

ON A COLLECTION OF ANOPHELES MADE AT ONDERSTEEPPOORT IN THE AUTUMN OF 1909.

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THE mosquitos recorded in this paper were collected in connection with some experiments to trace the carrier of horse-sickness, which was suspected (though not proved) to be an anopheles.

The collection was brought together from three sources; some of the insects were reared from the larvae, others caught in the house, the rest were taken in the mosquito trap, but all were collected within one mile of each other.

The mosquito trap is a movable wood and iron erection, which stands down in a swamp. It is constructed so as to serve as a stable for a horse; at one end is a manger, above this a window of wire mosquito gauze, at the other end is the door divided in two, with a wire gauze window above. On the sides, which are openable, are iron rails to prevent damage being done by the horse to the roller blind shutters, by which the sides can be closed. In practice a horse was placed in the trap an hour before sunset, the roller blinds on the sides being then raised about 18 inches. The blinds were left open overnight, being closed just before daybreak. In the morning the horse was first removed from the trap, the mosquitos then collected. With this trap it has been possible to obtain a supply of mosquitos even in May, and by utilizing a horse suffering from horse-sickness, to be certain to get insects infected with the disease.

For collecting purposes I use an incandescent gas cylinder, covered at one end with gauze, closed at the other end by a rubber stopper; a tube made out of a test tube with the bottom cut off passes through the stopper and projects about 5 cm. into the cylinder and the same distance outwards. This tube can be plugged with cotton wool after collecting.

A mosquito passing through the tube into the cylinder will hardly ever find its way out again, thus quite a number can be collected into the cylinder without any danger of losing those already caught.

From records kept by the Government Entomologist and the Government Veterinary Bacteriologist, it appears that the following species of anophelines have already been taken in the Transvaal, and identified by Mr. F. T. Theobald:—

Pyrethrophorus	..	Costalis	..	..	Loew.
		Cinereus	..	..	Theobald.
		Marshallii	..	..	Theobald.
		Aureosquamiger	..	..	Theobald.

Myzomyia	Funesta	Giles.
	Rossii	Giles (this record is doubtful).
Myzorhynchus ..	Mauritianus ..	Grandpré.
Nyssorhynchus ..	Pretoriensis ..	Theobald.
	Maculipalpis ..	Giles.
Cellia	Squamosa	Theobald.
To this list I must add :		
Myzomyia	Rhodesiensis ..	Theobald.
Myzorhynchus ..	Natalensis	Hill and Haydon.
	Pretoriensis, var.	
	rufipes, n. var.	
Cellia	Argenteolobata, n. sp.	
	Pretoriensis, n. sp.	

I have not seen *Myzomyia rosi* nor *Nyssorhynchus maculipalpis*. The culices taken have not yet been worked out; however, a new locality record for *Stegomyia argenteopunctata* can be mentioned here, five having been taken at Onderstepoort. Three species of cellia were taken, which can be differentiated by the following key:—

- (1) Basal lobes black above; basal lobes densely covered with white scales. *Cellia argenteolobata*, n. sp.
- (2) Last segment covered above with yellow scales as on other segment of abdomen. *Cellia squamosa*, Theobald.

Last segment with prominent white scales on upper surface. *Cellia pretoriensis*, n. sp.

Cellia squamosa.—A single damaged specimen, No. 104, can be referred to this species. Taken at the end of March, it agrees fairly well with Theobald's description.

Cellia argenteolobata, n. sp.—Seven specimens (female), Nos. 107, 124, 125. Taken end of March, 1st, 6th, 13th, and 29th of April.

Head, entire upper surface covered with upright white forked scales and a few black bristles, similar black scales on the sides. Two tufts of long white hairs project between the eyes. Eyes black with silvery margin.

Antennae, dark brown or black, with black hairs and white flat scales on the first nine joints, pubescence on the remaining joints, white. Palpi with long black scales, with a few scattered white ones, and four rings of white scales, the apical one very narrow. Proboscis black.

Thorax, dark brown, with a median black line, almost covered with white narrow scales arranged more or less in lines or bands, and with black bristles.

Pleura, dark brown, with three white lines forming a Z, white flat scales above the bases of the legs. Legs, femur, tibia, and metatarsus dark brown to black in front, mottled with white, white behind metatarsus, and first joint of tarsus of first leg apically banded with white, last three tarsi black. Metatarsus and tarsus of two hind-legs uniformly very dark brown to black.

Abdomen, densely covered above with dull ochraceous scales and with black bristles, lateral tufts of black scales. Last segment covered above with similar white scales; basal lobes covered above with white, below with black scales. Under side of abdomen largely clothed with white scales.

Wings, black and white; costa, black with three larger white spots, a minute apical and two small basal spots. The apical spot is continued on to the first vein, as are the three larger spots, a smaller white spot midway between

the outer two large costal spots; a similar one between the inner two larger costal spots is situated at two-thirds distance from middle and one-third from large spot. Basal portion of first vein pure white. The second vein has a minute whitish spot at its base, a similar one at the fork, the upper branch is tipped with white (as are the veins), the lower branch is white with the exception of its middle third.

The stem of the fourth vein is dusky to black, a small whitish patch at the fork, two small white patches on each upper and lower branches. The stem of the fifth vein is white for its first third, followed by a black patch half as long, then follows a white patch of the same size as the basal one; the last sixth of the stem is black, as is the fork. The upper branch has two short white patches in addition to the terminal spot, the lower branch one long white patch near the base, and a terminal white spot. The sixth vein has two white patches and a terminal spot, being more black than white. Fringe smoky with white (or lighter) patches opposite most of the veins.

Evidently distinct from *Cellia squamosa* and *Cellia jacobii* by the white terminal segment and terminal lobes, scales on head, colour of thorax and legs, and from *Cellia squamosa* by the parti-coloured fringe.

TABLE OF VARIATIONS.

No.	Light Fringe Spots Opposite.	No. of Spots on First Vein.	No. of Spots on Anterior Branch of V5.
107.. ..	I, 2A, 2B, 5B, 6	7	3
124.. ..	All	8	2
125.. ..	Fringe damaged, 4A, 4B, 5A, 5B, 6	7	3
216.. ..	Fringe damaged, 4A, B, 5A, B, 6..	7	3

Cellia pretoriensis, n. sp.—Eighteen specimens taken in March and April.

Head, similar to sp. 2; thorax, slate coloured, with a black median line, two curved black lines on either sides converging in front; covered by somewhat scattered narrow curved white scales arranged more or less in lines or bands, and with black bristles, especially along the lateral black lines.

Abdomen, black, with dark brown and ochraceous flat scales and black lateral tufts. Hairs black. Last segment above with flat white scales, denser apically. Basal lobes covered with black scales.

Legs, femur and tibia, dark brown, mottled with creamy in front, creamy to yellow behind. Metatarsus dark brown to yellow, with a few lighter scales, and a light apical ring, first two tarsi of each leg apically banded with lighter, terminal tarsus dark brown to brown.

Wings, black and white, markings rather variable (see table). The tips of most of the veins, usually of all, are white.

On the costa are an apical white spot, three larger white spots, and two small basal ones. The apical and the three larger spots spread on to the first vein, which has in addition a small white spot near the first larger spot (reckoning from the apex), but between spots one and two. A similar small

spot near spot 3, but between 2 and 3, and a white base. The number of spots on the first vein varies, however, between five and eight. The second vein is mostly black, as are also the third and fourth (for spots, see table of variations). The fifth has two large white patches on the stem, and a large one on each branch (in addition to the terminal spots). The sixth vein has two large white patches in addition to the terminal spot. The fringe always has white patches opposite some of the veins. In some specimens there is a white patch opposite each vein.

This species can be recognized from *Cellia squamosa* and from *Cellia jacobi* by the head and antennae, thorax, and terminal segment of abdomen and by the mostly black third vein. From *Cellia squamosa*, in addition, by the fringe; and from *Cellia jacobi* by the legs.

TABLE OF VARIATIONS.

No. of Spec.	Fringe Spots Opposite.	White Tips to Veins.	White Spots on Veins.											
			1	2	2A	2P	3	4	4A	4P	5	5A	5P	6
100	0	All	7	0	1	3	3	1	3	3	2	2	2	3
101	1, 2A, 2P, 5	All	7	2	3	1	2	1	3	3	2	3	2	3
102	1, 2A, 2P, 3, 5P	All	7	2	2	3	4	1	3	3	2	3	2	3
103	Damaged ..	1, 4P, 4P, 6 ..	7	2	0	1	2	2	1	1	2	2	1	3
106	1, 2A, 2P, 3, 5P	All	7	0	2	2	2	1	2	2	3	3	2	3
108	Damaged ..	1, 2A, 6 ..	7	0	2	3	1	2	0	0	2	2	1	3
109	1, 2, 5P ..	2P, 3A, 4AP, 5AP, 6	6	2	0	1	2	0	3	2	2	2	3	3
110	All except 5A	All except 2P ..	7	3	1	1	4	4	2	2	2	3	2	3
111	Damaged 5P	All	7	0	1	2	2	2	2	2	2	2	2	3
112	Damaged ..	1, 2A, 4A, P, 5P ..	7	0	1	2	2	0	1	1	2	3	3	2
113	Damaged ..	All	7	0	1	1	2	0	1	1	1	3	2	3
114	1, 2A, P, 4P, 5P	1, 2A, P, 3, 4A, P, 5A, 6	7	2	1	1	3	1	3	2	2	3	1	3
116	Damaged ..	Damaged 6 ..	7	1	0	1	2	2	0	0	2	1	1	3
119	Damaged ..	All	5	0	1	2	2	2	2	3	2	2	2	3
147	2A, P, 3, 4P, 5A	2A, 4A, P, 5A, P, 6	5	3	1	2	1	3	1	1	2	3	2	3
155	Damaged ..	All	7	0	1	2	3	1	3	3	2	3	2	3
158	1, 2A ..	All except 2P and 3	7	0	1	1	2	0	3	3	2	3	2	3
165	All	5, B, 6	5	0	1	2	2	0	2	2	2	2	2	3

NOTE.—Every spot of white, be it ever so small, has been counted; for instance, in 102, vein 3 has four white spots recorded, the vein is, however, almost entirely black. The fringe spots are not quite reliably recorded. The fact that they are not recorded for any particular vein may mean that the fringe is missing at that part; they have been recorded only where seen.

On the branches of veins 2, 4, and 5, the apical spot has in each case been included; 2, second vein; 2A, anterior branch of second vein; 2P, posterior branch of second vein.

Nyssorhynchus pretoriensis, *Theobald*.—Six males and eight females taken from 5th to 21st April. The males are not quite so densely scaled as the females.

Counting the apical spot the costa has constantly six white spots, the first vein seven. Two females (133 and 136) have four white bands on the palps, the others have three.

Nyssorhynchus pretoriensis, var. *Rufipes*, n. var.—Two females, 134 and 140, vary from the rest in some particulars.

Their legs are not spotted with white, but are uniform ruddy brown; the tarsus of the first leg is not annulate, and the stem of the second vein is three-spotted.

TABLE OF VARIATIONS.

No.		Spots on.										
		2	2A	2P	3	4	4A	4P	5	5A	5P	6
79	.. Female	1	1	1	2	1	3	3	2	3	2	3
76	.. Male	2	1	1	3	1	3	3	3	2	3	3
86	.. Male	2	2	1	3	1	2	2	3	2	2	3
87	.. Male	2	1	2	3	0	2	2	3	3	2	3
132	.. Male	2	1	2	3	0	2	3	1	3	2	3
145	.. Male	2	1	2	2	0	2	3	3	3	2	3
133	.. Female	1	0	1	3	0	2	3	2	3	2	2
134	.. Female	3	1	2	3	1	3	3	2	3	2	3
135	.. Female	2	1	2	3	0	2	3	1	3	2	3
140	.. Female	3	1	1	3	1	2	2	2	4	1	3
71	.. Female	3	1	1	2	1	2	3	2	3	1	4
136	.. Female	2	0	0	2	1	2	3	3	2	3	2

No. 186 is not included, being too denuded to allow satisfactory counting.

Myzomyia funesta.—A single female taken 6th April, 1909.

Myzomyia Rhodesiensis.—A single female taken end of March.

The white spots on the first vein are not quite symmetrical. On the left wing there is a white spot on the first vein under each costal spot; on the right wing the middle spot is missing on the first vein, although present on the costa.

Pyretophorus costalis.—One hundred and fifty-three specimens, of which nineteen males, taken March to May. This is the commonest anopheline at Onderstepoort in March and April.

The dorsum of the last abdominal segment of the males is regularly clothed with small flat yellow scales.

The wing markings of *Pyretophorus costalis* resembles those of *Pyretophorus merus* to such an extent, judging from the figure in Theobald, vol. 3, p. 79, that it is difficult to see what the difference between the two species is supposed to be. In addition, the palps and the legs appear from the descriptions given by Theobald to be practically the same in both species.

The slight difference in the description of the legs of the two species lies well within the range of variations of my species.

The legs of my specimens show all variations from dark brown with clearly defined rounded light spots, to brown mottled with whitish. The banding of the tarsi is also rather variable, being very prominent in some examples, in others less so. In some cases this is due to the colours of the bands not contrasting very vividly with the ground colour of the legs.

Pyretophorus cinereus.—Five females taken from the end of March to the middle of April.

I find, as Hill and Haydon did, that there are constantly two small yellow spots at the base of the costa, and bright patches where all the veins except the sixth join the border. A very small yellow apical spot is also always present in the costa. The wing markings vary a little.

Pyretophorus marshallii.—Two females taken in March and beginning of April. Both damaged (long flown).

Pyretophorus ardensis.—Two females taken 18th April, 1909, and 3rd May, 1909.

Pyretophorus aureosquamiger, *Theobald*.—A single female taken 2nd May, 1909.

Head, covered with upright scales, white in front, passing through grey to black behind, a double tuft of long white hairs in front projecting over the bases of the antennae.

Antennae, brown, with white hairs and pubescence. White flat scales on the first five joints. Palpi black, with three white rings, a narrow apical one at the end of the first joint, a broad one covering the apex of the second and base of the third, and a broad one covering the apex of the third and the whole of the fourth joint.

Proboscis, black with light brown tip. Thorax slate grey above, with three narrow black stripes, the median twice as broad as the other two, dark brown on the sides with a horizontal white line running to the base of the wings. Pleura with three white stripes arranged in a Z. Legs dark brown, almost black.

Femur and tibia mottled with lighter gold brown, the contrast in the two colours being very slight, with very narrow apical bands or patches of white. Metatarsus dark brown, with broad white apical ring. Tarsus of first and second pairs with broad white apical bands to all joints except to the distal two, tarsus of hind legs, first joint for the first three-quarters brown, apex and last quarter white; second joint brown at the base, the rest and the two ultimate joints pure white.

Abdomen, dark brown, densely covered above with longer and shorter golden hairs, the longer ones towards the sides, the shorter towards the middle. Lower surface scantily strewn with scattered brown hairs, a flat scale here and there (not more than six).

The wings have the general appearance of a *Pyretophorus costa* with four yellowish patches, black being predominant, apex yellowish, a small black spot in the middle of the curve of the wing spreads on to the first vein and interior branch of second vein, the second black patch commences just proximally of the curve and spreads on to the first vein, being interrupted from the middle to the inner quarter. The second black patch is about twice as long as the third yellowish patch.

The third black patch is rather longer than the second; it spreads evenly on to the first vein; it is followed by a very short light patch; the proximal portion of the costa is black, the black spreading only at its distal extremity on to the first vein, which is light at its base. The second vein has a dark spot on each side of the cross vein and a dark spot on each of the branches; the fork is light.

The third vein is light except a small black spot at the tip, and a small black spot on each side of the cross veins.

The fourth vein has a dark patch distally to the cross veins; two dark patches on the upper and two on the lower.

The fifth vein has a long black patch commencing at the fork on the interior branch, followed by a light dot and a dark spot, again followed by a light spot, tip black, lower branch with a black dot near the tip. Sixth vein with three dark spots, middle one largest, proximal one minute; the veins are all tipped with yellow, and all except the posterior branch of the second have a small spot near the margin.

Fringe, apex yellow, a black spot between the branches of the second vein, next black spot after the third vein, rest black with a yellow spot at t

termination of each vein. The first fork cell is much longer than the second, its fork being considerably nearer the base of the wing than that of the second.

The specimen differs in some respects from the two described by *Theobald*, and may possibly be distinct. The flat white scales on the under surface of the abdomen make this species appear to be a connecting link between the genera *Pyretophorus* and *Myzorhynchus*; the white ends to the hind-legs also somewhat suggest a relationship to the latter genus.

Myzorhynchus natalensis.—Eight females taken from March to May, 1909. The species agree well with *Hill* and *Haydon's* description. However, I find that the long curved white scales projecting from the clupeus above the antennae form two very distinct tufts (or a forked tuft), each tuft consisting of about six hairs. The flat scales on the ventral surface of the abdomen are to be seen on two specimens, both engorged ones. These scales are apparently hidden in fasting specimens, they are very widely scattered, and white in colour. *Hill* and *Haydon* were consequently correct in assigning this insect to the genus *Myzorhynchus*, although they had not seen these scales, which are distinctive of the genus. *Theobald's* definition of the genus is not invalidated by the species.

TABLE OF VARIATIONS.

Number.	Number of Bands on Palp.	Apical Spot on Costa.	Number of Spots on First Vein.
143	5	Present	6
152	4	Absent	5
131	4	Present	7
137	5	Present	7
141	5	Absent	6
No number ..	7	Present	7

NOTE.—The proximal of the basal spots on the first vein is sometimes white.

Myzorhynchus mauritianus.—Four females taken in March and the first week of April.

TABLE OF VARIATIONS.

Number.	Apex of Palp.	Rings on Palp, exclusive Apex.	
122	Black	3	The species varies considerably in size and markings. In these specimens the two white spots on the costa and first vein were constant, as also the spreading of the apical white spot on 2A.
127	White	3	
138	Black	3	
126	White	1	
118	Black	3	
130	White	3	
144	White	3	
149	Black	0	
157	White	3	
115	White	3	
129	White	1	
128	White	3	
123	White	2	
120	Black	3	