DANISH REVIEW
of
GAME BIOLOGY

Edited by

Jagtfondets vildtbiologiske undersøgelser

and

Vildtbiologisk station, Kalø

Managing editors

R. Spärck †
Zoological Museum
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H. M. Thamdrup
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Kalø pr. Rønde

Vol. 4, Part 3

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J. H. SCHULTZ A/S
KØBENHAVN

CONTENTS

INTRODUCTION

In »Danske Vildtundersøgelser« no. 8 (1958) the author analysed the marking experiments with reared Mallards carried out by the Game Biology Station during the period 1950–1955. All recoveries obtained before 31 Dec. 1956 were considered.

Since then, a large number of Mallards have been marked, and the present paper analyses the marking data from the entire period 1950–1960. Recoveries obtained before the end of 1962 have been included.

Many aspects of the biology of a game species cannot be analysed unless marked individuals have been released and, subsequently, recovered.

The fate of released Mallards as disclosed through the marking operations are interesting in many ways.

The experience gained is useful to all who consider the possibility of releasing Mallards because it gives an idea of Mallard movements not only during the open season but throughout the year, and of the returns to be expected on estates where Mallards are released to increase the future bag.

No satisfactory data on the revocery of Danish wild Mallards are available but, undoubtedly, the marking data obtained from reared Mallards reflect the situation within Mallard populations in general since released birds that have survived the first year must be assumed to behave largely as members of the wild population.

The Game Biology Station extends its sincere thanks to sportsmen and all other persons who have shown their interest by participating in the marking operations and by supplying data on marked Mallards shot or traced in other ways.

ALMOST 1200 RECOVERIES

As mentioned above, the body of data comprises results already published as well as birds marked, released, and recovered later than 1956. A few ringed and wing-tagged birds from 1951 have been left out here although considered in the 1958 publication; it has later been found that some of them were pinioned.

	Nos. marked Antal mærket	Age at release Alder ved udsætning	Recovered Tilbagemeldt	
			Nos. Antal	%
1) Ringed	3757	juvv.	887	23,6
Ringmærkede	302	ad.	75	24,8
	217	?	74	34,1
Total I alt	4276		1036	24,2
2) Wing-tagged	919	juvv.	149	16,2
Vingemærkede	37	ad.	5	13,5
	4	?	1	25,0
Total I alt	960		155	16,1
Total ringed and wingtagged I alt ring- og vingemærkede	5236		1191	22,7

Table 1. Nos. of ringed and wing-tagged Mallards (hand-reared) released 1950–60 and the recoveries obtained before 31.12.1962.

Skema 1. Antal ring- og vingemærkede udsat som ællinger, voksne og uden aldersangivelse 1950–60 og alle genmeldinger, der er indløbet indtil den 31.12.1962.

It appears from Table 1 that 5236 Mallards were marked, and that a total of 1191 recoveries were obtained. In other words

22.7% of the birds released are reported back.

It is apparent that a higher recovery percentage results from ringed than from wing-tagged birds. This is easily verified by comparing the recoveries of ringed and wing-tagged birds released at the same age, thus 23.6% of ringed but only 16.2% of wing-tagged ducklings were recovered, i.e. rings yield a recovery appr. 46% higher than wing-tags.

There are no indications that wing-tags are lost, nor is this indicated by experiments on Pheasants supplied with rings as well as wing-tags. Also in Partridge ringing gives higher recovery than wing-tagging (PALUDAN 1957, 1963). The

two categories of ducks were released at largely the same age, in the same season, and into comparable environments, thus 94% of wing-tagged and 89% of ringed ducklings were released in June, July and August. There can be little doubt that the lower returns resulting from wing-tags are caused by the fact that the tags, hidden in the plumage, are easily missed when the dead birds are inspected.

Institutes concerned with bird marking or game release must, therefore, be strongly warned against the use of wing-tags in all cases where the birds have reached a size where rings can be used.

Unfortunately, it is not possible to consider males and females separately, partly because in most cases the ducklings were released before sexing was possible and partly because information on the sex was not supplied with the rings returned to us.

DISTANCE COVERED FROM POINT OF RELEASE

Recoveries throughout the year.

A total of 1191 Mallards were reported back to us, and in 1153 cases the distance from the point of release could be calculated with good approximation.

It appears from Table 2 that more than one half of all Mallards were recovered within 1 km from the point of release, and that the two first columns contain about 81% of all recoveries. Only 3% of all calculated distances exceed 100 km from the point of release.

Distance in km Afstand i km	0–1	0–5*)	6–20	21–100	101–200	201–300	301–500	501–1000	2000	Total I alt
Nos. Antal	590	339	126	64	16	1	5	11	1	1153
%	51,2	29,4	10,9	5,6	1,4	0,1	0,4	1,0	0,1	100,1
	80,6		16,5		3,0					100,1

Table 2. Distances between points of release and recovery for 1153 of the 1191 recovered Mallards.

*) Distances known to be between 1 and 5 km, and those not accurately known but not exceeding 5 km.

Skema 2. Afstand mellem udsætnings- og tilbagemeldingssted for 1153 gråænder (både skudte, aflæste, fundne o.s.v. fra alle årets måneder).

*) Denne rubrik omfatter ænder, hvis genmeldingsafstande vides at være mellem 1 og 5 km, samt fugle, der højst er kommet 5 km væk, men hvor afstanden ikke kendes nøjagtigt.

It seems appropriate to analyse whether the ducks remain near the point of release only for a short time after the release. What is the situation in the years following the release? In Table 3 the two categories, recoveries from the year of release and from the following years, are compared. The distances tend to be greater for the latter category, but the difference is small. Even for Mallards reported back later than the year of release 75% were reported back from within 0–5 km and only 7% from more than 100 km from the point of release.

Distance in km Afstand i km		0–1	0–5*	6–20	21–100	101–200	201–300	301–500	501–1000	2000	Total I alt
Recoveries from year of release. Tilbagemeldinger fra udsætningsåret.	Nos. Antal	427	229	86	39	7		1			789
	%	54,1	29,0	10,9	4,9	0,9		0,1			99,9
		83,1		15,8		1,0					99,9
Recoveries later than year of release. Tilbagemeldinger senere end mærkningsåret.	Nos. Antal	163	104	40	24	8	1	4	10	1	355
	%	45,9	29,3	11,3	6,8	2,3	0,3	1,1	2,8	0,3	100,1
		75,2		18,1		6,8					100,1

Table 3. Distances between points of release and recovery for 789 Mallards recovered in the year of release and for 355 birds recovered later (*: As in table 2).

Skema 3. Afstand mellem udsætningssted og tilbagemeldingssted for 789 gråænder, der er genmeldt i udsætningsåret, og for 355 ænder, som er tilbagemeldt senere (9 af fuglene fra skema 2 er udeladt, da der kun forelå ufuldstændige tilbagemeldingsdata) (*: Som i skema 2).

The recoveries of Mallards shown in Tables 2 and 3 were obtained in all months of the year, and the tables are based on birds shot as well as found dead or dying etc.

Shot during the open season.

Sportsmen are interested in knowing where in relation to the point of release Mallards are likely to be shot. To shed light on this question we have a material consisting of 781 birds shot during the first open season (1 Aug.–31 Dec.) after their release and 313 Mallards shot during open seasons later than the first. The distances of recovery are shown in Figs. 1 and 2. For both categories more than three fourths of the ducks were shot within 5 km from the point of release, less than one tenth between 21 and 100 km distance, and less than one twentieth more than 100 km from the point of release.

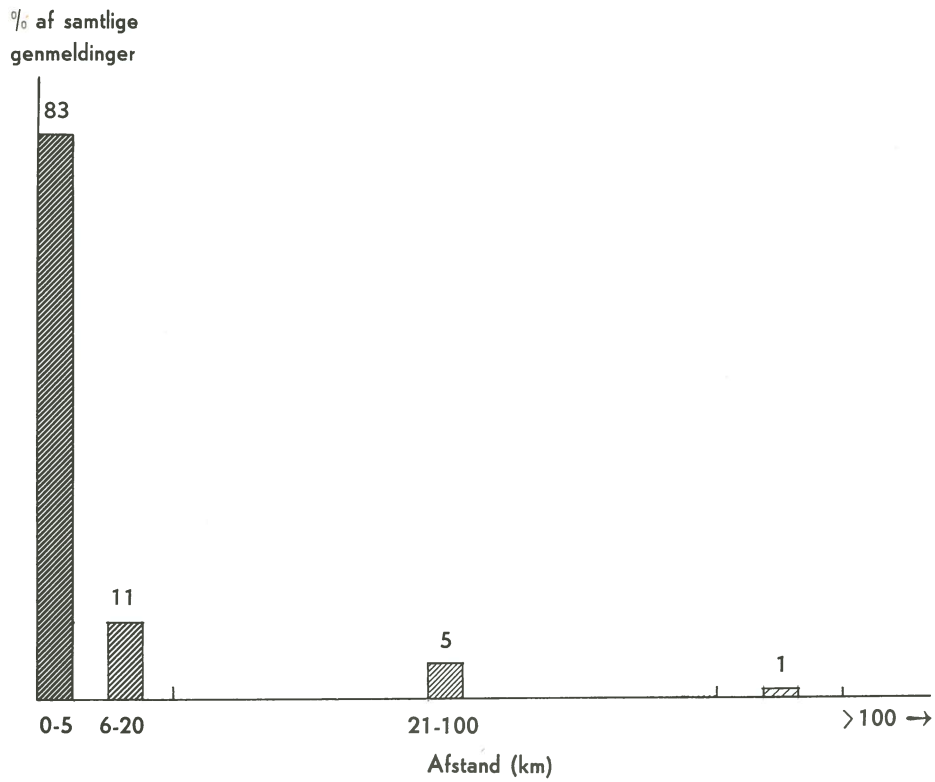

Fig. 1. Distance between points of release and recovery for 771 Mallards recovered as shot in the first open season (1. 8.–31. 12.) after release.

Fig. 1. Afstand mellem udsætningssted og tilbagemeldingslokalitet for 771 gråænder, der er skudt i den første jagtsæson efter udsætningen.

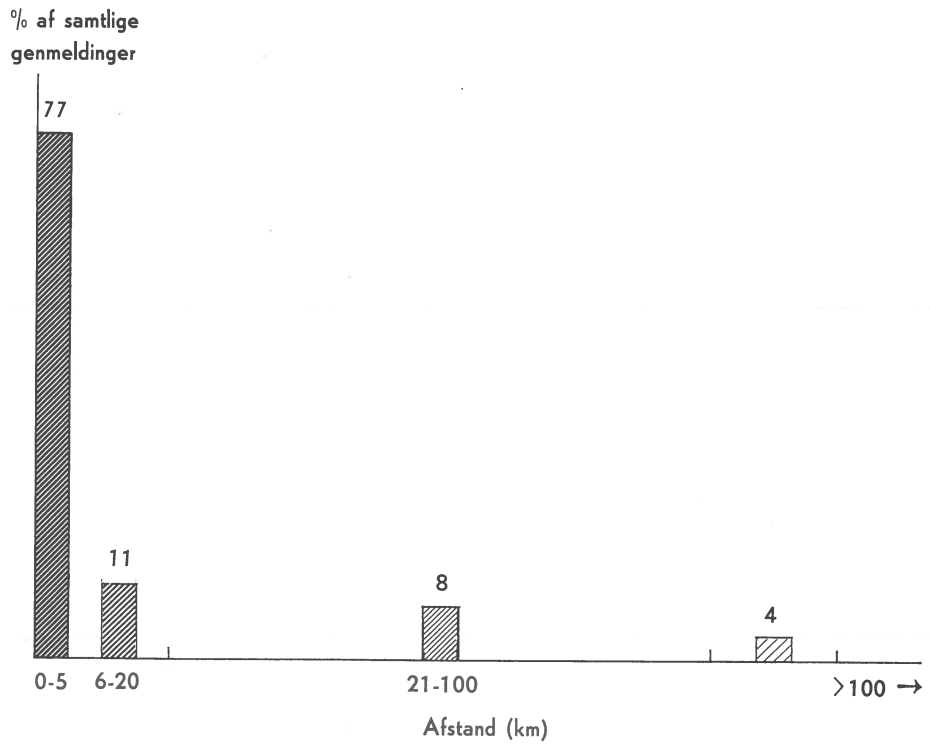

Fig. 2. Distance between points of release and recovery for 313 Mallards recovered as shot in open seasons later than the year of release.

Fig. 2. Afstand mellem udsætnings- og tilbagemeldingslokalitet for 313 gråænder, der er skudt senere end udsætningsåret.

It must give a certain measure of satisfaction to people who release Mallards that they seem so strongly bound to the district where they were released. The majority of Mallards remain within this district at least during the five months of the first open season, this is clearly seen from Table 4. Beforehand, one might expect that increased dispersal would occur during the autumn, but the Table shows no such pronounced tendency.

Breeding period and winter.

Very few recoveries are available from the breeding period and from mid-winter. Hence the material is little informative as regards the movements between

Distance in km Afstand i km			0–1	0–5*	6–20	21–100	101–200	201–300	301–500	501–1000	Total I alt
Recovered in the year of release. Tilbagemeldt i udsætningsåret.	August and September. August og september.	Nos. Antal	118	66	26	7	1				218
		%	54,1	30,3	12,0	3,2	0,5				100,1
	October. Oktober.	Nos. Antal	75	39	27	7	1				149
		%	50,3	26,2	18,1	4,7	0,8				100,1
	November and december. November og december.	Nos. Antal	125	97	31	24	4		1		282
		%	44,3	34,3	11,0	8,5	1,4		0,4		100,0
Recovered later than the year of release. Tilbagemeldt senere end udsætningsåret.	August and September. August og september.	Nos. Antal	19	33	17	12	4	1	2		88
		%	21,6	37,5	19,3	13,6	4,5	1,1	2,3		99,9
	October. Oktober.	Nos. Antal	36	20	7	5	1			2	71
		%	50,7	28,2	9,9	7,0	1,4			2,8	100,0
	November and December. November og december.	Nos. Antal	63	37	10	7	3		1		121
		%	52,1	30,6	8,3	5,8	2,5		0,8		100,1

Table 4. Distances between points of release and recovery for 929 Mallards recovered in the first open season and in subsequent open seasons. The recoveries arranged according to the month of recovery (*: As in table 2).

Skema 4. Afstand fra udsætnings- til genmeldingssted for 929 gråænder, der er genmeldt i den første og i senere jagtsæsoner. Jagtsæsonen er opdelt i august + september, oktober samt november + december (*: som i skema 2).

the end of one open season and the beginning of the next, i.e. between 31 Dec. and 1 or 15 Aug. However, it would seem that a fair proportion of the Mallards released also spend the breeding period in the vicinity of the point of release. This conclusion seems also quite natural since the bulk of Mallards shot later than the year of release were shot near the point of release. Further support of this assumption is given by the following instances of birds recovered in spring and summer:

300272 ♀ Released as duckling near Svendborg, 1 Sept. 1951.
Found dead, washed upon the shore near Troense, Tåsinge, 29 May 1952.
Distance from point of release: 4–5 km.

300358 ♂ Released as duckling in Skanderborg, Sept. 1951.
Found dead in the same locality, 30 April 1953.

300855 ♀ Released as duckling near Espe, Fyn, 23 July 1952.
Ring read quite close to point of release, 26 May 1956.
The reporter informs that is has bred on the roof of his house in two summers. The bird was shot less than 1 km from the point of release, 15 Aug. 1957.

301134 ♂ Released as duckling in Svindinge, Fyn, 22 Sept. 1954.
Found dead in Svindinge in May 1955.

303252 ♀ Released as duckling at the lake St. Øresø, Diernæs, 5 July 1957.
Bird captured and ring removed in Vester Åby in June 1959.
Distance: 6 km. The reporter informs that this Mallard arrived in Vester Åby during the autumn of 1958. It lived among domestic ducks and bred in the summer of 1959.

303929 ♂ Released as duckling at Borreby, Skelskør, 15 July 1958.
Found dead in the same locality, 27 May 1959.

417196 ♂ Released as duckling at Løvenholm, Djursland, 14 June 1958.
Bird captured and ring read in the same locality in April 1959.

From what follows it will become clear that very few released Mallards spend the winter in other countries.

Unfortunately, the data do not give too many details about the movements of Mallards within this country during the months immediately following the open season. It is reasonable to assume Mallards to be more stationary in places where they are fed during the winter. Also they may be assumed to move about more extensively in severe than in mild winters.

The following few recoveries from the winter months may indicate that also the winters are spent near the point of release:
300258, 300265, 300273, 300275, 300279, 300281, 301104, and 301105 were all released at Svendborg Sund, some as ducklings during the summer, others as adults in February. All eight have been identified and reported present near the point of release in February in years later than the year of release.

301057 ♀ Released as duckling at Kongsdal, Mørkøv, 1 July 1954.
Ring read at Tølløse, 19 Jan. 1955. Distance: 13–14 km.

301170, 301715, 301722, 301735, 301744, 302386 were reared and marked at Kalø. They were found dead or reported in other ways from near the point of release in winter. The ducks in the Kalø ponds are fed throughout the year.

301386 ♀ Released as duckling at St. Ladager, 12 Sept. 1954.
Found dead 6 km away, 26 Febr. 1955.

302842 ○ Released as duckling at Fjellerup Lake, Fyn, 18 Sept. 1956.
Found dead near the same lake, 5 March 1957.

303741 ♂ Released as duckling at Valbygaard, Slagelse, 29 June 1959.
Killed by train two km away, mid January 1960.

303918, 304507 and 304557 were released as ducklings at Borreby, near Skelskør.
In January and February they were found dead in the same locality.

306334 ○ Released as duckling at Svenstrup, Borup, 26 July 1960.
Killed by bird of prey in the same locality, 29 Jan. 1961.

306451 ♀ Released as duckling at Svenstrup, Borup, 5 July 1960.
Found dead at Jersie Strand, 15 km from Svenstrup, 12 Febr. 1961.

VF 68 ○ Released as duckling at Kalø, 30 July 1950.
Caught in the same locality, 5 March 19??.

Released versus wild Mallards.

It cannot be assumed a priori that Mallards hatched in the open are as stationary as are released birds. BOYD and HARRISON (1962) have been able to compare the distances of recovery for the two categories of Mallards in England. They conclude that reared Mallards move less widely about than wild ones. The comparison was based on groups of birds recovered during the first shooting season after the release.

Very few shot at sea.

By far the greater number of Mallards have been shot at lakes, bogs, etc., although some were killed in fjords and bays, and some on the tidal flats between Fanø and the mainland of Jylland. Only very few were reported from the open sea. As an example of the latter category it may be mentioned that nos. 302021 and 302022 were released in June 1953 in Øster Marie on the island of Bornholm. In October of the same year they were shot at sea N of the island. No. 303740 was reported from near Sprogø in Store Bælt, 27 Dec. 1959. This bird was released as duckling at Valbygaard near Slagelse 6 months earlier.

Although only few recoveries from the sea are available, it cannot be excluded that Mallards may spend some time at sea in the closed season.

Recoveries from abroad.

Appendix 1 lists all Mallards recovered 5 km (3.1 miles) or more from the point of release. Among these 23 were reported from abroad (see Table 5 and Fig. 3). Sixteen were shot or found dead in areas S, SW, and W of Denmark during autumn and winter (no. 304751 was found dead in July but in an advanced stage of decomposition). Apparently, these birds, 1.3% of all recoveries, have undertaken genuine autumn migration. They were reported from Great Britain, Western Germany, Holland, and France.

It is interesting to note that so few birds are reported back from abroad in winter since in these countries ducks are being shot regularly at least during part of the winter. In all countries mentioned the open season extends from 1 Sept. to the end of January, and even in February duck shooting takes place in France and Ireland (HUDEC, 1963). The reason that only very few Danish Mallards are shot abroad must be that only a very small proportion of Danish Mallards leave Denmark in autumn. *Released Mallards are largely non-migratory.*

All Mallards recovered in Great Britain had been released in western Jutland. The data are few, and they do not allow definite conclusions. Future research may support the hypothesis that the Mallards migrating through western Jutland from abroad in the autumn are birds which, largely, are bound for their winter quarters in Great Britain, and that some of the reared birds in western Jutland join the migrants.

Male Mallard no. 306552, marked on the island of Ærø, was shot a little more than two years later in East Germany. This may be a case of abmigration.

One of the reared Mallards from Nordby, Fanø, has abmigrated to Russia, where it, a male, was shot 2000 km away from the point of release 32 months after marking.

Recovered from Tilbagemeldt fra	Ring no. Ring-nummer	Point of release Udsætningssted	Distance and direction Afstand og retning	Date of recovery Tilbage-meldingsdato	Months between release and recovery Antal mdr. mellem udsætning og tilbagemelding
Great Britain Storbritannien	○ 301366	Fanø	700 km WSW	2.3.	43
	♂ 303152	V. Stadil Fjord	700 km W	16.1.	6
	○ 304751	V. Stadil Fjord	650 km WSW	25.7.	(12)
	♀ 304775	V. Stadil Fjord	650 km W	13.10.	3
	○ 305084	Fanø	550 km SW	2.1.	28
West Germany Vesttyskland	♀ 300323	Vedbæk	400 km SW	1.12.	8
	○ 301426	Bevtoft	100 km SW	?.12.	5–6
	♂ 303071	Tebbestrup	540 km S	24.1.	8
	♂ 304436	Sønderborg	100 km SW	4.11.	4
	○ 306551	Ærø	70 km SSE	26.10.	28
	○ 406336	Mørkøv	350 km SW	12.12.	17
East Germany Østtyskland	♂ 306552	Ærø	130 km SE	14.9.	27
The Netherlands Holland	♀ 303885	Mørkøv	550 km SW	21.1.	6
	○ 304669	V. Stadil Fjord	500 km SW	23.1.	7
France Frankrig	♂ 301428	V. Stadil Fjord	700 km SW	10.2.	7
	○ 302110	Svindinge, Fyn	1000 km SW	11.2.	6
	○ 304752	V. Stadil Fjord	800 km SW	17.1.	6
Sweden Sverrig	♀ 301739	Rønde	150 km E	19.10.	15–16
	○ 304270*	Fanø	(800 km NE)	(19.4.)	(20)
	♂ 302329	Skødstrup	650 km NE	22.10.	20
	♀ 303919	Skelskør	490 km NE	10.9.	26
	♂ 304730	V. Stadil Fjord	450 km NE	15.8.	25
Russia Rusland	♂ 304263	Fanø	2000 km NE	2.5.	32

Table 5. The 23 recoveries from abroad. * Only ring found.

Skema 5. De 23 tilbagemeldinger fra udlandet. ○ = ukendt køn. ♂ = andrik. ♀ = and (hun). * Kun ringen fundet.

Fig. 3. The 23 recoveries from abroad. Further data are presented in Appendix 1 and Table 5.
Fig. 3. Genmeldingsstederne for 23 gråænder, der er skudt, fundet o.s.v. i udlandet. Ringnumre og yderligere data fremgår af bilag 1 og skema 5.

A certain number of the recoveries from Sweden may be explained through abmigration. However, it is worth noticing that there were some females among the recoveries (information on sex supplied by the reporters). When Mallards of different geographical origin meet and mate during the winter it is usually the male who follows the female to her breeding area. HARRISON and WARDELL (1963 a) mention some cases of abmigrating females in their report on recoveries of W.A.G.B.I. hand-reared Mallards. No. 301739 traversed the 150 km from Rønde in Djursland to the nearest Swedish coastal area. The female no. 303919 was shot in Bråviken, 450 km NE of the marking area 26 months after being marked. Since it was killed in early September it seems likely that it also spent the breeding period in areas NE of Denmark. No. 304751 (sex unknown)

was found in an advanced state of decomposition in Norfolk, England, on 25 July in the year after marking. It may have hibernated in England, mated to a local bird, and bred in Norfolk.

Very few wild Mallard ducklings have been marked in Denmark. SKOVGAARD (1930 and 1942) and HØRRING (1938, 1939) have published data concerning wild ducklings marked during the period 1919–1941. Among 87 recoveries 13 came from abroad, among them 4 from Sweden. The remaining 9 had migrated to the following countries: Belgium, France, Holland, Scotland, and Germany. As early as October one was shot in Germany. The remaining Mallards were recovered in December (5), January (1), and February (2). The nine Mallards mentioned contribute 10.3% of all recoveries. As already mentioned, only 1.3% of the recoveries of reared Mallards came from places S, SW, and W of Denmark.

From this it would appear that the tendency to be non-migratory is more pronounced in reared than in wild Mallards. On the other hand, the two sets of data may not be directly comparable. The data published by SKOVGAARD and HØRRING belong to another period than those considered here. This may be important since, during the last decades, our winter has tended to grow milder. This may have caused the Mallards of the 1950es to become more stationary than those of the years 1919–1941.

DISTRIBUTION ON MONTHS OF MALLARDS SHOT

Table 6 shows the distribution on the five months of the open season of Mallards reported shot.

The upper half of the Table comprises 540 reared ducks released before the open season and shot during the autumn of the same year. The birds are seen to be fairly evenly distributed on the five months. Although more seem to be killed during the last three than during the first two months. No less than 43% were shot in November–December. The lower half of the Table shows the same distribution for Mallards shot during the autumn of years after the year of release. The difference is small. In either case October contributes the highest percentage. The reason may be that for most other game species the open season commences on 1 October. During the first weeks of the open season overexploitation of hunting areas occurs more often in Denmark than later in the year. This also increases the shooting pressure to which Mallards are exposed.

Months of open season Jagtsæsonens fem måneder		VIII	IX	X	XI	XII	Total I alt
Recoveries from year of release Genmeldinger fra udsætningsåret	Nos. Antal	98	87	122	117	116	540
	%	18,1	16,1	22,6	21,7	21,5	100,0
Recoveries later than year of release Genmeldinger senere end udsætnings-året	Nos. Antal	43	37	67	36	67	250
	%	17,2	14,8	26,8	14,4	26,8	100,0

Table 6. Mallards reported *shot* in Denmark during the open season (VIII–XII).
Above: Birds released before 1 August and reported shot before the first 1 January.
Below: Birds shot in open seasons later than year of release. Here releases later than 1 August are included.
The table includes both Mallards released as juvv. and ad.

Skema 6. Fordelingen på jagtsæsonens fem måneder af gråænder tilbagemeldte som skudte i Danmark.
Øverst i skemaet finder man de ænder, der er skudt i udsætningsåret (kun fugle udsat inden den 1. august er medtaget).
Nederst ser man fordelingen af de gråænder, der er skudt i senere jagtsæsoner (fugle udsat efter den 1. august er i dette tilfælde medregnet).
Skemaet omfatter både ænder udsat som ællinger og som voksne.

CAUSES OF DEATH

In connection with Table 7, which shows the various ways in which the recoveries were obtained, it must be emphasized that the Table does not reflect the true frequency of the causes of death in a Mallard population. Birds shot and afterwards handled by man stand a good chance of being reported back in contrast to birds which have succumbed without the interference of man, e.g. due to severe winter conditions. Only few of these latter are ever found, hence they are underrepresented in the material. Among the 1191 birds recovered 88% have been reported shot. Presumably, many of the Mallards reported "found dead or dying" and "taken by vermin" should strictly be classified among those shot.

How recovered Årsag til genmelding	The recoveries Tilbagemeldingerne	
	Nos. Antal	%
Shot or found wounded Skudt eller fundet anskudt	1053	88,4
Found dead or in poor condition Fundet syge eller døde	47	3,9
Recaptured or ring read Indfanget eller aflæst	35	2,9
Killed by predators Taget af rovvildt	7	0,6
Done away Aflivet	6	0,5
Killed by dogs Taget af hunde	3	0,3
Killed by traffic Dræbt i trafikken	3	0,3
Hitting wires Fløjet mod ledninger	2	0,2
Drowned in fish trap Druknet i fiskeruse	1	0,1
Stuck in wire fence Hængt fast i hegn	1	0,1
Only ring recovered Kun mærket fundet	12	1,0
Unknown Ukendt	21	1,8
Total I alt	1191	100,1

Table 7. Cause of death or source of information.

Skema 7. Fordelingen af genmeldingsårsager.

POPULATION TURNOVER

The maximum age is 10½ years.

A total of 1191 recoveries are available, and in 1150 cases the data are sufficiently accurate to classify the birds according to age. The first age group comprises Mallards recovered within the calendar year of their release (Table 8).

Among the 1150 age-grouped Mallards 1127, or 98%, belong to the first four age groups. Thus the material shows that a population of released Mallards is replaced almost completely within 3–4 years.

Nos. released Antal udsat	The recoveries Tilbagemeldingerne															
	Distribution on age-classes (1.1.–31.12.) Tilbagemeldingernes fordeling på aldersgrupper													Total age-class 1.-12. I alt 1.-12. aldersgruppe	Age unknown Alder ukendt	Total I alt	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.			Nos. Antal	%
5236	793	208	94	32	10	2	5	0	0	0	6	0	0	1150	41	1191	22,7

Table 8. Number of hand-reared Mallards released as juvv. and ad. 1950–60 (ringed and wing-tagged) and the recoveries obtained before 31.12.1962.

Skema 8. Der er i alt ring- og vingemærket 5236 gråænder, der dels er udsat som ællinger, dels som voksne. I skemaet er genmeldingerne fordelt på aldersgrupper.

The oldest Mallards obtained have reached an age of 10½ years, i.e. the 6 birds of the 11th age class. They were all released as ducklings. It seems odd that whereas there are 6 birds in the 11th age class no members of the 8th–10th age class are present. Four members of the 11th age class were females, reared and marked in a duck farm at Nordby, Fanø in the summer of 1952. Ducks on this farm are only shot when they leave the farm. They are fed liberally, and many become domesticated to such an extent that they hardly leave the duck pond. In November 1962 part of the ducks in this pond were caught and released immediately after the rings had been read. The four females mentioned were among these (Nos. 300926, 300934, 300939, and 300951). The two last members of the 11th age group were released as ducklings at Kliplev on 10 July 1951. Both, a male and a female, were shot on 14 Dec. 1961, about 1 km from the point of release. On receiving the rings the person who originally released the birds

was asked whether they had been wingclipped for some time after the release. He was almost certain that this had not been the case, and the person who shot the birds informs us that they were shot flying.

The 7th age class has five ducks, four of them reared and marked in the Nordby duck farm in the summer of 1956. Their rings were read in the same place in November 1962. The fifth is a male released as duckling near Vejle on 30 June 1953 and shot near the point of release on 23 December 1959.

OLSSON (1960) has analysed some Swedish ringing data. The oldest Swedish Mallards are also in the 11th age class. They were birds marked as adults. Also American data (HICKEY, 1952) seem to show that the maximum age of Mallards in nature is 10–12 years.

Mean annual mortality.

Table 8 comprises ringed and wing-tagged Mallards, some released as adults, others as ducklings. All ways of recovery mentioned in Table 7 are represented, for this, as well as for other reasons, the data are not very suitable for population dynamical calculations. Thus some of the records were obtained through the reading of rings, a procedure that has been used to a varying extent in different years.

For calculating the mortality only those Mallards have been used which were released as ducklings and reported back as shot, furthermore only ringed birds have been considered. The data are set out in Table 9. It can be seen that 775 recoveries could be distributed on age classes. Corrections for the further expected recoveries have been made; on including them 782 birds could be distributed on the 12 age classes as follows:

574–118–53–25–7–3–2–0–0–0–0–0.

The first age class consists of birds shot in the year of release, i.e. they have been living in the open at most for 6 months. For the moment, we will disregard them and only consider the second and later age classes comprising birds all adult and adapted to life in the open when shot.

The ratio of members of each individual age class between the second and the twelfth enables one to calculate the mean annual mortality among adult Mallards. The calculations are shown in Table 10 where x: 1–7 corresponds to age classes 2–8 (corrected) in Table 9. It is seen that the mean annual adult mortality is $58.8 \pm 2.6\%$, and the mortality can be considered identical in all age classes, see also the data of Table 11.

Year of release Udsætningsår	Nos. juvv. released Antal ællinger udsat	The recoveries Tilbagemeldingerne														
		Distribution on age-classes (1.1.–31.12.) Tilbagemeldingernes fordeling på aldersgrupper												Total age-class 1.–12. I alt 1.–12. aldersgr.		Age unknown Alder ukendt	Total I alt	
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	Nos. Antal	%		Nos. Antal	%
1951	54	5	0	0	1	1	0	0	0	0	0	0	0	7	13,0		7	13,0
1952	332	24	5	4	4	0	1	0	0	0	0	0		38	11,4	1	39	11,7
1953	179	13	2	2	0	0	0	1	0	0	0			18	10,1		18	10,1
1954	352	69	27	5	2	1	0	0	0	0				104	29,5		104	29,5
1955	398	58	9	20	3	0	0	0	0					90	22,6		90	22,6
1956	451	45	2	2	3	0	1	0					0	53	11,8		53	11,8
1957	433	33	14	5	2	1	0				0			55	12,7		55	12,7
1958	326	84	7	2	5	2			0	0				100	30,7		100	30,7
1959	773	160	19	10	2		1	1						191	24,7		191	24,7
1960	459	83	33	3	3	2								119	25,9		119	25,9
Total I alt	3757	574	118	53	22	5	2	1	0	0	0	0	0	775	20,6		776	20,7
Total, corrected I alt, korrigeret		574	118	53	25	7	3	2	0	0	0	0	0	782	20,8	1	783	20,8
‰ of 782		734,0	150,9	67,8	32,0	9,0	3,8	2,6	0	0	0	0	0	1000,1		1		

Table 9. Number of *ringed*, hand-reared Mallards released as juvv. 1951–60 and the recoveries obtained as *shot* before 31.12.1962. Below serrated line: Corrections for missing recoveries. Paludan's method is used (PALUDAN 1951 p. 107 and 1957 p. 8).

Skema 9. Alle *ring*mærkede gråænder udsat som ællinger 1951–60 og de deraf *skudte* indtil 31.12.1962. Under trappen er udført korrektioner for forventede, yderligere genmeldinger. Angående beregningsmetoden: Se PALUDAN 1951 p. 107 og 1957 p. 8.

x	d_x	xd_x	expected d_x forventet d_x	Δ	χ^2
1	118	118	122,20	— 4,20	0,1444
2	53	106	50,40	+ 2,60	0,1341
3	25	75	20,78	+ 4,22	0,8570
4	7	28	8,57		
5	3 } 12	15	3,53 } 14,16	— 2,16	0,3295
6	2	12	1,46		
7	0	0	0,60		
	208 = N	354	207,54		1,4650

Table 10. *Mean annual mortality among adult Mallards.*

x: 1–7 represents age-groups 2–8 in Table 9. Column d_x: recoveries from each agegroup, including the expected further recoveries. The annual survival factor, $\hat{s}$, is calculated according to Lack:

$$\hat{s} = 1 - \frac{N}{\Sigma x d_x} = 0.4124$$

$$S.D.: \sigma = 0.5876 \sqrt{\frac{0.4124}{208}} = 0.0261$$

For the calculation of $\hat{s}$ the first age-group (comprising birds dying between release and first 1 January) was disregarded. The annual percentage survival for ducklings alive on the first 1 Jan. is 41.2 ± 2.6% and the annual mortality consequently 58.8 ± 2.6%.

Assuming the calculated percentage mortality to be the same for all age-groups the expected distribution of recoveries (d_x) shown in column 4 is obtained. Δ: d_x—expected d_x.

$$\chi^2 = \frac{\Delta^2}{\text{expected } d_x}$$

There are 3 degrees of freedom, and the sum of individual values of χ^2 is 1.4650. The difference between observed and expected d_x does not exceed the value compatible with chance, hence the mortality can be assumed identical in all age-groups (from age-group 2 onwards in Table 9).

Skema 10. *Den gennemsnitlige, årlige dødelighed blandt de voksne gråænder.*

x = 1–7 svarer til 2.–8. aldersgruppe i skema 9. I kolonnen d_x er anbragt de genmeldte fugle fra hver aldersgruppe incl. de forventede, yderligere tilbagemeldinger. Den årlige overlevelsesfaktor, $\hat{s}$, beregnes med LACK'S formel således:

$$\hat{s} = 1 \div \frac{N}{\Sigma x d_x} = 0{,}4124.$$

Standardafvigelsen: $\sigma = 0{,}5876 \sqrt{\frac{0{,}4124}{208}} = 0{,}0261$

Ved beregningen af $\hat{s}$ blev 1. aldersgruppe (omfattende ænder, der er døde mellem udsætningstidspunktet og den følgende 1. januar) udeladt. Efter at de udsatte ællinger har overlevet det første årsskifte, er den årlige overlevelsesprocent 41,2 $\pm$ 2,6% og den årlige dødelighed følgelig 58,8% $\pm$ 2,6%.

Antager man, at den fundne dødelighedsprocent er den samme for alle aldersgrupper, måtte man forvente en fordeling af tilbagemeldingerne som anført i kolonnen »forventet d_x«. Δ er forskellen mellem d_x og »forventet d_x«.

$$\chi^2 = \frac{\Delta^2}{\text{forventet } d_x}$$

Der er tre frihedsgrader, og summen af værdierne for χ^2 er 1,4650. Dette betyder, at d_x ikke afviger mere fra »forventet d_x«, end at forskellen kan skyldes tilfældigheder, hvorfor dødeligheden kan anses for at være konstant, når man går fra aldersgruppe til aldersgruppe (fra og med 2. aldersgruppe i skema 9).

The first-year mortality is 73.4% (Table 11). It is a common feature that the mortality among Mallards is higher in the year of hatching than later. This is also apparent from Table 12 which shows the results obtained in a number of studies in other countries.

The age classes Aldersgrupperne x	Alive at beginning of each age-class Antal i live ved hver aldersgruppes begyndelse l_x	Nos. reported shot during each age-class Antal skudt i hver aldersgruppe d_x	Mortality rate per year Dødelighed % q_x	
1	782	574	73,4	
2	208	118	56,7	
3	90	53	58,9	
4	37	25	67,6	
5	12	7	58,3	58,8
6	5	3	60,0	
7	2	2	(100,0)	
8	0	0	0	
Total I alt	1136	782		

Table 11. Mortality rate per annum. The figures from table 9 are used.

Skema 11. Tallene fra skema 9 brugt til beregning af den gennemsnitlige dødelighed i hver aldersgruppe.

For the material published in "Danske Vildtundersøgelser" no. 8 (FOG, 1958) the first-year mortality was of the same order as in later age groups. The most likely explanation of this discrepancy is that the bulk of data came from areas where it was hoped to increase the breeding population. Hence, the birds were exposed to reduced shooting pressure during the year of release. A large proportion of the marked Mallards released in subsequent years were released to increase the bag of the same year. This may explain why the mortality reached more than 70% in the first year.

BRAKHAGE (1953) has compared the first-year mortality in reared and wild Mallards in Delta Marsh, Manitoba. All birds were marked as ducklings. The reared Mallards were hatched from eggs collected from the nests of wild Mallards, and the two categories of Mallards were coexisting in the same areas. As regards migration the two groups behaved similarly, but the first-year mortality was 91% among reared and only 70% among wild Mallards. BRAKHAGE concludes that hand-reared birds are more vulnerable to shooting pressure in the area of release than wild-trapped birds captured in the same area.

BOYD (1957) claims a first-year mortality of 94% among reared Mallards in Britain and 71% among wild Mallards.

Inspection of the results quoted in Table 12 shows that also these studies support the conclusion that, on the whole, the first-year mortality among reared Mallards is higher than among wild ones. Although the explanation need not necessarily be the same in all cases it seems generally true that reared birds are less shy after release than are naturally wild birds, for this reason the reared birds are more easily shot. In many places part of the explanation must also be that the birds were released with the aim of increasing the bag in the year of release.

Some studies tend to show that also in years later than the year of release reared birds suffer a higher mortality than wild Mallards (HICKEY, 1952; HÖHN, 1948), but except for the first age class the two categories generally seem quite comparable as regards mortality, cf HUNT et al. (1958) and HARRISON and WARDELL (1963b) with the two groups of British wild Mallards.

In the Danish material the adult mortality is 59%, which is similar to Finnish data, and to most British and several North American data. Unfortunately, no sizeable Danish data on the recovery of marked ducklings hatched in the open can be drawn upon, but the adult mortality among wild Mallards must be assumed of the same order as among reared Mallards.

OLSSON (1960) has analysed a rather heterogeneous Swedish material comprising ringed as well as wing-tagged Mallards. Some were reared and others hatched in the open. The data on the number of Mallards marked in individual years were incomplete, hence the correction for expected further recoveries (as

Country Land	a = hand-reared Opdrættet b = wild reared Klækket i det frie	Age at marking Alder ved mærkning	Nos. recovered Antal tilbagemeldt	Mortality in 1st age-class Dødelighed i 1. aldersgruppe %	Mortality in subsequent age-classes Dødelighed i følgende aldersgrupper %	Reference Litteraturhenvisning
USA and Canada USA og Canada	b	juv.	163[1])	68	50	HICKEY (1952)
	b	unknown ukendt	2992	51	45[2])	
	a	juv.	448[1])	82	70 (2. age-class) (2. aldersgruppe) 49 (subsequent age-classes) (sen. aldersgrupper)	
	b a	juv. juv.	222 2812	75 91	58 56	HUNT et al. (1958)
Great Britain Storbritannien	b b a	juv. ad. juv.	271 305 557	88 65[3]) 89	58 63[3]) 100	HÖHN (1948) HICKEY (1952)
	a	juv.	1850	60	59	WARDELL and HARRISON (1963 b)
Finland	b	juv.	133	57	56	KOSKIMIES (1956)
Sweden Sverige	a + b	juv.	355	74[4])	45[4])	OLSSON (1960)
New Zealand	b	ad. + juv.	916	60	51	BALHAM and MIERS (1959)
Denmark Danmark	a	juv.	782	73	59	This study Denne undersøgelse

Table 12. Some mortality studies based on marked and recovered mallards.

Skema 12. Nogle af de dødelighedsstudier, der er udført på grundlag af mærkning og tilbagemelding af gråænder.

1) All ducks were marked during one year.
Alle ænderne er mærket i et enkelt år.
2) Calculated from the data of the author.
Beregnet på grundlag af forfatterens tal (HICKEY (1952) p. 70, table 29.)
3) Calculated from the data of Höhn
Beregnet på grundlag af Höhn's tal (HÖHN (1948) p. 234)
4) From table 4, OLSSON (1960)
Tallene fra tabel 4, OLSSON (1960)

used by PALUDAN) could not be introduced. OLSSON does, however, remark that in Sweden the Tawny Owl (Strix aluco) shows an age composition which in several cases is similar to that of the Mallard. In a study of the population dynamics of the Tawny Owl (OLSSON, 1958) the 306 owls recovered could be supplemented by 22 expected further recoveries, i.e. an increase by a little more than 7%.

Next, OLSSON transfers his experiences with the Tawny Owl to the Mallard and increases the number of recoveries in his Table 4 by 20 (= c. 5%), distributing them selectively among the age groups. After this attempt at "cautious correction" OLSSON calculates the adult mortality among Swedish Mallards as appr. 35%.

A mean annual mortality of 35% must be considered extremely low when compared to results obtained in other countries. OLSSON's data are rather unreliable due to the 20 birds added to compensate for further recoveries, it seems highly dangerous to extrapolate to other species. The distribution of the 20 "recoveries" on age classes 4–12 was as follows: 3–4–4–1–3–2–1–1–1. Also this distribution seems rather arbitrary.

In OLSSON's data (Table 5) 12.5% of the recoveries (those actually obtained plus the correction) belong to age classes 4–12. In the Danish material these age groups only contribute 4.7% of the recoveries (incl. those expected).

On disregarding the expected recoveries and analysing the recoveries actually obtained, and presented by OLSSON in Table 4, the adult mortality is found to be 44.9 $\pm$ 3.5% and the first-year mortality 74.1%. Even an adult mortality of 44,9% seems low, although it will appear from Table 12 that HICKEY (1953) has reported a mortality as low as this among Mallards.

OLSSON's material is rather limited. Table 4, which shows the recovery of ringed and wing-tagged ducklings, has only 355 recoveries. The first age group contributes 263, thus the calculated mean annual mortality among adult Mallards is based on only 92 recoveries. This can hardly be assumed representative of the Swedish Mallard population.

Longevity.

The mean annual mortality among adult Mallards has been calculated as 59%. This mortality is of the same order as the mortality among adult hen Pheasants (PALUDAN, 1959). An annual mortality at this high level implies that a given generation is rapidly replaced by younger ones. It appears from Table 13 that a population consisting of 1000 individuals is completely replaced in six years. This means that the mean longevity of Mallards is short. Table 13 shows the expectation of further life for Mallards which have survived until the beginning of 2nd, 3rd, 4th, 5th, and 6th age class. The underlying calculations are set out in Appendix 2.

The age-classes Aldersgrupperne	Nos. alive at beginning of each age-class Antal i live ved hver aldergruppes begyndelse	Nos. recovered in each age-class Dør i hver aldersgruppe	Mean lifespan for birds dying in the age-class Gennemsnitlig levealder for de fugle, der dør i hver aldersgruppe		Expectation of further life at beginning of each age-class (years) Forventet yderligere levetid angivet i år ved aldersgruppens begyndelse
x	l_x	d_x	z	zd_x	e_x
2.	1000	588	0,5	294,0	1,17 $\pm$ 0,03
3.	412	243	1,5	364,5	1,21 $\pm$ 0,07
4.	169	114	2,5	285,0	1,02 $\pm$ 0,10
5.	55	32	3,5	112,0	0,94 $\pm$ 0,18
6.	23	14	4,5	63,0	0,89 $\pm$ 0,22
7.	9	9	5,5	49,5	
Total life span of the 1000 ducks Den samlede levetid for de 1000 ænder				1168,0	

Table 13. The mean expectation of further life for ad. Mallards. For calculations, see Appendix 2.

Skema 13. Den forventede, yderligere levetid for voksne gråænder. Beregningerne er udført i bilag 2.

Among 1000 Mallards alive on the first 1 January 588 die during the subsequent 12 months (Table 11 shows the mortality in individual age classes). Assuming the mortality concentrated at the midpoint of the age groups their total span of life has been 294 years. In the 3rd age group 243 are likely to die after a total span of life og $1\frac{1}{2} \times 243$ years $= 364.5$ years. On extending the calculations similarly to subsequent age groups the total span of life of the initial 1000 Mallards is found to be 1168,0 years. On an average each bird alive at the beginning of the 2nd age class has had a span of life of 1168: 1000 $=$ 1.17 years. As can be seen from Table 13 the expectation of further life can be calculated similarly for Mallards alive on entering the 3rd, 4th, 5th, and 6th age classes as 1.21, 1.02, 0.94, and 0.89 years respectively. At first sight one gets the impression that younger birds stand a better chance of living longer than older birds, but on considering also the standard error of the estimates this impression is hardly confirmed. As shown in Table 10 the mortality can be assumed identical in all age classes from the 2nd onwards.

When the mortality is evenly distributed on all months of the year it is legitimate to consider the mortality concentrated at the midpoint of each age class. In cases when shooting during the last months of the calendar year represents a major cause of death the point of mortality should be located some time during the autumn, e.g. on 1 October. However, it is not possible to calculate the contribution of shooting to the total mortality, the mortality is, therefore, assumed to be centrally located in the calendar year.

CAN THE PRODUCTION OF YOUNG COMPENSATE MORTALITY?

According to unpublished data placed at my disposal by Naturfredningsrådet a census of nests on the island of Saltholm in Øresund resulted in the figure of 40 Mallard nests. The author took part in the census, which was made during the days between 25 April and 11 May 1959. Only some of the nests were visited more than once, but presumably most of the clutches were complete since, in most cases, the females were seen on the nest during the day hours. SOWLS (1955) claims that most Mallards lay their eggs within the first four hours after sunrise, and that most records were obtained during the first two hours after sunrise.

The mean clutch size in the 40 nests on Saltholm was 9.3 eggs, with a range from 5 to 13 (see table 14).

Clutch size Antal æg i kuldet	No. of clutches Antal kuld
5	1
6	2
7	5
8	4
9	8
10	7
11	10
12	2
13	1
373 eggs. 373 æg.	40 clutches. 40 kuld.	Mean: 9,3. Gennemsnitlig kuldstørrelse: 9,3.

Table 14. Frequency distribution of clutch size among 40 clutches. The Mallard nest census on Saltholm near Copenhagen in 1959.

Skema 14. Fordelingen af 40 kuld efter antal æg i hvert kuld (rederne er fundet på Saltholm i 1959).

Since the fate of the clutches is unknown and no other studies on the breeding of Danish Mallards have been made it cannot be decided whether production balances mortality.

Using the percentage mortality found in this study one can, however, attempt to calculate the number of fledged young per adult female required to maintain balance.

In the absence of reliable information the mortality is assumed identical in the two sexes. If, in this respect, the Danish populations are similar to the New Zealand Mallard populations (BALHAM and MIERS, 1959) this assumption is not likely to introduce serious errors. Furthermore, it must be assumed that the numbers of fledged male and female young are identical.

The adult mortality is 59% and the first year mortality 73%. As mentioned above the first age class covers the interval between release and end of first calendar year. Tables 10 and 11 show the mortality to be identical among ducklings and adults after the first calendar year.

Among 100 females alive on 1 January 59 are likely to die within the following calendar year, hence 59 female ducklings must be available for replacement.

The ducklings are about eight weeks old, and fledged, when they are released. The mortality from moment of release (July) to 1 January is 73%.

To compensate for an adult mortality of 59%, the 100 females alive on 1 January must supply $\frac{59 \times 100}{27} = 219$ fledged female ducklings by July.

Howewer, some of the 100 females die before or during the breeding period. The actual fraction of mortality to be allocated to the first half of the year is not known, but we may assume it to be between 5 and 25% of the females. The 219 fledged female ducklings must, consequently, be derived from 75–95 females. The mean clutch size of 8 week old ducklings must therefore be 2.3–2.9 female ducklings or a total of 4.6 to 5.8 ducklings.

The necessary production can also be approximated in another way. From data produced by HICKEY (1952) BALHAM and MIERS (1959) propose the following expression:

$$x = \frac{M_w}{50\,(1—M),}$$

where x is the number of young per pair at time of banding, M_w the annual loss per 100 adults (mean mortality rate), M the first year mortality rate per cent, and 50 indicating 50 pairs.

On introducing the Danish mortality figures, we obtain:

$$x = \frac{58.8}{50\,(1—0.734)}$$

or

$$x = 4.4$$

According to this equation each pair of Mallards must produce an average of 4.4 fledged young per year to balance mortality. The two approaches lead to figures of much the same size.

During the years 1950–54 a duckling census of 3717 Mallard clutches was made in Holland (EYGENRAAM, 1957). The census took place in many localities scattered all over the country, and the age of the ducklings was estimated. Immediately after hatching the clutch size was appr. 11. The mortality seemed particularly high during the first week of life. At 7–8 weeks of age the clutch size varied from 6.0 to 6.4 in different years. Not all females succeeded in rearing a clutch. EYGENRAMM calculates that the percentage of ducks that are unsuccesful in rearing young was 23 and 24 in 1953 and 1954 respectively. He concludes that in both years about five ducklings per female reached maturity.

In the above estimations of Mallard production it was found that each female should rear a clutch of 4.4–5.8 young. The calculated production in the Dutch Mallard populations, appr. 5 young at the age of eight weeks per female is of the same order.

LINKOLA (1962) reports that he studied the breeding success of the ducks in an area in Central Häme, Finland, during the period 1948–61. The successful Mallards raised an average of 7.0 young per brood. He estimates that two-thirds of the females get their young to the water, this means a production of 4–5 young ducks per brood. Again this is an estimate of the same order as those based on Danish and Dutch Mallards.

If the scanty material from Saltholm can be assumed representative of Danish Mallard production it seems likely that 9.3 eggs per nest would balance the mortality.

On the whole, it must be assumed that shooting pressure has not been able to increase mortality beyond the level where the production of young is insufficient for population maintenance. The mortality figures presented here refer to reared birds, but, as already discussed (p. 25) the mortality among wild Mallards may tend to be even lower, hence it seems safe to extend the considerations to the entire Danish Mallard population.

SUMMARY

1. Between 1950 and 1960 a total of 5236 reared Mallards were ringed or wing-tagged. Until the end of 1962 1191 recoveries (22.7%) were obtained.

2. Ringing resulted in a recovery appr. 46% higher than wing-tags.

3. More than half the Mallards were recovered 0–1 km from the point of release, and c. 81% were shot or found dead within 5 km from the point of release. The distances moved are almost identical in ducks recovered in the year of release and later.

4. Only 23 Mallards were recovered from abroad. Among them 16 (1.3% of all recoveries) were shot or found in winter in places W or SW of Denmark. The remaining recoveries from abroad may partly be explained as cases of abmigration.

5. The Mallards released are shot fairly evenly distributed on the 4½–5 months of the open season (1 Aug.–31 Dec., in the last few years from 15 Aug. to 31 Dec.).

6. The maximum span of life was 10½ years. For calculating the mortality 775 reared, ringed birds released as ducklings and reported shot have been used. Including the further expected recoveries 782 birds were distributed on age classes. The first year mortality is 73.4%, and the mean annual mortality among adults 58.8 $\pm$ 2.6%. A given population of 1000 Mallards is replaced within six years. The expectation of further life of birds alive at the beginning of age class 2 is 1.17 years.

7. Cautious calculations seem to show that the population of breeding females must produce 4.4–5.8 fledged young in order to counterbalance mortality. It seems likely that this production actually takes place.

DANSK RESUMÉ

De udsatte gråænders bevægelser og omsætningen i bestanden.

INTRODUKTION

I »Danske Vildtundersøgelser«, hefte 8, blev der gjort rede for Vildtbiologisk Stations mærkning af opdrættede gråænder i perioden 1950–55. Der er mærket et stort antal opdrættede ænder siden da, og i det følgende sammenfattes resultaterne af mærkningsarbejdet fra 1950–60. Genmeldingerne, der er kommet Stationen i hænde indtil udgangen af 1962, er medtaget.

De kendsgerninger, som mærkningen afslører om de udsatte fugles videre skæbne, har interesse af flere grunde. For det første afspejler en hel del af resultaterne uden tvivl forholdene i den almindelige gråandebestand. For man må antage, at de udsatte ænder, der overlever det første år, stort set opfører sig ligesom ænderne i vor egentlige bestand. For det andet kan nu- og fremtidige udsættere have glæde af de indhøstede erfaringer, der blandt andet fortæller om ændernes bevægelser jagtsæsonen og det øvrige år igennem.

Vildtbiologisk Station retter en tak til de jægere og andre interesserede, der har udført mærkningerne og indsendt oplysninger om skudte eller på anden måde døde ænder.

OMTRENT 1200 GENMELDINGER

Materialet omfatter altså dels resultater, der er offentliggjort tidligere, dels de senere års mærkninger og tilbagemeldinger. Som det fremgår af skema 1, er der mærket 5236 gråænder, der i alt har givet 1191 genmeldinger. Det vil sige, at

22,7% af fuglene er tilbagemeldt.

Kikker man på genmeldingsprocenterne for gråænder, der er udsat som ællinger, ser man, at der er indløbet rapport om 23,6% af de ringmærkede og kun om 16,2% af de vingemærkede. De vingemærkede giver efter alt at dømme

færrest tilbagemeldinger, fordi mærkerne sidder skjult mellem fjerene og derfor let overses på de døde fugle. Man må altså fraråde vildtudsættere og mærkningsinstitutioner at bruge vingemærker, hvis fuglene ved udsætningen er store nok til at bære fodringe.

HVOR LANGT HAR ÆNDERNE FJERNET SIG FRA UDSÆTNINGSSTEDET?

Genmeldt i alle årets måneder.

Der var i alt genmeldt 1191 gråænder, og i 1153 tilfælde er det muligt omtrentligt at angive, hvor langt fra udsætningsstedet fuglene er blevet skudt, fundet o.s.v.

Man ser af skema 2, at over halvdelen er genmeldt fra 0 til 1 km væk, medens de to første rubrikker (0–5 km) tilsammen omfatter ca. 81% af samtlige genmeldte. Kun 3% er kommet over 100 km væk.

Det er ikke bare i udsætningsåret, at fuglene således opholder sig nær mærkningsstedet. Dette fremgår af skema 3. Selv af ænder tilbagemeldt senere end udsætningsåret ligger 75% i rubrikkerne 0–5 km, medens blot 7% har fjernet sig over 100 km.

Skudt i jagtsæsonen.

For jægere er det af interesse at vide, hvor de udsatte gråænder *skydes* i relation til udsætningslokaliteterne. Til belysning af dette har vi 781 fugle, der er *skudt* i den *første* jagtsæson efter udsætningen og 313 ænder, som er *nedlagt* i *senere* jagtsæsoner. Genmeldingsafstandene er afbildedet i figurerne 1 og 2. I begge grupper er over tre fjerdedele af ænderne nedlagt 0–5 km fra løsladelsesstedet, mindre end en tiendedel er kommet fra 21–100 km bort, og under en tyvendedel af ænderne har overskredet 100 km. Som det også fremgår af skema 4, opholder flertallet af ænderne sig altså jagtsæsonen igennem på den egn, hvor de er udsat.

Yngletid og vinter.

Der foreligger meget få tilbagemeldinger fra yngletiden og fra den egentlige vintertid, men det ser dog ud til, at en hel del af de udsatte ænder også forår og sommer opholder sig i nærheden af udsætningsstedet.

Materialet giver ikke alt for klare oplysninger om fuglenes bevægelser inden for landets grænser i månederne lige efter jagtsæsonens slutning. Ænderne er nok mest stationære, hvor der finder effektiv vinterfodring sted.

Udsatte contra vilde ænder.

Man kan ifølge udenlandske undersøgelser ikke gå ud fra, at gråænderne, der er klækket i det frie, er lige så stedbundne som de udsatte.

Meget få er skudt på havet.

Langt de fleste ænder er skudt i søer, moser o.s.v. En del er dog nedlagt i fjorde og vige og i Vadehavet mellem Fanø og Jylland. Kun ganske få er rapporteret skudt i åbent hav. Dette udelukker naturligvis ikke, at en del af ænderne uden for jagttiden kan opholde sig i saltvand i perioder.

Genmeldt fra udlandet.

Bilag 1 giver en liste over de gråænder, der er tilbagemeldt 5 km og derover fra mærkningsstedet. Af disse er 23 genmeldt fra udlandet (se skema 5 og fig. 3). De 16 er skudt eller fundet i områder vest, sydvest og syd for Danmark i efterårs- og vintermånederne. Disse fugle, der udgør 1,3% af samtlige tilbagemeldte, har tilsyneladende foretaget et egentligt efterårstræk. De er genmeldt fra Storbritannien, Vesttyskland, Holland og Frankrig.

I betragtning af at der i overvintringslandene drives andejagt i en større eller mindre del af vinteren, er det interessant, at så få af de udsatte fugle er genmeldt fra udlandet i vinterhalvåret. Man kan konkludere, at de udsatte gråænder stort set er stand- eller strejffugle.

En andrik, der er opdrættet i Nordby på Fanø, blev nedlagt i Rusland i maj – 32 måneder efter mærkningen. Der må her være tale om abmigration, idet den danske andrik formentlig efterår eller vinter har parret sig med en trækgæst fra Rusland, for så senere at have fulgt magen til dennes hjemstavn. Genmeldingerne fra Sverige må formentlig også i de fleste tilfælde opfattes som abmigration.

I HVILKE MÅNEDER BLIVER ÆNDERNE SKUDT?

Fordelingen på jagtsæsonens fem måneder af gråænder tilbagemeldt som *skudte* i Danmark fremgår af skema 6. Både for fugle nedlagt i udsætningsåret og for ænder skudt senere gælder det, at de er skudt ret jævnt fordelt på månederne august til december. I begge tilfælde figurerer oktober dog med den største procent. Som det fremgår af foregående kapitel, opholder ænderne sig stort set i Danmark hele året, hvorfor det er naturligt, at de således nedlægges hele sæsonen igennem.

DØDSÅRSAGER OG ANDRE TILBAGEMELDINGSGRUNDE

De i skema 7 nævnte genmeldingsårsager tegner ikke noget billede af dødsårsagernes reelle fordeling i andebestanden. De fugle, der skydes og derefter kommer i menneskehænder, har en god chance for at blive tilbagemeldt. Ganske anderledes stiller sagen sig med de individer, der omkommer uden menneskets medvirken.

OMSÆTNINGEN I BESTANDEN

Højeste alder er 10½ år.

Der foreligger som nævnt 1191 genmeldinger, og de opgivne data er i 1150 tilfælde så udførlige, at fuglene kan fordeles i aldersgrupper, hvoraf den første omfatter ænderne, der er genmeldt i det kalenderår, de er udsat (skema 8).

Af de 1150 genmeldinger hører 1127 eller 98% hjemme i de første fire aldersgrupper. Bestanden er således praktisk talt omsat på 3–4 år.

Materialets ældste gråænder er blevet 10½ år gamle. Amerikanske og svenske ænder har i naturen ligeledes maksimalt opnået en alder på 10–12 år.

Den gennemsnitlige, årlige dødelighed.

Til brug ved dødelighedsstudierne er uddraget antallet af ænder, der er udsat som *ællinger*, og som er genmeldt som *skudte*. Uddraget omfatter endvidere kun *ring*mærkede fugle. Tallene ses i skema 9, hvor 782 ænder er fordelt således på 1.–12. aldersgruppe:

574–118–53–25–7–3–2–0–0–0–0–0.

Vi betragter disse 782 genmeldinger som et repræsentativt udsnit af bestanden. I første omgang ser vi bort fra 1. aldersgruppe og kikker kun på de individer, der har levet mindst et år i det frie. På grundlag af forholdet mellem antallet af tilbagemeldte i 2.–12. aldersgruppe er den gennemsnitlige, årlige dødelighed blandt voksne gråænder beregnet i skema 10. Den er 58,8% ± 2,6%, og dødeligheden er ens i alle aldersgrupper.

Dødeligheden fra udsætningen og til jagtsæsonens slutning (førsteårsdødeligheden, skema 11) er 73,4%. Det er et almindeligt fænomen, at dødeligheden hos gråænder er større i klækningsåret end senere, hvilket fremgår af skema 12, der gengiver resultaterne af en række udenlandske dødelighedsstudier.

Ved de fleste udenlandske dødelighedsundersøgelser er den årlige afgang ens hos udsatte og hos vilde gråænder, når man ser bort fra førsteårsdødeligheden, der gennemgående er større blandt udsatte end blandt vilde.

Den forventede, yderligere levetid.

Der er altså en hurtig omsætning i gråandebestanden. En givet bestand er forsvundet og afløst af yngre generationer på få år. Det er jo netop også derfor, at gråanden er et godt jagtobjekt, der tåler stærk beskydning. Når dødeligheden blandt de voksne er stor, bliver ændernes gennemsnitlige levealder naturligvis kort. Som det fremgår af skema 13, kan en gråand, der er blevet voksen, kun forvente at leve et årstid endnu. Beregningerne er udført i bilag 2.

Kan ællingeproduktionen opveje dødeligheden?

Førsteårsdødeligheden er 73%, og den gennemsnitlige, årlige dødelighed blandt de voksne fugle er 59%. Med udgangspunkt i disse procenter kan man danne sig et nogenlunde fornuftigt skøn over, hvor mange flyvestore ællinger de voksne ænder (hunner) er nødt til at producere i gennemsnit om året, hvis der skal opretholdes balance mellem dødelighed og tilgang. Det forlanges, at der skal være 4,4 til 5,8 flyvedygtige ællinger for hver hun, der er tilstede i yngletiden.

Dette krav ligger inden for rammerne af den ællingeproduktion, man har iagttaget ved hollandske og finske undersøgelser. I Danmark er der desværre ikke foretaget ynglebiologiske studier. Der foreligger et lille materiale over ægantallet i 40 gråandereder, der blev fundet på Saltholm i 1959 (skema 14). Rederne indeholdt i gennemsnit 9,3 æg. Hvis Saltholm-materialet er repræsentativt for de danske gråænder, er det absolut sandsynligt, at bestanden kan honorere det nævnte produktionskrav.

Alt i alt må man således formode, at beskydningen ikke har presset dødeligheden så højt op, at ællingeproduktionen ikke kan følge med. Dette gælder gennemsnitsforholdene i den samlede bestand og udelukker naturligvis ikke, at man kan finde lokale områder, hvor bestanden er beskudt for hårdt.

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APPENDIX 1:
MALLARDS RECOVERED 5 KM OR MORE FROM POINT OF RELEASE

The data of each individual Mallard occupy two lines. Above: No. of ring or wing-tag, age of Mallard at release, sex, date and point of release. Below: Cause of death, date and point of recovery, distance between points of release and recovery. Coordinates and direction of movements from point of release are only given for recoveries from abroad.

BILAG 1: LISTE OVER DE GRÅÆNDER,
DER ER TILBAGEMELDT 5 KM OG DEROVER FRA UDSÆTNINGSSTEDET

Hver enkelt ands data er behandlet på to linier. Øverst er anført: Ringens eller vingemærkets nummer, andens alder ved udsætningen, dens køn, udsætningsdato og udsætningslokalitet. Nederste linie giver oplysning om: Dødsårsag, tilbagemeldingsdato, tilbagemeldingslokalitet samt afstand mellem udsætningssted og tilbagemeldingslokalitet. Kun for genmeldinger fra udlandet er der angivet koordinater samt den retning, i hvilken anden har bevæget sig i relation til udsætningslokaliteten.

Abbreviations:

De anvendte forkortelser og tegn:

juv. = young bird released in the calendar year of hatching.
juv. = ungfugl. Betegnelsen er brugt for de ænder, der er udsat i det kalenderår, i hvilket de blev udruget.
ad. = adult bird released later than the calendar year of hatching.
ad. = voksen fugl er anvendt for ænder, der er udsat efter udgangen af det kalenderår, i hvilket de blev udruget.
? = age at release unknown, alder ved udsætning ukendt.
♀ = female, hun.
♂ = male, han.
○ = unknown sex, ukendt køn.
+ = shot, skudt.
× = found dead, fundet død.
v = read, aflæst.
() = caught and released with ring removed, fanget og igen frigivet, men uden ring.
/?/ = manner of recovery unknown, de nærmere omstændigheder ved fundet ukendt.

1: Wing-tagged Mallards

1: Vingemærkede ænder

A-serien

1300	juv.	♂	14.7.53	Anderiet, Pindstrup, Djursland
		+	7.11.53	W of Thorsager. 5 km
2526	ad.	♂	26.6.53	Skanderborg, Jylland
		+	18.11.53	Near Kolind. 55 km
2528	ad.	○	26.6.51	Skanderborg, Jylland
		+	16.8.52	Snåstrup, Harlev. 12 km
2565	ad.	○	26.6.51	Ravning, Jylland
		+	25.10.53	Rugstedgård, Vejle. 6 km
2572	juv.	♂	26.6.51	Ravning, Jylland
		+	17.9.52	Hoven, Tarm. 40 km
2601	juv.	♂	26.6.51	Flyndersø SW of Skive, Jylland
		+	25.11.51	Eising, Vinderup. 7 km
2613	juv.	○	26.6.51	Ramten, Djursland
		+	23.8.54	Vondå, Kibæk, Jylland. 150 km
2693	juv.	○	4.7.51	Vantinge, Ringe, Fyn
		+	?.8.54	Stavis Å, Fyn. 25 km
2747	juv.	♂	10.7.51	Gelsted, Fyn
		+	?.9.52	Revninge, Kerteminde, Fyn. 45 km
2777	juv.	○	10.7.51	Gråsten, Sønderjylland
		+	?.11.51	Horsbyg Mose, Rødekro, Sønderjylland. 33 km
2820	juv.	○	10.7.51	Pederstrup, Torrig, Lolland
		+	4.10.51	Nakskov Fjord, Lolland. 17 km
2823	juv.	○	10.7.51	Pederstrup, Torrig, Lolland
		+	4.10.51	Nakskov Fjord, Lolland. 17 km
2824	juv.	○	10.7.51	Pederstrup, Torrig, Lolland
		+	4.10.51	Nakskov Fjord, Lolland. 17 km
4161	juv.	♂	15.7.51	Nøbbølle, Stege, Møn
		+	31.10.52	Sørup Mose, Holme Olstrup, Sjælland. 37 km
13001	juv.	○	20.7.54	Anderiet, Pindstrup, Djursland
		+	2.9.54	Skalmstrupvig, Randers Fjord. 18 km
13015	juv.	○	20.7.54	Anderiet, Pindstrup, Djursland
		+	1.9.54	Øster Tørslev Enge, Randers Fjord. 18 km
17661	juv.	♂	22.6.59	Dønnerup Gods, near Jyderup, Sjælland
		+	14.12.59	Skærbæk, Sønderjylland. 180 km
17683	juv.	○	22.6.59	Dønnerup Gods near Jyderup, Sjælland
		+	?.11.59	Aggersvold near Jyderup, Sjælland. 6–8 km
17689	juv.	♀	22.6.59	Dønnerup Gods near Jyderup, Sjælland
		+	12.11.59	Hallenslev Mose, Tissø, Sjælland. 13 km
20164	juv.	○	20.7.59	Dønnerup Gods near Jyderup, Sjælland
		+	?.11.59	Aggersvold near Jyderup, Sjælland. 6–8 km
20165	juv.	○	20.7.59	Dønnerup Gods near Jyderup, Sjælland
		+	?.11.59	Aggersvold near Jyderup, Sjælland. 6–8 km

F-serien

1324	ad.	○	?.4.52	Andestrup, Maribo, Lolland
		×	?.2.54	Oreby, Sakskøbing, Lolland. 6 km

2: Ringed Mallards

2: Ringmærkede gråænder

300126	juv.	♀	14.7.51	Møllerup, Bjødstrup, Djursland
		+	22.12.55	Rugaard, Hyllested, Djursland. 16 km
300139	juv.	○	5.7.54	Arnum Sø, Højrup, Sønderjylland
		+	27.9.54	Kammerslusen, Ribe, Sønderjylland. 26 km
300180	juv.	○	28.6.54	Sølvbjerg, Brahetrolleborg, Korinth
		+	20.8.54	Nakkebølle Fjord, Fyn. 5 km
300223	ad.	♀	14.4.52	Sdr. Omme, Jylland
		+	6.12.52	Gørding, Jylland. 40 km
300323	ad.	♀	9.4.52	Enrum, Vedbæk, Sjælland
		+	1.12.52	Fischerhude, 20 km E of Bremen (53° 07′ N; 09° 10′ E), *W. Germany*. 400 km SW
300463	ad.	♂	3.4.52	Kerteminde, Fyn
		v	28.8.53	Sølykkegård, Rønninge, Langeskov, Fyn. 11 km
300477	juv.	♂	8.8.52	Heldager, Svendborg, Fyn
		+	22.10.52	Kærsgård, Lunde, Stenstrup, Fyn. 5 km
300493	ad.	♂	15.3.52	Brejninge, Tåsinge, Svendborg
		+	18.10.52	Avernakø, Fåborg. 20 km
300496	ad.	♀	15.3.52	Brejninge, Tåsinge, Svendborg
		+	16.8.56	Aabyskov, Skårup, Fyn. 10 km
300601	juv.	○	17.7.51	Holsteinborg, Rude, Sjælland.
		+	22.12.51	5 km SE of Dalmose, Sjælland. 8 km
300606	juv.	○	17.7.51	Holsteinborg, Rude, Sjælland
		+	1.8.54	Dalmose, Sjælland. 10 km
300690	juv.	○	autumn 53	Brejninge, Tåsinge, Svendborg
		+	8.9.54	Gestelevlunde, Espe, Fyn. 27 km
300691	juv.	○	spring 53	Brejninge, Tåsinge, Svendborg
		+	13.9.53	Vårø, Tåsinge, Svendborg. 7 km
300700	juv.	♂	5.7.54	Runde Mølle. Genner, Sønderjylland
		+	20.10.54	Bolderslev, Sønderjylland. 18 km
300713	juv.	○	19.7.52	Langholt, Nordjylland
		+	5.11.52	Sønderkær, Raunstrup, Hjallerup, Nordjylland. 6 km
300720	juv.	♂	15.7.52	Skarregård Sø, Mors
		+	18.12.52	Alsted Kær, Nykøbing Mors. 10 km
300735	juv.	○	21.7.52	Torslev, Skovsgård, Nordjylland
		+	19.10.52	Nr. Stokholm near Sindal, Nordjylland. 63 km
300738	juv.	○	20.7.52	Bevtofte, Sønderjylland
		+	10.10.52	Nr. Hjarup, Hovslund, Sønderjylland. 7 km
300767	juv.	♂	19.7.52	Søparken, Dybvad, Nordjylland
		+	30.11.53	Byrum, Læsø. 38 km

300768	juv.	♂	18.7.52	Søparken, Dybvad, Nordjylland
		+	about 56	Ove Sø, Thy, Nordjylland. 125 km
300773	juv.	○	19.7.52	Søparken, Dybvad, Nordjylland.
		+	autumn 52	Gedved near Horsens, Jylland. 150 km
300776	juv.	♂	19.7.52	Stude, Nordjylland
		+	19.8.55	Kettrup Sø, Løkken, Nordjylland. 6 km
300781	ad.	○	19.7.52	Stude, Nordjylland
		+	1.11.52	3 km S of Løkken, Nordjylland. 5 km
300784	juv.	○	19.7.52	Stude, Nordjylland
		+	11.10.52	Ry Å, Aabybro, Nordjylland. 15 km
300792	juv.	○	19.7.52	Gølstrup, Jelstrup, Nordjylland
		+	7.10.52	Hjortnæs, Børglum, Vrå, Nordjylland. 6 km
300794	juv.	○	18.7.52	Gølstrup, Jelstrup, Nordjylland
		+	17.12.52	Smidstrupgård pr. Vrå, Nordjylland. 6 km
300802	juv.	○	20.7.52	Stenskilde, Ugilt, Nordjylland
		+	14.11.52	St. Rammelhøj, Hørmested, Tolne. 9 km
300805	juv.	○	20.7.52	Stenskilde, Ugilt, Nordjylland
		+	11.10.52	Guldager near Hastrup, Nordjylland. 9 km
300807	juv.	♂	20.7.52	Stenskilde, Ugilt, Nordjylland
		+	9.10.52	Hvidstedgård, Tårs, Nordjylland. 6 km
300878	ad.	♂	10.3.53	Gl. Sølvbjerg Mose, Brahetrolleborg, Fyn
		+	25.8.53	Odense Fjord, Fyn. 40 km
300961	juv.	○	28.7.52	Fuglekøjen, Albuen, Fanø.
		+	11.8.54	Karup Å. Skygge, Engesvang, Jylland. 100 km
300998	juv.	♂	28.7.52	Fuglekøjen, Albuen, Fanø
		+	9.11.54	Darum Strand, Bramminge, Jylland. 10 km
301057	juv.	♀	1.7.54	Kongsdal, Mørkøv, Sjælland
		v	19.1.55	Tølløse, Sjælland. 13 km
301078	juv.	○	1.7.54	Kongsdal, Mørkøv, Sjælland.
		+	22.10.55	Sophienholm near Uggerløse, Sjælland. 9 km
301080	juv.	○	1.7.54	Kongsdal, Mørkøv, Sjælland
		+	26.12.54	Lammefjorden, 500 m N of Avdebodæmningen, Sjælland. 20 km
301081	juv.	○	1.7.54	Kongsdal, Mørkøv, Sjælland
		×	19.7.55	Mose near Aagerup, Vipperød, Sjælland. 13 km
301182	juv.	○	6.7.54	Arnum Sø, Højrup, Sønderjylland
		+	?.8.54	Bjørnkær Mose, Ribe, Sønderjylland. 12 km
301190	juv.	♂	7.7.54	Arnum Sø, Højrup, Sønderjylland
		+	17.10.54	Bjørnkær Mose, Ribe, Sønderjylland. 12 km
301192	juv.	○	6.7.54	Arnum Sø, Højrup, Sønderjylland
		+	?.8.54	Bjørnkær Mose, Ribe, Sønderjylland. 12 km
301193	juv.	♂	7.7.54	Arnum Sø, Højrup, Sønderjylland
		+	3.9.55	Alslev, Øster Højst, Sønderjylland. 25 km
301199	juv.	○	5.7.54	Arnum Sø, Højrup, Sønderjylland
		×	?.9.54	Ribe Holme, Sønderjylland. 24 km
301293	juv.	○	6.7.54	Svindinge, Fyn
		+	15.8.55	Avernakø, Fåborg. 33 km

301304	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	23.9.54	Flakkerne near Esbjerg. 6 km
301331	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	18.9.55	Tjæreborg, Esbjerg. 11 km
301332	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	16.8.54	Ho Bugt. 22 km
301338	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	1.9.54	Oddens Grønning, Fanø. 10 km
301342	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	21.10.54	Oddens Grønning, Fanø. 10 km
301352	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	10.9.55	Salten Langsø, Jylland. 104 km
301359	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	16.10.54	Farup Enge, Ribe, Sønderjylland. 16 km
301366	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		×	2.3.58	Hemington, Nr. Derby (52° 55′ N; 0° 30′ E), *England*. 700 km WSW
301372	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	27.11.55	Sneum Å S of Endrupholm, Bramminge, Sønderjylland. 22 km
301374	juv.	○	8.8.54	Fuglekøjen, Albuen, Fanø
		+	16.12.54	Janderup Enge, Janderup, Jylland. 24 km
301383	juv.	○	4.8.54	Hovborg, Holsted, Jylland
		+	17.10.54	Kongeåen near Føvling, Sønderjylland. 20 km
301384	juv.	○	4.8.54	Hovborg, Holsted, Jylland
		+	17.10.54	Kongeåen near Føvling, Sønderjylland. 20 km
301386	juv.	○	12.9.54	St. Ladager, Sjælland
		×	26.2.55	Lellinge near Køge, Sjælland. 6 km
301392	juv.	♀	12.9.54	St. Ladager, Sjælland
		+	16.8.55	Kimmerslev Sø, Sjælland. 6 km
301415	juv.	♂	21.6.55	Houvig, Søndervig, Ringkøbing, Jylland
		+	15.8.56	Kouen, Rindum, Ringkøbing, Jylland. 10 km
301416	juv.	○	21.6.55	Houvig, Søndervig, Ringkøbing, Jylland
		+	10.9.55	Felstedkogs Reservat, Jylland. 20 km
301421	juv.	○	21.6.55	Houvig, Søndervig, Ringkøbing, Jylland
		+	24.10.55	Thorsminde near Ulfborg, Jylland. 26 km
301426	juv.	○	2.7.55	Hovslund, Bevtoft, Sønderjylland
		+	?.12.55	Pril, Schleswig-Holstein (54° 20′ N; 08° 40′ E), *W. Germany*. 100 km SW
301428	juv.	♂	3.7.55	V. Stadil Fjord, Jylland
		+	10.2.56	Saint-Omer (50° 45′ N; 02° 15′ E), *France*. 700 km SW
301502	?	○	20.7.56	Nørholm, Ribe, Jylland
		+	27.12.58	Anderiet, Kalø, Djursland. 140 km
301667	juv.	○	19.7.54	Kongsdal, Mørkøv, Sjælland
		+	8.12.55	Hesselbjerggård, Ruds-Vedby, Sjælland. 9 km
301725	juv.	○	3.7.55	V. Stadil Fjord, Jylland
		+	15.8.55	Nordre Dyb, V. Stadil Fjord, Jylland. 10 km

301731	juv.	○	16.7.56	Nr. Søby, Odense, Fyn
		+	18.8.56	Aalsbogård, Gelsted, Fyn. 25 km
301739	juv.	♀	?.7.55	Kalø, Rønde, Djursland
		+	19.10.56	Skälderviken, Skåne (56° 15′ N; 12° 45′ E), *Sweden*. 150 km E
301766	juv.	○	3.7.55	V. Stadil Fjord, Jylland
		+	15.8.55	Nordre Dyb, V. Stadil Fjord, Jylland. 10 km
301778	juv.	○	3.7.55	V. Stadil Fjord, Jylland
		+	30.8.55	Bankgården, Husby Klit, Tim, Jylland. 7 km
301779	juv.	○	3.7.55	V. Stadil Fjord, Jylland
		+	30.8.55	Bankgården, Husby Klit, Tim, Jylland. 7 km
301789	juv.	○	3.7.55	V. Stadil Fjord, Jylland
		+	22.12.55	Sdr. Hygum, Sønderjylland. 100 km
301795	juv.	♂	2.7.55	Bevtoft, Sønderjylland
		+	22.12.55	Vollerup near Bolderslev, Sønderjylland. 48 km
301818	juv.	○	28.7.55	Kongsdal, Mørkøv, Sjælland
		+	10.9.55	Sandlyng Skov, Stenlille, Sjælland. 5 km
301917	?	○	16.7.56	Nr. Søby, Fyn
		+	9.11.58	Nybølle, Fyn. 10 km
302004	juv.	○	3.6.53	Enrum Mose, Vedbæk, Sjælland
			/?/ autumn 53	Avedøre, Sjælland. 27 km
302013	juv.	○	3.6.53	Skarregård Sø, Mors
		+	?.10.53	Skjoldborg, Vest Vildsund. 16 km
302018	ad.	♀	15.2.54	Nielstrup Sø, Ulse, Haslev, Sjælland
		+	9.10.55	Faxe Ladeplads, Sjælland. 12 km
302021	juv.	♂	4.6.53	Upnastedgård, Øster Marie, Bornholm
		+	25.10.53	The sea N. of Bornholm. ≧ 5 km
302022	juv.	♂	4.6.53	Upnastedgård, Øster Marie, Bornholm
		+	25.10.53	The sea N of Bornholm. ≧ 5 km
302057	juv.	♂	30.6.53	Mølledammen, Hover, Vejle, Jylland
		+	22.12.55	Vestbirksøerne, Gudenå, Jylland. 27 km
302058	juv.	♀	30.6.53	Mølledammen, Hover, Vejle, Jylland
		+	17.12.53	Vejle Fjord, Jylland. 15 km
302104	juv.	○	20.8.55	Svindinge, Fyn
		+	6.11.56	Damgården, Gislev, Fyn. 5 km
302110	juv.	○	20.8.55	Svindinge, Fyn
		+	11.2.56	Grimault, Noyens-sur-Serein (47° 42′ N; 3° 59′ E), *France*. 1000 km SW
302211	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	13.11.55	Engene near Varde Å, Varde, Jylland. 25 km
302219	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	6.10.55	The sea near Tjæreborg, Jylland. 9 km
302237	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	11.12.55	Sønderho, Fanø. 5 km
302267	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	1.10.55	Sønderho, Fanø. 5 km

302269	juv.	♀	3.9.55	Fuglekøjen, Albuen, Fanø
		+	10.10.55	St. Darum Enge, Bramminge, Sønderjylland. 11 km
302294	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	18.12.55	Sdr. Hygum, Sønderjylland. 35 km
302300	juv.	○	3.9.55	Fuglekøjen, Albuen, Fanø
		+	8.12.55	The water between Fanø and Roborg. 0–10 km
302303	juv.	○	15.8.57	Fjerbækgård, Vostrup, Jylland
		+	15.8.60	Stauning, Jylland. 11 km
302329	ad.	♂	6.3.57.	Skjødstrup, Djursland
		+	22.10.58	10 mil N of Stockholm (60° 05′ N; 18° 10′ E), *Sweden*. 650 km NE
302334	ad.	♂	14.3.57	Løvenholm, Djursland
		+	16.11.57	Skarresø near Ryomgård, Djursland. 11 km
302376	juv.	○	7.7.56	Voldbakkerne, Løvenholm, Djursland
		+	1.11.56	Vollum Sø, Ryomgård, Djursland. 5 km
302377	juv.	○	7.7.56	Voldbakkerne, Løvenholm, Djursland
		+	16.9.56	Ramten Sø, Djursland. 9 km
302698	ad.	♂	19.3.57	Odense Fjord, Fyn
		+	16.10.57	Stige, Seden Strand, Fyn. 6–20 km
302717	juv.	○	26.8.56	Fuglekøjen, Albuen, Fanø
		+	21.10.57	Tjæreborg Enge, Esbjerg, Jylland. 10 km
302719	juv.	○	26.8.56	Fuglekøjen, Albuen, Fanø
		×	3.10.57	Vognsbølparken, Esbjerg, Jylland. 10 km
302725	juv.	○	26.8.56	Fuglekøjen, Albuen, Fanø
		+	1.9.56	Klingenbjerg, Fanø. 5 km
302758	juv.	○	26.8.56	Fuglekøjen, Albuen, Fanø
		×	31.12.56	Vognsbølparken, Esbjerg, Jylland. 10 km
302781	juv.	○	26.8.56	Fuglekøjen, Albuen, Fanø
		+	16.10.56	Vigen 7 km N of Fuglekøjen, Fanø. 7 km
302961	ad.	♂	14.3.57	Løvenholm, Djursland
		+	16.8.60	Sallingmosen, Pindstrup, Djursland. 7 km
302996	juv.	○	6.7.57	Basnæs, Skælskør, Sjælland
		+	24.9.57	Korsør Nor, Sjælland. 18 km
302997	juv.	♂	6.7.57	Basnæs, Skælskør, Sjælland
		+	15.9.57	Bonderup, Korsør, Sjælland. 17 km
302999	juv.	♂	6.7.57	Basnæs, Skælskør, Sjælland
		+	24.9.57	Hovslund, Sønderjylland. 130 km
303021	juv.	○	30.7.58	Vedskølle, Skælskør, Sjælland
		+	26.8.59	Glænø, Sjælland. 5 km
303071	juv.	♂	4.6.59	Tebbestrup Bredning, Jylland
		+	24.1.60	River "Diemel", Liebenau, 30 km NW of Kassel (51° 30′ N; 09° 08′ E), *W. Germany*. 540 km S
303080	juv.	○	4.6.59	Bavelse Sø, Glumsø, Sjælland
		+	20.8.59	Alsted Møllegaard, Fjenneslev, Sjælland. 10 km
303081	juv.	♂	4.6.59	Bavelse Sø, Glumsø, Sjælland
		+	15.11.59	4 km S of Ringsted, Sjælland. 13 km

303084	juv.	♂	4.6.59	Bavelse Sø, Glumsø, Sjælland
		+	18.8.59	Holmegaard, Næstved, Sjælland. 14 km
303101	juv.	○	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	14.9.58	Felstedkog, Jylland. 9 km
303107	juv.	○	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	18.8.59	Ferring Sø, Jylland. 33 km
303116	juv.	♀	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	18.12.59	Nissum Fjord, Jylland. 15 km
303126	juv.	○	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	?.12.58	Ulfborg, Jylland. 8 km
303151	juv.	♂	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	2.10.57	Klim Fjordholme, Nordjylland. 95 km
303152	juv.	♂	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	16.1.58	Allenshaws Loch Stow, Midlothian (55° 50′ N; 03° 15′ W), *Skotland*. 700 km W
303160	juv.	○	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	29.8.60	Naur, Jylland. 10 km
303163	juv.	♂	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	24.10.57	Bøvling Indfjord, Jylland. 18 km
303168	juv.	○	28.7.57	Anderiet Raasted, Ringkøbing, Jylland
		+	10.10.57	Vejlerne between Egholm and Gjøl, Jylland. 120 km
303206	juv.	○	6.7.57	Basnæs, Skælskør, Sjælland
		+	15.8.57	Glænø, Skælskør, Sjælland. 6 km
303219	juv.	○	18.7.57	Basnæs, Skælskør, Sjælland
		+	25.9.57	Øllerup Mose, Næstved, Sjælland. 22 km
303220	juv.	○	18.7.57	Basnæs, Skælskør, Sjælland
		+	15.8.58	Kværkeby, Sjælland. 43 km
303252	juv.	♀	5.7.57	Øresø, Diernæs, Svendborg, Fyn
		( )	?.6.59	"Helenehøj", Vester Aaby, Fyn. 6 km
303292	juv.	♂	13.7.57	Agernæsgård, Tingerup, Sjælland
		+	17.10.58	Vandmøllegård, Thureby, Sjælland. 30 km
303308	?	♂	20.7.57	Visborg, Aalborg, Jylland
		( )	9.11.57	Sørvad, Holstebro, Jylland. 105 km
303312	ad.	♂	?.4.58	Almstofte Damgård Mose, Sneslev, Sjælland
		+	15.8.58	Regnemarks Mose, Borup, Sjælland. 15 km
303324	juv.	○	16.9.57	Fuglekøjen, Albuen, Fanø
		+	15.12.57	Near the estuary of Kongeåen. 12 km
303339	juv.	○	16.9.57	Fuglekøjen, Albuen, Fanø
		+	1.12.57	Staushede, Jylland. 49 km
303349	juv.	♀	16.9.57	Fuglekøjen, Albuen, Fanø
		+	10.11.57	Sønderho, Fanø. 5 km
303351	juv.	○	16.9.57	Fuglekøjen, Albuen, Fanø
		+	8.12.57	Gammelby, Esbjerg, Jylland. 8 km
303396	juv.	○	19.7.58	Villerup, Hjørring, Nordjylland
		+	26.10.58	Rubjerg, Gølstrup, Nordjylland. 6 km

303398	juv.	○ 19.7.58	Villerup, Hjørring, Nordjylland
		+ ?.9.59	Vejlen near Gjøl, Nordjylland. 40 km
303408	juv.	○ 20.7.59	Skovlund, Raasted, Jylland
		+ 15.8.59	Gørding, Vemb, Jylland. 8 km
303412	juv.	○ 20.7.59	Skovlund, Raasted, Jylland
		+ 1.9.59	Gørdingbjerg Eng, Jylland. 10 km
303416	juv.	○ 20.7.59	Skovlund, Raasted, Jylland
		+ 16.8.59	Thorsted, Jylland. 12 km
303419	juv.	○ 20.7.59	Skovlund, Raasted, Jylland
		+ 11.9.62	Felstedkog, Jylland. 16 km
303605	juv.	○ 19.7.58	Gandrup, Vebbestrup, Aalborg, Jylland
		+ ?.12.58	Sanderup Å, Skivum near Vægger, Jylland. 20 km
303616	juv.	○ 19.7.58	Gandrup, Vebbestrup, Aalborg, Jylland
		+ 11.10.59	Fuglsø, Mariager Fjord, Jylland. 24 km
303636	juv.	○ 19.7.58	Gandrup, Vebbestrup, Aalborg, Jylland
		+ 21.12.59	Brabrand Sø, Aarhus, Jylland. 70 km
303650	juv.	○ 4.7.59.	Kalø, Rønde, Djursland.
		+ 31.12.59	Mellerup, Randers, Jylland. 30 km
303680	juv.	○ 5.7.59	Hindsgaul, Fyn
		+ ?.12.59	Roerslev, Middelfart, Fyn. 11 km
303683	juv.	○ 5.7.59	Hindsgaul, Fyn
		+ ?.12.59	Roerslev, Middelfart, Fyn. 11 km
303725	juv.	○ 17.6.59	Valbygaard, Sjælland
		+ ?.11.59	Dønnerup, Jyderup, Sjælland. 23 km
303740	juv.	○ 29.6.59	Tude Å, Valbygaard, Sjælland
		+ 27.12.59	Sprogø, Store Bælt. 25 km
303744	juv.	○ 29.6.59	Tude Å, Valbygaard, Sjælland
		+ 18.10.59	Knudstrup Mose, Gierslev, Sjælland. 6 km
303779	juv.	♂ 22.7.59	Nr. Harritslev, Hjørring, Nordjylland
		v 27.5.62	Sæby Å, Nordjylland. 36 km
303787	?	♂ summer 58	Kongsdal, Mørkøv, Sjælland
		+ 26.12.61	Bjerregrav, Viborg, Jylland. 140 km
303827	juv.	○ 12.7.58	Kongsdal, Mørkøv, Sjælland
		+ 2.10.58	Halskov Rev, Korsør, Sjælland. 40 km
303855	juv.	○ 12.7.58	Kongsdal, Mørkøv, Sjælland
		+ 3.9.58	Ll. Knabstrup, Regstrup. Sjælland. 5 km
303879	juv.	♂ 12.7.58	Kongsdal, Mørkøv, Sjælland
		+ 22.12.59	Ørslevvester, Fjenneslev, Sjælland. 19 km
303885	juv.	♀ 12.7.58	Kongsdal, Mørkøv, Sjælland
		+ 21.1.59	Dalfsen (52° 31′ N; 06° 15′ E), *Holland*. 550 km SW
303919	juv.	♀ 15.7.58	Borreby, Skælskør, Sjælland
		+ 10.9.60	Lönö, Bråviken (58° 45′ N; 16° 15′ E), *Sweden*. 490 km NE
303926	juv.	♂ 15.7.58	Borreby, Skælskør, Sjælland
		+ 29.12.62	Torpet, Ringsted, Sjælland. 39 km
303945	ad.	♂ 3.4.60	Skallerup, Vennebjerg, Nordjylland
		+ 18.11.62	Liverå, Hjørring, Nordjylland. 6 km

303977	juv.	○	23.8.59	Fuglekøjen, Albuen, Fanø
		+	26.10.59	Oddens Grønning, Fanø. 10 km
303978	juv.	○	23.8.59	Fuglekøjen, Albuen, Fanø
		+	19.10.59	Vilslev Enge, Ribe, Jylland. 15 km
303982	juv.	○	23.8.59	Fuglekøjen, Albuen, Fanø
		+	25.10.59	Klingenbjerg, Fanø. 5–6 km
303989	juv.	♀	23.8.59	Fuglekøjen, Albuen, Fanø
		+	18.10.59	Ribe Kammersluse, Ribe, Jylland. 15 km
304038	?	○	20.8.58	Valbygård, Sjælland
		+	24.11.58	Borreby, Skælskør, Sjælland. 20 km
304040	?	○	20.8.58	Valbygård, Sjælland
		+	24.10.58	Borreby, Skælskør, Sjælland. 20 km
304060	?	○	20.8.58	Valbygård, Sjælland
		+	1.12.58	Borreby, Skælskør, Sjælland. 20 km
304243	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	5.11.58	Værnet, Nymindegab, Jylland. 53 km
304246	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	30.11.58	Trindmosegård, Tofterup, Jylland. 38 km
304247	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	10.11.58	Sæd-Udbjerg, Sønderjylland. 60 km
304260	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	25.9.58	Rindby, Fanø. 5. km
304263	juv.	♂	28.8.58	Fuglekøjen, Albuen, Fanø
		+	2.5.61	Plesefsk, Arkangelsk (62° 43′ N; 40° 17′ E), *Russia*. 2000 km NE
304265	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	15.12.58	Nordby, Fanø. 6 km
304270	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		/?/	19.4.60.	Gävle (60° 45′ N; 17° 15′ E), *Sweden*. 800 km NE
304282	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	13.12.58	NE Fanø. 6 km
304297	juv.	○	28.8.58	Fuglekøjen, Albuen, Fanø
		+	1.9.58	Sønderho, Fanø. 5 km
304419	juv.	○	12.7.59	Urup Dam, Langeskov, Fyn
		+	autumn 59	Ravnholt, Fyn. 13 km
304435	juv.	○	?.7.59	Sønderborg, Als, Sønderjylland
		+	28.11.59	Kær-Vig, Als, Sønderjylland. 5 km
304436	juv.	♂	?.7.59	Sønderborg, Als, Sønderjylland
		+	4.11.59	Kreis Norderditmarschen, Heide (54° 13′ N; 09° 30′ E), *W. Germany*. 100 km SW
304437	juv.	♂	?.7.59	Sønderborg, Als, Sønderjylland
		+	29.8.59	Skelde, Sønderjylland. 10 km
304446	juv.	○	?.7.59	Ketting Nor, Augustenborg, Sønderjylland
		+	15.11.59	Oksbøl near Nordborg, Als. 10 km
304449	juv.	○	?.7.59	Bavelse Sø, Glumsø, Sjælland
		+	19.8.59	Fjenneslev, Sjælland. 10 km

304478	juv.	○	10.7.59	Etterupgård, Gribsvad, Aarup, Fyn
		+	6.11.60	Myllerup, Aarup, Fyn. 10 km
306488	juv.	♀	5.7.60	Svenstrup, Borup, Sjælland
		+	13.11.60	Særløse, Sjælland. 12 km
304601	juv.	♂	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	4.10.60	Felsted Odde, Felstedkog, Jylland. 17 km
304618	juv.	♂	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	20.11.59	3 km E of Sdr. Felding, Jylland. 45 km
304626	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	4.11.59	Værnet, Ringkøbing, Jylland. 35 km
304639	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	21.11.59	Snogdal, Tim, Jylland. 6–8 km
304647	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	13.12.59	Tim Å, Jylland. 5–10 km
304659	juv.	♀	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	7.9.60	Holbæk, Sjælland. 235 km
304664	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	8.12.59	Nissum Fjord, Jylland. 20 km
304669	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	23.1.60	Keukenhof, Lisse (52° 15′ N; 04° 30′ E), *Holland*. 500 km SW
304677	juv.	♂	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	31.12.59	Vorgod Å, Barde, Herning, Jylland. 30 km
304680	juv.	♂	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	7.12.59.	Tranehuse, Mejlgård, Djursland. 160 km
304691	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	13.11.59	Bjerregaard, Holmsland Klit, Jylland. 33 km
304698	juv.	○	1.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	13.11.59	Bjerregård, Holmsland Klit, Jylland. 33 km
304713	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	24.9.61	Vorgod Å, Barde, Herning, Jylland. 35 km
304717	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	?.9.60	Gammelåen, Nissum Fjord, Jylland. 20 km
304718	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	28.8.60	Timgård, Tim, Jylland. 7–8 km
304722	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	20.11.59	Årgab, Ringkøbing Fjord, Jylland. 23 km
304730	juv.	♂	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	15.8.61	Nossare, Skaraborgs län, Västergötland (58° 40′ N; 13° 25′ E), *Sweden*. 450 km NE
304741	juv.	♂	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	19.12.59	Bøvling Fjord, Jylland. 25 km
304742	juv.	♂	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	12.11.61	Bygholm Vejle, Vesløs, Nordjylland. 115 km
304747	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	29.10.60	Bøvlingbjerg, Jylland. 25 km

304751	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		×	25.7.60	Waterden, Walsingham, Norfolk (52° 54′ N; 0° 49′ E), *England*. 650 km SW
304752	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	17.1.60	Juvigny-sur-Marne, 10 km NW of Chalons-sur Marne (48° 59′ N; 04° 21′ E), *France*. 800 km SW
304774	juv.	♂	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	29.10.59	Horn Sø, Lemvig, Jylland. 38 km
304775	juv.	♀	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	13.10.60	Grantshouse, Berwickshire (55° 53′ N; 02° 18′ W), *Skotland*. 650 km W
304779	juv.	○	25.7.59	Vest Stadil Fjord, Ringkøbing, Jylland
		+	19.10.60	Lindholm, Tim, Jylland. 6 km
304820	juv.	♂	10.7.59	Fælleseje, Slemminge, Lolland
		+	?.11.60	Radsted Mose, Krenkerup, Lolland. ;; km
304952	juv.	○	4.8.59	Fiskebæk, Farum, Sjælland
		+	23.8.59	Mandrupgård, Skibby, Sjælland. 25 km
304990	juv.	♂	4.8.59	Fiskebæk, Farum, Sjælland
		+	18.10.59	Mørkøv, Sjælland. 55 km
304977	juv.	○	23.8.59	Fuglekøjen, Albuen, Fanø
		+	autumn 59	Allerup, Esbjerg, Jylland. 12 km
305043	juv.	○	16.8.60	Nørholm, Sig, Ribe, Jylland
		+	9.9.61	Varde Å, 3 km E of Varde, Jylland. 6 km
305070	juv.	○	19.8.60	Fuglekøjen, Albuen, Fanø
		+	5.12.60	Blommens Toft, Fanø. 5 km
305084	juv.	○	19.8.60	Fuglekøjen, Albuen, Fanø
		×	2.1.62	5 miles from the coast of Norfolk (52° 50′ N; 0° 30′ E), *England*. 550 km SW
306412	juv.	♀	30.6.60	Svenstrup, Borup, Sjælland
		+	22.8.62	Søvind Enge, Vorsø, Horsens Fjord, Jylland. 130 km
306436	juv.	♂	30.6.60	Svenstrup, Borup, Sjælland
		+	19.11.60	Føllenslev, Sjælland. 45 km
306451	juv.	♀	5.7.60	Svenstrup, Borup, Sjælland
		×	12.2.61	Jersie Strand, Køge, Sjælland. 15 km
306551	juv.	○	28.6.60	Voderup, Tranderup, Ærø
		×	26.10.62	Binnensee, Lütjenburg (54° 15′ N; 10° 35′ E), Schleswig-Holstein, *W. Germany*. 70 km SSE
306552	juv.	♂	28.6.60	Voderup, Tranderup, Ærø
		+	14.9.62	Wismar (53° 45′ N; 11° 30′ E), *East Germany*. 130 km SE
306553	juv.	♂	28.6.60	Voderup, Tranderup, Ærø
		+	9.9.61	Rudbjerggård, Kappel, Lolland. 50 km
306554	juv.	○	28.6.60	Voderup, Tranderup, Ærø
		+	19.11.61	Bagenkop, Langeland. 25 km
306582	juv.	○	28.6.60	Errested, Bjerning, Haderslev, Jylland
		+	15.8.60	Hejlsminde, Haderslev, Jylland. 15 km

306583	juv.	♀	28.6.60	Errested, Bjerning, Haderslev, Jylland
		+	19.8.60	Bågø, Lillebælt. 20 km
306649	juv.	♂	19.8.60	Fuglekøjen, Albuen, Fanø
		+	27.12.61	Tjæreborg Enge, Esbjerg, Jylland. 10 km
306652	juv.	♀	19.8.60	Fuglekøjen, Albuen, Fanø
		+	10.11.60	Vilslev, Gredstedbro, Jylland. 19 km
306654	juv.	♀	19.8.60	Fuglekøjen, Albuen, Fanø
		+	30.9.60	Halen, Fanø. 5 km
306657	juv.	♀	19.8.60	Fuglekøjen, Albuen, Fanø
		+	7.11.60	Søllested, Fyn. 105 km
306695	juv.	♀	19.8.60	Fuglekøjen, Albuen, Fanø
		+	12.10.60	Halen, Fanø. 5 km
306697	juv.	♂	19.8.60	Fuglekejøn, Albuen, Fanø
		+	26.10.60	Mjolden, Brede Å, Sønderjylland. 43 km
406336	juv.	♀	1.7.54	Kongsdal, Mørkøv, Sjælland
		+	12.12.55	Weser S of Bremen (53° 00′ N; 08° 50′ E), *W. Germany*. 350 km SW
417449	juv.	♂	13.9.58	Illumø, Fåborg
		+	7.10.61	Helnæs, Fyn. 5 km
417450	juv.	♂	13.9.58	Illumø, Fåborg
		+	25.11.61	Helnæs, Fyn. 5 km

APPENDIX 2: THE EXPECTATION OF FURTHER LIFE
BILAG 2: DEN FORVENTEDE, YDERLIGERE LEVETID

1) For birds alive at beginning of age-class 2.
Gråænder, der har overlevet til begyndelsen af 2. aldersgruppe.

x	d_x	z	zd_x	z^2	z^2d_x
2.	588	0,5	294,0	0,25	147,00
3.	243	1,5	364,5	2,25	546,75
4.	114	2,5	285,0	6,25	712,50
5.	32	3,5	112,0	12,25	392,00
6.	14	4,5	63,0	20,25	283,50
7.	9	5,5	49,5	30,25	272,25
	1000		1168,0		2354,00

Mean expectation of further life:
Middel forventede, yderligere levetid:

$$M = \frac{1168,0}{1000} = 1.168$$

$$SSD = \sum z^2d_x - \frac{(\sum zd_x)^2}{1000} = 989,776$$

$$S.E. = \sqrt{\frac{989,776}{1000 \times 999}} = 0,0315$$

$$M = 1,168 \pm 0,032$$

2) For birds alive at beginning of age-class 3.
Gråænder, der har overlevet til begyndelsen af 3. aldersgruppe.

x	d_x	z	zd_x	z^2	z^2d_x
3.	243	0,5	121,5	0,25	60,75
4.	114	1,5	171,0	2,25	256,50
5.	32	2,5	80,0	6,25	200,00
6.	14	3,5	49,0	12,35	171,50
7.	9	4,5	40,5	20,25	182,25
	412		462,0		871,00

$$M = \frac{462{,}0}{412} = 1{,}121$$

$$SSD = 871{,}00 - 213{,}444 = 657{,}556$$

$$S.E. = \sqrt{\frac{657{,}556}{412 \times 411}} = 0{,}0714$$

$$M = 1{,}121 \pm 0{,}071$$

3) For birds alive at beginning of age-class 4.
Gråænder, der har overlevet til begyndelsen af 4. aldersgruppe.

x	d_x	z	zd_x	z^2	z^2d_x
4.	114	0,5	57,0	0,25	28,50
5.	32	1,5	48,0	2,25	72,00
6.	14	2,5	35,0	6,25	87,50
7.	9	3,5	31,5	12,25	110,25
	169		171,5		298,25

$$M = \frac{171{,}5}{169} = 1{,}015$$

$$SSD = 298{,}25 - 29{,}412 = 268{,}838$$

$$S.E. = \sqrt{\frac{268{,}838}{169 \times 168}} = 0{,}0973$$

$$M = 1{,}015 \pm 0{,}097$$

4) For birds alive at beginning of age-class 5.
Gråænder, der har overlevet til begyndelsen af 5. aldersgruppe.

x	d_x	z	zd_x	z^2	z^2d_x
5.	32	0,5	8,0	0,25	8,00
6.	14	1,5	21,0	2,25	31,50
7.	9	2,5	22,5	6,25	56,25
	55		51,5		95,75

$$M = \frac{51{,}5}{55} = 0{,}936$$

$$SSD = 95{,}75 - 2{,}652 = 93{,}098$$

$$S.E. = \sqrt{\frac{93{,}098}{55 \times 54}} = 0{,}1771$$

$$M = 0{,}936 \pm 0{,}177$$

5) For birds alive at beginning of age-class 6.
Gråænder, der har overlevet til begyndelsen af 6. aldersgruppe.

x	d_x	z	zd_x	z^2	z^2d_x
6.	14	0,5	7,0	0,25	3,50
7.	9	1,5	13,5	2,25	20,25
	23		20,5		23,75

$$M = \frac{20{,}5}{23} = 0{,}891$$

$$SSD = 23{,}75 - 0{,}420 = 23{,}330$$

$$S.E. = \sqrt{\frac{23{,}330}{23 \times 22}} = 0{,}2147$$

$$M = 0{,}891 \pm 0{,}215$$