

## OBSERVATIONS OF LAND BIRDS ON WEATHER SHIPS IN THE NORTH ATLANTIC

Waarnemingen van landvogels op weerschepen in de Noord Atlantische Oceaan

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### INTRODUCTION

In 1947 eight countries started gathering meteorological information on 13 stations in the North Atlantic. According to a scheme of international cooperation, effective since 1950, Dutch ships took regular turns at five positions (table 1, fig. 1; see also Downes 1977). Since 1959 meteorologists on

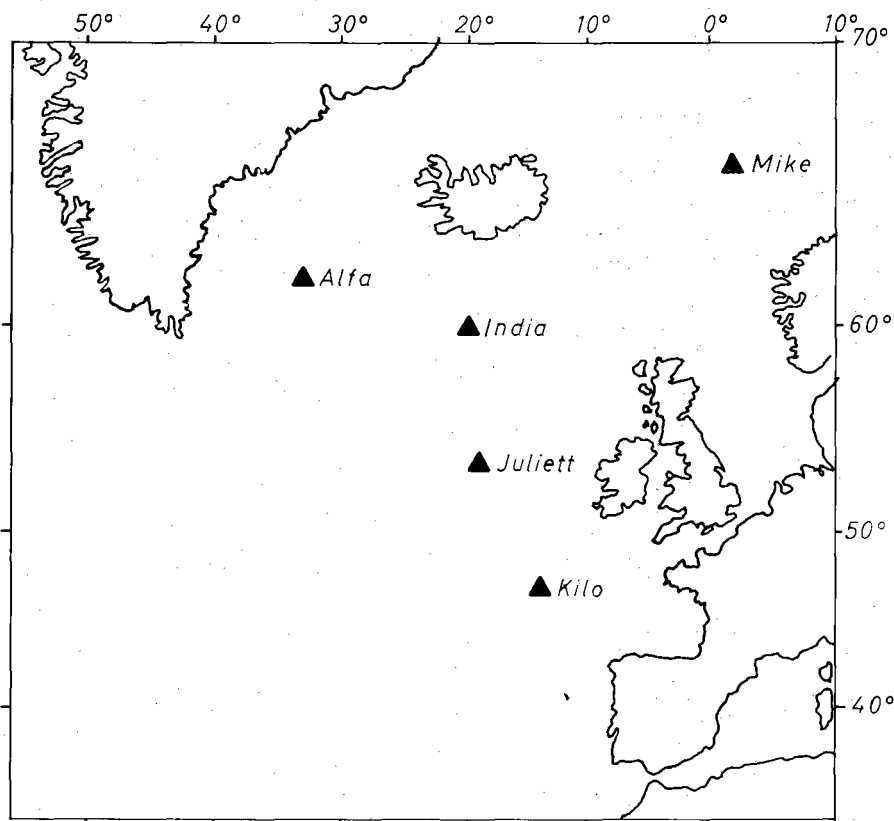


Figure 1. Positions of the Ocean Weather Stations in the Northeast Atlantic.

Figuur 1. Posities van de weerstations in het noordoostelijk deel van de Atlantische Oceaan.

board of the Dutch Ocean Weather Ships (O.W.S.) "Cumulus" and "Cirrus" have made observations of birds. The observations on board O.W.S. Cirrus were carried on until the end of 1971, when this ship was taken out of service;

Table 1. The Northeast Atlantic Ocean weather stations, 1950-1974.

Tabel 1. De weerstations in het noordoostelijk deel van de Atlantische Oceaan, 1950-1974.

Stations	Positions	
Mike (Metro)	N 66,0°	E 02,0°
Alfa	N 62,0°	W 33,0°
India	N 59,0°	W 19,0°
Juliett	N 52,5°	W 20,0°
Kilo	N 45,0°	W 16,0°

those on board O.W.S. Cumulus are continuing. Visits to the stations Kilo and Juliett were discontinued in 1973, those to Alfa and India in 1974, owing to a reorganisation of the entire scheme of weather observations.

Data were gathered by three counts daily of seabirds in the neighbourhood of the ship, at 10.00, 14.00 and 18.00 G.M.T., sometimes in winter these hours were changed, depending on sunrise and sunset. The numbers of birds were noted on data-sheets, on which cloudiness, state of the sea, windspeed and direction and air and water temperature also were recorded. In addition notes were taken of any landbird flying past or alighting on board. It is the purpose of this paper to summarize the observations of landbirds observed between 1 January 1960 and 31 December 1976 and to relate these to their known patterns of migration. To enlarge the scope of the present investigation published data on landbirds at British (Sea Swallow 1967-1975) and Norwegian (Hjelmtveit 1969) weather ships are also taken into consideration. The data of the British weather ships concern the stations Alfa, India, Juliett and Kilo and were gathered from January 1966 until June 1975. Those from the Norwegian weather ships were taken on station Mike from July 1950 until November 1961.

#### METHODS OF ANALYSIS

The numbers of days on which observations were made are listed by station in table 2. In order to make comparisons possible the coverage for

Table 2. Coverage of the weather stations by Netherlands and Norwegian ships.

Tabel 2. Bezetting van de weerstations door Nederlandse en Noorse schepen, in dagen en in procenten van het totaal aantal dagen.

Country	Station	Years	Numbers of days station was manned	Total number of days	% coverage
Netherlands	Mike	1960-1976	1516	6210	24,4
Netherlands	Alfa	1960-1974	764	5479	13,9
Netherlands	India	1960-1974	849	5479	15,5
Netherlands	Juliett	1960-1973	735	5114	14,4
Netherlands	Kilo	1960-1973	877	5114	17,1
Norway	Mike	1950-1959	1506	3652	41,2
Norway/ Netherlands	Mike	1960-1976	1771	6210	28,5

Table 3. Coverage of the weather stations in percent of total number of days per month.

Tabel 3. Bezetting van de weerstations in procenten van het totaal aantal dagen per maand.

Country	Station	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Netherlands	Mike	16,9	11,6	9,3	8,0	10,4	4,3	36,8	33,8	29,6	32,3	40,8	38,5
Netherlands	Alfa	21,1	13,4	13,8	15,3	7,3	22,4	19,8	11,2	8,9	20,0	2,9	11,0
Netherlands	India	8,0	10,8	34,0	32,9	23,2	13,6	6,0	8,2	17,3	12,5	10,7	8,8
Netherlands	Juliett	12,9	14,1	7,1	16,2	34,3	28,6	12,0	6,7	3,6	5,1	15,7	16,4
Netherlands	Kilo	22,1	40,4	24,9	19,0	18,4	15,5	16,1	13,1	15,7	10,8	5,7	5,5
Norway	Mike	53,0	49,4	44,4	55,6	64,5	55,2	33,3	44,4	33,7	38,7	34,1	43,4
Norway/ Netherlands	Mike	17,8	20,2	15,2	13,9	17,5	8,2	42,7	33,7	35,5	32,4	44,5	38,5

each station is estimated by expressing the number of days for which it was manned as a percentage of the total number of days of the years under consideration. In the same way a more detailed estimate of the coverage per month over all years is given in table 3. At the bottom of these two tables the coverage of station Mike by Norwegian vessels from July 1950 until December 1959 and the combined coverage by Dutch and Norwegian vessels from 1960 to 1976 is indicated. It was not possible to estimate the coverage by British observers, but it is known that the stations India and Juliett have been manned far more frequently than the others.

For seven species a diagram is given summarizing the observations by seven-day periods, according to a method developed by Sharrock (1969; see results). The height of the bars in the diagrams is proportional to the numbers of times a particular species was observed. In cases where the number of individuals involved differs from the number of observations, the former number is printed in the bars.

For a number of cases a circular diagram is presented illustrating the distribution of the birds in relation to the direction from which the wind was blowing at the time of their arrival. The wind direction is given by meteorologists in compass-degrees. The bearing east is 90°, south 180°, west 270° and north 360°. For our diagrams the compass-card is divided into eight sectors (fig. 2). The sectors 1, 3, 5 and 7 each contain five directions and the sectors 2, 4, 6 and 8 each four directions. Owing to this the odd sectors are somewhat overestimated. The wind direction 000 (no wind) is not included in the sectors of the compass-cards. A few birds arrived during a calm, but they have no effect on the presented discussions.

## RESULTS

The Dutch crews observed a total of 801 birds of 76 species. These are listed in table 4. Three extreme rarities were reported from station Mike, Scops Owl *Otus scops* on 19 April 1975, Blue Rock Thrush *Monticola solitarius* on 1 November 1960 and Melodious Warbler *Hippolais polyglotta* on 7 October 1964. The records were not accompanied by descriptions. So it seems best to disregard them as unconfirmed identifications. Norwegian and

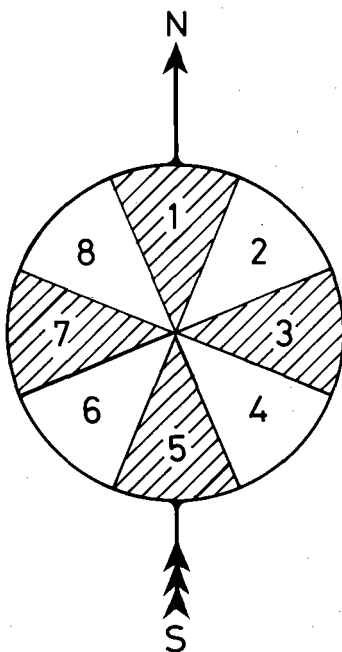


Figure 2. Designations of the sections of the compass-card.

Figuur 2. Sector-verdeling van de windroos.

Table 4. List of species of birds observed on board ocean weather ships. For the Netherlands vessels, the number of individuals recorded is also given.

Tabel 4. Lijst van de op de weerscheepen waargenomen vogelsoorten (exclusief zeevogels). Voor de Nederlandse schepen is tevens aangegeven hoeveel exemplaren van de genoemde soorten werden gemeld.

		Netherlands					Norway					England				
		M	A	I	J	K	M	A	I	J	K	M	A	I	J	K
Little Bittern	<i>Ixobrychus minutus</i>						1									
Little Egret	<i>Egretta garzetta</i>						1									
Grey Heron	<i>Ardea cinerea</i>	6					8	x				x			x	
Spoonbill	<i>Platalea leucorodia</i>						1									
Whooper Swan	<i>Cygnus cygnus</i>		1													
Pink-footed Goose	<i>Anser brachyrhynchus</i>														x	
White-fronted Goose	<i>Anser albifrons</i>	1		1								x			x	
Greylag Goose	<i>Anser anser</i>			3			x					x				
Barnacle Goose	<i>Branta leucopsis</i>											x				
Brent Goose	<i>Branta bernicla</i>			1					x			x				
Teal	<i>Anas crecca</i>											?				
Mallard	<i>Anas platyrhynchos</i>	1					x								x	

		M	A	I	J	K	M	A	I	J	K
Shoveler	<i>Anas clypeata</i>				1						
Red-crested Pochard	<i>Netta rufina</i>									x	
Pochard	<i>Aythya ferina</i>									x	
Tufted Duck	<i>Aythya fuligula</i>				2					x	
Scaup	<i>Aythya marila</i>						x				
Black Kite	<i>Milvus migrans</i>					1					
Goshawk	<i>Accipiter gentilis</i>						x			x	
Sparrowhawk	<i>Accipiter nisus</i>		1				x				
Buzzard	<i>Buteo buteo</i>			1							
Kestrel	<i>Falco tinnunculus</i>	1		1	3		x	x	x	x	x
Merlin	<i>Falco columbarius</i>	1		4			x	x	x	x	
Hobby	<i>Falco subbuteo</i>				1	1				x	
Gyr Falcon	<i>Falco rusticolus</i>							x			
Peregrine	<i>Falco peregrinus</i>	1				1				x	
Water Rail	<i>Rallus aquaticus</i>	1					x				
Oystercatcher	<i>Haematopus ostralegus</i>	8		2			x		x	x	
Avocet	<i>Recurvirostra avosetta</i>								x		
Ringed Plover	<i>Charadrius hiaticula</i>	12	1	1			x	x	x	x	
Kentish Plover	<i>Charadrius alexandrinus</i>					1					
Golden Plover	<i>Pluvialis apricaria</i>	4	2	6	3	1	x	x	x	x	
Lapwing	<i>Vanellus vanellus</i>				1		x				
Knot	<i>Calidris canutus</i>		1						x	x	
Sanderling	<i>Calidris alba</i>			2				x	x	x	
Little Stint	<i>Calidris minuta</i>	3	1				x				
White-rumped Sandpiper	<i>Calidris fuscicollis</i>							x			
Curlew Sandpiper	<i>Calidris ferruginea</i>		1								
Purple Sandpiper	<i>Calidris maritima</i>	5	2	2		1	x	x	x	x	
Dunlin	<i>Calidris alpina</i>	4	8	4	4	1	x	x	x	x	
Ruff	<i>Philomachus pugnax</i>									x	
Jack Snipe	<i>Lymnocyrtes minimus</i>									x	
Snipe	<i>Gallinago gallinago</i>			1					x		
Whimbrel	<i>Numenius phaeopus</i>		1	3		1	x	x	x	x	
Curlew	<i>Numenius arquata</i>	1		4	8	1	x			x	
Redshank	<i>Tringa totanus</i>	1	1				x	x	x		
Greenshank	<i>Tringa nebularia</i>									x	
Common Sandpiper	<i>Actitis hypoleucos</i>	1								x	
Turnstone	<i>Arenaria interpres</i>	8	18	63			x	x	x	x	
Rock Dove	<i>Columba livia</i>									x	
Woodpigeon	<i>Columba palumbus</i>	3									
Collared Dove	<i>Streptopelia decaocto</i>		1						x	x	
Turtle Dove	<i>Streptopelia turtur</i>					1	33	x	x	x	x
Eagle Owl	<i>Bubo bubo</i>	1									
Snowy Owl	<i>Nyctea scandiaca</i>							x			
Hawk Owl	<i>Surnia ulula</i>						x				
Tawny Owl	<i>Strix aluco</i>	2									
Long-eared Owl	<i>Asio otus</i>								x		x
Short-eared Owl	<i>Asio flammeus</i>	1		1			x		x	x	
Swift	<i>Apus apus</i>	2			1	4	x	x	x		
Woodlark	<i>Lullula arborea</i>										x
Skylark	<i>Alauda arvensis</i>			1			x		x	x	x

		M	A	I	J	K	M	A	I	J	K
Shore Lark	<i>Eremophila alpestris</i>						x				
Sand Martin	<i>Riparia riparia</i>							x		x	
Swallow	<i>Hirundo rustica</i>	4	2	6	16	24	x	x	x	x	x
House Martin	<i>Delichon urbica</i>				5		x		x	x	x
Tree Pipit	<i>Anthus trivialis</i>			4		1	x		x	x	
Meadow Pipit	<i>Anthus pratensis</i>	22	6	34	3	13	x	x	x	x	x
Rock Pipit	<i>Anthus spinoletta</i>			1	1			x			
Yellow Wagtail	<i>Motacilla flava</i>	1									
Grey Wagtail	<i>Motacilla cinerea</i>									x	
White Wagtail	<i>Motacilla alba</i>	2	4	4		1	x		x	x	
Waxwing	<i>Bombicilla garrulus</i>	2							x		
Wren	<i>Troglodytes troglodytes</i>	3									
Robin	<i>Erithacus rubecula</i>	4								x	
Nightingale	<i>Luscinia megarhynchos</i>									x	
Bluethroat	<i>Luscinia svecica</i>								x		
Black Redstart	<i>Phoenicurus ochruros</i>						x		x	x	
Redstart	<i>Phoenicurus phoenicurus</i>						x			x	
Whinchat	<i>Saxicola rubetra</i>						x		x	x	
Wheatear	<i>Oenanthe oenanthe</i>	12	12	15	11	12	x	x	x	x	
Blackbird	<i>Turdus merula</i>	11					x		x	x	x
Fieldfare	<i>Turdus pilaris</i>	8					x		x	x	
Song Thrush	<i>Turdus philomelos</i>								x	x	x
Redwing	<i>Turdus iliacus</i>	21	1	17	2		x	x	x	x	x
Grasshopper Warbler	<i>Locustella naevia</i>									x	
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>								x		
Marsh Warbler	<i>Acrocephalus palustris</i>									x	
Reed Warbler	<i>Acrocephalus scirpaceus</i>									x	
Lesser Whitethroat	<i>Sylvia curruca</i>						x		x		
Whitethroat	<i>Sylvia communis</i>									x	x
Garden Warbler	<i>Sylvia borin</i>						x		x	x	
Blackcap	<i>Sylvia atricapilla</i>	8		1			x		x	x	
Chiffchaff	<i>Phylloscopus collybita</i>	2					x		x	x	
Willow Warbler	<i>Phylloscopus trochilus</i>	1					x		x		
Goldcrest	<i>Regulus regulus</i>	2		1			x			x	
Spotted Flycatcher	<i>Muscicapa striata</i>	1							x	x	
Red-breasted Flycatcher	<i>Ficedula parva</i>									x	
Pied Flycatcher	<i>Ficedula hypoleuca</i>									x	
Great Tit	<i>Parus major</i>	1					x				
Golden Oriole	<i>Oriolus oriolus</i>					1					
Rook	<i>Corvus frugilegus</i>						x				
Carriion Crow	<i>Corvus corone</i>	4					x				
Starling	<i>Sturnus vulgaris</i>	137	1	2	7	2	x		x	x	x
Chaffinch	<i>Fringilla coelebs</i>	6				1	x		x	x	
Brambling	<i>Fringilla montifringilla</i>	5					x		x	x	
Serin	<i>Serinus serinus</i>					2					
Greenfinch	<i>Carduelis chloris</i>					1			?		
Goldfinch	<i>Carduelis carduelis</i>	1									
Siskin	<i>Carduelis spinus</i>				1					x	
Linnet	<i>Carduelis cannabina</i>	1									
Redpoll	<i>Carduelis flammea</i>						x	x	x	x	

		M	A	I	J	K	M	A	I	J	K
Two-barred Crossbill	<i>Loxia leucoptera</i>									x	
Crossbill	<i>Loxia curvirostra</i>						x		x		
Lapland Bunting	<i>Calcarius lapponicus</i>							x	x	x	
Snow Bunting	<i>Plectrophenax nivalis</i>	30	4	3			x	x	x	x	x
Yellowhammer	<i>Emberiza citrinella</i>									x	
Reed Bunting	<i>Emberiza schoeniclus</i>						x			?	

British crews recorded in addition 42 species which are also listed in table 4. Many unidentified birds were also reported, but these are not listed. Seven species occurred in some numbers, Turnstone, Swallow, Meadow Pipit, Wheatear, Redwing, Starling and Snow Bunting. Notes on these species are presented below under separate headings. The sequence of the accounts and also of table 4 is according to Voous (1973, 1977).

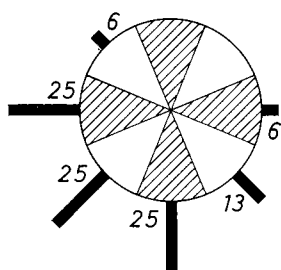
#### Turnstone *Arenaria interpres*

The distribution throughout the year is given in fig. 4. The birds appear at four stations (not at Kilo) mostly in May and August/September. In spring, the numbers at Mike and Juliett are small. The compass-card for India in autumn (fig. 3.1) shows that 75% of the birds arrive with a wind between south and west. Presumably the observations on board the weather ships are of birds breeding in Greenland. These migrate from Greenland to the British Isles across the North Atlantic either by way of Iceland or directly. Their main passage through Iceland is between 10th and 25th May and between mid-August and mid-September (Timmermann 1938-1949). The autumn migration is probably more often directly across the North Atlantic, as the species is observed at the southern station Juliett in autumn only. The arrival at India with southern winds also bespeaks a southerly migration route. Lack of birds at Juliett in spring indicates that the spring migration may be more often by way of Iceland. Turnstones arriving at station Mike in autumn are coming from Spitsbergen and northern Scandinavia rather than from Greenland.

#### Swallow *Hirundo rustica*

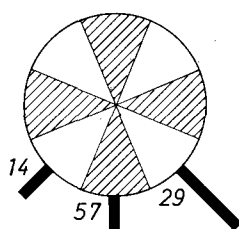
The Swallow has been observed at all stations. Their main passage at the ships is in April and May. Then the birds are returning from their winter quarters. The distribution throughout the year is given in fig. 5. The birds arrived at Mike, India and Juliett (fig. 3.3) with winds between east and

3.1 Turnstone

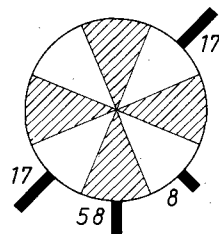


I, autumn

3.2 Redwing, M

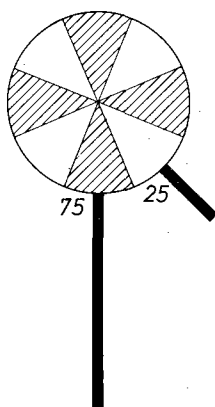


spring

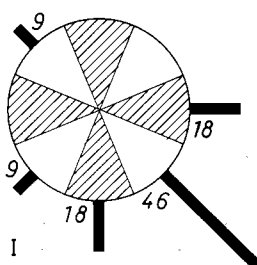


autumn

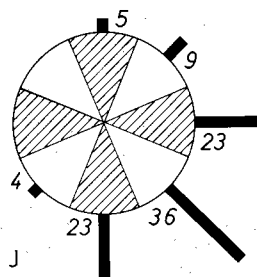
3.3 Swallow, spring



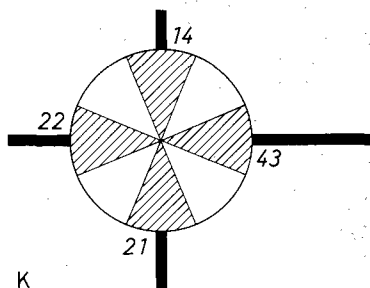
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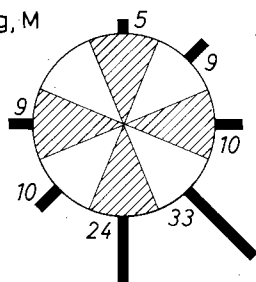


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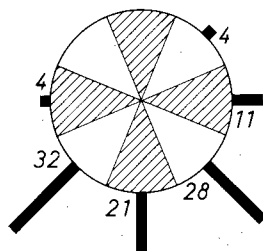


K

3.4 Starling, M



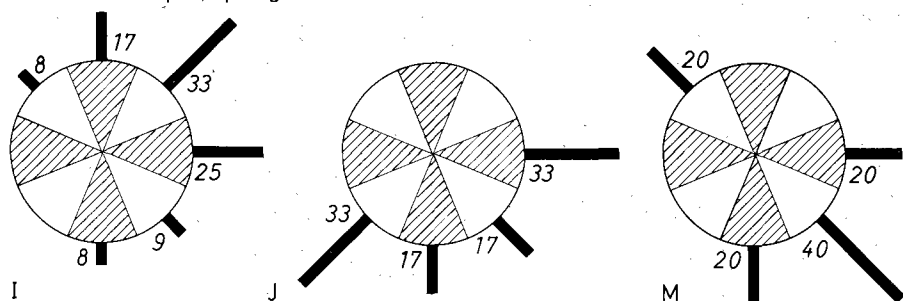
spring



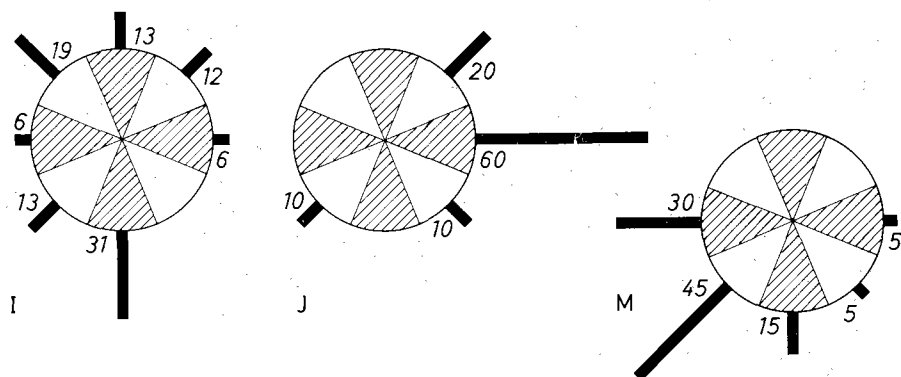
autumn



## 3.5 Meadow Pipet, spring



## 3.6 Meadow Pipet, autumn



## 3.7 Snow Bunting, M

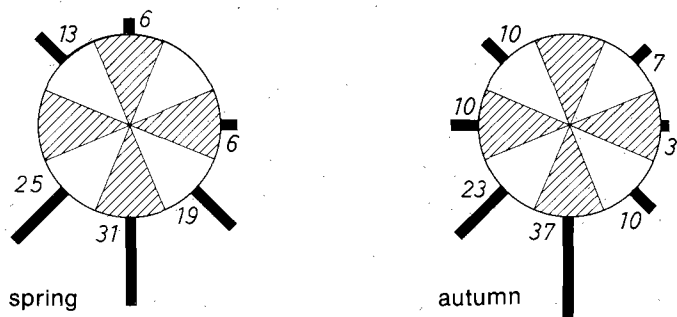


Figure 3. Observations of several species of birds in relation to wind direction. The number of individuals arriving with a particular wind is indicated as a percentage of the total number of individuals observed per station and per season.

Figuur 3. Waarnemingen van bepaalde vogelsoorten in relatie tot de op het moment van waarneming heersende wind. Het aantal bij een bepaalde wind waargenomen individuen is aangegeven in % van het totaal aantal individuen per station en per seizoen.

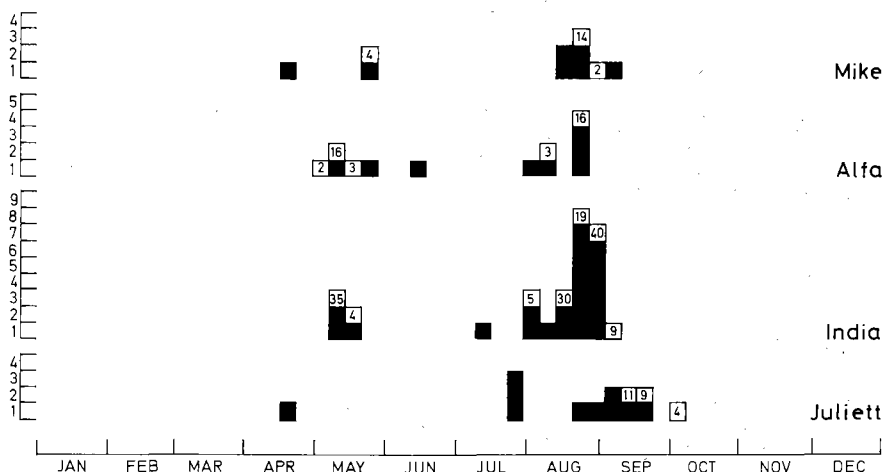


Figure 4. Distribution of Turnstone observations throughout the year. For explanation see text.  
 Figuur 4. Verdeling van de waarnemingen van de Steenloper over het jaar. De hoogte van de kolommen geeft het aantal waarnemingen aan per periode van 7 dagen. Indien in sommige gevallen meer dan één vogel tegelijk werd waargenomen is het totaal aantal individuen in de kolommen vermeld.

south. The compass-card for Kilo (fig. 3.3) shows a slight preponderance of arrivals with easterly winds, but apparently birds may be drifted toward the station from other directions as well. In our opinion we have to do with two

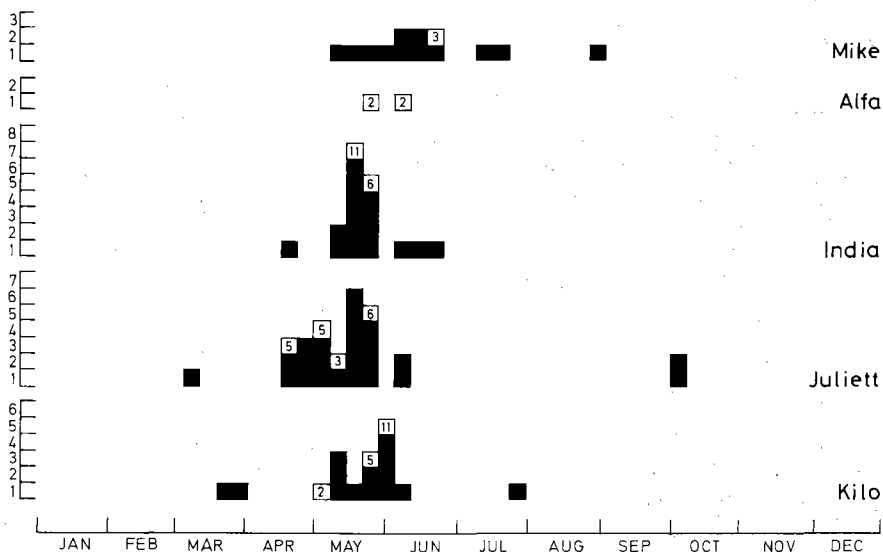


Figure 5. Distribution of Swallow observations throughout the year. For explanation see text.  
 Figuur 5. Verdeling van de waarnemingen van de Boerenzwaluw gedurende het jaar. Verklaring zie figuur 4.

kinds of arrival at the ships; overshoot and drifted birds. Arrival at Kilo with all winds indicates something else than drift and also some of the arrivals at Juliett give the same impression. These records could be birds which were overshooting their breeding range during the spring migration. The remaining observations consist of birds which were drifted to the stations by eastern and southern winds. Only on two occasions Swallows were seen at Alfa. This could depend on the small coverage in May, but it is also obvious that the Swallow must be a rarity at Alfa. It does not breed in Greenland and only marginally in Iceland (Voous 1960).

### Meadow Pipit *Anthus pratensis*

The Meadow Pipit has been observed at all stations mainly in the periods April-May and August-October (fig. 6). It is a breeding bird of northwestern

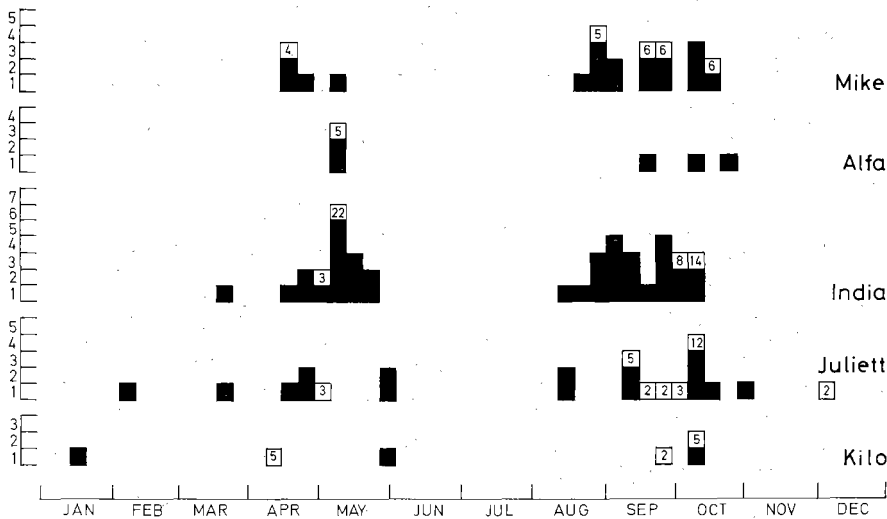


Figure 6. Distribution of Meadow Pipit observations throughout the year. For explanation see text.

Figuur 6. Verdeling van de waarnemingen van de Graspieper gedurende het jaar. Verklaring zie figuur 4.

Europe, Iceland and a small part of Greenland (Voous 1960). The small number of observations at Alfa indicates a migration of the Greenland birds over Iceland to the British Isles. The compass-card for India in autumn (fig. 3.6) shows arrivals with winds blowing from almost every quarter, but in spring (fig. 3.5) an arrival of 75% of the birds by winds between north and east. Probably the migration route in autumn is directly over India, whereas in spring a more easterly way to Iceland may be flown. Arrivals at Juliett in autumn (fig. 3.6) are typical examples of drifted birds. In spring (fig. 3.5) few Meadow Pipits were seen there; these may be considered stragglers, but

there is a tendency to birds drifted by easterly and southerly winds. Meadow Pipits are observed at Mike in spring (fig. 3.5) with winds between east and south, but the number of birds is rather small. These may probably be interpreted as Scandinavian breeding birds that have overshot their goal. The birds that arrived at Mike in autumn (fig. 3.6) with winds between south and west were probably Scandinavian migrants heading for Scotland that were delayed by head-winds, though there are no ringing records confirming this migration route (Zink 1975).

### Wheatear *Oenanthe oenanthe*

The Wheatear has been observed in some number at all stations. The distribution throughout the year is given in fig. 7. At Alfa the number of observations is very small in autumn. This may be partly due to poor coverage in August and September, but this is the same in April and May (table 3), so there is a real difference. At Juliett there are many more observations in autumn than in spring. Both in spring and autumn there are few observations at Kilo. For most stations there is no correlation with

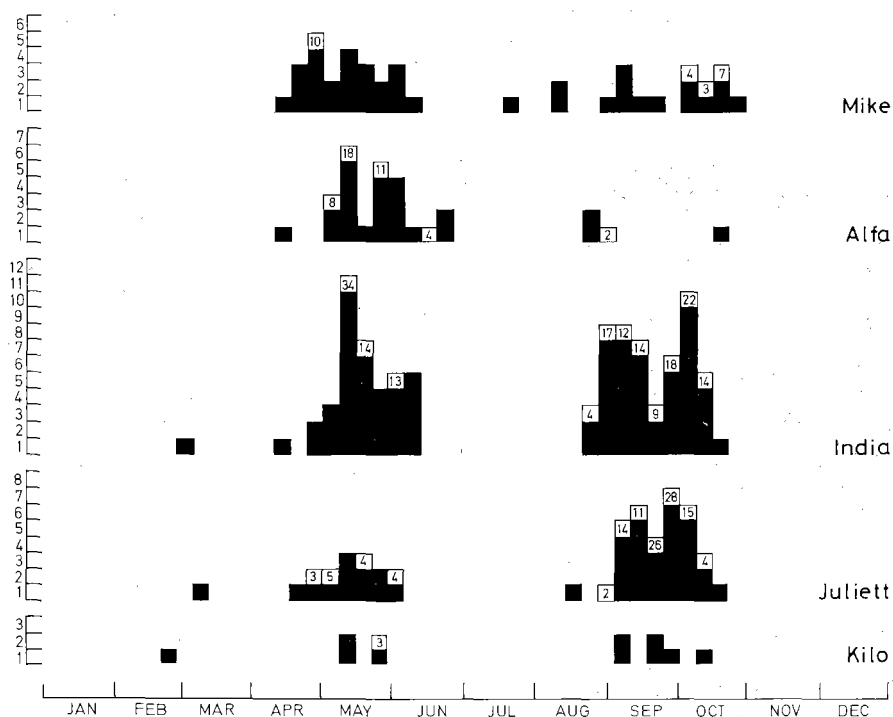


Figure 7. Distribution of Wheatear observations throughout the year. For explanation see text.  
 Figuur 7. Verdeling van de waarnemingen van de Tapuit gedurende het jaar. Verklaring zie figuur 4.

prevailing winds, but for Mike there is some evidence in spring for birds drifting from Scandinavia and also but to a lesser extent in autumn. Snow (1953) analysed records of Wheatears on board ships in the North Atlantic and concluded that in spring they tended to avoid excessively long sea crossings, flying from Britain to Iceland and thence to Greenland. In autumn, he concluded, they regularly migrate directly across the ocean from Greenland to the British Isles or even to the Iberian peninsula. Our data suggest a few modifications of this picture. Quite a few Wheatears reach India and Alfa in spring, indicating that a straight crossing from Britain to south Greenland is more common than Snow surmised. The good numbers at India and Juliett in autumn confirm a route from Greenland to Britain, but the near absence of the species at Kilo suggests that a crossing to Iberia is rarely made. Autumn birds may not reach Alfa because they are guided by the Greenland coastline and venture only out to sea after having reached the southern tip of that island. Wheatears observed at Mike might indicate migration from Britain to Norway in spring, but alternatively they could also be drifted from a route leading from western continental Europe to northern Scandinavia.

#### Redwing *Turdus iliacus*

In fig. 8 the distribution of the Redwing throughout the year is given. It was seen at every station, but at Kilo only once in winter and at Alfa only a few times. At Mike and India they were observed in April-May and October-

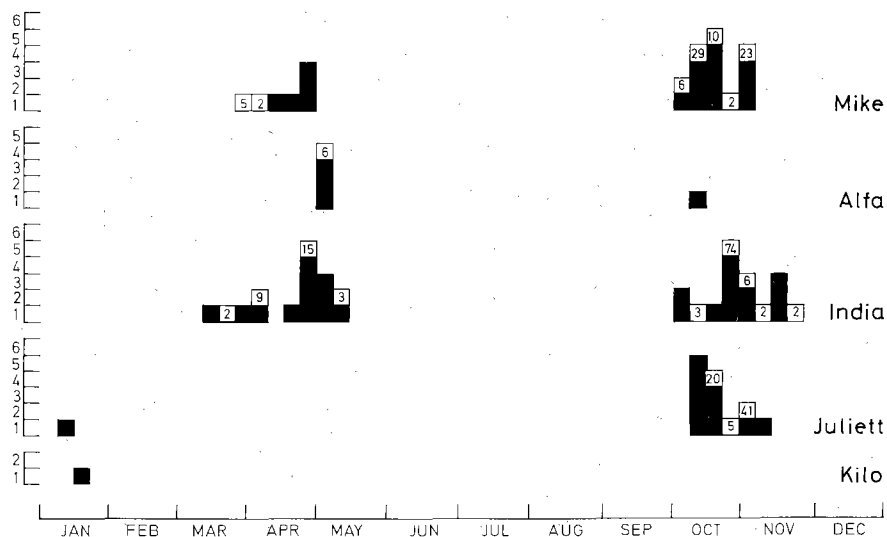


Figure 8. Distribution of Redwing observations throughout the year. For explanation see text.  
 Figuur 8. Verdeling van de waarnemingen van de Koperwiek gedurende het jaar. Verklaring zie figuur 4.

November, at Juliett only in the latter period. The birds observed at Mike were probably breeding birds of northern Scandinavia, those at India of the Iceland race *Turdus iliacus coburni*. One specimen found dead on board at the latter station was identified as belonging to this subspecies (ZMA nr. 15.854). The Redwing departs from Iceland from mid-September and returns from late March until early April (Timmermann 1938-'49). Analysis of arrivals in relation to wind direction in spring for Mike (fig. 3.2) shows that almost all Redwings arrived with winds between southeast and southwest, this probably points to birds drifted from Europe. The compass-card for Mike in autumn (fig. 3.2) is similar to that for the Meadow Pipit; this may reflect Scandinavian birds heading for Scotland and struggling with unfavourable winds.

### Starling *Sturnus vulgaris*

In fig. 9 the distribution of the Starling throughout the year is given. The picture strongly resembles that for the Redwing, but much fewer birds were seen at India. The birds were mainly seen in March-April and in October-November. In spring 56% of the birds arrived at Mike with winds between southeast and southwest (fig. 3.4), in autumn 81% with winds between southeast and southwest (fig. 3.4). It is known that Starlings migrate from Scandinavia directly to the British Isles and vice versa. So all birds arriving at station Mike are drifted to far north from this migration route. For Juliett it

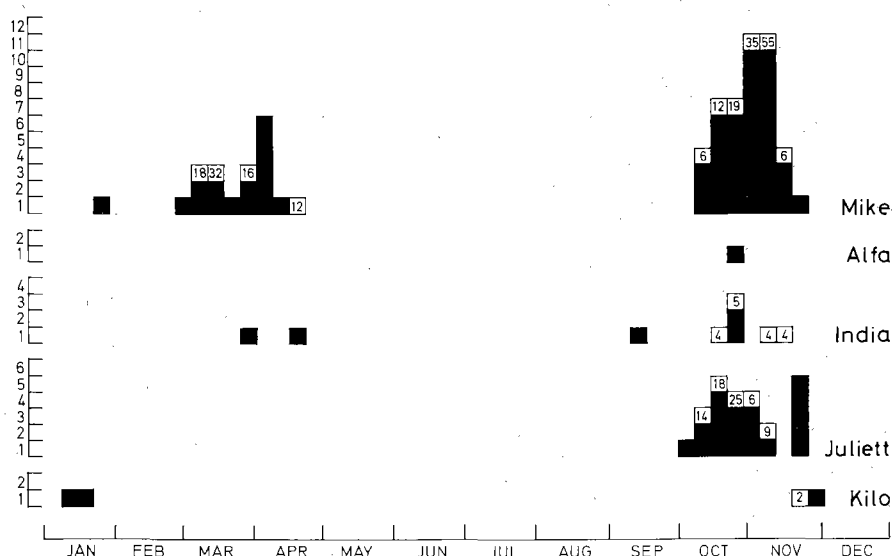


Figure 9. Distribution of Starling observations throughout the year. For explanation see text.  
 Figuur 9. Verdeling van de waarnemingen van de Spreeuw gedurende het jaar. Verklaring zie figuur 4.

is not known with which winds the Starlings arrived, but these birds must certainly also have been drifted. The small number of observations at Alfa and India correspond to the known occurrence of the Starling in Greenland and Iceland. Salomonsen (1967) says that the species has been recorded in Greenland in May and in September-November (sometimes December). In Iceland the Starling has bred in small numbers since 1941. In autumn and winter groups of stray migrants are often seen there (Timmermann, 1938-'49).

### Snow Bunting *Plectrophenax nivalis*

The distribution of the Snow Bunting throughout the year is given in fig. 10. In spring, the birds are mainly seen at the stations Mike, Alfa and India (April-May); in autumn, mainly at Mike, India and Juliett (September till mid-November). The compass-cards for Mike (fig. 3.7) show that in spring most Snow Buntings arrive with winds between southeast and southwest, in autumn with winds between south and southwest. The Snow Bunting breeds far to the north in Greenland (Voous, 1960). The birds of east Greenland have their winter quarters in the south Russian steppe, those from west Greenland in south Canada and north America. Birds ringed in east Greenland have been found in north Norway and north Russia, some ringed birds were also found in Shetland. It is supposed that the Snow Bunting migrates from east Greenland across the Denmark Strait and the Atlantic to

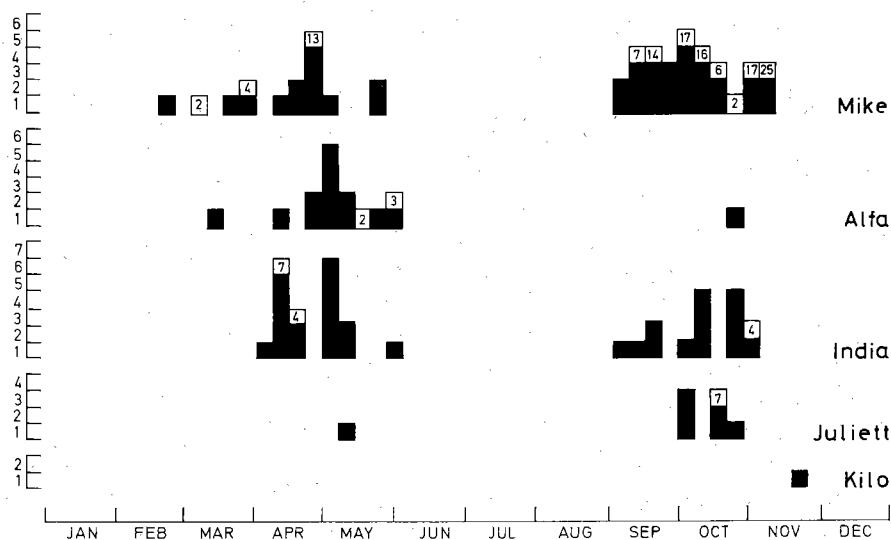


Figure 10. Distribution of Snow Bunting observations throughout the year. For explanation see text.

Figuur 10. Verdeling van de waarnemingen van de Sneeuwgorz gedurende het jaar. Verklaring zie figuur 4.

north Norway and that the birds found at Shetland have been displaced by drift. The birds leave Greenland from the end of September until mid-October (sometimes mid-November) and return from the end of April to June (Salomonsen, 1967). In Iceland the Snow Bunting is a resident bird (Timmermann, 1938-'49). The compass-cards for Mike agree nicely with the assumption of Salomonsen about the migration routes. However, many birds are also seen in autumn at India and Juliett and in spring at Alfa and India. Most observations are of single birds in contrast to the observations at Mike. In our opinion there are more birds migrating directly from Greenland to the British Isles than is supposed by Salomonsen, but the main migration is to Norway. In addition, birds arrived at India, Alfa and Juliett (no figures) with winds blowing from any direction, which is again an indication that the stations lie just within a migration route. In autumn, this migration could go from the south point of Greenland to Britain (to the south of Alfa). In spring, the birds might steer a more northerly course to Greenland (to the north of Juliett and over Alfa). For Alfa the pattern for the Snow Bunting resembles that for the Wheatear.

#### DISCUSSION

From table 4 it appears that almost any migratory species from the West European avifauna may be recorded far out at sea in the North Atlantic. However, most species are only stragglers, very few being seen more than five times at a particular station during the 17 years of observation. When they alight on board of the weather ships they are usually exhausted and emaciated. They would certainly have perished at sea without reaching any goal. Seven species appeared in some numbers and were dealt with in the previous section. Five of these are migrants from Greenland or Iceland to West Europe that must make the ocean crossing to reach their winter quarters. As has been shown above these appear most frequently on stations lying directly in the route of their migration. Station Alfa is apparently in the spring migration route, but not in the autumn route. This means that small birds leaving Greenland do so mainly from the southern tip of the island.

In addition, the Swallow appears almost exclusively in spring, the Starling typically in autumn. The greatest number of Starlings were seen at station Mike. This is interpreted as evidence that the Starling more often than the other migrants choose a route from Scandinavia to Britain across the Norwegian Sea. Of course, the Starling is one of the most numerous migrants, but hardly more so than the Chaffinch, which occurs at Mike as a straggler only. Similarly, the Redwing is more often recorded than the Blackbird or the Fieldfare. This again may reflect a real difference in the extent which each of these species migrates across the sea.

Apart from the Turnstone and four passerines discussed in chapter three a number of geese and waders also cross the North Atlantic on their migration.



These species are only seldom recorded at the weather ships. Speculating about the cause for the lack of observations, we think that these stronger flyers do not need to rest aboard ship. Most of the passerines are recorded when they come down and alight on the ships. Geese and waders rarely do this. In addition, the absolute number of migrant geese is of course much smaller than the number of migrant songbirds. We cannot guess why the Turnstone is so much more often recorded than any other wader.

It is a bit puzzling that the Turtle Dove should appear in some numbers at Kilo. Five records in spring and eight in autumn account for a total of 33 individual birds. This could mean that the Turtle Dove usually flies a westerly migration route from Britain to the Iberian Peninsula. Interestingly quite a few falcons have been recorded, far outnumbering the other birds-of-prey. This is in accordance with their greater powers of long distance flight. Migratory members of the family *Accipitridae* mostly depend on soaring and gliding during migration. Falcons, particularly Kestrel and Merlin, have been seen alighting on board, settling on the mast. Several times the observers reported them taking exhausted songbirds. Usually the falcons stayed for some hours after which they left and continued their migration (see also Voous 1961).

Summarizing it can be said that most landbirds recorded at the Atlantic weather stations were drifted birds, far removed from their normal course of migration. For some species regular migration to and from Iceland and Greenland is confirmed by the records. For a few others, Turtle Dove, Redwing and Starling, the number of records is so large that it may indicate the existence of migration across the sea. Transoceanic migration is better known and more frequent in the Western Atlantic, where it is induced by the relative position of the continents North and South America (McClintock *et al.* 1978).

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#### SAMENVATTING

Door waarnemers aan boord van de Nederlandse weerschepen zijn sedert 1959 vogelwaarnemingen verricht. In dit artikel worden de gegevens betreffende land- en kustvogels samengevat en besproken. Ter vergelijking wordt ook een overzicht gegeven van gepubliceerde waarnemingen aan boord van Britse en Noorse weerschepen.

De waarnemingsintensiteit is weergegeven in de tabellen 2 en 3. Tabel 4 bevat een lijst van alle vastgestelde soorten. In de figuren 4 tot 10 is de

verdeling over het jaar weergegeven. De verdeling over de heersende windrichtingen vindt men in figuur 3.

Zeven soorten worden iets uitvoeriger besproken. Voor vijf van hen, Steenloper, Graspieper, Tapuit, Koperwiek en Sneeuwgorz liggen één of meer weerstations op de normale trekroute. De Boerenzwaluw wordt met name in het voorjaar vaak ver op zee waargenomen. Het is bekend dat deze soort jaarlijks in klein aantal op IJsland broedt. De Spreeuw is vooral talrijk op het weerstation M, ter hoogte van de Noorse kust. Ook op het station J, ten westen van Ierland, worden regelmatig Spreeuwen gezien, maar alleen in de herfst. Op het meest zuidelijke station Kilo komen nogal eens Tortelduiven. Misschien duidt dit op een tendens om vanuit Engeland rechtstreeks naar het zuiden te vliegen. Valken worden veel vaker midden op zee waargenomen dan andere roofvogels.

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