Short notes

THE EFFECT OF A SPRING GALE AND A FREAK WAVE ON A BREEDING GROUP OF COMMON GUILLEMOTS *URIA AALGE*

HET GEVOLG VAN EEN VOORJAARSSTORM EN EEN SUPERGOLF OP EEN BROEDENDE GROEP ZEEKOETEN

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On 19 May 1997, during a north-easterly gale (force 8-9) an exceptionally large swell approached and swept across a rock platform with nesting Guillemots at Sumburgh Head (Shetland). A total of 27 eggs of 110 being incubated on 18 May were lost, but most pairs relaid within 13-20 days. Hatching success of replacement eggs was low and none of the chicks fledged. The storm occurred too late in the incubation period for the replacement eggs to have been successful.

Heubeck M. 1999. The effect of a spring gale and a freak wave on a breeding group of Common Guillemots *Uria aalge*. Atlantic Seabirds 1(1): 43-47.

In the British Isles, Common Guillemots *Uria aalge* normally achieve relatively high breeding success, usually fledging *c.* 0.7-0.8 chicks per breeding pair (Thompson *et al.* 1997) Severe gales can reduce breeding success, although apparently infrequent (Thompson *et al.* 1998). This note describes the effect of a gale on breeding Guillemots in Shetland in May 1997.

Hatching success of the first egg laid by a pair of Guillemots is commonly *c.* 80%. The main causes of egg loss, where known, are rolling due to an inadequate nest site and/or parents, predation, and infertility (Birkhead 1977, Harris & Wanless 1988). The probability of a replacement egg being laid declines seasonally (Wanless & Harris 1988; Hatchwell 1991), this decline being more closely associated with laying date relative to surrounding pairs rather than to absolute date (Wanless & Harris 1988). However, there is a rapid seasonal decline in the productivity of replacement eggs (Hatchwell 1991).

As part of the Shetland Oil Terminal Environmental Advisory Group's seabird monitoring programme, the breeding success of Guillemots in a single study plot on the east side of Sumburgh Head, at the southern tip of the Shetland Mainland, has been monitored since 1989. The method applied involves the use

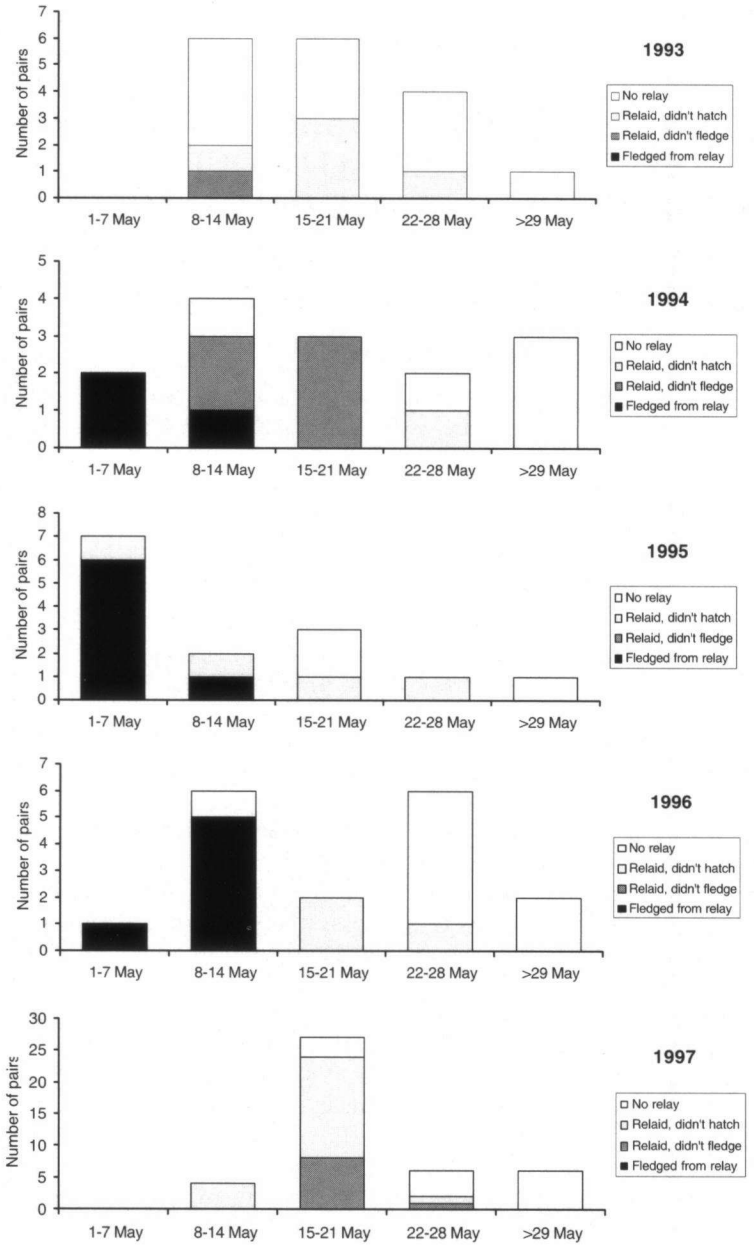
1993
1994
1995
1996
1997
Number of pairs
No relay
Relaid, didn't hatch
Relaid, didn't fledge
Fledged from relay
1-7 May
8-14 May
15-21 May
22-28 May
>29 May

Figure 1. The timing of first egg loss during 1993-97 and the fate of replacement eggs.
Figuur 1. De periode waarin een eerste ei werd verloren en het lot van tweede legsels in de jaren 1993-97. Afgebeeld worden vogels die niet opnieuw legden, vogels die een tweede ei produceerden dat niet uitkwam, tweede legsels waarvan het jong niet uitvloog en succesvolle tweede pogingen.

of marked photographs and daily checks using a telescope. The plot lies on the landward side of a sloping buttress of rock aligned north-west to south-east, the birds nesting 10-15m above sea level. Additional shelter from the open sea is provided from above by a 2-3m high vertical wall of rock, and by a 10m wide rock platform on the seaward side of the base of the buttress. Although heavy spray is sometimes blown over the buttress, there is no evidence that waves washed over the breeding ledges in any of the eight previous summers of monitoring. In 1997, 122 pairs laid eggs in the plot.

During 17-18 May 1997, easterly winds increased in strength and by the morning of 19 May were north-easterly 8-9B, with a heavy north-easterly swell. Of the 110 Guillemots presumed incubating the previous day, 107 remained 'sitting tight', although few eggs were seen in the severe conditions. A very large swell was seen approaching from the north-east, considerably higher than the surrounding waves. It swept across the rock platform and crashed against the seaward side of the buttress, throwing many tonnes of water over the ridge and onto the lower part of the breeding area. Sixteen incubating birds and their eggs, and another 10-15 loafing birds, were washed into the sea in a narrow cleft inside the buttress. None were able to fly out from here but eventually escaped to seaward by flapping and diving through the boiling surf; after 30 min the first of these birds had returned to their breeding sites. By the morning of 20 May a further eight eggs had been lost, the pattern of loss within the plot suggesting that driving spray rather than another freak wave had been responsible.

Thus, a total of 27 (25%) of the 110 eggs being incubated on 18 May was lost during the gale. Most pairs suffering egg loss (23, 85%) relaid within 13-20 days (Figure 1, Table I), with a mean replacement interval of 16.1 days; this is similar to the 16.2 days recorded over a six-year period on the Isle of May (Harris & Wanless 1988). The proportion of pairs relaying in 1997 was higher than during 1993-96, but not significantly so ($\chi^2 = 2.96$, $P = 0.085$). However, excluding early (before 8 May) and late (after 28 May) first egg losses, the replacement rate during the second, third and fourth weeks of May (83%, n = 36) was significantly higher in 1997 than in 1993-96 (56%, $n = 45$; $\chi^2 = 7.08$, $P = 0.008$). That 25% of pairs in the plot lost their eggs within 48 hours, and that the losses were mostly in two discrete clusters, may have resulted in such a high rate of relaying relatively late in the season.

Table 1. The response of breeding pairs of Common Guillemots to the loss of their first egg in a study plot at Sumburgh Head, 1993-1996 and (1997).

Tabel 1. De respons van Zeekoeten op het verlies van het (eerste) ei in een studiegebied bij Sumburgh Head op Shetland. Gegeven zijn: datum van eiverlies, aantal gevallen, % tweede legsels, % uitgekomen eieren, % uitgevlogen jongen, aantal uitgevlogen jongen per tweede legsel en uitvliegsucces per broedpaar in 1993-96 en (1997).

First egg lost	Number	% relaid	Hatching success, %	Fledging success, %	Fledged per relay	Fledged per pair
1-7 May	10 (0)	100	90	100	0.90	0.90
8-14 May	18 (4)	67 (100)	83 (0)	70	0.58	0.39
15-21 May	14 (27)	64 (89)	33 (33)	0 (0)		
22-28 May	13 (5)	31 (40)	25 (50)	0 (0)		
>28 May	7 (5)	0 (0)				
Total	62 (41)	57 (73)	66 (30)	70 (0)	0.46 (0.00)	0.26 (0.00)

Hatching success of replacement eggs during the May 1997 gale was the same as for eggs replacing those lost in the third week of May in 1993-96, but as in 1993-96, no chick fledged from an egg replacing one lost after the second week of May. Twenty of the total of 30 replacement eggs laid in the plot in 1997 disappeared, half (possibly including some newly hatched young) after heavy overnight rain on 30 June/1 July. The first chick hatched from a replacement egg on 1 or 2 July, by which time 72% of the 61 chicks that fledged from the plot had done so, 92% having departed the plot by 7 July. By the second week of July, most adults had left the plot and the nine chicks from replacement eggs had disappeared within ten days of known hatching; possibly taken by Herring Gulls *Larus argentatus* or Great Black-backed Gulls *L. marinus*, that had previously been seen predating Guillemot eggs and chicks in the vicinity of the plot.

Both breeding density and synchrony are important factors in Guillemot breeding success, especially at colonies where predation of eggs and chicks occurs (Birkhead 1977; Hatchwell 1991). In this instance, although the synchronous loss of eggs during 18-20 May may have led to a high proportion of females relaying, the storm occurred too late in the incubation period for replacement eggs to have much chance of success.

SAMENVATTING

Zeekoeten leggen slechts één ei, maar over het algemeen hebben de op de Britse Eilanden nestelende Zeekoeten een hoog broedresultaat (0.7-0.8 jongen per paar). Normaal komt ongeveer

80% van de eieren uit en de belangrijkste oorzaken van verlies zijn wegrollen, predatie en onvruchtbaarheid. Indien een ei verloren gaat, worden dikwijls nieuwe pogingen ondernomen, maar de kans op zo'n tweede ei neemt snel af in de loop van een broedseizoen. Het broedsucces van een groep Zeekoeten op de Shetland Eilanden, nestelend bij Sumburgh Head op de zuidpunt van Mainland, wordt sinds 1989 gedetailleerd onderzocht. Bij dit onderzoek worden regelmatig overzichtsfoto's gemaakt en vaste delen van de kolonie worden dagelijks met behulp van een telescoop bekeken. Deze studie-plot bevindt zich aan de landzijde van een rotsblok voor de kust en de broedrichels, waarop in 1997 122 paren nestelden, bevinden zich 10-15m boven zeeniveau.

Op 17 en 18 mei 1997 nam de toch al harde oostelijke wind toe tot stormkracht (NO 8-9B). In de vroege morgen van 19 mei had dit tot gevolg dat er een enorme deining stond en deze zware zeegang zorgde voor de nodige overlast op de kolonies. Van de 110 broedende Zeekoeten die op 18 mei gezien waren zaten deze morgen 107 exemplaren dicht opeen op de eieren. Tijdens de observaties naderde vanuit het noordoosten een ongebruikelijk hoge supergolf en toen deze brak op de rotsen van Sumburgh Head werd de studieplot gedeeltelijk schoongeveegd. Tenminste 16 broedende vogels en hun eieren spoelden van de rotsen. De volgende dag bleken nog eens acht broedvogels hun ei verloren te hebben hetgeen het totale verlies op 27 (25%, n = 110) bracht. De meeste paartjes probeerden het opnieuw (23 ex., 85%), door gemiddeld binnen 16 dagen een nieuw ei te produceren. Net als in eerdere jaren vloog er echter geen enkel jong uit van paren die na de tweede week van mei een nieuw ei konden produceren (Fig. 1, Tabel 1). Ofschoon het simultane verlies van eieren dus tot een hoog percentage tweede pogingen heeft geleid, sloeg de supergolf te laat in het seizoen toe om nog met tweede legsels gecompenseerd te kunnen worden.

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