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The effect of seal hunting in Germany on the further existence of a harbour seal population in the Dutch Wadden Sea

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Abstract

Calculated influence of dispersal and hunting pressure on seals in the Wadden Sea. Due to pollution effects pup production in the Dutch seal population is too low compared to the stable population in Schleswig-Holstein. Nevertheless, aerial surveys showed that the total number of seals remained fairly stable at about 500 specimens since 1974. It is demonstrated that since hunting was stopped in Niedersachsen and Schleswig-Holstein unrestricted dispersal in the Wadden Sea area could take place. It is calculated that the Dutch seal population in 1980 contained 41 % animals originating from outside the area. Besides another 15 % of the animals were repatriated by seal nursery stations. Abstinence of hunting in the whole area is of vital importance for the further existence of a harbour seal population in the Dutch Wadden Sea.

Introduction

The stock of harbour seals occurring in the Wadden Sea area (Fig. 1) has to be considered as one population. Tagging of young seals within the area (Wipper 1975; Drescher 1979; van Haaften, pers. comm.) and outside the area (e.g. Bonner and Witthames 1974) showed that random dispersal occurs within the Wadden Sea but exchange with other areas is negligible. However, the large estuaries of the rivers Ems and Elbe and the Hindenburg dam to Sylt act as geographical barriers and therefore it is assumed that with respect to mature seals four "sub" populations can be distinguished.

Regular aerial surveys showed that at least since 1960 the total number of seals in the Wadden Sea decreased, although since 1973 a slight increase is noted (Reijnders 1981). Studies on population dynamics carried out in The Netherlands (Reijnders 1978) revealed that compared to the fairly stable population in Schleswig-Holstein pup production in the Dutch seal population is too low (Fig. 1). This is probably caused by pollution (Reijnders

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Fig. 1. Map of the international Wadden Sea and percentages of pups born per subadult and adult seals in the different areas during 1977–1981

1980). In spite of that phenomenon the numbers in the Dutch area fluctuate around 500 specimens (Fig. 2) since 1974.

It is the aim of this paper to discuss the respective population parameters in order to obtain information on the background of this stability.

Population parameters

Pup production

Data on reproduction (percentages of pups/subadults and adults) in the areas of Denmark, Schleswig-Holstein, Niedersachsen and The Netherlands are given in Fig. 1. Comparison of earlier data for Niedersachsen by Wipper (1974) reveals that pup production in Niedersachsen did not change considerable during 1970–1978. Pup production in the Dutch area during 1964–1973 is calculated according to the equation of population growth applied in Reijnders (1978). It is found that during that period pup production should have been lower than nowadays: 12 % instead of 16 %.

Mortality

Mortality amongst subadult and adult seals is difficult to assess. Strandings of dead seals reflect more their chances of being found than a reliable population sample. Only for juvenile seals the situation is different because they can be easily recognized as such. A

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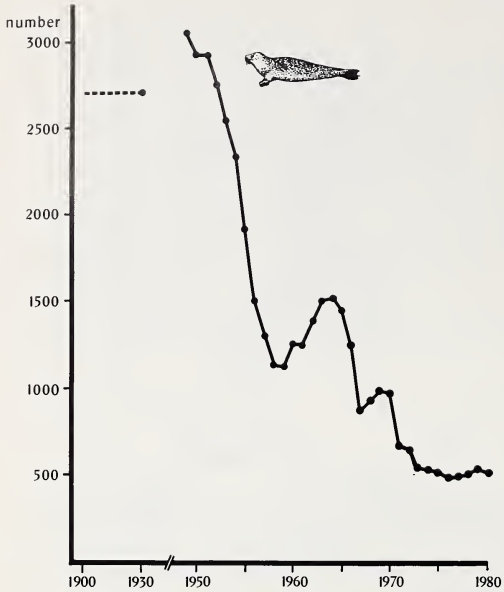

Fig. 2. Total numbers of harbour seals (incl. juveniles) in the Dutch Wadden Sea. – – – – estimates based on bounty data; ——— until 1958 based on bounty data and since 1959 on aerial surveys

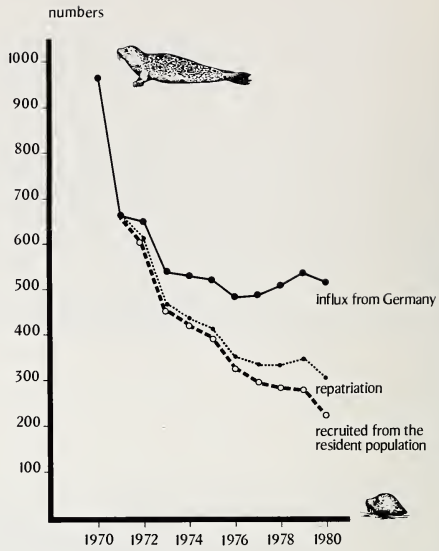

Fig. 3. Actual numbers of harbour seals in the Dutch Wadden Sea based on aerial surveys (●—●). Dotted lines denote estimated numbers if influx (●- - -●) and also repatriation (○- - -○) had not found place

recruitment model devised by Fransz (1979) and Fransz and Reijnders (1978) enables the calculation of juvenile mortality on basis of surveys of living juveniles during the pupping season. In that way it was calculated that the overall first year mortality in the Dutch population is about 60 % (Reijnders 1978). Drescher (1979) arrives via strandings and some assumptions at the same figure for Schleswig-Holstein as was calculated by Reijnders (1978). Therefore, it is tentatively believed that this is a reliable figure.

On the basis of strandings of dead juveniles it is concluded that mortality amongst juveniles did not change dramatically during 1970–1978.

Migration

Reijnders (1978) states already that with respect to the Dutch area immigration must occur. Aerial surveys during three subsequent years provided data to calculate for the summer of 1977 under certain assumptions on mortality rates – the number of subadults (1, 2 and 3 years old animals) which should be recruited from the locally occurring population. By track width measurements in the same year the actual number of subadults was also obtained. It appeared that about 20 % more subadults occurred than could have been recruited from the parent stock both by survival of juveniles, born in the wild and those repatriated by nursery stations. Hence, an additional influx must have taken place.

Migration, especially of juveniles amongst pinnipeds is well known (Sergeant 1965; Wada 1969; Bonner and Witthames 1974; Johnson 1975). A comprehensive tagging programme by Wipper (1975) and to a lesser extent by van Haaften (pers. comm.) showed that from a certain tagging centre in the Wadden Sea about 15 % of the juveniles move (north-)eastwards and the same quantum (south-)westwards. Assuming that tagging does not alter dispersal behaviour and that the chances of tag recovery are equal in each area, it is clear that before the severe decrease in the Dutch area started a balance must have

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existed in exchange between Niedersachsen and The Netherlands because of roughly equal population size and recruitment. But as pup production in the Dutch population decreased an unbalance was created and as a result more seals will have moved from Niedersachsen to The Netherlands than vice versa.

Discussion

From the population parameters discussed before it can be deduced that since 1974 a low pup production in the Dutch population is counterbalanced by a net immigration into The Netherlands from Niedersachsen and to a very small extent from Schleswig-Holstein, as can be derived from Drescher (1979). Still the question is open when this net influx started and what its contribution to the whole Dutch population is nowadays. In this respect the hunting of juvenile seals for their fur will have had a large influence on the normally unrestricted ocurring dispersal. It can be derived from Meyer (1964) that in The Netherlands between 1950 and 1960 nearly all newborn pups were killed whereas in Niedersachsen up to 1970 more than 80 % of the annual seal kill consisted of pups (Wipper 1972). It is concluded that at that time when the numbers of seals in both areas were equal, dispersal took place at a very low level due to lack of juvenile animals.

In spite of cessation of hunting in The Netherlands since 1962, emigration from this area will not have increased considerably because pup production decreased after 1964 as is mentioned before. But a heavy hunting pressure especially in Niedersachsen is likely to have inhibited a net influx of seals to The Netherlands. But after hunting was prohibited in Niedersachsen in 1971 and in Schleswig-Holstein in 1973 an enhanced dispersal could take place. This enables the calculation of the migration of animals from Niedersachsen and Schleswig-Holstein to The Netherlands and vice versa under the following assumptions:

1. The percentage of pups that disperse is applied on the number of pups present after the first initial juvenile mortality and mortality in the rest of their first year is equal to that for subadults and adults (Wipper 1972; Reijnders 1978 and van Haaften, pers. comm.).
2. Population characteristics i.e. sex ratio, survival rates, age of sexual maturity, fecundity are the same in all areas: the values are the same as those used by Reijnders (1978).
3. Immigrant seals become stationary like the older original ones as can be concluded from the fact that in The Netherlands since 1974 nearly every year about equal numbers on the very same spots on specific sandbanks occur in spite of low pup production.
4. Immigrants exhibit the same population characteristics as stationary animals.

At the same time hunting was stopped, two seal nursery stations in Norden (Niedersachsen) and Pieterburen (The Netherlands) started to nurse and repatriate orphaned and ill seals. If the same assumptions as mentioned earlier are also applicable to these animals, this extra contribution to the population and migration as well can be accounted for too. The course of the contributions by influx and repatriation is shown in Fig. 3.

It is calculated that in 1980 the total population in the Dutch Wadden Sea consisted of 41 % immigrants, 15 % repatriated animals and 44 % born in the area itself. This implies that for the further existence of a seal population in the Dutch Wadden Sea unrestricted dispersal of juvenile seals is essential. Therefore absence of hunting in the whole area is a very important factor.

Next to this, both the contribution of the seal nursery stations and the establishment of seal reserves create conditions for an artificial decrease of juvenile mortality. This offers the opportunity to close the gap in pup production in the Dutch seal population. Otherwise this population would arrive in a critical situation within a few years (Fig. 3). One could argue that hunting in Schleswig-Holstein would have a minor effect on the Dutch seal population. However, as stated before, the stock of seals present in the Wadden Sea is an entity and besides reproduction in the population of Niedersachsen has decreased too.

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Wipper (1974) found a pup production percentage of 28 whereas in 1980 only 20 % was noted (European Seal Group 1980). Within the limits of the data available (Wipper 1975; Drescher 1979) it is estimated that in 1980 about 10 % of the animals present in Niedersachsen originated from a net influx out of Schleswig-Holstein. That could be an explanation for the relatively high share of subadults present in Niedersachsen (European Seal Group 1979). The population in Schleswig-Holstein is because of the present optimal conditions, reflected in the highest percentage of pups, of vital importance for the total population in the Wadden Sea (see also Drescher 1979).

Zusammenfassung

Auswirkungen der Seehundbejagung in Deutschland auf die weitere Existenz einer Seehundpopulation im niederländischen Wattenmeer

Die Geburtenrate der Seehundpopulation im niederländischen Wattenmeer ist durch Schadstoffbelastung zu niedrig im Vergleich zur stabilen Population im schleswig-holsteinischen Wattenmeer. Trotzdem wurde durch Flugzeugzählungen festgestellt, daß die Gesamtzahl der Seehunde seit 1974 bei etwa 500 Tieren liegt.

Es wird dargelegt, daß eine unbehinderte Verbreitung von Jungtieren im gesamten Wattenmeer stattfinden konnte, seitdem die Seehundjagd in Niedersachsen und Schleswig-Holstein beendet wurde. Berechnungen ergaben, daß 41 % der niederländischen Seehundpopulation im Jahre 1980 aus anderen Bereichen des Wattenmeeres stammten. Außerdem sind nochmals weitere 15 % der Tiere von mehreren Seehundaufzuchtstationen wieder freigesetzt worden.

Das niedersächsische und insbesondere das schleswig-holsteinische Wattenmeer ist wegen der dort vorhandenen günstigen Geburtenrate der Seehunde von erheblicher Bedeutung für die gesamte Seehundpopulation des Wattenmeeres. Es wird mit Nachdruck betont, daß die Durchführung der Jagd in dem ganzen Gebiet unterlassen werden sollte, um die weitere Existenz einer Seehundpopulation im niederländischen Wattenmeer nicht zu gefährden.

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