



Lecture title: Seasonality

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Seasonality

Seasonal breeders are animal species that successfully mate only during certain times of the year. These times of year allow for the optimization of survival of young due to factors such as temperature, food and water availability,.

Related [sexual interest and behaviors](#) are expressed and accepted only during this period. Female seasonal breeders will have one or more [estrus cycles](#) only when she is "in season" or fertile and [receptive to mating](#). At other times of the year, they will be anestrus,

seasonality is described in both males and females.¹ Male seasonal breeders may exhibit changes in [testosterone](#) levels, [testes](#) weight, and fertility

photoperiod action?

Seasonality is regulated by daylength, technically known as 'photoperiod'. Photoperiod is the relative amount of light to dark (day to night) in a 24-hour period. The photoperiod observed for a particular place is not constant during the year, but the pattern of change over the year is constant.ending on the time of year

The animal perceives changes in the daylight:nighttime ratio through its eyes, via the optic nerve to the brain. The pineal gland in the brain produces and secretes a hormone called melatonin during the hours of darkness. As the length of night increases during late summer through to winter, the total duration of melatonin secretion ... and therefore volume of melatonin produced ... increases. The amount of melatonin produced controls the rate of production of other hormones involved in processes such as reproduction hormone. This is achieved specifically through changes in the production of the hormone GnRH. GnRH in turn transits to the pituitary where it promotes the secretion of the gonadotropins LH and FSH, both pituitary hormones critical for [reproductive function](#) and behavior, into the bloodstream.



the Pineal Gland

The pineal gland is a small organ shaped like a pine cone (hence its name). It is located on the midline, attached to the posterior end of the roof of the third ventricle in the brain. The pineal varies in size among species;

The pineal hormone melatonin (darkness hormone) plays a important role in biology as a chemical mediator of the effects of season on animal physiology and behavior. Seasonal changes in night length changes in the duration of melatonin secretion (which occurs exclusively at night), so that it is longer in winter and shorter in summer.

Melatonin is secreted by the pineal gland in two phases: photophase (daytime); and scotophors (night-time). It therefore demonstrates a circadian secretion, with the highest levels of secretion being evident during the scotophors. The presence or absence of daylight is perceived by the pineal gland via neural messages from the retina of the eye. In the absence of light, the conversion of tryptophan to melatonin is driven. The exact means by which melatonin controls the hypothalamus is unclear

seasonal breeders can be divided into groups based on fertility period. "Long day" breeders cycle when days get longer (spring) and are in anestrus in fall and winter. Some animals that are long day breeders include; , [horses](#), "Short day" breeders cycle when the length of daylight shortens (fall) and are in anestrus in spring and summer.

short day breeders:-

sheep are short day breeders, breeding at times of the year when the day length is shorter and night time longer. Thus, ewes are normally sexually active (show 17 day oestrous cycles) mid-Autumn into Winter, The melatonin concentration increases with follow-up and reaches the highest level at midnight and begins to decrease in the morning. This increase in melatonin results in an increase in GnRH and subsequently an increase in the hormones LH and FSH, which stimulate cyclicity.

Seasonality ensures lambs are born at an optimal time, in the spring, when grazing quality increases to support lactation. However,

long day breeders:-

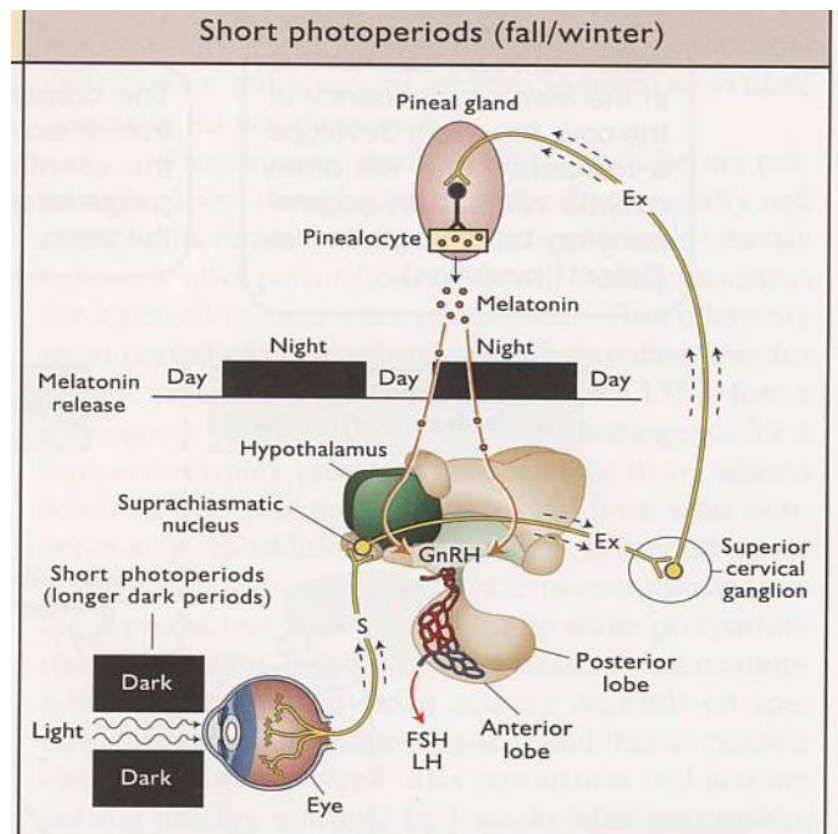
mare are long day breeders, breeding at times of the year when the day length is longer and night time shorter . Thus, mare are normally sexually active (show 22 day oestrous cycles) mid-April into

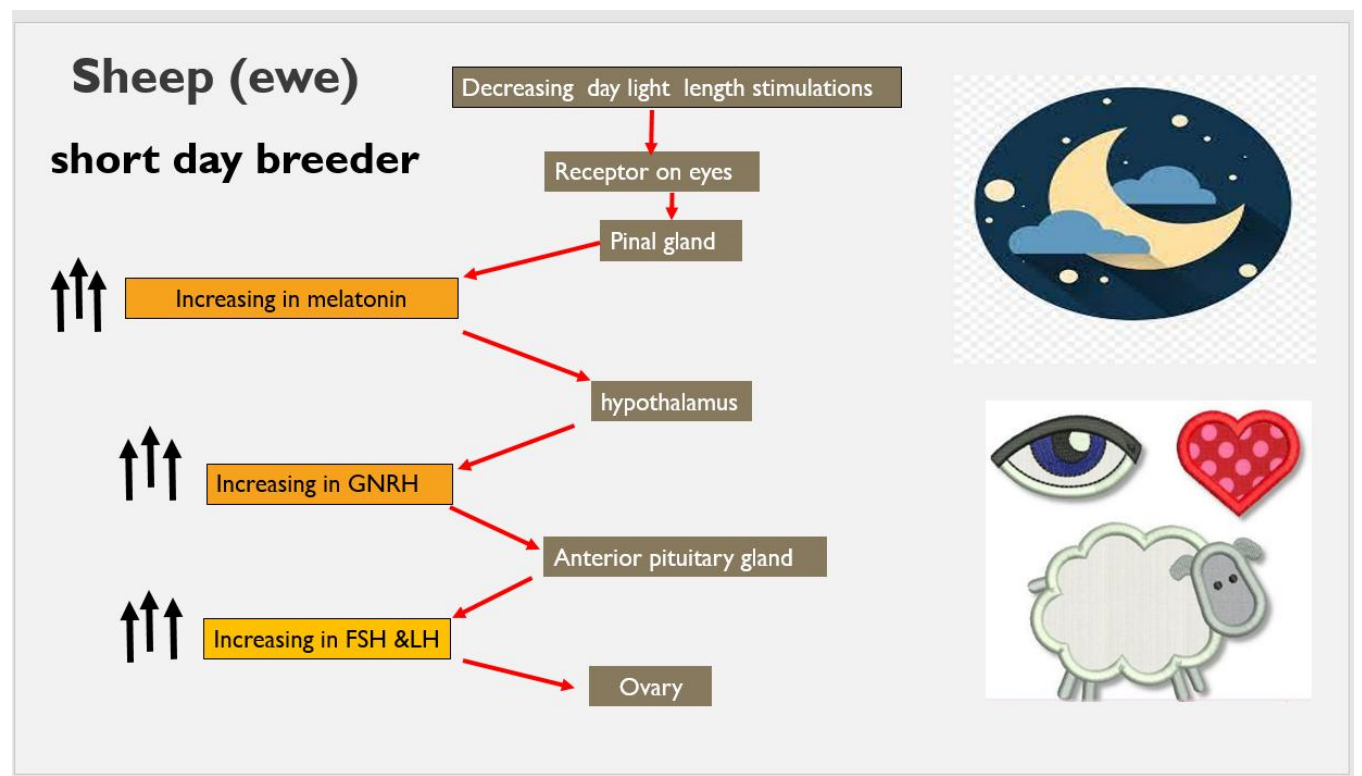


spring, The melatonin concentration decreases with and declined. the lowest level at day and begins to increase in the night. This decrease in melatonin results in an increase in GnRH and subsequently an increase in the hormones LH and FSH, which stimulate cyclicity.

Role of Pineal in Control of Seasonal Breeding

short day breeders





long day breeders

