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## Articles

# The relationship between sexual and aggressive behaviour, and pituitary and testicular activity during the seasonal sexual cycle of rams, and the influence of photoperiod

GA Lincoln and W Davidson

Six adult Soay rams were housed under artificial lighting conditions with alternating 16-week periods of long (16 h light: 8 h darkness) and short days (8L:16D) During long days the rams were reproductively quiescent: the abrupt change from long to short days induced a specific succession of responses in the reproductive system. Plasma LH and FSH levels began to increase after 2-4 weeks, followed almost immediately by a rise in plasma testosterone levels accompanied by growth of the testes. Testicular activity continued to increase during short days and the greatly elevated androgen levels apparent after 5-10 weeks caused changes in the peripheral target organs, including growth of the epididymides, development of the sexual flush on the exposed ventral skin and heightened genital sensitivity. High testosterone levels were also associated with an increase in aggressive (scored by a mechanical device) and sexual (incidence of Flehmen) behavior which was at peak about 1 month after the start of the peak androgen levels. The change to long days was associated with a decrease in plasma gonadotrophin levels within 2 weeks followed by a progressive decline in all reproductive parameters measured. Implantation of a low dose of testosterone (200 mg) during the period of reproductive quiescence induced the development of the sexual flush and an increase in genital tactile sensitivity, although behaviour was not significantly affected. The annual changes in reproductive physiology and behaviour of 12 Soay rams living under natural lighting conditions were recorded for comparison with the experimental situation. The nadir of the sexual cycle was in the spring and early summer, and the sequence of events culminating in the mating season in the autumn was similar to that induced experimentally.

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page

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page

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Home  
page

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Home  
page

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Home  
page

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▶ HOME

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