

# SOME EFFECTS ON THE PERFORMANCE OF THE CZECH WARM-BLOOD HORSE IN THE HORSE BREEDING STATION (ŠCHK) – MĚNÍK

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## Abstract

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Using the Excel programme a database was created of 332 horses born at the horse breeding station (ŠCHK) – Měník after 1 August 1993. The database was transferred to the Unistat 6.5 programme and by means of the linear model GLM evaluated were some effects on horse performance in the horse breeding station (ŠCHK) – Měník. For the evaluation of breeding activities we selected a few important effects on the herd, i.e. sex, father (line), mother (family) and year of birth. For each horse of the database we identified the basic measurements, results from the score on entry into the studbook and performance tests. The database included a total of 15 homogeneous families and their numerous offspring. The following stallions influenced the herd: 366 Taarlo, 616 Erudit, 2626 Sahib Kubišta, 525 Tarlo Kubišta, 1004 First Bride, 2805 Le Patron, 630 Przedswit Makebo, 1028 Manillon Rouge and 2640 Radegast. Rating based on the variable score on entry into the studbook and the basic performance test was statistically the highest in 1994. In dependence on the basic performance test the rating of stallion 1028 Manillon Rouge was the highest with an average of 7.8 scores. The families Forma and Gama S reached the statistically significantly highest scores for the dependent variables of the testing rearing house and heart girth. The mares have a statistically significantly larger heart girth than the stallions. Stallion 2640 Radegast had a bone diameter of 22 cm which was statistically significantly the highest rating; stallion 616 Erudit had the lowest rating.

Keywords: horse, stallion, mare, horse breeding, Czech warm-blood, basic performance test.

## INTRODUCTION

Horse breeding stands at the beginning of the imaginary pyramid of development of the horse of today serving the general public's leisure time or as a special-purpose horse, usually as a sports or working horse. If we are to understand the importance of horse breeding in the broadest sense of the word we must look into the history of breeding. For this purpose we selected the Czech warm-blood horse from the breeding station (ŠCHK) – Měník, a station with a long tradition in horse breeding. The person who founded the breeding herd in Měník, now the breeding station ŠCHK – KUBIŠTA Ltd., is the outstanding Czech breeder Josef Kubišta.

Misař (2011) stated that the objective of the breeding was a noble warm-blooded horse with a wide stride and balanced gait. Dušek (1992) added that the objective was to breed a versatile utility horse of a predominantly riding type; therefore, the herd was gradually upgraded with sires of improved breeds. Misař (2011) described the gradual formation of a herd of breeding mares based on the original Czech warm-blood horse. The original herd consisted of 3 daughters of the Kladruby stock stallion Alarm, 2 mares from the line based on the original Oldenburg stallion Genius and 2 daughters of sires of the Kladruby warm-blood herds (8 Gidran VII and 30 Furioso XVII). After 1970 the 1109 Protěž was added to

the herd, the daughter of the English thoroughbred Varin, and 1111 Hala after Biskaj, whose mother was the original mare from Pohořelice.

Dušek (1992) mentioned other foundation mares which had a considerable effect on the formation of the herd and whose families exist up to the present day. We must not forget to mention the mares 68 Lecha, Lucka, Gama, Jiskra. Perhaps the most merited mother was Čajka who reared 16 foals among which were two sires – 39 Alarm Bydžovský and 110 Hubertus of Humburg.

Other families that are still in this herd are the following: Forma, 38/49 Maruna, VČ 135 Alma, 70 Gamu S, 43 Flopa, Vč 160 España, VČ 1155 Gama, 95 Kolibra, Jitřenka, 25/145 Ascona and the youngest family 41/535 Linda. In this study we will evaluate their offspring.

In the following years, specifically in 1988, the stallion 366 Taarlo was imported into the breeding herd of horses in Měník and had a substantial effect on breeding and structure of the herd (Sixta, 2006). Other stallions which had a great effect on horse breeding in Měník are the imported stallion from the French stud farm Haras de Rouge 1028 Manillon Rouge of the Selle Français breed, the stallion which comes directly from the Měník herd, i.e. 2626 Sahib Kubišta, champion of the Velká Pardubická race, stallion 616 Erudit, the latter is a Budyonny horse. Another Selle Français stallion imported from France is 1004 First Bride. The objective of the present study was to evaluate the breeding efforts and breeding activities at the Horse Breeding Station (ŠCHK) – Měník in the period 1993–2013.

## MATERIAL AND METHODS

The database was based on a population of 332 horses born in the period 1993–2013. The data were obtained from the internal documentation of the breeding station (ŠCHK) – Měník and were entered into the programme Microsoft Excel. Other data that were used to obtain information about the respective horses were data from

the online stud book of the Association of the Czech Warm-Blooded Horse Breeders (SCHČT). Each of the horses entered in the database was given: a name, registration number, year of birth, family, sex, results of basic performance tests, results of rating on entry, stick-measure, heart girth, bone, father and mother. The dependent variables were the following: results of basic performance tests and rating on entry in stud book, stick-measure, heart girth and bone. The year of birth, family, sex, and father were specified as the source of variability. To assess the results we used the general linear model GLM in the Unistat 6.5 programme and following tests using the Tukey-BV test; in the case of a statistically significant effect the differences in values were determined by multiple comparisons using the Tukey-B test at the level of significance of  $P < 0.05$  and  $P < 0.01$ .

The respective families were divided into 14 groups. Group 9 consisted of families with only a small number of own offspring. Group 10 consisted of families which did not come from the herd of the Měník breeding station. Sex was indicated by numbers: 1 = stallion and 2 = mare. In total 23 fathers were tested and were given numbers 1 to 23; number 15 are fathers with less than 3 offspring.

## RESULTS AND DISCUSSION

The first are results of the Tukey-B test – multiple comparisons of the year of birth and offspring of stallions based on the **rating on entry**. The **rating on entry** is the total rating for mechanics of movement and body conformation. The mares are rated prior to the basic performance test, on entry into the stud book. The mechanics of movement and body conformation of the stallions were also rated during in-hand shows at the testing rearing house. The rating on entry was the highest in 1994 with an average of 7.8 scores. By contrast the worst was in 2008 with an average of 7.1 scores. The following Tab. I shows highly statistically significant differences among the respective years.

I: Statistical comparisons of the respective years based on rating on entry

| Year | Ø<br>Rating<br>on entry | 2008 | 1996 | 2002 | 1998 | 2003 | 1997 | 2001 | 1999 | 1994 |
|------|-------------------------|------|------|------|------|------|------|------|------|------|
| 2008 | 7.1                     |      |      |      |      |      |      |      |      | **   |
| 1993 | 7.2                     |      |      |      |      |      |      |      |      |      |
| 1996 | 7.2                     |      |      |      |      |      |      |      |      | **   |
| 2002 | 7.2                     |      |      |      |      |      |      |      |      | **   |
| 1998 | 7.2                     |      |      |      |      |      |      |      |      | **   |
| 2003 | 7.3                     |      |      |      |      |      |      |      |      | **   |
| 1997 | 7.3                     |      |      |      |      |      |      |      |      | **   |
| 2001 | 7.3                     |      |      |      |      |      |      |      |      | **   |
| 1999 | 7.3                     |      |      |      |      |      |      |      |      | **   |
| 1994 | 7.8                     | **   | **   | **   | **   | **   | **   | **   | **   | **   |

\*\* highly statistically significant difference  $P < 0.01$ .

II: Statistical comparisons of the stud horses based on rating on entry.

| Father         | Ø<br>Rating on entry | Le Patron | Sahib Kubišta | Manillon Rouge | Taarlo |
|----------------|----------------------|-----------|---------------|----------------|--------|
| Le Patron      | 7.2                  |           |               |                | **     |
| Sahib Kubišta  | 7.3                  |           |               | **             | **     |
| Manillon Rouge | 7.5                  |           | **            |                |        |
| Taarlo         | 7.8                  | **        | **            |                |        |

\*\* highly statistically significant difference  $P < 0.01$ .

Tab. II shows highly statistically significant differences between the fathers and their offspring in the rating on entry. The rating of the offspring of stallion 366 Taarlo was the highest, the average was 7.8 scores. Sixta (2006) described stallion 366 Taarlo as follows; he represented the breed KWPN, predominating in his father's pedigree were elements of the Holstein horse. He belongs to the traditional Holstein line Rittersporn – Ramzes. The mother of Ramzes was 532 Shagya X-3. Misař (2011) maintained that this fact could have a positive effect on the further breeding of the herd in Měník because of the representation of Shagya XV in the pedigree of the mares which formed the breeding herd. The rating of the offspring of stallion 2805 Le Patron was the worst averaging 7.2 scores.

Results of the Tukey-B test were next, presenting multiple comparisons of the years and offspring of the stallions depending on the resulting rating of the **basic performance test**; this is the total rating for the basic performance test. Evaluated were the following: mechanics of movement, inherent aptitudes, willingness to work and temper, jumping aptitude and readiness. Stallions pass this test after they finish in the testing station. Tab. III shows that there were highly statistically significant differences

among the years. Here again the rating of the year 1994 was the highest with an average score of 8 for the basic performance test. In the herd we see successors of some mares born in 1994 and this fact could be a guarantee of the quality of the breeding herd. This result bears evidence of the importance of maintaining the families in the herd.

Tab. IV shows that there are statistically significant differences among the stallions and at the same time confirms the quality of stallions 1028 Manillona Rouge and 1004 First Bride with 7.8 scores for the offspring in basic performance tests. The pedigree of these stallions is Selle Français. Kuřítková (2011) claims that efforts are made to eliminate by selection horses of poor performance and rideability from Selle Français herds and the emphasis is particularly on the willingness of the horse to cooperate with the rider. Kubištová (2016) evaluated the offspring of stallion 1028 Manillona Rouge, which could not be tested for sports due to injury the horse had suffered at 2 years of age, as balanced offspring with excellent results that are highly statistically significant compared to other stallions.

The third results presented are results of the Tukey-B test showing multiple comparisons of families depending on the **stick-measure**.

III: Statistical comparisons of the years based on the rating of the basic performance test

| Year | Ø Basic<br>performance<br>test | 2000 | 1998 | 2002 | 1997 | 1999 | 2008 | 2009 | 1996 | 2001 | 2007 | 2006 | 2011 | 2013 | 1994 |
|------|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2000 | 7                              |      |      |      |      |      |      |      |      |      | **   | **   | **   | **   | **   |
| 1998 | 7.1                            |      |      |      |      |      |      |      |      |      |      | **   | **   | **   | **   |
| 2002 | 7.11                           |      |      |      |      |      |      |      |      |      |      | **   | **   | **   | **   |
| 1997 | 7.11                           |      |      |      |      |      |      |      |      |      |      | **   | **   | **   | **   |
| 1999 | 7.11                           |      |      |      |      |      |      |      |      |      |      |      | **   | **   | **   |
| 2008 | 7.2                            |      |      |      |      |      |      |      |      |      |      |      |      |      | **   |
| 2009 | 7.4                            |      |      |      |      |      |      |      |      |      |      |      |      |      | **   |
| 1996 | 7.4                            |      |      |      |      |      |      |      |      |      |      |      |      |      | **   |
| 2001 | 7.4                            |      |      |      |      |      |      |      |      |      |      |      |      |      | **   |
| 2007 | 7.7                            | **   |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2006 | 7.8                            | **   | **   | **   | **   |      |      |      |      |      |      |      |      |      |      |
| 2011 | 7.9                            | **   | **   | **   | **   | **   |      |      |      |      |      |      |      |      |      |
| 2013 | 7.9                            | **   | **   | **   | **   | **   |      |      |      |      |      |      |      |      |      |
| 1994 | 8                              | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   |

\*\* highly statistically significant difference  $P < 0.01$ .

## IV: Statistical comparisons of the stud horses based on the rating of the basic performance test

| Father         | Ø basic performance test | Landprinz | Sahib Kubišta | Taarlo | Manillon Rouge | First Bride |
|----------------|--------------------------|-----------|---------------|--------|----------------|-------------|
| Ladnprinz      | 7.1                      |           |               |        | **             |             |
| Sahib Kubišta  | 7.2                      |           |               | **     | **             | **          |
| Taarlo         | 7.7                      |           | **            |        |                |             |
| Manillon Rouge | 7.8                      | **        | **            |        |                |             |
| First Bride    | 7.8                      |           | **            |        |                |             |

\*\* highly statistically significant difference  $P < 0.01$ .

The ratings of the family Forma and family Gama S were the highest with average stick-measures of 172 cm and 171 cm, respectively. The ratings of the families Jitřenka and Ascona were the worst. These results are highly statistically significant and confirm that the stick-measure is dependent on the family.

The fourth results presented are results of the Tukey-B test with multiple comparisons of the family and sex depending on the **heart girth**. The heart girth is directly related to health, performance of the horses, and also to maternity. In his article Štěrba (2017) confirms the importance of the family and claims that it is the mother – the mare, that is more important in the entire process of breeding. Her share in the creation and development of a new individual and its characters is much greater – he claims that the share of the mother in the creation of a new individual is double – on the one hand through her ovum, and then the fact that she is a kind of mentor in the prenatal, and

particularly in the postnatal development. On the basis of the statistically significant results shown in Tab. VI we can say that mares of the families Forma and Flopa have all the qualifications required for them to be good mothers. The statistically significant results for stallions and mares given in Tab. VII confirmed that the breeding activities are correct and that they are in accordance with the breeding objective for the Czech warm-blooded horse.

The fifth are results presented are results of the Tukey-B test with multiple comparisons of sex and offspring of stallions based on the **bone**. Dušek (2011) described the bone as a direct indicator of the strength of the skeleton, and that is why it is monitored in all herds. If the strength of the skeleton is weakening then measures must be taken and the damage amended. The results in Tab. VIII are on the margin of the objective of breeding the Czech warm-blood, therefore the breeder should take these results into account when working out

## V: Statistical comparisons of the families in dependence on their stick-measure

| Family   | Ø Stick-measure in cm | Jitřenka | Ascona | Flopa | Gama | Kolibra | España | Maruna | Alma | Lecha | Gama S | Forma |
|----------|-----------------------|----------|--------|-------|------|---------|--------|--------|------|-------|--------|-------|
| Jitřenka | 163                   |          |        |       |      |         |        | **     | **   | **    | **     | **    |
| Ascona   | 164                   |          |        |       |      |         |        |        |      |       | **     | **    |
| Flopa    | 164                   |          |        |       |      |         | **     | **     | **   | **    | **     | **    |
| Gama     | 164                   |          |        |       |      |         | **     | **     | **   | **    | **     | **    |
| Kolibra  | 164                   |          |        |       |      |         |        |        |      |       | **     | **    |
| España   | 165                   |          |        |       |      |         | **     | **     | **   | **    | **     | **    |
| Maruna   | 169                   | **       |        | **    | **   |         | **     |        |      |       |        |       |
| Alma     | 169                   | **       |        | **    | **   |         | **     |        |      |       |        |       |
| Lecha    | 169                   | **       |        | **    | **   |         | **     |        |      |       |        |       |
| Gama S   | 171                   | **       | **     | **    | **   | **      | **     | **     | **   | **    | **     | **    |
| Forma    | 172                   | **       | **     | **    | **   | **      | **     | **     | **   | **    | **     | **    |

\*\* highly statistically significant difference  $P < 0.01$ .

## VI: Statistical comparisons of the families in dependence on their heart girth

| Family | Ø Heart girth in cm | Gama | Flopa | Forma |
|--------|---------------------|------|-------|-------|
| Gama   | 185                 |      |       | **    |
| Flopa  | 186                 |      |       | **    |
| Forma  | 193                 | **   | **    |       |

\*\* highly statistically significant difference  $P < 0.01$ .

the mating plans for the future to avoid undue weakening of the constitution.

The statistically significant differences among the stallions given in Tab. IX confirmed that the decision to incorporate stallion 2640 Radegast into the mating plans in order to sustain the good quality of the bones was right. Unfortunately at the end of 2016 the stallion died. Sixta (2006) described this stallion as follows: chestnut, harmonious conformation, a sports jumping type whose performance was passed down to

the offspring. The show jumping performance of the horse was at degree "T T". His asset was an excellent pedigree with the blood of successful stallions Ramiro, Absatz and Wendekreis constituting the present Hanoverian herd. Proof of its potential and importance in the herd was information gleaned from the studbook of the Association of Czech Warm-Blooded Horse Breeders On-line (2017); the studbook includes a total of 192 offspring whose show jumping performance is as high as degree "T".

VII: *Statistical comparisons of sex in dependence on the heart girth*

| Sex       | Ø Heart girth in cm | stallions | mares |
|-----------|---------------------|-----------|-------|
| Stallions | 186                 |           | **    |
| mares     | 189                 | **        |       |

\*\* highly statistically significant difference  $P < 0.01$ .

VIII: *Statistical comparisons of sex in dependence on the bone*

| Sex       | Ø Bone in cm | stallions | mares |
|-----------|--------------|-----------|-------|
| Mares     | 20.5         |           | **    |
| stallions | 21.5         | **        |       |

\*\* highly statistically significant difference  $P < 0.01$ .

IX: *Statistical comparisons of the stud horses in dependence on their offspring and bone.*

| Father         | Ø Bone in cm | Erudit | Manillon Rouge | Radegast |
|----------------|--------------|--------|----------------|----------|
| Erudit         | 20           |        | **             | **       |
| Manillon Rouge | 21           | **     |                |          |
| Radegast       | 22           | **     |                |          |

\*\* highly statistically significant difference  $P < 0.01$ .

## CONCLUSION

At the beginning of targeted and systematic work with the horse is the selection of parents, the conformation, temperament and performance of which are deemed suitable for the conception of a new offspring which should reflect the positive talents and gene pool of the parents and to carry these characters. It is through the selection of the sire and dam that the breeder indirectly influences the future development of the individual and the herd. The greatest drawback in horse breeding is the long generation interval. For that reason the results of the present study are important in order to be able to decide whether breeding work carried out since 1993 has been suitable, whether it has been directed in the right direction and whether it was in accordance with the present demands of the horse market.

Statistically the rating of the year 1994 was the highest based on the entry in the stud book and basic performance test. Results of tests of stallions based on entry in the stud book and basic performance tests showed that the offspring of stallion 1028 Manillon Rouge was the best and well-balanced with an average basic performance test of 7.8 scores. We can therefore say that this stallion passes his qualities, such as temperament, rideability and performance to the offspring. The results for stallion 366 Taarlo were also very good. Owing to this we can state that the decision to combine these stallions in the pedigrees of the mares was right. In further tests of the dependent variables of stick-measure and heart girth the families Forma and Gama S achieved the best results which prove how important it is to preserve the families. Mares have a statistically significantly larger heart girth than the stallions, these results confirming that the breeding goal had been observed. In this case the heart girth of the mares was 189 cm. The diameter of the bone of stallions is statistically significantly larger than that of the mares, i.e. 21.5 cm and 20.5 cm in stallions and mares respectively. This result may seem to be satisfactory but the breeder at the Horse Breeding Station – Měňík must pay attention to the risk of the weakening of the skeleton. Statistical comparisons of the respective stallions based on their bone

showed that the bone diameter of stallion 2640 Radegast was 22 cm what is the best result. It means that the offspring of this stallion will inherit his bone structure which is desirable for the warm-blood herd. The bone diameter of stallion 1028 Manillon Rouge was 21 cm. A combination of these stallions could meet the demands of the present market, such as correctness, boniness, temperament, rideability and performance. Results of the present study confirmed that the horse breeding activities at the Horse Breeding Station – Měník were correct.

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