

Short Communications Korta rapporter

Gulls and Fulmars following ships and feeding on discards at night

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Fishery waste has obviously contributed considerably to an increase of the breeding populations of scavenging seabird species such as Fulmar *Fulmarus glacialis*, Gannet *Morus bassanus*, large gulls (*Larus marinus*, *argentatus* and *fuscus*) and Kittiwake *Rissa tridactyla* in the North Sea (e.g. Furness 1992, Camphuysen et al. 1993). Commercial fishing takes place both by day and night. In particular, that for Sole *Solea vulgaris* in the eastern and southern North Sea occurs principally at night. This type of fishery produces huge amounts of discards and is characterized by considerable numbers of ship-following birds (Garthe 1993). Although most, if not all gull species as well as the Fulmar are known to feed at night (e.g. Cramp & Simmons 1977, Glutz von Blotzheim & Bauer 1982, Gorke 1990, Garthe 1993), one can only guess about the importance to seabirds of nocturnal feeding on discards.

What can be the advantages of nocturnal scavenging on discards? First, both inter- and intraspecific competition may be reduced, because some species are assumed to be predominantly active during the daylight hours (e.g. Gannet, Great Skua *Catharacta skua*). This is implied by observations in the North Sea where higher capture rates were found for "weaker" species such as Fulmar when "stronger" species such as Gannet and Great Skua were absent (Garthe & Hüppop in prep.). Furthermore, birds may more easily escape with a fish into the dark without being chased by others.

To record the species feeding on discards at night and their numbers, experiments were conducted on board the research vessel "Heincke" (Biologische Anstalt Helgoland, Germany) from 23 to 25 March 1993. Otter-trawlings were carried out in the southeastern Skagerrak (north of Skagen, Denmark)

and northern Kattegat (Læsø-Deep, for hydrographical details see Buchholz & Boysen-Ennen 1988). Birds attending the vessel while trawling and discarding were counted during eight hauls. Four hauls each took place during daylight (sunshine) and darkness (apart from moonlight and floodlights of

Table 1. Species and numbers of birds attending RV "Heincke" during trawling and discarding. Time means the time from setting out the net until the end of discarding.

Arter och antal fåglar som följde RV "Heincke" under trålning och utkastning av fisk. Det betyder från tiden då nätet sattes ut till slutet av fiskutkastningen.

Southeastern Skagerrak				
Haul-no. Trålning nr	1	2	4	5
Date Datum	23.3	23.3	23.3	23.3
Time Tid (UTC)	13.45	15.25	19.20	21.25
	-15.10	-17.00	-21.10	-23.20
	light	light	dark	dark
Fulmar	0	1	1	12
Gannet	0	1	0	0
Common Gull	0	0	0	1
Lesser Black-backed Gull	3	5	11	10
Yellow-legged Gull	0	0	0	0
Herring Gull	1	3	2	3
Great Black-backed Gull	6	17	6	7
Kittiwake	1	7	0	0
Northern Kattegat				
Haul-no. Trålning nr	6	7	8	9
Date Datum	24.3	24.3	25.3	25./26.3
Time Tid (UTC)	11.15	12.35	21.15	23.05
	-12.40	-14.00	-22.45	-00.10
	light	light	dark	dark
Fulmar	0	0	0	0
Gannet	0	0	0	0
Common Gull	1	6	0	1
Lesser Black-backed Gull	2	5	0	8
Yellow-legged Gull	0	3	1	2
Herring Gull	3	18	6	19
Great Black-backed Gull	4	22	7	11
Kittiwake	2	3	0	0

Table 2. Percentages of experimentally discarded fish taken by birds in the Skagerrak / Kattegat, in the North Sea and around Shetland during day and night. Numbers in brackets give the total numbers of fish offered. "winter" = October to March, "summer" = April to September.

Procenten experimentellt utkastade fiskar som togs av fåglar i Skagerrak/Kattegat, Nordsjön och runt Shetland under dag och natt. Antal inom parentes anger totala antalet erbjudna fiskar. "winter" = oktober till mars, "summer" = april till september.

	roundfish		flatfish		area and season	authors
	%	n	%	n		
day	86	7	16	19	Skagerrak / Kattegat (winter)	this study
	92	5000	36	372	North Sea (winter)	Camphuysen et al. (1993)
	85	13575	8	397	North Sea (summer)	Garthe & Hüppop in press
	85	430	30	56	Helgoland area (winter)	Garthe (1993)
	79	909	30	1259	Helgoland area (summer)	Garthe (1993)
	83	208	67	76	off southwestern Norway (summer)	Hüppop unpublished
	58	6423	5	1182	around Shetland (summer)	Hudson & Furness (1988)
night	48	52	24	79	Skagerrak / Kattegat (winter)	this study

the ship). Immediately after six of the hauls fish were experimentally discarded (for details on methods see Garthe & Hüppop in press): fish were identified to species, their length measured to the nearest cm and then thrown overboard one after the other from the stern of the vessel. The bird species which consumed the fish was recorded.

The main species among the total of 157 fish discarded were Long Rough Dab *Hippoglossoides platessoides* (68 individuals), Haddock *Melanogrammus aeglefinus* (25), Flounder *Platichthys flesus* (13), Norway Pout *Trisopterus esmarki* (11), Witch *Glyptocephalus cynoglossus* (7), Cod *Gadus morhua* (7) and Grey Gurnard *Eutrigla gurnardus* (7).

The numbers of five *Larus* species following the vessel did not differ much between day and night, whereas Kittiwake and Gannet were present only by day (Table 1). In contrast, Fulmars were more numerous at night.

The percentages of discarded fish taken by these birds were remarkably high at night (Table 2). Six species were observed to take experimentally discarded fish at night: Lesser Black-backed Gull *Larus fuscus* (16 fish), Herring Gull *Larus argentatus* (12), Great Black-backed Gull *Larus marinus* (12), Common Gull *Larus canus* (2), Yellow-legged Gull *Larus cachinnans* (1) and Fulmar (1). The small sample size during the day in the present study prevents a comparison between day and night. However, we know from other studies that e.g. in the North Sea and around Shetland on average 58 to 92 % of all roundfish and 5 to 67 % of all flatfish

experimentally discarded during daytime were taken by birds (Table 2).

On only 3 out of 131 (2.3 %) occasions were fish stolen from other individuals in the darkness. This may indicate a relatively low rate of kleptoparasitism if compared to 10 % (n = 13972 discarded fish) in the North Sea during daylight (Garthe & Hüppop in prep.).

Since all seabird species attending the vessel at night successfully took fish, it is obvious that nightly feeding on discards plays a more important role than previously assumed. Hence, at least some seabird species seem to cover a considerable amount of their energy demand foraging on fishery waste during night.

We thank our friend Harro H. Müller for field assistance. We also thank the cruise-leader Friedrich Buchholz, captain H. Höppner and his crew for their kind cooperation on board RV "Heincke" (Biologische Anstalt Helgoland). John C. Coulson and Friedrich Buchholz made useful remarks on an earlier draft of this text, and the "Verein der Freunde und Förderer der Inselstation der Vogelwarte Helgoland" supported the project financially.

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Sammanfattning

Måsar och stormfåglar som följer fartyg och lever på fiskeavfall nattetid

Avfall från kommersiellt fiske har uppenbart bidragit till beståndsökningar hos arter som stormfågel, sula, trutar, och tretåmåsar i Nordsjön. Detta fiske pågår både dag och natt och producerar väldiga mängder avfall som utnyttjas av fåglar som följer båtarna. Även om de flesta måsar och stormfågeln är kända för att söka föda nattetid kan man ännu bara gissa vilken betydelse som nattligt avfallsfiske har.

En fördel med nattfiske kan vara att konkurrensen både inom och mellan arter kan reduceras genom att olika delar av dygnet utnyttjas. Man har således observerat att "svagare" arter som stormfågel fiskade effektivare när "starkare" arter som sula och storlabb var frånvarande. Fåglarna kan kanske fly från båtluuset in i mörkret med sin fångst utan att bli jagade av andra.

Föreliggande experiment utfördes från forskningsfartyget Heincke i sydöstra Skagerak och norra Kattegat 23-25 mars 1993. Fyra trålningar vardera utfördes under dag och natt. De fåglar som följde

både räknades. Vid sex av trålningarna kastades fiskar överbord från aktern en efter en. Fiskarnas art och längd samt den fågelart som tog fiskarna registrerades. Totalt kastades 157 fiskar.

Antalet trutar av fem arter skiljde sig inte mellan dag och natt medan tretåmåsar och sula bara fanns dagtid (Tabell 1). Stormfåglar fanns däremot bara nattetid. Andelen fiskar som togs var påtagligt hög under natten (Tabell 2). Det lilla stickprovet från dagtid i denna studie förhindrar jämförelse, men vi använder resultat från andra undersökningar från Nordsjön i Tabell 2.

Endast 3 av 131 fiskar stals av en annan fågel i mörker, vilket pekar på låg frekvens keltoparasitism nattetid i jämförelse med dagtid (10 % enligt egna observationer).

Eftersom alla arter som följde båten nattetid tog fisk framgångsrikt, är det uppenbart att nattligt födosök spelar en större roll än man tidigare trott. Följaktligen kan man räkna med att åtminstone vissa havsfåglar täcker en avsevärd del av sitt energibehov genom att följa fiskebåtar nattetid.

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Excessive migratory fattening in a captive Bluethroat *Luscinia s. svecica*

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Migratory birds mainly use body stores of fat as energy source for their long demanding flights (see e.g. Odum 1960a, 1960b, Alerstam 1982). In the extreme cases, individuals of some species probably more than double their body mass due to fat deposition (see e.g. Lindström 1986, Hedenström & Alerstam 1992). This conclusion is normally drawn from weight data on live birds, where individual birds have twice as high body mass as the estimated average fat-free mass of the population. However, these very fat individuals may have higher than average fat-free mass, leading to an overestimate of their fat loads. We have found only a few studies where fat loads of more than 100% of the fat-free