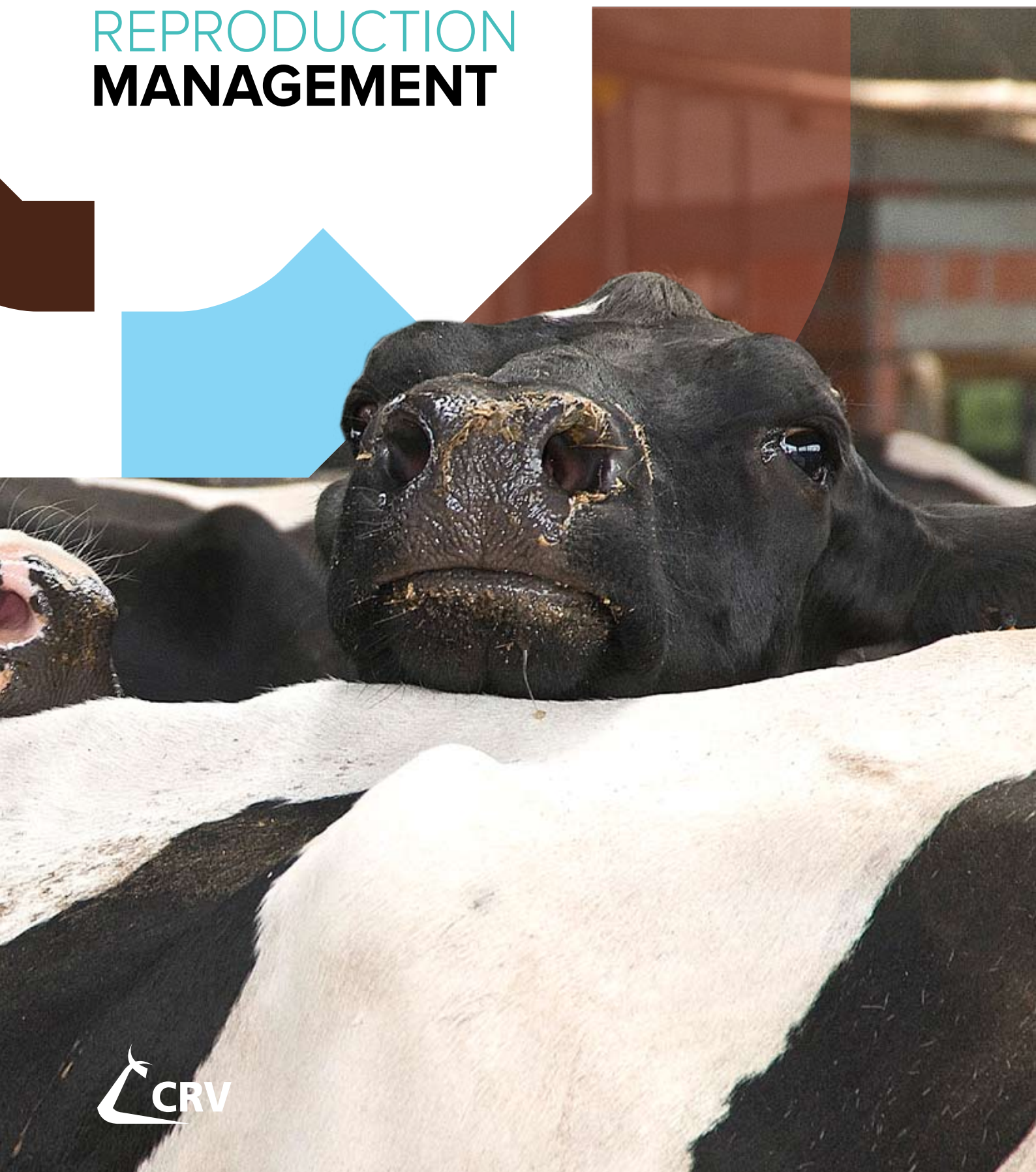




REPRODUCTION MANAGEMENT



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represented by many distributors. This guide is an addition to CRV's semen portfolio of many breeds and breeding programmes. The dairy management guide consists of ten issues. The guides concern the whole spectrum of dairy management and varies from young stock management to milking machines, health care and more. CRV is very dedicated to support farmers to manage and breed "better cows for a better life".

Acknowledgement

CRV developed this Dairy Management Guide to ensure the farmers of practical and well-stated information. To create this guide some information was used from external sources. Therefore thanks go out to Veepro Holland and PTC+.

Veepro Holland is the Information Centre for Dutch Cattle. Main goal of the organisation is to support the export of Dutch genetics. Dutch genetics refer to breeding cattle (mainly pregnant heifers of the Holstein-Friesian breed), semen and embryos. Veepro is in close contact with many (international) authorities. Veepro has a supporting and advising function. Veepro has various publications like Veepro magazine but also seminars, exhibitions, trade missions, excursions, receptions, brochures, videos and their website.

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Other references

- The Agricultural Notebook, 20th edition, 2003, Richard J. Soffe, University of Plymouth
- Beslissen van kalf tot koe
- Veeteelt
- CowManagement

INTRODUCTION

This edition of CRV Dairy Management Guide consists of practical information on reproduction management. The reproduction management is strongly correlated to production levels and economic results of the farm. Often

management problems are the leading cause of problems in the herd's reproduction results.

This edition will give you practical advice to improve the reproduction management of your cows and heifers.

When the information from this publication is implemented in your daily management you will:

- Gain knowledge of the cow's reproductive tract
- Gain full and exact knowledge of heat signs
- Know the correct moment for insemination in the heat cycle
- Recognize the right body condition score around calving and first insemination
- Be able to use up-to-date insemination techniques for good results
- Improve your management on pregnancy checks
- Recognize fertility issues in an early stage.

This publication is part of the series CRV Dairy Management Guide. Other publications are:

- Young stock management
- **Reproduction management**
- Breeding management
- Feeding management
- Health management
- Udder health management
- Hoof health management
- Milking systems
- Housing management
- Dairy farm economics



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CHAPTER 1

REPRODUCTION

CYCLE

A regular heat cycle is important to achieve positive reproduction results. The normal heat cycle of a cow averages 21 days, within a range of 18 to 24 days. This chapter describes the physical processes within the cow that result in a heat and conception of the egg cell.

1.1 HORMONES

Hormones are the chemical messengers that control the reproduction system of the cow. The part of the reproductive system that is responsible for hormones is attached to the brain; to be precise, in the so-called hypothalamus and hypophysis. The other part of the cow's reproductive system is the physical reproductive tract and the bloodstream of the animal.

LH and FSH

The hypothalamus sends a message to the hypophysis to release hormones, the Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). These hormones are secreted into the bloodstream by the hypophysis, located at the base of the brain and regulated by the hypothalamus. The hypothalamus arranges the synthesis and release of the LH and FSH hormones. LH causes ovulation and growth of the corpus luteum and FSH stimulates the growth of follicles in the ovary.

Estrogen

The pre-ovulation follicles develop at the end of the reproduction cycle to ensure an ovulation. They then produce estrogen, causing signs of heat. The

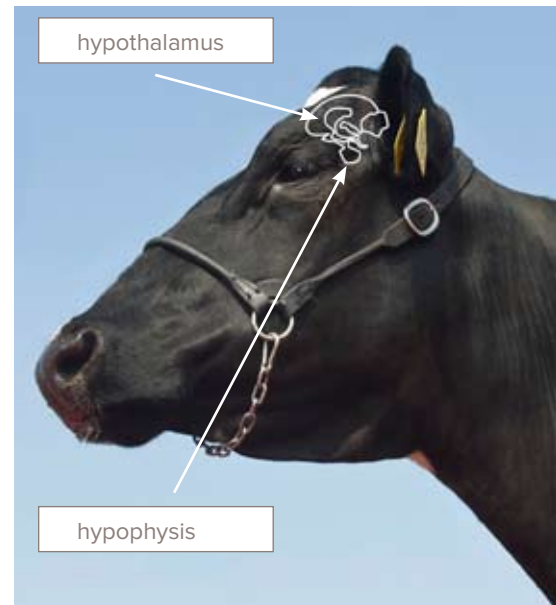


Figure 1 – The place of hypothalamus and hypophysis

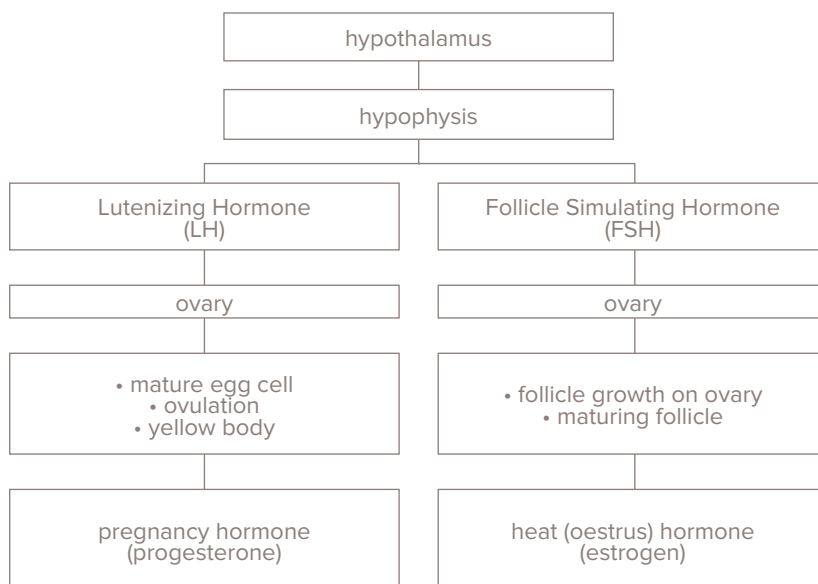


Figure 2 – The role of LH and FSH in the reproduction cycle

CHAPTER 1 REPRODUCTION CYCLE

rising levels of estrogen in the meantime cause the release of LH, which leads to the release of a mature egg (ovulation) into the infundibulum and oviduct. If cows are bred, about twelve hours after the onset of estrus (heat), the egg may be fertilized in the upper part of the oviduct. The resulting embryo takes four days to mature in the oviduct and is then passed to the uterus.

Progesterone

After ovulation, the yellow body or corpus luteum (CL) is formed by cells lining the empty ovulation cavity of the ovary. The developing CL begins to secrete the hormone progesterone between two heat periods of the cow. In case of a viable embryo, progesterone is responsible for maintaining pregnancy and prevents cows from coming into heat. If the cow is not pregnant, prostaglandin hormones produced by the uterus about seventeen days after estrus and ovulation will break down the CL. This results in a new estrus after three or four days (see figure 5).

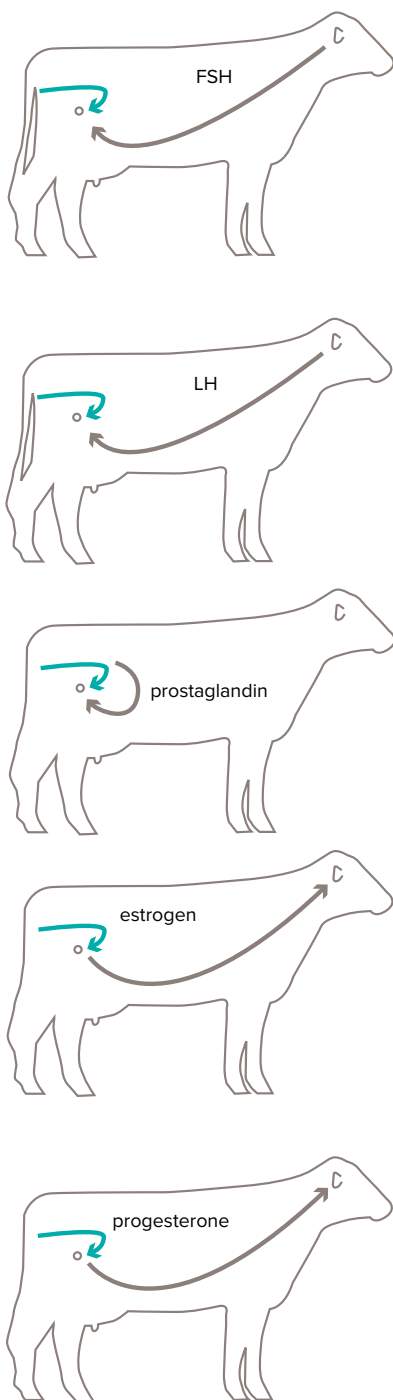
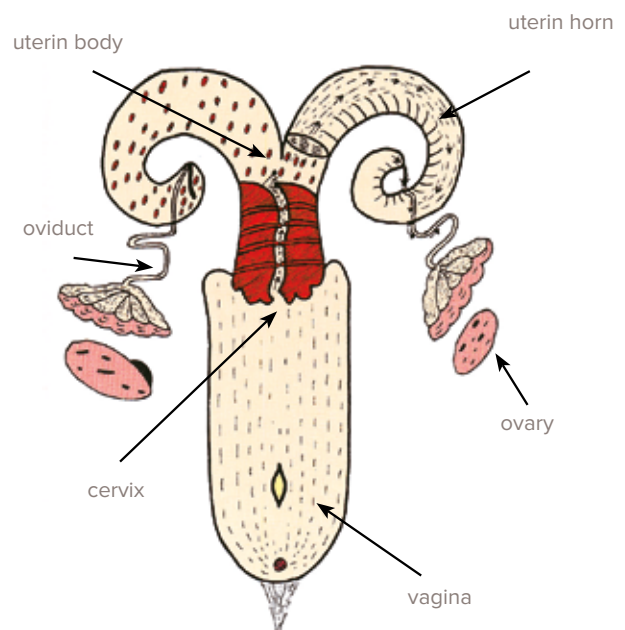


Figure 3 – Reproduction hormones

1.2 REPRODUCTIVE ORGANS OF THE COW

The vulva is the external part of the cow's reproductive tract. The vagina is the thin walled part extending from the opening of the vulva to the cervix. It is about 20 to 25 centimeters long. In natural mating the vagina functions as the place where the semen is deposited, near the cervix. The cervix forms the junction between vagina and uterus and is about 7 to 12 cm long and about 2 to 5 cm wide, depending on age and parity. The uterus consists of two parts, the small uterine body and the two uterine horns, left and right. In general, the horns have a length of about 20 cm in maiden heifers and up to 40 cm in older cows. During the estrus the horns become quite firm and are more resistant to infections. The target for semen deposition with artificial insemination (AI) is the end of the cervix near the uterine body. When AI damages the lining of the cervix opening or the uterine horns, the chances of successful fertilization are less because blood will kill sperm cells. Semen passes through the horns of the uterus to the oviducts where fertilization takes place. Fertilization is the union of one egg cell and one sperm cell.

Figure 4 – The reproductive tract of the cow



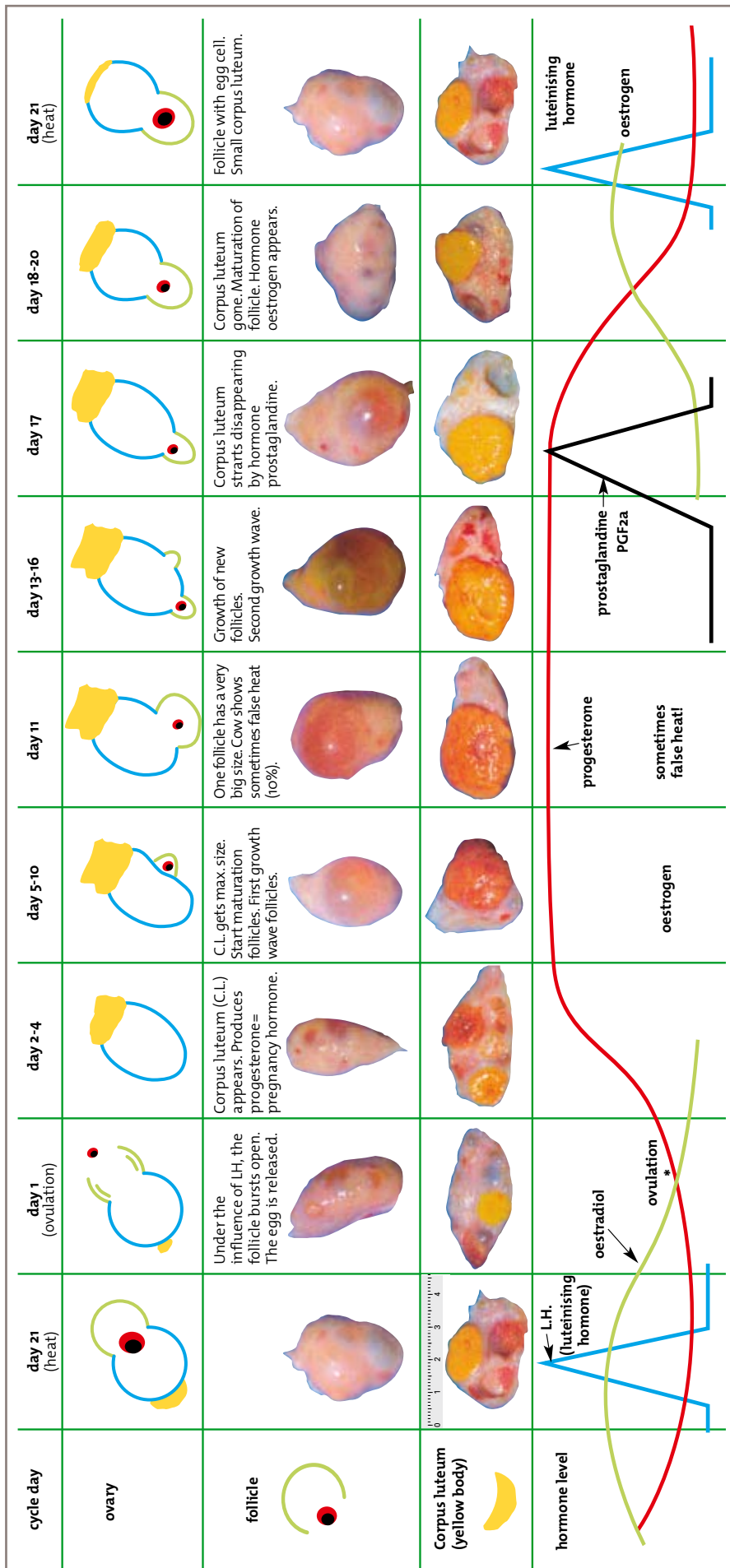


Figure 5 – Bovine reproduction cycle