Effect of Polish and foreign purebred Arabian stallions on conformation traits of their progeny participating in shows in the last decade

Wpływ polskich i zagranicznych ogierów czystej krwi arabskiej na cechy pokroju potomstwa biorącego udział w pokazach w ostatnim dziesięcioleciu

Rafał CZARNECKI*

Department of Poultry Breeding and Animal Material Evaluation, University of Technology and Life Sciences, ul. Mazowiecka 28, 85-084 Bydgoszcz, Poland, *correspondence: r.czarnecki@poczta.onet.pl

Abstract

Observations confirm correctness of the statement that the best recommendation for a stallion is his progeny. The aim of this study was indicating purebred Arabian stallions passing on to their progeny best conformation traits, assessed in Polish shows, in the past decade, taking into consideration their origin. The analysis included national and foreign stallions used in Polish breeding of purebred Arabian horses, which are fathers of at least 5 heads of progeny. The author's own research proved that progeny of foreign stallions statistically differed significantly from the progeny sired by Polish stallions within all conformation traits tested in shows. In the studied period, the highest final score (91.37 points) and note for the trait 'type' (19.11 points) was characteristic of the progeny of QR Marc. The best head was passed on by stallions: QR Marc (19.06 points) and WH Justice (18.78 points), born in the United States and owned by the European breeders. In the Top Ten of producers passing on a refined head to their progeny, there was only one Polish stallion bred in the Horse Stud Michałów, Ekstern (18.29 points). Progeny with the most correct body structure was sired by foreign stallions, Eden C (18.13 points) and QR Marc (18.13 points), and by the Polish stallion, Złocień (17.95 points). The highest score for the trait 'legs' was obtained by the progeny of the Qatar stallion Gazal Al Shaqab (16.30 points). However, the title of the father of the best movers got an Israeli stallion, Laheeb (18.91 points).

Keywords: Arabian horse, stallion, conformation, shows

Streszczenie

Wiele obserwacji potwierdza słuszność stwierdzenia, że najlepszą rekomendacją ogiera jest jego potomstwo. Celem pracy było wskazanie ogierów czystej krwi arabskiej, które przekazały potomstwu najlepsze cechy pokrojowe, oceniane podczas pokazów w Polsce, w ostatnim dziesięcioleciu, z uwzględnieniem ich pochodzenia. Analizą objęto krajowe i zagraniczne ogiery użytkowane w polskiej hodowli koni czystej krwi arabskiej, będące ojcami co najmniej 5 szt. potomstwa. Badania własne wykazały, że potomstwo ogierów wyhodowanych poza granicami Polski różniło się istotnie statystycznie (P<0.001) od potomstwa po rodzimych ogierach w zakresie wszystkich ocenionych na pokazach cech pokrojowych. W badanym okresie najwyższa nota końcowa (91,37 pkt.) i ocena za cechę „typ" (19,11

pkt.) charakteryzowała potomstwo ogiera QR Marc. Stwierdzono, że najlepszą głowę przekazywały urodzone w Stanach Zjednoczonych, a będące własnością europejskich hodowców ogiery, QR Marc (19,06 pkt.) i WH Justice (18,78 pkt.). W „Top Ten" reproduktorów przekazujących potomstwu urodziwą głowę znalazł się tylko jeden polski ogier, wyhodowany w Stadninie Koni Michałów Ekstern (18,29 pkt.). Potomstwo obdarzone najbardziej poprawną kłodą wyhodowano po zagranicznych ogierach Eden C (18,13 pkt.) i QR Marc (18,13 pkt.) oraz wyhodowanym w Polsce ogierze Złocień (17,95 pkt.). Najwyższą punktację za cechę „nogi" otrzymało potomstwo katarskiego ogiera Gazal Al Shaqab (16,30 pkt.). Natomiast miano ojca najlepiej ruszającego się potomstwa przypadło izraelskiemu ogierowi Laheeb (18,91 pkt.).

Słowa kluczowe: koń arabski, ogier, pokrój, pokazy

Introduction

Horses are characterized by a relatively low reproduction indicator and a long period of alternation of generations. Therefore, tools offered by biotechnology and molecular genetics are used more and more frequently (Swalve, 2002). Moreover, breeding programs for sport horses are being constantly improved, and they include selection methods as well as methods of estimating the breeding value of stallions (Dubois, et al., 2008; Schubertová, et al., 2014). However, elaborating an objective standard for show horses whose look is subjectively judged, still poses a problem. In the case of Arabian horses, breeding work is additionally made more difficult by the closely related herd. Research carried out by Głażewska & Jezierski (2004) proved that Polish Arabian horses from the pre-war period originate from 213 progenitors. It is widely known that the smaller population, the greater risk of increase in the level of herd homozygosity, and in negative effects connected with it. To prevent this, stallions of foreign origin are leased, or their semen is imported.

Top Polish State Studs (Janów Podlaski, Michałów and Białka), in total assign about 250 mares for the breeding season every year, while three times as much are assigned by private breeders. Although the Register of Polish Purebred Arabian Horses annually accepts applications of over 200 pure-bred Arabian producers for the breeding season, on a larger scale on average from 30 to 35 stallions are used. Decision of using them is often made under the influence of common opinions, concerning the effect of particular stallions on the formation of traits judged in shows. Preliminary study in this field proved significant differences between groups of progeny from particular producers compared to their peers (Chmiel, et al., 2002). Many observations confirm the truth of the statement that the best recommendation for a stallion is his offspring (Stojanowska, 2010).

The aim of this study was indicating purebred Arabian stallions which passed on to their progeny best conformation traits, judged during national shows in Poland, in the past decade, including their origin.

Materials and Methods

The analysis included 134 national and foreign stallions used in Polish breeding, whose offspring participated in Polish National Youth Arabian Horse Shows in the past decade. The research included producers whose progeny had at least 5 starts. 48 stallions satisfied the criteria, as in total 954 starts of their offspring were noted.

Research material consisted of the results of evaluation of yearlings and two-year-olds. Three-year-old horses were excluded as in the studied championships they participated in an insignificant number (Catalogs of Spring Youth Arabian Horse Shows). The score of each individual taking part in the show was counted as 'start', irrespective of which mother the foal came from, and if it participated as a yearling or both a yearling and a two-year-old. All notes given to every participating individual for the following traits by three judges were taken into consideration: type, head and neck, body, legs and movement, as well as the final point score of the show: the mean of all points. Each trait could be given a maximum of 20 points, while the best final point score possible to achieve was 100 points (Catalogs of Spring Youth Arabian Horse Shows).

Collected numerical data was subjected to statistical analysis with the use of the program SAS Enterprise Guide 4.3. Mean values were calculated (x), as well as the standard deviation (SD) and coefficient of variability (CV) of the studied traits. Significance of differences between mean values of evaluated traits for the offspring of 10 best stallions was verified with a one-factorial analysis of variance ANOVA, with the use of the Duncan's multiple range test. The t-Student test was applied when comparing the offspring, with regard to the father's origin.

Results

The number of offspring from a stallion participating in shows in the studied period oscillated between 5-137 heads. Fillies were definitely presented more eagerly in shows as their 596 starts constituted 62.5% of the total number of all starts, while for colts the respective values were 37.5% and 358 starts. Most of the judged horses originated from 32 national stallions bred in Poland (71.07%), while the remaining part included the offspring of 16 foreign producers (28.93%).

The author's own research proved that the offspring of foreign-bred stallions differed statistically ($P<0.001$) from the offspring sired by Polish stallions within all conformation traits judged in shows (Table 1). The offspring obtained an average final point score higher by 1.62 points, and this difference was greater in the case of fillies (1.76 points) than in colts (1.55 points). Within particular conformation traits the greatest differences occur when evaluating the type (0.41 points), head and neck (0.45 points) and movement (0.41 points). Statistically significant differences were observed also within the body (0.17 points) and legs (0.15 points), however differences in the point score were smaller. The smallest statistically significant differences ($P<0.05$) within the sex group were observed in the body of colts, whose mean note, depending on the father's origin, differed on average by 0.14 points.

Table 1. Comparison of the results of progeny sired by stallions of Polish and foreign origin

Stallions	Sex	Number	Total points	Type	Head and Neck	Body and Topline	Legs	Movement
Polish	♂	244	86.70*** ± 2.56	17.89*** ± 0.69	17.68*** ± 0.72	17.37* ± 0.52	15.96** ± 0.47	17.81*** ± 0.74
	♀	434	87.86*** ± 2.49	18.21*** ± 0.65	17.98*** ± 0.68	17.62*** ± 0.52	15.96** ± 0.42	18.10*** ± 0.79

	♀♂	678	87.44*** ± 2.58	18.10*** ± 0.68	17.87*** ± 0.71	17.53*** ± 0.53	15.96*** ± 0.44	18.00*** ± 0.78
Foreign	♂	114	88.25*** ± 2.22	18.30*** ± 0.58	18.06*** ± 0.62	17.51* ± 0.52	16.15** ± 0.46	18.25*** ± 0.70
	♀	162	89.62*** ± 2.16	18.66*** ± 0.57	18.51*** ± 0.61	17.83*** ± 0.44	16.09** ± 0.42	18.53*** ± 0.67
	♀♂	276	89.06*** ± 2.28	18.51*** ± 0.60	18.32*** ± 0.65	17.70*** ± 0.50	16.11*** ± 0.44	18.41*** ± 0.69

Significance level for progeny sired by stallions of Polish and foreign origin * P ≤0.05, ** P ≤0.01, *** P ≤0.001; ± SD

Table 2 contains mean values of conformation traits in the offspring sired by ten best purebred Arabian stallions participating in shows in the last decade. Most of the offspring was sired by stallion Ekstern, while the fewest by stallions Eden C, El Nabila B, and Padrons Psyche. The average final point score for the population included in the research was 87.91 points, while 20 out of 48 stallions included in the research were above this level. In the „Top Ten" statistically significant differences were observed ($p<0.05$) between progeny of the highest classified stallion QR Marc (91.37 points) and WH Justice, Al Maraam, Ekstern, Galba and Złocień. The second place was occupied by progeny of the Israeli stallion, Laheeb (90.55 points), with a low coefficient of variability being 1.30%, which testifies to the fact that the stallion passes on his traits to a high degree, and gives equalized progeny.

Within the trait 'type', the mean for the whole population was 18.21 points, while 17 out of 48 evaluated stallions were above this level. The first place was occupied by QR Marc, whose progeny statistically differed significantly ($p<0.05$) from the progeny of stallion Ekstern, Galba as well as Złocień, and reached a mean of 19.11 points, with a small gap between the maximum (19.67 points) and minimum (18.67 points) note, i.e. 1.00 point. Stallion Laheeb was placed 2nd as his progeny obtained an average note of 18.91 points. This stallion was characterized by the lowest diversification of the trait in the offspring (CV=1.45%). Other stallions in the top five were: WH Justice, Enzo and Al Maraam (18.81, 18.72, 18.67 points, respectively).

Another trait included in the analysis was 'head and neck'. The mean for the whole population was 18.00 points, with a low coefficient of variability at the level of 4.00%. 19 out of 48 stallions were above the mean level. In the Top Ten statistically significant differences ($p<0.05$) were indicated between the offspring of QR Marc and 6 stallions from last places, as well as between the progeny of WH Justice and Psytadel. Progeny of stallion QR Marc was judged the highest with a mean of 19.06 points with a small gap between the maximum and minimum notes being 1.17, while the lowest obtained note was 18.50 points. The second place belonged to the offspring of stallion WH Justice with a mean score of 18.78. Progeny of stallion Laheeb (3rd place – 18.61 points) were characterized by the lowest diversification of the evaluated trait (1.54%).

Progeny of the American stallion Eden C, which started only five times, along with the progeny of QR Marc, obtained the highest notes for the trait 'body' (18.13 points). The mean for the whole evaluated population was 17.58 points, while 21 out of 48 stallions included in the study were above this level. In the Top Ten, no statistically significant differences were found between progeny of chosen stallions

($p<0.05$), and the comparison included four stallions which previously were behind the leaders (El Nabila B, FS Bengali, HS Etiquette, Magnum Psyche). The most equalized progeny with regard to the body, was obtained from the stallion bred in Great Britain, HS Etiquette, which in the Top Ten was placed 9th, with the mean note of his progeny being 17.78 points, and a low coefficient of variability (1.33%).

Another trait which was taken into consideration were notes for 'legs'. The best results were achieved by the progeny of the Qatar-bred stallion, Gazal Al Shaqab (16.30 points). For the first time in the author's own research, the following stallions bred in Poland entered the Top Ten: Eukaliptus, Drabant and Werbum, as well as the American-bred stallion, Padrons Psyche. No statistically significant differences were indicated between the offspring of producers mentioned above.

Within the trait 'movement', the mean for the whole population was 18.12 points, while 23 out of 48 stallions included in the study were above this level. Analyzing all the studied traits, in relation to the whole population, these were notes for 'movement', that were distinguished by the highest coefficient of variability (4.30%). The best classified offspring within this trait was the progeny of the Israeli-bred stallion, Laheeb (18.91 points). The first five places also included the following: QR Marc, Eden C, Enzo and Gazal Al Shaqab (18.87, 18.63, 18.59, 18.55 points, respectively).

Table 2. Mean values of conformation traits in progeny sired by ten best purebred Arabian stallions participating in shows in the last decade

The Stallion`s Name	Progeny	Total points	Type	Head and Neck	Body and Topline	Legs	Movement
QR Marc	9	$91.37^{a} \pm 1.34$	$19.11^{a} \pm 0.35$	$19.06^{a} \pm 0.35$	18.13 ± 0.30	16.20 ± 0.29	18.87 ± 0.42
Laheeb	22	$90.55^{ab} \pm 1.18$	$18.91^{ab} \pm 0.27$	$18.61^{abc} \pm 0.29$	17.92 ± 0.31	16.20 ± 0.49	18.91 ± 0.68
Eden C	5	$90.00^{ab} \pm 1.59$	$18.63^{ab} \pm 0.56$	$18.60^{abc} \pm 0.68$	18.13 ± 0.34	-	18.63 ± 0.22
Enzo	15	$89.71^{ab} \pm 2.11$	$18.72^{ab} \pm 0.61$	$18.48^{bc} \pm 0.63$	17.82 ± 0.40	16.10 ± 0.41	18.59 ± 0.57
Gazal Al Shaqab	89	$89.66^{ab} \pm 2.21$	$18.62^{ab} \pm 0.56$	$18.44^{bc} \pm 0.60$	-	16.30 ± 0.44	18.55 ± 0.69
WH Justice	13	$89.33^{b} \pm 1.47$	$18.81^{ab} \pm 0.41$	$18.78^{ab} \pm 0.39$	-	-	-
Al Maraam	15	$89.29^{b} \pm 1.90$	$18.67^{ab} \pm 0.56$	$18.33^{bc} \pm 0.58$	17.91 ± 0.50	-	18.42 ± 0.57
Ekstern	137	$89.07^{b} \pm 2.07$	$18.53^{b} \pm 0.58$	$18.29^{bc} \pm 0.61$	-	-	18.49 ± 0.64
Galba	9	$89.04^{b} \pm$	$18.48^{b} \pm$	18.33^{bc}	-	$16.07 \pm$	-

		2.04	0.60	± 0.53		0.28	
Złocień	7	88.86[b] ± 1.81	18.43[b] ± 0.42	-	17.95 ± 0.56	-	18.43 ± 0.57
Psytadel	27	-	-	18.19[c] ± 0.69	-	-	
El Nabila B	5	-	-	-	17.83 ± 0.29	-	18.43 ± 0.81
FS Bengali	9	-	-	-	17.82 ± 0.43	-	-
HS Etiquette	9	-	-	-	17.78 ± 0.24	-	18.48 ± 0.65
Magnum Psyche	7	-	-	-	17.76 ± 0.25	16.10 ± 0.46	-
Eukaliptus	11	-	-	-	-	16.12 ± 0.56	-
Drabant	6	-	-	-	-	16.08 ± 0.25	-
Werbum	13	-	-	-	-	16.08 ± 0.31	-
Padrons Psyche	5	-	-	-	-	16.07 ± 0.37	-
The Total Score for the Whole Population	19.86	87.91	18.21	18.00	17.58	16.00	18.12

a. b. c - mean values in columns marked with different letters differ significantly (P ≤0.05); ± SD

In the evaluated population, thirty-six horses were awarded the title of champion or reserve champion, while the best of them in every class was awarded the title of 'the best in show'. The most titled progeny came from the following stallions: Gazal Al Shaqab, Ekstern and Laheeb (10, 7, 5 individuals, respectively). The awarded horses in 47.2% came from the State Stud Michałów, 41.7% from the State Stud Janów Podlaski, and 11.1% from a private breeding (17, 15, 4 individuals, respectively).

Discussion

Among the studied producers – fathers of half-siblings judged in shows, stallions classified as 'improvers', improving the population, can be distinguished as well as 'degraders', decreasing the breeding progress within conformation traits, as well as those which neither improved nor deteriorated results of the progeny compared with their peers.

The definite improver turned out to be the stallion born in 2005 in the United States, QR Marc, whose progeny was placed first in the Top Ten in terms of the final point score, type, head and neck. His lineage is rich in the most famous producers of

the 20th century, beginning with one of the most notable Egyptian stallions of all time, Nazeer, to Morafic, Shaikh Al Badi, Ruminaja Ali, Anaza El Farid, Gazal Al Shaqab and finally to Marwana Al Shaqab. Good origin and success in shows drew the attention of breeders. In the past two years, his semen has been sold for over 500 mares, thanks to which he became one of the most widely used producers in recent years (Stojanowska, 2010b).

In purebred Arabian horses, refined or coarse head determines the typical nature or its lack, and thus winning or losing in the show. It was observed that in the studied population the best head was passed on by stallions born in the United States, owned by European breeders, QR Marc and WH Justice. Among the best 10 producers passing on a refined head to their progeny there was only one Polish stallion, bred in the State Stud Michałów, Ekstern. Although, in the ranking including the trait 'head and neck' he was placed 9th, he may enjoy the name of the father of the horse which got the highest score for this trait. His daughter, chestnut Ekina, as the only one obtained the highest notes, 20 points, from the three judges (Łęczycka, 2010). Also from this stallion, the highest number of starting offspring was observed, which constituted 14.36% of all evaluated horses. The high interest in this producer among breeders was probably influenced by the fact that he won all the shows in which he participated, winning among others the titles of All Nations Cup Champion, of Aachen, Europe and World (Łęczycka, 2009).

WH Justice is also a stallion worth consideration as his progeny was 6th in the ranking of 'the final point score', third for the trait 'type' and second for the trait 'head and neck'. The structure of the body in offspring was judged below the mean value for the population, 17.55 points. It is connected with the fact that this charismatic stallion with a refined head has a soft back, which unfortunately is passed on to his progeny. The stallion was born in 1999 in the USA, and soon he came to Europe (Leo, 2007). So far, WH Justice has sired nearly 800 heads of progeny all over the world, and today is one of the stallions which have had a huge impact on breeding of Arabian horses (Messina, 2006).

Most equalized offspring in terms of 'the body', was sired by the stallion HS Etiquette. He is the son of stallion Simeon Sadik of the Egyptian origin, from Etenta purchased in Poland, the daughter of Monogramm and Emigracja, representative of the most awarded female family Milordka in the Polish State Stud Michałów. HS Etiquette, originating from this combination and bred in Great Britain, is a horse with beautiful dark eyes, good topline and shoulder-in (Chmiel, 2003). Improvers within the judged trait turned out to be also stallions El Nabila B (placed 6th) and FS Bengali (placed 8th), which in earlier comparisons were classified below the first top ten. They are both sons of the famous stallion, Kubinec. The chestnut stallion in the 1990s was one of the most widely used producers in the world, passing on to its progeny not only the looks, but also the correct structure and expressive movement (Stojanowska, 2007).

It is thought that legs of Arabian horses have numerous structure faults, which are often passed on from generation to generation. Therefore, the mean for the whole studied population was only 16.00 points, while the horse with the lowest score obtained a total note of 14.33 points, and the one with the highest score 17.00 points. Twenty stallions were above this mean in the ranking, and the best results were obtained by the offspring of the Qatar-bred stallion, Gazal Al Shaqab (16.30), which among others was the world champion, achieving huge success in the shows in

Europe and Near East. This rather small, though correct and impressive dark bay stallion left a lot of valuable progeny in Poland (Łęczycka, 2005). Eukaliptus, in turn, (the oldest stallion, 1974) turned out to be the best Polish improver for this trait, being 4th in the Top Ten, right after three foreign producers. The Polish Champion of 1979, at first was used on a smaller scale, and left the best progeny at the end of his breeding career (Pankiewicz, 1999).

The improvers, improving the population within the trait 'movement' to a particularly high degree turned out to be foreign stallions, which took the first five places in the Top Ten. The title of the father of progeny with best movement gained an Israeli-bred stallion, Laheeb, which is a typical representative of the most valuable Egyptian lines of Arabian horses. To the value of his lineage contributes among others a very strong influence of line Nazeera. Today, horses from this line are very successful in shows all over the world (Idan, 2011).

Conclusions

1. In the Top Ten of producers, with regard to the total means of final point score per head of progeny, there were 8 stallions of foreign origin and only 2 from the Polish breeding (Ekstern and Złocień).

2. Among stallions, which passed on the best conformation traits to their progeny in the studied period, the most beneficial indicators were obtained by stallions of foreign origin: QR Marc, Laheeb ,WH Justice, Eden C, Enzo and Gazal Al Shaqab.

3. Observed were special predispositions of certain stallions to pass on particular traits to their progeny.

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