Development of the Razorbill population of the Quark in 1957–90

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Received 12 March 1991, accepted 18 June 1991

Introduction

The population crash of Baltic Razorbills *Alca torda* in the early 1940s was one of the severest known in any bird species in northern Europe. The Danish, Swedish and Finnish populations were almost exterminated, so that numbers left in the colonies often amounted to less than 10% of those censused in the late 1930s (Wahlin 1943, v. Haartman 1947, Paludan 1947, Nordberg 1950, Hildén 1966, v. Haartman et al. 1967). The crash has been explained by the complete freezing of the Baltic Sea during extremely cold winters in the 1940s.

This paper describes the recovery of the Baltic Razorbill population, especially in the Quark archipelago on the Finnish west coast, during recent decades. The population dynamics of the species is discussed.

Material and methods

The Razorbill is one of the most easily censused seabirds in the Finnish archipelagoes. In most areas the breeding skerries are few and inhabited faithfully from year to year, so they are well known among ornithologists. During the early morning hours the members of each colony gather in small groups around each islet and are easy to count. Within the same breeding season their number remains fairly constant from day to day. Without a search for nests, however, the proportion of non-breeding birds remains unknown.

All Razorbill colonies on the Finnish side of the Quark, the narrowest portion of the Gulf of Bothnia, were counted in 1957–60 by OH, and the census was renewed in 1972–76 (Hildén 1978). In 1985–86, TP organized a new survey of the Razorbill colonies. Some complementary counts were made in 1988–90. The same method was used throughout the study: in late June or early July, usually between 05 and 09 hrs, birds in each colony were counted carefully from the highest point of the islet. If more than one count was made in a colony during each census period, the highest number recorded was chosen.

Results

During the whole study period of about 30 years, the Razorbill population of the Quark has steadily increased (Table 1). The average growth rate has been about 8% per year. Between the colonies, however, there have been marked differ-

ences. Some colonies have increased from a few birds in 1957–60 to 100 pairs or more, in others the growth has been much slower. The main reason for this is certainly the differing availability of nest sites on the skerries: as soon as the best sites have been occupied, the growth of the colony will slow. Disturbances in nesting, caused usually by man or the mink *Mustela vison*, and gradual spread of vegetation, may have retarded the growth of some colonies (cf. Räsänen 1957, Hildén 1966, Kilpi et al. 1984.). Scarcity of nest sites may also cause some individuals to leave a colony and settle on new islets. The number of breeding skerries has, in fact, steadily increased, from 12 in 1957–60 to 28 in 1985–90 (Table 1). Some of the recently established colonies have grown rapidly.

Discussion

The Razorbill populations have increased throughout the Baltic region during recent decades (Grenquist 1965, v. Haartman et al. 1967, Hario 1983, Hildén 1990, SOF 1990). In the big colony of the island of Bonden on the Swedish side of the Quark, the population growth has been of the same order of magnitude as on the Finnish side, from 200 pairs in 1950 to 2000 pairs in 1985 (Grenmyr & Sundin 1981, Elmberg & Fredriksson 1988). In 1988, the Razorbill was recorded breeding for the first time in Estonia (Kuresoo & Renno 1989).

The increase in Razorbill numbers mainly reflects a recovery of the population after the crash in the early 1940s. The long duration of the recovery, extending over 40 years, is due to the low reproductive potential of the species: it lays only one egg, most individuals breed for the first time at the age of 4–5 years (Lloyd 1979), and only 11–14% (Steventon 1982) to 18% (Lloyd & Perrins 1977) of the fledglings survive to breeding age, on average.

Against this background, the growth rate of the Razorbill population in the Quark must be considered rapid. Assuming an adult survival of 92% and a nesting success of 0.8 fledglings per pair per year, which represent the maximum values obtained from any population study of the Razorbill (Cramp 1985), the survival of juveniles from fledging to first breeding should be no less than 58% to result in a growth rate of 8%, as recorded in the Quark. Such a high survival of

Table 1. Development of Razorbill colonies in the Quark from 1957–60 to 1985–90. Figures refer to numbers of individuals at the breeding skerries.

Area and breeding islet	1957–60	1972–76	1985–90
Rönnskären			
Fällisbådan	–	7	23
Stora Gloppsten	3	4	50
Lilla Gloppsten	15	36	102
Norra Gloppsten	7	12	40
Södra Malhöysan	–	10	18
Norra Malhöysan	50	150	265
Berggrynnan	30	66	48
Höggrund	–	23	227
Skvättan	3	60	170
Veckargrund	–	–	30
Norrskär			
Synnerstberget	35	58	90
Norrberget	–	3	–
Raippaluoto–Replot			
Ensten	–	2	2
Skötgrund	?	?	5
Yttre Gloppsten	15	64	75
Punakarit/Rödgrunden	–	–	18
Hällbådarna	–	–	40
Valassaaret–Valsörarna			
Gråskälsbådan	15	65	128
Skutgrynnan	–	–	15
Mellanklubb	1	–	25
Vörboashällan	–	–	26
Båtslagsgrynnan	–	–	28
Bredbådan	–	?	9
Bullergrynnan	–	–	13
Rackelgrynnan	–	–	2
Mikkelinsaaret–Mickelsörarna			
Hällgrund	1	26	155
Pjuken	40	70	240
Knuven	–	–	30
Ivankallan	–	–	13
Total	215	658	1887

juveniles seems very unlikely, in view of the results from British studies quoted earlier. The conclusion is that the Razorbill colonies in the Quark almost certainly receive recruits from elsewhere, probably mainly from the more southerly colonies in the Baltic, where lack of nesting space retards further growth of the population.

The above explanation receives support from the striking regional differences in timing of the growth among the Baltic colonies. In the southern colonies of Finland, the recovery started immediately after the crash and was rapid during the 1950s and 1960s (Grenquist 1965, v. Haartman et al. 1967), but has slowed during the last two decades. In the large colony of Aspskär in the eastern Gulf of Finland, for instance, the population grew from 50 pairs in 1946 to 340 pairs in 1961, i.e. at an annual rate of 13.6%, but since then the average growth has been only 1.7% per year and has resulted in a population of 550 pairs in 1990 (H. Malkio and O. Stenman, in litt.).

Further north, however, in the Quark the recovery was very slow to begin with. The only colony at Valassaaret, on Gråskälsbådan, was inhabited steadily by about ten birds in 1949–58. Thereafter the number increased to 22 in 1962 and then again stayed at this level to 1969; only then did rapid growth begin, with an average increase of 11% annually (Hildén 1966, Hildén et al. 1978). Detailed data from other parts of the Finnish side of the Quark are lacking, but on the Swedish side the situation was the same on Bonden: in 1950 200, in 1955 150 and in 1970 250–300 pairs, but thereafter very rapid growth of 13.5% per year (Elmberg & Fredriksson 1988).

Two conclusions may be drawn from these data. First, the recruitment occurred mainly in the southern colonies during the first two decades following the crash, and only after nest sites there began to become saturated did the immigrants start colonizing the more northern suitable sites in the Quark. The high proportion of immigrants is evident when considering the growth rates at Aspskär in the 1950s and 1960s and at Bonden in the 1970s and 1980s. Both rates clearly exceeded the theoretical maximum of 11.5% that results if all the fledglings born in a colony survived to breed there. Second, the fast growth of the Finnish Razorbill population since the crash in the 1940s shows that the overall juvenile survival in the Baltic must have been much higher than that observed in the Atlantic colonies (cf. Lloyd & Perrins 1977, Steventon 1982). This could in part result from a lowered age of first breeding in a greatly reduced population, with a large surplus of good nest sites (cf. Lack 1966, p. 148).

Its low reproductive potential makes the Razorbill very vulnerable to environmental disturbances, because compensation for large-scale adult mortality always takes a long time. However, recent severe winters have not been as disastrous to the species as those of the 1940s. The two exceptionally cold winters of 1984 / 85 and 1986/87 caused no decline in the Finnish Razorbill colonies (Hildén 1989). The probable explanation is that the Baltic was never completely frozen during these winters, partly because of strong winds and partly because of modern shipping.

A more serious threat to the Razorbill population in the Baltic is posed by oil-disasters. The species is known to suffer heavy losses from oil-spills (e.g. Bourne 1970, Nelson-Smith 1972, Lloyd 1974, Anker-Nilssen et al. 1987). Probably the crash in the early 1940s was caused not only by severe winters but in part also by wartime oil pollution. A major disaster polluting extensive breeding or wintering areas of Razorbills could cause a marked reduction of the population.

This very nearly happened in the Quark in 1984, when *m/s Eira* went aground on 31 August and about 200 tons of heavy fuel-oil escaped into the sea, polluting an area of more than 2000 km^2 on the Finnish side (Malinen et al. 1987). The population of the Black Guillemot *Cepphus grylle* was badly affected: 1528 oiled individuals were found dead or had to be killed, and the population of Valassaaret decreased by 28.5% from 1984 to 1986. In contrast, only one oiled Razorbill was found and no decline occurred in the colonies in the summers that followed the disaster (Koivusaari & Pahtamaa 1987, Pahtamaa & Hildén 1987). The explanation may be that the Razorbill population had already left the area by late August, whereas large numbers of Black Guillemots were still left. An oil-spill 2–3 weeks earlier would probably have devastated the Razorbill population in the Quark.

Acknowledgements. We thank Heikki Katajisto, Tapani Missonen and Ari Veijalainen for help in the field work, Matti Maskulin for the data on Veckargrund, Harri Malkio and Olavi Stenman for the information from Aspskär, and Peter Evans, Martti Hario, Svein-Håkon Lorentsen and Johan Ulfvens for comments on the manuscript.

Selostus: **Merenkurkun ruokkikannan kehityksestä 1957–90**

Merenkurkun ruokkikoloniat tutkittiin 1957–60, 1972–76 ja 1985–90. Menetelmänä oli pesimäluotojen rannoille kerääntyneiden emolintujen laskenta varhaisina aamutunteina kesäkuun lopussa–heinäkuun alussa. Pesivien lintujen osuutta ei voitu määrittää, ja yhdyskuntien koot taulukossa onkin esitetty yksilömäärinä.

Koko 30-vuotisen jakson aikana Merenkurkun ruokkikanta on ollut tasaisessa nousussa. Eri yhdyskuntien kasvunopeudessa on kuitenkin suuria eroja, mikä johtunee lähinnä pesäpaikkojen saannista. Pesimäluotojen määrä on kasvanut 12:sta 28:aan. Myös Ruotsin puolella Bondenin saarella, missä pesii Itämeren suurin ruokkiyhdyskunta, kannankasvu on ollut samaa luokkaa: 200 parista 1950 2000 pariin 1985.

Ruokkikannat ovat runsastuneet kaikkialla Itämeren piirissä sitten 1940–luvun romahduksen, joka aiheutui koko Itämeren jäätymisestä ja pahoista öljytuhoista ankarina sotatalvina. Toipumisen kestäminen yli 40 vuotta johtuu lajin erittäin vähäisestä lisääntymiskyvystä (1 muna, ensipesintä 4–5-vuotiaana, nuorten lintujen elossa säilyvyys pesästälähdöstä pesimisikään Atlantin kolonioissa 11–18%). Tätä taustaa vasten Merenkurkun ruokkikannan kasvunopeus, etenkin 1970- ja 80-luvulla, on ollut paljon suurempi kuin pelkkä jälkeläistuotto edellyttäisi ja vaatinut muualta tulevaa täydennystä.

Selitystä tukee se, että ruokkikantojen toipuminen alkoi maamme eteläisissä yhdyskunnissa nopeana heti romahduksen jälkeen, kun taas Merenkurkussa se pääsi vauhtiin vasta 1960-luvun lopulla. Ilmeisesti ensipesijät asettuivat parin ensimmäisen vuosikymmenen aikana romahduksen jälkeen pääasiassa eteläisiin kolonioihin, ja vasta näiden vähitellen täytyttyä ne rupesivat asuttamaan pohjoisempia Merenkurkun yhdyskuntia. Koko Suomen ruokkikannan elpyminen tällä vauhdilla osoittaa, että nuorista linnuista on täytynyt säilyä elossa pesimisikään paljon suurempi osuus kuin on todettu Atlantin kannoissa.

Ruokin hidas lisääntymiskyky tekee lajin hyvin alttiiksi aikuisiin lintuihin kohdistuville ympäristötuhoille. Onneksi ankarat talvet, kuten 1984/85 ja 1986/87, eivät enää ole aiheuttaneet pahoja tappioita. Suurempana uhkana ovat öljyonnettomuudet. Merenkurkun öljyturmasta 1984 ruokit selvisivät hyvällä onnella, kun kanta oli juuri ehtinyt muuttaa alueelta pois.

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