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ACARINE SYMBIONTS OF LOUSEFLIES (DIPTERA : HIPPOBOSCIDAE)

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ACARINE SYMBIONTS OF LOUSEFLIES (DIPTERA : HIPPOBOSCIDAE)

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MITES
HIPPOBOSCIDAE
ASSOCIATION

SUMMARY : Approximately 4 000 hippoboscid flies were examined for mites. Four hundred ninety mites were found on 129 flies. The mites belonged to 12 families, 17 genera and 31 species. There are 62 new mite/fly host records, 71 new mite/bird host records, and 55 new mites/country distibution records.

ASSOCIATION
ACARIENS
HIPPOBOSCIDAE

RÉSUMÉ : Des acariens ont été recherchés sur un total d'environ 4 000 mouches hippoboscides. Des acariens, au nombre de 490, furent découverts sur 129 de ces mouches, ils font partie de 12 familles, 17 genres et 31 espèces.
On a observé 62 nouvelles associations acariens/mouche-hôte, 71 nouvelles associations acariens/oiseau-hôte et 55 nouvelles localisations géographiques (pays) pour ce groupe d'acariens.

INTRODUCTION

Hippoboscid flies (Diptera : Hippoboscidae), or louseflies, are bloodsucking ectoparasites of birds and mammals. Man is not the normal host of any lousefly, but species such as the sheep ked, *Melophagus ovinus* (Linnaeus) and the pigeon fly, *Pseudolynchia canariensis* (Macquart) will bite man and can be very irritating pests to those handling sheep or domestic pigeons. Animals with heavy infestations of louseflies become emaciated and more susceptible to secondary infections. Louseflies also serve as vectors, transmitting endoparasites, and other ectoparasites. Mammalian trypanosomes and filarial worms, and avian trypanosomes and haemosporina, are transmitted by louseflies (BAKER, 1967) and ectoparasitic avian lice (Mallophaga) and mites (Acarina) both utilize louseflies in dispersal as well (KEIRANS, 1975 ; BEQUAERT, 1953, 1957 ; MAA, 1966, 1969).

Most of the mites which occur on louseflies are avian skin mites (Epidermoptidae) which may burrow into birds' skin, causing mange lesions that are often extensive, resulting in scruffiness and feather loss. Female mites of the genus *Microlichus* are phoretic on the flies ; fertilized females of the genera *Myialges* and *Promyialges* parasitize the flies (FAIN, 1965). *Strelkoviacarus* is a similar avian skin mite, formerly in the Epidermoptidae, but closer to the Analgidae, whose females are also phoretic on louseflies (MACK-FIRA and CRISTEA, 1966 ; HILL *et al.*, 1967). Other genera of mites found on louseflies in isolated instances include *Acarus* (CORBET, 1961), *Glycyphagus* (BUTTIKER and CERNY, 1974), *Proctophyllodes* (HILL *et al.*, 1967), *Blattisocius* (HILL *et al.*, 1967), and *Leptus* (HILL *et al.*, 1967).

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However, mite family or species determinations have usually been absent from records of mites from louseflies published by entomologists such BEQUAERT and MAA. Consequently, host associations between the mites and the flies or the mites and the flies' avian hosts are not well known. The objectives of this research were to survey the acarine symbionts of louseflies to ascertain what species of parasitic and phoretic mites occur on various species of louseflies, and to determine the specificity of the host-parasite relationships between birds and mites transported by louseflies.

METHODS

Most of the specimens of louseflies discussed in the literature on which unidentified mites have been observed are preserved in museum collections. We examined hippoboscid flies in the collections of the Museum of Comparative Zoology (Harvard), the Bernice P. Bishop Museum in Honolulu, the U.S. National Museum, and the British Museum of Natural History. Approximately 4 000 louseflies were examined for mites with a binocular dissecting microscope. We did not record an exact count of number of flies examined, since the data cannot be used for calculation of rates of mites incidence on the flies, because mites have been removed from some of the flies by previous researchers.

Flies were also solicited from members of the Ornithological Societies of North America through a request for assistance published in the Ornithological Newsletter. All mites found were removed and temporarily preserved in 70 % isopropyl alcohol. Later mites were mounted on slides using Hoyer's medium and identified using a phase-contrast microscope. Preserved epidermoptid mites were also examined in the W. T. ATYEO collection of the University of Georgia.

RESULTS

In the museum collections we visited, we were able to locate most of the specimens mentioned in the literature as harboring unidentified mites, except for those flies listed in publications by T. C. MAA. Dr. MAA still had those flies in his possession, and was unwilling to loan them to anyone since he had them on loan himself. We did find some museum specimens with mites not previously listed in the literature. Four hundred ninety mites were found on 129 flies. The mites belonged to 12 families, 17 genera and 31 species. There are 62 new mite/fliy host records, 71 new mite/bird host records, and 55 new mite/country geographic distribution records. In the collection data, the fly host is given first, then the avian host.

Strelkoviacarus critesi Spory, 1965

3 females ex *Ornithomya bequaerti* Maa, ex *Zonotrichia leucophrys gambelii* (Nuttall), Totem Park, Juneau, Alaska, 9-VI-73, R. B. WILLIAMS; 4 females, same data; 2 females, 2 tritonymphs, 1 protonymph, same data except 9-X-73.

Strelkoviacarus quadratus (Haller, 1882)

1 female ex *Ornithoica turdi* (Latreille), ex *Melaenornis fischeri toruenesis* (Hartert), Kwagimba, Toro, Uganda.

4 females ex *Ornithomya bequaerti* Maa, ex *Junco hyemalis* (Linnaeus) Totem Park, Juneau, Alaska, 9-XI-84, R. B. WILLIAMS.

Microlichus americanus Fain, 1964.

9 females ex *Ornithomya "fringillina* Curtis ", ex *Dumetella carolinensis* (Linnaeus), Middletown, Rhode Island, 5-IX-57, J. BAIRD; 6 females, same fly host, no avian data, same locality, 1957, J. BAIRD.

10 females ex *Ornithomya "fringillina* Curtis ", ex *Catharus ustulatus swainsoni* (Tschudi), Rhode Island..

45 females ex *Ornithomya "fringillina* Curtis ", ex *Quiscalus quiscula* (Linnaeus), Milton, Massachusetts.

1 female ex *Ornithomya "fringillina* Curtis ", ex *Spizella pusilla* (Wilson), Block Island, Rhode Island.

Remarks : These are all specimens of the " small *americanus* " described by FAIN (1965). Males are needed to distinguish whether this is an *americanus* variant or a different species. North American louseflies labeled *O. fringillina* or *O. chloropus* Bergroth in museums were identified before Maa revised the genus. The North American species of *Ornithomya* are *anchineuria* Speiser and *bequaerti* Maa ; *fringillina* and *chloropus* are Palaearctic species.

Myialges anchora Trouessart, 1906.

5 females ex *Pseudolynchia canariensis* (Macquart), Limasol, Cyprus.

3 females ex *Pseudolynchia canariensis* (Macquart), art gallery, Durban, Natal, 3-x-1933.

31 females ex *Ornithoctona erythrocephala* (Leach), Balzampra, Ecuador.

1 female ex *Ornithoctona erythrocephala* (Leach), Sa. Maria, Colombia.

Myialges bombycillae Fain, 1965.

5 females ex *Icosta chalcolampra* (Speiser), Solomon Islands.

5 females ex *Icosta hirsuta* (Ferris), ex *Callipepla californica* (Shaw).

1 female ex *Icosta mecorrhina* (Maa), ex *Bycanistes bucinator* (Temminck), Zululand, 15-XI-34.

9 females ex *Icosta rufiventris* (Bigot), ex *Buteo magnirostris* (Gmelin), Brazil.

23 females ex *Ornithoctona erythrocephala* (Leach), Chippewa County, Michigan.

1 female ex *Ornithoica curvata* Maa, ex *Centropus sinensis* (Stephens), Myitkina, Burma, 7-IV-45.

3 females ex *Ornithoica exilis* (Walker), ex *Dacelo novaeguineae*, (Hermann), N. Queensland, 3-VIII-64.

1 female ex *Ornithoica exilis* (Walker), ex *Halcyon chloris pealei* Finsch and Hartlaub, Tutuila, Samoa.

20 females ex *Ornithoica exilis* (Walker), ex *Halcyon cinnamomina reichenbachi* (Hartlaub), Ponape.

1 female ex *Ornithoica stipituri* (Schiner), ex *Pitta erythrogaster gazellae* Neumann, New Britain.

1 female ex *Ornithoica tridens* Maa, Taiwan.

2 females ex *Ornithoica turdi* (Latreille), ex *Tchagra senegala* (Linnaeus), Kenya, MEINERTZ-HAGEN.

3 females ex *Ornithoica vicina* (Walker), *Cyanocitta cristata* (Linnaeus), Groton, Massachusetts.

1 female ex *Ornithoica vicina* (Walker), ex *Pipilo erythrophthalmus erythrophthalmus* (Linnaeus), New Brunswick.

4 females ex *Ornithoica vicina* (Walker), ex *Pipilo fuscus mesoleucus*, Baird, Colorado Springs, Colorado.

1 female ex *Ornithoica vicina* (Walker), ex *Quiscalus quiscula* (Linnaeus), Oak Bluffs, Massachusetts.

2 females ex *Ornithoica vicina* (Walker), ex *Zonotrichia albicoliis* (Gmelin), Middletown, Rhode Island, 6-x-58 ; 9 females, same hosts, Londonderry, Vermont.

13 females ex *Ornithomya avicularia* (Linnaeus), ex *Turdus merula* Linnaeus, Spanca, Turkey, 2-IX-53.

20 females ex *Ornithomya avicularia* (Linnaeus), ex *Otus* sp., Italy.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Coccothraustes vespertinus* (Cooper), Londonderry, Vermont, 14-VI-59, P. REED.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Cyanocitta cristata* (Linnaeus), New Brunswick.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Dumetella carolinensis* (Linnaeus), Middletown, Rhode Island, 1957, J. BAIRD.

2 females ex *Ornithomya* " *fringillina* Curtis ", ex *Melospiza melodia* (Wilson), Groton, Massachusetts.

9 females ex *Ornithomya* " *fringillina* Curtis ", ex *Spizella passerina* (Beckstein), Groton, Massachusetts.

3 females ex *Ornithomya* " *fringillina* Curtis ", ex *Zonotrichia albicollis* (Gmelin), Elmhurst, New York.

1 female ex *Ornithophila metallica* (Schiner), ex *Eurystomus orientalis* (Linnaeus), Myitkina, Burma.

13 females ex *Ornithophila metallica* (Schiner), ex *Halcyon albonotata* Ramsay, New Britain.

3 females ex *Ornithophila metallica* (Schiner), ex *Halcyon chloris* (Boddaert), Boang Island, Bismarck Archipelago.

1 female ex *Ornithophila metallica* (Schiner), ex

Halcyon chloris tannensis Sharpe, E. Tanna Island, New Hebrides.

1 female ex *Ornithophila metallica* (Schiner), ex *Malaconotus blanchoti approximans* (Cabanis), Uganda.

1 female ex *Ornithophila metallica (Schiner), ex Strix ocellata* (Lesson), Deccan, India.

Myialges caulotoon Speiser, 1907.

3 females ex *Icosta ardeae botaurinorum* (Swenk), ex *Botaurus lentiginosus* (Rackett); 10 females, same hosts, St Paul, Minnesota.

1 female ex *Icosta chalcolampra* (Spreiser), Solomon Islands.

1 female ex *Icosta dukei* (Austen), ex *Urotriorchis macrourus* (Hartlaub) Bantanga, Congo; 1 female, same fly host, Kwamouth, Africa, 6-VI-13.

2 females ex *Icosta nigra* (Perty), Indefatigable Island, Galapagos; 1 female, same fly host, Tucson, Arizona, 8-IV-16.

3 females ex *Olfersia fossulata* Macquart, Peru.

2 females ex *Olfersia fumipennis* (Sahlberg), ex *Pandion haliaetus* (Linnaeus), British Honduras.

2 females ex *Olfersia spinifera* (Leach), ex *Fregata magnificens* Mathews, Jamaica.

Promyialges falconis Fain, 1965.

5 females ex *Icosta nigra* (Perty), ex *Buteo jamaicensis* (Gmelin), Montana.

2 females ex *Pseudolynchia canariensis* (Macquart), Manila, Philippines.

4 females ex *Stilbometopa fulvifrons* (Walker), ex *Quiscalus niger* (Boddaert), Rio Ojo del Toro, Cuba, 30-VIII-30.

Promyialges lophortyx (Furman and Tarshis, 1953)

4 females ex *Ornithomya "chloropus* Bergroth," ex *Zonotrichia albicollis* (Gmelin), California.

Promyialges macdonaldi Evans, Fain and Bafort, 1963.

17 females ex *Ornithoctona laticornis* (Macquart), ex *Passer griseus* (Vieillot), Kivu, Zaire.

1 female ex *Ornithoica curvata* Maa, ex *Centropus bengalensis bengalensis* (Gmelin), Myitkina, Burma, 13-V-45.

3 females ex *Ornithoica curvata* Maa, ex *Centropus sinensis intermedius* Hume, Myitkina, Burma, 2-VII-45.

11 females ex *Ornithoica curvata* Maa, ex *Centropus sinensis sinensis* (Stephens), Myitkina, Burma, 27-IV-47; 4 females, same host and locality, 18-IV-45.

1 female ex *Ornithoica exilis* (Walker), British Solomon Islands, R. J. A. W. Lever.

2 females ex *Ornithoica turdi* (Latreille), ex *Circus macrourus* (Gmelin), Businzera, Uganda.

1 female ex *Ornithoica turdi* (Latreille), ex *Machaerhamphus alcinus andersoni* (Gurney), Avakubi, Belgian Congo, 21-I-14.

1 female ex *Ornithoica turdi* (Latreille), ex *Ploceus capensis*, (Linnaeus), Cape Province, South Africa, 1965.

1 female ex *Ornithomya avicularia* (Linnaeus), ex *Corvus albicollis* Latham, Kibati, Congo; 2 females, same data.

1 female ex *Ornithomya fringillina* Curtis, ex *Sylvia communis communis* Latham, Suffolk, England.

3 females ex *Ornithomya parva* Macquart, ex *Duica* sp. Valparaiso, Chile.

1 female ex *Ornithophila metallica* (Schiner), ex *Pycnonotus barbatus arsinoe* (Lichtenstein), Egypt.

1 female ex *Pseudolynchia canariensis* (Macquart), Tana River, Kenya.

Promyialges species nr. *pari* Fain, 1965

10 females ex *Ornithoctona fusciventris* (Wiedemann), ex *Tangara arthus aurulenta* (Lafresnaye), Colombia.

1 female ex *Ornithoica exilis* (Walker), ex *Halcyon chloris tristrami* Layard, New Britain.

2 females ex *Ornithoica exilis* (Walker), ex *Halcyon cinnamomina reichenbachi* (Hartlaub), Ponape.

4 females ex *Ornithophila metallica* (Schiner), ex *Ammoperdix* sp., Abant Bow, Turkey, 11-VIII-53, H. HOOGSTRAAL.

1 female ex *Ornithophila metallica* (Schiner), ex *Corvus corone* Linnaeus, Wadi Nissim, Egypt.

1 female ex *Ornithophila metallica* (Schiner), ex *Cuculus solitarius* Stephens, Congo.

5 females ex *Ornithophila metallica* (Schiner), ex *Falco tinnunculus* Linnaeus, Cyprus.

1 female ex *Ornithophila metallica* (Schiner), ex *Halcyon chloris tristrami* Layard, New Britain.

1 female ex *Ornithophila metallica* (Schiner), ex *Lonchura cucullata* (Swainson), Temvo, Congo, 1922.

1 female ex *Ornithophila metallica* (Schiner), ex *Motacilla alba* Linnaeus, Doab, Afghanistan.

1 female ex *Ornithophila metallica* (Schiner), ex *Malaconotus blanchoti approximans* (Cabanis), Uganda.

Remarks : These individuals may be a new species or a subspecies of *pari*. Males are needed for more exact determination. Another specimen of the African variety found on *O. metallica* was examined in the University of GA mite collection, ex *Erythropygia paena* Smith, Kukong, Bechuanaland, 20-XII-57, F. ZUMPT.

Promyialges uncus (Vitzthum, 1934)

5 females ex *Ornithomya bequaerti* Maa, ex *Bombycylla cedrorum* Vieillot, Rector, Pennsylvania, 4-VI-82, LEBERMAN.

6 females ex *Ornithomya bequaerti* Maa, ex *Picoides pubescens* (Linnaeus), Rector, Pennsylvania, 4-VI-82, LEBERMAN.

1 female ex *Ornithomya bequaerti* Maa, ex *Zonotrichia Leucophrys gambelii* (Nuttall), Totem Park, Jumeau, Alaska, R. B. WILLIAMS.

3 females ex *Ornithomya* " *chloropus* Bergroth ", ex *Catharus guttatas* (Pallas), Mt. Desert Island, Maine, 29-VII-32.

1 female ex *Ornithomya* " *chloropus* Bergroth ", ex *Geothlypas trichas* Linnaeus, E. Westmoreland, New Hampshire.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Agelaius phoeniceus* (Linnaeus), Philadelphia Neck, Pennsylvania.

3 females ex *Ornithomya* " *fringillina* Curtis ", ex *Colaptes auratus* (Linnaeus), New York.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Dumetella carolinensis* (Linnaeus), Middletown, Rhode Island, 5-IX-57 ; 4 females, same hosts and locality, 1957.

7 females ex *Ornithomya* " *fringillina* Curtis, ex *Ixoreus naevius naevius* (Gmelin), Vernon, Bristish Colombia.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Zonotrichia lincolnii* (Audubon), Fargo, North Dakota.

2 females ex *Ornithomya* " *fringillina* Curtis ", ex *Melospiza melodia* (Wilson), Groton, Massachusetts.

2 females ex *Ornithomya* " *fringillina* Curtis ", ex *Spizella passerina* (Beckstein), Groton, Massachusetts.

1 female ex *Ornithomya* " *fringillina* Curtis ", ex *Spizella* sp. (*passerina* or *pallida* (Swainson)), Fargo, North Dakota.

3 females ex *Ornithomya* " *fringillina* Curtis ", ex *Turdus migratoriu* Linnaeus, Demarest, New Jersey ; 1 female, same hosts, Middletown, Rhode Island.

Promyialges n. spp.

1 female ex *Microlynchia crypturelli* Bequaert, ex *Columba rufina sylvestris* Vieillot, Brazil, 1940.

3 females ex *Ornithoica exilis* (Walker), ex *Dacelo novaeguineae* (Hermann), North Queensland, 3-VIII-64.

1 female ex *Ornithoica turdi* (Latreille), ex *Gypohierax angolensis* (Gmelin), Kakatowm, Liberia, 24-VIII-26.

Remarks : The Brazilian species has bilobed pulvilli and an undivided hysterosomal shield. The Australian and Liberian specimens appear to be the same species, with small hysterosomal shields (80 × 40 μm) far apart from each other (40-65 μm).

Accidentals

Acaridida

Acaridae : *Histiogaster* n. sp. ; 1 hypopus, ex *Ornithoctona erythrocephala* (Leach), Brazil ; *Sancassania* spp., 1 hypopus each, ex *Ornithomya fringillina* Curtis, ex *Bonasa umbellus* (Linnaeus), Montana ; ex *Ornithophila metallica* (Schiner), ex *Halcyon chloris* (Boddaert), Boang Island, Bis-

marck Archipelago, and ex *Olfersia bisulcata* Macquart, ex *Coragyps atratus* (Bechstein), Venezuela ; 1 acarid sp. hypopus ex *Ornithomya bequaerti* Maa, ex *Zonotrichia leucophrys gambelii* (Nuttall), Totem Park, Juneau, Alaska, 9-v-73, R. B. WILLIAMS ; 1 acarid tritonymph, ex *Ornithomya "fringillina* Curtis", ex *Zonotrichia albicollis* (Gmelin), Elmhurst, New York.

Analgidae : *Radfordalges* sp., 1 male, 1 tritonymph, 1 larva ex *Ornithoica exilis* (Walker), ex *Dicrurus hottentottus laemostictus* Sclater, New Britain, March 1932 ; 1 male, same fly host, ex *Halcyon cinnamomina reichenbachi* (Hartlaub), Ponape ; 1 male and 1 tritonymph, same fly host, ex Alcedinidae, Irian Jaya. 1 male, 1 female ex *Ornithoica stipituri* (Schiner), ex *Ptiloris magnifica alberti* Elliot, Queensland ; 1 analgid larva, ex *Ornithoica stipituri* (Schiner), ex *Ninox odiosa* Sclater, New Britain.

Histiostomatidae : *Histiostoma* sp., 1 hypopus, ex *Ornithomya "fringillina* Curtis", ex *Dumetella carolinensis* (Linnaeus), Middletwon, Rhode Island, 1957, J. BAIRD ; new genus, 3 hypopi, ex *Ornithoctona erythrocephala* (Leach), Brazil.

Glycyphagidae : *Dermacarus* sp., 1 hypopus ex *Ornithoica turdi* (Latreille), ex *Melaenenornis fiischeri toruensis* (Hartert), Kwagimba, Toro, Uganda.

Kramerellidae : *Pseudogabucinia* sp., 1 female ex *Icosta dukei* (Austen), ex *Urotriorchis macrourus* (Hartlaub), Batanga, Cameroon ; 2 females, 5 tritonymphs, 10 protonymphs and 1 larva ex *Icosta pilosa* (Macquart), ex *Choriotis kori* (Burchell), Kenya.

Psoroptoididae : *Temnalges* sp., 5 females ex *Icosta rufiventris* (Bigot), ex *Leucopternis albicollis* (Latham), Panama ; 5 females, same fly host, ex *Harpyhaliaetus solitarius solitarius* (Tschudi), Venezuela.

Winterschmidtiidae : *Procalvolia*? sp., 1 female ex *Ornithoica curvata* Maa, ex *Centropus sinensis sinensis* (Stephens), Myitkina, Burma, 18-IV-45.

Xolalgidae : Ingrassiinae spp., 3 larvae ex *Icosta coalescens* Maa, Congo, 1 female ex *Icosta rufiventris* (Bigot), ex *Micrastur ruficollis* (Vieillot), Brazil ; 1 tritonymph, ex *Ornithoctona erythrocephala* (Leach), ex *Circus cinereus* Vieillot, Brazil, 1955.

Mesostigmata

Ascidae : *Blattisocius keegani* Fox, 1 female ex *Ornithoica vicina* (Walker), ex *Bubo virginianus* (Gmelin), Eureka, Missouri, 1988, W. CRAWFORD.

Uropodina : 2 deutonymphs ex *Ornithoctona erythrocephala* (Leach), Brazil.

Prostigmata

Erythraeidae : *Leptus* sp., 2 larvae ex *Ornithophila metallica* (Schiner).

Remarks : The new genus of Histiostomatidae is similar to *Ameranoetus* and *Hormosianoetus* in having dark pigment dorsolateral to the palposoma, but has claws on leg IV.

DISCUSSION

There are now a total of 14 epidermoptid mite species known from 32 species of hippoboscid flies and 101 species of birds (FAIN, 1965 ; MACK-FIRA and CRISTEA, 1966 ; HILL *et al.*, 1967 ; MAIN and ANDERSON, 1970 ; BUTTIKER and CERNY, 1974 ; CHIROV, 1979 ; WILSON and HAAS, 1980 ; HUTSON, 1981 ; FAIN, GAUD and PHILIPS, 1987). The classification of these mites remains tentative for those species known only from females found on the flies, and it is likely further species will become apparent when more birds are directly examined and males are found. Since epidermoptid mites are so far known only from 32 of the 153 species of hippoboscid flies, it is also likely that many females of new species remain to be discovered.

Some of the mites found are cosmopolitan in occurrence, but most have restricted geographic distributions. Fly host specificity varies among the mite genera. Each species of *Microlichus* associated with louseflies is so far known only from one fly species and three of the four mites are known from *O. avicularia*. Species of *Myalges* and *Promyialges* are less fly-specific, typically occurring on 1-5 fly genera. Mites found on polyxenous flies can occur on monoxenous flies as well — for example, *Ornithomya rupes* Hutson, from the crag martin

Ptyonoprogne reipestris (Scopoli), is parasitized by *Myialges bombycillae* (HUTSON, 1981), and *Ornithomya biloba* Dufour, from the barn swallow *Hirundo rustica* Linnaeus, is parasitized by *Promyialges uncus*.

Most of the epidermoptid mites so far found on hippoboscid flies occur on polyxenous flies from many avian hosts, and the mites apparently exhibit a lack of avian host specificity corresponding to that of their dipteran hosts. Thus the mites can take advantage of whatever avian their fly host brings them to. This assumes that the mites on flies from birds were actually parasitizing that bird. It is possible that mite on a stray fly may not be able to parasitize an improper new hosts bird. However, direct bird collections have shown that at least some of these epidermoptid species can parasitize several bird orders or families. *Microlichus avus* is known from hummingbirds and passerines, including finches, parrotbills and weavers ; *Promyialges macdonaldi* is known from babblers, titmice and warblers (FAIN, 1965 ; CHIROV, 1979).

In this study, we found mites on three monoxenous flies : *Microlynchia crypturelli, Olfersia fumipennis* and *Olfersia spinifera*. M. *crypturelli* had a new species of *Promyialges*, while the *Olfersia* species each had slightly different mites very close to *Myialges caulotoon*. Males are needed to confirm their identity with *M. caulotoon*, but the unique discovery on *M. crypturelli* suggests other undiscovered epidermoptid species may exist, monoxenous for both fly an bird hosts.

Two species have been described in the genus *Strelkoviacarus*. *S. quadratus* has been found on *Ornithomya chloropus* from European passerines (MACK-FIRA and CRISTEA, 1966 ; HILL *et al.*, 1967), and *S. critesi* was described from *Agelaius phoeniceus* (Linnaeus) in Ohio (SPORY, 1965), then found on *Ornithomya fringillina* in Europe (HILL *et al.*, 1967). Our records represent new avian hosts, a new fly host genus, and new continental distributions for these mites. Epidermoptid mites are much more common on louseflies than *Strelkoviacarus* is.

The accidental mites found in this study included avian feather mites, phoretic entomophilic astigmatic and mesostigmatic deutonymphs and adults, and one insect parasite — *Leptus* sp. Others have reported similar finds (CORBET, 1961 ; HILL *et al.*, 1967 ; BUTTIKER and CERNY, 1974). Since feather mites are generally highly host specific while louseflies are not, a phoretic feather mite does not stand a very high chance of a polyxenous fly happening to pick the same host again. Soil and bark mites will similarly not find louseflies optimal transportation vehicles. Erythraeid larvae have previously been found on louseflies by HILL *et al.* (1967) and BUTTIKER and CERNÝ (1974). The latter illustrated their mite on the fly's leg — which is also where our specimens occurred. While *Leptus* parasitizes flies, such as tse-tse flies (FAIN and ELSEN, 1972), there was no evidence our specimens had penetrated the cuticle anywhere. Since records of *Leptus* on houseflies are so scarce, and are observations of phoresy but not parasitism, we cannot conclude it is a deliberate lousefly parasite.

Considerably more field collecting of mites and flies is needed. We need both sexes of the mites for proper classification, and there are species of *Microlichus* which have been found on birds but not yet on louseflies (FAIN and GAUD). There is also little available information on the frequency of occurrence of these skin mites on birds, or what an average infestation means as far as numbers and pathological effects. Infestation rates of flies with mites have been shown to vary from 1-93 % (HILL *et al.*, 1967) so the incidence of mites and the importance of flies in spreading them may be quite variable and is currently unpredictable for most bird species and geographical areas.

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