NOTES ON HIPPOBOSCIDÆ

3. HIPPOBOSCIDÆ OF YUCATAN

BY J. BEQUAERT

Department of Tropical Medicine
Harvard University Medical School

The following notes are based mainly upon material obtained in 1929 and 1930 by the Expedition to Yucatan, organized by the Department of Tropical Medicine of Harvard Medical School, under the auspices of the Carnegie Institution of Washington, D. C., and under the leadership of Dr. George C. Shattuck. In Yucatan the Hippoboscidae are of peculiar interest, inasmuch as one species has been suspected or incriminated as the vector of a human disease.

Subfamily Olfersiinae

Olfersia coriacea van der Wulp

Olfersia coriacea van der Wulp, 1903, "Biol. Centr.-Amer.," Dipt., II, p. 430, Pl. XIII, figs. 2 and 2a (described doubtfully as ♀; according to Austen, both specimens seen by v. d. Wulp were males; in part: only the specimen from Mirandilla, Guatemala).

Pseudolfersia coriacea Austen, 1903, Ann. Mag. Nat. Hist., (7) XII, p. 265 (selects van der Wulp's male from Mirandilla as the holotype; states that the male from Presidio, Mexico, is *Olfersia propinqua* Walker). Aldrich, 1905, "Cat. North Amer. Dipt.," p. 656. Speiser, 1907, Ent. News, XVIII, p. 104.

Pseudolfersia meleagridis Lutz, Neiva and da Costa Lima, 1915, Mem. Inst. Osw. Cruz, VII, p. 179, Pl. XXVII,

fig. 3 (no sex given; on domestic turkey, *Meleagris gallopavo*, in Pernambuco and Sao Luiz do Maranhao; on *Tinamus solitarius* Vieillot in Minas Geraes or Espiritu Santo; all localities in Brazil).

Colonia Santa Maria (near Puerto Morelos), in the northern part of the Territory of Quintana Roo, May, 1929 (G. C. Shattuck). This specimen was received from a Maya hunter, who said he found it on an ocellated turkey, *Agriocharis ocellata* (Temminck). Territory of Quintana Roo ("Herrera, 1919, said to cause a disease in man."—U. S. Nat. Mus.).

I have also seen specimens from Peten, Guatemala (Oliver Ricketson, Jr.; as "bay-sore fly," received through Dr. Thomas Barbour); Uaxactun, Peten, Guatemala, off *Crax globicera* (Linnæus), April 15, 1931 (J. Van Tyne); Upper Chagres River, Panama, off turkey (U. S. Nat. Mus.); Rio Colorado, Bolivia, off *Penelope* sp. (W. M. Mann.—U. S. Nat. Mus.); and Pernambuco, Brazil, off turkey (received from Dr. Ad. Lutz as *P. meleagridis*.—U. S. Nat. Mus.).

The following characters may aid in separating *O. coriacea* from other closely allied species of *Olfersia*. Frons rather narrow, very little wider than an eye. Posterior orbits and postvertex about equally produced behind, the orbits short and divided from the hind margin of the postvertex by a very shallow sinus. Postvertex with a slight transverse depression, dividing it into a short, anterior, dull, alutaceous area and a much longer, posterior, smooth and shiny area. Fronto-clypeus not covering nearly the whole palpi; its apical, interantennal portion rather narrow and not striate; the free, terminal arms short and broad, not appreciably grooved above. First basal cell (*R*) long and narrow, nearly parallel-sided in its apical half; second basal cell (*M*) long, the second section of the fourth longitudinal vein (*M1+2*) being about as long as the first section of the fifth (*M3+Cu1*); third and fourth longitudinal veins (*R4+5* and *M1+2*) not setulose; first longitudinal

vein (*R*1) ending in the costa opposite or basad of the small anterior cross-vein (*r-m*).

I synonymize *Pseudolfersia meleagridis* with *O. coriacea* after carefully studying the description as well as a specimen (probably a cotype), at the United States National Museum, received from Dr. Ad. Lutz. In connection with the possible rôle of *O. coriacea* as a carrier of human leishmaniasis (see below), the statement by Lutz, Neiva and da Costa Lima that their *P. meleagridis* occasionally attacks man, is of particular interest.

Olfersia mexicana Macquart (1843, Mém. Soc. Sc. Agric. Arts Lille (1842), p. 435; 1843, "Dipt. Exot.," II, 3, p. 278. —No sex; Mexico), is possibly the same as *O. coriacea*. If the identity of these two species could be established beyond doubt, Macquart's name would have to be used.

The correct wild host or hosts of *O. coriacea* in Central and South America deserve to be more carefully investigated. Mr. J. Van Tyne's specimen from *Crax globicera* is the first Central American record for which the zoological identity of the host is beyond question. I am therefore under particular obligation to Mr. J. Van Tyne for the privilege of studying this and other hippoboscids collected by him on his recent trip to Guatemala.

In the Peninsula of Yucatan, there are four gallinaceous birds that might possibly serve as hosts to *O. coriacea*. (1) The ocellated turkey, *Agriocharis ocellata* (Temminck), "*pavo del monte*" in Spanish and "*Kutz*" in Maya (according to Gaumer), is perhaps the most common of the four and is particularly abundant in Quintana Roo. (2) The crested curassow, *Crax globicera* (Linnæus), usually called "*Pahuil*" by the natives of Mexico and Guatemala, is a much rarer bird, though occasionally seen in Quintana Roo.¹

¹ According to a note by the late Dr. G. F. Gaumer (quoted by Boucard, 1883, Proc. Zool. Soc. London, p. 459), the flesh of *Crax globicera* is highly valued as food by the Maya; but the bones are always carefully kept away from the dogs and cats, as they are said to be very poisonous. E. W. Nelson described the young of *C. globicera* as *C. chapmani*. He says that the Maya Indians call this bird the "*Kambul*," whereas they designate the adult as "*Bolonchan*" or "*Bolonchana*."

(3) The bare-throated guan, *Penelope purpurascens* Wagler, "cojolito" in Spanish and "Kosh" in Maya (according to Gaumer), is very rare in Quintana Roo. (4) The chacha or chachalaca, *Ortalis vetula pallidiventris* Ridgway, "Bach" in Maya, a much smaller bird than the others, is abundant, particularly in Quintana Roo.²

The main interest of these birds and their fly parasites lies in their possible connection with the etiology of "bay-sore" or human cutaneous leishmaniasis, a disease of man in the humid, densely forested areas of the Yucatan Peninsula (Territory of Quintana Roo and the southeastern part of the State of Campeche), British Honduras (Belize), and Guatemala (Peten). As a rule the sores are found on exposed parts of the body, and they are particularly frequent on the ears. It can hardly be doubted that some biting insect is the transmitter, but no experiments have as yet been published showing which particular species is involved. Various insects are blamed by the inhabitants of the infected regions. One opinion which enjoys much local popularity, in Yucatan and northern Guatemala, incriminates the bird-fly of the ocellated turkey or of the bare-throated guan. During my visit at Merida, Dr. Abalardo Lara N. showed me some specimens of the fly in question, in which I recognized *Olfersia coriacea*. He also stated that he had transmitted leishmaniasis through the bite of this fly and exhibited some photographs to support his claim.¹ This theory deserves, at any rate, to be investigated with care; even though it seems more likely that in Yucatan, as elsewhere in the New World, cutaneous leishmaniasis is transmitted by one or more species of *Phlebotomus*.

² I am under great obligations to Mr. Ludlow Griscom for valuable information concerning these birds. The Spanish names here given for the various gallinaceous birds apply only to Yucatan. In other parts of Central America they may be used for different birds. I have been unable to find out which species is known more specially as "faisan," a name sometimes heard in Yucatan.

¹ A discussion of the possible carriers of human leishmania sores in Central America has been given by Farfan y Lopéz, E. 1922. "La leishmaniosis americana o 'ulcera de los chicleros.'" (Merida, Yucatan), 27 pp. Page 13 of this pamphlet shows a reproduction of a photograph of *Olfersia coriacea*, in ventral and dorsal aspect.

Entomologists acquainted with the habits of the Hippoboscidae might perhaps object to the *Olfersia* theory of leishmaniasis that these flies, as a rule, are not prone to bite man after leaving their normal host. Thus C. M. Wenyon (1911, Parasitology, IV, pp. 292 and 299), in the course of his studies of human Oriental sore at Bagdad, found that the dog-fly (evidently *Hippobosca capensis* v. *Olfers*, although no name is given), will bite human beings, but that this is an uncommon occurrence. He was only bitten on two occasions, though he lived in close association with a number of dogs, all of which had many of these insects about them. Wenyon did not succeed in inducing these flies to feed on cases of Oriental sore in man. They very quickly died if kept in confinement away from a dog. It is possible, however, that certain species of Hippoboscidae attack man more readily than others. The European *Cratærina pallida* (Latreille), a common parasite of swifts, for instance, has been observed repeatedly in Germany biting human beings, even indoors, either during the day or at night in bed. Similar observations have been made in France.¹

Olfersia vulturis van der Wulp

Olfersia vulturis van der Wulp, 1903, "Biol. Centr.-Amer.," Dipt., II, p. 429, Pl. XIII, figs. 1-1a (♀ ?; off a vulture; Rio Sucio, Costa Rica). J. Bequaert, 1926, "Med. Rept. Hamilton Rice 7th Exp. Amazon," p. 240. Ferris, 1928, Ent. News, XXXIX, p. 36, figs. A-B (larva).

Chichen Itza, common on the black vulture, *Catharista urubu* (Vieillot), although not all birds are infested. One bird shot on June 1st was free of flies; another, examined the next day, had eight parasites. In Yucatan the black vulture is known as "*sapilote*" in Spanish and as "*Tchom*"

¹ See: Erich Hesse, 1919, Jl. f. Ornithologie, LXVII, p. 408-409; 1920, Zeitschr. Wiss. Insektenbiol., XVI, p. 33; 1929, *Loc. cit.*, XXIV, pp. 70-71. Also E. Christeller, 1924, *Loc. cit.*, XIX, p. 103; J. Guiart and Lesieur, 1912, Paris-Médical, Dec. 12; and F. Moutier, 1928, Ann. Paras. Hum. Comp., VI, pp. 105-106.

or "*Chom*" in Maya. One specimen of *O. vulturis* was also obtained off a sparrow-hawk at Chichen Itza, by Dr. J. Sandground, February 15, 1929.

I have fully discussed this species in 1926. I regard *O. vulturis*, *O. fossulata* Macquart and *O. spinifera* (Leach) as valid species, separable by structural characters.

Subfamily Melophaginae

***Lipoptena mazamæ* Rondani**

Lipoptena mazamæ Rondani, 1878, Ann. Mus. Civ. Genova, XII, p. 153 (♀; South and Central America; off "*Cervus mexicanus*"). Speiser, 1904, *Loc. cit.*, XLI, p. 334. Aldrich, 1905, "Cat. North Amer. Dipt.," p. 653. Ferris and Cole, 1922, Parasitology, XIV, p. 185, figs. 2A and 2E (♀ ♂). Ferris, 1930, Canad. Entom., LXII, p. 70. Falcoz, 1930, Encycl. Entom., B, Dipt., V (1929), p. 51.

Lipoptena depressa var. *mexicana* C. H. T. Townsend, 1897, Ann. Mag. Nat. Hist., (6) XX, p. 289 (♀ ♂; Paso de Telaya, Vera Cruz, Mexico; off white-tailed deer, *Cariacus virginianus* var. *mexicanus*); 1897, Trans. Texas Ac. Sci., II, 1, p. 41. Van der Wulp, 1903, "Biol. Centr.-Amer.," Dipt., II, p. 432. Speiser, 1904, Ann. Mus. Civ. Genova, XLI, p. 334. Aldrich, 1905, "Cat. North Amer. Dipt.," p. 653. Speiser, 1907, Ent. News, XVIII, p. 103. Bezzi, 1916, Natura, Riv. Sc. Nat., VII, p. 178.

Lipoptena depressa mazamæ Bau, 1930, Konowia, IX, p. 211, fig.

Lipoptena conifera Speiser, 1905, Zeitschr. Syst. Hym. Dipt., V, p. 354 (♀ ♂; off *Cariacus rufus* Ill. var. *simplicicornis* Ill., from South America, without more definite locality); 1908, Zeitschr. Wiss. Insektenbiol., IV, p. 304.

Lipoptena surinamensis Bau, 1930, Stettin. Ent. Zeitg., XCI, 2, p. 175 (♀ ♂; without host; Macaraibo, Surinam).

Chichen Itza, several females and males, off a "deer," February 10, 1930 (obtained from a native hunter by Dr. G. C. Shattuck).

It is unfortunately not possible to state whether the host of these parasites was the brocket or the Yucatan deer; possibly both animals harbor this *Lipoptena*. The brocket, *Mazama pandora* Merriam, "corzo" in Spanish and "Yuk" or "Yuk-keh" in Maya, has short, unbranched antlers in the male. The Yucatan deer, *Odocoileus toltecus* (H. de Saussure) (= *yucatanensis* Hays), "venado" in Spanish and "Keh" or "Kieh" in Maya, has, in the male, antlers with a few ramifications. Both are widely distributed in Yucatan and are known to occur near Chichen Itza. Ferris records *L. mazamæ* from *Mazama sartorii reperticia*, in Panama (collected by L. H. Dunn), and Bau from *Mazama nemorivaga*, in Bolivia.

I have also seen many specimens of *L. mazamæ* from "deer," obtained at Peten, Guatemala; Kartabo, British Guiana; and Manaos, Amazonas, Brazil. No structural differences can be detected among the four series studied. Rondani mentioned no locality for his type; but, since it came from Bellardi's collection and the host was given as "*Cervus mexicanus*," it was evidently obtained somewhere in Mexico.

My interpretation of *L. mazamæ* is the same as that of Ferris and Cole, who saw specimens from Yacuiba, Bolivia, and from Chiriqui Province, Panama. The species is distinct on structural characters from *Lipoptena depressa* (Say). On the other hand, Townsend's lengthy description of his var. *mexicana* fits, in all essential details, specimens of *L. mazamæ*. Color characters are not of specific value in this genus; they are liable to change in life after hatching, as well as after death, and they may differ according to whether the specimens are kept in a fluid or preserved dry. Moreover, Townsend's notes on the color were written largely from memory. One of the few structural features mentioned by Townsend is the shape of the male organ, which is said to be "moderately stout and blunt at tip." This would seemingly describe the "inner ring-like

piece" of the male genitalia of *mazamæ* as figured by Ferris and Cole.

So far as one can judge from Speiser's description, his *L. conifera* is likewise a synonym of *L. mazamæ*. The head is described as follows: "Der Kopf ist durch eine ganz ausserordentlich kurze Stirnstrieme charakterisiert, die wenig mehr ist als ein matter querer Spalt zwischen dem Scheiteldreieck und der sehr breiten Lunula." The unusually wide frontal lunule, with consequent shortening of the medio-vertex (or frontalia), must have been accidental, either due to the mode of preservation or to the incomplete retraction of the ptilinum within the lunule.

There is also nothing in Bau's description of his *L. surinamensis*, supposedly from Surinam,¹ that does not apply to our many specimens of *L. mazamæ* from Yucatan, Guatemala, British Guiana, and Brazil. Bau writes: "In der Bildung des zweiten Abdominal-Tergits gleicht diese Form den amerikanischen Arten *Lipoptena depressa* Say, var. *mexicana* Townsend, *mazamæ* Rondani und *conifera* Spieser. Die beiden ersteren haben auf dem membranösen Teil des Abdomens zwei kleine querliegende Chitinplättchen, welche der *L. surinamensis* fehlen. *L. mazamæ* ist auch kleiner, nur $2\frac{1}{4}$ bis $2\frac{1}{2}$ mm. lang." The length of dry specimens of *L. surinamensis* is given as 3.25 to 3.9 mm. in the female and about 3 mm. in the male. I am unable to find any trace of transverse chitinous plates on the membranous portion of the abdomen (dorsally) in my several lots of *L. mazamæ* (preserved in alcohol). In the Yucatan lot the females measure from 2.8 to 4 mm. Of course, in both sexes dry specimens give no correct idea of the size of a hippoboscid fly, and in the female the size also depends upon the condition of the larva contained in the abdomen.

¹ I have been unable to locate a locality "Macaraibo" on any of the South American maps I have seen. Perhaps the locality was really "Maracaibo," which, however, is in Venezuela.