

NOTES ON HIPPOBOSCIDÆ.

14. THE GENUS ECHESTYPUS SPEISER

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Echestypus Speiser

Echestypus Speiser, 1907, Wiss. Ergebn. Schwed. Zool. Exped. Kilimandjaro, II, pt. 10, p. 3; 1908, Denkschr. Med.-Naturw. Ges. Jena, XIII, pt. 1, p. 176.

Speiser described the genus as new in two different publications; but it should be dated from the first appearance in 1907, where it included only two species, *Lipoptena sepiacea* Speiser (1905) and *Echestypus parvipalpis* Speiser (1907). One of these must be the genotype and I select herewith as such the older species, *Lipoptena sepiacea*. In 1908, Speiser included *Lipoptena sepiacea* and *Echestypus binoculus* Speiser (1908); but not *E. parvipalpis*. Aldrich (1923, Insecutor Inscitiæ Menstr., XI, p. 77) selected "*E. binoculatus* Speiser" (misspelling of *binoculus*) as genotype; but, that species not being mentioned with the 1907 description, Aldrich's type designation is invalid.

Echestypus agrees with *Lipoptena* in all essential characters, save two, the absence of ocelli and the short or vestigial palpi. Neither of these characters is of particular phylogenetic importance in Hippoboscidæ, and I am inclined to regard *Echestypus* merely as a subgenus of *Lipoptena*. Within the limits of the latter genus, the length of the palpi varies considerably, being very short in some species.

The three species which I recognize in *Echestypus* agree also in the following characters, all of which, however, are found in one species or other of *Lipoptena*. Head and thorax dorsally with few, spaced setæ: one to six frontal bristles, none of them behind the eyes; one pair of vertical bristles; mesonotum on each side with a conspicuous curved

row of four to six short, dorsocentral setæ; three humeral bristles (two anterior, one posterior); two rows of notopleural setæ (before base of wing), those of the posterior row very long; two presutural bristles (one short and one long) close to the notopleurals; on each side two to five prescutellar bristles, the external ones placed close to the base of the wing, the single internal one very long, far from the others and seemingly in line with the dorsocentrals; scutellum with one or two pairs of apical setæ. Abdomen with sclerotized tergal plates as follows: a short basal plate, more or less fused with the first pleurite on each side (though generally much darker) and excised in the middle by a broad triangle, the apex of which extends as a narrow notch; hind margin of basal plate with a row of three to eight long setæ on each half, the disk either bare or with a few setæ mostly in a transverse post-median row; second to fourth tergites each with a more strongly sclerotized transverse plate near the hind margin, variable in size, the plate bearing a pair of distant setæ or a medially interrupted row of three to six setæ; most of fifth and sixth tergites strongly sclerotized, short, bearing one or two pairs of long setæ near the apex; the tergal area occupies about the median half of the dorsal surface, the remainder being covered by four partly sclerotized pleurites, which are even more developed ventrally than dorsally and bear scattered setæ (more numerous ventrally). Ventrally the abdomen has a strongly sclerotized basal crescent-shaped sternite, the disk partly covered with short, thick, almost spine-like setæ (two of these much longer in each apical corner); remainder of median ventral area not sclerotized, but soft and fairly uniformly covered with scattered short setæ. Setæ of sternum short, spine-like, few in number and placed more or less in transverse rows. Claws of all tarsi robust and slightly asymmetrical; apical spur of fore and mid tibia stout; fore coxa dorsally without retrograde spur, but with a long seta. As in *Lipoptena*, the wings break off apicad of the base, shortly after the adult hatches. I have seen the complete wing of *E. sepiaceus* (Fig. 2) and *E. paradoxus*. It is shaped as in *Lipoptena cervi* and has the same type of venation: only three well-developed longitudinal veins, apparently the first (R_1), third (R_{4+5}) and fifth (M_3+C_1); the sixth (2d An)

is incomplete; other veins are indicated by depressed (concave) lines; only one cross-vein, between the supposed third and fifth longitudinals, therefore probably a fusion of anterior basal cross-vein (M_3), anterior cross-vein (r-m) and portion of fourth longitudinal (M_{1+2}); the third longitudinal ends in the tip of the costa at an acute angle and without knob-like swelling; the costa is thickened only at the extreme base and between the tips of the first and third longitudinals. The alula is rudimentary; the halter well developed and shaped as in *Lipoptena*. The membrane bears uniformly scattered, exceedingly minute microtrichia.

It may be noted that the external morphology is extremely similar to that of the European *Lipoptena cervi* (Linnaeus) and the Cingalese *L. efovea* (Speiser), particularly in the arrangement of the sclerites of the abdomen and in the venation of the wing.

Echestypus is known at present only from the Ethiopian portion of the African continent (south of the Tropic of Cancer), where it occurs on various antelopes, *viz.*, on bushbuck and nyala (*Tragelaphus*), reedbuck (*Redunca*), oribi (*Ourebia*), waterbuck (*Kobus*), duiker (*Cephalophus* and *Sylvicapra*), steinbok (*Raphicerus*), springbok (*Antidorcas*) and kudu (*Strepsiceros*). The host relationships are more fully discussed under each species.¹

To some extent *Echestypus* is the Ethiopian representative of *Lipoptena*, although I have seen a true species of *Lipoptena* (with well-developed ocelli) off bushbuck and duiker in Uganda and the eastern Belgian Congo.

Four "species" of *Echestypus* have been described; but, after studying some 600 specimens, from 90 different lots and off more than a dozen hosts, collected throughout tropical and South Africa, I am able to recognize three species only. These are, moreover, very similar, as will be seen from the subjoined key. As I was unable to examine the types of the four described forms and as the original descriptions are scattered and inaccessible to the average entomologist, I have reproduced them in full.

¹Throughout this paper the nomenclature of the hosts is that of Glover M. Allen's recent "Checklist of African Mammals" (1939, Bull. Mus. Comp. Zoöl., LXXXIII).

KEY TO SPECIES

1. Palpi vestigial, not or barely visible from above beyond the anterior margin of the fronto-clypeus. Mediovertex nearly as long as or slightly longer than wide; inner orbits narrower than the eye; postvertex as long as or slightly shorter than mediovertex. Scutellum with two pairs of apical bristles. *E. paradoxus*.
Palpi short, but distinctly protruding beyond the anterior margin of the fronto-clypeus on the head seen from above, nearly half as long as the fronto-clypeus. 2.
2. Mediovertex as wide as long or slightly wider; inner orbits narrower than the eye; postvertex nearly as long as or slightly shorter than mediovertex. Scutellum with two pairs of apical bristles. *E. sepiaceus*.
Mediovertex longer than wide; inner orbits as broad as or broader than the eye; postvertex about half the length of mediovertex. Scutellum with one pair of apical bristles. *E. binoculus*.

1. *Echestypus paradoxus* (Newstead). Fig. 1.

Lipoptena paradoxa Newstead, 1907 (February), Ann. Trop. Med. Paras., I, p. 91, figs. 19-20 (♀; Kasongo, Belgian Congo; off *Tragelaphus scriptus*). Austen, 1909, Illustr. African Blood-Suck. Flies, p. 209. Bezzi, 1916, Natura, Riv. Sc. Nat., VII, p. 178.

Echestypus paradoxus D. Bruce, Hamerton, Mackie and Lady Bruce, 1911, Rept. Sleeping Sickn. Comm. Roy. Soc., XI, p. 228. C. W. Howard, 1912, Bull. Ent. Res., III, p. 218. S. A. Neave, 1912, Bull. Ent. Res., III, pp. 311, 314, 315, 320 and 322. Mason, 1916, Ann. Rept. Dept. Agric. Nyasaland for 1915-16, p. 19. Anderson, 1924, Kenya Med. Jl., Suppl. No. 1, p. 9, and Suppl. No. 2, p. 4. Bedford, 1927, 11th and 12th Repts. Dir. Vet. Res. South Africa, I, pp. 300 and 782. Ferris, 1930, Parasitology, XXII, pt. 3, p. 278, figs. 3 and 4 A-C (♀ ♂). Bedford, 1932, 18th Rept. Dir. Vet. Serv. An. Ind. South Africa, p. 421. Cuthbertson, 1937, Proc. Trans. Rhodesia Scientif. Assoc., XXXV, pt. 1, p. 33.

Eschestypus paradoxus Curson, 1928, South Afric. Jl. Nat. Hist., VI, pt. 3, p. 182.

Echestypus parvipalpis Speiser, 1907, Wiss. Ergebn. Schwed. Zool. Exped. Kilimandjaro, II, pt. 10, pp. 3 and 5 (♀ ♂; Mt. Kilimanjaro, Tanganyika Territory; off *Tragelaphus scriptus roualeyni*). Austen, 1909, Illustr. African Blood-Suck. Flies, p. 202. S. A. Neave, 1912, Bull. Ent. Res., III, p. 317. Morstatt, 1913, Der Pflanze, IX, p. 509. Bezzi,

1916, *Natura*, Riv. Sc. Nat., VII, p. 178. Falcoz, 1930, *Encyclop. Entom.*, B, Diptera, V (1929), p. 52 (♀ ♂).

Previous Records. — Belgian Congo: Kasongo, types, off *Tragelaphus scriptus*; Newstead described the species from an "antelope", but stated that "the same host also harboured a number of ticks. (*q. v.*)" These ticks, from Kasongo, are listed in his paper (p. 100) as *Rhipicephalus nitens* from *Tragelaphus scriptus*. — Uganda: Singo, off *Tragelaphus scriptus* (Bruce *et al.*, 1911). — Kenya Colony: Makindu, off *Strepsiceros imberbis* (Neave, 1911). — Tanganyika Territory: Mt. Kilimanjaro, types of *E. parvipalpis*, off "*Tragelaphus roualeyni*"; this name is now used for the South African race of *T. scriptus*; the type host of *E. parvipalpis* was probably the East African race *T. scriptus masaicus* Neumann (Syn.: *T. sylvaticus meruensis* Lönnberg) (Speiser, 1907). — Northern Rhodesia: Msoro's, 50 miles W. of Ft. Jameson, off *Tragelaphus scriptus* (Neave, 1912); 35 miles E. of Ft. Jameson, off *Strepsiceros strepsiceros* (Neave, 1912). — Southern Rhodesia: Gatooma, Hartley District, off *Sylvicapra grimmia*; Inyati, Matabeleland, off *Sylvicapra grimmia* (both Cuthbertson, 1937). — Nyasaland: Near Kota-Kota, off *Tragelaphus scriptus* (Neave, 1912); off bushbuck [= *Tragelaphus scriptus*] and warthog, without more definite locality (Mason, 1916); the warthog appears very questionable as a host. — Bechuanaland Protectorate: Sekukuniland, off *Tragelaphus scriptus sylvaticus* (Bedford, 1927 and 1932). — Transvaal: Pietersburg District, off *Strepsiceros strepsiceros* (Bedford, 1927 and 1932). — Zululand: Ubombo Flats, off *Tragelaphus angasii*; Ntambanana, off *Tragelaphus scriptus sylvaticus* (erroneously recorded in 1927 as off *Redunca fulvorufula*); Emakosini, off *Redunca arundinum*; Umfolosi, off *Sylvicapra grimmia*; without more definite locality, off *Strepsiceros strepsiceros* (all from Bedford, 1927 and 1932). — Portuguese East Africa: Pongwe Valley; tendos [?dembos] of Urema, Gorongozo Province; forest of Inhaconde, 350 m., Gorongozo Province (all without host, from Falcoz, 1930); C. W. Howard's (1912) record off an owl is open to question and probably due to an error in labelling.¹

¹Two specimens, collected in Portuguese East Africa by C. W. Howard, are at the U. S. National Museum, labelled "from *Sylvicapra grimmia*."



Fig. 1. *Echestypus paradoxus* (Newstead). Female, Elisabethville, Belgian Congo. Dorsal (right) and ventral (left) view.

Specimens Examined. — Belgian Congo: Luofu, Kivu District, off *Tragelaphus scriptus* (J. P. Chapin); Rutshuru, Kivu District, off *Tragelaphus scriptus* (J. Bequaert); Katofio, Katanga, off *Sylvicapra grimmia* (B. Bennett); Elisabethville, Katanga, off *Sylvicapra grimmia* (J. De Riemaecker; L. Van den Berghe); Kasepa River near Elisabethville, off *Sylvicapra grimmia* (J. De Riemaecker); Malenda River (a tributary of the Bushibila River), near Elisabethville, off *Sylvicapra grimmia* (J. De Riemaecker); Kilwa, on Lake Moero, off *Sylvicapra grimmia* (L. Van den Berghe); Kapiri, Katanga, without host (Congo Mus.); Kibombo, Manyema, off *Tragelaphus scriptus* (J. Bequaert); Doruma, Uele, off an antelope (C. Henrard); Nyanza, Urundi (H. C. Raven). — Uganda: Entebbe, off *Tragelaphus scriptus* (R. W. M. Mettan); Stogem, off *Tragelaphus scriptus* (C. R. S. Pitman); West Nile, off *Tragelaphus scriptus* (C. R. S. Pitman); without more definite locality, off *Tragelaphus scriptus* (J. O. Shircore); Toro, without host (Congo Mus.); Matuba Island, Lake Victoria (G. H. E. Hopkins). — Ethiopia: Addis Abeba, off *Tragelaphus scriptus*. — Kenya Colony: Zuwani, without host (L. Bayer); Guaso Nyiro, off *Strepsiceros imberbis* (W. L. Smith). — Tanganyika Territory: Kilossa, off *Tragelaphus scriptus* and *Sylvicapra grimmia* (A. Loveridge; these specimens were erroneously recorded as *Hippobosca capensis* in Proc. Zool. Soc. London for 1923, p. 734). — Angola: 80 miles from the coast, off *Strepsiceros strepsiceros* (Brit. Mus.). — Southern Rhodesia: Matetsi, Wankie District, off *Strepsiceros strepsiceros* (R. H. R. Stevenson). — Nyasaland: Maperera Stream, Lower Shire River, off *Tragelaphus scriptus* (P. le Touzel Chapman); Henga River, and Kayuni, N. Nyasa, off "gawpi" (T. B. Davey); Karonga, without host (W. Hood-Dye); Tangazi River, Namulambo, Ruo District, off *Taurotragus oryx pattersonianus* and *Strepsiceros strepsiceros* (Rodney C. Wood); Chikonje, Ruo District, off *Strepsiceros strepsiceros* and *Tragelaphus scriptus* (Rodney C. Wood); Ruo District, off *Aepyceros melampus*, *Sylvicapra grimmia*, and *Tragelaphus angasii* (Rodney C. Wood). — Transvaal: without more definite locality, off *Tragelaphus scriptus*; Guernsey, District Pilgrim's Rest, off *Strepsiceros strepsiceros* (R. du Toit). — Zululand: Ubombo Flats, off *Tragel-*

aphus scriptus sylvaticus (H. H. Curson) and off *Tragelaphus angasii*; Umfolosi, off *Sylvicapra grimmia*; White Umfolosi River, off *Tragelaphus scriptus sylvaticus* and *Kobus ellipsiprymnus* (H. H. Curson); Lower Umfolosi River, off *Tragelaphus angasii*, and *T. scriptus sylvaticus* (H. H. Curson); Umkuzi River, off *Tragelaphus scriptus sylvaticus* (H. H. Curson). — Cape Province: Port Elizabeth, without host (Brit. Mus.); if the locality label is to be trusted, this specimen was possibly taken from some animal in captivity.

Host Relationships. — There are now reliable records of *E. paradoxus* from nine distinct antelope hosts. The bushbuck, *Tragelaphus scriptus* (Pallas), is by far the most common host. It is found over practically the whole of Africa south of the Sahara, in several races. G. M. Allen (1939) recognizes 27 valid races and lists many more synonyms. The nyala, *Tragelaphus angasii* Gray, is restricted to south-eastern Africa. The kudus are closely related to the foregoing, from which some authors do not separate them generically. The lesser kudu, *Strepsiceros imberbis* Blyth, is restricted to Northeast Africa. The greater kudu, *Strepsiceros strepsiceros* (Pallas), occurs throughout the savanna areas of Africa south of the Sahara. Both are frequent hosts of *E. paradoxus*. The duiker, *Sylvicapra grimmia* (Linnaeus), also a common host, has about the same distribution as the greater kudu. The following four hosts are perhaps more accidental: the reedbuck, *Redunca arundinum* (Boddaert); the eland, *Taurotragus oryx pattersonianus* Lydekker; the impalla, *Aepyceros melampus* (Lichtenstein); and the waterbuck, *Kobus ellipsiprymnus* (Ogilby). These antelopes are found in the savannas of South, Central and East Africa. The two anomalous records of warthog and owl seem wholly unreliable.

Distribution. — *E. paradoxus* is reliably known in the wild state from Ethiopia, Uganda, the eastern and south-eastern Belgian Congo, Kenya Colony, Tanganyika Territory, Nyasaland, Northern Rhodesia, Southern Rhodesia, Angola, Bechuanaland, Transvaal, Portuguese East Africa and Zululand. It is definitely an insect of the savanna and plains country of East, Central and South Africa, avoiding

the Rain Forest of the Congo Basin, as well as West Africa proper.

Synonymy. — The types of *E. paradoxus* are at the Liverpool School of Tropical Medicine. Although I have not seen them, there can be no doubt that the species here called *paradoxus* is the one described and figured by Newstead and later figured by Ferris (1930) under the same name.

Speiser evidently could not have been acquainted with Newstead's *paradoxus*, when he erected his genus *Echestypus*. There seems to be no reason why the three species he knew should not be the same as those recognized in the present paper. Both his *E. sepiaceus* and *E. binoculus* may, I believe, be recognized with certainty from the descriptions, as shown in the sequel. Hence, *a priori*, Speiser's third species, *E. parvipalpis*, may be Newstead's *paradoxus*, particularly in view of the fact that this is the most common and most widely distributed of the three. The types of *E. parvipalpis* are at the Stockholm Museum and I have not seen them. The statement about the unusually short palpi clearly applies only to *E. paradoxus* and the remainder of the description also fits this species better than either of the others.

The descriptions of *E. paradoxus* and *E. parvipalpis* were published the same year, but that of *paradoxus* certainly appeared first. The issue of the Ann. Trop. Med. Paras., containing the description, was dated February 1st. The paper on the Diptera Pupipara of the Kilimanjaro Expedition, by Speiser, was first recorded at the meeting of April 10, 1907, of the Stockholm Academy of Sciences (Kungl. Svenska Vetenskapsakad. Årsbok for 1908, p. 33).

Characters. — In addition to the features mentioned in the key, *E. paradoxus* is characterized by the slightly more developed chetotaxy; there is usually one more dorsocentral and the disk of the basal tergal plate bears a number of setæ, mostly in one oblique row. The second to fourth tergal sclerotized plates of the abdomen are rather smaller in the female than in the other species, although their anterior limits are poorly defined; moreover, in the male there are only four sclerotized tergal plates (II to V) behind the basal plate (I). The hind margin of the crescent-shaped basal sternite of the abdomen forms a shallow, semi-elliptical

curve. The wing, which I have seen in a male from Ruo, Nyasaland, does not differ from that of *E. sepiaceus*.

Original description of *E. paradoxus*: "Female. — Specimens preserved in Canada balsam and alcohol are red-brown inclining to orange-brown at the sides of the abdomen; claws black; base of abdomen with a bilateral patch of darker chitin, the median area of the remaining segments also with darker markings, but these are both irregular and inconstant in the preserved examples. Head as wide as the anterior part of the thorax; ocelli absent. Mouth parts rudimentary. Outer margin of eyes with a double series of spinose hairs. Thorax narrower in front than behind, with a submedian series of about nine long spinose hairs forming a curved line, and a short submarginal series of usually four similar ones terminating opposite the insertion of the mid legs; posterior margins with four long spinose hairs on either side of the scutellum; the last-named organ is also furnished with four similar hairs. Abdomen short ovate, almost sub-circular, with numerous spinose hairs arranged as shown in the figure. Venter with numerous short spinose hairs; median convex area with numerous minute equidistant tubercles bearing slender spinose hairs, the spaces between the tubercles finely but strongly rugose. Legs short, stout, sparsely clothed with hairs of varying lengths and varying degrees of thickness; the posterior pair not extending beyond the tip of the abdomen; tibial spine to anterior and mid legs stout; tibial spine to posterior legs long, slender; pulvillus broadly dilated from the middle outwards, finely spinose; feather-bristle strongly spinose; the upper surface with only one series of spines, the inner with two or three; ungues very faintly and irregularly toothed on the inner margin. Length 4 mm.; width of abdomen 2 mm. The absence of ocelli in the female is rather remarkable. There is also an almost entire absence of external mouth parts, including the labial sheath; the only indication of these organs being a minute truncated cone, the exact nature of which could not be determined in the limited supply of material."

Original description of *E. parvipalpis*: "Länge 4-5 mm., Mundrand-Scutellum 1.6 mm. Farbe braun in verschiedener Schattierung, am Hinterleib die weichhäutigen Teile weisslich gelb. — Kopf breiter als lang, der Clypeus etwas länger

als das vordere Drittel, die matte Stirnstrieme länger als breit, die Augen gross, auf den Orbiten je 2 Borsten, eine stärkere nahe dem oberen Ende, neben dem Scheiteldreieck, eine kürzere in der Mitte etwas nach auswärts von der grössten Konvexität der Orbita. Fühler ohne Besonderheiten, die aus den zusammenliegenden Maxillartastern gebildete Rüsselscheide ganz auffallend kurz, nur mit den kurzen Börstchen, mit denen sie besetzt ist, über den Vorder- rand des Clypeus hinausragend, kaum länger als an der Basis breit. Thorax in der allgemeinen Konfiguration wie bei *Lipoptena* und *Echestypus* sonst. Die mit 3 kräftigen Borsten besetzte Schulterschwiele ist nicht durch eine so deutliche Naht abgegrenzt wie bei *Echestypus* spec. typic., jederseits der Längsnaht stehen 5 Borsten in etwa hyperbolisch gekrümmter Reihe, auf den kurzen Scutum mesonoti jederseits 4, auf den Pleuren vor der Flügelwurzel 2 Reihen von je 4 Borsten, die vorderen kürzer, die hinteren länger. Scutellum mit 4 Borsten, zu denen bisweilen noch eine überzählige fünfte an einer Seite der Vierergruppe kommt. Flügelstumpfe mit kaum mehr erkennbaren Rest von Geäder, Halteren weisslich gelb, gross und voll entwickelt. Abdomen in der allgemeinen Konfiguration mit *Echestypus* spec. typ. übereinstimmend. Das erste Tergit als ein Paar dunkelbrauner Platten auf den weicheren zweiten liegend, jederseits nahe dem Hinterrande mit 4 dünnen kurzen Börstchen. Die Hinterrand des zweiten in der Mitte tief und spitz eingebuchtet, in dieser Bucht jederseits 5 lange ziemlich kräftige Borsten, die Seiten weitläufig mit kürzeren bedeckt. Dahinter liegen 4 derber chitinige Tergite, denen 3 weichere, deutlich abgegrenzte Pleurite entsprechen. Die Tergite sind noch eigentümlich konfiguriert: III ist fast ganz, mit Ausnahme einer ganz weisslich häutigen Partie, die den spitzen Winkel im II Tergit ausfüllt, derb chitinig, quengerunzelt und dunkelbraun, am Hinterrande in der Mitte liegt aber eine etwa halbelliptische heller braune Platte, an deren Hinterrande wieder jederseits 2 schwache Börstchen stehen. Sonst stehen Börstchen nur noch an den Seiten des Tergits, jederseits 3 am Hinterrande und 2 etwa auf der halben Länge davor. Die beiden folgenden sind ähnlich, die dunkle Chitinisierung ist aber mehr auf die Seiten beschränkt, das helle besonders herausgehobene Feld

ist bei IV schon etwas, bei V noch wieder breiter, trägt bei IV jederseits 2, bei V jederseits 1 Börstchen, auf den Seiten bei IV nur noch 3, bei V keine Börstchen mehr. Tergit VI, dem kein eigentliches Pleurit mehr entspricht, ist eine quere Platte, die nahe ihren Hinterecken jederseits 3 Borsten trägt, und auf ihrer Fläche zwei dunkler chitinige Seitenflecken erkennen lässt. Das nun folgende Analsegment, durch den Besitz von 2 Stigmenpaaren als VII + VIII gekennzeichnet, ist nackt mit Ausnahme eines Kranzes von Borsten um die Analöffnung. Die dem III Tergit entsprechende Pleuritplatte ist gleichmässig weitläufig kurz beborstet, die dem IV Tergit entsprechende nur in der vorderen Hälfte, die dem V entsprechende nackt mit Ausnahme von 2 Borsten am Rande. Diese Angaben über die Pleuritplatten beziehen sich auf die Ansicht *a tergo*; auf der Bauchseite sind sie alle ebenso wie die nicht segmentarisch abgeteilte Ventralfläche gleichmässig kurz beborstet. Das dunkelbraune Basalsternit kann man etwa als ein gleichseitiges Dreieck beschreiben, dessen hintere Ecken als halbrunde (sie sind in sich etwas gewölbt) Zapfen soweit nach hinten vorgezogen sind, dass am Hinterrande ein halbkreisförmiger Ausschnitt entsteht. Der Hinterrand ist ganz mit dornartig kurzen Borsten besetzt, ebenso die Zapfen selber und ihr Seitenrand, während die Basishälfte nur wenige schwache Borsten aufweist. — Diese bisher beschriebenen Verhältnisse sind bei ♂ und ♀ ganz gleich, Abweichungen ergibt nur die Genitalregion. Hier wird beim ♂ die Genitalöffnung von zwei sanften, mit den gewöhnlichen Börstchen der Ventralfläche besetzten Höckerchen flankiert während beim ♀ vor der Genitalöffnung eine breite fingernagelförmige, etwas derber chitinige Platte liegt, die sehr dicht mit ziemlich feinen Börstchen, in etwa 3-4 Reihen vor ihrem Hinterrande besetzt ist. Vor dieser Platte liegt noch eine kleinere, die offenbar dem Hinterrande eines (VI?) Sternites entspricht, dunkel gelbbraun und mit 3-4 Borsten besetzt, vor dieser eine unregelmässig verdoppelte Reihe Borsten, die keiner Segmentgrenze entsprechen. Die Beine sind kräftig, die Hüften stark beborstet, die Vorder- und Mittelschenkel etwas verdickt, auf den Hinterschenkeln steht auf der Vorderseite am Anfang des letzten Drittels eine kräftige auffallende Borste. Die Tibien sämtlich auf der Oberseite (dor-

sal) fast kahl und nur ventral mit kräftigen Borsten besetzt." ♂ ♀.

2. *Echestypus sepiaceus* (Speiser). Figs. 2 and 3.

Lipoptena sepiacea Speiser, 1905, Zeitschr. Syst. Hym. Dipt., V, p. 353 (♀; Caffraria; and Witu, Lamu and Wangi, Kenya Colony; no host). Bezzi, 1908, Bull. Soc. Ent. Italiana, XXXIX, (1907), p. 198.

Echestypus sepiaceus Speiser, 1907, Wiss. Ergebn. Schwed. Zool. Exped. Kilimandjaro, II, pt. 10, p. 3; 1908, Denkschr. Med.-Naturw. Ges. Jena, XIII, pt. 1, pp. 176 and 178. Austen, 1909, Illustr. African Blood-Suck. Flies, pp. 187 and 196. H. H. King, 1911, 4th Rept. Wellcome Res. Lab. Khartoum, vol. B, p. 126, Pl. VI, fig. 5 (♀). S. A. Neave, 1912, Bull. Ent. Res., III, p. 320. Bezzi, 1916, Natura, Riv. Sc. Nat., VII, p. 178. W. B. Johnson, 1918, Nigeria, Ann. Med. Sanit. Rept. N. T. Prov. for 1917, p. 165. Davey and Newstead, 1921, Ann. Trop. Med. Paras., XV, p. 461. Anderson, 1924, Kenya Med. Jl., Suppl. No. 1, p. 9. Bedford, 1927, 11th and 12th Repts. Dir. Vet. Res. South Africa, I, p. 782; 1932, 18th Rept. Dir. Vet. Serv. An. Ind. South Africa, p. 421.

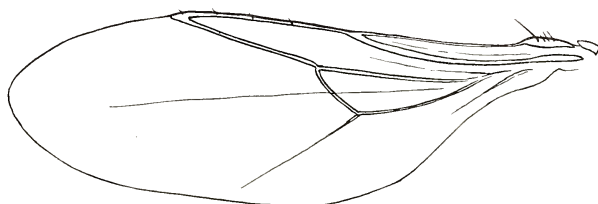


Fig. 2. Wing of *Echestypus sepiaceus* (Speiser), female, Bulukatoni, Uganda.

Eschetypus sp. J. J. Simpson, 1914, Bull. Ent. Res., V, pp. 24, 25, 30 and 35.

Previous Records. — Gold Coast: Sawla, off duiker (*Cephalophus* sp.); Banda N'Kwanta, off "red-flanked duiker", *Cephalophus rufilatus*; Bandowa, off "oribi", *Ourebia ourebi*; all three localities in the savanna country north of the Volta River (Simpson, 1914; as *Eschestypus* sp.; I have seen these specimens). — Anglo-Egyptian Sudan: Kio, without host

(King, 1911). — Kenya Colony: Witu, Lamu and Wangi, without host, cotype.—Nyasaland: Upper Shire River, south of Lake Malombe, off *Strepsiceros strepsiceros* (Davey and Newstead, 1921). — Cape Province: Caffraria, without host, cotype.

Specimens Examined. — Gold Coast: Sawla, off *Cephalophus* sp.; Banda N'Kwanta, off *Cephalophus rufilatus*; Bandewa, off *Ourebia ourebi quadriscopa*; Guripe, off *Cephalophus* sp. (all J. J. Simpson). — Anglo-Egyptian Sudan: Darraba, Dinder River, off *Ourebia ourebi montana* (G. M. Allen); Bongo, River Nile, Equatoria, off Abyssinian blue duiker, a race of *Cephalophus caerulus* (Neal Weber). — Uganda: Bulukatoni, West Nile, off *Tragelaphus scriptus* (C. R. S. Pitman).

Host Relationships. — *E. sepiaceus* has been definitely recorded from five distinct antelope hosts. The red-flanked duiker, *Cephalophus rufilatus* Gray, is strictly West African (Upper Guinea to northeastern Belgian Congo). The blue duiker, *Cephalophus caerulus* (Ham. Smith), occurs in several races in South and East Africa, as far north as the eastern Sudan. The distribution of the bushbuck, *Tragelaphus scriptus* (Pallas) and of the greater kudu, *Strepsiceros strepsiceros*, are discussed under *E. paradoxus*, as these antelopes harbor both species of *Echestypus*. The ouribi, *Ourebia ourebi* (Zimmermann), occurs in several races in the savannas of most of Africa south of the Sahara.

Distribution. — *E. sepiaceus* is now known with certainty from the Gold Coast, the Anglo-Egyptian Sudan, Uganda, Kenya Colony and Nyasaland. The only record for South Africa proper is based on the old specimen from "Caffraria", which Speiser included among the types. Perhaps it might be well to examine this fly more carefully, to see whether it is strictly cospecific with the cotype from Kenya Colony.¹ Like *E. paradoxus*, *E. sepiaceus* is evidently an insect of the savanna and plains country of Central and East Africa, but it extends much farther west, across the Sudan. It should be looked for in French Guinea and Senegambia.

Synonymy. — *E. sepiaceus* was originally based upon two

¹ In case the Caffraria specimen was of a different species, I herewith restrict the name *sepiaceus* to the form represented by the type from Witu, Lamu and Wangi.



Fig. 3. *Echestypus sepiaceus* (Speiser). Female, Bulukatoni, Uganda. Dorsal (right) and ventral (left) view.

females at the Berlin Museum, one dry, labelled "Caffraria, Drège"; the other in alcohol, labelled "Witu, Lamu u. Wangi 23/8, 95, Denhardt." I have not seen the types. That Speiser's and my *sepiaceus* are the same is shown by the following statements in the original description: "Stirns- trieme etwas breiter als lang. . . . Maxillarpalpen kurz." It is further confirmed by the comparison drawn by Speiser (1907), in a key, between *E. sepiaceus* and his *E. parvipalpis* (= *paradoxus* Newstead).

Characters. — In addition to those given in the key, the chetotaxy is somewhat less developed than in *E. paradoxus*, there being usually one dorsocentral less, while there is no transverse row of setae on the disk of the basal tergal plate. The second to fourth tergal sclerotized plates of the female are larger than in *E. paradoxus*. The hind margin of the crescent-shaped basal sternite of the abdomen forms a deep semi-circular curve. The claspers (or parameres) of the male genitalia are stronger than in *E. paradoxus*.

Original description of *E. sepiaceus*: "♀. Länge 3.8-4.2 mm.; Mundrand-Scutellum 2.2 mm. Russbraun mit etwas helleren Vorderbeinen und Schenkelwurzeln und graubraunem Abdomen. Kopf rundlich mit grossen Augen, die wenig schmaler als hoch sind. Stirnstrieme etwas breiter als lang, Lunula ohne Grübchen, heller lederbraun abgesetzt. Clypeus am Vorderrande ebenfalls heller braun, mit einer feinen Mittellinie. Maxillarpalpen kurz. Thorax auf seinem vorderen Abschnitte etwas heller braun als hinten. Skulptur und Beborstung wie gewöhnlich. Metasternum halb so lang als Mesosternum. Beine mehr oder weniger hell kastanienbraun mit dunkeln Knien und Tarsengliedern. Abdomen ähnlich dem von *L. cervi* L. Das erste Tergit wie gewöhnlich nur in der Form zweier derberer Platten zu beiden Seiten der Hinterleibswurzel auf dem zweiten darauf liegend. Dieses ist weniger derb als bei *L. cervi* L., mit geschwungenem Hinterrande, in der Mitte eingezogen. Das dritte Tergit ist länger als bei *L. cervi* L. Es ist an seinem Vorderrande, der sich an den Ausschnitt des Basalsegments 1 und 2 anlegt, nur schwach, am Hinterrande in einem rechteckigen queren Stück derb chitinisiert und dieses Rechteck entspricht den ebenso gestalteten, dahinter liegenden 3 folgenden Tergiten. Das Basalsternit ist an seinem

Hinterrande so tief ausgebuchtet, dass es nur aus zwei zungenförmigen, vorne in ihrer eigenen Breite zusammenhängenden, divergierenden Lappen besteht. Sonst ist die Ventralfläche gleichmässig beborstet und nur vor der Genitalöffnung ein wenig derber bräunlich chitinisiert."

3. *Echestypus binoculus* Speiser. Fig. 4.

Echestypus binoculus Speiser, 1908, Denkschr. Med.-Naturw. Ges. Jena, XIII, pt. 1, p. 176, fig. (♀ ♂; Kalahari; off *Raphicerus campestris*). Bezzi, 1916, Natura, Riv. Sc. Nat., VII, p. 178. Bedford, 1932, 18th Rept. Div. Vet. Serv. An. Ind. South Africa, p. 420.

Echestypus binoculatus "Speiser" Aldrich, 1923, Insecutor Inscit. Menstr., XI, p. 77 (error for *binoculus*).

Previous Records. — Kalahari: Without more definite locality, off *Raphicerus campestris*, types. — Cape Province: Middelburg, off *Antidorcas marsupialis* (Bedford, 1932).

Specimen Examined. — Orange Free State: Hoopstad District, one female, off *Raphicerus campestris* (R. du Toit).

Host Relationships. — The few specimens known were taken from steinbok, *Raphicerus campestris* (Thunberg) and springbok, *Antidorcas marsupialis* (Zimmermann), both small South African antelopes. *Antidorcas* reaches southern Angola, while *Raphicerus* extends farther north in East Africa, to northern Tanganyika Territory.

Distribution. — This rare species is known only from the Kalahari, the western Orange Free State and the west-central part of Cape Province. When steinbok and springbok are more carefully examined, the range of the parasite will no doubt be extended.

Synonymy. — *E. binoculus* was described from two males and five females, from the Kalahari. I have not seen the types and I do not know where they have been deposited. The species is, however, easily recognized from the original description and figure.

Characters. — I have only seen one female, received through the kindness of Dr. R. du Toit. The characters given in the key are taken from this specimen. In addition, it may be noted that the chetotaxy is more reduced than in either of the other species: there is only one pair of apical



Fig. 4. *Echestypus binoculus* Speiser. Female, Hoopstad District, Orange Free State. Dorsal (right) and ventral (left) view.

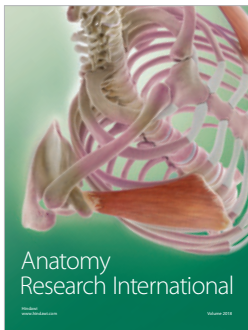
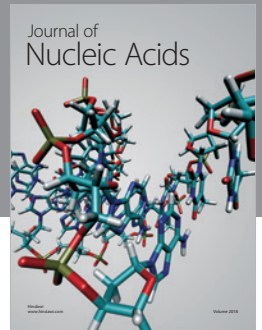
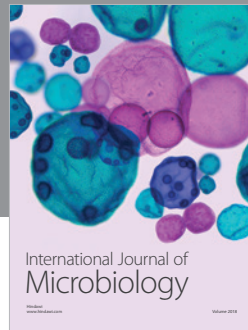
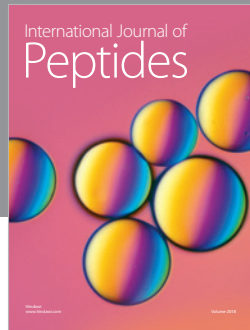
scutellar bristles and the second to fourth median tergal plates bear only one bristle on each side. These tergal plates are, moreover, larger than usual.

Original description of *E. binoculus*: "Länge 3.5-4.5 mm., Mundrand-Hinterrand des Scutellum 2 mm. Kastanienbraun mit einigen helleren Teilen am Kopf, an der Basis der Schenkel und den Schulterecken, die weichhäutigen Teile des Abdomens hell-umberbraun. Kopf rundlich, mit nur wenig verschmälerten Augen, die etwa $1\frac{1}{2}$ mal so hoch wie breit sind. Orbiten sehr breit, fast so breit wie die Augen. Stirnstrieme etwas länger als breit. Lunula ohne Grübchen. Clypeus heller als der übrige Kopf, mit einzelnen braunen Querlinien und einer noch etwas helleren vertieften Mittellinie, die hinten, mitten zwischen den Fühlern, in einem Grübchen endet. Maxillarpalpen, die die Rüsselscheide bilden, kurz. Thorax dorsal wie ventral in Bau und Behaarung sich fast ganz an *Lipoptena* anschliessend. Scutellum mit einem Paar Borsten. An den Beinen fallen die Knie durch etwas dunkleres Braun auf. Ueber Flügelstummel und Halteren siehe die Gattungsbeschreibung. Abdomen bei ♂ und ♀ fast ganz gleich konfiguriert, nur dass beim ♂ die Segmentgrenzen auch ventral ziemlich deutlich sind, während sie beim ♀ hier verwischt sind. Das 1. Tergit ist nur durch 2 derbere Chitinplatten in dem 2. Tergit markiert. Dieses 2. Tergit ist nicht so derb wie bei *Lipoptena*, der Hinterrand bogenförmig, median aber ist er noch bis fast auf seine halbe Länge von hinten her durch eine schmale Kerbe gespalten. Dahinter folgen, den Hinterrändern der Tergite 3-6 entsprechend, 4 unter sich nach Länge und Breite fast ganz gleich gestaltete Chitinplatten; bei den 3 ersten davon ist der vordere Rand nicht gerade, sondern in der Mitte zipfel- oder zahnartig nach vorn vorgezogen. Diese 3 Platten tragen nahe ihrem Hinterrande jederseits eine Borste, die 4., vorn geradrandige bisweilen jederseits 2. Hinter ihr folgt ein Paar am Hinterrande mit vielen Borsten besetzter, fast quadratischer Platten, die zusammen das 7. Tergit repräsentieren; dahinter das weiche Analsegment. Ventral ist ausser dem Basalsegment keinerlei derbere Chitinisierung zu bemerken. Das Basalsternit ist schmal, besteht, (ähnlich wie bei *Echestypus sepiaceus* m.), fast nur aus 2 schmalen, zungenförmigen divergierenden Lap-

pen, die median an ihrer Vereinigungsstelle sich so weit verbreitern, dass das Segment median beim ♀ etwa $1\frac{1}{2}$ mal, beim ♂ fast zweimal so breit (recte lang!) ist wie an den Seiten. Die übrigen Sternite kennzeichnen sich durch etwas dunkleres Chitin und die Stellung der Borsten. Beim ♂ steht jederseits der Genitalöffnung eine kleine, kaum erhabene, mit dünnen Borsten besetzte Warze." ♀ ♂.

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