Notes on the Danish Louse-Flies (*Diptera: Hippoboscidae*).

By
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Very little information exists in the literature concerning the Danish species of the family *Hippoboscidae*. Apart from Zetterstedt's "Diptera Scandinaviae" from 1848 they are only mentioned in a paper by Hj. Ussing (1946) — besides which a few of the species are referred to in some popular books for instance in Vilh. Bergsøe's "Fra Mark og Skov". This book contains a brief survey of the natural history of the family. In order to remedy the somewhat neglectful treatment of these flies in Danish literature I shall here give a survey of the species found in Denmark together with information as to range, time of occurrence, hosts etc. — as far as the present material allows.

The original information on the species in this country is based on the collection in The Zoological Museum of Copenhagen. I have also had occasion to examine three small collections belonging to The Royal Veterinary and Agricultural College, Copenhagen, The Museum of Natural History, Aarhus, and Hj. Ussing, Randers, for which I wish to express my best thanks.

The specimens in the collections have been collected by the following people: F. Andersen, T. P. E. Andersen, Bang, Bauditz, A. Benzon, J. E. V. Boas, H. C. Christensen, B. Damstedt-Christensen,

C. Engelhardt, Fencker, K. Fæster, N. Haarløv, Hald, H. J. Hansen, A. Hemmingsen, Hermansen, Holten, R. Hørring, O. Jacobsen, O. Jensen, N. P. Jørgensen, C. E. Kjellerup, Kløcker, N. S. Kristensen, J. P. Kryger, P. Larsen, P. Lorenzen, W. Lundbeck, B. Løppenthin, E. A. Løvendal, H. Madsen, U. Møhl-Hansen, F. Møller, S. Nielsen, C. Overgaard, I. C. Schiødte, R. W. Schlick, Sparre, R. H. Stamm, R. Spärck, E. Suenson, W. Sørensen, Trøstrup, S. L. Tuxen, Hj. Ussing, B. Westermann, A. Windeballe, T. Wolff, W. Wüstnei, O. Ørnsholt. Furthermore the author has himself collected some specimens.

Key for the determination of Danish Hippoboscidae.

Whether a fly belongs to the *Hippoboscidae* is easily determined for instance by means of Tuxen's *Diptera*-key (1943). Keys to this family are found in the works of Falcoz, Smart and Bequaert and Leclercq, cited in the list of literature.

1. Wings functional and normally developed..... 2.
— Wings non-functional, broken off or absent..... 5.
2. Wings with only three well developed longitudinal veins.. ..... *Lipoptena cervi.*
— Wings with 7-8 well developed longitudinal veins..... 3.
3. No ocelli. 7-8 mm. Wing membrane pleated. Anal cell not closed by a cross vein..... *Hippobosca equina.*
— Ocelli present. 5-6 mm. Wing membrane not pleated. Anal cell closed by a cross vein (*Ornithomyia*)..... 4.
4. Palpi pale. Medio-cubital cross vein (*m-cu* in fig. 4) about four times the length of the radio-median cross vein (*r-m*). 6-10 preapical macrochaetae. Wings 6-7 mm..... ..... *Ornithomyia avicularia.*
— Palpi dark brown. Medio-cubital cross vein twice the length of the radio-median cross vein. 2-6 preapical macrochaetae. Wings 4-5.5 mm..... *Ornithomyia fringillina.*
5. Halteres present. Wings reduced or broken off ..... 6.
— Halteres absent. Wings completely missing..... ..... *Melophagus ovinus.*

6. Wings absent, i. e. broken off, claws single. *Lipoptena cervi.*
— Wings merely reduced in size and non-funtional. Claws tridentate ..... 7.
7. Ocelli present. Wings strap-like (Fig. 2) seven times as long as broad and almost as long as the legs ..... *Stenepteryx hirundinis.*
— Ocelli absent. Wings twice as long as broad and only about half the length of the legs ..... *Crataerina pallida.*

I have avoided using the hosts in the determination in the key, for even if some of the species of *Hippoboscidae* are very selective in their choise of hosts, there is always the risk of meeting a fly on a host, on which it is only found by mere chance, and furthermore the flies may also be caught at other places than on the hosts. As a help to the determination I include the following table of the species and their normal hosts:

Hippobosca aquina:	Horse (*Equus*), Cattle (*Bos*).
Lipoptena cervi:	Deer (*Cervidae*).
Malophagus ovinus:	Sheep (*Ovis*).
Stenepteryx hirundinis:	Swallow (*Hirundinidae*).
Crataerina pallida:	Swift (*Apus apus*).
Ornithomyia avicularia:	Various birds (*Aves*).
Ornithomyia fringillina:	Various birds (*Aves*).

Hippobosca equina L. (Forest fly. Danish: Hesteflue).
= *H. equi* Mac., *H. taurina* Rondani, *H. cunicosa* Mad.

The species has a cosmopolitan range. Its normal host is horse (*Equus caballus* L.) and cattle (*Bos taurus* L.), more rarely donkey (*Equus asinus* L.). In exceptional cases taken on other mammals such as rabbit (*Lepus cuniculus* L.) and dog (*Canis familiaris* L.) and on birds ("*Strix noctua* Boie" = ?*Athene noctua* (Scop) and kite (*Milvus milvus* (L.))). This species may also be met with on man. (Falcoz 1926, Bezzi 1905, Smart 1939).

The Danish material consisting of 147 specimens, has all — in the cases where the hosts are stated — been taken from horse and cattle with a single exception of one specimen taken on a deer in Jutland. The species

of deer in question was not stated on the label. *H. equina* has not hitherto been known from deer. In this country it is a rather frequent species and the fact that it has got no less than three different colloquial names i. e. hesteflue, hestetæge or hestebider (Henriksen 1944) proves that it is a species much noticed by people.

The finds originate from the following places: Sealand (Copenhagen, Sorø), Lolland (Thureby), Funen (Odense), Jutland (Randers, Hurup, Hadsten, Lagtved) and Als (Sønderborg). The times of catching are in the period June to September. Pupae, collected in August 1881, were reared $^4/_4$ 1882 — which indicates that the species in this country — as is the case in our neighbouring countries — is wintering in the pupal stage. There is reason to believe that the species normally and under natural conditions is reared a little later in the year than in the above case, as the earliest finds of imagines are from June and as the species in the neighbouring countries are not met with on wings until somewhat later — in England for instance not until May (Smart 1939). In Germany, where spring comes earlier than in Denmark, it appears in April (Wülker 1925).

***Lipoptena cervi* (L.) (Deer fly).**

Lipoptena = *Pediculus* L., *Melophagus* Meig., *Leptotena* Macq.
Cervi = *cervina* Nietzsch, *pallipes* Meig., *nigrirostris* Roser.

Ranges in the whole of the palaearctic region. The species is found, as the name implies, on deer (Falcoz 1926). In exceptional cases it has been found on wild-boar (*Sus scrofa* L.), badger (*Meles meles* (L.)) (Eichler 1937) and on horse (*Equus caballus* L.) (Megnin 1899). Man may also be attacked by the species (Villeneuve 1913, Brumpt 1922) — it is especially hunters in areas rich in deer who are risking such attacks.

The Danish material, consisting of 166 specimens, is distributed evenly all over the country. Sealand (Dyre-

haven, Rudehegn, Salpetermosen near Hillerød, Farum, Ramløse, Tibirke, Tisvilde, Jyderup, Jægerspris, Bøllemose, Ermelunden, Geel Skov, South-Sealand), Lolland, Falster, Møn (Stege), Funen, Als (Sønderborg), Jutland, (Horsens, Lindum Skov near Hobro, Rold Skov, Gjedsted near Viborg, Reistrup Plantage near Faarup, Buderupholm, Toft Skov) and Bornholm (Aakirkeby).

The specimens have been collected during the months of February to December ($^{24}/_{2}$-$^{12}/_{12}$) — so it might appear as if there is a possibility that the species is able to winter as an imago. Winged specimens, a total of 19, were all taken during the period $^{2}/_{9}$ to $^{2}/_{11}$ and are all males with a single exception, one female taken on $^{28}/_{10}$. This was according to expectations after investigations in England, which indicated that at any rate the wings of the females break off as soon as after the metamorphosis the flies have reached a host-animal, and during the greater part of the year males as well as females are found on the deer in the wingless condition. Only during fall, the investigations prove, winged males are met with in forests inhabited by deer (Smart 1939). A single find from Bornholm in September 1926 is remarkable as the label shows that the fly has been taken on a Peregrine (*Falco peregrinus* Tunstall), a host which is not mentioned in the literature. Meigen and other authors have thought that the species was in the habit of having alternate hosts and was to be found on birds during the autumn — this is certainly incorrect, but it is at any rate a fact that it migt be met with on birds. All the specimens in the collections provided with statement as to host are from roe (*Capreolus capreolus* (L.)) and red deer (*Cervus elaphus* L.) with exception of two specimens on tallow deer (*Dama dama* (L.)).

***Melophagus ovinus* L. (Sheep-Ked. Danish: Faarelus).**

Originally eurasiatic, now cosmopolitan, like its host, the sheep (*Ovis aries* L.) (Falcoz 1926). Cases of sucking on man are known (Brumpt 1922).

The Danish material, 230 specimens, are all taken on sheep in the months March to August. The localities are: Sealand (Copenhagen, Farum, Vejby, near Tystrup Sø), Falster, Funen (Odense), Jutland (Ringkjøbing, Harboøre, Laurbjerg near Bøllingsø), and finally Læsø. Just like the Forest-Fly (or Horse-Fly) this is of course a species which has got a colloquial name. It is called Sheep-Ked, Sheep-Tick or Sheep-Louse — in Denmark it is called faaretæge, faarebider, faarelus or faareleye (Henriksen 1944). This species is the species of the family which has been transformed to the highest degree to the parasitic life. It is completely wingless and often spends the whole of its life — also as larva and pupa — in the wool of the sheep. According to Tullgren and Wahlgren (1920-22), however, in Sweden the pupae which are wintering fall to the ground in the pasture areas and not in the sheep-sheds where imagines and larvae will not be found during the winter. Contrary to this Wülker (1925) states that *M. ovinus* in Germany is found on the sheep in the sheds during the winter too. The pupa is of a more flattened shape than the other louse-flies and the colour is yellow-brown unlike all the other species, which are black or black-brown.

***Stenepteryx hirundinis* (L.) (Danish: Svalebider)**

Stenepteryx = *Stenopteryx* Leach, *Chelidomyia* Bigot, *Craterina* Curtis. *Hirundinis* = *cypselis* Rond., *hirundinum* Rossi, *stenoptera* v. Olf.

Ranges all over the palaearctic region where the hosts are living. House Martin (*Delichon urbica* (L.)) and Swallow (*Hirundo rustica* L.) are the normal hosts. In

the literature it is recorded that also Swift (*Apus apus* (L.)) exceptionally can act as host. The species are occasionally attacking man (Falcoz 1926). Personally I have received (May 1948) a specimen for determination with the information that it had bitten people in a house in Copenhagen. The bites were said to be very painful and to cause swellings of about one centimeter.

The Danish material, consisting of 38 specimens, originate exclusively from House Martin, adult as well as juvenile. The finding places are as follows: Sealand (Asnæs, Blovstrød, Lyngby, Amager, Boserup, Taastrup), Funen (Odense), Jutland (Skagens Rev) and Bornholm (Almindingen). The dates of collecting are as follows: $^{2}/_{5}$, $^{6}/_{6}$, $^{18}/_{6}$, $^{9}/_{7}$, $^{13}/_{7}$, $^{30}/_{7}$, $^{4}/_{9}$, $^{7}/_{9}$, $^{11}/_{9}$ and $^{?}/_{9}$ — i. e. in the period from May to the middle of September, the very period in which the House Martin is staying in Denmark. This may be taken as a sign of the fact that the species here as in England is wintering in the pupal stage in the deserted nests (Smart 1939).

Crataerina pallida (Latr.)

Pallida = *hirundinis* Panz., *kirbyana* Leach, *lonchoptera* v. Olf., *tangerii* Guer.-Mén.

The genus-name must be written *Crataerina* and not *Crathaerhina*, *Cratharina* or *Craterrhina* as it may be seen in the literature (see Eichler 1939).

Crataerina (=*Oxypterum* Leach) *pallida* ranges throughout the whole of the palaearctic region where the host is living. This is normally Swift (*Apus apus* (L.)) and Alpine Swift (*Apus melba* (L.)), as *Crataerina melbae* Rondani according to investigations by Eichler (1939b) cannot be considered a specific species but only a form of *C. pallida*. In exceptional cases it might be found on House Martin (*Delichon urbica* (L.)) and Swallow (*Hirundo rustica* L.) (Falcoz 1926). A single specimen is recorded from Buzzard (*Buteo buteo* (L.)) (Massonnat

1909). The species is known in several cases to have attacked and sucked on man in houses (Hesse 1920 and 1929, Eichler 1939a, Natvig 1941).

The Danish material, a total of 30 specimens, originates from Copenhagen on Sealand and from Odense on Funen. The specimens with information concerning host are from Swift with exception of two specimens which have been taken on House-Sparrow (*Passer domesticus* (L.)). This bird I have not found recorded as host in the litterature but it is jumping out and in in such places where the swifts have their nests and may even breed in deserted swifts' nests — so there is nothing strange about the fact that a fly now and then is taken on a House-Sparrow. The dates of catching are $^{20}/_{5}$, $^{16}/_{6}$, $^{7}/_{7}$ and $^{10}/_{8}$ i. e. from the beginning of May to the middle of August. The Swift is just arriving in Denmark in the beginning of May and is migrating from the country in July-August, so it seems that the imagines only are found, while there are Swifts. After the departure of the host the species is to be found in the nests as pupae in which stage they are wintering.

The pupae (fig. 9) may be known on the hind-spiracles. They resemble the hind-spiracles of *Ornithomyia fringillina* very much having a shape like a question-mark, but there are not nearly as many knobs in the series of knobs which are forming the question-mark and the area in which they are situated is almost circular on the pupa I have seen contrary to the species of *Ornithomyia* which have the hind-spiracles on an oval area.

Whether the imagines like the species of *Ornithomyia* are joining the host when it is migrating southwards we do not know but according to the opinion of Thompson (1938) this is doubtful, as *C. pallida* has not been recorded from the winterquarters of the Swift which is tropical East Africa and South Africa.

***Ornithomyia avicularia* (L.).**

Ornithomyia = *Hippobosca* L., *Ornithomyza* Zett. — *Avicularia* = *corvi* Scop., *nigricornis* Erichs., *nigrirostris* v. Ros., *oculata* Motsch., *opposita* Walk., *viridula* Meig.

Found throughout the palaearctic region and in North America. Known from India and Australia (Falcoz 1926).

The species is a bird-parasite which must be said to be rather ubiquistic as regards host for it has been found on a long series of different species of birds as will appear from the table pag. 292—95. The hosts are classed among the orders: *Ciconiiformes, Falconiformes, Galliformes, Gruiformes, Charadriiformes, Columbiformes, Strigiformes, Piciformes, Cuculiformes* and *Passeriformes*. Only a single one of the hosts is a water-bird namely Moor-Hen (*Gallinula c. chloropus* (L.)), i. e. only one of 63 hosts so it is hardly too much to say that the species normally is avoiding water-birds. Not a single host among the *Anseriformes* has been recorded.

To enable future authors to draw their conclusion as to the extent of the use of the different birds as hosts I shall here state the hosts of the Danish material. It is distributed as follows: 7 specimens on *Corvus f. frugilegus* L., 2 specimens on *Pica p. pica* (L.), 1 specimen on *Columba p. palumbus* L., 8 specimens in nests of *Buteo b. buteo* (L.), 2 specimens on *Turdus m. merula* L., 1 specimen on *Numenius a. arquata* (L.), in two cases 2 and 4 specimens on *Garrulus g. glandarius* (L.) respectively, in two cases 1 specimen on *Strix a. aluco* (L.) and in five cases 2, 1, 1, 1 and 3 specimens respectively on *Asio o. otus* (L.). Of these birds two are of special interest as they have never before been recorded as hosts for this species. They are Curlew (*Numenius arquata* (L.)) and Rook (*Corvus f. frugilegus* L.). *O. avicularia* is known from several other species of *Corvidae* while the recording of Curlew as a host is remarkable because only two species of *Charadriiformes* are

recorded as hosts in the literature. (See also under *O. fringillina* in the passage dealing with hosts). As is the case with most of our other species this one too has been known to suck on man (Leclercq 1946).

O. avicularia is judging from the Danish material of 74 specimens rather frequent all over the country. The finding places are as follows: Sealand (Hillerød, Holte, Rudehegn, Dyrehaven, Lyngby, Grevinge Skov in Odsherred, Søborg, Ordrup Mose, Espergærde, Geel Skov, Tisvilde, Kongsøre, Vemmetofte, Bognæs, Ølsted, Skjoldnæsholm, Frederiksgave, Gundsømagle Holme), Lolland, Falster, Møn (Liselund), Funen (Odense, Veflinge), Jutland (Langholt, Randers, Hammel, Øster Assels on Mors, at Vidaa near Tønder), Anholt light-ship, Horns Rev light-ship) and Bornholm (Randkløve and Gudhjem). Two findings of *O. avicularia* on light-ships prove that the species is also found on birds during migration for it is without any doubt that the flies have come to the light-ships with migrating birds.

The dates of catching are $^{1}/_{7}$, $^{9}/_{7}$, $^{11}/_{7}$, $^{15}/_{7}$, $^{20}/_{7}$, $^{26}/_{7}$, $^{?}/_{7}$, $^{5}/_{8}$, $^{7}/_{8}$, $^{17}/_{8}$, $^{?}/_{8}$, $^{1}/_{9}$, $^{8}/_{9}$, $^{26}/_{9}$, $^{?}/_{9}$, $^{5}/_{10}$, $^{18}/_{10}$, $^{28}/_{10}$, and $^{30}/_{11}$ — that is to say in the months July to November. The majority has been caught in July, namely 12. In the months of August, September and October 7, 4 and 3 specimens respectively have been caught (not all finds are dated). From November I only know of one single specimen. Pupae found $^{9}/_{10}$ 1910 in a Buzzard's (*Buteo b. buteo* (L.)) nest was reared $^{2}/_{3}$-$^{4}/_{8}$ the following year. This together with the fact that all the material originates from the warmer period of the year indicates that the species is wintering as a pupa in the deserted nests. Some pupae have been found in July too.

Some specimens from Rook (*Corvus f. frugilegus* L.) had lots of small white bodies which looked like arthropod-eggs attached to the integument but more particularly to the underside of the wings. By digging in these masses

of eggs I found a species of mite classed among *Sarcoptidae*. The species is new to Denmark as it appeared to be *Microlichus uncus* Vitzthum. This hyperparasitic mite was first discovered by Collart (1934) on *O. fringillina* and *O. biloba* Dufour. It was described by Vitzthum in 1934. *O. avicularia* is not known as a host for this mite.

***Ornithomyia fringillina* Curtis (Grouse-fly).**

Fringillina = *chloropus* Bergr., *lagopodis* Sharp., *pallida* Say (non Latr.), *anchineuria* Speiser.

Common in England (Smart 1939) as well as on the European Continent. Known from Finland (Bergroth 1901) and Sweden (Thompson 1935) but up till now it has not been recorded from Norway and Denmark, but it is to be expected that it will be found in Norway too. The species *O. pallida* Say described from U. S. A. is said to be synonymous with *O. fringillina* (Bequaert and Leclercq 1947).

Just as the previous species *O. fringillina* is a bird-parasite which is known from a long series of different birds. The hosts of the species will be treated in detail below.

O. fringillina is new to the Danish fauna. The finds from Denmark, 33 specimens in all, were in the collection of the museum — partly undetermined and partly incorrectly determined as *O. avicularia*. The places where they have been collected are: Saltholm, Sealand (Taastrup, Køge Nordstrand, Copenhagen, Amager Fælled,

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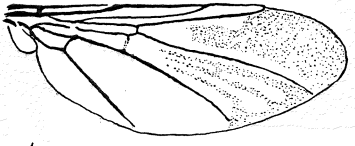
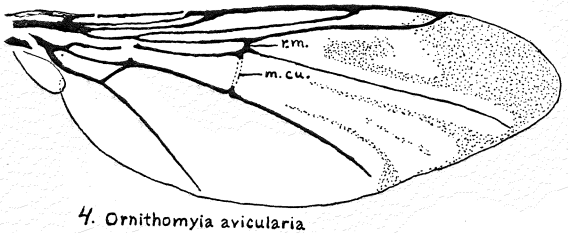
Fig. 1—9. *1.* Wing of *Ornithomyia fringillina* (After Smart). *2.* Wing of *Stenepteryx hirundinis* (After Massonnat). *3.* Wing of *Crataerina pallida* (After Massonnat). *4.* Wing of *Ornithomyia avicularia* (After Smart). *5. Ornithomyia fringillina.* The area with hind-spiracles. (Orig.). *6. Ornithomyia avicularia.* The area with hind-spiracles. (Orig.). *7. Ornithomyia fringillina.* Outline of pupa. (Orig.). *8. Ornithomyia avicularia.* Outline of pupa. (Orig.). *9. Crataerina pallida.* Outline of pupa. (Orig.).



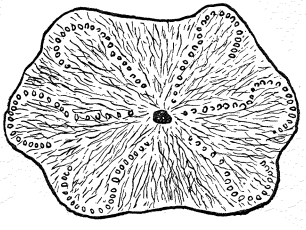
1. Ornithomyia fringillina

2. Stenepteryx hirundinis

3. Crataerina pallida



4. Ornithomyia avicularia



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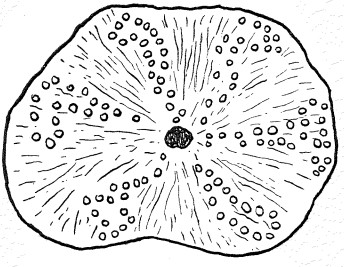
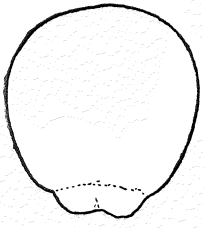
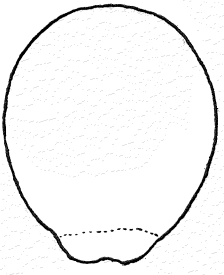


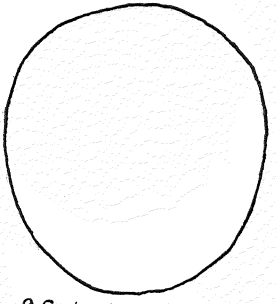
6. Ornithomyia avicularia



7. O. fringillina



8. O. avicularia



9. Crataerina pallida

Rørvig), Jutland (Vendsyssel, Legind, Randers) and on Vyl light-ship. The labels give the following information as to time of catching: $^{20}/_{7}$, $^{24}/_{7}$, $^{?}/_{8}$, $^{21}/_{8}$, autumn, $^{16}/_{10}$, $^{21}/_{10}$ and $^{13}/_{11}$, that is to say during the period July to November. The latest occurrence is on birds on light-ships i. e. on birds during migration. Another find without date, is only labelled "from birds on lighthouse". From this is indicated that the species may be found on migrating birds — a fact which hitherto has been proved only in the case of *O. avicularia*. Sharp (1907) states the time of occurrence as June-October. A single pupa in the collection was in a tube together with two imagines taken on a Curlew in the autumn of 1937, and I suppose it is laid by one of these at or shortly after the capture.

Our two species of *Ornithomyia* are also determinable in the pupal stage. The puparium of *O. fringillina* is smaller and more circular than the puparium of *O. avicularia* which is more oval of shape. Far better characteristics in the determination of the pupae are found in the posterior spiracles. In *O. fringillina* the spiracles are forming 6 elegant "pearl ribbons" of a shape like a question-mark (fig. 5). In *O. avicularia* the general impression is that of disorder. By colour examination it is possible, however, to recognize the "pearl ribbons" which in this species are almost forming a closed loop (fig. 6).

Three specimens were infested with parasitic mites. One of the infested specimens of *O. fringillina* was caught on Amager $^{21}/_{8}$ 1924 and its parasite resembles *Microlichus avus* Trouess. and Neum. very much, but the determination is doubtful. Another species of mite, also classed among *Sarcoptidae* has also been found on this species of fly.

The Danish material is distributed on the hosts as follows: 1 specimen on *Sturnus v. vulgaris* L. and in another case 2 specimens on the same bird (juv.), 1 spec-

imen on *Larus* sp., 3 specimens on *Pica p. pica* (L.), 4 specimens on *Perdix p. perdix* (L.), 1 specimen on *Accipiter nisus* (L.), 2 specimens on *Numenius arquata* (L.), 4 specimens on *Capella media* (Latham), 1 specimen on *Falco columbarius aesalon* Tunstall, 2 specimens on *Capella g. gallinago* (L.) and 1 specimen on *Pluvialis apricaria* (L.). Three are especially interesting because they have not previously been known as hosts for *O. fringillina*. These new hosts are Great Snipe (*Capella media* (Latham)), Gull (*Larus* sp.) and Magpie (*Pica pica* (L.)). Particular interest is attached to *Larus* sp. because *O. fringillina* has been said to avoid sea-birds completely, but as Smart states Arctic Skua (*Stercorarius parasiticus* (L.)) and I now *Larus* sp. as hosts, this cannot any longer be said to be quite true.

As will be seen from the table page 292—95 *O. fringillina* is known from several species of birds classed among the *Ciconiiformes, Falconiformes, Galliformes, Gruiformes, Charadriiformes, Cuculiformes, Strigiformes, Piciformes* and *Passeriformes*. The table has been made partly because a complete list of the hosts of our species of *Ornithomyia* never has been prepared and partly in order to undertake a comparison between the two species' choice of host.

To the right in the table all the birds on which *O. avicularia* and *O. fringillina* have been found, are gathered as far as I have been able to trace. If for instance *O. fringillina* is found on Merlin (*Falco columbarius aesalon*) an × has been placed towards the name of this host in the column marked *fringillina* at the top, if this information has been obtained from other authors. If this bird is met with in Denmark as a host it is marked with ○. If the bird is known as a host both in Denmark and in other countries it is marked with ⊗. It is thus very easy to read which species are known as hosts in Denmark. In the column to the left the

Authors	*avicularia*	*fringillina*	Host		
Bezzi 1905	×		Ardea cinerea L.	Heron	Ciconiiformes
Massonnat 1909	×		Nycticorax nycticorax (L.)	Night Heron	
Massonnat 1909	×		Botaurus stellaris (L.)	Bittern	
Eichler 1937-42		×	Ciconia c. ciconia (L.)	White Stork	
Bequaert & Leclercq 1947	×		Pernis apivorus L.	Honey Buzzard	Falconiformes
Massonnat 1909	×		Milvus milvus (L.)	Kite	
Massonnat 1909	×		Accipiter gentilis (L.)	Goshawk	
Smart 1939. Thompson 1938	×	⊗	Accipiter nisus (L.)	Sparrow Hawk	
Massonnat 1909. Bezzi 1905	⊗		Buteo buteo (L.)	Buzzard	
Eichler 1937-42	×		Circus macrourus (Gmelin)	Pallid Harrier	
Bau 1929		×	Falco peregrinus Tunstall	Peregrine	
Smart 1939		⊗	Falco columbarius aesalon Tunst.	Merlin	
Smart 1939	×		Falco tinnunculus L.	Kestrel	
Smart 1939. Eichler 1937-42	×	×	Lyrurus tetrix (L.)	Black Grouse	Galliformes
Wülker 1925. Smart 1939	×	×	Lagopus lagopus scoticus (Lath.)	Red Grouse	
Thompson 1937		×	Lagopus mutus millaisi Hart.	Scottish Ptarmigan	
Smart 1939. Thompson 1937. Bezzi 1905	×	⊗	Perdix perdix (L.)	Patridge	
Smart 1939. Ussing 1946. Thompson 1937	⊗	×	Phasianus colchicus L.	Pheasant	
Bezzi 1905	×		Pavo cristatus L.	Peacock	
Eichler 1937-42		×	Crex crex (L.)	Corncrake	Gruiformes
Thompson 1937	×		Gallinula c. chloropus (L.)	Moor-Hen	

Smart 1939		×	Haematopus ostralegus (L.)	Oystercatcher	Charadriiformes
Smart 1939		×	Vanellus vanellus (L.)	Lapwing	
Smart 1939		⊗	Pluvialis apricaria (L.)	Golden Plover	
Thompson 1937		×	Charadrius h. hiaticula L.	Ringed Plover	
Smart 1939	○	⊗	Numenius arquata (L.)	Curlew	
Thompson 1940		×	Tringa t. totanus (L.)	Common Redshank	
Wülker 1925	×	×	Actitis hypoleucos (L.)	Common Sandpiper	
Eichler 1937-42. Thomps. 1937	×	⊗	Capella gallinago (L.)	Common Snipe	
Present author		○	Capella media (Latham)	Great Snipe	
Smart 1939		×	Stercorarius parasiticus (L.)	Arctic Skua	
Present author		○	Larus sp.	Gull	
Massonnat 1909	×		Columba livia Gml.	Rock-Dove	Columbiformes
Massonnat 1909. Smart 1939. Ussing 1946	⊗		Columba palumbus Gml.	Wood-Pigeon	
Thompson 1937	×		Streptopelia t. turtur (L.)	Turtle-Dove	
Massonnat 1909. Thompson 1938	×	×	Cuculus canorus L.	Cuckoo	Cuculiformes
Smart 1939. Bezzi 1905	×		Tyto alba (Scop.)	Barn-Owl	Strigiformes
Massonnat 1909	×		Bubo bubo L.	Eagle Owl	
Smart 1939. Massonn. 1909 Bequaert & Leclercq 1947	⊗	×	Asio otus (L.)	Longeared-Owl	
Massonnat 1909	⊗		Strix aluco L.	Tawny-Owl	
Bergroth 1901		×	Asio f. flammeus (Pontoppidan)	Shorteared-Owl	
Eichler 1937-42	×		Picus v. viridis L.	Green Woodpecker	Piciformes
Bequaert & Leclercq 1947. Bezzi 1905	×		Dryobates major (L.)	Great Spotted Woodpecker	
Eichler 1937-42		×	Dryocopus martinus (L.)	Black Woodpecker	

Authors	*avicularia*	*fringillina*	Host		
Bezzi 1905	×		Alauda arvensis L.	Skylark	
Smart 1939. Eichler 1937-42	×	×	Hirundo rustica L.	Swallow	
Massonnat 1909	×		Riparia riparia (L.)	Sand-Martin	
Massonnat 1909	×		Oriolus oriolus (L.)	Golden-Oriole	
Bezzi 1905. Massonnat 1909	×		Corvus c. corax L.	Raven	
Thompson 1937	×		Corvus c. corone L.	Carrion Crow	
Smart 1939	⊙	×	Corvus frugilegus L.	Rook	
Bequaert & Leclercq 1947	×		Coloeus monedula (L.)	Jackdaw	
Bequaert & Leclercq 1947. Massonnat 1909	⊗	○	Pica p. pica (L).	Magpie	
Massonnat 1909. Bezzi 1905. Thompson 1937	⊗	×	Garrulus glandarius (L.)	Jay	Passeriformes
Eichler 1937-42	×		Parus m. major L.	Continental Great-Tit	
Thompson 1937		×	Parus major newtoni Prazah.	British Great Titmouse	
Eichler 1937-42	×		Sitta europaea sordidior Reichenow	Nuthatch	
Thompson 1937		×	Cinclus cinclus gularis (Latham)	British Dipper	
Eichler 1937-42	×		Troglodytes t. troglodytes (L.)	Wren	
Thompson 1935		×	Turdus pilaris L.	Fieldfare	
Thompson 1937	×		Turdus v. viscivorus L.	Mistle-Thrush	
Ussing 1946. Thompson 1940	⊗		Turdus ericetorum Turton	Song-Thrush	
Smart 1939. Massonnat 1909 Bequaert & Leclercq 1947	⊗	×	Turdus merula L.	Blackbird	
Eichler 1937-42	×	×	Turdus torquatus alpestris (Brehm)	Ring-Ouzel	
Eichler 1937-42	×		Turdus m. musicus L.	Redwing	
Smart 1939. Eichler 1937-42	×	×	Oenanthe oenanthe (L.)	Wheatear	
Eichler 1937-42	×		Phoenicurus p. phoenicurus (L.)	Redstart	
Eichler 1937-42		×	Phoenicurus ochruros gibraltariensis (Gml.)	Black-Redstart	
Smart 1939. Thompson 1940	×	×	Erithacus rubecula (L.)	Robin	
Say 1823		×	Sialia sialis (L.)	Bluebird	
Thompson 1938		×	Sylvia n. nisoria (Beckstein)	Barred Warbler	
Thompson 1938 & 1940	×	×	Sylvia c. communis Latham.	Whitethroat	
Wülker 1925		×	Hippolais icterina (Viellot)	Icterine Warbler	
Eichler 1937-42	×		Phylloscopus trochilus L.	Willow Warbler	
Bequaert & Leclercq 1947		×	Regulus ignicapillus (Temm.)	Firecrest	
Eichler 1937-42	×	×	Regulus r. regulus (L.)	Continental Goldcrest	
Thompson 1937		×	Muscicapa s. striata (Pall.)	Spotted Flycatcher	
Smart 1939. Thompson 1940	×	×	Prunella modularis (L.)	Hedge-Sparrow	
Smart 1939		×	Anthus pratensis (L.)	Meadow Pipit	
Smart 1939		×	Anthus spinoletta L.	Rock Pipit	
Falcoz 1926	×		Anthus trivialis (L.)	Tree Pipit	
Wülker 1925		×	Motacilla c. cinerea Tunstall	Grey Wagtail	
Eichler 1937-42. Masson. 1909		×	Motacilla citreola Pallas	Yellow-headed Wagtail	
Eichler 1937-42	×	×	Lanius e. excubitor L.	Great Grey-Shrike	
Massonnat 1909. Smart 1939	×		Lanius collurio L.	Redbacked Shrike	
Smart 1939	×	⊗	Sturnus vulgaris L.	Starling	
Massonnat 1909. Bezzi 1905. Thompson 1940	×	×	Passer domesticus L.	House-Sparrow	
Eichler 1937-42		×	Chloris c. chloris (L.)	Greenfinch	
Bezzi 1905	×		Loxia curvirostra L.	Crossbill	
Smart 1939	×		Fringilla coelebs L.	Chaffinch	
Thompson 1938		×	Emberiza s. schoeniclus (L.)	Reed-Bunting	
Wülker 1925	×		Calcarius lapponicus (L.)	Lapland-Bunting	

names of the authors in question are stated, however, not always all who have the same information.

The table signifies that both our species of *Ornithomyia* are found on a great many different birds classed among different orders. Furthermore it will be seen that only 23 different birds may act as hosts to both species amounting only to 21 per cent of the 92 different hosts of the table. The rest of the birds, by far the majority is only known as hosts for one of the flies. *O. fringillina* is not at all known from hosts classed among *Columbiformes,* whereas *O. avicularia* is known in many cases from different hosts classed among the *Columbiformes.* On the other hand the table shows that at some places in the columns coherent series of signs appear in one column while the next column is empty or only shows a few signs and vice versa. This is hardly due to mere coincidence in the collection but may safely be considered a certain tendency towards a certain preferation of the species of the different hosts. It is worth noticing that the sequence of the birds has been made according to the arrangement of a list of Danish birds (Løppenthin 1946). It is especially evident that *O. fringillina* is frequent on birds classed among *Charadriiformes* — known on 11 species of these — whereas *O. avicularia* is only in three cases known on species of this order of birds. Even if *O. fringillina* is known from species of *Ciconiiformes, Falconiformes* and *Strigiformes* it may be said that these birds seem to be preferred by *O. avicularia* as several species of these birds and in by far the most cases are infested by *O. avicularia.*

Finally I want to draw the attention to the fact that the following species may with time be found in this country as they have been found near our Southern frontiers and as they are known to be parasites on birds which are met with here in Denmark: *Ornithoica turdi*

Latr. on different birds. *Ornithomyia biloba* Dufour on Swallows, *Ornithoponus massonnati* Falcoz on Spoonbill, *O. ardeae* Macquaert on Bittern. The Zoological Museum Copenhagen, would be grateful if ornithologists, taxidermists, and the great number of bird-banders who no doubt will have opportunity of collecting louse-flies, would be so kind as to send these to the Museum with information as to host, time and place of find.

Literature.

Bau, A. 1929: Die Pupipara der Dipter-Sammlung Victor v. Röder. Zool. Anz. Leipzig. 85.

Bequaert, J. and M. Leclercq, 1947: Révision des Hippoboscides de Belgique. Ann. de l'Univ. de Lyon, I, Sciences, Médecine. Fasc. 28.

Bergroth, E., 1901: Ueber eine auf Eulen schmarotzende Hippoboscide. Medd. Soc. Fauna Flora Fennica. 27. Hft.

Bergsøe, V., 1915: Fra Mark og Skov I. København.

Bezzi, M. (Becker, Kertész and Stein) 1905: Katalog der paläarktischen Dipteren, 4. Budapest.

Brumpt, E., 1936: Précis de Parasitologie. 5. édit. Paris.

Collart, A., 1934: A propos d'un acarien Microlichus uncus Vitz., parasite de l'Ornithomyia fringillina Curtis. Bull. Mus. Roy. Hist. Nat. Belgique 10.

Eichler, W. 1937: Wo kommt die Mehlschwalbenlausfliege vor? Nebst Bestimmungsübersicht deutcher Lausfliegen. Mitt. Vereins sächs. Ornitholog. 5.

— 1937—42: Parasiten in: G. Niethammer: Handbuch der deutschen Vogelkunde. Leipzig.

— 1939 a: Deutsche Lausfliegen, ihre Lebensweise und ihre hygienische Bedeutung. Zeitschr. f. hyg. Zool. u. Schädlingsbek. 7—8. Berlin.

— 1939 b.: Geographische und ökologische Probleme bei ektoparasitischen Insekten. VII. Intern. Kongress f. Entomol. II. Berlin.

Falcoz, L., 1926: Diptères Pupipares. Faune de France. 14. Paris.

Henriksen, K. 1944: Danske Insektnavne. København.

Hesse, E., 1920: Entomologische Miszellen. Zeits. f. wissensch. Insektbiol. XVI.

Hesse, E. 1929: Ueber Lepisma, Ptinus und Crataerina. Zeits. f. wissensch. Insektenbiol. XXIV. Berlin.

Leclercq, M., 1946: Some parasites of birds and mammals observed recently in Belgium. Ent. Month. Mag. LXXXII.

Løppenthin, B., 1946: Fortegnelse over Danmarks Fugle. København.

Massonnat, E., 1909: Contribution à l'étude des Pupipares. Ann. de l'Univ. de Lyon, I, Sciences, Médecine. Fasc. 28.

Mégnin, P., 1899: Un cas de parasitisme chez le cheval par le Leptotena cervi. C. R. Soc. Biol. VI.

Natvig, L., 1941: Crataerina pallida Latr., en for Norges fauna ny Hippoboscide. Norsk Ent. Tidsskr. B. VI. Hft. 1.

Say, J., 1823: Descriptions of Dipterous Insects of the United States. Journ. Acad. Sc. Philadelphia. 3.

Sharp, D. 1907: The Grouse-Fly, Ornithomyia sp. n. Ent. Month. Mag.

Smart, J. (Edwards, Oldroyd), 1939: British blood-sucking flies. London.

Thompson, G. 1935: Two further records of the association of Hippoboscidae and Mallophaga. Ent. Month. Mag. 71.

— 1937—40: The parasites of British birds and mammals. XI. Ibid. 73. 1937. XIX. Ibid. 74. 1938. XX. Ibid. 74. 1938. XXII. Ibid. 76. 1940.

Tullgren, A. and E. Wahlgren, 1920—22: Svenska Insekter. Stockholm.

Tuxen, S. L. 1943: Danske Dipterer. Bestemmelsestabeller til Familie. Ent. Medd. 24.

Ussing, Hj., 1946: Snyltende Insekter. Flora og Fauna. 52.

Vitzthum, H., 1934: Microlichus uncus n. sp. Mus. Roy. Hist. Nat. Belgique. 10.

Wülker, G., 1925: Zur Biologie der Lausfliegen der Vögel und ihrer Rolle als Protozoenüberträger. Senckenbergiana. 7.

Zetterstedt, J. 1848: Diptera Scandinaviae. Tom. VII. Lundae.