Jadwiga Złotorzycka

Mallophaga from Birds Associated with the Water Environment in Poland

Wszyscy (Mallophaga) ptaków Polski, związanych ze środowiskiem wodnym

Пухоеды (Mallophaga) птиц Польши, связанных с водной средой

I. PROVENANCE OF MATERIAL

The Mallophaga examined during the course of the enquiry were collected from birds in the Wroclaw, Katowice, Kraków, Lublin, Warszawa, Białystok, Olsztyn, Gdańsk and Koszalin Provinces in the years 1950—1959.

They were taken from the birds representing 13 families, which I numbered according to the sequence assumed by Sokolowski (1958). Only Strigidae and Falconidae are placed at the end of the list (Nos. 12 and 13), because, contrary to the other families of birds searched for Mallophaga, all the species of these two families are not connected with the water environment. The numeration so established is consequently kept throughout the present study and also applied in the map to mark the localities at which the birds of the following families examined for Mallophaga were found: 1. Ciconiidae, 2. Plegadiidae, 3. Ardeidae, 4. Gruidae, 5. Rallidae, 6. Charadriidae, 7. Laridae, 8. Anatidae, 9. Phalacrocoracidae, 10. Podicipedidae, 11. Colymbidae, 12. Strigidae, 13. Falconidae (Fig. 1).

As will be seen from this map the most abundant material was collected in the Wroclaw Province, especially in the environs of the towns of Wroclaw and Milicz. The following families were represented by the birds examined for Mallophaga from the Wroclaw region: Ardeidae, Rallidae, Charadriidae, Laridae, Anatidae, Phalacrocoracidae, Podicipedidae, Colymbidae, Strigidae and...
Falcoidae. They were mostly shot, while on migration, on the banks of the Odra River and its tributaries and sometimes in small marshy areas. In the Milicz region I also collected rich material embracing the families Ardeidae, Rallidae, Charadriidae, Laridae, Anatidae, Podicipedidae and Falconidae. These birds inhabited the areas abounding in ponds and marshes, where they also mostly nested.

The Mallophaga found on the Ciconiidae and Anatidae from the Wroclaw Zoological Garden deserve a special mention. I managed to collect them from living birds thanks to the kindness of Dir. K. Łukaszewicz, for which I should like to express my warm gratitude to him.

* Distribution of localities in which Mallophaga were collected from the respective avian families.
A part of *Mallophaga* from the birds of the family *Falconidae* were collected at Węglińiec near Zgorzelec in the Wroclaw Province. All the *Mallophaga* from the Wroclaw Province were collected by me personally.

Abundant material was collected by me, also personally, in the Pomorze Lake District, near Bytów in the Koszalin Province. I have elaborated it in a separate paper (Złotorzycka 1959 a). This collection consisted of *Mallophaga* from the following avian families: *Rallidae, Charadriidae, Laridae, Anatidae, Podicipedidae* and *Falconidae*. I obtained most of these birds through the courtesy of Prof. G. Poluszyński, who at that time (1957), together with his co-workers, carried out investigations on the endoparasites of birds near Bytów. The Pomorze Lake District is a haunt of many species of birds migrating or nesting there. Similar features characterize the avifauna of the lakes in the Suwalki region in the Białystok Province. Here *Mallophaga* were taken from the following families of birds: *Ciconiidae, Ardeidae, Rallidae* and *Podicipedidae*. I was given some *Mallophaga* from *Rallidae, Anatidae* and *Podicipedidae* from the Goldap region and those from *Ciconiidae* from the Białowieża region by J. Wiprzycki, student of the Warsaw University, who subsequently died prematurely. Besides, I received from him the *Mallophaga* from *Ciconiidae, Gruidae, Charadriidae, Laridae* and *Falconidae* from the Warszawa Province and some from *Ciconiidae, Plegadiidae, Ardeidae, Anatidae* and *Falconidae* from the Lublin Province. I owe to Eng. J. Danecki, co-worker of the Zoological Museum in Wroclaw, for the material from *Falconidae* from the Olsztyn region. I was provided with *Mallophaga* from the remaining provinces, namely with those from *Charadriidae, Laridae, Anatidae* and *Podicipedidae* from Pomorze (Gdańsk Province), from *Anatidae* and *Falconidae* from the Katowice Province and from *Rallidae* and *Podicipedidae* from the Kraków Province by Mgr. Z. Dąbrowski, worker of the Jagellonian University. My hearty thanks are due to both of them.

My elaboration of *Mallophaga* is grounded on material from various parts of Poland and from various environments. Therefore, I believe it possible to sketch the general characteristics of the *Mallophaga* fauna of Poland on the basis of my material, though the data from several provinces have been lacking so far. I have been also prompted to do this by my previous (Złotorzycka 1959 a and b) and present observations as well as by the data from literature indicating that the specific composition of *Mallophaga* depends chiefly on the species of the host and not on the locality of its occurrence. To illustrate these observations better I have included in my study some material from *Ciconiidae, Rallidae, Laridae, Charadriidae* and *Anatidae* that I received by exchange from Dr. Savo Brelil from Yugoslavia, for which I should like to express my thanks to him.

As regards the birds bred in zoological gardens, I have noticed (Złotorzycka 1959 b) that those birds may have been bred for many generations, but they have the same species of *Mallophaga* as the respective birds living
at liberty. What makes them different is that the Mallophaga fauna from the birds reared in captivity is impoverished in species and, generally, in number so that after long breeding only the most characteristic Mallophaga of the given species are to be found on them.

The faunistic elaboration of the Mallophaga of Poland, as extensive as the present study, is the first one of this kind, as, so far, the data from the literature on this subject matter have been limited to the work by S. Kéler (1940). In this work he mentions 28 species of Mallophaga collected by E. L. Niezabitowski from various families of birds and mammals in Poland. Among others he quotes the following Mallophaga from Poland which I also used to find in this country: Ciconiphilus decimfasciatus (Bois. et Lac.) by syn. Aneutalus importunus (Nitzsch) from unidentified Ardeidae, Colpocephalum zebra Nitzsch from Clethrionomys glareolus (Schreber) and Ardea cinerea L., Craspedorrhynchus platystomus (Nitzsch) from Aquila chrysaetos L., Neophilopterus tricolor (Nitzsch) from Ciconia nigra L., Quadraceps phaenotus (Nitzsch) from an unidentified gull, Strigiphilus cursor (Nitzsch) from Asio flammeus Pont. and Trinoton querquedulae (L.) from Anas platyrhynchos L. and from Nyroca marila L.

Consequently all the species of Mallophaga collected by me are new to Poland with the exception of the above-mentioned ones.

II. METHOD OF COLLECTING AND PRESERVING MATERIAL

Collections of Mallophaga were made in the manner described below. Immediately after killing or catching a bird all the Mallophaga noticed were collected and preserved in 70 per cent alcohol. I tried to repeat the same procedure with each bird for several successive days. Then, having treated material thus preserved with KOH, I made permanent preparations from it in Canada balsam following the routine method. I have realized that the treatment of Mallophaga with alkali is very important in this method, because the good clarification of Mallophaga facilitates their identification. I made the drawings of the specimens identified using a ROW microscope as a projector of image. 22 drawings made by this method are included in this work.

III. SURVEY OF MATERIAL COLLECTED

The Mallophaga collected were elaborated faunistically according to the particular families of birds infested by them. In identifying the specimens I chiefly used the monography by Séguy (1944). Unluckily, this work is not
accurate and somewhat out of date as far as its nomenclature is concerned. Therefore, for the identification of specimens I was compelled to employ also source-books (Denny 1842, Giebel 1864, Burmeister 1838, Kellogg 1896, Mjöberg 1910) as well as more recent monographies (Blagoveschensky 1940 a) and works comprising revisions of particular species of *Mallophaga* (Clay 1949 a, 1953, 1958, 1959, Hopkins a. Timmermann 1954). I applied the specific classification of Hopkins and Clay (1952) for *Mallophaga* and that of Sokolowski (1958) for birds. The data quoted for each of *Mallophaga* species discussed were taken, as a rule, from the recent literature (after 1940). The data from older writers were cited after Ségy (1944) and Hopkins a. Clay (1952). More recent faunistic data come mostly from the works by Balat (1953 a and b, 1955, 1956, 1958), Blagoveschensky (1940 b, 1948, 1951), Tuleshkov (1957, 1958), Szidat (1940), Eichler (1949) and Clay (1958).

I consider the above-mentioned works to be sufficient and most suitable, because they include many data more reliable and accurate than those from the works of the older authors. In order to obtain a possibly exact picture of the geographic distribution of *Mallophaga*, in citing the data from other works I take care to name the country or its region where the specimens in question were found, when possible. On this basis I attain another proof that the specific composition of *Mallophaga* depends chiefly upon the host species and not upon the geographic conditions under which the latter occurs.

In the present study *Mallophaga* are dealt with according to particular avian families within which they parasitize. In this way 13 sections have been established, in which I discuss the specimens collected from birds belonging to the families listed at the beginning of this work. Each section is provided with the general characteristics of the occurrence of the *Mallophaga* from the given family of birds. *Mallophaga* species typical of given families of birds are discussed at length, and the atypical ones are mentioned. The *Mallophaga* recognized typical in literature (Hopkins a. Clay 1952) or frequently found on birds of the species in question are reckoned among typical ones. On the other hand, those exceptionally found on the birds examined and in literature mentioned as typical of other avian families are reckoned here among atypical species. I avoid the use of the term „casual species“ intentionally, because I was often unable to explain what had caused the exceptional occurrence of certain *Mallophaga* on some birds.

The survey of the hosts showing the degree of infestation by *Mallophaga* is presented in Table I.

As can be seen from this table 1-5 typical species of *Mallophaga* were generally found on particular species of birds. The greatest number of typical species were found on Ciconia ciconia L., Grus grus L., Fulica atra L., Gallinula chloropus L., Larus canus L., Sterna hirundo L., Chlidonias niger L., Anas platyrhynchos L., A. querquedula L., A. penelope L., Nyroca nyroca Güld., Milleus migrans Bodd.
<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Number of birds</th>
<th>Number of Mallophaga typical</th>
<th>Number of Mallophaga atypical</th>
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<tr>
<td>1. Ciconiidae</td>
<td>Ciconia ciconia L.</td>
<td>7</td>
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<td>4</td>
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<td></td>
<td>Ciconia nigra L.</td>
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<td>2. Plegadiidae</td>
<td>Platalea leucorodia L.</td>
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<td>3. Ardeidae</td>
<td>Botaurus stellaris L.</td>
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<td>Ardea cinerea L.</td>
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<td>4. Gruidae</td>
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<td>5. Rallidae</td>
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<td>Gallinula chloropus L.</td>
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<td>52</td>
<td>4</td>
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<td>6. Charadriidae</td>
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<td>Capella gallinago L.</td>
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<td>Scolopax rusticola L.</td>
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<td>2</td>
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<tr>
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<td>Tringa erythropus PALL.</td>
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<td>18</td>
<td>3</td>
</tr>
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<td>Tringa ochropus L.</td>
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<td>9</td>
<td>2</td>
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<td>Limicola falcinellus PONT.</td>
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<td>13</td>
<td>1</td>
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<td></td>
<td>Actitis hypoleucos L.</td>
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<td>Calidris minuta LEISL.</td>
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<td>Calidris alpina L.</td>
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<td>6</td>
<td>3</td>
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<tr>
<td>7. Laridae</td>
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<td>Larus canus L.</td>
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<td>Sterna hirundo L.</td>
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<td>Sterna macrura NAUM.</td>
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<td>5</td>
<td>1</td>
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<tr>
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<td>Sterna albifrons PALL.</td>
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<td>Chlidonias nigra L.</td>
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<td>Anas querquedula L.</td>
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<td>5</td>
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<tr>
<td></td>
<td>Anas penelope L.</td>
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<td>62</td>
<td>4</td>
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<td>Anas crecca L.</td>
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<td>Anas strepera L.</td>
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<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nyroca nyroca GÜLD.</td>
<td>4</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Nyroca fuligula L.</td>
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<tr>
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<td>Bucephala clangula L.</td>
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<td>13</td>
<td>2</td>
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<td></td>
<td>Anser anser L.</td>
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<td>6</td>
<td>2</td>
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<tr>
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<td>Anser fabalis LATH.</td>
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<tr>
<td></td>
<td>Cygnopsis cygnoides L.</td>
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<td>3</td>
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<tr>
<td>9. Phalacrocoracidae</td>
<td>Phalacrocorax carbo L.</td>
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</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Number of birds</td>
<td>Number of Mallophaga typical</td>
<td>Number of Mallophaga atypical</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>----------------</td>
<td>------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>10. Podicipidae</td>
<td>Podiceps cristatus L.</td>
<td>23</td>
<td>162</td>
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<tr>
<td></td>
<td>Podiceps nigricollis Brehm</td>
<td>6</td>
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<td>Podiceps ruficollis Pall.</td>
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<td>Podiceps griseigena Bodd.</td>
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<td>Podiceps auritus L.</td>
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<td>12. Strigidae</td>
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<td>Tyto alba Scop.</td>
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<td>1</td>
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<tr>
<td>13. Falconidae</td>
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<td>Milvus migrans Bodd.</td>
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<td>72</td>
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<td>Buteo buteo L.</td>
<td>23</td>
<td>608</td>
<td>3</td>
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<td></td>
<td>Buteo lagopus Brun.</td>
<td>3</td>
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<td>Accipiter nisus L.</td>
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<td>2</td>
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<td>Accipiter gentilis L.</td>
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<td>5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Falco tinunculus L.</td>
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<td>6</td>
<td>1</td>
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<td>Falco subbuteo L.</td>
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<td>7</td>
<td>1</td>
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<td></td>
<td>Pandion haliaetus L.</td>
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<td>16</td>
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</tr>
<tr>
<td></td>
<td>Haliaetus albicilla L.</td>
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<td>31</td>
<td>3</td>
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<tr>
<td></td>
<td>Circus aeruginosus L.</td>
<td>3</td>
<td>34</td>
<td>3</td>
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<tr>
<td>Together:</td>
<td></td>
<td>317</td>
<td>3757</td>
<td></td>
</tr>
</tbody>
</table>

List of Mallophaga typical of given hosts

The fauna of Mallophaga typical of particular species of birds presents itself in my collection as follows:

Actornithophilus affinis (Nitzsch) — Tringa erythropus Pall.
Actornithophilus lyallpurensis Ansari — Tringa ochropus L.
Actornithophilus ochraceus (Nitzsch) — Vanellus vanellus L.
Actornithophilus piceus (Denny) — Chlidonias nigra L.
Actornithophilus spinulosus (Piag.) — Calidris minuta Leisl.*
Anaticola anseris (L.) — Anser anser L.
Anaticola crassicornis (Scop.) — Cygnopsis cygnoides L.*

* The species of birds, on which the respective Mallophaga species have not been hitherto found, are marked with an asterisk.
Anaticola crassicornis (Scop.)

Anatoecus dentatus (Scop.)

Aquanirmus colymbinus (Scop.)

Ardeicola ciconiae (L.)
Ardeicola maculatus (Nitzsch)
Ardeicola stellaris (Denny)
Ardeiphilus trochioxus (Burm.)
Austromenopon durisetosum (Blag.)
Austromenopon fuscofasciatum (Piaq.)
Austromenopon icterus (Burm.)
Austromenopon lutescens (Burm.)
Austromenopon nigropleurum (Denny)
Austromenopon ridibundus (Denny)

Carduiceps cingulatus (Denny)

Ciconiophilus decimfasciatus (Bois. et Lac.)
Ciconiophilus pectiniventris (Haar.)
Ciconiophilus quadripustulatus (Burm.)
Colpocephalum flavescens Haan.

Colpocephalum tricinctum Nitzsch
Colpocephalum zebra Burm.
Crasspedonirmus colymbinus (Denny)
Craspedorrhynchus pachypus (Gieb.)
Crasedorrhynchos platystomus (Burm.)

Degeeriella dissocephalus (Burm.)
Degeeriella fulva (Gieb.)

Degeeriella fusca (Denny)
Degeeriella r. regalis (Gieb.)
Degeeriella r. rufa (Burm.)

Eastiopterus gruis (L.)
Falcipennis sulcirostris (Denny)
Fulicola lurida (Nitzsch)
Fulicola rallina (Denny)
Gruimnepo po longum (Gieb.)
Hemicometus macilentus (Nitzsch)
Holomenopon leucoxanthum (Burm.)

Holomenopon nyrocae (Blag.)
Ibidoeus platoleae (Denny)
Incidiros fulicae (L.)
Incidiros ralli (Scop.)
Kurodaia haliaeet (Denny)
Laemobothrion circi Fourc.

Laemobothrion tinnunculi (L.)
Lunaceps holophaeus (Burm.)

Neophilopterus incomplectus (Denny)
Neophilopterus tricolor (Burm.)
Ornithobius cygni (L.)
Pseudomenopon pilosum (Scop.)

— Accipiter gentilis L.
— Accipiter nisus L.*
— Aquila pomarina Br.*
— Buteo buteo L.
— Buteo lagopus Brünn.*
— Milvus migrans Bodd.
— Haliaeetus albicilla L.
— Asio flammeus Pont.*
— Buteo buteo L.
— Ciconia ciconia L.*
— Circus aeruginosus L.
— Milvus migrans Bodd.
— Accipiter nisus L.
— Falco tinnunculus L.
— Grus grus L.
— Haliaeetus albicilla L.
— Fulica atra L.
— Gallinula chloropus L.*
— Grus grus L.
— Grus grus L.
— Anas platyrhynchos L.
— Anas querquedula L.*
— Buphala clangula L.*
— Nyroca nyroca Guld.*
— Platalea leucorodia L.
— Fulica atra L.
— Gallinula chloropus L.*
— Pandion haliaeet L.
— Circus aeruginosus L.
— Milvus migrans Bodd.
— Falco subbuteo L.
— Calidris minuta Leisl.*
— Limicola falcinellus L.
— Ciconia ciconia L.
— Ciconia nigra L.
— Cygnus cygnus L.
— Anas platyrhynchos L.*
— Fulica atra L.
— Gallinula chloropus L.
— Podiceps auritus L.
— Podiceps cristatus L.
— Podiceps griseigena Bodd.
— Podiceps nigricollis Br.
— Podiceps ruficollis Pall.
Quadraceps furcatus (Burm.)
Quadraceps juncus (Scop.)
Quadraceps phaeonotus (Nitzsch)
Quadraceps punctatus (Burm.)
Quadraceps sellatus (Burm.)
Quadraceps similis (Gieb.)
Ralllicola fulicae (Denny)
Ralllicola minutus (Nitzsch)
Rhynonirnus helvolus (Burm.)
Rhynonirnus scolopacis (Denny)
Saemundssonia gonothorax (Gieb.)
Saemundssonia integer (Nitzsch)
Saemundssonia melanocephalus (Burm.)
Saemundssonia mülli Eich.
Saemundssonia temporalis (Gieb.)
Saemundssonia variabilis (Denny)
Strigiphilus cursor (Burm.)
Striphilus rostratus (Burm.)
Trinoton lituratum Burm.
Trinoton querquedulae (L.)
— Tringa erythropus Pall.
— Tringa ochropus L. *
— Actitis hypoleucos L.
— Vanellus vanellus L.
— Chlidonias niger L.
— Sterna albifrons L.
— Sterna hirundo L.
— Larus canus L.
— Larus ridibundus L.
— Sterna hirundo L.
— Phalacrocorax carbo L.
— Fulica atra L.
— Gallinula chloropus L.
— Scolopax rusticola L.
— Capella gallinago L.
— Larus canus L
— Grus grus L.
— Chlidonias niger L.
— Sterna albifrons Pall.
— Sterna hirundo L.
— Sterna occidentalis NAUM.
— Larus canus L. *
— Larus ridibundus L.
— Vanellus vanellus L.
— Calidris alpina L.
— Calidris minuta Leisl.
— Asio flammeus Pont.
— Tyto alba Scop.
— Anas penelope L.
— Anas platyrhynchos L.
— Anas querquedula L. *
— Anas strepera L. *
— Anas crecca L.
— Anas penelope L.
— Anas platyrhynchos L.
— Anas querquedula L.
— Nyroca nyroca GÜLD.

A total of 73 species of Mallophaga was examined.

Mallophaga atypical of given hosts

Atypical Mallophaga occur on birds rather rarely and in small numbers. First of all, they are species common on their typical hosts. This can be easily explained, as the Mallophaga that infest one bird abundantly have more chance
of migrating to another bird than those that are scarce and few. Of the total of 317 birds searched for Mallophaga 19 exhibited the presence of atypical species. Of the total of 3757 Mallophaga collected 169 were atypical, representing 19 species. Among the atypical species collected special attention should be paid to Pseudomenopon pilosum (Scop.), which was being found on atypical hosts more frequently than any other species, and to Degeeriella fulva (Gieb.), of which lots were collected from atypical hosts. The occurrence of these two species will be discussed in the faunistic part of this study, in the sections on the Mallophaga from their typical hosts. I have noticed some irregularities in the general arrangement of the atypical species, and these are illustrated in Table II. All the atypical Mallophaga collected, together with their hosts, are specified in this table in reference to those avian families in which they were previously found, that is to say in reference to their typical hosts. The presence of atypical Mallophaga may have been caused by the lack of isolation of the shot birds, or by other factors in the cases, in which I was able to state for certain that the dead birds were separated one from another. The latter fact is marked in Table II and in other places of this work with the sign „+“.

The following letter symbols are used in the caption of Table II: „a“ for the columns comprising the numbers of birds of the given species infested by a definite species of atypical Mallophaga, „b“ indicates the columns in which these species of atypical Mallophaga are specified and „c“ the columns with the numbers of individuals of the atypical species of Mallophaga.

Atypical Mallophaga were most frequently taken from birds of the families Rallidae, Anatidae, Podicipidae and Falconidae, and they very often belong to the species that should live on birds of other families such as Rallidae, Charadriidae, Anatidae and Falconidae. On the base of my observations these relations would be as follows:

1. Mallophaga typical of Rallidae tend to migrate to the birds of the family Anatidae.

Rallidae are rather often atypical hosts of the Mallophaga typical of Laridae and Charadriidae.

2. Mallophaga typical of Anatidae tend to migrate to the birds of the families Rallidae, Podicipidae and Falconidae.

Anatidae are rather often atypical hosts of the Mallophaga typical of Rallidae and Charadriidae.

3. Mallophaga typical of Falconidae tend to migrate to the birds of the families Podicipidae and Strigidae.

Falconidae are rather often atypical hosts of the Mallophaga typical of Anatidae.

4. Mallophaga typical of Charadriidae tend to migrate to the birds of the families Rallidae, Anatidae and Podicipidae. No tendency to receive Mallophaga from other avian families has been noticed in the birds of the family Charadriidae.
5. No tendency to migrate to other birds has been found in the *Mallophaga* typical of *Podicipidae*. *Podicipidae* are rather often atypical hosts of the *Mallophaga* typical of *Charadriidae*.

6. No more considerable tendency to migrate to other birds has been found in the *Mallophaga* typical of *Laridae*. Similarly the birds of the family *Laridae* rarely receive *Mallophaga* from other birds.

I believe that the explanation of these facts is to be found in the influence exerted upon *Mallophaga* living on different birds by different ecological conditions. These relations are certainly not simple, and only further investigations will render an exhaustive answer and explanation possible.

IV. FAUNISTIC DISCUSSION OF MALLOPHAGA FROM THE VIEWPOINT OF THEIR PERTAINING AS PARASITES TO PARTICULAR FAMILIES OF BIRDS

1. *Mallophaga* from *Ciconiidae*

7 specimens of *Ciconia ciconia* L. from the Milicz region, the Białystok and Lublin Province, Jugoslavia and 1 specimen of *Ciconia nigra* L. from the Wroclaw Zoological Garden, were examined for *Mallophaga*.

In spite of a small number of birds examined I succeeded in collecting almost all species of *Mallophaga* typical of these two species of birds. Therefore I think that all these *Mallophaga* are common on their respective species of storks. Unluckily the data from literature, though consistent with one another, are published rarely. Supposedly it is so because storks are seldom searched for parasites, as they are under protection. The composition of the *Mallophaga* population on *Ciconia ciconia* L. varies from that on *C. nigra* L. However, the species of *Mallophaga* that live on *Ciconia nigra* L. are very similar to the respective species from *Ciconia ciconia* L. and constitute their substitutive species.

*Neophilopterus incompletus* (Nitzsch 1818)

34 ♂♂, 39 ♠♀ and 4 juv. found on 7 *Ciconia ciconia* L. This species was present on all the storks examined. It is considered to be a typical parasite of *Ciconia ciconia* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, Tuleshkov 1958 — Bulgaria, Szidat 1940, Séguy 1944).

*Neophilopterus tricolor* (Burm. 1838)

Colpocephalum zebra Burm. 1838


Ciconophilus quadripustulatus (Burm. 1838)

19 ♂♂, 63 ♀♀ and 19 juv. taken from 2 Ciconia ciconia L. from Radziądz near Milicz on 13. VIII. 1955. Both birds were infested by Mallophaga so heavily that a total of 85 specimens of various species was collected from one bird and as many as 135 from the other. Ciconophilus quadripustulatus (Burm.) is typical of Ciconia ciconia L. (Hopkins a. Clay 1952, Szidat 1940, Seguy 1944).

Ardeicola ciconiae (L. 1758)

3 ♂♂, 8 ♀♀ and 1 juv. obtained from 4 Ciconia ciconia L. Ardeicola ciconiae (L.) is a typical species on Ciconia ciconia L. (Hopkins a. Clay 1952, Tuleshkov 1958 — Bulgaria, Szidat 1940, Seguy 1944). Besides, Seguy (1944) recorded it from Ciconia nigra L., C. leucocephala 1 and Mycteria crumenifera.

Ardeicola maculatus (Nitzsch 1866)

1 ♀ found on Ciconia nigra L. This species is reported to be typical of Ciconia nigra L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, Tuleshkov 1958 — Bulgaria). Seguy (1944) should be mentioned here as well, because he considers the species Ardeicola maculatus (Nitzsch) to be the synonym of Ardeicola ciconiae (L.) and records it from Ciconia nigra L.

Mallophaga atypical of Ciconiidae

Degeeriella fulva (Gieb. 1874)

syn. Nirmus fuscus Nitzsch 1861, nee Nirmus fuscus Denny 1842.

8 ♂♂, 33 ♀♀ and 8 juv. collected from 2 specimens of Ciconia ciconia L. from Radziądz near Milicz on 13. VIII. 1955. Fig. 2. Degeeriella fulva (Gieb.) is a typical parasite on Aquila chrysaetos L. (Hopkins a. Clay 1952) 2.

It is curious that some dozens of Mallophaga of the species Degeeriella fulva (Gieb.) were present on two storks which did not come into contact with each other or with any other birds after their being shot. The occurrence of this species on storks is an exceptional phenomenon, since it was not found

1 I do not give the names of the authors that described this species and any others, if they were not mentioned in the sources from which information was taken.

2 I identify the species of Mallophaga as typical of given birds according to the list made by Hopkins and Clay (1952).
on several other storks that I collected in different regions of Poland. In view of this the question of the permanent occurrence of *Degeeriella fulva* (GIEB.) on *Ciconia ciconia* L. is still open. Besides my observations, the presence of *Degeeriella fulva* (GIEB.) on storks has not been recorded in literature.

Fig. 2. *Degeeriella fulva* (GIEB.) (head, terminal abdominal segments of male and female) from *Ciconia ciconia* L., Radzińdz, 13. VII. 1955. Scale length = 1 mm.

I have already written about finding *Degeeriella fulva* (GIEB.) on *Ciconia ciconia* L. and on *Asio flammeus* Pont. (ZLOTORZYCKA 1959 b). Then I called the species *Degeeriella fulva* (GIEB.) by the name of *Degeeriella fusca* (DENNY 1842). The error resulted from my relying upon the monography by SÉGY (1944) who synonymized *Degeeriella fulva* (GIEB.) with *Degeeriella fusca* (DENNY). It was only when the revision of the *Mallophaga* genus *Degeeriella* from *Falconiformes* was published (CLAY 1958) that I was able to designate *Degeeriella fulva* (GIEB.) correctly.

2. *Mallophaga* from *Plegadiidae*

Mallophaga from 4 specimens of *Platalea leucorodia* L. were examined. The material consisted of the species *Ibidoecus plataleae* (DENNY) only.

*Ibidoecus plataleae* (DENNY 1842)

In my collection there are 2 ♂♂ and 1 ♀ from 2 *Platalea leucorodia* L. from the Lublin region, 19. IV. 1950, as well as 2 ♂♂ and 2 ♀♀ from 2 *Platalea leucorodia* L. from Jugoslavia (Cerkno), 14. XI. 1956.
This species is a typical parasite of *Platalea leucorodia* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, Blagoveschensky 1951 — Tadzikistan, Tuleshkov 1958 — Bulgaria, Ségyu 1944). In addition, Ségyu (1944) records it from *Ibis religiosa* and *Anas platyrhynchos* L.

3. *Mallophaga* from *Ardeidae*

*Mallophaga* were collected from 4 specimens of *Ardea cinerea* L. and 6 specimens of *Botaurus stellaris* L. from the Wroclaw, Lublin and Bialystok Provinces. These species, like storks, have a characteristic fauna of *Mallophaga*. *Ciconiphilus decimfasciatus* (Bois. et Lac.) turned out to be the commonest species on *Ardea cinerea* L., whereas *Ardeicola stellaris* (Denny) was the commonest on *Botaurus stellaris* L. Both these species were found on all the specimens of the respective hosts.

*Ardeicola stellaris* (Denny 1842)

10 ♂♂, 71 ♀♀ and 12 juv. collected from 6 *Botaurus stellaris* L. A large number of females by comparison with males is considerable in this collection. *Ardeicola stellaris* (Denney) is a typical parasite of *Botaurus stellaris* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, Tuleshkov 1958 — Bulgaria, Ségyu 1944 — Holland).

*Ardeiphilus trochioxus* (Burm. 1838)

3 ♀♀ obtained from a *Botaurus stellaris* L. This species is known to be typical of *Botaurus stellaris* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, Tuleshkov 1958 — Bulgaria, Ségyu 1944). Besides, Ségyu (1944) records it from *Ardea purpurea* L. and *A. russata*.

*Ciconiphilus decimfasciatus* (Bois. et Lac. 1835)

10 ♂♂, 14 ♀♀ and 13 juv. from 4 *Ardea cinerea* L. are in my possession. This species is considered typical of *Ardea cinerea* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, Blagoveschensky 1940 — Talysh, 1948 — Bababinsk Lake, Tuleshkov 1958 — Bulgaria, Ségyu 1944). In addition, it is known also from *Egretta garzetta* L. (Blagoveschensky 1940 — Talysh, Ségyu 1944), *Nycticorax nycticorax* L., *Ixobrychus minutus* L., *Demigretta jugularis*, *Sterna bergii*, *S. melanauchen* (Ségyu 1944).

*Mallophaga* atypical of *Ardeidae*

*Anatoecus dentatus* (Scop.) typical of *Anas platyrhynchos* L. 1 ♂ found on an *Ardea cinerea* L.
4. *Mallophaga from Gruidae*

*Mallophaga* were taken from 2 specimens of *Grus grus* L. from the Warsaw Zoological Garden. It is noteworthy that all the species of *Mallophaga* known from *Grus grus* L. were accumulated on so poor material of birds. The exceptionality of this phenomenon is emphasized by my earlier observations, which confirmed the quantitative and qualitative poverty of *Mallophaga* on the birds reared in captivity; these birds, as a rule, were infested only by their most typical and common *Mallophaga* species (Złotorzycka 1959 b).

*Saemundsonnia integer* (Nitzsch 1866)


*Esthiopterus gruis* (L. 1758)

2 ♂♂ and 6 ♀♀ from 2 *Grus grus* L. examined. This species is typical of *Grus grus* L. (Hopkins a. Clay 1952, Balát 1956 — Slovakia, Séguy 1944). In addition, Séguy (1944) found this species on *Balearica pavonina* L., *Grus antigone* L. and *Anas platyrhynchos* L.

*Gruimenopon longum* (Gieb. 1874)

2 ♂♂ and 6 ♀♀ taken from a *Grus grus* L. This species is typical of *Grus grus* L. (Hopkins a. Clay 1952, Balát 1956 — Slovakia, Séguy 1944 — under the synonym *Colpocephalum atrofasciatum* PIAG. 1880). Séguy (1944) records it also from *Grus antiqua*.

*Helcemonus macilentus* (Nitzsch 1866)

2 ♂♂ and 2 ♀♀ from 1 *Grus grus* L. are in my possession. This species is a typical parasite of *Grus grus* L. (Hopkins a. Clay 1952, Séguy 1944 — under the synonym *Colpocephalum truncatum* PIAG. 1880). Then it is recorded by Séguy (1944) from *Grus carunculata* and *G. mexicana*.

*Mallophaga atypical of Gruidae*

*Pseudomenopon pilosum* (Scop.) typical of *Fulica atra* L. 1 ♀ found on *Grus grus* L.

5. *Mallophaga from Rallidae*

40 specimens of *Fulica atra* L. and 5 of *Gallinula chloropus* L. from the Wrocław, Koszalin, Białystok Province and Yugoslavia, were searched for *Mallophaga*. The *Mallophaga* fauna from both these species is generally rich in number
as well as in species *Fulica atra* L. and *Gallinula chloropus* L. have very similar species of *Mallophaga*, i.e. the common species *Pseudomenopon pilosum* (Scop.) and the remaining ones appropriately substitutive for each other.

*Pseudomenopon pilosum* (Scop. 1763)


78 ♂♂, 79 ♀♀ and 23 juv. collected from 31 *Fulica atra* L., 3 ♂♂, 4 ♀♀ and 2 juv. from 3 *Gallinula chloropus* L., 9 ♂♂ and 64 ♀♀ from 7 *Podiceps cristatus* L., 5 ♂♂, 10 ♀♀ and 3 juv. from 2 *Podiceps nigricollis* Brehm, 2 ♀♀ from 1 *Podiceps auritus* L., 1 ♂ and 2 ♀♀ from 3 *Podiceps grisegena* Bodd. and 4 ♀♀ from 4 *Podiceps ruficollis* Pall. Besides, 6 ♂♂ and 7 ♀♀ were found on 5 specimens of *Anas platyrhynchos* L. (Fig. 3).

Living on birds pertaining to different orders (*Podicepedes* and *Ralli*) *Pseudomenopon pilosum* (Scop.) is an interesting exception. When considering the reasons for this fact, I have come to believe that it lived originally on birds.

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*Fig. 3. Pseudomenopon pilosum* (Scop.) (head, terminal abdominal segments of male and female) from *Anas platyrhynchos* L. Somin, 2. IX. 1957. Scale length = 1 mm.

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of Ralidae and subsequently spread over the family Podicipidae. I assume Ralidae as primary hosts, because Pseudomenopon pilosum (Scop.) occurs on them more frequently than on the birds of the family Podicipidae. I consider it possible that the expansion of this Mallophaga species over Podicipidae took place relatively not long ago, as no substitutive species has had time to develop since. Therefore it might be supposed that Pseudomenopon pilosum (Scop.) tends to spread over other species of birds and shows an aptitude for adaptation to various ecological conditions. This is supported by the fact that it used to be found on mallards (Anas platyrhynchos L.) from the Pomerze Lake District (Bytów region) and often singly on other avian species. (See Table II).


Rallicola fulicae (Denny 1842)

51 ♂♂ and 91 ♀♀ taken from 25 Fulica atra L. This species is thought to be typical of Fulica atra L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1958 — Hungary, Blagoveshchensky 1951 — Tadjikistan). Séguy (1944) has synonymized Rallicola fulicae (Denny) with R. cuspiduala (Scop. 1763) and recorded it from Fulica atra L., Gallinula chloropus L. and Fulica americana Gm.

Rallicola minutus (Nitzsch 1866)
syn. Rallicola parvulus (Plag. 1880)

9 ♂♂ and 1 ♀ obtained from 2 Gallinula chloropus L. Rallicola minutus (Nitzsch) is a typical species on Gallinula chloropus L. (Hopkins a. Clay 1952, Séguy 1944).

Incidifrons fulicae (L. 1758)
syn. Incidifrons pertusus (Burm. 1838)

7 ♂♂, 11 ♀♀ and 9 juv. collected from 16 Fulica atra L. Incidifrons fulicae (L.) is known to be typical of Fulica atra L. (Hopkins a. Clay 1952, Balát

**Incidifrons ralli** (Scop. 1772)
syn. Incidifrons ralli (Denny 1842)

1 ♂, 1 ♀ and 1 juv. found on 2 Gallinula chloropus L. Incidifrons ralli (Scop.) has been hitherto known only from Rallus aquaticus L. (Hopkins a. Clay 1952, Séguy 1944).

**Fulicoffula lurida** (Nitzsch 1818)

11 ♂♂, 23 ♀♀ and 1 juv. taken from 14 Fulica atra L. This species is a typical parasite of Fulica atra L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1958 — Hungary, Blagoveshchensky 1948 — Barabinsk Lake, 1951 — Tadjikistan, Séguy 1944). Besides, Blagoveshchensky found 1 ♀ on Gallinula chloropus L. Séguy (1944) writes also on the occurrence of this species on Gallinula chloropus L. according to the older literature (Nitzsch 1818, Denny 1842).

**Fulicoffula rallina** (Denny 1842)

1 ♀ taken from 1 specimen of Gallinula chloropus L. This species was previously known only from Rallus aquaticus L. (Hopkins a. Clay 1952, Séguy 1944).

**Mallophaga** atypical of Rallidae

**Quadraceps junceus** (Scop.) typical of Vanellus vanellus L. 3 ♂♂ and 6 ♀♀ collected from 1 specimen of Gallinula chloropus L. +

**Quadraceps punctatus** (Burm.) typical of Larus ridibundus L. 1 ♀ taken from a Fulica atra L.

**Aquanirmus colymbinus** (Scop.) typical of Podiceps auritus L. 1 ♀ taken from a Fulica atra L. +

**Austromenopon ridibundus** (Denny) typical of Larus ridibundus L. 2 ♂♂ and 3 ♀♀ collected from 1 specimen of Fulica atra L. and 1 ♀ from a Gallinula chloropus L.

**Actornithophilus affinis** (Nitzsch) typical of Tringa erythropus Pall. 1 ♀ found on a Fulica atra L. +

**Actornithophilus ochraceus** (Nitzsch) typical of Vanellus vanellus L. 8 ♂♂ and 3 ♀♀ collected from 1 specimen of Gallinula chloropus L. +
Trinoton querquedulae (L.) typical of Anas crecca L. 1 ♀ obtained from a Fulica atra L.
Anatoecus dentatus (Scop.) typical of Anas platyrhynchos L. 1 ♂ and 7 ♀ collected from 2 Gallinula chloropus L.

6. Mallophaga from Charadriidae

8 specimens of Vanellus vanellus L., 1 of Scolopax rusticola L., 3 of Capella gallinago L., 1 of Limmola falcinellus Pont., ♂ of Actitis hypoleucus L., 1 of Calidris minuta Leisl. and 1 of Calidris alpina L. from the Wroclaw, Warszawa, Koszalin Provinces and Yugoslavia, were examined for Mallophaga. In spite of such poor material I have obtained from it a rather wide range of Mallophaga species.

Quadraceps junceus (Scop. 1763)


Quadraceps furvus (Burm. 1838)

5 ♂♂ and 8 ♀♀ found on 2 Tringa erythropus Pall., 2 ♀♀ on 1 Tringa ochropus L., 10 ♂♂, 13 ♀♀ and 1 juv. on 4 Actitis hypoleucus L. Quadraceps furvus (Burm.) is reported to be a typical parasite of Tringa erythropus Pall. (Hopkins a. Clay 1952, Balat 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Seguy 1944). Besides, it is recorded from Tringa totanus L. (Blagoveshchensky 1948 — Barabinsk Lake), Tringa nebularia Günn., Arenaria interpres L., Vanellus vanellus L., Actitis hypoleucus L., Charadrius dubius Scop., Ch. alexandrinus L. (Italy), Ch. geoffroi Wagl. (Italy), Himantopus himantopus L. (Italy), Phalaropus tricolor Vieill. (U. S. A.), Actitis macularia L. (Panama), Vanellus cayennensis GM. (Surinam), Glareola orientalis Leach. from Formosa (Seguy 1944). As results from the data above, Quadraceps furvus (Burm.) being a substitutive species to Quadraceps junceus (Scop.) has a wider distribution than the latter, because it occurs on several species of the genus Tringa.

Rhynonotimus scolopacis (Denny 1842)
syn. Esthiopterum emarginatum Piag. 1880

1 ♂ and 8 ♀♀ from 3 specimens of Capella gallinago L. examined. This species is known to be a typical parasite of Capella gallinago L. (Hopkins a. Clay

**Rhynonirmus helvolus** (Burm. 1838)

9 ♂♂, 9 ♀♀ and 2 juv. obtained from one specimen of Scolopax rusticola L. This is the substitutive species of Rhynonirmus scolopacis (Denny). Rhynonirmus helvolus (Burm.) has been known only from Scolopax rusticola L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Séguy 1944).

**Lunaceps holophaeus** (Burm. 1838)

7 ♂♂ and 6 ♀♀ collected from 1 Limicola falcinellus Pont., 3 ♂♂ and 4 ♀♀ from 1 Calidris minuta LeisL. Lunaceps holophaeus (Burm.) has not been L. hitherto recorded from Limicola falcinellus Pont. and Calidris minuta LeisL. However, it is wide-spread in the family Charadriidae and I believe it is also characteristic of Calidris minuta LeisL. and Limicola Pont.


**Carduiceps cingulatus** (Denny 1842)

15 ♂♂ and 19 ♀♀ taken from 1 Calidris minuta LeisL. and 1 ♂ from Calidris alpina L. This species is acknowledged to be a typical parasite of Limosa limosa L. (Hopkins a. Clay 1952, Blagoveshchensky 1940 b — Talysh, 1948 — Barabinsk Lake, Séguy 1944). Séguy (1944) mentions it also from Limosa lapponica L., Philomachus pugnax L., Croethia alba Pall., Calidris minuta LeisL. and Vanellus vanellus L.

**Saemundssonia temporalis** (Gieb. 1874)

2 ♂♂, 3 ♀♀ and 2 juv. collected from 5 Vanellus vanellus L. Only single specimens were found on these birds, although they were easily caught because of their small mobility. Saemundssonia temporalis (Gieb.) is typical of Vanellus vanellus L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1958 — Hun-
gary, Blagoveshchensky 1948 — Barabinsk Lake, 1951 — Tadzikistan, Séguy 1944). In addition, Séguy (1944) records it from Charadrius hiaticula L., Tringa erythropus PALL., Actitis hypoleucus L. and Crocethia alba PALL.

*Saemundssonia variabilis* (Denny 1842)

3 ♀♀ found on 1 Calidris minuta Leisl. and 1 ♀ on Calidris alpina L. This species is typical of Calidris alpina L. (Hopkins a. Cl ay 1952, Balát 1953 a — Bohemia, Séguy 1944). Balát (1953 a — Bohemia) records it also from Calidris ferruginea Pont. and C. minuta Leisl.

*Actornithophilus ochraceus* (Nitzsch 1818)

14 ♂♂, 15 ♀♀ and 1 juv. obtained from 4 Vanellus vanellus L. Hopkins a. Clay (1952) record Actornithophilus ochraceus (Nitzsch) as a typical parasite of Pluvialis aterophila Mein. Besides, it is known from Vanellus vanellus L. (Blagoveshchensky 1940 b — Talysh, 1948 — Barabinsk Lake, Séguy 1944), Vanellus varius and Sterna nilotica GM. (Séguy 1944). Blagoveshchensky (1951 — Tadzikistan) distinguished Actornithophilus ochraceus himantopi Blag. on Himantopus himantopus L. As can be seen from above, Actornithophilus ochraceus (Nitzsch) is also a typical parasite on Vanellus vanellus L.

*Actornithophilus lyallpurensis* Ansari 1956

4 ♂♂ and 3 ♀♀ collected from 1 Tringa ochropus L. This species is considered typical of Tringa ochropus L. (Ansari 1956 — Panjab).

*Actornithophilus affinis* (Nitzsch 1874)

1 ♂, 1 ♀ and 1 juv. collected from 1 Tringa erythropus PALL. This species is considered typical of Tringa erythropus PALL. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, Séguy 1944). Further, it is known from Tringa ochropus L. (Clay 1951, Blagoveshchensky 1948 — Barabinsk Lake, 1951 — Tadzikistan, Séguy 1944), T. glareola L., T. nebularia Gunn., T. totanus L. (Balát 1953 a — Bohemia, Blagoveshchensky 1948 — Barabinsk Lake, 1951 — Tadzikistan), T. stagnatilis Bechst. (Blagoveshchensky 1948 — Barabinsk Lake) and from T. latirostris (Séguy 1944).

*Actornithophilus spinulosus* (Piag. 1880)

1 ♂ taken from a Calidris minuta Leisl. This species has been hitherto unknown from Calidris minuta Leisl. but from Limosa limosa L. (Hopkins a. Clay 1952, Blagoveshchensky 1940 b — Talysh, 1948 — Barabinsk Lake, Séguy 1944). Besides, Séguy (1944) records it from Crocethia alba PALL. and Arenaria interpres L. (Europe, Japan, India, China, Australia, Africa, Chile).
Austromenopon nigropleurum (Denny 1842)

2 ♀♀ found on 1 Tringa erythropus PALL. Austromenopon nigropleurum (Denny) is known to be typical of Alca torda L. (Hopkins a. Clay 1952, Séguy 1944, Timmermann 1954). It is also recorded by Séguy (1944) from Philomachus pugnax L., Tringa totanus L., Numenius arquata L. and Rissa tridactyla L. Austromenopon nigropleurum (Denny) has not been hitherto recorded from Tringa erythropus PALL. Being found on as remote orders as Laro-Limicolae and Alcae it is a noteworthy exception.

Austromenopon durisetosum (Blag. 1948)

2 ♀♀ taken from 1 specimen of Capella gallinago L. This species is known only from Capella gallinago L. (Blagoveschensky 1948 — Barabinsk Lake).

Austromenopon icterus (Burm. 1838)

3 ♂♂ and 5 ♀♀ collected from 1 Scolopax rusticola L. from the Wroclaw region, 26. III. 1957. This species is known only from Scolopax rusticola L. (Hopkins a. Clay 1952, Clay 1959, Séguy 1944). Only the female of Austromenopon icterus (Burm.) has been hitherto described.

Description of the male Austromenopon icterus (Burm.) (Fig. 4): Austromenopon icterus (Burm.) is a species closely related to Austromenopon durisetosum (Blag.) so that Clay (1959) gave one description for both the species in his key to the genus Austromenopon. They differ from each other chiefly by their body measurements which are as follows:

<table>
<thead>
<tr>
<th>Individuals examined</th>
<th>Body</th>
<th>Head</th>
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<tr>
<td></td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>1</td>
<td>1.55</td>
<td>0.65</td>
</tr>
<tr>
<td>2</td>
<td>1.62</td>
<td>0.56</td>
</tr>
<tr>
<td>3</td>
<td>1.55</td>
<td>0.56</td>
</tr>
</tbody>
</table>

For comparison the measurements (in mm.) of a male Austromenopon durisetosum (Blag.) according to Blagoveschensky (1948) are given below.

- Body length — 1.39
- Body width — 0.57
- Head length — 0.26
- Head width — 0.46

The body measurements of the male Austromenopon icterus (Burm.) are somewhat larger than those of the male Austromenopon durisetosum (Blag.).
Fig. 4. Austromenopon icterus (Burm.) ♂ from Scolopax rusticola L., Kotowice, 25. III. 1957. Scale length = 1 mm.

The differences, in mm., are as follows:

Difference in body length — 0.16—0.23  
Difference in body width — 0.08—0  
Difference in head length — 0.05—0.01  
Difference in head width — 0.09—0.07

The male Austromenopon icterus (Burm.) is considerably smaller than the females examined by me, whose measurements (in mm.) are presented below.
<table>
<thead>
<tr>
<th>Individuals examined</th>
<th>Body</th>
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<tr>
<td></td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>1</td>
<td>1.96</td>
<td>0.84</td>
</tr>
<tr>
<td>2</td>
<td>2.16</td>
<td>0.80</td>
</tr>
<tr>
<td>3</td>
<td>2.01</td>
<td>0.87</td>
</tr>
<tr>
<td>4</td>
<td>2.19</td>
<td>0.81</td>
</tr>
<tr>
<td>5</td>
<td>1.96</td>
<td>0.84</td>
</tr>
</tbody>
</table>

The average differences in the measurements of the males and the females of *Austromenopon icterum* (Burm.) examined by me are, in mm., as follows:

Difference in body length — 0.50
Difference in body width — 0.24
Difference in head length — 0.04
Difference in head width — 0.10

The male *Austromenopon icterum* (Burm.) is far less pigmented than the female and it is pale yellow. The setulae, which cover its body, are lighter and thinner. The ninth abdominal segment is rounded and smaller than the eighth segment. Contrary to the female, the male has no ciliated membrane at the end of the ninth abdominal segment. The penis with parames is delicately framed and visible in segments VI—IX.

*Austromenopon lutescens* (Burm. 1838)


As results from above, *Austromenopon lutescens* (Burm.) exhibits a remarkably wide distribution within the large family *Charadriidae*. 
Mallophaga atypical of Charadriidae

Austromenopon ridibundus (Denny) typical of Larus ridibundus L. 1 ♂ and 1 ♀ collected from 1 specimen of Vanellus vanellus L. +

7. Mallophaga from Laridae

16 specimens of Larus ridibundus L., 3 of Larus canus L., 6 of Sterna hirundo L., 1 of Sterna macrura Naum., 1 of Sterna albifrons Pall. and 4 of Chlidonias nigra L. from the Wroclaw, Koszalin, Gdańsk Provinces and Yugoslavia, were searched for Mallophaga.

From the viewpoint of systematics the Mallophaga fauna from Laridae is related to that from Charadriidae. The following genera of Mallophaga have been recorded from both these families: Saemundssonia, Quadraceps, Austromenopon and Actornithophilus. This proves a close relationship between the hosts representing the families Charadriidae and Laridae. Besides, these families are reckoned in the common order Laro-Limicolae.

Saemundssonia melanocephalus (Burm. 1838)

3 juv. from 6 Sterna hirundo L., 1 ♂ and 4 ♀♀ from 1 Sterna macrura Naum., 2 ♀♀ and 5 juv. from 1 Sterna albifrons Pall., 9 ♂♂, 6 ♀♀ and 1 juv. from 3 Chlidonias nigra L. Saemundssonia melanocephalus (Burm.) is considered to be a typical parasite of Sterna albifrons Pall. (Hopkins & Clay 1952, Ward 1953 — South Caroline, Cuba, West Indies, Bahama Is., Acklin I., Grand Caios I.). Further, this species is mentioned from Sterna hirundo L. and Larus ridibundus L. (Blagoveshchensky 1948 — Barabinsk Lake, Seguy 1944). In addition, Seguy (1944) records it from Sterna sandvicensis Lath., S. fuscata L., S. hirundinacea, S. gracilis, S. bergii, S. forsteri, S. maxima, S. vitata GM., Hydrochoerus tschegkraev LEPI., Hydrochelidon leucopreta TEM., Chlidonias nigra L., Pagophila eburnea PHIP., Larus cirrocephalus, Anous galapagensis, Stercorarius parasiticus L., S. pomarinus TEM., Creagrus furcatus, Oidemia sp., Pagodroma nivea, Nesiomimus macdonaldii, Thalassoeca antarctica, Chionis alba and Tringa sp.

Unfortunately Seguy does not give any geographic data concerning the occurrence of the birds mentioned as well as the authors of many of the bird species. Basing on the data of Burmeister (1838) he literally quotes the latter's opinion that Saemundssonia (Docophorus) melanocephalus (Burm.) lives „on many species of Larus and Sterna“.

Saemundssonia gonothorax (Gieb. 1874)

8 ♂♂, 10 ♀♀ and 30 juv. taken from 1 specimen of Larus canus L. This species is considered typical of Larus marinus L. (Hopkins & Clay 1952, Seg-

*Saemundssonia mulleri* Eichler 1942

syn. *Docophorus lari* Müller 1927

66 ♂♂, 88 ♀♀ and 13 juv. obtained from 14 *Larus ridibundus* L. and 17 ♂♂, 11 ♀♀, 4 juv. from 2 *Larus canus* L. This species is known to be a typical parasite of *Larus ridibundus* L. (Hopkins a. Clay 1952, Balát 1958 — Hungary).

*Quadraceps punctatus* (Burm. 1838)

1 ♂, 5 ♀♀ and 4 juv. obtained from 5 *Larus ridibundus* L., 5 ♀♀ and 2 juv. from 1 *Larus canus* L. This species is known to be a typical parasite of *Larus ridibundus* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1958 — Hungary, Blagoveschensky 1948 — Barabinsk Lake, Séguy 1944). This species is also reported from *Larus ichthyaetus* Pall. (Blagoveschensky 1948 — Barabinsk Lake, Séguy 1944), *L. canus major* Midd. (Blagoveschensky 1940 b — Talysh), *L. cachinnans* Pall., *L. taimyrensis* But. (Blagoveschensky 1948 — Barabinsk Lake), *L. melanocephalus* Temm., *L. lenocphthalmus* Temm. (Egypt), *L. occidentalis* Aud., *L. delawarensis* Ord. (California), *L. dominicanus* Licht. (Chile) and *L. heermanni* Can. (Séguy 1944).

*Quadraceps phaeonotus* (Nitzsch 1866)

12 ♂♂ and 6 ♀♀ found on 4 *Chlidonias nigra* L., 2 ♂♂ on 1 *Sterna hirundo* L., 4 ♂♂ and 6 ♀♀ on 1 *Sterna albifrons* Pall. This species is known to be typical of *Chlidonias nigra* L. (Hopkins a. Clay 1952, Balát 1953 a — Bohé-

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1 Blagoveschensky (1940 b) considers *Saemundssonia gonothorax* (Gieb.) to be the synonym of *Saemundssonia lari* (Fabr.), *S. mulleri* Eich., *S. congener* (Gieb.) and *S. larina* (Pic.).

Séguy (1944) synonymizes *Saemundssonia gonothorax* (Gieb.) with *S. lari* (Fabr.), *S. congener* (Gieb.), *S. larina* (Pic.); *S. magna* (Pliag.) and *S. breviappendiculata* (Pliag.).
nia, 1956 — Slovakia, Blagoveshchensky 1948 — Barabinsk Lake, Séguy 1944). Besides, it is recorded from Sterna hirundo L., Hydrochelidon leucoptera Temm. (Blagoveshchensky 1948 — Barabinsk Lake), Sterna albifrons Pall., Chlidonias hybrida Pall. (Ch. leucopareius Temm.), Hydrochelidon panagensis (Italy), H. surinamensis Gm. (Peru and Panama) and Phalaropus fulicarius L. (Séguy 1944). Séguy (1944) synonymizes Quadraceps phaeonotus (Nitzsch) with Quadraceps anagrapus (Nitzsch 1866).

Quadraceps sellatus (Burm. 1838)

5 ♀♂ and 9 ♀♀ collected from 4 Sterna hirundo L. This species is regarded as typical of Sterna hirundo L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Blagoveshchensky 1948 — Barabinsk Lake, Séguy 1944). Further, it is recorded from Larus ridibundus L. (Blagoveshchensky 1948 — Barabinsk Lake, Séguy 1944), Larus minutus Pall. (Blagoveshchensky 1948 — Barabinsk Lake), Sterna vittata Gm., S. sandvicensis Lath., Larus fuscus argenteus Brehm and Hydropogoe tschegegra Lep. (Séguy 1944).

Austromenopon ridibundus (Deny 1842)

5 ♀♂ and 11 ♀♀ found on 3 Larus ridibundus L., 1 ♀ on Larus canus L. and 1 ♀ on Sterna hirundo L. Perhaps the Mallocopa found on Larus canus L. and Sterna hirundo L. occurred on these birds casually, as they have not been known from them with the exception of my specimens and I found only 1 female on either bird.

Austromenopon ridibundus (Deny) is known to be typical of Larus ridibundus L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, Blagoveshchensky 1948 — Barabinsk Lake, Séguy 1944). It is also recorded from Larus minutus Pall. (Balát 1952 a — Bohemia, Blagoveshchensky 1948 — Barabinsk Lake), Rissa tridactyla L. and Larus hyperboreus (Séguy 1944).

Austromenopon fuscofasciatum (Plag. 1880)

1 ♂ and 5 ♀♀ taken from 1 Sterna hirundo L. and 1 ♀ from Chlidonias nigra L. This species is recognized as typical of Stercorarius pomarinus Temm. (Hopkins a. Clay 1952, Séguy 1944). Séguy (1944) mentions it also from Sterna hirundo L. and S. sandvicensis Lath.

Actornithophilus piceus (Deny 1842)

1 ♂ obtained from a Chlidonias nigra L. This species is judged to be a typical parasite of Sterna sandvicensis Lath. (Hopkins a. Clay 1952, Séguy
1944) and, besides, is recorded from *Chlidonias nigra* L. Blagoveschensky 1948 — Barabinsk Lake, Séguy 1944), from *Sterna hirundo* L., *Hydropogne tchegevara* Lep., *Larus minutus* Pall. (Blagoveschensky 1948 — Barabinsk Lake), *Gelochelidon nilotica* Gm., *Sula piscator* L. and *Rissa tridactyla* L. (Séguy 1944).

*Mallophaga* atypical of *Laridae*

*FulicoILLA* sp. typical of *Rallidae*. 1 juv. found on a *Larus ridibundus* L. +

8. *Mallophaga* from *Anatidae*

A total of 61 *Anas platyrhynchos* L., 9 *A. querquedula* L., 4 *A. penelope* L., 4 *A. crecca* L., 2 *A. strepera* L., 1 *A. domesticus* L., 1 *Nyroca juligula* L., 4 *N. nyroca* GülD., 2 *Bucephala clangula* L., 1 *Anser fabalis* Lath., 1 *A. anser* L., 3 *Cygnopsis cygnoides* L. and 1 *Cygnus cygnus* L. from the Wroclaw, Warszawa, Lublin, Katowice, Koszalin, Białystok Provinces and Yugoslavia, was examined for Mallophaga.

I realized that, as a rule, all birds of the genera *Anas, Nyroca* and *Bucephala* had a uniform fauna of *Mallophaga* as far as its specific composition was concerned, i.e. the same species of *Mallophaga* were present on all these birds, and not the sets of substitutive species, as it is usual within other avian genera. In my opinion the reasons for this may be various.

The presence of such a *Mallophaga* fauna on *Anatidae* may be caused by the ways of living of these birds. It has been known that ducks willingly lead the orphaned young ones of other species of *Anatidae*. Similarly the flocks of ducks are frequently mixed of different species at the migration season. Under such conditions the possibilities of general infestation by *Mallophaga* increase apparently. Nest parasitism in some species of *Anatidae* can be considered as a further factor causing the uniformity of the *Mallophaga* fauna in ducks. Nest parasitism has been stated in *Nyroca ferina* L. (Witkowski 1958). The latest observations made by Witkowski and unpublished as yet are very interesting. On the basis of his observations of duck breeding in the Milicz region he ascertained that the parasite laying eggs in another bird’s nest was, as a rule, *Nyroca ferina* L. In about 40% of breedings it lays eggs in the nests of *Nyroca nyroca* GülD., and sometimes in those of *Anas platyrhynchos* L. The alien young hatch on condition that the parasitizing duck laid its eggs soon after the host duck had laid its. Witkowski has computed that the cases in which all the young of a mixed clutch hatch are to 40% of the total of mixed egg-layings. So these are not frequent cases, but I believe that they can also contribute to the mixing and the specific unification of *Mallophaga* in ducks.
The Mallophaga living on geese (Anser) are related to those from ducks. On the other hand, the swans (Cygnus) show a quite peculiar fauna of Mallophaga. The species characteristic of Cygnus cygnus L. is Ornithobius cygni (L.), which, as regards systematics, diverges from all other genera of Mallophaga living on the birds of the genera Anas and Anser. As far as the Mallophaga fauna is concerned some resemblance to swans can be found only in Cygnopsis cygnoid L., which is the host to the species Ornithobius mathisi Neum. (Eichler 1954/1955, Tuleshkov 1958).

Anatoecus dentatus (Scop. 1763)

143 ♂♂, 303 ♀♀ and 3 juv. collected from 47 Anas platyrhynchos L., 18 ♂♂, 28 ♀♀ and 1 juv. from 7 A. querquedula L., 16 ♂♂, 24 ♀♀ and 4 juv. from 3 A. crecca L., 7 ♀♀ from 1 A. penelope L., 1 ♀ from A. strepera L., 1 ♂ and 3 ♀♀ from 1 A. domestica L., 2 ♂♂ and 3 ♀♀ from 1 Nyroca fuligula L., 4 ♀♀ from 1 N. nyroca GÜLD., 6 ♂♂ and 4 ♀♀ from 2 Bucephala clangula L., 5 ♂♂ and 6 ♀♀ from 1 Anser fabalis LATH., 1 ♂ and 2 ♀♀ from 1 A. anser L. and 1 ♀ from 1 Cygnopsis cygnoid L.

Aythya affinis Blp., A. a. maritima, Mergus serrator L. and Anas carolinensis Gm. (Séguy 1944). Further, Blagoveschensky (1958 — Wrangel Lake) records Anatoecus dentatus (Scop.) from Clangula hyemalis L., Somateria mollissima v. nigrum Gray., S. spectabilis L., Arctonetta fischeri Brandt. and Anas domestica L.

All the foregoing data indicate a very wide distribution of Anatoecus dentatus (Scop.) as regards both its hosts and area of occurrence.

Anaticola crassicorns (Scop. 1763)

20 ♂♂, 50 ♀♀ and 5 juveniles obtained from 23 Anas platyrhynchos L., 1 ♂ and 3 ♀♀ from 2 A. querquedula L., 12 ♂♂, 37 ♀♀ and 3 juveniles from 3 A. penelope L., 1 ♂ and 2 ♀♀ from 1 A. crecca L., 2 ♂♂ and 1 ♀ from 1 A. strepera L. and 1 ♀ from Nyroca nyroca Güld.


Anaticola anseris (L. 1758)

2 ♂♂, 5 ♀♀ and 2 juveniles collected from 1 Anser fabalis Lath., 1 ♀ and 2 ♀♀ from 1 A. anser L., 4 ♂♂ and 1 ♀ from 1 Cygnopsis cygnoid L.

Anaticola anseris (L.) is substitutive for Anaticola crassicorns (Scop.).

Anaticola anseris (L.) is a typical parasite of Anser anser L. (Hopkins a. Clay 1952, Blagoveschensky 1948 — Barabinsk Lake, 1951 — Tadjikistan, Tuleskow 1958 — Bulgaria, Séguy 1944 — Sweden and America). This species is also recorded from Anser fabalis Lath. (Balá 1953 a — Bohemia,

Trinoton quercedulae (L. 1758)

12 ♂♂ and 20 ♀♀ taken from 17 Anas platyrhynchos L., 2 ♂♂ and 2 ♀♀ from 4 A. quercedula L., 1 ♀ from 1 A. penelope L., 3 ♂♂ and 2 ♀♀ from 3 A. crecca L., 1 ♀ from 1 Nyroca nyroca Güld.


As can be seen from the data above Trinoton quercedulae (L.) has a distribution as wide as that of Anatoecus dentatus (Scop.) or Anaticola crassicornis (Scop.). Only single specimens of this species were found on individual birds by me.

Trinoton lituratum Burm. 1838?

In my opinion the systematic position of *Trinoton lituratum* BURM. is obscure. It seems to me that the *Mallophaga* designated as *Trinoton lituratum* BURM. may be the juvenile forms of the species *Trinoton querquedulae* (L.) (Figs. 5 and 11).

I have been induced to form this opinion by the following observations:

1. *Trinoton lituratum* BURM. was described on the basis of females, whereas no males have been known so far. If we take into consideration all the data concerning the occurrence of this species, it hardly seems probable that there has been no opportunity to find a male.

![Fig. 5. *Trinoton lituratum* BURM. (head of female) from *Anas platyrhynchos* L., Sominy, 2. IX. 1957. Scale length = 1 mm.](image)

2. I used to find *Trinoton lituratum* BURM. on the same species as I found *Trinoton querquedulae* (L.) and often accompanied by the latter. Since I have succeeded in obtaining only adult specimens of *Trinoton querquedulae* (L.) up to now, I suppose that the specimens that I was enforced to identify, basing on the description of Burmeister (1838), as *Trinoton lituratum* BURM. might be the juvenile individuals of *Trinoton querquedulae* (L.).
3. The body proportions of *Trinoton lituratum* BURM. suggest those of juveniles — that is to say, the head and limbs are relatively big by comparison with the abdomen.

4. The coloration of the chitin shell in all individuals of *Trinoton lituratum* BURM. is very light, and the brown pigmental spots are accumulated in small areas, which is frequently characteristic of juveniles.

5. The female *Trinoton lituratum* BURM. has been described by external morphological features and the sex determined on the basis of the lack of the penis, which is always distinctly seen through the chitin shell in *Mallophaga*. Since the penis is also undeveloped in juveniles, a mistake may have been made, resulting in including the juvenile specimens of *Trinoton querquedulae* (L.) in the species *Trinoton lituratum* BURM.

6. Blagoveschensky (1940 a) has raised a supposition that *Trinoton lituratum* BURM. recorded from ducks and geese may belong to the species *Trinoton querquedulae* (L.) and *Trinoton anserinum* (FABR.).

I think that the accurate answer to and the explanation of these uncertainties can be reached only by means of a careful anatomical investigation of the reproductive apparatus in the species *Trinoton lituratum* BURM., or by breeding it in confinement.

*Holomenopon leucoxanthum* (BURM. 1838)

5 ♂♂ and 16 ♀♀ collected from 7 *Anas platyrhynchos* L., 1 ♂ from 1 *A. querquedula* L., 1 ♂ and 2 ♀♀ from 1 *Bucephala clangula* L. This species was found by me on the above-mentioned ducks comparatively rarely and in small numbers.

*Holomenopon leucoxanthum* (BURM.) is known as a typical parasite of *Anas crecca* L. (Hopkins a. Clay 1952, Blagoveschensky 1951 — Tadjikistan, Séguy 1944). In addition, it is recorded from *Anas platyrhynchos* L. (Blagoveschensky 1951 — Tadjikistan, Séguy 1944), *Netta Rufina* PALL., *Mergus Albellus* L. (Blagoveschensky 1951 — Tadjikistan), *Oidemia nigra* L. (Séguy 1944). Besides, Blagoveschensky (1940 b — Talysh) has described *Holomenopon leucoxanthum* var. *marecae* (BLAG.) from *Anas penelope* L.

*Holomenopon nyrocae* (BLAG. 1940)

1 ♂ and 1 ♀ taken from 2 *Nyroca nyroca* GÜLD. This species has been hitherto known from *Nyroca ferina* L. as its typical host (Hopkins a. Clay 1952, Blagoveschensky 1940 b — Talysh, 1948 — Barabinsk Lake). Moreover, Blagoveschensky (1948 — Barabinsk Lake) records it from *Oxyura Leucocephala* Scop.

*Ciconiphilus pectiniventris* (HAAR. 1916)

3 ♂♂, 8 ♀♀ and 5 juv. obtained from 2 *Cygnopsis cygnoid* L. The species is a typical parasite of *Anser a. domesticus* L. (Hopkins a. Clay 1952, Séguy
1944). Blagoveschensky distinguished also Ciconiophilus pectiniventris var. parvus (Blag.) from Anser anser L. (1948 — Barabinsk Lake).

Ornithobius cygni (L. 1758)

3 ♀♀ from a Cygnus cygnus L. examined. This parasite is typical of Cygnus cygnus L. (Hopkins a. Clay 1952, Tuleškov 1958 — Bulgaria, Séguy 1944). It is known from Cygnus olor Gm. and C. bewicki Yarr. as well (Séguy 1944).

Mallophaga atypical of Anatidae

Pseudomenopon pilosum (Scop.) typical of Fulica atra L. 6 ♂♂ and 7 ♀♀ obtained from 5 Anas platyrhynchos L. +, from the Pomorze Lake District (Bytów region) in August and September 1957. A total of 20 Anas platyrhynchos was examined there. Therefore 25% of these ducks were infested by Mallophaga of the species Pseudomenopon pilosum (Scop.). It may be concluded from this that this species lives also on Anas platyrhynchos L. (Zlotorzynska 1959 a). This, however, would refer only to the Pomorze Lake District, because the species has not been collected from ducks elsewhere except for one juvenile specimen found on an Anas platyrhynchos L. + in the Suwałki region in 1959. Perhaps the fact testifies to an expansion of the parasite now developing and aiming at acquiring new hosts. This subject is dealt with in the section on Mallophaga from Rallidae.

Actornithophilus affinis (Nitzsch) typical of Tringa erythropus Pall. 1 ♀ taken from an Anas platyrhynchos L. +

Actornithophilus ochraceus (Nitzsch) typical of Vanellus vanellus L. 5 ♂♂, 2 ♀♀ and 3 juv. found on 1 specimen of Anas querquedula L.

Rallicola fulicæ (Denny) typical of Fulica atra L. 1 ♂ and 1 ♀ collected from 2 Anas platyrhynchos L. +, 1 ♂ and 1 ♀ from an Anas strepera L.

Incidifrons fulicæ (L.) typical of Fulica atra L. 1 ♂ and 1 ♀ from 2 Anas platyrhynchos L. +

9. Mallophaga from Phalacrocoracidae

Only 2 specimens of Phalacrocorax carbo L. were examined for Mallophaga, one from the Wrocław region on 31. III. 1952, and the other from Yugoslavia (Zbiljsko, 9. IV. 1955). The following Mallophaga species were present on these birds:

Quadraceps similis (Gieb. 1866)

3 ♀♀ from either bird were examined. Hopkins a. Clay (1952) consider this species to be a typical parasite of Tringa nebularia Günn. Séguy (1944)
mentions Quadraceps similis (GIEB.) under the synonym of Degeeriella interrupta (PIAG.) to be typical of Phalacrocorax carbo L. I support the statement of SÉGUY that Quadraceps similis (GIEB.) is typical of Phalacrocorax carbo L.

The species atypical of Phalacrocoracidae were represented in my collections by 1♀ Anaticola crassicornis (SCOP.) typical of Anas platyrhynchos L. found on the cormorant from the Wroclaw region, 31. III. 1952.

10. Mallophaga from Podicipidae

A total of 23 Podiceps cristatus L., 6 P. nigricollis BREHM, 5 P. ruficollis PALL., 8 P. griseigena BODD. and 2 P. auritus L. from the Wroclaw, Kraków, Gdańsk, Koszalin and Białystok Provinces, was searched for Mallophaga.

The Mallophaga faunas on all the birds examined were very similar and poor in species.

*Anuirmus colymbinus* (SCOP. 1763)

syn. *Nirnus fuscocincinus* DENNY 1842

*Nirnus rufinotus* NITZSCH 1842

27♂♂, 45♀♀ and 8 juv. collected from 21 Podiceps cristatus L., 6 ♂♂, 13♀♀ and 1 juv. from 6 P. nigricollis BREHM, 1 ♂♂, 3♀♀ and 3 juv. from 2 P. ruficollis PALL., 2 ♂♂, 6♀♀ from 3 P. griseigena BODD., 2 ♂♂, 1♀♀ and 2 juv. from 1 P. auritus L.

*Anuirmus colymbinus* (SCOP.) is known as typical of Podiceps auritus L. (HOPKINS a. CLAY 1952, BALAT 1953 a — Bohemia, 1956 — Slovakia). Then BALAT (1953 a — Bohemia) records *Anuirmus colymbinus* (SCOP.) from Podiceps cristatus L., P. g. griseigena BODD., P. n. nigricollis BREHM and P. ruficollis PALL. SÉGUY (1944) mentions *Podiceps cristatus* L. as the typical host of this species and P. auritus L., P. ruficollis PALL., Sterna gracilis GOULD. and Nesoinimus parvulus GLD. as casual hosts. Basing on the foregoing data I suppose that *Anuirmus colymbinus* (SCOP.) steadily occurs on all the species of grebes.

*Pseudomenopon pilosum* (SCOP. 1763)

The occurrence of this species on the birds of the family Podicipidae is discussed in the section on Mallophaga from Rallidae, for it is considered typical of Fulica atra L.

Mallophaga atypical of Podicipidae

*Anaticola crassicornis* (SCOP.) is typical of *Anas platyrhynchos* L. 1♂ and 3♀♀ collected from 2 Podiceps cristatus L. and 1 juv. from P. griseigena BODD.

*Craspedorrhynchus platystomus* BURM. typical of *Buteo buteo* L. 1♀ taken
from *Podiceps griseigena* BODD. and 1 juvenile specimen of *Craspedorhynchus* sp. from *Podiceps cristatus* L.

*Rhynonirmus scolopacis* (DENNY) typical of *Capella gallinago* L. 2 ♀♀ obtained from 1 *Podiceps cristatus* L. and 1 ♂ from *Podiceps ruficollis* PALL.

*Quadraceps ferus* (BURM.) typical of *Tringa erythropus* PALL. 1 ♂ found on a *Podiceps griseigena* BODD. +

*Fulicojula lurida* (NITZSCH) typical of *Fulica atra* L. 1 ♂ found on 1 *Podiceps griseigena* BODD. and 1 ♀ on *P. ruficollis* PALL.

*Anatoecus dentatus* (SCOP.) typical of *Anas platyrhynchos* L. 1 ♂ and 2 ♀♀ collected from 1 specimen of *Podiceps cristatus* L.

*Actornithophilus* sp. typical of the birds of the order *Laroidae*. 1 juvenile taken from a *Podiceps griseigena* BODD. +

11. *Mallophaga from Colymbidae*

*Mallophaga* were taken only from 1 specimen of *Colymbus arcticus* L. from the Wroclaw region on 2. XII. 1955. They represented the following species:

*Craspedonirmus colymbinus* (DENNY 1842)

3 ♂♂ and 15 ♀♀ were collected. The species is given as typical of *Colymbus arcticus* L. (HOPKINS, a. CLAY 1952, BALÁT 1956 — Slovakia, TULESHKOV 1958 — Bulgaria). SÉGUY (1944) regards *Craspedonirmus colymbinus* (DENNY) as the typical parasite of *Colymbus stellaris* PONT., and a casual one of *C. arcticus* L., *C. immer* BRUNN., *Tadorna tadorna* L. and *Urinator lumme* (America).

12. *Mallophaga from Strigidae*

7 specimens of *Asio flammeus* PONT. and 3 of *Tyto alba* SCOP. from the Wroclaw Province were searched for *Mallophaga*. The *Mallophaga* fauna was, as a rule, similar on these species.

*Strigiphilus cursor* (BURM. 1838)

16 ♂♂ and 17 ♀♀♀ collected from 6 *Asio flammeus* PONT. The species is known as typical of *Asio flammeus* PONT. (HOPKINS, a. CLAY 1952, BLAGOVESHCHENSKY 1940 b — Talysh, 1948 — Barabinsk Lake, 1951 — Tadjikistan, BALÁT 1956 — Slovakia, 1958 — Hungary, SÉGUY 1944 — Alaska). Besides, it is recorded from *Asio otus* L. (BLAGOVESHCHENSKY 1948 — Barabinsk Lake), A. otus wilsonianus LESS. (SÉGUY 1944 — California, Iova, Nebraska), Strix aluco sylvatica SHAW., Bubo bubo L., B. maculosus VIEILL. (Africa), B. ascalaphus Sav. (Egypt), B. virginianus GM. (Kansas), *Asio galapagensis* GOULD. (Galapagos) and Falco tinnunculus L. (SÉGUY 1944). The foregoing data point to a wide distribution of *Strigiphilus cursor* (BURM.).
Strigophilus rostratus (Burm. 1838)

4 ♀♀ and 1 juv. taken from 2 Tyto alba Scop. The species is known to be typical of Tyto alba Scop. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Tuleshkov 1957 — Bulgaria), Séguy (1944) mentions it only from Asio flammeus Pont.

Mallophaga atypical of Strigidae

Colpocephalum flavescens Haan. typical of Haliaeetus albicilla L. 2 ♀♀ obtained from 1 Asio flammeus Pont., 1 ♂ and 2 ♀♀ from 1 Tyto alba Scop. + Degeeriella fulva (Gieb.) typical of Aquila chrysaetos L. 2 ♂♂, 32 ♀♀ and 10 juv. collected from 1 specimen of Asio flammeus Pont. from the Zoological Garden in Wroclaw. This bird, however, had been recently caught and had not come into contact with other birds in confinement yet. Mass occurrence of Degeeriella fulva (Gieb.) on Asio flammeus Pont. should be regarded as an exceptional phenomenon and only further investigations will make it possible to answer whether the Mallophaga of this species are steady inhabitants also on Asio flammeus Pont.

13. Mallophaga from Falconidae

2 Pandion haliaetus L., 1 Haliaeetus albicilla L., 3 Circus aeruginosus L., 1 Aquila pomarina Br. and 4 Milvus migrans Bodd. from the Wroclaw, Lublin, Katowice, Koszalin and Olsztyn provinces, were searched for Mallophaga. All these species of birds are more or less connected with the water environment. In addition, Mallophaga were collected from the following species: 23 specimens of Buteo buteo L., 3 of B. lagopus Brünn., 4 of Accipiter nisus L., 2 of A. gentilis L., 1 of Falco subbuteo L. and 1 of F. tinnunculus L. Although these birds live far from water, I include them in my work because the fauna of Mallophaga is the same within the whole family Falconidae.

Craspedorrhynchus platystomus (Burm. 1838)

42 ♂♂, 94 ♀♀ and 26 juv. collected from 15 Buteo buteo L., 3 ♂♂, 7 ♀♀ and 5 juv. from 2 B. lagopus Brünn., 4 ♂♂, 8 ♀♀ and 4 juv. from 1 Aquila pomarina Br., 3 ♂♂, 6 ♀♀ and 4 juv. from Milvus migrans Bodd., 1 ♂, 1 ♀ and 2 juv. from 2 Accipiter nisus L. and 1 ♀ from A. gentilis L.

Craspedorrhynchus platystomus (Burm.) is known as a typical parasite of Buteo buteo L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Tuleshkov 1957 — Bulgaria, Sofia — ZOO, Séguy 1944). It is also known from Milvus milvus L., Pernis apivorus L., Acci-
piter gentilis L., Buteo erythropolis KING. (Argentina, ZOO), Buteo swainsoni (U.S.A.), B. borealis costariensis, B. abbreviatus (Costa-Rica), Accipiter velox (U.S.A.), Leucopternis semiplumbea from Costa-Rica (Séguy 1944).

Craspedorrhynchus pachypus (Gieb. 1874)

1 ♂ from a Milvus migrans Bodd. examined. The species is regarded as typical of Haliastur indus Bodd. (Hopkins a. Clay 1952, Séguy 1944). Besides, Hopkins and Clay (1952) as well as Séguy (1944) record it from Buteo buteo L. and Milvus migrans Bodd. [Séguy 1944, by the synonymous name of Philopterus angulatus (Piag. 1880)].

Degeeriella fusca (Denny 1842)

28 ♀♀ obtained from one specimen of Circus aeruginosus L. Besides this specimen I have found no Mallophaga of this species on other birds of the family Falconidae. Degeeriella fusca (Denny) is, however, often mentioned in literature from many species of birds of the family Falconidae. In these cases, I feel, the species Degeeriella fusca (Denny) may have been confused with D. rufo (Burm.), D. fulva (Gieb.) and D. regalis (Gieb.). All these species are like each other, and it was only the revision of this group of species (Clay 1958) that established their systematic position clearly. Degeeriella fusca (Denny) is a typical parasite of Circus aeruginosus L. (Clay 1958, Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Blagoveschensky 1951 — Tadjikistan, Tuleshkov 1957 — Bulgaria, Séguy 1944). It is also mentioned from Circus cyaneus L. (Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Blagoveschensky 1951 — Tadjikistan), Circus macrourus Gm. (Balát 1956 — Slovakia, Blagoveschensky 1951 — Tadjikistan), Buteo rufinus Cretzsch. (Blagoveschensky 1940 b — Talysh, 1951 — Tadjikistan), Accipiter nisus L. (Blagoveschensky 1951 — Tadjikistan, Séguy 1944), Circus pygargus L., Aegypius monachus L., Accipiter gentilis L., Buteo buteo L., B. lagopus Brünn., Milvus milvus L., M. migrans Bodd., Falco rusticolus islandicus Brun., and from America from Falco rufigipes, F. brachydactylus, Buteo jakal, B. swainsoni, B. borealis, B. lagopus sanctijohannis Gm., Circus cyaneus hudsonicus L., Accipiter gentilis atricapillus Wils., A. bicolor, Falco sparverius, F. peregrinus anatum Bp. and Elanus leucurus (Séguy 1944). Then Blagoveschensky records Degeeriella fusca (Denny) under the synonymous name of D. rufo var. socialis (Gieb.) from Circus aeruginosus L. (1940 b — Talysh, 1948 — Barabinsk Lake) and from Circus macrourus Gm. (1948 — Barabinsk Lake).

Degeeriella rufo rufo (Burm.) 1838

3 ♂♂ and 3 ♀♀ taken from 1 Falco tinnunculus L. and 7 ♀♀ from 2 Accipiter nisus L. After being shot both the individuals did not come into contact

*Degeeriella discocephalus discocephalus* (Burm. 1838)

2 ♂♂ and 19 ♀♀ obtained from 1 specimen of *Haliaeetus albicilla* L. This species is considered typical of *Haliaeetus albicilla* L. (Hopkins a. Clay 1952, Clay 1958, Balát 1953 a — Bohemia, 1956 — Slovakia, Blagoveschensky 1940 b — Talysh, 1951 — Tadjikistan, Séguy 1944). Besides, it is mentioned from *Aquila heliaca* Sav. and *Haliaeetus discocephalus* (Séguy 1944 — U. S. A.).

*Degeeriella fulva* (Gieb. 1874)


*Degeeriella angusta* (Gieb. 1874)

104 ♂♂, 191 ♀♀ and 76 juv. collected from 15 specimens of *Buteo buteo* L. out of a total of 23 individuals. It appeared that the degree of infestation of buzzards by these parasites varied considerably. I found out that the heaviest infestation of the birds by *Degeeriella fulva* (Gieb.) was from June until December. It is the more noteworthy as in the remaining months the drop in the number of *Degeeriella fulva* (Gieb.) was accompanied by an increase of infestation by the species *Craspedorhynchus platystomus* (Burm.) in the same birds. *Degeeriella fulva* (Gieb.) lives on the wings and body of the buzzard, and *Craspedorhynchus platystomus* (Burm.) on its head. Of course, the ecological conditions are different in either case, because the plumage of the head varies from that of the body. The seasonal oscillation in the number of both *Mallophaga* species may be influenced by such factors as differences in the temperatures in summer and winter, various ways of moulting as regards the place (head or body) and other unknown factors.

LEV., B. rufouscus FORST., B. r. augur RÜPP., B. hemilasius TEM. a. SCHLEG., B. regalis GRAY, B. jamaicensis alascensis GRINN., B. j. borealis GM., B. j. kriderii HOOP., B. j. costariensis RID., B. harlani AUD., B. l. lineatus GM., B. v. vulpinus GLOG., B. b. burmanicus HUM., B. l. lagopus PONT., B. l. s.-jo-hannis GM., Geranoaetus melanoleucus australis SWAN. (Chile), Ichthyophaga ichthyaeus HORST. (India), Lopaëtus occipitalis DAUD. (Sudan, Uganda, Kenya), Hieraëtus ayresii GURN. (Uganda); H. pennisatus GM. (Palestine), Spilornis cheela albicus TEMM. (Rajputana), S. c. cheela LATH. (Nepal), S. c. burmanicus SWAN., Polemaëtus bellicosus DAUD. (Natal), Melierax musicus poliopterus CAB. (Kenya), M. metabates subspp. (Aden, Morocco, Southwest Africa, Portugal) — CLAY 1958.

Degeeriella regalis regalis (GIEB. 1866)
syn. Degeeriella vittata (GIEB. 1874)

16 ♂♂, 8 ♀♀ and 1 juv. found on 3 specimens of Milvus migrans migrans BODD. This species is regarded as typical of Milvus milvus milvus L. and Milvus migrans migrans BODD. (HOPKINS a. CLAY 1952, CLAY 1958). Then it is recorded from Milvus m. migrans BODD. (TULESHKOV 1957), M. aegyptiacus, M. ater, M. migrans parasiticus DAUD., M. m. arabicus SWAN., M. m. govinda SYKES. (Italy, Greece, Kenya, Uganda, Rhodesia, Bechuanaland, Land, Arabia, Aden, Deccan, India, Nepal), M. l. lineatus GRAY (Thailand), Buteo galapagensis GOUlD. (Galapagos), B. swainsoni BON. (North America), B. jamaicensis borealis GM. (Arizona), Haliaëtus indus BODD. (Rajputana, Deccan, India), Haliaëtus leucoryphus PALL (India) — CLAY 1958.

Falcolepeurus sulcifrons (DENNY 1842)
syn. Esthiópterus quadrioculatum NITZCH 1861

1 ♂ and 3 ♀♀ obtained from a Haliaëtus albicilla L. The species is known as a typical parasite of Haliaëtus albicilla L. (HOPKINS a. CLAY 1952, BALÁT 1953 a — Bohemia, 1956 — Slovakia, TULESHKOV 1957 — Bulgaria, SÉGUY 1944). Besides, it is recorded from Aquila chrysaëtos L. (BALÁT 1953 a — Bohemia, SÉGUY 1944) and from Spizaëetus cirrhatus PIAG. (SÉGUY 1944).

Colpocephalum flavescens HAAN. 1829

1 ♂ and 5 ♀♀ collected from 1 Haliaëtus albicilla L., 1 ♂ from Circus aeruginosus L., 9 ♂♂, 23 ♀♀ and 8 juv. from 8 Buteo buteo L., 52 ♂♂, 74 ♀♀ and 10 juv. from 2 B. lagopus BRÜNN., 1 ♂ and 3 ♀♀ from 1 Accipiter gentilis L. Colpocephalum flavescens HAAN. is typical of Haliaëtus albicilla L. (HOPKINS a. CLAY 1952, BALÁT 1953 a — Bohemia, 1956 — Slovakia, TULESHKOV 1957 — Bulgaria, BLAGOVESHCHENSKY 1951 — Tadjikistan, SÉGUY 1944). The species
is also known from Aquila chrysaetos L. (Balát 1953 a — Bohemia, Ségy 1944 — Alaska and California), Buteo lagopus Brünn (Balát 1953 a — Bohemia), Falco tinnunculus L. (Blagoveshchensky 1940 b — Talysh), F. subbuteo L. (Blagoveshchensky 1948 — Barabinsk Lake), F. peregrinus babylonicus Scl., Cerclheis naumanni pekinensis Swinh. (Blagoveshchensky 1951 — Tadjikistan), Milvus milvus L., Accipiter gentilis L., Falco peregrinus Tunn., Pernis apivorus L., Harpyia deistor Den., Gypaëtes barbatus L., Buteo buteo L., Circus pygargus L., Nyctea scandiaca L., Haliaeëtus leucogaster, Aquila pomarina Br., Otogyps auriculatus Daud., Haliaeëtus pelagicus (Arctic Zone), H. leucocephalus (Kansas and Alaska), Archibuteo sancti-johannis (Kansas), Alanoides forficatus (Iova), Buteo galapagensis, Fregata aquila (Galapagos), Haliaastur indus (Ségy 1944). Moreover, Balát (1956 — Slovakia) records Colpocephalum sp. (? flavescens Haan.) from Buteo lagopus Pont. and (1958 — Hungary) from B. lagopus Pont., Falco peregrinus germanicus ERL. and F. s. subbuteo L.

Colpocephalum trinectum Nitzsch 1861

22 ♂♂, 15 ♀♀ and 2 juv. taken from 4 specimens of Milvus migrans Bodd. This species is recorded only from Milvus migrans Bodd. (Hopkins a. Clay 1952, Clay 1951, Tuleshkov 1957 — Bulgaria, Ségy 1944).

Kurodaia haliaeëti (Denny 1842)

5 ♂♂, 5 ♀♀ and 5 juv. collected from one specimen of Pandion haliaeëtus L. This species is recorded only from Pandion haliaeëtus L. (Hopkins a. Clay 1952, Balát 1953 a — Bohemia, 1956 — Slovakia, 1958 — Hungary, Ségy 1944).

Laemobothrion cirbi Fourc. 1785

1 ♂ and 3 ♀♀ obtained from 1 Circus aeruginosus L. and 1 ♀ from Milvus migrans Bodd. This species is considered to be typical of Circus aeruginosus L. (Hopkins a. Clay 1952, Blagoveshchensky 1951 — Tadjikistan, Tuleshkov 1957 — Bulgaria, Ségy 1944). It is also known from Milvus migrans Bodd., Haliaeëtus albicilla L. (Blagoveshchensky 1951 — Tadjikistan, Ségy 1944), Neophron p. percropterus L., Gyps f. fulvus Hall., Gypaëtes barbatus hemachalamanus Hutt., Buteo rufinus Cretsch. (Blagoveshchensky 1951 — Tadjikistan), Gyps fulvus Hall., Circus cyaneus L., C. pygargus L., Buteo buteo L., Circaëtos ferox Gm., Strix aluco L. (Europe) and in America from Polyborus vulgaris, Milvus ater and Platalea leucorodia L. (Ségy 1944).

Laemobothrion tinnunculi (L. 1758)

6 ♀♀ and 1 juv. found on one specimen of Falco subbuteo L. This species is known as typical of Falco tinnunculus L. (Hopkins a. Clay 1952, Balát

Mallophaga atypical of Falconidae

Anatoecus dentatus (Scop.) typical of Anas platyrhynchos L. 1 ♀ found on a Buteo buteo L. +
Anaticola crassicornis (Scop.) typical of Anas platyrhynchos L. 1 ♀ found on a Pandion haliaeetus L. and 1 ♀ on a Circus aeruginosus L. +
Austromenopon ridibundus (Denny) typical of Larus ridibundus L. 1 ♀ found on a Buteo buteo L. from the Wroclaw Zoological Garden.
Pseudomenopon pilosum (Scop.) typical of Fulica atra L. 1 ♂ taken from a Buteo buteo L. and 1 ♀ from a Milvus migrans Bodd. +
Aquanirmus colymbinus (Scop.) typical of Podiceps cristatus L. 2 ♀♀ collected from 1 specimen of Accipiter nisus L. +

V. A TRIAL OF EXPLANATION OF SOME DEPENDENCES OF CHITIN SHELL STRUCTURE IN MALLOPHAGA UPON THEIR ECOLOGICAL CONDITIONS

In the course of my investigations I observed, using for the purpose my own material, different types of chitin shell structures in Mallophaga. Species of diverse shapes and sizes and with chitin shells variously shaped are seen within the Mallophaga order. This is apparent, when larger units and not particular species are being compared with each other. The now accepted systematic classification of Mallophaga (Hopkins a. Clay 1952) frequently comprises the species with various chitin shell structures within one family. Therefore I grouped the Mallophaga species of the same type of external structure together and in this way erected wider auxilliary units within the particular families 1. It appeared then that these groups correspond to the genera in the sense of the word used in the older nomenclature (Giebel 1864). Consequently, this division is natural and falls in with the systematics of Mallophaga. I named the groups thus formed according to the older genus names, from which the present genera of Mallophaga have been derived. So three groups have been established within the family Menoponidae: „Menopon“ represented in my collection by the genera Austromenopon, Pseudomenopon, Holomenopon and Gruimenopon, „Colpocephalum“ represented by Actorni-

1 Kéler (1957) in order to explain the phylogenesis of Mallophaga, formed similar auxilliary units based, however, on different morphological qualities (form of legs).
thophilus, Ardeiphilus, Ciconiphilus, Heleonomus, Colpocephalum and Kurodaia and „Trinoton“ represented by one genus, Trinoton. The group „Laemobothriion“ covers the present range of the family Laemobothriidae and comprises only the genus Laemobothriion. The group „Docophorus“ has been distinguished within the large family Philopteridae and has the following representatives in my collection: Saemundssonia, Anatooecus, Incidiirons, Ibidoecus, Neophi-lopterus, Craspedorrhynchus, Craspedonirmus and Strigiphilus. The group „Nirmus“ is represented in my collection by the genera Rhynonirmus, Lunaceps, Carduiceps, Quadraceps, Rallicola, Aquanirmus and Degeeriella, and the group „Esthiopterum“ by Anaticola, Fulicoffula; Ardeicola, Esthiopterum, Ornithobius and Falcolipeurus.

Having thus classified all the Mallophaga species examined I scrutinized them in order to state the hosts of Mallophaga in particular groups. I have come round to a conviction that the genus, showing clearly the ecological relations between Mallophaga and the respective host birds, is the smallest and most proper systematic unit for composing the general picture of these relations. As higher divisions I assumed the groups established by me for Mallophaga, and the families for birds. On this basis I made up a list, presented in Table III, illustrating the aforesaid ecological relations between Mallophaga and their hosts by my own material.

Characteristics of the group „Menopon“

This group consists of Mallophaga living on the birds of the families Charadriidae, Laridae, Ralliidae, Podicipidae, Anatidae and Gruidae.

The Mallophaga of the group „Menopon“, in the systematics reckoned among the most primitive ones, are characterized by a rather uniform build and slight ecological specialization. Their hosts belong to different families and orders having various habits of living. The birds of the families Charadriidae and Laridae, combined in the order Laro-Limicolae, are noted for swift flight just as the birds of the family Gruidae which, besides, can reach considerable heights in the air. The birds of the family Anatidae are in frequent contact with both water and air. They are able to fly fast and often dive very well. Ralliidae and Podicipidae are in the closest connexion with water and they are excellently specialized in diving.

The diverse living habits of these birds create different environmental conditions for the Mallophaga parasitizing them. These Mallophaga must accordingly endure various, frequently rapid environmental changes, e. g., those in pressure, speed, temperature and humidity. I suppose that the lack of a developed specialization in these most primitive Mallophaga gives them wide adaptational abilities in different ecological conditions (Fig. 6).
Characteristics of the group "Colpocephalum"

This group comprises the Mallophaga that live on the birds of the following families: Charadriidae, Laridae, Ciconiidae, Gruidae, Falconidae and Strigidae.

Fig. 6. Holomenopon leucoxanthum (Burm.) ♀ from Anas platyrhynchos L., Radziąd, 29. VIII. 1955. Scale length = 1 mm.

The avian hosts of the Mallophaga of the group "Colpocephalum" are not, generally speaking, so closely connected with water as the birds infested by the Mallophaga of the group "Menopon". All these birds are known for their
### Ecological relations between Mallophaga and their hosts

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<td>Calidris</td>
<td>Charadriidae, Laridae, Rallidae, Podicipedidae, Phalacrocoracidae, Falconidae, Strigidae, Ciconiidae</td>
</tr>
<tr>
<td></td>
<td>Quadrageps</td>
<td>Tringa, Vanellus, Sterna, Chlidonias, Larus, Actitis, Phalacrocorax</td>
<td>Charadriidae, Laridae, Rallidae, Podicipedidae, Phalacrocoracidae, Falconidae, Strigidae, Ciconiidae</td>
</tr>
<tr>
<td></td>
<td>Rallicola</td>
<td>Fulica, Gallinula</td>
<td>Charadriidae, Laridae, Rallidae, Podicipedidae, Phalacrocoracidae, Falconidae, Strigidae, Ciconiidae</td>
</tr>
<tr>
<td></td>
<td>Aquaniminus</td>
<td>Podiceps</td>
<td>Charadriidae, Laridae, Rallidae, Podicipedidae, Phalacrocoracidae, Falconidae, Strigidae, Ciconiidae</td>
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<tr>
<td></td>
<td>Degeericilla</td>
<td>Haliaeetus, Falco, Milvus, Circus, Buteo, Accipiter, Asio?, Ciconia?</td>
<td>Charadriidae, Laridae, Rallidae, Podicipedidae, Phalacrocoracidae, Falconidae, Strigidae, Ciconiidae</td>
</tr>
<tr>
<td>&quot;Esthipterus&quot;</td>
<td>Anaticola</td>
<td>Anas, Nyroca, Anser, Cygnopsis</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
</tr>
<tr>
<td></td>
<td>Fulicojulla</td>
<td>Fulica, Gallinula</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
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<tr>
<td></td>
<td>Ardeicola</td>
<td>Ciconia, Botaurus</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
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<tr>
<td></td>
<td>Esthipterus</td>
<td>Grus</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
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<tr>
<td></td>
<td>Ornithobius</td>
<td>Cygnus</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
</tr>
<tr>
<td></td>
<td>Falcolipeurus</td>
<td>Haliaeetus</td>
<td>Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae, Falconidae</td>
</tr>
</tbody>
</table>
Fig. 7. *Ardeiphilus trochicus* (Burm.) ♀ (head and terminal abdominal segments) from *Bolaurus stellaris* L., Samokleski, 22. VII. 1949. Scale length = 1 mm.
Fig. 8. *Colpocephalum tricinctum* Nitzsch (head and terminal abdominal segments of female and abdomen tip of male) from *Milvus migrans* Bodd., Opatowice, 30. VII. 1952. Scale length = 1 mm.

Fig. 9. *Colpocephalum zebra* Burm. ♀ (head and terminal abdominal segments) from *Ciconia ciconia* L., Radziądz, 13. VIII. 1955. Scale length = 1 mm.
skilful flight, and with the exception of *Charadriidae* and *Laridae* they are big birds.

The *Mallophaga* of the group „*Colpocephalum*“ exhibit higher specialization in their build than those of the group „*Menopon*“. This specialization reveals itself in a stronger and more diversified external structure. All thicker and stronger parts of the chitin shell are of darker pigmentation (*Neuffer* 1954).

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**Fig. 10.** *Colpocephalum zebra* BURM. ♂ (portion of abdomen) from *Ciconia ciconia* L., Radziędz, 13. VIII. 1955. Scale length = 1 mm.

The strengthenings have sometimes a characteristic arrangement. For instance, the chitin strengthenings of the head form four separate patches, which in other cases are joined together so as to form one patch in the shape of a horseshoe. On the thorax and abdomen there are also some chitin strengthenings...
in the shape of compact patches on the lateral portions of the body (Figs. 7, 8, 9 and 10).

I think that the structure of this kind helps the *Mallophaga* to retain their place on the birds flying fast and willingly bathing in water. In my opinion the characteristic arrangement of pigment patch strengthenings in separate accumulations helps the parasites by absorbing shocks at rapid rising or alighting, which is especially significant in the birds of the families *Charadriidae* and *Falconidae*.

**Characteristics of the group „Trinoton“**

The group „*Trinoton“* is represented by one genus, *Trinoton*, living on *Anatidae*. The *Mallophaga* of the group „*Trinoton“* have a specific structure. They are characterized by large measurements (about 8 mm.), mobility and

![Image](image-url)

Fig. 11. *Trinoton querguedulae* L. (head of female) from *Anas platyrhynchos* L., Sominy, 13. VIII. 1937. Scale length = 1 mm.

strong build. Their bodies are provided with numerous hairs and setulae. I suppose that these chitin formations are useful to the parasites to keep on the feathers when the bird flies or swims. Besides, the numerous setulae scattered all over the body of these *Mallophaga* seem to play an important role protecting the parasites against low ambient temperatures and against getting wet (Fig. 11).
Characteristics of the group „Laemobothrion“

The group „Laemobothrion“ is represented also only by one genus, Laemobothrion. The Mallophaga of this genus live on Falconidae and show much resemblance to the Mallophaga of the group „Trinoton“, e. g., large measurements (up to 10 mm.), dark pigmentation and mobility. Only the setae covering their bodies are poorly developed, which, I think, is connected with different living habits of their hosts: Falconidae are not connected with water as much as Anatidae. Consequently the Mallophaga living on Falconidae are not exposed to such rapid changes of temperature and humidity as those living on Anatidae are (Fig. 12).

Characteristics of the group „Docophorus“

The group includes the Mallophaga from the following families of birds: Charadriidae, Laridae, Anatidae, Rallidae, Columbidae, Ciconiidae, Plegadiidae, Falconidae and Strigidae.
The foregoing birds much differ from one another as regards their living habits. The spreading of the group "Docophorus" over the birds of so numerous and various families requires an explanation different from that for the similar circumstance in the group "Menopon". The Mallophaga of the group "Docophorus", contrary to those of the group "Menopon", constitute a considerably specialized division. They are noted for their strong and stumpy structure of body, sedentary living habits and distinct location on the head and neck of the bird; they appear particularly numerousy on the feathers with undeveloped webs. It is rather more difficult for the birds to get rid of the parasites located in the above-mentioned places than from other parts of their bodies. The birds of the family Colymbidae are an exception; I found only single specimens of the Mallophaga of the group "Docophorus" on them. I suppose Colymbidae produce worse conditions for Mallophaga to keep on them, owing to their frequent diving. Fig. 13 is presented as an example of a species belonging to the group "Docophorus".

Fig. 13. Saemundssonia integer (Nitzsch) (head, terminal abdominal segments of male and female) from Grus grus L., Warszawa, 5. XII. 1954. Scale length = 1 mm.
Characteristics of the group „Nirmus“

This group consists of the Mallophaga from Charadriidae, Laridae, Rallidae, Phalacrocoracidae, Falconidae and perhaps Strigidae and Ciconiidae.

The Mallophaga of this group are widely spread and live both on the birds that fly skilfully and on those that dive well. So, like Mallophaga of the group „Colpocephalum“, they must show an ability to adapt themselves to the different living ways of their hosts. These adaptations, like in the group „Col-

Fig. 14. Quadraceps sellatus (Burm.) (head, terminal abdominal segments of male and portion of female abdomen) from Sterna hirundo L., Sominy, 6. VIII. 1957. Scale length = 1 mm.

pocephalum“, depend on the strengthening of the chitin shell structure. The Mallophaga living on the birds that rise rapidly and fly swiftly are particularly strongly built. Separate chitin thickenings in the shape of dark patches stiffening the whole body are to be seen in them as they were in the group
Fig. 15. *Quadraceps punctatus* (Burm.) (male and terminal abdominal segments of female) from *Larus canus* L., Krynica Morska, 27. VII. 1956. Scale length = 1 mm.
Fig. 16. *Degeeriella discocephalus* (Burm.) ♂ (head and terminal abdominal segments) from *Haliaeetus albicilla* L., Węgliniec, 15. XII. 1956. Scale length = 1 mm.

Fig. 17. *Degeeriella ruja ruja* (Burm.) ♀ (head and terminal abdominal segments) from *Accipiter nisus* L., Wrocław region, 24. XI. 1957. Scale length = 1 mm.
"Colpocephalum". They are particularly distinctly seen in the species occurring on the birds of the order Lario-Limicolae (Figs. 14 and 15).

This chitin strengthening is different in the Mallophaga of the group "Nirmus" living on Falconidae. Here the head is provided with a semi-circular thickening and the whole body is rather strongly chitinized with particularly great accumulations of pigment in its central and lateral portions (Figs. 16 and 17).

In my opinion these strengthenings play the same role as the analogous features of the structure in the Mallophaga of the group "Colpocephalum".

Fig. 18. Esthiopterus gruis (L.) (head of female) from Grus grus L., Warszawa, ZOO, 5. XII 1954. Scale length = 1 mm.

Characteristics of the group "Esthiopterus"

This group comprises the Mallophaga from the following avian families: Anatidae, Rallidae, Ciconiidae, Ardeidae, Gruidae and Falconidae. The birds of these families are more or less closely connected with the water environment.
However, the birds marked for good diving such as Podicipidae are lacking here. As to the occurrence of the Mallophaga of the group „Esthiopterum“ on the birds of the family Anatidae, I most frequently found them on the surface-feeding ducks which are poor divers. Consequently, the Mallophaga of the group „Esthiopterum“ live on the birds that either do not dive at all or dive feebly but that fly well or at least moderately well. These Mallophaga are represented by species with elongated shapes of body. They live on the wing-feathers and cling to them in the position parallel to the barbs. Their chitin shell strengthenings are not very strong by comparison with other Mallophaga. I believe that the main adaptation permitting them to keep on birds is their characteristic position on the feathers (Figs. 18, 19, 20 and 21).

Fig. 19. Esthiopterum gruis (L.) ♀ (terminal abdominal segments) from Grus grus L., Warszawa, ZOO, 5. XII. 1954. Scale length = 1 mm.
Fig. 20. *Fulicofulva lurida* (Nitzsch) (head and terminal abdominal segments of male and female) from *Fulica atra* L., Držno, Scale length = 1 mm.

Fig. 21. *Ornithobius cygni* (L.) ♀ (head and terminal abdominal segments) from *Cygnus cygnus* L., Jugoslavia, Kresnice, February 1954. Scale length = 1 mm
VI. A TRIAL OF CORRELATION OF AFFINITIES IN MALLOPHAGA WITH THOSE IN THEIR HOSTS

The conclusions drawn from my observations, completed with the data from literature (Hopkins a, Clay 1952, Clay 1957, Eichler 1941 a and b, 1942, 1949), have enabled me to present the relations between the Mallophaga and the birds more accurately. The general juxtaposition of the groups erected by me („Menopon“, „Colpocephalum“, „Trinoton“, „Laemobothrium“, „Docophorus“, „Nirmus“ and „Esthiopterum“) with the orders of birds on which the Mallophaga classified in these groups were found has become a starting point for my considerations. I keep using here the division into the auxilliary groups of Mallophaga, because the various types of chitin shell structures in Mallophaga of particular groups were developing very slowly, with their roots reaching back as far as the prehistory of the respective hosts. Therefore, assuming the theory that the phylogenetic development of Mallophaga advances more slowly than that of their hosts (Clay 1949 b, Blagoveshchensky 1959), I watch which orders of birds are infested by the Mallophaga of particular groups with similar external structures and related closely to each other. I suppose that this may be of importance for an analysis of the phylogenetic relations in birds.

In order to obtain a fuller picture of the occurrence of Mallophaga on birds I list all the orders of birds of Poland, in the sequence established by Sokolowski (1958), in Table IV and mark with the symbol „M“ those in which the presence of Mallophaga of particular groups has been stated by me and with the symbol „A“ when it has been recorded by other authors. The orders of birds connected with the water environment are placed in thick frames.

As can be seen from Table IV at least one group of Mallophaga occurs in each order of birds. The distribution of the individual groups of Mallophaga is here as follows:

The group „Menopon“ occurs in 20 orders of birds, 12 of which are connected with the water environment.

The group „Docophorus“ occurs in 17 orders of birds, 14 of which are connected with the water environment.

The group „Colpocephalum“ occurs in 17 orders of birds, 12 of which are connected with the water environment.

The remaining groups occur, as a rule, in the orders of birds more or less closely connected with the water environment. These groups are: „Esthiopterum“ present in 10 orders of birds, „Laemobothrium“ living on birds of 3 orders and „Trinoton“ occurring in 2 orders.

Whenever I speak about the orders of birds connected with the water environment, I mean the orders, all species of which are connected with water. These are: Gresores, Grues, Ralli, Laro-Limicolae, Anseres, Steganopodes, Tubinares, Phoenicopteri, Podicipedes, Colymbi, Alcae and Halecyones. In addition, I include here the following orders, some species of which only are con-
Table IV

Occurrence of Mallophaga groups on birds belonging to orders known in Poland

<table>
<thead>
<tr>
<th>Order of birds</th>
<th>Mallophaga groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passeres</td>
<td>A</td>
</tr>
<tr>
<td>Macrochires</td>
<td>A</td>
</tr>
<tr>
<td>Caprimulgii</td>
<td>A</td>
</tr>
<tr>
<td>Upupae</td>
<td>A</td>
</tr>
<tr>
<td>Meropse</td>
<td>A</td>
</tr>
<tr>
<td>Coraciæ</td>
<td>A</td>
</tr>
<tr>
<td>Haleyonæs</td>
<td>A</td>
</tr>
<tr>
<td>Cuculi</td>
<td>A</td>
</tr>
<tr>
<td>Pici</td>
<td>A</td>
</tr>
<tr>
<td>Strigæ</td>
<td>A</td>
</tr>
<tr>
<td>Accipitres</td>
<td>A</td>
</tr>
<tr>
<td>Columbææ</td>
<td>A</td>
</tr>
<tr>
<td>Pterocètes</td>
<td>A</td>
</tr>
<tr>
<td>Galli</td>
<td>A</td>
</tr>
<tr>
<td>Gressores</td>
<td>A</td>
</tr>
<tr>
<td>Phoenicoptæri</td>
<td>A</td>
</tr>
<tr>
<td>Grææs</td>
<td>MA</td>
</tr>
<tr>
<td>Otides</td>
<td>A</td>
</tr>
<tr>
<td>Ralli</td>
<td>MA</td>
</tr>
<tr>
<td>Laro-Limicolaæ</td>
<td>MA</td>
</tr>
<tr>
<td>Anserææ</td>
<td>MA</td>
</tr>
<tr>
<td>Steganopodes</td>
<td>A</td>
</tr>
<tr>
<td>Tubinææ</td>
<td>A</td>
</tr>
<tr>
<td>Podiciææ</td>
<td>MA</td>
</tr>
<tr>
<td>Colymbi</td>
<td>MA</td>
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<tr>
<td>Alcae</td>
<td>A</td>
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</tbody>
</table>

connected with the water environment: Strigæ, Accipitres and Passeres. I treat all these orders jointly, because the specific compositions of the Mallophaga populations from the birds related to each other always show much resemblance independently of the environments in which these birds live.

I explain the wide distribution of the Mallophaga of the groups „Menopon“ and „Colpoccephalum“ over many orders of birds by the primitiveness and poor specialization of the Mallophaga of these groups belonging to the family Menoponidae.

On the contrary, I explain the wide distribution of the groups „Docophorus“ and „Nirmus“ by the plasticity of the adaptations of Mallophaga specialized according to the various biologies of the hosts.

The group „Esthiopterum“ is limited only to the birds closely connected with the water environment, but it is not to be found in the orders Podicipidae, Colymbi and Alcae that are noted for excellent diving. Probably the
Mallophaga of the group "Esthiopterum" have not produced proper adaptations for the biology of these birds.

The groups "Trinoton" and "Laemobothrion" show a considerable specialization, but no wider distribution.

I consider also the phylogenetic aspect of the relations existing between the parasites and the hosts. Table V, given below, is to explain this matter. It presents the orders of birds, more or less connected with the water environment, from which I have worked out Mallophaga, as well as the orders standing next to them in the system. The avian orders possessing similar Mallophaga faunae are placed in thick frames.

<table>
<thead>
<tr>
<th>Mallophaga groups</th>
<th>Striges</th>
<th>Accipitres</th>
<th>Gressores</th>
<th>Steganopodes</th>
<th>Ralli</th>
<th>Laro-Limicolaen</th>
<th>Grues</th>
<th>Tubinares</th>
<th>Anseres</th>
<th>Phoenicopteri</th>
<th>Podicipedes</th>
<th>Colymbi</th>
<th>Alcae</th>
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</thead>
<tbody>
<tr>
<td>&quot;Colpocephalum&quot;</td>
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<td>A</td>
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<tr>
<td>&quot;Trinoton&quot;</td>
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<td>A</td>
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<tr>
<td>&quot;Dococephorus&quot;</td>
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<tr>
<td>&quot;Nirnus&quot;</td>
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<tr>
<td>&quot;Esthiopterum&quot;</td>
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<td>M A</td>
<td>M A</td>
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</tbody>
</table>

As will be seen from Table V various numbers of particular groups of Mallophaga occur in different orders of birds. With respect to that, the richest orders are: Accipitres (6 groups of Mallophaga), Gressores (6 groups), Phoenicopteri (6 groups), Anseres (6 groups), Ralli (5 groups), Laro-Limicolaen (5 groups) and Steganopodes (5 groups). On the other hand, the poorest orders — as regards the number of the Mallophaga groups — are: Colymbi (2 groups), Alcae (3 groups) and Striges (3 groups). These are old and markedly specialized orders. It is known from literature (Clay 1949 b) that the phylogenetically old groups of birds are characterized by a Mallophaga fauna poor in species.

Taking into consideration the orders of birds specified in Table V and comparing the groups of Mallophaga present on them, certain conclusions can be drawn concerning the mutual relationship among some orders of birds,
and thus the confirmation of the results of the ornithological researches attained.

As I have mentioned, the order Striges has 3 groups of Mallophaga: "Colpocephalum", "Docophorus" and "Nirmus". These are the groups most frequently represented in the remaining avian orders. The fact constitutes another reason for treating the owls (Striges) as a phylogenetically old group. The judgement expressed by SokolowskI (1958), quoted below in extenso, concerns this subject as well as the subject of the relationship of owls to other orders of birds:

"Before now owls were believed to be affined with the diurnal birds of prey, and the only difference between them was supposed to be the adaptation of owls for nocturnal life and that of diurnal birds of prey for being active in the daytime. At present it is assumed that the owls form a quite different evolitional line and that their resemblance to the diurnal predatory birds has developed secondarily, owing to the fact that both get food in a very similar manner. The matter is not quite clear, as F. Engelmann enumerates as many common features uniting owls with diurnal birds of prey as differences separating them. The differences between owls and all other predatory birds are not more eminent than those to be seen among some genera of diurnal birds of prey. Consequently owls give much trouble to the systematists, and even now it is not known with which birds they may associate. Some authors attempted to find resemblance between owls and the birds differing from them considerably in external appearance, such as rollers, nightjars and kingfishers. There is no doubt as to the fact that owls are a very old feathered race. O. Heinroth supposes that, e. g., the barn owl as species is older than the present state of continents, and its antiquity is proved by the fact that it is present all over the globe though it does not migrate."

Accipitres and owls have the same groups of Mallophaga. Only the Mallophaga of the groups "Menopon" and "Laemobothrion" occurring in Accipitres have not been found in owls. The group "Menopon" embraces, as was mentioned above, the Mallophaga of the most primitive structure and slight specialization of external qualities, and it belongs to the phylogenetically oldest branch of Mallophaga (Kéler 1957). Besides, this group is represented in a majority of birds. The lack of the group "Menopon" in Striges can be explained either by the lack of phylogenetic connexions between owls and Accipitres or by ecologic factors. Perhaps the Mallophaga of the group "Menopon" did not find suitable conditions on owls and have not developed on them, or at one time renounced them for some reason. The same refers to the other missing group, "Laemobothrion", which is typical of Accipitres and better specialized than the group "Menopon". All these, not to mention the fact that the Mallophaga from owls may be still inaccurately recognized, do

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1 As to the group "Nirmus", I must treat my data as questionable, for they refer to the finding of the species Degeeriella fulva (Gieb.), a typical parasite of Buteo buteo L, on Asio flammeus Pont.
not give sufficient evidence that there is no affinity between owls and Accipitres. The affinity is remote, if there is any.

According to Sokołowski (1958) Accipitres separated from Gressores and Steganopodes in the early period of the phylogenetic development. In his opinion Steganopodes, in spite of some resemblance to Lamellirostres (Anseres), emerged early from the old group of birds, which combined the features of the predatory and wading birds. Accipitres, Gressores and Steganopodes have very similar compositions of Mallophaga. The largest number of the Mallophaga groups were found in Gressores and Accipitres, namely „Menopon“, „Colpocephalum“, „Laemobothrium“, „Docophorus“, „Nirmus“ and „Esthiopterum“. The group „Laemobothrium“, most typical of Accipitres and met in Gressores, is lacking in Steganopodes. This may prove the very early differentiation of Steganopodes from the birds combining the features of predatory and wading birds. However, the general uniformity of the Mallophaga groups in Accipitres, Gressores and Steganopodes seems to be connected with the ties of affinity uniting these orders.

My further observations refer to the group of the orders Laro-Limicola and Grues. Sokołowski (1958) thinks that there is a remote affinity between these orders and, besides, that Alcae have also descended from the same, common stem. Laro-Limicola and Grues, comprising a number of most various forms, have the similar compositions of Mallophaga. The Mallophaga recorded from Laro-Limicola belong under the following groups: „Menopon“, „Colpocephalum“, „Docophorus“ and „Esthiopterum“. In Grues only the group „Nirmus“, present in a majority of birds, is lacking. The lack of this group may indicate a rather remote affinity between the orders Laro-Limicola and Grues. As to the relationship between these two orders and Alcae, no close connexions may be stated on the basis of the Mallophaga groups present on them. The orders Laro-Limicola and Steganopodes show the identical compositions of Mallophaga groups. This fact is striking, as the birds of both these orders differ from each other considerably. However, it is difficult to draw any conclusions here.

Phoenicopteri resemble Anseres in some measure. The birds of these two orders have horny lamellae on the edges of mandibles and in result their manners of nourishing are similar. The structure of the digestive duct in Anseres resembles that in Phoenicopteri and the young in both orders are led to water just after drying. In addition, both Anseres and Phoenicopteri have the desmo- gnathous and holorhinal structure of the skull (Stresemann 1934). Sokołowski (1958) explains these resemblances between the orders Anseres and Phoenicopteri by the analogy in the structures resulting from the similar nourishment of the birds belonging to these orders, and not by their affinity. It is, however, characteristic of these orders that they have similar compositions of Mallophaga. The following groups are known in Phoenicopteri: „Menopon“, „Colpocephalum“, „Trinoton“, „Docophorus“, „Nirmus“ and „Esthiopterum“. Of these only the group „Nirmus“ is lacking in Anseres. The occur-
rence of the group „Trinoton“, unknown in other birds, is a distinctive quality of these orders. This may indicate some phylogenetic connexions between these two orders of birds which conforms with the opinion expressed by Clay (1957).

The orders Colymbi and Alcae have analogous compositions of Mallophaga except for the group „Menopon“. The occurrence of this Mallophaga group in Alcae is sporadic and concerns only the species Austromenopon nigropleurum (Denny), which according to Hopkins and Clay (1952) is reckoned among the typical parasites of Alca torda L. However, I used to find this species on the birds of the family Charadriidae, from which it is also recorded by Seguy (1944).

Naumann (1905) associates Colymbi and Tubinares with Steganopodes from the phylogenetic point of view, and Sokolowski (1958), as was mentioned above, associates Alcae with Laro-Limicolae and Grues. No connexions can be found here as far as the compositions of Mallophaga groups are concerned. It is noteworthy that the birds of the order Podicipedes, in spite of their considerable similarity to Colymbi, have slight connexions as regards the composition of Mallophaga. Only the group „Nirmus“ is here common. Colymbi and Alcae have two common groups of Mallophaga, „Docophorus“ and „Nirmus“, which are also often met in other birds. The group „Esthiopterum“, recorded from all other aquatic birds, is lacking both in them and in Podicipedes. This may be due to the phylogenetic diversity of these orders, or to bad ecologic conditions for the Mallophaga of the group „Esthiopterum“ in them.

Finally we should mention the order Ralli, from which the following groups of Mallophaga are known: „Menopon“, „Laemobothrion“, „Docophorus“, „Nirmus“ and „Esthiopterum“. Ralli constitute a phylogenetically old group, which is characteristic by their wide dispersion all over the earth in spite of their poor abilities to fly (Heinroth 1924). For these reasons, just as in owls, it is difficult to associate them phylogenetically with other avian orders. Heinroth (1924) placed Ralli close to Grues and Sokolowski (1958) between Otidae and Laro-Limicolae. As regards the groups of Mallophaga in Ralli, „Colpocephalum“, occurring in a majority of birds, is lacking here. It points to the lack of a close phylogenetic connexion with other orders of water birds. It is interesting, that the group „Laemobothrion“, hitherto recorded exclusively from Gressores and Accipitres, has been found in Ralli.

Recapitulating my present considerations I gather that the structure of the Mallophaga fauna on birds depends chiefly upon the environment in which those Mallophaga live and the ties of affinity uniting their hosts.
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STRESZCZENIE

Niniejsza praca obejmuje szereg spostrzeń i wniosków na podstawie zbadania wszołów z ptaków należących do następujących rodzin: Ciconiidae, Plegadiidae, Ardeidae, Gruidae, Rallidae, Charadriidae, Laridae, Anatidae, Phalarocoracidae, Podicipedidae, Columbidae, Strigidae i Falconidae. Ptaki te pochodziły głównie z województw: wrocławskiego, katowickiego, krakowskiego, warszawskiego, lubelskiego, białostockiego, olsztyńskiego, gdyńskiego i kosza- lińskiego.

1. Udało mi się zebrać 73 gatunki wszołów, w tym 16 gatunków zebrałem z ptaków, na których dotychczas nie były znane. Wykaz tych ostatnich wraz z ich nowymi żywicielami zamieszczam poniżej.

Actornithopus spinulosus (PIAG.) — Calidris minuta LEISL.
Anaticola anseris (L.) — Cygnopsis cygnoid L.
Anaticola crassicornis (SCOP.) — Nyroca nyroca GÜLD.
Austromenopon nigropleureum (DENNY) — Tringa erythropus PALL.
Austromenopon ridibundus (DENNY) — Larus canus L.
CARDUCEPS CINGULATUS (DENNY) — Sterna hirundo L.
Ciconophilus pectiniventris (HAAR.) — Calidris alpina L.
Colpocephalum flavescens HAAN. — Cygnopsis cygnoid L.
Craspedorrhynchus platystomus (Burm.) — Circus aeruginosus L.

Fulicoffula rallina (DENNY) — Accipiter nisus L.
Holomenopon leucoxanthum (Burm.) — Aquila pomarina BR.
Holomenopon nyrocae (BLAG.) — Buteo lagopus BRÜNN.
Incidifrons ralli (SCOP.) — Milvus migrans BODD.
Lunaceps holophaeus (Burm.) — Gallinula chloropus L.

Quadraceps furvus (Burm.) — Anas querquedula L.
Trinoton lituratum BURM. ? — Bucephala clangula L.


3. Znalazłam na jednym okazie Scolopax rusticola L. 3 3 Austromenopon icterus (Burm.). Ponieważ dotychczas znane były tylko samice tego gatunku, zamieściłam opis 3.

4. Przypuszczam, że szerokie rozprzestrzenienie gatunku Pseudomenopon pilosum (SCOP.), który, będąc typowym dla ptaków z rodziny Rallidae, wy-
stępuje również stale na ptakach z rodziny Podicipidae, może być spowo-
dowane niedawną historycznie migracją tego gatunku z Rallidae na Podi-
cipidae.

5. W badaniach swoich objęłam, prócz wsólów typowych dla danych
ptaków, także i nietypowe. Wszysty nietypowe znajdywałam na ptakach rzadko
i przeważnie w małych ilościach. Wyjątek stanowił tu gatunek Degeeriella
fuiva (GIEB.), którego zebrałam 49 osobników z 2 okazów Ciconia ciconia L.
68 osobników z jednego okazu Asio flammeus Pont. Wszysty nietypowe chwy-
tałam zarówno na ptakach izolowanych od siebie po zastrzeleniu, jak i nie-
zisolowanych. Stwierdziłam, że na badanych przeze mnie ptakach z rodziny
Rallidae, Anatidae, Podicipidae i Falconidae wszysy nietypowe występowy-
ło częściej niż na ptakach z pozostałych badanych rodzyn. Ponadto zauważa-
ła, że nietypowymi na danych ptakach były najczęściej wsiwy, które zwykle
stale żyją na ptakach z rodziny Rallidae, Charadriidae, Anatidae i Falconidae.
Być może istnieją u tych wsiółków pewne tendencje migracyjne z jednych
ptaków na drugie.

6. Prześledziłam morfologię pancera chitynowego wsiółków, które podzie-
liłam na 7 grup, na podstawie podobieństw w budowie zewnętrznej. Wszysty
zaszeregowane do określonych grup posiadają specyficzne dla siebie skład
żywicieli, a mianowicie na ptakach szybko latających znajdowałam głównie
formy o mocno zbudowanym pancerzu chitynowym, a na ptakach mniej ruchli-
vych formy o cienistym i słabszym pancerzu. Widocznie sposoby poruszania
się ptaków stanowią między innymi ważny czynnik ekologiczny dla wsiółków.
Sposób związania rozmaitych ptaków ze środowiskiem wodnym stwarza różne
warunki ekologiczne, mniej lub więcej korzystne dla wsiółków. Odbija się to
na liczebności osobniczej i gatunkowej, a poza tym na wykształceniu rozmaitych
cech zewnętrznych u wsiółków żyjących na ptakach z poszczególnych rodzin.
Na ptakach dobrze nurkujących stwierdziłam ubóstwo ilościowe i gatunkowe
wsólków w porównaniu z fauną wsiółków żyjących na innych ptakach. Kaczki
będące ścisłe związane z wodą, posiadają niektóre gatunki wsiółków silniej
owłosione, niż analogiczne gatunki żyjące na ptakach drapieżnych. Być może
stoi to w związku z większymi różnicami temperatur, na jakie są narażone
wsół ptaków pływających, w porównaniu z wsiółkami ptaków rzadziej sty-
kujących się z wodą.

7. Uczyniłam próbę korelacji pokrewieństw wsiółków ze stosunkami pokre-
wieństwa między ich żywicielami, opierając się o teorię twierdzącą, że rozwój
filogenetyczny wsiółków kroczy wolniej niż rozwój filogenetyczny ich żywicieli
(Clay 1949b). Badając rozsiedlenie pokrewnych wsiółków na ptakach z roz-
maitych rodzów, udało mi się znaleźć pewne nawiązania filogenetyczne po-
między poszczególnymi rdzemi ptaków, które są zasadniczo potwierdzone
przez ornitologię. Na podstawie porównania podobnych grup wsiółków mogłam
potwierdzić istnienie pewnej więzi pokrewieństwa między rdzemi: Accipitres,
Gressores, Steganopodes i między Grues i Larolimicola. Morfologicznie po-
dobne do siebie wsiółki występują na ptakach z rdzów Anseres i Pheonicopteri,
a także na Colymbi i Alcae, co może wskazywać na istnienie pewnego pokre-wieństwa między tymi rzędami.

Praca została wykonana dzięki pomocy finansowej Komitetu Parazytologicznego Wy-działu Nauk Biologicznych PAN.

РЕЗЮМЕ

Настоящая робота содержит ряд наблюдений и заключений на основании изучения материала пухоедов, собранного на птицах принадлежащих к следу-ющим семействам: Ciconiidae, Plegadiidae, Ardeidae, Gruidae, Rallidae, Charadriidae, Laridae, Anatidae, Phalacrocoracidae, Podicipedidae, Colymbidae, Strigidae и Falconidae. Птицы эти собраны были главным образом в воеводствах: вроцлавском, катовиц-ком, краковском, варшавском, люблиńskim, белостоцком, ольштинском, гданском и кошалинском.

1. Мне удалось собрать 73 вида пухоедов, в том числе 16 видов я собрала на птицах, на которых до настоящего времени виды эти не были найдены. Перечень этих последних, вместе с их новыми кормилицами, я привожу ниже.

Actornithophilus spinulosus (PIAG.)
Anaticola anseris (L.)
Anaticola prasinicornis (SCOP.)
Austromenopon nigropleurum (DENNY)
Austromenopon ridibundus (DENNY)
Carduiceps cingulatus (DENNY)
Ciconiophilus pectiniventris (HAAR.)
Colpocephalum flavescens HAAN.
Craspedorhynchus platystomus (BURM.)

— Calidris minuta LEISL.
— Cygnopsis cygnoid L.
— Nyroca nyroca GOLD.
— Tringa erythropus PALL.
— Larus canus L.
— Sterna hirundo L.
— Calidris alpina L.
— Cygnopsis cygnoid L.
— Circus aeruginosus L.
— Accipiter nisus L.
— Aquila pomarina BR.
— Buteo lagopus BRÜNN.
— Milvus migrans BOOD.
— Gallinula chloropus L.
— Anas querquedula L.
— Bucephala clangula L.
— Nyroca nyroca GOLD.
— Gallinula chloropus L.
— Calidris minuta LEISL.
— Limicola falcinellus PONT.
— Tringa ochropus L.
— Anas querquedula L.
— Anas strepera L.

3. Я нашла на одном экземпляре *Scolopax rusticola* L. три самца вида *Austrovenonopiterum* (Bürm.). Так как до настоящего времени известны были только самки этого вида, я привела описание самца.

4. Я полагаю, что широкое распространение вида *Pseudomenonop pilosum* (Sco.), который типичен для птиц из семейства *Rallidae* и который появляется также на птицах из семейства *Podicipidae*, может быть вызвано исторически недавней миграцией этого вида с семейства *Rallidae* на семейство *Podicipidae*.

5. В мои исследования я заключила не только пухоеды, типичные для данного вида птиц, но и нетипичные. Нетипичные пухоеды я находила на птицах редко и обыкновенно в небольшом количестве. Как исключение является вид *Degeeriella fulva* (Giev.), собранный мною в количестве 49 экземпляров на двух экземплярах *Ciconia ciconia* L. и 58 экземпляров на одном экземпляре *Asio flammeus* Pont. Нетипичные пухоеды я находила на птицах, изолированных после того, как птицы эти были застрелены, и на неизолированных. Я констатировала, что нетипичные пухоеды чаще попадались на птицах из семейства *Rallidae*, *Anatidae*, *Podicipidae* и *Falconidae*, чем на птицах остальных, мною исследованных семейств. Я заметила, что нетипичными пухоедами на данном виде птицы чаще всего были такие, которые обыкновенно живут на птицах из семейства *Rallidae*, *Charadriidae*, *Anatidae* и *Falconidae*. Не исключается возможность, что у этих пухоедов существует тенденция к миграции с одних видов птиц на другие.

6. Я проследила морфологию хитинового панциря пухоедов и поделила их на 7 групп, основываясь на сходстве во внешнем строении. При этом я заметила, что пухоеды, заключенные в известную группу, имеют специфический состав кормильцев, а именно: на быстро летающих птицах, я находила главным образом пухоеды с сильно построенными хитиновыми панцирями. Это привело меня к заключению, что повидимому способы передвижения птиц являются между прочим важным экологическим фактором для пухоедов. Сверх того, я заметила, что связь разных птиц с водной средой, создает различные экологические условия, более или менее благоприятные для пухоедов. Это отражается на индивидуальной и видовой численности пухоедов, живущих из различных семейств, а также на их внешних признаках. На птицах, хорошо ныряющих, я констатировала количественную и видовую бедность пухоедов по сравнению с фауной пухоедов на других видах птиц. Кроме того, я заметила, что утки, тесно связанные с водой, имеют некоторые виды пухоедов, сильнее покрытых волосками, чем это замечается у аналогичных видов, живущих на хищных птицах. Возможно, что явление это имеет связь с большими изменениями температуры, которым подвержены пухоеды, живущие на плавающих птицах, чем те, которые живут на птицах, реже соприкасающихся с водой.

7. Я пыталась установить родственную связь у пухоедов с соотношением родственности между их кормильцами, опираясь на теории, утверждающей, что
филогенетическое развитие пухоедов подвигается вперед медленнее, чем филогенетическое развитие их кормильцев (Клей, 1949). Исследуя расселение родственных пухоедов на птицах из различных семейств, мне удалось найти известные филогенетические связи между известными рядами птиц, которые принципиально подтверждаются орнитологией. На основании сравнения похожих групп пухоедов, я могла констатировать существование известной родственной связи у рядов: Accipitres, Gressores, Steganopodes и у Grues и Laro-Limicolae. Морфологически похожие пухоеды живут на птицах из рядов: Anseres и Phoenicopteri, а также Colymbi и Alcae. Это обстоятельство может служить показателем существования известного родства между этими рядами.
<table>
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<th>Family</th>
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<th>Laridae</th>
<th>Charadriidae</th>
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*Note: Numbers in parentheses indicate the species' scientific name.*
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1 Degeerella fulva (Gieb.) +
1 Colpocephalum flaveoccens Haan.
1 Colpocephalum flaveoccens Haan.

1 Rhyonirnus scolopacis (Denny) 1 Anthocephalus dentatus (Scop.) +
1 Rhyonirnus scolopacis (Denny) 1 Anthocephalus dentatus (Scop.) +
1 Rhyonirnus scolopacis (Denny) 1 Anthocephalus dentatus (Scop.) +
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