ELSEVIER

Animal Reproduction Science 87 (2005) 283–293

ANIMAL REPRODUCTION SCIENCE

www.elsevier.com/locate/anireprosci

Relationships between sexual behaviour, dominant follicle area, uterus ultrasonic image and pregnancy rate in mares of two breeds differing in reproductive efficiency

Aleksandra Górecka*, Tadeusz A. Jezierski, Krzysztof Słoniewski

Polish Academy of Sciences, Institute of Genetics and Animal Breeding, Jastrzębiec, 05-552 Wólka Kosowska, Poland

Received 11 March 2003; received in revised form 25 October 2004; accepted 9 November 2004

Abstract

Weak or equivocal expression of oestrous behaviour, related to different level of mares' reactivity, may cause problems in oestrus detection and thus influence the reproductive efficiency. The aim of the study was to test whether a breed characterised by low pregnancy rate and high emotional reactivity (Thoroughbreds) differs in oestrous behaviour from a primitive breed with higher reproductive efficiency (Koniks). Additionally, the follicle size was examined to determine how it influences the intensity of oestrus and uterine ultrasonic image and whether the pregnancy rate differs in relation to the intensity of oestrous behaviour and the size of the dominant follicle(s) area on day preceding ovulation in both breeds.

During four reproductive seasons the behaviour of 20 Konik polski (K) and 37 Thoroughbred (T) was observed during daily teasing. Simultaneously, the ultrasonic examinations of the reproductive system were carried out. The behaviour of mares was quantified by scoring on an 8-point scale (behavioural score, BS), according to increasing sexual receptivity. Cross-sectional follicular area (FA) was taken as a product of the two largest perpendicular follicular diameters and mean values for each breed were estimated on 1693 and 1982 mm^2 for K and T mares, respectively ($P < 0.05$). Mares were classified according to the pooled area of dominant follicle (FA) during the preovulatory period: group A (FA $\leq$ breed mean) and group B (FA> breed mean). Uterus image (UI) was scored (1–5) according to the increasing uterine echogenicity. The BS was higher ($P < 0.01$) in K mares (BS = 5.19)

* Corresponding author. Tel.: +48 22 756 17 11; fax: +48 22 756 16 99.
E-mail address: a.gorecka@ighz.pl (A. Górecka).

doi:10.1016/j.anireprosci.2004.11.007

than in T mares (BS = 4.04). The BS was significantly related to increasing follicular area (FA). There was no breed difference in uterus image (UI) score. However, significant regression of UI on FA was found in K mares. The intensity of oestrus was positively related with UI ($r = 0.29$; $P < 0.01$) only in K mares, no such relationship was found in T mares. The pregnancy rate was significantly higher for K mares (88.5%) than for T mares (46.0%) and lower for T mares with less intense oestrous behaviour (29.4%) as compared to T mares with more intense oestrus (60.0%). No differences in pregnancy rate was found in mares belonging to A or B group of follicular area. The ascertained weaker oestrous behaviour in Thoroughbred was related to lower pregnancy rate. It is hypothesised that oestrus intensity may be the result of breed differences in the response of the neural system to follicular secretions, or may be an effect of higher incidence of multiple non-synchronic ovulation and/or higher sensitivity to stress in Thoroughbred mares.

Keywords: Horse; Sexual behaviour; Oestrus; Dominant follicle; Uterus ultrasonic image; Pregnancy rate

1. Introduction

High pregnancy rate in mares is crucial for successful horse breeding. It has been confirmed that particular breeds differ in pregnancy rate and thus in reproductive efficiency. The effect of breed on this parameter was summarised by Ginther (1992). The reported pregnancy rate in Thoroughbreds was lower than in other breeds and was estimated at 49% for maiden, 44% for non-lactating and 55% for lactating mares. It has also been found that the pregnancy rate differs among different horse breeds in Poland (Byszewski and Gromnicka, 1994).

In mares kept under stable conditions oestrus detection is based mainly on observations of the mare's behaviour towards a stallion. Oestrus in mares is expressed by raising attractivity and proceptivity (behaviour or odour encouraging the stallion) or receptivity (behaviour that facilitates mating) (Beach, 1976). Weak or equivocal signs of oestrus and the resulting low oestrus detection rate, may be one of the reasons for unsuccessful mating and thus may cause low pregnancy rate. Thoroughbreds are known for their high emotional reactivity, which may have also an impact on a mare's sexual behaviour. Conversely, Konik Polski, a native polish primitive, pony-type breed, derived directly from the wild Tarpan horse, has been maintained under free-roaming conditions and natural selection has taken place for high reproductivity and good health, which are essential for survival under semi-natural conditions (Jezierski and Górecka, 1998). High reproductive indices, ability to survive in unfavourable conditions and marked social behaviour are typical for this breed (Kownacki et al., 1978). Although there is no direct scientific research comparing the temperament in these two breeds, the differences in emotional reactivity between them can be assumed. There is no information in available literature on breed-dependent differences in sexual behaviour of mares.

It could be hypothesised that a high level of emotional reactivity, related to the breed of a mare negatively influences the expression of sexual receptivity in mares, as it was found in other species (Fabre-Nys and Venier, 1989; Gelez et al., 2003; Pedersen et al., 2003). The aim of our work was to test whether a breed characterised by low pregnancy rate and high emotional reactivity (Thoroughbreds) differs in oestrous behaviour from a primitive