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PROGENICIDE IN DOUBLE-CRESTED CORMORANTS

DOUGLAS SIEGEL-CAUSEY

Adult Double-crested Cormorants (*Phalacrocorax auritus*) have been known to attack (but rarely kill) strange, sick, or dying cormorant chicks (Lewis, H.L., The natural history of the Double-crested Cormorant, Ru-Mi-Lou Books, Ottawa, 1929). During the first week of July 1975, on Mandarte Island, British Columbia, Canada, I observed five adult cormorants killing their own chicks.

The Double-crested Cormorant colony on Mandarte Island was composed of eight groups totaling 544 nesting pairs. One group, on the southern tip of the island, was a compact, isolated cluster of 43 nests containing 143 chicks. During the week of 3 July 1975, 46 chicks died (32%): 16 of these were by parental attack (see Table 1). The weekly mortality rate never exceeded 5% in the other groups during this period, and I noticed no unusual occurrences that might account for the high chick mortality in this group.

Adults were identified by several characters, but for this report I considered only banded birds. Sexes were determined through behavior (i.e. courtship displays, position during copulation, etc.). Parents were identified through long-term observations of the nests—unless the birds were positively recognized by the above means, and were observed courting, copulating, incubating, and sitting at the same nest, they were not considered true parents. Because cormorants are sensitive to intrusions, the colonies were never entered, and human disturbance was minimized.

Observations through binoculars and a 45× telescope, and later examination of photographs made during this period, confirmed the method by which parents killed their chicks. In all cases a parent grasped a chick and shook very quickly for about two seconds, and then paused about three seconds. This sequence was repeated until the chick became still. None of the chicks in the nests fled while their sibs were being strangled: all eventually perished. In two nests, B and C, the dead chicks were incorporated into the nest structure. The killer worked the beak and head into the interstices and draped the body over the rim of the nest. All the nests were abandoned by the next week and the adult pairs were not seen again that season.

TABLE 1. Characteristics of nests and occupants where cormorant parents killed their young.

Date (1975)	Nest	Number of chicks killed	Age of chicks (weeks)	Sex of killer parent	Age of parent (years)
4 July	A	2	3	M	3
5 July	B	4	3	?	4
6 July	C	3	4	M	5
7 July	D	3	5	M	3
7 July	E	4	4	F	3

I know of no report of parent cormorants killing their own offspring. The affected nests did not differ from the rest of the group in any way that I could see (i.e., substrate slope, age of nest, or nearest neighbor distance). On Mandarte Island, cormorants breed as early as two years old and banding results indicated the killer parents to be young. Their nests were in a group which is the most recent in the colony (van de Veen, H. E., Breeding biology and demography of the Double-crested Cormorant, Univ. Groningen, Holland, 1973). I speculate that parental inexperience and aberrant chick behavior (caused perhaps by disease or pollution) elicited parental responses usually directed toward strange chicks. In the absence of data to support this, I cannot explain why parents would visit such destruction upon their progeny.

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VOCALIZATION DURING INHALATION IN A NIGHTJAR

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The song of the Eurasian Nightjar (*Caprimulgus europaeus*) is a loud, low-pitched trill comprised of 25 to 40 pulses of sound per second. Nightjars can sing for several minutes during which the interval between pulses never exceeds 40 ms. This presents two complementary problems: (1) how do the birds get enough air to vocalize for so long and (2) how do they get oxygen while vocalizing? A number of birds produce longer vocalizations than one can reasonably expect a small respiratory system to sustain in a single exhalation. Calder (1970) proposed that they did this by using "mini-breaths," i.e., very rapid, very shallow breaths with one exhalation for each sound pulse (see also Brackenbury 1978a, b). However, he pointed out that "mini-breaths" could have little, if any, respiratory function, i.e., they will not prevent oxygen depletion of the lung's gases. Thus, although they might explain Calder's 27-s Canary (*Serinus canaria*) song, it seems unlikely that they could permit the 8-min burst of continuous vocalization that I recorded for one nightjar. In this paper I present inferential evidence for the hypothesis that nightjars can sustain very long vocalizations by continuing to sing while inhaling.

STUDY AREAS AND METHODS

I recorded 11 songs from four nightjars in Sussex and Buckinghamshire, England with a Sennheiser directional microphone and a Stellavox SP 7 tape recorder. I examined the temporal patterns and power parame-