

Herring gulls, *Larus argentatus*, preying upon Shelduck *Tadorna tadorna* ducklings on unfavourable habitat

From Uwe Fuellhaas, Ulrich Strobel, Hans-Heiner Bergmann and Heinz Düttmann

1. Introduction

Adult Shelducks suffer low mortality whereas ducklings are under heavy predation pressure (PATTERSON 1982). While eggs appear to be well sheltered in breeding holes only a small proportion of ducklings appears to survive and reach adulthood. According to BOASE (1932) mortality is highest during their first days of life. The estimated proportion of hatchlings reaching water as compared with the number of eggs laid, was between 24 and 74 % in Scotland (HORI 1964). Mortality in creches was still 33 % (BOASE 1951) or as high as 78 % as compared with only 66 % in solitary broods (WILLIAMS 1974). Here higher early mortality may have been balanced by better survival and growth of creche fledglings later on (WILLIAMS 1974). Mortality, however, may vary enormously. SWENNEN (pers. comm.) often stated 100 % losses in the Dutch Wadden Sea islands. On the other hand, BEINTEMA (1969) would not exclude that some creches, after hatching on Wadden Sea islands like Schiermonnikoog, migrate to the Frisian coasts where they grow up under lower predation pressure.

Among the main predators are Herring gulls. As generalists, these gulls and their congeners exert heavy impacts also on other species such as Eider (*Somateria mollissima*) ducklings (MENDENHALL & MILNE 1985), mainly on unfavourable sites for feeding, where ducklings show careless behaviour that makes them vulnerable for predation (SWENNEN 1989). Nevertheless rates of observed predation in juvenile Shelduck are low (MAKEPEACE & PATTERSON 1980). In 554 hours of observation on the Ythan within 3 years, only two cases of predation were actually seen. Most of the ducklings merely disappeared from one day to the next. According to SWENNEN's observations (pers. comm.), most broods were devoured within 5 min when attacked by Herring gulls on Vlieland, often shortly after leaving the cover of vegetation or arriving at the shore. BEINTEMA (1969) reports on the predation of 9 out of 10 ducklings by Herring gulls within 100 minutes after they had reached the open mudflats of the Wadden Sea. VAN DOBBEN (1937) gives some descriptions of interactions between Herring gulls and parent Shelducks. Further predators of smaller importance are rats, foxes, crows, birds of prey and, in the vicinity of human settlements, straying cats and dogs (BOASE 1932).

In addition to predators, also weather conditions may affect the survival of ducklings during their first weeks of life. Ducklings killed during coldspells showed muscous

constipations of their respiratory tracks (BEINTEMA 1969).

During a long-term study of territoriality on southern Texel (The Netherlands), some Shelduck families with newly hatched ducklings arrived at the observation site and their fate was recorded. The present paper gives detailed descriptions of attacks of predators and strategies of parent and duckling Shelducks together with data of temporal distribution of mortality.

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2. Observation site, birds, material and methods

On the Dutch Wadden Sea island Texel, there is a breeding population of Shelduck numbering about 200 or perhaps 275 pairs (DIJKSEN 1992, DIJKSEN & DIJKSEN 1977). Feeding sites are mostly on mud flats. Some feeding territories are also found on small brackish inland ponds and ditches. The observation site called »de Petten« is situated close to de Mok, a tidal bay in the south of the island with extensive mud flats and salt marshes. De Petten is a non-tidal shallow salt water pond of 1.2 hectares lined by 0.7 hectares of salt marshes. Here about 4 Shelduck pairs have constant territories in spring and throughout the breeding season (FUELLHAAS 1991, FUELLHAAS, STROBEL & BERGMANN in prep.). Breeding mostly takes place in the dunes at distances of at least 1 km. De Petten is surrounded by a system of ditches up to 3 m wide. Shelduck pairs were individually recognized by features such as plumage marks, mainly white patches on the heads of females. Observations were made using telescopes and binoculars at distances up to 80 m. Owing to rich food supply in the Mok and – at the time – on a waste dump some 750 m away, Herring gulls were nearly continuously present in the surroundings of de Petten during this investigation. In addition, there is a breeding colony of 7.400 pairs of Herring gulls and 1.500 pairs of Lesser Black-backed gulls at 1 km distance (counts of SOVON 1992 fide C. SWENNEN).

3. Results

3.1. Losses of ducklings

On the 4th and 16th of June 1990, two of the resident pairs (R and K) turned up with 6

ducklings each, at 5.50 and 11.45 h a.m. The R pair lost all their offspring on the day of arrival (figure 2). The first predation of a gosling by a Herring gull occurred at 7.51 h a.m., two hours after their arrival. The last pullus was lost at 4.01 h p.m., 10 h and 10 min after arrival. For the K-pair, the first duckling was lost 69 min after arrival, only 2 goslings survived up to 6.20 h p.m. on this same day. On the following day, the pair was observed without any ducklings.

On the 25th of June, an additional unknown male (u) with 4 pulli arrived at de Petten at 4.24 h p.m. Nothing happened for the first 52 minutes. Then his 4 ducklings joined another Shelduck pair without offspring. During the subsequent aggressive encounters between the adult birds, the four ducklings were easily captured by gulls. Curiously, the last young was not preyed upon when swimming and running about alone without parent contact. At 6.18 h p.m. this duckling was killed after joining the pair again. This was also true for one duckling of the K-pair which was separated for 101 minutes and was captured by a Herring gull only after joining its parents again. Another pair (g-pair) with 6 ducklings visited de Petten for some minutes on the 18th of June, without any losses of ducklings.

On 17th July, another unknown Shelduck pair with a creche of 20 half-grown pulli of 3 age classes was encountered on one of the ditches close to de Petten. At this late developmental stage, there was no interaction between ducks and Herring gulls. This same pair was seen here two weeks later with the same number of ducklings two of which were able to fly at that time.

3.2. The preying strategy of Herring gulls

All attacks on Shelduck ducklings were made by adult Herring gulls which was also reported by SPAANS (1959) for Vlieland. When Herring gulls approached the families both male and female Shelduck usually threatened with elevated bills. The ducklings did not crowd around the parents as is usual in Eider ducklings (SWENNEN 1989) or geese (BERGMANN, unpubl., for Brent geese) or was also reported by GOETHE (1962) for Shelduck on the island Memmert. Instead they dived in different directions. Owing to observation distance, calls of adult Shelduck were not heard. The Herring gulls passed over the Shelduck parents at low heights of about 1 m and after a sharp turn immediately seized one of the young behind them from the water surface or when diving in the shallow clear water (figure 1). After an unsuccessful attack gulls started a

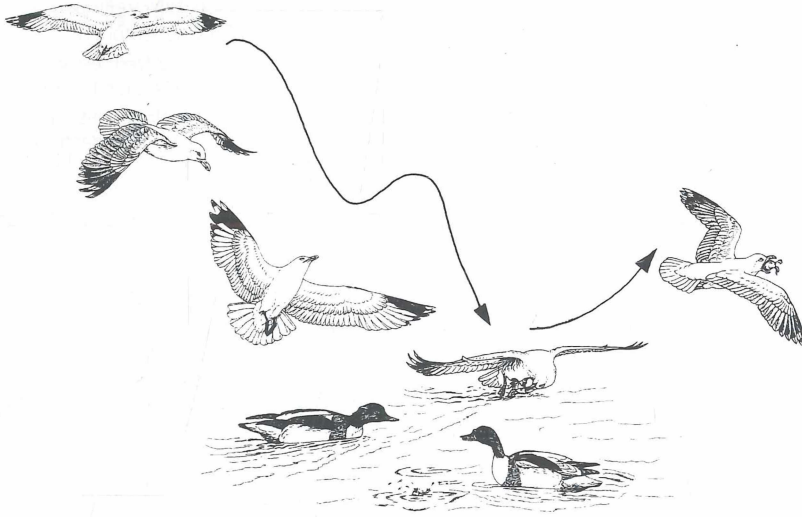


Fig. 1: Successful attack of an adult Herring gull on a family of Shelducks. Drawing by Dr. F. MÜLLER according to photos and observations.

Abb. 1: Erfolgreicher Flugangriff einer adulten Silbermöwe auf eine Familie von Brandenten. Halbschematisch nach Fotos und Beobachtungen. Original Dr. F. MÜLLER.

new one in front of the Shelduck pair. One gull caught two ducklings within some minutes. Some ducklings were also captured on the salt marsh. Generally, Herring gull attacks occurred in bouts. Surveys on successful and unsuccessful attacks of Herring gulls on the Shelduck families involved are given in figures 2 and 3.

Up to the arrival date of the first family on the 4th of June, Herring gulls were rarely seen on de Petten, in spite of their constant presence in the surroundings. Starting from the first successful predation, some gulls were present on many occasions and seen patrolling along the dike close to de Petten, from where they had a good view on the pond. From here also attacks directed to other species were observed. On the 18th June 1989, two adult gulls suddenly stooped on nests and small chicks of Black-headed gulls (*Larus ridibundus*) and Common Terns (*Sterna hirundo*) on some small artificial islands in de Petten. Most of them were depleted within some minutes, the rest had disappeared on the next morning. In 1990, 12 tern pairs nested on one of the islands. When their 16 chicks were half or nearly full grown they disappeared within some days. In spite of heavy attacks by the adult terns, several cases of successful predation by Herring gulls were observed.

3.3. Protective behaviour of Shelduck
During gull attacks, male and female Shelduck came close to one another (see also SPAANS 1959). Whereas they produced threat postures against Herring gulls flying at high levels above ground, the only defence against low-level flight attacks was a short flight jump not more than 1 m high where they tried to bite the aggressor. These flight jumps were executed on the

water surface as well as on the ground. During such encounters, males and females were observed by BEINTEMA (1969) to utter different calls. Furthermore clearly audible ringing sounds were produced by powerful wing strokes, when birds tried to attack Herring gulls by flight jumps. In addition both male and female reacted to successful or unsuccessful gull attacks by partly sustained aggressive flights of several hundred meters against the predators. In contrast to observations of BEINTEMA

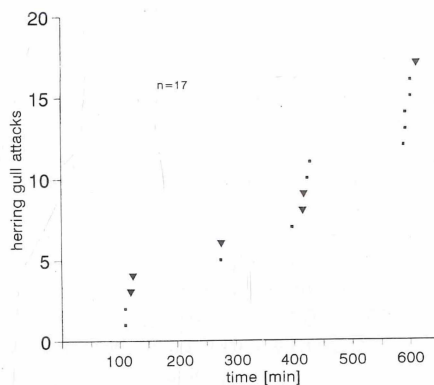


Fig. 2: Successive attacks of Herring gulls on a Shelduck family with 6 ducklings (R pair) on the day of their arrival (time 0) on de Petten. Attacks occur in bouts. Squares: unsuccessful attacks; triangles: successful attacks.

Abb. 2: Aufeinander folgende Angriffe von Silbermöwen auf eine Brandentenfamilie mit sechs Küken am Tag ihres Eintreffens (Zeitpunkt 0) auf de Petten. Die Angriffe treten jeweils in Schüben auf. Quadrat: erfolgloser Angriff; Dreieck: erfolgreicher Angriff. Die Küken sind nach 10 Stunden alle den Möwen zum Opfer gefallen.

(1969), ducklings were left alone in some of these cases but could survive by diving. Moreover, adult Shelducks even indulged in territorial encounters with their neighbours during the gull attacks. On such an occasion the K male attacked ducklings of another pair by territorial aggressive flights when they recovered from gull attacks. In one case a furious aggressive encounter with the female of this pair including breast to breast contact with wing beats resulted (see also WILLIAMS 1974). Four out of six successful attacks of Herring gulls happened subsequently to such aggressive interactions of the adults with Shelduck pair R. Nevertheless BEINTEMA (1969) reports also cases where attacked pairs and their neighbours cooperated in aggressive flights against Herring gulls.

The protective behaviour of Shelduck parents after their ducklings had disappeared consisted exclusively of aggressive flights against both adult and immature Herring gulls. These aggressive flights, as a rule, were longer than normal intraspecific territorial flights but similar in form (FUELLHAAS 1991, BEINTEMA 1969). During the remaining time, both parents turned to searching on the water as well as in the salt marshes. They did not only walk or swim but also flew from one place to the other to proceed with their search. This searching activity lasted for 1 h 20 min in one case.

4. Discussion

De Petten is a good feeding ground for adult Shelduck throughout the breeding period. High densities of small surface living invertebrates such as *Corophium volutator*, *Abrax tenuis*, *Nereis diversicolor*, *Hydrobia stagnalis* and polychaete and oligochaete worms are present (STROBEL in prep.). Most of these are also suitable food for ducklings. On the day when the R pair arrived with their ducklings the density of *Corophium volutator* was estimated at an average of more than 10.000 individuals per m² (STROBEL in prep., compare data given by SWENNEN 1989). Nevertheless, de Petten appeared not to be a good place to survive for Shelduck ducklings. Presumably low duckling survival was due to physical exhaustion after their walk from the breeding grounds or to low water depth which did not allow for effective escape diving. These factors do not exclude each other but could cooperate in the sense of ultimate and proximate factors as discussed by SWENNEN (1989) for Eider ducklings. Territorial aggression among neighbouring pairs could work as an additional but not crucial factor. De Petten could well turn out to be an ecological trap for duckling Shelducks, at least in some years. Still, it is a better place than the Wadden Sea near the islands (SWENNEN, pers. comm.). In 1936, e.g., practically none of about 1.000 Shelduck pairs succeeded in elevating their offspring on the

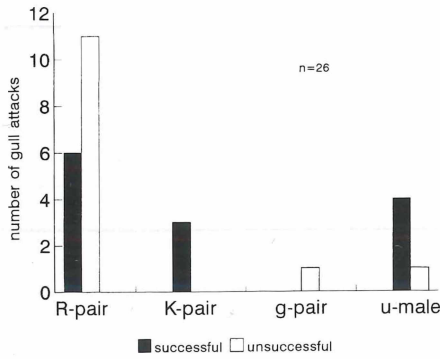


Fig. 3: Distribution of successful and unsuccessful attacks of Herring gulls on different Shelduck pairs on de Petten.

Abb. 3: Verteilung von 26 erfolglosen (weiß) und erfolgreichen (schwarz) Silbermöwenangriffen auf verschiedene Junge führende Brandentenpaare in de Petten. Ordinate: Anzahl der Angriffe.

Vlieland mudflats (VAN DOBBEN 1937). In spite of their much more aggressive behaviour towards intruding gulls, also Common terns and Black-headed gulls lost their broods on de Petten due to Herring gull predation.

The Shelduck strategy of protecting their offspring seems to be not very effective against Herring gulls especially when they attack in couples. Also VAN DOBBEN (1937) remarks that Shelduck females are not effective in collecting their ducklings under themselves. The males, on the other hand, indulge in flying attacks against the predators, thereby leaving their families unsheltered. Against single gulls, however, this strategy appears to be much more promising.

An important share is on the side of ducklings. If these are not able to rescue themselves by diving – due to their own bad condition or shallow water – they can easily become victim to their enemies. Diving in young Shelducks is a common behaviour. In captivity, Shelduck ducklings up to the age of 5 weeks are able to forage to a large degree by diving. These diving acts, however, differ from refuge diving in form as well as in duration (DÜTTMANN 1992).

Contrasting with the de Petten pairs, a pair on a ditch nearby was successful. A creche of 20 juveniles of at least 3 different broods was reared. This may have been due to the depth of more than one meter allowing for better escape diving.

The impact of Herring gull predation on the breeding success of Shelducks is further underlined by observations of DÜTTMANN (unpubl.) on the German Wadden Sea island Wangerooge where no Herring gull breeding colony exists. Here, 27 Shelduck pairs raised successfully a number of 65 ducklings in 1986. In spite of the apparent local predation pressure they are suffering, Shelduck populations are known to be stable or increasing in Europe (RÜGER et al.

1986, see also NEHLS et al. 1992), possibly as a consequence of conservation (BEZZEL 1985). This has been found also in winter quarters, e.g. on the French atlantic coast (GÉLINAUD et al. 1992). The population pressure exerted in marine habitats is mirrored in increasing numbers of inland breeding birds. Breeding losses repeatedly occurring in sink habitats or areas may well be compensated by successes in source habitats. Under what conditions failed pairs could change to better habitats to raise their offspring is not known.

Summary

The mortality of Shelduck ducklings by predation on a non-tidal pond on the Dutch Wadden Sea island Texel was observed. Three families of Shelduck with 16 ducklings lost all their offspring by attacks of Herring gulls within 1 day from their arrival to the site. The losses might be due to bad condition of ducklings after a long walk from the nesting hole, to shallow water or to both these factors in connection. Also intraspecific territorial aggression between Shelduck pairs may have increased the risk. Shelduck protective and Herring gull preying strategies are described.

Zusammenfassung

Silbermöwen (*Larus argentatus*) erbeuten Brandentenküken (*Tadorna tadorna*) in ungünstigem Lebensraum

Daten zur Mortalität von Brandentenküken auf einem tidenfreien flachen Salzwasser- teich nahe der Wattenmeerbucht de Mok im Süden der Wattenmeerinsel Texel (Niederlande) werden mitgeteilt. Drei Familien verloren sämtliche Junge durch Angriffe von Silbermöwen innerhalb von längstens 24 Stunden nach ihrer Ankunft am Gewässer. Die Ursache für diese Verluste könnten in schlechter Kondition der Küken nach kilometerlangem Anmarsch von den Bruthöhlen oder in der geringen, für das Fluchttauchen nicht ausreichenden Wassertiefe des Teiches liegen; beide Faktoren könnten auch zusammenwirken. Auch die innerartlichen territorialen Auseinandersetzungen zwischen benachbarten Brandentenpaaren dürften zu den Verlusten beigetragen haben. Das Angriffsverhalten der Silbermöwen und das Abwehrverhalten der Brandenten werden beschrieben.

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