

# Breeding success of the Great Cormorant, *Phalacrocorax carbo* Linnaeus, 1758, at Ramsar, northern Iran

(Aves: Phalacrocoracidae)

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**Abstract.** Factors influencing the breeding success of the Great Cormorant, *Phalacrocorax carbo* Linnaeus, 1758, were studied in the 2003 breeding season at the Ramsar colony in northern Iran. The mean brood size was 3.03, and early-breeders had significantly larger broods than later breeders. However, no statistically significant difference was found in the reproductive success between early and late breeders. There was no significant relationship between nest size and number of chicks fledged. The mean productivity was 2.88 young per breeding attempt, which means about 80% of eggs laid produced nestlings that reached the fledging stage. Daily nest survival was higher in the chick-rearing stage than in the incubation period, and most failures (ca. 60%) occurred during the incubation period. The results suggest that the Ramsar colony provides more favourable nesting conditions for Great Cormorants than do some of the other colonies studied throughout its range.

**Key words.** Great Cormorant, *Phalacrocorax carbo*, breeding success, daily survival rate, Ramsar, Iran.

## Introduction

Great Cormorants, *Phalacrocorax carbo* Linnaeus, 1758, inhabit coastal areas as well as inland wetlands and are opportunistic feeders (VAN EERDEN et al. 1995). The species is a regular breeder in northern Iran, with breeding locations in coastal zones of the Caspian Sea, along streams and in wetlands. It is the most widespread and abundant cormorant species in Iran (SCOTT 2007, MANSOORI 2008, BARATI 2008). In the 1970s this species was abundant in the south Caspian region, occurring in large tree-nesting colonies. Four colonies were located: Abbasabad Dam near Astara, Gilan (1200-1500 pairs), Asalem, Gilan (2000 pairs), Bandar Kiashar Lagoon, Gilan (1000+ pairs), and Sisangan, Mazandaran (1000+ pairs) (SCOTT 2007). However, some of these colonies no longer exist (BARATI 2003). Almost no information is available about its breeding biology and ecology. The aims of this paper are therefore (1) to estimate several breeding parameters of the Great Cormorant at the Ramsar colony in 2003; (2) to identify sources of variation in reproductive performance.

## Methods

**Study Area.** This study was carried out at the Ramsar colony (35°54'N, 50°40'E), which is located near Ramsar, southern Caspian Sea, during the 2003 breeding season. The distance from