

Great Cormorant counting manual

- from the INTERCAFE COST cormorant manual -

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2.1 Breeding colonies

2.1.1 Introduction

Two sub-species of the Great Cormorant (*Phalacrocorax carbo*) breeds in Europe. The nominate form *P. c. carbo* inhabits marine waters of northern Europe, and the *P. c. sinensis* breeds from Southern Norway and Finland in north throughout Central and Southern Europe, mostly in brackish and fresh water systems. Whereas the nominate form is almost entirely ground nesting, *sinensis* mostly breeds in trees. The methods of counting nests partly depends on whether nests are in trees or on the ground.

2.1.2 Definition of a colony

We recommend that a colony is defined as a separate colony if it is isolated from other group(s) of nests by at least 2000 m. Therefore, a group of nests is defined as belonging to the same colony as the other groups of nests if it is located within 2000 m from the nearest neighbouring group of nests. Such groups of nests are often referred to as “sub-colonies”. We recommend that a single nest is sufficient to have a colony as long as it is not located within 2000 m from other colonies. The definition of a colony has varied among countries. Therefore, there may be historical and/or biological reasons not to follow this recommendation for colonies that have already existed for some years.

2.1.3 Definition of colony size

We recommend that colony size is defined as the number of apparently occupied nests (often referred to as “AON”). An apparently occupied nest is a nest that is in use and sufficiently finished to hold one or more eggs (i.e. a well-built nest). Apparently occupied nests thus includes all nests in use, except those under construction that are not capable of holding an egg. Nests under construction can be recorded separately. There is some variation among and within countries with respect to whether or not unfinished cormorant nests are included in nest counts.

2.1.4 Timing of the count

Counts should be made when the maximum numbers of nests are occupied. If the nests are counted several times within the same season, one should use the maximum number. The ability of the observer to count at the time when nest

numbers culminate will often be constrained by several factors. First of all, the observer rarely knows at exactly what time of the season nest numbers can be expected to culminate. In planning the time of a nest count the observer may also have to take into account a) that the number of nests tends to reach a maximum later in the season in newly founded colonies than in older colonies, b) that the visibility of nests in trees declines after foliation, and/or c) that nests traditionally have been counted at a certain stage in the breeding cycle. The observer may also be forced to count at a suboptimal time because of other duties or poor weather conditions on the day when the count was planned to be carried out.

The time of culmination in nest numbers may vary among years and colonies. Several publications present information about variation in timing of breeding (e.g. Newson et al. 2005, Polish paper), but few present information about seasonal variation in nest numbers. Examples of seasonal variation in nest numbers in Denmark were given in Bregnballe & Gregersen (1995, see Fig. 1).

In Table 1 we give a best guess for timing of culmination in nest numbers in different countries. These periods may be taken into account when planning the timing of counts in each country. The timing of culmination in nest numbers in Europe is partly related to location of the colony in relation to a North-South and East-West gradient, but it also varies locally, partly depending on seasonal variation in food availability. It was found in Great Britain that cormorants breeding on the coast initiated breeding several weeks later than cormorants breeding in inland colonies (Newson et al. 2005).

Table 1. Best guess of timing of culmination in nest numbers in great cormorant colonies given for different countries in Europe.

Country	Period when nest numbers culminate	Comments
Norway ¹	1 May-15 June	coastal colonies of <i>P.c. carbo</i>
Denmark ³	25 April - 10 May	coastal as well as inland colonies
England ⁴	12 April – 17 May	Inland colonies of mixed <i>sinensis/carbo</i>
Wales ⁴	10 May – 7 June	Coastal colonies of <i>P. c. carbo</i>
Italy ⁵	15 April – 30 May	New colonies settle later
Czech Republic ⁶	25 April – 5 May	south Bohemia
The Netherlands ⁷	March	Inland colonies
The Netherlands ⁷	May	IJsselmeer colonies (1978-2000)
The Netherlands ⁷	April	IJsselmeer colonies (2001-2005)
The Netherlands ⁷	May/beginning of June	Coastal colonies
Germany ⁸	First half of May	

¹ Røv & Lorentsen unpublished

³ J. Eskildsen, J. Gregersen, J. Sterup & T. Bregnballe unpublished

⁴ S. Newson unpublished

⁵ S. Volponi unpublished

⁶ Martinová & Musil unpublished

⁷ S. van Rijn & M.R. van Eerden

⁸ W. Knief unpublished

The number of nests present at the time of the season when nest numbers reach their maximum will in most cases be lower than the total number of nests built in the colony. Thus nests may disappear before and new nests may be built after the culmination in nest numbers (Harris & Forbes 1987). Furthermore, the number of pairs attempting to breed will usually be higher than the number of nests at the time of the season when nest numbers reach their maximum (Harris & Forbes 1987, Walsh et al. 1995). Thus a nest built by a pair that gave up early in the season may be taken over by a new pair.

2.1.5 Nest counts in ground nesting colonies

Cormorants breeding on the ground tend to nest in discrete and well-defined groups but the exact location of these groups might shift from year to year. Care must therefore be taken to check the potentially suitable sites for presence of isolated or newly-established groups.

Counts from the ground. Care should be taken to minimise disturbance. We therefore recommend that entering the colony is avoided if possible. Instead the observer should find a suitable vantage point (or several if necessary) and count the nests from here. Registering nest content is not essential for counting nests, but if possible a general assessment of the stage of the breeding cycle should be given. If repeated counts are performed the highest number registered should be used as the total number of AON's for the colony. In some colonies it is not possible to see all parts from the vantage point(s) selected. Keep a note and a map of the parts of the colony that is not visible and try to estimate (minimum-maximum) for the number of AON's likely to be hidden, based on numbers on visible sections. When reporting these numbers make clear that they are of unknown reliability.

Entering the colony may be the only option available in some ground nesting colonies because vantage points are unavailable. In that case it may be an advantage to put sticks in the ground inside the colony or use spray paint on selected nests to keep track of the parts of the colony where nests have been counted. The duration of disturbance can be reduced by being two or three persons that carry out the count together. The extent of disturbance will in some areas be lower if the count is carried out during the night. This is frequently done in Norway (N. Røv pers. comm.). The advantages of counting during the night are that the adults tend to leave their nest at closer range and that gull predation is lower than during disturbance in daytime.

In cases where the only option available is to walk through the colony when counting it, and the observers intend to record nest contents, we recommend that information about nest contents is dictated to a tape recorder. This enables the observer to keep a better track of which nests have and have not been counted and it minimises the duration of disturbance. When recording nest contents, we recommend that the observer for each nest dictates numbers of eggs, numbers of chicks and estimated age of the oldest chick in the brood (give age in days).

Using aerial photographs. The best method for counting ground nesting colonies is to photograph the colony from the air. Subsequently, one should make large prints of the photos, or project slides on a large sheet of paper or the wall. Finally nests are

counted by marking them. Be aware of double-counting sites if several photos from the same colony are used. It is recommended that several observers count the same photo and that the mean is used as the size of the colony.

2.1.6 Nest counts in tree nesting colonies

In planning the date of the count it should be considered that the visibility of nests usually starts decreasing a few days after foliation. Before disturbing the colony it should be explored whether some sectors of the colony can be counted from outside the colony, thereby minimising disturbance. However, it is usually necessary to walk through the entire colony to count all nests and keep track of which nests have and have not been counted. It is helpful to make maps of the colony and use features in the landscape (e.g. certain trees) to keep track of the sections of the colony that have been counted.

Counting of nests in tree nesting colonies will often cause extensive disturbance of the colony. Be aware that incubating cormorants that suddenly detect a person may flush from the nest immediately whereby one or more eggs fall out of the nest. A nest count in a tree nesting colony will frequently lead to exposure of eggs and small young to predation from crows and magpies. The loss of eggs and chicks may be kept down by mowing around in a way that minimises the number of nests disturbed within a time period.

Be aware that cormorants sometimes breed in mixed colonies with other species like herons and that heron nests may be mistaken as cormorant nests.

Literature

Bregnballe, T. & Gregersen, J. (1995): Udviklingen i ynglebestanden af Skarv *Phalacrocorax carbo sinensis* i Danmark 1938-1994. - Dansk Ornitologisk Forenings Tidsskrift 89: 119-134.

Lorentsen, S.-H. 1989. The national monitoring programme for breeding seabirds. Counting manual *Det nasjonale overvåkingsprogrammet for hekkende sjøfugl. Takseringsmanual*. - NINA Oppdragsmelding 16: 1-27. (in Norwegian)

Newson, S.E., Hughes, B., Hearn, R. & Bregnballe, T. 2005: Breeding performance and timing of breeding of inland and coastal breeding Cormorants *Phalacrocorax carbo* in England and Wales. - *Bird Study* 52(1): 10-17.

Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W. & Tasker, M.L. 1995. Seabird monitoring handbook for Britain and Ireland. JNCC / RSPB / ITE / Seabird Group, Peterborough.

Harris, M.P. & R. Forbes 1987: The effect of date on counts of nests of Shags *Phalacrocorax aristotelis*. - *Bird Study* 34: 187-190.