

# A Comparison of the Ectoparasites of the House Sparrow (*Passer domesticus*) from North America and Europe

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**ABSTRACT:** The house sparrow (*Passer domesticus*) was introduced into the United States at least 16 times between 1850 and 1881. Since then it has spread over most of North America. Reports in the literature of ectoparasites collected from house sparrows and the results of the two surveys presented here indicate that differences exist in the species of Acarina, Mallophaga, Hemiptera, Diptera and Siphonaptera found on the house sparrow in North America and Europe.

## INTRODUCTION

The house sparrow (*Passer domesticus*) is a native of Europe, with closely related subspecies inhabiting North Africa, South America and the Middle East. It has been introduced into North America, South America, Australia, New Zealand and many of the Pacific Islands and thus has spread throughout most of the civilized world. At least 16 separate importations into the United States are recorded between 1850 and 1881. From these original colonies the sparrow has spread over most of North America.

Because of its abundance, wide range and close association with man and his domestic animals, the house sparrow has been the subject of a number of studies to determine its economic importance. Barrows (1889), Kalmbach (1940) and Southern (1945) are the most complete in this regard. Records of ectoparasites from *P. domesticus* are quite numerous but are widely scattered in the literature. This article gives the results of two surveys made in the United States and England, presents a checklist of the ectoparasites of this host that appear in the literature, and determines which ectoparasites were brought to North America by the sparrow and which have been acquired since its introduction.

## MATERIALS AND METHODS

Information contained here was obtained from examination of material from house sparrows collected in the vicinity of Boston, Mass., 1970-71, and Stockton-on-Tees, England, 1954-58, examination of preserved specimens from the U.S. National Museum, and from published records.

The collection methods used with the Boston and Stockton-on-Tees birds were quite different. Boston birds were killed with chloroform and examined for ectoparasites using the following techniques. Swab-

bings from the mouth, pharynx and ears were made and examined. Each bird was then returned to the killing jar with 1 liter of water and 4 g of detergent and shaken for 5 min, after which the water was poured out and kept. The bottle was refilled three times with water alone and shaken for 30 sec each time. Finally, the bird was removed, suspended and rinsed with approximately 300 ml of water to remove any remaining parasites. The washing and rinsing fluids were filtered through closely woven nylon and the residue examined with a dissecting microscope. Permanent mounts were studied later, using a compound microscope.

Ectoparasites from the Stockton-on-Tees birds were collected by J. D. Summers-Smith using the Fair Isle apparatus. This involved placing a bird into a cylinder containing chloroform with its head remaining outside. Ectoparasites collected from the bottom of the cylinder were mounted in Hoyer's media. Acarina and Mallophaga from the Stockton-on-Tees birds were examined during the present study.

#### DATA AND DISCUSSION

The results of the collections from 34 house sparrows caught in the vicinity of Boston, Mass., are shown in Table 1. Three species of mites, *Microlichus avus*, *Proctophyllodes truncatus* and *Analges* sp., were found which had not been reported previously from *P. domesticus* in North America. The mite found most frequently and in greatest numbers was *P. truncatus*.

The results of Summers-Smith's collections from house sparrows from the vicinity of Stockton-on-Tees are shown in Table 2. Of the Acarina, only *Ornithonyssus sylviarum* has not been reported previously from this host in Europe. *P. truncatus* is again the mite found in greatest numbers. A comparison of the number of *P. truncatus* here with that collected in the Boston study shows approximately equal numbers collected from greatly dissimilar numbers of birds. This probably indicates the greater efficiency of the collection technique rather than any real difference in the levels of infestation.

These results and those reported in 82 other studies of ectoparasites

TABLE 1.—Ectoparasites from 34 house sparrows collected in the vicinity of Boston, Mass.

	Total	Median	(Range)	% infestation
ACARINA				
<i>Dermanyssus americanus</i>	20	1	1-12	14.7
<i>Ornithonyssus sylviarum</i>	10	5	1-8	5.8
<i>Paraneonyssus hirsti</i>	23	2	1-8	23.5
<i>Syringophiloides minor</i>	15	....		2.9
<i>Microlichus avus</i>	49	....		2.9
<i>Proctophyllodes truncatus</i>	1957	11	1-437	64.7
<i>Analges</i> sp.	2	....		2.9
MALLOPHAGA				
<i>Brueelia cyclothorax</i>	471	20	1-204	29.4

on European house sparrows and 54 studies on North American birds have been used to compile a checklist (Table 3). A total of 75 species of ectoparasites have been reported from the house sparrow in Europe and/or North America, respectively; 19 are found in both areas.

Twenty-four and 21 species of mites have been reported from the European and North American house sparrow, respectively. Thirteen species are found in both areas. The nasal mites have been included here because of their arthropod character although they are true endoparasites.

*Harpirhynchus pilirostris* may have been brought to this country on the sparrow, but it does not seem to have spread to native passerine birds. The nasal mite, *Speleognathus sturni*, has been reported from house sparrows and was originally described from the starling. Boyd (1951) proposed that this mite may have entered North America with the starling and has since spread to native birds. The sparrow may have acquired the parasite in this way, or may itself have been one of the means of introducing it to this continent.

Eight species of ticks are reported as parasites of the house sparrow in Europe and North America. The majority of these are primarily mammalian or fowl parasites with wide host ranges. *Ixodes brunneus*, *I. auritulus*, *Amblyomma maculatum* and *Haemophysalis leporis-palustris* are apparently native to this hemisphere.

Nine species of Mallophaga have been found on house sparrows; two species have been reported from both Europe and North America.

Only one species of Hemiptera has been found on house sparrows in Europe; none is reported from North America.

Seven species of Diptera are reported as attacking house sparrows in Europe and five in North America. One of these, the hippoboscid,

TABLE 2.—Ectoparasites from house sparrows collected in the vicinity of Stockton-on-Tees, England<sup>1</sup>

	Total	Median	(Range)	% infestation
<b>ACARINA</b>				
<i>Ptilonyssus nudus</i>	9	..	1-8	
<i>Dermanyssus gallinae</i>	25	..		
<i>Ornithonyssus sylviarum</i>	5	1	1-2	
<i>Syringophilodius minor</i>	1	..		
<i>Proctophyllodes truncatus</i>	1165	4	1-155	
<i>Dermoglyphus elongatus</i>	34	..		
<i>Analges</i> sp.	147	1	1-87	
Cheyletidae	1	..		
<b>MALLOPHAGA</b>				
<i>Menacanthus</i> sp. <sup>2</sup>	21	1	1-9	1.3
<i>Brueelia cyclothorax</i>	22	1	1-2	3.0
<i>Phlopterus fringillae</i>	17	1	1-2	1.9

<sup>1</sup> Acarina were collected from 123 birds. Other birds were listed by Summers-Smith as having "mites." Calculation of % infestation not possible. Mallophaga were collected during examination of 473 birds

<sup>2</sup> Genus is currently being revised. May = *M. annulatus*

*Ornithomyia fringillina*, has been found on both continents. With the exception of the hippoboscids, most of these flies attack nestling birds as larvae and would not have been introduced into this country with the host. It is most likely that *O. fringillina* was not brought to America by the sparrow or the starling as has been suggested by Boyd (1951). According to Bequaert (1954), the fly has a great variety of American hosts, has been reported from the house sparrow infrequently, and occurred in the United States prior to the introduction of the starling or the house sparrow.

Seven species of fleas are listed from this host in Europe and three from North American birds. Only *Ceratophyllus gallinae*, the European chicken flea, has been found to infest both groups.

In summary, 34 species (49.3%) of ectoparasites reported from European birds have not been found in North America. This seems to be a large number in comparison to the total, 69. The difference may be the result of such factors as changed environmental conditions experienced by host and parasite, and variations in the number of studies and their methodology.

Two species of ectoparasite, *Harpirhynchus pilirostris* and *Speleognathus sturni*, were probably brought to this continent by the house sparrow, and eight mites, four ticks, four flies and two fleas apparently have been acquired since its arrival. The domestic chicken and the house sparrow have at least seven species of ectoparasites in common. Their close association may account for some of the ectoparasites acquired by the house sparrow.

*Acknowledgments.*—The authors would like to thank J. D. Summers-Smith for making available his extensive collection of ectoparasites, G. Metallides and L. Maynard for collecting and identifying ectoparasites, and Dr. W. Atyeo and T. Clay for identification of some Acarina and Mallophaga, respectively. This research was supported by grants from the Simmons College Fund for Research and the Society of the Sigma Xi.

TABLE 3.—Comparison of the ectoparasites from house sparrows in Europe (E) and North America (N.A.). (Numbers refer to reference citations; PS = found in Present Study)

ACARINA—MESOSTIGMA	
RHINONYSSIDAE: <i>Paraneonyssus hirsti</i> de Castro & Pereira, 1947—E. 37, 38, 41; N.A. 41, 92, 130. <i>Ptilonyssus nudus</i> Berlese & Trouessart, 1889—E. 22, 38, 58, PS; N.A. 92, 131. <i>Sternostoma cryptorhynchum</i> Berl. & Troues., 1889—E. 120; N.A. 130. <i>S. tracheocolum</i> Lawrence, 1948—E. ....; N.A. 40.	
DERMANYSSIDAE: <i>Dermanyssus americanus</i> Ewing, 1922—E. ....; N.A. 34, 35, 130, PS. <i>D. gallinae</i> DeGeer, 1778—E. 107, PS; N.A. 33, 34, 130. <i>D. longipes</i> Berl. & Troues., 1889—E. 58; N.A. 60, 131. <i>D. passerinus</i> Berl. & Troues., 1889—E. 58; N.A. 60. <i>Ornithonyssus bursa</i> Berlese, 1888—E. 57, 58; N.A. 17, 42. <i>O. iheringi</i> Fonseca, 1935—E. ....; N.A. 93. <i>O. sylviarum</i> Canestrini & Fanzago, 1877—PS; 3, 4, 34, 36, 42, 43, PS, 58, 60, 95, 130, 131. <i>Pelonyssus passerii</i> Clark 1956—E. ....; N.A. 25, 130.	
LAELAPTIDAE: <i>Haemolaelaps casalis</i> Berlese, 1910—E. ....; N.A. 15, 112, 131.	
ACARINA—IXODIDES	
ARGASIDAE: <i>Argas persicus</i> (Oken, 1818) Fischer, 1824—E. 90; N.A. ....	
IXODIDAE: <i>Ixodes canisuga</i> Johnston, 1849—E. 80; N.A. .... <i>I. auritulus</i>	

TABLE 3.—(continued)

- Frauenfeld, 1860—E. ....; N.A. 88. *I. brunneus* Koch, 1844—E. ....; N.A. 26. *I. hexagonus* Leach, 1815—E. 77, 78; N.A. .... *I. ricinus* Linnaeus, 1758—E. 75, 118; N.A. .... *Amblyomma maculatum* Koch, 1844—E. ....; N.A. 11. *Hæmaphysalis concinna* Koch, 1844—E. 86; N.A. .... *H. leporis-palustris* Packard, 1869—E. ....; N.A. 87, 131. *H. punctata* Canes. & Fan., 1877—E. 110; N.A. .... *Rhipicephalus sanguineus* Latreille, 1806—E. 73; N.A. ....
- ACARINA—TROMBIDIFORMES
- SPELEOGNATHIDAE: *Speleognathus sturni* Boyd, 1948—E. ....; N.A. 14, 92.
- MYOBIIDAE: *Harpirhynchus holopus* Berl. & Troues., 1889—E. 93, 126; N.A. .... *H. ovalis* Fritsch, 1954—E. 46; N.A. .... *H. pilirostris* Berl. & Troues., 1889—E. 93, 126; N.A. 130. *Syringophiloidus minor* Berlese, 1887—E. PS; N.A. 24, 72, 130<sup>1</sup>, PS.
- CHEYLETIDAE: E. PS; N.A. ....
- TROMBICULIDAE: *Trombicula autumnalis* Shaw, 1790—E. 65; N.A. ....
- ACARINA—SARCOPTIFORMES
- SARCOPTIDAE: *Knemidocoptes laevis passeris* Fritsch, 1962—E. 47; N.A. ....
- EPIDERMOPTIDAE: *Dermatophagoides passericola* Fain, 1964—E. 39; N.A. .... *Microlichus avus* Trouessart & Neumann, 1877—E. 56, 121, 123; N.A. PS. *Rivoltasia dermicola* Trouessart, 1886—E. 20, 94; N.A. ....
- ANALGESIDAE: *Analges chelopsis* Hermann, 1804—E. 70, 83, 98, 121, 122; N.A. .... *A. mucronata* de Buchholz, 1869—E. 83; N.A. .... *A. passerinus* Nitzsch, 1818—E. 45, 83, 98; N.A. ....
- DERMOGLYPHIDAE: *Dermoglyphus elongatus* Mégnin, 1877—E. PS; N.A. 130, 131.
- PROCTOPHYLLODIDAE: *Proctophyllodes amelides* (de Buchholz, 1869) Robin, 1868—E. 12; N.A. .... *P. passeris* Vitzthum, 1922—E. 23, 107, 125; N.A. .... *P. pinnatus* Nitzsch, 1818—E. 83, 125; N.A. 130. *P. profusus* Robin, 1868—E. 98; N.A. .... *P. truncatus* Robin, 1868—E. 125, PS; N.A. PS. *Trouessartia* sp. Canestrini, 1889—E. ....; N.A. 130.
- MALLOPHAGA—AMBLYCERA
- Colpocephalum scopularium* Neumann, 1912—E. 55, 104; N.A. .... *Menacanthus annulatus* Giebel, 1874—E. 13, 55, 76, 90, 113, PS, Clay (pers. comm.); N.A. 61. *Myrsidea quadrifasciata* Piaget, 1880—E. 19, 68, 91, 104, Clay (pers. comm.); N.A. ....
- ISHNOCERA: *Brueelia cyclothorax* Burmeister, 1838—E. 27, 107, 113, PS, Clay (pers. comm.); N.A. 18, 67, 68, PS. *B. subtilis* Nitzsch, 1874—E. 31; N.A. 21, 63, 121. *B. vulgata*<sup>2</sup> Kellogg, 1896—E. 134; N.A. 5, 16, 31, 32, 49, 50, 69, 87, 130, 133. *Lipeurus heterographus* Nitzsch, 1866—E. 60; N.A. .... *Philopterus aeneas* Piaget, 1885—E. 90; N.A. .... *P. fringillae* Scopoli, 1772—E. 7, 28, 113, 124, PS, Clay (pers. comm.); N.A. .... *P. subflavescens* Geoffrey, 1762—E. 13, 27, 54, 55, 68, 74, 89, 104, 114, 116; N.A. .... *Rostrinirinus refractariolus* Zlotorzycska, 1964—E. 134; N.A. ....
- HEMIPTERA: *Oeciacus hirudinis* Jenyns, 1839—E. 29; N.A. ....
- DIPTERA—CALLIPHORIDAE: PROTOCOLLIPHORA: *Apaulinaeena* (Shannon and Dobroscky, 1924) Hall, 1948—E. ....; N.A. 53. *A. hesperia* Shannon and Dobroscky, 1924—E. ....; N.A. 52. *A. hirudo* Shannon and Dobroscky, 1924—E. ....; N.A. 102.
- HIPPBOSCIDAE: *Ornithomyia avicularia* Linnaeus, 1758—E. 104; N.A. .... *O. fringillina* Curtis, 1836—E. 30, 71, 82, 109, 113, 129, Southern & Thompson in 113; N.A. 71, 109. *O. lagopodis* Sharp, 1907—E. 82; N.A. .... *Ornithoica vicina* Walker, 1849—E. ....; N.A. 66, 71, 131.
- OTHERS: *Carnus hemapterous* Nitzsch, 1818—E. 128; N.A. .... *Lipoptena cervi* Linnaeus, 1761—E. 103; N.A. .... *Neottiophilum praeustum* Meigen, 1826—E. 10; N.A. .... *Boreellus caerulea* Robineau-Devoidy, 1907—E. 105; N.A. ....
- SIPHONAPTERA: *Ceratophyllus borealis*, Rothschild 1907—E. 79, 100; N.A. .... *C. fringillae* Walker, 1856—E. 1, 2, 84, 96, 97, 99, 113, 127; N.A. .... *C.*

TABLE 3.—(continued)

*gallinae* (Shrank, 1803) Jordan & Rothschild, 1920—E. 51, 81, 85, 96, 99, 101, 113, 128; N.A. 8, 44, 48, 61, 62, 111. *C. hirundinis* Samonelle, 1819—E. 106; N.A. .... *C. niger* Fox, 1908—E. ....; N.A. 59. *C. rusticus* Wagner, 1903—E. 106; N.A. .... *Dasypsyllus gallinulae* Dale, 1878—E. 117; N.A. .... *Echidnophaga gallinacea* Westwood, 1895—E. ....; N.A. 44, 119. *Hectopsylla psittaci* Frauenfeld, 1860—E. 132; N.A. ....

<sup>1</sup> *Syringophilus* sp. in original publication

<sup>2</sup> Clay (pers. comm.). "Until someone has designated a lectotype with a host of this species, it is impossible to say what it is; its use in the literature is usually meaningless."

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SUBMITTED 18 MARCH 1974

ACCEPTED 20 JUNE 1974

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Reprinted from  
**THE AMERICAN MIDLAND NATURALIST**  
Vol. 94, No. 1, July, 1975, pp. 154-165  
University of Notre Dame Press  
Notre Dame, Indiana