A Full Description of the Adult, Pupa and Larva of *Anopheles (Cellia) cameroni* De Meillon and Evans, from the Cape Province, South Africa

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ABSTRACT. The adult, pupa and larva of *Anopheles (Cellia) cameroni* DeMeillon & Evans, from the southern Cape, South Africa, are fully described and comparisons are made with *Anopheles rhodesiensis* Theobald. The egg remains unknown.

INTRODUCTION

Anopheles cameroni from Fish Hoek, near Cape Town, was described in 1935 from one female and associated pupal pelt, both in bad condition (De Meillon & Evans 1935, De Meillon 1947). This species was regarded as being very closely related to *A. rhodesiensis* because of similarities in the pharynx. Subsequent attempts by Dr. Hesse of the South African Museum and his assistants to collect more material were unsuccessful.

In January and December 1978, large numbers of larvae were collected from sunlit rock pools in the Palmiet river near Kleinmond, some 50 kilometers from the type locality. Mortality was high but a few adult *A. cameroni* and *A. rhodesiensis* with associated pelts were obtained.

MATERIALS AND METHODS

The following description is based on 15 females and three male *A. cameroni*. Full setal counts of 15 pupae and six larvae were done following the format of Belkin (1962). Comparisons with one male and one female *A. rhodesiensis* from the same locality are made, though the specimens are not in good condition. The illustrations were drawn from several specimens.

DESCRIPTION

ADULT (Fig. 1)

Head and palps: as in *A. rhodesiensis*. *Pharynx:* as in *A. rhodesiensis* but the teeth with terminal spicules which are finely drawn out. *Mesonotum:* clothed in fine hairs with a few hair-like scales extending back from the anterior promontory to a greater distance than in *A. rhodesiensis*. *Legs:* dark with a few pale scales at the apices of the tibiae. Some specimens also have distinct pale scales at the apices of the hind tarsomeres. *Wings:* costa and 1st vein with large pale areas; apical pale spot extending to the 3rd vein; wing field with well marked pale spots present at the bases of the fork cells and near the cross-veins; apex of the upper branch of the 5th vein pale, sometimes extending onto the fringe; lower branch of the 5th vein without pale area. *Male terminalia:* coxites with a few scales laterally and ventrally; five parabasal spines; harpago slightly pointed, club expanded and bent inwards, apical

hair longer than club, inner and outer accessory hairs of equal length more than half the length of the apical hair; phallosome with about four pairs of leaflets, some of which are finely serrated.

Full setal counts of the pupae and larvae are given in Tables 1 and 2. In the descriptions which follow only the setae that are considered to be of specific importance are given.

PUPA (Fig. 2)

Integument: brown to dark brown. *Cephalothorax:* seta 8 with 2-4 branches; 10 with 2-5 branches; 12 with 2-7 branches. *Abdomen:* seta 2-I, 5-9 branches; 3-II, 3-6 branches; 9-II, III small and stubby; 9-IV, spine-like, about 0·3 length of segment; 9-VII about 0.6 length of segment; 4-III, 4-8 branches; 7-III, 4-8 branches; 6-VII, 2-4 branches. *Paddle:* lateral fringe extending to within 0.4 of base of paddle and up to, but not beyond, apical hair, composed entirely of long hairs; 2-P with 2-5 branches.

LARVA (Fig. 3)

Head: darkly pigmented; antennae almost black with spicules of equal length sparsely distributed over the whole antenna; setae 2,3-A attenuate, serrate on one edge; 4-A, 3-5 branches; 2-C long, simple, bases widely separated; 3,4-C simple, slightly shorter than 2-C. *Thorax:* setae 1,2-P well developed, mounted on large fused tubercles; 1-M with 28-40 branches; 13-M, 7-11 branches; 5,7,8-T with approximately 25-35 branches; 10-P,M,T simple. *Abdomen:* setae 6,7-I,II with 20-30 branches; 6-III, 20-25 branches; 4-IV, 3-5 branches; 11-V, 4 branches; 5-VI, 6-9 branches; 8-VI, 4-6 branches; 1-3 accessory abdominal plates on segments V-VII; pre-spiracular plate prominent, as pigmented as the other plates.

EGG. Unknown.

DISCUSSION AND SUMMARY

The adults of *A. cameroni* and *A. rhodesiensis* are easily separated by the spots on the wing field as described by Gillies & De Meillon (1968). The original description of *A. cameroni* includes a pale area on the lower branch of the 5th vein which is absent in our material. The male terminalia of *A. cameroni* differ in having an inner accessory hair on the harpago which is absent in *A. rhodesiensis*.

The obvious pupal differences are: a) *A. cameroni* has hairs only on the external border of the paddle, while *A. rhodesiensis* has spines changing gradually to hairs; b) setae 9-II,III are small and stubby and 9-IV is spine-like, 0.3 the length of segment V in *A. cameroni*. In *A. rhodesiensis* they get progressively larger with 9-IV only about 0.25 the length of V.

In the larva, the posterior clypeals hairs of *A. cameroni* are almost the same length as the inner clypeals, while in *A. rhodesiensis* they are 0.5-0.7 as long. *A. cameroni* does not have a group of spicules on the basal third of the inner border of the antennae markedly longer than the rest. Setae 6,7-I, II,III of *A. cameroni* are much more heavily branched than those of *A.*

rhodesiensis from the same locality. (However, *A. rhodesiensis* larvae from the northern Transvaal do not show such a marked difference in the branching.)

ACKNOWLEDGMENTS

We thank Mr. K. Newberry for the tremendous support and encouragement he gave us, his help with the illustrations and his comments on the manuscript; Dr. S. Neser of Plant Protection, Stellenbosch, for his help in collecting the material; Dr. B. de Meillon for his expert advice and opinions; Dr. M. Gillies for his comments on the manuscript; the Director and staff of this Institute for their help and support; and finally, the Secretary for Health for permission to publish.

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TABLE 1. Range of setal branching of 15 *A. cameroni* pupae.

Seta	Branches	Seta	Branches	Seta	Branches
Cephalothorax		**Metanotum**		**Abdomen I**	
1	2 - 3	10	2 - 5	2	5 - 9
2	1 - 3	11	2 - 5	3	1
3	2 - 4	12	2 - 7	4	3 - 6
4	3 - 5			5	1 - 3
5	4 - 6			6	1 - 6
6	2 - 5			7	3 - 6
7	1 - 3			9	1 - 2
8	2 - 4				
9	1 - 3				
Abdomen II		**Abdomen III**		**Abdomen IV**	
0	1 - 2	0	1	0	1 - 2
1	6 - 12	1	4 - 9	1	3 - 7
2	2 - 6	2	3 - 6	2	2 - 6
3	3 - 6	3	3 - 7	3	4 - 6
4	4 - 8	4	4 - 8	4	2 - 6
5	2 - 5	5	6 - 11	5	5 - 9
6	1 - 4	6	2 - 5	6	2 - 3
7	4 - 6	7	4 - 8	7	3 - 5
8	1 - 4	8	3 - 5	8	2 - 4
9	1	9	1	9	1
		10	2 - 4	10	1 - 3
		11	1 - 2	11	1
		14	1	14	1
Abdomen V		**Abdomen VI**		**Abdomen VII**	
0	1	0	1 - 2	0	1 - 2
1	1 - 2	1	1 - 3	1	1 - 2
2	2 - 4	2	2 - 4	2	2 - 4
3	2 - 5	3	1 - 3	3	2 - 4
4	3 - 6	4	1 - 3	4	1 - 3
5	3 - 8	5	3 - 7	5	1 - 7
6	1 - 3	6	1 - 3	6	2 - 4
7	2 - 4	7	1 - 3	7	1 - 2
8	2 - 4	8	2 - 4	8	2 - 5
9	1	9	1 - 2	9	1 - 2
10	1 - 3	10	2 - 4	10	2 - 5
11	1 - 2	11	1 - 2	11	1 - 3
14	1	14	1 - 2	14	1 - 2
Abdomen VIII		**Paddle**			
0	1	1	1		
4	2 - 3	2	2 - 5		
9	8 - 16				
14	1 - 2				

TABLE 2. Range of setal branching of six *A. cameroni* larvae.

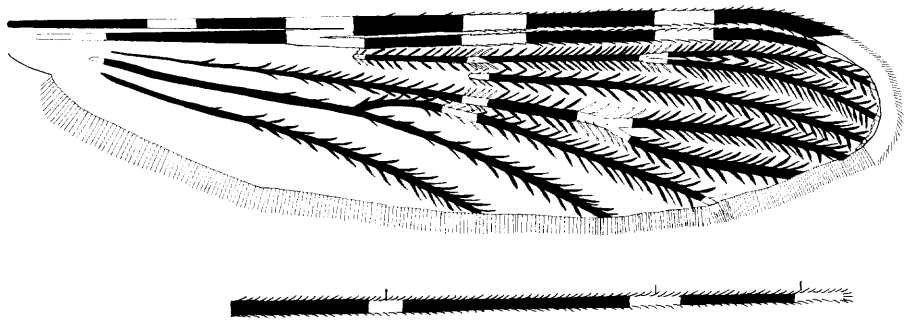
Seta	Branches	Seta	Branches	Seta	Branches
Head		Prothorax		Mesothorax	
0	1	0	1	1	28 - 40
1	1	1	14 - 22	2	2 - 4
2	1	2	11 - 22	3	1
3	1	3	1	4	1 - 3
4	1	4	16 - 18	5	1 - 2
5	9 - 12	5	31 - 33	6	3 - 5
6	7 - 12	6	1	7	3 - 5
7	12 - 16	7	26 - 28	8	20 - 24
8	1 - 2	8	27 - 28	9	3 - 5
9	2 - 4	9	1	10	1
10	2 - 3	10	1	11	1
11	28 - 31	11	3 - 4	12	1 - 2
12	2 - 4	12	7 - 10	13	7 - 11
13	6 - 8	13	3 - 6	14	7 - 10
14	9 - 12	14	3 - 6		
15	8 - 9				
6MP	12 - 14				
A 1	1				
A 4	3 - 5				
Metathorax		Abdomen I		Abdomen II	
1	2 - 4	1	7 - 11	0	1
2	1	2	2 - 3	1	16 - 21
3	12 - 17	3	1 - 2	2	5 - 11
4	3 - 4	4	3 - 6	3	1
5	26 - 35	5	3 - 5	4	5 - 6
6	3 - 4	6	22 - 26	5	5 - 7
7	25 - 31	7	21 - 27	6	23 - 29
8	30 - 35	9	5 - 10	7	24 - 29
9	6 - 12	10	3 - 4	8	4 - 6
10	1	11	4 - 6	9	7 - 11
11	1	12	3 - 5	10	3 - 4
12	2 - 3	13	7 - 11	11	2 - 4
13	3 - 5			12	3 - 4
				13	5 - 9
				14	1 - 2

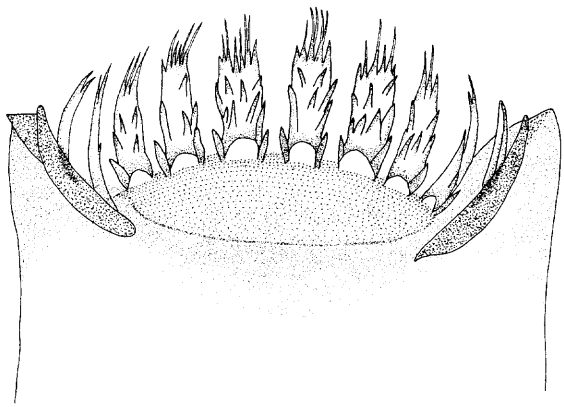
TABLE 2. (Continued)

Seta	Branches	Seta	Branches	Seta	Branches
Abdomen III		Abdomen IV		Abdomen V	
0	1	0	1	0	1
1	19 - 22	1	18 - 22	1	18 - 21
2	4 - 6	2	1 - 2	2	1 - 2
3	1	3	2 - 3	3	1
4	4 - 6	4	3 - 5	4	3 - 4
5	5 - 6	5	4 - 6	5	4 - 8
6	20 - 25	6	3 - 6	6	3 - 6
7	4 - 6	7	5 - 6	7	4 - 5
8	3 - 5	8	3 - 4	8	3 - 5
9	5 - 10	9	5 - 9	9	5 - 10
10	2 - 4	10	3	10	2 - 4
11	2 - 3	11	2 - 3	11	4
12	4 - 5	12	4 - 5	12	3 - 4
13	3 - 7	13	4 - 5	13	4 - 5
14	1 - 3	14	1 - 3	14	1 - 2
Abdomen VI		Abdomen VII		Abdomen VIII	
0	1	0	1	0	1
1	16 - 21	1	16 - 20	1	1 - 3
2	1 - 2	2	3 - 4	2	9 - 10
3	1	3	2 - 3	3	7 - 10
4	1	4	1	4	2 - 4
5	6 - 9	5	6 - 10	5	5 - 7
6	3 - 5	6	4 - 7	6	3 - 5
7	3 - 4	7	4 - 5	8	4 - 6
8	4 - 6	8	3 - 5	9	4 - 6
9	5 - 10	9	5 - 9	14	1
10	3 - 4	10	5 - 7		
11	3 - 4	11	2 - 3	Pecten	
12	2 - 3	12	2 - 3	1	5 - 10
13	6 - 9	13	3 - 5	2	7 - 10
14	1 - 3		Saddle hair simple.		
1 - 3 accessory abdominal plates on segments V - VII					

Fig. 1

Anopheles (Cellia) cameroni

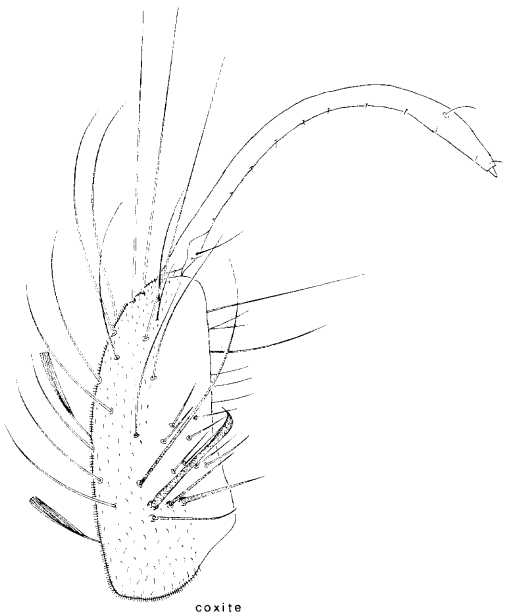


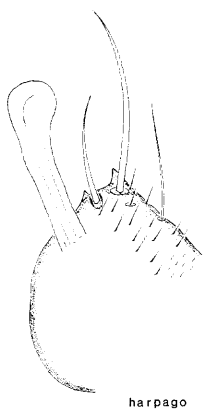


female

pharynx

male terminalia





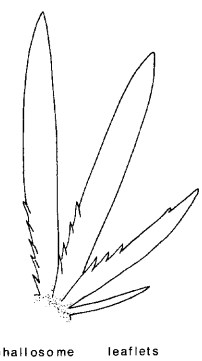
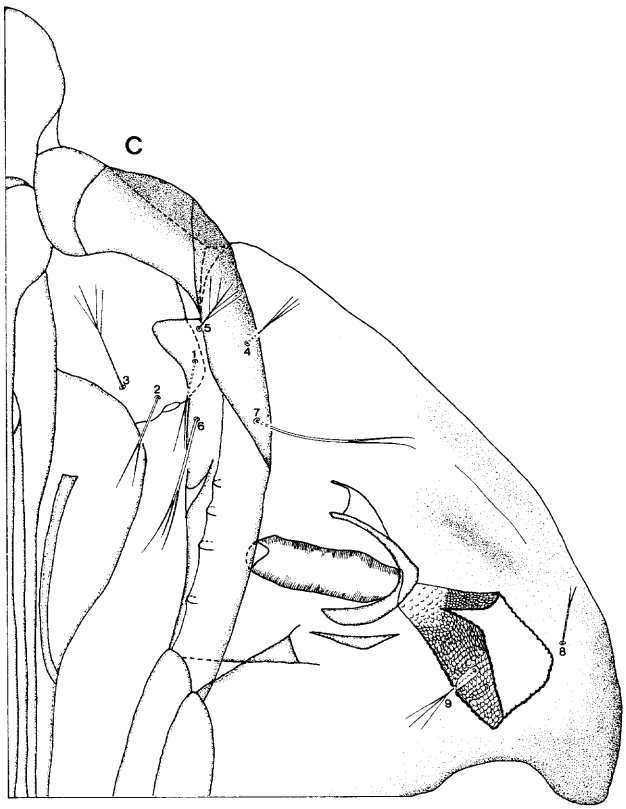
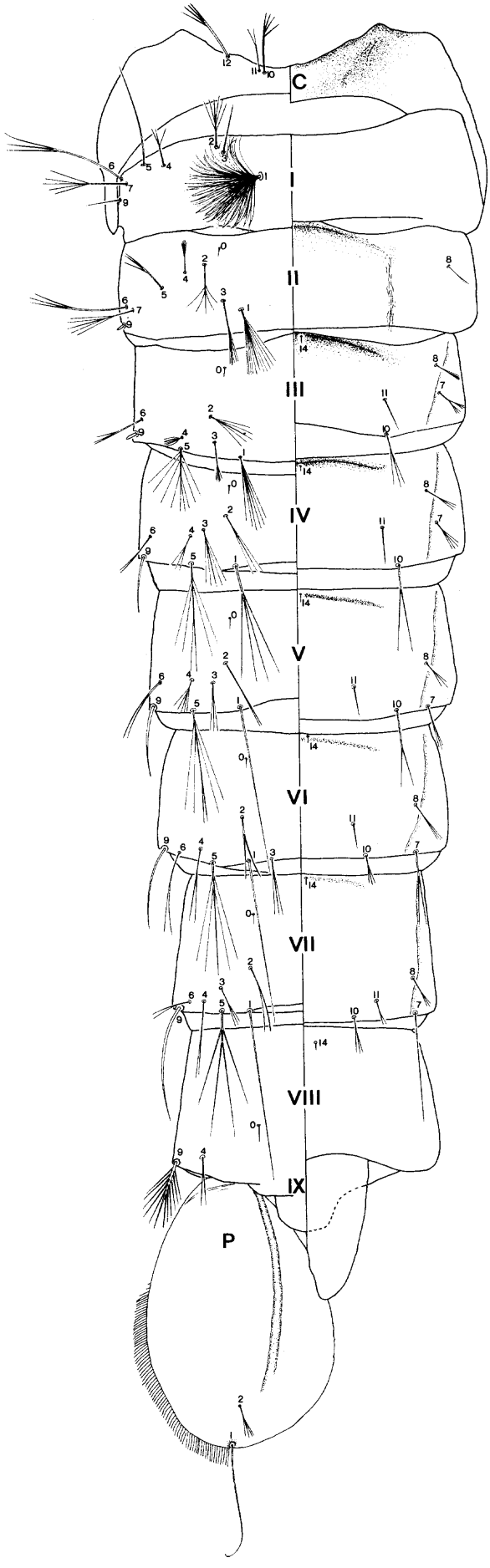


Fig. 2





Anopheles (Cellia) cameroni — pupa

Fig. 3

Anopheles (Cellia) cameroni — larva