

International Waterfowl Research Bureau

WOODCOCK AND SNIPE RESEARCH GROUP

Newsletter Number 6.

December 1980

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EDITORIAL

Together with the coordination of the "Woodcock and Snipe Research Group" I had to take over the edition of the WSRG Newsletter from Ireland, thanking hereby B. Stronach, J. Rochford and J. Wilson for the meritorious work they have done to continue what Monica Shorten has started in 1974.

At Dublin, October 1979, where some WSRG members met, we decided to treat the "Proceedings of the 1. European Woodcock Workshop", issued in December 1979, as Newsletter No. 5.

This is our sixth Newsletter which, I hope, will appear in time, in December 1980. I had no problems to get contributions, since several research projects are under way. In order to avoid too much extension I had to delay some papers and will publish them in the next issue. On this occasion I want to thank all contributors for their cooperation.

Reviewing this year's activities of the Group, the following points may be of interest:

1. Meetings

During the 26th Executive Board Meeting of IWRB at Sapporo, Japan, I took the chance to contact the colleagues in the Far East. There is obviously considerable interest in our work. In the meantime contact has also been established with Russia. The ex-

tended list of WSRG members will be published in the next newsletter.

Four members, J. Harradine, G. Hirons, J. Wilson and myself, followed the invitation of the American colleagues to join the "7th American Woodcock Symposium", at Pennsylvania State University, October 28-30. Most of the 30 papers given (four by the Europeans) were of high standard and revealed very interesting aspects of woodcock habitat requirements. The abstract of these papers will be published in the next newsletter.

Since our first Woodcock and Snipe Workshop in Denmark there has been considerable interest in a second one. It was proposed to follow a three years' turn (as the Americans do) and plan it for 1982. A place in a country of Eastern Europe would provide the chance to contact colleagues working within the main production area of our woodcock.

2. Research

Research on the European woodcock was considerably intensified by several projects. Breeding biology and especially roding behaviour are the main topics at the moment. Telemetric studies by G. Hirons again provided interesting results and the same method is used in France now. Increased efforts are also put in the snipe species.

Wing collection is being continued, but not yet sufficiently organized and centralized (as it is in North America). It should

be considered to centralize all wing sampling activities at WAGBI, England (or Kalö, Denmark), since these two institutions are most experienced in this field.

Organizing the financing of research projects is not an easy task. So I am very grateful to the German Delegation of C.I.C. and to the Ministry of Agriculture, Stuttgart, Federal Republic of Germany, for the support they give to E. Perttunen's projects in Finland and H. Berlich's research in the FRG, respectively. However, such important long-term projects as G. Hirons' telemetric studies require long-term financial planning, and the necessary steps should be taken by IWRB to arouse the interest of EEC, WWF or some other financial source. In the meantime the two organizations mentioned above will fortunately extend their support for one more year to guarantee continuation.

3. Publications

It is suggested to take mainly briefer articles and preliminary results of running projects in the Newsletter and to try to publish longer and more detailed papers of general interest in scientific organs of higher edition. These publications will then be reviewed in the Newsletter bibliography.

Again I want to thank all contributors for sending reprints or giving hints for search of literature.

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Herby Kalchreuter
December 1980

AUSTRIA

Philipp Meran

Some Observations on Fall Migration

A considerable amount of woodcock passed through Eastern Austria, the areas around Graz, in fall 1979. The first migrants arrived in the lowlands by September 11, followed by several flocks in 3 to 6 days' intervals. There was an obvious evening flight, resembling "roding" during this time. As late as October 26 there were still woodcock even in the hills up to 900 m NN, in spite of a short cold spell. However, during the mild period in the first days of November all had left by November 5, and immediately thereafter the winter broke in with heavy snowfall and frost. So the departure was earlier and more abruptly in 1979 than in previous years, when woodcock of the hilly areas obviously first came down to the valleys before they left the area.

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DENMARK

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Notes on the Jack Snipe (*Lymnocyptes minimus*)

The smallest of the snipe species, the jack snipe, does not breed in Denmark but is found in suitable localities as a common migrant and uncommonly as a winter visitor. At present the annual shooting yield is not known, as in the questionnaire sent to game licence holders no distinction is made between the two game species of common snipe and jack snipe. It is, however, estimated that only a small proportion of snipe shot are jack snipe (approximately 10%).

Capture and ringing at Vejlerne

From 1968 to 1971 the Game Biology Station was responsible for ringing 132 jack snipe at Vejlerne in north-west Jutland. They were all captured in autumn in clover-leaf traps (special tunnel traps), primarily erected to catch common snipe. This latter point is important when comparing numbers of the two species caught (660 common snipe as opposed to 132 jack snipe), as therefore one cannot conclude that the area of Vejlerne is visited by five times as many common snipe as jack snipe. During the work at Vejlerne it became clear that the jack snipe often prefers drier grounds with taller vegetation than its close relative. Its most preferred haunts were thus lightly-grazed meadows with tall tufts of grass, and reed-beds with herbs growing at their base.

Arrival of jack snipe

While common snipe from abroad are already found in August at Vejlerne, the first jack snipe are normally not seen until September. Fig. 1 illustrates the situation in autumn; it is clear that many birds are captured from mid-September until early November. For comparison, Fig. 2 shows the course of migration as seen from results in east Zealand. Captures here begin a little earlier than at Vejlerne and continue until the end of November. It is also known that other wading birds leave the Vejlerne area earlier than more southernly Danish regions, where an occasional jack snipe may even be seen in winter. During one autumn at Vejlerne, 16 of the ringed birds were captured a second time. They were caught from 1 to 38 days after the first ringing, the average being after 16 days. One individual was captured a total of 3 different times, i.e. October 9th and 24th, and November 4th.

Percentage of recapture

Of the jack snipe ringed at Vejlerne, 4 (3%) were later found dead. One was shot near Vejlerne 3 years after being ringed, one was shot in Belgium after 3 months, one was found dead at Vejlerne one month after capture, while the fourth was found badly decomposed in France six weeks after being ringed. In an article on the jack snipe in "Feltornithologen" (19), 1977, N.O. Preuss mentions a percentage recovery of over 5% for 248 birds ringed by the Zoological Museum in eastern Denmark. Thus the number of jack snipe migrating through Denmark which fall prey to guns seems extremely small.

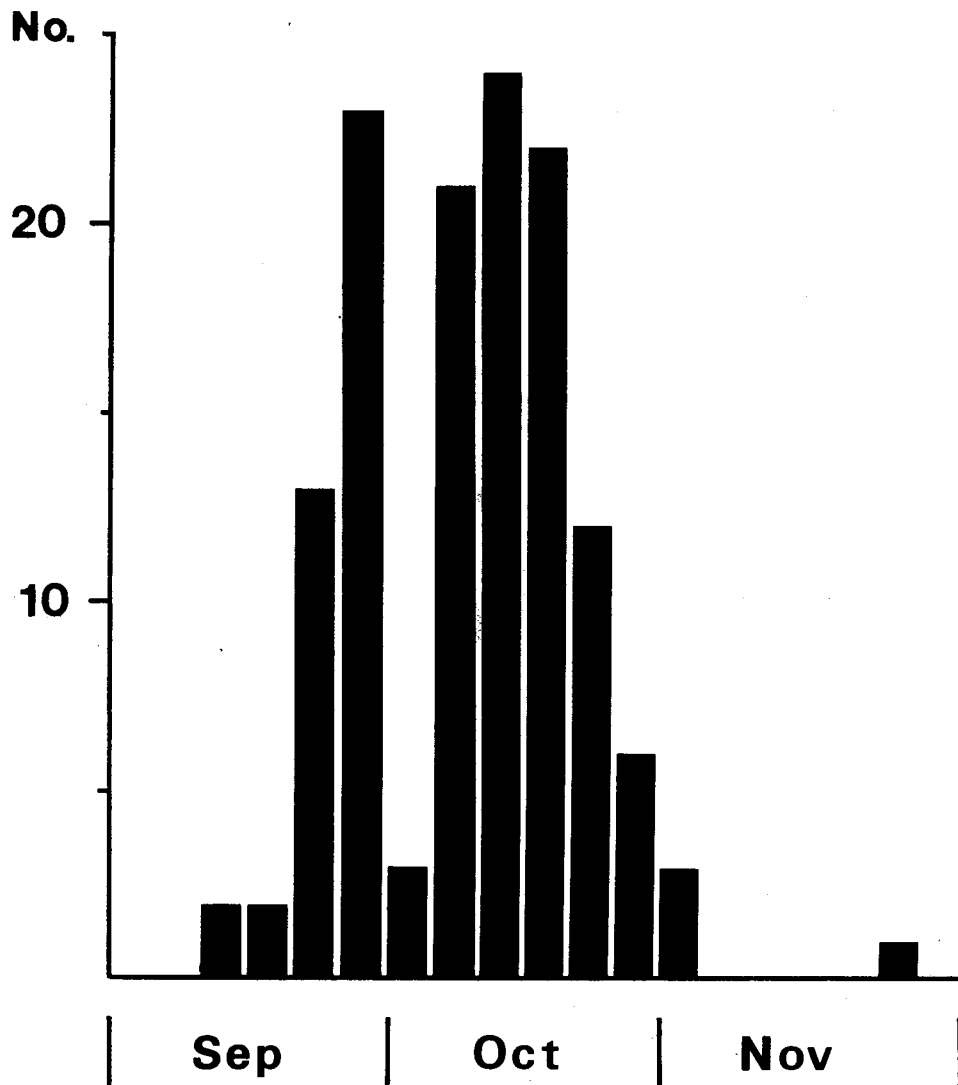
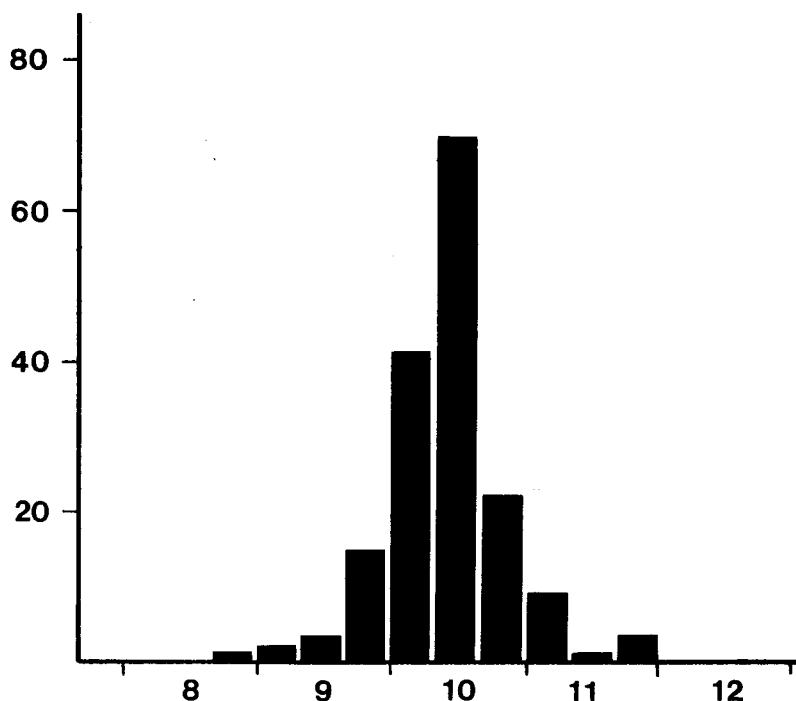


Fig. 1. The temporal distribution, based on 5-day intervals, of 132 jack snipe captured at Vejlerne during 1968-1971.

Fig. 2. The time of ringing of 248 jack snipe caught from 1950-1962 in eastern Denmark (mainly Amager and Utterslev Mose). The months are divided into 10-day periods (from Preuss 1977).



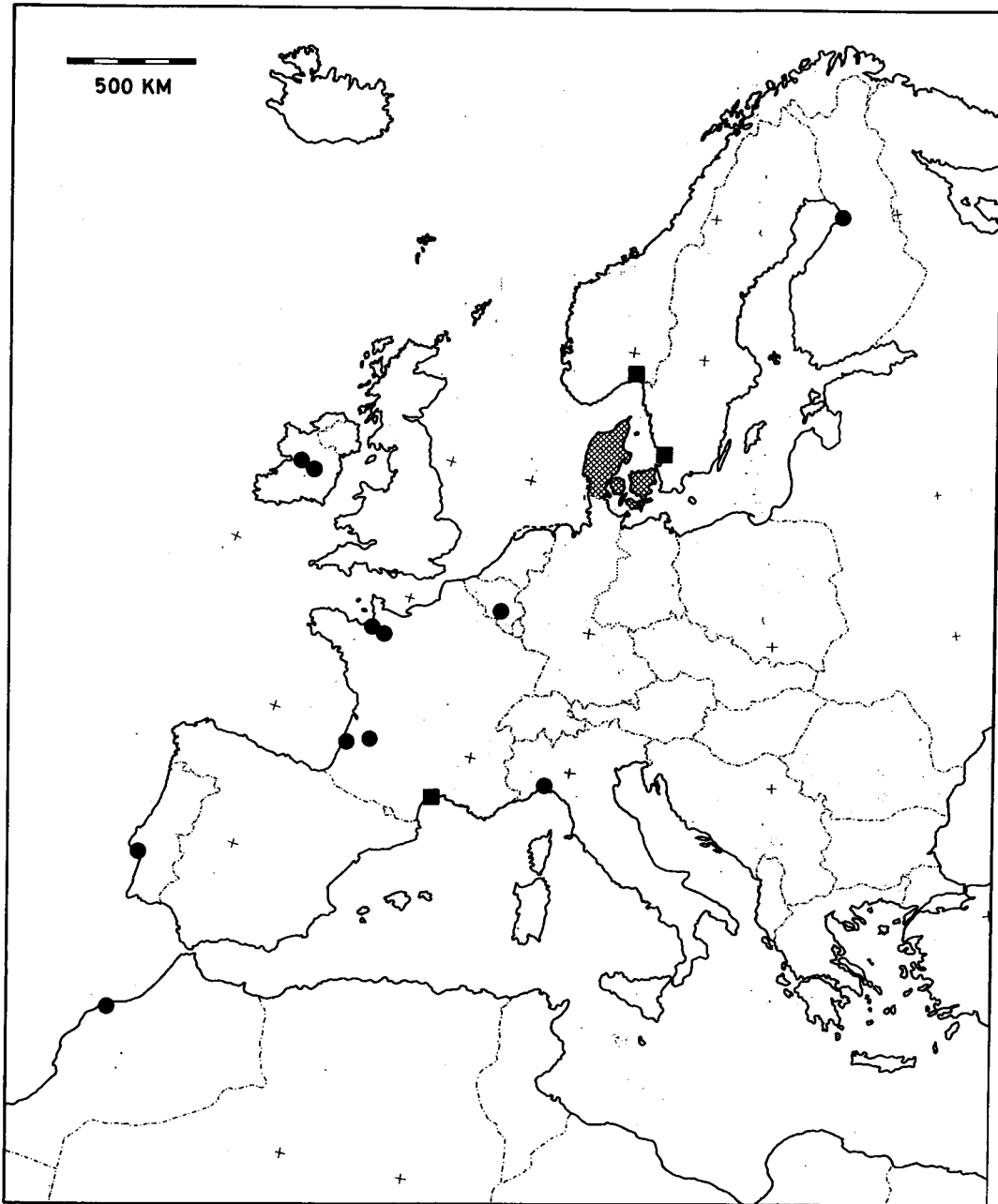


Fig. 3. Circles represent recoveries in Europe of jack snipe ringed in Denmark, squares the place of ringing of individuals from abroad later captured in Denmark (from Preuss 1977).

Migration flyways

The few recaptures obtained provide little information on the origin and destination of the migrating populations. In the article mentioned above, Preuss has combined captures abroad of birds ringed by both the Zoological Museum and the Game Biology Station (Fig. 3). It could appear that breeding birds from northern Fennoscandia and western Russia migrate through Denmark. Some probably winter in west- and south-west Europe, while others fly on to Africa.

It was mentioned previously that the Game Biology Station has also ringed common snipe at Vejlerne. The results were published by the author in "The Danish Review of Game Biology", Vol. 11 (1) 1978, as "Gallinago gallinago Ringed in Demark". In this work, too, comparison is made with the results obtained from the ringing work of the Zoological Museum in eastern Denmark.

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FINLAND

Eero Perttunen

Migration, Breeding Biology and Hunting of the Woodcock
(Scolopax rusticola L.) in Finland

Summary of the paper (84 pp.) presented to the University of Helsinki (master's degree).

1. Migration

The woodcock arrives at Aaslaluoto, Rymättylä (60° 17' N 21° 56' E) in southwestern archipelago in Finland in late March and at the beginning of April. The first woodcocks reach the middle parts of Finland in the middle of April and in late April. The north of Ostrobothnia and Kainuu are reached in late April and at the beginning of May. The last autumn observations from Aaslaluoto have been made in October and November. The latest woodcock have been seen on the 27th of December, 1977.

The migratory direction, winter quarters, population structure and mortality were analyzed from the records of the bird ringing office of the Zoological Museum of Helsinki. By 31/1/1978, 142 ring recoveries had been obtained (reporting rate 11.2%, 93% originated from birds shot). The migratory direction of the Finnish woodcocks is 220° (almost southwesternly). The most important winter quarters are in France, the British Isles and Italy. The average distance from the nesting area to the winter quarters is 2222 km. Part of the Finnish woodcock population spend their winters further south than the woodcocks of Denmark,

Sweden and Norway. Woodcock nestlings have a life expectancy of 1.44 years, which is shorter than that of the nestlings in the British Isles. The maximum age attained by a Finnish woodcock is over 10 years. The mortality rate during the first year of life is 61.7%; later the average annual mortality is 48.4%.

2. Breeding Biology

The breeding biology of the woodcock was studied by field observations on Aaslaluoto, Rymättylä (60°17'N/21°56'E) and analyzing data were sent by the observers in different parts of Finland. The nest record cards of 171 nests, some of which were incomplete, collected by the Finnish Society of Sciences, were analyzed according to the method of Morgan & Shorten (1974). Woodcocks favour groves, mixed forests and fresh forest types on Aaslaluoto. Fresh forest types are common in other parts of Finland, too.

Roding begins in April, and during humid summers it continues up to the beginning of August. The courtship flight starts before sunset from the middle of May and the display activity is highest after sunset. Comparatively few birds are displaying at midnight and after that. Darkness does not prevent roding activities in the middle of the summer. Cloudiness makes roding start earlier than usually. Roding was observed during completely clear weather and in the moonlight as well as in a storm. When roding males meet each other they start singing their fight song, that is the "tschiwit" sound. Four displaying males have been seen at the same time. Conflicts with a mallard male (Anas platyrhynchos L.) and a snipe (Capella gallinago L.) have been observed.

The population density on Aaslaluoto was estimated at 3.7 roding birds/km² in 1977 and 3.5 in 1978.

Nesting already starts in late April and continues until late August. The nest site is usually under a tree (mainly a spruce, Picea abies) in a mixed forest, grove, deciduous forest or a spruce forest. Some nests have been found in open areas. The egg-laying interval is 1-2 days (n=6), which is little shorter than the data given in the literature. The average clutch size is 3.9 (n=42). The incubation period analyzed for one nest only was 19-21 days, which corresponds to the shortest periods given in the literature. The brood size is 3.6 (n=25) on an average. Nestlings favour fresh forest types. The hatching success was 53.7% (n=46), which is lower than in the study made in the British Isles. Fertility was 92.1% (n=26). Total failures, such as desertion and predation, were excluded when analyzing fertility. The nesting success was 67.2% (n=64). A nest was considered successful if at least one young was hatched. Productivity was 2.4 young/♀ if only single-brooded. The nesting success corresponds to the study made in the British Isles.

3. Hunting

Hunting was studied from wing sample material collected by the Finnish Game Research Department and from literature.

The open season for woodcock has been the same as that of the Tetraonids. In 1978 the open season was extended by 10 days, so it now starts on the 1st of September and ends on the 15th of October. It is estimated that only 500-1,000 woodcocks are shot

in Finland annually. The Tetraonid bag is much higher. According to the wing sample collection, juv/ad ratio was 2.42:1 in Finland in 1977. The 64 woodcocks weighed in Finland in 1978 averaged 333.8 grams. The majority of woodcocks killed in Finland are shot by chance in connection with other hunting. Woodcocks mostly live alone during the hunting period. Woodcock hunting is not very popular in Finland, but it could be increased.

Roding Observations on the Woodcock in Joutseno in 1980

by Eero Perttunen

1. Material and Methods

Roding observations on the woodcock were made by myself in a study area in the commune of Joutseno (61°09'N, 28°29'E) in SE Finland (see p. 18) from different observation points starting about one hour before sunset and finishing 1.5-2 hours after it. Since 12 June observations were carried on till 24:00 hrs., excluding 17 June, when they were finished at 03:15 hrs. In addition there were some observations after the study period, which have been made on the way from the study area. The first roding woodcock was seen on 18 April and observations were continued up to 11 July. Altogether there were 586 sightings on 52 days during the study period. The weather conditions were recorded each day the observations were made.

The time when a roding woodcock was seen is indicated with a dot at the intervals of three minutes in Fig.1. The mean of the sightings has been calculated in pentads since 20 April except

on 18 April and 11 July, when the daily mean was used. The observations after midnight have been omitted, so the total number of observations was 570 sightings. When looking at Fig.1. we have to keep in mind that several individuals observed at the same time cannot be told apart from each other in the diagram although they have been included in the mean.

2. Results

Roding observations are summarized in Fig.1. Since 6 May the display flight commenced before sunset and the peak occurred shortly after it. A woodcock male was seen to show aggression towards a gull (Larus sp.) on 16 June. Males seemed to react quite strongly when noticing the observer and often changed their routes in spite of his immobility.

3. Discussion

According to von HAARTMAN (1976), the display flight commences in Lemsjöhölm, Askainen in SW Finland ($60^{\circ}30'N$, $21^{\circ}47'E$) in April in the twilight after sunset, which corresponds well to the results obtained in this study. NEMETSCHKEK (1977) came to the same conclusion in the Federal Republic of Germany. According to PERTTUNEN & SAARI (in press), roding regularly commences before sunset after mid-May. We summarized the information of eight years' observations in Rymättylä ($60^{\circ}17'N$, $21^{\circ}56'E$) SW Finland (where the sun sets 18 min. later than in Joutseno). SAARI made 312 observations during 49 days in Rymättylä in 1980. The first observation before sunset was made on 7 May. We got the impression that roding started earlier in the evenings during 1972-79 than in 1980. This might be due to the difference in

weather conditions between these summers. In Finland the summer of 1980 was sunny and roding may have commenced later, since the light intensity greatly influences the onset of the display flight. Summers during 1972-79 have varied greatly: e.g. the summer of 1975 was very dry and roding in Rymättylä ceased as early as the 7 July, whereas in wet summers it ceased about one month later. In 1980 it ceased on 19 July.

Acknowledgements

This study has been financed by the FRG delegation of the CIC, for which I want to express my sincere thanks. I also want to thank lic. Lennart Saari for making roding observations in Rymättylä and for reading and criticising the manuscript and checking the language.

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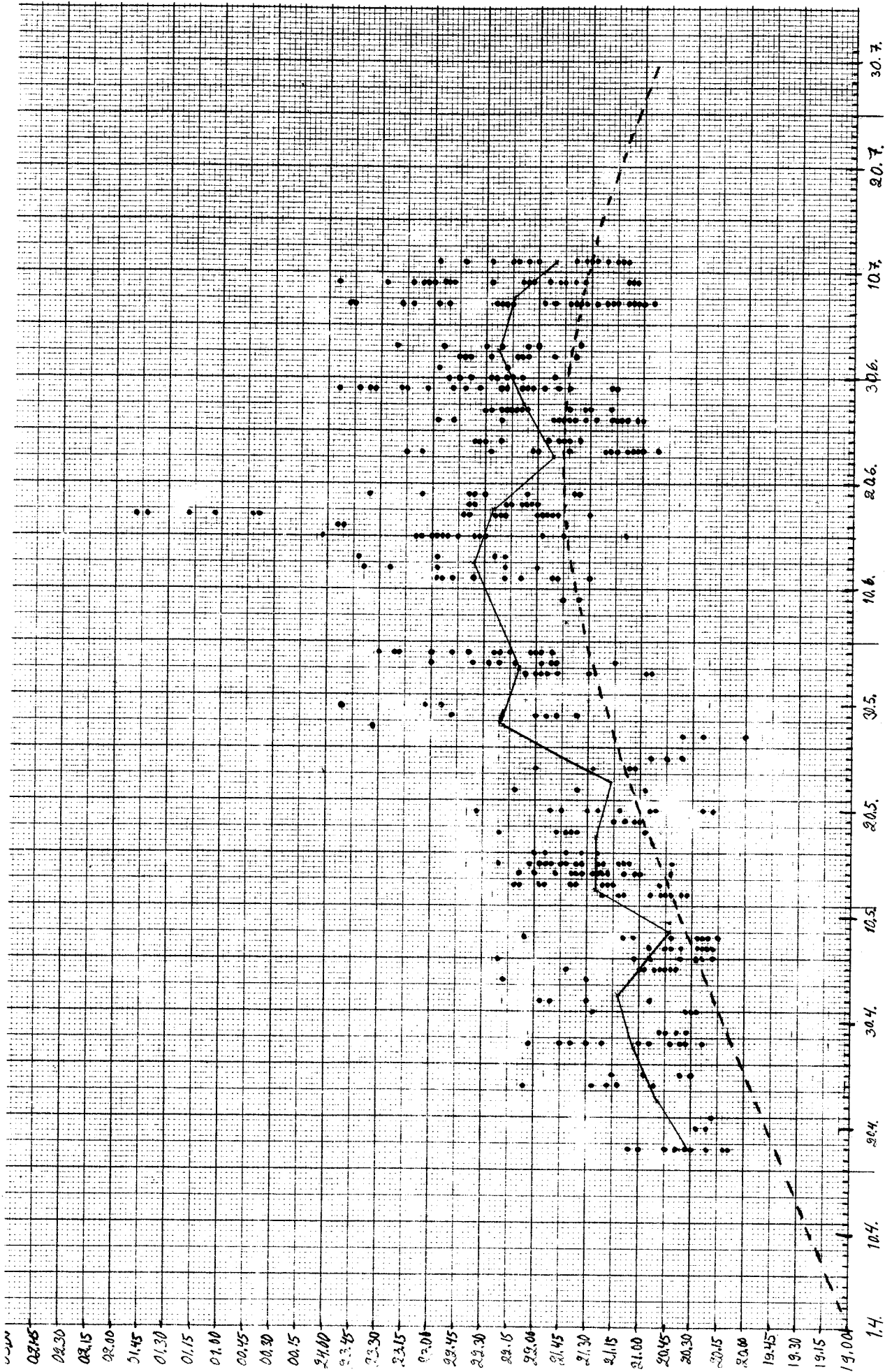


Fig.1. Roding observations of woodcock in Joutseno in 1980.

The Roding Male Count by Hunting in Finland

by Eero Perttunen

1. Introduction

A roding male count has been conducted in southwestern Finland during 1977 and 1978 by Eero Perttunen and Lennart Saari. The density numbers obtained were greater than ever before, but the reliability of the method remained open. At the Woodcock and Snipe Symposium in 1979 the Nordic Wildlife Committee agreed that the validity of the method should be tested by taking all the roding males to an isolated area in Finland. The aim of this project was to carry out this plan.

2. Methods

2.1. Study area

The study island is situated in southeastern Finland on the lake Saimaa (61°09'N, 28°29'E). The total area of the island (with an adjoining small island) is 156 ha, 4.6 ha of which consist of deciduous forests. The soil is fertile, mostly Oxalis-Maianthemum-type; and now very thickly spruce-dominated (Picea abies) after cutting and planting in 1941. The northeastern part is optimal for woodcock: a linden forest (Tilia cordata). The control area is on a nearby peninsula (61°10'N, 28°31'E) and its land area with an adjoining small island is 212 ha, 2.0 ha of which are covered with deciduous forest. The control area is less fertile on an average than the study island.

2.2. Methods

Roding males were censused in places I to X in the control area (Fig.1) during 18 April - 5 May 1980 by myself on consecutive evenings, starting about an hour before sunset and terminating 1.5-2 hours later. The roding male count was performed on the study island in places I to IX, B, C and E (Fig.1) during 6 - 24 May, beginning about an hour before sunset and terminating two hours later. If two males had been observed simultaneously from an observation point, the minimum number of males of that area was estimated at two. If a displaying bird on a completely different route from these had been observed, the area was considered to have three males. Because of the thickness of the forest only a part of the roding routes could be seen, so the length of the route was deducted from the roding speed of 32 km/h given by NEMETSCHKEK (1977). The direction of the route was used in deciding whether or not the woodcock might rode over another area, too, and so might probably have been seen on another evening.

Shooting of the roding males by the local hunters' club took place on 25 and 27 May between 19:50 and 22:20 hrs. and on 28 May between 19:50 and 22:40 hrs. on points I to IX (point IV was occupied on two evenings and point V on one evening only). On 25 May it was raining and the wind was blowing, other evenings were bright and calm. After shooting the remaining roding males were censused on the study island in places I to IX, A, C, D and E during the first week of June and on the control peninsula in places I, II, IV to VI and VII to IX from 23 June to 11 July. From 30 June to 2 July the shooting was repeated, but the results were poor due to the scarcity of hunters.

In order to relate the number of males to that of females nests were searched for both on the study island and in the control area between 18 April and 7 August, altogether 100 hours. A branch which was about 1.5 - 2 metres long was used in nest searching.

3. Results

3.1. Population density on the study island

The results of the shooting during 25, 27 and 28 May are given in Table 1.

Table 1. The roding male census by counting and shooting on the island Muukonsaari on 25, 27 and 28 May.

Observation point	Birds before shooting (estimated)	Birds shot	Remaining birds seen by hunters	Birds after shooting (estimated)
I	2	3	-	3
II	same as on point I	-	-	1
III	3	-	2	2
IV	1	1	-	1
V	1	-	-	1
VI	2	1	-	2
VII	2	1	} 3	3
VIII	3	2		3
IX	3	2	-	1
Other points	4	-	-	1
Total	21	10	5	18
Density		$\frac{15 \text{ ex}}{= 9.1 \text{ ex/km}^2}$		18 ex $= 11.3 \text{ ex/km}^2$

The maximum density would be gained by adding together the birds shot and those censused after shooting. This leads to an original density of 17.6 birds/km^2 , if no birds had invaded from the mainland, which cannot completely be excluded. The minimum density would be 9.1 or, if only regarding birds shot, 6.4 birds/km^2 .

The last woodcock on site IX was shot on 28 May and a new roding male was observed two days later. First observation of the roding male was made as late as 22:53 hrs. and it was seen three times after the first observation during the same evening. Maybe it wanted to be sure that the area was free.

Four males were shot at the second attempt between 30 June and 2 July; two of them were not found. One of those found (shot on 30 June) was moulting its 1st and 2nd primaries.

The first nest on the island was found on 6 May after 16 hours of work. The incubating female was observed many times, but on a visit on 22 May the nest was obviously destroyed by a predator. The second nest with four eggs was found on 12 May after an additional 10 hours of searching, but it was soon deserted. These were the only nests found. However, after the first shooting three broods were found on 29 May, 10 June and 13 June.

3.2. Population density in the control area

18 males were seen from 10 observation points in the first census from 18 April to 5 May on the control peninsula. This equals 8.5 ex/km^2 . The second count was performed on seven points between

23 June and 11 July. 14 males were seen, which gives a total density of 6.6 ex/km². No nests were found, but a brood of three full-size juveniles accompanied by a female was seen on 31 July.

3.3. Voices and age ratio of the woodcocks shot

Including one bird shot on 19 May and four birds shot in the second hunt between 30 June and 2 July, a total of 15 woodcocks was shot by using 46 cartridges, which makes 3.1 cartridges/woodcock. Five birds were not found. A retriever was used for searching one of the lost birds, but it failed. Six woodcocks were giving "quorr, quorr, quorrtsiwick" sound, one only "tsiwick" sound, the voice of one could not be heard and two were flying silent. All those found were males, even the silent ones. The testes of all birds were found active. Six birds were hatched in the previous year and four were older, so the .juv/ad ratio was 1.5:1.

3.4. Biometric data

Measurements have been taken of 10 woodcocks. They are summarized in Table 2.

Table 2. Measurements of woodcock shot on 25, 27 and 28 May, on 30 June and on 2 July 1980 (N=10) in the study area

	\bar{x}	Range
Body weight	280.5 g	245-335 g
Length of wing	195.6 mm	185-203 mm
-"- bill	70.8 "	67-75 "
-"- tail	80.6 "	40-88 "
-"- larger testis	32.3 "	27-40 "

The "maximum method" was applied when measuring the wings. Two birds, which fell in the lake after being shot, were wet when weighed (335 g and 310 g) and one was partly wet (290 g). The tail of 40 mm belonged to an individual shot on 19 May, which was moulting its tail feathers. Birds shot in turn of June and July had smaller testes than the average: the length of the larger testis of one shot on 30 June was 28 mm and the other shot on 2 July was 27 mm. Study skins were made of three birds and the wings and the tail of the rest were collected. The stomachs have been preserved, too.

3.5. Other observations made during the research

A roding male was seen to collide with a birch branch with its wing on 28 April. The collision was so rough that for a moment it seemed as if the bird would stop and sit on the branch. Anyway it soon continued its display flight at a low altitude.

A possible "display ground" was found in an open Scots pine (Pinus sylvestris) forest near site II in the control area. At least four woodcocks were seen to alight on it during one night. At 23:00 hrs. two birds alighted in the open area. One of them was emitting a high-pitched sound for 2.5 min. At 23:03 a third woodcock flew above the two and alighted, which caused the other one to chase the newcomer for a while. While chasing it was emitting the "tsiwick" sound. Then all three birds became silent. The intensity of the display flight was high between 21:02 and 23:27 hrs. and several "pair"-flights with a twittering sound (see WILSON 1979 p. 10) were observed.

4. Discussion

4.1. Roding study by shooting

MARCSTRÖM (1974) has counted roding males in a small clearcutting of 225 x 90 metres in Central Sweden. He observed 10, 10 and 6 roding males during three consecutive evenings and shot 8 of the 12 passing birds during the following two days. One day after shooting he observed 19 roding males and three days later 17 roding individuals. During the two following days he shot 10 of the 13 roding males he saw. Three days later he observed 8 roding males, a similar number as in the beginning of the study, in spite of the removal of 18 birds.

My study revealed a similar situation. The removal of 10 birds of an estimated 21 before shooting had hardly any effect on the number of birds (18) estimated after shooting. As this part of the study was performed on consecutive days, an invasion of substitute birds from the main land to such an extent is very unlikely. There were only few observations of birds crossing the channel during the whole study. It is more likely that the birds replaced so quickly were recruited from a "standby population" of birds which had not roded before and therefore remained undetected, as HIRONS (pers.comm.) and several studies on *Scolopax minor* (summarized in KALCHREUTER, 1979) revealed.

4.2. Population density

Owing to the possibly large area covered by roding woodcock and the irregularity of the timing (HIRONS, pers.comm.) my census method can only be regarded as a rough estimate, in spite of the

time-consuming efforts I have made. The figure of 12.8 birds/km² might be an over- or under-estimate. The number of birds shot (6.4/km²) definitely provides too low a figure, since despite the efforts it was not possible to get all the males or a majority of them. To achieve this a still higher number of hunters would be required, which was not possible in this area.

4.3. Sex ratio

In spite of considerable searching efforts only two nests were found in both study areas. In comparison with the number of males observed this would lead to the assumption of a highly unbalanced sex ratio. However, since nest searching was most intensively done during the first three weeks of May and four broods were seen in June and July, it might also be possible that females arrived or started breeding later. OWEN (pers.comm.) reports a similar situation, probably influenced by precipitation, from a British population.

4.4. Population densities elsewhere in Finland

FISKAR et al. (1976) give the density of 0.5 "pairs"/km² for the Tammela region in southwestern Tavastia. PERTTUNEN & SAARI (in press) have performed roding male counts in Rymättylä, southwestern archipelago of Finland, during 1977 and 1978 and reached the density of 3.7 ex/km² and 3.5 ex/km² respectively. It should be pointed out that, with the aid of the line transect method, during 1976-1980 (the total length of three transects annually was 17.3 km) only one woodcock was observed in 1980 in the same area (Lennart Saari, in litt.) UKKONEN & TOIVANEN (1980) have

censused the avifauna in Kaavi, North Savonia, where the habitats have been created by traditional agriculture (especially swidden cultivation). They observed 1.5 "pairs"/km² by using the line transect method. All the censuses mentioned above led to lower densities than the shooting method, and we can say that the line transect data method is not at all suitable for counting woodcocks. Females are the most difficult ones to observe by man. E.g. the flushing distance of the incubating females from the two nests I found on the study island was only two metres.

4.5. Estimates of woodcock population in Finland

MERIKALLIO (1958) has estimated (by using the line transect method) the breeding population of Finland at 16,000 pairs. The number is evidently too small, since woodcock are difficult to observe by daytime, owing to their excellent protective colouration and secretive habits. Tentative reports from the Bird Atlas Project in Finland show that woodcock has been observed on more than 1,600 Atlas squares (the file of the Finnish Bird Atlas from August 1979). The area of one square is $10 \times 10 = 100 \text{ km}^2$. Supposing all squares were as good habitats as the study island is, there would be more than a million woodcocks in Finland. This might be an overestimate, but we can conclude that the number of woodcocks is rather hundreds of thousands than tens of thousands.

Acknowledgements

This project has been financed by the CIC/Delegation of FRG. Dr. H. Kalchreuter has planned the final form of the shooting method. The forest company Enso-Gutzeit has given me access to

their land. The hunters of Honkalahti have taken part in shooting woodcocks according to the scheme. Dr. Kalchreuter and Lic. Lennart Saari have read the manuscript and given valuable criticism on it. Lic. Saari has also checked the English language. I want to express my sincere thanks to all mentioned above.

Summary

Population density of woodcock was studied on an island in SE Finland by shooting roding birds from nine points on three consecutive evenings in late May 1980. Altogether ten birds were shot and five more were seen on the island, which equals 9.1 ex/km². All woodcocks shot were males, the testes of which were active. Juv/ad ratio was 1.5:1. Roding male counts by observation on consecutive evenings at different locations were conducted before and after shooting mainly from the same sites as shooting was done. The density before shooting was 12.8 ex/km² and after shooting 11.3 ex/km². The shooting method revealed a considerably higher woodcock density than the transect methods used so far. In the light of these investigations the woodcock population of Finland is estimated at hundreds of thousands.

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Breeding Biology of the Common Snipe (Gallinago Gallinago)

in Finland

by Eero Perttunen

1. Introduction

The common snipe (Gallinago gallinago) breeds in every part of Finland (von HAARTMAN et al. 1963-72), but since it is the smallest bird game in Finland, it has been little studied. According to LAMPIO (1980) the breeding population in Finland is estimated at 150,000 pairs, though a basic study of this species is still to be made. The aim of this paper is to clarify the breeding biology of the Finnish common snipe.

2. Material and Methods

Breeding biology was studied from the nest-record cards dating from 1934 - 1978 collected by the Finnish Society of Sciences. The nest-record cards, some of which were incomplete, totalled 227.

Breeding season and clutch size were studied according to the method of HAARTMAN (MS) and the data obtained by him have been added to the information from the nest-record cards. Brood size was calculated either by counting chicks when still in the nest or on the basis of the number of hatched eggs. Nests reported as "the chicks have left" or "hatched" have been included as well as those which were visited regularly even if they were not visited on the hatching date, providing there were no recordings of unhatched eggs or destruction of the nest. Nesting success has been analyzed according to the method of MAYFIELD (1961) (cf. also SOIKKELI 1978) and for comparison to the method of MORGAN & SHORTEN (1974). Clutches laid by 31 May were considered to be first clutches in the latitudes of 60 - 64°N and the ones laid after that were regarded as renests or second clutches when using MAYFIELD's method. In the latitudes from 64° to 70°N the corresponding date was taken as 20 June according to the advance in spring migration by HILDEN et al. (1979). There were 14 renests or second clutches in the data. The egg-laying interval used in the analysis was one day and the incubation period 20 days.

3. Results

3.1. Breeding season

Breeding season according to nest cards is shown in Table 1. The tabulation includes all clutches known to von HAARTMAN (MS).

Table 1. The dates of finding (not commencement) of the clutches in Finland.

Latitude Period	Number of clutches			
	60-62°N	62-64°N	64-66°N	66-70°N
1-10 May	10	-	1	-
11-20 May	41	11	-	-
21-31 May	47	28	13	3
1-10 June	40	13	17	9
11-20 June	20	8	17	26
21-30 June	7	1	5	6
1-10 July	3	3	7	4
11-20 July	4	1	1	4
21-31 July	6	-	-	2
1-10 August	1	-	-	1

n = 360

The earliest clutches consisting of three eggs and one egg respectively in the latitudes of 60 - 62°N have been found in Teisko on 1 May 1953 (K. Juutilainen). A nest with three eggs has also been found on 3 May in the same area. The earliest clutch of four eggs, which was completed, has been found in Pori on 3 May 1968 (E. Raikamo). In the zone 62 - 64°N the earliest clutches of four eggs have been found in Vilppula on 15 May 1960 (P. Eloranta) and in Kristinestad on 15 May 1963 (P.-A. Johansson). According to literature the earliest

clutch of three eggs was found in Alavus on 12 May 1946 (von HAARTMAN MS). The earliest clutch of four in the zone 64 - 66°N has been found in Oulujoki on 22 May 1961 (M. Juutilainen). According to von HAARTMAN et al. (1963-72), the earliest clutch of four has been found as early as 8 May 1884 in Sotkamo. From the zone 66 - 70°N the earliest clutch of four has been found in Torankijärvi, in the commune of Kuusamo, on 26 May 1977 (H. Ketola).

The latest clutch (two eggs) in southern Finland has been found in Rymättylä on 3 August 1969 (K. & L. Saari). The two eggs hatched on 6 August. The latest clutches in northern Finland have been found in Meltaus, in the rural commune of Rovaniemi, on 22 July 1966 (T. Raitis, H. Lindén & J. Lumme). Both clutches had four eggs and a parent was observed to incubate the other one. According to literature the latest clutch of four in northern Finland has been found in Kemijärvi on 10 August 1936 (von HAARTMAN MS).

3.2. Nest site and habitat

The nest sites of the Finnish Common Snipe are summarized in Table 2.

Table 2. Nest site recorded for snipe.

Nest site	n	%
In tussocks of grass and sedges	103	61.0
Underneath old grass	21	12.5
Beside a tussock	8	4.7
In sedges (<i>Carex</i> sp.)	7	4.1
Under a willow (<i>Salix</i> sp.)	7	4.1
Under grass	7	4.1
On marshland	3	1.8
Beside a ditch	3	1.8
In a pit	3	1.8
Other sites	7	4.1
Total number of nests	169	100.0 %

The majority of the nests were recovered in tussocks of sedges and grass, where the nest is protected from small changes in the water level, which may occur in wet nesting habitats used by common snipe. Two nests were recorded surrounded by water; two were unprotected, one of these was deserted. Four clutches found in the woods were in similar habitats as nesting habitats are.

Nesting habitats are summarized in Table 3.

Table 3. Nesting habitats of snipe.

	n	%
Meadow (wet)	99	48.3
Marshland	48	23.4
Shore habitats	25	12.2
Damp forest	16	7.8
Forest close to shore	8	3.9
Meadow (dry) or field	8	3.9
Tundra	1	0.5
<hr/>		
Number of nests	205	100.0 %

A great amount of nests has been found on shore meadows, which are covered with water during spring. These habitats are also favoured in previous researches, which may have biased the results given above. Secondly, the largest number of nests have been found on marshland (many on open marshland), which ornithologists have just recently begun to study. Habitats referred to damp forests have been groves in many cases. One nest recorded from tundra has been found in Utsjoki, the northernmost commune in Finland.

3.3. Egg-laying interval

The egg-laying interval could be obtained from three nests only. The time of day of observation is given in brackets where known.

				egg-laying interval
6 May (11.00)	2 eggs	7 May (19.30)	4 eggs	\bar{x} = 0.7 days
15 May	0 "	21 May	4 "	\bar{x} = 1.5 "
4 June (23.00)	3 "	5 June (12.00)	4 "	0.5 "

3.4. Clutch size

Clutch size is summarized as follows. This tabulation includes all clutches known to von HAARTMAN (MS).

Clutch size	1	2	3	4	\bar{x}	n
Number of all clutches	11	8	23	106	3.793	348
Known to be completed	-	3	3	122	3.930	128
		(2.4%)	(2.4%)	(95.2%)		

The normal clutch size is four, which is characteristic of waders. No clutches of five eggs have been found according to the nest-record cards. One completed clutch of two eggs has been found in Rymättylä on 3 August (K. & L. Saari). Laying was commenced on 15 July. It may be a second clutch or a clutch of a one-year-old female (cf. TUCK 1972). Two clutches of three eggs have been found in May and one in July (commenced on 22 June).

3.5. Incubation period

The incubation period (from the last egg laid to the last chick hatched) could be determined on five cards. The results are summarized in Table 4. The time of day of observation is given in brackets where known.

Table 4. Incubation period. (e = eggs)

					Incubation period (estimated)
1 June	1e	8 June	4e	22 June hatch.start.	18 days
(08.10)		(08.00)		(13.18)	
14 May	4e			3 June hatched	20 days
(13.00)					
13 May	4e	2 June	1	3 June all hatched	21 days
(17.30)		(06.30)hatch.	(02.55)		
17 May	2e	22 May	3e	9 June hatch. 1 pull	22 days
(19.10)		(19.00)		(21.20)	
11 May nest		18 May	4e	6 June hatched	22 days
compl.				(16.00)	

3.6. Brood size

The brood size could be studied from 28 cards:

Number of hatched	1	2	3	4
Number of nests	-	3	2	23

$$\bar{x} = 3.7 \quad n = 28$$

3.7. Hatching success

66.2% of the nests hatched at least one young and 33.8% failed (n = 68). Eight nests were deserted (two due to human disturbance) and 15 nests were destroyed. Two nests were destroyed by man (one with forestry activities); the muskrats (Ondatra zibethica) and the hooded crows (Corvus corone cornix) are also suspected for predated two nests each. A horse, a cow and a dog destroyed one nest each, and the causes for five nest failures were not recorded. Excluding total failures 110 (95.7%) eggs

hatched from 115 eggs laid ($n = 30$). Three chicks died within the eggs during the hatching period.

3.8. Productivity

Using MAYFIELD's (1961) method we notice that 23 nests were lost in 803 nest-days' exposure during incubation ($n = 97$). So the mortality rate is $23/803 = 0.03$ and the survival rate 0.97. The incubation period is 20 days, so the probability of survival during incubation is $0.97^{20} = 0.54$, which is multiplied by the average clutch size of 3.930 bearing in mind that 14 clutches were renests or second clutches, so they are calculated twice (see SOIKKELI 1978). Finally we get the productivity of 2.3 young/pair/year.

According to the method by MORGAN & SHORTEN (1974) the average brood size 3.7 is multiplied by the average nesting success (66.2%): $0.662 \times 3.7 = 2.4$ young/pair/year if single-brooded (and would be 4.8 if double-brooded).

4. Discussion

4.1. Breeding season

The breeding season of the Common Snipe is five months in the British Isles, starting from the beginning of March and continuing to the beginning of August (MASON & MACDONALD 1976). In Newfoundland, USA, the breeding season lasts from May till August (TUCK 1972), which is approximately as long as it is in Finland.

TUCK (1972) has not observed the individually marked Wilson's snipes (Gallinago gallinago delicata) laying second clutches. He thinks that late clutches are laid by one-year-old birds, which are nesting for the first time. I have found 10 nests among the nest-record file, which might be replacement clutches according to the dates of finding, and four nests, which might be second clutches or first clutches laid by one-year-old birds, providing the nesting habits of Finnish snipes correspond with those of North America.

4.2. Breeding habitat

MASON & MACDONALD (1976) report that 58% of the nests found are in tussocks in the British Isles (n = 287), which is approximately the same figure as in Finland (61%). In Newfoundland nests have been found in Sphagnum, in hummocks of Myrica gale and in Calamagrostis sp. TUCK (1972) has also observed that most nests were protected by high cover. In Finland two nests were recorded in an open site.

In the British Isles 34.1% of the nests were in a wet pasture, 17.8% in a dry pasture, 30.4% on marshland and 16.2% on moorland (MASON & MACDONALD 1976). Over 50% were found on grassland, the majority in wet sites. In Finland wet habitats are more common.

4.3. Egg-laying interval and clutch size

Eggs are laid daily (von HAARTMAN et al. 1963-72), which is supported by the few recordings in this study.

The average clutch size in the British Isles was 3.89 (n = 284) (MASON & MACDONALD 1976) and 3.8 (n = 76) in North America with the Wilson's snipe (TUCK 1972). In Finland the mean clutch size was little larger: 3.93 eggs. One clutch of six eggs and two clutches of five eggs were reported from the British Isles. In Finland I have not found records of such large clutches.

4.4. Incubation period

The incubation period ranged from 18 to 21 days in the British Isles and the mean was 20 days (n = 8) (MASON & MACDONALD 1976). A similar range in duration has been reported in the United States, which may be due to the stage of laying when the bird begins to incubate (TUCK 1972). According to von HAARTMAN et al. (1963-72) the incubation starts with the third or the fourth (last) egg laid. The incubating period varied from about 18 to 22 days in this study. Generally the female is said to incubate alone, but observations of incubating males have been made in North America (TUCK 1972).

4.5. Nesting success

In the British Isles 138 (59%) of 234 nests hatched at least one young and the productivity was 2.2 young per nest (MASON & MACDONALD 1976). 96 nests were total failures. Predation was the most important cause (the carrion crow Corvus corone corone was the worst one) and trampling by cattle was also significant. Flooding is the greatest hazard to nests in North America according to TUCK (1972). He believes that the snipes' nests are

seldom preyed on. Causes of failure in Finland correspond well with those in the British Isles, except that grazing cattle causes much more damage in Great Britain than it does in Finland and the percentage of deserted nests is greater in Finland. Hatching success is better in this study (66%), but productivity per pair per year is only slightly greater (2.3) in Finland than in Britain.

The annual mortality for the common snipe in Finland is 46.9% (PERTTUNEN MS). We can calculate that 100 adults (50 males and 50 females, if the sex ratio is even) must produce 88.3 fully-fledged juveniles to maintain a stable population. This corresponds to a ratio of 0.883 juveniles per adult or, more precisely, 1.77 juveniles per adult female. The mortality rate in the first month after hatching is 22% for the woodcock (CLAUSAGER 1974). If it is the same for the common snipe, 2.3 young/female/year would maintain a stable population. We have to treat this result with caution, since MASON & MACDONALD (1976) say that the population is declining in the British Isles, although the annual mortality rate is greater than that calculated for Finnish snipes.

Acknowledgements

This study was financed by the FRG delegation of the CIC. Prof. Lars von Haartman kindly placed at my disposal data from the nest-record file of the Finnish Society of Sciences. Lic. Lennart Saari has read the manuscript and checked the language. I wish to express my sincere thanks to all mentioned above, not for-

getting the ornithologists, who have reported the nests to the nest-record file.

Summary

Data of 227 nest-record cards, dating from 1934-78, were analyzed. The breeding season lasts from May to the first half of August. 61% of the nests were found in a tussock. Wet meadows (flooded meadows) and marshlands are the most important habitats. The mean clutch size was 3.93 and the incubation period ranged from about 18 to 22 days. The average brood size was 3.7. 66% of nests hatched at least one young. The causes of failure were predation and desertion. Productivity/pair/year was 2.3 young.

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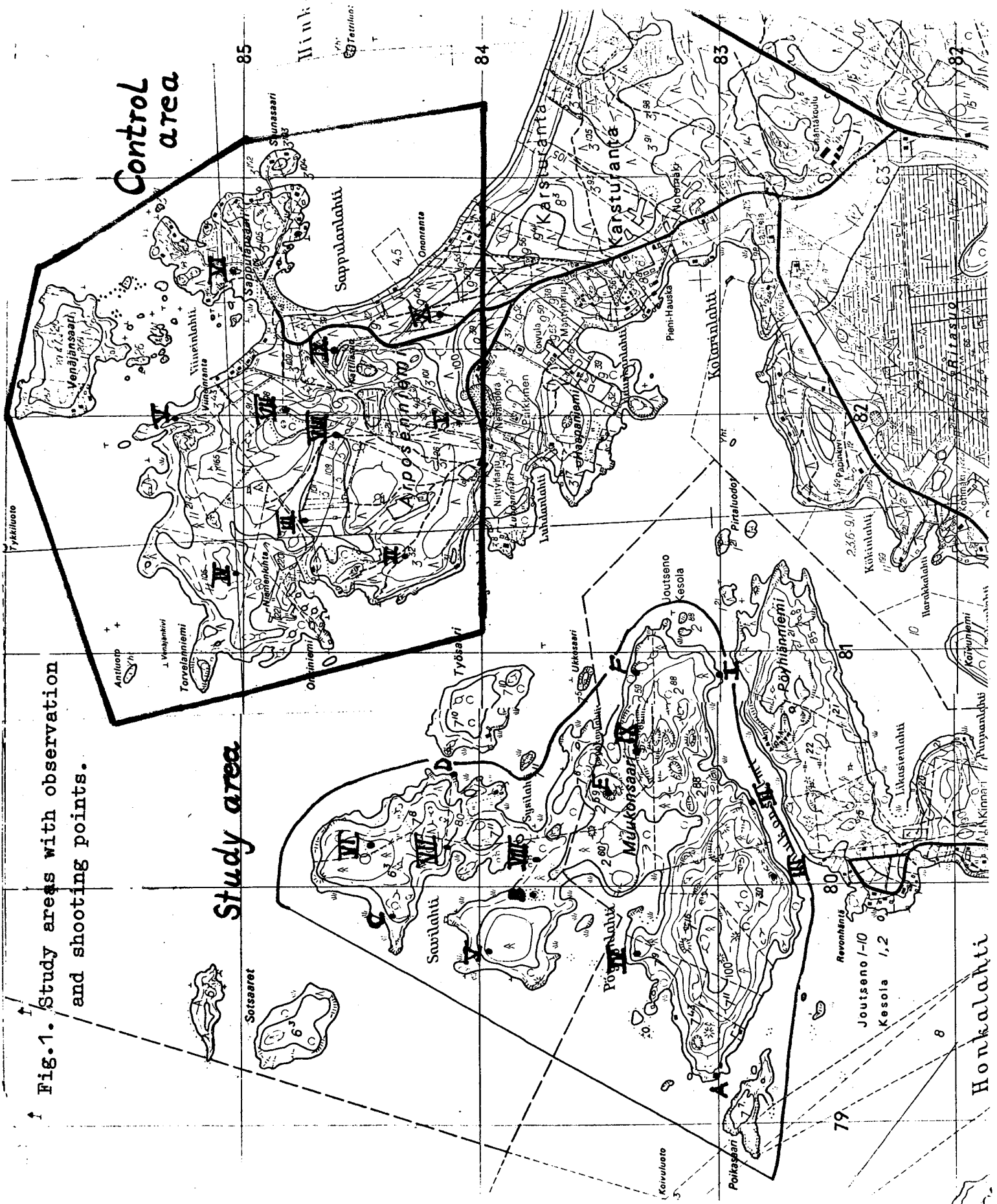
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Fig. 1. Study areas with observation and shooting points.



FRANCE

Charles Fadat

Activity of the Woodcock Department of the National Hunting
Office During the Shooting Season 1979/80

Summary

This paper is a balance sheet of the activities of the French National Hunting Office "Woodcock Department" (= "section BECASSE" de l'OFFICE NATIONAL de la CHASSE - O.N.C. -) during the last shooting season.

The study of the reproduction biology has been prosecuted for the fourth consecutive year in the State Forest of COMPIEGNE (Oise) by means of radiotelemetry.

The study of the migration and wintering modalities has been prosecuted by the instrumentality of analysis of shooting bags: Shooting Indexes of Abundance (= Indices Cynégétiques d'Abondance - I.C.A. -), age-ratio and sex-ratio.

Conclusions

The study of Woodcock's reproduction biology which was carried out at COMPIEGNE, during the spring of 1980, has allowed to specify fundamental points of the activity of males (process of the choice of the display area), but nevertheless we have not had the possibility of proving the relation with the nesting female(s).

Moreover, it was possible to ascertain that the shortage of displaying males, noticed during 1979, had been filled and that, out of COMPIEGNE, indications of a good reproduction had been perceived, allowing to forecast a good density of woodcock at the beginning of the shooting season; the density at the end of the shooting season (late November till February) being more connected with the meteorology and the nesting in Northern Europe, from which we know nothing now.

Data of ringing and the analysis of the shooting bag lead to think that the number of woodcock which visited France was lower than in 1978/79 by about 20%, probably on account of a bad production of young in Middle Europe and in France.

Therefore, shooting was especially done at the expense of the Nordic populations, young females above all, only few adults being taken.

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GREAT BRITAIN

Peter Bickford-Smith

Wintering Woodcock Studies in Cornwall

During the winter season of 1979/80 a Ph.D. student, Peter Lack, was employed to study the Woodcock, Scolopax rusticola, on the Lizard peninsula in west Cornwall. This area is mainly a patchwork of three types; Pasture leys, Calluna/Molinia moorland, some of which have clumps of gorse Ulex europaeus and Salix spp., and areas of rhododendron thickets, some of which have trees as well. There were in addition a few fields containing permanent pasture, a few recently ploughed fields and a few stubble fields.

Methods

Woodcock were caught in mist-nests set at about 20-30 m intervals along a series of rides in the central block of rhododendron thicket. During the study period 16 individuals were caught and ringed, one of which was a retrap from the 1978/79 winter. In addition two of these birds were caught a second time. 17 of these captures were as the birds returned to the coverts at dawn and one was caught in the evening. Also two birds were shot that had been ringed in the previous winter. Eight of the birds were fitted with radio-transmitters. Two of these were additionally fitted with beta-lights attached to the transmitter; and one with a thermistor probe integrated with the transmitter itself. Table 1 summarizes the stay of those birds in the study area.

Table 1. Some data on the eight birds fitted with radio-transmitters

Name	Date of capture	Date last heard	Minimum length of stay (days)	Transmitter days of information		Cause of loss of information
				Diurnal	Nocturnal	
George	13/1	19/2	38	35	33	end of study
Edward	13/1	15/2	34	26	26	migrated
Margaret	13/1	17/2	36	33	30	migrated
Louise	15/1	28/1	13	9	10	predated
Nicola	15/1	17/1	3	3	-	transmitter failure?
Speedy	16/1	19/2	35	30	30	end of study
Rhona	31/1	31/1	1	-	-	migrated?
Stuart	2/2	19/2	18	16	15	end of study

Activity patterns were determined by 'watching' (actually listening) to individual birds for periods of one to five and a half hours at a stretch. A constant signal was taken to indicate a 'roosting' bird, and a variable signal a 'moving' bird. During the course of the study each hour of the day was monitored with two separate birds.

Woodcock in previous winters have been found to have a diet consisting mainly of earthworms. As a result some attempts were

made to assess the relative numbers of worms available in a variety of sites. Worms were sampled by using the formalin method of extraction. Great problems were experienced with this method of sampling due to the waterlogged state of the ground.

Main conclusions

- a) Woodcock in winter in Cornwall are very faithful to both their diurnal and nocturnal sites. They spend the day in areas of thick bushes and the night mainly on pasture fields, although some birds spend some time on moorland.
- b) Woodcock are considerably more active at night than during the day, and the activity is concentrated in three periods, around dusk, midnight and dawn. They are also very active just before leaving the coverts at dusk. How much of these active periods is spent feeding is unknown. They certainly feed just after dusk when they first arrive on the fields, and it seems unlikely that they can survive with only one feeding period per day although they seem to be capable of surviving at least 36 hours even in cold weather, with at most very little food.
- c) The few worms present suggest that they are unlikely to feed in the coverts, on the moorland or in the rides. The fields, especially the leys, do, however, provide quite large amounts of potential food and it may be more available at dusk (and midday) than at midnight or dawn.

d) Some disturbance experiments were performed and these suggest that some traits may be characteristic of individual birds. A beat seems to flush 85-90% of the birds present but successive beats will include a proportion of birds flushed from earlier beats - from the two experiments carried out, this may be about 40%. On an organized shoot, assuming the proportion shot is 50%, the true number of birds present can be estimated by:

Number of rises + 10-15% (for those missed) - 20% (for those recorded twice = half the 40% noted above)

So the number of rises on a shoot provides quite a good indication of the total number of birds present, possibly a slight overestimate.

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John Harradine

Woodcock Production Survey 1979/80

The Woodcock Production Survey in Britain has been running for five seasons now with the overall objectives of determining both the number of immature birds in the adult population of woodcock and their distribution throughout Britain over the winter. The

survey contributes to the Woodcock and Snipe Research Group's work, under the International Waterfowl Research Bureau, which coordinates similar wing collections in several European countries (including Denmark, Sweden, Finland, Italy, France and Ireland). These studies give some insight into the pattern of breeding success and wintering distributions over much of the range of the woodcock, from its main breeding grounds in northern Europe to the main wintering grounds in western and southern Europe.

Recently the value of these wing studies has been re-assessed by the coordinator of the Research Group with the result that more effort is requested from each of the participating countries to obtain as large and as representative a sample of woodcock wings as possible each season. Although our knowledge and understanding of this elusive game-bird is increasing, thanks particularly to detailed studies by the Game Conservancy and researchers in Ireland, there are still many gaps to be filled. Furthermore, one of the difficulties of studying the species is that of obtaining large enough samples to be informative. Since many thousands of woodcock are shot each winter in Britain there is a ready source of material with which to throw light on aspects of their breeding biology and wintering behaviour, which otherwise would not be revealed without very costly and time-consuming research programmes. Hence the value of the wings contributed to the Woodcock Production Survey and the need for more sportsmen to help with this work.

The results for the 1979/80 collection of wings show again some variation in the proportion of immature woodcock among the different regions, with the Midlands/South and Southwest regions showing significantly more juveniles, and Wales significantly fewer, than occurred in the other regions. It should be noted that, for this year's figures, the boundaries of some regions have been altered. Thus the Southwest now includes Avon, Somerset and Dorset, and the East contains all of Cambridgeshire. Despite this alteration the southwest peninsular of England continues to produce relatively more immature woodcock than most other regions. This pattern has shown up for several years now, but whether they congregate there or are simply shot more frequently is still not known.

The number of contributors for 1979/80 was greater than for the previous season (134 and 121, respectively) but the number of wings was lower (1677 compared with 2034). The former result is encouraging and the latter disappointing although the reason probably was the generally mild winter with fewer birds wintering in this country. Several contributors, in fact, commented on the relative scarcity of woodcock and this could explain the smaller bags, particularly from the Midlands/South and Southwest.

The overall proportion of immature birds in the bag was significantly lower than that for 1978/79, implying a less successful breeding season in 1979 than in 1978, but only slightly lower than the five-year average from this survey: 1.0 immature to each adult woodcock, compared with 1.2 over the 1975/76 to 1979/80 period. This variation in the mainland Britain proportion from

The results for the 1979/80 collection of wings show again some variation in the proportion of immature woodcock among the different regions, with the Midlands/South and Southwest regions showing significantly more juveniles, and Wales significantly fewer, than occurred in the other regions. It should be noted that, for this year's figures, the boundaries of some regions have been altered. Thus the Southwest now includes Avon, Somerset and Dorset, and the East contains all of Cambridgeshire. Despite this alteration the southwest peninsular of England continues to produce relatively more immature woodcock than most other regions. This pattern has shown up for several years now, but whether they congregate there or are simply shot more frequently is still not known.

The number of contributors for 1979/80 was greater than for the previous season (134 and 121, respectively) but the number of wings was lower (1677 compared with 2034). The former result is encouraging and the latter disappointing although the reason probably was the generally mild winter with fewer birds wintering in this country. Several contributors, in fact, commented on the relative scarcity of woodcock and this could explain the smaller bags, particularly from the Midlands/South and Southwest.

The overall proportion of immature birds in the bag was significantly lower than that for 1978/79, implying a less successful breeding season in 1979 than in 1978, but only slightly lower than the five-year average from this survey: 1.0 immature to each adult woodcock, compared with 1.2 over the 1975/76 to 1979/80 period. This variation in the mainland Britain proportion from

year to year is slight when results are viewed from across Europe where a clear trend has emerged, from a high proportion of immature birds in northern and southern Europe, to relatively few in the bag of woodcock in Northern Ireland and Eire, where, traditionally so many birds spend the winter.

Once again we would like to thank all the contributors to this Survey, who by now should have received a fuller report on the season's results. Finally we would encourage every member who shoots woodcock to consider helping us in the Survey since the wings tell us much about the birds which only considerably more expensive and complicated research could do better.

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Graham Hiron

Radiotelemetric Studies on Woodcock - Results and Proposal

This year I could continue my studies that started in October 1976. Preliminary results had been published in WSRG Newsletters No. 4 and 5, in the "Annual Review of the Game Conservancy" No. 8, 9 and 10 and in Ibis 1980 (122: 350-354). In 1980 Dr. R.B. Owen of the University of Maine, U.S.A., assisted me, and fortunately plans to do so again in 1981.

1. Recent stage and first results

The aim of this project is to provide comprehensive information on the woodcock's (Scolopax rusticola) breeding biology, population dynamics, food and habitat requirements.

Radio-tracking has shown that male woodcock are successively polygynous. Contrary to earlier thinking they do not defend either an exclusive or specific area to which females are attracted, and in which mating and/or nesting takes place. Instead males display solitarily for up to 1 hour per 24-hour period, over a wide area; some birds have been seen over points 3 km apart in the same evening. When a male finds a receptive female he remains with her constantly (usually 4-5 days) until egg-laying and does not rove any more. After this he again resumes display flights.

There might be differences in the ability of males to locate and mate with females (from none to at least 5 per season among males studied). This can be correlated with differences in individual display performance. Several males exhibited intensive roding, but never were observed copulating.

Females breed in their first year and there is obviously not much difference in roding behaviour of first year and older males. Lost clutches or broods are rapidly replaced, sometimes in as little as 12 days, and some females probably rear two broods per season.

Successful males might return each year to the same breeding area. By contrast females are less site-faithful than males and almost

invariably change breeding localities following an unsuccessful breeding attempt (10 km in one instance) or varying food conditions.

Forty-five percent of woodcock nests studied so far have been lost to predators, but the factors affecting the survival of chicks have not yet been quantified, although very young broods have been shown to be vulnerable to prolonged spells of inclement weather. Little is known at present of the diet of chicks but this is being studied by collecting faeces produced by broods accompanied by radio-tagged females.

Over 90% of woodcock stomachs examined in winter contain earthworms. At this season woodcock adopt a regular pattern of behaviour, spending the day in thick cover (where no feeding occurs) and flying out at dusk to pasture fields (up to 2 km away). This contrasts with their behaviour in summer when all feeding takes place by day within woodland. The distribution of woodcock within the breeding habitat seems to correspond with the abundance of earthworms and nests are invariably located close to good feeding areas. Areas with trees such as Ash and Sycamore are much preferred to other broad-leaved trees, and broad-leaved trees are preferred to conifers. The soil and habitat properties which affect the distribution of worms need to be further quantified before the main factors determining good woodcock habitat can be ranked in order of importance. The present study has shown these to be cover type, soil drainage and food supply, but it is likely that their order of importance alters with season.

2. Proposal for 1981

Now that the basic elements in the breeding biology of this species have been determined it is appropriate to turn attention to the implications for management of the species, remembering that management, and in particular habitat manipulation, will only be successful if it is based on sound scientific knowledge.

About 50 male roding woodcock have been marked in the past three years and the display performance of most of these, and their success in locating mates, have been monitored by the use of sophisticated techniques of radio-telemetry. Since some males seem to be more successful at finding females than others, we propose to remove the most successful males to see how this affects the subsequent display behaviour of the remaining males, and also their success in locating females.

This experiment is important from a practical standpoint because, until recently, spring shooting of displaying male woodcock has been widespread in Europe. Though several studies let assume a considerable surplus of males, the population consequences of shooting roding males have not been studied, although it is clear that this is essential before ecologically sensible and realistic conservation strategies can be adopted for those species with these unusual mating systems. It is possible that limited selective shooting of males of species which exhibit pronounced polygyny such as woodcock, is a reasonable method of harvesting without harming the reproductive success of the population. However, more data are required to sufficiently answer this question.

Dr. Graham Hirons, The Game Conservancy,
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NORWAY

Arne Krafft

Data on the Breeding Biology of a One-Year-Old Woodcock Hen
(Scolopax rusticola)

On 22 June 1961 we found a woodcock hen followed by 3 chicks in the Hurdal study area in Akershus County, Norway. The chicks were caught and marked with wing tags. The young were estimated to be about 5 days old. One of these chicks was recovered on 10 July 1962 in the Hurdal study area, about 1,800 metres from the banding place. This bird, which now was 13 months old, was found incubating 4 eggs, 3 of which were "pipped" eggs (highly incubated). The hen was located with the help of a pointing dog and caught with a hand net. After the inscription on the wing tag was examined the hen was released near its nest.

The hen was recovered on 13 July 1962 and was now followed by four newly-hatched chicks (about one day old). The female with its young were found close together about 20 metres from the nest. All the chicks were now marked with wing tags to assist in following family movements.

The same brood was recovered on 21 July 1962 about 70 - 100 metres from the nest site. The four chicks, which were 9 days old, were caught and the wing tags were controlled before they were released again.

This observation supports the assumption that the woodcock female may be sexually mature in the first breeding season after hatching and is then capable to produce and raise a normally sized brood of four chicks.

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RUMANIA

Mircea Matieş and Dr. Dan Munteanu

Woodcock in Rumania

As international representatives of Rumania for the study of Woodcock (Scolopax rusticola), the authors have provided in the last few years various scientific information for I.W.R.B, Woodcock and Snipe Research Group. An abstract of the reported data will be made in the following.

1. Research

Several papers issued in the last years - indicated in the annexed literature - present new aspects concerning the biology of the woodcock migrating or even breeding in Rumania. As can be seen from their titles the papers refer particularly to woodcock's migration and food. As a matter of fact, an extensive monographic work is going to be printed this year (Matieş - Munteanu, 1979).

The collaborators of the Rumanian Ornithological Centre (Bucharest) made a minimum number of marks not exceeding the figure of 10 woodcock captured in nets for scientific purposes; recaptures of these very few ringed and released specimens have not been reported. Nor have specimens marked abroad been recovered on the Rumanian territory; however, some woodcock passages have been ascertained in our country, too (Matieş - Munteanu, 1977) on the basis of ringing carried out abroad

(ringed in the Baltic countries and Scandinavia; recoveries southward of Rumania, in the wintering Mediterranean areas of Greece and Turkey).

No investigation was performed in our country in order to ascertain woodcock's "subspecies", which the hunters categorize as: "small" (russet) and "big" (brown), appearing in passage at different periods; the "short-bill" woodcock (Scolopax rusticola "brevirostris") has not been identified in Rumania as yet.

Studies on woodcock's parasites (Mallophaga) have been carried out at the University of Cluj (I. BECHET).

Some research on habitat is carried out in Rumania. The woodcock breeds in mixed forests, usually dense trees interfered with rich bushes, grassy vegetation, felled trees etc. but also with glades, clearings etc.; the few nests known were located in mixed (coniferous and broad-leaved) woods as well as in beech forests. Breeding birds prefer riverside woods and generally the ground with humid loose soil. During migration the birds usually make halts in comparatively dense forests of abundant young trees (in autumn often in groves and river meadows), also in plantations (poplar etc.), among tree bunches and thickets on open fields (hayfields, agricultural crops, high pastures etc.), in areas of humid soil or, sometimes, near swamps and marshes; very seldom even in the grassy vegetation of sandy sea-shores, during winter, accidentally, in boggy or even marshy grounds with various bushes, alders, osiers etc., but also in forests. We point out that, according to KISS' (1977) investigations in the

Danube Delta, migratory woodcock were usually found on soil in recent plantations and especially in hybrid-poplar plantations.

Pesticides are used on a small scale for protecting forest and the noxious effect of this practice on the woodcock was not yet examined in Rumania.

The investigations of woodcock's food through examining stomach contents have been carried out in our country especially in the last decade and the results are reported in the papers of KISS and STERBETZ (1973-1975).

No extensive research was made in Rumania regarding woodcock's mating behaviour and reproductive success. It is known, however, that woodcock sporadically breed in the area of the Carpathian Mountains (between 700 and 1,700 meters high), very rarely in hilly regions and quite exceptionally in plain forests (e.g. Jibou, Sălaj District, Plătărești, Ilfov District etc.).

2. Harvesting

In Rumania the woodcock is hunted particularly in groves, meadow woods and plain or hill forests by 600-800 hunters at the most, out of over 60,000 hunters existing in our country. Therefore, it has not become a popular game in our country. The woodcock is not imported, exported or sold in the market.

The legal period of woodcock hunting is, in our opinion, too long, beginning on 1 September and ending on 30 April; consequently, hunting may be performed not only in the migration

(and wintering) periods, but also at the beginning of incubation (especially in the hilly regions). The woodcock is usually hunted during evening (or morning) flights in passage and roding areas (particularly in Transylvania), but also by beating up in woods and rarely by using dogs. Trapping the woodcock by nets or hooks is neither known nor practised in Rumania.

Systematic data (statistics) about the number of woodcock hunted yearly do not exist in our country. Only isolated data are available, e.g. those listed in the hunting record (diary) of General GEORGE MANU (1875-1955) printed by N. CRISTOVEANU (1975). Between 1895 and 1948 the General shot 2,146 woodcock, at the least 2 specimens during a cynegetic season (1948-1949), at the most 164 specimens (during the season 1939-1940, when the European woodcock population was to the greatest extent attracted in the direction of wintering areas of SE Europe as a consequence of the abundant - even excessive - precipitations fallen there during those months). Today, due to the general diminution of the number of woodcock, a passionate hunter is scarcely able to shoot more than 20-40 birds during one season.

3. Migration

Woodcock identified in Rumania between 1894 and 1975 (on the basis of personal and reported observations), according to geographical units as well as to seasons, months and even half decades, allowed us to draw migration patterns. Hence, it has been ascertained that autumn migration of woodcock to Rumania

begins in the northern part of the country between 21-29 September, reaches its climax in the period of 20-31 October and ends almost completely in the southern and western part of the country on 1-7 December. Spring passage begins in South and East between 26 February - 3 March, culminates in the period of 25 March - 7 April and comes to an end in the northern extreme of the Carpathians between 27 April - 1 May.

Details on the development of woodcock passage to Rumania are thoroughly presented in our synthesis paper and the maps attached to it (MATIEȘ-MUNTEANU, 1979, in print).

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Literature mentioned in this paper will be reviewed in the next Newsletter (Editor)

SPAIN

Francisco J. Purroy

Some Aspects of Woodcock in Spain

The surveys and observations carried out by A. Vizoso, M. Shorten and the Spanish Society of Ornithology have allowed a distribution map of the woodcocks breeding in Spain. The presence of a population at the Cantabrian and Pyrenean mountains has been known for years. In addition, isolated nesting nuclei have been found in several inland mountains (Demanda, Moncayo and Albarracín). The improvement of the ornithological investigation, still not finished due to the low number of bird watchers and to the secret habits of the species, indicates that Scolopax breeds in 58 Spanish places. This situation was reported in Ardeola (1978), vol. 24, 219-227.

An estimate of the woodcock shot in Mallorca island during the season 1978-79 has been carried out in collaboration with ICONA (Ministry of Agriculture). The number of specimens shot was estimated at 7,860. This number was obtained using data given by the gamekeepers of each town in each geographical sector (see Fig. 1). The distribution of the annual bags by geographical sectors is also shown in the map.

The Western Pyrenees, the Cantabrian coast and the Balearic islands suffer the highest hunting pressure. In these regions there is a shortage of sedentary species of small game. In the

remaining regions of the country, woodcocks are scarcely shot, in 1976-77 only 118 were reported, 39 in social hunting reserves (668,757 ha) and 79 in 22 areas of controlled hunting (81,386 ha). In the province of León for example there are only two hunters specialized in woodcock shooting. It must be pointed out that 54.6 % of the surface of this province (1,426,900 ha) is woodlands.

The data collected indicate that some parts of Spain play an important role as wintering area providing a quiet stay to the European migrating birds.

The winter season in 1978-79 was considered to be unusually rich and rather poor in 1979-80. The Spanish laws allow woodcock hunting from the second Sunday of October to the first Sunday of February (peninsular territory). Exceptionally, it is allowed in Asturias, Santander, Guipuzcoa, Alava and Navarra until March (first Sunday). On the Balearic islands the woodcock hunting periods are as follows: On Mallorca and Minorca from September (4th Sunday) to January (4th Sunday). On Ibiza and Formentera from September (1st Sunday) to January (1st Sunday). The woodcock is fully protected at the Canary islands.

Habitats of wintering woodcocks have been investigated. There are significant differences among the places surveyed specially, with regard to plant species and vegetation structure.

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León - Spain

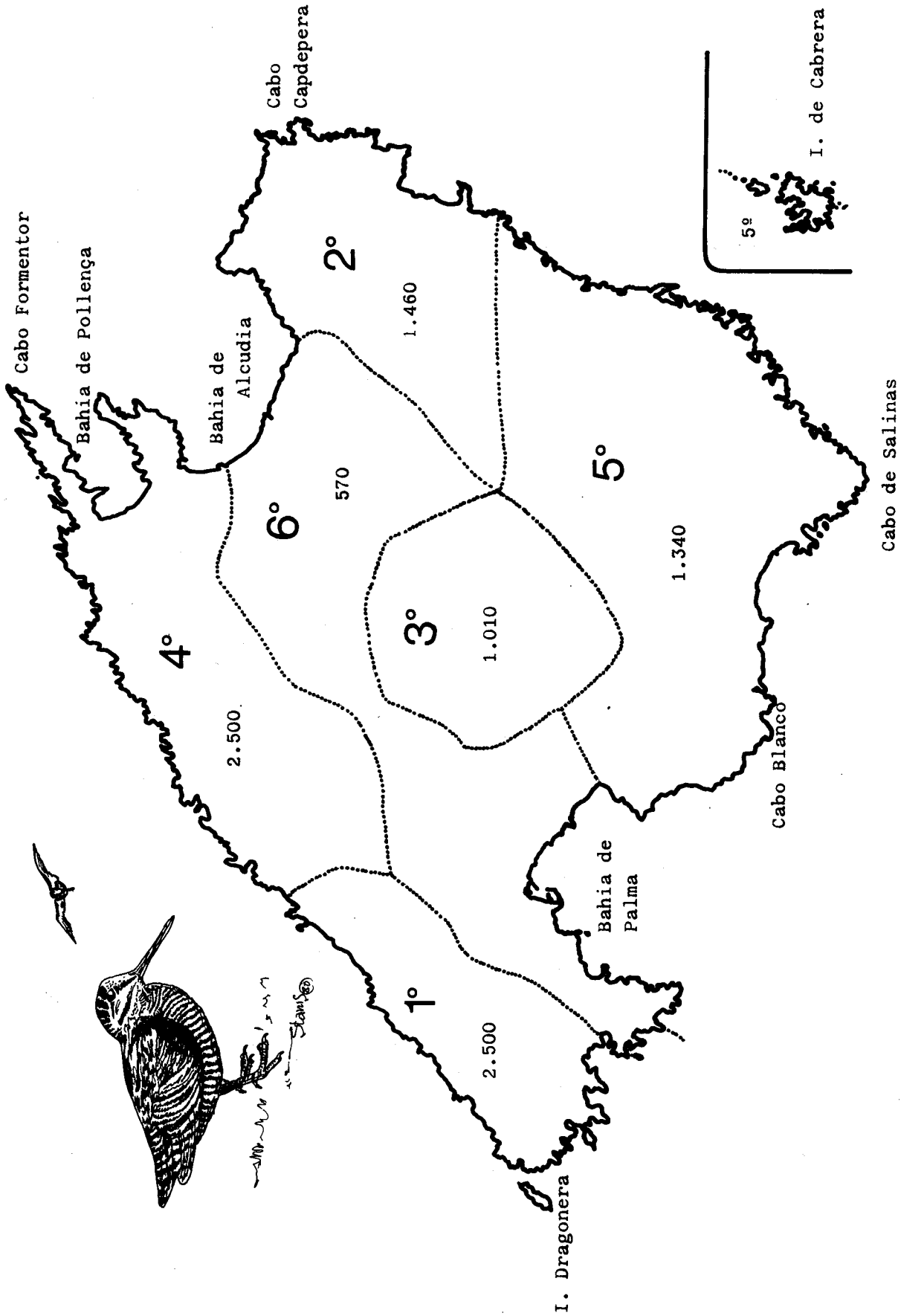


Fig. 1. Kill statistics of woodcock on the island of Mallorca, Spain.

SWEDEN

Vidar Mareström

Removal of Roding Woodcock

Introduction

Woodcock roding occurs in Sweden from the species' arrival in spring until the latter half of July. In southern Sweden, to which woodcock usually return towards the end of March, roding therefore continues for almost 4 months. In the north, the period is shorter, although some males may still be seen roding in the beginning of August. Roding activity varies considerably from week to week and from one evening to the next. Weather has been shown to influence the intensity of roding, but other factors are probably involved, too. It has earlier been suggested that roding in central and northern Sweden peaks in early spring and later in the summer, which might indicate the production of two broods a year. Our studies have not confirmed the occurrence of two peaks in roding activity in central Sweden. There is a successive increase in the number of observed birds over a certain area during the first part of the roding period and a gradual decrease during the last weeks.

Methods

To provide extensive information on roding, its intensity has been recorded in several areas over a number of years, and the effect on local roding by removing the males has been investigated. One removal experiment was conducted in several thousand

hectares of continuous woodland in central Sweden between 11th May and 24th June 1975.

The number of flights over a small clearing was counted for several evenings. In later evenings, some or all of the passing birds were shot. Counting and simultaneous shooting of the roding males was repeated at short intervals, which were not always the same number of days because the experiment depended on voluntary assistance. On several occasions, all roding was also recorded at two control clearings, 500 m and 2,600 m from the experimental site.

Results

A total of 27 roding woodcock, all males, including 1st-year and older birds, were shot during the experimental period, and two more may have been killed but were not recovered. There was an obvious reduction in roding at the first day of removal, but little further decrease despite the continued removal of the males (Fig. 1, Table 1). Very little activity was found in early June, but on the 15th and 24th of June respectively, 5 and 6 males were roding. In the 500 m distant control areas there were almost identical changes in roding intensity, with a marked reduction at the time of the first shooting. On the other hand, the few observations at the 2,600 m distant control indicated no marked changes in roding there. The number of active males there fluctuated in the way one usually finds at roding sites and in the shooting area as well.

Discussion

The marked decrease in roding flights after the first removal day suggests that some male woodcock were flying more than once per evening over the same area which led to an overestimate in our first counts. Some males may have more extended ranges, as G. Hirons has found in England with its smaller areas of continuous woodland. Our earlier observations also indicate that some woodcock can cover considerable areas in extensive woodland, with some birds flying in the same direction for several kilometers. If birds sometimes fly more than once per evening over the same area, the marked variation between evenings in the number of observed flights may in part reflect changes in the duration of each individual's flight. The number of males involved may also vary from time to time. However, the fact that so many roding males could be removed within a small area without further decrease in the number of roding flights suggest that there may have been even more males in the area than was at first suspected. Other field data support this contention.

Conclusions

1. First-year woodcock as well as older birds take part in roding activity.

Table 1. Number of roding flights and number of shot woodcock over a research area (175 x 50 metres) in central Sweden and number of flights observed or heard over a control area 2,600 metres away.

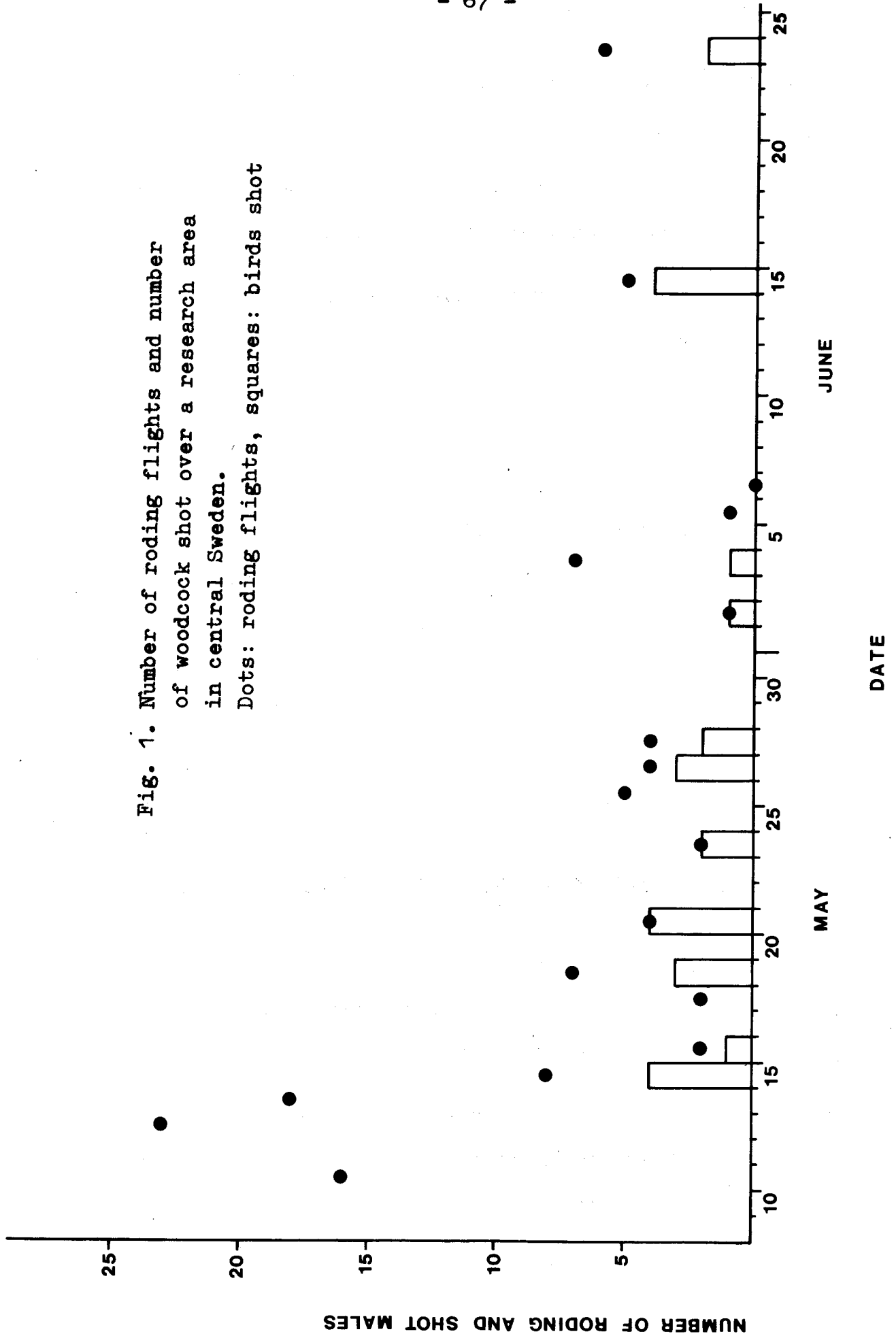
Table 1.

<u>Research area</u>			<u>Control area</u>
Date	Number passing	Number shot	Number passing (and heard)
11 May	16	-	7 + (5)
13 "	23	-	
14 "	18	-	
15 "	8	4	
16 "	2	1	
18 "	2	-	5 + (2)
19 "	7	3	
21 "	4	4	
24 "	2	2	12 + (8)
26 "	5	-	
27 "	4	3	
28 "	4	2	
2 June	1	1	
4 "	7	1	10 + (6)
6 "	1	-	
7 "	0	-	8 + (3)
15 "	5	4	7 + (4)
24 "	6	<u>2</u>	

27

2. As shown in our experiments at the beginning of the 1970s, male woodcock appear not to defend a territory but to make courting flights over large areas, with a degree of competition in any one area.

Fig. 1. Number of roding flights and number of woodcock shot over a research area in central Sweden.
Dots: roding flights, squares: birds shot



3. When males in a particular area are removed, others seem to take over.
4. The number of male woodcock in some woodland areas is probably greater than has been previously suggested.
5. Within continuous woodland, some males probably have larger ranges than others.

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Pal Máriássy

Some notes on woodcock spring migration and roding 1979

After a very hard and long winter this spring the thaw came suddenly to Scandinavia and the first birds were observed on March 12 in Åland and also other places in Sweden.

This early arrival also resulted in the first brood being more full-grown and ready than usual, when the open season on woodcock started on July 1 in Sweden.

In Åland the open season is from May 1 to 25 and the shooting is done exclusively during the evening (and sometimes also morning) roding. The total bag of Åland is around 100 birds each year and this year was - compared to 1978 - a better year, more birds were seen and shot. Of the total bag only 1% were females.

Sweden, on the other hand, showed less roding birds than last year, which might have been caused by the very unsteady weather. After a very dry June the first weeks of July were poor for the not too numerous woodcock hunters, and when it started raining again in July the roding was almost over.

The most interesting feature of this season was that young birds from the first brood already took part in the July roding. A game-keeper from a nearby estate, who is a very keen naturalist and observer, shot 4 woodcock on July 14 and again 3 woodcock on July 15. Two of these birds of each evening he thought were young male birds from this year's first brood. He said that these young birds were covered with a fly (*Ornithomia avicularia* - belonging to the Pupipara), which is usually only found on very young birds, such as young pigeon, song birds etc., but never affects adult birds. Besides, these young cock birds had a somewhat lighter colour and the pin feather and outer wing markings all pointed to very young specimen. The birds did not croak as adults do during roding.

Pal Máriássy

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Bibliography

The following papers and book have been read since the last Newsletter:

- Berlich, H.D. (1979): Topographie und Anatomie des Verdauungstraktes der Waldschnepfe (*Scolopax rusticola*). Schriften Arbeitskreis Wildbiologie Universität Gießen (German with English summary).
Detailed investigation of 106 woodcock intestines. Gross anatomy and topography of guts, microscopic anatomy of the organs of the digestive tract.
- Fadat, Ch.; Y. Ferrand; J. Martinel (1979): Etude Préliminaire du Régime Alimentaire de la Bécasse, à partir des Analyses de Contenus Stomacaux prélevés en France (some data of the feeding of the woodcock in France, derived from stomach analyses). Bull. Mensuel Office Nat. de la Chasse No. 27; 26-33. (French, no English Summary).
Analysis of 286 stomachs of woodcock taken in several parts of France during the hunting seasons (October - March) of 1976-78 let assume sexual differences in feeding behaviour. Females tended to stay in lowlands and feed preferably Larvae and Myriapods on moist soil, what might be in consense with their longer beak and possibly higher protein requirements.
- Fog, J. (1978): Studies in Migration and Mortality of Common Snipe (*Gallinago gallinago*) Ringed in Denmark. Danish Rev. Game Biol. 11/1, 12 pp.
Evaluation of snipes ringed in Denmark. Of 660 birds ringed at Vejlerne 6.8% were reported dead and 2.9% were retrapped. Trapping data revealed a migration period from August 20 till the end of November, limited by the first frost. Spring migration is much less pronounced and might occur from mid-March to mid-April. Distribution maps of those and other Danish recoveries (209) over

Europe. Mortality calculations from altogether 4,348 snipes ringed in Denmark and discussion of results of other countries (England, Belgium, North America): about 7% are reported shot, adult mortality around 50%, no significant variation in mortality during the last decades. Population equation requires 3 young per pair under the assumption of 67% of mortality in the first year.

Fraguglione, D. (1979): Les Bécasses A Bec Court. La Mordorée No. 132, 32 pp. (French, no English Summary).

Summary of all (70) known reports of woodcock with a short bill (30-56 mm) of 8 European countries. Since neither accidental trauma nor embryonic disturbance by e.g. intoxication of pesticides could be proved having caused the short bill, the author (and other authorities) assume "accidental mutation" as the most likely explanation. This hypothesis is supported by the fact that several short-billed birds were taken in a small area at the same time.

Hemery, G., G. Jarry, A. Le Toquin and P. Nicolan-Guillaumet (1978): Etude Préliminaire des Populations de Bécasses des Bois (*Scolopax rusticola*) Migratrices et Hivernantes en France. Bull. Mensuel Office Nat. de la Chasse No. 27: 5-34. (French, no English summary).

Preliminary results of an investigation of the woodcock harvested and evaluation of ringed birds recovered in France. Regional evaluation of 7 zones (Departments lumped) suggest some movements along the French coast, where the highest concentrations of woodcock occur. From the distribution of recoveries of birds banded abroad the authors derive a distinct preponderance of European woodcock populations to winter in certain areas of France. This contrasts, however, with other evaluations that detected a broad geographical (and annual?) variation of migration (ref.). The total bag of 1974/75 was estimated between one and two million woodcock, with some

correlation to the number of ringed birds reported from the seven zones (200,000 to 400,000 birds shot for one ring reported). From their data the authors derive a higher hunting pressure in France than in other parts of Europe. First attempts to evaluate ecological data of habitats preferred by migrating and wintering woodcock.

Hirons, G. (1980): The Significance of Roding by Woodcock: An Alternative Explanation based on Observations of Marked Birds. *Ibis* 122: 350-354.

Detailed radiotelemetric studies could not support the former hypothesis that roding is just territorial behaviour. Obviously several males overfly certain areas in search of females. Aggressive interactions occur frequently. Males are probably successively polygynous, spending only a short time with the female, but do not take part in incubation and rearing of young. One male certainly spent some time with two different females. During breeding season females flew seldom.

Kalchreuter, H. (1979): *Die Waldschnepfe*. 158 pp. Hoffmann-Verlag, Mainz.

A monography of the European woodcock based on a search of literature. Aspects of the American woodcock are included. Special attention is given to migration, history of European populations, breeding biology, population dynamics (natality, mortality) and the impact of hunting. Suggestions are given for habitat management and further research.

An English edition is in preparation.

Mareström, V. and F. Sundgren (1977): On the Reproduction of the European Woodcock. *Viltrevy* 10,2: 27-40.

33 Swedish woodcock nests were situated rather in deciduous and mixed woodland than in pure coniferous forests. Clutch was 4 (31 cases), 5 (1) and 2 (1). Mean egg-laying interval in two nests studied was 1.5 days, incubation period 20-22 days. Some clutches were hatched

in an incubator and the chicks raised in captivity. Some of the older chicks tended to feed the younger ones. 1.5-month-old chicks had approached adult size already.

Matieș, M. and D. Munteanu (1979): La dynamique saisonnière de la Bécasse des bois (*Scolopax rusticola*) en Roumanie. Travaux Mus. Hist. Nat. Grigore Antipa, Bucharest, 20: 455-478 (French, no English summary).

Evaluation of 31,825 registrations of woodcock from 1894 to 1975, 76% originating from spring, 23% from fall.

The autumn passage lasts about 70 days and peaks between 20 and 31 October, the respective data from spring are 65 days with peak between 25 March and 7 April. In winter and summer woodcock occur only rarely in Rumania. Some breed in the Carpathians (May, June) but are only occasionally observed (breeding?) on the plains (April).

During migration large numbers of woodcock may concentrate in areas of heavy rainfall.