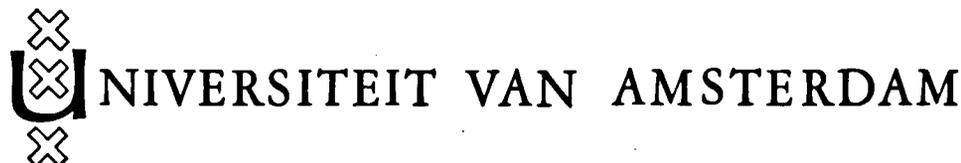


# BULLETIN ZOOLOGISCH MUSEUM



Vol. 5 No. 3 13-I-1976

## HEAVY FALL OF MIGRATING LAND-BIRDS ON BOARD OF A SHIP OFF CENTRAL AMERICA

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### ABSTRACT

Between 4 and 7 October 1973, during a spell of unfavourable weather, 85 North American migratory birds were found dead on board a ship sailing between Costa Rica and Belize and in the roads of Belize. They were donated to the Institute of Taxonomic Zoology, University of Amsterdam, where they were identified and examined on gonads, skull pneumatization, amount of fat, etc. Some of the species were recorded only once before from Belize under comparable weather conditions. A possible relation between difference in spring and autumn weight, and length of migration route is mentioned. Reliability of age determination by gonads and by skull pneumatization is discussed.

### INTRODUCTION

The bird department of the Institute of Taxonomic Zoology (Zoologisch Museum Amsterdam) enjoys the cooperation of a number of sailors. These people donate birds picked up dead on board of their ships to our collection. Through this activity, quite a number of birds from all over the world has been received already. Of the men sailing in the

Caribbean area, Mr. K. de Wit, chief cook with the Royal Dutch Steamship Company K.N.S.M. has made particularly valuable contributions to our bird collection. Early October 1973, when sailing from Limon (Costa Rica) to Belize (former British Honduras), he witnessed a major fall of North American migrants. In all, 85 specimens belonging to 17 species of passerines were collected.

### DATA ON THE VOYAGE AND SURVEY OF SPECIMENS RECEIVED

The vessel left Porto Limon in Costa Rica on 4 October 1973, and, steaming close to the coast of Nicaragua and Honduras, reached Belize in the afternoon of 6 October. During the night of 6/7 October the ship stayed in the roads of Belize. When on voyage off Nicaragua and Honduras, the sky was heavily clouded and rain was falling in unceasing showers. Frequently birds were seen trying to find cover on board, and a sample of those found dead

was collected, viz., one specimen each of *Hirundo rustica*, *Vireo olivaceus*, *Mniotilta varia*, *Helminthos vermivorus*, *Dendroica fusca*, *D. pensylvanica*, *Seiurus aurocapillus*, and *S. noveboracensis*, 2 specimens of *Dendroica magnolia*, and 3 of *Setophaga ruticilla*. In the night off Belize the weather was still worse, but nevertheless, the watchman, who even had difficulties to maintain himself on the rainy and windy deck, regularly heard the twittering of large groups of birds passing by. Quite a number of these hit the wires of the vessel during the rain showers, and were picked up dead on the morning of 7 October. They comprised even more species, with several specimens of each: 3 *Contopus virens*, 11 *Hylocichla ustulata*, 3 *H. minima*, 6 *Vireo olivaceus*, 5 *Vermivora peregrina*, 2 *Dendroica magnolia*, 14 *D. fusca*, 8 *D. pensylvanica*, 3 *D. castanea*, 5 *Seiurus aurocapillus*, 3 *Piranga rubra*, and 9 *P. olivacea*.

#### METHODS

Mr. K. de Wit packed each specimen in a piece of aluminium-foil as soon as possible, and all together, adequately labelled, in some plastic bags. They were immediately deep-frozen. When the birds arrived in Amsterdam on November 10, they were instantly weighed and labelled. The birds were not dissected and skinned until more than a year later. Sexing and determining of skull pneumatization was done with a stereo-microscope. We also tried to determine age and sex of the specimens according to plumage and wear, and compared the results with the condition of gonads and skull. Comparative data on migration, and winter area were taken from the AOU Checklist (1957) and Ridgway (1902, 1904, and 1907), data on occurrence in Belize, timing of migration and weight from Russell (1964).

#### THE SPECIMENS COLLECTED

*Contopus virens* (L.); Eastern Wood Peewee: 3 specimens, off Belize. Skull of all fully pneumatized, subcutaneously fat or rather fat. 1 adult ♂, 12.6 g, testis 3 × 1 mm; 1 adult ♀, 13.8 g, oviduct twisted and swollen, follicles of ovary varying in size, up to 1 mm; 1 juvenile ♀, 12.9 g, oviduct straight, but slightly swollen, follicles finely granulated.

Rather uncommon migrant in Belize in spring and

fall, but at times fairly numerous on keys off the coast.

*Hirundo rustica erythrogaster* Boddaert; Barn Swallow: 1 juvenile ♂, off Nicaragua/Honduras, lean, 12.0 g, testis small.

Common spring and fall transient throughout Middle America.

*Hylocichla ustulata swainsonii* Tschudi; Swainson's Thrush: 11 specimens, all off Belize, fat or very fat. 1 adult ♂, 31.2 g, skull pneumatized, testis 2.0 × 1.3 mm; 2 adult ♀♀, 30.6 and 32.6 g, skull pneumatized, oviduct twisted and swollen or straight but slightly swollen, ovaries finely granulated; 4 juvenile ♂♂, 30.0, 31.6, 33.4, and 37.4 g, skull nearly completely pneumatized, testis between 0.7 × 1.0 and 2.0 × 1.5 mm; 4 juvenile ♀♀, 26.7, 27.6, 30.0, and 33.2 g, skull not or only partly pneumatized, oviduct straight and thin or slightly swollen.

Only rarely recorded before on autumn migration in Belize: 1 specimen known for September, and 20 collected by Shufeldt for the University of Michigan Museum of Zoology on 9 October 1932 (Russell, 1964).

*Hylocichla minima* (Lafresnaye) ssp.; Gray-cheeked Thrush: 3 specimens, 6/7 October off the harbour of Belize. All fat or very fat subcutaneously. 1 adult ♂, 33.1 g, skull fully pneumatized, testis 2.0 × 1.2 mm; 1 adult ♀, 31.4 g, skull fully pneumatized, oviduct swollen and twisted, follicles of ovary varying, up to 1 mm in diameter; 1 juvenile ♂, 34.9 g, skull not pneumatized, testis 1 mm.

Like Swainson's Thrush, the Gray-cheeked is rarely recorded. One in November and 3 in May is the total score, besides 13 specimens collected on 9 October 1932 in Belize by Shufeldt.

*Vireo olivaceus* (L.); Red-eyed Vireo: 1 juvenile ♀ off Nicaragua and Honduras 4/6 October, 6 of various age and sex from Belize, 6/7 October, all fat to very fat. 1 adult ♂, 16.7 g, skull fully pneumatized, testis spherical, 1.3 × 0.8 mm; 2 adult ♀♀, 14.8 and 17.9 g, skull pneumatized, oviduct twisted and swollen, ovaries slightly enlarged, follicles varying in size, up to 1.6 mm; 2 juvenile ♂♂, 16.9 and 17.3 g, skull nearly completely pneumatized, testis small and flat; 2 juvenile ♀♀, 16.1 and 16.2 g, skull not completely pneumatized, showing 2 small transparent windows, oviduct straight, thin or slightly swollen.

Common transient in Middle America. Moderately

common as transient through Belize over an extended period in fall and spring.

*Mniotilta varia* (L.); Black-and-white Warbler: 1 adult ♂ off Nicaragua or Honduras, 4/6 October. 9.4 g, lean, skull fully pneumatized, testis spherical, 2 mm.

As the Black-and-white Warbler winters only marginally in South America, but mainly in Middle America and the Antilles, this specimen appears to be displaced or to have overshot its winter quarters, apparently as a consequence of the unfavourable weather.

*Helmitheros vermivorus* (Gmelin); Worm-eating Warbler: 1 adult ♂ off Nicaragua or Honduras. 13.7 g, much subcutaneous fat, skull fully pneumatized, testis spherical, 1.3 mm.

Like the Black-and-white Warbler, this species winters rarely south of Nicaragua, so the specimen may have lost its way near the southern limit of its winter distribution.

*Vermivora peregrina* (Wilson); Tennessee Warbler: 5 specimens on 6/7 October off Belize, all in good condition and with rather much fat. 2 adult ♂♂, 9.0 and 9.5 g, skull fully pneumatized, testis spherical, 0.7 × 0.8 mm; 1 juvenile ♂, 9.4 g, skull fully pneumatized, testis very small and translucent; 2 juvenile ♀♀, 8.7 and 9.0 g, skull partly pneumatized with 1 or 2 large translucent windows, oviduct straight and thin.

Winters in Middle America and the extreme northwest of South America. Nevertheless, it has been recorded rarely in winter in Belize, and only one autumn specimen (late October) was recorded previously.

*Dendroica magnolia* (Wilson); Magnolia Warbler: 2 juveniles (♂ and ♀) on 4/6 October off Nicaragua or Honduras, both lean; 1 adult ♂ and 1 juvenile ♀, both rather fat, near Belize on 6/7 October. 1 adult ♂, 6.7 g, skull fully pneumatized, testis rather small and flat, 1 mm; 1 juvenile ♂, 5.8 g, skull not completely pneumatized, with 2 large windows, testis very small; 2 juvenile ♀♀, 5.8 and 8.0 g, skull as juvenile ♂, oviduct straight and thin.

*Dendroica magnolia* hardly winters south of Nicaragua, so the 2 lean birds of 4/6 October were probably displaced. The species is an abundant migrant and winter resident in Belize.

*Dendroica fusca* (P.L. Statius Müller); Blackburnian Warbler: 1 lean adult ♀ between 4 and 6

October off Nicaragua or Honduras; 14 rather fat to very fat specimens of various age and sex on 6/7 October at Belize. 2 adult ♂♂, 10.1 g and 10.6 g, skull fully pneumatized, testis spherical, 1.0 × 0.8 mm; 2 adult ♀♀, 6.4 and 10.0 g, skull fully pneumatized, oviduct slightly twisted and swollen, ovaries finely granulated; 2 juvenile ♂♂, 8.8 and 9.2 g, skull hardly pneumatized, almost completely translucent, testis small and flat; 9 juvenile ♀♀, 8.3, 8.4, 8.7, 8.7, 8.8, 8.9, 9.4, 9.5, and 11.6 g, skull as juvenile ♂♂, oviduct straight and thin, ovaries very small, not granulated.

Recorded only once before in autumn from Belize, 5 specimens collected by Shufeldt on 9 October 1932. The species winters mainly in northern South America. It is not uncommonly seen in spring in Belize.

*Dendroica pensylvanica* (L.); Chestnut-sided Warbler: 1 lean juvenile ♂ from off Nicaragua/Honduras; 8 fat specimens from Belize. 1 adult ♂, 9.6 g, skull pneumatized, testis 1.0 mm, opaque; 1 adult ♀, 8.7 g, skull pneumatized, oviduct swollen and twisted; 3 juvenile ♂♂, 6.1, 8.9, and 10.0 g, skull not pneumatized, with 2 smaller or larger windows, testis very small and translucent; 4 juvenile ♀♀, 8.3, 9.2, 9.2, and 9.3 g, skull not or partly pneumatized, leaving 2 smaller or one larger window, oviduct straight and thin.

Rarely recorded in autumn from Belize, only a few specimens from September and October being known. Winters apparently mainly in southern Middle America.

*Dendroica castanea* (Wilson); Bay-breasted Warbler: 3 juvenile ♀♀ from Belize, 6/7 October. 10.8, 11.4, and 11.7 g, fat subcutaneously, skull completely or almost completely pneumatized, oviduct straight, but rather swollen.

Besides one autumn (2 specimens on 9 October 1932 collected by Shufeldt) and one winter (December) record, only spring specimens are known for British Honduras.

*Seiurus aurocapillus aurocapillus* (L.); Ovenbird: 1 adult ♀ off Honduras/Nicaragua on 4/6 October (lean); 5 specimens from Belize 6/7 October (all fat). 2 adult ♀♀, 13.7 and 17.8 g, skull fully pneumatized, oviducts swollen and twisted, ovaries finely granulated; 2 juvenile ♂♂, 18.4 and 19.1 g, skull mainly not pneumatized, testis fairly flat, 0.8 to 1.3 mm long; 2 juvenile ♀♀, 18.0 and 18.1 g, skull not pneumatized, oviduct

straight, thin or slightly swollen. Contrary to all other birds collected by Mr. De Wit, one of the adult ♀♀ showed active moult of body feathers and wing-coverts.

The subspecific identification is provisional, as only limited material for comparison was available. The Ovenbird is a moderately common fall and spring migrant and occurs in moderate numbers in winter in Belize. It winters as far south as the Antilles and extreme northwestern South America, the specimen off Honduras/Nicaragua perhaps already overshooting its target, being displaced by the bad weather.

*Seiurus noveboracensis* (Gmelin) ssp.; Northern Waterthrush: 1 juvenile ♀ on 4/6 October off Honduras or Nicaragua, 10.7 g, lean, skull not pneumatized, oviduct straight and thin.

Winters in Middle and northern South America, so the record is not unusual, although the low weight may indicate that it is possibly displaced. *Setophaga ruticilla* (L.) ssp.; American Redstart: 3 specimens collected on 4/6 October off Honduras/Nicaragua, all very lean. 1 juvenile ♂, 5.4 g, skull hardly pneumatized, testis very small; 2 juvenile ♀♀, 5.2 and 5.5 g, skull as ♂, oviduct straight and thin, ovaries very small.

Common winterer in Middle and northern South America.

*Piranga rubra* (L.); Summer Tanager: 3 specimens from Belize, all fat and with 2 large translucent windows in the skull. 1 adult ♀, 30.1 g, oviduct swollen and twisted, follicles of ovary varying in size, between 0.3 and 0.6 mm in diameter; 1 juvenile ♂, 29.0 g, testis 1 mm, translucent; 1 juvenile ♀, 29.9 g, oviduct straight and thin, ovary not granulated.

Not uncommon in fall, winter, and spring in British Honduras.

*Piranga olivacea* (Gmelin); Scarlet Tanager: 9 specimens, all from Belize and in good condition, fat to very fat. 2 adult ♂♂, 28.8 and 29.3 g, skull fully pneumatized, testis spherical, 2.0 X 1.4 mm; 1 adult ♀, 27.2 g, skull fully pneumatized, oviduct twisted and swollen, all follicles of the ovary c. 0.7 mm in diameter; 3 juvenile ♂♂, 30.3, 30.7, and 32.1 g, skull nearly completely pneumatized (2 small windows), testis small and flat, 0.7 - 1.0 mm long; 3 juvenile ♀♀, 29.0, 30.1, and 34.3 g, skull fully pneumatized or with 2 very small translucent windows, oviduct straight and thin.

Not recorded before from Belize in autumn, except for 22 specimens, collected by Shufeldt on 9 October 1932, "probably due to unfavorable climatic conditions at the time" (Russell, 1964).

#### SPECIES COMPOSITION OF BOTH SAMPLES

The difference in species composition between birds found dead on 4/6 October off Nicaragua and Honduras, and on 6/7 October off the harbour of Belize is quite apparent, obviously because of the difference in circumstances under which the birds came on board. The specimens collected on 4/6 October were for the greater part exhausted and picked up in bad condition, as if they already had made a long flight. Almost all individuals belonged to species wintering in Middle America or at most in the extreme northern part of South America. At least some of them were apparently overshooting their winter quarters. On the other hand, the dead birds found on deck in the morning of 7 October off the harbour of Belize mostly belonged to species wintering farther to the south, mainly in South America, or at most in the more southern parts of Central America. These birds were in good condition, all with fairly heavy subcutaneous and mesenteric fat layers, and they seemed to have been killed by hitting the wires of the ship while flying low over. The only exceptions to this rule: "Middle America = lean, South America = fat" were a specimen of *Helminthos vermivorus* (fat, but supposed to winter in Middle America), and one each of *Dendroica fusca* and *Hirundo rustica* (lean, but wintering in South America).

#### PREVIOUS MASS OCCURENCE OF RARE MIGRANTS

Of the birds, picked up on board of the ship off Belize, a number is commonly recorded as migrant (Russell 1964), e.g. *Contopus virens*, *Vireo olivaceus*, *Dendroica magnolia*, *Seiurus aurocapillus*, and *Piranga rubra*. The others are very rarely observed in autumn, at most once or twice, so the occurrence of fairly large numbers on 6/7 October seems exceptional. However, one date, on which a large number of birds was collected, was recorded previously: on 9 October 1932, P.W. Shufeldt collected among others 20 specimens of *Hylodichla ustulata*, 13 of *H. minima*, 5 of *Dendroica fusca*, 2 of *D. castanea*, and 22 of *Piranga olivacea*, all

of them being extremely rarely recorded before or afterwards from British Honduras. Russell (1964) suggested that the weather must have been exceptional at that time; this suggestion is corroborated by Weightman (1933), who recorded a hurricane in Middle America between 7 and 15 October 1932. The hurricane reached its lowest pressure on the evening of the 9th, when the centre was in a short distance east of Belize. The hurricane moved westward the next days. As the above mentioned birds were hardly seen again in Belize until the present record (although probably migrating regularly through Middle America), the weather conditions on 6/7 October 1973 may have been similar to those of 1932. In the Monthly Weather Review, vol. 102, no hurricane is reported for Belize in October 1973, although there were some tropical storms nearby in September (Hebert and Frank, 1974). However, on 9/10 October records were received of a hurricane later named "Fran" and of a nearby tropical storm both northeast of Cuba, moving northeastward. It seems not improbable that these two were born some days before in the western Caribbean, in connection with the bad weather noted by Mr. De Wit between 4 and 7 October, which caused the death of so many birds.

#### WEIGHTS

As noted before, most birds found dead on 4/6 October were lean, with a weight considerably lower than that mentioned by Russell (1964). The Belize birds of 6/7 October were heavier, and fat layers suggest that they were in optimal migrating condition. Although Russell records only a limited number of weights from spring migrants in British Honduras, it is interesting to compare these with our October data. It appears that the average weight of migrating spring specimens of *Contopus virens*, both *Hylocichla*'s, *Vermivora peregrina*, and *Piranga rubra* is similar to that of migrating October specimens, while *Vireo olivaceus*, the 4 *Dendroica* species, and *Piranga olivacea* are much heavier in spring than in autumn. If a non-stop migration flight is supposed (as may be suggested by the absence of these species in British Honduras during normal weather conditions), one may conclude that the former species are about half way their flight, while for the latter the winter quarters are closer at hand.

#### AGEING BY SKULL PNEUMATISATION

Generally, the stage of skull pneumatisation (or ossification, as it is sometimes called) was a reliable ageing character in early October. All birds which proved to be adult by gonads and plumage had fully pneumatised skulls, except for 1 ♀ *Piranga rubra*, which showed 2 large translucent windows, although the gonads were well developed and the feather structure and brightness of plumage indicated maturity. In juveniles, a wide range was found in the amount of ossification. Mostly it had hardly started, about 40 out of 58 still showing completely translucent skulls or 1 or 2 large windows. In *Piranga olivacea*, *Contopus virens*, *Vireo olivaceus*, *Dendroica castanea*, and part of *Hylocichla ustulata* and *Dendroica pensylvanica* pneumatisation was in full progress and the skull showed only small windows, while in 4 specimens, the juvenile *Contopus*, 1 of *Vermivora peregrina*, 1 of *Dendroica castanea*, and 1 of *Piranga olivacea*, skulls were already fully pneumatised, resembling adults, although in some of the latter the skull was more opaque and appeared thicker than in juveniles. Concluding, 5 out of 85 (c. 6%) could not be reliably aged by skull in early October.

#### AGEING BY GONADS

Where plumage is concerned, ageing is usually easy in autumn, as adults often show differently shaped tail and flightfeathers, tertials, or wing-coverts when compared with juveniles, while in some species also obvious differences in colour occur. Sexing by plumage appeared to be impossible in some of the species examined, but in others, e.g. most Parulidae and *Piranga* it is as a rule rather easy. Many of the species collected by Mr. De Wit also showed distinct differences in wing length between the sexes, in case that birds of the same age were compared: adult ♂♂ are usually largest, adult ♀♀ and juvenile ♂♂ in between, and juvenile ♀♀ smallest. Sexing by gonads is of course obvious, but ageing more difficult. Yet, in the ♀♀ of our sample, 11 out of 13 adults had twisted and swollen oviducts, and 28 out of 36 juveniles had them straight and thin. Besides, adults also showed distinctly granulated ovaries with follicles up to 1.5 mm, while those of juveniles hardly revealed

any structure. Two females, adult by plumage and skull pneumatisation, had straight but swollen oviducts and finely granulated ovaries, perhaps because they did not breed during 1973, or because of a more intense degeneration of the oviduct after breeding. In 8 juveniles, oviducts appeared straight and swollen, probably indicating that egg-glands were active already, but no egg had been laid. Of 49 ♀♀, 10 (c. 20%) could not be reliably aged by gonads.

It proved difficult to age ♂♂ by gonads; as a rule, adults showed larger, less translucent and more spherical gonads, while juveniles had them smaller, flat, and translucent, but the distinction was difficult in quite a number of specimens.

#### ACKNOWLEDGEMENTS

We are indebted to Mr. K. de Wit for collecting the birds on board of the ship and donating them,

and to the Officers of the ship for permission to take the birds to the Netherlands. I like to thank Dr. J. Wattel for his encouragement to write this paper, Mr. P. Graat for his help in skinning and dissecting the specimens, and the Director of the Royal Netherlands' Meteorological Institute K.N. M.I. for providing weather data.

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Received: 17 October 1975