Bill Deformity in a Pygmy Cormorant (*Phalacrocorax pygmeus*) Chick

STEFANO VOLPONI

Department of Biology, University of Ferrara
Via L. Borsari 46, I-44100 Ferrara, Italy
Internet: col@dns.unife.it

Abstract.— The occurrence of a congenital malformation in the Pygmy Cormorant (*Phalacrocorax pygmeus*) is reported. In 1995, a cross-billed chick was observed in the natural reserve of Punte Alberete (southern Po Delta, northern Italy) where a small colony of Pygmy Cormorant became established in 1994. *Received 19 December 1995, accepted 21 February 1996.*

Key words.—Pygmy Cormorant, *Phalacrocorax pygmeus*, bill malformations, developmental toxicants, cormorant, Po River Delta.

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Pygmy Cormorants (*Phalacrocorax pygmeus*) recently returned to breed in Italy and a small colony was established in 1994 at the natural reserve of Punte Alberete, in the southern Po River Delta (Volponi and Emiliani 1995). On 9 June 1995, during a census of the breeding herons and egrets, we found seven Pygmy Cormorant nests in three different locations in the heronry. While a group of five nests still contained eggs, the other two held four nestlings each, estimated to be between 10 and 15 days old. One unhatched and probably infertile egg was also present in one of the nests.

During ringing operations, we observed that one of the eight chicks had a severe bill defect, the upper mandible being right-deflected by approximately sixty degrees. The tip of the upper mandible was slightly bent downward, while the lower mandible did not show any sign of deformity. The chick appeared healthy and as vigorous as its siblings. Thus, it is possible that this malformed chick would survive long enough to fledge.

Considering that cormorant chicks must remove their food from the adult gular pouch, it is quite surprising that chicks with malformed bills may be able to survive and withstand sibling competition. The literature suggests that even if most malformed cormorant embryos do not hatch (Kurita *et al.* 1987), some hatch and may survive until the fledging stage and achieve independence from their parents (T. Menke and T. Nazirides, pers. comm., Snow 1963, Stronks 1983). There is also evidence that, at least for experienced adult cormorants, a severe bill defect may not significantly affect or preclude feeding ability. After half of her upper mandible accidentally broke off when the nestlings were just a week old, a breeding female was able to provide enough fish for herself and her young until fledging (Buchheim and Bellebaum 1993).

Congenital malformations have been reported for at least six cormorant species, but never for Pygmy Cormorants. In North America, 22 per 10,000 of a large sample (N = 31,168) of chicks of Double-crested Cormorant (*P. auritus*) in the Great Lakes showed crossed or deflected bills, while single observations were reported for a Brandt's (*P. penicillatus*) and a Pelagic (*P. pelagicus*) Cormorants (Fox *et al.* 1991, Hobson and Carter 1988). In Australia, five Pied Cormorant (*P. varius*) nestlings out of 91 from 34 nests were observed to have bent bills (Ball 1991). In Europe, single occurrences of bill defects were noted both for European Shag (*P. aristotelis*) and Great Cormorant (*P. carbo*) (Fox *et al.* 1991, Snow 1963, Stronks 1983). For the latter, Brengballe and Gregersen (pers. comm.) observed between 8 and 12 chicks with crossed bills among 19,567 (4.1-6.1 per 10,000) Great Cormorants ringed in 13 Danish colonies between 1977 and 1995. A higher proportion (40-50 per 10,000) was reported for the Dutch colony of Dordtse Biesbosch in the polluted delta of the Rhine and Meuse rivers during both 1987-1989 (Boudewijn and Dirksen 1995) and 1990-1995 (T. J. Boudewijn, pers. comm.). Chicks

with the upper or the lower mandible shorter or slightly deformed were also observed in northern Germany colonies with a frequency of about 57 per 10,000 (T. Menke, pers. comm.).

Congenital malformations are relatively uncommon in most wild bird populations. However, among waterbirds, defects at hatching have been recorded for several species at locations where there are elevated levels of persistent lipophilic contaminants (e.g., PCBs and dioxins) or high selenium levels in the aquatic food chain (Giesy *et al.* 1994, Hoffman and Heinz 1988, Ohlendorf *et al.* 1986, Tillitt *et al.* 1992). Fish-eating birds may bioconcentrate lipophilic chemicals in their eggs by as much as 2.5×10^7 times the environmental concentration in water (Norstrom *et al.* 1986). This may result in a decreased reproductive output (Fox and Weseloh 1987).

Chemical industries are numerous around the feeding grounds of colonial waterbirds breeding at Punte Alberete, and the Po River Delta receives water discharges from most of the industries in the Po Plain. With the exception of some preliminary data on heavy metals and organochlorine compounds in gull and tern eggs (Boldreghini *et al.* 1983, Fasola *et al.* 1987), no current information is available regarding the presence of persistent environmental contaminants in fish-eating birds breeding in the Po River Delta. Thus, it is presently impossible to ascertain whether the bill malformation in the Pygmy Cormorant chick is associated with the bioconcentration of developmentally toxic compounds or due to natural causes.

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