

FAMILY HECTOPSYLLIDAE BAKER

- 1904 Hectopsyllidae Baker, Proc. United States Nat. Mus., 27:375.
1904 Sarcopsyllidae Baker, Proc. United States Nat. Mus., 27:373.
1905 Hectopsyllidae Baker, Proc. United States Nat. Mus., 29:123.
1905 Rhynchoprionidae Baker, Proc. United States Nat. Mus., 29:123.
1906 Hectopsyllidae Oudemans, Nov. Zool., 16:157.
1925 Tungidae C. Fox, Insects and Disease of Man, p. 130.
1926 Sarcopsyllidae Dampf, Ent. Mitt., 15:378.
1929 Hectopsyllidae Ewing, Manual External Parasites, p. 178.
1936 Hectopsyllidae Wagner, Tierwelt Mitteleuropas, Bd. VI, Abt. XVII,
s. 4.

The members of this family are distinguished by the great reduction of the thoracic segments which together are usually not longer than either the head or the first abdominal tergite. The legs are rather weak, and the abdomen in the female is prominently distended. No antepygidial bristles are present.

But one genus belonging to this family has been reported from the East. It may be characterized as follows.

ECHIDNOPHAGA OLLIFF

Echidnophaga Olliff, 1886, Proc. Linn. Soc. N. S. Wales, 1:172.

Genotype: *Echidnophaga ambulans* Olliff

Neither a genal nor a pronotal ctenidium present. Head angulate in front. Frontal tubercle absent. Abdominal segments II to VIII each with a conspicuous spiracle. Hind coxa produced at the apex into a broad tooth; hind coxa also armed with a patch of spinelets on the inner side (Plate II, fig. 5). Fifth tarsal segment of each leg armed with three pairs of stout lateral plantar bristles anterior to which there may be one or two pairs of much more slender bristles.

This genus is represented in the East by but one species which is a widespread pest of chickens in the South. Its depredations are so great as to cause serious losses to the poultry business.

Echidnophaga gallinacea (Westwood)

(Plate II)

- 1875 *Sarcopsyllus gallinaceus* Westwood, Ent. Mo. Mag., 11: 246.
 1890 *Pulex pallulorum* Johnson, Proc. Ent. Soc. Washington, 1: 59.
 1895 *Sarcopsylla gallinacea* Baker, Can. Ent., 27: 21.
 1896 *Sarcopsylla gallinacea* Osborn, United States Dept. Agric. Div. Ent., Bull. 5 (n.s.), p. 144, figs. 76, 77.
 1904 *Xestopsylla gallinacea* Baker, Proc. United States Nat. Mus., 27: 375.
 1905 *Argopsylla gallinacea* Baker, Proc. United States Nat. Mus., 29: 138.
 1906 *Echidnophaga gallinacea* Jordan and Rothschild, Liverpool Univ., Thompson Yates and Johnson Lab. Rep. 7 (n.s.), p. 52.
 1907 *Xestopsylla gallinacea* Herrick, Jour. Econ. Ent., 1: 355.
 1910 *Echidnophaga gallinacea* Banks, United States Public Health Mar. Hosp. Ser., Bull. 30: 77.
 1914 *Echidnophaga gallinacea* C. Fox, United States Public Health Hyg. Lab., Bull. 97, Pl. XVI, fig. 29; Pl. XXII, fig. 72.
 1915 *Echidnophaga gallinacea* Illingworth, Jour. Econ. Ent., 8: 492.
 1925 *Echidnophaga gallinacea* C. Fox, Insects and Disease of Man, p. 131, fig. 59.
 1926 *Echidnophaga gallinacea* Parman, Jour. Econ. Ent., 19: 644.
 1928 *Echidnophaga gallinacea* Stewart, Cornell Univ. Agric. Exp. Sta., Mem. 101, p. 868.
 1929 *Echidnophaga gallinacea* Ewing, Manual External Parasites, p. 179, fig. 94.
 1929 *Echidnophaga gallinacea* Hasseltine, United States Public Health Ser., Rep. 44: 583.
 1929 *Echidnophaga gallinacea* Jordan, Nov. Zool., 35: 176.
 1931 *Echidnophaga gallinacea* C. Fox, United States Public Health Ser., Rep. 46: 574.
 1932 *Echidnophaga gallinacea* Stewart, Jour. Econ. Ent., 25: 164.
 1933 *Echidnophaga gallinacea* Stewart, Jour. New York Ent. Soc., 41: 253.
 1934 *Echidnophaga gallinacea* Shaftesbury, Jour. Elisha Mitchell Sci. Soc., 49: 248.
 1935 *Echidnophaga gallinacea* Vogel and Cadwallader, United States Public Health Ser., Rep. 50: 1953.
 1937 *Echidnophaga gallinacea* Jordan, Nov. Zool., 40: 283.

MALE. Preantennal region of the head with but two bristles which comprise the frontal row. Eye heavily pigmented, oval in shape. Maxilla short and broad, triangular in shape. Mandibles wide and prominent, deeply serrated (Plate II, fig. 4). Second segment of the antenna with three or four long bristles, some of which are about as long as the third antennal segment. Pronotum and mesonotum each with a single row of long bristles. Each abdominal tergite armed with at least one long bristle in the dorsal region. **MODIFIED SEGMENTS:** Clasper with two processes, one long with a number of bristles along the anterior margin, the other much smaller and narrower. Mov-

able finger rounded apically and curved toward the smaller process. Distally, the movable finger bears several bristles of which one is longer than the others. Manubrium long and slender. Penis long and broad, terminating in a curved point; spring not much longer than the penis and not completing a single turn. For further details concerning the structure of the male genitalia, see Plate II, fig. 3.

FEMALE. General structure and chaetotaxy essentially as in the male. Receptaculum seminis somewhat in the form of a question mark; much broader ventrally than dorsally. For further details concerning the structure of the female genitalia, see Plate II, figs. 1 and 2.

RECORDS. ALABAMA—Auburn, June, on "dogs," numerous specimens. ARKANSAS—Imboden, November 27, 1931, on same host, four females (B. C. Marshall). FLORIDA—Leon Co., April 13-15, 1926, on "quail," two females (H. L. Stoddard); Tallahassee, June 15, 1937, on "*Rattus alexandrinus*," female; July 12, 1937, on same host, male, three females; January 21, 1937, on same host, three females. GEORGIA—Newton, July 26, 1937, on "wharf rat," numerous specimens; April 1, 1937, on "*Vulpes fulva*," two females (B. V. Travis); July, 1936, on *Urocyon cinereoargenteus floridanus* Rhoads, female, two males (E. V. Komarek); July 8, 1936, on "*Mephitis elongata*," male, three females (Travis and Komarek); Beachton, December 31, 1927, on "Cooper's Hawk," two females (W. B. Bell); Camden Co., April 25, 1933, on "*Urocyon cinereoargenteus*," male (F. Harper); Nashville, December 5, 1935, on "rabbit," male, three females; May 12, 1936, on "gray squirrel," four females; Valdosta, October 22, 1935, on "rabbit," female; November 22, 1935, on same host, four females; November 29, 1935, on "roof rat," female (H. Hixson). NORTH CAROLINA—Wilmington, June 15, 1908, on "dog," five specimens (W. E. Merritt). SOUTH CAROLINA—Orangeburg, November, 1894, on "horses," numerous specimens (J. C. Hartzell, Jr.); Florence, June 16, 1935, on "jaybird," female (C. F. Rainwater). VIRGINIA—Virginia Beach, July 19, 1928, on "rat," two females (H. E. Ewing and C. East); Ocean View, May 29, 1938, on "cat," numerous specimens (P. W. Oman); Cape Henry, September 8, 1927, on "chicken," two females (J. Mullenfeld).

EASTERN HOSTS. "Horse," "Dog," "Cat," "Rat," "Wharf-rat," Roof-rat ("*Rattus alexandrinus*"), Gray Fox ("*Urocyon cinereoargenteus*"), Red Fox ("*Vulpes fulva*"), Skunk ("*Mephitis elongata*," "*Spilogale ambarvalis*," etc.), "Gray Squirrel,"

"Rabbit," "Coyote," Cooper's Hawk (*Accipiter cooperi* (Bona-parté)), Domestic Turkey (*Melagris gallopava*), "Deer," English Sparrow (*Passer domesticus domesticus* (Linnaeus)), Florida Bob-white (*Colinus virginianus floridanus* (Coues)), "Jaybird," "Quail," "Chicken."

EASTERN LOCALITIES. Alabama, Arkansas, Florida, Georgia, Kansas, Louisiana, Minnesota, Mississippi, Missouri, New York, North Carolina, Oklahoma, Pennsylvania, South Carolina, Texas, Virginia. (Tropical regions of the world.)

TYPE MATERIAL. Numerous specimens from the "domestic fowl" at Colombo, Ceylon. Location of the types not ascertained.

***Tunga penetrans* (Linnaeus)**

(Plate III, figs. 8, 9)

1758 *Pulex penetrans* Linnaeus, Syst. Nat. 10th Ed., p. 614.

1838 *Tunga penetrans* Jarocki, Zoology or Gen. Desc. Anim., p. 50, Pl. II, figs. 10-13.

1921 *Tunga penetrans* Rothschild, Ectoparasites, 1:129.

This species, which is commonly known under the various popular names (particularly "jigger" and "chigoe"), is an important pest in tropical and subtropical America but is not yet established in the United States. Some years ago Baker (1904, p. 374) suggested that it might be introduced into Florida, but no authentic record of such an occurrence has yet been made known. It may readily be separated from *E. gallinacea* by the absence of a patch of spinelets on the inner side of the hind coxa, and by the character of the head and genitalia (Plate III, figs. 8, 9).