

Effects of artificial photoperiod and β -carotene administration on the resumption of the mare's oestrous activity

Adalberto Falaschini¹, Roberta Viggiani¹, Pier Attilio Accorsi¹,
Giorgia Canestrari¹, Francesco Parmeggiani²,
Maria Federica Trombetta³

¹ Dipartimento di Morfofisiologia Veterinaria e Produzioni Animali, Università di Bologna, Italy

² Medico Veterinario, Libero professionista, Angola Emilia, Bologna, Italy

³ Dipartimento S.A.I.F.E.T. Università Politecnica delle Marche, Italy

Corresponding author: Adalberto Falaschini. Dipartimento di Morfofisiologia Veterinaria e Produzioni Animali, Sezione di Zootecnia Università di Bologna. Via Tolara di Sopra, 50, 40064 Ozzano dell'Emilia, Italy - Tel. +39 051 209 7389 - Fax: +39 051 209 7373 - Email: adalberto.falaschini@unibo.it

ABSTRACT

The resumption of the mare's oestrous cycle is regulated by the interaction of the photoperiod (equids are long-day breeders) with some nutritional factors, mainly β -carotene levels. The study tested the single and combined effects of β -carotene and the induction of an artificial photoperiod on anoestrous mares in winter, considering previous investigations in this direction. The mares were exposed to fairly stressful artificial light (300W from 0200 to 0400 am), envisaging the prolongation of the natural photoperiod, differently from other studies. Since the last 10 days of December blood progesterone (P4) level of 40 Italian trotters was monitored. Eight trotters showed changes in P4 and were excluded after 4 weeks. The remaining mares were randomly assigned to one of 4 groups [Contr (control: n=6); Beta (β -carotene: n=6; 500 mg/d β -carotene); ContrLux (artificial photoperiod: n=10); and BetaLux (β -carotene and artificial photoperiod: n=10)] and monitored for plasma progesterone and oestrogen, twice in a week, until the end of the research (25th April). In all groups progesterone levels showed an early resumption of the oestrus cycle, which however was earliest in " β -carotene and artificial photoperiod mares" (BetaLux: 27.0 \pm 20.3; ContrLux: 42.1 \pm 22.8; Beta: 37.1 \pm 6.9; Contr: 56.4 \pm 37.4 days from the beginning of the study). Cycling activity in BetaLux mares resumed on average one month (16th February) before than in the Contr group (17th March). Oestrogen profiles were consistent with P4 levels, with a peak in all groups 2 days before the rise of P4. In conclusion, combined β -carotene supplementation and exposure to an artificial photoperiod successfully induced resumption of cyclic activity in February, the latest possible time allowing parturition in the early days of the following year.