



Reproduction traits of Thoroughbred mares in a Hungarian studfarm (Short communication)

JUDIT PARÉJ – ERIKA LENCSES-VARGA –
ÁGNES BALI PAPP – LÁSZLÓ PONGRÁCZ

University of West Hungary
Faculty of Agricultural and Food Sciences
Institute of Animal Sciences
Mosonmagyaróvár

SUMMARY

This study was made in the Thoroughbred studfarm called Telivér Farm Ltd. in Sárbogárd-Mindszentpuszta. We have made records of the stuff, equipment, assistants and the time of covering, applied veterinary surgeries if needed. At the end of the breeding season and so later on we made a monthly follow-up study. We recorded the successful mating, the occurrence of embryo absorption-, abortion- and premature, and the applied surgeries, as well. Then we calculated different parameters, like pregnancy rate, foaling rate, frequency of embryo absorptions and failure of conception. At last, we made notes of the used hormones and the applied treatment as well, if needed.

The farm operates with 32 mares and 2 stallions. We have data of 2 years (2005, 2006). The foaling rate was 61 and 69%, respectively. By the racer mares this rate was 63% and 78% by the non racer mares. The foaling rate of the mares which haven't had foals in the previous year was 82%. In reference to whole herd, 9% of the covers happened embryonic death and 6% abortion. The absence of the fertilization was occurred in 46% out of the total covers and 39% produced healthy foals. Twin pregnancy happened in 6%, but twins were never born because if the foetus doesn't absorbed itself, pregnancy was interrupted. 42% out of the first covers produced healthy foals, and so 43% and 25% out of the second or third covers. Considering the rate of the successful and unsuccessful covers March was the most fortunate. Although, the activity of ovaries doesn't follow this "claim", accordingly they often use hormone treatments.

All in all, reproduction parameters of the examined stud are really fortunate. The used thoughtful reproduction biological care and the perfect conditions are good examples to follow.

Keywords: Thoroughbred, reproduction, fertility.

INTRODUCTION AND BIBLIOGRAPHY

Scotti (1775) and *Csekonics* (1817) have already been reported so early that fertility is very important feature in a horse stud because it is the limitation factor of all the values. However, the selection of Thoroughbred horses based on its maximum output of speed and endurance from the beginning (*Kovácsy* and *Monostori* 1892, *Halász* 1944, *Döhrmann* 1922, *Fehér* 1990, *Bodó* and *Hecker* 1992, *Bokor* 2006). It is known that the increasing performance on the racetrack accompanies with worse fertility. According to national and international papers, the foaling rate of Thoroughbred herds in England/Ireland and in Hungary was around 65 and 50% (*Cunningham* 1991, *Pongrácz* 1997). *Wrangel* (1910) and many others reported that breeding of Thoroughbreds started out of a relatively small stock so, inbreeding should provide an explanation for the low fertility. However, different parameters of reproduction (pregnancy rate, foaling rate, embryo absorption, abortion or failure of conception) of Thoroughbred horses caused by remarkable inbreeding do not show significant increase in the past years (*Cunningham* 1991, *Bokor* 2006).

Fertility is influenced by many factors. Sexual transmission of genital infections among horses can lead to infertility after endometritis, early embryonic death, abortion or birth of weak and sick foals which die during the neonatal period (*Couto* and *Hughes* 1993, *McKinnon* and *Voss* 1993). The importance of feeding, the ingredients of the feed (especially the vital amino acids, some minerals and vitamins), the teasing and mating procedure, the health status of the broodmares and stallions, the age and the previous story of life etc. are those factors which have a great influence on the quality of germ cells (*Pickett* 1993, *Nagy et al.* 1999, *Squires et al.* 2003, *Betteridge* 2007). Thus, without a proper technology of breeding and keeping hygiene it is just a dream to raise up longlife and endurance horses (*Kovácsy* and *Monostori* 1892, *Mészáros* and *Ócsag* 1978, *Szenczi* 1984, *Becze* 1990, *Haraszi* and *Zöldág* 1993, *Pongrácz* 1997, *Bokor et al.* 2003).

Since mares usually have only one foal and their value is rather high, it is very important to keep our broodmares bred every year; as long as possible. So, further researches are needed for clearing up of the results of fertility under Hungarian circumstances and to compare nowadays breeding results with the former and up-to-date national, and so the international literature.

MATERIALS AND METHODS

This study was carried out in the Thoroughbred studfarm called Telivér Farm Ltd. of Sárbogárd-Mindszentpuszta. The breeding goes on with 32 mares and 2 stallions. Covering season takes from 15th of February until 15th of June. By this breed only the controlled (or hand) mating is permitted. Free (or pasture) mating, mating in group or in harem and some advanced methods like artificial insemination (AI) or embryo transfer (ET) are strictly prohibited.

Data were available from 2005 and 2006. We have made records of the stuff, equipment, assistants and the time of covering, applied veterinary surgeries if needed, and at last

we took some pictures, too. At the end of the breeding season and so later on we made a monthly follow-up study in order to get more data. We recorded the successful mating, the occurrence of embryo absorption-, abortion- and premature, and the applied surgeries, as well. Then we calculated different parameters, like pregnancy rate, foaling rate, frequency of embryo absorptions and failure of conception. Age of the mares and their race results are important factors that were taken into consideration. At last, we made notes of the used hormones and the applied treatment as well, if needed.

RESULTS AND DISCUSSION

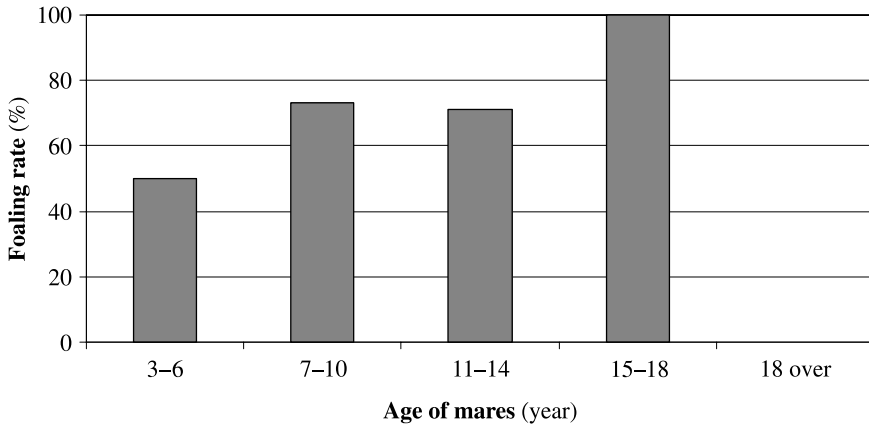
Condition of the stallions and the broodmares was appropriate. Safety regulations and hygienic requirements are considered very well. Teasing and mating is carried out by the same appearances every day. The breeding shed crew consists of five members as it is prepared in the literature (Kovácsy and Monostori 1892, Mészáros and Ócsag 1978, Bodó and Hecker 1989). Both mares and stallions are handled as individuals. Some mares do not show significant signs of oestrus during training period and short after their racing carrier; others require more attention after covering. The breeding area is large enough to allow safe movement for horses and stuff. The floor covering is consisting of sand. That provides non slippery, safe surface for the stallion, mare and people. Teasing is widely used and properly speaking it is essential to know the signs of oestrous behaviour of mares. They tease every day depending on the status of the cycle and use ultrasound equipment every other day. A small percentage doesn't show classic signs of oestrous and they have to be handled differently. Adequate time must be allowed for the mare to respond. There cannot be found a teaser stallion used for only this reason. After teasing, preparation of mares before mating means that external genitalia and perineal area is washed with thin Betadine solution and the mare's tail was wrapping. After covering, penis is always washed with Betadine solution. Mating is usually repeated two days later. Keeping of "Teasing and mating diary" is very important and it is very exact. After 16 days the reproduction status of mares are checked by ultrasounography and when necessary (by nonpregnant mares) the procedures start again. When abortion occurs progesterone is applied. At last, bacteriological and blood test is made. Anyhow, the whole stock is immunised against equine influenza and herpes virus by *Equilis Resequin* and *Duvaxin EHVI.4*.

The breeding records consist of 2 years (2005 and 2006). The calculated foaling rate was 61 and 69%, respectively. By the racer mares this rate was 63% and 78% for the non racer mares. The foaling rate of the mares which haven't had foals in the previous year was 82%.

Because of the age of the mare is a significant influencing factor of reproduction results we created five groups based on the age of mares and evaluated the foaling rate according to the groups. *Figure 1.* presents these results. *Horn* (1976 cit. *Pécsi* 2007) reported that mares in age of 6–12 show the best fertility and it reduces over 15 years largely. Nevertheless, in 2006 we couldn't notice exactly this.

Figure 1. Foaling rate according to the age of mares in 2006.

($n_{3-6} = 4$, $n_{7-10} = 15$, $n_{11-14} = 7$, $n_{15-18} = 5$, $n_{18\text{over}} = 1$)



In reference to whole herd, 9% of the covers happened embryonic death and 6% abortion. The absence of fertilization was occurred in 46% of the total number of covers and 39% produced healthy foals. Twin pregnancy happened in 6%, but twins were never born because if the foetus doesn't absorbed themselves, they interrupted the pregnancy. The mentioned ratios are presented in Figure 2. 42% of the first covers produced healthy foals, and so 43% and 25% out of the second or third covers (Figure 3).

Figure 2. Rates of foaling, failure of conception, abortion and embryo absorption in reference to all coverings (2005 and 2006)

($n_{3-6} = 6$, $n_{7-10} = 28$, $n_{11-14} = 9$, $n_{15-18} = 6$, $n_{18\text{over}} = 1$)

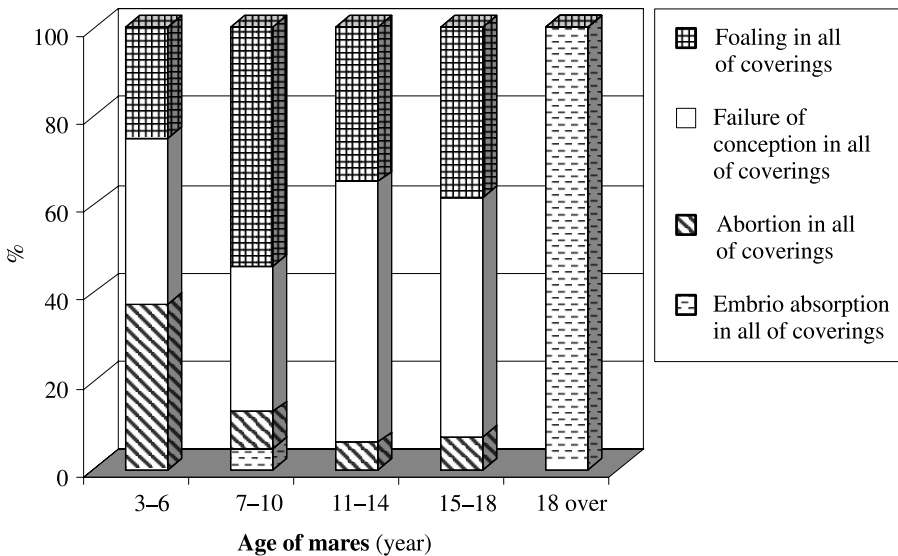


Figure 3. Rate of coverings resulted viable foals in case of 1st, 2nd and 3rd mating in the studied period

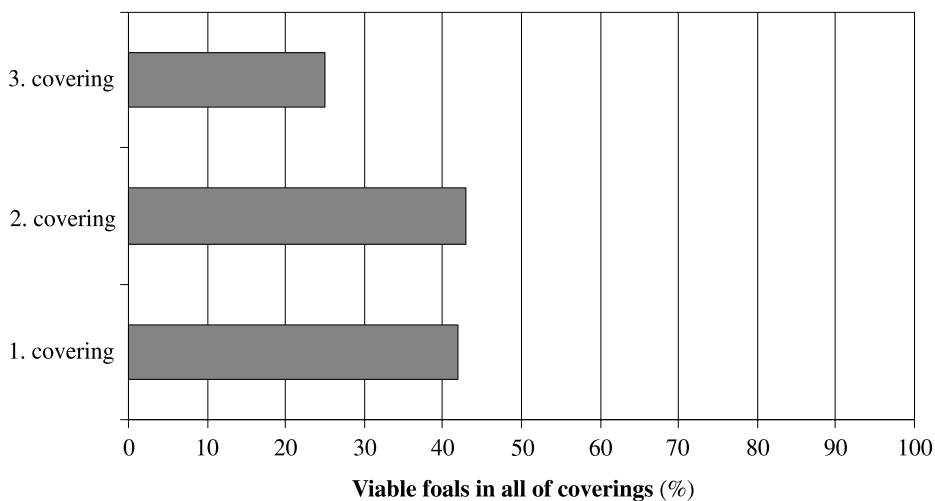
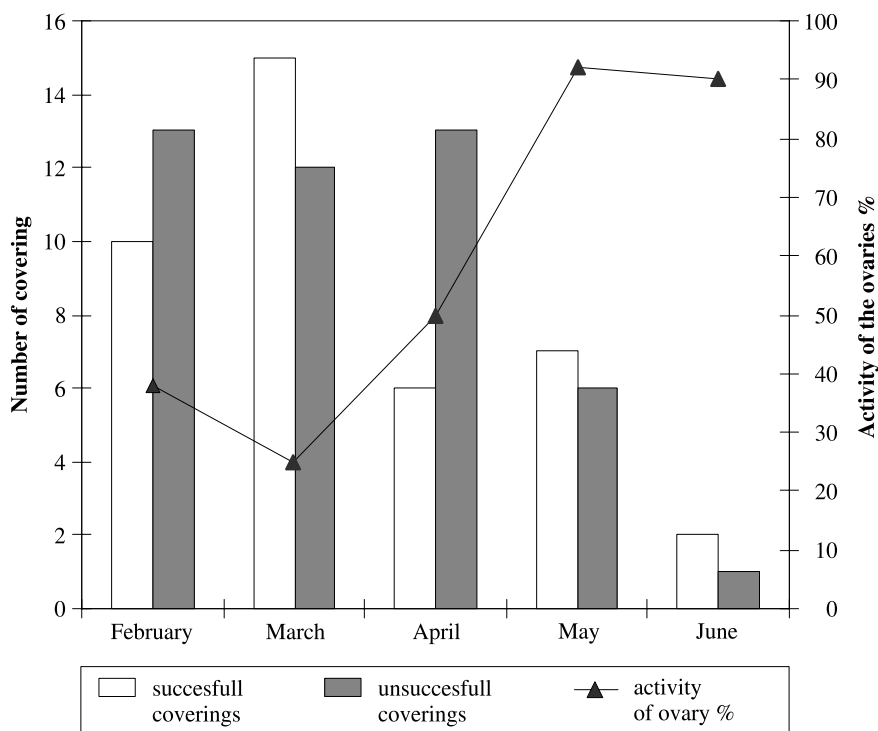


Figure 4. Successful and unsuccessful coverings in the administered stock in different months of the covering season, and the activity of ovary (according to *Becze* 1990)



Ovaries start functioning more actively early spring and these processes are influenced by the weather and the length of the sunny hours, and also the characteristics of the mare (Becze 1987, Haraszi and Zöldág 1993, Gentry *et al.* 2002, Bokor *et al.* 2003). The most successful covering rate was observed in March (Figure 4.). Although, the activity of the ovaries doesn't follow this "claim", accordingly hormone treatments are often used. All in all, the thoughtful reproduction biological care and the perfect conditions resulted reasonable reproduction results on the examined farm.

CONCLUSIONS

Rising the quality of Hungarian horse breeding, among other things, we have to catch reasonable reproduction results. The hygiene of horse keeping, the method of covering and the order of exact recording was excellent on the investigated Thoroughbred farm. The stud provides a good example that is worth to be followed. Statistics, like foaling rate etc. confirm this, too. Data are more favourable than the domestic mean and comparable with the international results. The reason of the poor results in younger mares should be the physical activity by races since the better results of the elder mares are based on conditioning, used thoughtful reproduction biological care and the perfect conditions. The used thoughtful reproduction biological care and the perfect conditions are the reasons of the good results.

ACKNOWLEDGEMENT

Appreciation is extended to Ms. Melinda Hajba and Mr. Zsolt Gimesi DVM for fruitful discussion concerning practical work in the studfarm. We wish to express our thanks to Mr. Balázs Szemere DVM (Thoroughbred Fun Club) for critically reviewing the English manuscript of this article.

Szaporodásbiológiai tulajdonságok vizsgálata egy magyarországi angol telivér méneseben

PARÉJ JUDIT – LENCSÉS-VARGA ERIKA – BALI PAPP ÁGNES – PONGRÁCZ LÁSZLÓ

Nyugat-magyarországi Egyetem
Mezőgazdaság- és Élelmiszertudományi Kar
Állattudományi Intézet
Mosonmagyaróvár

ÖSSZEFOGLALÁS

Vizsgálatainkat a Telivér Farm Kft. Sárbogárd-mindszentpusztai angol telivér ménésében végeztük, ahol a tenyésztés 32 kancával és 2 ménnel folyik. Két év adatai álltak rendelkezésre (2005 és 2006) A csikózási százalék 2005-re vonatkozóan 61%, 2006-ban pedig 69% volt; a két év adatait együtt kezelve 66%-os értéket kaptunk. A versenyzett kancák esetében 63, a nem versenyzett kancáknál 78 volt a csikózási százalék. Az egész állományra vonatkozóan a fedeztetések 9%-ában történt embriófelszívódás, 6%-ában pedig vetelés. A fogamzás elmaradása 46%-ban fordult elő. A fedeztetések 39%-ból született életképes csikó. Ikervemhesség 6%-ban fordult elő, de ebből ikercsikók egyetlen esetben sem születtek, mivel ha a vehem nem szívódott fel magától, akkor vemhesség-megszakítást végeztek. A vizsgált állományban az életképes csikót eredményező fedeztetések aránya az első fedeztetés alkalmával 42%, a második fedeztetésnél 43%, a harmadik fedeztetés esetében pedig 25% volt. A fedeztetést megelőző évben üresen maradt kancák csikózási százaléka 82 volt. Adataink alapján a sikeres és sikertelen fedeztetések arányát tekintve a március hónap a legkedvezőbb. A szakirodalom szerint ebben az időszakban a petefészkek működése még nem elég aktív, ezért az eredményes fedeztetés érdekében gyakran hormonkezeléseket alkalmaznak.

A vizsgált állomány szaporulati mutatói magyarországi viszonylatban összességében igen kedvezőek. Az alkalmazott figyelmes szaporodásbiológiai gondozás és a kitűnő tartási körülmények követendő példaként szolgálhatnak a hazai tenyésztőknek.

Kulcsszavak: angol telivér, reprodukció, termékenység.

REFERENCES

- Becze J. (1987): Kérdések és válaszok a szaporodásbiológia gyakorlatából. Mezőgazdasági Kiadó, Budapest.
- Becze J. (1990): Szaporodásbiológia. Kari jegyzet, Mosonmagyaróvár.
- Betteridge, K. J. (2007): Equine embryology: An inventory of unanswered questions. *Theriogenology*, **68**, 9–21.
- Bodó I. – Hecker W. (1992): Lótenyésztők kézikönyve. Mezőgazdasági Kiadó, Budapest.

- Bokor Á. – Csicsek A. – Hecker W. – Stefler J. – Petrovics E.* (2003): Fényprogramok alkalmazásának lehetőségei a kanca ivarzásának indukálásában. *Acta Agraria Kaposvariensis*. 7.2. 1–8.
- Bokor Á.* (2006): Az akadályversenyeken mért versenyteljesítmény javításának lehetőségei angol telivér populációkban. Ph.D. disszertáció, Kaposvár.
- Couto, M. A. – Hughes, J. P.* (1993): Sexually transmitted diseases of horses. In *McKinnon, A. O. – Voss, J. I.* (ed.): *Equine Reproduction*. Lea and Febiger, Philadelphia.
- Cunningham, E. P.* (1991): A telivérek genetikája. *Tudomány*, 52–58.
- Csekonics J.* (1817): *Praktische Grundsätze die Pferdezucht betreffend*. Pesth.
- Döhrmann H.* (1922): *Lótenyésztés II*. Pátria, Budapest.
- Fehér D.* (1990): Az angol telivér Magyarországon. *Mezőgazdasági Kiadó*, Budapest.
- Gentry, L. R. – Thompson, Jr. D. L. – Gentry, Jr. G. T. – Davis, K. A. – Godke, R. A. – Cartmill J. A.* (2002): The relationship between body condition, leptin, and reproductive and hormonal characteristics of mares during the seasonal anovulatory period. *J. Anim. Sci.* **80**, 2695–2703.
- Halász Gy.* (1944): *Telivérek*. Vajna és Bokor Kiadó, Budapest.
- Haraszti J. – Zöldág L.* (1993): A háziállatok szülészete és szaporodásbiológiája. *Mezőgazdasági Kiadó*, Budapest.
- Kovácsy B. – Monostori K.* (1892): *A ló és tenyésztése*. Pátria, Kassa.
- McKinnon, A. O. – Voss, J. I.* (1993): *Equine reproduction*. Lea and Febiger, Philadelphia.
- Mészáros I. – Ócsag I.* (1978): *A kanca sárlása és fedeztetése*. Állattenyésztési Kutatóintézet, Herceghalom.
- Nagy Sz. – Kovács A. – Szász F. – Merész L. – Sinkovics Gy. – Iváncsics J.* (1999): A rutin spermavizsgálatok fejlesztési lehetőségei. *Állattenyésztés és Takarmányozás*, **48**, 6, 660.
- Pécsi T.* (2007): *Házi emlősállatok mesterséges termékenyítése*. Mezőgazda Kiadó, Budapest.
- Pickett, B. W.* (1993): Factors affecting sperm production and output. In *McKinnon, A. O. – Voss, J. I.* (ed.): *Equine Reproduction*. Lea and Febiger, Philadelphia.
- Pongrácz L.* (1997): Method and hygiene of covering mares in different places of north-west Hungary. *Acta Agronomica Óváriensis*. **39**, 1–2., 59–66.
- Scotti, L.* (1775): *Vollkommenes Pferdrt Arzteyney Buch...* Wien.
- Squires, E. L. – Carnevale, E. M. – McCue, P. M. – Bruemmer, J. E.* (2003): Embryo technologies in the horse. *Theriogenology*, **59**, 151–170.
- Szenczi O.* (1984): *A háziállatok szaporodása és mesterséges termékenyítése*. Mezőgazdasági Kiadó, Budapest.
- Wrangel, C. G.* (1910): *Das Buch vom Pferde I-II*. Verlag von Schickhard und Ebner, Stuttgart.

Address of the authors – A szerzők levélcíme:

PONGRÁCZ László
 University of West Hungary
 Faculty of Agricultural and Food Sciences
 Institute of Animal Sciences
 H-9200 Mosonmagyaróvár, Vár 2.
 E-mail: pongracz@mtk.nyme.hu