

## The biology of incubation in Black Swans *Cygnus atratus*: preliminary results

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*The incubation of the Black Swan *Cygnus atratus* is exceptional for two reasons: this swan is the only anseriform bird, besides the aberrant genera of *Anseranas* and *Dendrocygna*, in which males obligatorily share in incubation. Secondly, Black Swans tend to breed at all seasons of the year. In Vienna, some pairs incubated even at temperatures below minus 20°C. We investigated the pattern of incubation in the course of the year.*

*All observations were performed on a free-living colony of Black Swans at the Wasserpark of the River Danube in Vienna. The birds bred on an island which is not accessible to the public. At any time of the year, between 10 and 30 pairs were simultaneously incubating their eggs on this island during the observation period. All behaviour of breeding males and females was recorded at and around the nest. We aimed at obtaining continuous information on the incubation pattern of each pair. For each pair and week we have at least one full day recording of both pair members at the nest. Seventy-two broods of 37 different pairs were recorded during one year (start of September 1988 to end of August 1989). Clutches and egg weights/measures were monitored. Weights of breeding birds were taken and the egg and nest temperatures sampled in some of the nests.*

*The results show that males expend over 50% more time incubating than females do ( $P < 0.005$ , Wilcoxon test): on average, males incubated for about 55% of total incubation time, females 35% and for the remaining 10% the eggs were uncovered. This relatively large amount of inattentiveness is mainly due to the early phases of incubation: when the first one or two eggs are laid, there is virtually always one pair member present, but the amount of actual incubation is very variable.*

*Preliminary analyses suggest that the sharing of tasks between males and females does not vary systematically between seasons.*

*By shaking eggs or exchanging natural eggs with plaster dummies the natural incubation period of an average 5 1/2 weeks may be prolonged to 10 months or even more. Therefore, the incubation pattern of one particular pair may be investigated for influences of incubation time and, especially, seasonal effects. Generally, the incubation effort of males as compared to their partners increased with time during breeding ( $P < 0.01$ ). Seasonal influences on the sharing of tasks between long-time incubating pair members are currently analysed.*

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