ANTELOPE · SEASONAL BREEDING

Short-Day Breeders, Melatonin & the Rut

How impala and kudu read the length of the night — and how that signal switches on breeding season.

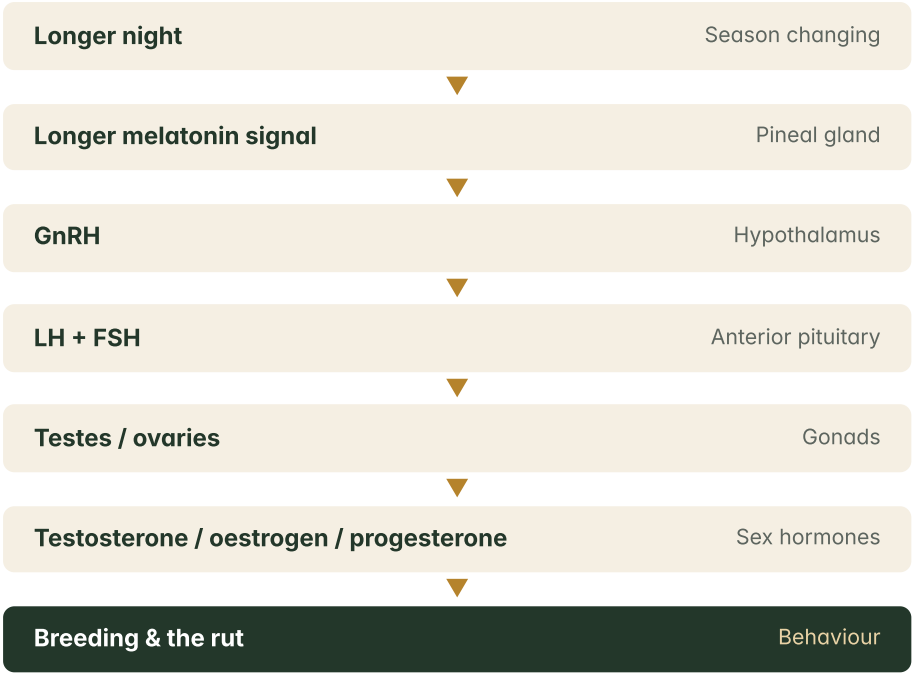
SERIES **SAFARI NOTES** FORMAT **GUIDED-TALK NOTES** PUBLISHED BY **THE SAFARI SHOW**

> Animals such as impala and greater kudu use changing day length as a seasonal clock. As days shorten and nights lengthen, the pineal gland produces melatonin for longer each night. In short-day breeders, that seasonal melatonin signal helps switch on the reproductive system and time breeding and the rut.

01 The process, step by step

1. **Shorter days.** Daylight shortens and nights grow longer.
2. **The eyes detect light.** The retina picks up the changing daylight and sends that information to the brain's biological clock.
3. **The pineal gland responds.** It produces melatonin mainly during darkness, so a longer night means a longer melatonin signal.
4. **The brain reads the signal.** Melatonin helps seasonal reproductive centres work out the right time of year to breed.
5. **GnRH is released.** The hypothalamus releases gonadotropin-releasing hormone (GnRH), activating the reproductive hormone system.
6. **LH and FSH are released.** GnRH stimulates the anterior pituitary to release luteinising hormone (LH) and follicle-stimulating hormone (FSH).
7. **The gonads respond.** In males, LH stimulates the Leydig cells of the testes to make testosterone, and FSH supports sperm production. In females, LH and FSH regulate ovarian activity.
8. **The rut begins.** Reproductive hormones help drive mating behaviour, territorial behaviour and the other features of the rut.

02 The hormone pathway to remember



03 What does LH do?

LH is a key reproductive hormone made by the anterior pituitary. In males it travels to the testes and binds to the **Leydig cells**, stimulating testosterone production. Testosterone contributes to sexual motivation, territorial behaviour, competition and the rest of the rutting behaviour we see in the field.

04 A fascinating example: impala

Impala show seasonal changes in their reproductive system around the **April–May rut**. Research found that during the rut the testes grew larger and carried **more LH receptors**. That meant they could respond far more strongly to LH and produce substantially more testosterone.

THE KEY POINT

The change was not simply a big rise in circulating LH. It was the testes becoming much more *sensitive* to it.

05 Greater kudu

Greater kudu are another useful African example. Their breeding season is associated with **decreasing day length**, with mating commonly around **April–June** in southern African populations. Pregnancy lasts **about nine months**, which helps time births for a period when conditions are more favourable.

06 Why use day length as a clock?

Rainfall and food availability change from year to year, but sunrise and sunset are predictable. That makes day length a reliable advance warning of seasonal change. The pineal gland turns that information into a hormonal signal: melatonin.

07 The glands involved

STRUCTURE	HORMONE / SIGNAL	MAIN JOB
Pineal gland	Melatonin	Signals night length and seasonal timing
Hypothalamus	GnRH	Activates the reproductive hormone pathway
Anterior pituitary	LH and FSH	Controls the gonads
Testes	Testosterone	Male reproductive function and rutting behaviour
Ovaries	Oestrogen, progesterone	Female reproductive function and pregnancy

08 Explaining it to guests

AT THE SIGHTING — HOW TO SAY IT

"Think of the animal as having a biological calendar. As the nights get longer, the pineal gland produces melatonin for longer. That melatonin signal tells the brain the season is changing, and the brain switches on the reproductive hormone system. GnRH stimulates the pituitary, the pituitary releases LH and FSH, and those hormones activate the testes or ovaries. In a male impala, LH drives the testes to produce testosterone — and that helps bring on the behaviour we recognise as the rut."

SUGGESTED CLOSING LINE

"So when we see an impala rutting, we're not just seeing one animal responding to another. We're seeing the end of a seasonal chain that began with the changing length of the night — and a signal from the pineal gland."

GET THIS BIT RIGHT

Avoid saying that "more melatonin directly causes the rut." More accurately, the **duration and pattern** of the melatonin signal provide seasonal information, which the reproductive system interprets through the hypothalamus, pituitary and gonads. Rainfall, food, body condition and social cues can also influence reproduction.

Quick reference

Pineal gland	Produces melatonin.
Melatonin	Tells the body how long the darkness lasts.
Hypothalamus	Produces GnRH.
Pituitary	Produces LH and FSH.
LH	Stimulates testosterone production in the testes.
FSH	Supports sperm production and reproductive function.
Testosterone	Helps drive male reproductive behaviour and the rut.
Impala	Example of seasonal changes in testicular sensitivity to LH.
Kudu	Example of breeding timed to decreasing day length.