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ACKNOWLEDGEMENTS

We should like to thank all those who have helped the Group in so many ways during 1971.

Foremost, we are very grateful to the National Trust: Wicken Fen Local Committee for continuing to allow us facilities on the Fen for ringing. Their waiving of access and camping restrictions has made the Group's operations far more comfortable and successful. The National Trust also tangibly supported the Group by reimbursing the cost of all rings used during the year. The Secretaries, Dr. John Smart and Dr. S. Max Walters, have been unfailingly helpful; the Warden, Lt. Col. C.E. Mitchell, has constantly assisted and encouraged us.

Once again we are extremely grateful to Dr. E.A.R. Ennion for drawing the cover design. We would also like to thank P.E. Merrin and M.J. Everett for the line drawings, so generously provided at very short notice.

Editor: C. J. Bibby

Wicken Fen Group Report No.3 1971

INTRODUCTION

For yet another year, the Group has excelled its previous records. Parties were on the Reed Bed every weekend from April to mid-October. In addition, four weekends were completed at the North end of the Fen, and three extra weeks were filled in on the Reed Bed. This involved a total of some 6,800 man hours from 41 people. As before, the major effort fell on a small number of people, though the keen nucleus has expanded. 16 individuals (5 A permits, 1 C and 10 trainees) spent over 200 hours in the field.

The large effort did not catch as many birds as had been hoped; indeed it was only a large number of Swallows which increased the annual ringing total to 4,308 birds, compared with 3,231 in 1970. Some catches were disappointing, particularly in late July, when a team of undergraduates spent a week on the site. Wet and cold weather during much of June may have lowered the breeding success of many species. Not all species were low in numbers however. Kingfishers and Redpolls go from strength to strength with ringing totals in the last three years of 2,7,17 and 50, 106 and 140 respectively. Seven species ringed for the first time included three of some rarity on the Fen; Coal Tit, Great Reed Warbler and Lesser Spotted Woodpecker. The first two might not have been recorded at all if they had not appeared in the nets!

To the considerable disappointment of some, no flocks of moulting juvenile Tree Sparrows were located in August, so it was not possible to improve on last year's findings. Moult cards were however completed for 158 birds of 26 species. The autumn produced the alternative benefit of large Swallow and Reed Bunting roosts on the Reed Bed, which resulted in plenty of birds for trainee members to ring.

New developments in the field have been limited, with the main priority being the execution of as full routine coverage as possible. An increased effort to find nests was not rewarded with much success. The only Reed Warbler's nest found, contained a Cuckoo's egg which hatched successfully, and only a single brood of Sedge Warblers was ringed. A small programme of temperature measurement was conducted and is reported later in this Report The incidence of ticks and a mite infestation known as grotty leg was recorded, but both were found to be uncommon.

This Report is much in line with the earlier two, but there are some very encouraging signs. More individuals have contributed than in previous years and the contents are more varied as a result. With the material collected in the last four summers, it is apparent that each extra year produces disproportionately more information. There are already a great many species and topics on which we have enough data to produce a worthwhile analysis. In the case of the Reed and Sedge

Warblers there is so much information that analysis of such things as weight variation or activity patterns is already daunting. It is hoped that more sophisticated data processing might replace our present back of envelope methods. Even the straightforward copying of the field information onto species schedules is proving to be an increasingly arduous process.

Early in the pages of this Report is a review of the benefit of a co-operative enquiry of the kind that is conducted at Wicken. It is hoped that, satisfying though our development has been, it will not rest where it now lies. It is now possible to concentrate an immense amount of manpower on the Fen and some important ornithological development should not be far ahead of us.

In one of its more relaxed moments, the Group was able to field a cricket team, which just beat a touring eleven (actually rather less) from the BTO. It is hoped that whatever else the Group can do in the future, it will continue to prove enjoyable.

SOME NOTES ON SELECTED SPECIES

As in previous years, a few of the more interesting observations of birds during the ringing operations are reproduced here. These are selected primarily if they add to or differ from the statements made by Easy and Kirtland in the *Birds of Wicken Fen* and the observations published in previous Reports of the Group.The small number of records of migratory waders are not included, as they were much as in previous years, and it may be worth collecting observations for a few more years during the development of the Charles Raven Marshland Reserve.

All records below refer to the part of South Adventurers' Fen in the vicinity of the main bird catching area of the Reed Bed unless stated otherwise.

Shag Single immature seen frequently from Sep 5th to Oct 9th.
Bittern Single seen on 7 occasions from Apr 3rd to 15th; on one occasion, it was seen leaving a net.
Goldeneye 2 on Apr 4th.
Shelduck 2 on May 16th.
Sparrow Hawk One on Aug 27th and 28th
Marsh Harrier Single adult females on six dates from Apr 9th to May 22nd and also on Aug 27th and Sep 10th.
Water Rail Singles heard throughout the summer. Three young ones were seen on Jun 26th, feeding on the trampled area of a net site.
Common Tern One flew South on Apr 30th.
Long-eared Owl One caught on Apr 2nd.
Short-eared Owl Singles seen on six dates from Apr 2nd to May 5th.
Kingfisher The totals caught anually since 1968 have been 0,2,7,& 17 respectively, which constitutes a remarkable increase.
Lesser Spotted Woodpecker One seen on Sep 12th and caught on Sep 18th.
Coal Tit Single juveniles caught on Jun 27th, Jul 10th, Sep 6th and Sep 26th are our second to fifth records of a bird not mentioned by Easy and Kirtland.

Wheatear Singles on four days between Apr 16th and 30th and Aug 13th and 21st and two on Sep 4th, all on the fields of Priory Farm.
Redstart One on May 1st.
Great Reed Warbler One on May 21st and 22nd. A note on this follows.
Brambling At least 250 present on Apr 4th. This was presumably a migratory occurrence in view of the recapture of one at Heligoland a fortnight later.

Great Reed Warbler (Acrocephalus arundinaceus)

On the evening of Friday May 21st shortly after the weekend party had finished putting up the nets on the Reed Bed, and during the final round in the dusk a very large acrocephalus warbler was taken from a 60 foot net at the top of the ride on the southern edge of the reedfield. It was immediately apparent to those emptying the nets that the bird was new to the Group, and back at base, by the light of torches in the gathering gloom it was identified as a Great Reed Warbler. Full examination and measurement was postponed until dawn (0500 hrs.) on the following day, when a full description was taken of the bird in the hand. Until then it was roosted overnight.

With the assistance of Kevin Baker the following description was taken on the morning of Saturday May 22nd:

Measurements	Wing formula	
wing : 98 mm	wing point : 3rd	Emarginated: 3rd primary only. Notch on inner web of 2nd primary 16mm from tip, falling between 6th & 7th. No notch on inner web 3rd. 1st primary minute, ½ p.c.
tail : 80 mm	2nd : 2mm shorter	
bill : to skull : 23 mm	4th : 3mm shorter	
to feathering: 15mm	5th : 6mm shorter	
tarsus : 30 mm	6th : 10mm shorter	
weight: 34.8g	7th : 13mm shorter	
	10th : 24mm shorter	

The general impression in the hand was of a very large Reed Warbler (Acrocephalus scirpaceus), with brown upper parts and orange-buff flanks and underwing coverts. The underparts were whitish, with a streaked appearance on the throat arising from the darker shafts of the throat feathers. The supercilium was pale and the lores dark. The remiges and rectrices were extremely worn, but some white tips to the remiges were still partly visible. The tertials and secondaries had a buffish suffusion and the tips of the scapulars and rump were also

rusty-buff. The tail was markedly rounded. On the bill the upper mandible was very dark brown, and the lower pinkish with a dark brown tip. The bird had strong dark rictal bristles. The legs were brownish-grey with a light grey tarsal joint. The mouth was bright orange-red in colour and the iris a dull olive. From the evidence of the rusty-buff suffusion on the tertials and secondaries, and from the presence of some white tips to the remiges, the bird was aged first year (5).

During the examination it was noted that the claws were extremely sharp, particularly when the bird made an occasional violent struggling movement, usually accompanied by a gutteral croak. Apart from such brief outbursts the bird was quiet in the hand.

On release it flew with a fast direct low flight to a nearby bramble bush uttering a deep *Chack* as it did so.Subsequently it was heard and seen giving a deep gutteral croak in the bushes at the edge of Harrison's Drove, a sound at first mistaken by the writer for a frog.

The bird was subsequently retrapped on two further occasions during the day in nets adjacent to that of its first capture. It was reweighed at 1600 hours, when its weight had dropped to 29.5 gms.
It was not heard to sing at all during the weekend although the area was continuously visited by those taking birds out of the nets, and was not subsequently seen in the area.

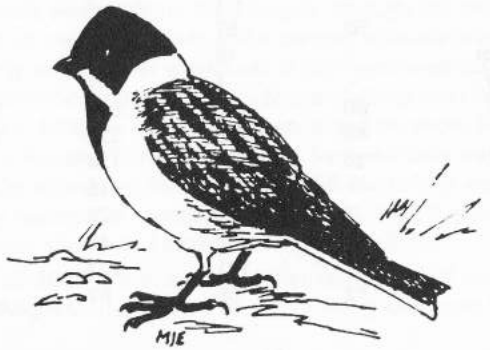
RECOVERIES

There follows a list of all recoveries and controls of over 8km distant notified by the ringing office since the last report.
The Group has now received notification of five overseas recoveries, four of which are included here. The Whitethroat from Morocco is the most distant recovery to date for the Group. The catching of a Brambling on Heligoland only fourteen days after ringing is interesting as it was part of an unusual spring gathering on the Fen. The five Reed Warbler returns reflect movements of a local nature in Cambridgeshire further exchanges with birds from Hertfordshire colonies, and one surprising movement of a bird ringed during the previous years' autumn passage in Somerset. It is interesting that during four years' ringing,totals of 1190 Reed and 1038 Sedge Warblers have been ringed and while there have been nine controls of Reed Warblers, not one Sedge Warbler has been controlled or recovered.

Key to symbols and terms

3 – bird ringed in the calendar year of hatching
4 – bird ringed in the year following hatching or later
5 – bird ringed in the calendar year following hatching
m – male
f – female
v – controlled (caught alive and released)
x – recovered (found dead)

Swallow	JB99823	3	9. 8.71	The Calf of Man	
		v	25. 9.71	WF	390km SE
Great Tit	BH54736	3m	19. 9.70	WF	
		v	26. 9.70	Cambridge	16km SW
	BH54642	3	18. 7.70	WF	
		v	26.11.70	Histon	13km WSW
Blackbird	CP64251	3f	19.10.69	WF	
		x	- .3. .71	Detmold (Germany)	580km E
Song Thrush	CN57547	3	24. 7.70	Coton	
		v	11. 6.71	WF	19km NE
Robin	HV23708	4	17. 5.70	WF	
		x	27. 2.71	March	28km NW
Reed Warbler	HV23856	4	16. 5.70	WF	
		v	5. 5.71	Rickmansworth (Herts)	91km SW
	HN08203	3	21. 8.68	Tring (Herts)	
		v	19. 6.71	WF	82km NE
	HV96180	4	4. 8.70	Milton	
		v	22. 5.71	WF	11km NE
	JA04753	3	15. 8.70	Chew (Somerset)	
		v	29. 5.71	WF	225km ENE
	HV96185	4	4. 8.70	Milton	
		v	26. 7.71	WF	11km NE
Whitethroat	HV81652	3	18. 7.70	WF	
		x	10. 5.71	Freckenham (Suffolk)	10km E
	HV81178	4m	4. 7.70	WF	
		x	6. 4.71	Berkane (Morocco)	1940km S
Chiffchaff	152721	3	10. 7.71	WF	
		v	26. 8.71	Cambridge	15km SW
Sp. Flycatcher	HX99500	3	25. 7.70	Sawston	
		v	15. 5.71	WF	22km NNE
Redpoll	HV81229	3	10. 7.70	WF	
		vm	13. 2.71	Montargis (France)	570km SSE
Brambling	JB30593	4f	10. 4.71	WF	
		v	24. 4.71	Heligoland (Germany)	520km SE
Bullfinch	HX47153	5f	26. 4.69	WF	
		x	11. 5.71	Cottenham	11km WSW
	JE64550	5m	15. 5.71	WF	
		x	23. 8.71	Cambridge	15km SW
Reed Bunting	JB92295	4f	13. 3.71	Rye Meads (Herts)	
		v	3.10.71	WF	63km NNE



Species ringed in 1971

	Site A & B	Site F	1971 total	Grand 1968-1971 Total
Mallard	-	2	2	5
Red-legged Partridge	-	-	-	3
Water Rail	-	1	1	1
Moorhen	-	-	-	1
Lapwing	1	-	1	1
Snipe	-	13	13	25
Jack Snipe	-	-	-	1
Woodcock	-	1	1	2
Cuckoo	2	4	6	10
Woodpigeon	2	2	4	6
Collared Dove	-	1	1	4
Turtle Dove	-	10	10	10
Tawny Owl	-	-	-	5
Long-eared Owl	-	1	1	1
Swift	-	1	1	1
Kingfisher	-	17	17	26
Lesser Spotted Woodpecker	-	1	1	1
Skylark	-	3	3	7
Swallow	1	840	841	976
House Martin	-	-	-	1
Sand Martin	-	-	-	1
Jay	-	-	-	2
Great Tit	9	47	56	147
Blue Tit	13	107	120	376
Coal Tit	-	4	4	4
Willow Tit	10	12	22	109
Long-tailed Tit	9	48	57	157
Tree Creeper	-	14	14	32
Wren	20	93	113	349
Mistle Thrush	-	-	-	1
Fieldfare	-	4	4	10
Song Thrush	47	221	268	609
Redwing	-	12	12	34
Blackbird	36	102	138	497
Redstart	-	1	1	6
Nightingale	1	1	2	7
Robin	53	57	110	320
Grasshopper Warbler	-	18	18	54
Great Reed Warbler	-	1	1	1
Reed Warbler	50	469	519	1190
Sedge Warbler	43	295	328	1038
Blackcap	20	104	124	265
Garden Warbler	1	14	15	46
Whitethroat	7	22	29	104
Lesser Whitethroat	8	35	43	91
Willow Warbler	22	181	203	551
Chiffchaff	12	55	67	165

Goldcrest	-	3	3	5
Spotted Flycatcher	6	12	18	46
Dunnock	47	139	186	582
Meadow Pipit	-	3	3	4
Tree Pipit	-	-	-	1
Pied Wagtail	-	-	-	7
Yellow Wagtail	-	1	1	3
Red-backed Shrike	-	-	-	1
Starling	-	-	-	11
Greenfinch	6	35	41	149
Goldfinch	9	35	44	133
Linnet	-	34	34	89
Redpoll	10	130	140	304
Bullfinch	37	194	231	582
Chaffinch	5	51	56	141
Brambling	-	22	22	23
Yellowhammer	3	4	7	40
Corn Bunting	-	-	-	4
Reed Bunting	16	309	325	653
House Sparrow	-	-	-	1
Tree Sparrow	10	16	26	609
TOTALS	516	3792	4308	10641

35%

THE CO-OPERATIVE RINGING ENQUIRY

The advantages of co-operative bird-ringing have been discussed by Nau *(Bird Study 14: 1-9):* his observations remain in some senses a definitive prescription and his strictures valid for co-operative ringing enquiries like those currently conducted by the Wicken Fen Group. It may be timely to re-examine the progress made by the Group and some of Nau's recommendations in the light of four year's experience at Wicken Fen.

History and Organisation

The pilot study was made in 1968 largely through the effort of three ringers, two 'A' permit holders and a trainee, who contrived to spend several spring and summer weekends at the north-east corner of the Fen, netting principally around the brickpits and along the edge of the Common Fen. Initially recording sheets based on those in use at the Chew Valley Ringing Station were used for field data and for writing up the species schedules, but when in 1969 the Group was officially formed new systems of recording were established, based on Iberian Ringing Group sheets and schedules (WFG 1, p2).

By the end of 1968 it was apparent that our principal aim of contributing some East Anglian information to the recently launched BTO

Acrocephalus Enquiry could be achieved through a greater and more concerted effort in 1969. At the end of our first year we reported on our results in a brief duplicated Report circulated principally to members of the National Trust's local committee.

The Wicken Fen Group was officially formed in February 1969 in an attempt to ensure an effective continuation of the work already begun. A larger pool of ringers was needed to ensure regular weekend coverage and to this end new members were encouraged and the range of experience and qualification widened. Particularly valuable were the 'A' ringers from other established groups who brought much useful experience as well as enthusiasm to the team. By the end of the year our membership numbered thirteen ringers, eight trainees and one friend (a membership category established for those who were not ringers but who wished to support the Group's work). From the outset, it should be stressed, the personal contact between most members of the Group was close and the effectiveness of the team thus much enhanced. The element of younger trainees, many of whom were undergraduates, contributed in no small measure to this.

The management of the Group was in the hands of the three founder-members: Hon Secretary, Michael Allen; Hon Treasurer and Ringing Officer, David Steventon; Hon Research Officer, Colin Bibby. In practice the title of Ringing Officer has been abandoned, and it seems increasingly unnecessary in the light of subsequent experience to separate the honorary posts of Secretary and Treasurer. By basing the management on three officers it has been possible to avoid the formation of a committee, and to discuss most major decisions instead in plenary session at meetings to which the whole Group has been invited at the beginning and end of each ringing season.

Aims

The inception of the Group occurred in an attempt to strengthen the study of the acrocephalus warblers as part of the BTO enquiry. Further it was felt that with a regular annual intake of new potential ringers at Cambridge University some facilities might thus be made available for training those who on graduation might strengthen ringing enquiries elsewhere in the country. In order (less selflessly) to ensure the Group's continuity it was hoped to encourage local and native interest.

In neither aim have we been completely successful, though one of the initial undergraduate members has achieved full 'A' permit status with the Group, and one subsequently elsewhere, while two others now hold 'C' permits. Of the local members one has now gained his 'A' permit, and one has achieved his elsewhere; three town members hold 'C' permits while one other has recently been applied for.
In addition to these two aims it was also hoped to add regular observations to the data already collected on the birds of the Fen,

and to supplement the census work of Professor Thorpe and others in the 1950's, and the more recently published paper (Easy and Kirtland). Thus ornithologists might begin to assemble data from which results might emerge comparable in depth and range to the researchers of botanists and entomologists on the reserve.

Procedure

From the outset it was accepted that routine was of vital importance in the work of the Group, and that the maximum use should be made of the bird in the hand within the limits always of the bird's safety and comfort. While it might not always be possible to predict the usefulness of any single item of data it should be collected because of its potential importance in possible further studies of weight, population structure, moult, parasites, plumage, or other possible lines of enquiry. Because of limitations of working conditions and the necessity of careful supervision for the numbers of trainees present, certain measurements accepted as standard by the Rye Meads Group (tarsus, bill and tail for example) are not collected at Wicken Fen.

In addition to the collection of wing-lengths and weights each bird is aged and sexed where this is possible and examined for brood-patch and moult. The same procedure is adopted for all handlings of all birds, save those retrapped within two hours of their last capture. Not only is the series of data thus collected of enormous value, but the results of different handlers can be cross-checked against others for the same bird.

Publications

During the year the members of the Group are kept in contact through a bulletin which is circulated six or seven times a season. It is essential to keep everybody abreast of events and developments if their interest and support is to be maintained throughout a season, and a duplicated bulletin serves the purpose well.

The major means of keeping those outside the Group informed of its activities is the annual report, and it has been axiomatic since the Group's inception that a report only fulfills its function if it is the collective responsibility of the whole Group, and further if it appears promptly and regularly at the end of each season's work. Systematic recording in the field, subsequent organised transfer of field sheet data and the mass of paper work which this implies can only be justified by the response of individuals in the Group to make appropriate use of the data collected. The proper presentation of a current report should stimulate that response, and every member of the Group should contribute in some way.

Such a production inevitably costs a great deal in present circumstances but the costs of a properly presented and attractively produced publication should be borne by the Group; sales to interested members of the public can offset such costs while at the same time providing useful publicity for the Group's activities and tangible evidence of its attitude to the responsibility of engaging in the collection of data from the living bird in the field.

We would support Nau's contention that the full systematic list has no place in a ringing report but we have provided notes on selected species of interest in the reports, where evidence could be produced of a change of status, or where corrections or additions could be made to the published observations in the *Birds of Wicken Fen.*

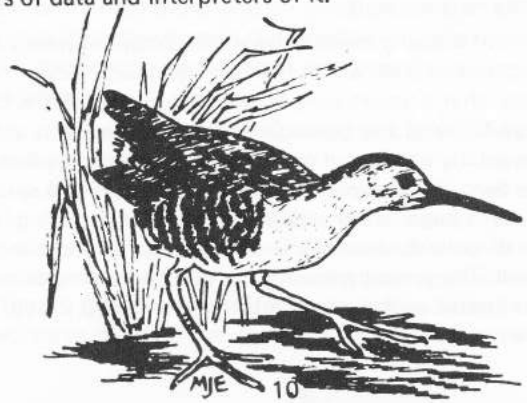
With the stimulus of the annual report there may be some encouragement for a few members of the Group to write-up work in progress which might subsequently be extended with more data into a full paper to be published in a national journal such as *Bird Study.*

Projects

Elsewhere in these pages is the evidence of projects currently in progress at the Fen; evidence of the work of 1969 and 1970 can be found in the reports for those years. No member is discouraged from making use of our data and some try lines of enquiry which prove unprofitable. None should feel discouraged: that process is as important as the lines of enquiry which lead immediately to significant results.

Quite apart from the individual projects of the Group the presence of its members on the Fen each weekend from April to September makes it possible for valuable contributions to be made to national enquiries such as the BTO Atlas. It is to be hoped that the Group's skill in nest finding will improve with practice, and this should result in the completion of more Nest Record Cards.

After only four year's work it is perhaps too early to be drawing final conclusions from the results obtained, or looking too far into the future. At this point it is probably worthwhile remarking on the continuing enthusiasm of the Group and its expanding membership both as collectors of data and interpreters of it.



SYLVIA WARBLERS AT WICKEN FEN

Four warblers of the genus Sylvia occur at Wicken Fen, the Blackcap, Garden Warbler, Whitethroat and Lesser Whitethroat. During the period 1968-1971, the Group has ringed 265 Blackcaps, 46 Garden Warblers, 104 Whitethroats and 91 Lesser Whitethroats. All four species breed in the area, though the Garden Warbler is not numerous. The Whitethroat suffered a drastic national decline in 1969, and in previous years it may have been as numerous as the Blackcap. In addition to the local breeding populations, birds of these four species occur at the Fen on spring and autumn passage. Young birds from relatively nearby may feed in the area in late summer and autumn.

The bird populations in different habitats at Wicken Fen have been sampled by mist netting (simultaneously) in different sites in 1970 and 1971 (WFG Report 2:26). Table 1 shows the numbers of captures of each of the four species during these simultaneous netting periods. It should be noted that 700 feet of net were used at the NE end, compared with 400 at the Reed Bed.

Table 1. Numbers of Sylvia warblers caught during mass weekend coverage in 1970 and 1971.

		Site A & B	Site F
Garden Warbler	Ad.	3	0
	Juv.	4	0
Blackcap	Ad.	24	10
	Juv.	27	21
Whitethroat	Ad.	13	5
	Juv.	15	4
Lesser	Ad.	18	5
Whitethroat	Juv.	4	0

The table suggests that all the species are more numerous as breeding birds at the NE end of the Fen. This seems to be most marked in the Whitethroat. The habitat at the NE end is more diverse and nearer to climax than that at the Reed Bed, and this would be expected to favour Sylvia warblers (Lack 1971). At least as many juvenile Blackcaps appear at the Reed Bed as at other sites. This may be due to the presence of birds other than those fledged in the vicinity of the Reed Bed, using the area as a feeding place.

Figure 1 shows numbers of birds caught and mean body weights for each half month period throughout the season. Examination of these graphs reveals several points of interest. In the species where the sex of the birds can be determined, that is, the Blackcap and the Whitethroat, adult males show a loss of weight during the breeding season. This may be due to the

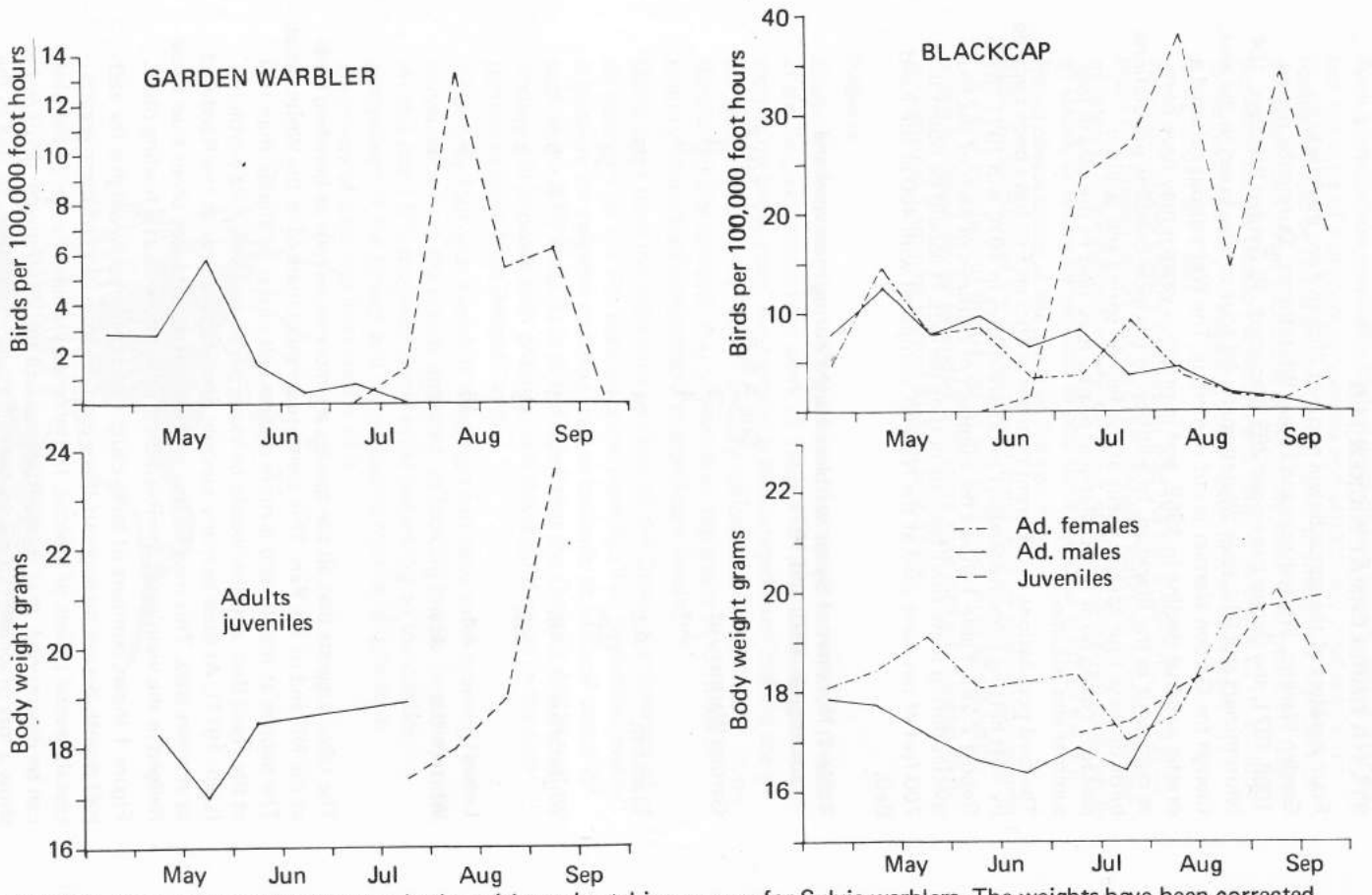


FIGURE 1 Seasonal variation of mean body weight and catching success for Sylvia warblers. The weights have been corrected to the predicted weight 10 hours after dawn. The catching success is the number of birds caught per 100,000 foot hours of netting.

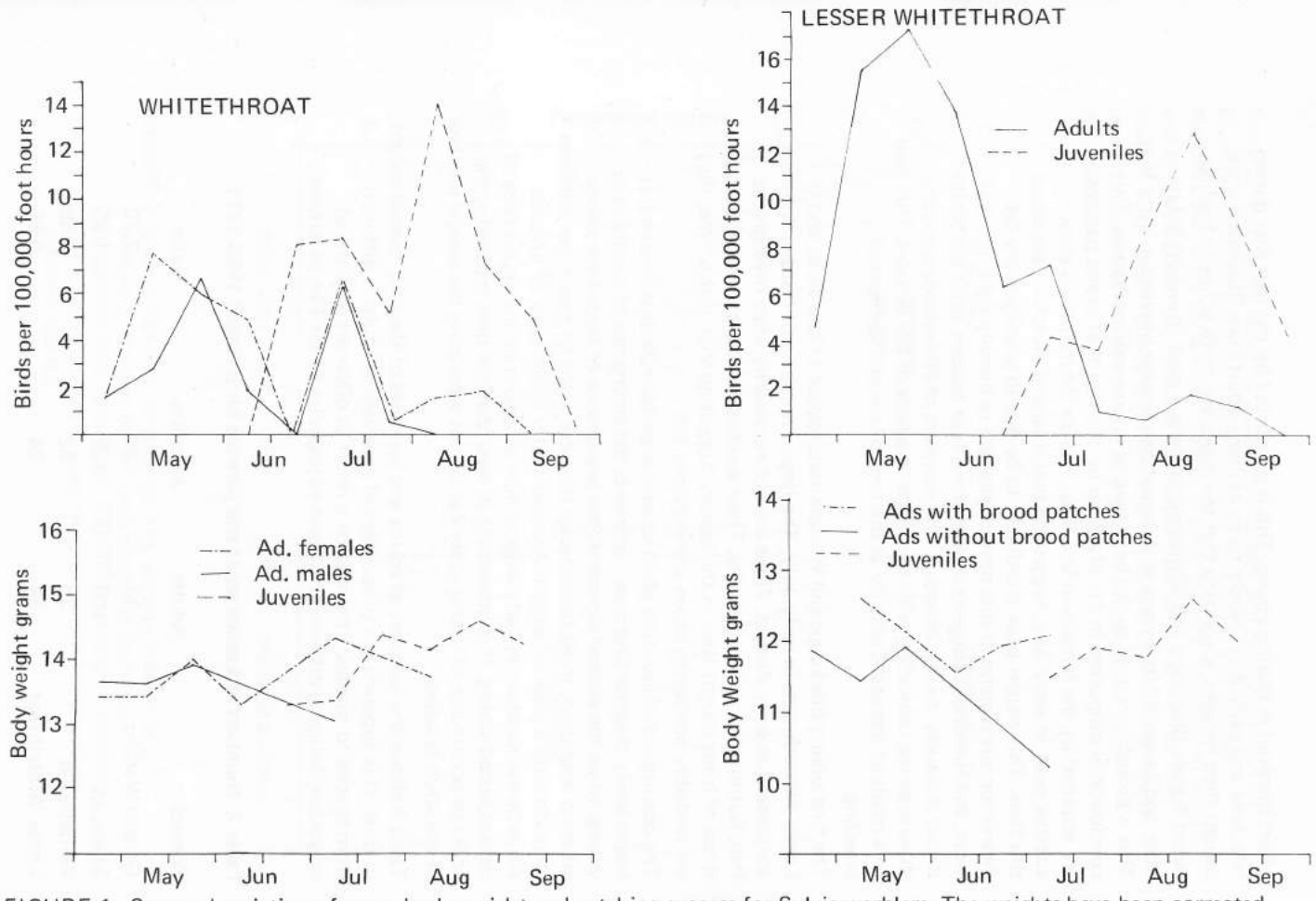


FIGURE 1 Seasonal variation of mean body weight and catching success for Sylvia warblers. The weights have been corrected to the predicted weight 10 hours after dawn. The catching success is the number of birds caught per 100,000 foot hours of netting

effort involved in rearing young. This is supported by the fact that during late June and early July, nearly twice as many adult male Blackcaps were caught than females, suggesting that the males are more active in feeding.

Adult female Blackcaps and Whitethroats show a peak in weight in late May, and Lesser Whitethroats with brood patches are heaviest in early May, This is probably related to the beginning of laying and incubation. This conclusion is supported in the Blackcap by the fact that brood patches are acquired by the females in late May. Female Whitethroats show another peak in early July, suggesting that a second clutch is laid about this time. This weight peak is unlikely to be due to premigratory fat deposition since males at this time of year are extremely light. Furthermore, the Handbook suggests that of these four species, only the Whitethroat is usually double brooded. The numbers of Whitethroats caught show maxima coinciding with the weight maxima of the females. This may be a result of increased activity at the time of commencement of breeding.

The first young Blackcaps and Whitethroats appear in late June, and Lesser Whitethroats in early July. The largest numbers of Garden Warblers are present in early August. These are not necessarily birds bred on the Fen, but may come from nearby. Their weights are low compared with those of birds caught later in the season, suggesting that at this time, they are probably not laying down premigratory fat.

The occurrence of juveniles of all species seem to show two maxima. It seems likely that the first peak represents the emergence of locally bred young, while the second represents the appearance of birds from other areas on migration. In all four species the later peaks of maximum numbers coincide with a peak of weight. Another factor in the peak of juvenile Whitethroat numbers in early August may of course be the appearance of second brood young. It is interesting to note that the time separating the peaks of occurrence of young is similar to that separating the weight maxima of the adult females.

Table 2 shows the numbers of adults and juveniles of the four species caught in total. It is apparent the proportion of juveniles to adults is different from species to species. This may be a result of different patterns of migration, bringing different numbers of juveniles to the Fen in autumn.

Table 2. Numbers of known adult and juvenile birds ringed 1968-1971.

Species	Adults	Juveniles	Ratio
Garden Warbler	13	30	2.30
Blackcap	100	125	1.25
Whitethroat	35	52	1.48
Lesser Whitethroat	44	24	0.55

Many of these birds, especially Garden Warblers and Blackcaps, feed on Elder berries in late August and September. Blackcaps and Garden Warblers also show the greatest degree of premigratory elevation of weight and they remain on the Fen well into September unlike the other two species. Such weight changes in the Whitethroat and Lesser Whitethroat must either be less marked or else they occur at places other than Wicken Fen.

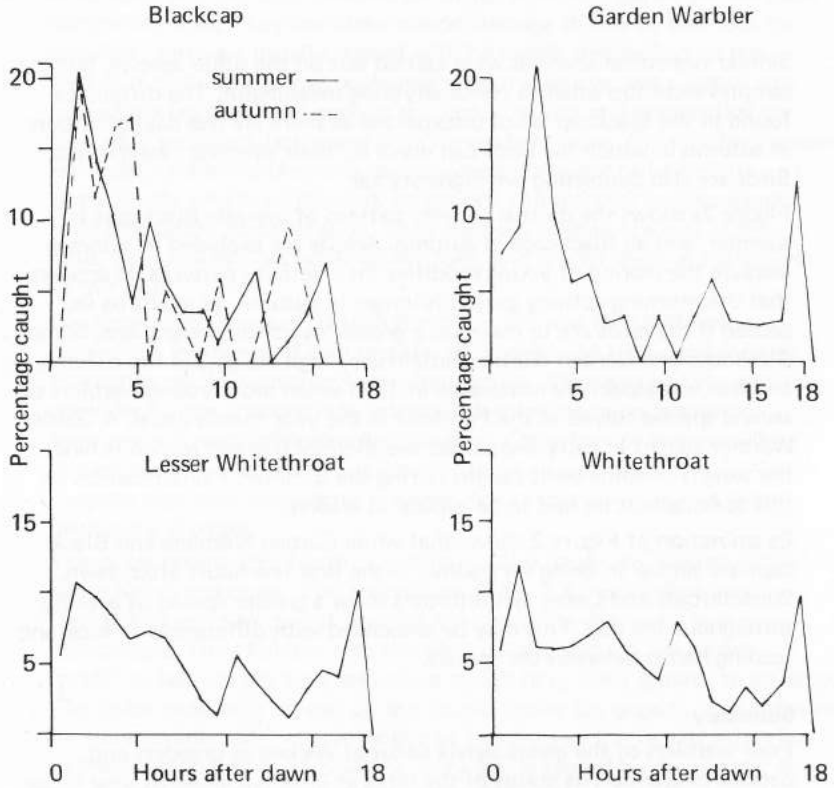


FIGURE 2 Diurnal variation of activity. The activity index was calculated as the number of birds caught in each hour (measured from dawn) per 100,000 foot hours of netting. These are expressed as percentages to permit comparison between species.

The diurnal variations of weight were investigated, and a difference was found between summer and autumn in the Blackcap. These data are presented in Table 3.

Table 3. Diurnal variations of weight of Blackcaps

	dawn weight (g)	diurnal weight gain (g/hr.)
Summer (before mid-Aug)	17.00	0.054
Autumn (after mid-Aug)	18.12	0.126

Similar regression analyses were carried out on the other species, but the samples were too small to reveal anything meaningful. The difference found in the Blackcap is not unexpected as there are less daylight hours in autumn in which the birds can make up their overnight weight loss. Birds are also depositing premigratory fat.

Figure 2a shows the diurnal activity pattern of juvenile Blackcaps in summer, and all Blackcaps in autumn. Adults are excluded in summer because the rearing of young modifies their activity patterns. It appears that the morning activity period is longer in autumn, as might be expected if the birds are to make up a greater overnight weight loss. Some Blackcaps and Garden Warblers attain very high weights in the autumn, and this was especially noticeable in 1971 when more young warblers of several species stayed at the Fen later in the year than is usual. A Garden Warbler caught in early September weighed 29.0 grams, which is twice the weight of some birds caught during the summer. Fat deposition on this scale cannot be said to be typical at Wicken.

Examination of Figure 2 shows that while Garden Warblers and Blackcaps are similar in being very active in the first few hours after dawn, Whitethroats and Lesser Whitethroats show a greater spread of activity throughout the day. This may be associated with differences in food and feeding habits between the species.

Summary

Four warblers of the genus Sylvia occur at Wicken as breeders and passage migrants. The status of the birds at different times of year is discussed with reference to weight, numbers caught, brood patches and diurnal activity. The analysis suggests that these Sylvia warblers may form two pairs on the basis of certain aspects of their biology:–

1) Garden Warbler and Blackcap
11) Whitethroat and Lesser Whitethroat.

Reference

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GROTTY LEG

Of the thousands of birds trapped at Wicken, very few show any signs of disease or injury. In fact, on Sunday mornings the healthy condition of those caught contrasts markedly with that of the catchers. But the apparent fitness of the birds may be misleading, because we know that bird mortality is high and that disease and injury must contribute to this. Predation or death probably soon overtake birds seriously ill; we observe mainly the healthy and those with only minor disabilities.

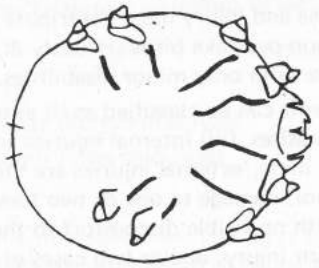
For practical convenience bird ailments can be classified as (i) external injuries, usually to limbs, (ii) ectoparasites, (iii) internal injuries and infections, and (iv) skin diseases. Of these, external injuries are the most commonly seen. They are often minor, damage to one or two toes for example, and have usually healed with no visible discomfort to the bird. But birds can survive quite major injury; one or two cases of loss of a whole leg have been seen at the Fen. Flatflies and feather lice are seen with some regularity and ticks somewhat rarely. The numbers present are small, and while they may be a nuisance they are not a serious threat to the health of the bird. Infections and internal injuries usually need laboratory identification, since they are seldom obvious in the field. Skin diseases are occasionally seen, and one of these is the subject of this note.

Blackmore and Keymer (British Birds 57, 175 and 62, 316) have reviewed the incidence of skin diseases in British wild birds, and showed that although the symptoms are often similar, the cause of the condition could be a virus, a bacterium, a fungus, burrowing mites, cancerous tumours or a metabolic disorder like gout. Only four of the cases they quoted were due to mites, but recent literature and field investigation suggests that mite infestation is rather more common than had been previously thought.

The mites responsible for the condition called 'scaly leg' belong to the genus Knemidokoptes. The animals are 0.2 – 0.4 mm in diameter (females larger than males), and are thus invisible without a lens or microscope. They burrow into the skin, usually around the bird's 'ankle' or base of the toes, and cause a wart-like, flaky growth to develop. The lesion may later spread up the shank. Inside the growth is a profusion of 'honeycomb cells', characteristic of the disease; the female mites live in the individual cells. In poultry 'scaly leg' is caused by K. mutans; the condition in wild birds is known in the ringing fraternity by a less precise synonym–'grotty leg'.

	Adult birds examined	Grotty leg cases	Percentage
Wicken Fen	158	6	4
Sawston	10	1	10
Fowlmere	28	3	11
Icklingham	8	2	25
	204	12	6

During 1971 birds caught locally have been examined for grotty leg, and twelve cases discovered. All were Sedge Warblers, and all were adult birds; the incidence is shown in the table. The mites isolated in three of the cases were all K. jamaicensis.



Knemidokoptes jamaicensis

Scale mms.

0 0.1 0.2

Transmission of mites is something of a mystery. Kirmse (Bull. Wildlife Disease Assoc. 2, 86) in a major paper on Knemidokoptes, showed that mites could be transferred from diseased to healthy Red-winged Blackbirds by cage contact, but the disease appeared only after two or more months. Transmission to other species was unsuccessful. Sedge Warblers do not roost regularly in close contact, and it seems more probable that in the wild mites may be transmitted from parent to young in the nest. If the infestation requires several months to become visible as leg damage, this would explain why all cases examined have been of adult birds. Wintering Sedge Warblers in East Africa (birds of Asian origin) show a similar incidence of grotty leg (c 5%). But these African birds have already moulted and cannot be aged, so it is not yet known whether grotty leg is ever visible in birds as young as 6 months old.

Well established grotty leg can become very severe and must inconvenience the host. But an affected Sedge Warbler at Icklingham has survived at least three seasons, and it would be interesting to know more about the long-term development of the disease.

Other records confirm that the Sedge Warbler is the main European species affected in the wild by grotty leg – but no records exist of the disease in any other warbler species. There are single records in the literature for Rook, Skylark, Tree Pipit, Sand Martin, Chaffinch, Dunnock and Pheasant as well as those reported more frequently in caged birds of several species and in poultry. Unfortunately however the species of mite responsible is not always identified. In North America, grotty leg has been recorded in many host species, particularly the Icteridae. Kirmse records that 15% of a sample of nearly 2,000 Red-winged Blackbirds were affected. Much work, however, remains to be done on host specificity and possible interspecies transmission. An affected Sedge Warbler – fostered Cuckoo would be an interesting discovery!

I am grateful to Tom Kittle for Fowlmere records, to David Pearson for African data, to Harry Green for the photograph from which the figure was taken, and particularly to Steve Barnett for mite identification and helpful discussions.

SURVIVAL OF REED AND SEDGE WARBLERS

Introduction

Reed and Sedge Warblers are trans-Saharan migrants, but nonetheless, totals of 90 and 55 respectively have been caught on the Fen in years subsequent to their ringing. To the end of 1970, 671 Reed and 710 Sedge Warblers had been ringed and thus were available to reappear in a later year. This might give the impression of a relatively poor ability to return to the same breeding site. On the other hand, all but 6 of the 90 Reed Warblers, and 5 of the 55 Sedge Warblers, were actually recaught at the same end of the Fen as they were ringed, in spite of the fact that the two sites are little more than half a mile apart. Interesting comparisons between species, ages and years arise, and are discussed as far as possible with the limited data as yet available.

The most intensive ringing effort on the Fen has been applied to the Reed Bed, with coverage of about half the breeding season weekends in 1969, all but one in 1970 and all in 1971. Coverage of the north end has been less thorough, so only birds caught on the Reed Bed are considered. This omits 18 Reed and 20 Sedge Warblers from the analysis. All differences considered in this note have been compared by chi-squared tests. The word *significantly* is used throughout to indicate a probability of less than 5% of the observed difference arising by chance.

Month of initial capture

To see whether the month of initial capture had any bearing on the chance of subsequent recapture, the figures for adult birds were divided into months of capture (Table 1).

Table 1. Months in which returning birds were caught in the year of ringing. No bird is counted more than once per month. 1969 and 1970 data are combined and all juveniles are omitted.

	REED WARBLER			SEDGE WARBLER		
	Nos. caught	Total ringed	Per cent returning	Nos. caught	Total ringed	Per cent returning
May	18	88	20	19	104	18
June	16	47	34	10	33	30
July	28	73	38	8	27	30
August	20	58	34	7	17	41
	82	266	31	44	181	24

For both species it is apparent that the month of capture has limited effect on the chance of subsequent recapture. Birds caught in May have a significantly lower rate of subsequent recapture than the others. This suggests that some of the birds caught in May are in fact on passage to other breeding sites either distant or elsewhere on the Fen. There is no sign of this at the end of the breeding season, and it is concluded that there is no appreciable passage of adult birds from other areas through Wicken Fen in the autumn. The rate of return of juveniles is so low that such an analysis is not yet possible.

The consistency of these data probably justify treating all birds from any one year together. Table 2 shows the percentages of birds returning in each combination of years.

Table 2. Percentage of birds ringed in initial years returning in each combination of subsequent years.

	Reed Warbler		Sedge Warbler	
Years caught	Adults	Juveniles	Adults	Juveniles
1969, 1970	7.7	0.2	11.1	9.3
1969, 1970, 1971	8.6	0	6.4	1.8
1969, 1971	7.7	0.2	1.6	0
1970, 1971	16.8	6.4	9.3	0.7
TOTAL	19.9	5.6	12.7	3.5

Age Differences

The table suggests differences between species, years and ages. The rate of return of juveniles is significantly lower than that of adults. This is probably in part a result of the higher mortality of young birds with no previous experience of the hazards of migration. It is also possible that young birds do not return with such precision as the adults. The latter suggestion would probably result in a high proportion of young birds amongst those which changed ends. This is not found, though the samples are too small for certainty (one each of the 6 Reed and 5 Sedge Warblers which moved were ringed as juveniles). Single birds ringed as nestlings at sites ten and thirty-eight miles away have however been caught at Wicken the following year. Thirdly, the small number of juveniles returning may be caused by the fact that many of the young birds ringed at Wicken in autumn are not of local origin. Direct evidence in support of this is not available. It is however apparent that few of

the juveniles caught in late autumn have been ringed earlier. Conversely, few of the early-ringed juveniles are retrapped later in the autumn. Perhaps juveniles wander from their natal sites shortly after becoming independent of their parents. Such post-juvenile dispersal is well known in many birds, and is suggested by some of the Reed Warblers controlled at Wicken Fen (the two most distant were ringed as juveniles in August at Rye Meads, Herts, and Chew Valley Lake, Somerset). All that can be said at the moment, is that there are three possible explanations of the low return rate of juveniles. All probably interact, and cannot yet be treated further.

Species Differences

There is a marked difference in the rates of return of the two species, the survival of Reed Warblers being significantly higher. As with the juveniles, this might indicate a difference of mortality or of precision of returning. The latter is suggested, though not significantly, by the higher proportion of Sedge Warblers returning to the other end of the Fen (four out of 27 adult Sedge Warblers compared with five out of 58 Reed Warblers). This finding is hardly unexpected in view of the limited habitat requirements of the Reed Warbler, which must confine a major part of its population to the Reed Bed, the fringes of the Mere, and other rather smaller areas of reed. The Sedge Warbler on the other hand is probably more uniformly distributed, and thus in a position to move more readily from one year to the next. It is obvious that Wicken Fen is an ideal area to study such differences between the two species, and continued coverage of several sites will certainly provide much useful data. It is probable that both the true survival and the precision of returning will be found to differ between the two species.

Differences of years

Differences between the years are also evident. In the Sedge Warbler, a significantly smaller proportion of 1970 birds returned for 1971 than did 1969 birds for 1970 (17.5% compared with 9.3% for adults, 11.1% compared with 0.7% for juveniles). It is interesting that the juvenile return rate fell more than that of adults. There was a notable decline in the breeding population in 1971. Which pattern is normal we will not know for some years, but it is apparent that winter mortality and hence summer breeding population are variable. This may be a regular feature of populations of long distant migrant passerines, which must presumably be vulnerable to highly variable food and weather conditions. Such variations have recently been detected by the BTO's Common Birds Census.

Reed Warblers also show a difference between the years with the 1970-71 survival being lower but only the juveniles being affected (0.2% compared with 6.4%). A similar argument to that applied to the Sedge Warbler is

relevant. There is however another item of interest in this case. A remarkable number (9) Reed Warblers ringed in 1969 managed to evade capture in 1970, but were recaught in 1971. This may be a result of change of habitat, or possibly indicates that the Reed Warbler is less retrappable than the Sedge. In 1970 a large part of the Reed Bed was burnt in early May in order to promote a better reed harvest. This deprived the Reed Warbler of a large area of nesting sites. Though a similar area of the Reed Bed was again burnt in 1971, this was of a different nature with considerable areas of willowherb and Meadow-sweet, which are probably not as suitable for Reed Warblers. Juvenile Reed Warblers may have suffered a greater mortality in the 1969-70 winter than in 1970-71, on the other hand it may be that they were displaced from the diminished Reed Bed by the experienced adult birds in 1970.

Catching Efficiency

The matter of variation of retrappability of the two species was considered by seeing how long individual birds known to be present can in fact avoid capture. These data are presented in Table 3.

Table 3. Months of first recapture of individuals caught in years subsequent to ringing.

	Reed Warbler	Sedge Warbler
April	0	1
May	21	19
June	16	10
July	24	3
August	9	2
September	2	0
TOTAL	72	35

These figures show that large numbers of Reed Warblers are not recaught until late in the season. Over half of the Reed Warblers have not been caught until the end of June, and in July, many are caught for the first time. On the other hand, half the Sedge Warblers have been caught by the end of May. This is more than the difference between the overall timing of the breeding seasons of the two species (about 2-3 weeks).

In addition it was found that individual returning Reed Warblers were caught on average 2.0 times per season, compared with 2.5 for Sedge Warblers. The difference between the two species is probably attributable to their different habitats. Sedge Warblers probably nest fairly close to the net sites on the edge of the Reed Bed. Reed Warblers on the other hand could avoid capture if they nested in the centre of the pure reed

stand and rarely if ever came out. It is perhaps noteworthy that an increased number of Reed Warblers were first caught in July, after fewer in June. This could be a result of local movement after the initial stages of breeding. Whether or not the nine Reed Warblers which evaded capture for the whole of 1970 were typical or not will be revealed in time, by seeing whether a similar percentage of 1970 birds reappear for the first time in 1972.

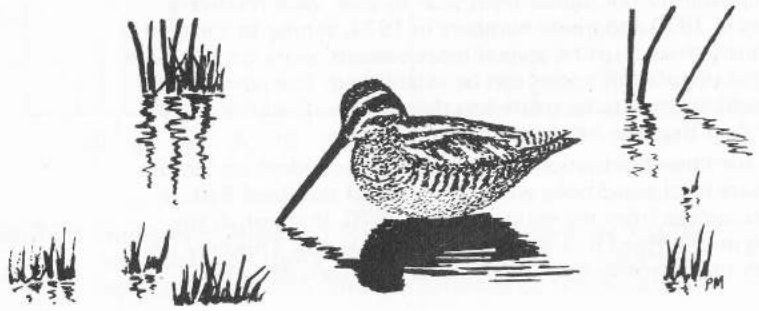
Discussion

None of the survival rates revealed in Table 1 are sufficiently high for the two species to maintain their numbers. It is obvious that for combinations of the several reasons discussed, the numbers of birds recaught are much lower than those which do in fact survive a year. This is clearly demonstrated by the fact that of the 117 adult Reed Warblers ringed in 1969, 19 (16.3%) returned in 1970. However of these 19, 10 (53%) returned in 1971. These 19 birds obviously represent regular Reed Bed breeders, not susceptible to the movement factors reducing the apparent survival of the overall sample. 53% must be closer to a realistic survival figure. The equivalent figure for Sedge Warblers is 36%. In time, it should be possible to make comparisons between years which will be valid if the basic patterns of relative movement and catchability remain constant. As in all articles published in this Report, it is expected that further work will permit a fuller analysis in future.

Summary

90 Reed and 55 Sedge Warblers have to date been caught in years following ringing. Those caught on the Reed Bed are compared and contrasted. Juveniles return at a much lower rate than adults. Survival of Sedge Warblers was lower from 1970 to 1971, and this was reflected by a reduction of the overall population in 1971. Reed Warbler survival was lower in the other winter, but this was possibly a result of change of habitat on the Reed Bed.

Reed Warbler survival is higher than that of Sedge Warbler. There are differences of catchability of the two species, the Sedge Warbler being more thoroughly caught. It was not possible to estimate the true survival rates of the two species with only three years' data.



A PRELIMINARY ANALYSIS OF THE RELATIVE POPULATIONS AND BREEDING SUCCESS OF REED AND SEDGE WARBLERS.

Introduction

The inadequacies of population estimates undertaken in previous years and the decline of Sedge Warbler numbers apparent in fieldwork in 1971 prompted this attempt to investigate relative populations and breeding success of Reed and Sedge Warblers on the Reed Bed. The numbers of captures of each species were used as a basis for the study.

The numbers of handlings of each species were extracted by half monthly periods from the field schedules. To compensate for the variation of netting effort, the figures were divided by the foot hours of netting employed. The resulting figures were then multiplied by 10,000 for convenience.

Results

The results are presented in Figure 1. On the basis of these histograms, two periods of time were chosen in order to calculate population indices for the adults and juveniles in each year. The periods were chosen with the intention of including as few migrant birds as possible. For adults, this period spans from the second half of June to the end of July, and for juveniles from the beginning of July to mid-August. These totals, corrected as before for catching effort are presented in Table 1.

Table 1. Indices of adult and juvenile populations of Reed and Sedge Warbler populations 1969-1970. See text for details of calculation. The juvenile to adult ratio was calculated by dividing the juvenile index by that for the adults.

	Reed Warbler			Sedge Warbler		
	Ads	Juvs	Juv/Ad	Ads	Juvs	Juv/Ad
1969	24.4	9.6	0.39	8.6	10.6	1.23
1970	36.9	17.0	0.46	19.2	22.1	1.14
1971	16.8	9.1	0.56	6.3	7.7	1.22

Discussion

Table 1 suggests several possibilities of interest. The numbers of adults on the Fen apparently fluctuated from year to year, with relatively high numbers in 1970 and lower numbers in 1971, similar to those of 1969. Obviously there must be several more seasons' work on the Reed Bed before the population norms can be established. The number of juveniles caught appears to be related to the number of adults; 1970 was a better year than the other two for juveniles.

The reasons for these fluctuations are obviously dependent on factors other than pure local conditions within the area of the Reed Bed. It does however appear from the spring peak in 1970, that not all the birds arriving on the Reed Bed actually stayed to breed. This may have resulted from the extensive burning of the area in early May 1970.

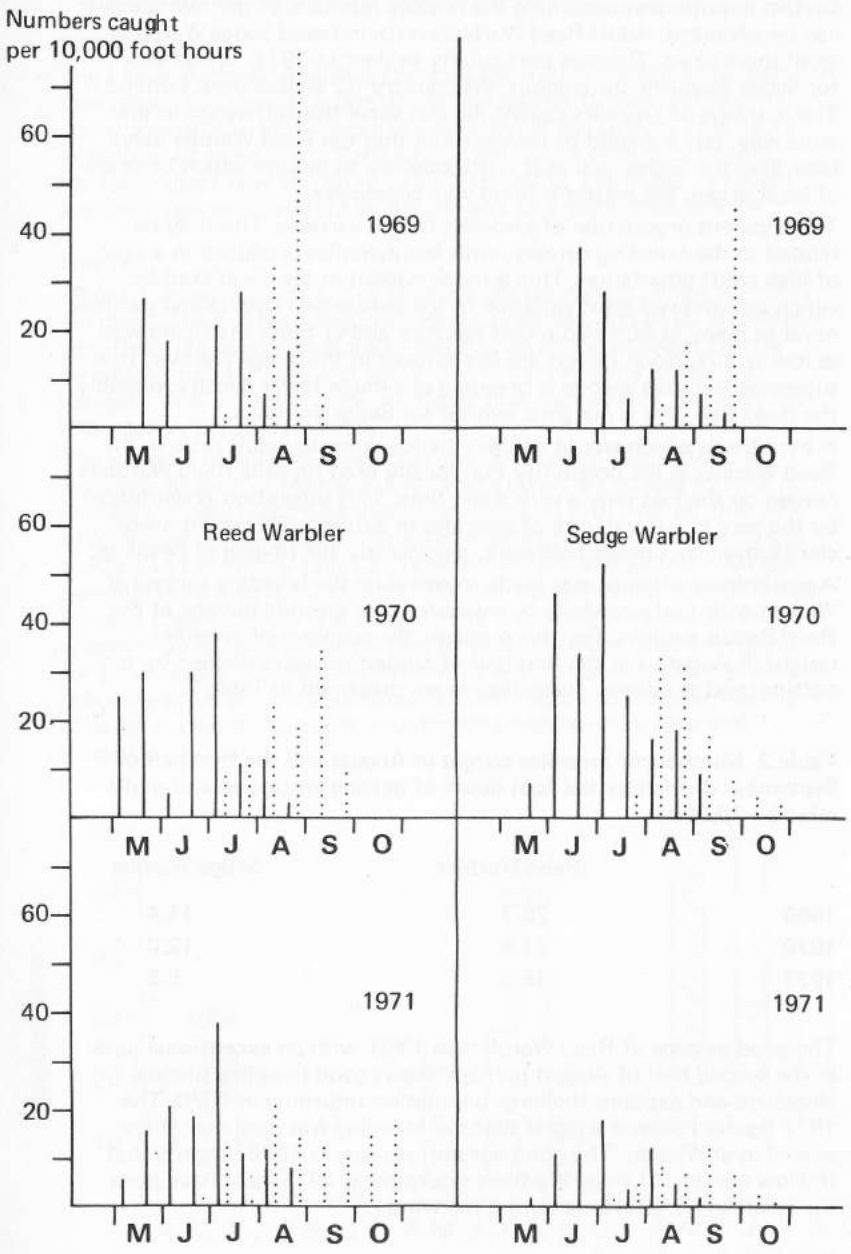


FIGURE 1 Numbers of Reed and Sedge Warblers caught per 10,000 foot hours of netting in half monthly periods. Adults are represented by solid lines and juveniles by broken lines.

Certain hypotheses concerning the relative numbers of the two species can be advanced. Adult Reed Warblers outnumbered Sedge Warblers in all three years. This was particularly evident in 1971 ; a bad year for Sedge Warblers throughout the country (S. Walker pers. Comm.). The numbers of juveniles caught did not show this difference in the same way, but it should be remembered that the Reed Warbler stays later than the Sedge, and as it is not possible to be sure which birds are of local origin, the matter is in no way conclusive.

The apparent production of juveniles is very variable. This may be related to the breeding density, with less juveniles produced in a year of high adult population. This is more evident in the Reed Warbler, which also showed great variation in the percentage with brood patches; never as many as 50% had brood patches, and at times the figure was as low as 20%. Such factors are less evident in the Sedge Warbler. It is suggested that this species is breeding at a much lower density; possibly the Reed Bed area is marginal habitat for Sedge Warblers.

A hypothesis which would explain the low juvenile/adult ratio in the Reed Warbler is the possibility that locally bred juvenile Reed Warblers remain on the Fen only a very short time. This suggestion is reinforced by the very low retrap rate of juveniles in autumn. This point needs clarification by further fieldwork, particularly the ringing of nestlings.

A preliminary attempt was made to correlate the breeding success at Wicken with that elsewhere by measuring the juvenile passage at the Reed Bed in autumn. For this purpose, the numbers of juveniles caught in August and the first half of September were divided by the netting used as before. These figures are presented in Table 2.

Table 2. Numbers of juveniles caught in August and the first half of September divided by the foot hours of netting employed and multiplied by 10,000.

	Reed Warbler	Sedge Warbler
1969	26.7	11.4
1970	21.8	12.0
1971	15.3	5.8

The good passage of Reed Warblers in 1969, with an exceptional peak in the second half of August perhaps shows good breeding success elsewhere and explains the large population returning in 1970. The 1971 figures however suggest that the breeding was poor elsewhere as well as at Wicken. The good autumn passage in 1970 suggests that the low number of Reed Warblers returning in 1971 must have been the result of a misfortune during the winter.

Conclusion

It seems that the method of estimating populations is a feasible one, and several interesting suggestions can be made on the strength of three years' data. More work is obviously required to establish the long term population trends as well as short term fluctuations.

POPULATION CHANGES IN THE REDPOLL

Introduction

The Lesser Redpoll (Acanthis flammea cabaret) is present at Wicken Fen throughout the year. It is one of the few species to have changed its status appreciably in the years of operation of the Group. This paper examines the numbers of Redpolls caught each month that ringing has taken place over the three years 1969-1970. The numbers caught and their ages are discussed in the context of a population change.

Results

Figure 1 shows the number of birds caught per month. These numbers are divided into three categories; adults, juveniles, and birds of unknown age. There are great variations in this species of the plumage criteria by which birds are aged and sexed, hence the necessity of the last category. It is apparent from the figure that the catch of Redpolls has increased in the study period.

The seasonal patterns differed over the three years, but showed a tendency to peak in May and July. These peaks are related to large numbers of adults and juveniles respectively. It is of interest that 77% of all the adults were caught between May and July, 10% were caught in April and the remaining 13% between August and October. Of the juveniles only 7 out of a total of 105 were caught earlier than July and 80 were caught in July and August. The two sexes were caught in approximately equal numbers throughout. It is likely that the figures for juveniles are underestimates as most birds of unrecorded age were probably juveniles; the adult moults from August to October making clear ageing easier. The peak months for juveniles were July and August.

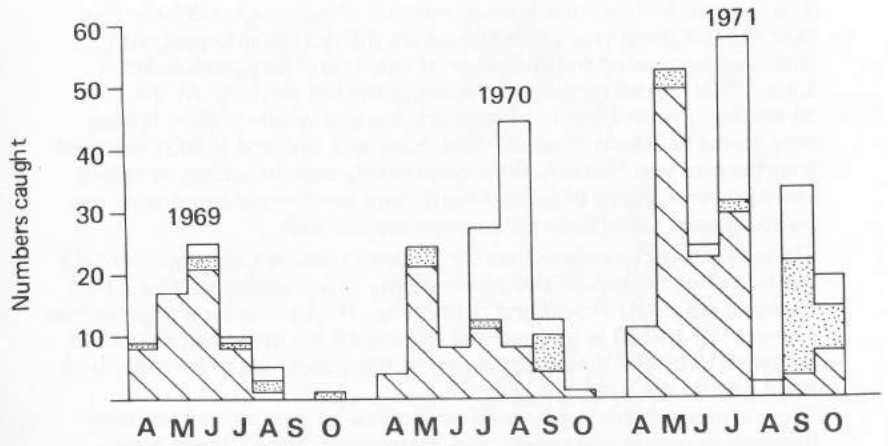


FIGURE 1 Numbers of Redpolls caught by month. Adults hatched, juveniles plain, and birds of unknown age dotted.

Factors affecting the catch

The total number of birds caught cannot provide a reliable indication of the population since the factors which affect it are many and variable. The most important of these factors relate to the human element involved. This can be measured by the time spent catching and the amount of net employed. This factor is expressed in a unit of foot hours. Such figures make no allowance for weather conditions which may affect the catch substantially, for example, in August 1969, with near normal weather, a total of 385 birds were caught with an effort of 23260 foot hours, in August 1971, 454 birds were caught with 62510 foot hours. The feature of August 1971 was the wind and rain which hindered the netting operations, thus an increase of 180% in effort only increased the catch by 18%. A more accurate means of comparison is probably provided by the figures of the total catch of all species, which show the success of the effort. Table 1 shows the Redpoll catch divided into age categories.

Table 1. Numbers of adult Redpolls caught in May and June and juveniles from July to October. These numbers are also expressed as percentages of the total catch in the respective periods. Some birds of unknown age have been included in the most likely category for the time of capture.

	Adults caught	% of total	Juveniles caught	% of total
1969	55	1.9	9	0.7
1970	47	2.1	59	2.0
1971	114	2.8	64	0.8

Discussion

The Redpoll has shown a marked increase of numbers at Wicken Fen over the last three years. The figures are difficult to interpret with precision because of the variations of catching effort and success. Lack (1934) noted nesting at Wicken in the last century. At the time of writing, the bird was not common, and as a winter visitor, it was very scarce or absent from the fens. Easy and Kirtland (1963) reported that the bird was *formerly only occasionally seen in winter, in recent years however flocks of up to twenty have been noted and one or two breeding pairs have remained through the summer.*

These two sources suggest that the Redpoll became more common as a winter visitor to Wicken and subsequently as a breeding species. The change is evidently recent and continuing. To date the largest gatherings number up to 100 in autumn and the size of the breeding population is suggested by the figures presented in this paper, which can only be a small part of the total.

There is indisputable evidence of an increase of numbers of breeding Redpolls in recent years at Wicken. Batten (1971) has shown from Common Birds Census results that this increase has taken place across the country despite even the severe winter of 1962/63.

The reason for such an increase is suggested to be a recent change in the hitherto exacting dietry requirements of the species. Newton (1967) describes it as feeding almost entirely on Birch seeds, an observation shown also by Evans (1966). The Group has recorded the species feeding on Meadowsweet, thistles and willowherb in summer and Alder in winter. It is also notable that there is very little Birch at Wicken Fen.

Summary

The Redpoll has increased in numbers at Wicken Fen, first as a winter visitor and subsequently as a breeding species. The increase over the last three years has been shown by ringing data. This increase is probably due to a change in diet of the Redpoll.

I am indebted to Dr. A. V. Edwards and Dr. C. J. R. Thorne for their helpful criticism of earlier drafts of this paper.

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WING-LENGTH AND BROOD PATCHES AS A GUIDE TO SEXING WILLOW WARBLERS AND CHIFFCHAFFS

Brood patches are formed in many families of birds during the breeding season (see reviews by Bailey, 1952 and Jones, 1971). The development of the brood patch involves a complex sequence of events including changes in hormone levels and environmental stimuli. In general, the brood patch of passerines begins to form immediately before egg laying. De-feathering is usually complete by the end of laying, but the full histological responses do not occur until incubation has begun. The patch of bare skin on the bird should be visible once laying has started.

Although there are differences between Willow Warblers and Chiff-chaffs in habitat preference, migration seasons and wintering areas, such closely related species would be expected to exhibit a similar pattern of breeding behaviour. The Handbook states that only the females incubate, so one might expect to find a brood patch only on female birds.

In the past three summers, the first juvenile Willow Warblers have been caught at Wicken between 19 and 28 June and the first juvenile Chiff-chaffs between 28 June and 4 July. Allowing 35 days for laying, incuba-tion and fledging, laying will not generally begin until mid May. Before 15 May, the breeding cycle may not have begun or the birds may still be migrating and hence birds caught before this date are excluded from the analysis. The skin of the brood patch has returned to normal by the time the young have fledged and in late summer the adults moult and regrow the feathers. Thus adult birds caught after 15 July have also been excluded.

The wing-length distributions of Willow Warblers and Chiffchaffs have two peaks and females are generally assumed to be smaller (Figure 1) The mean wing-lengths of the two sexes were estimated on this basis. The mean wing-length of birds with and without brood patches were also determined (Table 1).

Table 1. The wing-lengths (in mm) of birds with (P) and without (N) brood patches compared with the estimated wing-lengths of males and females. All values are means ± standard error; n = number of birds in each group followed by the wing-length range in brackets.

	P	Females	N	Males
Willow Warbler	62.18±0.32	61.51±0.12	66.09±0.31	66.48±0.12
	n=38 (59-67)	n=284 (57-64)	n=65 (59-72)	n=329 (64-72)
Chiffchaff	57.12±1.03	55.44±0.19	58.17±0.62	60.53±0.12
	n=8 (54-62)	n=85 (49-58)	n=18 (54-62)	n=112 (58-63)

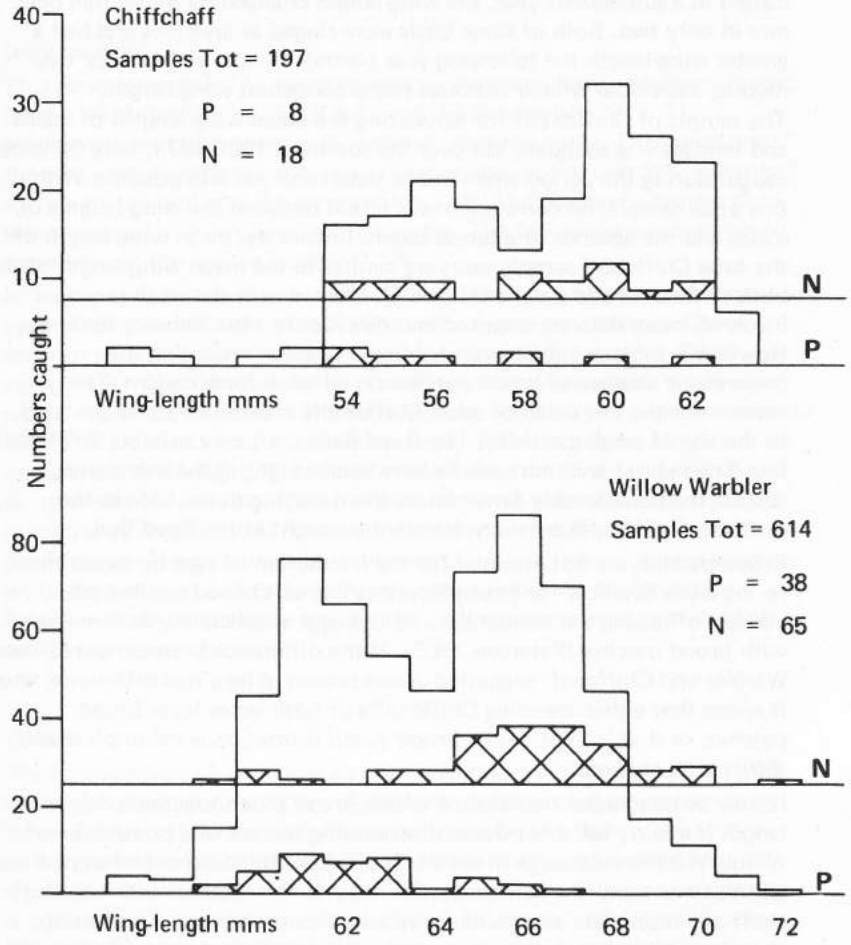

FIGURE 1 Wing-length distribution of Willow Warblers and Chiffchaffs. The inset distributions are of birds with (P) and without (N) brood patches.

The Willow Warbler sample is quite large and there is a close correlation between the wing-lengths of birds with brood patches and the wing-lengths of presumed females. This confirm's Bibby's (1969) analysis but on this occasion a larger and more carefully selected group has been used. In the birds with brood patches there are a few large wing-lengths between 64 and 67 mms. These may represent large females, males which have developed brood patches or recording errors. The small wing-length birds without brood patches probably represent non breeding females. Without collecting specimens there is no way at present of proving

these possibilities. Of the 22 Willow Warblers ringed at Wicken and re-caught in a subsequent year, the wing-length changed by more than one mm in only two. Both of these birds were ringed as juveniles and had a greater wing-length the following year (4mm). Hence, after one or two moults, individual Willow Warblers had a consistent wing-length.

The sample of Chiffchaffs for estimating the mean wing-lengths of males and females was adequate but over the summers 1969-1971, only 26 were caught during the period when brood patch analysis was possible. With this small sample, no correlation was found between the wing-lengths of males and the absence of a brood patch. Indeed the mean wing-length of the total Chiffchaff sample was very similar to the mean wing-length of the birds without brood patches (Table 1). Clearly with the small sample involved, more data are required and this is only a preliminary finding. However it indicates the continued importance of recording the presence or absence of brood patches on all adult birds caught. The reasons for the low catch of adult Chiffchaffs seem to be closely related to the site of ringing activity. The Reed Bed is not very suitable Chiffchaff breeding habitat and more adults have been caught at the other sites, despite the considerably fewer hours spent ringing there. Late in the summer, Chiffchaffs are more frequently caught at the Reed Bed.

Brood patches are not essential for the incubation of eggs by passerines. In the Bank Swallow for example, males without brood patches are capable of raising the temperature of the eggs as efficiently as females with brood patches (Peterson 1955). If the difference between the Willow Warbler and Chiffchaff suggested above proves to be a real difference, then it seems that either breeding Chiffchaffs of both sexes form brood patches, or that in Chiffchaffs brood patch formation is incomplete and difficult to observe.

It may be concluded that the use of the brood patch together with wing-length is a fairly reliable means of estimating the sex of a population of Willow Warblers although in certain individuals the determination of the sex will be uncertain. No such conclusion may yet be reached with the Chiff-chaff and more data are obviously required to answer the question of the relationship between brood patch, wing-length and sex in Chiffchaffs.

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TEMPERATURES OF REED AND SEDGE WARBLERS

Introduction

This paper describes 147 temperatures of Reed and Sedge Warblers caught on the Reed Bed during 26-29 July and 3-9 September 1971. The instrument used was a copper/constantan thermocouple. This measures the temperature difference between two points, in this case the abdominal surface of the bird and the observer's mouth. The observer's temperature was measured with a clinical thermometer. The technique was considered to be accurate to approximately 0.1°C.

In taking a measurement, the head of the instrument was pressed lightly against the skin of the bird's abdomen at a central point about 12mm anterior of the cloaca. A steady reading was usually reached in 30-40 seconds. It might be expected that external stimuli especially visual ones would cause fluctuations in skin temperature. Preliminary experiments with Blue Tits indicated that it made little or no difference if the bird was kept in darkness or daylight. Sudden movement near the bird was avoided to to minimise the possible effects of fear. Work on the measurement of human skin temperatures has shown that the recorded values vary with the force used in applying the instrument. For the light pressures used on birds it appeared that the only important thing was good contact between the thermocouple and the skin. All measurements were made by one person to reduce error.

Results

The relationships of temperature with body weight and time of day were investigated (see Figure 1). No significant variation of temperature with time of day was found. Juveniles of both species showed no correlation of weight and temperature in July, when adults showed a slight but significant correlation ($r=0.31$, $p<0.05$). In September there was a strong suggestion of a negative correlation ($r=-0.33$) for juvenile Reed Warblers. The samples of juvenile Sedge Warblers were small, but did not suggest a similar relationship. Very few adult birds were caught in September. The mean temperatures of different groups were considered (see Table 1).

Table 1. Mean temperatures of different groups of birds.

		Mean temp. °C	Sample size
Reed Warbler	juveniles	39.43	54
	adults	40.84	54
Sedge Warbler	juveniles	39.79	25
	adults	40.87	14

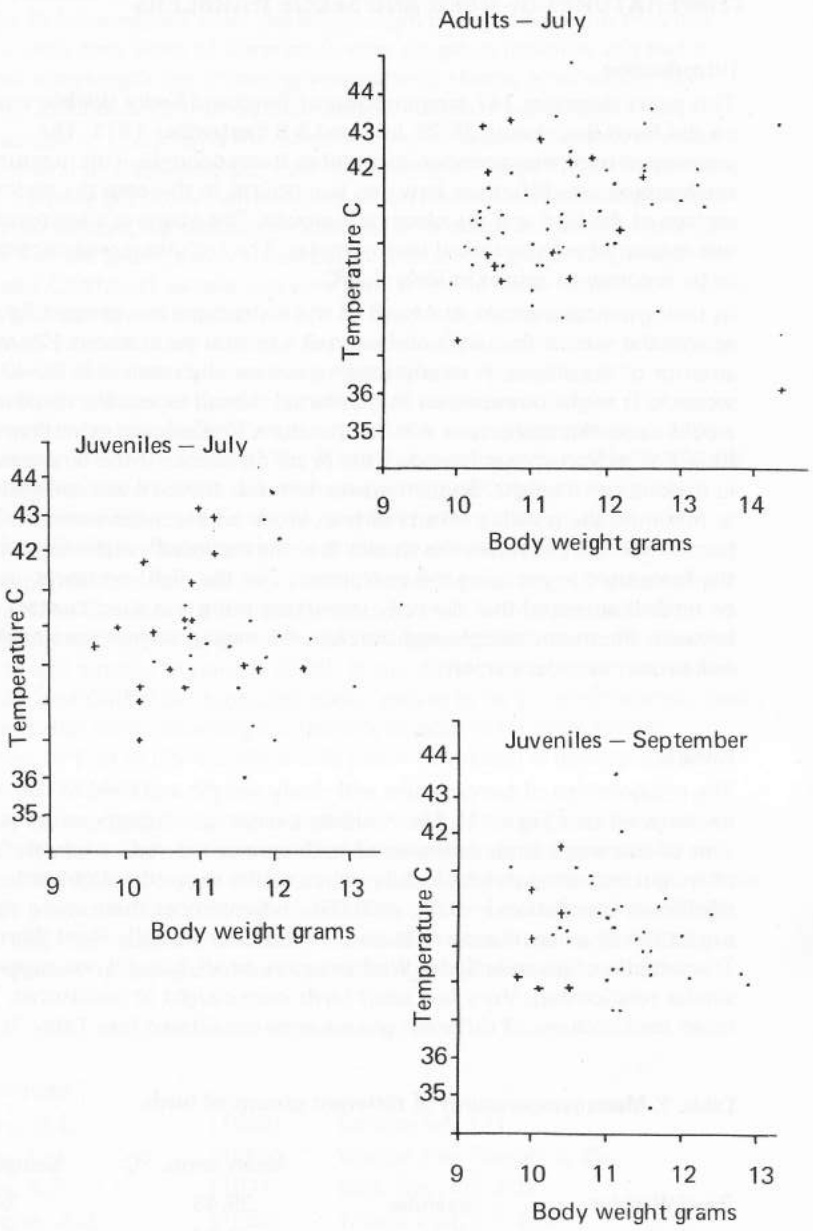


FIGURE 1 Skin temperatures of Reed and Sedge Warblers, related to body weight. From top to bottom, adults in July, juveniles in July, and juveniles in September. Dots are for Reed Warblers and crosses for Sedge Warblers.

The difference between adult and juvenile Reed Warblers was highly significant ($p<0.001$). None of the other small differences between species or groups within species were significant.

Discussion

There are two possible reasons for the difference in temperature of adult and juvenile birds.

a) The adults have a higher deep body temperature than the juveniles, and this is reflected in higher skin temperatures.

b) The deep body temperature of the two age groups are the same, but there are differences in the texture, insulative properties or blood supply of the abdominal skin.

Most of the adult birds were caught in late July. Twenty-five of the sixty-six had brood patches. Though the point at which the temperature was measured lay in the brood patch, there was no evidence of a difference between birds with and without brood patches. It should be added that the brood patches were probably regressing by late July, and there may have been differences earlier in the season. It is apparent however that the brood patch does not explain the difference between adult and juvenile temperatures.

In July, skin temperature correlated significantly with weight for adult birds but not for juveniles. This suggests that the temperature difference was due to a physiological difference between adults and juveniles at the end of the breeding season. This is hardly surprising since in late July the adult birds are preparing to migrate, whereas the juveniles are unlikely to leave for some weeks. Differences in metabolic rate might thus explain the results.

The mean skin temperature of juvenile birds in September was lower than in July, though not significantly. However it was also suggested that there was a negative correlation of temperature with body weight for juvenile Reed Warblers in September. If the differences between adults and juveniles were due to premigratory physiological changes, then it appears that these were different in the two age groups. It should however be noted that none of the birds ringed in July were handled in September. It is likely that the local young birds had left and those birds present were from populations of different origin.

Further interpretation of these results is not possible without further data and it is hoped to continue this work in the future. It is encouraging that such crude methods as were used in this study have revealed something of interest.

Membership of the Group

The Wicken Fen Group is anxious to enrol new members, either as ringers, trainees or friends, but potential trainees are reminded of our two basic principles:

i) Ringing is a serious and disciplined undertaking, and those wishing to train must be prepared to visit the Fen with some regularity during the ringing season, mainly between April and October. The recommendation for a permit is not an inevitable consequence of ringing a certain number of birds or completing a given number of months' training, but depends on the complete confidence of the trainer concerned. The 'C' permit is awarded, after all, in his name.

ii) A good knowledge of bird identification is a necessary first step for the potential trainee.

There are two membership categories:

a) Members, who pay an annual subscription of £2.00 (but those who join the Group after August 1st will pay only £1.00 for the remaining part of that year).

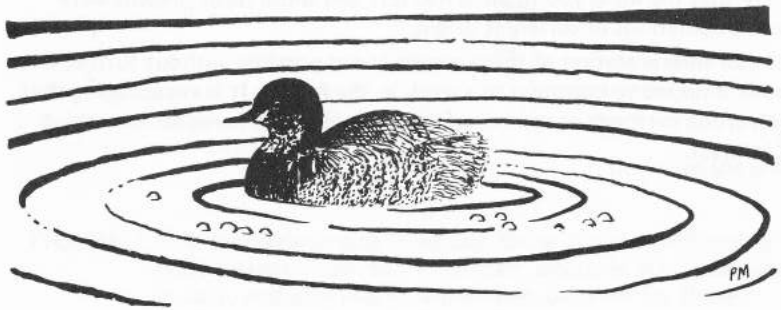
b) Friends, who pay an annual subscription of £0.75.

Both classes of members will receive the periodic bulletins produced by the Group, and one copy of each report.

Membership is open to those wishing to take part in the ringing activities. New members hoping to train as ringers may be asked to serve a probationary period of not more than three months. Anyone discontinuing membership within this period will be entitled to a refund of £1.50 of his subscription (£0.50 if he paid only the £1.00 subscription).

Friends of the Wicken Fen Group are always welcome; this category is intended for those who are interested in the Group's activities and would like to support them, but who do not wish to take part in the ringing itself.

Further details of membership are available from the Secretary.



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