DANISH REVIEW OF GAME BIOLOGY Vol. 10 no. 1

# Occurrence of Seals and Seal Hunting in Denmark

by
Anders Holm Joensen
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Резюме на русском языке

Распространение тюленя и охота на тюленей в Дании

COMMUNICATION NO. 133 FROM VILDTBIOLOGISK STATION
Vildtbiologisk Station, Kalø, 8410 Rønde, Denmark
1976

# DANISH REVIEW OF GAME BIOLOGY

The journal is published and distributed by the

## Game Biology Station, Kalø, 8410 Rønde, Denmark

Each paper is issued separately and when a number of papers have appeared (comprising ca. 200 pages) these will be collected in a volume together with a table of contents. The price will be set separately for each volume. For volume 5–10 it is 50 Danish Kroner per volume.

Editor: Anders Holm Joensen. – Assistant editor: Susanne Lykke-Hansen. – Russian summaries: Axel Mortensen. – Printed by Clemenstrykkeriet, Århus.

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# Introduction

In recent years several studies on seals have been initiated in northern Europe, and in some areas, for example the Waddensea and particularly the Baltic Sea, seal populations have been found to be declining as a result of increased human impact on their environment. In view of these findings, it was decided in 1975 to collect all the available information on seals in Denmark and surrounding waters for a report on the status of the seal species, with a main objective of determining population trends over the last decades, and of evaluating possible measures for the future conservation of seals in Denmark.

The status report was published in Danish in May 1976 (N.-O. SØNDERGAARD, A. H. JOENSEN, E. B. HANSEN: Sælernes forekomst og sæljagten i Danmark. – Danske Vildtundersøgelser, 26, 80 pp.), and the present publication, which was compiled from the comprehensive report, includes most of the information of international scientific interest. It should be emphasized that the original report was not the result of a large-scale research project on seals in Denmark. It was based on many different sources of information of very heterogeneous character, and most field data for example were collected in conjunction with research projects on other animal species conducted by the Game Biology Station. The available information constitutes an acceptable basis for a faunistic report on Danish seals. However, in Denmark several aspects of seal biology, including those important for conservation, have only been studied superficially or not at all.

The collection of seals was started in 1975 for analyses of their pesticide contents, diseases, and parasites. The Game Biology Station assisted in collecting animals, and analyses were made by the State Serum Laboratory (Section for Game Diseases) and the Royal Veterinary University in Copenhagen. As the study is still in progress, no preliminary results are included in the present report.


The authors express their gratitude to the Danish section of the World Wildlife Fund and to the Game Foundation for economic support in the compilation of the status report. In addition

they are indebted to the hundreds of people who supplied information for the report and assisted in various ways, including many hundred seal-hunters and other informants, game advisors, and pilots and observers engaged in aerial surveys conducted either with aircraft hired by the Game Biology Station, or placed at its disposal for waterfowl surveys by the Royal Danish Airforce and the Army Air Corps. Thanks are also due to the staff of the Game Biology Station for assisting in the compilation of data, particularly to Cand. scient. K. Fog, and to Cand. mag. P. Valentin-Jensen (Zoological Museum, Copenhagen) who placed at the authors' disposal data on seals received by the Museum in 1889/90, and Mag. scient. B. Møhl (Zoological Institute, University of Århus) who supplied data on age determination of these seals. The English manuscript was read by Dr. R. Russel, and the Russian summary translated by Mr. Axel Mortensen.

## Occurrence of seals before 1940

### PREHISTORIC TIMES

The occurrence of seals in Denmark and their exploitation by man, based on finds in prehistoric settlements, has been thoroughly described by Møhl (1970). During the period 6000–1000 B.C. *Halichoerus grypus* was the most intensively hunted seal species, its remains having been found in more than fifty settlements. *Pagophilus groenlandicus* was found in more than twenty settlements, whereas there are only a few records of *Pusa hispida* and *Phoca vitulina* from prehistoric Denmark. *Phoca vitulina* must have been much less abundant than in the period after 1500 A.D., although the frequent occurrence of *Halichoerus grypus* in settlements probably also resulted from this large gregarious species being particularly attractive to prehistoric hunters.

### 1500–1889

Seals are first mentioned in Danish literature at the beginning of the 16th century, but until about 1750 the information is too scanty for a general description of their occurrence in Danish waters. After the middle of the 18th century the number of sources in literature becomes more frequent. The early zoological literature contains little faunistic data, the most valuable information being found in topographical, economic descriptions of different large or small regions of the country. The fact that seals are often mentioned in this type of literature is entirely due to their economic importance, in the beginning primarily as sources of valuable products such as blubber and skin, but later also because of the damage they cause to fishing nets (see below).

During the period 1750–1889 seals had a much wider distribution in Danish waters than today, and seal populations were larger. They were hunted intensively in several areas with large concentrations of seals, and without doubt this exploitation was the primary reason for a gradual decline in numbers and eventual disappearance from several areas. Although many literature sources do not distinguish between the different species, it is possible to summarize the information as follows:

*Halichoerus grypus* bred in several areas (south of Lolland in the Baltic Sea, on Saltholm in the Øresund, and on several islands in the Kattegat) early in the period. Some populations must have originally been very large, but numbers decline due

to intensive exploitation. In the Kattegat a population decrease already took place before 1800, and during the 19th century most breeding grounds were abandoned, such that by the end of the century, only small numbers bred in two or three localities.

*Phoca vitulina* was widespread during the whole period and numerous in most areas, gradually becoming by far the dominant species. In the course of the 19th century numbers declined in many areas, but by the end of the period the species was still quite widespread and numerous in many areas.

*Pusa hispida;* there is little information on this species, but apparently it occurred regularly in the Øresund and adjacent waters about the middle of the 19th century, later gradually becoming a rare visitor.

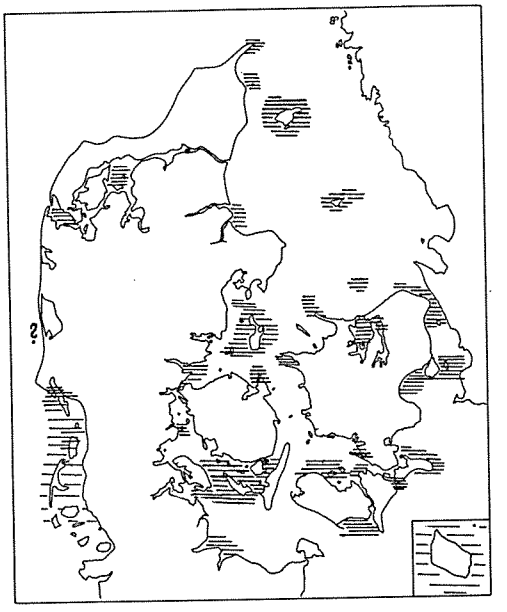


Fig. 1. The distribution of seals in Danish waters during 1750–1889.

Фиг. 1. Распределение тюленей в датских водах в периоде с 1750 по 1889 г.

Several literature sources describe the methods and tools used by the early seal-hunters in Denmark. Firearms were in use from early times, this being explained by the very high value of seal products and the fact that up to about 1840 seal-killing was reserved to the Crown and nobility. However several other methods were used, up to quite recent times the most important being to kill seals on breeding grounds with clubs or pickaxes. In some areas seals were killed by harpoons in their ice-holes during winter. Locally large iron hooks were fastened to stones or planks hidden in the sand. Nets of different kinds were occasionally used, e.g. south of Lolland, where a specially-designed trap was in use from about 1850 to 1950.

## 1889–1940

From the middle of the 19th century fisheries in Denmark developed considerably, becoming the major source of income for many coastal settlements and towns, instead of being mainly a side occupation of farmers and smallholders. Coastal fishery expanded first, and new, expensive and effective fixed nets were introduced. In spite of the fact that seal populations had already been considerably reduced, fishing nets suffered increasing damage. In order to control seal populations a government-financed bounty was introduced in 1889. It lasted until 1927, by which time damage to coastal fisheries had been considerably reduced, and open-sea fishery had become more important. It should be emphasized that besides the purpose of controlling seal populations, the intensive persecution of seals during the whole

period was also due to the high prices obtainable for blubber and skin.

The occurrence of seals in Denmark during 1889–1940 can be described in considerable detail. Basic data has been obtained from statistics on bounties published by Fisheries Unions (1889–1912) and the governmental fisheries department (1913–1927) (see Tables 1–3). In the first year (1889/90), skulls of killed seals had to be sent to the Zoological Museum in Copenhagen for species determination. This material has been used to illustrate the distribution of the different species (see Fig. 2). Age determination based on tooth structure was carried out on all *Phoca vitulina* specimens killed in 1889/90 (see Table 4). Furthermore considerable information on the occurrence of seals was found in fishing and shooting magazines and other literature, and interviews with older fishermen and hunters

| Year | no. seals | Year | no. seals | Year | no. seals | Year | no. seals |
|---|---|---|---|---|---|---|---|
| 1889 | 187 | 1900 | 1269 | 1910 | 1536 | 1920 | 302 |
| 1890 | 1123 | 1901 | 1369 | 1911 | 1895 | 1921 | 291 |
| 1891 | 998 | 1902 | 1471 | 1912 | 1662 | 1922 | 275 |
| 1892 | 1215 | 1903 | 1815 | 1913 | 625 | 1923 | 357 |
| 1893 | 1287 | 1904 | 1151 | 1914 | 491 | 1924 | 336 |
| 1894 | 1359 | 1905 | 1280 | 1915 | 435 | 1925 | 247 |
| 1895 | 1435 | 1906 | 1298 | 1916 | 489 | 1926 | 237 |
| 1896 | 1298 | 1907 | 1108 | 1917 | 483 | 1927 | 56 |
| 1897 | 1240 | 1908 | 1201 | 1918 | 544 | | |
| 1898 | 1469 | 1909 | 1510 | 1919 | 332 | | |
| 1899 | 1552 | | | | | | |
| Total | 13163 | | 13472 | | 8492 | | 2101 |
| % killed in decade | 35 | | 36 | | 23 | | 6 |
| Average per year | 1280 | | 1347 | | 849 | | 290 |

Table 1. The yearly number of seals killed for which bounty was paid, the average annual number, and the percentage of seals killed per decade during the period 1889–1927.

Табл. 1. Число тюленей, за которых выплачена правительственная премия в течение каждого года периода с 1889 по 1927 г.

| Period | 1st quarter Jan.–Mar. | 2nd quarter Apr.–June | 3rd quarter July–Sep. | 4th quarter Oct.–Dec. |
|---|---|---|---|---|
| 1893–1896 | 6 | 13 | 59 | 22 |
| 1897–1900 | 9 | 13 | 48 | 30 |
| 1901–1904 | 14 | 15 | 40 | 30 |
| 1905–1908 | 18 | 9 | 43 | 30 |
| 1909–1912 | 14 | 17 | 40 | 29 |
| 1893–1912 | 12 | 15 | 46 | 27 |

Table 2. The percentage quarterly distribution per five-year period of seals for which bounty was paid during 1893–1912, and the total quarterly distribution for the whole period.

Табл. 2. Распределение в процентах по кварталам года тюленей, за которые выплачена премия с 1893 по 1912 г., за каждый из пяти четырехлетних периодов и за все годы.

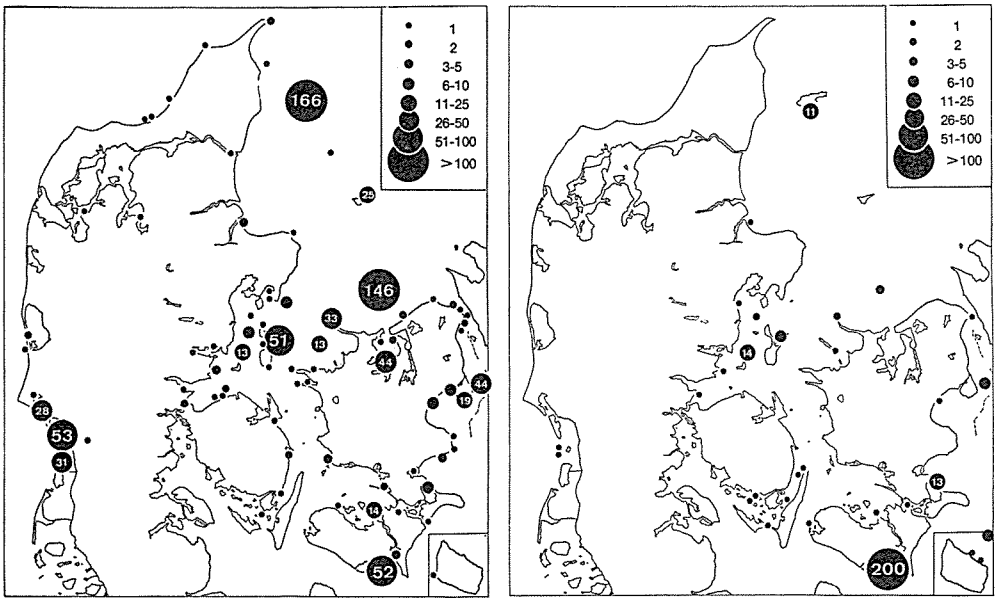



Fig. 2. Geographical distribution of 862 *Phoca vitulina* (left) and 304 *Halichoerus grypus* (right) killed in the first year of the bounty period, 1889/90.

Фиг. 2. Географическое распределение 862 *Phoca vitulina* (слева) и 304 *Halichoerus grypus* (справа), убитых в первый год периода правительственной премии, 1889/90.

| Year | *Ph. vitulina* No. | % | *H. grypus* No. | % | *P. hispida* No. | % | Total determined to species |
|---|---|---|---|---|---|---|---|
| 1889/90 | 882 | 74 | 304 | 25 | 8 | 1 | 1194 |
| 1918 | 329 | 60 | 207 | 38 | 8 | 1 | 544 |
| 1919 | 215 | 65 | 111 | 33 | 6 | 2 | 332 |
| 1920 | 242 | 80 | 57 | 19 | 3 | 1 | 302 |
| 1921 | 236 | 81 | 49 | 17 | 6 | 2 | 291 |
| 1922 | 199 | 72 | 76 | 28 | – | – | 275 |
| 1923 | 216 | 61 | 140 | 39 | 1 | – | 357 |
| 1924 | 240 | 71 | 91 | 27 | 5 | 1 | 336 |
| 1925 | 176 | 71 | 65 | 26 | 6 | 2 | 247 |
| 1926 | 218 | 92 | 18 | 8 | 1 | – | 237 |
| 1927 | 38 | 68 | 17 | 30 | 1 | 2 | 56 |

Table 3. The species composition of seals for which bounty was paid in 1889/90 and each of the years 1918–1927.

Табл. 3. Распределение по видам тюленей, за которые выплачена премия в 1889/90 г. и в каждом из годов с 1918 по 1927.

during 1970–75 added information on conditions going back to the early years of this century.

During the period 1889–1940, *Phoca vitulina* was by far the dominant species in all waters except the Baltic Sea. The population gradually decreased over its whole range, particularly in the Kattegat, Øresund, Storebælt and Baltic Sea, while appearing to have maintained its position somewhat better in the Limfjord and Waddensea. By about 1930, the species was restricted to areas which still have breeding populations of *Phoca vitulina* today.

The last small breeding populations of *Halichoerus grypus* disappeared early in the same period. Since then it has only occurred as a non-breeding visitor, scarce and intermittent in most waters, and only more regularly recorded in flocks in the Baltic Sea.

During the whole period *Pusa hispida* was a very scarce and irregular visitor to all Danish waters, comprising only about one percent of all bounty seals (Table 3).

Without doubt intensive persecution was the main reason for the general decline in seal populations in Denmark during 1889–1940, and which eventually led to the extinction of *Halichoerus grypus* as a breeding species. During a 37-year long period (1889–1927) bounty was paid on more than 37,000 seals, two-thirds of which were killed during the two first decades, in most years 1,200–1,500 seals being killed (Table 1). The drastic decline in bounties paid in 1913 is possibly due to an overestimation of numbers killed in the preceding years, but irrespective of this possible error, the number of seals killed continued to decline towards the end of the bounty period. Without doubt this was due to increasing difficulties in finding seals, caused by decreasing populations, first and foremost resulting from very intensive persecution.

In Table 2 the quarterly distribution of seals killed per 5-year period during 1893–1912 is given. A large proportion mainly consisting of new-born seals are killed during July–September, and during the whole period this proportion decreased as a result of the gradual reduction of the most easily accessible breeding populatons. Fig. 2 shows the geographical distribution of *Phoca vitulina* and *Halichoerus grypus* killed in 1889/90.

Table 4 shows the age composition of 890 *Phoca vitulina* sent to the Zoological Museum in Copenhagen in 1889/90. The age determination was done by B. Møhl, and based on tooth structure using the method of Jensen & Nielsen (1968). 82 % of the seals were less than one year old, most of them in fact being killed on the breeding-grounds when new-born. 1–3 year old animals comprised 8%, and 3–5 year old 2% of the total killed. The subsequent age classes maintain a fairly stable percentage of the total, e.g. 5–10 year old seals comprised 1.5%, 10–15

| Age years | No. | Age years | No. | Age years | No. | Age years | No. |
|---|---|---|---|---|---|---|---|
| <1 | 729 | 9–10 | 2 | 18–19 | 5 | 27–28 | 4 |
| 1–2 | 67 | 10–11 | 5 | 19–20 | 8 | 28–29 | 1 |
| 2–3 | 5 | 11–12 | 1 | 20–21 | 4 | 29–30 | 1 |
| 3–4 | 3 | 12–13 | 4 | 21–22 | 1 | 30–31 | – |
| 4–5 | 14 | 13–14 | 4 | 22–23 | 2 | 31–32 | – |
| 5–6 | 4 | 14–15 | 4 | 23–24 | 1 | 32–33 | – |
| 6–7 | 6 | 15–16 | 3 | 24–25 | – | 33–34 | 1 |
| 7–8 | 1 | 16–17 | 2 | 25–26 | 4 | 34–35 | 1 |
| 8–9 | 1 | 17–18 | 1 | 26–27 | 1 | | |

Table 4. Age composition of 890 *Phoca vitulina* killed in 1889/90. (Determined by B. Møhl, University of Århus, from tooth structures.)

Табл. 4. Возрастное распределение 890 *Phoca vitulina*, убитых в 1889/90 г., определенное В. Møhl по структуре зубов.

year olds 2.0%, 15–20 year olds 1.9%, 20–25 year olds 0.9%, and 25–30 year olds 1.2%. The two oldest animals were between 33 and 35 years old. The monthly percentage distribution of 770 seals killed was: Jan. 3%, Feb. 1%, March 2%, April 2%, May 2%, June 15%, July 24%, Aug. 24%, Sep. 10%, Oct. 10%, Nov. 6%, and Dec. 1%. The figures for both the age composition and the monthly distribution illustrate the selective character of seal-killing, and since the composition of this sample does not reflect the composition of the population, no further comment will be made here.

## Seals in Denmark 1940-1975

Subsequent to 1940 the occurrence of seals and seal-hunting in Danish waters can be described in more detail than for previous years. The most important sources of information were a) the official bag record, b) additional information from a questionnaire survey of seal-hunters, c) information from many local people throughout the country, and in particular d) observations of seals made in the field by the authors. The information from literature was of relatively little importance.

### MATERIAL

*The official bag record*

The official bag record, based on annual returns from nearly all holders of the compulsory shooting licence, illustrates the size of the annual seal-kill in the whole country since 1941/42 (Table 5) and in each county since 1958/59. For game species shot in small numbers the bag record can be influenced by several sources of error, and for seals, the bag record tends to underestimate the actual kill, particularly in the early part of the period. Altogether the figures obtained give only an approximate order of magnitude of the number of seals killed. The bag record figures from 1941–1974 (uncorrected and corrected) are given in Table 5.

*Information from seal-hunters etc.*

Very important information was derived from a questionnaire sent to seal-hunters in six seasons (1960/61, 66/67, 67/68, 68/69, 69/70, 73/74). About 800 hunters, who had reported nearly 1,900 seals killed in their returns, were asked to give detailed information on the seals shot (exact locality, month, and age), and general information on seal populations in their hunting area. Two-thirds of the hunters replied and gave detailed information on the bagged seals, and about half of their letters contained valuable information on seal populations.

In various magazines etc., naturalists, hunters, fishermen and the like were requested to inform the authors about seal observations, and during the preparation of the final report many enquiries were made to lighthouse keepers, fishermen, hunters etc. in areas were the occurrence of seals had been only slightly elucidated. In addition to seal-hunters, more than 200 individuals supplied information on the occurrence of seals in Danish waters.

*Field observations*

Since the early 1960's the Game Biology Station has carried out field observations of seals in Danish waters. Most observations were made during studies on other game species, in particular in waterfowl surveys, and only in later years have rather small scale systematic observations with particular emphasis on seals been conducted. The observations were made from small aircraft, boats, and along coasts.

It should be emphasized that counts of *Phoca vitulina* are very difficult, because this species never hauls out on land for longer periods like several other seal species, for example *Halichoerus grypus*. The seals can only be accurately counted when they lie on sand banks, stony reefs etc., and although a greater proportion of the populations is generally present on such sites

during the breeding months (June–August) than in other seasons, the actual number which can be recorded will always be influenced by several varying factors, for example the time of day, the tide, the immediate weather situation, the degree of human disturbance in general, and during the preceding hours in particular. Furthermore seals in Danish waters are extremely shy, often going into the water on the approach of an observer. Thus, in most cases, the number of seals recorded constitutes only part of the population in the area surveyed, and it is only possible to estimate the population accurately through frequent observations over a long period. Field observations primarily serve the purpose of elucidating the distribution of seals, while also giving an idea of the relative magnitudes of the different populations. Furthermore observations of new-born seals (which are less shy than older animals) are important for the overall evaluation of breeding activity.

*Aerial surveys:* Since 1966 the Game Biology Station has conducted aerial surveys of coastal and offshore waters in Denmark, with the primary purpose of mapping and counting waterfowl populations (JOENSEN 1973, 1974), and concurrently seals were recorded whenever possible. The total number of seals recorded in aerial surveys exceeded ten thousand. Of almost one thousand hours spent in aerial survey, only one-third were in the period April–September, the time most favourable for seal counts. A large proportion of the surveys were conducted under conditions which gave acceptable results for waterfowl but which were unsuitable for seal counts. As a result, even in areas with large populations of seals, many surveys resulted in no seals being recorded. In the summer of 1975 some surveys were conducted of seals alone under optimal conditions, and in particular the recording of newborn seals was of great value. A list of all observations (area, year, month) was published in the comprehensive seal report (SØNDERGAARD et al. 1976), and information on methods used in aerial surveys is in JOENSEN (1973, 1974).

| | Number killed | | | Number killed | |
|---|---|---|---|---|---|
| Year | Uncorrected | Corrected | Year | Uncorrected | Corrected |
| 1941/42 | 715 | | 1958/59 | 525 | 632 |
| 1942/43 | 437 | | 1959/60 | 414 | 509 |
| 1943/44 | 685 | | 1960/61 | 417 | 486 |
| 1944/45 | 387 | | 1961/62 | 293 | 350 |
| 1945/46 | 641 | | 1962/63 | 279 | 349 |
| 1946/47 | 409 | | 1963/64 | 373 | 433 |
| 1947/48 | 608 | | 1964/65 | 385 | 451 |
| 1948/49 | 634 | | 1965/66 | 342 | 415 |
| 1949/50 | 527 | | 1966/67 | 450 | 543 |
| 1950/51 | 486 | | 1967/68 | 286 | 340 |
| 1951/52 | 655 | | 1968/69 | 273 | 333 |
| 1952/53 | 530 | | 1969/70 | 245 | 277 |
| 1953/54 | 470 | | 1970/71 | 282 | 312 |
| 1954/55 | 399 | 517 | 1971/72 | 169 | 175 |
| 1955/56 | 428 | 548 | 1972/73 | 182 | 203 |
| 1956/57 | 640 | 806 | 1973/74 | 279 | 306 |
| 1957/58 | 461 | 529 | | | |

Table 5. The annual seal-kill in Denmark during 1941/42–1973/74, according to the official bag record. Left-hand value; the number reported by hunters. Right-hand value; corrected numbers, allowing for approximately 15% of licence questionnaires not returned by hunters.

Табл. 5. Годовая охотничья добыча тюленей в Дании с 1941/42 по 1973/74 г. по официальной статистике охотничей добычи. Левый столбец: числа по заявкам охотников. Правый столбец: числа с поправкой на анкеты, не заполненные охотниками (прибл. 15 %).

*Observations from boats and coasts:* In later years the authors have visited all known and many potential seal haunts in Danish waters, and in some areas visits have been fairly frequent particularly during summer, when valuable information on breeding activity such as finds of *placentae* can be gained.

## DISTRIBUTION AND POPULATIONS OF *Phoca vitulina*

The comprehensive report (SØNDERGAARD et al. 1976) provides detailed information on populations and trends, shooting exploitation, occurrence of ill seals and factors influencing the general welfare of *Phoca vitulina* in different waters from 1940 up to 1975. Thus here only a brief summary is given.

Recoveries of seals marked in the Dutch and German parts of the *Waddensea* show that the seal population in these waters can be regarded one unit. In the Danish Waddensea the population was very large in the 1940's but gradually it declined until apparently stabilising in the 1950's. The present population is estimated at 500–600 in late summer, including roughly 150 new-born seals. The most important breeding grounds today are in the western central part around the islet of Mandø, but since 1940 the breeding area has been considerably restricted by human disturbance (see Fig. 3). In very recent years frequent disturbance by tourists has become a great threat even to the more remote breeding grounds.

There are no breeding grounds along *western and northern coasts of Jutland*, but visiting seals are often recorded, mostly as single individuals, and in recent years less frequently than 10–20 years ago.

In the *Limfjord* there are breeding populations in the westernmost part (Nissum Bredning) and the central part (Løgstør-Livø Bredning). The distribution of the species has been somewhat restricted during recent decades, but generally the population appears fairly stable, in later years being estimated at approximately 200 seals in late summer, including 40–50 new-born seals. Disturbance and hunting pressure have increased considerably here in later years.

The *northern Kattegat* contains two large populations, which have been fairly stable during recent decades. At Læsø the population in later years has been estimated at 400–500, including approximately one hundred new-born seals, and at Anholt there are about 150 seals, including about fifty new-born. This island is regularly visited by flocks from other breeding-grounds in the Kattegat. In addition, a very small breeding population exists along the east coast of Jutland.

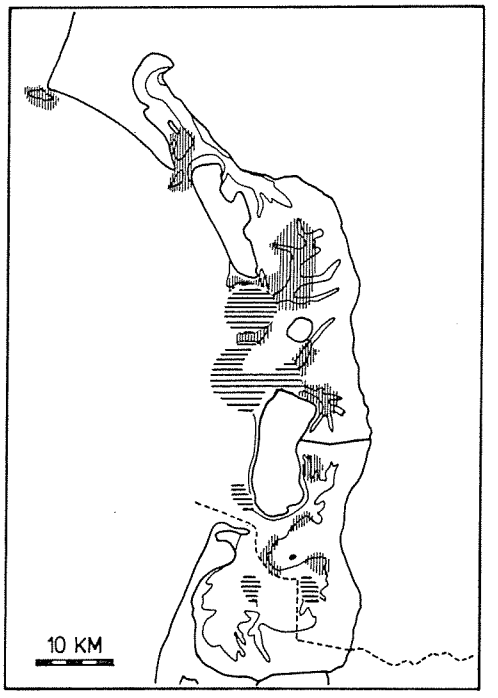



Fig. 3. The Danish Waddensea, showing the present concentrations of *Phoca vitulina*. Horizontal hatching: Very important breeding-grounds and concentrations. Vertical hatching: Less important breeding-grounds and concentrations. Single individuals and small groups occasionally occur in all other parts of the area, particularly in autumn and winter.

Фиг. 3. Датская часть морских отмелей к югозападу от Ютландии. Показаны районы скоплений *Phoca vitulina* в настоящее время. Горизонтальная штриховка: очень важные лежбища для размножения и районы скопления. – Вертикальная штриховка: Менее важные лежбища для размножения и районы скопления. – Отдельные особи и небольшие группы иногда встречаются во всех других участках данного пространства, в особенности осенью и зимой.

In the *south-eastern Kattegat* a protected area for seals was established at Hesselø in 1951, and in recent decades this is the only breeding-ground showing a marked population increase. The present population is estimated at over 500, including approximately 150 new-born. At nearby Sjællands Rev the summer population is probably less than fifty seals, but flocks from Hesselø occur regularly at other seasons.

In the *south-western Kattegat* the seal population has declined considerably in recent decades, particularly on the islets east of Samsø, where the present population is probably less than 25. A larger population, estimated at 75–125 in summer, occurs west of Samsø. In a few other areas breeding activity may occasionally occur on a very small scale.

In the *Lillebælt, Storebælt, and South Funen Archipelago* there have been no breeding populations during 1940–1975, and visiting seals are only seldom recorded.

In the *Smålandshavet*, a small, rather isolated breeding population of 15–25 seals has been in existence during the whole period.

In the *Øresund* the population has declined, and the breeding area diminished. Breeding only occurs today on Saltholm, and the total population in recent years has probably been 10–15.

Between *Møn and Sealand* there is still a small declining breeding population, of no more than 15–20 animals today.

Waters south of *Lolland (Rødsand)* formerly had very large seal populations. In the 1940's the breeding population must have been more than 100, and occasionally a few hundred visiting seals were observed. However numbers gradually declined, particularly after 1965, and today the area probably holds less than twenty seals. Capture in nets (up to the 1950's), intensive shooting, and in later years human disturbance, are the most evident reasons for the decline.

On *Bornholm* during 1940–1975 the species has only occurred as a scarce and irregular visitor.

The map in Fig. 4 shows the breeding areas and estimated populations of *Phoca vitulina* in the 1970's. In order to avoid too much public interest in breeding grounds the exact localities are not shown (see also p. 15). It must be emphasized that the population estimates are very approximate and only indicate the order of magnitude. This is particularly true for the total of well over 2,000 seals, obtained by addition of sub-population estimates. The total population in late summer is certainly more than 1,500 but unlikely to exceed 3,000.

Nowadays, breeding activity is confined to about twenty-five small, well-defined islets, sand banks etc. The largest concentrations of seals outside the breeding season also occur here. Particularly in autumn, single individuals and small groups regularly visit areas away from the breeding grounds (see Fig. 4), but the number of stragglers has been declining in recent years. Larger flocks occasionally move from one island to another. Seals marked in the German Waddensea and recovered in Danish waters (usually along the west coast of Jutland, but in one case in the Kattegat) show that juvenile individuals at least may move considerable distances.

## OCCURRENCE OF *Halichoerus grypus* AND *Pusa hispida*

Fig. 5 shows confirmed records of *Halichoerus grypus* during 1940–1975. With the exception of new-born pups found on the ice at Bornholm in the unusually severe winters of the early 1940's, the species has not bred in Danish waters during this period. In most waters it is a rare visitor, only Læsø and Anholt in the Kattegat and Rødsand and possibly Bornholm in the Baltic Sea being regularly visited by

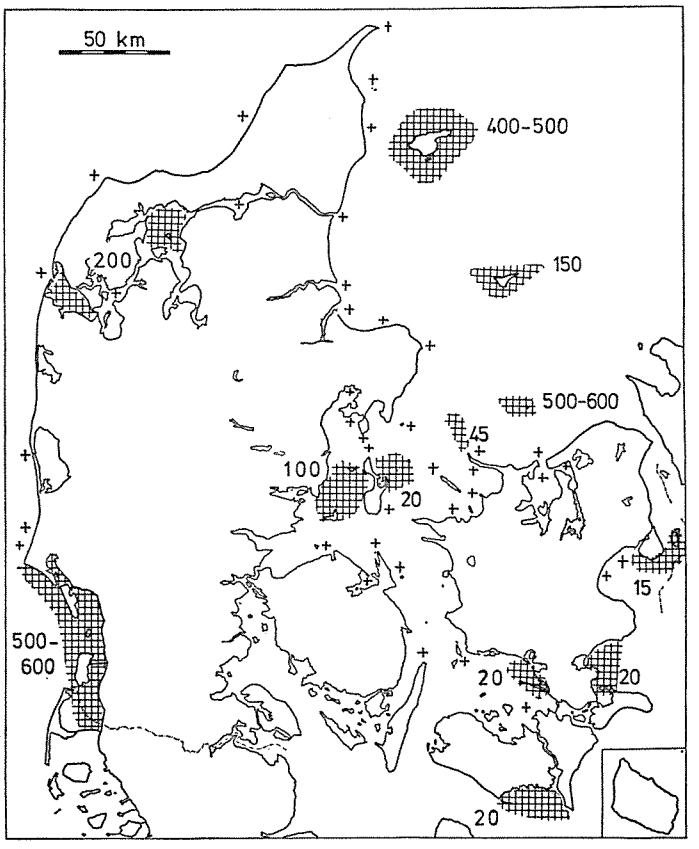
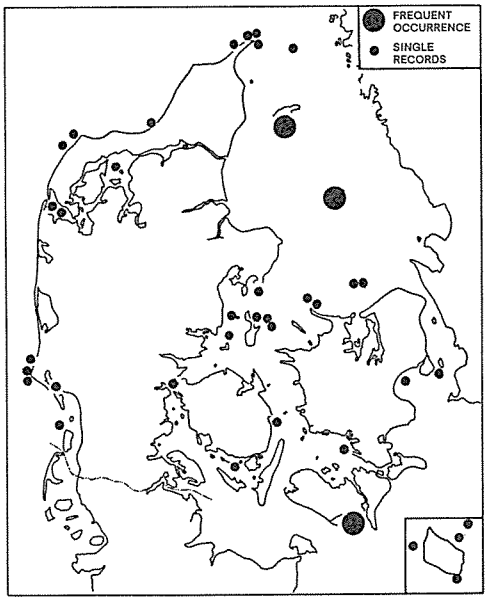



Fig. 4. The distribution of *Phoca vitulina* in Danish waters in the 1970's. Hatching shows breeding areas with more than fifteen seals, and the estimated late summer population is indicated. Crosses indicate localities where single individuals or small groups regularly occur, mainly outside the breeding season.

Фиг. 4. Распределение *Phoca vitulina* в датских водах в 1970-х годах. Штриховкой обозначены лежбища для размножения, обитаемые более чем 15 тюленями, и указана численность популяций поздним летом. Крестами обозначены местности, где отдельные особи или небольшие группы встречаются регулярно, главным образом вне сезона размножения.




groups; in recent years up to forty have been recorded at Anholt. Several pups marked on Farne Island in Great Britain have been found a few months later along the west coast of Jutland (Hewer 1974). In other waters both juvenile and full-grown animals have been recorded.

During the period 1940–1975 there were only one or two records of *Pusa hispida* in Danish waters.

Fig. 5. Records of *Halichoerus grypus* in Danish waters during 1940–75 (see also text).

Фиг. 5. Зарегистрированные встречи *Halichoerus grypus* в датских водах с 1940 по 1975 г.

## SEAL-HUNTING

Until 1967 seals were not generally protected in Denmark. At Læsø in the northern Kattegat protection during June–August was introduced in 1960, and with introduction of the Game Act of 1967 this was applied to *Phoca vitulina* in the whole of Denmark. At the same time other seal species became totally protected.

In the 1940's and part of the 1950's, prices of blubber and skin remained high, constituting an important motive for seal-hunting in Denmark. Thus several hunters shot large numbers of seals to derive a considerable extra income. With a decline in the price of seal products, and growing difficulty in shooting large numbers of seals (due to decreasing populations) the professional seal-hunter gradually disappeared, and in later years sport has been the main motive for seal-hunting, as for most other hunting in Denmark in general. Whereas in the early part of the period a very large proportion of the kill was due to hunters specialising in seals, each of whom killed many, nowadays seals are shot more by chance and the individual hunter's annual bag seldom exceeds 1–2 seals.

The official bag record although it contains sources of error gives an approximate idea of the hunters' kill and the downward trend of the annual bag (Table 5). During 1941–1973 the annual kill has gradually decreased, in later years comprising 200–300 seals, or approximately one-quarter of the annual kill at the beginning of the period. Table 7 shows the percentage distribution of seals killed in different areas. The large majority of seals are shot on or near major breeding grounds, which during the shooting season also hold the largest seal concentrations. Very few seals are shot in waters which do not have resident seal populations.

Table 7 shows the monthly distribution of 546 seals killed during six seasons, of which three were before and three after the introduction of summer protection. In both periods most seals were shot in autumn (September–November), but with the introduction of a closed season during summer, the proportion shot during December to May increased from 15% to 25%. According to information from hunters, about two-thirds of the kill consists of seals less than one-year old.

| | | 1960/61 | 1966/67 | 1967/68 | 1968/69 | 1969/70 | 1973/74 | Area average |
|---|---|---|---|---|---|---|---|---|
| Waddensea | % | 48 | 32 | 26 | 29 | 28 | 28 | 33 |
| Limfjord | | 7 | 10 | 12 | 11 | 17 | 19 | 12 |
| North Kattegat | | 8 | 20 | 26 | 22 | 10 | 21 | 18 |
| South Kattegat | | 20 | 24 | 25 | 28 | 26 | 28 | 25 |
| Øresund | | 1 | 1 | – | 1 | 11 | 2 | 2 |
| Storstrøm County | | 14 | 13 | 10 | 8 | 7 | 2 | 9 |
| Other waters | | 1 | – | 1 | – | – | 1 | 1 |
| Total number of seals reported | | 249 | 205 | 242 | 203 | 96 | 187 | |

Table 6. The geographical distribution of seals killed during six seasons, based on information from seal-hunters from the questionnaire survey.

Табл. 6. Географическое распределение тюленей, убитых за шесть сезонов, на основании сведений, полученных анкетным опросом охотников (в процентах).

| | | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60/61 66/67 67/68 | no. | 4 | 6 | 5 | 43 | 27 | 70 | 50 | 33 | 16 | 11 | 2 | 2 | 269 |
| | % | 1 | 2 | 2 | 16 | 10 | 26 | 19 | 12 | 6 | 4 | 1 | 1 | |
| 68/69 69/70 73/74 | no. | 11 | 15 | – | – | – | 77 | 99 | 31 | 24 | 10 | 4 | 6 | 277 |
| | % | 4 | 5 | – | – | – | 28 | 36 | 11 | 9 | 4 | 1 | 2 | |

Table 7. The monthly distribution of 546 seals killed during six seasons, of which three were before and three after the introduction of a closed season (June-August).

Табл. 7. Распределение по месяцам 546 тюленей, убитых за шесть сезонов, из которых три перед, и три после введения летнего запрещения охоты (с июня по август).

## Conclusions

This report has described trends in Danish seal populations over 300 years, and for the last 100 years in particular the information available was sufficient to allow a fairly detailed description of trends. The overall trend has been a constant reduction in distribution and numbers of seal populations. *Halichoerus grypus* disappeared as a breeding species in about 1900, and populations of *Phoca vitulina* have also decreased, without doubt as the result of intensive hunting, which at times took the character of ruthless persecution.

The present population of *Phoca vitulina* in late summer has been estimated as roughly 2,000. Some local populations seem fairly stable, and in one area (Hesselø) a notable increase has even occurred, but in several areas, particularly the SW Kattegat, Øresund and other waters of south-eastern Denmark, the decline has continued, and some populations are at present so small that their continued existence is endangered. Without doubt the present total population is considerably smaller than that of 30 years ago. Although the occurrence of *Phoca vitulina* in Denmark does not appear threatened, the situation is obviously critical in some areas and conservation measures are urgently required.

Since there is an evident lack of knowledge on several biological aspects, no attempt will be made to discuss all the potential factors which may have influenced population trends over recent decades. It is however relevant to discuss some human factors, such as seal-hunting, disturbance and the pesticide-disease problem.

*Seal-hunting:* In recent years, the annual seal-kill has comprised approximately 10–15% of the late summer population. No information is available on reproductive or mortality rates or population turnover in Danish seal populations, on which an estimate of the maximum annual tolerable kill could be based. However information from other countries and other seal species indicates that in a stable population, the maximum tolerable harvest is of the order of 5–10%. On this basis it can be concluded that seal-hunting is possibly

restraining the Danish seal population, and certainly giving it little or no possibility of recovery. Furthermore it is obvious that in the case of some of the very small local populations, the shooting of single individuals (e.g. a pregnant female) can be critical for the survival of the species in that area.

*Disturbance, particularly on breeding-grounds:* Without doubt the overall increase in marine traffic has caused a deterioration in the seals' environment. In recent years in particular, increasing disturbance by tourism on breeding-grounds in summer has caused great concern. A few breeding-grounds are still relatively unaffected by this type of traffic, but in several areas the impact of disturbance has grown rapidly and tremendously. In many areas adult females with newborn pups are disturbed repeatedly almost every day, and although it is not possible to evaluate the actual impact of such disturbance on the welfare of the pup, it seems reasonable to consider increasing disturbance as one of the most dangerous threats to Danish seal populations. The disturbance pressure on seal haunts has also increased considerably outside the breeding season, for example in several areas where seal-shooting exists.

*Pesticides and diseases:* This problem is being studied in Denmark at present (see p. 2), and the preliminary results will not be commented on here. The presence of large numbers of unhealthy seals (often with wounds and abcesses) in recent years, first in the Waddensea and more recently also in the northern and central Kattegat, is an indication of abnormal conditions in the seal population.

In view of the existence of these potentially negative factors, and further inspired by the conservation policies of other countries in recent years, the authors of this report recommend that the following experimental measures be immediately taken:

1) The shooting-season for *Phoca vitulina* should be reduced. – 2) In waters where it is endangered the species should be fully protected. – 3) Experimental reserves should be established in areas where disturbance in breeding-grounds is considered critical. Such reserves should comprise the actual breeding-grounds and surrounding areas of water, within which marine traffic should be restricted as much as possible.

It must be emphasized that although such measures are urgently required, they are at the same time only preliminary, and should be followed up by continued monitoring of the general state of seal populations in Denmark, and of the effect of the measures in particular. Only in this way can a suitable long-term conservation policy be gradually developed.

Резюме на русском языке

# Распространение тюленя и охота на тюленей в Дании

## Введение

В 1975 г. было решено собрать все доступные сведения о тюленях в Дании и окружающих водных пространствах и составить отчет о положении, причем главной целью было определение тенденций популяций за последние десятилетия, и оценка возможных мероприятий для сохранения тюленей в будущем.

Отчет о положении был опубликован в мае 1976 г. (N.-O. Søndergaard, A. H. Joensen, E. B. Hansen: Sælernes forekomst og sæljagt i Danmark. – Danske Vildtundersøgelser, 26, 80 pp.) на датском языке, и настоящая публикация является выдержкой из полного отчета.

Следует подчеркнуть, что отчет не является результатом обширного исследовательского проекта, посвещенного тюленям Дании. Он основан на большом числе разных источников информации очень разнообразного характера, и напр. большинство полевых данных собрано попутно с проектами исследований других видов, проведенными Станцией Исследования Биологии Дичи.

В 1975 году началось собирание тюленей для анализов их содержания пестицидов, их болезней и паразитов. Это исследование еще в процессе становления, и его предварительные результаты по этому не будут обсуждаться в настоящем отчете.

## Распространение тюленей до 1940 г.

### Доисторические времена

Распространение тюленей в Дании и их использование человеком на основании находок в доисторических поселениях подробно описал Møhl (1970). В течение периода с 6000 по 1000 г. до нашей эры, *Halichoerus grypus* был видом тюленя, на который велась самая интенсивная охота, и остатки его найдены в более чем 50 поселениях. *Pagophilus groenlandicus* найден в более чем 20 поселениях, между тем как из доисторической Дании имеется только немного находок, свидетельствующих о *Pusa hispida* и *Phoca vitulina*.

### Период с 1500 по 1889 г.

Тюлени впервые упомянуты в датской литературе в начале 16 столетия, но сведения, имеющиеся до прибл. 1750 г., слишком редки для того, чтобы дать общее описание их распространения в датских водах.

С середины 18 столетия число литературных источников сильно увеличивается. Что тюлени часто упоминаются в литературе, полностью объясняется их промысловым значением, сначала главным образом как источников таких ценных продуктов как ворвани и меха, а со временем также из за причиняемых тюленями повреждений рыболовных сетей.

В течение периода с 1750 до 1889 г., тюлени были гораздо более широко распространены в датских водах, чем в наше время, и популяции были многочисленнее. В нескольких районах с большими концентрациями тюленей на них велась интенсивная охота, и это использование их несомненно было основной причиной постепенного уменьшения численности и исчезновения их из нескольких участков моря.

*Halichoerus grypus* в начале периода размножался в нескольких морских районах (к югу от острова Лоллан в Балтийском море, на острове Сальтхольме в Зунде и на нескольких островах Каттегата). Некоторые из популяций вероятно были очень многочисленны, но вследствие интенсивной охоты численность их сокращалась. В Каттегате сокращение произошло уже до 1800 г., и в течение 19 столетия большинство лежбищ для размножения было покинуто. В конце столетия только небольшое число тюленей размножалось в двух-трех местностях.

*Phoca vitulina* в течение всего периода был широко распространенным и многочисленным видом в большинстве участков моря, и постепенно стал далеко преобладающим видом. В течение 19 столетия, численность во многих водных пространствах сократилась, но этот вид всё еще был распростра-

нен довольно широко, и во многих водах в конце периода встречался в большом числе.

*Pusa hispida.* Об этом виде сведений немного, но он, очевидно, регулярно встречался в Зунде и смежных с ним водах около середины 19 столетия, а затем стал редким посетителем.

В нескольких литературных источниках описаны способы и орудия, которыми пользовались древние датские охотники на тюленей. Огнестрельное оружие применялось довольно рано, что объясняется высокой ценностью тюлених продуктов, а также фактом, что охота на тюленей до прибл. 1840 г. была исключительным правом казны и дворянства. Однако, применялись и разные другие способы, важнейшим из которых до сравнительно недавнего времени был убой тюленей на их лежбищах для размножения дубинами и мотыгами. В некоторых местностях, тюленей зимой убивали гарпунами в их ледяных норах. Местами, к скрытым под песком камням и бревнам прикрепляли большие железные крюки. Иногда применялись и сети разных типов, напр. к югу от острова Лоллан, где специально устроеная ловушка была в употреблении с прибл. 1850 до 1950 года.

## Период с 1889 по 1940 г.

С середины 19 столетия, в Дании широко развилось прибрежное рыболовство, и были введены новые, эффективные и дорогие типы ставных неводов. Несмотря на то, что популяции тюленей уже значительно сократились, они в возрастающей степени повреждали рыболовные сети. С целью регулирования численности тюленей в 1889 г. была введена правительственная премия, оставшаяся в силе до 1927 г. Следует подчеркнуть, что кроме желания регулировать популяцию, очень важным побуждением к интенсивному преследованию тюленей в течение всего периода служили высокие цены на ворвань и мех.

В течение периода с 1889 по 1940 г., *Phoca vitulina* был далеко преобладающим видом во всех участках моря за исключением Балтийского моря. Популяция постепенно уменьшалась во всех водах, особенно в Каттегате, Зунде, Большом Бельте и Балтийском море, между тем как она, повидимому, несколько лучше сохранялась в Лимфиорде и на морских отмелях у югозападной Ютландии. Около 1930 г., распространение этого вида было ограничено на те районы, где и в настоящее время происходит размножение *Phoca vitulina.*

Последние небольшие размножающиеся популяции *Halichoerus grypus* исчезли в начале указанного периода, и с тех пор этот вид встречался только в качестве не размножающегося посетителя, в большинстве морских участков редкого и нерегулярного, и только в Балтийском море регулярно встречающегося стадами.

В течение всего периода, *Pusa hispida* был очень редким и нерегулярным посетителем всех датских морских участков, составлявшим только около одного процента охотничей добычи тюленей (см. табл. 3).

Без сомнения, интенсивное преследование было главной причиной общего сокращения популяции тюленей в Дании с 1889 по 1940 г., постепенно дошедшего до того, что *Halichoerus grypus* вымер как размножающийся вид. За 37-летный период правительственной премии (1889–1927), премия была выплачена за более чем 37.000 тюленей. Две трети их были убиты в течение первых двух десятилетий, и в большинстве отдельных годов было убито по 1.200–1.500 тюленей (Табл. 1). Резкое понижение суммы выплаченных премий в 1913 г. может объясняться слишком высокой оценкой чисел тюленей, убитых за предыдущие годы, но невзирая на эту возможную ошибку, число убитых тюленей к концу периода премии постоянно уменьшалось. Это несомненно объясняется возрастающими трудностями охоты на тюленей вследствие сокращения популяций, прежде всего вызванного очень интенсивным преследованием их.

Табл. 4 показывает распределение по возрасту 890 *Phoca vitulina,* присланных Зоологическому Музею г. Копенгагена в 1889/90 году. Определение возраста произвел B. Møhl на основании структуры зубов способом, описанным Jensen & Nielsen (1968). 82 % тюленей были моложе одного года – большинство их было убито даже новорожденными на лежбищах для размножения. Животные 1–3 летнего возраста составляли 8 %, 3–5 летние 2 %. Последующие возрастные классы держаться на довольно равномерном уровне, напр. 5–10 летние тюлени составляют 1,5 %, 10–15 летние 2,0 %, 15–20 летние 1,9 %, 20–25 летние 0,9 %, и 25–30 летние 1,2 %. Две старшие особи были 33–34 и 34–35 летнего возраста. Распределение 770

убитых тюленей по месяцам года было следующее: январь 3%, февраль 1%, март 2%, апрель 2%, май 2%, июнь 15%, июль 24%, август 24%, сентябрь 10%, октябрь 10%, ноябрь 6% и декабрь 1%. Распределение, как по возрасту, так и по месяцам, иллюстрирует селективный характер охоты на тюленей, но так как состав этого образца не иллюстрирует состава популяции, он в настоящем труде более подробно не обсуждается.

## Тюлени в Дании с 1940 по 1975 г.

### Материалы

Официальная статистика охотничей добычи

Официальная статистика охотничей добычи, основанная на ежегодных отчетах почти всех владельцев обязательного охотничего билета, иллюстрирует объём годовой добычи тюленей по всей стране с 1941/42 г., и по отдельным областям с 1958/59 г. (см. табл. 5). Полученные данные дают только грубое представление о численности добычи тюленей.

Сведения от охотников на тюленей и пр.

Очень важные сведения извлечены из анкетного опроса охотников на тюленей за шесть сезонов (1960/61, с 1966/67 по 1969/70, 1973/74 г.). Около 800 охотников, подавших заявления для официальной статистики охотничей добычи о почти 1.900 убитых тюленях, были попрошены дать более подробные сведения об убитых тюленях (точное местонахожение, месяц, возраст), а также общие сведения о популяциях тюленей в их охотничьих угодьях. Получены ответы от двух третей этих охотников. Кроме охотников, 2–300 других лиц дали сведения о встречах тюленей в датских водах.

Полевые наблюдения

С начала 1960-х годов, Станция Исследования Биологии Дичи проводила полевые наблюдения тюленей в датских водах. Большинство наблюдений проводилось попутно с исследованиями другой дичи, прежде всего водоплавающих птиц, и только за последние годы проводились систематические наблюдения довольно небольшого масштаба, специально касавшиеся тюленей.

Авиаучеты: С 1966 г., Станция Исследования Биологии Дичи проводила наблюдения с самолетов прибрежных и более дальных морских пространств Дании, основной целью которых были нанесение на карту и учет популяций водоплавающих птиц (JOENSEN 1972, 1974), а попутно регистрировались тюлени, где это было возможно. Общая длительность наблюдений с самолетов составляла почти 1.000 часов, но только одна треть их происходила в период с апреля по сентябрь, наиболее благоприятный для учетов тюленей. Значительная часть наблюдений проводилась в условиях, дающих приемлемые результаты для водоплавающих птиц, но неблагоприятных для учета тюленей. В результате этого, при многих наблюдениях, даже в районах с многочисленными популяциями тюленей, тюленей не было зарегистрировано. Летом 1975 г. было проведено несколько специальных наблюдений тюленей в оптимальных условиях, и особенно данные, полученные регистрацией новорожденных тюленей, очень ценны. Общее число тюленей, учтеных при авиаучетах, превышает десять тысяч. Перечень всех учетов (район, год, месяц) опубликована в полном отчете о тюленях (SØNDERGAARD et al., 1976), а информация о методике учетов дана JOENSEN (1972, 1974).

Наблюдения с лодок и берегов: В течение последних годов, авторы посетили все известные и многие возможные убежища тюленей в датских водах, и некоторые из районов посещались довольно часто, особенно летом, причем между прочим были раздобыты ценные сведения об активности размножения (находки плацент).

### Распространение и популяции *Phoca vitulina*

Полный отчет (SØNDERGAARD et al., 1976) содержит подробную информацию о популяциях и их тенденциях, об охотничем использовании, встречах больных тюленей и факторах, влияющих на общее благосостояние *Phoca vitulina* в разных водных пространствах с 1940 г. по 1975 г. В следующем дается только краткая сводка:

На карте фиг. 4 показаны лежбища для размножения и оцененная численность популяций *Phoca vitulina* в 1970-х годах. Следует подчеркнуть, что оценки численности очень грубы и только указывают порядок

её величины. Это в особенности касается суммы свыше 2.000 тюленей, полученной сложением оценок популяций отдельных подрайонов. Общая численность популяции в конце лета несомненно выше 1.500, но едва-ли превышает 3.000.

В настоящее время, размножение ограничено в пределах около 25 четко определенных островков, песчаных отмелей и т. п. Здесь-же встречаются самые большие скопления тюленей и вне сезона размножения. Особенно осенью, некоторые особи поодиночке или небольшими группами регулярно посещают местности, отдаленные от лежбищ для размножения (см. фиг. 4), но за последние годы число скитающихся вразброд тюленей уменьшается. Иногда от одного острова к другому переплывают и более многочисленные стада. Тюлени, помеченные в германской части морских отмелей к западу от Ютландского полуострова и найденные в датских водах (чаще всего вдоль западного берега Ютландии, но в одном случае и в Каттегате) указывают на то, что во всяком случае молодые особи иногда мигрируют довольно далеко.

## Распространение *Halichoerus grypus* и *Pusa hispida*

Фиг. 5 показывает подтвержденные встречи *Halichoerus grypus* с 1940 по 1975 г. За исключением новорожденных детенышей, найденных на льду у Борнхольма во время необычайно суровых зим начала 1940-х годов, этот вид в течение данного периода в датских водах не размножался. В большинстве участков моря он является только редким посетителем, и только острова Лесё и Анхольт в Каттегате, отмель Рёдзанд и, может быть, Борнхольм в Балтийском море регулярно посещались группами.

За период с 1940 по 1975 г. известны только один или два случая наблюдения *Pusa hispida* в датских водах.

## Охота на тюленей

До 1967 г. общей охраны тюленей в Дании не было. На острове Лесё в северном Каттегате в 1960 г. была введена охрана с июня по август, а по закону об охране дичи 1967 г. эта охрана была распространена на *Phoca vitulina* по всей Дании, и одновременно с этим введена полная охрана других видов тюленя.

В 1940-х, а отчасти и в 1950-х годах, цены на ворвань и мех всё еще были высоки и служили важным побуждением к охоте на тюленей в Дании. В те годы некоторые охотники убивали большое число тюленей, и этим добывали себе значительные добавочные доходы. По мере понижения цен тюлених продуктов и сокращения численности популяций, профессиональные охотники на тюленей постепенно исчезли. За последние годы, важнейшим мотивом охоты на тюленей стало развлечение, и большинство охотников убивает только по 1–2 тюленя в год.

С 1941 по 1973 г. годовая добыча постепенно уменьшилась, и за последние годы составляла по 200–300 тюленей, т. е. около четверти годовой добычи в начале периода. (Табл. 5). В табл. 6 показано распределение убитых тюленей (в процентах) по разным морским районам.

Преобладающее большинство тюленей убивается в важнейших местностях их размножения или вблизи их. Здесь-же в течение сезона охоты встречаются самые многочисленные скопления тюленей. Очень немного тюленей убиваются на водах, не имеющих постоянных тюлених популяций. Большинство тюленей убивается осенью.

## Вывод

В настоящее время, популяция *Phoca vitulina* в конце лета грубо оценивается в прибл. 2.000. Некоторые местные популяции кажутся довольно постоянными, и в одном районе (острова Хесселё) даже произошло заметное увеличение её, но в нескольких районах, особенно в югозападном Каттегате, Зунде и других водах юговосточной Дании, сокращение численности продолжалось, и некоторые из популяций в настоящее время так немногочисленны, что нужно считаться с опасностью их исчезновения. Без сомнения, общая численность популяций в настоящее время значительно меньше, чем 20–30 лет тому назад.

Ввиду явного недостатка знаний о нескольких биологических аспектах, здесь не делается попытки обсуждения всех тех факторов, которые за последнее десятилетие смогли-бы оказать влияние на тенденции популяции. Однако, кажется уместным обсудить несколько человеческих факторов.

Охота на тюленей: За последние годы, годовая численность охотничей добычи составляла около 10–15 % популяции конца лета. Не имеется данных о темпах воспроизводства, смертности и оборота датских популяций тюленей, на которых было бы возможно основать оценку максимальной годовой добычи. Однако, данные из других местностей и по другим видам тюленей указывают на то, что при постоянной численности популяции порядок величины максимальной допустимой добычи составляет от 5 до 10 %. На основе такой информации можно прийти к выводу, что охота на тюленей может быть причиной сокращения их численности, и что она во всяком случае не предоставляет популяции почти никакой или даже совсем никакой возможности восстановления численности. Кроме того очевидно, что в случае некоторых очень малочисленных местных популяций, убой отдельных особей (напр. беременной самки) может стать критическим для дальнейшего существования данного вида в данной местности.

Нарушения покоя, особенно на лежбищах для размножения: Без сомнения, повсеместный рост движения ухудшил условия обитания тюленей. Особенно за последние годы, это развитие движения привело ко всё более частому нарушению покоя на лежбищах для размножения посещениями туристов летом. Это дает повод к серьезному беспокойству и считается одной из важнейших опасностей, грозящих нашим тюленим популяциям. Ухудшение условий обитания тюленей вследствие нарушений покоя также стало более серьезным и вне сезона выводки детенышей, напр. вследствие нарушений покоя в нескольких местностях охотниками.

Пестициды и болезни: Эта проблема в настоящее время изучается в Дании (см. ст. 000). Наличие большого числа больных тюленей (часто с ранами и абсцессами) за последние годы, сначала на морских отмелях у югозападной Ютландии, а позднее также в северном и центральном Каттегате, указывает на ненормальное состояние популяции тюленей.

Ввиду этих возможных неблагоприятных факторов, а также руководясь примером охранных мероприятий, за последние годы принятых в других странах, в отчете о положении рекомендуется немедленно принять следующие опытные мероприятия:

1) Сократить сезон общей охоты на *Phoca vitulina*. 2) Совершенно запретить охоту на этот вид в тех водах, где ему грозит опасность вымирания.

3) Организовать экспериментальные заказники с ограничением движения в тех районах, где нарушение покоя на лежбищах для размножения считается критическим.

Следует подчеркнуть, что хотя такие мероприятия считаются срочно необходимыми, они в то же время только являются предварительными, и должны сопровождаться постоянным наблюдением за благосостоянием популяций тюленей в Дании в общем, а в особенности за результатами этих мероприятий. После этого станет возможной организация долгосрочных мероприятий по сохранению тюленей.

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