

REPRODUCTIVE INDICATORS OF ARABIAN MARES FROM POLISH STUDS BETWEEN 1983-2002¹

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Abstract: Reproduction described by indicators of reproduction is one of the most important parts of animal breeding. These indicators show the result of breeding process and also state the intensity of animal husbandry. In horse breeding indicators concerning mares' reproduction seems to be very important. Polish Arabian horses are very well known all over the world so they need a special attention paid on their reproduction. The aim of this study was to evaluate the effect of the stud (breeder and environment) on basic reproductive indicators of Arabian mares bred in Poland between 1983-2002. The study was carried out on information concerning 648 Arabian mares –from Janów Podlaski, Michałów and Białka studs. Calculation of fertility (%), barren mares (%), abortions and resorptions (%), mortality (%), foals born alive (%), rearing (%), foals lost till weaning (%), prolificacy (%), colts (%) and fillies (%) was done according to standard formulas. It was observed that most of studied indicators for Arabian mares were better than for other breeds. The highest fertility was shown in Michałów stud and the highest number of barren mares was noted in Białka Stud. The most abortions and resorptions were observed in Janów Podlaski stud and the highest mortality level - in Michałów stud. In this stud the highest percent of colts born alive was stated, on the other hand in Białka the highest percent of fillies born alive were noted. The highest rearing and prolificacy percent was shown in Białka stud.

Key words: Arabian horses, reproduction indicators, breeders

Introduction

Reproduction described by special indicators is one of the most important parts of animal breeding. These indicators show the result of breeding process and also state the intensity of animal husbandry. In horse breeding indicators concerning mares' reproduction seems to be very important. Polish Arabian horses are very well known all over the world (Kulisa and Pieszka 1996) so they need a special attention paid on their reproduction. The selection among Arabian horses is based on traits concerning their pedigree, beauty, racing performance and offspring value but reproduction indicators are not so important during that process so sometimes horses successful in shows or at race track are characterized by low reproductive indicators. It was shown that mares winning in Championships were oftener barren (Budzyński and Chmiel 2000). Similar results were obtained for stallions (Budzyński et al. 2003). Budzyński et al (1999) stated that increasing inbred among Polish bred Arabian horses was the cause of decreasing of their reproduction indicators. The reproduction problems are also caused by environmental conditions (Küst et al 1972). The aim of this study was to evaluate the effect of the stud (breeder and environment) on basic reproductive indicators of Arabian mares bred in Poland between 1983-2002.

Materials and methods

Materials for the research concerned 648 broodmares from Janów Podlaski (297 mares), Michałów (234 mares) and Białka (117 mares) studs used in breeding in 1983-2003 so in the work 3038 season-mares were taken under consideration. For studied studs following reproduction indicators were counted:

- Fertility (%) as a rate of mares in foal number to covered mares' number;
- Barren mares (%) as a rate of barren mares' number to covered mares' number;
- Abortions and resorptions (%) as a rate of abortion and resorption number to mares in foal number;
- Mortality (%) as a rate of dead foals' births number to total number of births;

¹ Original scientific paper – Originalni naučni rad

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- Foals born alive (%) as a rate of foals born alive to covered mares' number;
- Rearing (%) as a rate of reared foals number to total number of births;
- Foals lost till weaning (%) as a rate of number of foals dead during rearing to foals born alive number;
- Prolificacy (%) as a rate of reared foals' number to total number brood mares;
- Colts (%) as a rate of number of born colts to total born foals number;
- Fillies (%) as rate of number of born fillies to total born foals' number.

All mares were divided into groups according their breeders (Janów Podlaski, Michałów and Białka). One factor variance analysis and Duncan's test were used for statistical verification of differences between breeders according to Arabian mares reproduction indicators.

Results and discussion

Analysis carried out on collected data showed that the highest fertility was noted in Michałów stud (84,03%) and this value was significantly higher than obtained for mares in Białka stud (81,96%) and as a result the barren mares percentage obtained the lowest value in Michałów stud (15,97%) and the highest in Białka stud (18,04%). *Brzeski et al* (1983) showed higher value of fertility for Michałów stud - in 1977/78 it was 91,8%. Both values obtained for Janów Podlaski stud were on average level (respectively 83,01 and 16,99%) (tab. 1). The average fertility for all Arabian horses was 83% which is lower than value obtained by *Oleksiak and Galas* (2000) – 87,5%. These authors stated that fertility in Arabian mares is significantly higher than in other breeds from Poland except Polish Koniks. *Tischner* (2002) obtained the result for Arabian mares on the level 84,1% for 2000 year which is similar to the value obtained in this study.

Table 1. Reproductive indicators of Arabian mares from Polish studs between 1983-2002

Indicator (%)	Studs			Total
	Janów Podlaski	Michałów	Białka	
Fertility (%)	83,01	84,03a	81,96a	83,00
Barren mares (%)	16,99	15,97a	18,04a	17,00
Abortions and resorptions (%)	5,29a	4,74b	2,95ab	4,33
Mortality (%)	0,61a	2,69ab	0,83b	1,38
Foals born alive	77,85	78,46	78,95	78,42
Rearing (%)	93,52	92,28	95,18	93,66
Foals lost till weaning (%)	4,92	5,86	3,99	4,92
Prolificacy (%)	72,21	72,19	74,7	73,03
Colts (%)	48,61	50,53	49,47	48,93
Fillies (%)	51,39	47,68	52,53	51,07

Means marked with the same capital letters differ significantly at $P \leq 0.01$

Means marked with the same small letters differ significantly at $P \leq 0.05$

Byszewski and Gromnicka (1994) stated the fertility for Thoroughbreds on the level about 77%, for Wielkopolski horses – 79%, Silesian horses – 76%, cold-blood horses – 75%, Huculs – 83% (in herd even 94%) and for *Jaworski et al* (1996) for Koniks – 88%. The lowest percent of abortions and absorptions were noted for mares from Białka stud (2,95%) and this value was significantly lower than observed in Janów Podlaski (5,29%) and Michałów studs (4,74%). Nearly the same results were obtained by *Oleksiak and Galas* (2000) but *Budzyński et al* (1997) showed average percent of abortions and resorptions as 7% for all population and 1,85% for Białka stud. The lowest percent of abortion and resorptions was observed for Koniks – in the stable 3,8% and in the forest – 1,9% (*Jaworski et al* 1996). Foals' mortality was the lowest in Janów Podlaski stud (0,61%). Similar value was obtained for mares from Białka stud (0,83%). The highest mortality was stated in Michałów stud (2,69%) and this value was statistically significantly higher then in

other studied studs. *Byszewski and Gromnicka* (1994) noted the level of Arabian foals mortality together with abortions – 4,6% and this value was lower than for other breeds. *Budzyński et al* (1997) stated 0,6% of mortality in Białka stud. In Thoroughbreds the values 2,6-4,4% was obtained by *Geringer et al* (2001) and by *Nowicka-Postulszna and Zygmunt* (2001) for Wielkopolski horses – 0,63-6,52%. Among Huculs mortality could be noted only in stable system of breeding – 2% (*Gancarz et al* 2002). Percent of foals born alive compared to all covered mares reached the highest value in Białka stud (78,95%), slightly lower was noted for Michałów stud (78,46%) and for Janów stud (77,85%) but the differences were not statistically significant. Also other authors obtained similar values of studied indicator (*Oleksiak and Galas* 2000, *Byszewski and Gromnicka* 1996). The value of this indicator varied in other breeds: in Thoroughbreds – about 68% (*Kulisa et al* 1999), in Noble-half-bred – 72,7%, in Małopolski – 79,5%, in Wielkopolski – 79,4% (*Budzyński et al* 2003), in Koniks – 81,2% in stables, 87,6% in forest (*Jaworski et al* 1996) and in Huculs – 77,4% in stables and 92,7% in herd (*Gancarz et al* 2002). The highest value of rearing indicator was observed in Białka stud (95,18%) and the lowest for Michałów stud (92,28%) but the differences between studs were not statistically significant. *Oleksiak and Galas* (2000) showed the rearing indicator as 89,3% for all Arabian population in Poland and 89,4% for Janów Podlaski and 89,1% for Michałów studs. Arabian horses are characterized by higher rearing percent compare to Thoroughbreds – 82,6-85,7% (*Geringer et al* 2001, *Jeleń and Cieślak* 1996) but by lower compare to primitive Huculs – 97-99% (*Gancarz et al* 2002). The most foals lost during rearing till weaning were noted for Michałów stud (5,86%) and the lowest for Białka stud (3,99%) but also here the differences were not statistically significant. *Byszewski and Gromnicka* (1996) showed 7,1% and *Budzyński et al* (2003) - 4,9% for Białka stud. These values are higher than obtained in this research so it could suggest improvement of foals' rearing condition in Polish studs of Arabian horses. In breeding of other breeds losses are definitely higher: in Thoroughbreds – 11-12%; in Wielkopolski – 9%, in Małopolski – 8,7%, Silesian – 7,5-8,6% except cold-blood horses – 2%, Koniks – 3,5% and Huculs 4,9% (*Byszewski and Gromnicka* 1994). The percent of prolificacy shows the breeding effect during one season. All other factors are involved in that one. The highest prolificacy was noted for Białka stud (74,70%) and the lowest for Michałów stud (72,19%) but the differences were not statistically significant so it could be stated that the breeder had not a significant effect of total reproductive results in Arabian horse breeding. *Oleksiak and Galas* (2000) showed slightly lower value 70,08% for total population and for Białka – 74,2%, Michałów – 71,9% and for Janów Podlaski -68,9%. For other breeds value of prolificacy was also lower: for Thoroughbreds – 51,8-56,7%; for Małopolski – 62,1%, for Wielkopolski – 60,9%, Silesian – 59,5%, Huculs – 68,2% and Koniks – 75,2% (*Byszewski and Gromnicka* 1994). During all studied period more fillies were born (51,07%) which is very promising indicator, only in Michałów stud the percent was different – there were more colts born (50,53%).

Conclusions

During the research it was observed that most of studied indicators for Arabian mares were better than for other breeds. The highest fertility was shown in Michałów stud and the highest number of barren mares was noted in Białka Stud. The most abortions and resorptions were observed in Janów Podlaski stud and the highest mortality level - in Michałów stud. In this stud the highest percent of colts born alive was stated, on the other hand in Białka the highest percent of fillies born alive were noted. The highest rearing and prolificacy percent was shown in Białka stud but the differences between studs were not statistically significant so it could be stated that the breeder had not a significant effect of total reproductive results in Arabian horse breeding.

REPRODUKTIVNI INDIKATORI ARAPSKIH KOBILA IZ POLJSKIH ERGELA U PERIODU 1983-2002

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ergele (odgajivača i sredine) na osnovne reproduktivne indikatore kod arapskih kobila gajenih u Poljskoj u periodu 1983-2002. Ispitivanje je urađeno na bazi podataka o 648 arapskih kobila – 297 sa ergele Janów Podlaski, 234 sa ergele Michałów i 117 kobila sa ergele Białka. Izračunavanje plodnosti (%), jalovih kobila (%), pobačaja (%), mortaliteta (%), živorođene ždrebadi (%), odgoja (%), ždrebadi izgubljene do odbijanja (%), plodnosti (%), ždrebaca (%) i ždrebica (%) je urađeno prema standardnim formulama. Najveća plodnost je zabeležena na ergeli Michałów, a najveći broj jalovih kobila na ergeli Białka. Najviše pobačaja je zabeleženo na ergeli Janów Podlaski, a najveći stepen mortaliteta na ergeli Michałów. Najveći procenat u odgoju je registrovan na ergeli Białka. Na ovoj ergeli je zabeležen i najveći procenat živorođenih ždrebica, ali najveći procenat živorođenih ždrebaca na ergeli Michałów. Najveća plodnost je zabeležena na Białka ergeli ali razlike između ergela nisu bile signifikantne za ukupne reproduktivne rezultate za arapske konje u odgoju.

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