

Diet and growth of chicks of the Great Cormorant, *Phalacrocorax carbo*, at Ramsar, northern Iran

(Aves: Phalacrocoracidae)

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Abstract. The diet of Great Cormorant (*Phalacrocorax carbo* Linnaeus, 1758) chicks was studied using regurgitated fish prey in a colony at Ramsar, northern Iran, in the 2003 breeding season. The development of young was analysed in terms of body mass and wing length growth. The regurgitated prey items belong to Gobiidae, Mugilidae, Atherinidae and Clupeidae, with approximately 90% of the regurgitated prey mass belonging to Gobiidae and Mugilidae. The growth rate, expressed as body mass increment per day during the period 1-30 days, ranged from 58.7 to 112.2 g/d and was independent of age ranking and brood size. The growth rate of wings was 5.5 to 8.2 mm/d and did not vary between broods of different sizes and chicks of different ages.

Key words. Great Cormorant, *Phalacrocorax carbo*, diet, chick development, daily growth rate, Ramsar, Iran, Middle East.

Introduction

Great Cormorants, *Phalacrocorax carbo* Linnaeus, 1758, inhabit coastal areas as well as inland wetlands and are opportunistic feeders. Food studies in this species are made from regurgitated fish in the colony, by the reconstruction of fish species and size from otoliths, pharyngeal bones and chewing pads in pellets collected in colonies and under roosts (VAN EERDEN et al. 1995). The daily food intake of Great Cormorants has been studied by various methods such as pellet, regurgitated fish, or stomach content analysis, energetic models and captive bird studies (CARPENTIER & MARION 2003). The regurgitation method that is often used for cormorants (VELDKAMP 1995) is accurate enough to measure the chicks' daily food intake (CARPENTIER & MARION 2003) and thus to assess the chicks' diet and its seasonal variation.

The Great Cormorant is a regular breeder in northern Iran, with breeding locations in coastal zones of the Caspian Sea, along streams and wetlands. It is the most widespread and abundant cormorant species in Iran (SCOTT 2007, MANSOORI 2008), and has caused severe damage to fisheries in northern Iran (MONAVARI 1987). Nevertheless, many basic aspects of its breeding biology and diet composition are still unknown. In the present study, I therefore studied the diet of chicks using regurgitates. Chick development was monitored to determine if the brood size and chick age affect growth rate. This survey was conducted in the coastal colony of Ramsar in Mazandaran province, southern Caspian Sea, during the 2003 breeding season.