New records and species of biting insects from the Ethiopian region

by

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PHLEBOTOMINAE.

In 1930 Sinton gave a list of the African sandflies and in 1931 Theodor published a similar list. Theodor recorded 20 species which included the Mediterranean fauna as well. Since that date a large number of new species has been described. We have thought, therefore, that it would serve a useful purpose to give an up to date catalogue of the purely Ethiopian fauna which now includes over 40 species. We do not give exhaustive references but only those which may be regarded as important for identification.

For some reason, sandflies have rarely been collected in Southern Africa and, up to the year 1932, only two species had been recorded. It is therefore commonly believed that these flies are very rare, limited in their distribution and of minor importance. Since 1932, however, sporadic collecting has revealed that sandflies are not so uncommon here and they are now known to occur as far south as the Transkei in the Cape Province. Indeed, the southern Cape with its Mediterranean-like climate may yet be found to yield a rich fauna. The discovery of a species of the important *major* group in S. Rhodesia may well make us change our minds about the importance of these flies in Southern Africa.

A List of the Ethiopian Phlebotominae.

1. *P. adleri* Theodor.
   1933 *P. adleri* Theodor, Bull. ent. Res., 24:543. (♂♀). Gold Coast; Nigeria; Sudan.
2. *P. affinis* Theodor.
   1933 *P. affinis* Theodor, Bull. ent. Res., 24:545. (♀). 1940 Lewis & Kirk, Proc. R. ent. Soc. Lond. (B), 9:127. (♂). Anglo-Egyptian Sudan.
3. *P. africanus* Newstead.
   1912 *P. minutus* var. *africanus* Newstead, Bull. ent. Res., 3:363. (♂♀). 1926 *P. africanus*, Adler & Theodor, Bull. ent. Res., 16:402. 1929 Adler, Theodor & Parrot, Rev.

We wish to thank the Director General of Medical Services and the Director of Pathology, S.A.M.C., for allowing one of us (M.L.) to participate in the work.

Zool. Bot. afr., 18:73. (♂ ♀). Recorded from many localities in Africa from the Transvaal northwards.

3a. *P. africanus* var. *ater* Parrot.
1936 *P. africanus* var. *ater* Parrot, Arch. Inst. Pasteur Alger., 14:43. (♀). Abyssinia.

3b. *P. africanus* var. *longior* Parrot.
1936 *P. africanus* var. *longior* Parrot, Arch. Inst. Pasteur Alger., 14:40. (♂ ♀). Abyssinia.

3c. *P. africanus* var. *magnus* Sinton.
1932 *P. africanus* var. *magnus* Sinton, Indian J. med. Res., 20:571. (♀). Northern Transvaal.

3d. *P. africanus* var. *niger* Parrot & Schwetz.
1937 *P. africanus* var. *niger* Parrot & Schwetz, Rev. Zool. Bot. afr., 29:226. (♂ ♀). Belgian Congo; Nigeria.

3e. *P. africanus* var. *sudanicus* Theodor.
1933 *P. africanus* var. *sudanicus* Theodor, Bull. ent. Res., 24:541. (♂ ♀). Anglo-Egyptian Sudan.

4. *P. babu* Annandale.
1910 *P. babu* Annandale, Rec. Indian Mus., 4:49. (♂ ♀). 1928 Sinton, Indian J. med. Res., 16:314. 1932 Sinton, Indian J. med. Res., 20, plate IV. (♀). 1933 Sinton, Indian J. med. Res., 21, plate 24. (♂). Mauritius; widespread in Asia.

5. *P. bedfordi* Newstead.
1914 *P. bedfordi* Newstead, Bull. ent. Res., 5:191. (♀). 1921 Parrot, Arch. Inst. Pasteur Afri. N., 1:269. (♂). Transvaal.

6. *P. buxtoni* Theodor.
1933 *P. buxtoni* Theodor, Bull. ent. Res., 24:544. (♂ ♀). Gold Coast.

7. *P. collarti* Adler, Theodor & Parrot.
1929 *P. collarti* Adler, Theodor & Parrot, Rev. Zool. Bot. afr., 18:81. (♂ ♀). Belgian Congo.

8. *P. congolensis* Bequaert & Walravens.
1930 *P. africanus* var. *congolensis* Bequaert & Walravens, Rev. Zool. Bot. afr., 19:38. (♂ ♀). 1931 *P. nairobiensis* Theodor, Bull. ent. Res., 22:472. (♂ ♀). 1933 *P. congolensis*, Parrot, Rev. Zool. Bot. afr., 23:239. 1933 *P. congolensis*, Theodor, Bull. ent. Res., 24:542. Abyssinia; Anglo-Egyptian Sudan; East Africa; Belgian Congo.

8a. *P. congolensis* var. *distinctus* Theodor.
1933 *P. congolensis* var. *distinctus* Theodor, Bull. ent. Res., 24:542. (♂ ♀). Various localities in Equatorial Africa, also Sudan.

9. *P. clydei* Sinton.
1928 *P. clydei* Sinton, Indian J. med. Res., 16:179. (♂ ♀). 1939 Lewis & Kirk, Proc. R. ent. Soc. Lond., (B). 8:155. (♂ ♀). Anglo-Egyptian Sudan.

10. *P. dicipiens* Theodor.
1929 *P. simillimus* Adler, Theodor & Parrot (nec Newstead

1914) Rev. Zool. Bot. afr., 18:84. (♂♀). 1931 *P. decipiens* Theodor, Bull. ent. Res., 22:473. (♂♀). Belgian Congo.

11. *P. dubosqi* Neveu-Lemaire.
1906 *P. dubosqi* Neveu-Lemaire, Bull. Soc. Zool. Fr., 31:65. 1913? *P. roubaudi* Newstead, Bull. Soc. Path. exot., 6:124. (♂). (This publication not seen in the original). 1921 *P. dubosqi*, Franca & Parrot, Arch. Inst. Pasteur afr. N., 1:283. Ashanti; French Sudan; Mauretania; South Nigeria; Sierra Leone.

12. *P. dureni* Parrot.
1934 *P. dureni* Parrot, Rev. Zool. Bot. afr., 24:226. (♀). 1939 Parrot, Rev. Zool. Bot. afr., 32:146. (♂). Belgian Congo.

13. *P. freetownensis* Sinton.
1930 *P. freetownensis* Sinton, Indian J. med. Res., 18:188. (♀). Sierra Leone.

14. *P. gigas* Parrot & Schwetz.
1937 *P. gigas* Parrot & Schwetz, Rev. Zool. Bot. afr., 29:224. (♀). Belgian Congo.

15. [illegible]

22. *P. meilloni* Sinton.
1932 *P. meilloni* Sinton, Indian J. med. Res., 20:565. (♂♀). Northern Transvaal.

22a. *P. meilloni* var. *suberectus* Sinton.
1932 *P. meilloni* var. *suberectus* Sinton, Indian J. med. Res., 20:573, (♂). Kenya.

23. *P. minutus* Rondani.
1843 *P. minutus* Rondani. (The original description not available to us). 1911 Newstead, Bull. ent. Res., 2:69. (♂♀). 1926 Adler & Theodor, Bull. ent. Res., 16:403. (♂♀). 1927 Adler & Theodor, Ann. trop. Med. Parasit., 21:63. (♂♀). Anglo-Egyptian Sudan; French Sudan; Italian Somaliland; Sierra Leone.

23a. *P. minutus* var. *antennatus* Newstead.
1912 *P. antennatus* Newstead, Bull. ent. Res., 3:365. (♀). 1920 *P. antennatus* Newstead, Bull. ent. Res., 11:305. (♂). 1921 *P. minutus* var. *antennatus*, Sinton, Ann. trop. Med. Parasit., 15:105. 1927 Sinton, Trans. roy. Soc. trop. Med. & Hyg., 21:6. 1927 Sinton, Indian J. med. Res., 15:25. (♀). 1932 Sinton, Indian J. med. Res., 20, plate IV. Belgian Congo; Gold Coast; Nigeria; North Ashanti.

23b. *P. minutus* var. *occidentalis* Theodor.
1933 *P. minutus* var. *occidentalis* Theodor, Bull. ent. Res., 24:539. (♂♀). West Africa.

23c. *P. minutus* var. *signatipennis* Newstead.
1920 *P. signatipennis* Newstead, Bull. ent. Res., 11:310. (♀). 1931 *P. minutus*, Theodor, Bull. ent. Res., 22:475. 1933 *P. minutus* var. *signatipennis*, Theodor, Bull. ent. Res., 24:539. (♂♀). Anglo-Egyptian Sudan; Gold Coast.

24. *P. mirabilis* Parrot & Wanson.
1939 *P. mirabilis* Parrot & Wanson, Rev. Zool. Bot. afr., 32:149. (♂♀). Belgian Congo.

25. *P. notatus* Parrot.
1938 *P. notatus* Parrot, Arch. Inst. Pasteur Alger., 16:216. (♀). Abyssinia.

26. *P. papatasii* (Scopoli).
1786 *Bibio papatasii* Scopoli. (The original description not available to us). 1911 *P. papatasii*, Newstead, Bull. ent. Res., 2:73. (♂♀). 1926 Adler & Theodor, Bull. ent. Res., 16:399. 1929 Adler & Theodor, Ann. trop. Med. Parasit., 23:277. (♀). 1934 Parrot, Arch. Inst. Pasteur Alger., 12:384. (♂). 1932 Raynal & le Gac, Ann. Parasit. hum. comp., 10:497 (♂♀). 1933 Raynal & le Gac, Ann. Parasit. hum. comp., 11:255. (♂♀). Anglo-Egyptian Sudan; Italian Somaliland.

26a. *P. papatasii* var. *bergeroti* Parrot.
1934 *P. papatasii* var. *bergeroti* Parrot, Arch. Inst. Pasteur Alger., 12:383. (♂). 1936 Parrot, Arch. Inst. Pasteur

Alger., 14:39. 1936 *P. viduus* Parrot, Arch. Inst. Pasteur Alger., 14:34. (♀). 1941 *P. papatasii* var. *bergeroti* Parrot, Arch. Inst. Pasteur Alger., 19:437. Abyssinia; Tassili, Central Sahara.

27. *P. rodhaini* Parrot.
1930 *P. rodhaini* Parrot, Rev. Zool. Bot. afr., 30:187. (♂). Belgian Congo.

28. *P. renauxi* Parrot & Schwetz.
1937 *P. renauxi* Parrot & Schwetz, Rev. Zool. Bot. afr., 30:222. (♀). Belgian Congo.

29. *P. sanneri* Gaillard & Nitzulescu.
1930 *P. minutus* var. *antennatus* Parrot (nec Newstead 1912), Rev. Zool. Bot. afr., 19:189. (♂♀). 1931 *P. sanneri* Gaillard & Nitzulescu, Ann. Parasit. hum. comp., 9:238. (♀). Abyssinia; Belgian Congo; French Equatorial Africa.

30. *P. sergenti* Parrot.
1917 *P. sergenti* Parrot, Bull. Soc. Path. exot., 10:564. (♂). 1918 Franca, Bull. Soc. Path., exot., 11:731. (♂♀). 1920 Newstead, Bull. ent. Res., 11:307. (♂♀). 1929 Adler & Theodor, Ann. trop. Med. Parasit., 23:271. (♀). Air in Ethiopian Sahara; French West Africa.

30a. *P. sergenti* var. *saevus* Parrot & Martin.
1939 *P. sergenti* var. *saevus* Parrot & Martin, Arch. Inst. Pasteur Alger., 17:484. (♂♀). Abyssinia.

31. *P. schoutedeni* Adler, Theodor & Parrot.
1929 *P. schoutedeni* Adler, Theodor & Parrot, Rev. Zool. Bot. afr., 18:79. (♂♀). Belgian Congo; Uganda; Northern Transvaal.

32. *P. schwetzi* Adler, Theodor & Parrot.
1929 *P. schwetzi* Adler, Theodor & Parrot, Rev. Zool. Bot. afr., 18:75. (♂♀). 1930 *P. symesi* Sinton, Indian J. med. Res., 18:175. (♂♀). 1931 *P. schwetzi*, Theodor, Bull. ent. Res., 22:471. (♀). Widely distributed in Equatorial Africa and also recorded from the Anglo-Egyptian Sudan and the Northern Transvaal.

32a. *P. schwetzi* var. *aethiopicus* Parrot.
1936 *P. schwetzi* var. *aethiopicus* Parrot, Arch. Inst. Pasteur Alger., 14:39. (♂♀). Abyssinia; Anglo-Egyptian Sudan.

33. *P. simillimus* Newstead.
1914 *P. simillimus* Newstead, Bull. ent. Res., 5:180. (♂♀). 1930 *P. brodeni* Parrot, Rev. Zool. Bot. afr., 19:185. (♀). 1931 *P. simillimus*, Theodor, Bull. ent. Res., 29:171. Ashanti; Gold Coast; Nigeria; Belgian Congo.

34. *P. squamipleuris* Newstead.
1912 *P. squamipleuris* Newstead, Bull. ent. Res., 3:366. (♀). 1923 Sinton, Indian J. med. Res., 11:65. (♂♀). 1927 Sinton, Indian J. med. Res., 15:24. (♀). 1929 *P. ghesquieri* Parrot, Rev. Zool. Bot. afr., 18:90. (♀). 1930 *P. squamipleuris*,

Parrot, Rev. Zool. Bot. afr., 19:182. (♂♀). 1937 Raynal, Bull. Soc. Path. exot., 30:76. (♂♀). Abyssinia; Madagascar; Mocambique; North Nigeria; Anglo-Egyptian Sudan.

34a. *P. squamipleuris* var. *dreyfussi* Parrot.
1933 *P. squamipleuris* var. *dreyfussi* Parrot, Arch. Inst. Pasteur Alger., 11:603. (♀). 1936 Parrot, Arch. Inst. Pasteur Alger., 14:46. Abyssinia.

34b. *P. squamipleuris* var. *inermis* Theodor.
1938 *P. squamipleuris* var. *inermis* Theodor, Bull. ent. Res., 29:165. (♀). Abyssinia; North Nigeria.

35. *P. subtilis* Parrot & Martin.
1939 *P. subtilis* Parrot & Martin, Arch. Inst. Pasteur Alger., 17:151. (♂). 1936 *P. tiberiadis* Parrot (nec Adler, Theodor & Lourie 1930), Arch. Inst. Pasteur Alger., 15:44. (♀). 1940 *P. subtilis* Parrot, Arch. Inst. Pasteur Alger., 18:300. Abyssinia; French Somaliland.

36. *P. thompsoni* Theodor.
1938 *P. thompsoni* Theodor, Bull. ent. Res., 29:167. (♂♀). Nyasaland.

37. *P. transvaalensis* Sinton.
1933 *P. transvaalensis* Sinton, Indian J. med. Res., 20:879. (♀). Northern Transvaal.

38. *P. vagus* Parrot & Martin.
1939 *P. vagus* Parrot & Martin, Arch. Inst. Pasteur Alger., 17:147. (♂♀). Abyssinia.

39. *P. viator* Parrot & Martin.
1939 *P. viator* Parrot & Martin, Arch. Inst. Pasteur Alger., 17:153. (♂). Abyssinia.

40. *P. wansoni* Parrot.
1938 *P. wansoni* Parrot, Rev. Zool. Bot. afr., 30:361. (♂). 1939 Parrot, Rev. Zool. Bot. afr., 32:147. (♀). Belgian Congo.

41. *P. wurtzi* Parrot.
1938 *P. wurtzi* Parrot, Arch. Inst. Pasteur Alger., 16:213. (♂♀). Abyssinia.

42. *P. yusafi* Sinton.
1930 *P. yusafi* Sinton, Indian J. med. Res., 18:181. (♂♀). Kenya.

43. *P. yvonnae* Parrot & Schwetz.
1937 *P. yvonnae* Parrot & Schwetz, Rev. Zool. Bot. afr., 29:221. (♀). Belgian Congo.

New Records and Species.

1. *P. congolensis* Bequaert & Walravens. 6 ♂♂ & 5 ♀♀, Raheen, Umtali, S. Rhodesia. Caught in a stable, 15.12.41 (C. V. Meeser). 2 ♀♀, Kaperi Farm, Sinoia, S. Rhodesia. Taken at light, March, 1942 (H. C. Arnold). 1 ♂ 20 ♀♀, Onderstepoort, Transvaal. Taken at light, Nov. 1942 (R. du Toit).

2. *P. meilloni* Sinton. 9 ♂♂ & 7 ♀♀, Raheen, Umtali, S. Rhodesia. Caught in stable, 15.12.41 (C. V. Meeser). 1 ♂ & 1 ♀, Swaziland, Dec. 1942 (Dr Mastbaum).
3. *P. squamipleuris* Newstead. 1 ♂, Onderstepoort, Transvaal. Taken in light trap, Nov. 1942 (R. du Toit).
4. *P. schwetzi* Adler, Theodor & Parrot. 1 ♂, Tzaneen, N. Transvaal. Taken in a Stevenson Screen, 24.5.33 (C. V. Meeser).
5. **P. rossi.** sp. nov. (Fig. 1. a, b).

♂. *Length*: millimetres, epipharynx 0.2, clypeus 0.1, head 0.3, thorax 0.5, abdomen 1.5, total 2.6 mm. *Antenna*: formula $\frac{2}{\text{III—IX}}$, $\frac{1}{\text{X—XIII}}$, $\frac{0}{\text{XIV—XVI}}$; segment III = 0.24 mm.; $\frac{\text{AIII}}{\text{Ep.}} = 1.2$; III = IV + V; geniculate spine of segment IV half the length of that segment. *Palp*: formula 1, 2, (3, 4), 5; relative lengths I—V, 10, 30, 40, 40, 95. *Wing*: length 2.0 mm., greatest width 0.6 mm.; index 1.4; delta + 0.1 mm. *Pharynx*: posterior width one and a half times as broad as anterior; armed with irregular ridges and some minute punctiform teeth posteriorly. *Buccal cavity*: unarmed, without a pigmented area. *Terminalia*: the lengths, in millimetres, of the various segments are: superior clasper I, 0.3; superior clasper II, 0.16; median clasper 0.18; inferior clasper 0.26; valve 0.1. Superior clasper I with a prominent basal lobe bearing about 4 very long bristles apically and a large number of shorter, hooked, bristles ventrally, the latter decreasing in size from near the apex to the base. Proximal spine of superior clasper II longer than the distal ones. Median clasper evenly rounded distally with a number of delicate vertical hairs. Intromittent organ rounded distally.

1 ♂, the type, Raheen, Umtali, S. Rhodesia. Caught in a stable, 15.12.41 (C. V. Meeser).

This is a species of the *major* group but easily distinguished from all other members by the character of the setae on the basal lobe of superior clasper I. This is the first record of a member of the *major* group from Southern Africa and its occurrence here is of interest as it is among members of this group that the vectors of kala azar and sandfly fever are to be found.

The species is named in honour of Dr G. R. Ross, Director of the Public Health Laboratory and Pasteur Institute, Salisbury. It is largely through the initiative of Dr Ross that so much collecting of biting insects has been made in S. Rhodesia.

6. **P. africanus** var. **meridianus** var. nov. (Fig. 1. c, d).

♀. *Length*: millimeters, epipharynx 0.18, clypeus 0.1, head 0.24, thorax 0.6, abdomen 1.6, total 2.72 mm. *Antenna*: formula $\frac{2}{\text{III—XV}}$; segment III = 0.16 mm.; $\frac{\text{AIII}}{\text{Ep.}} = 0.9$; III < IV + V; geniculate spine

of segment IV nearly ¼ the length of that segment. *Palp*: formula 1, 2, (3, 4), 5; relative lengths I-V, 8, 15, 34, 34, 70. *Wing*: length 1.9 mm., greatest width 0.54 mm.; index 0.74; delta + 0.1 mm. *Hind leg*: lengths of the segments in millimetres, femur 0.74, tibia 0.84, tI 0.44, tII 0.29, tIII 0.16, tIV 0.12, tV 0.1, total 2.64 mm. *Pharynx*: posterior width about twice the anterior width; armed with numerous sharply pointed teeth posteriorly. *Buccal cavity*: with about 20 large pointed teeth with their bases nearly in a straight line, about

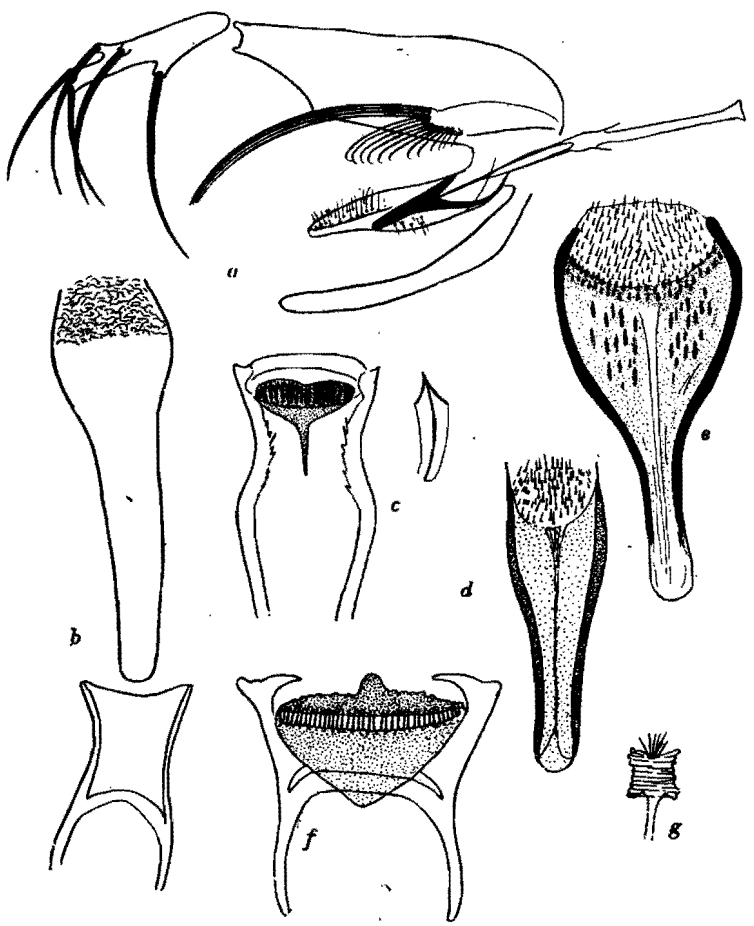

Fig 1. *Phlebotomus rossi* sp. nov.: *a*. male terminalia; *b*. male buccal cavity and pharynx. *Phlebotomus africanus* var. *meridianus* var. nov.: *c*. female buccal cavity and a single tooth much enlarged; *d*. female pharynx. *Phlebotomus caffraricus* sp. nov.: *e*. female pharynx; *f*. female buccal cavity; *g*. spermatheca.

three median and one or two of the extreme lateral teeth shorter than the rest; immediately anterior to this row of teeth a row of fine punctiform teeth; pigmented plate large, pale, mushroom-shaped. *Spermatheca*: elliptical as in *africanus* Newstead, measuring 0.3 mm. in length and 0.1 mm. in width.

Type ♀, and one other ♀, Onderstepoort, Transvaal. Taken at light, Jan. 1944 (R. du Toit).

The second female agrees in all important details with the description of the type specimen given above except that palpal segment IV is slightly longer than III, 36 units as against 33. This species resembles *africanus* Newstead differing as follows: 20 instead of 40 or more teeth in the buccal cavity and relative shortness of palpal segment IV. In these characters it also differs from all the varieties of *africanus* except *ater* Parrot (1936) which has a short fourth palpal segment but in this variety the buccal teeth are also numerous and the pigmented plate is much darker.

P. caffrarius sp. nov. (Fig. 1. e, f, g).

♀. *Length*: millimetres, epipharynx 0.3, clypeus 0.16, head 0.26, thorax 0.64, abdomen 2.2, total 3.56 mm. *Antenna*: formula $\frac{2}{III—XV}$; segment III = 0.26 mm.; $\frac{AIII}{Ep.} = 0.86$; III < IV + V; geniculate spine of segment IV about half the length of that segment. *Palp*: formula 1, 2, 4, 3, 5; relative lengths I—V, 15, 25, 40, 35, 64. *Wing*: length 2.4 mm., greatest width 0.7 mm.; index = 1.1; delta + 0.24 mm. *Hindleg*: lengths of the segments in millimetres, femur 0.88, tibia 1.2, tI 0.6, tII 0.3, tIII 0.2, tIV 0.16, tV 0.1, total 3.44 mm. *Pharynx*: posterior width nearly four and a half times the anterior width; armed with numerous fine teeth posteriorly and two irregular rows of strong, short, spines along the posterior margin of the dorsal plate; except for the posterior part bearing the fine teeth the whole organ is densely pigmented. *Buccal cavity*: as in the pharynx the buccal cavity is heavily pigmented the cornua and pigmented plate being practically black. Armed with an even row of about 40 approximately subequal, pointed, teeth; anterior to this a row of fine punctiform dots; because of the dark colour of the pigmented plate the teeth are very difficult to see and it is necessary to manipulate the specimen under a dissecting microscope before they become visible. Pigmented plate almost black, posterior edge ragged and with a prominent median lobe. *Spermatheca*: measures 0.024 mm. in length and 0.02 mm. in width; finely striated transversely not distinctly segmented; feebly pigmented; the figure was made from a specimen expanded in hot lacto-chloro-phenol.

Type ♀, Bizana, Transkei, Cape Province. Taken at light, Feb. 1944 (B. de M.).

This sandfly falls into a group of species consisting of *affinis* Theodor, *transvaalensis* Sinton and *thompsoni* Theodor. The charac-

ter of the pharynx and spermatheca as well as the shape of the posterior edge of the pigmented plate, however, immediately separates it from members of this group as well as from all other Ethiopian species. We have seen nothing resembling it in descriptions of sandflies from other parts of the world.

Technique.

We have found the following method of preparing specimens for identification very useful. It has the advantage of being rapid and involves the minimum amount of handling of the specimens. This is rather important as leg, antennal and palpal segments are very easily lost. Specimens remain in an expanded condition and there is very little distortion.

(1) Place in 10% caustic potash. Specimens may be left in this in the cold overnight or heated over a low flame for an hour. It is not necessary to boil.

(2) Transfer by picking up with a thin mounted needle to lacto-chloro-phenol to which a drop or two of 1% acqueous acid fuchsin has been added. The lacto-chloro-phenol neutralizes the caustic potash and clears the specimens. Specimens may be left in this for days on end without overstaining. The application of heat hastens both the clearing and staining process. The lacto-chloro-phenol is prepared as follows: chloral hydrate 2 parts by weight, carbolic acid crystals melted in a hot water bath 1 part by volume, lactic acid 1 part by volume.

(3) Pick up specimens with a thin needle and place in lacto-chloro-phenol to which no stain has been added. With the help of slight heat the excess stain will be removed.

(4) Pick stained and cleared specimen up with a thin needle, just touch it on filter paper to remove excess lacto-chloro-phenol (this is necessary as phenol is liable to crystallize out in the mounting medium) and place in a drop of de Faure's gum chloral mounting fluid. We have attempted to make the de Faure's ourselves with little success and now employ a preparation made by Messrs Flatters and Garnett, Manchester, England.

(5) Arrange the specimen in the mounting fluid and dissect as required.

This mountant has great advantages since it does not dry rapidly so that dissection can be done with care. Specimens do not float about as they do in thin canada balsam though we find it an advantage to place parts that have been dissected off under separate cover slips.

CULICIDAE.

BELGIAN CONGO.

Anopheles obscurus var. *nowlini* Evans. Adults and larvae. Yangambi (Dr Parent).

The only previous record of this variety is from the Firestone Plantation, Liberia. It was considered to be a purely localized form. The present record is therefore of some interest. Dr Parent has collected a series of typical larvae and has also bred out some adults from isolated specimens. These adults have been compared

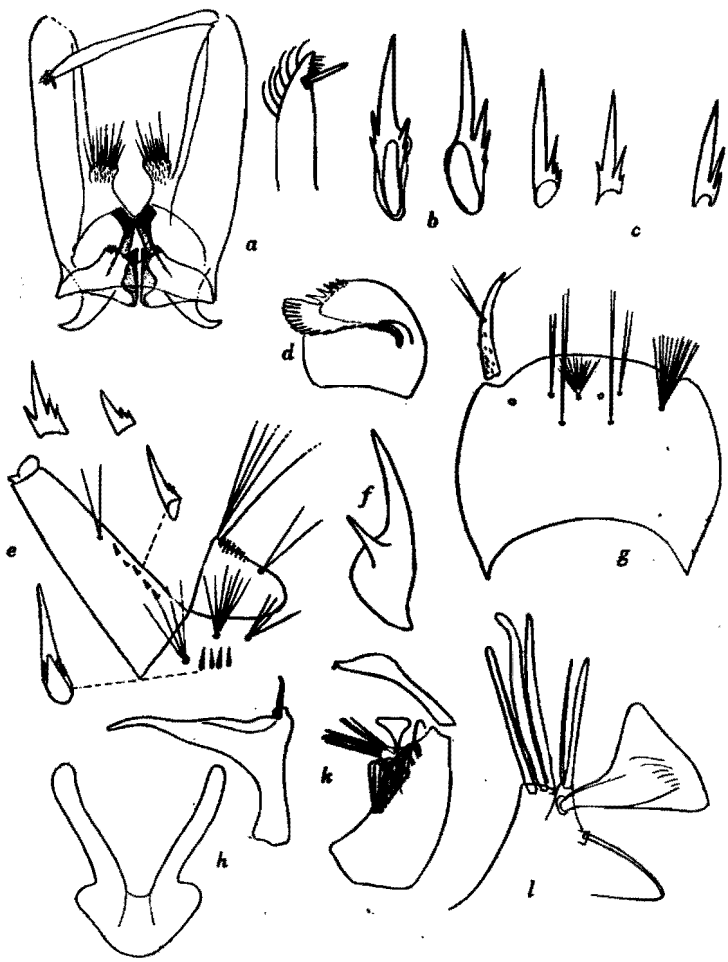

Fig. 2. *Aedes* (*A*) *amaltheus* sp. nov.: *a*. male terminalia, apex of the clasper enlarged; *b*. larval comb teeth; *c*. larval pecten teeth; *d*. phallosome in side view. *Aedes* (*D*) *fascipalpis* Edws.: *e*. terminal segments of the larva; *f*. basal spine of mesopleural group of hairs of the larva; *g*. larval head. *Culex* (*M*) *castor* sp. nov.: *h*. phallosome and clasper of male terminalia. *Culex* (C) *invidiosus* ssp. *vicinalis* ssp. nov.: *k*. sidepiece and clasper of male terminalia; *l*. lobe of the sidepiece enlarged.

with *obscurus* Grunberg obtained at Mongbwalu, Belgian Congo by Dr Janssens and it has been found impossible to separate them. Evans has, of course, pointed out that eastern specimens of *obscurus* typicus resemble var. *nowlini.*

Anopheles rufipes var. *ingrami* Edwards. Adult. Mongbwalu Dr Janssens).

This variety is considered to have a purely western distribution.

Aedes (*Stegomyia*) *simpsoni* Theobald. Bili (Dr Leigeois), Yangambi (Dr Parent).

Culex (Culex) invidiosus ssp. **vicinalis** ssp. nov. (Fig. 2. K, l).

External characters agreeing with *invidiosus* Theo. in all respects the only differences to be found in the male terminalia which are rather like those of the unnamed variety of *ornatothoracis* mentioned and figured by Edwards (Mos. Ethiop. Reg. III, 340, 1941). As in that variety and not in *invidiosus* seta *f* of the coxite lobe is not enlarged apically; on the other hand seta *h* is not sinuous. Coxite with numerous ventral hairs set in a double row as in *ornatothoracis* but differing from this species in having the hairs longer and rather sharply bent. Phallosome as in *decens* Theo. Because of its external resemblance to *invidiosus* it is regarded as a subspecies of that species rather than of *ornatothoracis.* 1 ♂, Yangambi (Dr Parent).

Culex (*Culex*) *laticinctus* Edwards. Larvae. Nizi (Dr Janssens).

This species is typical of the Mediterranean region and is only included in the Ethiopian fauna because of its occurrence in Southern Arabia and Somaliland. The present record is therefore of very great interest.

Culex (*Mochthogenes*) *simpliciforceps* Edwards. Adults. Yangambi (Dr Parent).

Culex (Mochthogenes) castor sp. nov. (Fig. 2. h).

♂. Resembles *inconspicuousus* Theo. differing as follows: all decumbent scales of the vertex dark and narrow, broad white scales confined to a prominent band adjoining the eyes. Hind femur almost completely pale only slightly darkened towards the apex. Phallosome without tubercles and finger-like ends of *lp* very long and bluntly rounded apically; style without a tooth on the outer margin.

The pale hind femur and character of the style place it near *simpliciforceps* Edws. but the terminalia are different. Type ♂ and 3 other ♂♂, taken in flight in a forest, Bili (Dr Leigeois).

Ficalbia (*Mimomyia*) *flavopicta* Edwards. A number of males, taken in flight in a forest, Bili (Dr Leigeois).

Ficalbia (Mimomyia) parenti sp. nov.

♀. *Head*: with a large patch of narrow, white, decumbent and forked upright scales on the vertex, on the nape the upright scales

are darkened; on each side of the narrow, white patch the scales are broad, flat and black. First flagellar segment nearly three times as long as the second. Palps pale tipped. *Thorax*: mesonotum with very dark, narrow, brown and creamy scales; the pale scales predominate on the anterior half of the scutum especially medianally and along the margins; from the anterior half a pair of widely separated lines of pale scales continue to the scutellum; prescutellar area with dark scales only; scutellum with pale, narrow scales. Pleura very dark-brown with a paler, poorly marked, band across the middle and one across the base. A large patch of flat, white scales in the middle of the sternopleuron and a smaller one basally. *apn* with long bristles but no scales. *Wing*: moderately heavily scaled, all dark except for the base of the first vein which is pale scaled for a considerable distance. Halteres white with dark-brown crowns. *Legs*: all femora and tibiae with a conspicuous spot at the apex; hind femur pale posteriorly almost to the apex; fore and mid tarsi with faint markings at the articulations of the joints; tarsus V of the fore legs and IV and V of the mid legs with many pale scales; pale markings at the articulations of the tarsal joints in the hind leg very conspicuous and tending to be both basal and apical; whole of tarsi V and IV and about apical third of III pale. *Abdomen*: tergites dark-purple with very broad, pale-yellow, basal bands on II to VI; sternites with basal pale bands.

♂. As in the female. Palps largely dark but terminal segment with a patch of pale scales above and pale tipped. *Terminalia*: somewhat as in *mimomyiaformis* Newst. but style with a single, short, terminal spine and tVIII narrower.

Type ♂, one other ♂ and one ♀, Yangambi (Dr Parent).

The pale scaling of the mesonotum, absence of flat, white scales from the median region of the head, the distinctive tarsal banding of the hind legs and the character of the style immediately distinguish this species from *mimomyiaformis* and except for the tarsal banding from var. *pincerna* Graham.

Aedes (Aedimorphus) yangambiensis sp. nov. (Fig. 3. c, d).

♂. *Head*: proboscis and palpi all dark, latter slightly longer than proboscis; most decumbent scales of the head broad, flat and white. *Thorax*: mesonotum dark-brown mainly clothed with darker, narrow, curved scales intermixed with similar pale scales with two small median spots of narrow, creamy scales; similar pale scales along the edges of the scutum especially marked on the shoulders and above the wing roots; scutellum with all lobes with broadish, flat, white scales; paratergite with a few, flat, white scales on the underside; two patches of flat, white scales on the sternopleuron and one on the upper mesepimeron; *apn* with a few flat, white scales; *ppn* with narrow, black, curved ones. No post- or subspiracular scales. *Wings*: without a trace of a white spot at the base of the coxa. *Legs*: fore and mid legs all dark except for a very small, but

distinct, spot of white scales at the apices of the tibiae; hind femur dark dorsally to the apex and pale ventrally to the apex, a minute spot of white scales externally at the extreme tip; hind tibia all dark except for a broad, white band apically which is about twice as long as broad; tarsi of all legs dark without any trace of pale markings. *Abdomen*: dark, with lateral, basal, white spots which

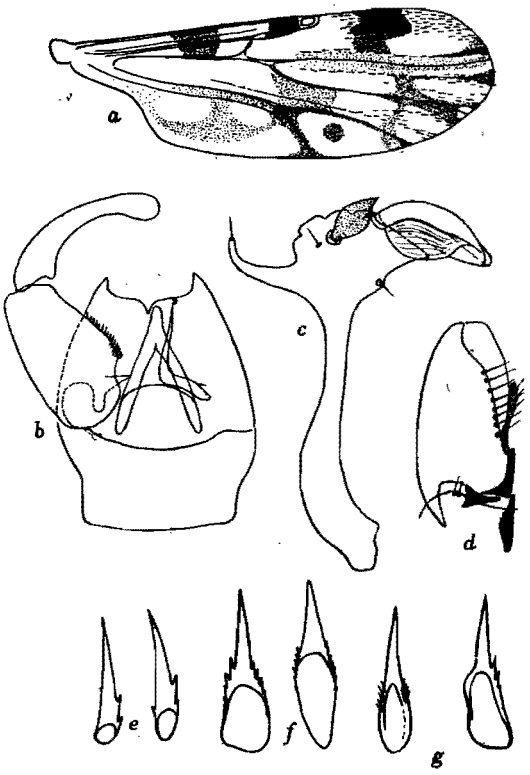

Fig. 3. *Culicoides hirtius* sp. nov.: *a*. male wing, fringe not shown; *b*. male terminalia. *Aedes* (*A*) *yangambiensis* sp. nov.: *c*. clasper of the male terminalia; *d*. sidepiece of the male terminalia in side view. *Aedes* (*S*) *calceatus* Edws.: *e*. larval pecten spines; *f*. larval comb spines. *Aedes* (*S*) *unilineatus* Theo.: *g*. larval comb spines.

tend to fuse medianally, tVIII completely pale scaled; sternites with broad, basal, white bands. *Terminalia*: IXst. narrow, with two small lobes carrying a few hairs, not deeply excavated medianally; coxite broad, internal lobe small, bearing a few short bristles; clasper expanded apically, bearing a long horn externally and produced to a point internally; carrying a very broad, flat, pointed spine and

a large membranous leaf, apart from these, three small hairs present on the clasper.

Type ♂ and one other ♂, Yangambi (Dr Parent).

This insect belongs to a group of species which includes *minutus* Theobald, *tarsalis* Newstead, *phyllolabis* Edwards and *yvonnae* Edwards. With its head scales mostly broad and flat it differs from all these except *minutus*. The clasper it quite unlike that of *minutus* and resembles more that of *tarsalis* and *filicis* Ing. & de Meillon differing however in the shape of the head and the greatly enlarged spine and broad leaf.

Uranotaenia bilineata Theobald. ♂♂ taken in flight in a forest, Bili (Dr Leigeois).

Uranotaenia hopkinsi Edwards. Larva. Yangambi (Dr Parent).

Hodgesia nigeriae Edwards. Larvae agreeing very well with the description given by Hopkins. Yangambi (Dr Parent).

NORTHERN RHODESIA.

Aedes (Stegomyia) amaltheus sp. nov. (Fig. 2. a, b, c, d).

♂. *Head*: upright, forked scales on the nape dark; a narrowly divided, median line of broad, flat, white scales reaching to the eye margins; on each side of this line a large patch of broad, flat, black scales; bordering the latter a patch of broad, flat, white scales. Tori with a few white scales internally. Palp slightly longer than the proboscis with a long, white dorsal line just beyond the clypeus, a broad, white band approximately midway, a small, white spot ventrally at the base of the second segment and the terminal segment all white beneath except at the extreme tip. *Thorax*: mesonotum with a pair of large, white triangular patches, these reach the border of the scutum; from the posterior angle of each large white mark a narrow white line to the posterior border of the scutum; anterior patch of white scales all narrow, from it a somewhat broken line to the prescutellar area where it branches so that this area is bordered by narrow, white scales; fairly large patch of somewhat broad scales above each wing root. Scutellum completely covered with flat, broad, white scales. *ppn* with a small patch of broad, flat, white scales, *apn* similarly clothed. *Legs*: fore leg, femur almost entirely dark, a few pale scales near the base; tibia all dark except for a small, white spot near the base in front; tI and tII with narrow, basal, white bands, tIII—tV all dark; mid leg, femur all dark except for a small, white, apical spot anteriorly; tibia completely dark; tI and tII with rather broad, white, basal bands, that on II equals about half the length of the segment; tIII—V all dark; hind leg, femur with more than the basal half white, the dark dorsal line extends to near the apex, externally at the apex a prominent white spot which is slightly longer than broad; tibia entirely dark; tI—II with basal, white bands about equal to those on the mid tarsi; tIII and V all dark; tIV all white. *Abdomen*:

tII with a small, white, median spot, tIII—V with broad, white, basal bands not quite reaching the lateral spots, on tVI the pale band smaller and on VII and VIII absent. Lateral white spots present on all segments, on VI—VIII easily visible from the dorsal side. *Terminalia*: IXth tergite excavated medianally, each lobe with a few very small hairs; paraprocts blunted apically, with ventral arms; lateral plate of the phallosome bent apically so that

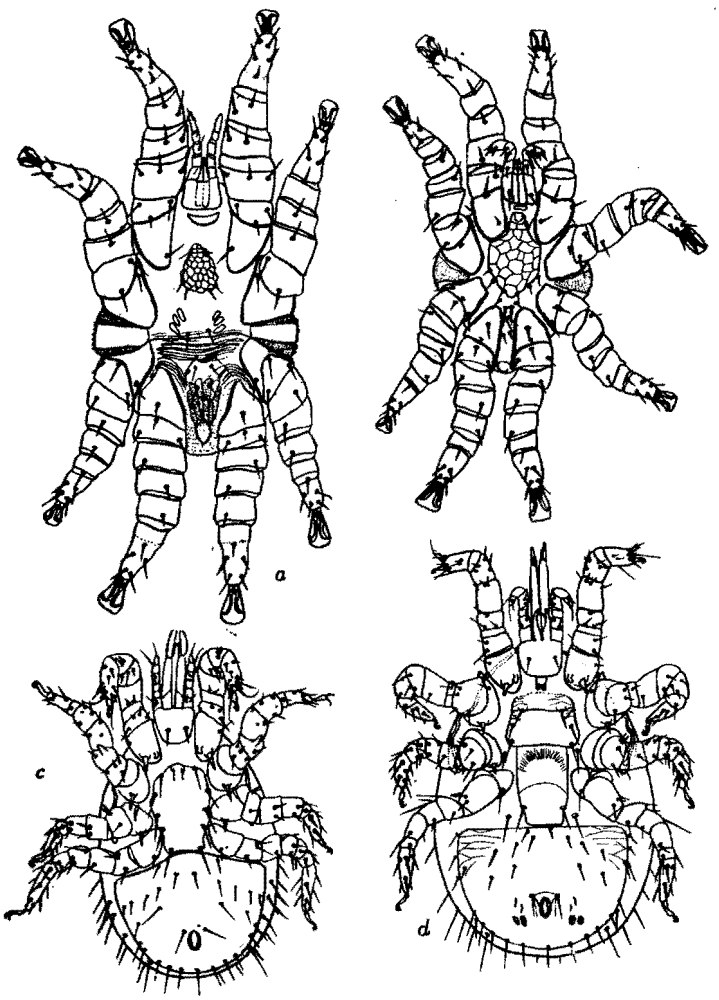

Fig. 4. *Spinturnix semilunaris* sp. nov.: *a*. female in ventral view; *b*. male in ventral view. *Myonyssoides spinosus* sp. nov.: *c*. male in ventral view; *d*. female in ventral view.

the teeth, which are small, are not visible in ventral view, in side view there are seen to be a row of finely pointed teeth on the crest succeeded by a larger number of closely set blunt teeth and finally a large, single tooth; sidepieces very long and narrow; basal lobes prominent, rounded apically and crowned with some long, stiff bristles; clasper narrow and long, apex with a few longish hairs dorsally and a number of minute hairs ventrally, style subventral, short.

♀. As in the male; tips of the palps pale scaled. Tori with rather more pale scales internally. Abdomen with broad, white, basal bands not quite reaching the lateral margin on tII—VI, in one specimen tII with only a few pale scales basally, tVI—VII with the lateral spots visible from the dorsal side.

Larva. The following is the description of the larval pelt of the type male reared in isolation. *Head*: pale-brown; antennae smooth, the shaft, without the terminal process, about twice as long as the distance between the preclypeal spines, antennal tuft at about five-eighths, double, simple. Seta "A" three branched, minutely barbed; "B" bifid, simple, shorter than the antenna; "C" longer than the antenna, single, simple; *d* with nine delicate branches, the longest of which is shorter than "B". *Thorax*: with numerous stellate hairs; spines accompanying pleural hairs small and straight. *Abdomen*: with many stellate hairs. Comb of eight large, black spines on the one side and seven on the other, each spine with a long, pointed, apical portion bearing basally a number of prominent denticles which vary in size and number, the longest basal denticle may be almost a half the length of the terminal spine or much shorter, on some spines as many as four denticles may be seen on each side, in others only one. Siphonal tuft of ten pectinate branches the longest of which equals about half the length of the siphon; subsiphonal of seven pectinate branches, these about as long as the siphonal; anal of nine pectinate branches which are much shorter than the siphonal. Siphon minutely spiculate basally, dark, index 1.9 — pelt rather flattened — with a pecten of six large, dark teeth extending to about the middle, pecten teeth variable in character, always with one large ventral basal denticle and one or two smaller ones, a minute dorsal denticle present on some teeth. Subventral tuft missing, the scar just beyond the last pecten tooth. Saddle complete with rather coarse spicules along the posterior margin; a large "window" at the place of insertion of the saddle hair which is missing; ventral brush with some tufts missing; three remaining hairs in the barred area bifid, simple; upper caudal seta two branched, lower single.

Variation: Apart from the pelt of the type described above seven other pelts, all obtained from specimens reared in isolation, are available for study. The variations seen in this material are given in the following table.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Head seta "A"	3	3	5	3	4	3	3
Head seta "B"	2	2	2	2	2	2	2
Head seta "C"	1	1	1	1	1	1	1
Head seta "d"	10	8	8	7	8	9	8
Comb spines	8	7	7	8	7	7	8
Siphonal index	3.4	2.1	1.9	2.25	2.1	2.3	1.9
Pecten spines	5	6	7	6	7	7	7
Subventral tuft .. .	4	—	—	3	—	4	4
Lateral seta of saddle	5	5	—	6	5	6	5
Ventral brush pairs	5	5	—	—	4	5	4

Specimen number 1 was the only one in which there was no flattening due to mounting hence its siphonal index is probably correct. In specimens with a complete ventral brush there are five pairs of setae four of them either single, bifid from near the base or branching some distance from the base. The fifth pair are proximal to the barred area much shorter than the other setae and 4—5 branched. Gills were present in one specimen only and were about five times as long as the saddle.

Type male, two other males and four females all reared in isolation from larvae collected in a tree hole, Livingstone, N. Rhodesia, 9.12.42 (J. Muspratt).

The adult resembles *masseyi* Edwards but differs as follows: no yellow scaling on the mesonotum; median pale line forks in front of the scutellum so that the latter is bordered by white scales; hind femur with more than the basal half white. The terminalia are quite distinct and differ from those of all other Ethiopian species. Unfortunately the male of *masseyi* is not known.

The larva resembles that of *unilineatus* Theobald very closely differing principally in having larger basal denticles on the comb spines and smaller pecten spines, also the antennal tuft is bifid. In the figure accompanying Hopkins' description of the larva of *unilineatus* (Mos. Ethiop. Reg. 1, 118, 1936) the comb spine is shown with rather large basal denticles though he says in his description "comb of 4—8 large strong spines which have a fringe of rather small denticles at the base". The pelts of two typical *unilineatus* from Livingstone (J. Muspratt) and one pelt from Tzaneen, the adult of which was identified by Edwards, show the comb teeth to have very small basal denticles. Mr. Lewis of the Sudan Medical Service has mentioned to me *in litt.* that Sudan specimens of *unilineatus* also show basal denticles very much smaller than figured for *unilineatus* in Hopkins' description.

Aedes (*Stegomyia*) *calceatus* Edwards (Fig. 3. e, f).

We have several specimens which agree very closely with this species. Two small points of difference are (1) white patch at the apex of the hind femur small (2) basal white ring on hind tarsus III very narrow only represented by a few pale scales. The male terminalia appear to be quite typical.

Larva. Almost exactly as in *dendrophilus* Edws. The only differences we have been able to find are (1) head seta *d* with 5—8 branches. (2) Comb spines usually with more prominent denticles. (3) Subventral tuft of the siphon with three branches. (4) Typical pecten spines with two ventral and one small dorsal denticle.

Several males and females with their associated pelts, Livingstone (J. Muspratt).

Aedes (*Stegomyia*) *unilineatus* Theobald (Fig. 3. g).

The pelts of two specimens reared in isolation by Mr Muspratt show that the basal denticles of the comb spines are quite small and unlike those figured for this species by Hopkins. (See the note under the description of *amaltheus*).

A series of specimens, Livingstone (J. Muspratt).

Aedes (*Stegomyia*) *metallicus* Edwards.

A series of specimens reared in isolation. The adults are quite typical but the larvae differ in one small detail from Hopkins' description in having head seta "A" double instead of single. Livingstone (J. Muspratt).

Aedes (*Aedimorphus*) *marshalli* Theobald.

A series with associated pelts. Livingstone (J. Muspratt).

Aedes (*Aedimorphus*) *haworthi* Edwards.

A series with associated pelts. Livingstone (J. Muspratt).

Aedes (*Diceromyia*) *fascipalpis* Edwards (Fig. 2. e, f, g).

Mr. Muspratt reared six adults from isolated larvae. The adults including the male terminalia are quite typical of this species. *Larva. Head*: antenna spiculate, hair more than half the length of the antenna, bifid, placed at three-fifths. Seta "A" 11—14 branched, the longest branch nearly equalling the length of the antenna; seta "B" bifid, minutely pectinate, nearly as long as the antenna; seta "C" bifid, but single on one side in one specimen, minutely pectinate, longer than the antenna; seta *d* 13—18 branched, the longest branch equalling about twice the distance between the preclypeal spines. *Thorax*: basal spines of the meso- and metapleural groups of hairs, large, curved and bifid each with a long and short spine. *Abdomen*: comb of 4—8 spines, lightly pigmented and each spine with a delicate fringe basally; siphonal tuft of 4 delicately pectinate branches; subsiphonal of 7—8 similar branches; anal of 5 somewhat stiff, delicately pectinate branches, on each side the branch furthest from the siphon slightly thicker than the rest. Siphon,

dark, straight-sided, slightly tapering, index 2.4—3.1, in an unmounted specimen the index was 2.7; subventral tuft slightly beyond the middle, of three delicate branches. Pecten of 3—8 teeth usually reaching just beyond the half of the siphon, teeth rather variable in character, usually with one or two ventral basal denticles which may be small or large, sometimes very broad when a dorsal basal denticle is also to be seen. Saddle coarsely spiculate at the dorsal apical angle, lateral hair placed practically on the distal margin of the saddle, consisting of 2 moderately long, simple, branches; upper caudal seta of 4 long branches, lower single; brush of 4 branched tufts.

The larva is separable from that of *flavicollis* Edws., *furcifer* Edws. and *taylori* Edws. on account of the fewer pecten teeth which are not closely or evenly set. In this and other respects it resembles *adersi* Edws. but may be separated by the character of head seta "C" which is bifid and the pecten spines which have smaller basal denticles. The large bifid basal spine of the meso- and metapleural groups of hairs separates it from *niveus* De Meillon (see below) and probably from *adersi* as well though this character is not mentioned in the description of *adersi*. Described from six pelts, Livingstone (J. Muspratt).

Aedes (Diceromyia) zethus nm. nov.

In describing *niveus*, 1943, the fact that the name had been used before by Ludlow in 1903 for a species of *Aedes* from the Orient was overlooked.

Aedes (*Finlaya*) *fulgens* Edwards.

A series of adults and their associated pelts, Livingstone (J. Muspratt).

SOUTHERN RHODESIA.

Anopheles listeri De Meillon.
Larvae. Plumtree (P. de Necker).

Culex (*Culex*) *vansomereni* Edwards.
Adults. Salisbury (C. V. Meeser).

Taeniorhynchus (*Coquillettidia*) *flavocinctus* Edwards.
Adults. Salisbury (C. V. Meeser).

SOUTH WEST AFRICA.

Aedes (*Aedimorphus*) *minutus* Theobald.
Larvae. Tsumeb (Major L. Fourie).

Culex (*Culex*) *decens* Theobald.
Larvae. Okarogawe Spring (Major L. Fourie).

CAPE PROVINCE.

Aedes (*Aedimorphus*) *hirsutus* Theobald.
Adults and larvae, Mtombe, Mkanduli District, Transkei (B. De M.).

Aedes (*Stegomyia*) *simpsoni* Theobald.

Adults and larvae, Hole in Wall, Mkanduli District, Transkei (B. De M.).

Larvae were found between the leaves of *Dracaena hookeriana* in a forest. *Aedes simpsoni* extends northwards along the coastal forests through Natal and Zululand. What its southern limit is we do not know as the coastal areas are largely unsurveyed.

Wild-caught *Aedes simpsoni* have been found infected with the virus of yellow fever and it is thought to have been the principal vector in a recent outbreak of yellow fever in western Uganda. It probably plays an important part in the transmission of "jungle" yellow fever in certain areas. (1)

Aedes (*Stegomyia*) *deboeri* Edwards.

Adult taken biting in forest during the day. Hole in Wall, Mkanduli, Transkei (B. De M.).

CERATOPOGONIDAE.

Culicoides hirtius sp. nov. (Fig. 3. a, b).

♂. Wing pale with dark markings, mesonotum and legs largely brown; halteres whitish. *Head:* mouth parts dark-brown; eyes widely separated, bare but densely pubescent along the inner margins. *Palps*: dark-brown, of even width throughout, the relative lengths of the segments are II 11, III 15, IV 8, V 9. III with some club-shaped sensory hairs but no definite pit. *Antennae:* the relative lengths and greatest widths are:

	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv	xv
L	25	10	10	10	11	12	11	11	11	13	25	23	26
W	10	9	8	8	7	7	6	6	6	5	5	5	8

Verticils pale-brown; torus and segments XIII—XV dark-brown, rest paler. *Thorax*: mesonotum and pleurae dark-brown with two admedian brown spots; prescutellar area grey; scutellum dark-brown with two central and one marginal lateral bristle on each side; halteres whitish throughout. *Wing*: the length of the wing measured from the arculus is 1.34 mm. and the greatest width 0.5 mm.; the costa ends slightly beyond the middle and beyond the fork of the median and the cubitus. Macrotrichia fairly dense towards the apex of the wing but not extending back further than the end of the costa, none in the cubital and anal cells. Pale with dark spots as shown in the figure; the most conspicuous markings are (1) the dark spot before the distal radial cell; (2) the large, dark spot on the border beyond the end of the costa; (3) the small, circular, dark spot in the cubital cell. *Legs:* femora and tibia dark-brown, tarsi paler. *Abdomen*: dark-brown. *Terminalia:* IXth sternite slightly excavated, the membrane bare; IXth tergite short, the apical lateral processes very short, sharply pointed but broad basally; aedeagus in the form of a triangle, produced apically;

parameres rather long, gradually narrowing to a fine point bearing some minute hairs; side piece short and broad, densely clothed on the inner aspect with curved, sharply pointed, short, stiff hairs; style expanded apically.

♂, type, taken at light, Onderstepoort, Transvaal (R. du Toit).

The terminalia bear a striking resemblance to those of *pulicaris* L. a Palaearctic species. The following differences may be noted (1) tip of aedeagus more prolonged; (2) parameres longer; (3) distal margin of the IXth tergite with a shallow excavation. In the last mentioned character as well as in wing ornamentation it differs from species related to *pulicaris* such as *halophilus* Kieffer and *delta* Edwards.

CHEYLETIDAE.

Myobia capensis sp. nov. (Fig. 5. e).

♀. An elongated species. Dorsal surface with setae arranged as follows: Lateral seta I arising well in front of leg II and slightly posterior to leg I. Lateral seta II arises immediately posterior to leg II. Lateral seta III arises on a level with coxa III. Lateral seta I blade like at base; very broad and coming to a long, drawn out apex. Lateral setae I and II more slender; lateral seta II very long. All these setae show longitudinal striations. Submedian seta I arising between lateral seta I and leg II. On a level with leg II arises submedian seta II. Submedian setae III to VI become progressively slender. Inserted at an angle to the longitudinal axis of the body are three pairs of long, finely lanceolate setae, arising on the extremity of the abdomen as shown in the figure. Terminally on the abdomen two minute setae. Ventral setae as follows: A pair of long setae arising medially immediately anterior to leg III; a second pair of equal length between legs III and IV; a third very slightly smaller pair posterior to leg IV. In addition a row of four small setae arising in a median position slightly anterior to the vulva; the two outer setae being longer than the inner. Claw on tarsus II smaller than those on tarsi III and IV. Tibiae III and IV bearing two long, fine setae arising laterally, one on each side. Measurements: Length 52μ. Breadth 20μ.

This species appears to be nearest to *M. plecotia* Radford but differs in a number of respects. In the new species the first two anterior median setae are broader than those that follow, which is not the case in *M. plecotia*. Moreover the position of the ventral spines differs considerably. This species is of interest in that it is the first of its genus to be described from South Africa.

Type ♀ from a bat, *Eptesicus capensis gracilior* Thomas and Schwan, Bizana, Transkei, Cape Province, 21.3.44 (B. de Meillon). We are indebted to Capt. Shortridge of the Kaffrarian Museum for the identification of this bat.

DERMANYSSIDAE.

Dermanyssus gallinae de Geer.

A long series of ♀♀ and nymphs from a fowl run in Johannesburg (B. de Meillon and M. Lavoipierre). These were collected on a number of occasions during the last few months of 1943. R. F.

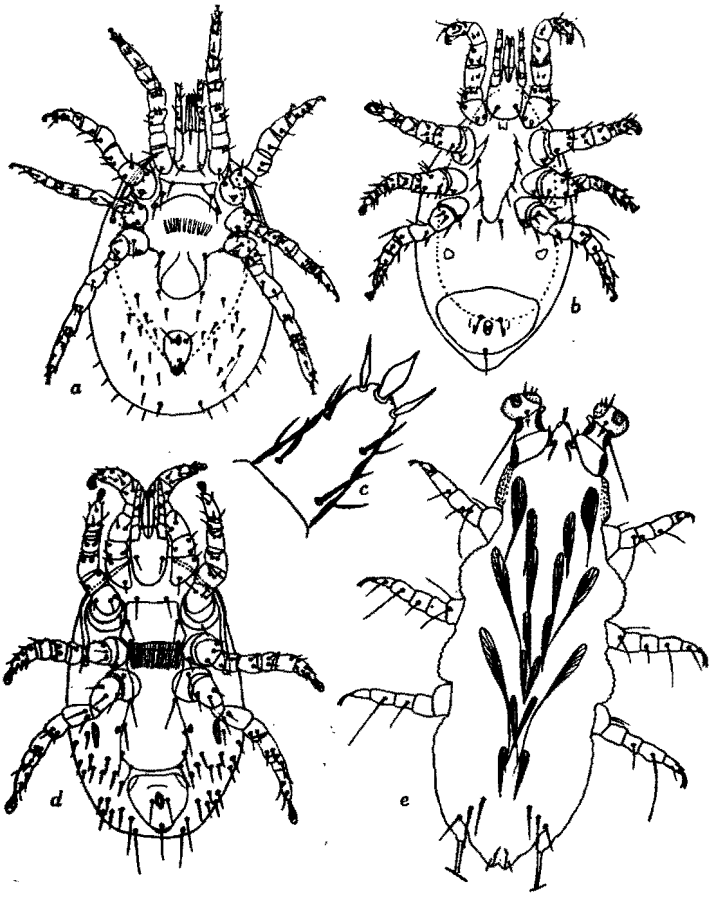

Fig. 5. *Liponyssus latiscutatus* sp. nov.: *a*. female in ventral view. *Myonyssoides spinosus* sp. nov.: b. nymph in ventral view. *Spinturnix semilunaris* sp. nov.: c. apex of tarsus I of the fore leg in dorsal view. *Laelaps longiventris* sp. nov.: *d*. female in ventral view. *Myobia capensis* sp. nov.: *e*. female in dorsal view.

Lawrence records this mite as attacking man in Cape Town where members of the municipal staff working in the city hall were bitten on the hands and arms by large numbers of mites coming down

the walls, from the pigeons nesting in the roof. It is a parasite of the domestic fowl, the canary and the pigeon, in South Africa and other countries and is a harmful species, a number of instances of it attacking man being known.

Liponyssus bacoti Hirst.

During the last few years specimens of *L. bacoti* have been received at the South African Institute for Medical Research from several outbreaks of dermatitis among workers in Johannesburg, Germiston, Port Elizabeth and Ladysmith. The outbreaks in Johannesburg approached a minor epidemic in nature and appeared to coincide with a vigorous anti-rat campaign which was undertaken by the City Health Authorities. In every case there was either a history of rats having been trapped in the building or in an adjoining one. The Germiston outbreak occurred in a soft goods store where no rat trapping had been undertaken, the invasion of the store by the mites apparently having happened suddenly. The Health Department found the premises to be heavily infested with rats. In Port Elizabeth the outbreaks occurred in a boot factory where the mites were actually found between the leathers which are used for making the "uppers" of shoes.

From the Johannesburg outbreaks it appears that *L. bacoti* attacks man when its normal host, the rat, has been destroyed or reduced in numbers. Under these circumstances the mite appears to migrate and suddenly invades premises occupied by human beings. This is the generally accepted view. There seems no doubt, however, that outbreaks do occurr in the absence of trapping. In such circumstances it is possible that sheer pressure of population causes the mite to migrate. There is some evidence for this idea. In 1943 Mr. D. H. S. Davis of the Union Health Department began a survey of the ectoparasites of rats caught in Johannesburg and large numbers of *L. bacoti* were collected.

The following table gives figures of trappings over a period of one month during the time when a number of cases of human dermatitis were reported.

Date	No. rats examined	No. rats with mites	Total No. mites
10.11.43	6	1	3
11.11.43	23	1	2
12.11.43	24	4	73
13.11.43	21	3	109
14.11.43	No trapping done		
15.11.43	20	4	22
16.11.43	No ectoparasites were present.		
*17.11.43	5	3	112
18.11.43	20	1	5
19.11.43	25	5	97
20.11.43	15	1	7
21.11.43	No trapping done.		

22.11.43	12	Mites absent.	
23.11.43	16	1	6
24.11.43	1	1	6
25.11.43	10	1	5
26.11.43	9	6	74
27.11.43	4	Mites absent.	
28.11.43	No trapping done.		
29.11.43	3	Mites absent.	
30.11.43	5	4	31
1.12.43	22	3	12
*2.12.43	23 (21 unweaned)	2 (adults)	22
3.12.43	37	No mites but a large number	
4.12.43	No rats caught in traps.		[of fleas.
5.12.43	No trapping done.		
6.12.43	14	2	19
7.12.43	11	1	1
8.12.43	7	1	1
9.12.43	13	1	21
10.12.43	5	2	25

It is interesting to note that Ingram reported no *L. bacoti* from Johannesburg rats when he did his survey in 1927 (2). It is possible that he did not collect mites but we feel certain that he would have done so had they been present in large numbers, as he collected them from other rodents at all times.

We also received specimens from the late A. Cuthbertson collected by H. Evans, with the information that these had been caught attacking man and causing irritation in Southern Rhodesia. Other records in our collection are as follows: 19 ♀♀ and 1 nymph from *Rattus rattus,* Ngqeleni Location, Transkei, Cape Province, 18.11.43 (D. H. S. Davis and B. de Meillon). 8 ♀♀ and 1 nymph from *Rattus rattus,* Holfontein, Kroonstad, Orange Free State, January — February, 1939 (D. H. S. Davis). 5 ♀♀ from floor sweepings, Holfontein, Kroonstad, Orange Free State, February, 1939 (D. H. S. Davis).

Liponyssus bursa Berlese.

Specimens of a mite attacking troops embarking horses at one of South Africa's ports have been sent in for determination and identified as the above species (3). It is a widely distributed acarine and has been reported as attacking man in Zanzibar, India and Australia. There is also a record by Hirst of this mite occurring on fowls at Mfongosi, Zululand.

Liponyssus latiscutatus sp. nov. (Fig. 5. a).

♀. Dorsal shield shaped as shown in figure. Sternal shield placed between coxae II. Anterior border straight and forming two antero-

* 67 of the mites collected on the 17.11.43 and 10 on the 2.12.43 are a new species of *Liponyssus* described in this paper.

lateral processes projecting between coxae I and II; lateral margin concave; with three pairs of setae as shown in figure. First pair of setae on anterior edge; second pair nearer first than third and arising a short distance from lateral edge; third pair on extreme posterior angle of shield. Metasternal shields scarcely visible; with metasternal setae inserted at level of centre of coxa IV. Anal shield drop-shaped; paired setae normal; posterior seta situated well back; terminal prolongation of shield showing fine longitudinal striations. Very large spine on anterior border of coxa II; coxa II with toothlike spine on posterior edge; coxa III with two larger similar spines; a smaller spine on posterior border of coxa IV. Setation of dorsal surface of legs as follows; trochanter I with a small seta; femur I with two stronger setae distally; femur III with two strong and one weaker setae; femur IV with one strong seta distally. Tarsus II with two very short, strongly chitinised ventral blunt spines distally. Measurements: Length (not including mouthparts) 68μ. Breadth 46μ.

Close to *L. otomys* Radford but differing in the position of the sternal shield and the genital aperture. Moreover the legs are longer and coxa IV bears a distinct spine which is not present in Radford's species. The new species resembles *L. otomys* in the shape of the dorsal shield and the general arrangement of the spines on the legs. It also bears some resemblance to *L. arcuatus* C. L. Koch in the spinulation of the coxae and the shape of the ventral plate. The dorsal plate is however much smaller in the new species.

Type ♀ from *Rattus rattus*, Newtown, Johannesburg, Transvaal. 17.11.43 (D. H. S. Davis). Also 66 ♀♀ from the same host and locality taken together with the type, and 10 ♀♀ from same host and locality 2.12.43. It is of interest to note that no *L. bacoti* were found on these two rats though other rats caught on the same day from the same locality were parasitised by *L. bacoti*.

Manisicola africana Lawr.

1 ♀ from Scaly Ant Eater, Rustenburg, Transvaal, 24.4.30 (G. A. H. Bedford). The specimens from which this species was described were obtained from the same host, in the National Zoo and the snake park at Cape Town. The Pangolin in the snake park had been there for a week having arrived from the Northern Transvaal. The present record is apparently the first one of this mite having been recovered from its host in the field.

Myonyssoides spinosus sp. nov. (Fig. (Fig. 5. b, c).

♀. Ovate with broadest region posteriorly. Sternal shield broader than long, roughly rhomboidal in shape with three pairs of setae. First pair arising on anterior border; second pair approximately midway between anterior and posterior pair on inner lateral margin; third pair arising slightly anterior to posterior edge. In young females genito-ventral shield shaped as cross section of high loaf; separated by small space from anal shield. In mature female shield

shaped as shown in figure; almost contiguous with anal shield. Anal shield very large, dome-shaped bearing twenty-seven setae arranged as shown in figure. Anus well defined; Anal setae distinct. Metasternal plates not visible. Legs stout, very setose; setae strong. Coxa I with a ventral peglike process on inner lateral margin; on slight protuberance on posterior edge, a strong spinelike seta; anteriorly on coxa II a large spinelike process projecting forwards and with a strong spine posteriorly. Coxa III with a strong spinous seta anteriorly; a strong spine posteriorly. Tarsi of all legs more strongly setosed than other segments. At base of capitulum a bifurcated chitinised structure. Peritreme well marked, opening between coxa III and IV.

Measurements: Length (not including mouthparts) 76μ. Breadth 54μ.

♂. Similar to female but differing in certain respects. Genitoventral shield with four pairs of setae arranged as shown in figure. Metasternal shield bearing one seta. Spines on coxae I, II, III stronger than in female. 29 instead of 27 setae on the anal plate. Femur II with a strong ventral thornlike process; patella II with a much smaller protuberance ventrally. Tarsus and tibia of legs II, III and IV armed with spines. Distal penultimate segment of palp with conspicuous seta. Mouthparts differing considerably from the female plan; moveable arms of chelicerae two flap like structures.

Measurements: Length (not including mouthparts) 55μ. Breadth 36μ.

Nymph. Elongated. Dorsal shield oblong-oval with sparse spinulation, leaving considerable area of dorsum uncovered. Anal shield large, coffee-bean shaped. Sternal shield lamp-glass shaped; with four pairs of setae. Metapodal plates distinct; large roughly triangular with edges rounded. Spinulation of legs resembling that of female. Peritreme very short extending from level of middle of coxa III to middle of coxa IV.

Measurements: Length (not including mouthparts) 70μ. Breadth 38μ.

The species described above is the second of the hitherto monotypic genus *Myonyssoides* described by Hirst. It is stouter and more spinous than *M. capensis* Hirst. The ventral peglike process on coxa I, so characteristic of the genus is not " squarish " as in Hirst's species but shaped rather like a "bonnet rouge" of the French revolutionaries. The bifurcated spinous structure at the base of the capitulum is more marked in *M. capensis.*

Type ♀ from a mole probably *Amblysommus hottentottus,* Eshowe, Zululand, 30.12.34 (B. de Meillon). Also 18 ♂♂ and 3 ♀♀ from the same host and locality. There are also specimens from a mole, Ngqeleni, Transkei, Cape Province, consisting of 11 ♂♂, 3 ♀♀ and 1 nymph (B. de Meillon and D. H. S. Davis) and 18 ♂♂ and 1 nymph from a mole, Escombe, Natal, 5.1.39 (M. Lavoipierre).

PARASITIDAE.

Laelaps longiventris sp. nov. (Fig. 5. d).

♀. An elongated and small species. Not strongly pigmented, sparsely provided with a few hairs. Dorsal shield covering nearly whole of dorsum. Sternal shield broader than long, shaped as shown in figure. Usual three pairs of setae. First pair on outer anterior edge; second pair equidistant between first and third; third pair in posterior angle, a short distance from posterior edge. Genito-ventral shield rather oblong-ovate with broadest region situated posteriorly; bearing four pairs of setae. First pair arising just within border; next two pairs on inside edge; last pair on outer border. Posterior edge of ventral shield almost contiguous with anterior edge of anal plate. Arrangement of setae on sternal plate as follows: Anterior setae a short distance from anterior edge; second pair arising halfway between first and third, a short distance from the border; third pair within posterior angle of shield. Anal plate large and heart-shaped with anus situated in the centre. Paired setae fairly long and terminal seta longer. At hinder end of plate a small crescentic area of longitudinal serrations. Across posterior portion of anal plate in type and paratypes a transverse line continued on either side of plate for a short distance. Chaetotaxy of legs apparently normal. No spine on coxa I; coxa II with a slender spine.

Measurements: Length (not including mouthparts) 48μ. Breadth 28μ.

A distinct species differing from other African species in its very small size and the shape of the coxal platelet. The absence of prominent spines on any of the coxae is also a noteworthy character.

Type ♀ from *Myosorex* sp., Gowies Kloof, Albany, Cape Province, 9.2.40 (South African Zoological Survey). Also three ♀♀ from the same host and locality.

Spinturnix semilunaris sp. nov. (Fig. 4. a, b).

♂. Jugular plate small, elongated in lateral plane, much broader than long, sausage-shaped. Sternal plate as shown in figure, with posterior edge slightly lobed; with reticulate pattern. Dorsal shield large broadly elliptical, provided with only a few small setae. First, second, third and fourth pair of setae on outer margin of ventral shield. Setae on venter fine and scarce. Peritreme continued for a short distance ventrally. Hypostome short and fairly elongated. Tooth at base of claw slightly developed. Each leg, on dorsal aspect at distal end of tarsus bears a large stout broadly lanceolate median seta; on either side two smaller slightly lanceolate setae. Setae on dorsal surface of legs and non-pigmented parts of dorsum very long, strong and barbellate. Encircling body as dorsal crown, rows of stout conical teeth-like projections with apices facing towards centre of mite.

Measurements: Length (not including mouthparts) 76μ. Breadth 60μ.

♀. Jugular plate well developed, apparently not strongly pigmented; crescentic with horns directed anteriorly; anterior border slightly concave. Sternal plate blunt heart-shaped; coarsely reticulated; bearing three pairs of marginal setae. Two pairs of punctations present. Genito-ventral area very strongly pigmented; almost forming a genito-anal plate consisting of long squamiform scales separated by non-pigmented areas, giving a striated appearance. Dorsal plate not as strongly pigmented as in male. Palpi long, hypostome slightly longer than in male. Otherwise resembling male. Measurements: Length (not including mouthparts) 56μ. Breadth 48μ.

A species close to *S. verspitilionis* L. and showing some relationship to *S. psi* Kolenati. Differing in the broader jugal plate, in the shape of the sternal shield in the male and in the size and shape of the jugal plate and the genito-anal chitinisation in the female. Resembling *S. verspitilionis* in the general morphology of the sternal plate and the punctations of the sternal shield of the female. The genito-anal pigmentation of this species makes it very distinct. In this respect it differs from all other described species. It is of interest to note that this is the first species of *Spinturnix* to be described from Southern Africa.

Type ♂ from *Miniopterus natalensis* Smith, Fountains, Pretoria, Transvaal, 3.2.40 (South African Zoological Survey). Also taken with type 3 ♂♂ and 4 ♀♀.

SARCOPTIDAE.

Notoedres notoedres Méigen.

A long series of all stages including ♂♂, ♀♀, nymphs, larvae and eggs from *Rattus rattus*, Burghersdorp, Johannesburg, 20.3.44 (Dr. Martinaglia). This mite was found in nodules on the ears, tails and genitalia of the hosts. It is apparently much commoner than it was thought to be in this country, as the condition has been known for a number of years to Dr. Martinaglia and others who have examined rats. As far as we are able to ascertain only one previous record of this mite occurring in Southern Africa exists, that of Bedford's (4) from Basutoland.

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