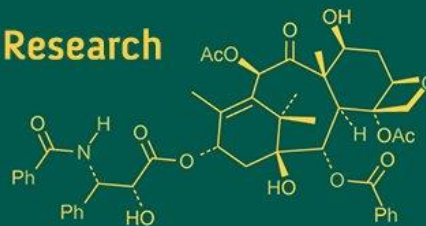
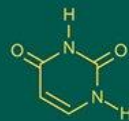
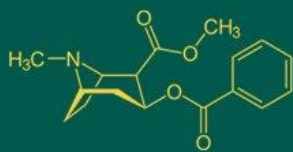


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Reproductive efficiency in thoroughbred mares: Influence of age, parity, foal heat and post-breeding endometritis in an Indian commercial stud farm (2015-2023)

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Abstract

A retrospective study was carried out to evaluate the influence of age, parity and breeding season in Thoroughbred mares maintained at commercial Stud Farm, Karnataka, India, during the period 2015-2023. Records of 747 mares involving 1,213 breeding cycles were analysed for conception rate, services per conception (SPC), gestation length, pregnancy losses and incidence of post-breeding endometritis (PBE) in foal-heat and regular-heat cycles. The overall conception rate per cycle was 52.8% with a mean SPC of 1.9. Fertility declined progressively with age, 62.7% (4-7 yr), 55.9% (8-11 yr), 48.1% (12-19 yr) and 37.7% (>20 yr). Conception rates were higher in maiden mares (64%) and foaling mares (58%) compared to barren/slipped mares (49%). The overall foal-heat conception rate was 58.7%, which was lower than that of regular cycles (66.8%). Mean gestation length was 336.4±3.5 days. Early embryonic deaths (EED) and late fetal deaths (LFD) were 11.4% and 13.0%, respectively. The findings indicate that mare age, reproductive status and uterine health after natural service mainly influence conception under Indian conditions.

Keywords: Thoroughbred mares, fertility, age, parity, foal heat, post-breeding endometritis, conception rate

Introduction

Reproductive efficiency is a key determinant of profitability in the Thoroughbred breeding industry. In India, Thoroughbred breeding is restricted to natural service and conception success depends on several factors such as mare age, parity, season and post-breeding uterine health. Studies in temperate regions (Morris and Allen, 2002; Lane *et al.*, 2016) [5, 4] have demonstrated that advancing age and PBE are major causes of reduced fertility. However, limited information is available from tropical countries like India, where high ambient temperature and humidity during the breeding season (February-June) can influence uterine clearance and embryonic survival. This study aimed to analyse retrospective breeding data (2015-2023) to identify how age, parity, foal-heat breeding and PBE affect conception and pregnancy outcome in Thoroughbred mares.

Materials and Methods

The study was conducted using records of 747 Thoroughbred mares maintained at commercial Stud Farm, Karnataka (12.9°N, 77.0°E) from 2015 to 2023. Breeding was performed by natural cover under Stud Book Authority of India guidelines. A total of 1,213 estrous cycles were analysed. Parameters recorded included mare identification, age, parity, foaling and breeding dates, services per conception, pregnancy diagnosis, gestation length and post-mating uterine findings. Pregnancy was confirmed ultrasonographically at 14 and 45 days post-service. Uterine fluid retained for more than 48 hours after service was considered evidence of PBE. Mares were grouped according to age (4-7, 8-11, 12-15, 16-19 and >20 years), parity (maiden, foaling, barren/slipped) and cycle type (foal heat ≤25 days post-foaling vs. regular heat >25 days). Data were analysed using SPSS v26. Descriptive statistics and ANOVA were applied, and differences with $p < 0.05$ were considered significant.

Results

A total of 690 mares were bred, resulting in 632 pregnancies from 1,213 services, giving an overall conception rate of 52.8% per cycle and 91.7% per mare per season. The mean

SPC was 1.9. Fertility was highest during March-April and lowest in June-July. Conception rate declined with increasing age and parity (Figure 1).

Group	No. of mares (n)	Cycles serviced	Pregnancies (n)	Conception/cycle (%)	SPC (Mean±SD)
4-7 years	135	201	126	62.7	1.7±0.2
8-11 years	218	347	194	55.9	1.8±0.2
12-15 years	204	345	166	48.1	1.9±0.3
16-19 years	150	243	117	48.1	2.0±0.3
>20 years	40	77	29	37.7	2.3±0.4
Total	747	1,213	632	52.8	1.9

Among 497 foaled mares, 109 exhibited foal heat and 80 were bred, of which 47 conceived (58.7%). Conception during regular heat was 66.8%, significantly higher ($p<0.05$). PBE incidence was higher in foal-heat cycles (26.8%) than in regular cycles (15.2%). Mean gestation

period was 336.4 ± 3.5 days. Early embryonic deaths were recorded in 72 (11.4%) pregnancies and late fetal deaths in 82 (13.0%). Twin pregnancies were noted in 69 cases (10.9%).

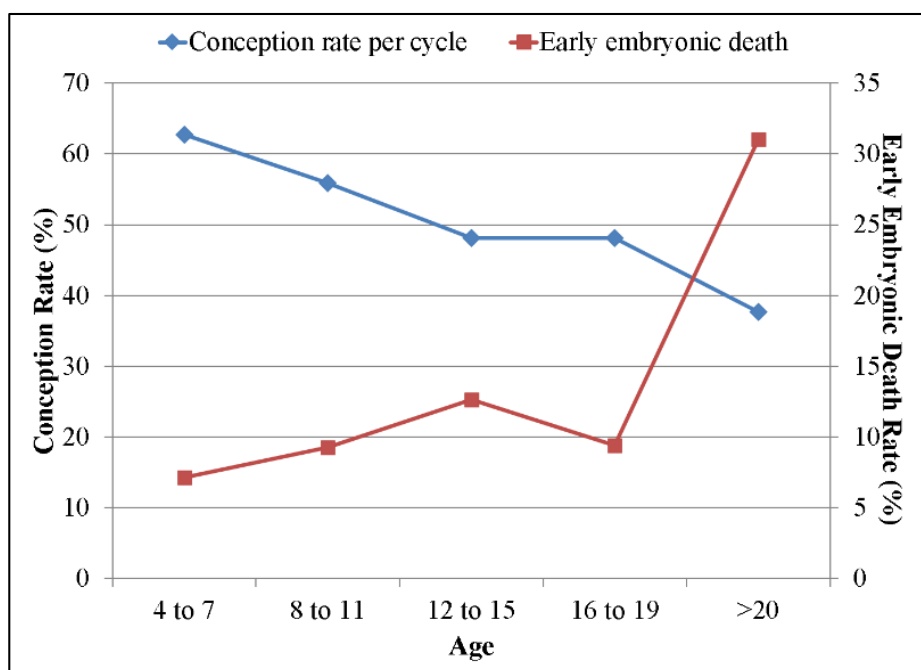


Fig 1: Effect of age on conception rate (per cycle) and odds ratio in Thoroughbred mares.

Discussion

The conception rate of 52.8% observed in this study is comparable to previous reports in Thoroughbred mares maintained under natural mating systems. Fertility declined with age due to reduced oocyte quality and degenerative endometrial changes Derisoud E *et al.* (2022) [3]. Parity also affected fertility, with maiden mares showing slightly higher conception rates than barren or slipped mares. Foal-heat breeding reduced conception and increased uterine inflammation, corroborating reports by Blanchard *et al.* (2012) [1] and Pasolini *et al.* (2017) [6]. Delaying breeding beyond 10 days post-partum and using uterine lavage or ecboic therapy are recommended to improve conception. Seasonal fertility peaks during spring months correspond with favourable temperature and photoperiod. Overall, mare age, parity and uterine health are the main determinants of fertility under Indian management conditions.

Conclusion

The retrospective analysis of Thoroughbred mares bred at commercial Stud Farm from 2015 to 2023 revealed that fertility decreases with increasing age and in barren mares.

The overall conception rate was 52.8% per cycle with 1.9 services per conception. Foal-heat breeding reduced conception by nearly 15% and showed higher incidence of PBE. Evaluation of uterine involution, delayed breeding and early treatment of PBE are essential to enhance conception and productivity in Indian Thoroughbred breeding farms.

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