# Equine Progesterone (eProg)

WOODLEY
EQUIPMENT COMPANY LTD.

InSight® Equine-IA

# Contents

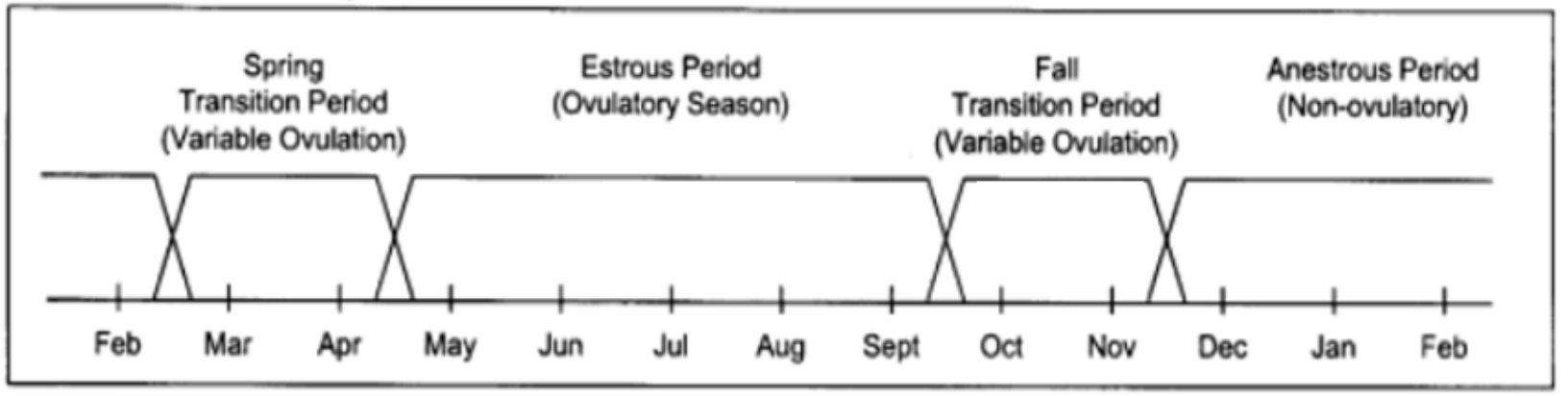
# a. The Oestrus Cycle of a Mare

Horses are animals that go into oestrus and ovulate multiple times seasonally. They are called long-day oestrus animals.

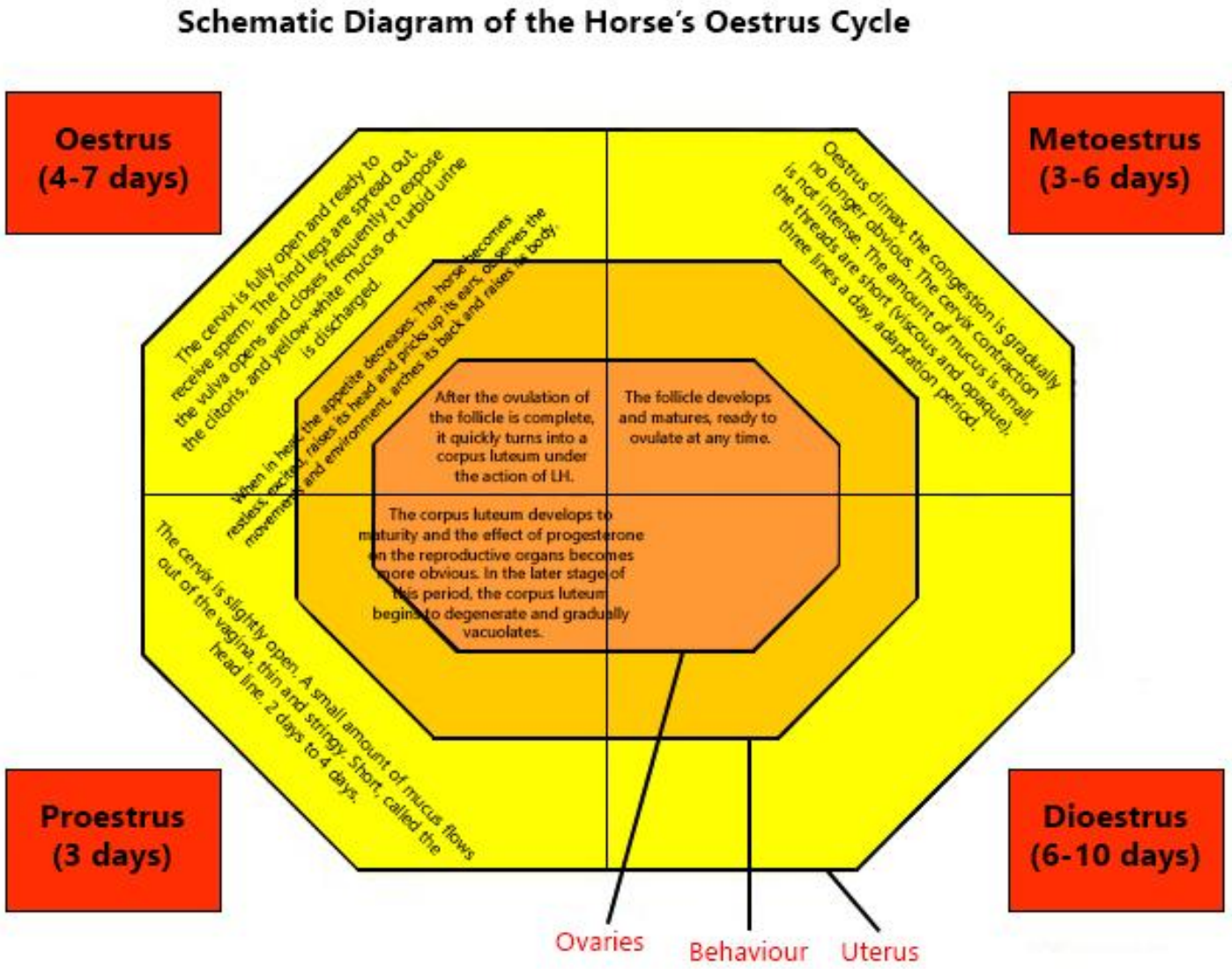
- Oestrus occurs in spring and summer. In the northern hemisphere, mares have a regular oestrus cycle during a certain period of time every year (mid-April to mid-September). During the winter, most mares show no behavioural signs of sexual receptivity and fail to develop ovulating follicles.

- The gestation period of a foal is 340 days ± 20 days (approximately 11 months).

**Figure 1. Mare seasonality.**



# a. The Oestrus Cycle of a Mare




- Oestrus Cycle (21 days) – Divided into proestrus, oestrus, metoestrus, and dioestrus.

InSight® Equine-IA

# a. How is Equine Progesterone Produced?

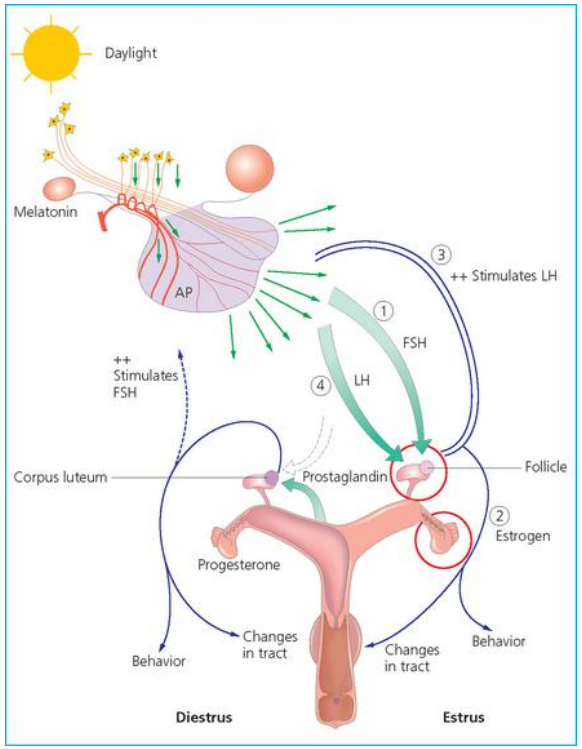
**Three major classes of hormones are involved in controlling the oestrous cycle.**

- ❑ **'Brain hormones'** (melatonin and gonadotropin-releasing hormone GnRH ) convert external stimuli into direct stimulation of the pituitary gland.
- ❑ **'Pituitary hormones'** (gonadotropins [follicle-stimulating hormone FSH, luteinising hormone LH, prolactin and oxytocin]) have direct nutritional effects on the ovaries, uterus and other parts of the reproductive tract.
- ❑ **'Reproductive or sex hormones'** (oestrogen, progesterone, inhibin and prostaglandin F2α [PGF2α]) are secreted in response to stimulation of pituitary hormones and control functional changes in the reproductive tract, and behavioural changes in animals. They provide positive and negative feedback on the rate of hypothalamic and pituitary hormone secretion.

**How is Progesterone Produced in Horses?**

As spring approaches, daylight increases, stimulating the pituitary gland and promoting the production of follicle-stimulating hormone (FSH).

1. FSH enters the ovary and initiates the development of follicles. The developing follicles produce oestrogen.
2. When oestrogen in the blood reaches a certain level, a surge of luteinising hormone (LH) is released from the pituitary gland into the blood.
3. LH surge causes ovarian follicles to rupture, leading to ovulation. The cavity left after the follicle ruptures becomes the corpus luteum.
4. As the corpus luteum develops, it begins to produce progesterone. The function of progesterone is to maintain pregnancy by maintaining a uterine environment conducive to foetal development.
5. If the mare is not pregnant, prostaglandins are released from the endometrium. Prostaglandins have a luteolytic effect - they act on the corpus luteum through the blood, causing it to degenerate. As the corpus luteum degenerates, progesterone levels decrease, resulting in removal of the inhibitory effect on LH secretion. The cycle starts over again.




**Hormone Control Chart of the Mare's Oestrous Cycle**

https://veteriankey.com/the-mare/

InSight® Equine-IA

# a. How to Determine Pregnancy

## Rectal Testing

- 18 – 45 days.
- Advantages: Simple and easy, no expensive equipment required.
- Disadvantages: There are health and safety risks.

## Ultrasonic Testing

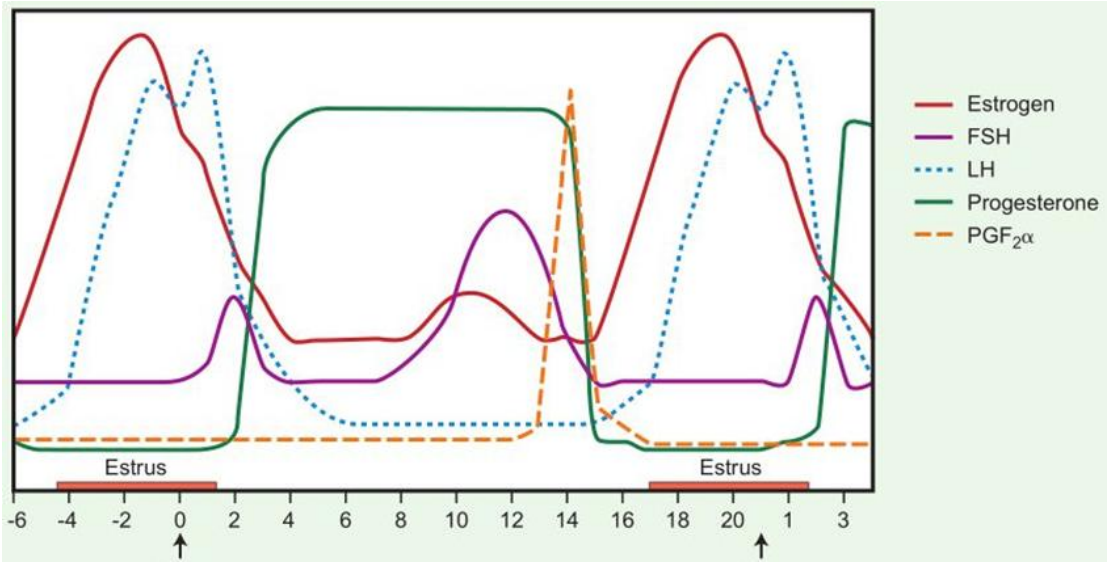
- It is used for various diagnoses, such as oestrus identification, early pregnancy diagnosis, foetal gender identification, reproductive disease examination, etc. Usually done 14 days after breeding.
- Advantages: Simple, fast, intuitive and accurate.
- Disadvantages: The price of the instrument is slightly high and it is difficult to promote it among retail investors.

## Hormone Testing

- During early pregnancy, progesterone is produced in the equine ovaries by the corpus luteum. Its concentration remains elevated and peaks between 60 – 120 days of gestation. For the assessment of luteal function in early pregnancy.
- Advantages (Fluorescence Immunochromatography): Simple, fast, highly accurate and convenient.

# b. Changes in Progesterone Levels During Pregnancy in Horses

In mares during the oestrous cycle, early gestation (45 – 60 days) and late gestation (2 – 10 months), progesterone levels are low during oestrus (less than 1 ng/mL) and are reached within 3 – 4 days after ovulation. High levels (usually over 10 nanograms per millilitre). High luteal levels are maintained for approximately 5 – 8 days and then drop sharply over approximately 24 – 48 hours, reaching low levels during subsequent oestrus. In fertile mares, progesterone levels rapidly rise to 5 – 9 ng/mL per millilitre after 21 days. Levels of 4 – 10 ng/mL are found within 30 – 60 days of successful conception. From day 60 to day 110, progesterone levels remain at around 7 – 10 ng/mL and then drop to a relatively stable level of 3 – 6 ng/mL until the tenth month of pregnancy.

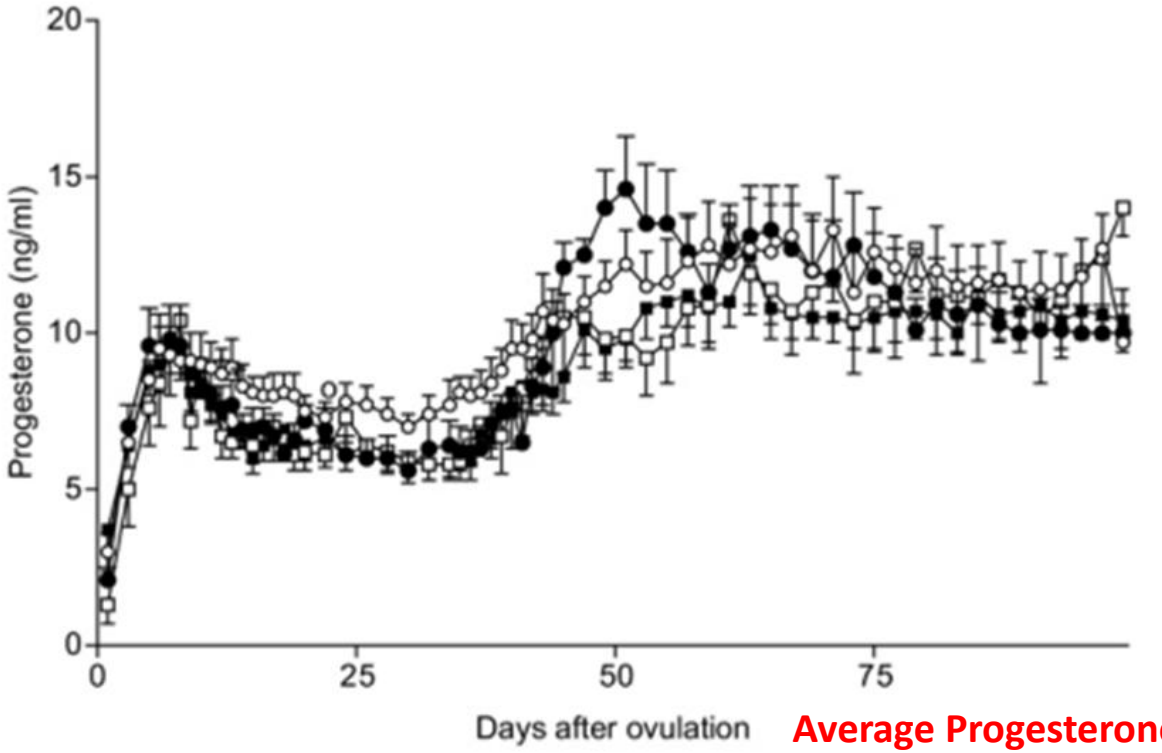



**Low Prog Levels During Oestrus**

**Low Prog Levels During Oestrus**

**Plasma progesterone levels in the mare during the oestrous cycle and pregnancy.**
Journal of the South African Veterinary Association, 01 Sep 1981, 52(3):181-185
PMID: 7310787

# b. Changes in Progesterone Levels During Pregnancy in Horses




**Average Progesterone Levels in Early Pregnant Mares 4 – 8 Years Old**

Willmann C, Schuler G, Hoffmann B, Parvizi N. Effects of age and altrenogest treatment on conceptus development and secretion of LH, progesterone and eCG in early-pregnant mares. Theriogenology. 2011;75:421-428.

# b. Changes in Progesterone Levels During Pregnancy in Horses

A progesterone concentration below 1 ng/mL 18 – 21 days after ovulation indicates that the mare is not pregnant.

In nonpregnant mares, progesterone concentrations >2 ng/mL indicate functional luteal tissue and suggest that prostaglandin therapy should induce luteolysis.

*Submission of laboratory samples and interpretation of results. In Diagnostic Techniques in Equine Medicine (Second Edition), 2009*

Progesterone is necessary for early embryonic survival. A progesterone concentration of 2 ng/mL is considered the minimum endogenous amount required to support pregnancy.

- ❑ <2 ng/mL – Associated with embryo loss.
- ❑ >4 ng/mL – Higher embryo survival rate (considered sufficient to maintain pregnancy).

*Equine Pregnancy and Clinical Applied Physiology. 2013, vol. 59, AAEP proceedings*

# c. Clinical Application of Equine Progesterone

- **Maintain Early Pregnancy** – In early pregnancy, progesterone in the horse ovary is produced by the corpus luteum. Its concentration remains elevated while peaking between 60 and 120 days of gestation. Circulating progesterone is used diagnostically to assess luteal function in early pregnancy. When circulating progesterone concentrations reach a significant level, this is considered sufficient to maintain early pregnancy.

- **Monitor During Pregnancy** – Such as uterine infection, history of pregnancy failure and luteal insufficiency. Based on changes in the horse's progesterone level, it is determined whether progesterone injection is needed to reduce the possibility of miscarriage, reduce losses and increase profits.

# InSight® Equine-IA

## Equine Progesterone (eProg) Rapid Quantitative Test


Woodley have developed a rapid, accurate and reliable, highly sensitive detection method for Progesterone in horses.

The InSight Equine-IA eProg Rapid Quantitative Test is a fluorescence immunoassay used with the InSight Equine-IA Veterinary Immunoassay Analyser for the quantitative determination of progesterone concentration in equine serum or plasma.

The test is used as an aid to track ovulation, determine the best time for breeding or detect early pregnancy failure.

It can be stored at room temperature.

# References

[1] Lu Yabin . Detection of changes in reproductive hormone levels during the estrous cycle, pregnancy period and abortion of giving birth mares [D]. Xinjiang Agricultural University , 2016.
[2] Xia Juan . Preparation of canine prorelaxin polyclonal antibodies [D]. Sichuan Agricultural University , 2015.
[3] Liu Fangyu , Jiang Xiang . Research progress in diagnostic methods for early pregnancy in dogs [J]. Animal Husbandry and Veterinary Medicine , 2013, 45 (07): 109-110.
[4] Yu Yankui . Identification of estrus in mares and timely insemination [J]. Heilongjiang Animal Breeding , 2010, 18 (03): 28-30.
[5] Yuan Wei , Wang Jianchen . Changes in major reproductive hormones during the estrous cycle and postpartum period of horses and donkeys and their clinical significance [J]. Foreign Veterinary Medicine . Livestock and Poultry Diseases , 1982, (05): 6-11. DOI :10.16437/j.cnki.1007-5038.1982.05.002.
[6] Guo Youchang . Identification of estrus in mare and diagnosis of early pregnancy [J]. Animal Husbandry and Veterinary Medicine , 1973, (02): 14-19.
[7] Equine Pregnancy and Clinical Applied Physiology. 2013, vol. 59, AAEP proceedings
[8] Clinical Veterinary Advisor: The Horse. 2012, Page 956
[9] Plasma progesterone levels in the mare during the oestrous cycle and pregnancy.
Journal of the South African Veterinary Association, 01 Sep 1981, 52(3):181-185
PMID: 7310787
[10] Willmann C, Schuler G, Hoffmann B, Parvizi N. Effects of age and altrenogest treatment on
[11] conceptus development and secretion of LH, progesterone and eCG in early-pregnant mares. Theriogenology. 2011;75:421-428.
[12] Submission of laboratory samples and interpretation of results. In Diagnostic Techniques in Equine Medicine (Second Edition), 2009

# Thank You

WOODLEY
EQUIPMENT COMPANY LTD.

InSight® Equine-IA