

## Plasma LH concentrations in Mute Swans *Cygnus olor* of different ages during spring

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The annual reproductive cycle of birds is initiated by short days during autumn (see Nicholls *et al.* 1988, for review). The same process probably occurs in most young birds during their first autumn, so that gonadal maturation and breeding can occur for the first time in the following spring (Dawson & Goldsmith 1989). However, in many larger and longer lived species, breeding may be delayed for several years. In some species which show this deferred breeding, e.g. storks, the reproductive physiology appears identical in young birds to that in adults (Hall *et al.* 1987), and a non-physiological mechanism is therefore thought to be responsible. In other species, notably gulls (Johnston 1956), and possibly albatrosses (Hector *et al.* 1986) the reproductive physiology appears to be suppressed in young birds.

Swans also show deferred breeding, and since free-living swans are easy to catch, sex

and age, they are an ideal species to investigate the problem further.

### Materials and Methods

Non-paired Mute Swans were caught in Staffordshire U.K. during two periods; from November 1986 to April 1987, and from February 1989 to April 1989. Swans were also caught on the Thames between December 1988 and April 1989. The birds were aged and sexed, and about 4 ml of blood was withdrawn from the brachial vein into a heparinized syringe. The blood was centrifuged a few hours later and plasma removed and stored at  $-20^{\circ}\text{C}$  until assayed.

Birds were classed as first years if they were caught less than one year after hatching, second years if they were between one and two

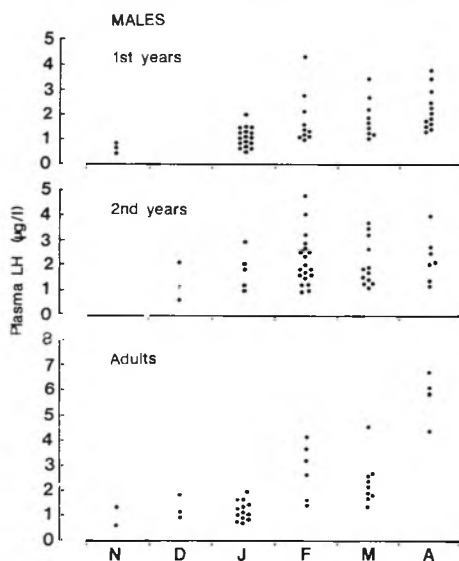


Figure 1. Individual plasma LH concentrations from first year, second year, and adult male Mute Swans between November and April.

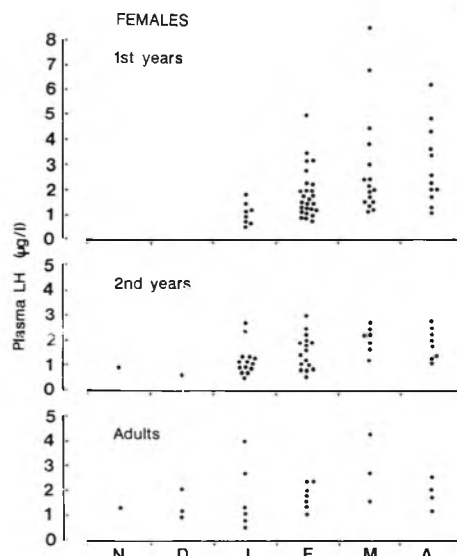


Figure 2. Individual plasma concentrations from female Mute Swans.

years old, and adults if more than two years old. Plasma concentrations of luteinizing hormone (LH) were measured by radioimmunoassay (Follet, *et al.* 1972). Data from both sites and both periods were combined.

### Results

Individual LH concentrations for 134 males are shown in Figure 1 and for 133 females in Figure 2. There were no significant differences between age classes in either sex. In all age classes of both sexes LH concentrations increased during spring. This increase was more pronounced in adult males than in younger males, but amongst females it was the first year birds which showed the most pronounced increase.

### References

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### Conclusion

The aim of this study was to determine whether there was a physiological block which prevented sexual maturation, and hence breeding, in young swans. We have no information on gonadal size in these birds, but judging by LH levels, clearly there is no such block. This study was deliberately restricted to non-paired birds, because breeding behaviour itself acts to increase levels of reproductive hormones (Harding 1981). The increase in plasma LH levels during spring would presumably have been greater in birds which paired. This may explain why there appeared to be a greater increase in LH in first year females than in older females; the more sexually mature older birds would have paired and not been included in this study. However, this effect was not apparent amongst males.