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The Distribution and Numbers of Goldeneye
(*Bucephala clangula*) Moulting in Denmark

by

PALLE UHD JEPSEN & ANDERS HOLM JOENSEN

Med et dansk resumé: Udbredelsen og antallet af fældende
hvinænder (*Bucephala clangula*) i Danmark.

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Introduction

The goldeneye (*Bucephala clangula*) is a very abundant non-breeding winter visitor in Denmark and particularly the surrounding waters. The numbers recorded during aerial surveys in the winters 1968-71 (January) varied between 40,000 and 90,000 (JOENSEN 1968, and unpublished count data), and between one-fifth and half of the birds were recorded in the Limfjord in northern Jutland. The presence during summer of goldeneye in Danish waters was reported early in this century by SCHIØLER (1926), and since then several notes on scattered observa-

tions have appeared, but no detailed or summarizing reports have been published.

Since 1966 the Game Biology Station has studied the distribution, numbers and various aspects of the moult biology of the goldeneye during summer in Denmark. The present report describes the results concerning distribution and numbers, whereas the more detailed analysis of moult migration, time of the moult, age- and sex-composition, habitats and habits are treated in a special report by JEPSEN (1973).

Material

Most data used in the present study were collected from 1966 onwards by the Game Biology Station in two independent research schemes. Since 1967 the first author has conducted general waterfowl studies in the game reserve of Hjarbæk Fjord (part of the Limfjord), established as a reserve in 1967. This area is by far the most important moulting area for goldeneye in Denmark. A special study concerning the moult biology of this species has been carried out since 1969, and in 1972 supplementary information was obtained through ground observations in other parts of the Limfjord as well as several other localities, mainly in Jutland. Details on the observation data etc. have been given in the above mentioned special report (JEPSEN 1973).

Since 1966 the second author as part of countrywide waterfowl population surveys has carried out aerial surveys and other observations on moulting diving ducks. During May-September 1966-72 a total of more than 200 flying hours were conducted, mainly over salt-water areas. A report containing details on survey ac-

tivities as well as the results concerning the true marine diving duck species has been published (JOENSEN 1973).

While *Somateria mollissima*, *Melanitta fusca*, *Melanitta nigra*, *Aythya marila* and *Mergus serrator* (treated in the above mentioned report) are almost entirely confined to salt-water, mostly far from the coast, the goldeneye frequents and spends the moulting period both in salt-, brackish- and fresh-water habitats. Consequently the combination of data from the two above mentioned investigations has been quite essential to establish a reliable picture of the distribution and number of moulting birds.

In addition to the studies by the Game Biology Station valuable information, mostly on scattered observations during the summer, has been obtained from many ornithologists, sportsmen etc., both in connection with a monthly count programme and as a result of special inquiries. The authors are indebted to all those who supplied information on the goldeneye.

Some information has been gathered

from a scrutiny of recent ornithological literature. For the present report only data back to and including 1960 have been used.

The question of representativeness of the material available has two aspects, 1) the extent to which data obtained during aerial surveys illustrate the number of birds in the areas surveyed, and 2) whether the survey activities as such covered all relevant habitats in all parts of the country.

The difficulties connected with aerial surveys of diving ducks during summer have been described by JOENSEN (1973 p. 5). During the flightless period goldeneye react very strongly on the approach of an aircraft by diving and scattering rapidly, and even when weather conditions favour longdistance observations the birds are often difficult to spot and count. When comparing aerial survey data with results obtained simultaneously from the ground it was often found that many birds were overlooked from the aircraft. Consequently it is strongly suspected that even in areas surveyed from the air during very good weather conditions, a relatively large pro-

portion of the birds present may have been overlooked.

In the Limfjord (particularly Hjarbæk Fjord) and also the fiords of western Jutland ground counts were very thorough and carried out several times during later years. Also some lakes in Jutland were visited repeatedly (see JEPSEN 1973 p. 4). However many lakes were only covered once, and a large number of both freshwater and salt-water habitats apparently suitable as moulting areas were only covered superficially or not at all. Most aerial surveys encompassed coastal and offshore waters around Jutland, whereas other waters particularly in the SE. parts of the country were only covered superficially (see JOENSEN 1973 p. 7).

In summary, the goldeneye is extremely difficult to observe from aircraft, and since many areas were only superficially covered or not at all covered, it is most probable that some moulting areas, particularly in the SE. parts of Denmark, have been overlooked. Consequently the total figures presented must be regarded as absolutely minimal for the number of goldeneye moulting in Denmark and surrounding waters.

Results

Most goldeneye wintering in Danish waters leave for their breeding grounds during April and May, and by the end of the latter month only few and generally small flocks are seen in Danish waters. Fig. 1 shows the distribution of goldeneye observed in June. Only in the Limfjord significant flocks have been found regularly in the period 1960–72, but elsewhere numbers are very small, and the total population in June probably does not exceed a couple of thousand birds.

In late June and early July the number

of birds increases considerably, and immigration continues through July and most of August.

The moult migration and time of moult of the different categories has been described by JEPSEN (1973). The succession of moult in the categories is juv. ♂♂, ad. ♂♂, juv. ♀♀ and ad. ♀♀, covering altogether a period of about three months from late June to late September.

The map Fig. 2 shows the distribution and numbers recorded in July–August, the principal moulting months. A distinction

has been made between areas where flightless birds were recorded, and areas where goldeneye were seen but no proof of moulting was found.

The largest concentration of moulting goldeneye has been found in the Limfjord, and Hjarbæk Fjord is by far the most important area. In later years the numbers here have been steadily increasing from about 2,300 in 1968 to about 4,000 in 1972 (JEPSEN 1973). Other important moulting areas in the Limfjord are Halkær Bredning, Ulvedybet, the northern part of Løgstør Bredning, Visby Bredning and Kilen, and in addition smaller flocks have been found less regularly in almost all other parts of the Limfjord.

The secondmost important moulting area is Ringkøbing Fjord in western Jutland, where up to 600 birds have been recorded. Elsewhere in Jutland smaller numbers of moulters have been recorded

more or less regularly in several localities, both fresh-water lakes, brackish-water fiords and also marine habitats in the Kattegat.

In later years the total number of goldeneye moulting in the Limfjord has been estimated at 6,000–11,000 and in other parts of Jutland and surrounding waters at about 2,000 birds.

In the islands and surrounding waters there are several observations of mostly small flocks, but occasionally flocks of a few hundred goldeneye in July–August. As indicated on the map (Fig. 2) few observations of flightless birds have been made. This suggests that the eastern parts of Denmark primarily serve as roosting areas for birds on their way to the principal moulting areas in northern and western Jutland. However, as mentioned above, surveys in these parts of the country were less intensive, and we cannot

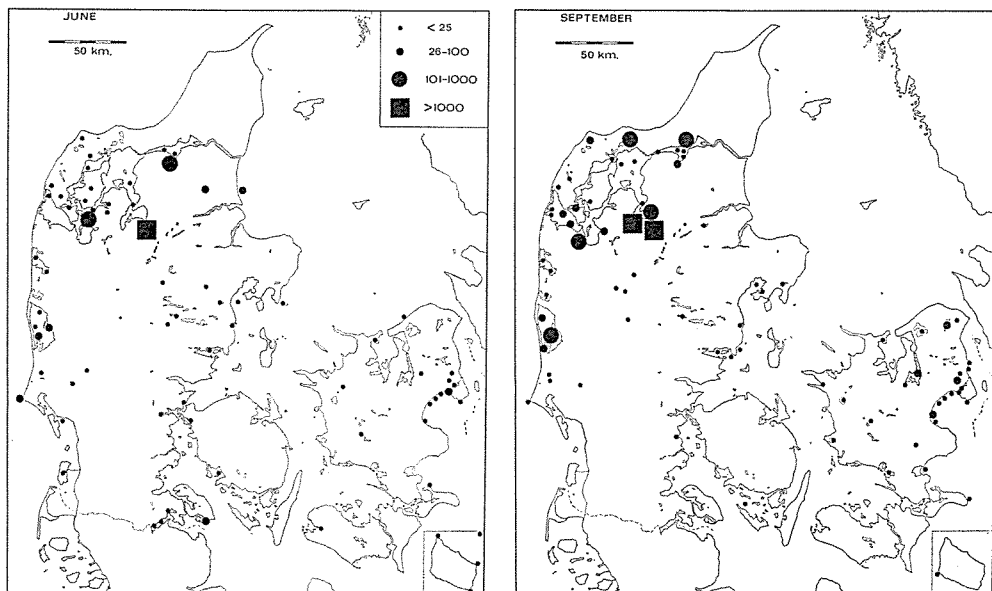


Fig. 1. The distribution of goldeneye recorded in June and September 1960–72.

Fig. 1. Den geografiske fordeling af hvinænder iagttaget i juni og september 1960–72.

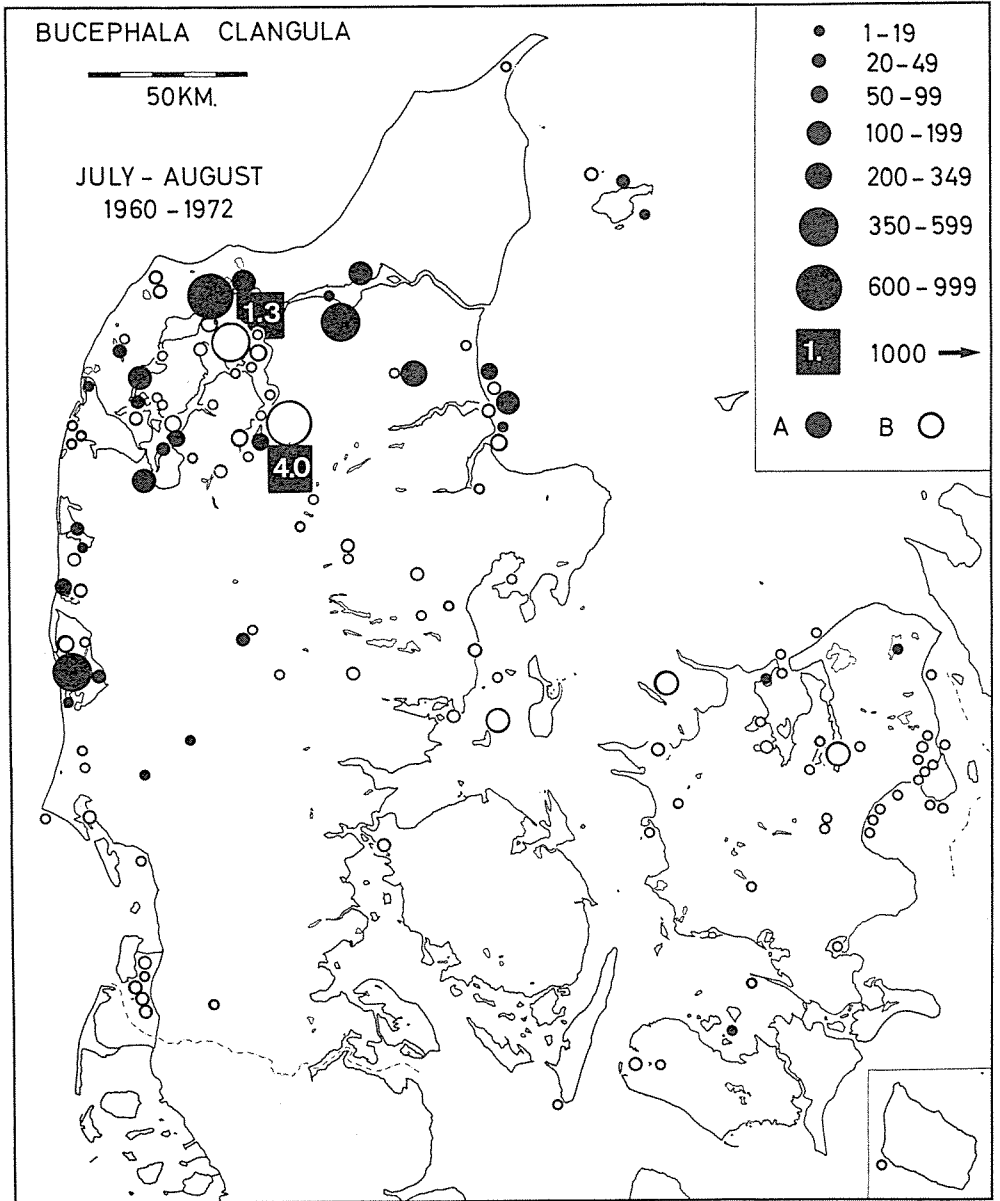


Fig. 2. The distribution and number of goldeneye recorded in the principal moulting months July-August 1960-72. Black signatures indicate localities where flightless birds have been observed, open circles localities where proof of moulting has not been found.

Fig. 2. Den geografiske udbredelse og antallet af hvinænder registreret i juli-august 1960-72. Udfyldte signaturer markerer områder, hvor afslæede fugle er observeret, mens åbne cirkler viser områder, for hvilke det ikke er bevist at fældning finder sted.

exclude that more moulting areas are yet to be found here.

The total number of goldeneye moulting in Denmark and surrounding waters can only be roughly estimated. The available data suggest an order of at least 12,000–14,000 birds, but the actual figure may well be some thousands higher.

The large majority of goldeneye have

completed their wing moult by early September (JEPSEN 1973). The distribution of birds recorded in September is shown in Fig. 1 and it is seen that most birds are still present in or near the main moulting areas. Later in the autumn the numbers increase in all Danish waters through the immigration of birds from the breeding areas.

Dansk resumé

Udbredelsen og antallet af fældende hvinænder (*Bucephala clangula*) i Danmark.

I årene 1966–72 gennemførte Vildtbiologisk Station en kortlægning og optælling af hvinænder på sommerfældningspladser i Danmark og omgivende farvande. Denne rapport behandler kun artens sommerforekomst i Danmark, mens fældnings-trækket, fældningens forløb hos de forskellige kategorier, samt biotopforholdene er beskrevet i en anden afhandling (JEPSEN 1973). Hvinandens fældningsperiode strækker sig fra ultimo juni til ultimo september.

Langt de fleste hvinænder gennemfører svingfjerfældningen i Limfjorden, hvor Hjarbæk Fjord er det vigtigste fældningsområde med omkring 4.000 fugle i de se-

nere år. I hele Limfjordsområdet fælder 6.000–11.000 hvinænder, på en række lokaliteter i det øvrige Jylland omkring 2.000, mens der kun kendes få sikre fældningslokaliteter på øerne og i de omgivende farvande. Det kan imidlertid ikke udelukkes at nogle fældningslokaliteter især i landets sydøstlige egne er blevet overset.

Hvinandens udbredelse i månederne juni og september ses i fig. 1 og udbredelsen i den vigtigste fældningsperiode juli-august fremgår af fig. 2. Der er i alt registreret 12.000–14.000 fældende hvinænder i Danmark, hvilket imidlertid må betragtes som et absolut minimumstal.

Резюме на русском языке

Распространение и численность гоголей (*Bucephala clangula*), линяющих в Дании

С 1966 по 1972 г., Станция Исследования Биологии Дичи отметила на карте и произвела учет гоголей на местах летней линьки в Дании. Настоящий отчет посвящен только летнему местонахождению этого вида в Дании, так как миграция на линьку, ход процесса линьки и биотопные условия описаны в отдельной статье (JEPSEN 1973). Период линьки гоголя продолжается от конца июля до конца сентября.

Преобладающее большинство гоголей проводит линьку маховых перьев в Лимфиорде, где главным районом линьки является Ярбек-Фиорд. За последние годы там наблюдалось около 4.000 птиц. Во всем районе Лимфиорда линяют 6.000–11.000 гоголей, в ряду участков остальной Ютландии около 2.000, между тем как на датских островах и окружающих их водах достоверно известно только немного

районов линьки. Однако, нужно учесть возможность того, что некоторые районы линьки, особенно в юговосточных краях страны, не были замечены.

Распределение гоголя в июне и сентябре месяцах показано в фиг. 1, а распределение в

течение главного периода линьки в июле и августе – в фиг. 2. Общим числом, в Дании зарегистрировано 12.000–14.000 линяющих гоголей, что однако следует считать абсолютным минимумом.

Literature

JEPSEN, P. UHØ, 1973: Studies of the Moulting Migration and Wing-feather Moulting of the Goldeneye (*Bucephala clangula*) in Denmark. – Danish Review of Game Biology Vol. 8 no. 6. 23 pp.

JOENSEN, A. H., 1968: Wildfowl Counts in Denmark in November 1967 and January 1968 – Methods and Results. – Danish Review of

Game Biology Vol. 5 no. 5. 72 pp.

JOENSEN, A. H., 1973: Moulting Migration and Wing-feather Moulting of Seaducks in Denmark. – Danish Review of Game Biology Vol. 8 no. 4. 42 pp.

SCHJØLER, E. LEHN, 1926: Danmarks Fugle. Andefugle II. – København.

- Part 3. Jørgen Fog: Dispersal and Survival of Released Mallards. (*Anas platyrhynchos* L.) pp. 1-57. 1964.
 Jørgen Fog: The Mallards from the Estate of Kongsdal. pp. 61-94. 1965.
 P. J. H. van Bree, Birger Jensen, L. J. K. Kleijn: Skull Dimensions and the Length/Weight Relation of the Baculum as Age Indications in the Common Otter. pp 97-104. 1966.
 Helge Walhovd: Reliability of Age Criteria for Danish Hares (*Lepus europaeus* Pallas). pp. 105-128. 1966.

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