withers height is 156 cm or less (Svaz chovatelů českého teplokrevníka 2016).

The above mentioned Acceleration Programme is a selective programme and its objective is to accelerate selective work in breeds of sport horses and to create a so-called pedigree core – horses of tested sport performance and high-quality lineage. Jiskrová (2014) evaluates this programme positively. The intention to create a pedigree core proved to be a success and it can be said that the Acceleration Programme is an efficient breeding tool for the Czech warm-blood.

MATERIALS AND METHODS

We monitored the effect of Czech warm-blood stallions on the performance of their daughters.

This is one possibility of progeny testing of the performance of the Czech warm-blood breed. The basic database contained 1140 mares by 51 stallions. We also monitored the years 2012–2017 when the basic performance tests were conducted. After passing these tests the mares were filed in one of the four sections of the Stud Book.

The data were fed into the database manually and consisted of the year of the basic performance test, year of birth of the mare, number and name of the stallion, entry of the mare in the respective section of the Stud Book, point rating of the mare in the mare performance test and group of commissioners.

In the GLM model we incorporated the following effects according to the equation:

$$Y_{ijklmnop} = \mu + S_i + C_j + a_k + e_{ijkl}$$

where:

y_{ijkl} = evaluated quantity

μ = total average

s_i = fixed effect of the i th year of the basic performance test ($i = 2012, \dots, 2017$)

c_j = fixed effect of the j th father ($j = 1, \dots, 51$)

a_k = fixed effect of the k th section of the Stud Book ($k = 1, \dots, 4$)

d_l = fixed effect of the l th group of commissioners. ($l = 1, \dots, 79$)

By multiple comparisons using the Tukey-B test we specified the concrete differences between the pairs of the years of the basic performance tests, fathers, Stud Book and group of commissioners.

Among the monitored effects, we could not include other effects that are usually monitored, such as the year of birth, or age (all mares pass the basic performance test at the age of 3 years) and naturally neither the sex (only mares).

In our study, we monitored only fathers who had seven or more daughters filed in the database. Since we did not want to lose any data we grouped the stallions that had less than seven daughters into one big unit.

RESULTS AND DISCUSSION

Three effects were monitored; we were interested above all in the effect of the father based on the GLM model. The results are given in (Tab. I).

The effect of the year of the basic performance test and the section of the Stud Book are highly statistically significant, while the effect of the father is statistically significant only at the level of significance of $P \leq 0.05$. Still, we tried to check

I: *Effect of the year of basic performance test, the father and section in the Stud Book on performance of mares in the basic performance test and groups of commissioners.*

Source of variability	Average square	Significance
Constant	67652.717	0.0000
Year of basic performance test	0.281	0.0000
Number of father	0.074	0.0257
Number of Stud Book	195.862	0.0000
Group of commissioners.	0.071	0.0719

II: *Average values of performance of daughters in mare performance tests based on the individual fathers*

Name of stallion	Number of daughters	Average results of performance of daughters in basic performance tests
1260 Askano-T	9	6.9767
718 Mineral	12	7.2967
1599 Norman	9	7.2989
2726 Cartouche	11	7.3036
1358 Lord Caletto	22	7.4564
2609 Przedswit Klam	12	7.4817
2840 Ladinos	8	7.4863
2746 Dantes	13	7.4908
2745 Oscar	8	7.5163
2782 Ballast	8	7.5200
1577 Con Me	9	7.5311
1744 Christon	15	7.5313
582 Caesar	9	7.5689
1154 Quick Lauro Z	29	7.5738
1015 Cyril	9	7.5778
1054 Limited	10	7.5830
1498 Carpalo	20	7.5870
1614 Gin Fizz IV	10	7.6270
1359 Colato R	23	7.6600
2997 Aristo Z	78	7.6627
1468 El Paso II	10	7.6660
2890 Eibisch II	13	7.6692
2805 Le Patron	16	7.6813
900 Landino	8	7.6838
1879 Clin d'Or ČT	10	7.6960
Less than 7	386	7.6989
1161 Tiznit (FR) xx	16	7.6994
1345 Heartbreak ZH	14	7.7207
2906 Federweisser	18	7.7267
1477 Flyinge Garibaldi 901	11	7.7336
2904 Przedswit Rufa	10	7.7540
577 Rock'n Roll	17	7.7547

Name of stallion	Number of daughters	Average results of performance of daughters in basic performance tests
1478 Cool Paradise	10	7.7630
411 Comero	9	7.8156
6055 Scyris (POL) xx	18	7.8189
1167 Favory	8	7.8263
1069 Beethoven	9	7.8422
1259 Cry For Me	14	7.8436
704 Amio	10	7.8470
2640 Radegast	22	7.8505
895 Phill	8	7.8513
1085 Cascavello	10	7.8580
953 Conway-T	20	7.8605
907 Curier Carilex	12	7.8667
1321 Catango HT	8	7.9400
1028 Manillon Rouge	35	7.9460
2765 Cassilius	23	7.9500
1360 Drosselklang II	21	7.9557
1053 Guidam Sohn	18	7.9617
1659 Jimtown	8	7.9950
2901 Lancelot	12	8.0283
1850 Cannavaro	11	8.2436

the data of the fathers in the following test and here the significance among the pairs did not appear. All the same it is the evaluation of the fathers that we are primarily interested in and so we present a table of the averages – see (Tab. II). The influence of the groups of commissioners proved to be statistically inconclusive.

The results given in (Tab. II) are very interesting. On the one hand we discovered which stallions are the improvers and which stallions degrade the breed. At the top of the list are the five following fathers: 1850 Cannavaro, 2901 Lancelot, 1659 Jimtown, 1028 Manillon Rouge and 1053 Guidam Sohn.

Evain (2009) mentions the father of the 1028 Manillon Rouge stallion – like Papillon Rouge after Jalisco B from Verboise's mother. Papillon Rouge was the winner of international competitions. He earned 2 500 000 F for the win. He is the father of many excellent stallions and international winners. Melissen and Remijns (2007) show more detailed achievements in origin as follows. Grandfathers of stallion Manillon Rouge s.v. was the extraordinary sports horse Jalisco B who had been celebrating his sporting career at world arenas also participated in the Olympic Games. He became the most successful follower of the Alme (SF) line.

Another breeding stallion is 1053 Guidam Sohn. Eylers and Schridde (2007) describe the origin of Guidam Sohn as follows. Guidam Sohn's father is the KWPN stallion Guidam, was also successful in the international jumping sport with performance 1.60m (Erich van der Vleuten). He won the GP Goes, Hasselt, Mechelen, Zuidlaren or 13th place in GP CSIO San Gallen, but soon began to promote himself as a prominent father of jumping horses. Guidam is said to have all the genetic qualities of his father, Quidam de Revel, in addition to transferring a better rideability to the offspring.

At the bottom of the list are 1260 Askano-T, 718 Mineral 1599 Norman, 2726 Cartouche and 1358 Lord Caletto; these stallions impair the breed considerably. For instance, stallion 2901 Lancelot is an unambiguous improver with a very high breeding value. In our opinion, the breeder should use such an excellent stallion much more.

Moreover, the data on the daughters are also interesting. The most frequently used stallion is 2997 Aristo Z, a stallion successful both in terms of high-quality offspring and particularly in its popularity among breeders. However, the results of its daughters in mare performance tests are only average and are probably influenced by the high

III: Average data on daughters in the mare performance tests according to the sections of the Stud Book

Group	Number of daughters	Average	PPK	PK	HPK	HPK AP PRO
PPK	16	0.3030		**	**	**
PK	47	6.8347	**		**	**
HPK	767	7.6267	**	**		**
HPK AP PRO	315	8.2675	**	**	**	

Legend: ** = $P \leq 0.0$, PPK – auxiliary Stud Book, PK – Stud Book, HPK – main Stud Book. HPK AP PRO – main Stud Book Acceleration program performed.

IV: Average values of daughters in the basic performance tests according to the year of the test

Year of basic performance test	Number of daughters	Average	2012	2013	2014	2015	2016	2017
2012	212	7.7190				**		
2013	232	7.5983				**		**
2014	191	7.7175				**		
2015	98	7.1269	**	**	**		**	**
2016	181	7.6603				**		
2017	138	7.9320		**		**		

Legend: ** = $P \leq 0.01$

numbers of daughters, showing variability in both directions; the average then is not very high. Some 386 stallions did not have seven and more offspring.

In order to classify the stallions as improvers or those that impair the breed it is important to know how many points their daughters obtained to be entered in the respective sections of the Stud Books; see (Tab. III).

The (Table 3) shows that the sections of the Stud Book differ from each other statistically significantly and this fact requires no comment because, naturally, it was predictable. The zero value of mares in the auxiliary Stud Book means that these mares failed the basic performance tests and won no points. The Czech warm-blood breeding book includes mares in the PPK group that did not perform the test or were excluded without

result. If the average points of daughters entered in the main Stud Book was 7.62, we assume that stallions with more points are improvers. Based on these facts stallions 1850 Cannavaro and 2901 Lancelot are outstanding individuals. The average of their daughters is a write of these mares into the main Stud Book and acceleration programme.

In terms of the average performance of daughters in the basic performance test based on the year when the test was conducted, without any comment we present the last Tab. giving the results of multiple comparisons; see (Table 4). The plain fact is that the conditions in the individual years probably differed (weather etc.) In order to eliminate this effect we had to include the year of the basic performance test and the group of commissioners in the GLM model.

CONCLUSION

In the present paper, we verified the possibility of applying the results of the basic performance test to test the performance of the Czech warm-blood horse. The method commonly used at the present time is more perfect for rating the genetic quality of the fathers – estimation of the breeding value. In fact of the Czech warm-blood, although it is based on the sport performance of the horses. In the Czech Republic evaluations of breeding tests have not yet been included in estimations of the breeding quality. In actual fact our research based on the results of basic performance tests is original. It shows that the effect of fathers on the performance of daughters in the basic performance tests is statistically significant; we consider this information to be of principal importance. We were very

interested in the influence of the commissioners, which turned out to be statistically inconclusive, we evaluate this result as positive for the breeding of the Czech warmblood.

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Contact information

Barbora Kubištová: xkubist2@node.mendelu.cz