

SYSTEMATICS AND BIONOMICS

OF THE SCORPIONS OF

SOUTH WEST AFRICA

(Arachnida, Scorpionida)

SUBMITTED IN TWO VOLUMES

VOLUME 2

Tables, Figures and Plates

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Table 2.4. Classification of the 14 vegetation types of South West Africa. (After Coaton & Sheasby 1972).

TYPE	KEY DESCRIPTION
1	Northern Namib (DESERT)
2	Central Namib (DESERT)
3	Southern Namib (DESERT)
3A	Desert and Succulent Steppe (DESERT & STEPPE)
4	Semi-desert and Savanna Transition (SAVANNA)
5	Mopane Savanna (SAVANNA)
6	Mountainous Savanna and Karstveld (SAVANNA)
7	Thornbush Savanna (SAVANNA)
8	Highland Savanna (SAVANNA)
9	Dwarf Shrub Savanna (SAVANNA)
10	Saline Desert with Dwarf Shrub Savanna Fringe (DESERT & TRANSITION)
11	Woodland and Forest Savanna: Northern Kalahari (WOODLAND SAVANNA)
12	Camelthorn Savanna: Central Kalahari (SAVANNA)
13	Mixed Tree and Shrub Savanna: Southern Kalahari (SAVANNA)

Table 2.2. Soil categories classified according to hardness ranges expressed as penetration force ranges. See also Lamoral, 1978, appendix 2.

Categories	Penetration force ranges in kg cm ⁻²	Categories	Penetration force ranges in kg cm ⁻²
I	0.02-0.1	XII	8.1- 9
II	0.11-0.5	XIII	9.1-10
III	0.51-1.0	XIV	10.1-12
IV	1.01-1.5	XV	12.1-14
V	1.51-2.0	XVI	14.1-16
VI	2.1 -3	XVII	16.1-18
VII	3.1 -4	XVIII	18.1-20
VIII	4.1 -5	XIX	20.1-22
IX	5.1 -6	XX	22.1-24
X	6.1 -7	XXI	24.1-26
XI	7.1 -8	XXII	26.1-28

Table 2.3. Results obtained from soil sample analyses and soil hardness readings. Soil textural classes worked out from fig. 2.1. See also Lamoral, 1978, appendix 2.

Sample	Clay (%)	Silt (%)	Sand (%)	Soil textural class	Range of penetrometer readings in kg cm ⁻² as a measure of soil hardness	
					Surface	Bottom of burrow
1	7	12.7	80.3	Sandy loam	15-17	14-16
2	8.5	5.6	85.9	Loamy sand	23-25	23-25
3	8.5	8.5	83	Sandy loam	3-4	3-4
4	5.6	2.8	91.6	Sand	1.5-2	1.5-2
5	14.1	7.1	78.8	Sandy loam	3-3.5	3-3.5
6	12.7	33.9	53.4	Silt loam	4-5	2-3(*)
7	2.8	Nil	97.2	Sand	1-1.5	1.5-2
8	8	10	82	Sandy loam	8-9	4-5(*)
9	2.8	8.5	88.7	Loam sand	1.8-3	2-4
10	5.6	2.8	91.6	Sand	2.5-3.5	2.5-3.0
11	Nil	1.4	98.6	Sand	1.5-2	1.5-2
12	1.4	Nil	98.6	Sand	0.3-0.5	0.4-0.7

* Slightly damp soil.

Table 2.1. Distribution of South West African scorpions according to habitat predilections

Habitat	Key description	Genera	Number of species	%
underground or in caves	Endogean EUEDAPHIC	<u>Lisposoma</u>	1	2
Burrows dug in soil	Fossorial HEMIEDAPHIC	<u>Opisthophthalmus</u>	24	43
Shallow scrapes under rocks	Infralapidicolous HEMIEDAPHIC	<u>Lisposoma</u> <u>Buthotus</u> <u>Parabuthus</u> <u>Uroplectes</u> <u>Karasbergia</u>	22	37
rock crevices and fissures	Infrasaxicolous and lithoclasicolous HEMIEDAPHIC	<u>Hadogenes</u> <u>Uroplectes</u>	5	9
under bark of trees and on vegetation ranging from shrubs to the largest trees	Supra- and infracorticicolous EPIGEIC	<u>Buthotus</u> <u>Parabuthus</u> <u>Uroplectes</u>	5	9

Table 1.1. Summary of number of infrageneric taxa revised and outcome.

Genera	Number of infrageneric taxa previously described	Number of species recognised as valid (no subspecies retained)	Number of new species in this work	Resulting number of species for the fauna
<u>Buthotus</u>	3	2	-	2
<u>Karasbergia</u>	1	1	-	1
<u>Parabuthus</u>	17	10	4	14
<u>Uroplectes</u>	10	9	1	10
<u>Hadogenes</u>	5	3	-	3
<u>Lisposoma</u>	1	1	1	2
<u>Opisthophthalmus</u>	33	19	5	24
Total for each column	70	45	11	56

Table 2.5. Approximate areas of climatic regions of South West Africa (After Barnard, 1965, and Köppen, 1931)

Main type	Region	Climatic Code	Area in square kilometres	%
Cool Desert	Namib Coast	BW kln	57630	7
	Central Plateau	BW kw	24700	3
	Southern Plateau	BW kx'	8230	1
Warm Desert	Namaland	BW hw	189360	23
	Namib Interior	BW ht'w	98800	12
	Eastern Kaokoveld	BW hgw	32930	4
	Orange basin	BW hx'	24700	3
Steppes	Damaraland	BS hw	164660	20
	Central Highlands	BS kw	8230	1
	North and North-East	BS hgw	214058	26

Meaning of symbols used in climatic code above

- B: General dry zone in which evaporation exceeds precipitation
- W: Desert
- S: Semi-desert or steppes
- h: average annual temperature above 18° C
- k: average annual temperature below 18° C
- g: warmest month in early summer
- t': warmest month in early autumn
- l: all monthly averages between 22° and 10° C
- w: summer rains
- x': scarce, intense rainstorms throughout the year
- n: regular mist.

Table 3.1. Orthobothriotaxies of type A (Buthidae) and C (Scorpionidae), see text.

TYPE A : BUTHIDAE Total number of fundamental δ = 39				TYPE C : SCORPIONIDAE Total number of fundamental δ = 48	
Segments	Surface	Number of δ	Codes	Number of δ	Codes
FEMUR	internal	4	i_1 i_2 i_3 i_4	1	i
	dorsal	5	d_1 to d_5	1	d
	external	2	e_1 e_2	1	e
	ventral	0		0	
TIBIA	internal	1	i	1	i
	dorsal	5	d_1 to d_5	2	d_1 d_2
	external	7	eb_1 eb_2 esb_1 esb_2 em est et	13	eb_1 to eb_5 esb_1 esb_2 em_1 em_2 est et_1 et_2 et_3
	ventral	0		3	V_1 V_2 V_3
HAND	dorsal	0		2	Db Dt
	external	6	Eb_1 Eb_2 Eb_3 Esb Est Et	10	Eb_1 Eb_2 Eb_3 Esb Est Et_1 to Et_5
	ventral	2	V_1 V_2	4	V_1 to V_4
FIXED FINGER	internal	1	it	2	ib it
	dorsal	2	db dt	4	db dsb dst dt
	external	4	et est esb eb	4	et esb est et

Table 3.2. Key to trichobothrial codes used in table 3. 1. and elsewhere in the text and figures

Codes	Keys	Surface	Segments
i d e	internal dorsal external	internal dorsal external	FEMUR
i d eb esb em est et V	internal dorsal external basal external suprabasal external median external subterminal external terminal ventral	internal dorsal external ventral	TIBIA
Db Dt Eb Esb Est Et V	dorsal basal dorsal terminal external basal external suprabasal external subterminal external terminal ventral	dorsal external ventral	HAND
it db dsb dst dt eb esb est et	internal terminal dorsal basal dorsal suprabasal dorsal subterminal dorsal terminal external basal external suprabasal external subterminal external terminal	internal dorsal external	FIXED FINGER

Table 3.3. Key to hemispermaphore abbreviations

ar,	axial rib	ha,	hook apex
bc,	basal cleavage	hn,	hook notch
bl,	basal lobe	il,	inner lobe
BP,	basal portion	lcr,	lateral crest
bsh,	basal scallop of hook	ll,	lateral lobe
dcr,	distal crest of distal lamina	ml,	median lobe
dcrdl,	distal crest of distal lobe	mtc,	median transverse cleavage
dl,	distal lobe	mtt,	median transverse trough
DL,	distal lamina	ol,	outer lobe
dr,	diagonal rib	pbrf,	pars bireflecta
dtDL,	dorsal trough of distal lamina	pr,	pars recta
dth,	dorsal trough of hook	prf,	pars reflecta
eccr,	ectal crest of distal lobe	salmh,	sub-apical lateral margin of hook
h,	hook	w,	waist

Table 4.1 Buthotus conspersus, measurements in mm. A, from Thorell's (1877: 43-44) original description; B, Thorell's rediscovered ♀ type; C, ♀ Homotype (N M 9045).

Parts Measured	A	B	C
Total body length	39,00	39,00	42,00
Carapace length	5,66	5,60	5,60
Posterior width of carapace	6,75	6,80	7,00
Anterior width of carapace	3,33	3,25	3,10
Metasoma (tail) length	24,00	24,00	25,00
Cauda I length	3,00	3,00	3,00
Cauda I width	3,00	3,05	3,15
Cauda II length	3,25	3,30	3,30
Cauda III length	3,50	3,55	3,60
Cauda IV length	4,00	4,00	4,10
Cauda V length	5,00	5,00	5,20
Telson length	5,25	aculeus broken	5,60
Telson width	2,80	2,80	2,90
Telson height	2,80	2,80	2,70
Pedipalp femur length	4,75	4,80	4,70
Pedipalp tibia length	5,33	5,40	5,50
Hand length	9,00	9,10	9,10
Hand back length	3,50	3,30	3,00
Hand back width	1,75	1,70	1,60
Fixed finger length	5,75	5,80	6,10
Movable finger length	6,50	6,50	6,50

Table 4.2. CHARACTER STATES SEPARATING SPECIES OF OPISTHOPHTHALMUS FROM SOUTH WEST AFRICA

CHARACTER STATES	<u>gigas</u>	<u>haackei</u>	<u>brevicauda</u>	<u>ugabensis</u>	<u>carinatus</u>	<u>litoralis</u>	<u>cavimanus</u>	<u>opinatus</u>	<u>new species A</u>	<u>intercedens</u>	<u>fitzsimonsi</u>	<u>new species C</u>	<u>schultzei</u>	<u>adustus</u>	<u>new species B</u>	<u>setifrons</u>	<u>chrysites</u>	<u>wahlbergi</u>	<u>new species D</u>	<u>new species E</u>	<u>concinus</u>	<u>holmi</u>	<u>jenseni</u>	<u>flavescens</u>
CARAPACE																								
1. Anterior median suture: (1) present; (2) absent.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
2. Median eyes position: (1) antero-medial; (2) postero-medial; (3) distinctly posterior; (4) intermediate to (2) and (3).	3	3	4	4	4	4	2	2-4	2	2	2	2	4	2	2	4	2	2	2	1	1	1	1	4
3. Interocular surface: (1) granular; (2) smooth or very nearly so.	2	2	1	2	2	2	1	1-2	♂, ♀	2	1	1-2	2	1	1	2	2	2	2	♂, ♀	1	♂, ♀	1	2
4. Lateral surfaces: (1) granular; (2) smooth or very nearly so.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	♂, ♀	1	♂, ♀	1	1
5. Postero-medial surface: (1) granular; (2) smooth or very nearly so	1	1	1	1	2	1	1	1	1	2	1	2	2	1	1	2	1	2	2	♂, ♀	2	♂, ♀	1	1
6. Superciliary crests: (1) shallow; (2) well developed.	1	1	2	1	1	2	1	2	2	2	2	2	1	1	1	2	2	1	2	1	♂, ♀	1	1	2
7. Median eyes size: (1) small (2) large.	1	1	1	1	2	2	1	1	2	1	1	2	1	1	1	1	1	1	2	2	♂, ♀	2	1	2
8. Median eyes, distance apart: (1) greater than eye diameter; (2) equal to or less than eye diameter.	1	1	1	1	2	2	1	1	2	1	1	2	1	2	1	1	1	2	2	2	♂, ♀	2	1	1
PEDIPALP CHELA																								
9. l.m.f./l.h.b. ♂: (1) 1,20-1,40; (2) 1,41-1,60; (3) 1,61+.	3	2	2	2	2	2	2	1-3	1	1	1	-1	1	1	1	3	1	2	2	-1	-1	-1	-1	3
10. l.m.f./l.h.b. ♀: (1) 1,10-1,20 (2) 1,21-1,30; (3) 1,31+.	3	1	3	3	3	3	3	2-3	1	1	3	-	3	1	1	3	1	3	3	-1	2	-1	-	3
11. Upper surface handback: (1) smooth or very shallowly reticulated; (2) granular.	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	♂, ♀	2	2	2	2
12. Finger keel: (1) predominantly costate; (2) predominantly granular; (3) indistinct.	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	♂, ♀	3	3	3	1

TABLE 4.2. continued

CHARACTER STATES	<u>gigas</u>	<u>haackei</u>	<u>brevicauda</u>	<u>ugabensis</u>	<u>carinatus</u>	<u>litoralis</u>	<u>cavimanus</u>	<u>opinatus</u>	<u>new species A</u>	<u>intercedens</u>	<u>fitzsimonsi</u>	<u>new species C</u>	<u>schultzei</u>	<u>adustus</u>	<u>new species B</u>	<u>setifrons</u>	<u>chrysites</u>	<u>wahlbergi</u>	<u>new species D</u>	<u>new species E</u>	<u>concinus</u>	<u>holmi</u>	<u>jenseni</u>	<u>flavescens</u>
STERNITES																								
24. VII in ♂: (1) smooth; (2) granular; (3) with transverse ridges; (4) with reticulated transverse ridges or pitted.	1	1	1	1	1-3	1	3	1	1	3	1	2	3	2	1	3	4	1	1	4	1	2	2	1
25. VII in ♀: (1) ibid.; (2) ibid.; (3) ibid..	1	1	1	1	1	1	1	1	1	1	1	-	1	2	1	3	1	1	1	1	1	2	-	1
CAUDAL SEGMENTS																								
26. I, dorsal surface in ♂: (1) smooth; (2) granular.	2	2	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2	2	2	2
27. I, dorsal surface in ♀: (1) smooth; (2) granular.	2	2	1	1	1	1	1	2	1	2	1	-	2	1	1	2	1	1	1	1	2	2	-	1
28. I, dorsal keels: (1) absent to obsolete; (2) present and distinct.	2	1	2	2	1	2	1	2	1	1	1	1	1	2	1	2	2	1	2	1	1	1	1	2
29. I, ventral keels: (1) absent to very obsolete; (2) costate.	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
30. I, ventro-lateral keels: (1) absent to very obsolete; (2) costate.	2	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
31. I, ventral surface in ♂: (1) smooth; (2) granular; (3) with transverse ridges; (4) reticulated ridges or pitted.	1	1	1	1	1-3	1	3	1	1	3	1	2	3	2	1	3	4	1	1	4	1	2	2	1
32. I, ventral surface in ♀: (1) ibid.; (2) ibid.; (3) ibid..	1	1	1	1	1	1	1	1	1	1	1	-	1	2	1	3	1	1	1	1	1	2	-	1
33. II, dorsal keels: (1) absent to obsolete; (2) present and distinct.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	2
34. II, ventral keels: (1) absent to very obsolete; (2) costate.	2	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
35. II, ventro-lateral keels: (1) absent to very obsolete; (2) costate.	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	♂, ♀	2	1	1	2	1	1	2

TABLE 4.2. continued

CHARACTER STATES	<u>gigas</u>	<u>haackei</u>	<u>brevicauda</u>	<u>ugabensis</u>	<u>carinatus</u>	<u>litoralis</u>	<u>cavimanus</u>	<u>opinatus</u>	<u>new species A</u>	<u>intercedens</u>	<u>fitzsimonsi</u>	<u>new species C</u>	<u>schultzei</u>	<u>adustus</u>	<u>new species B</u>	<u>setifrons</u>	<u>chrysitos</u>	<u>wahlbergi</u>	<u>new species D</u>	<u>new species E</u>	<u>concinuus</u>	<u>holmi</u>	<u>jenseni</u>	<u>flavescens</u>
48. V, dorsal surface in ♂; (1) smooth; (2) granular.	1	1	1	1	1	1	1	2	2	2	1	2	2	1	1	2	1	1	1	1	1	2	2	1
49. V, dorsal surface in ♀: (1) smooth; (2) granular.	1	1	1	1	1	1	1	1-2	1	1	1	-	1	1	1	2	1	1	1	1	1	1	-	1
50. V, dorsal keels: (1) absent; (2) partially developed; (3) distinct along entire length.	3	2	♂, ♀	2	2	3	♂, ♀	3	1	2	2	2	3	3	1	2	3	2	2	1	1	1	1	2
51. V, ventral keel: (1) absent or indistinct from adjacent granules; (2) single row of granules.	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	2
52. V, ventro-lateral keels: (1) granular; (2) spiniform or denticulate.	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2
53. V, ventro-lateral keels: (1) posteriorly convergent; (2) posteriorly divergent; (3) sub-parallel to each other.	2	2	2	2	2	2	2	2	2	3	2	3	2	2	1	3	3	3	2	1	1	1	1	2
54. V, ventral intercarinal surface: (1) sparsely granular; (2) granular.	2	2	2	2	1	1	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2
55. V, lateral profile of ventral surface: (1) shallowly concave; (2) shallowly convex; (3) sublinear.	2	2	2	2	2	2	2	2	2	1	2	3	2	2	3	2	1	2	3	3	1	3	1	2
TELSON																								
56. Vesicle ventral surface: (1) smooth; (2) lightly to distinctly granular.	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1
57. Vesicle lateral surface: (1) smooth; (2) lightly to distinctly granular.	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
58. Vesicle shape: (1) globose; (2) elongated.	1	1	2	2	2	2	2	1	1	2	2	2	2	2	1	2	2	1	1	2	2	2	2	1
LEGS																								
59. Protarsi I and II, posterior surface with: (1) row of 3-4 spine-like setae; (2) a few stiff setae; (3) many scattered setae; (4) comb-like row of stiff setae.	1	1	1	1	1	3	1	1	1	2	1	1	1	4	1	1	4	4	3	4	4	4	4	3

TABLE 4.2. continued

CHARACTER STATES	<u>gigas</u>	<u>haackei</u>	<u>brevicauda</u>	<u>ugabensis</u>	<u>carinatus</u>	<u>litoralis</u>	<u>cavimanus</u>	<u>opinatus</u>	<u>new species A</u>	<u>intercedens</u>	<u>fitzsimonsi</u>	<u>new species C</u>	<u>schultzei</u>	<u>adustus</u>	<u>new species B</u>	<u>setifrons</u>	<u>chrysites</u>	<u>wahlbergi</u>	<u>new species D</u>	<u>new species E</u>	<u>concinus</u>	<u>holmi</u>	<u>jenseni</u>	<u>flavescens</u>
60. Tarsi III, ventral anterior row of spine-like setae: (1) absent; (2) present + number in brackets.	2(3)	2(3)	2(2)	2(3)	2(2)	2(2)	2(3)	2(2)	2(2)	2(1)	1-2(1)	2(1)	2(1)	1	2(1)	1	1	1	2(2)	2(1)	1	1	1	2(2)
61. Tarsi III, ventral posterior row of spine-like setae: (1) absent; (2) present + number in brackets.	2(7)	2(7)	2(5)	2(6)	2(5)	2(5)	2(6)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(3)	2(3)	2(4)	2(3)	2(4)	1-2(2)	2(2)	2(3)
62. Tarsi IV, ventral anterior row of spine-like setae: (1) absent; (2) present + number in brackets.	2(3)	2(3)	2(2)	2(3)	2(2)	2(2)	2(3)	2(2)	2(2)	1	1	1	2(2)	1	1	1	1	1	2(2)	1	1	1	1	2(2)
63. Tarsi IV, ventral posterior row of spine-like setae: (1) absent; (2) present + number in brackets.	2(7)	2(7)	2(5)	2(6)	2(5)	2(5)	2(6)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(5)	2(4)	2(3)	2(4)	2(4)	2(4)	1-2(2)	2(2)	2(3)
64. Tarsi III and IV, ventral surface with: (1) no setae; (2) few setae; (3) many setae.	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	3	2	2
65. Tarsi lateral claws shape: (1) short and distinctly curved; (2) long and distally curved; (3) long and distally sublinear.	1	1	1	1	1	2	1	1	1	2	3	2	1	3	1	1	2	2	1	2	2	3	3	3
66. Tarsi I-II lateral claws length within each pair: (1) equal; (2) unequal.	1	1	1	1	1	2	1	1	2	2	2	1	1	2	1	2	2	2	1	1	2	2	2	2
67. Tarsi III-IV, lateral claws length within each pair: (1) equal; (2) unequal.	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2
68. Tarsi median dorsal lobe, length in relation to lateral lobes: (1) equal or subequal; (2) distinctly shorter.	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	1
69. Carapace, anterior furcated suture: (1) trifurcate, long and distinct; (2) bifurcate, short, obsolete to distinct; (3) absent	3	3	3	3	2	2	2	2	2	2	2	2	2	3	3	1	3	3	3	3	3	3	3	3
70. Cauda II, ventral surface in ♂: (1) smooth; (2) granular (3) with transverse ridges; (4) punctate	1	1	1	1	1	1	3	1	1	3	1	2	3	2	1	3	2	1	1	4	1	2	2	1

Table 4.3. Characters subject to variations within distribution range of adults of Opisthophthalmus carinatus.

Locality	Sex	Number of pectinal teeth	Transverse wrinkles on Sternite VII and cauda I; += present; -= absent; +/- intermediate
Kaoko Otavi, Kaokoland	♂	18-20	+
Kaoko Otavi, Kaokoland	♂	19-20	+
South western Angola	♂	23-23	+
Outjo	♂	24-23	+
Homob, Etosha Park	♂	21-22	+
Aus, Etosha Park	♂	21-22	+/-
Gobabeb, Namib Desert Park	♂	26-26	+
Windhoek	♂	28-27	+
Windhoek	♂	21-21	+
Windhoek	♂	23-22	+/-
Aus, Luderitz district	♂	25-26	+/-
Rundu, Kavango	♂	26-26	+/-
Otjikoto, Tsumeb district	♂	25-25	+/-
Ghohab, SE of Rehoboth	♂	23-23	+/-
Gautshe Pan, Bushmanland	♂	26-27	-
Gobabis	♂	27-28	-
Keetmanshoop	♂	27-29	-
Mata Mata, Gemsbok Park	♂	29-30	-
Mata Mata, Gemsbok Park	♂	25-26	-
Kaoko Otavi, Kaokoland	♀	14-15	-
Sesfontein, Kaokoland	♀	17-17	-
Dunedin, Kaokoland	♀	12-12	-
South western Angola	♀	17-17	-
Outjo	♀	18-18	-
Aus, Etosha Park	♀	18-18	-
Emeritus, Karibib district	♀	16-16	+/-
Gobabeb, Namib Desert Park	♀	19-19	-
Windhoek	♀	16-16	+/-
Windhoek	♀	17-17	-
Tsumeb	♀	14-15	-
Rehoboth	♀	18-18	-
Mata Mata, Gemsbok Park	♀	18-20	-

Table 4.4. Characters subject to clinal variations within distribution range of adults of Opisthophthalmus opinatus. Morphometric data listed as means.

CHARACTERS		Northern region	Intermediate region	Southern region (South of 26° of latitude)
Total body length in mm	♀	110	70	55
	♂	115	75	60
Carapace length in mm	♀	15,5	12,5	9,2
	♂	14,5	11,5	8,2
$\frac{l.c.}{x}$	♀	1,70	1,80	1,88
	♂	1,68	1,81	1,90
Interocular surface granulation	♀	Smooth occasionally with a few granules	lightly granular	granular
♂				
Number of pectinal teeth per pecten	♀	19	16	13
	♂	23	21	19
$\frac{w.h.b.}{l.c.}$	♀	0,80	0,85	0,85
	♂	0,70	0,78	0,79
$\frac{l.m.f.}{l.h.b.}$	♀	1,36	1,27	1,20
	♂	1,70	1,45	1,30
HEMISPHERMATOPHORE				
ha-w dist.X100				
dcr-w dist.		36,0	32,0	30,0
ha-bsh dist.X100				
ha-w dist.		45,0	36,0	30,0
ha-bsh dist.X100				
dcr-bsh dist.		22,0	15,0	10,0

TABLE 5.2. CHARACTER STATES SEPARATING SPECIES OF PARABUTHUS FROM SOUTH WEST AFRICA

CHARACTER STATES	<u>brevimanus</u>	<u>kuanyamarum</u>	<u>new species A</u>	<u>new species C</u>	<u>granulatus</u>	<u>kalaharicus</u>	<u>villosus</u>	<u>brachystylus</u>	<u>raudus</u>	<u>schlecteri</u>	<u>stridulus</u>	<u>laevifrons</u>	<u>kraepelini</u>	<u>new species B</u>
1. Cauda IV, ventral and lateral keels: (1) present; (2) absent.	2	2	2	2	1	1	1	1	1	1	1	1	1	1
2. Adult general size: (1) small; (2) large.	1	1	1	1	2	2	2	2	2	2	2	2	2	2
3. Sexual dimorphism in shape of proximal middle lamella of pectines in adults: (1) virtually absent; (2) present and distinct.	2	2	2	1	1	1	2	2	2	2	2	2	2	2
4. Cauda IV, median lateral keel: (1) absent to posteriorly obsolete; (2) present but poorly developed; (3) present, well developed and distinct.	1	1	1	1	1	1	3	3	3	3	2	2	3	3
5. Telson vesicle: (1) reduced in size; (2) not reduced.	2	2	2	2	1	1	2	2	2	2	2	2	2	2
6. Cauda V, accessory dorsal crest in adult σ^7 : (1) absent; (2) present, poorly developed and with blunt tubercles; (3) present, always distinct and with spiniform tubercles.	1	1	1	1	1	1	3	3	3	3	2	2	2	2
7. Cauda II, dorsal stridulatory area: (1) not reaching posterior margin; (2) reaching posterior margin.	2	2	2	2	1	1	1	2	1	1	2	2	2	2
8. Caudal segments width: (1) cauda I wider than IV; (2) cauda I narrower than IV.	1	1	1	1	1	1	1	1	2	2	1	1	1	1
9. Cauda I-V and telson: (1) sparsely pillose; (2) densely pilose.	1	1	1	1	1	1	2	2	1	1	1	1	1	1
10. Pedipalp tibia, δ esb ₂ : (1) level with or slightly distal to esb ₁ ; (2) distinctly distal to esb ₁ .	1	1	1	1	2	2	2	2	2	2	1	1	2	2
11. Cauda IV-V, lateral intercarinal surfaces: (1) smooth; (2) granular.	2	1	2	2	2	2	2	2	2	2	1	1	2	2
12. Sternites: (1) smooth; (2) punctate.	1	1	2	2	1	1	1	1	1	1	1	1	1	1
13. Pedipalp femur, δ e ₁ : (1) almost halfway between δ d ₄ and d ₅ ; (2) level with or distal to δ d ₅ .	1	1	2	2	2	2	2	2	2	2	2	2	2	1
14. Cauda V, distal half of ventro-lateral keels: (1) with lobate processes; (2) with spinose processes.	1	2	2	2	1	2	2	2	2	2	2	1	1	1
15. Pedipalp hand movable finger length of σ^7 : (1) short ($l_{mf}/l_{hb} \pm 1,50$); (2) long ($l_{mf}/l_{hb} \pm 2,00$).	1	1	1	2	2	1	2	2	2	2	1	1	2	2
16. Tergites I-VI, median keels: (1) present; (2) absent.	1	1	1	1	1	2	1	1	2	1	1	1	2	1
17. Cauda V, ventro-lateral keels: (1) converging distally; (2) diverging distally; (3) subparallel distally.	2	1	1	1	1	1	3	3	1	2	1	1	2	2
18. Telson vesicle dorsoproximal surface: (1) deeply excavated along longitudinal half; (2) very shallowly excavated.	2	2	2	2	2	2	2	2	2	2	1	2	2	2
19. Legs IV length: (1) very long; (2) moderately long.	2	1	1	1	2	1	2	2	2	2	1	2	2	1

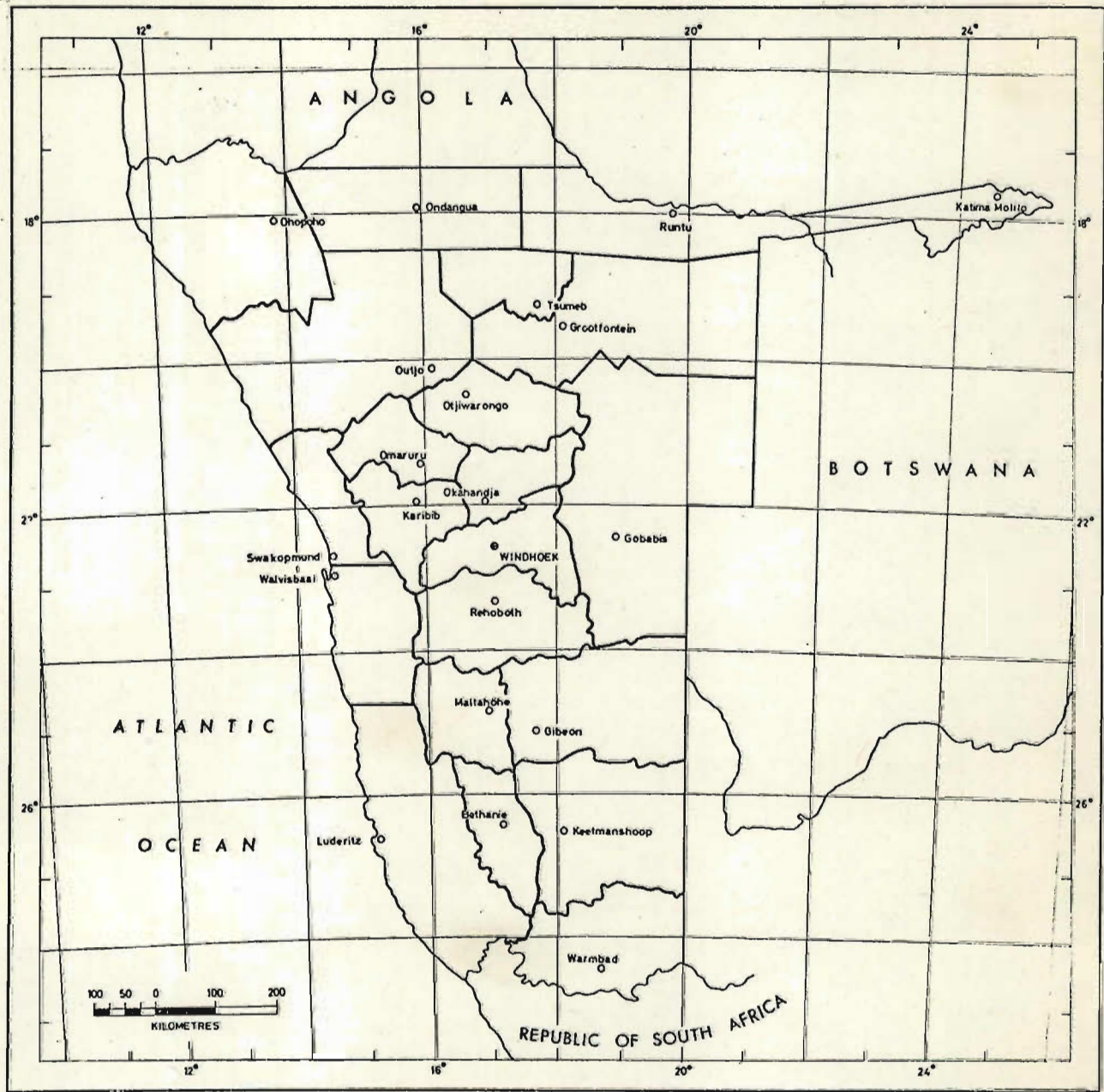


Fig. 1.1. 1966 delimitation of Magisterial districts for South West Africa. Each district derives its name from the town shown within its boundaries.

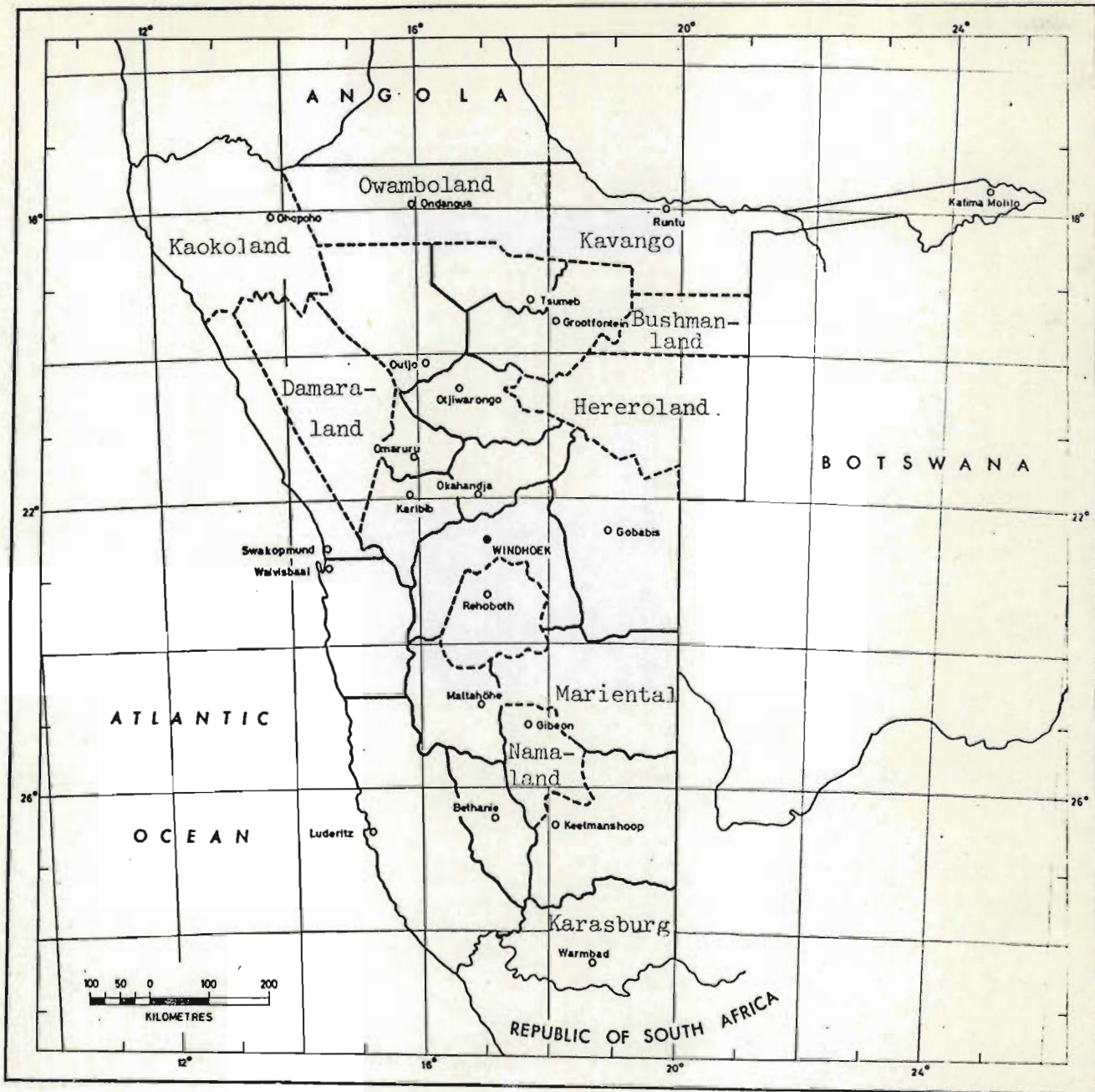


Fig. 1.2 . 1972 delimitation of Magisterial districts for South West Africa. The unaltered 1966 boundaries have been left as solid lines, the 1972 boundaries are shown as broken lines, and the changed magisterial district names appear in large lettering while those that have not changed derive their names from the towns in small print.

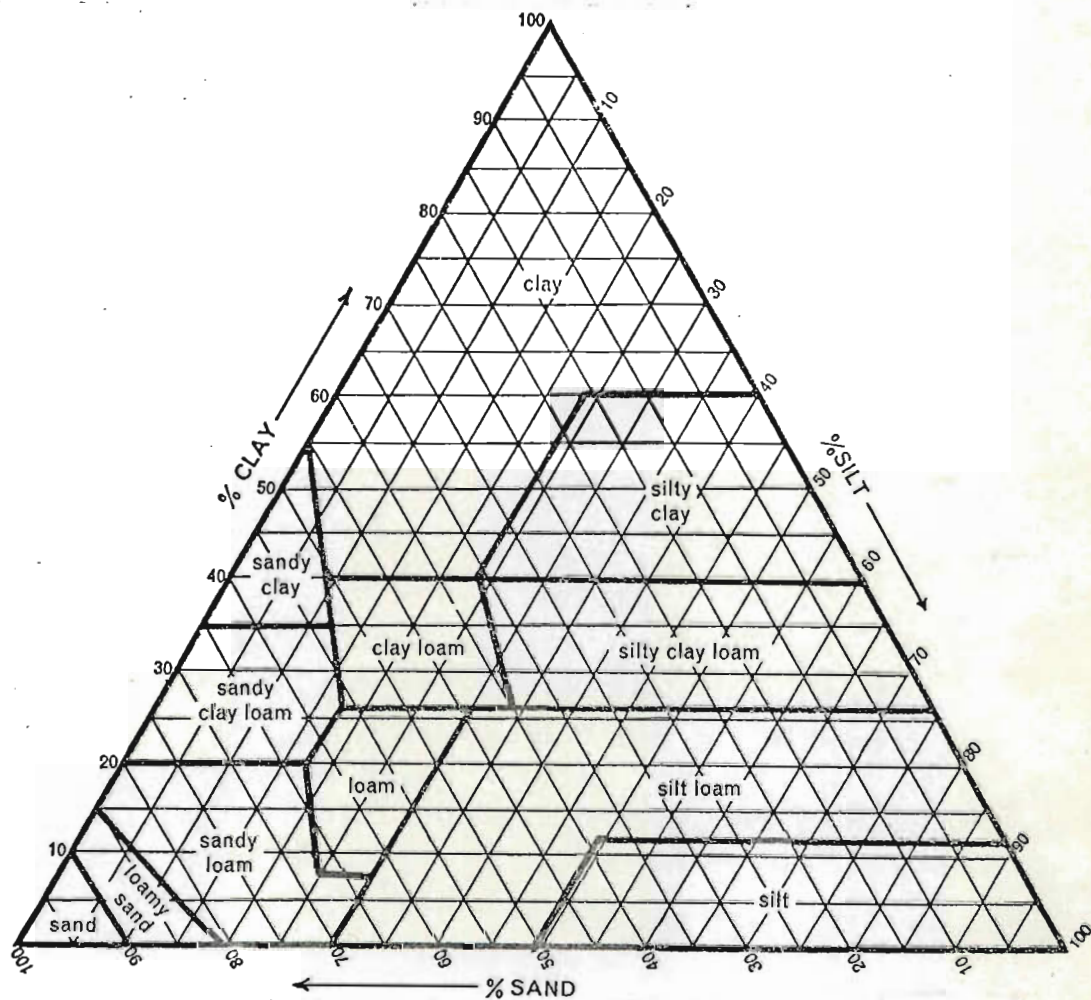


Fig. 2.1 . Chart for graphical determination of soil textural classes according to percentage of clay, silt and sand (after Loxton, 1961).

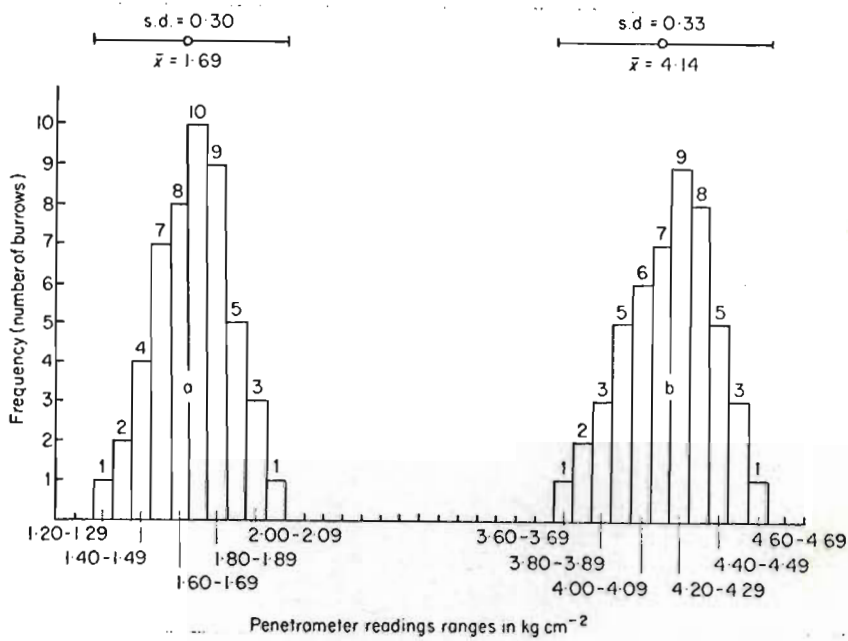


Fig. 2.2. Histograms for the distribution of (left) the 50 burrows of *Opisthophthalmus wahlbergi* and (right) the 50 burrows of *O. carinatus* mapped in fig. 2.3.a. (from Lamoral 1978, appendix 2).

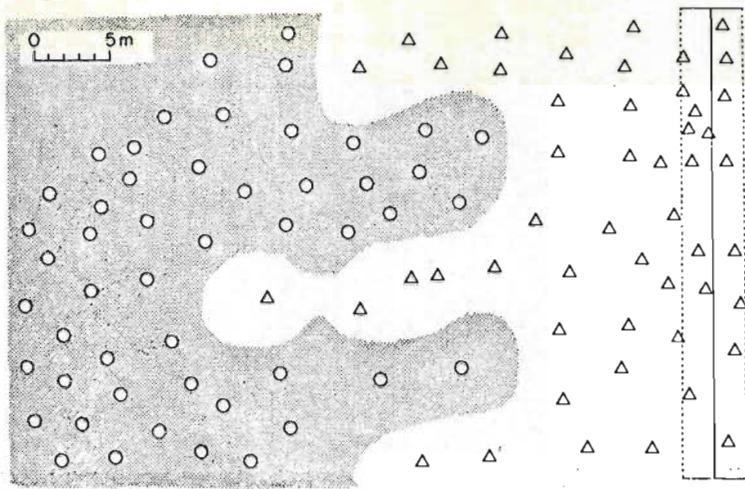


Fig. 2.3.a. Distribution of 50 burrows of *Opisthophthalmus wahlbergi* (o) and *O. carinatus* (Δ) from which penetrometer readings in fig. 2.2 were taken. Stippled area represents soil with category ranges III-V and unstippled VII-IX. The area transected for the data in fig. 2.3.b is delimited by broken lines. See also Lamoral, 1978, appendix 2.

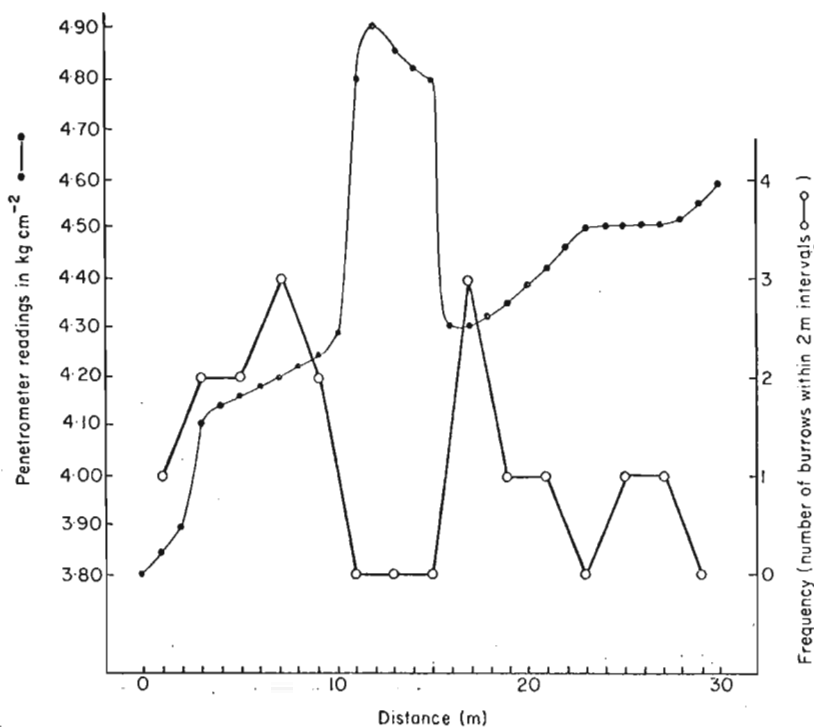


Fig. 2.3.b. Result of the transect in fig. 2.3.a to show relationship of burrow frequency (o) and soil hardness (\bullet) plotted over a distance of 30 m. See also Lamoral, 1978, appendix 2.



Fig. 2.4. Delimitation of the 14 vegetation types of South West Africa listed in table 2.4.

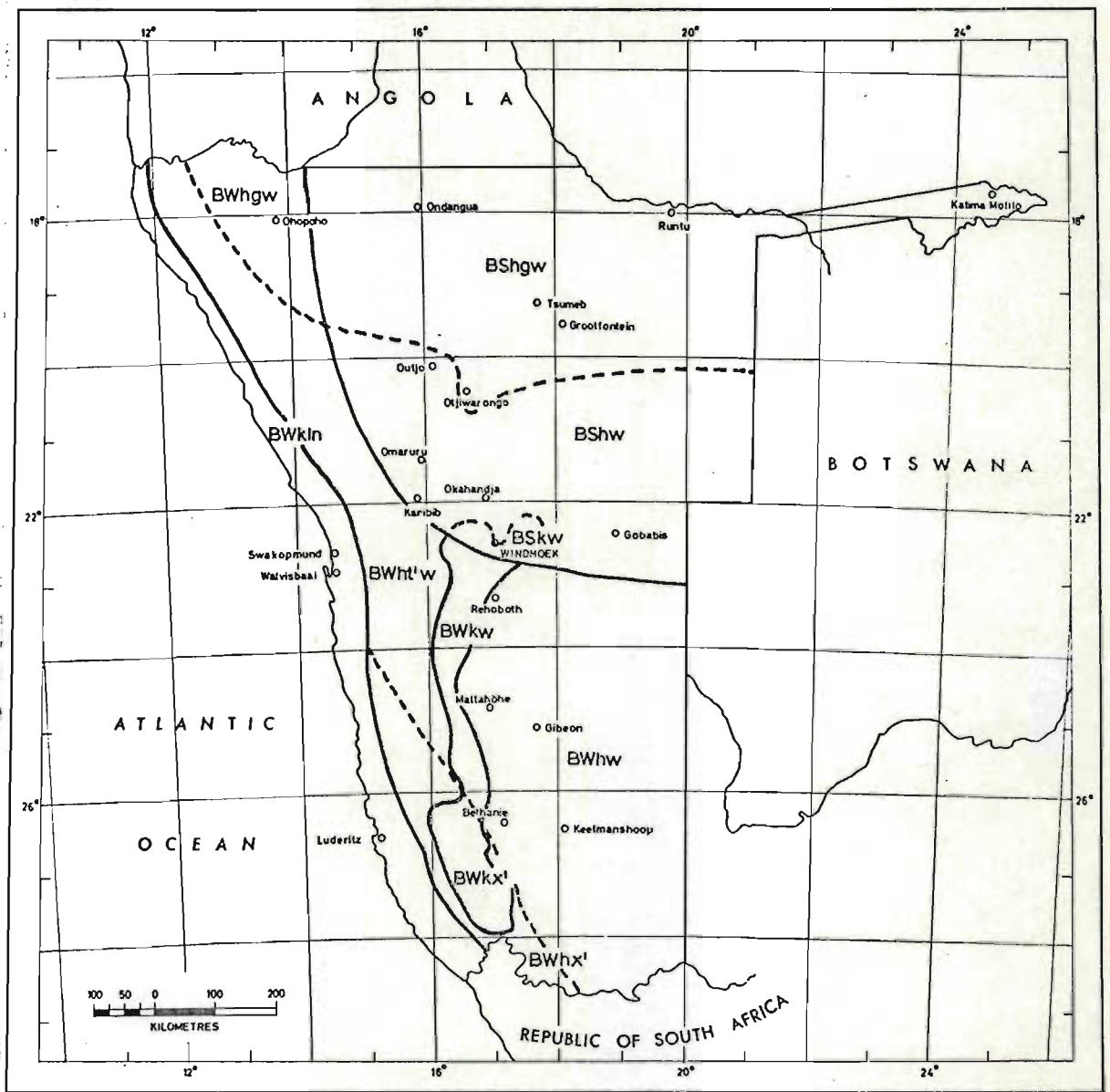


Fig. 2.5. Delimitation of the climatic regions of South West Africa listed in table 2.5.

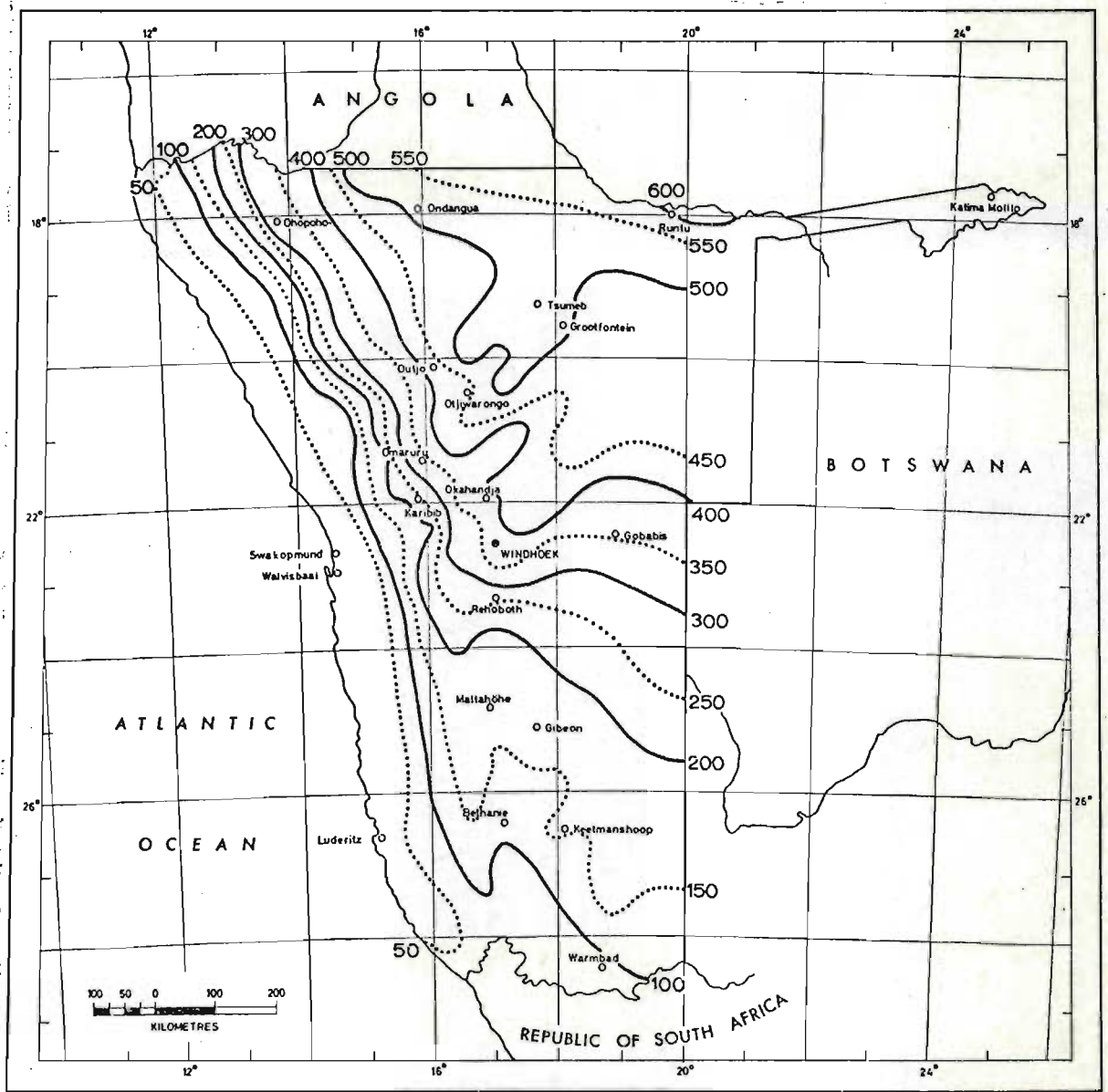


Fig. 2.6. Mean annual rainfall in millimetres for South West Africa (After Coaton & Sheasby, 1972).

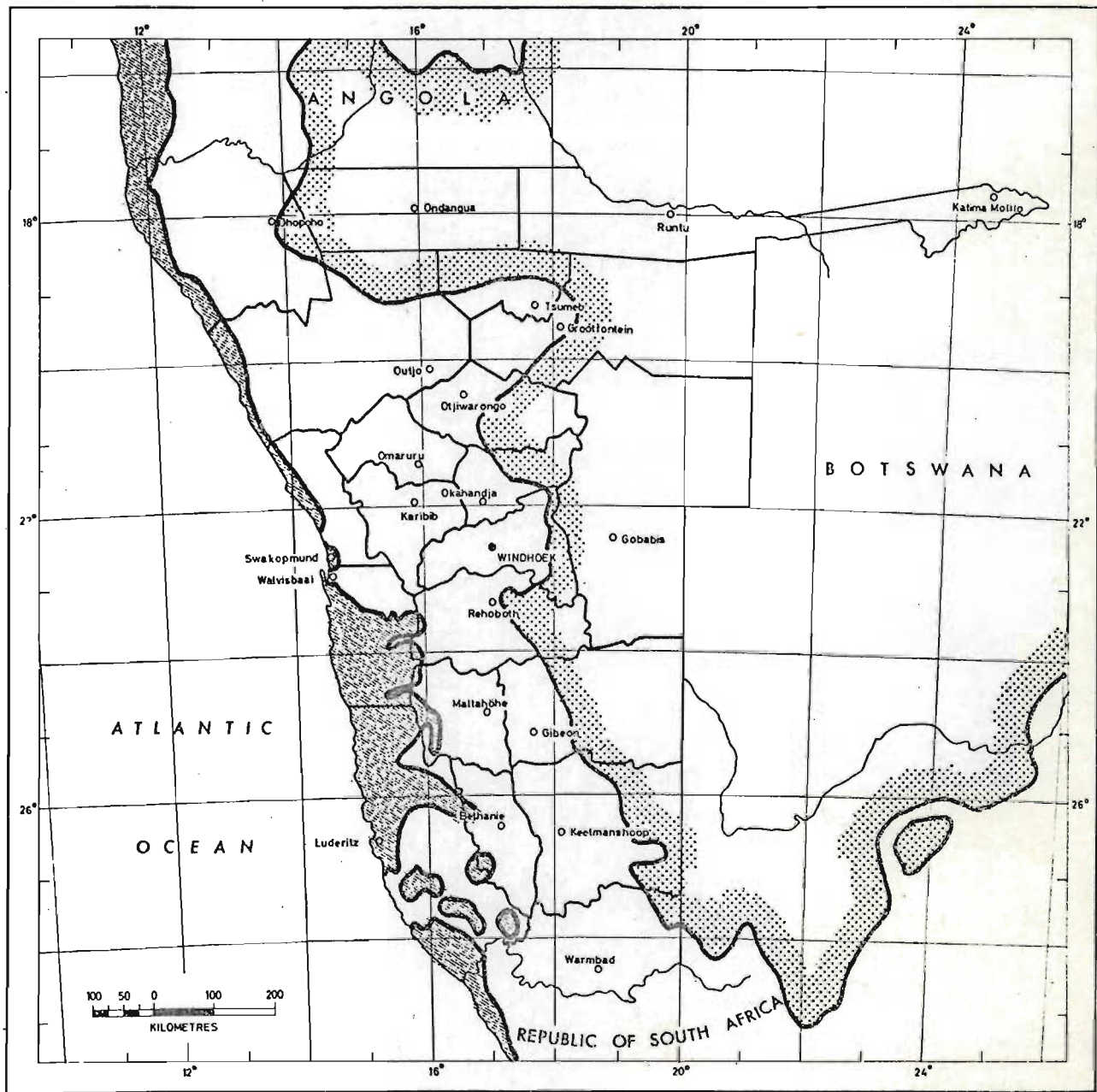


Fig. 2.8. Distributions of the Namib sand system (hatched) and the Kalahari sand system (stippled), with the 1966 magisterial districts for South West Africa delimited by solid lines.

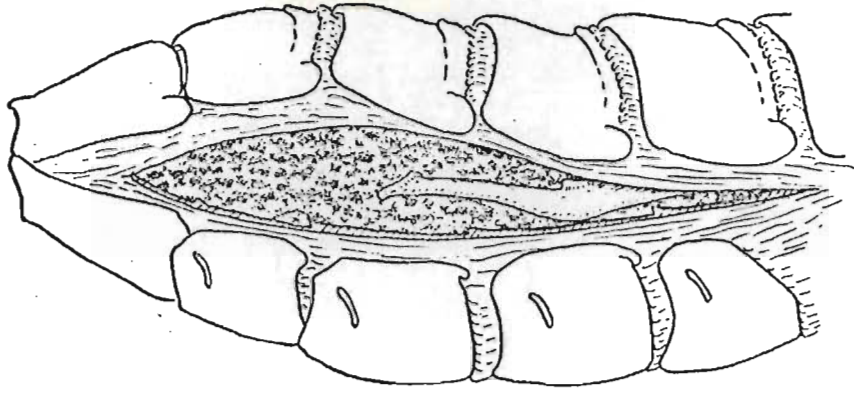


Fig. 3.2. Right side of a male scorpion mesosoma showing incision made in the pleural membrane to gain access to the paraxial organ; also showing is the distal end of the right paraxial organ.

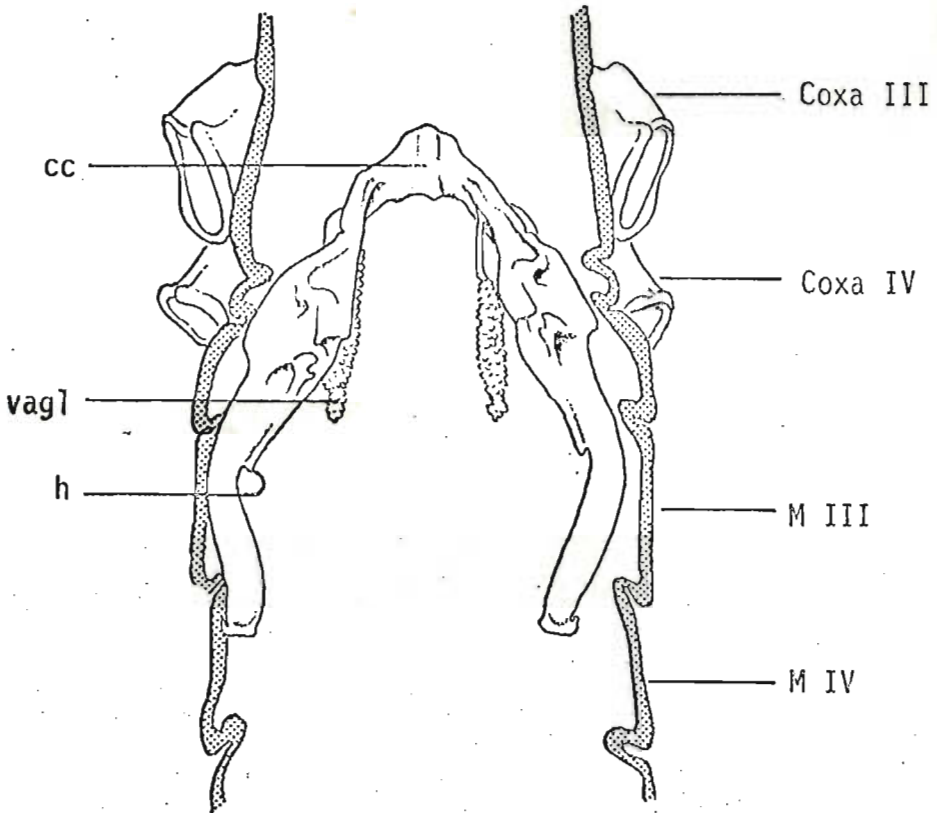


Fig. 3.3. Semi-diagrammatic dorsal aspect of male paraxial organs of Opisthophthalmus carinatus in situ. The testis network and associated glands of the paraxial organs are not shown. cc, common chamber; h, hook; M, mesosomal segments; vag1, ventral annex gland.

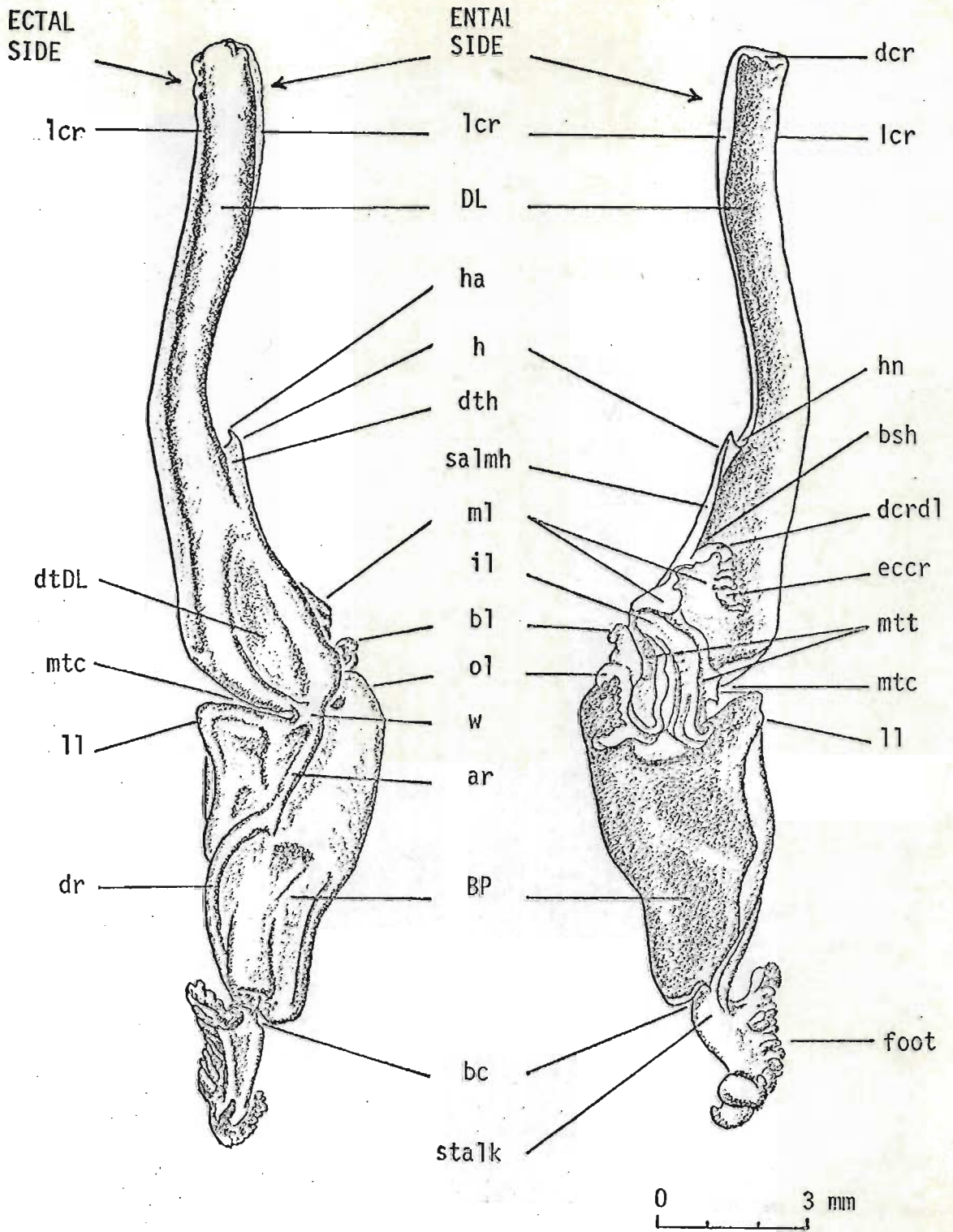


Fig. 3.4. Right hemispermatochore of *Opisthophthalmus carinatus* (S.M.N. 11). Left, dorsal aspect; right, ventral aspect. For key to abbreviations see table 3.3.

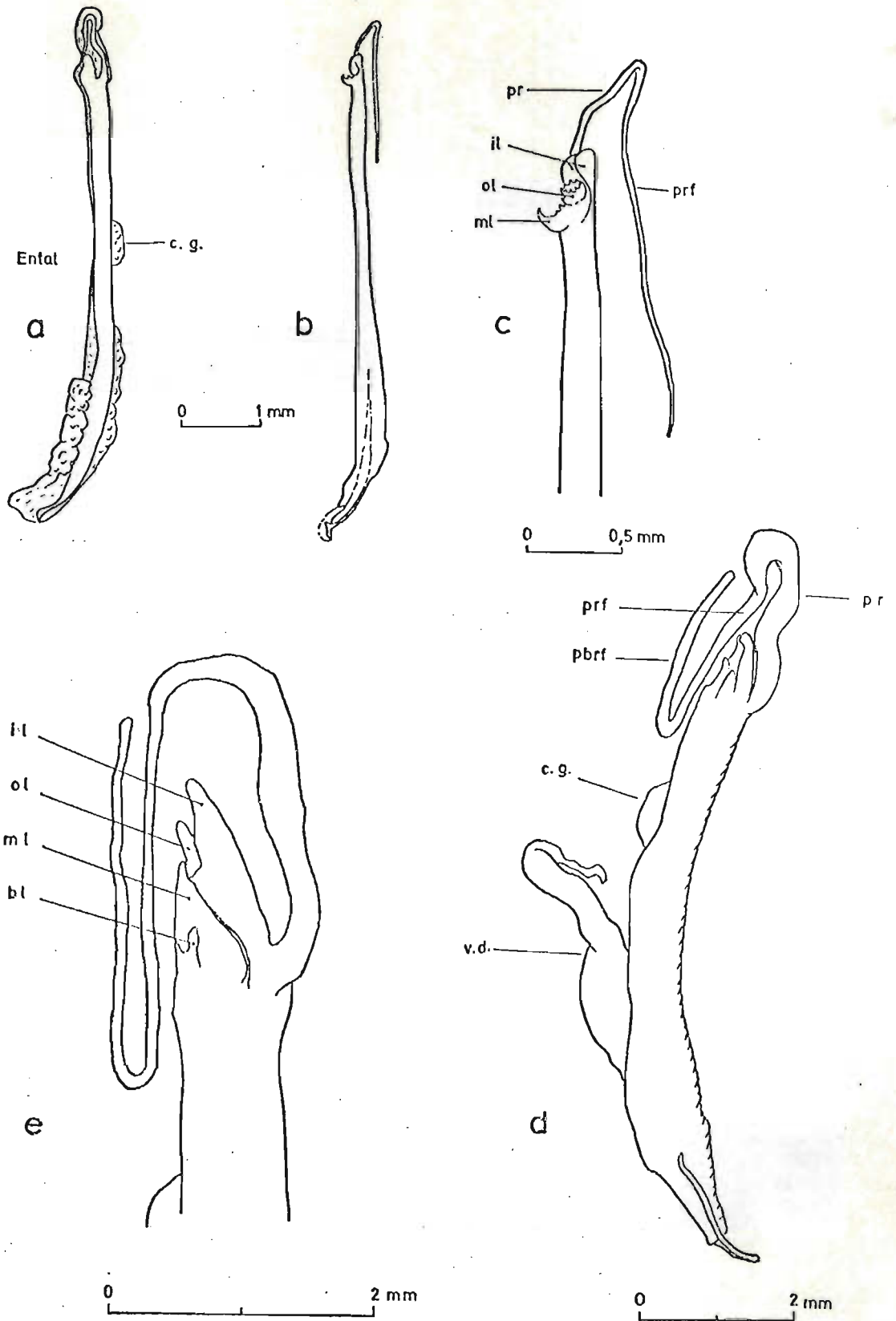


Fig. 3.5. a-c, *Uroplectes otjimbinguensis* (N M 10029); a, right paraxial organ, ventral aspect; b, right hemispermaphore, ental aspect; c, distal portion of b. d-e, *Buthotus conspersus*; d, left paraxial organ, ectal aspect; e, distal ectal aspect of left hemispermaphore. c.g., cylindrical gland; v.d., vas deferens.

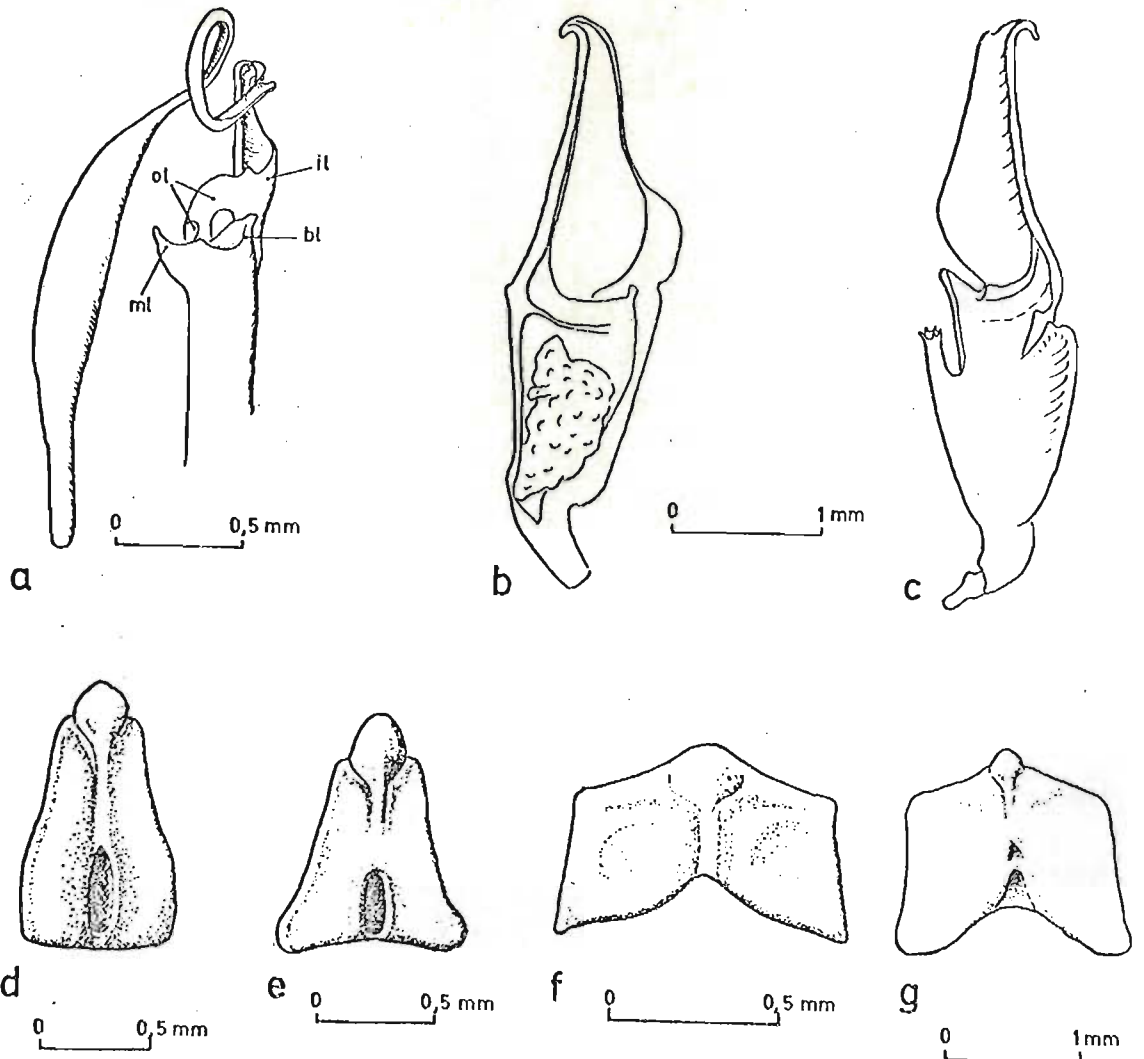


Fig. 3.6. a, distal ventral aspect of right hemispermatochore of Parabuthus villosus; b, ventro-ectal aspect of left paraxial organ of Euscorpius carpathicus (L., 1767), family Chactidae, (NM 10335); c, ventro-ectal aspect of right hemispermatochore of b. d-g, sterni of various taxa; d, Uroplectes carinatus ♀; e, Parabuthus brevimanus ♀; f, Superstitionia donensi Stahnke ♂; g, Euscorpius carpathicus ♀. f-g, family Chactidae.

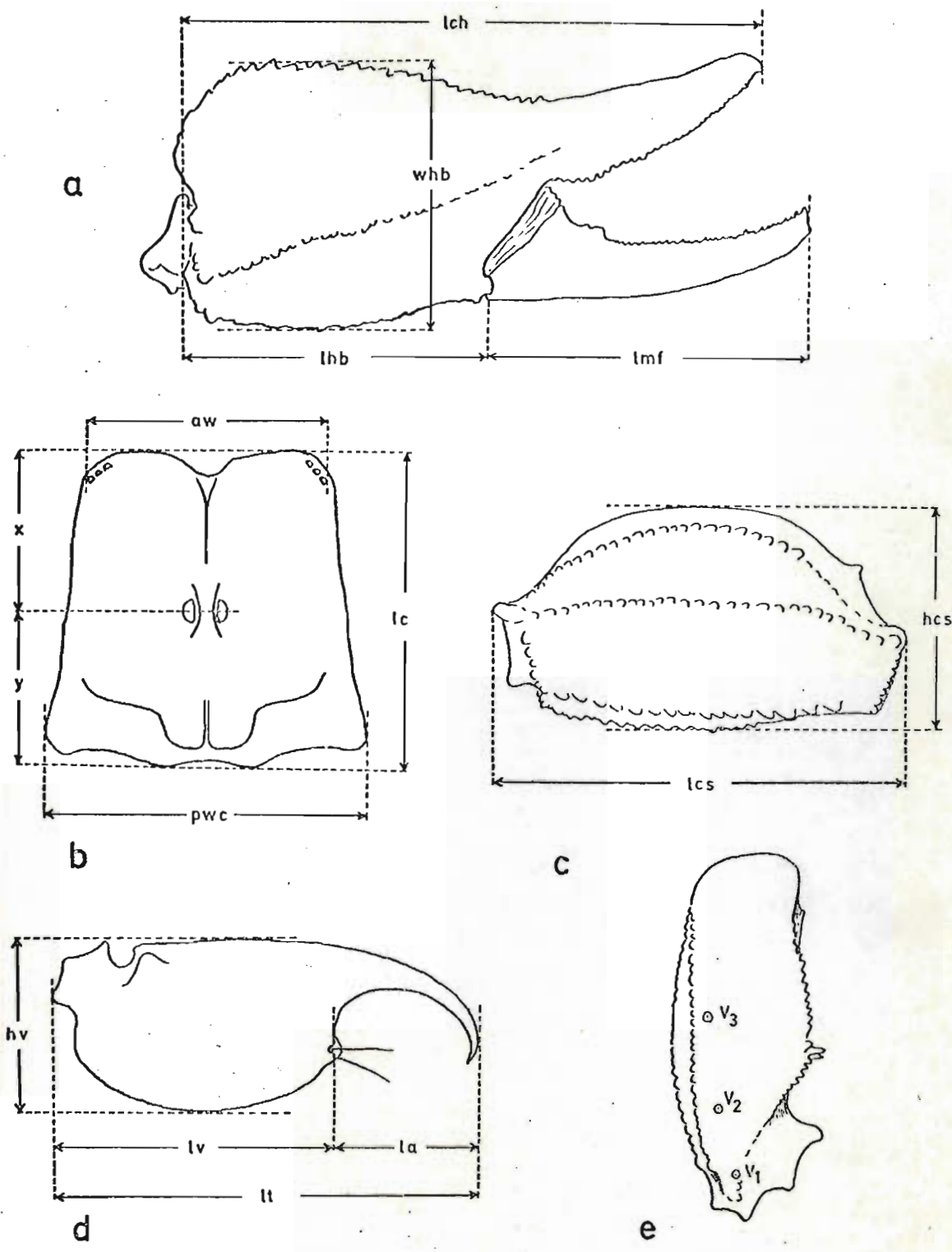


Fig. 3.7. See legend on opposite page.

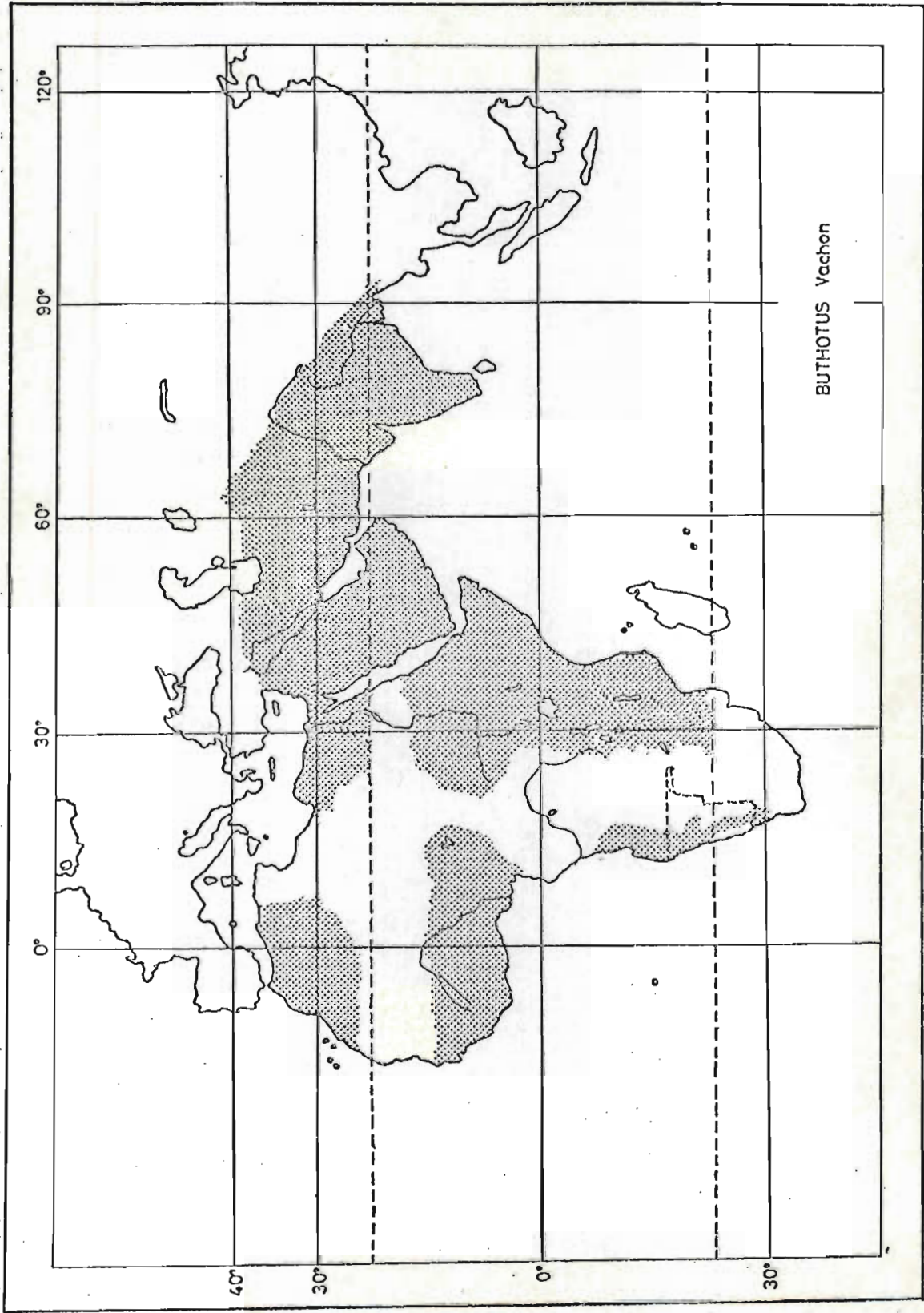


Fig. 4.1. Distribution of genus *Buthotus* Vachon.

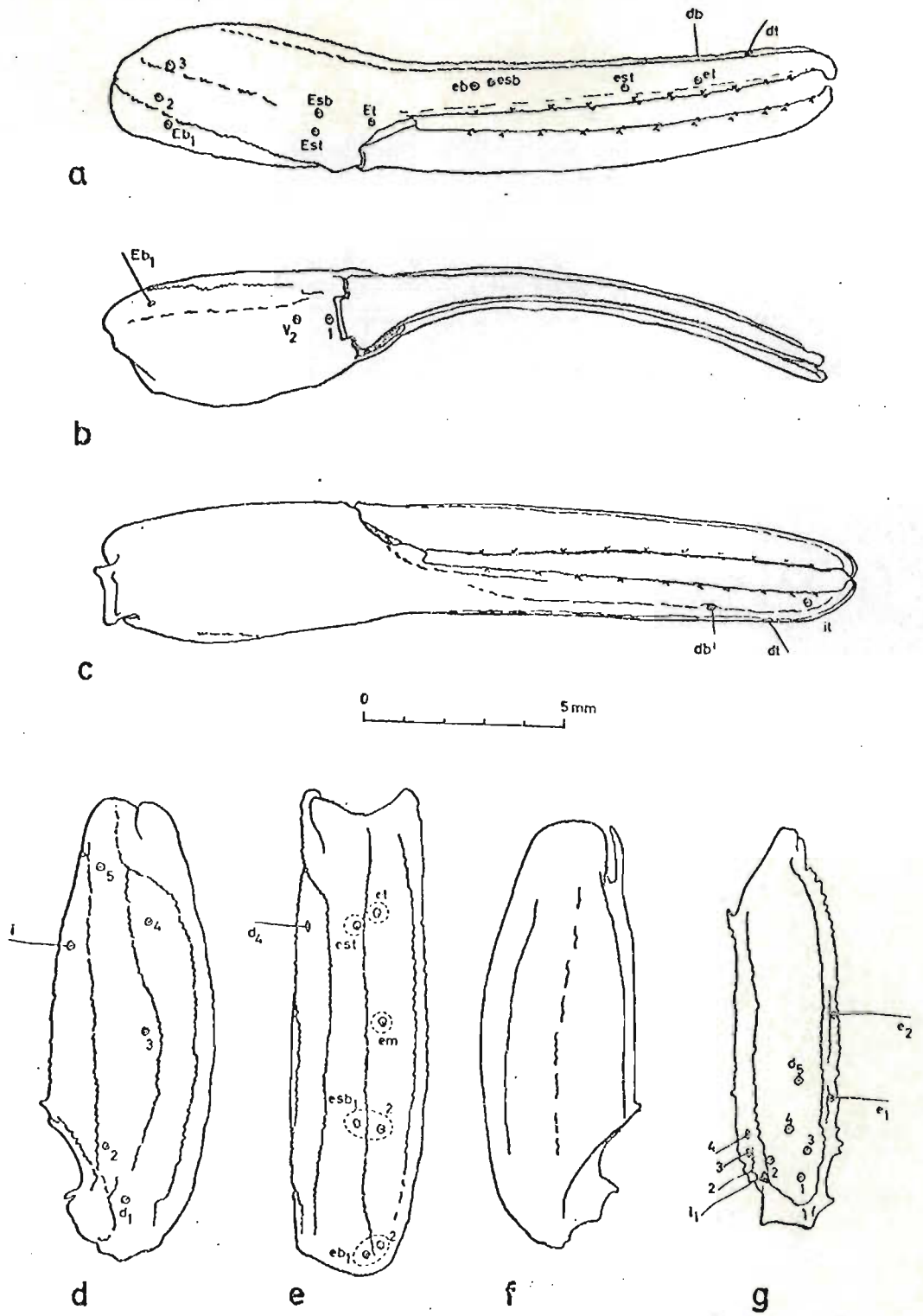


Fig. 4.2. *Buthotus arenaceus* (Purcell), ♀ (NM 10377)

a, right hand, outer aspect; b, right hand, ventral aspect; c, right hand, inner aspect; d, tibia of right pedipalp, dorsal aspect; e, tibia of right pedipalp, outer aspect; f, tibia of right pedipalp, ventral aspect; g, femur of right pedipalp, dorsal aspect; a - g, same scale.

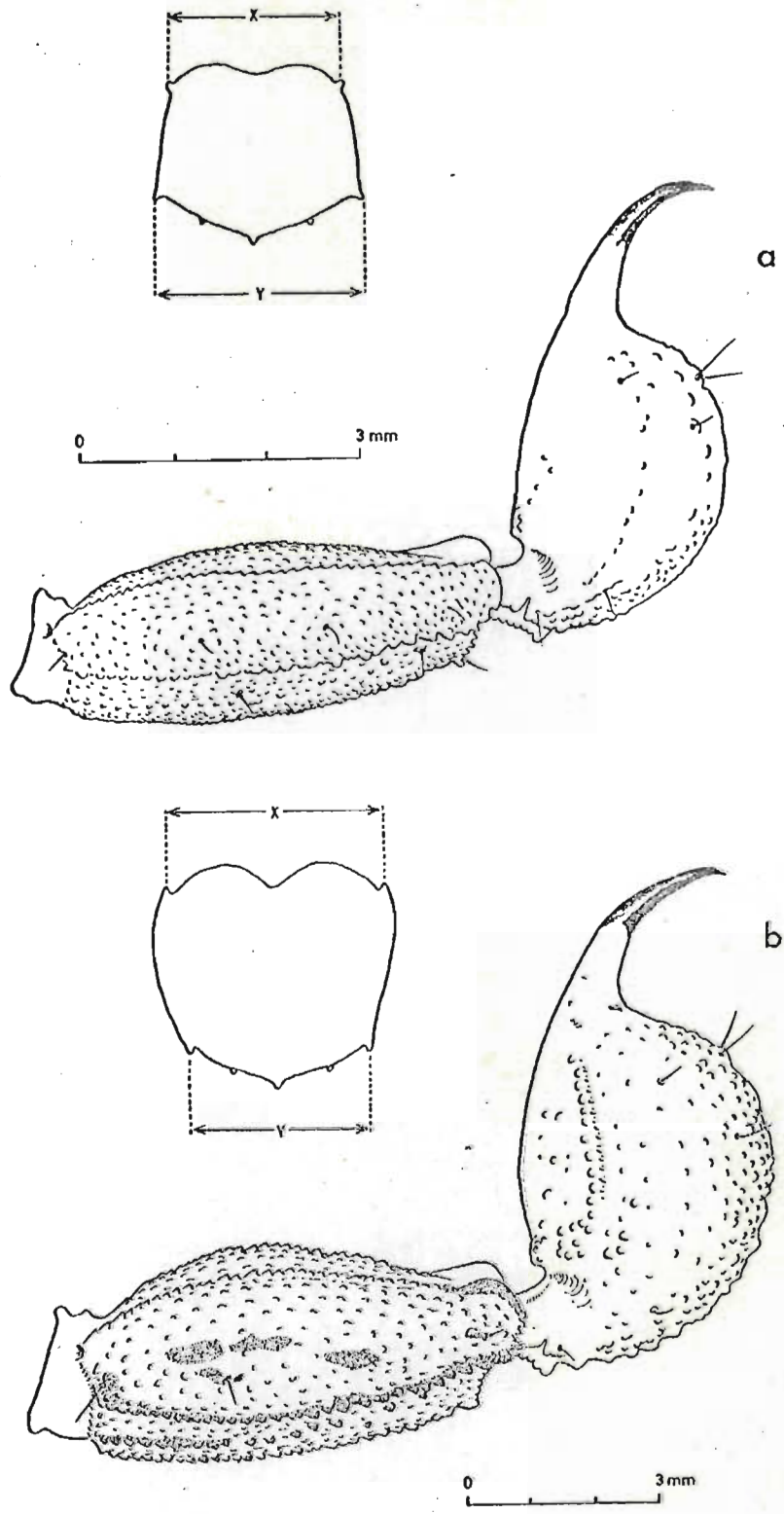
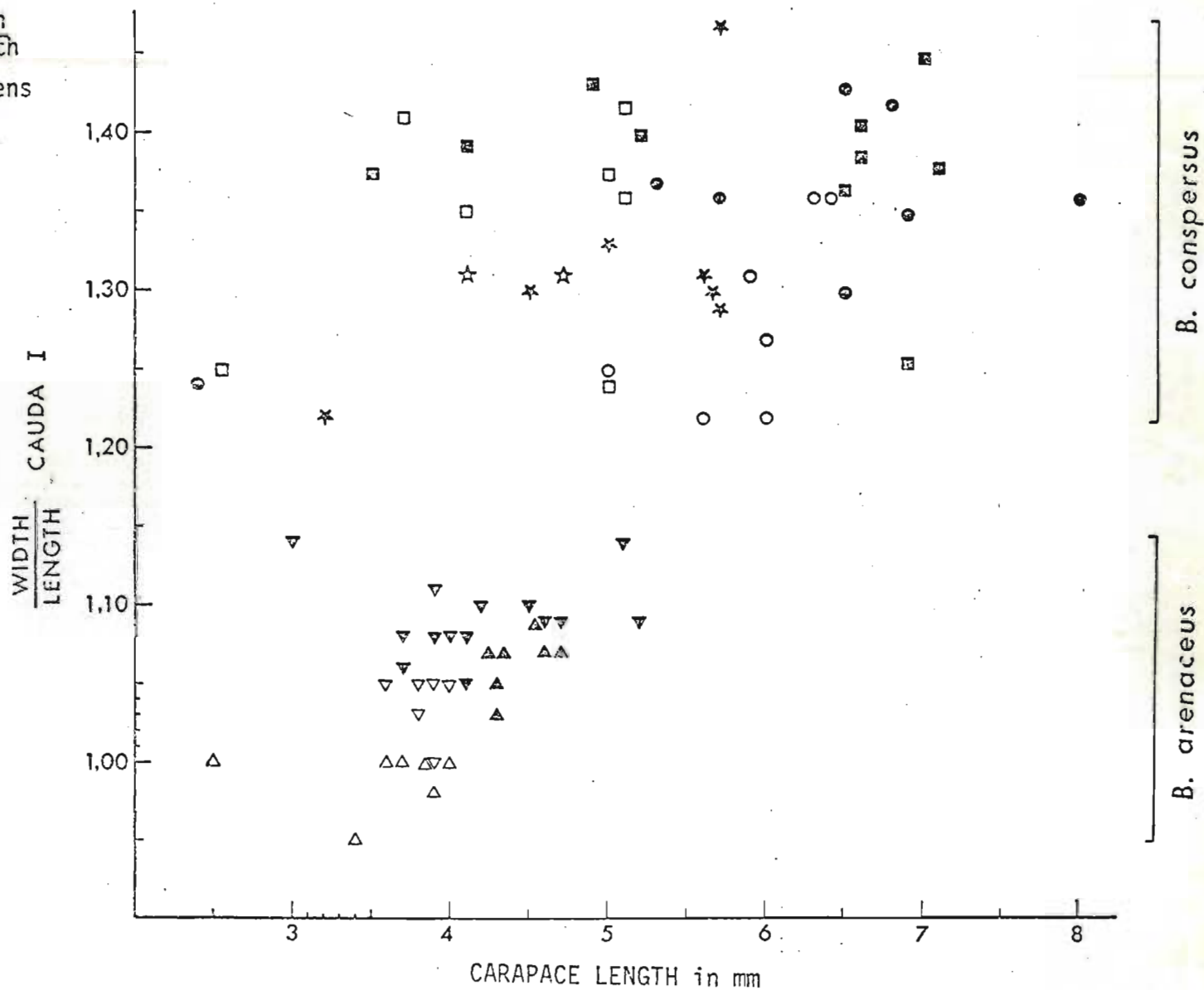


Fig. 4.3. Left lateral aspects of telson and cauda V with outline of median cross-section for latter in females of:

a, Buthotus arenaceus (NM 10377); b, Buthotus conspersus (NM 10021);
 x, distance between dorso-lateral keels; y, distance between ventro-lateral keels.

Fig. 4.4. Relationship between $\frac{\text{width}}{\text{Length}}$ cauda I and carapace length in specimens of Buthotus arenaceus and conspersus from different localities. ♂, open symbols; ♀, solid symbols.

- ▽ ▽, Louwshoop farm
- △ ▲, Schwarskuppen farm
- ☆ ☆, Brandberg Mountains
- ●, Kaoko Otavi
- ■, Catumbela (Angola)



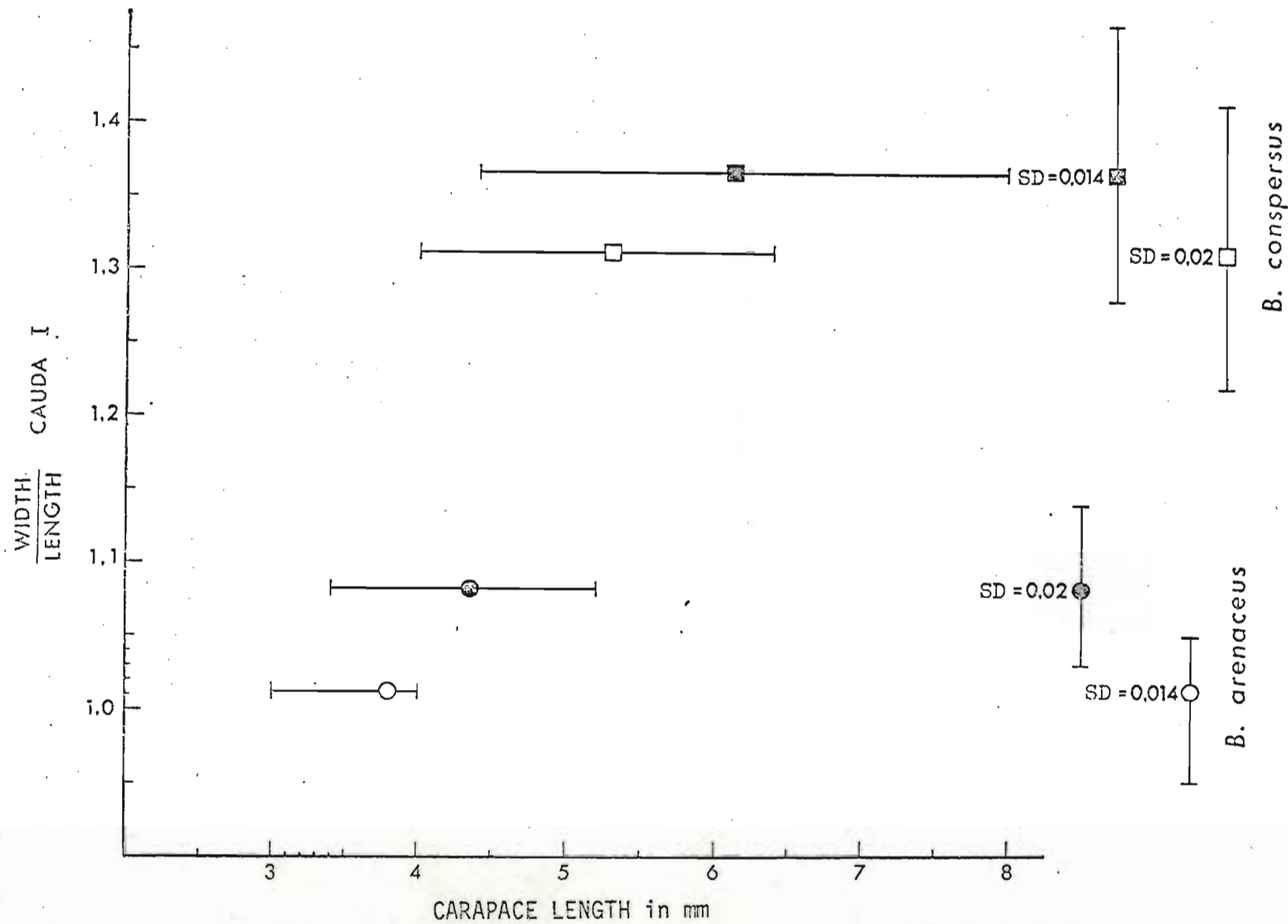


Fig. 4.5. Relationship between width/length cauda I and carapace length in specimens of *B. arenaceus* and *conspersus* with means and ranges calculated from values in fig. 4.4. ♂, open symbols; ♀ solid symbols. Horizontal lines indicate size range of adult specimens, vertical lines, ratio ranges with standard deviation SD indicated for each.

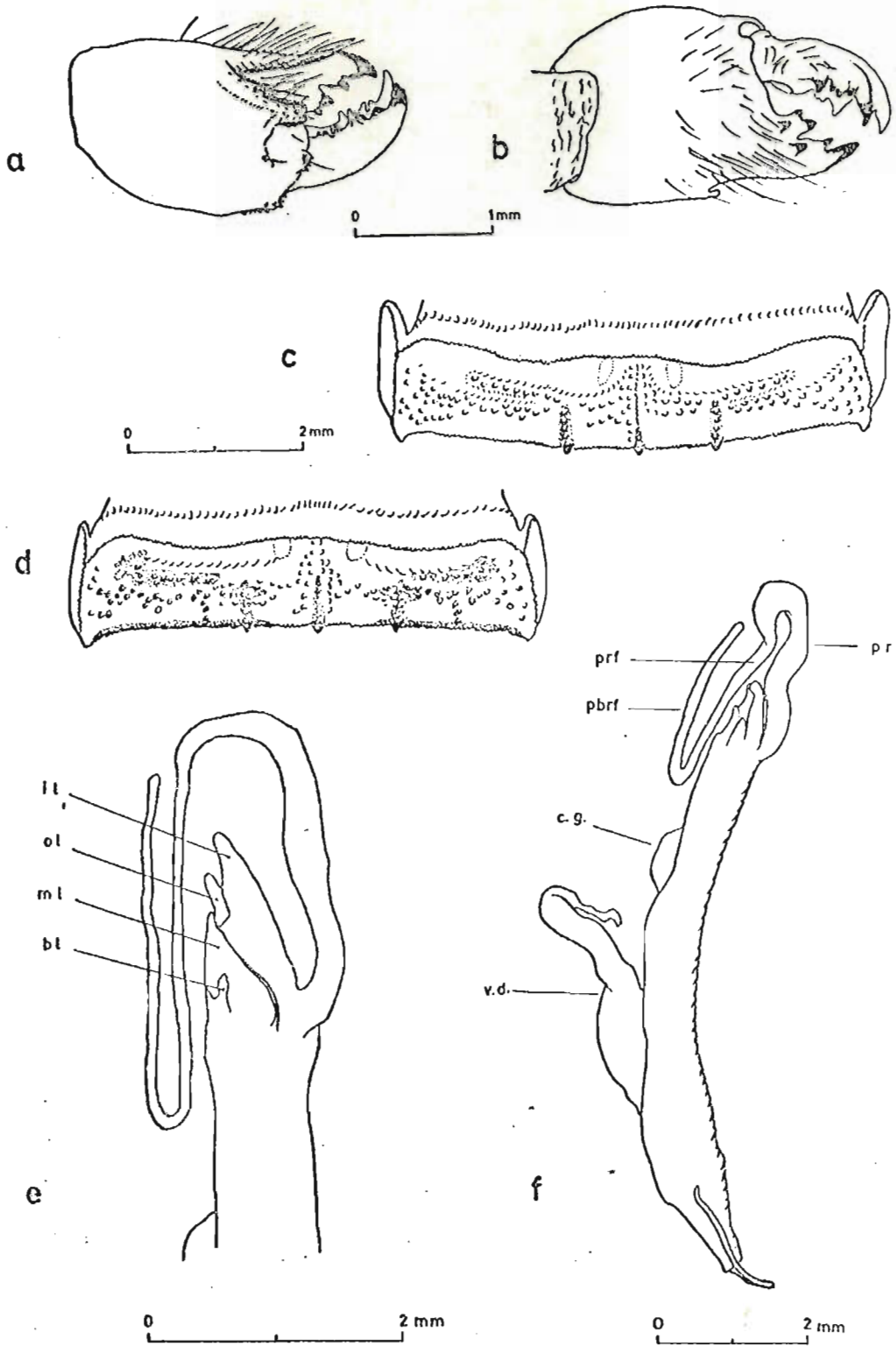


Fig 4.7. a-d Buthotus arenaceus, (Purcell) ♀ ; e-f, Buthotus conspersus (Thorell) ♂

a, right chelicera, dorsal aspect; b, right chelicera, ventral aspect; c, 4th tergite; d, 4th tergite; e, distal outer aspect of left hemispermatophore; f, outer aspect of left paraxial organ.

a-c, specimen from type locality, N.Cape, R.S.A. (N.M. 10377); d, specimen from Schwarzkuppen, S.W.A. (N.M. 10372); e-f, (N.M. 10409).

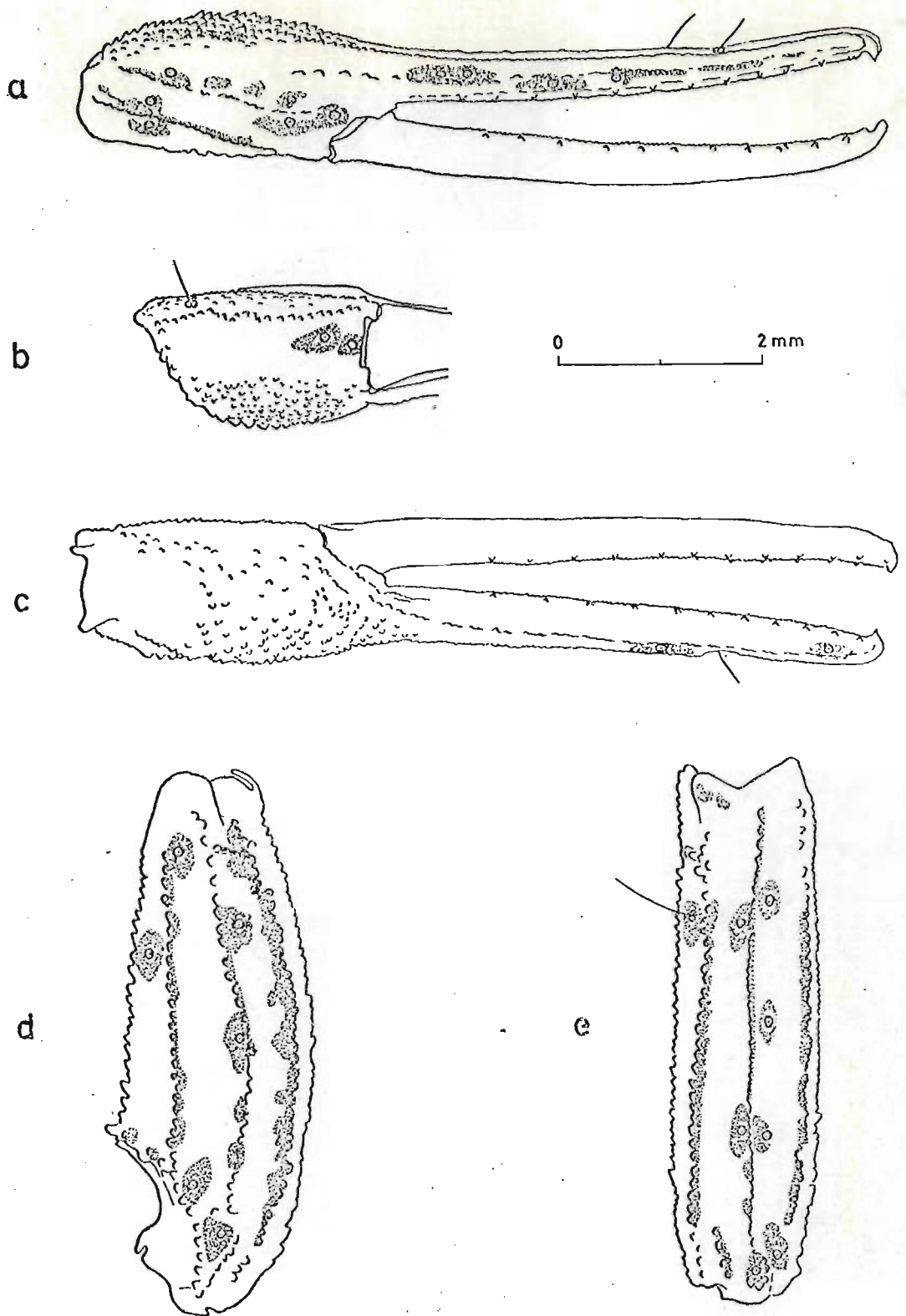
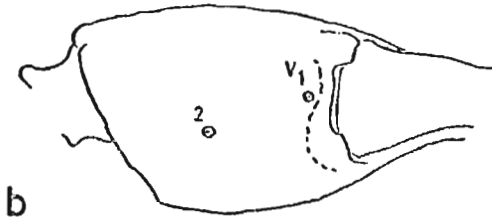
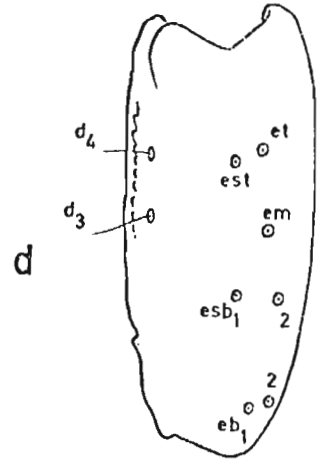
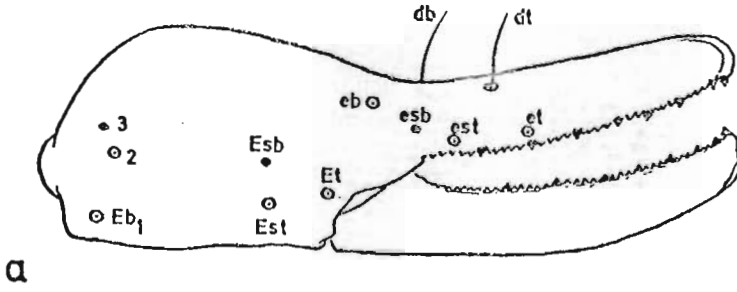


Fig. 4.8. Buthotus conspersus (Thorell)

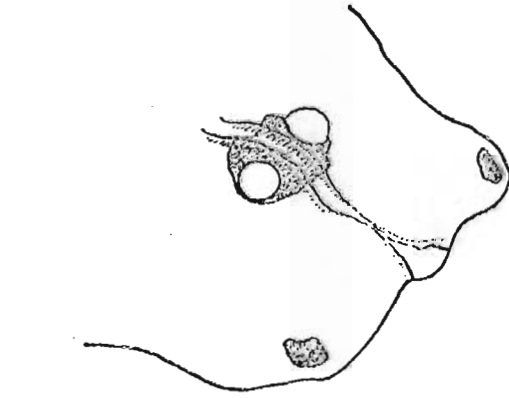
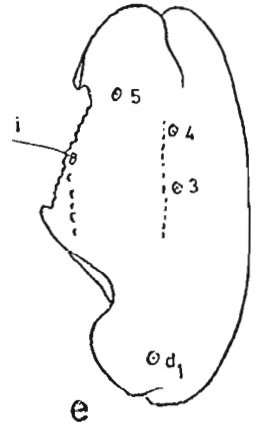
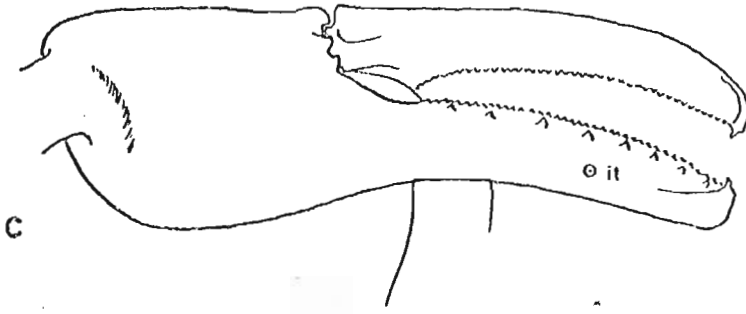
a, right hand, outer aspect; b, right hand, ventral aspect; c, right hand, inner aspect; d, tibia of right pedipalp, dorsal aspect; e. tibia of right pedipalp, outer aspect. a - e ♀ (NM 9045), same scale.

Fig. 4.10 Karasbergia methueni Hewitt

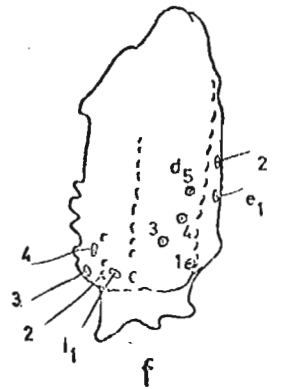
a, right hand, outer aspect; b, right hand, ventral aspect;
c, right hand, inner aspect; d, tibia of right pedipalp,
outer aspect; e, tibia of right pedipalp, dorsal aspect;
f, femur of right pedipalp, dorsal aspect; g, prosoma,
anterior dorso-lateral aspect showing position of lateral
and median eyes. a-f, lectotype ♀ (TM 1870); g, ♂ from
Tses (NM 10566), a-f, same scale, g, as indicated.



0 1 mm



0 1 mm



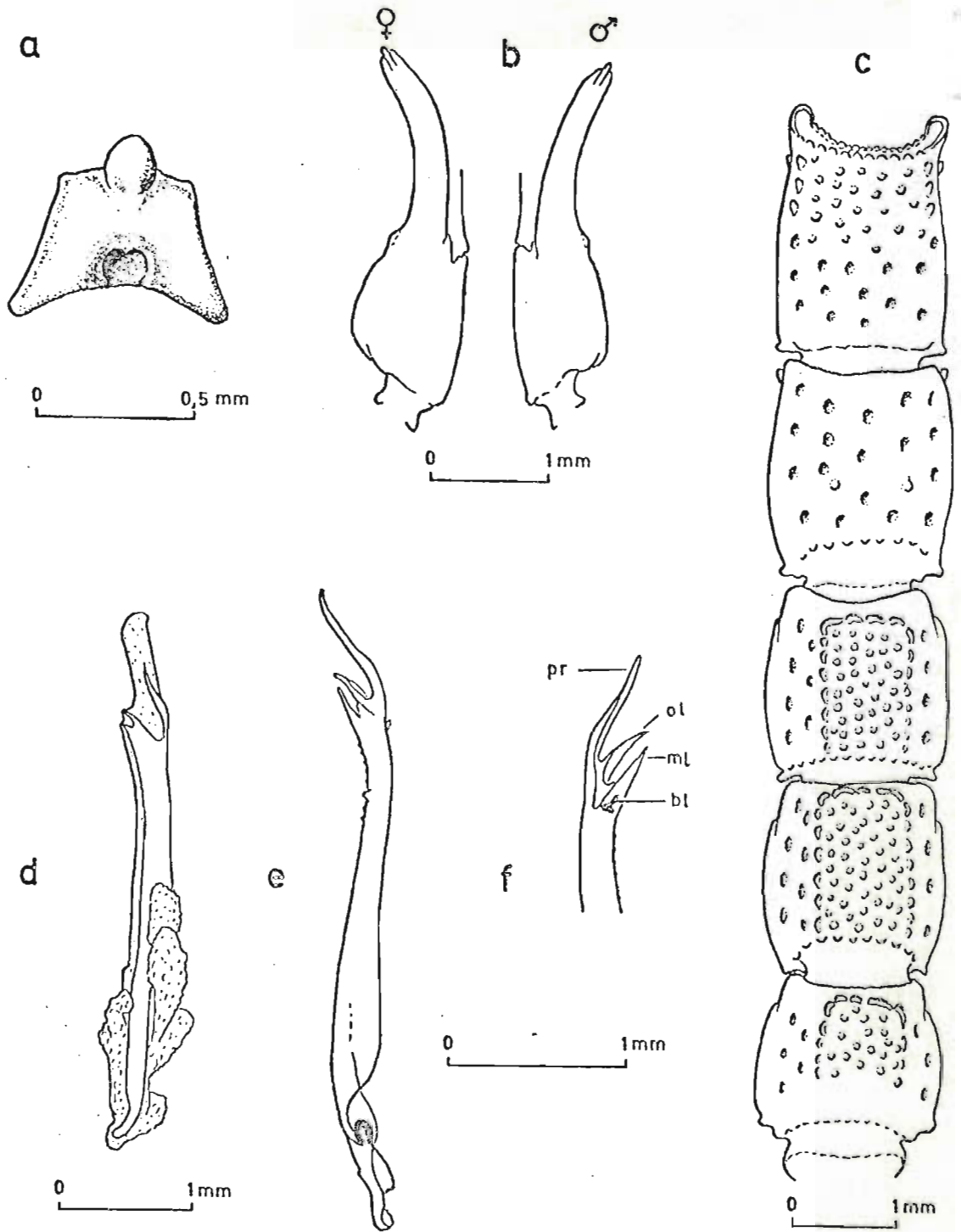
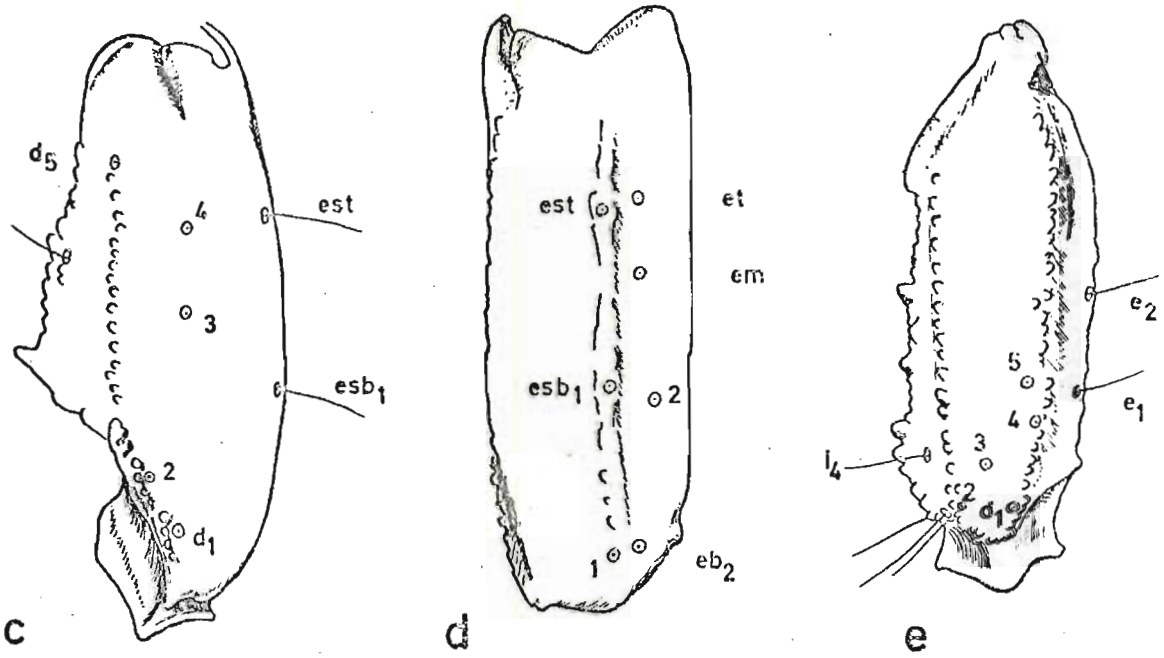
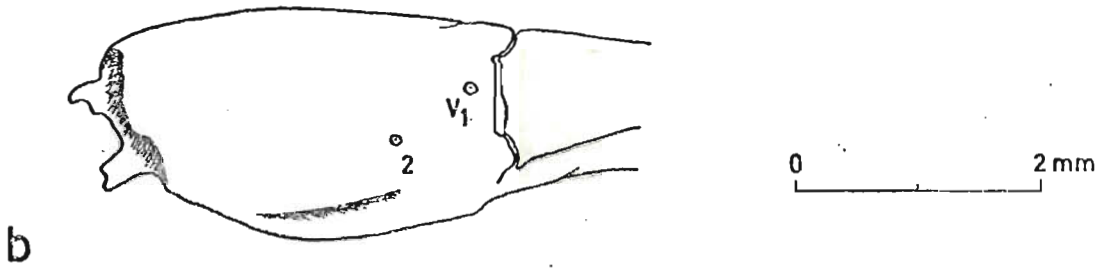
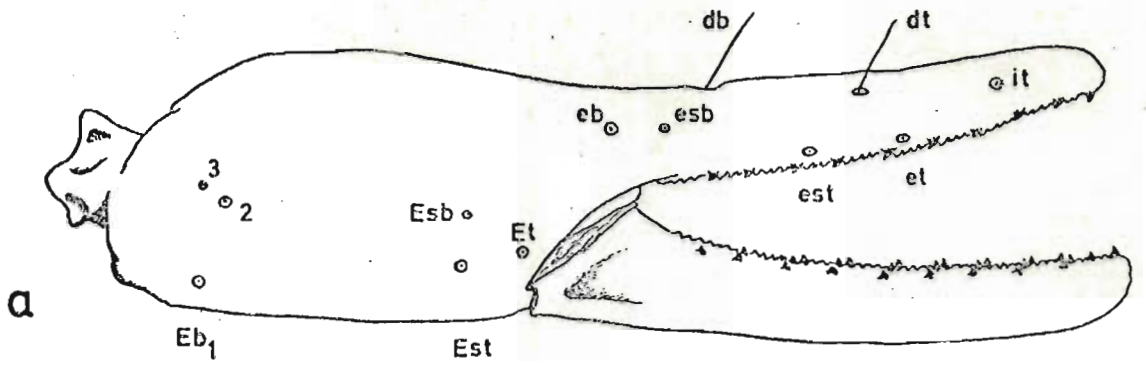


Fig. 4.11. Karasbergia methueni Hewitt

a, sternum, ventral aspect; b, right and left hands of ♀ (NM 10567) and ♂ (NM 10566) respectively, dorsal aspects; c, cauda I-V, ventral aspect; d, right paraxial organ, outer aspect; e, right hemispermaphore, outer aspect; f, right hemispermaphore, inner aspect of distal end. a and c lectotype ♀ (TM 1870); d-f, ♂ (NM 10566).

Fig 4.12. Parabuthus brevipennis (Thorell), ♀ (NM 10010)
a, right hand, outer aspect; b, right hand, ventral aspect;
c, right pedipalp tibia, dorsal aspect; d, right pedipalp
tibia, outer aspect; e, right pedipalp femur, dorsal aspect.



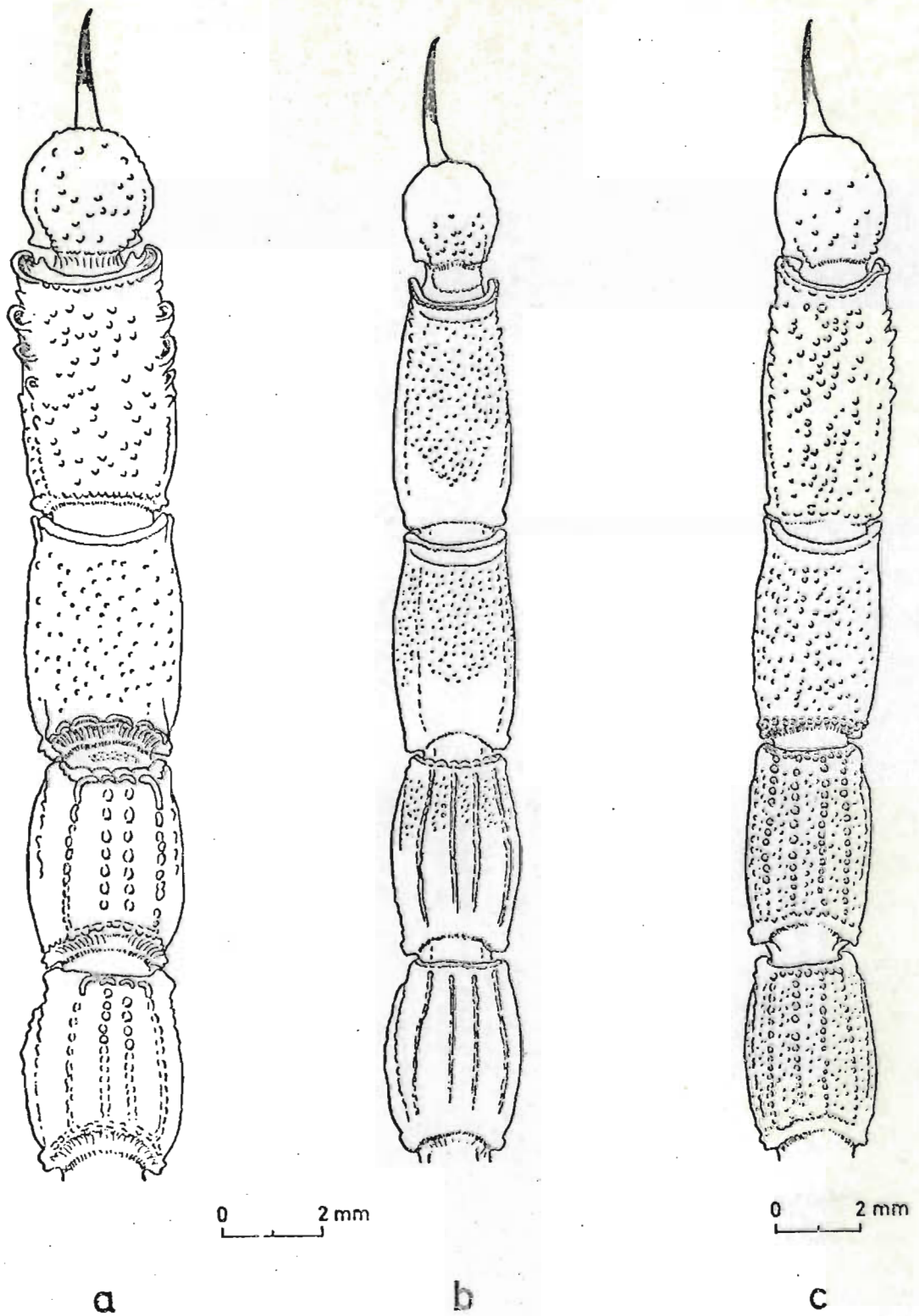


Fig. 4.13. Ventral aspects of cauda II-V and telson of:
 a, *Parabuthus brevimanus* ♀ homotype (NM 10010); b,
P. kuanyamarum ♀ (NM 10430); c, *P. new species A* ♀
 holotype (NM 10925).

Fig. 4.14. a-c, Parabuthus brevimanus: d-f and i-j, Parabuthus new species C; g-h and k-l, Parabuthus new species A. a, right paraxial organ, ventral aspect; b, right hemispermaphore, ental aspect; c, distal portion of b, ectal aspect; d, right hemispermaphore, ectal aspect; e, distal portion of d; f, same as e, dorsal aspect; g, distal portion of right hemispermaphore, ectal aspect; h, same as g, dorsal aspect; i and j, genital operculi and right pecten of ♀ holotype (NM 10926); k and l, genital operculi and right pecten of ♀ holotype (NM 10925).

a-c, N.M. 10365; d-f, paratype, N.M. 10702; g-h, paratype, N.M. 10848. a-b, same scale; e-h same scale: i-k, same scale.

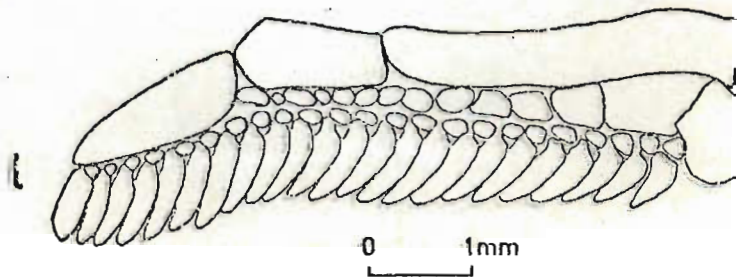
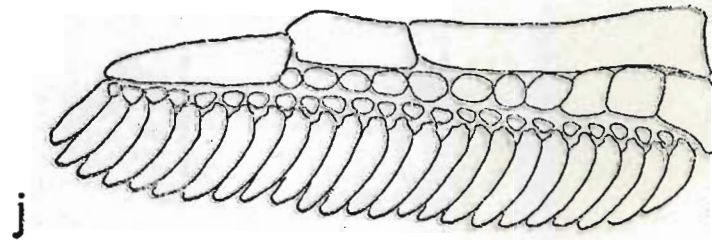
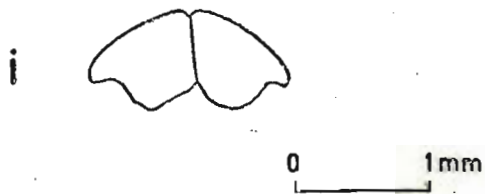
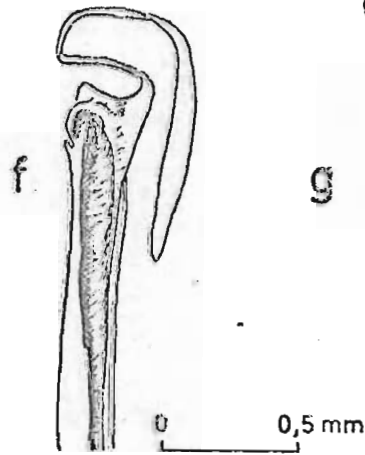
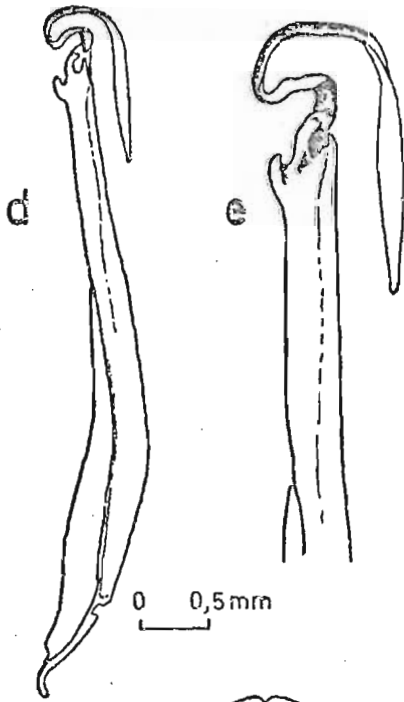
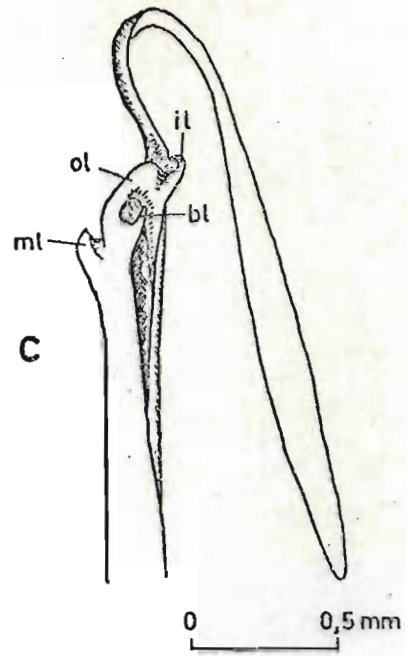
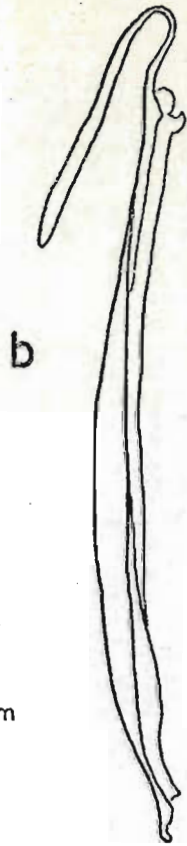
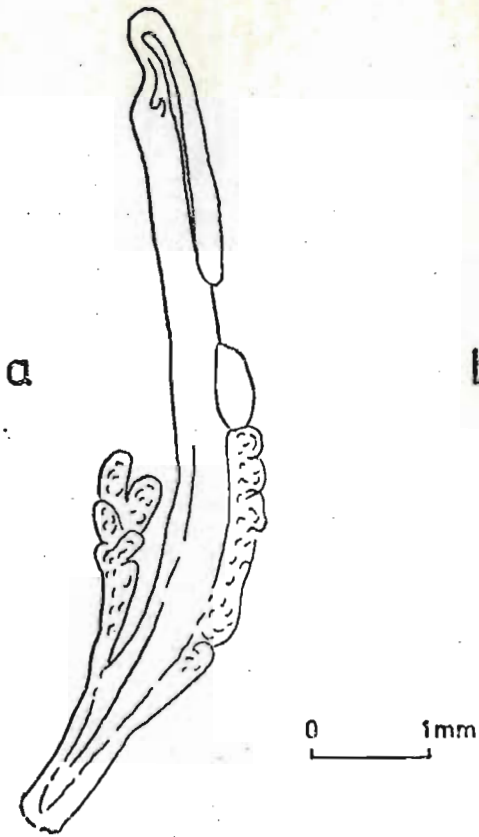
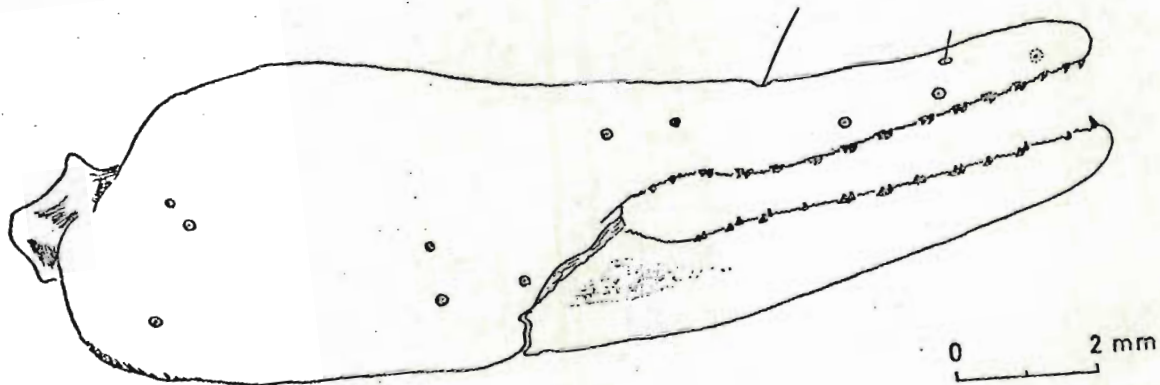


Fig. 4.15. Parabuthus new species A

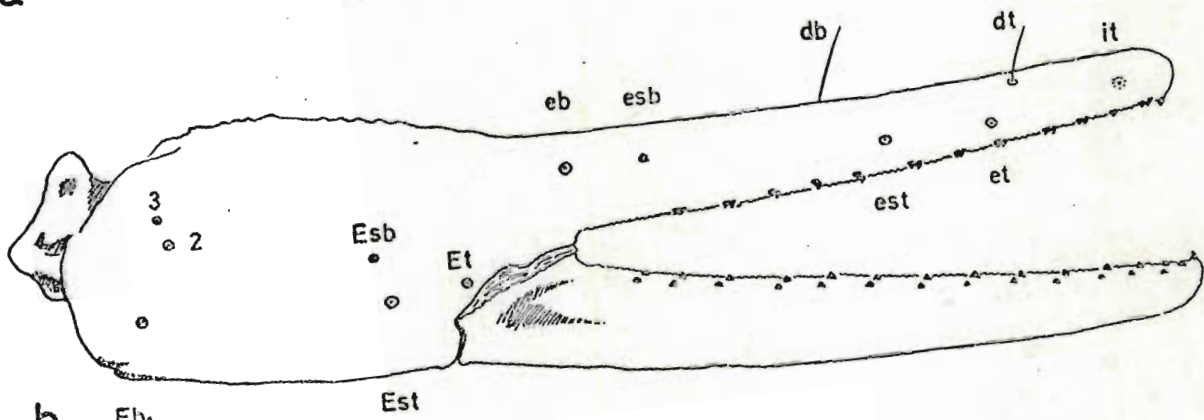
a, paratype ♂ (NM 10906); b-f, holotype ♀ (NM 10925). a and b, right hand, outer aspect; c, right hand, ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect.

Fig. 4.16. Parabuthus granulatus (H. & E.).

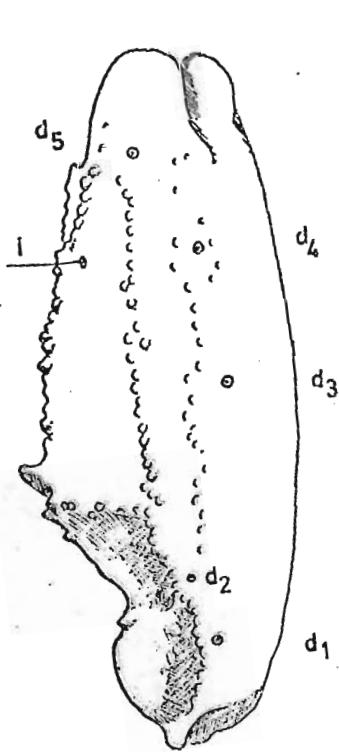
a, ♂ (N.M.10731); b-e, ♀ (N.M. 10513). a and b, right hand, outer aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer aspect; e, right pedipalp femur, dorsal aspect.



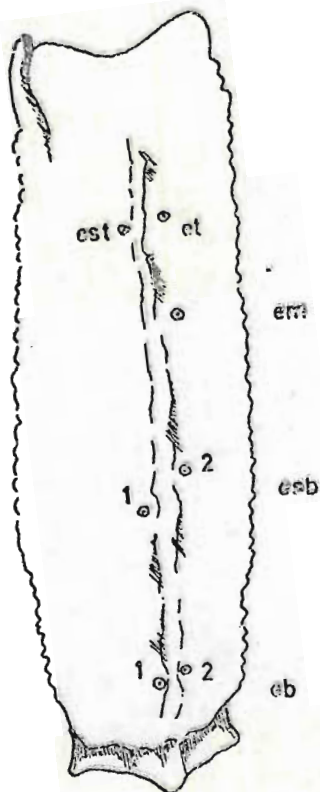
a



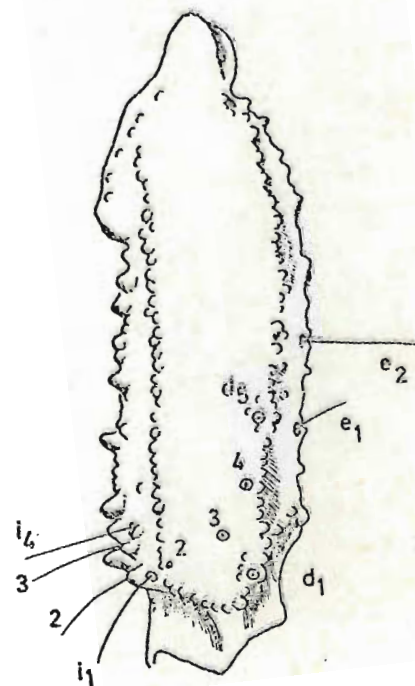
b



c



d



e

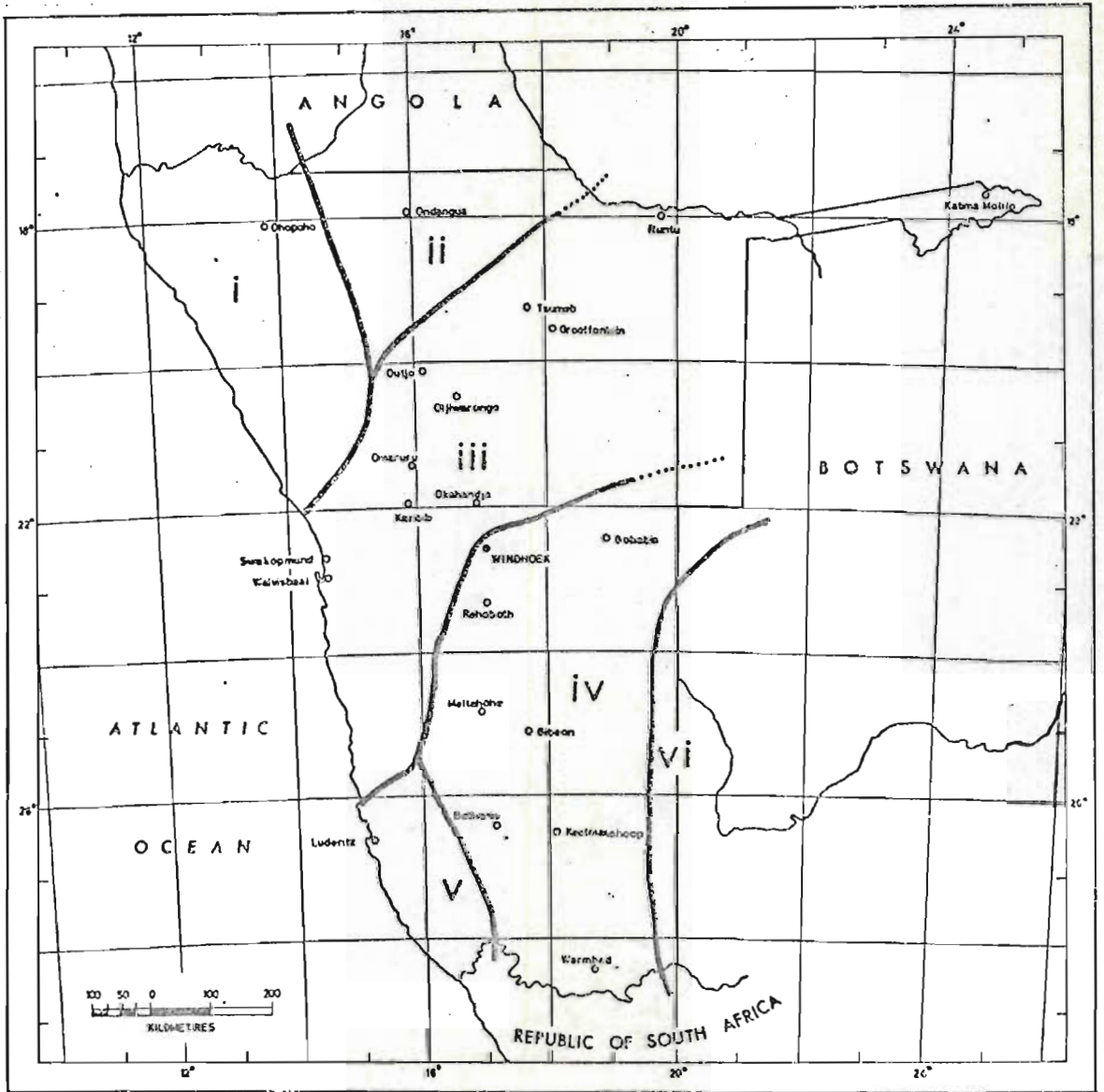
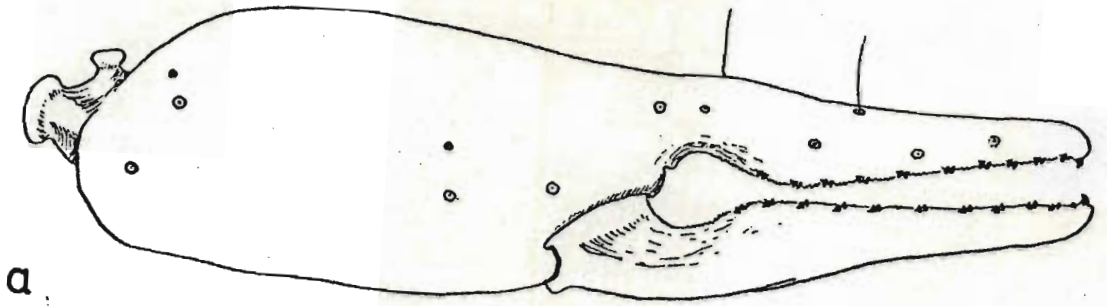


Fig. 4.17. *Parabuthus granulatus* (H. & E.).

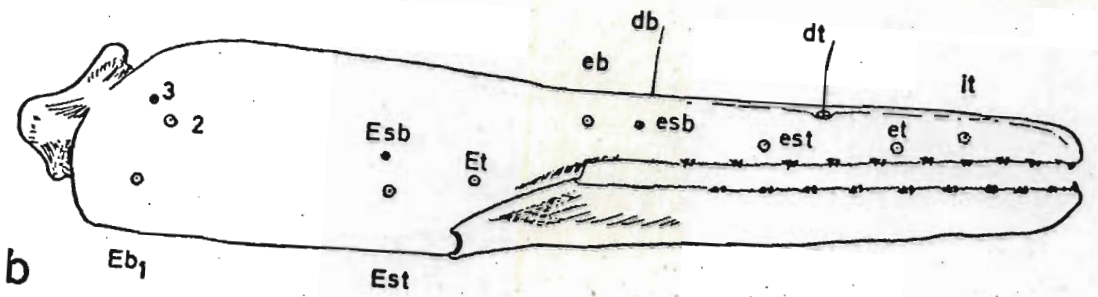
Approximate distribution ranges of intraspecific variants described in the text. Dotted lines indicate supposed extensions of solid lines.

Fig. 4.18. Parabuthus kalaharicus Lamoral .
a, holotype ♂ (N.M. 10945); b-f, paratype ♀ (N.M. 10946). a and b, right hand, outer aspect; c, right hand, ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect. Scales: a, as indicated; b-f, all same scale, as indicated.



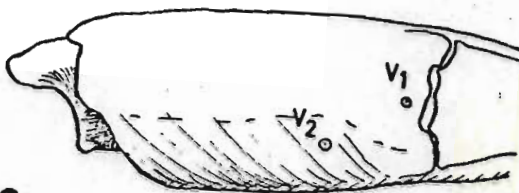
a

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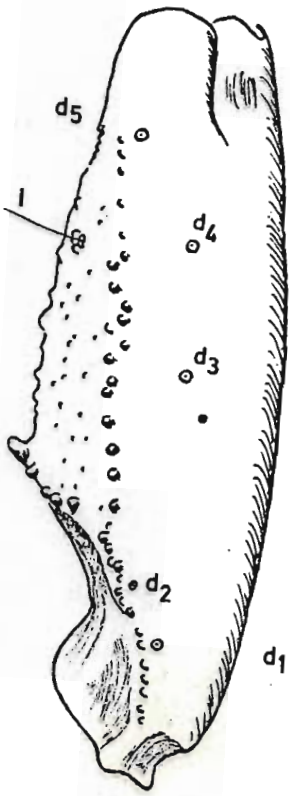


b

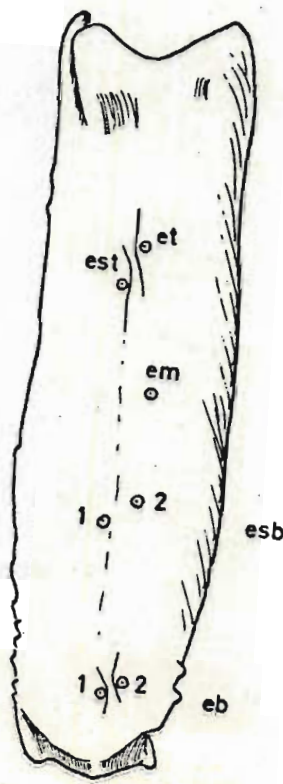
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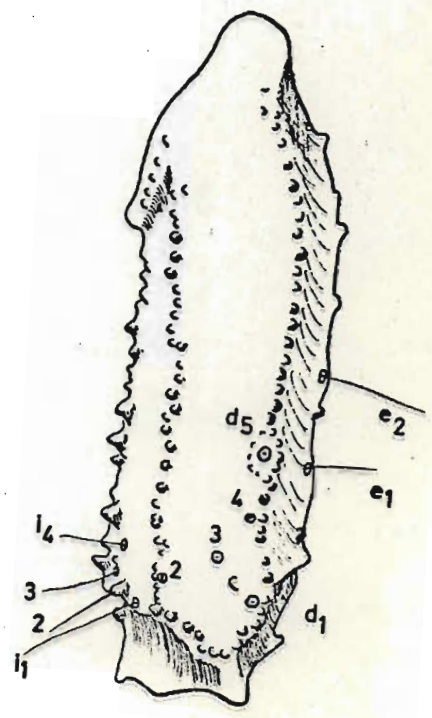
c



d

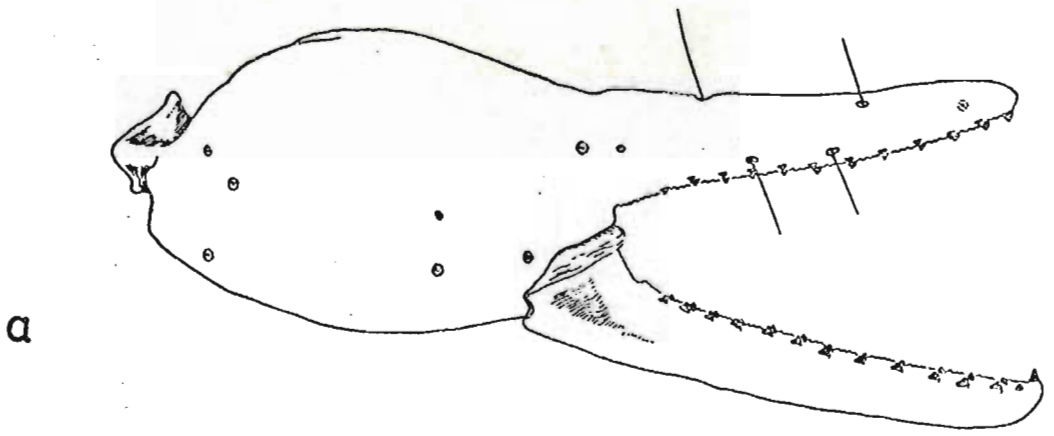


e

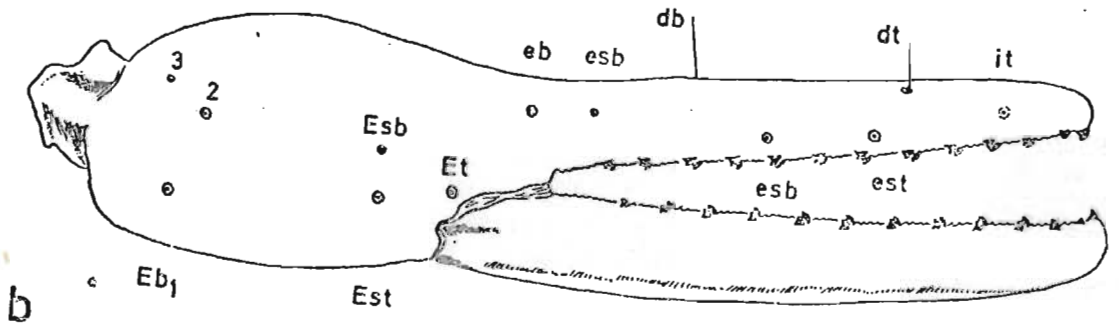


f

Fig. 4.19. Parabuthus kraepelini Werner.
a, ♂ (S.M.N. 382); b-e, ♀ (T.M. 10430). a and b,
right hand, outer aspect; c, right pedipalp tibia,
dorsal aspect; d, id., outer aspect; e, right
pedipalp femur, dorsal aspect.



a

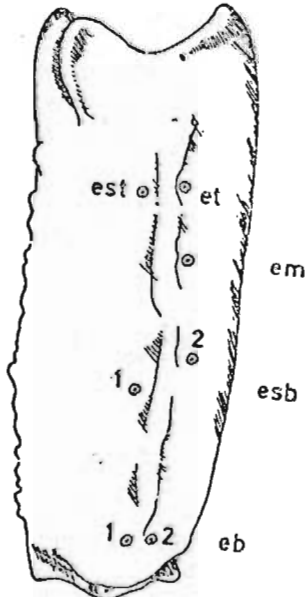


b

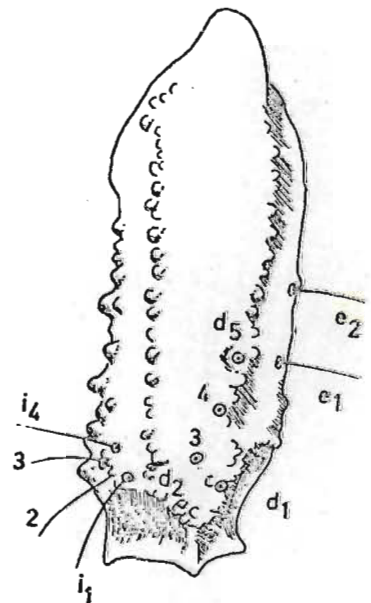
0 2 mm



c



d



e

Fig. 4.20 Parabuthus kuanyamarum Monard.
a-f, ♀ holotype (N.M. 10430). a, right hand, outer aspect; b, id., ventral aspect; c, id., inner aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right padipalp femur, dorsal aspect.

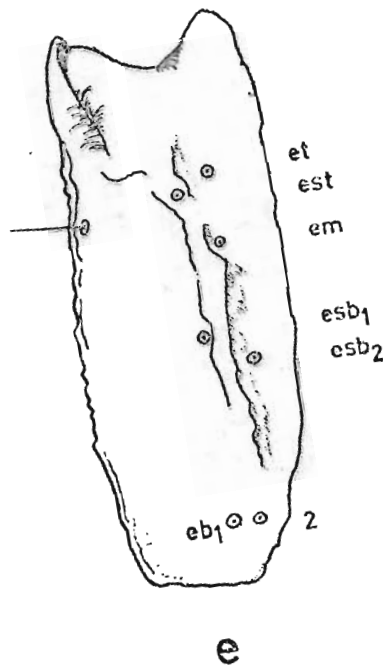
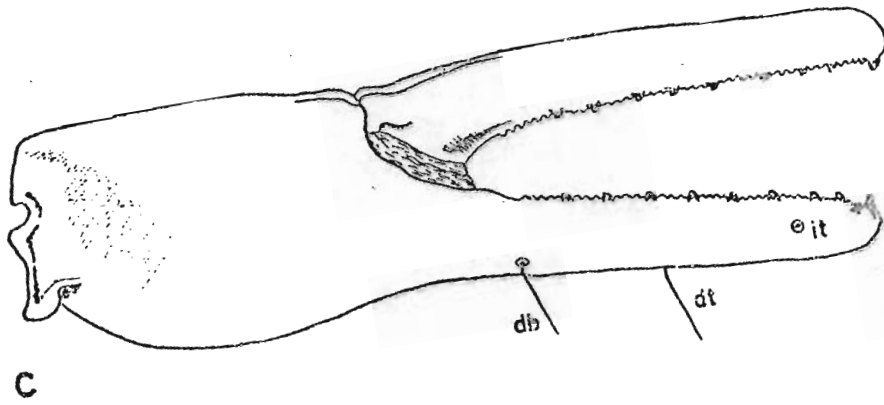
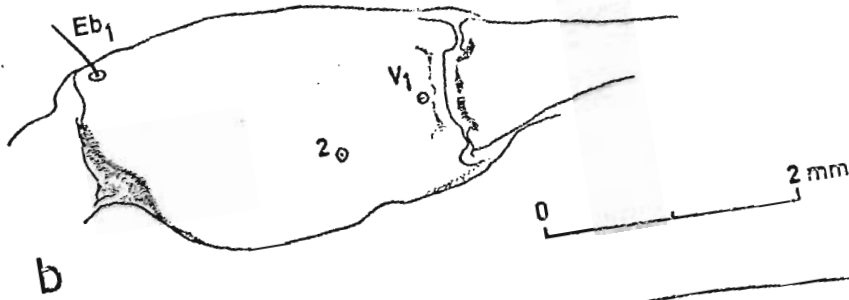
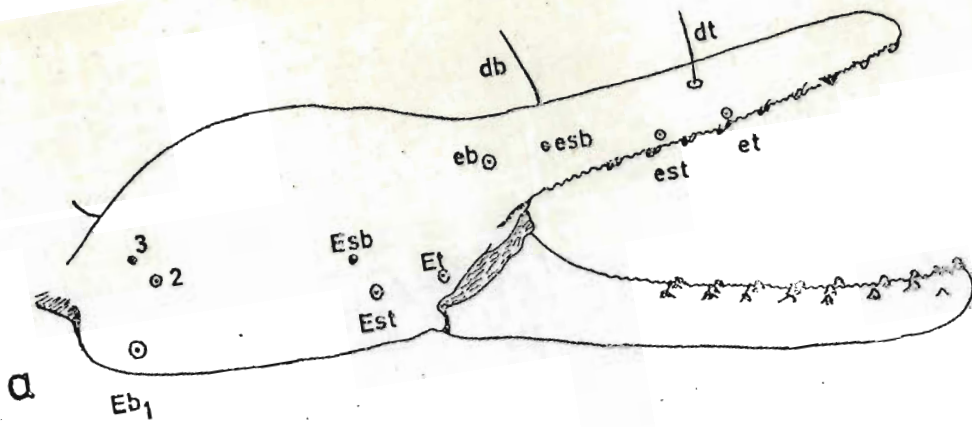
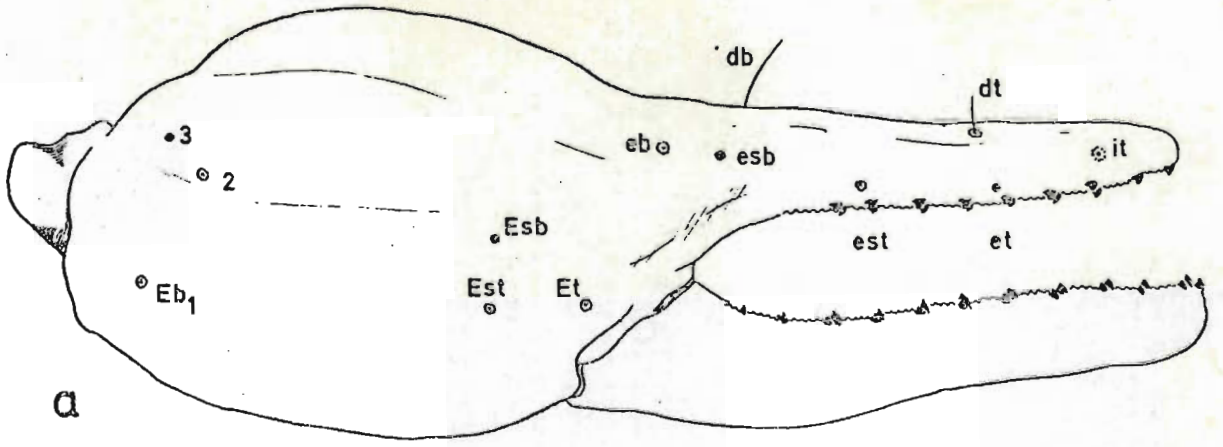
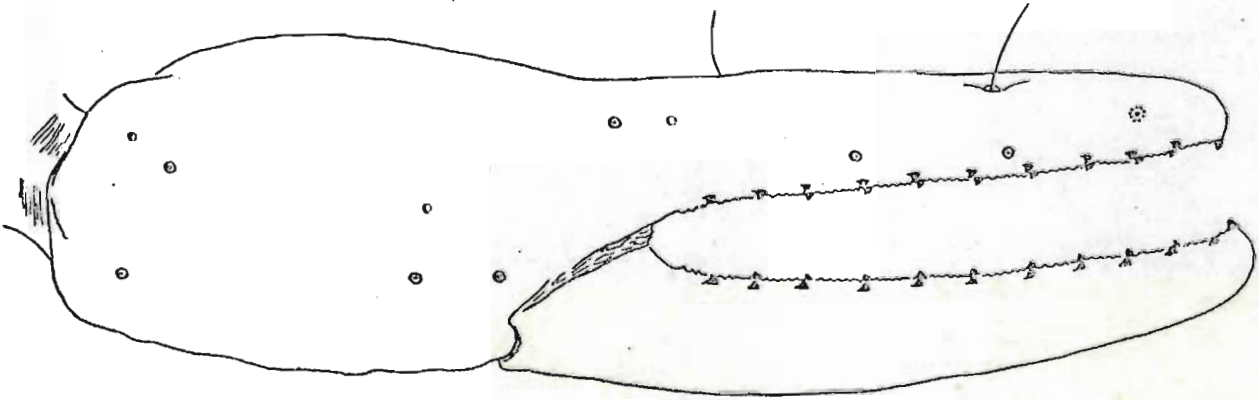


Fig. 4.21. Parabuthus laevifrons (E. Simon). a, ♂ (N.M. 10435); b-e, ♀ neotype (N.M. 10436). a and b, right hand, outer aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer aspect; e, right pedipals femur, dorsal aspect.



a

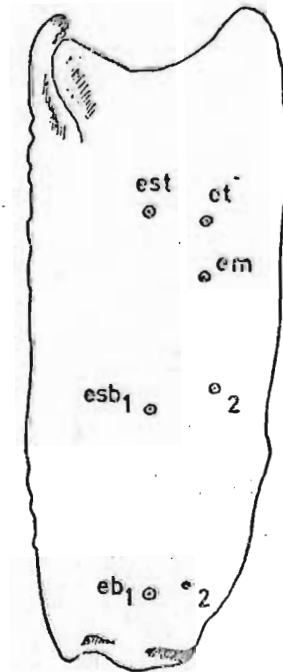


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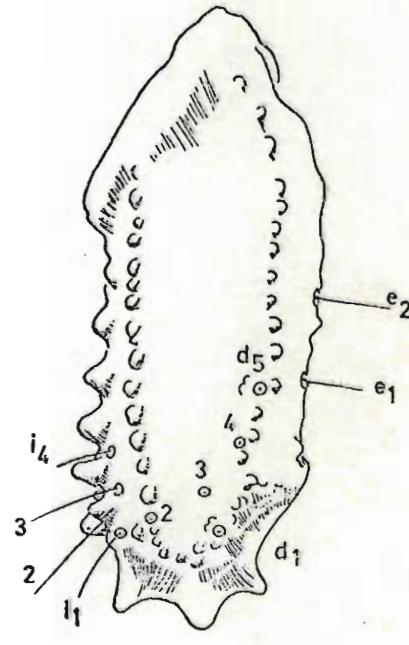
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c

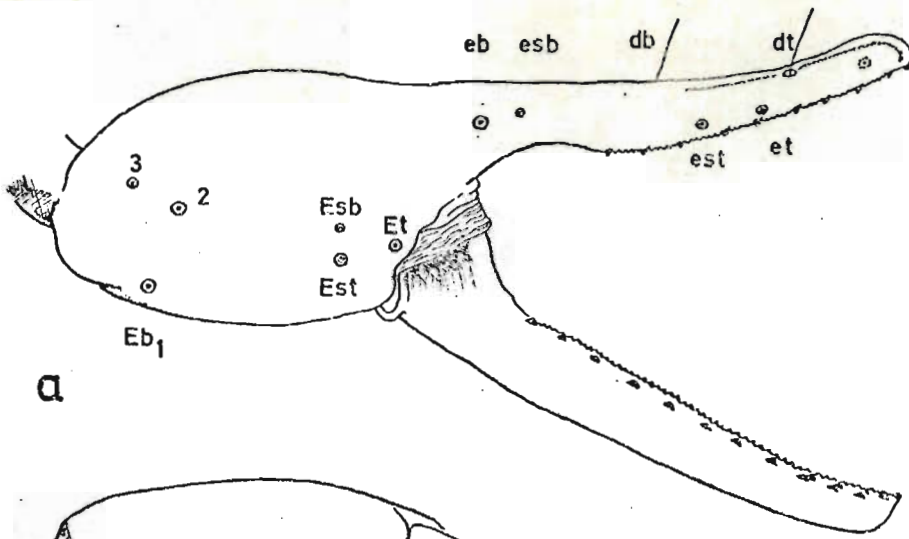


d

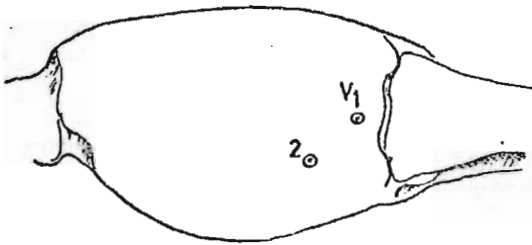


e

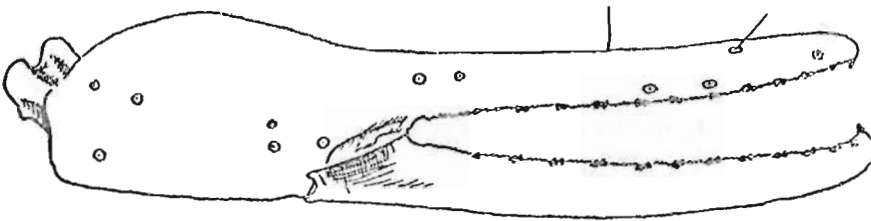
Fig. 4.22. Parabuthus new species B. a-b and d-g ♂ paratype (T.M. 9787). a, right hand, outer aspect; b, id. ventral aspect; c, ♀ holotype (N.M. 10822), right hand, outer aspect; d, right hand movable finger, mesial aspect; e, right pedipalp tibia, dorsal aspect; f, id., outer aspect; g, right pedipalp femur, dorsal aspect. a-c and e-g, same scale; d, as indicated.



a

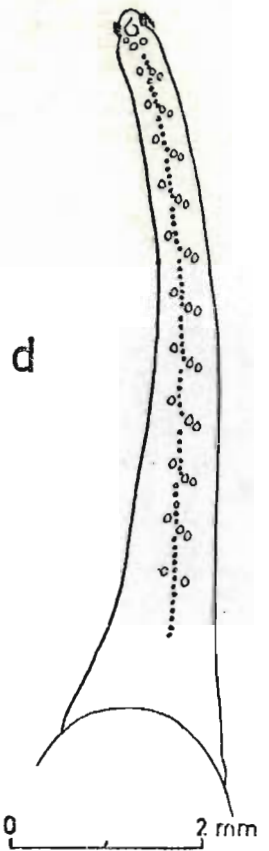


b

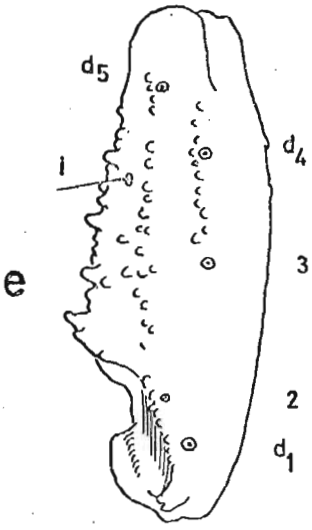


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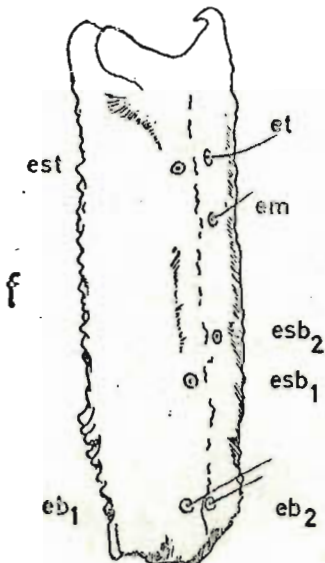
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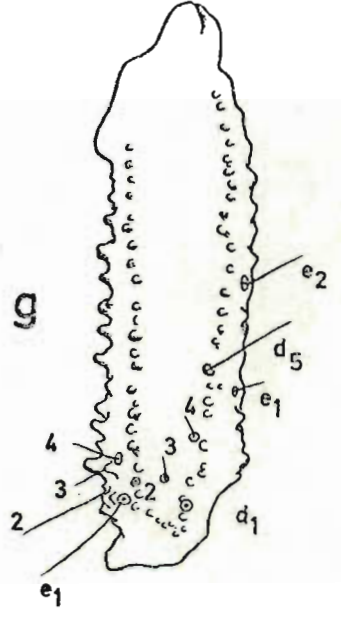
d



e



f



g

Fig. 4.23. Parabuthus new species C. a, ♂ paratype (NM 10365); b-g. ♀ paratype (NM 10365). a and b, right hand, outer aspect; c, id., ventral aspect; d, id., inner aspect; e, right pedipalp tibia, dorsal aspects; f, id., outer aspect; g, right pedipalp femur, dorsal aspect.

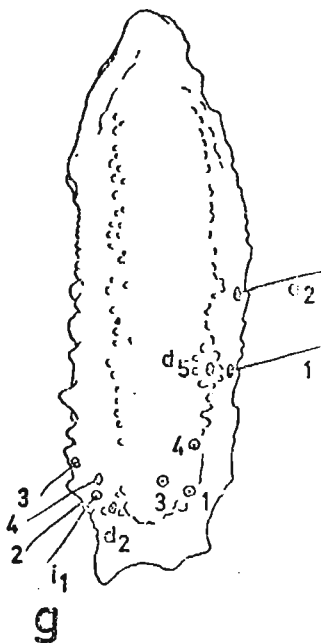
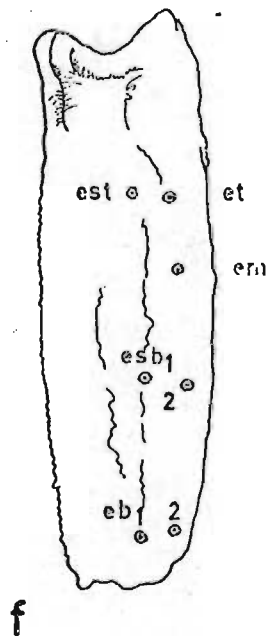
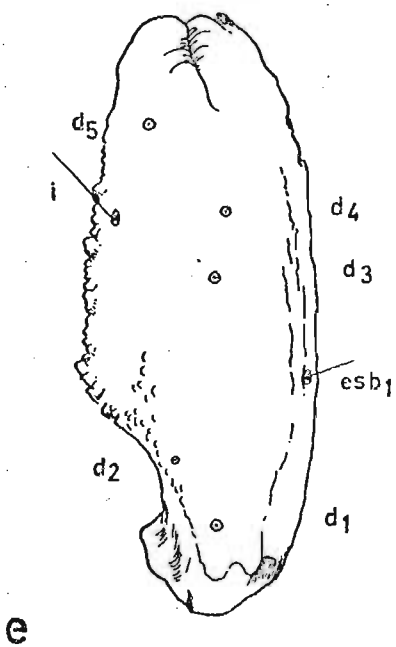
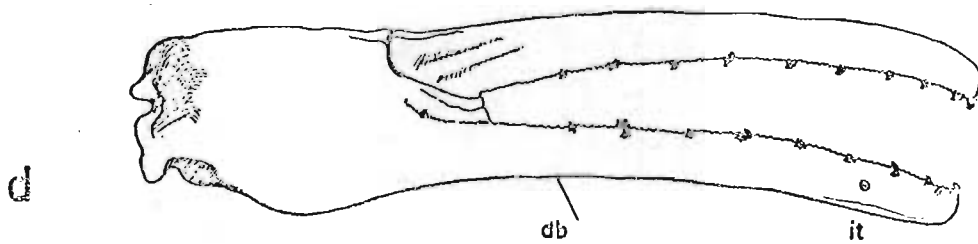
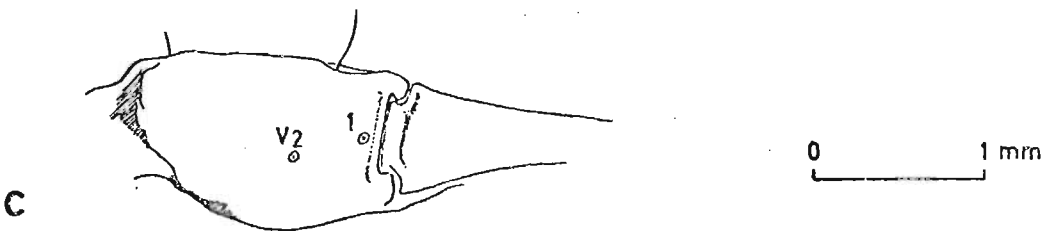
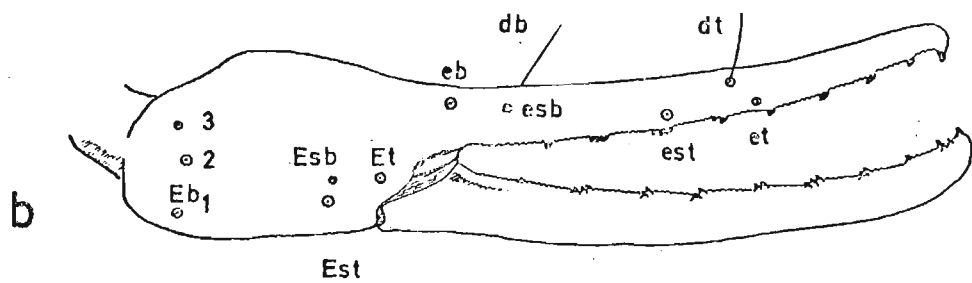
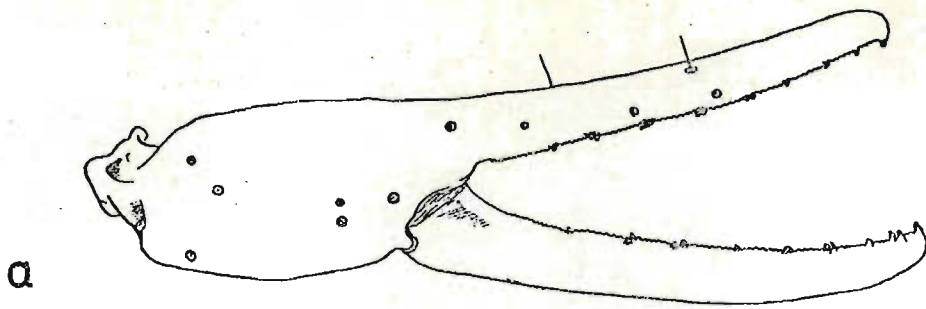


Fig. 4.24. Parabuthus raudus (E. Simon). a, ♂ (N.M. 10533); b-f, ♀ holotype (M.N.H.P. RS 0311). a and b, right hand, outer aspect; c, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect. a, scale as indicated; b-f same scale.

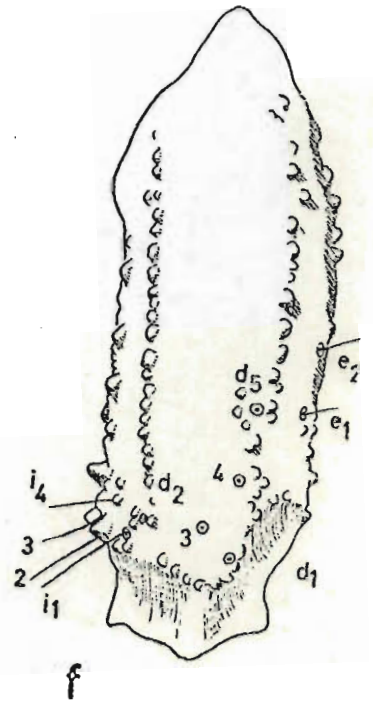
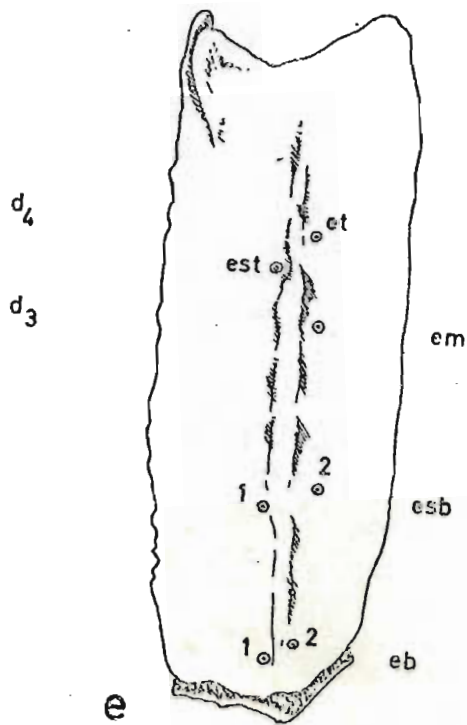
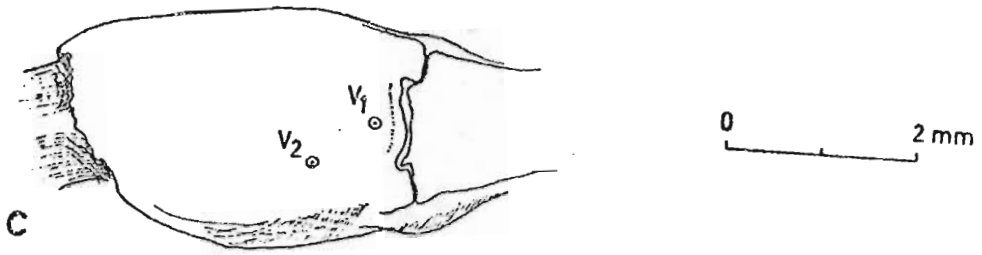
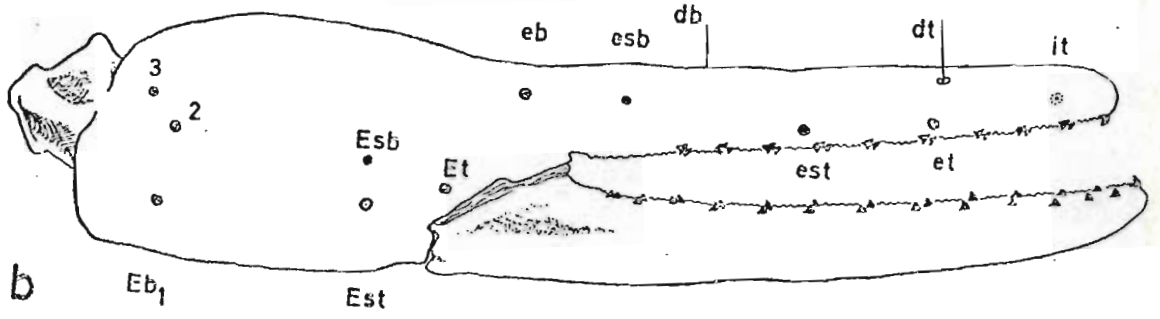
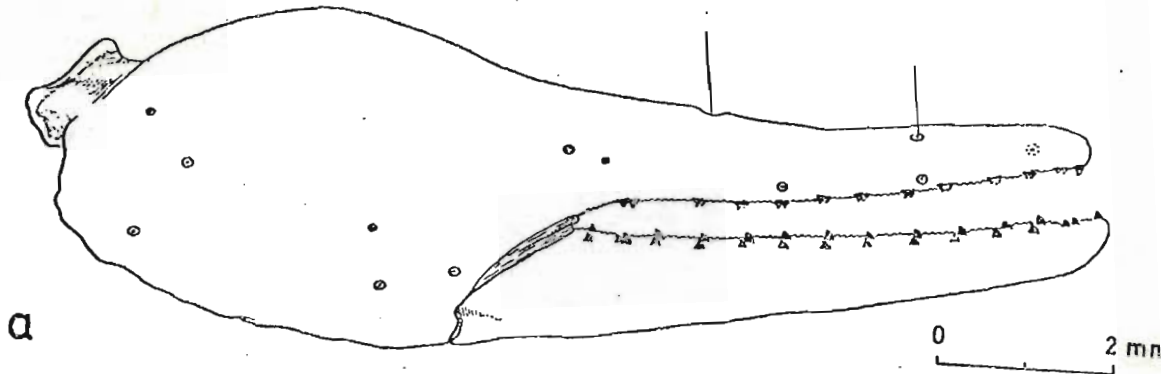
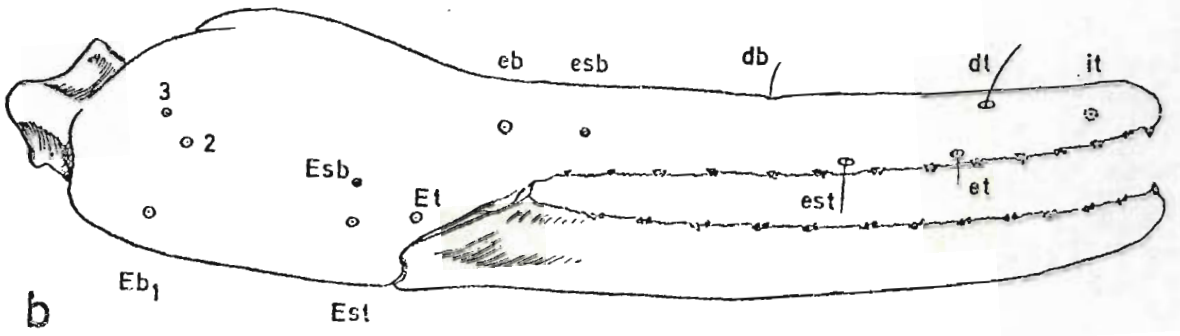
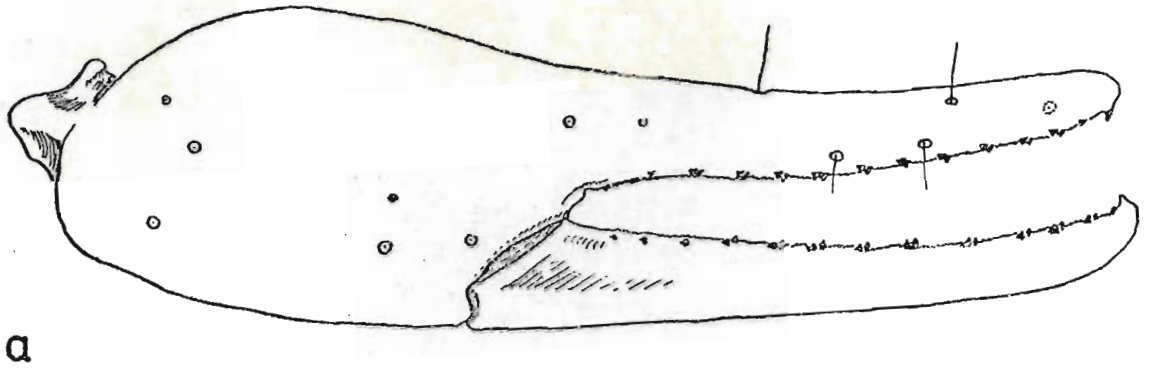


Fig. 4.25 Parabuthus schlechteri Purcell.

a, ♂ (S.M.N. 322); b-e, ♀ (S.M.N. 322). a and b, right hand, outer aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer aspect; e, pedipalp femur, dorsal aspect.



0 2 mm

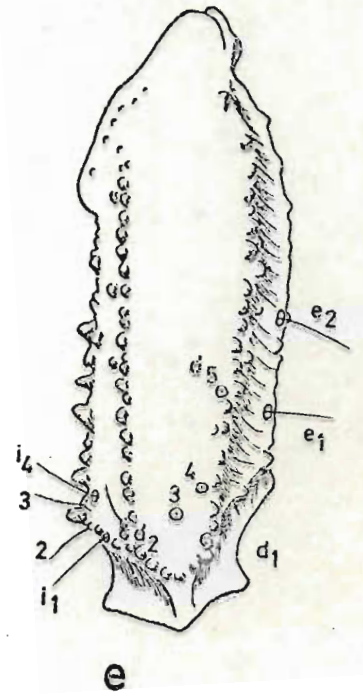
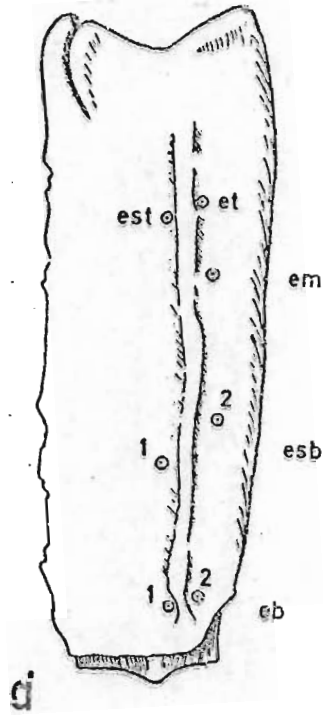
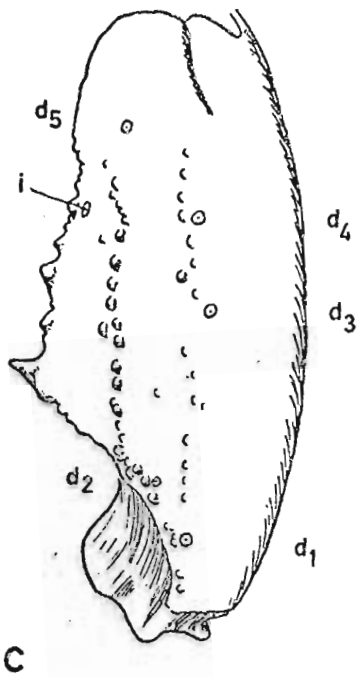


Fig. 4.26. Parabuthus stridulus Hewitt. a-f, ♂ holotype (T.M. 1868). a, right hand, outer aspect; b, id., semi-diagrammatic ventral aspect of handback and dorsal aspect of fixed finger; c, pedipalp hand, inner aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect.

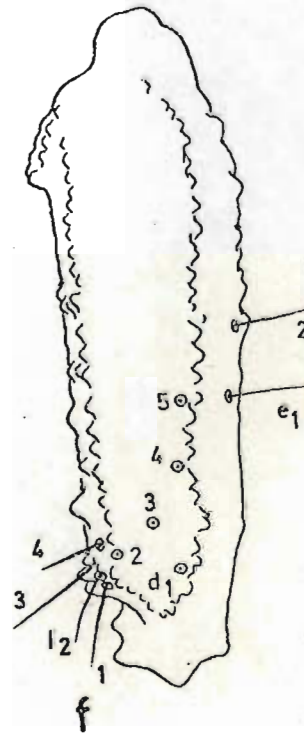
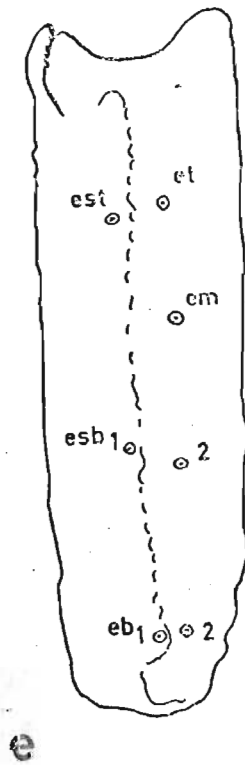
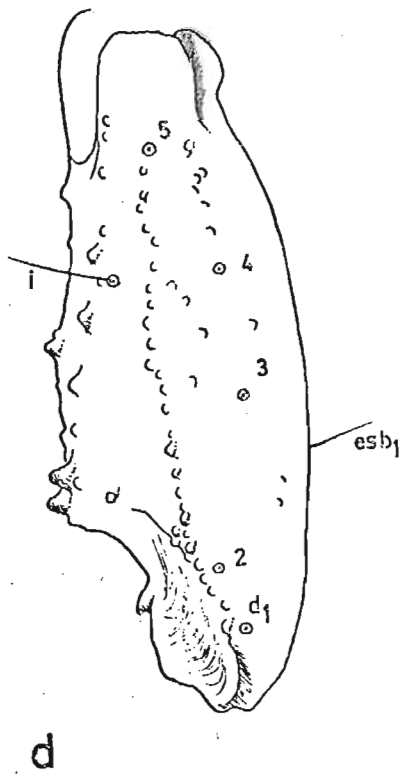
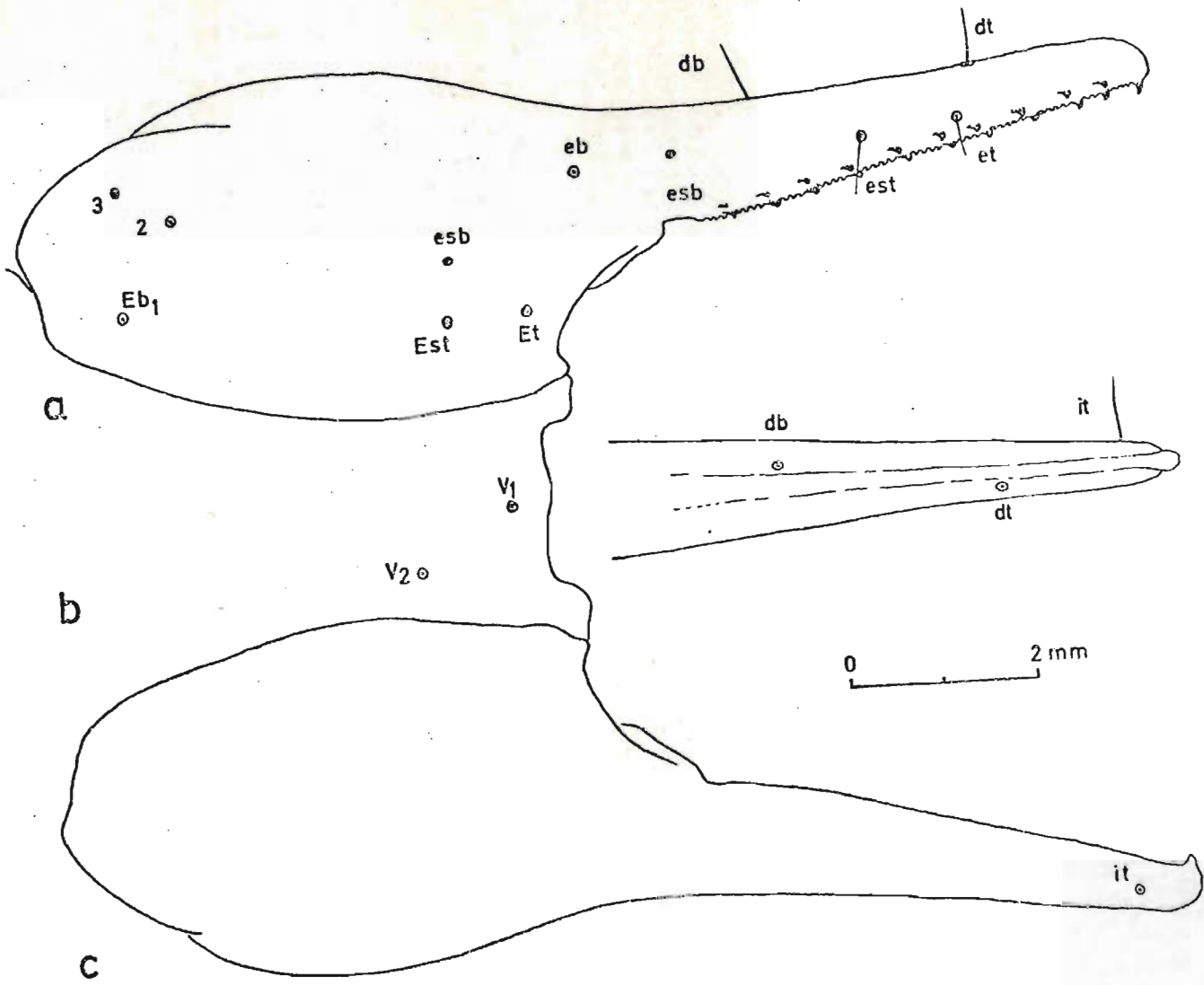


Fig. 4.27. Parabuthus villosus (Peters). a, ♂ (S.M.N. 34); b-e, ♀ (N.M. 10025). a and b, right hand, outer aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer aspect; e, right pedipalp femur, dorsal aspect.

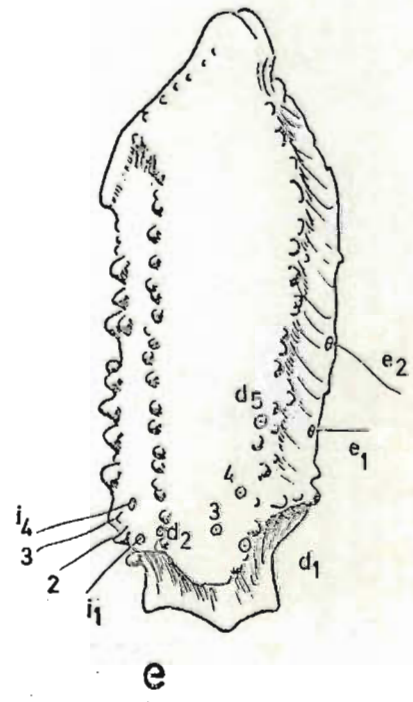
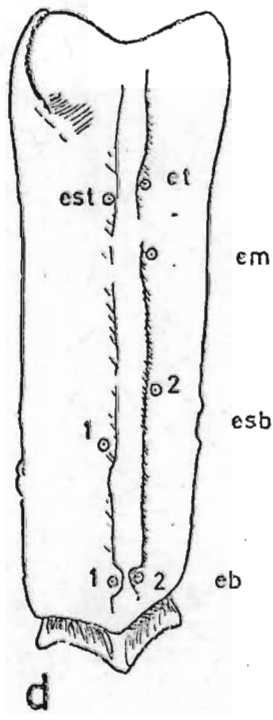
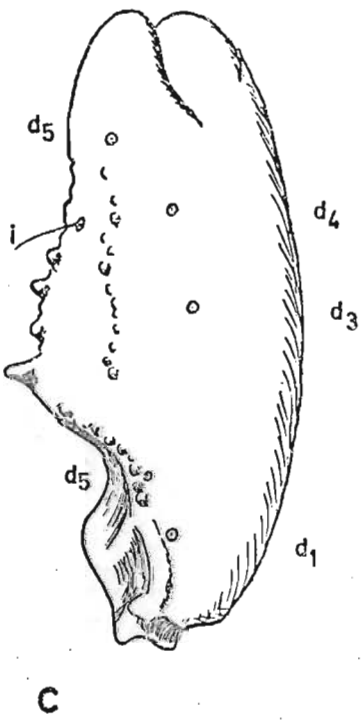
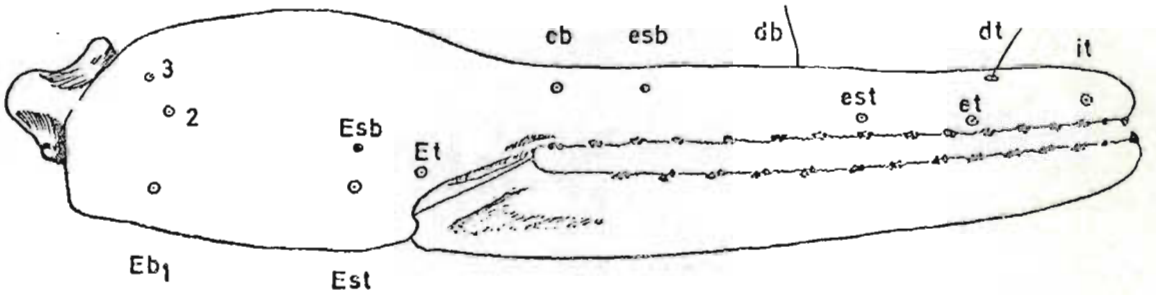
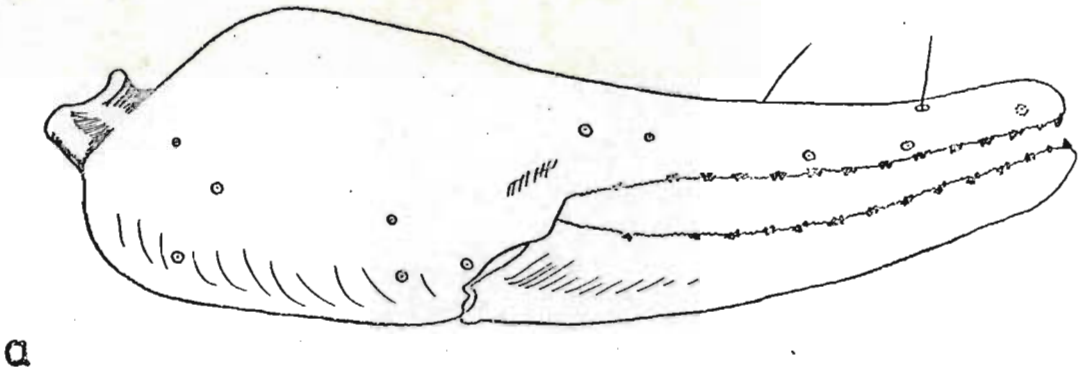


Fig. 4.30. Uroplectes carinatus (Pocock).

a-b, c-f, ♀ (N.M. 7303); c, ♂ homotype (N.M. 7303).

a and c, right hand, outer aspects; b, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect.

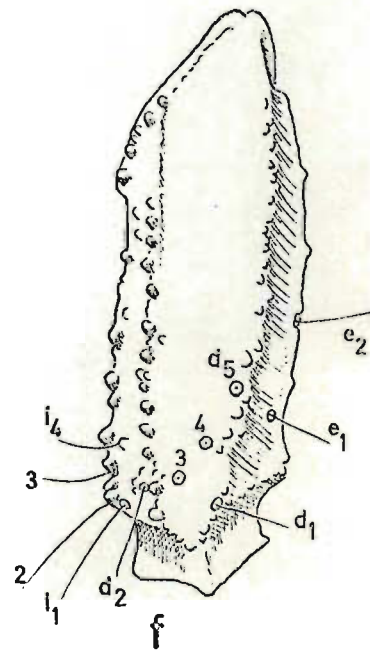
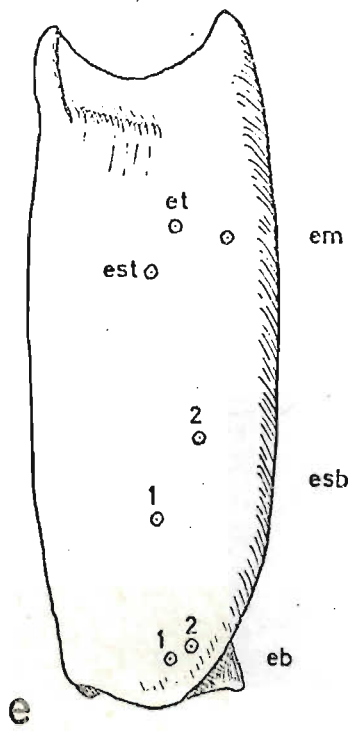
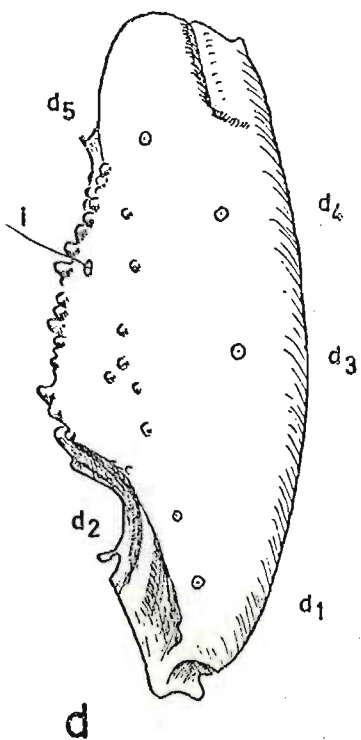
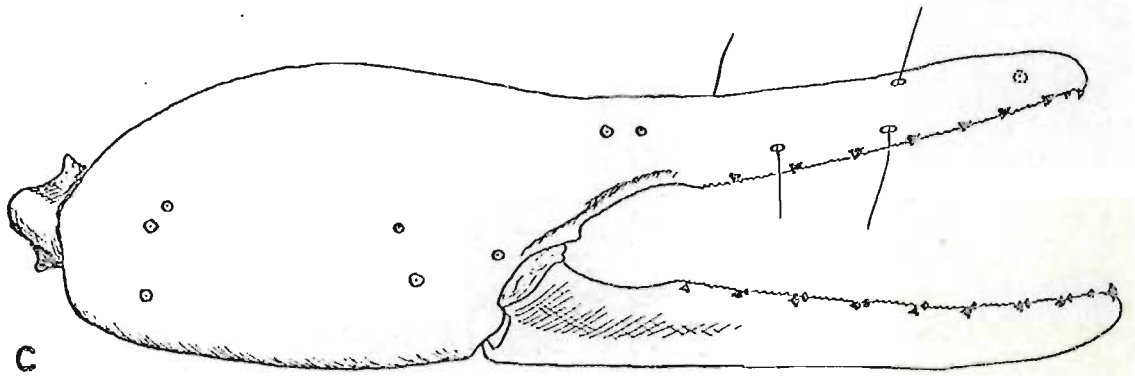
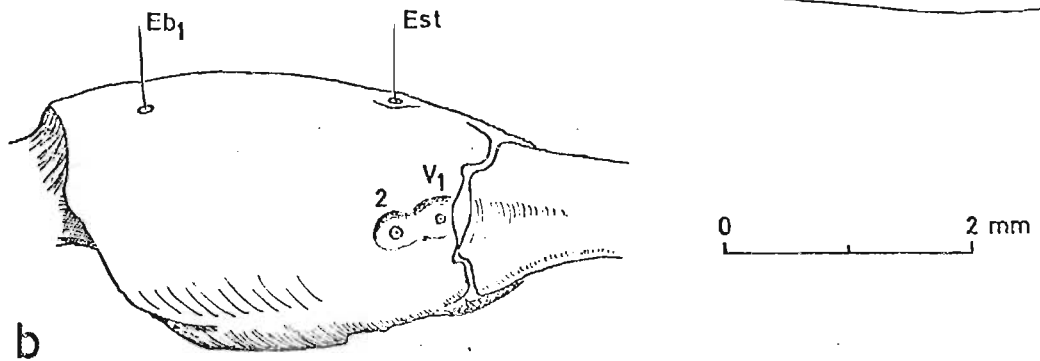
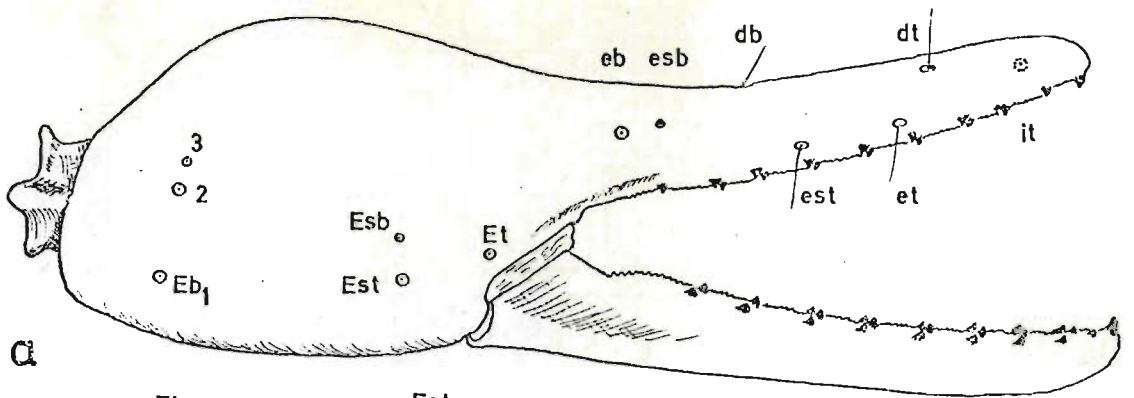
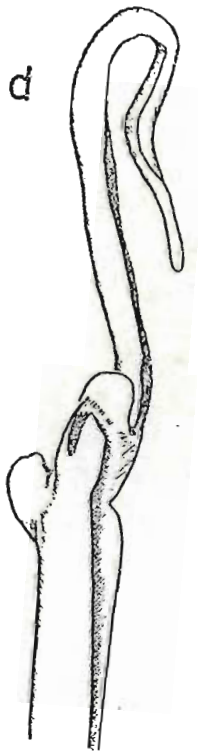
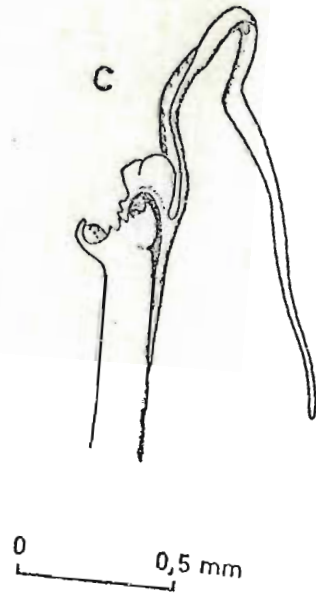
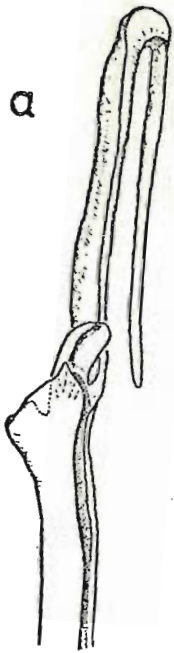


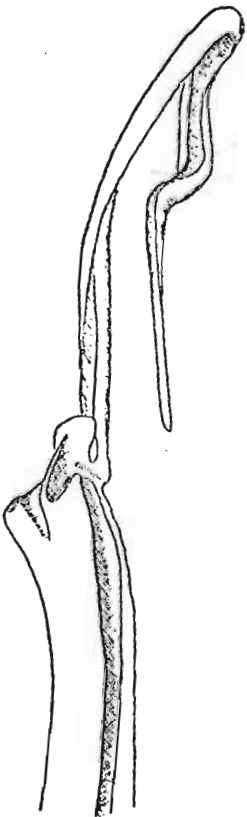
Fig. 4.31. a-d, f-i, distal portions of right hemispermatothores, ventro-ectal aspects; e, right hemispermatothore, ventro-ectal aspect. a. Uroplectes gracilior (N.M. 10870); b, U. carinatus (N.M. 10583); c, U. otjimbinguensis (N.M. 10029); d. U. pilosus (N.M. 10878); e-f, U. planimanus (S.M.N. 279); g, U. schlechteri (N.M. 11041); h, U. teretipes (N.M. 10840) i, U. new species A (N.M. 11040). Scales: e and h as indicated; a-d, f-g and i, all same scale.



e



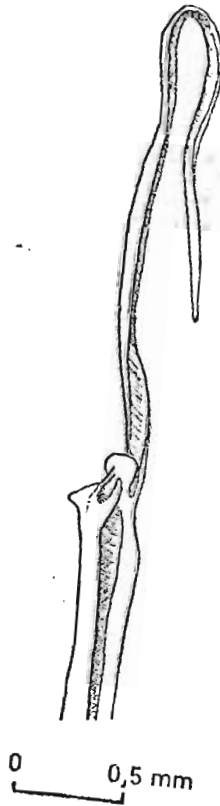
f



g



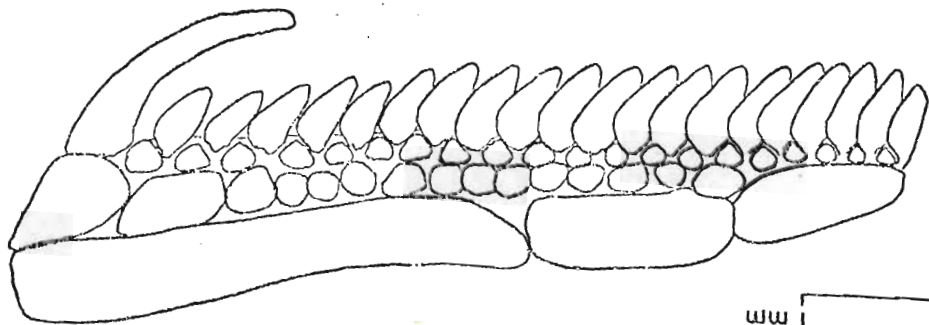
h



i

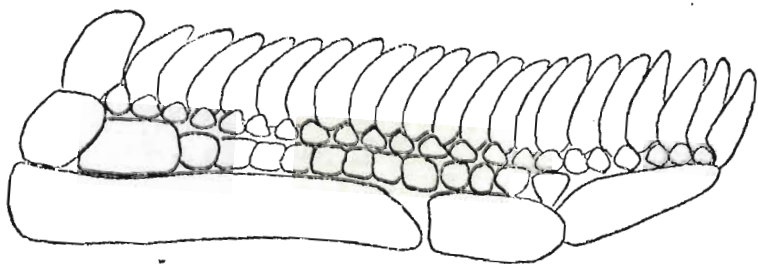


Fig. 4.32. a-d, cauda IV-V and telson, ventral aspects;
e-f, right pectines, ventral aspects. a, Uroplectes
carinatus, ♂ holotype (B.M.); b, id, ♀ (N.M. 7303);
c. U. gracilior, ♀ lectotype (T.M. 1864 ex 1033); d,
U. schlecteri, ♀ homotype (N.M. 10562); e. U. carinatus ♀,
(N.M. 7303); f, U. new species A ♀ holotype (N.M. 10866).
a-d, same scale; e-f same scale.



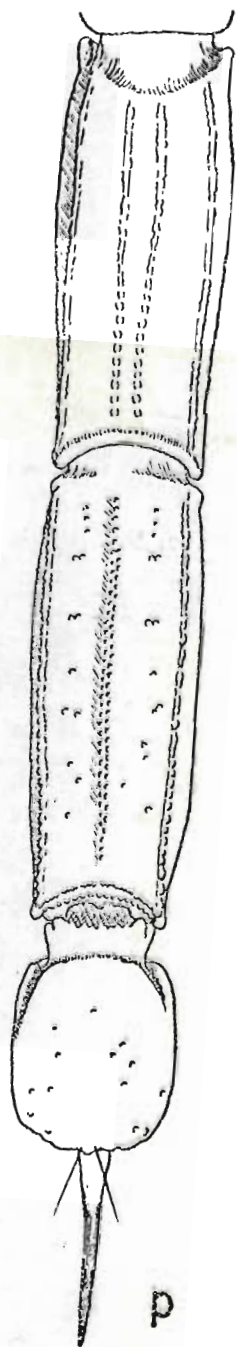
f

1 mm

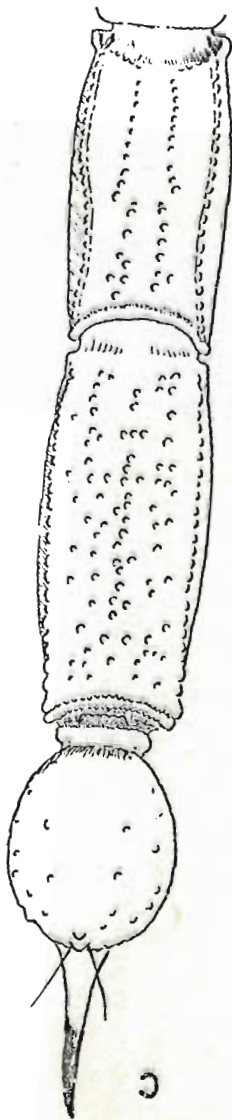


e

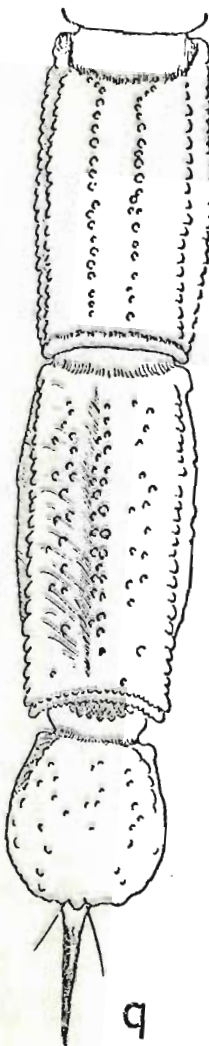
2 mm



d



c

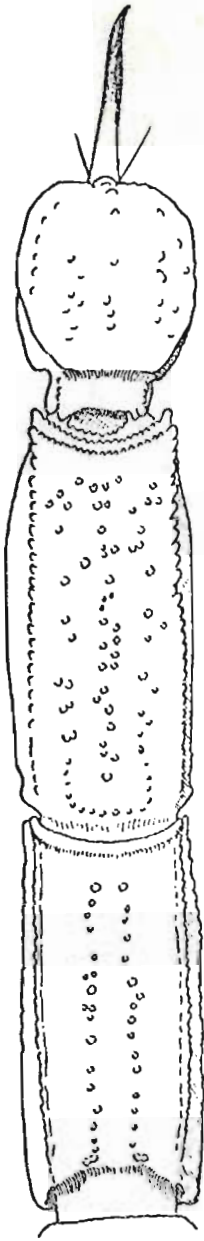


b

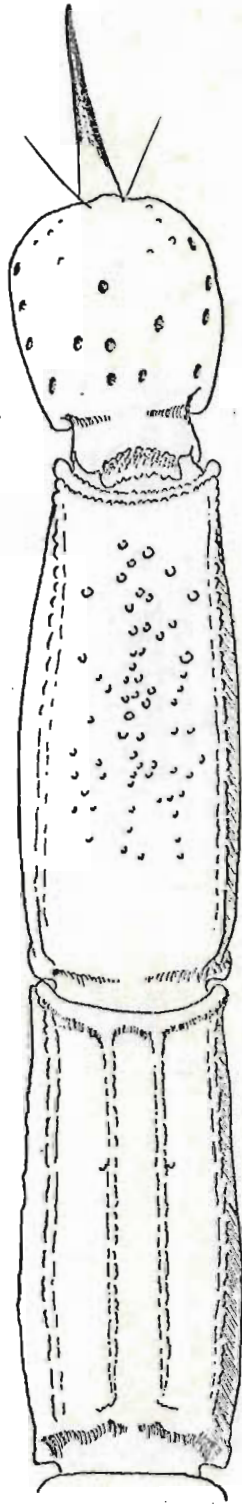


a

Fig. 4.33. Ventral aspects of cauda IV-V and telson of:
a. Uroplectes new species A, ♀ holotype (N.M. 10866); b,
U. planimanus, ♀ (N.M. 11037); c, U. teretipes, ♀ holotype
(N.M. 9101), black colouration of cauda IV, not shown here;
d, U. longimanus, ♀ lectotype (Z.M.H.). Scales: c, as
shown; a, b and d all same scale.



a



b



c



d

Fig. 4.34. Uroplectes gracilior Hewitt.

a-b, d-f, ♂ homotype (N.M. 11025); c, ♀ (N.M. 10870).

a and c, right hand, outer aspects; b, id., ventral aspect;

d, right pedipalp tibia, dorsal aspect; e, id., outer aspect;

f, right pedipalp femur, dorsal aspect.

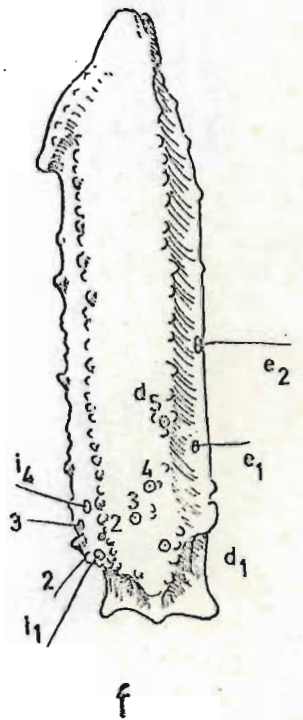
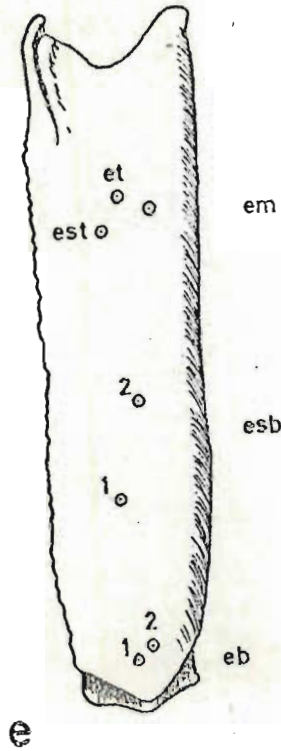
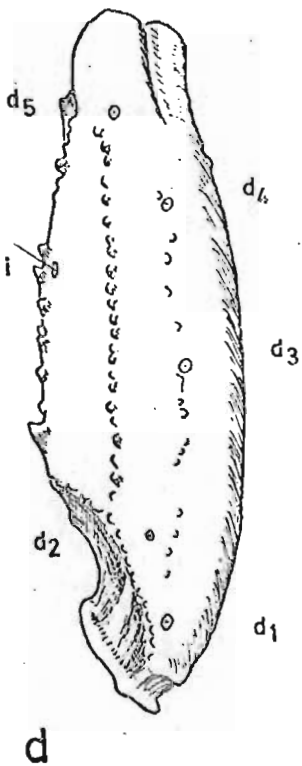
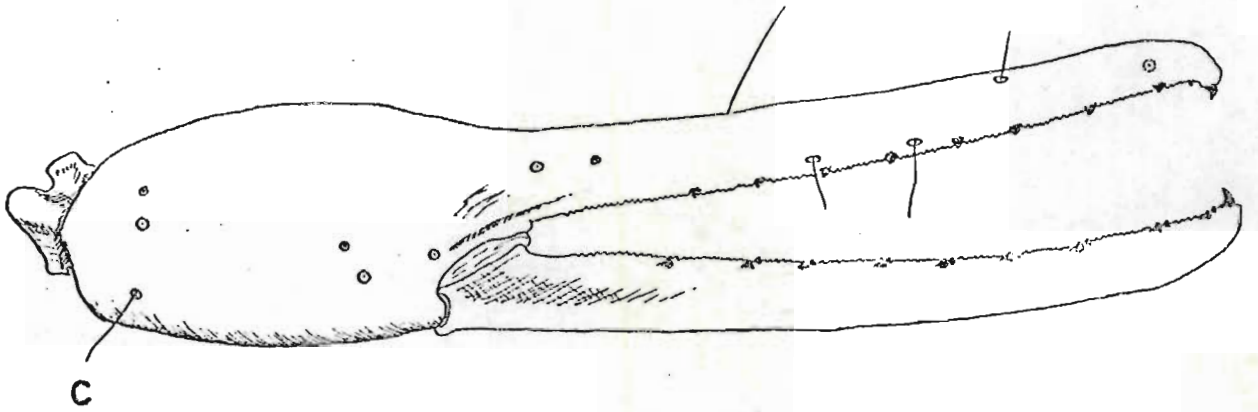
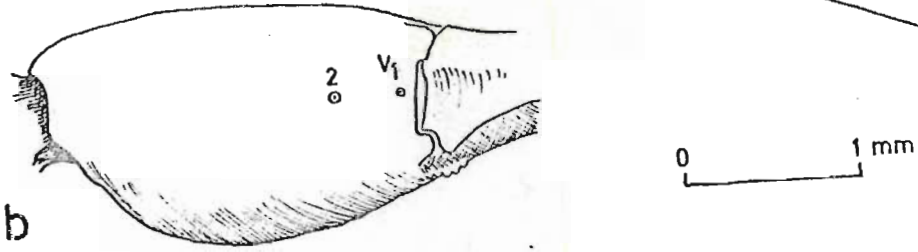
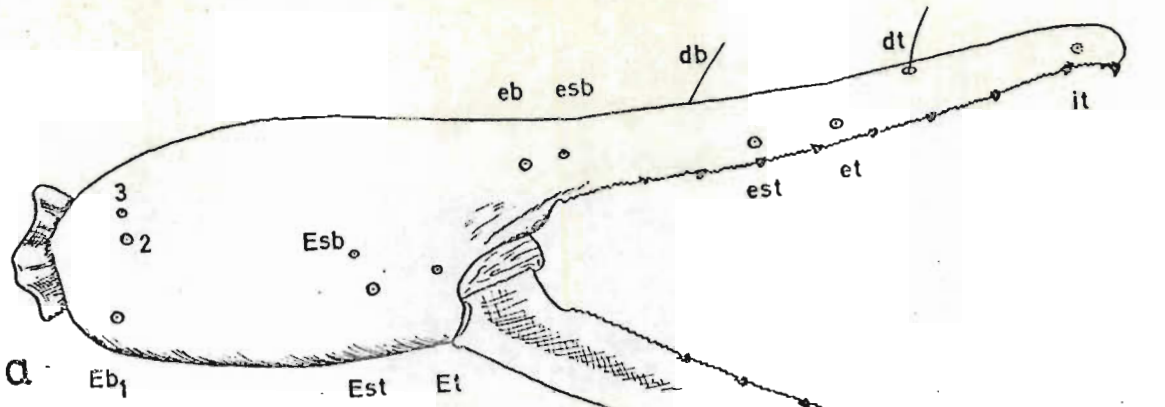


Fig. 4.35. Uroplectes longimanus Werner.

♀ lectotype (Z.M.H.). a, right hand, outer aspect;
b, id., ventral aspect; c, right pedipalp tibia, dorsal
aspect; d, id., outer aspect; e, right pedipalp femur,
dorsal aspect; f, right pecten, ventral aspect.

Scale: a-e, same; f, as indicated.

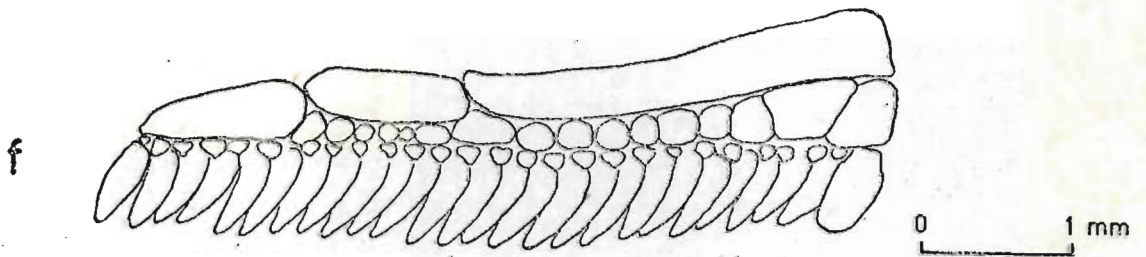
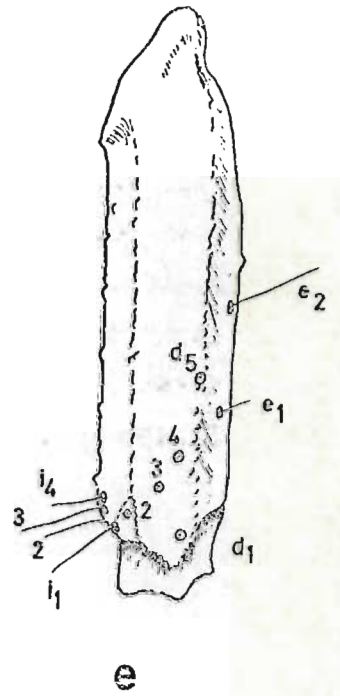
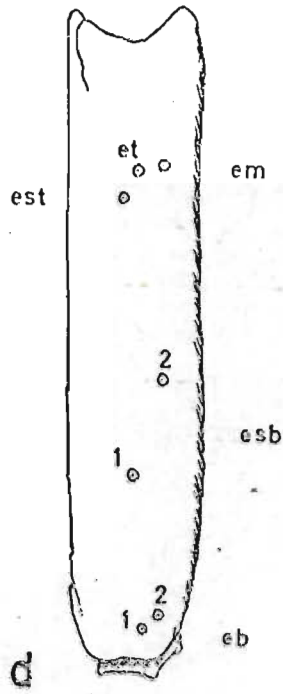
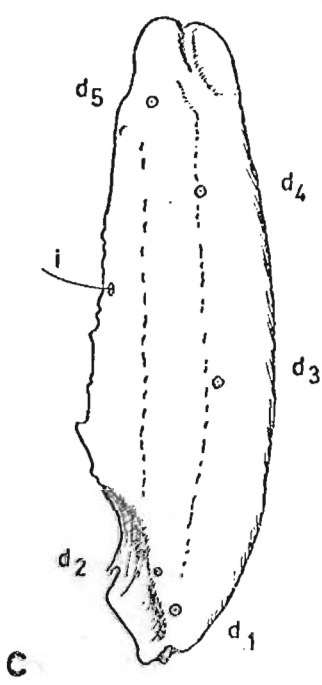
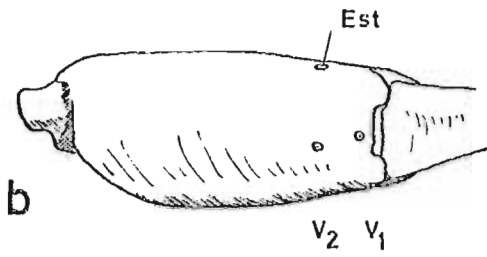
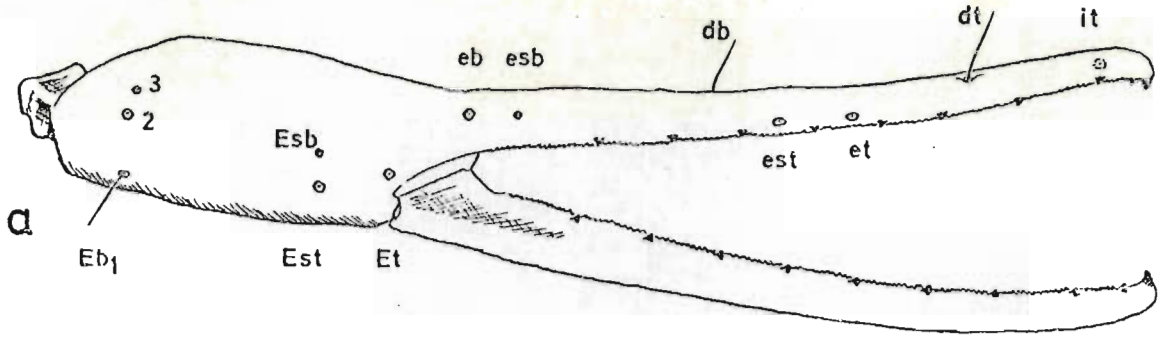


Fig. 4.36. Uroplectes otjimbinguensis (Karsch).
a-b, d-f, ♀ (N.M. 10580); c, ♂ (N.M. 10580). a and c,
right hand, outer aspects; b, id., ventral aspect; d, right
pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right
pedipalp femur, dorsal aspect.

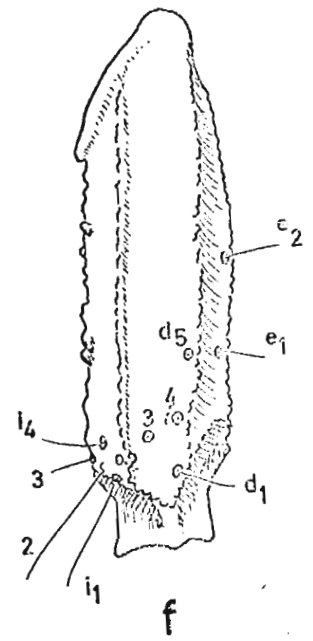
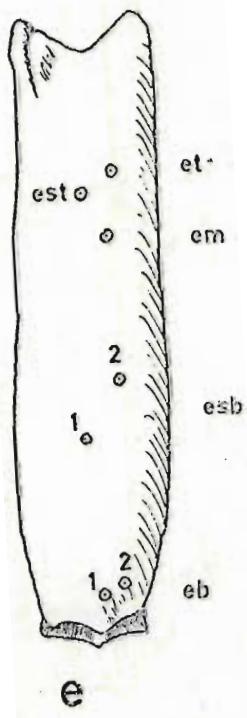
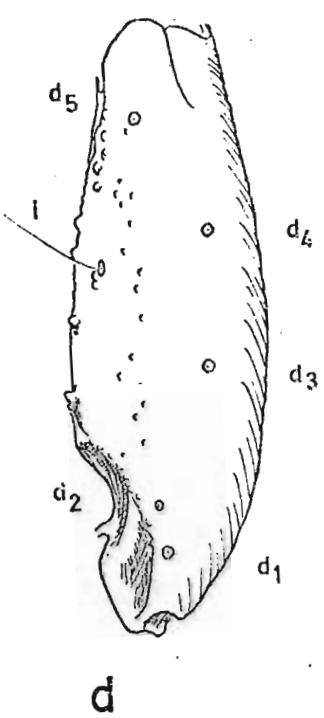
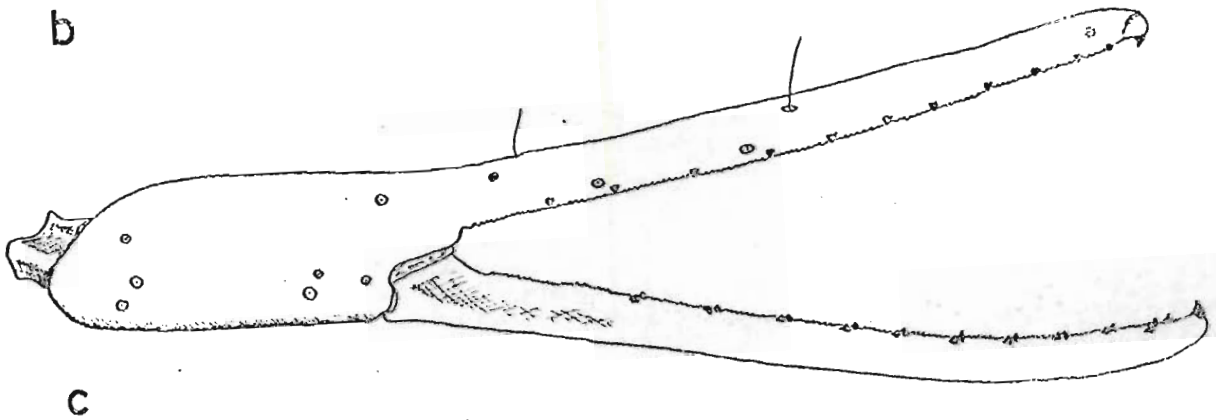
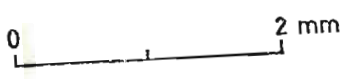
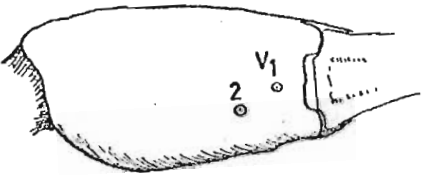
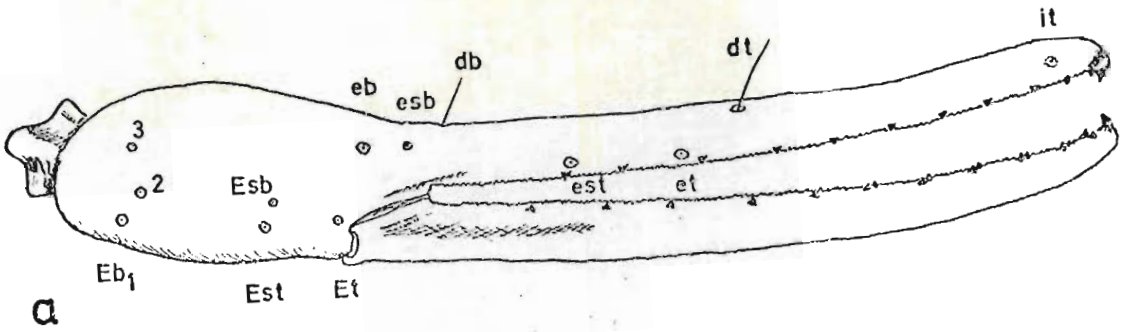


Fig. 4.37. Uroplectes pilosus (Thorell).
a-b, d-f, ♀ (T.M. 8924); c, ♂ (T.M. 8924). a and c, right
hand, outer aspects; b, id., ventral aspect; d, right
pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right
pedipalp femur, dorsal aspect.

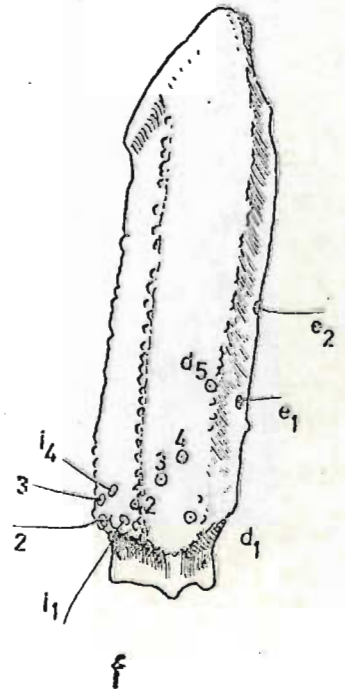
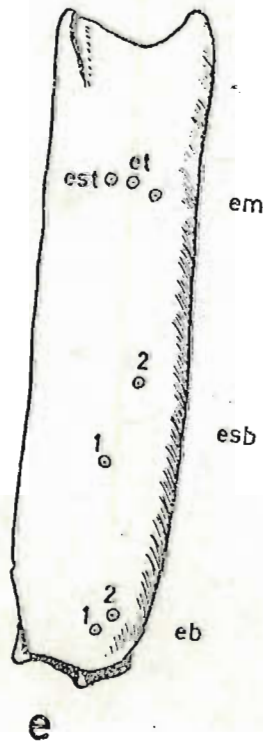
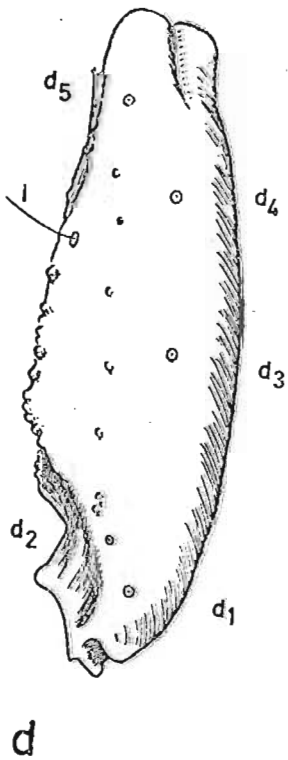
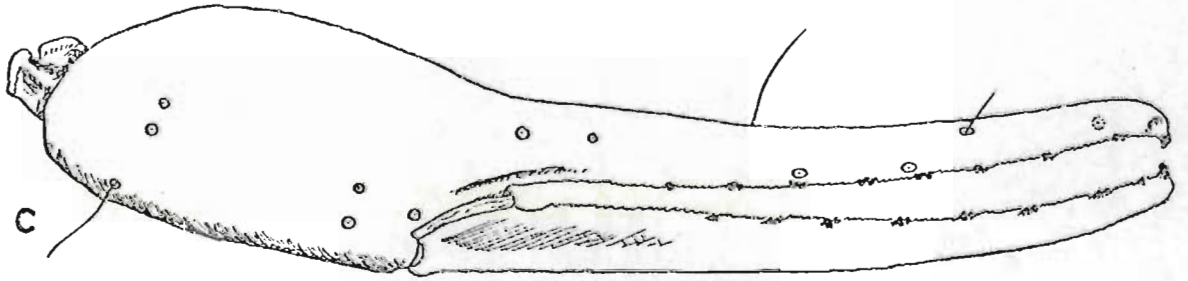
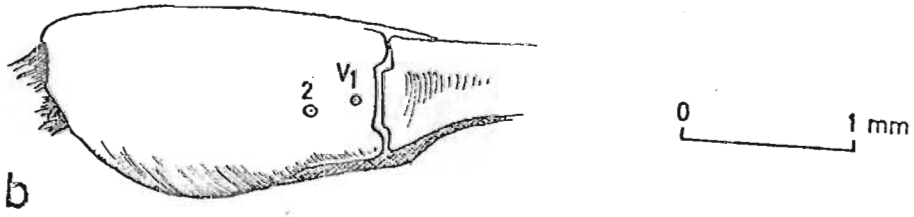
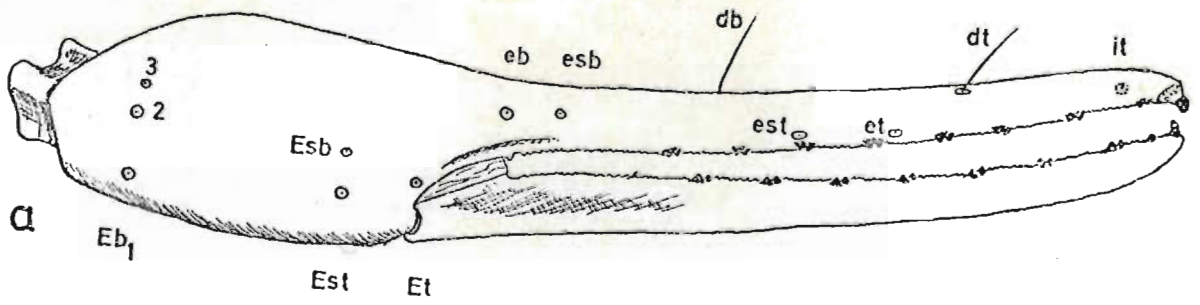


Fig. 4.38. Uroplectes planimanus (Karsch).

a-b, d-f, ♀ (N.M. 11037); c, ♂ (N.M. 11037). a and c, right hand, outer aspects; b, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect.

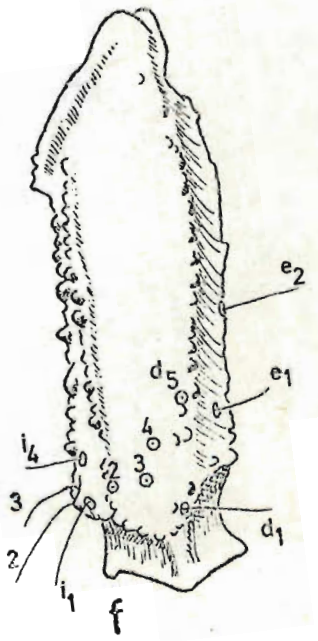
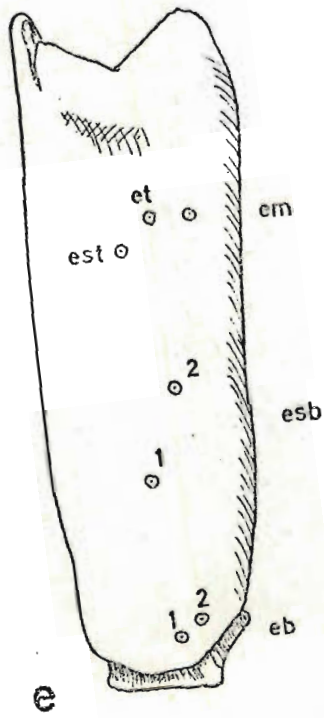
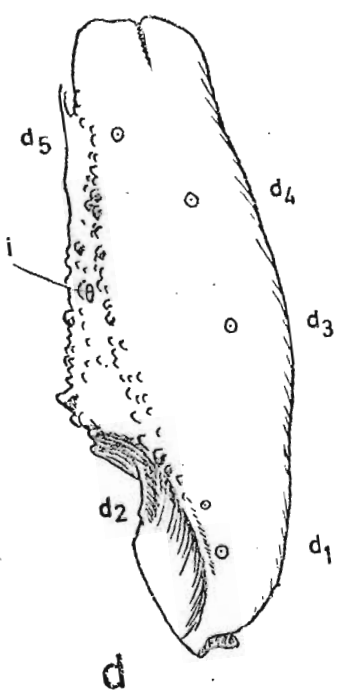
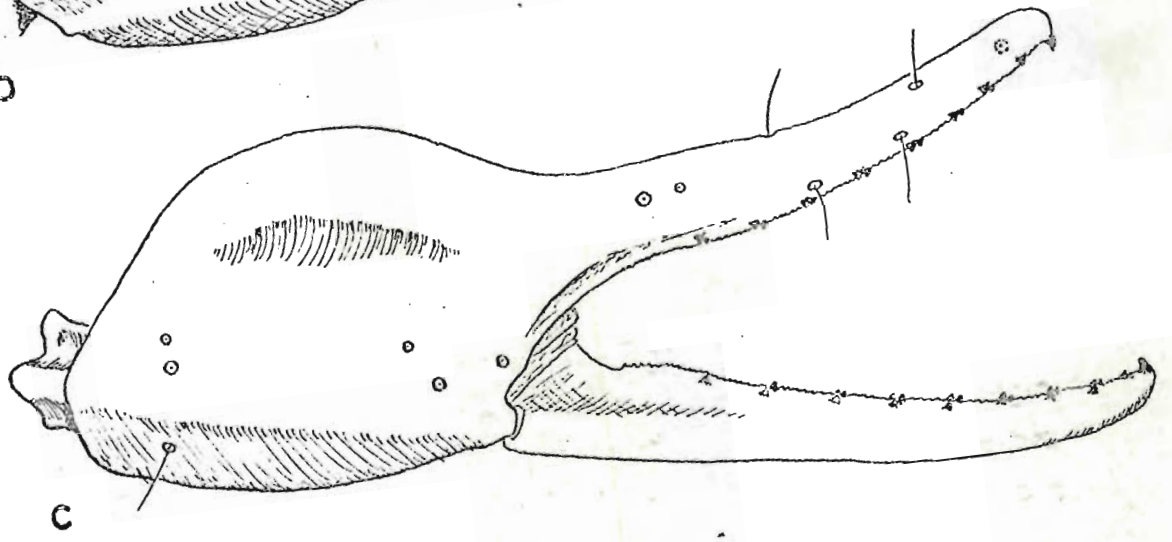
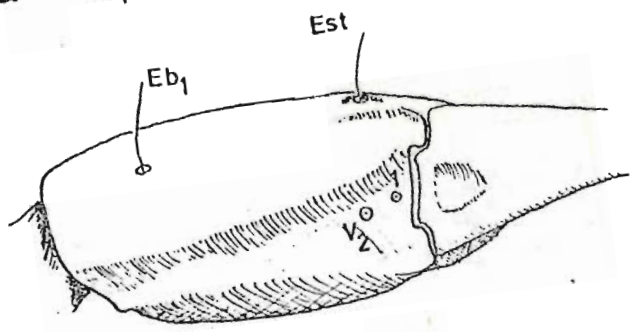
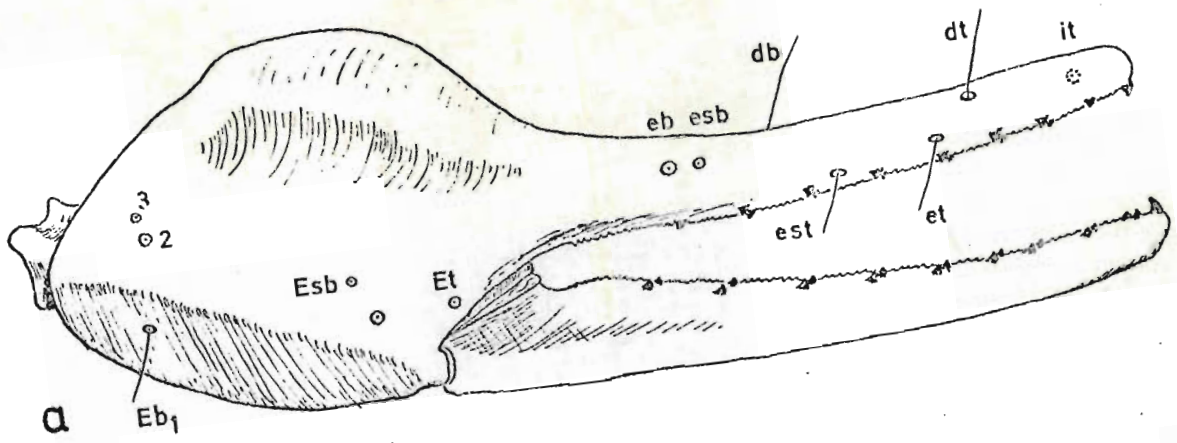
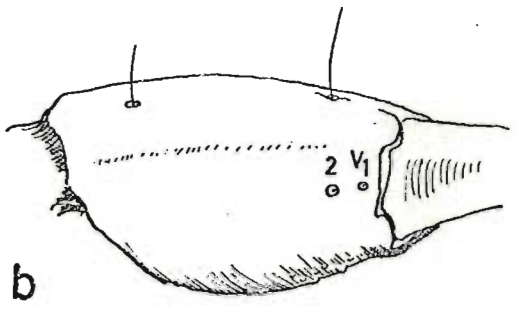
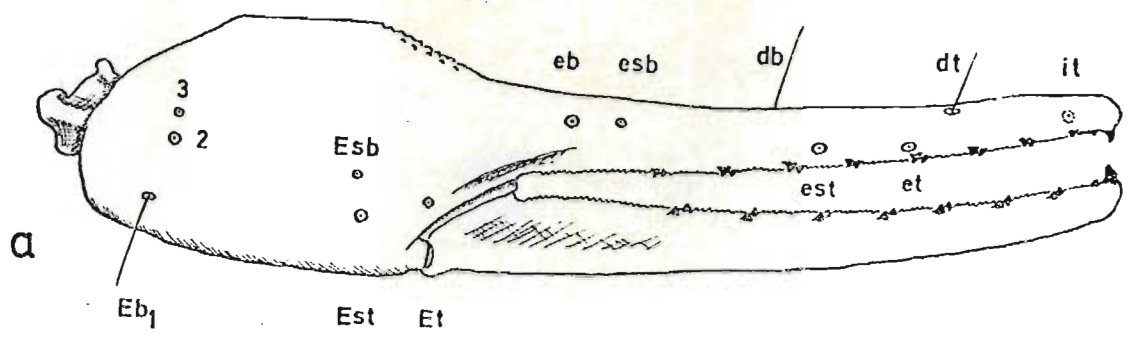
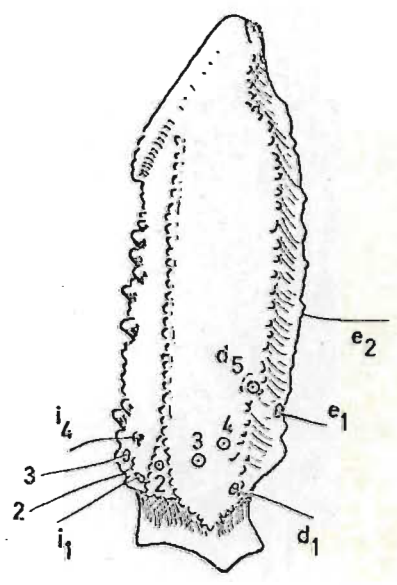
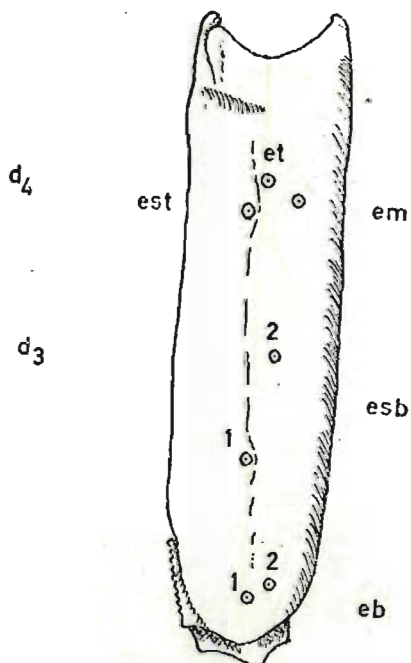
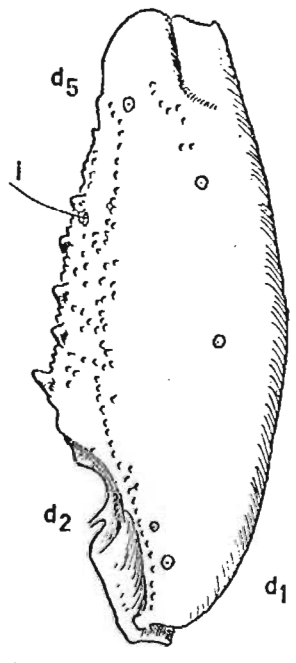
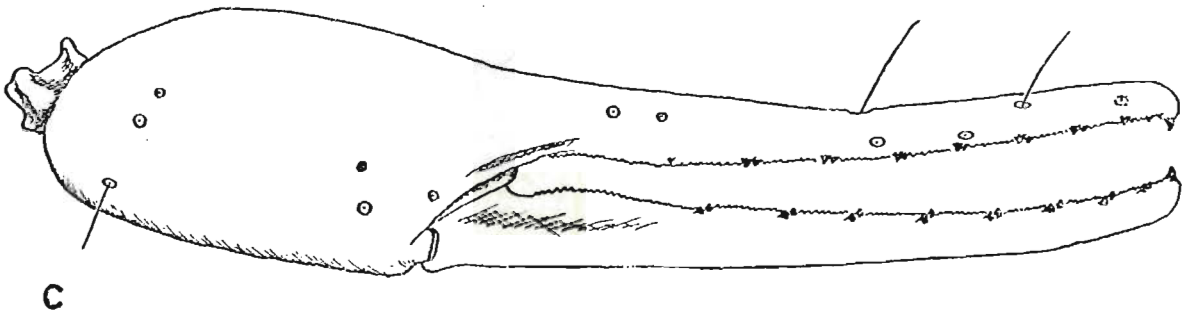


Fig. 4.39. Uroplectes schlechteri Purcell.
a-b, d-f, ♀ (N.M. 10562); c, ♂ (N.M. 11041). a and c,
right hand, outer aspects; b, id., ventral aspect; d, right
pedipalp tibia, dorsal aspect; e, id., outer aspect; f,
right pedipalp femur, dorsal aspect.



0 1 mm



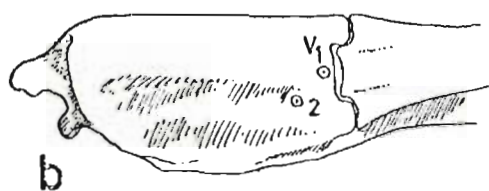
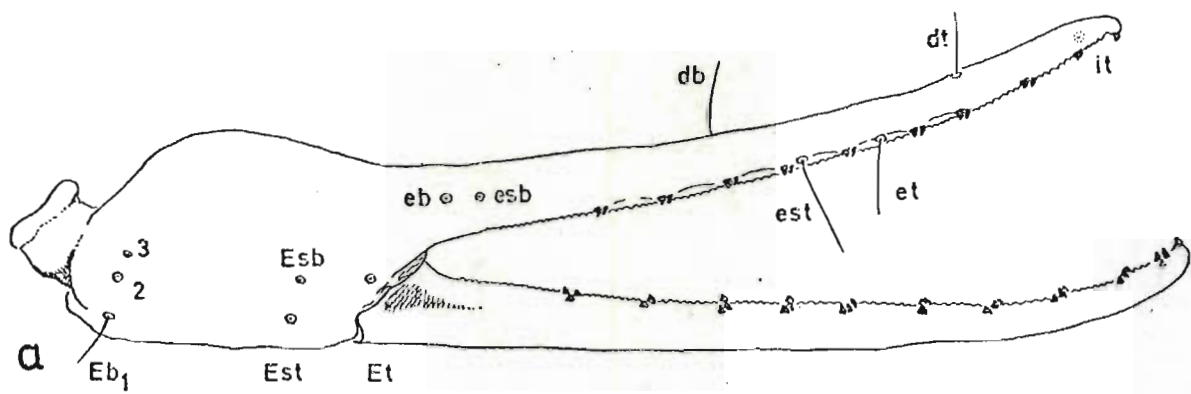
d

e

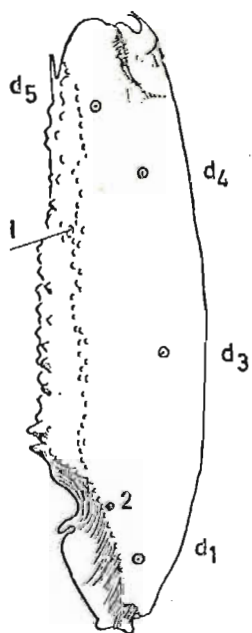
f

Fig. 4.40. Uroplectes teretipes Lawrence.

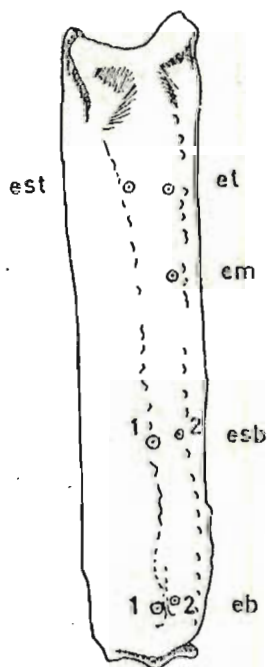
♀ holotype (N.M. 9101). a, right hand, outer aspect;
b, id., ventral aspect; c, right pedipalp tibia, dorsal
aspect; d, id., outer aspect; e, right pedipalp femur,
dorsal aspect.



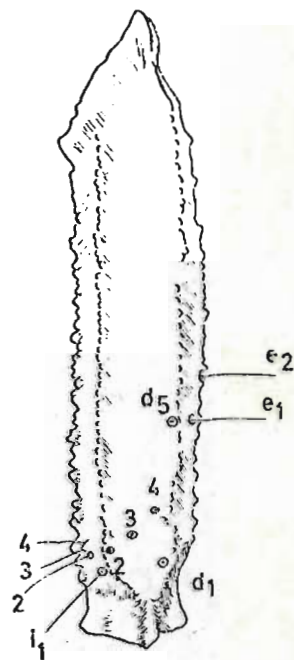
0 2 mm



c



d



e

Fig. 4.41. Uroplectes new species A. a-b, d-f, ♀ holotype (NM 10866); c, ♂ paratype (NM 10572). a and c, right hand, outer aspects; b, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, right pedipalp femur, dorsal aspect.

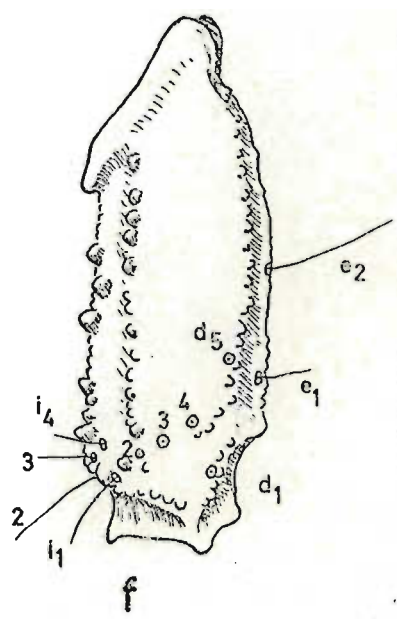
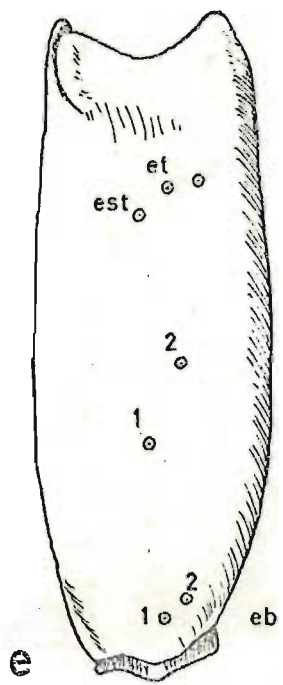
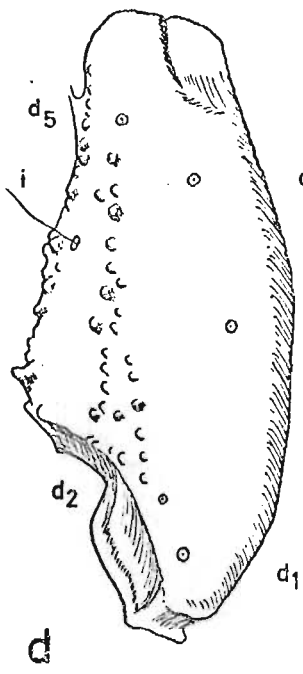
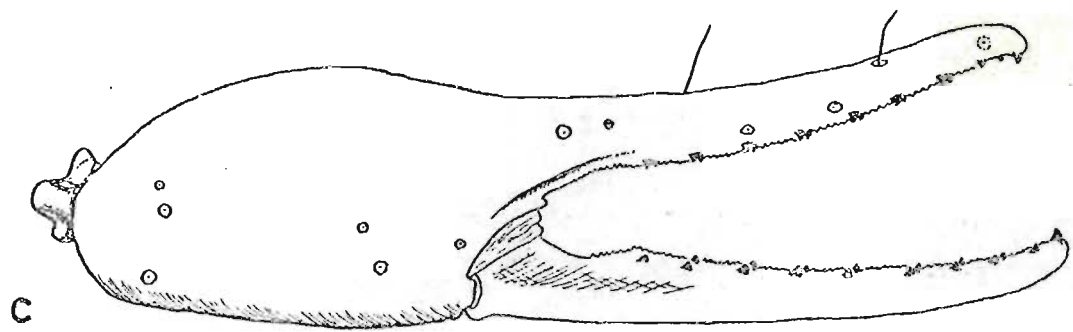
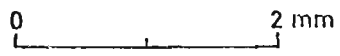
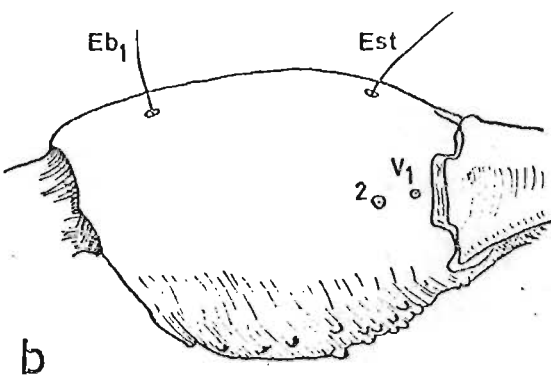
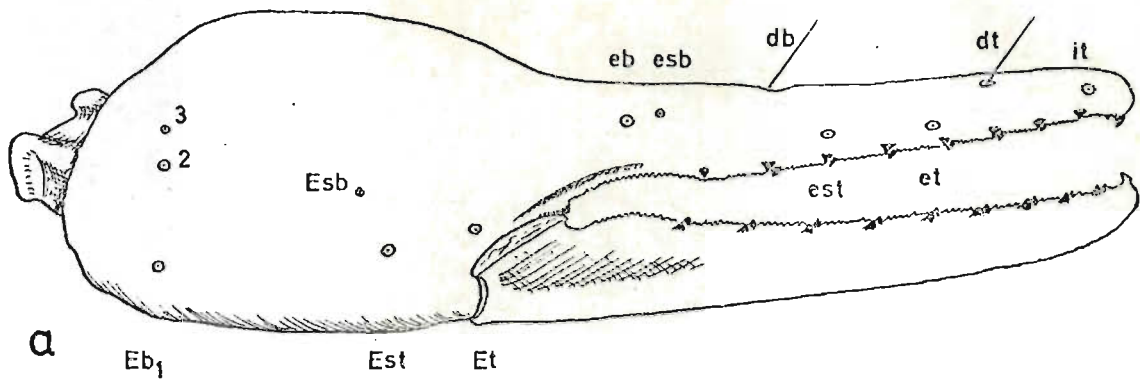
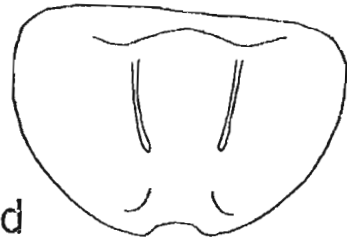
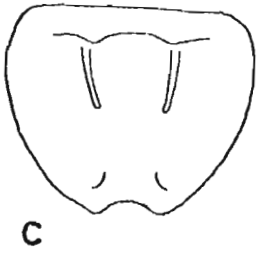
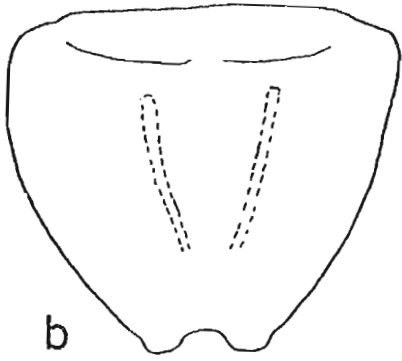
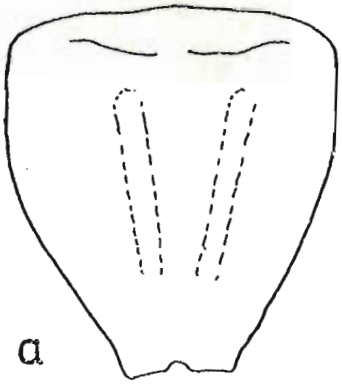
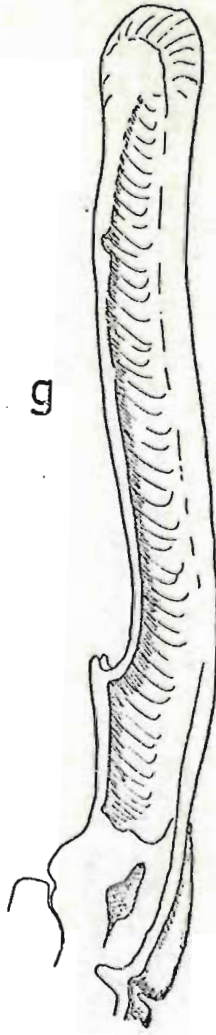
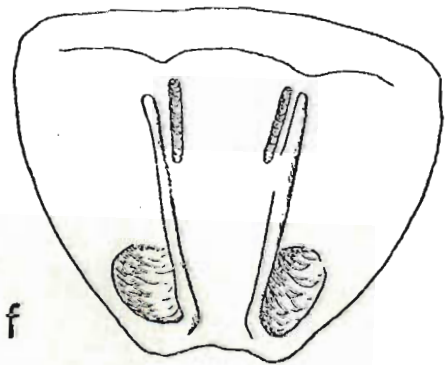
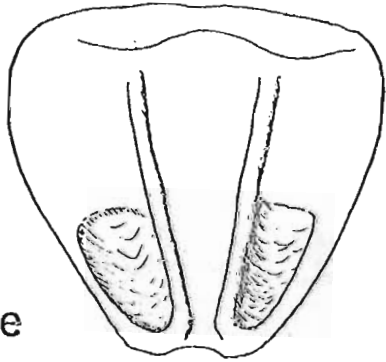


Fig. 4.42. a-f, sternite VII, ventral aspects; g-h, distal halves of right hemispermatothores, ventral aspects. a, ♂, b, ♀ of Hadogenes phyllodes; c, ♂, d, ♀ of H. tityrus; e, ♂, f, ♀ of H. taeniurus; g, H. phyllodes (N.M. 9941); h, H. taeniurus (S.M.N. 61). Scales: a-f as indicated; g-h same scale.



0 5 mm



0 1 mm

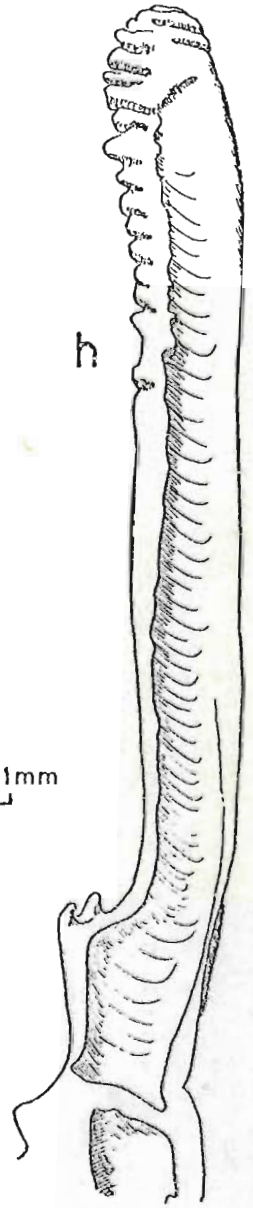
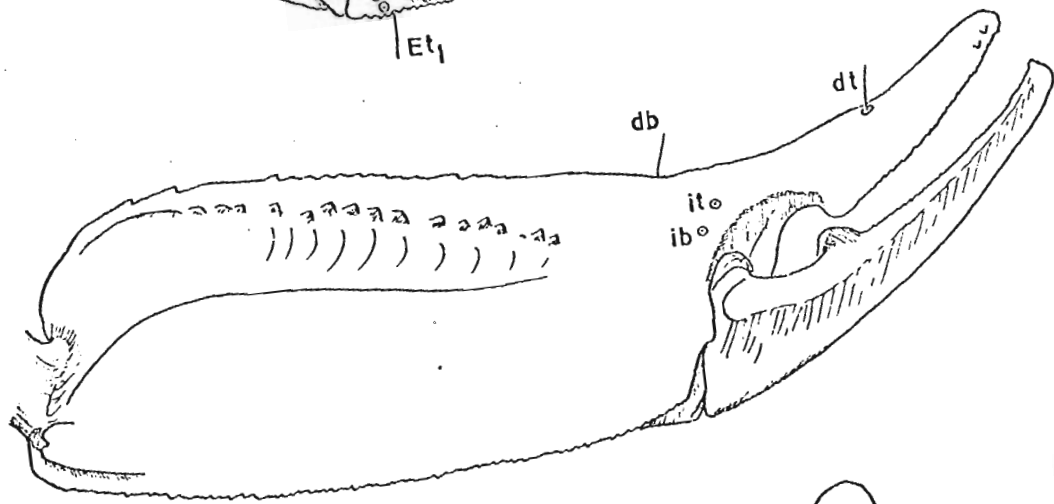
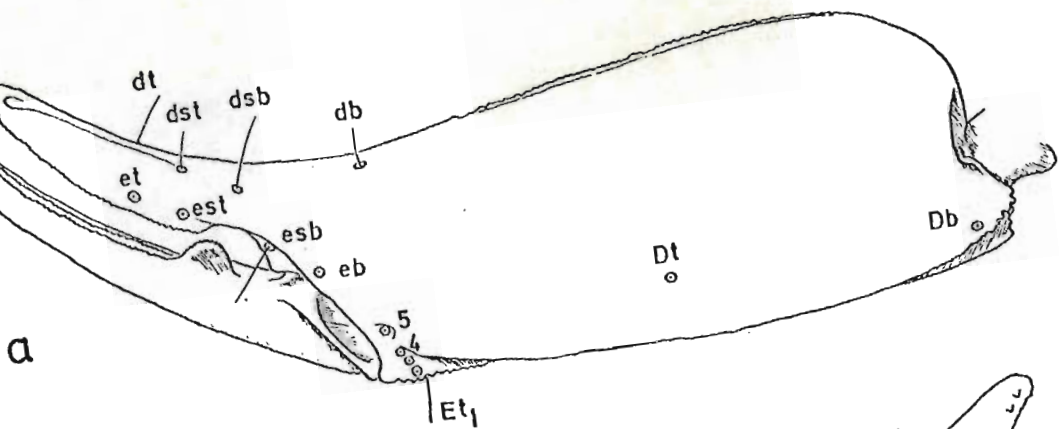
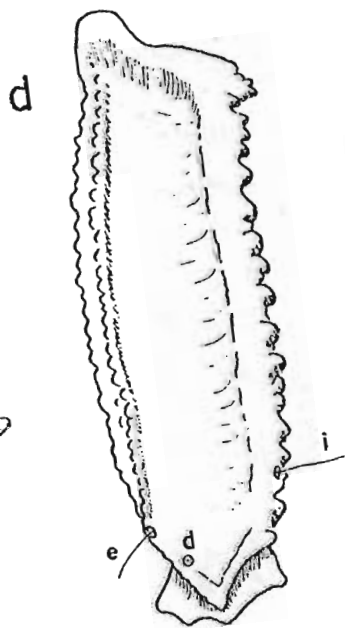
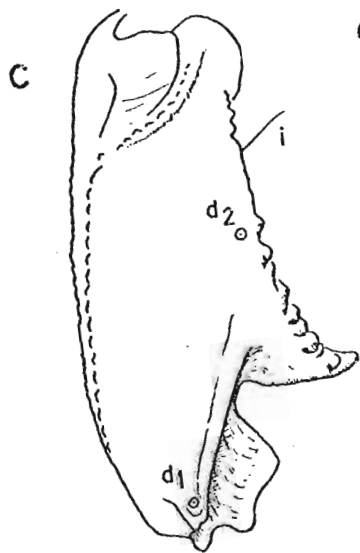


Fig. 4.43. Hadogenes tityrus (E. Simon).

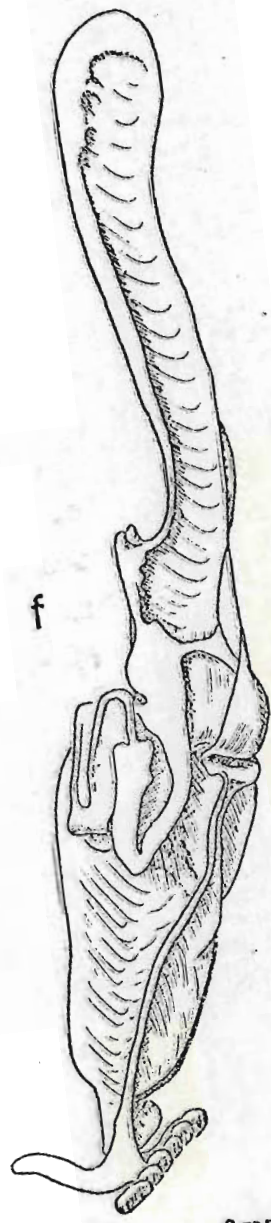
a, left hand, outer aspect; b, id. inner aspect; c, left pedipalp tibia, dorsal aspect; d, left pedipalp femur, dorsal aspect; e, right paraxial organ, ventral aspect; f, right hemispermatophore, ventral aspect. a-d, holotype ♀ (R.S. 0378); e-f, ♂ from Windhoek (N.M. 10671).
Scales: a-d, all same; e and f as indicated.



0 3 mm



0 2 mm



0 2 mm

Fig. 4.44. Lisposoma elegans Lawrence, ♀ (N.M. 10886).
a, right hand, outer aspect; b, id., ventral aspect; c, id.,
inner aspect; d, right pedipalp tibia, dorsal aspect;
e, id., outer aspect; f, id., ventral aspect; g, right
pedipalp femur, dorsal aspect.

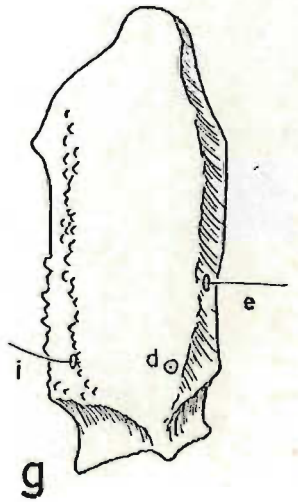
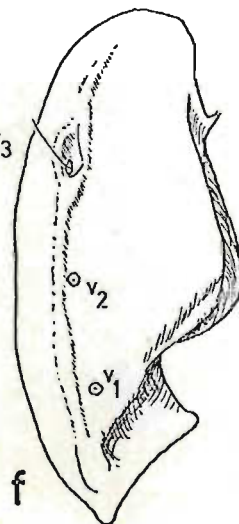
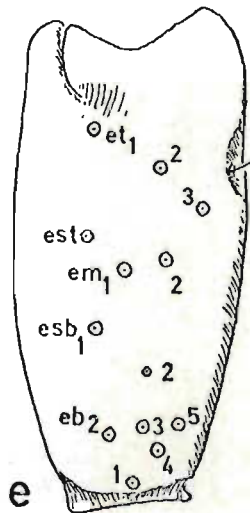
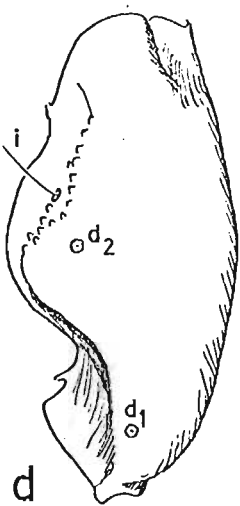
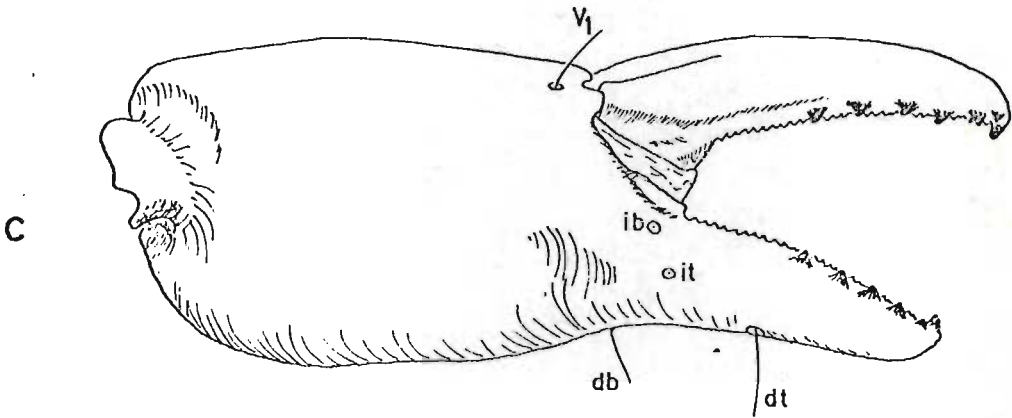
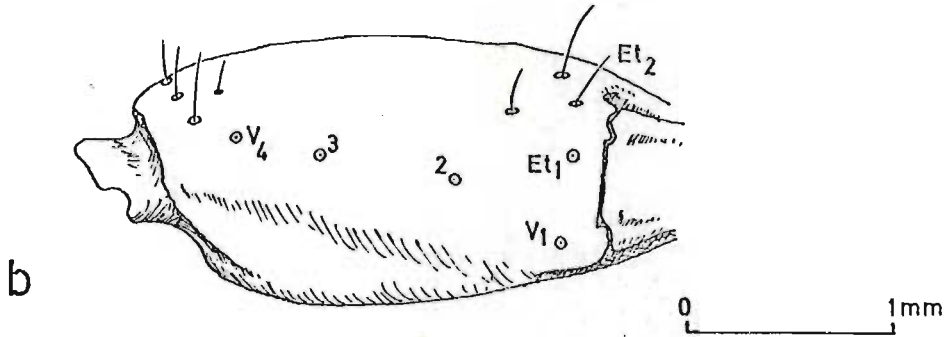
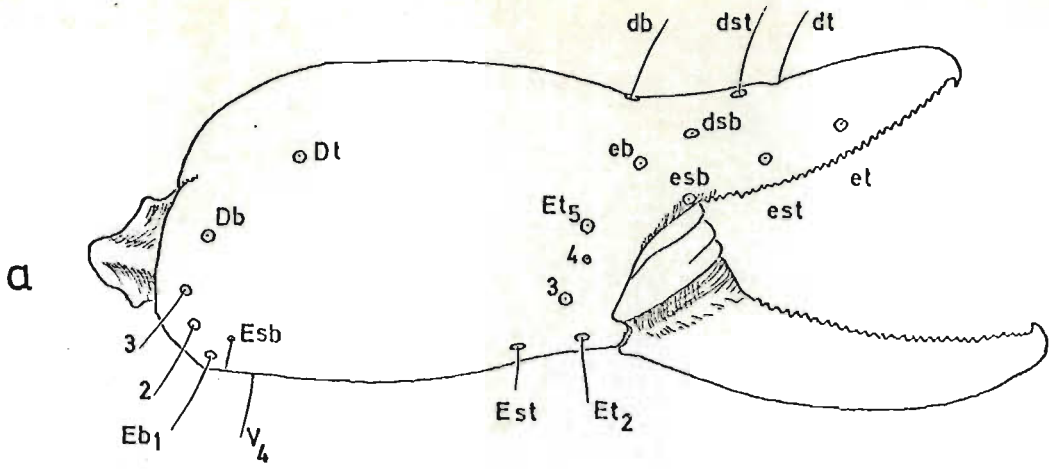


Fig. 4.45.a-b, Lisposoma elegans Lawrence, paralectotype (S.A.M. 6077); c-f, Lisposoma new species A, holotype ♂ (N.M. 10697). a, right hemispermatophore, ventral aspect; b, id., inner aspect; c, carapace, dorsal aspect; d, telson and cauda V, right lateral aspect; e, caudal segments I-V, dorsal aspect; f, entire cauda, ventral aspect. a-b, same scale; c, scale as indicated; d-f, same scale.

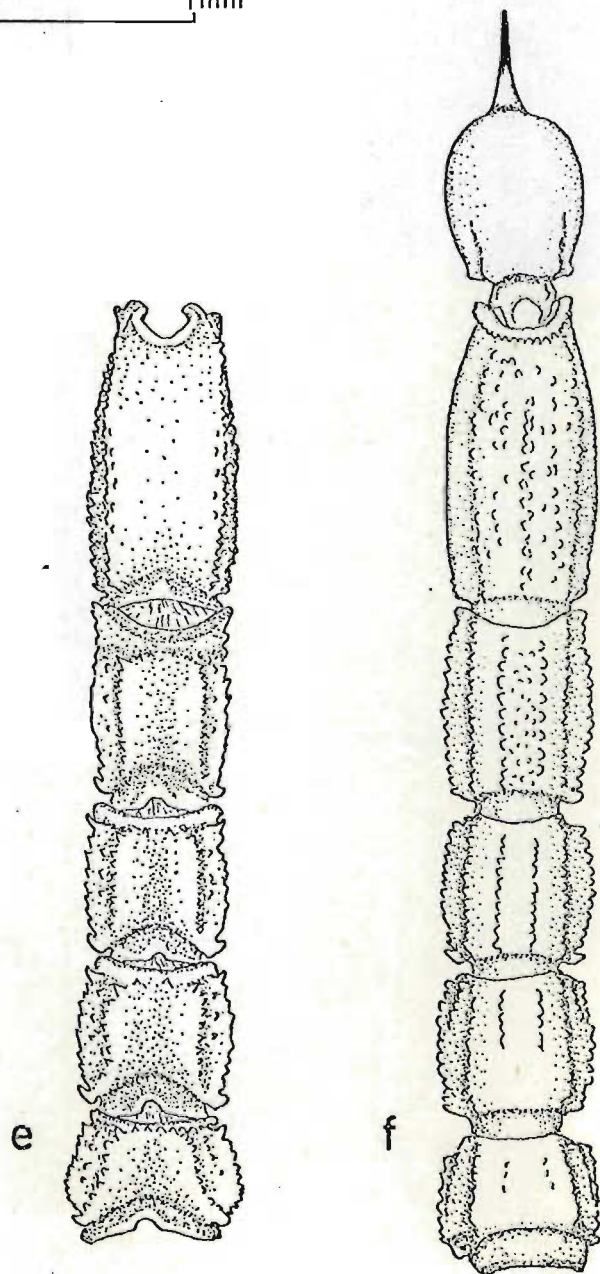
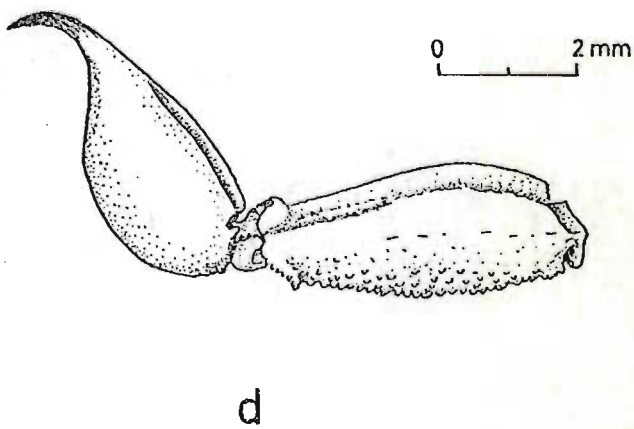
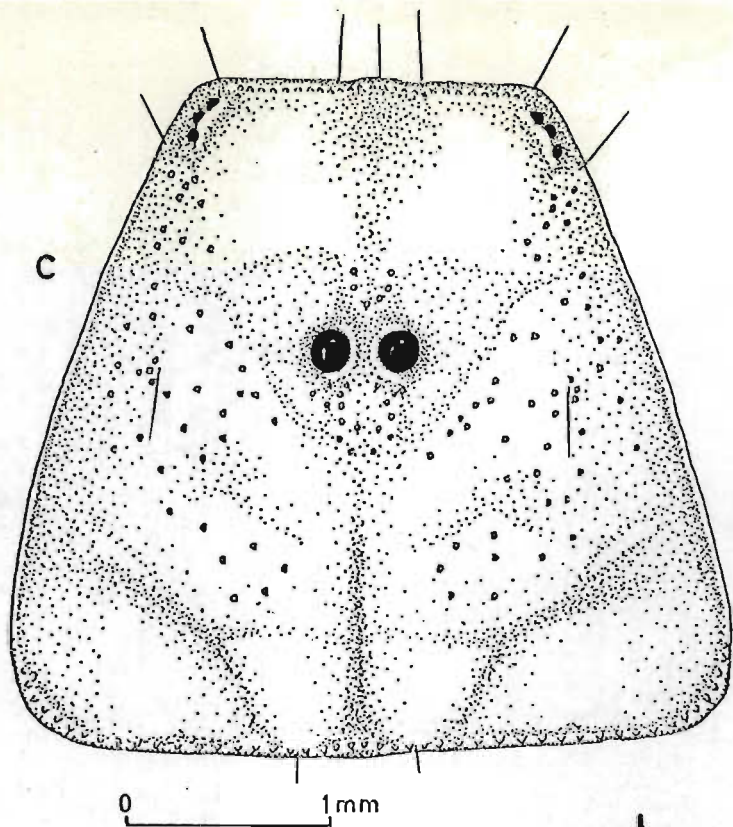
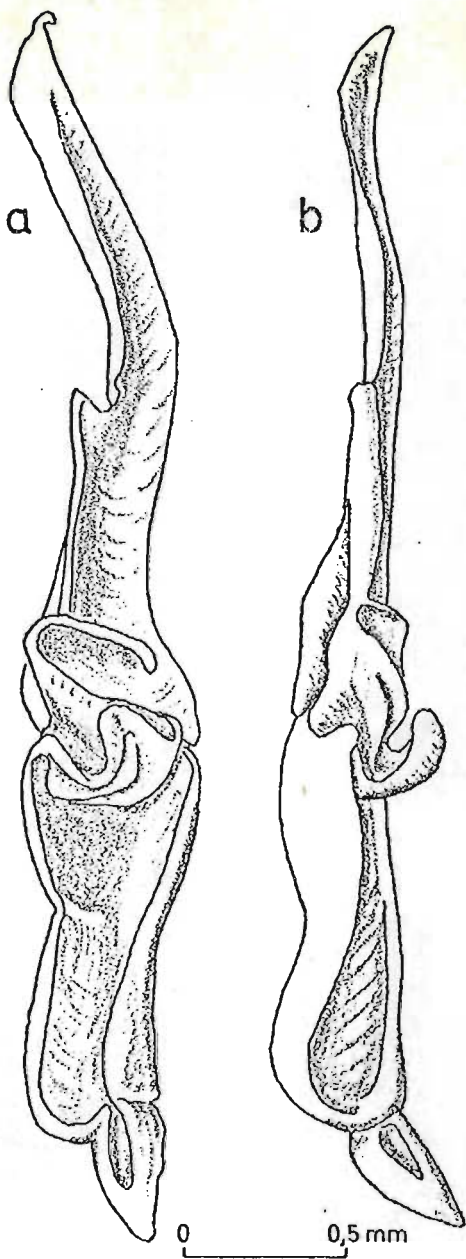
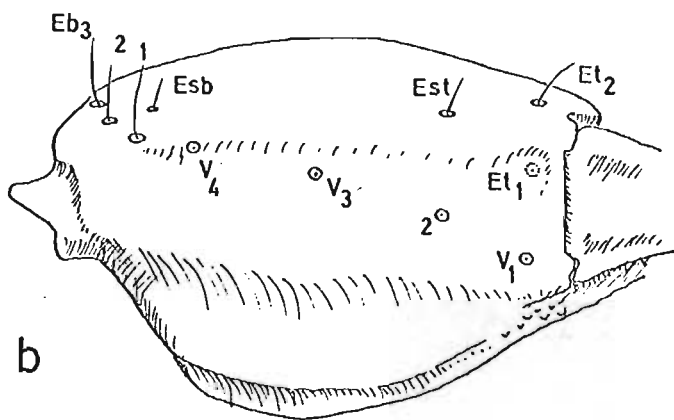
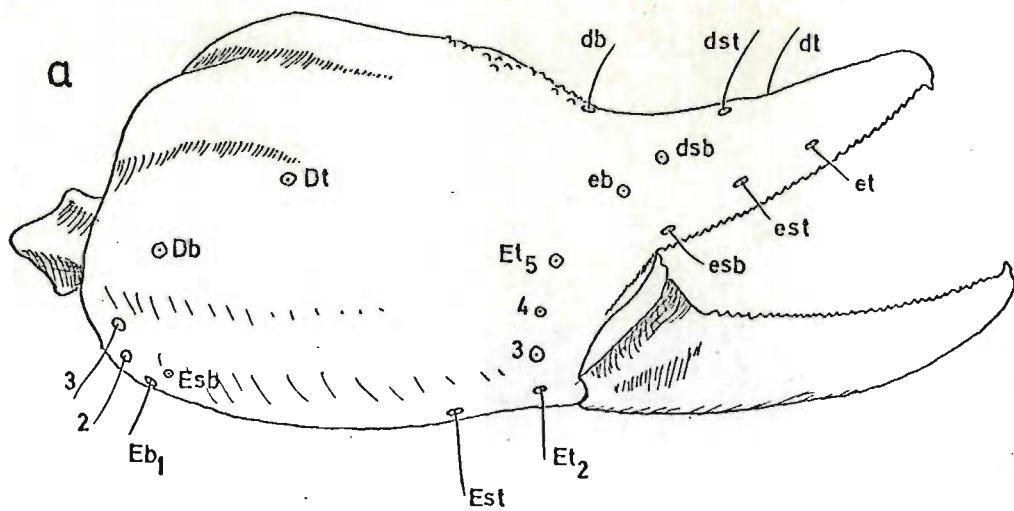
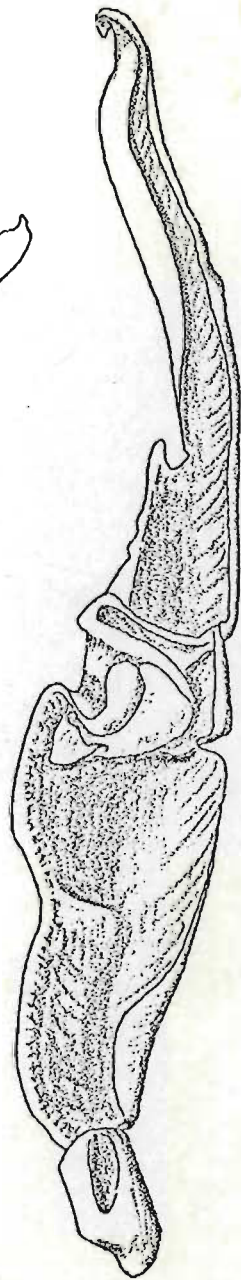


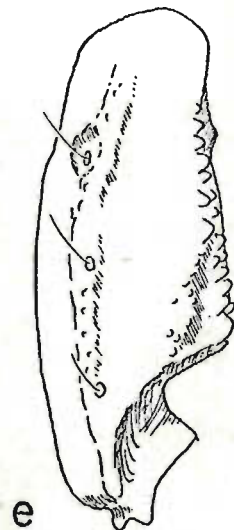
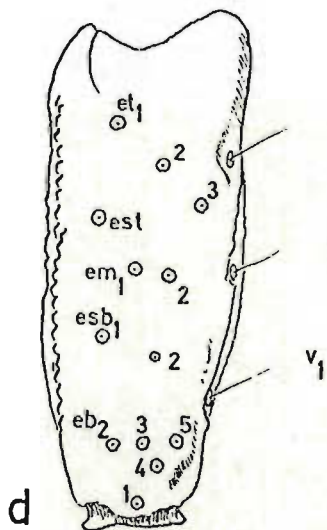
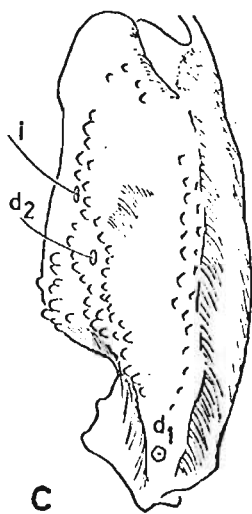
Fig. 4.46. Lisposoma new species A, holotype ♂ (N.M. 10697).
a, right hand outer aspect; b, id., ventral aspect; c,
pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id.,
ventral aspect; f, right hemispermatophore, ventral aspect.
a-e, same scale; f, scale as indicated.



0 1mm



0 1mm



c

d

e

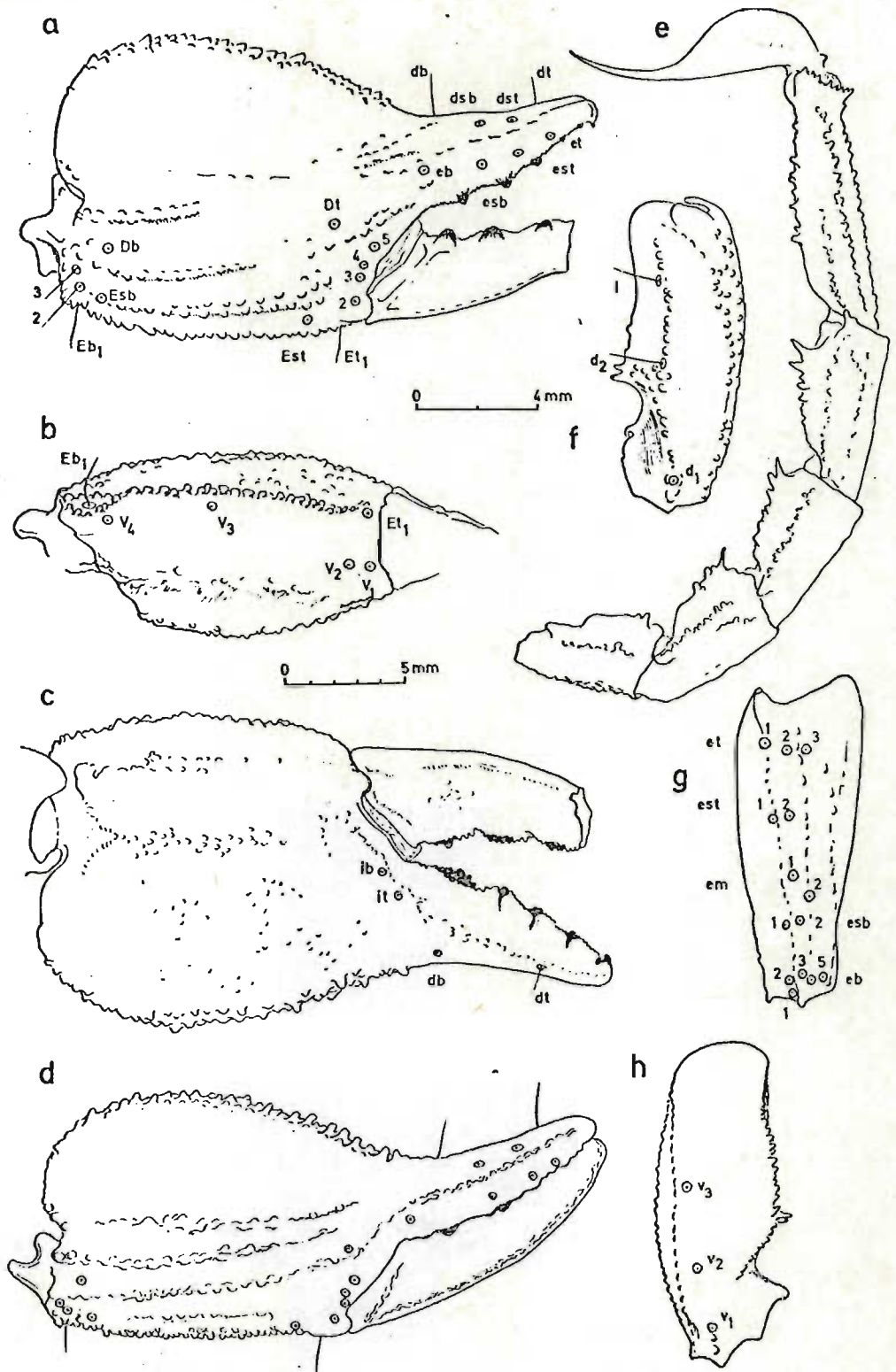


Fig. 4.47. Opisthophthalmus adustus Kraepelin. a-c and f-h, lectotype ♀ ; d and e, paralectotype ♂ . a and d, right hand, outer aspect; b, id., ventral aspect; c, id., inner aspect; e, cauda, left lateral aspect; f, right pedipalp tibia, dorsal aspect; g, id., outer aspect; h, id., ventral aspect. a and f-h, same scale; b-e, same scale.

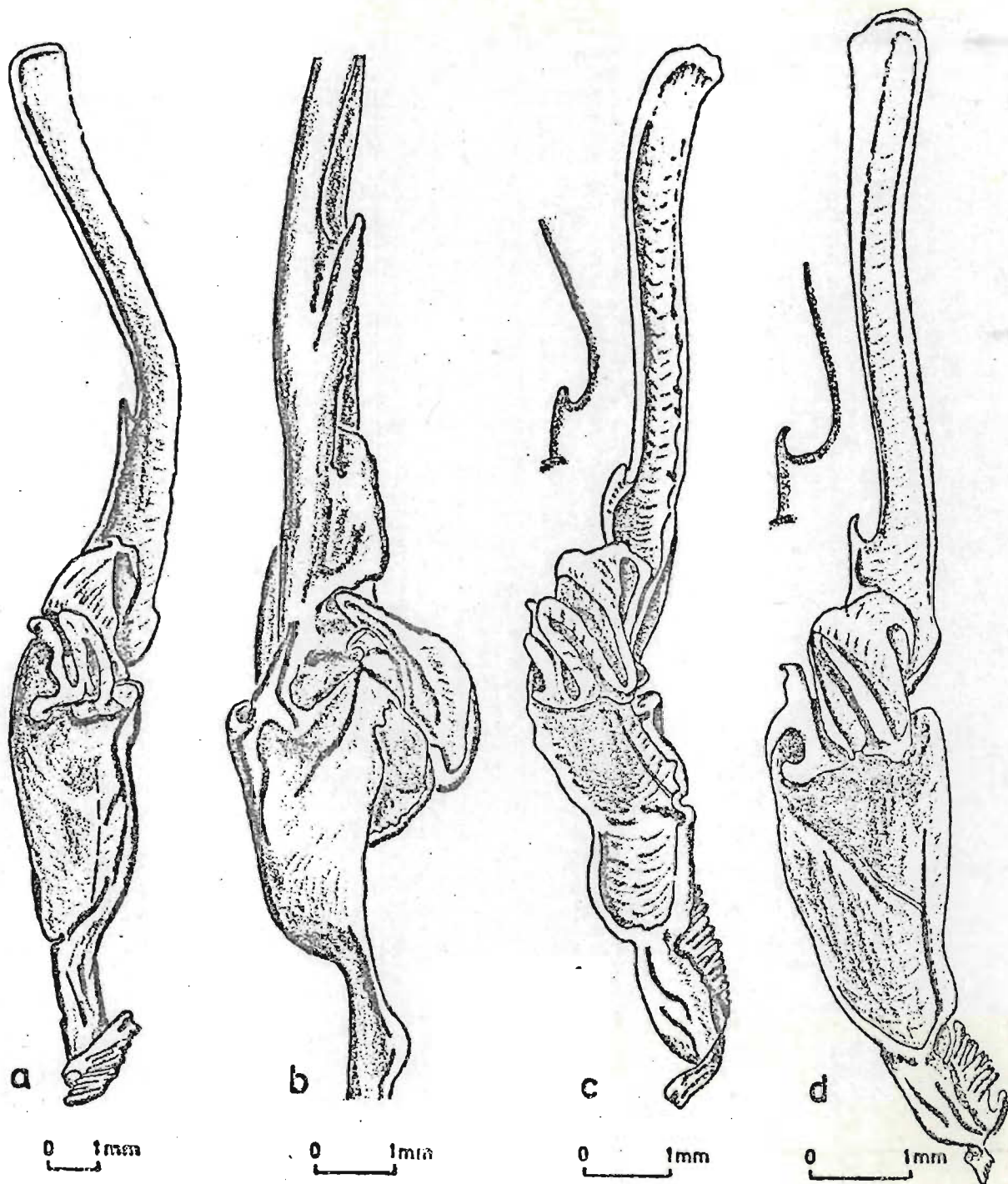
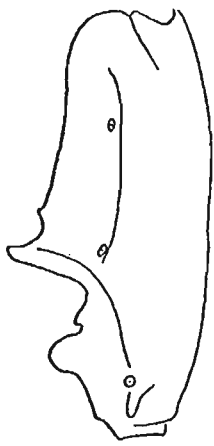
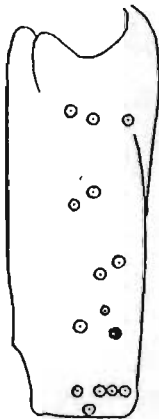


Fig. 4.48. Right hemispermatothores of: a, Opisthophthalmus adustus (N.M. 10713); b, O. carinatus (S.M.N. 11); c, O. cavimanus paralectotype (S.A.M. B 6095); d, O. chrysites (N.M. 11092). a, c and d, ventral aspect; b, ental aspect of middle portion. c and d, with insets of hook notch lateral outline.

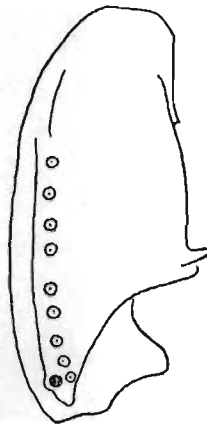
Fig. 4.49. a-d, Opisthophthalmus brevicauda; e-j, O. ugabensis. a-c and e-j, semi-diagrammatic aspects of pedipalp tibia; a, e and h, dorsal; b, f & i, outer; c, g & j, ventral; d, ventral aspect of right hemispermatophore with inset of hook notch lateral outline (N.M. 8292). a-c and e-j, no specific scales; d, scale as indicated. Black dots indicate position of accessory trichobothria.



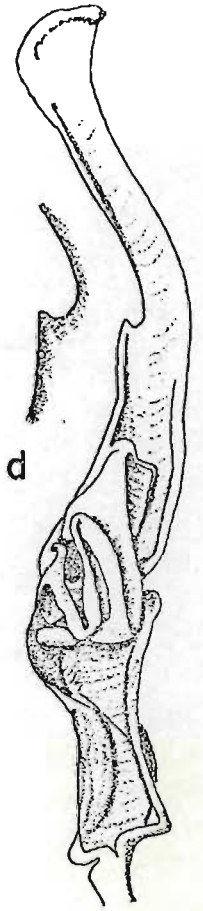
a



b

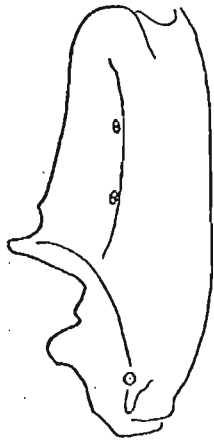


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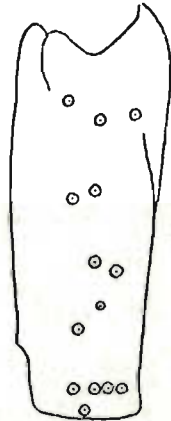


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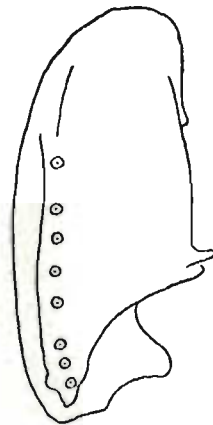
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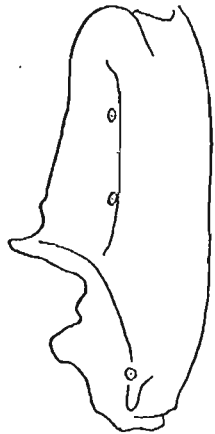
e



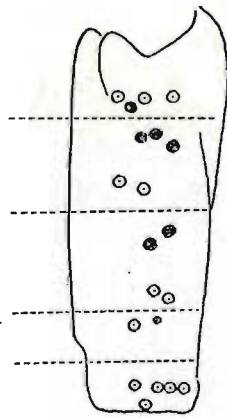
f



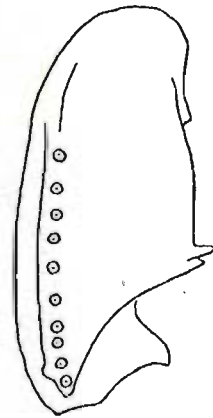
g



h

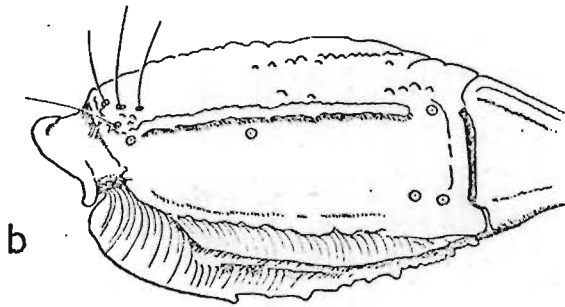
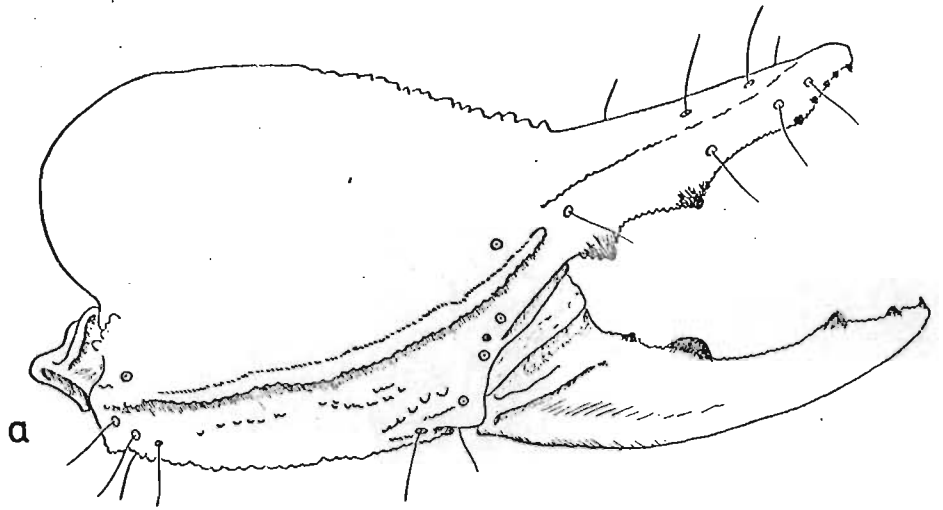


i



j

Fig. 4.50. Opisthophthalmus carinatus (Peters). a-e,
♀ from Windhoek. a, right hand, outer aspect; b. id., ventral
aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer
aspect; e, id., ventral aspect.



0 2 mm

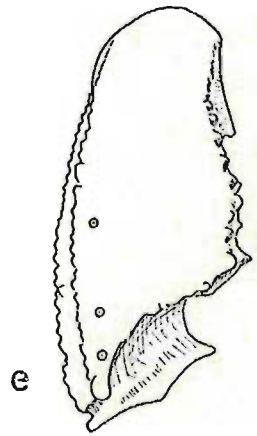
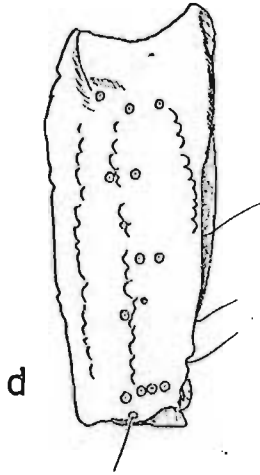
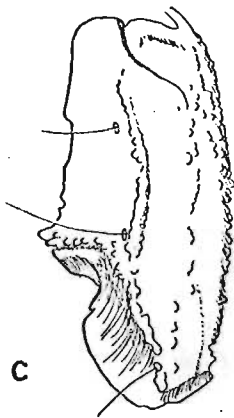
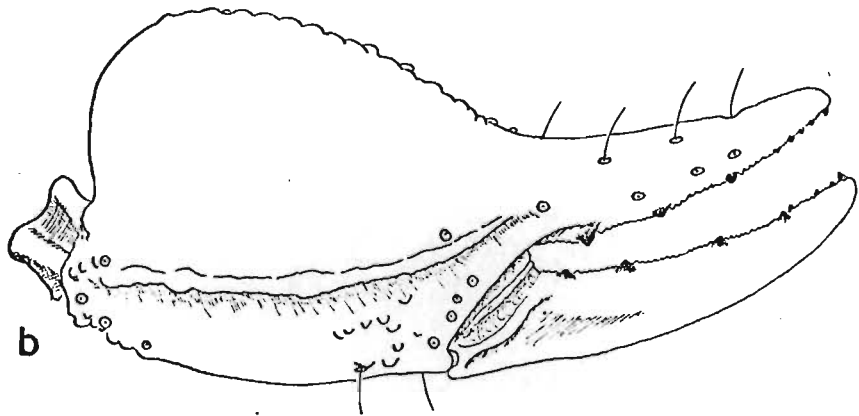
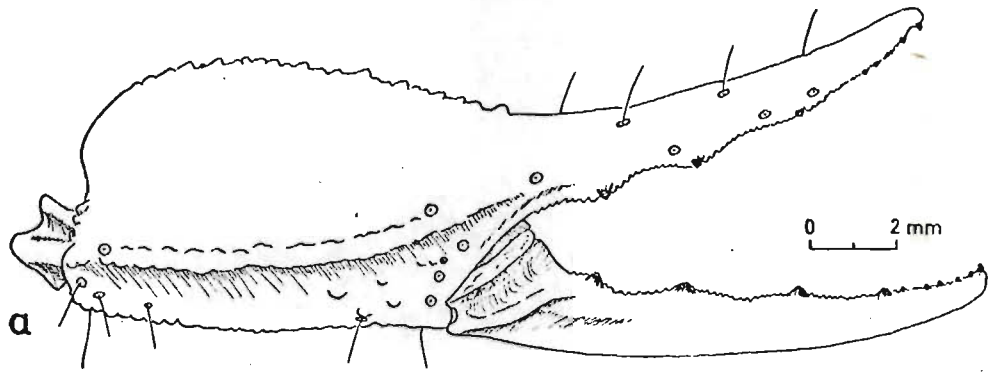
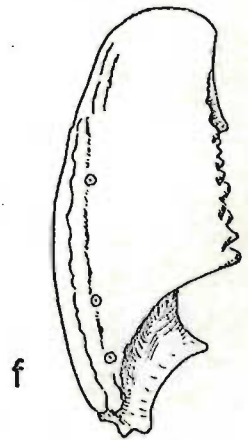
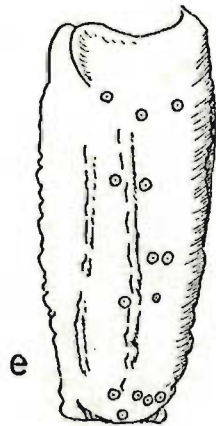
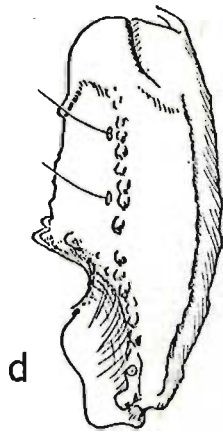
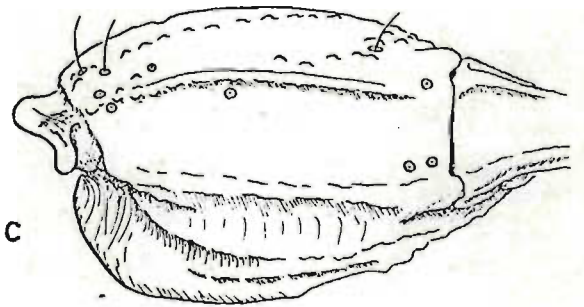


Fig. 4.51. Opisthophthalmus cavimanus Lawrence. a, ♂ (N.M. 10830); b-f, ♀ (N.M. 10830). a and b, right hand, outer aspect; c, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect, b-f same scale; a, as indicated.



0 2 mm



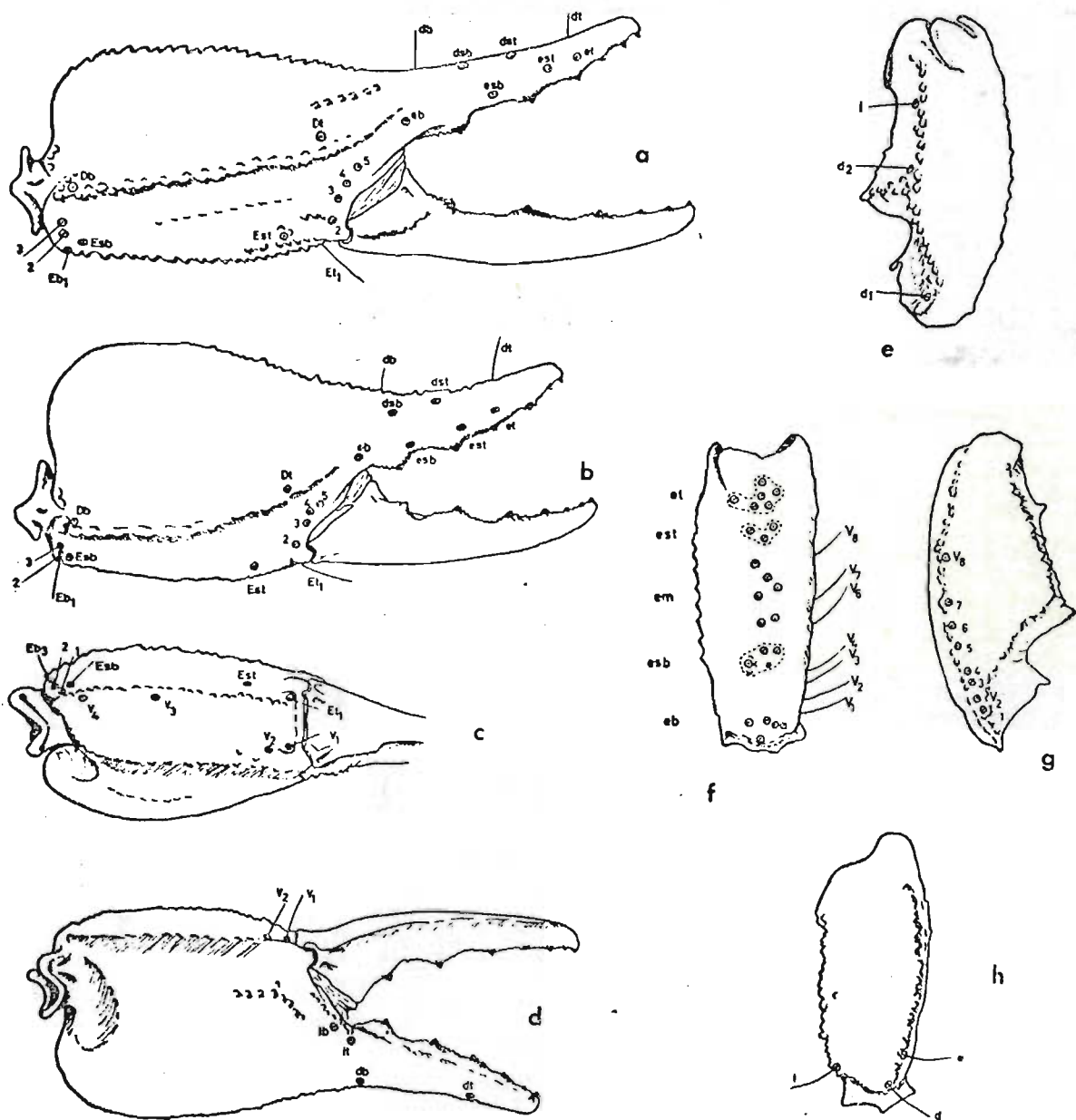


Fig. 4.52. Opisthophthalmus chrysites Lawrence. a, ♂ paralectotype (T.M. 9337); b-h, ♀ lectotype (T.M. 9337). a and b, right hand, outer aspect; c, id., ventral aspect; d, id., inner aspect; e, right pedipalp tibia, dorsal aspect; f, id., outer aspect; g, id., ventral aspect; h, right pedipalp femur, dorsal aspect.

Fig. 4.53. Opisthophthalmus new species A. a, paratype ♀ (N.M. 10795); b-f, holotype ♂ (N.M. 10627). a and b, right hand, outer aspect; c, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect.

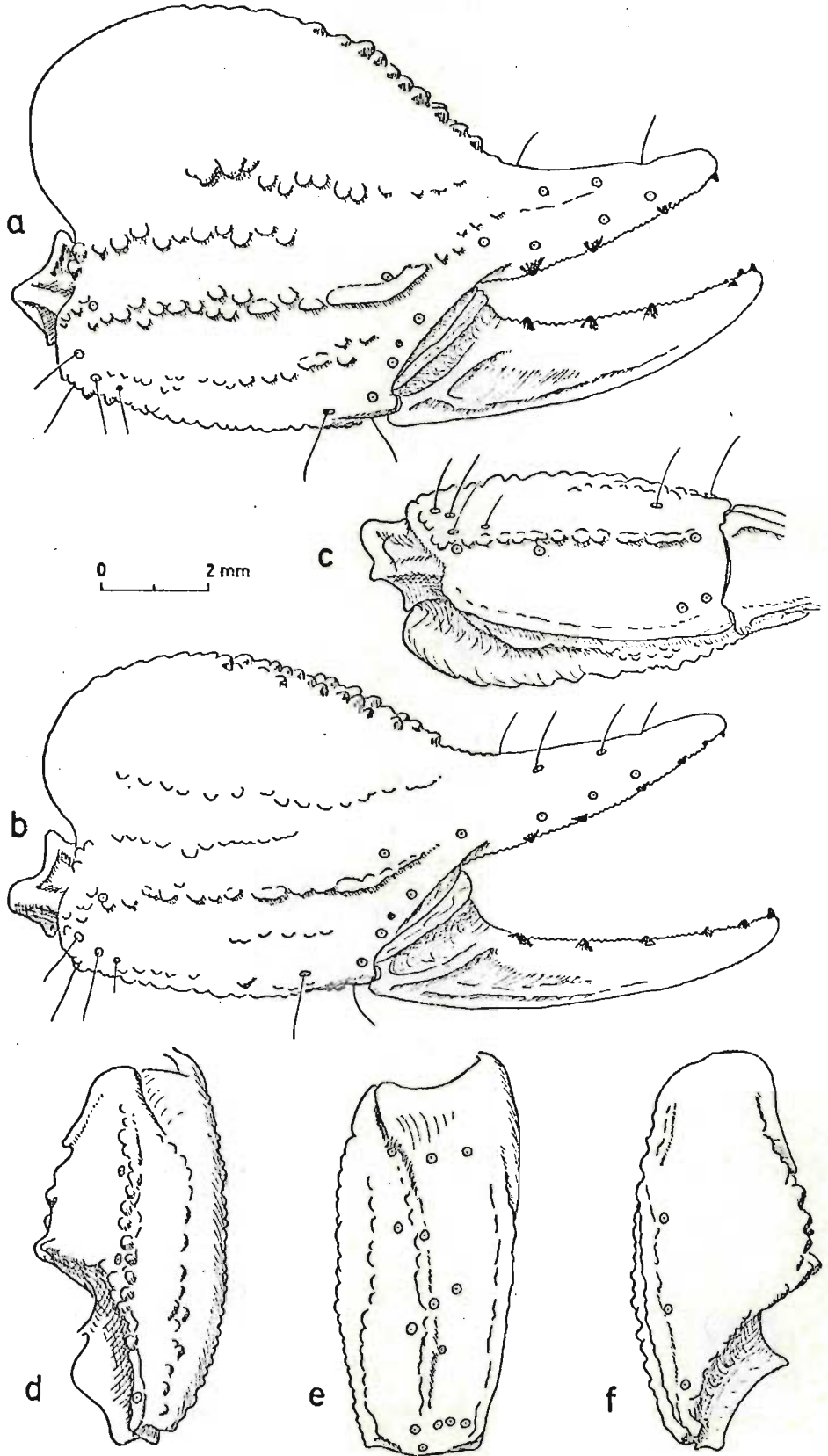
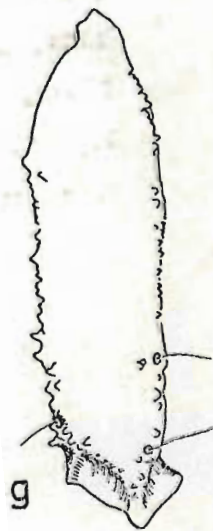
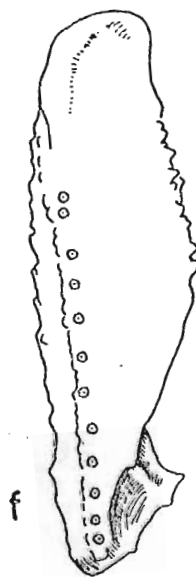
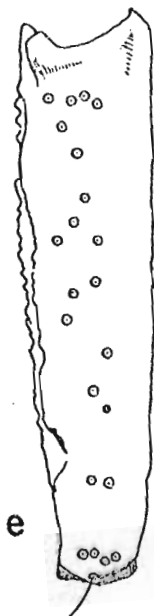
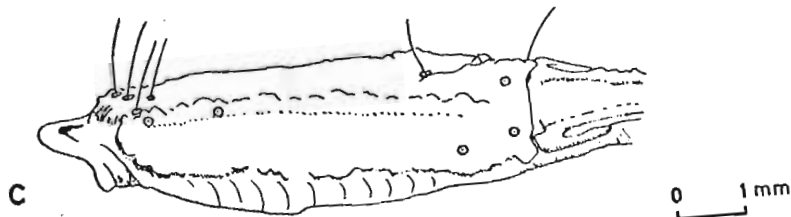
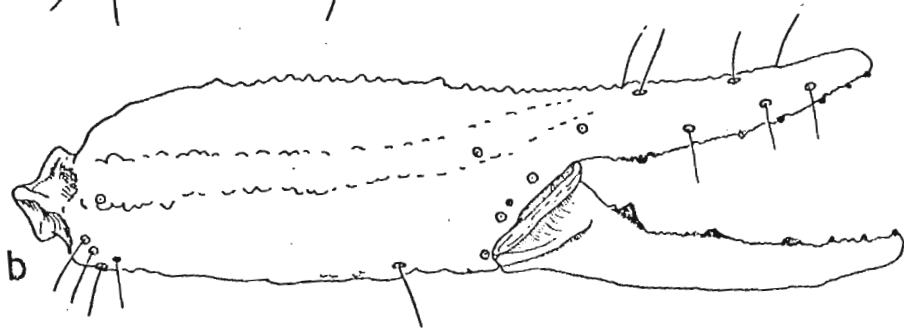
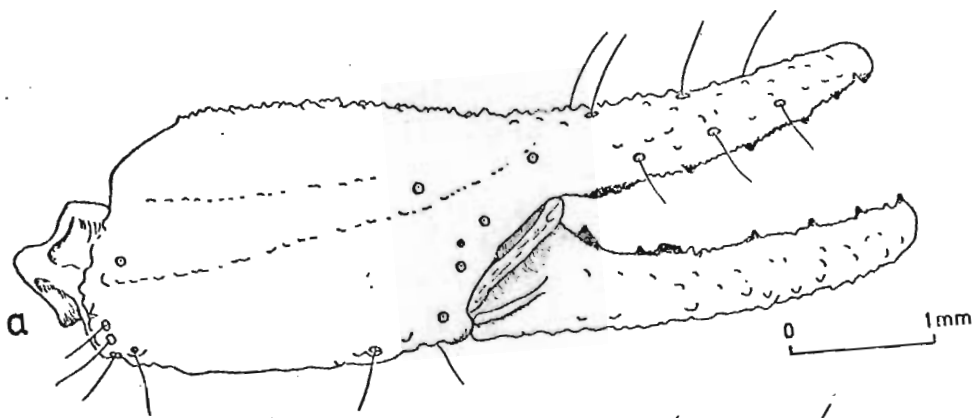


Fig. 4.54. Opisthophthalmus concinnus Newlands. a. ♀ (N.M. 10360); b-g, ♂ holotype (T.M. 9580). a and b, right hand, outer aspect; c, id., ventral aspect; d, pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect; g, pedipalp femur, dorsal aspect. b-g, same scale; a, as indicated.



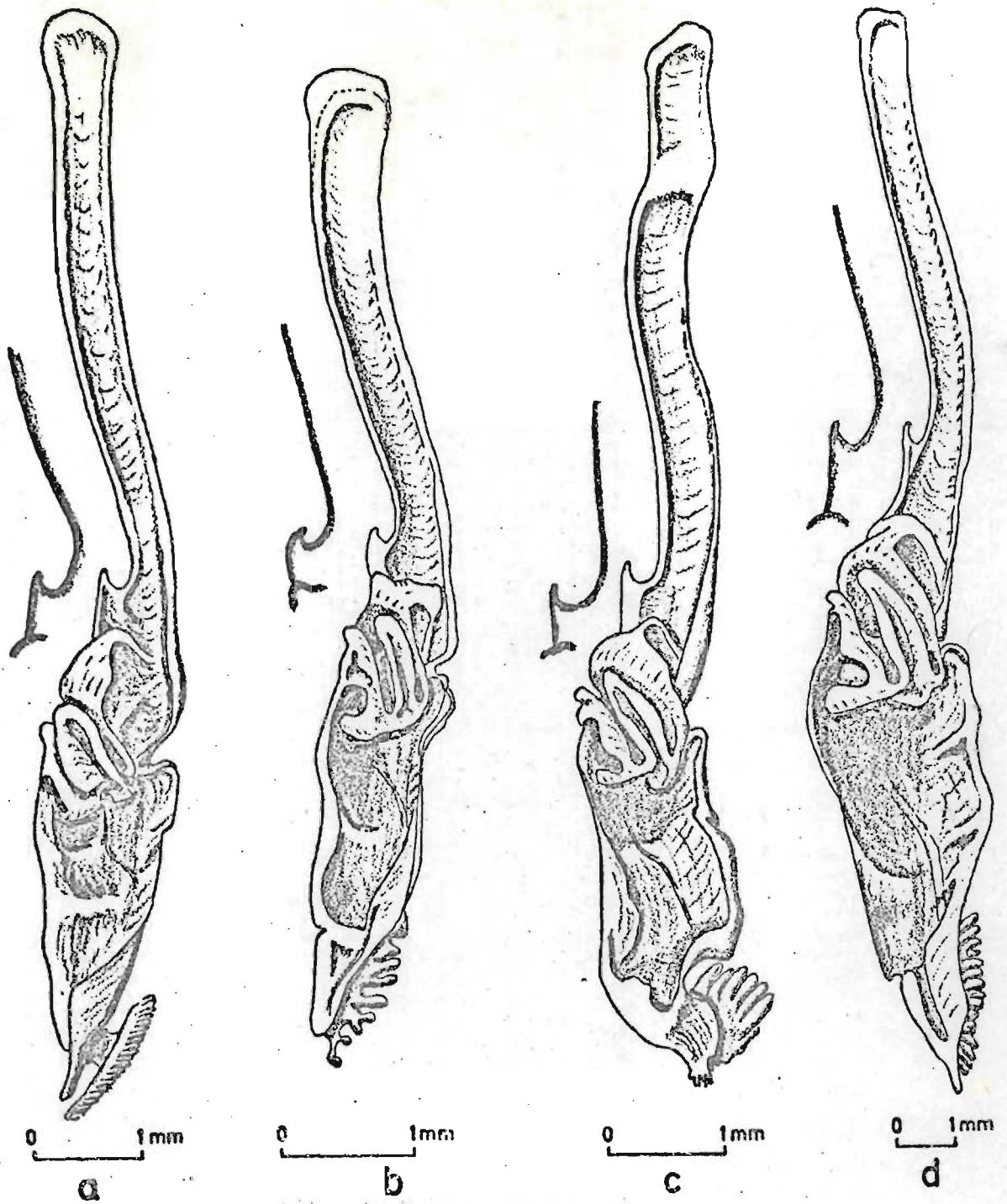
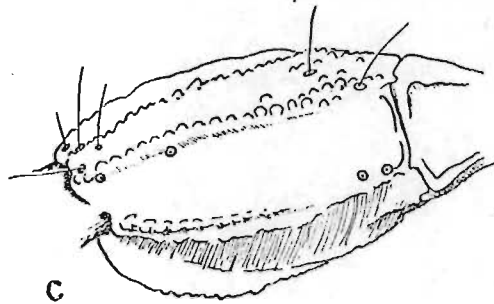
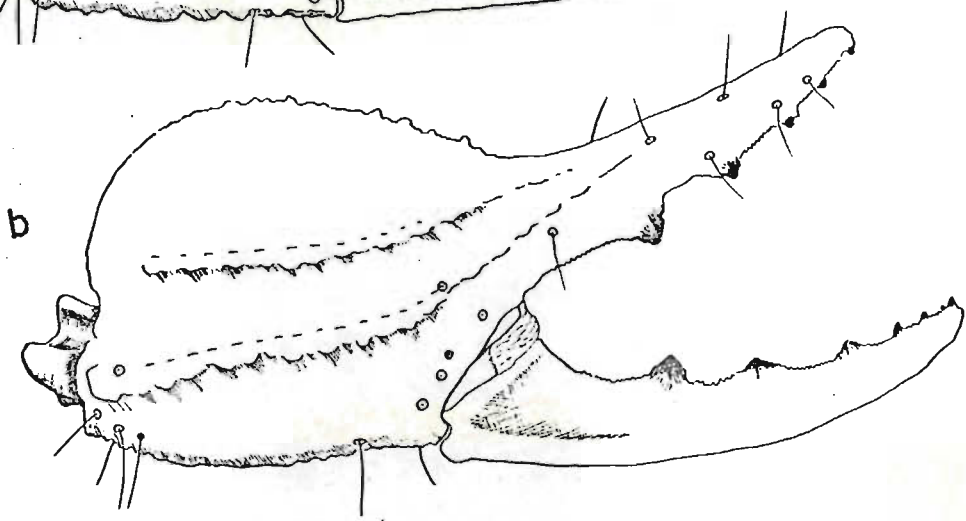
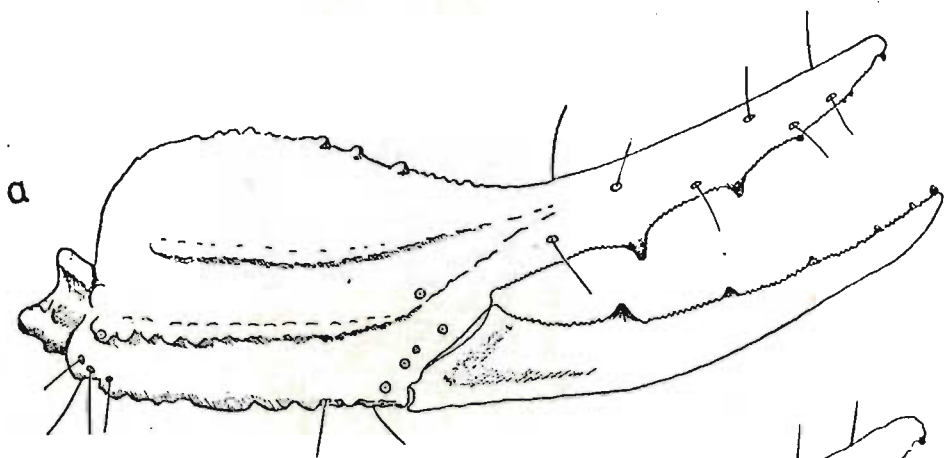


Fig. 4.55. Ventral aspects of right hemispermatochore with insets of hook notch lateral outline, of: a, Opisthophthalmus new species A paratype (N.M. 10690); b, O. concinnus (N.M. 11108); c, O. fitzsimonsi (N.M. 11109); d, O. flavescens (N.M. 10623).

Fig. 4.56. Opisthophthalmus flavescens Purcell. a, ♂
(N.M. 10594); b, ♀ (N.M. 10641). a and b, right hand, outer
aspect; c, id., ventral aspect; d, pedipalp tibia, dorsal
aspect; e, id., outer aspect; f, id., ventral aspect.



0 3 mm

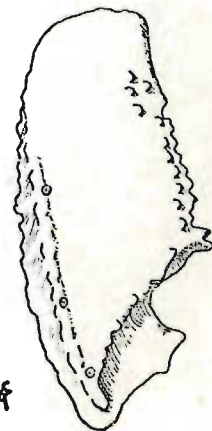
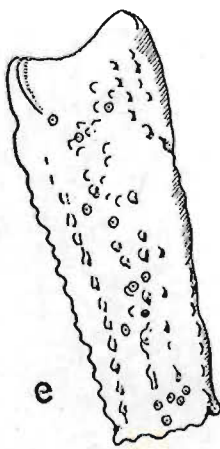
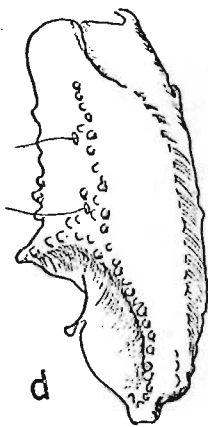
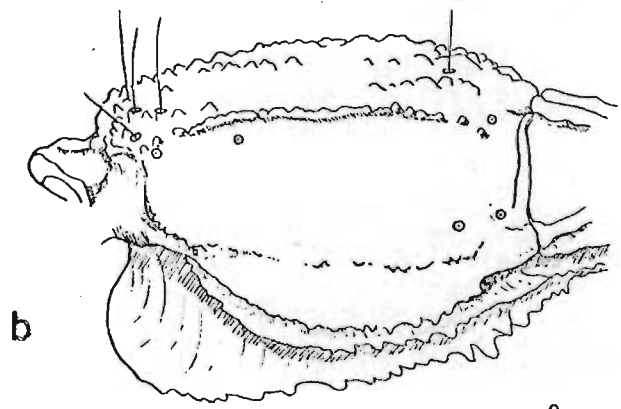
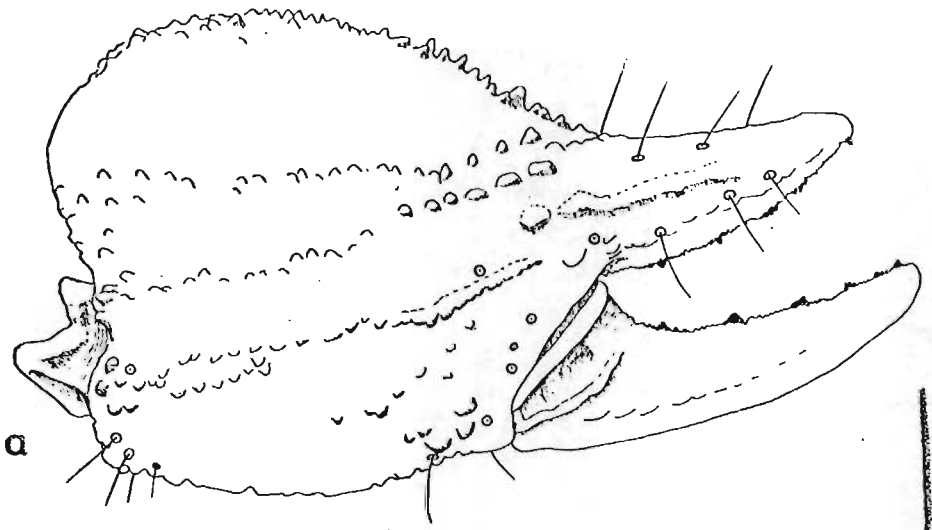
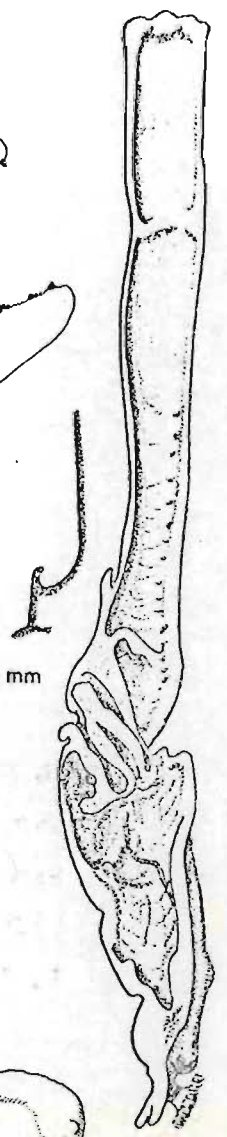


Fig. 4.57. Opisthophthalmus new species B. a-e, holotype ♂ (N.M. 11068); f, paratype (T.M. 10032). a, right hand, outer aspect; b, id., ventral aspect; c, pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id., ventral aspect; f, right hemispermatophore, ventral aspect. a-e, same scale; f, as indicated.



0 1 mm

f



0 1 mm

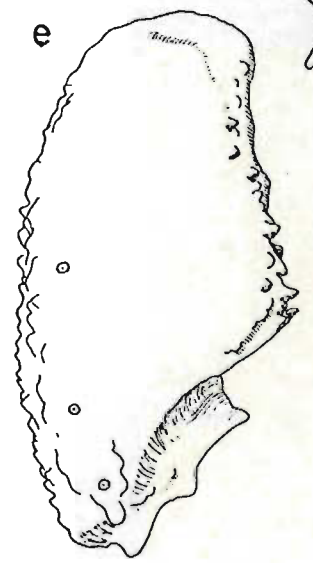
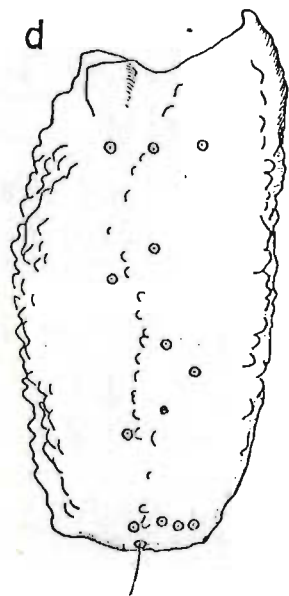
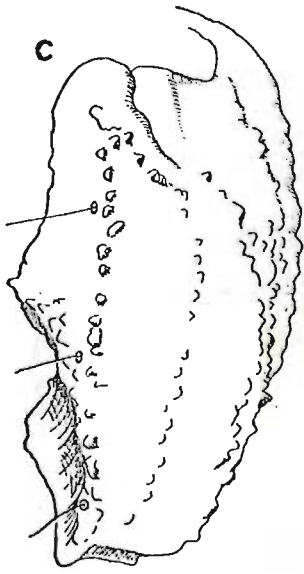


Fig. 4.58. Opisthophthalmus gigas Purcell. ♀ (N.M. 10426).
a, right hand, outer aspect; b, id., inner-ventral aspect;
c, right pedipalp tibia, dorsal aspect; d, id., outer aspect;
e, id., ventral aspect; f, right pedipalp femur, dorsal aspect.

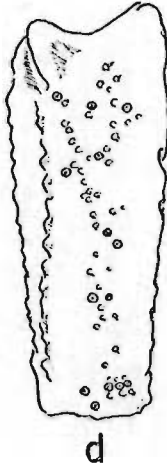
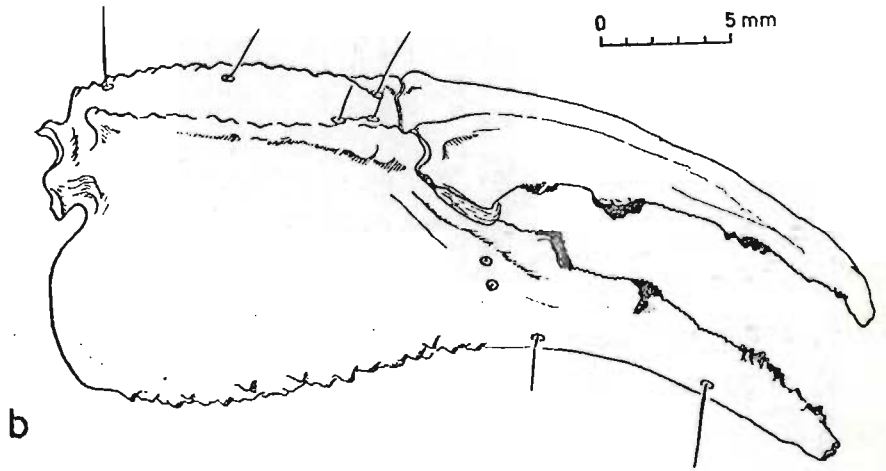
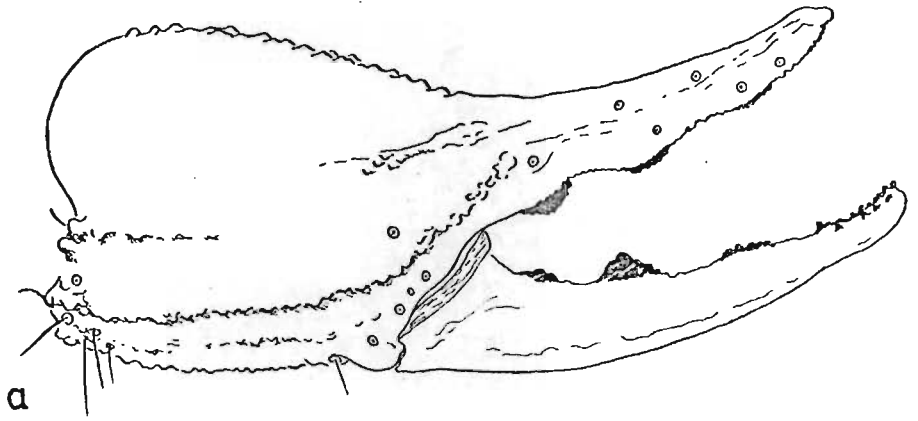


Fig. 4.59. Opisthophthalmus haackei Lawrence. Holotype ♀
(N.M. 9105). a, right hand, outer aspect; b, id., ventral
aspect; c, id., inner aspect; d, pedipalp tibia, dorsal
aspect; e, id., outer aspect; f, id., ventral aspect;
g, pedipalp femur, dorsal aspect.

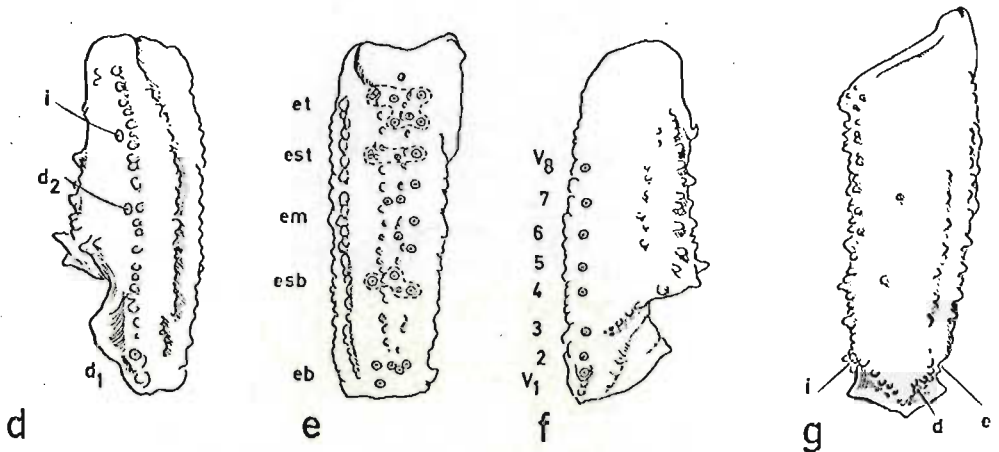
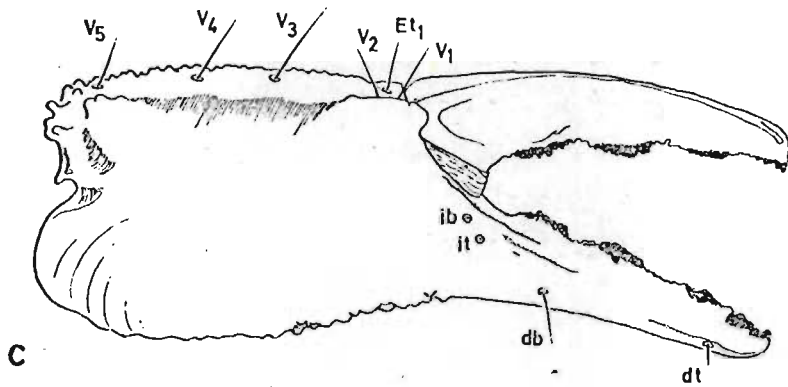
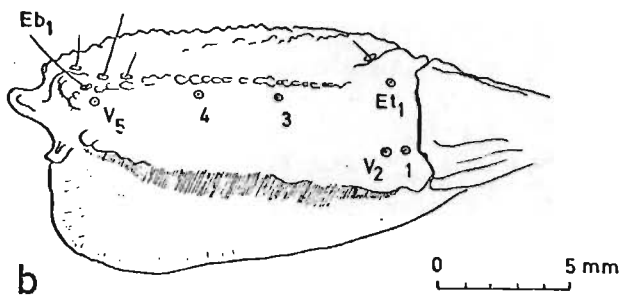
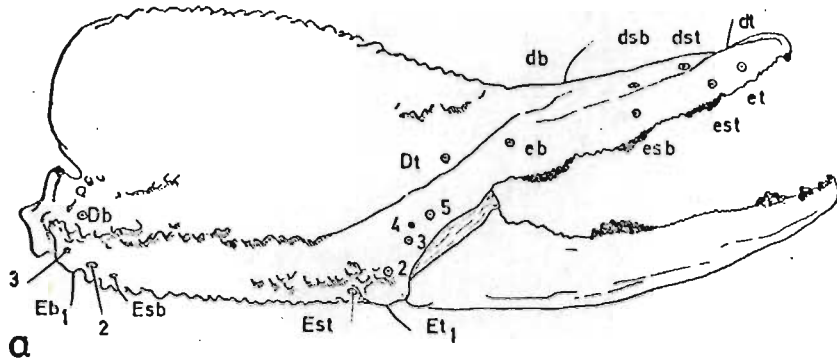
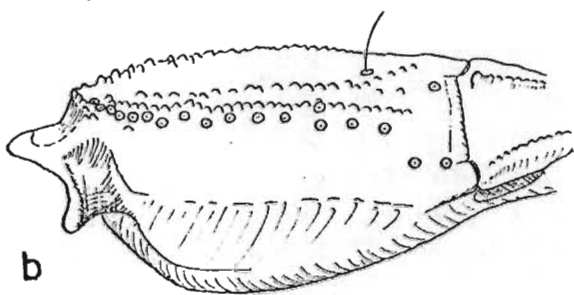
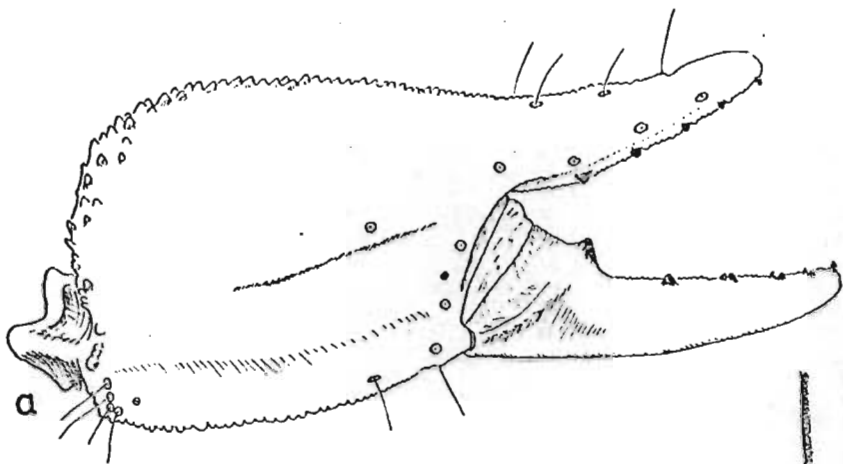
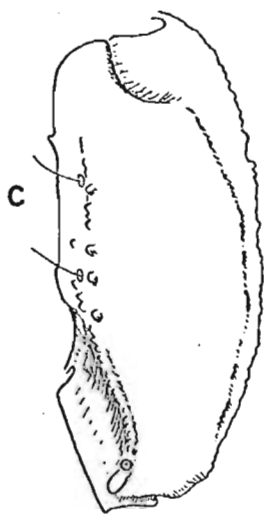


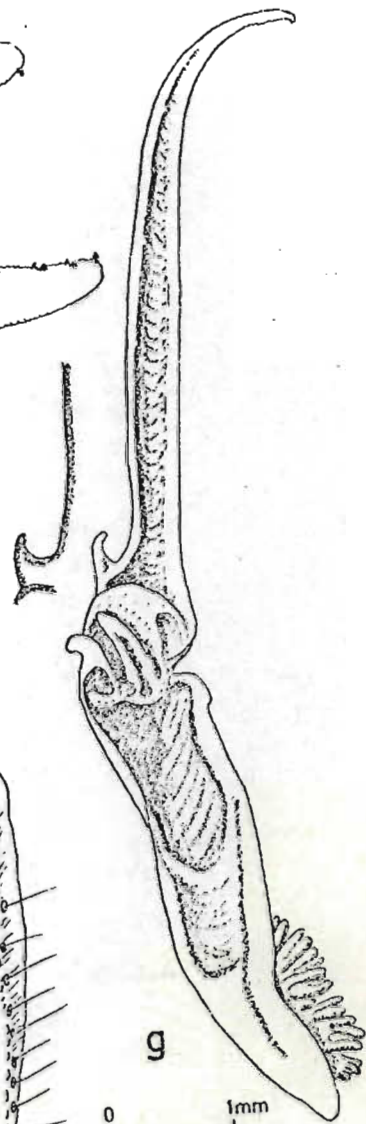
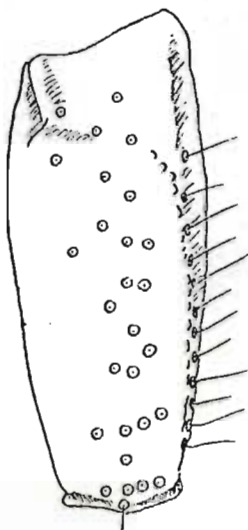
Fig. 4.60. Opisthophthalmus holmi (Lawrence). a-f, ♀ (N.M. 10676); g, ♂ (N.M. 10676). a, right hand, outer aspect; b, id., ventral aspect; c, pedipalp tibia, dorsal aspect. d, id., outer aspect; e, id., ventral aspect; f, pedipalp femur, dorsal aspect; g, right hemispermatophore, ventral aspect with inset of hook notch lateral outline. a-f, same scale; g, as indicated.



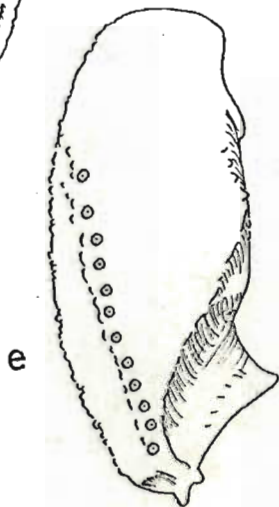
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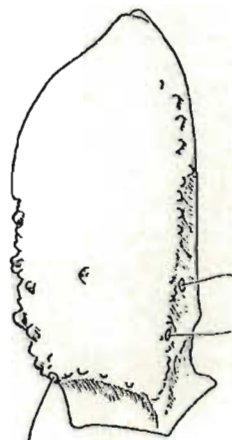
d



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f



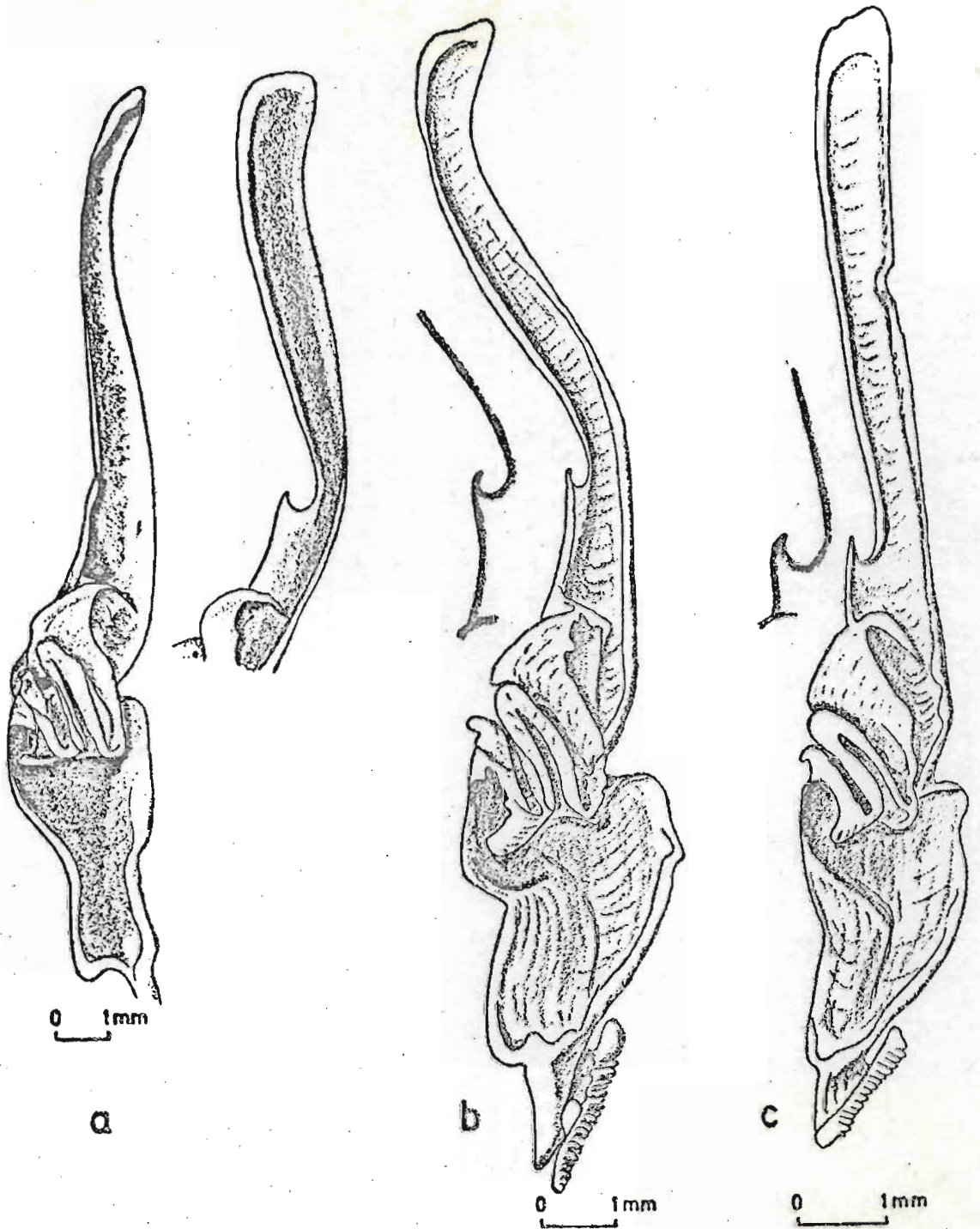
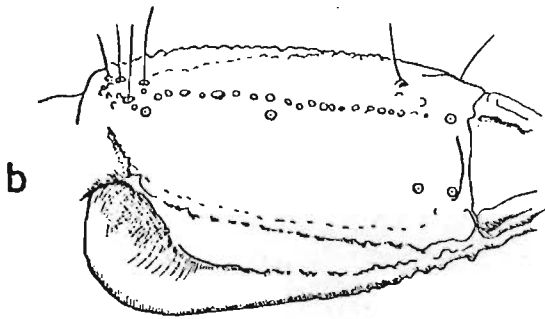
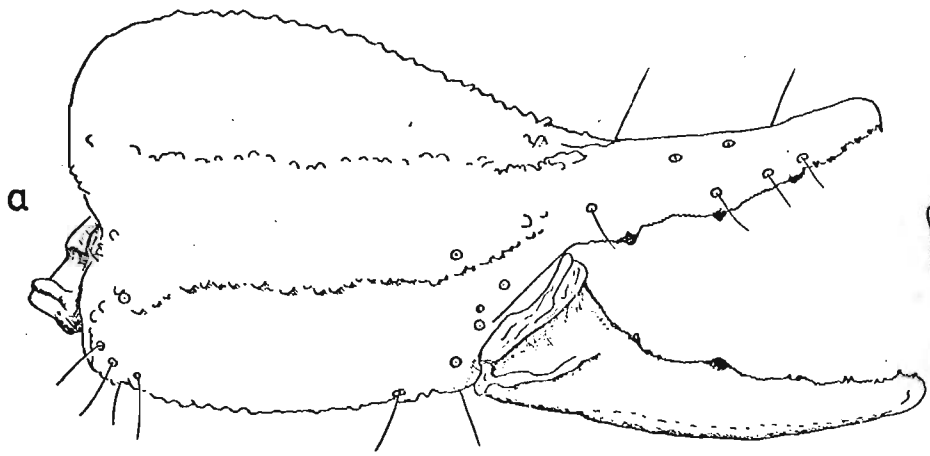
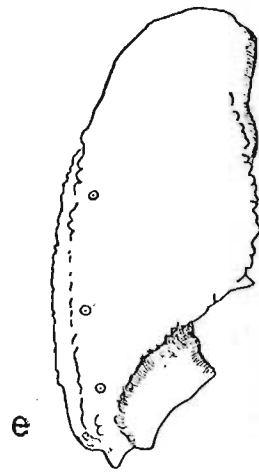
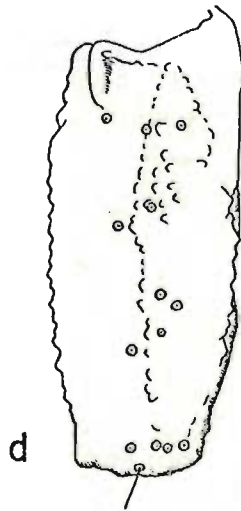
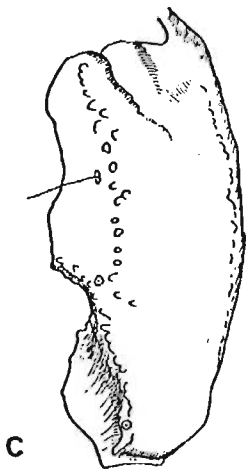


Fig. 4.61. Ventral aspects of right hemispermatothores of:
 a, *Opisthophthalmus gigas* with inset of oblique aspect to show hook notch lateral outline (S.M.N. 196); b, *O. opinatus* (S.A.M. B1700);
 c, *O. setifrons* (N.M. 11107). b and c, with insets of hook notch lateral outline.

Fig. 4.62. Opisthophthalmus intercedens Kraepelin. a-e, ♀
lectotype (Z.M.B. 14973); f, ♂ (N.M. 10726). a, right hand,
outer aspect; b, id., ventral aspect; c, pedipalp tibia,
dorsal aspect; d, id., outer aspect; e, id., ventral aspect;
f, right hemispermatophore, ventral aspect. a-e, same scale;
f, as indicated.



0 1mm



0 1mm

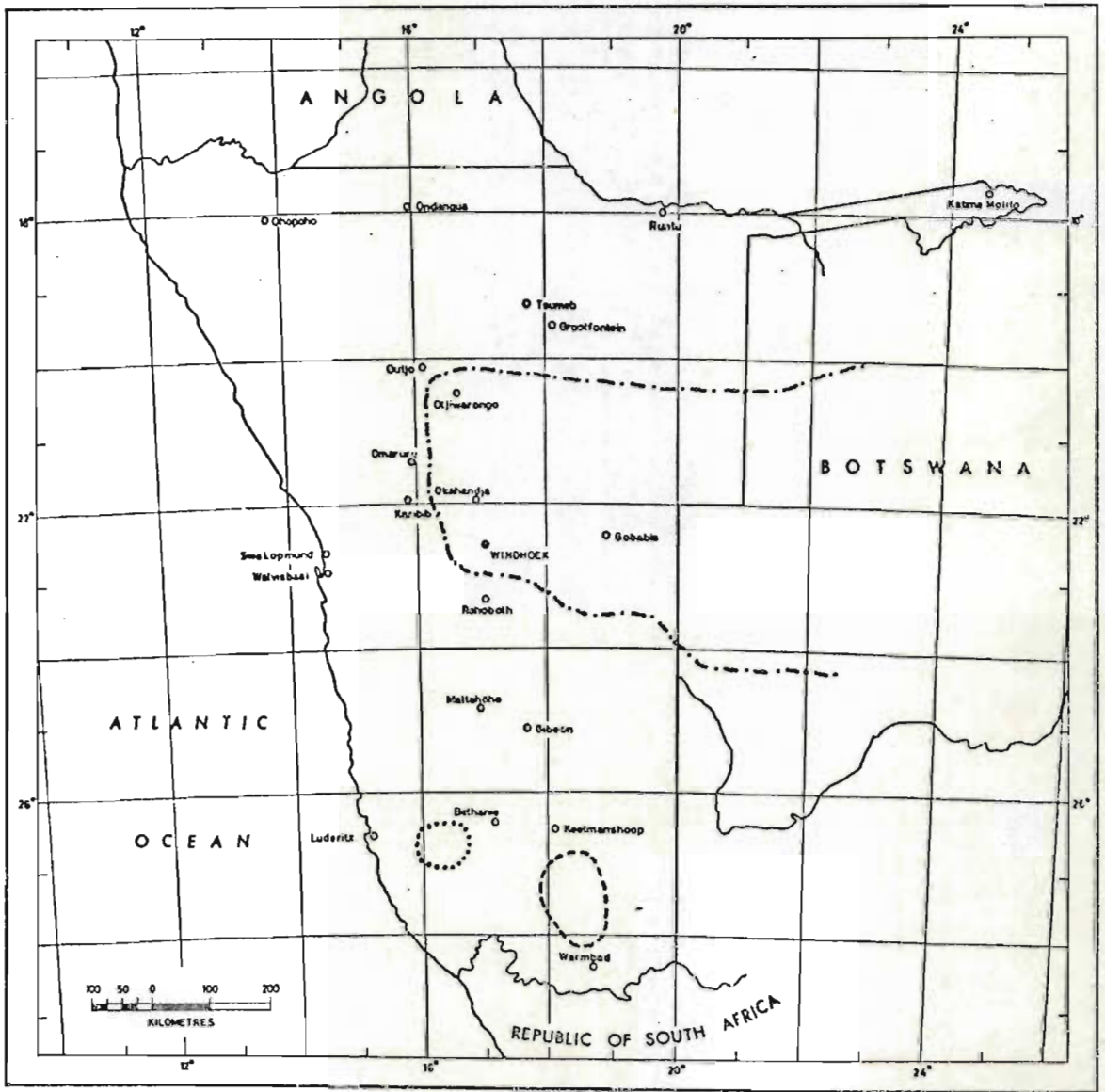
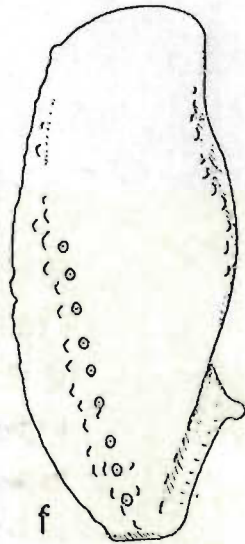
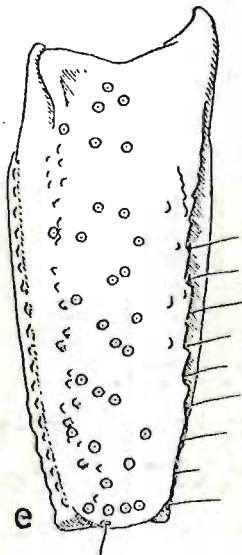
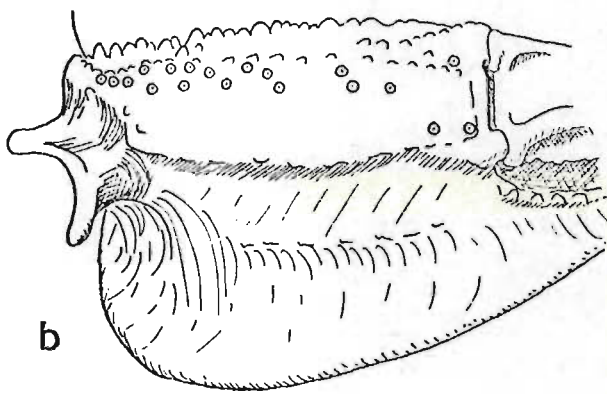
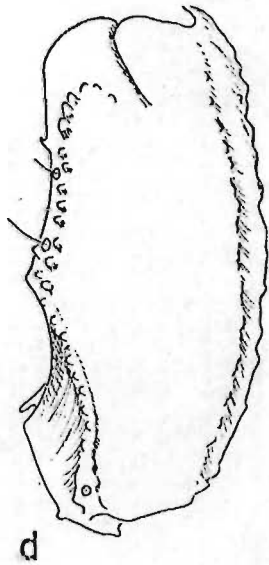
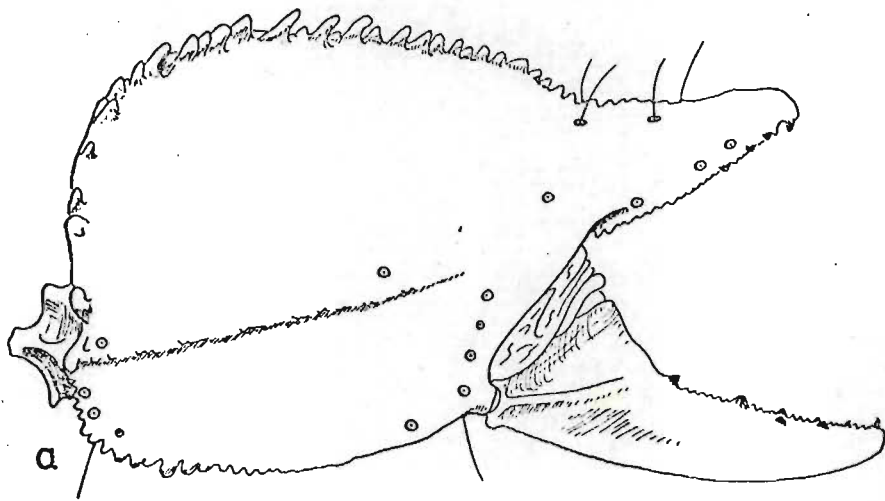


Fig. 4.63. Distribution ranges of: *Opisthophthalmus intercedens* (....); *O. new species C* (-----); *O. fitzsimonsi* (-.-.-.-)

Fig. 4.64. Opisthophthalmus jenseni (Lamoral). Holotype ♂ (T.M. 9504). a, right hand, outer aspect; b, id., ventral aspect; c, id., inner aspect; d, pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect; g, pedipalp femur, dorsal aspect.



0 2 mm

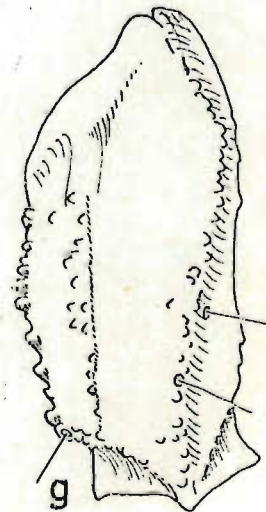
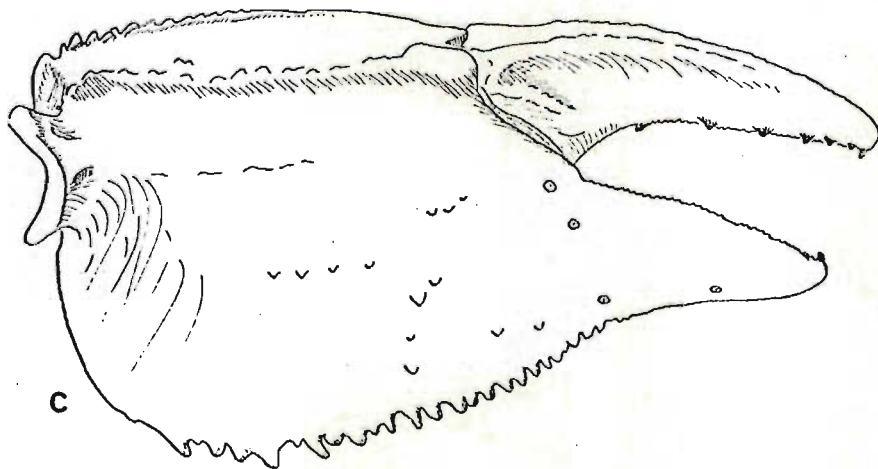


Fig. 4.65. Opisthophthalmus litoralis Lawrence. a, ♂ (S.M.N. 122); b-f, ♀ (S.M.N. 453). a and b, right hand, outer aspect; c, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect; g, right hemispermatophore, ventral aspect (N.M. 10821). b-f, same scale; a and g as separately indicated.

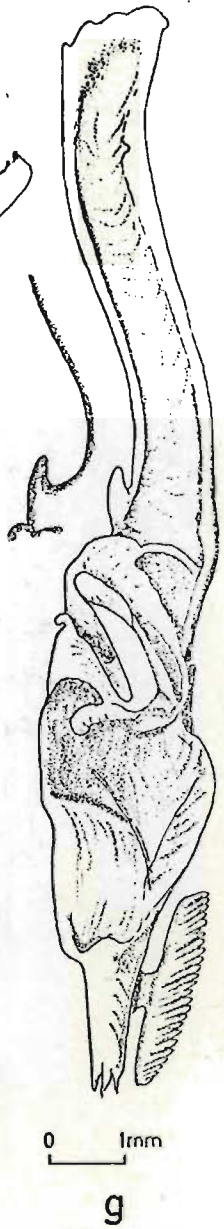
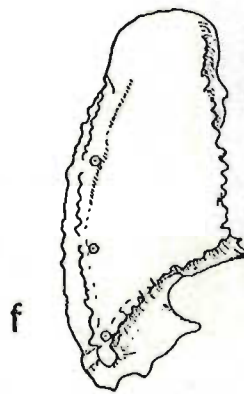
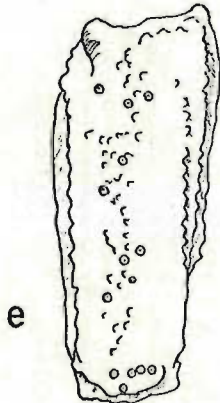
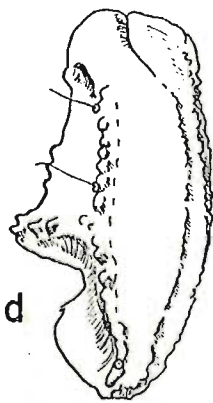
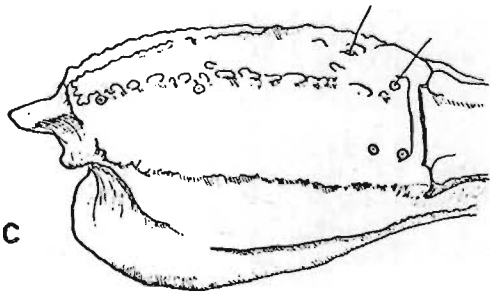
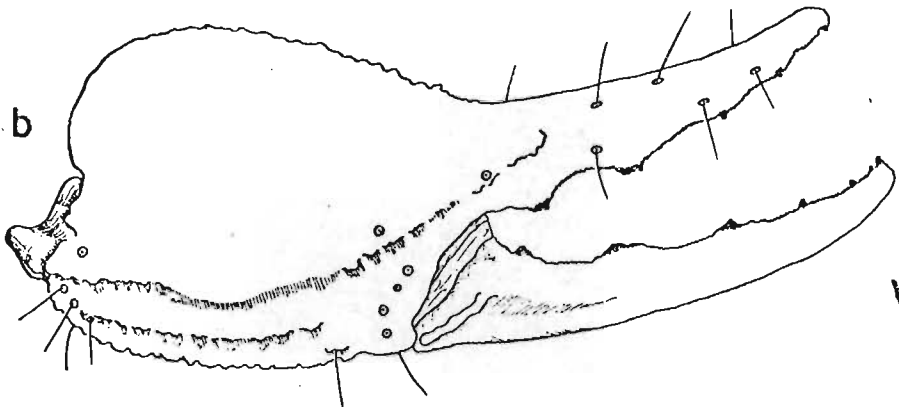
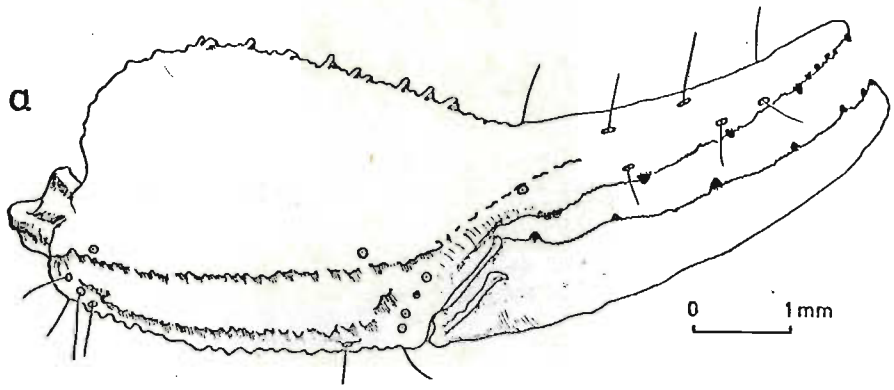
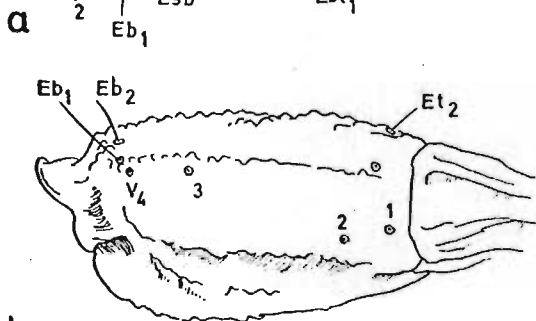
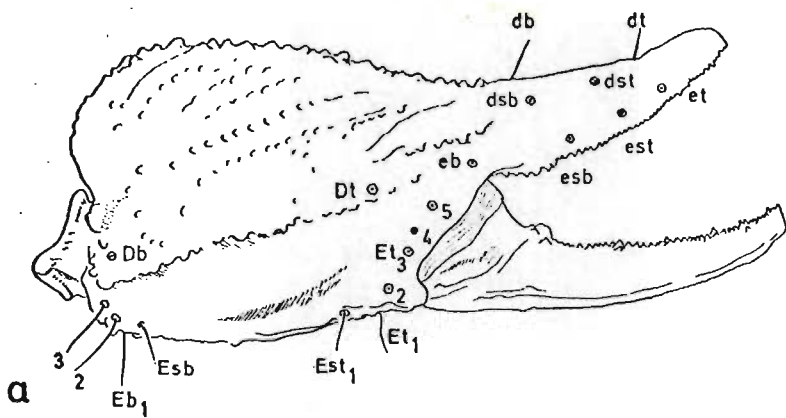
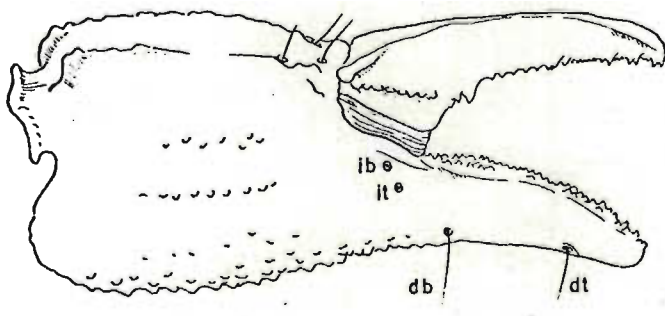


Fig. 4.66. Opisthophthalmus new species C. a-g, holotype ♂ (N.M. 11106); h, paratype (N.M. 10688). a, right hand, outer aspect; b, id., ventral aspect; c, id., inner aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id., ventral aspect; g, right pedipalp femur, dorsal aspect; h, right hemispermatophore, ventral aspect. a-g, same scale; h, as indicated.

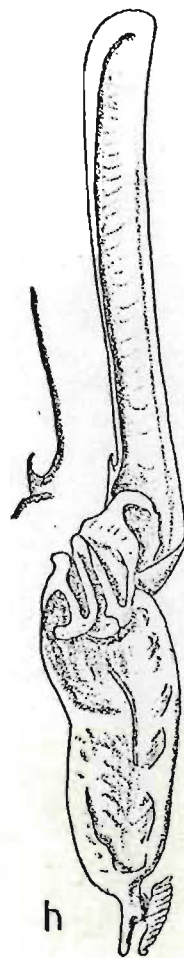


0 2mm

b

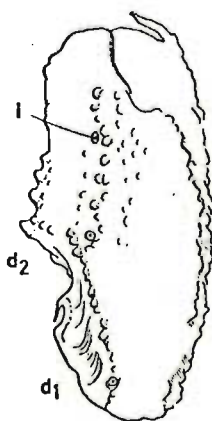


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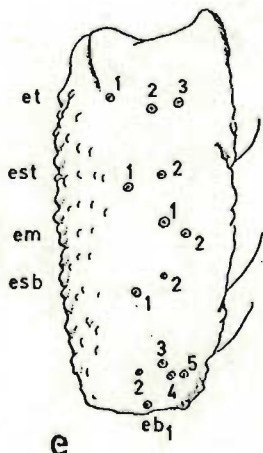


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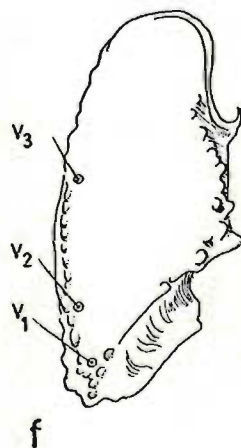
h



d



e



f



g

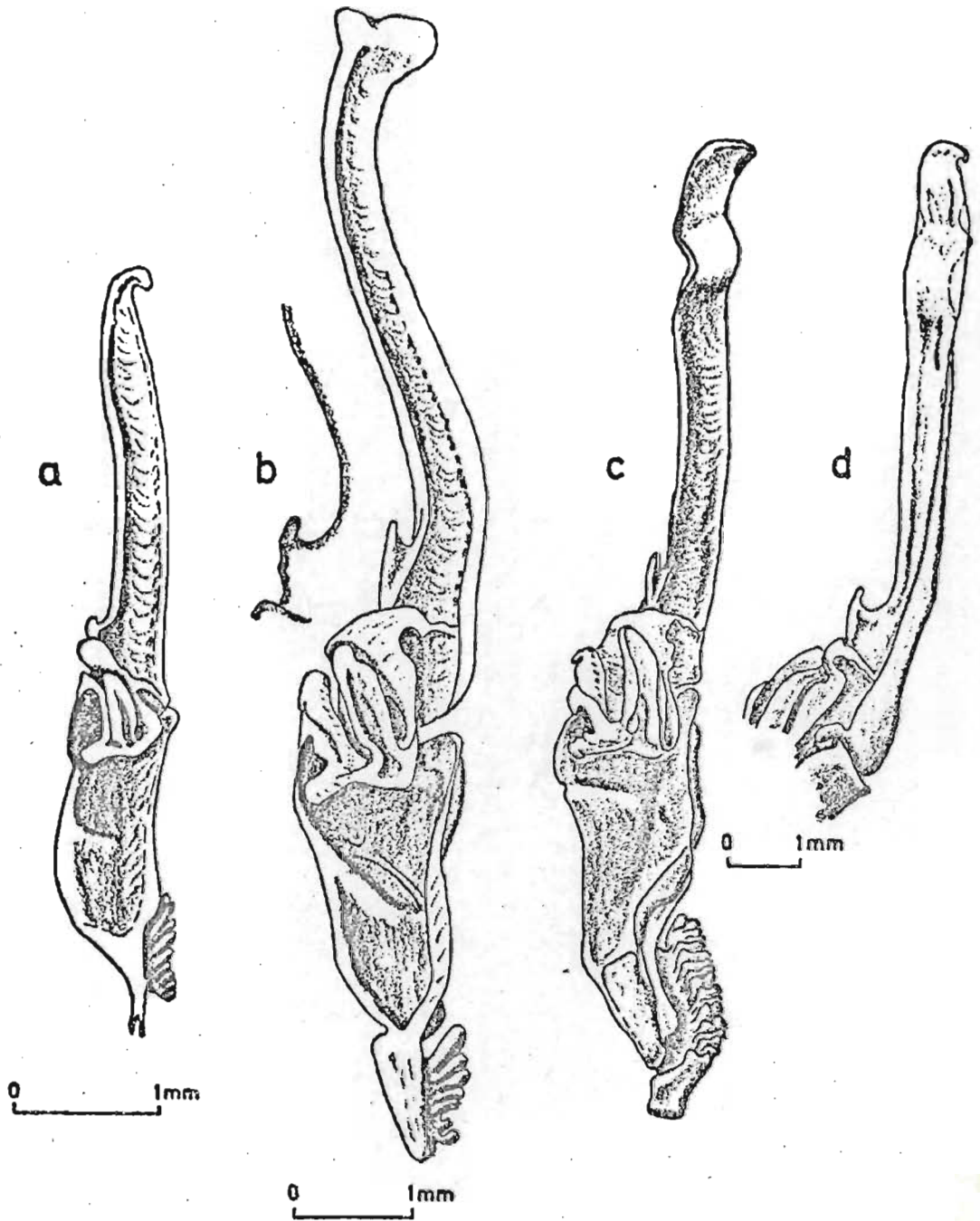
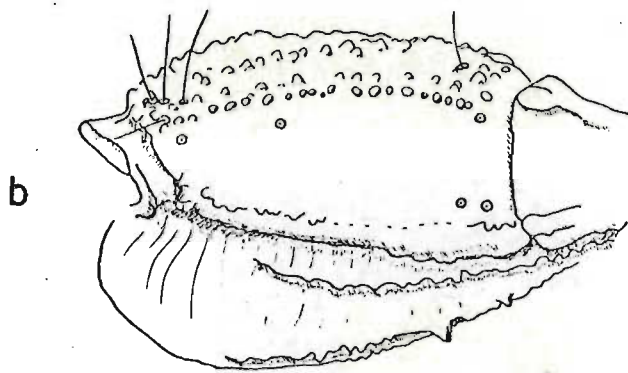
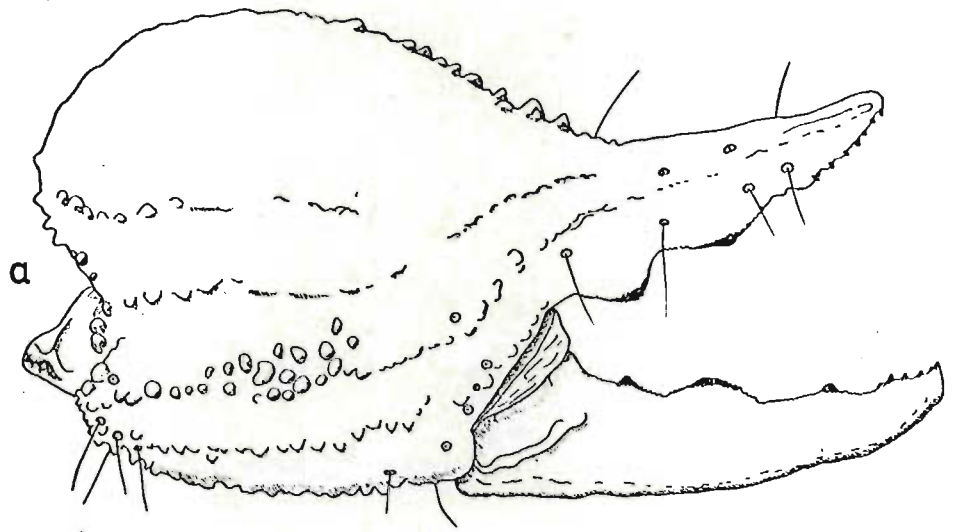


Fig. 4.67. Ventral aspects of right hemispermatozoa of: a, Opisthophthalmus jenseni holotype (T.M. 9504); b, O. new species D paratype (N.M. 10601); c, O. wahlbergi (N.M. 10356); d, id., oblique aspect of distal half to show hook notch lateral outline.

Fig. 4.68. Opisthophthalmus opinatus (E. Simon), holotype ♀ (R.S. 0235). a, right hand, outer aspect; b, id., ventral aspect; c, pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id., ventral aspect.



0 2 mm

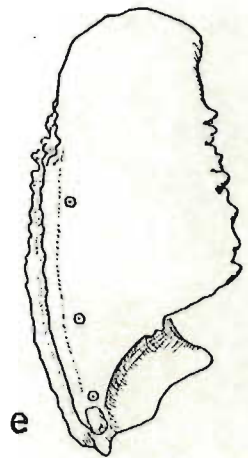
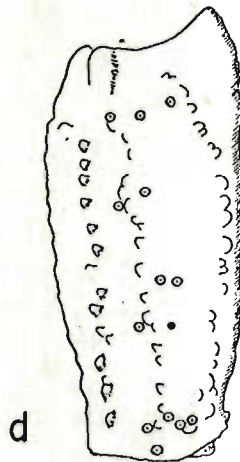
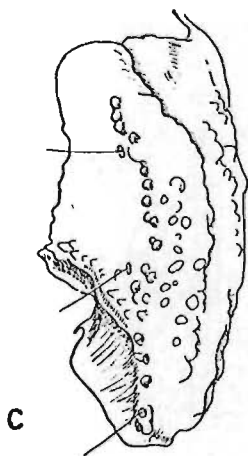
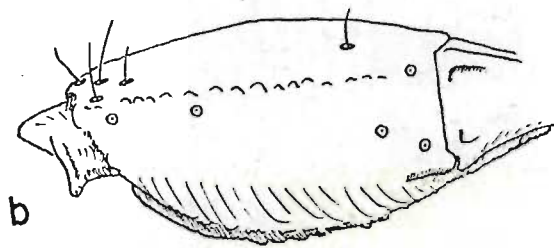
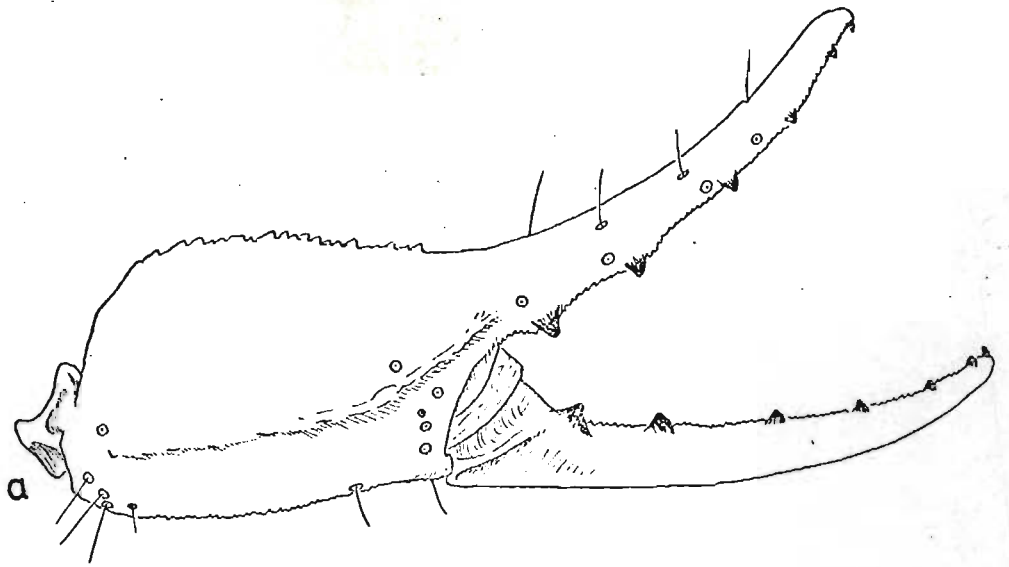
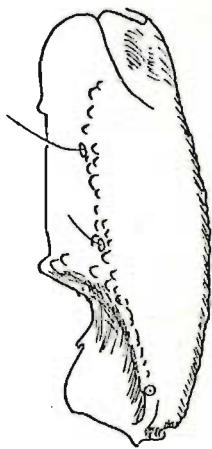


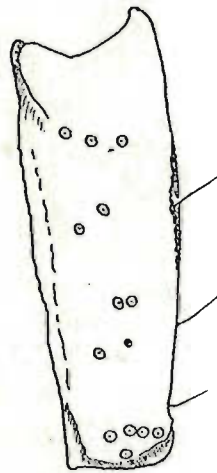
Fig. 4.69. Opisthophthalmus new species D, holotype ♀ (N.M. 9123). a, right hand, outer aspect; b, id., ventral aspect; c, pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id., ventral aspect.



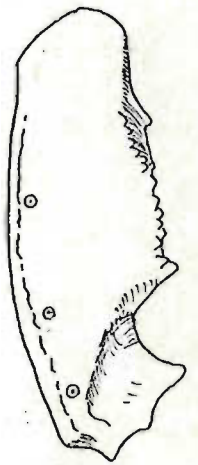
0 2 mm



c

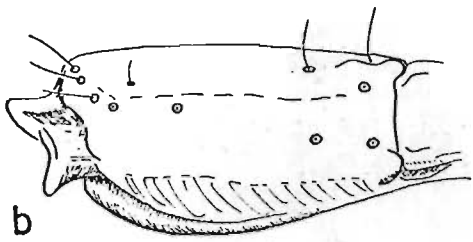
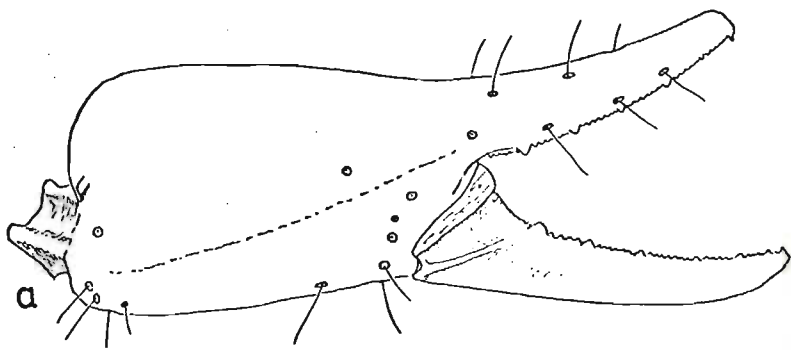


d

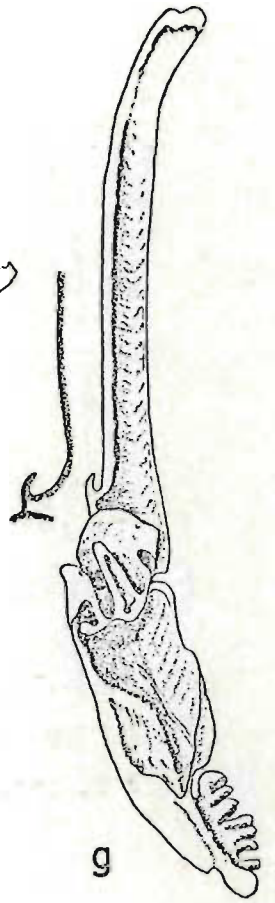
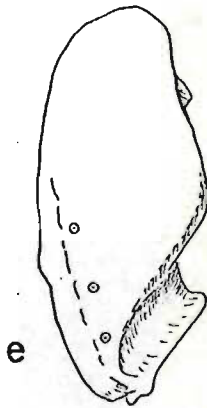
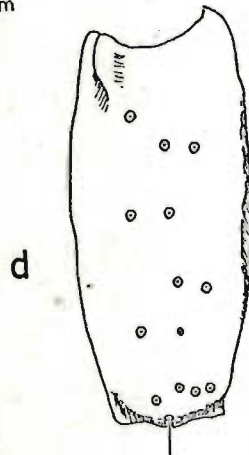
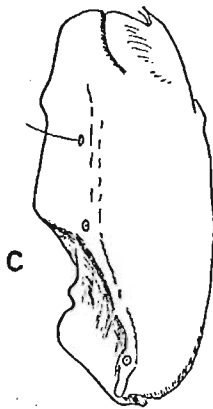


e

Fig. 4.70. Opisthophthalmus new species E. a-f, ♀ paratype (N.M. 11105); g. ♂ paratype (N.M. 10684). a, right hand, outer aspect; b, id., ventral aspect; c, pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id., ventral aspect; f, pedipalp femur, dorsal aspect; g, right hemispermaphore, ventral aspect with inset of hook notch lateral outline. a-f, same scale; g, as indicated.



0 1mm



0 1mm

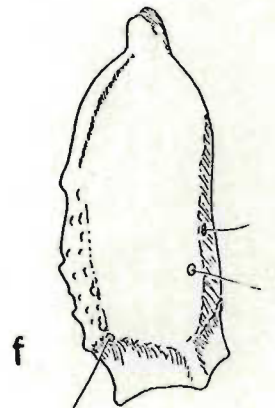
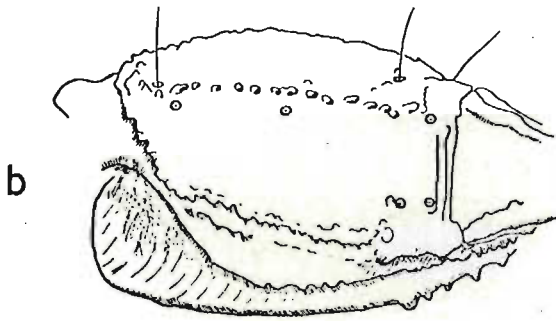
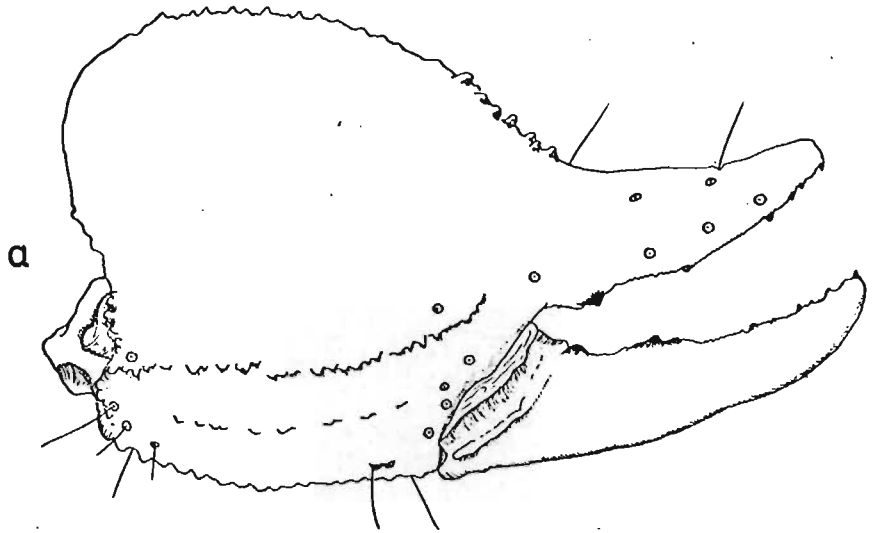


Fig. 4.71. Opisthophthalmus schultzei Kraepelin, ♀ lectotype (Z.M.B. 14988). a, right hand, outer aspect; b, id., ventral aspect; c, right pedipalp tibia, dorsal aspect; d, id., outer aspect; e, id., ventral aspect.



0 1mm

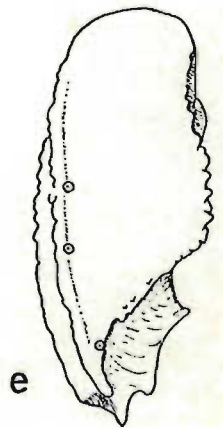
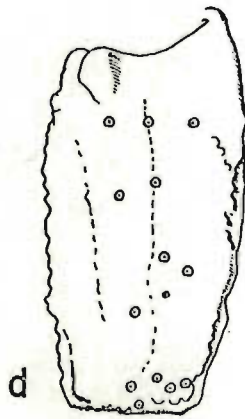
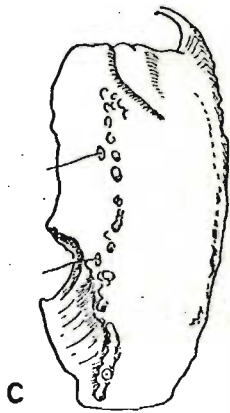
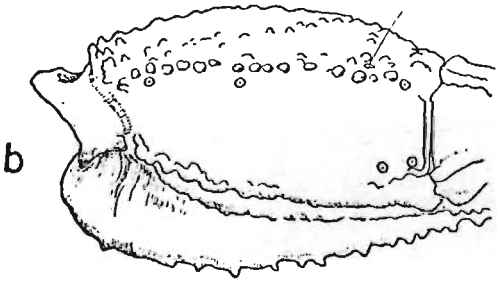
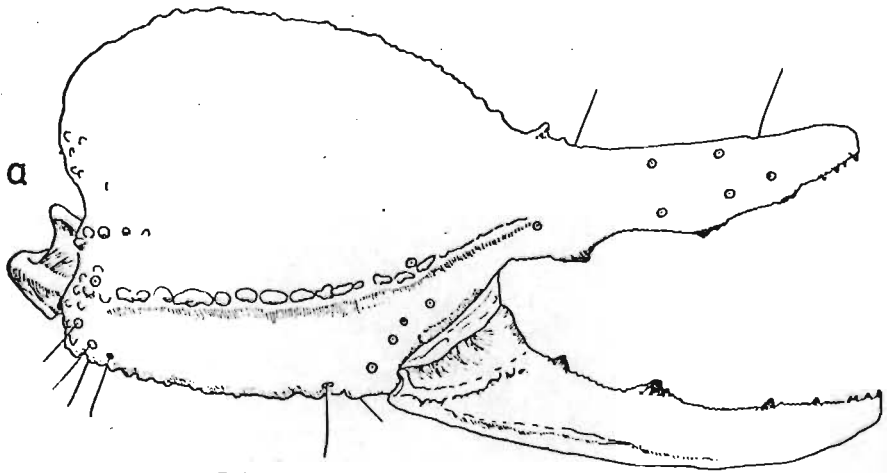
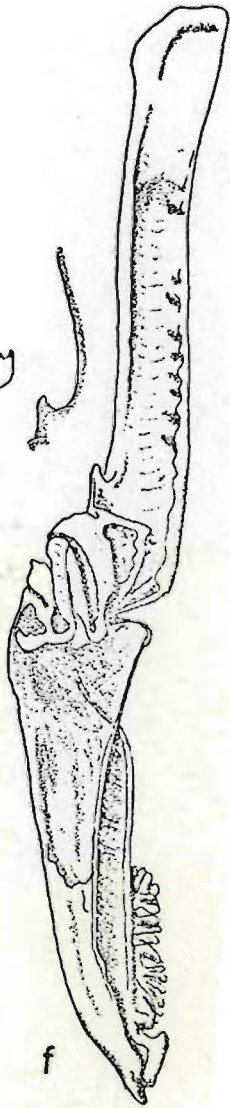
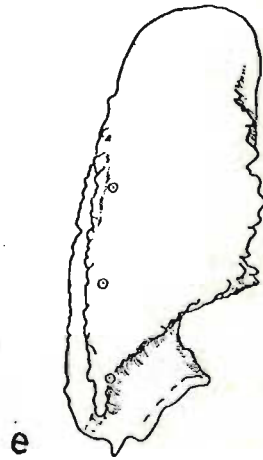
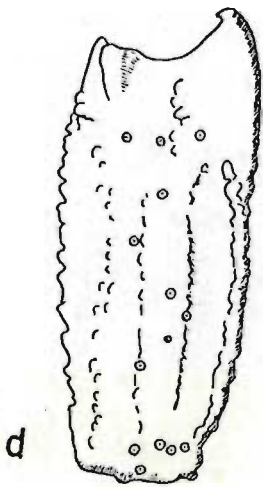
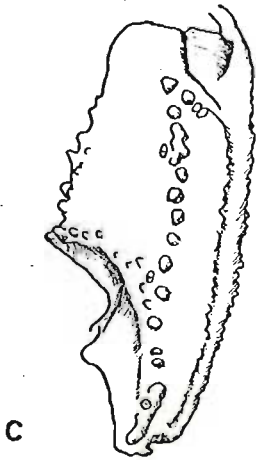


Fig. 4.72. Opisthophthalmus schultzei Kraepelin. a-f, ♂
(Z.M.B. 14993. - types of O. undulatus Kraepelin). a, right
hand, outer aspect; b, id., ventral aspect; c, right pedipalp
tibia, dorsal aspect; d, id., outer aspect; e, id., ventral
aspect; f, right hemespermatophore, ventral aspect, with
inset of hook notch lateral outline. a-e, same scale; f, as
indicated.

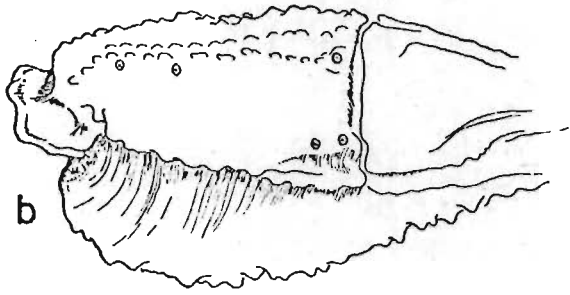
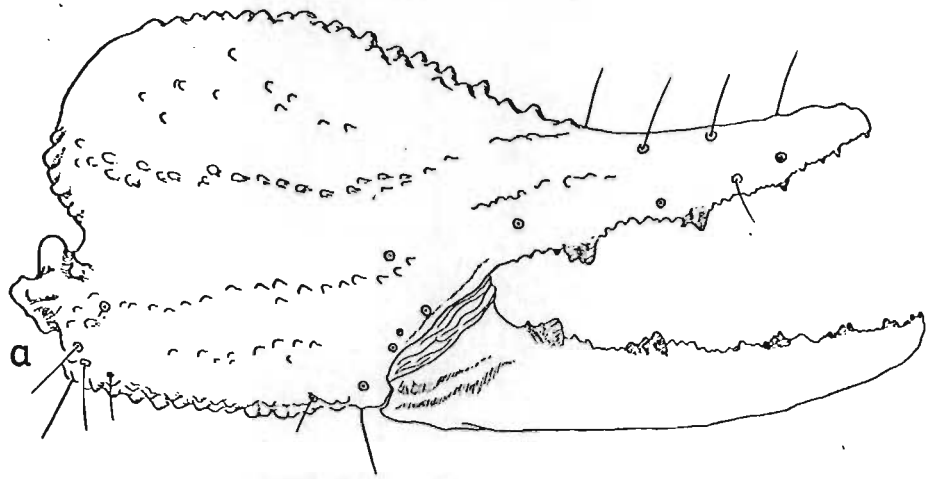


0 3 mm



0 1 mm

Fig. 4.73. Opisthophthalmus setifrons Lawrence, ♂ holotype (N.M. 8330). a, right hand, outer aspect; b, id., ventral aspect; c, id., inner aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id. ventral aspect.



0 3mm

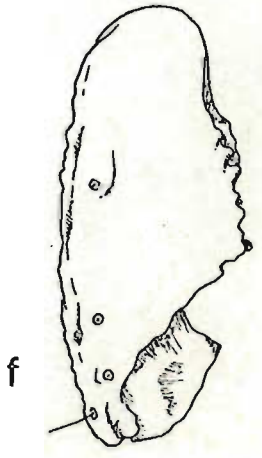
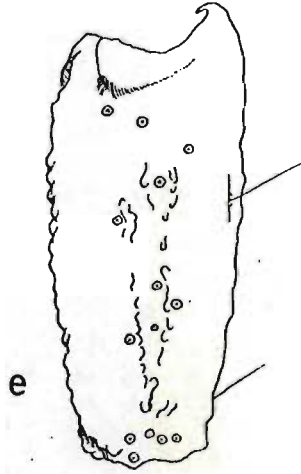
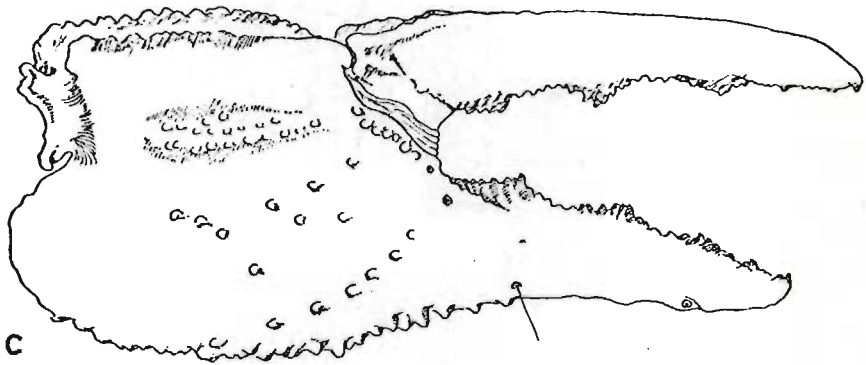
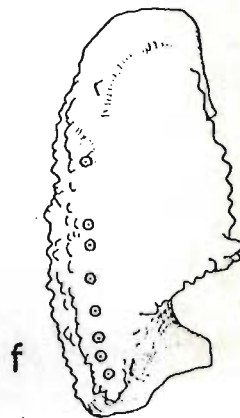
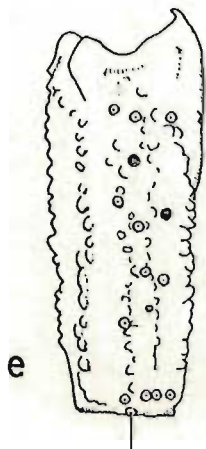
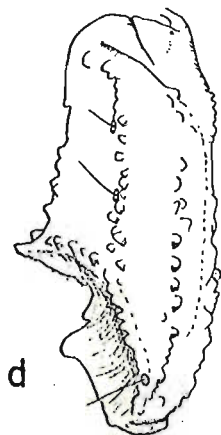
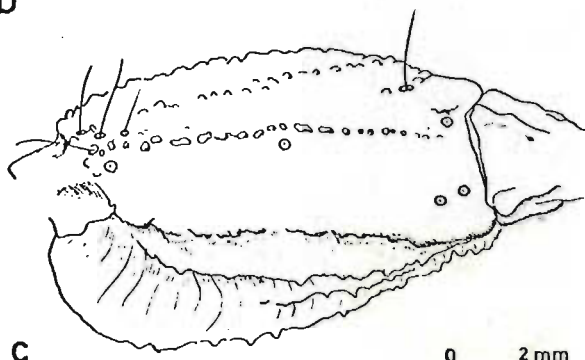
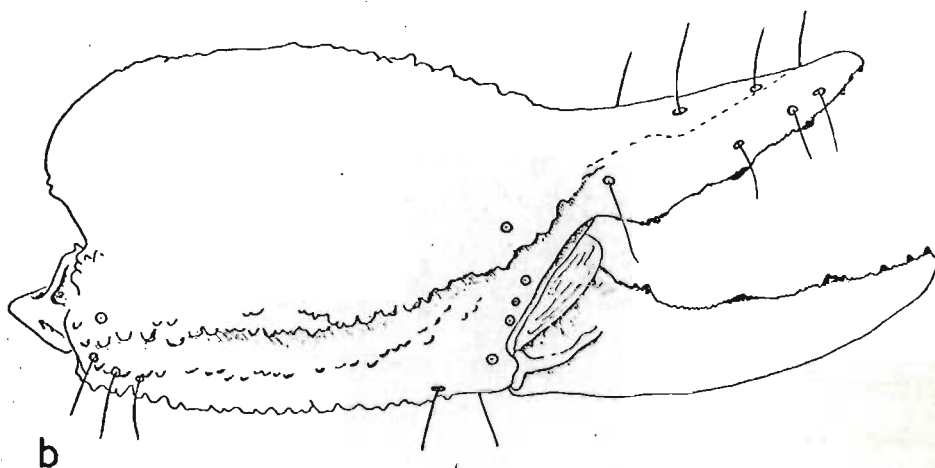
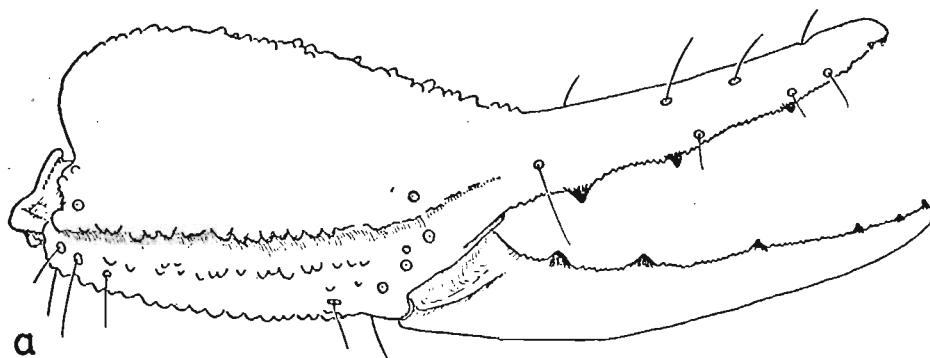


Fig. 4.74. Opisthophthalmus ugabensis Hewitt. a and g, ♂ (Ang. 4038); b-f, ♀ (S.M.N. 91). a and b, right hand, outer aspect; c, id., ventral aspect; d, right pedipalp tibia, dorsal aspect; e, id., outer aspect; f, id, ventral aspect; g, ventral aspect of right hemispermatophore with inset of hook notch lateral outline. a-f, same scale; g, scale as indicated. Black dots indicate position of accessory trichobothria.



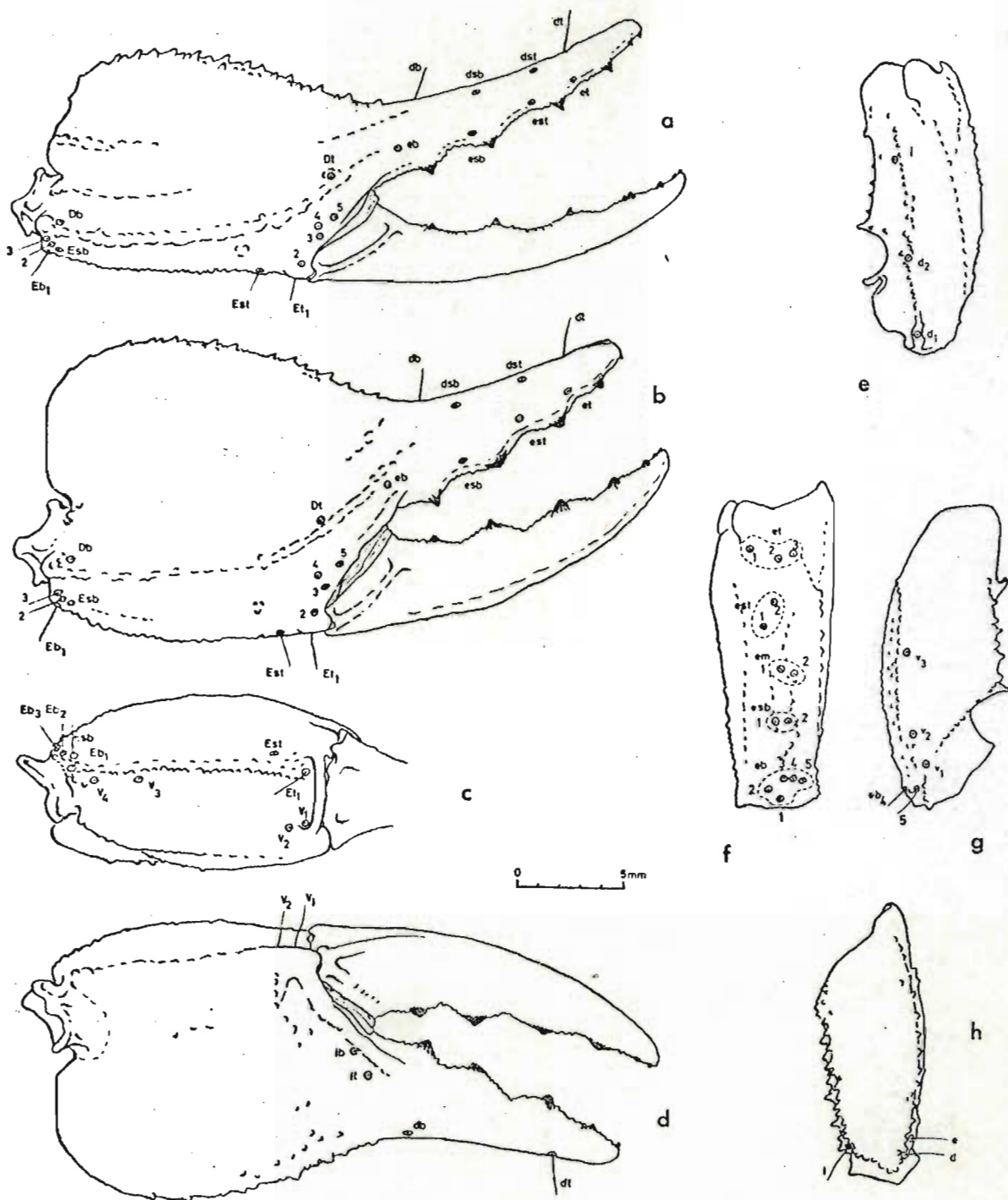


Fig. 4.75. Opisthophthalmus wahlbergi (Thorell). a, ♂ (N.M. 10356); b-h, ♀ (N.M. 10042). a and b, right hand, outer aspect; c, id., ventral aspect; d, id., inner aspect; e, right pedipalp tibia, dorsal aspect; f, id., outer aspect; g, id., ventral aspect; h, right pedipalp femur, dorsal aspect.

Fig. 4.76. Outlines of carapaces showing positions of median and lateral eyes and sutures in ♀ of the following species of Opisthophthalmus: a, brevicauda; b, ugabensis; c, gigas; d, haackei; e, carinatus; f, litoralis. All drawn approximately to the same proportions but with varying scales, using a camera lucida.

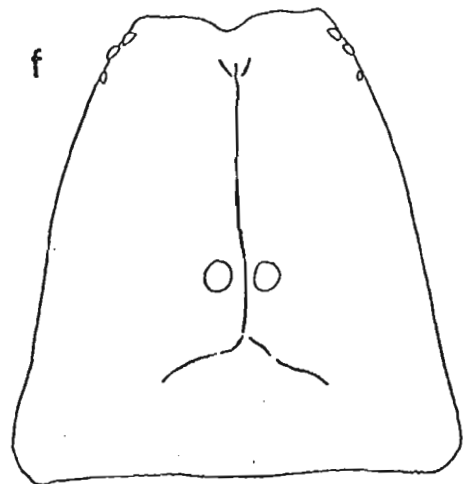
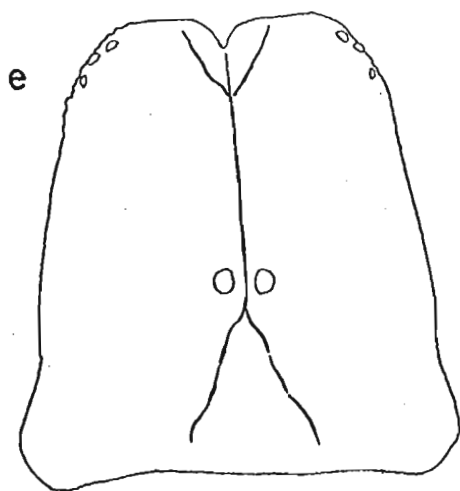
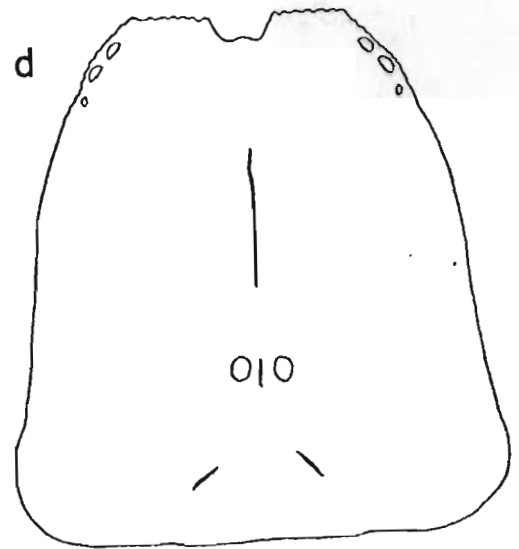
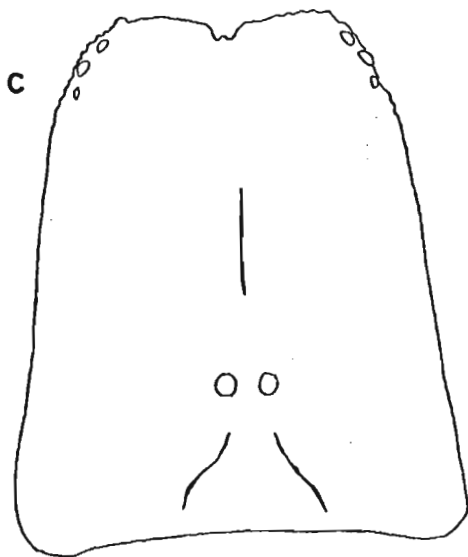
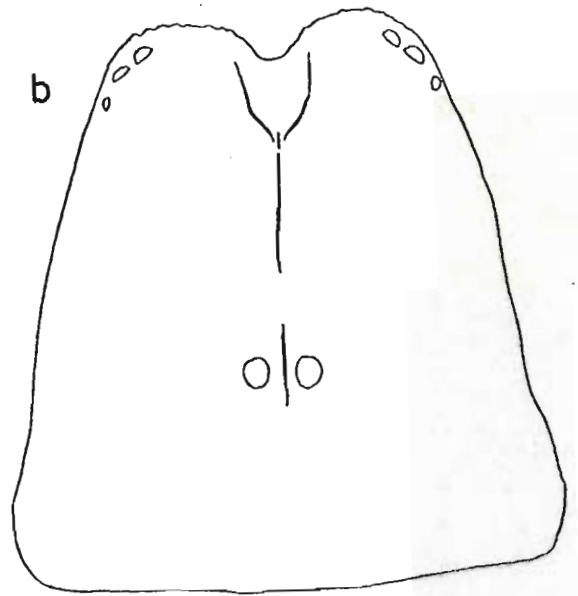
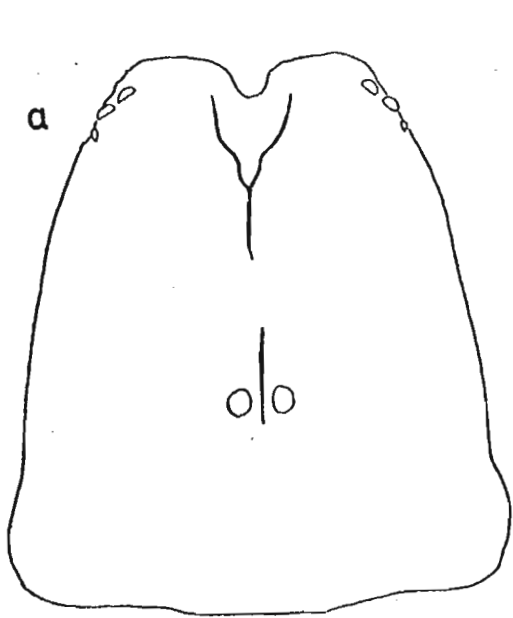


Fig. 4.77. Outlines of carapaces showing positions of median and lateral eyes and sutures in ♀ of the following species of Opisthophthalmus: a, opinatus; b, new species A; c, intercedens; d, fitzsimonsi; e, adustus; f, schultzei. All drawn approximately to the same proportions but with varying scales, using a camera lucida.

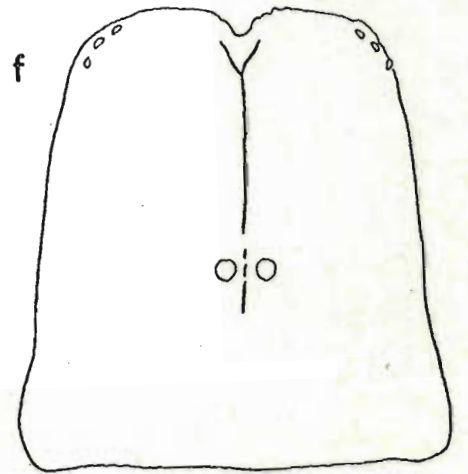
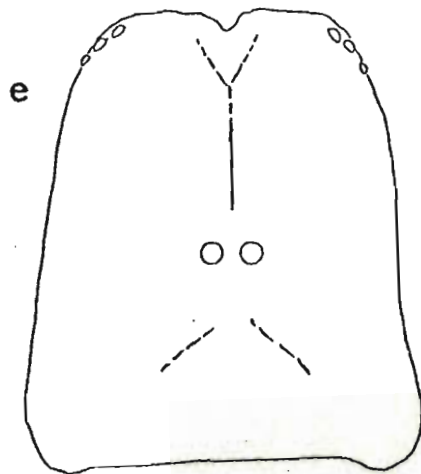
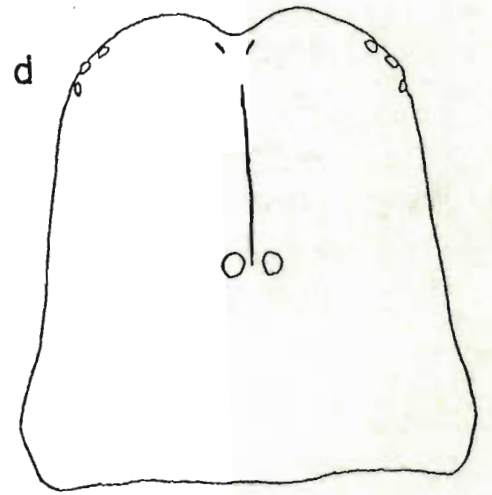
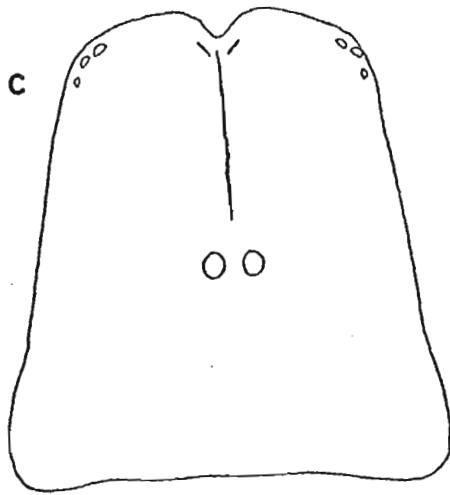
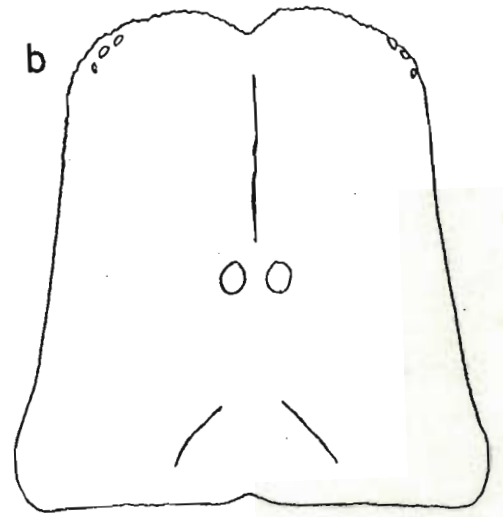
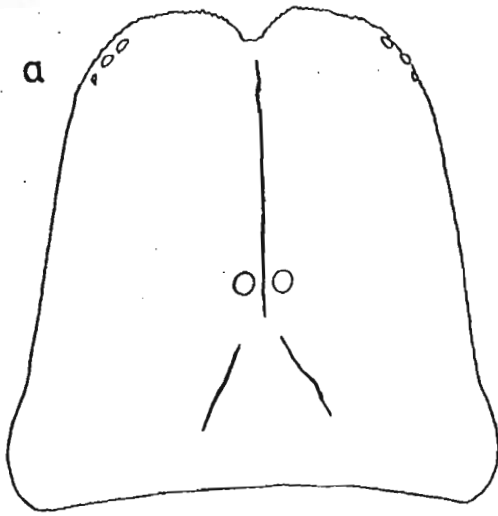
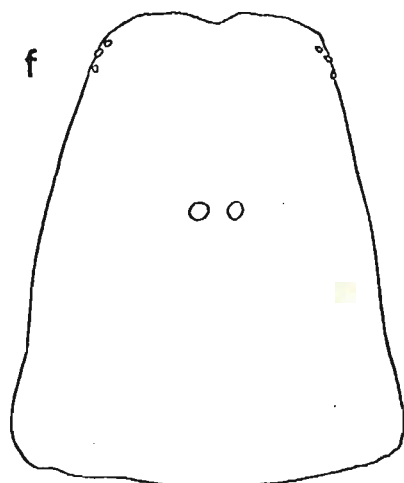
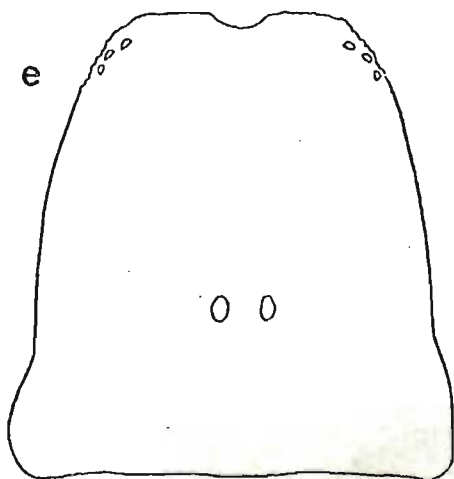
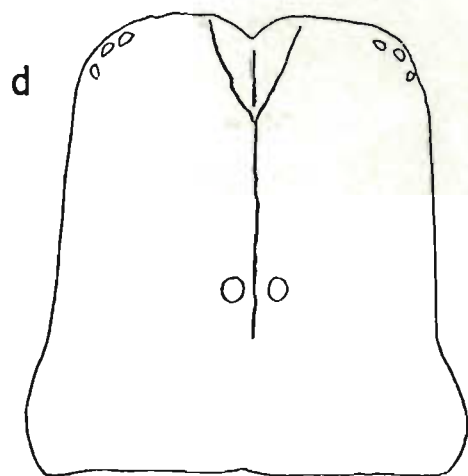
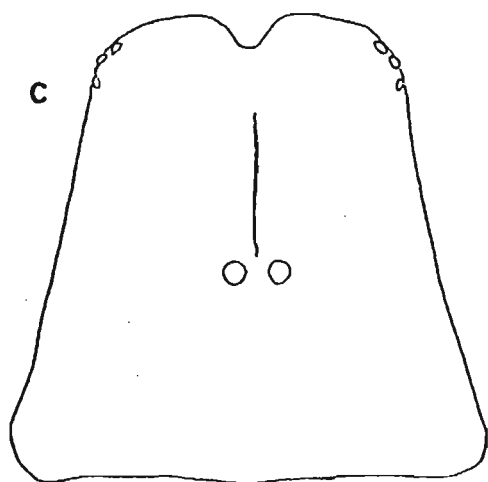
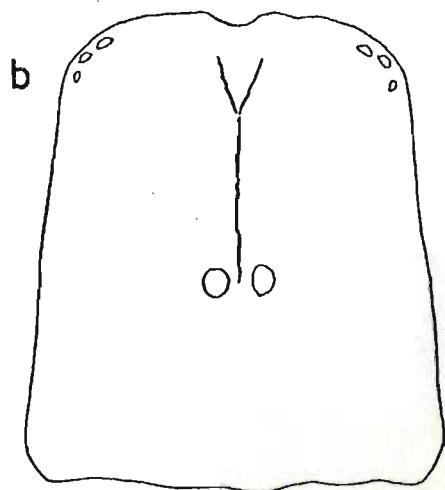
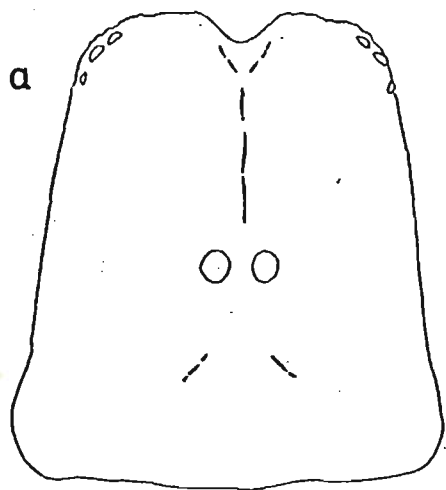


Fig. 4.78. Outlines of carapaces showing positions of median and lateral eyes and sutures (when present) in ♀ of the following species of Opisthophthalmus: a, cavimanus; b, new species C (♂); c, new species B; d, setifrons; e, flavescens; f, holmi. All drawn approximately to the same proportions but with varying scales, using a camera lucida.



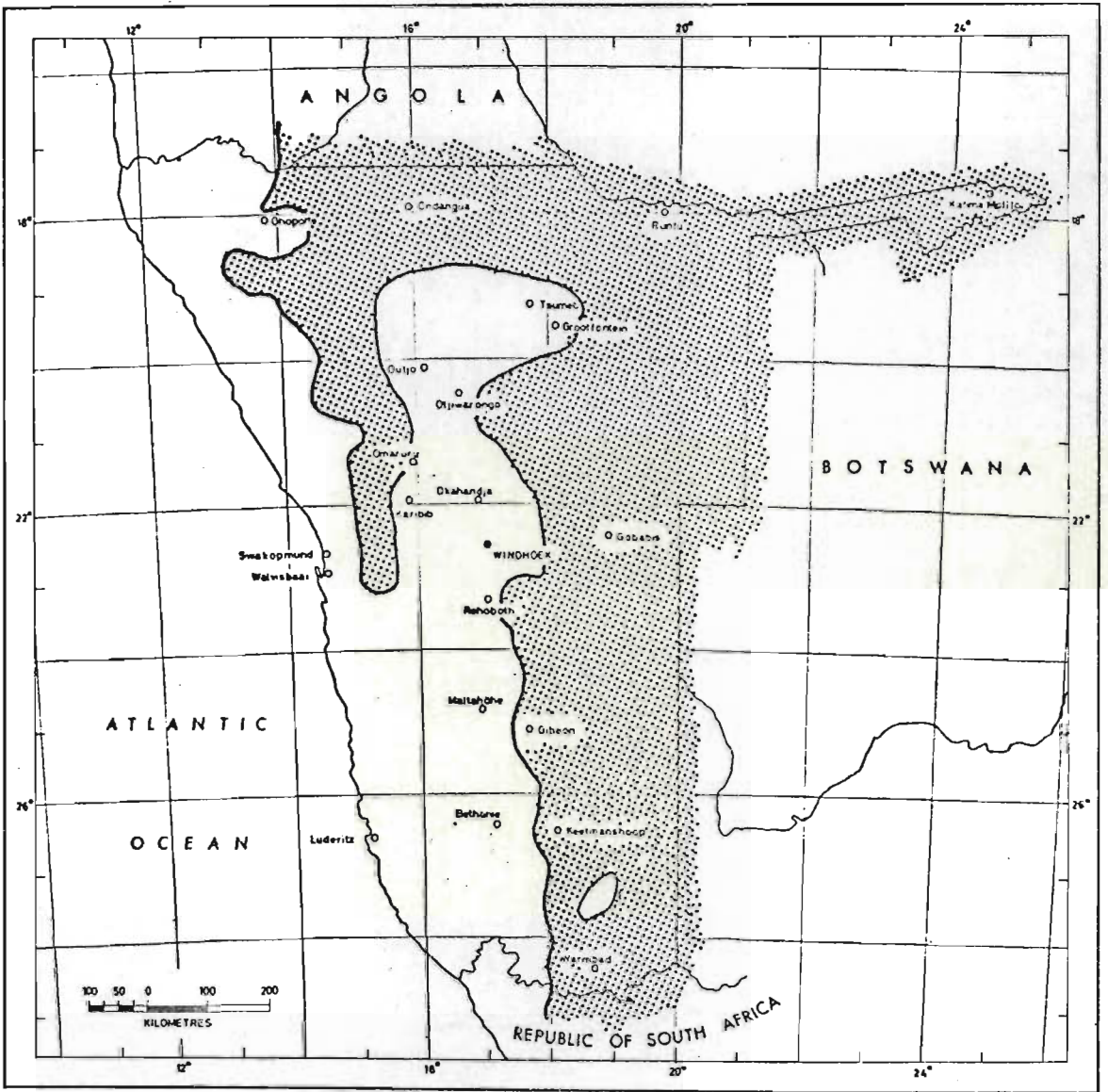
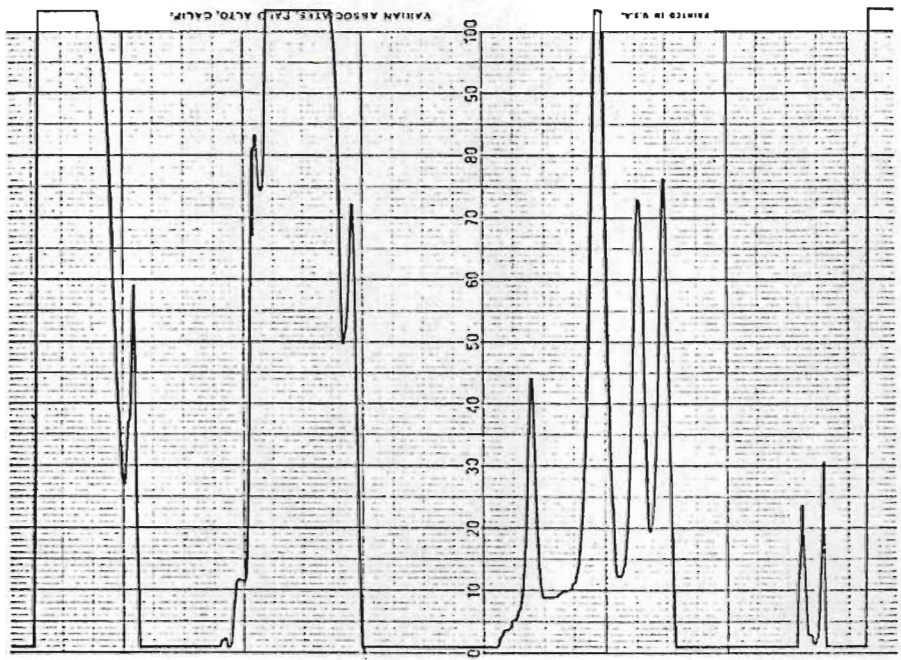
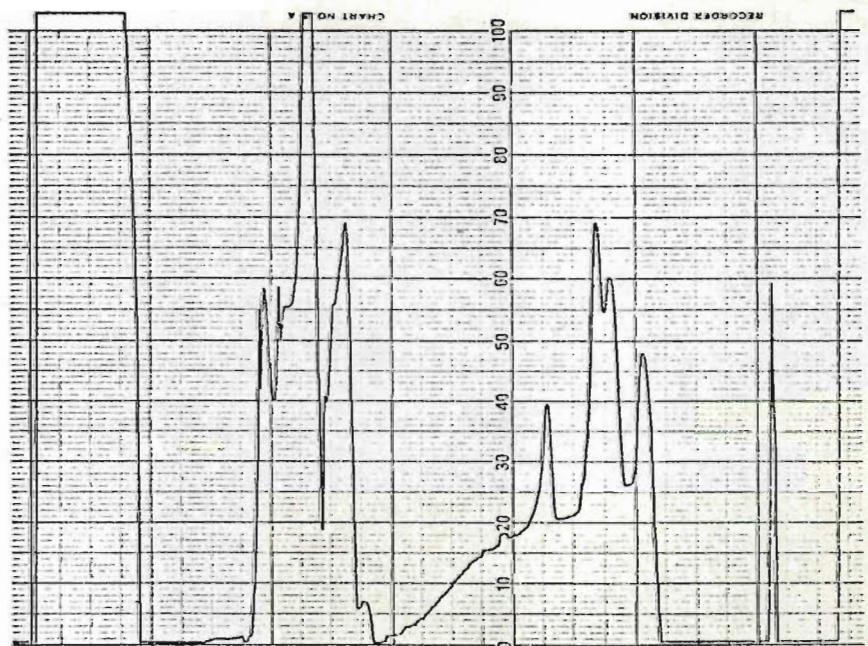


Fig. 4.79. Distribution range of *Opisthophthalmus wahlbergi* (stippled) in South West Africa.

Fig. 4.80. Graphic records obtained on scanning haemolymph
phoregrams of: a, Hadogenes taeniurus; b, Opisthophthalmus
gigas.

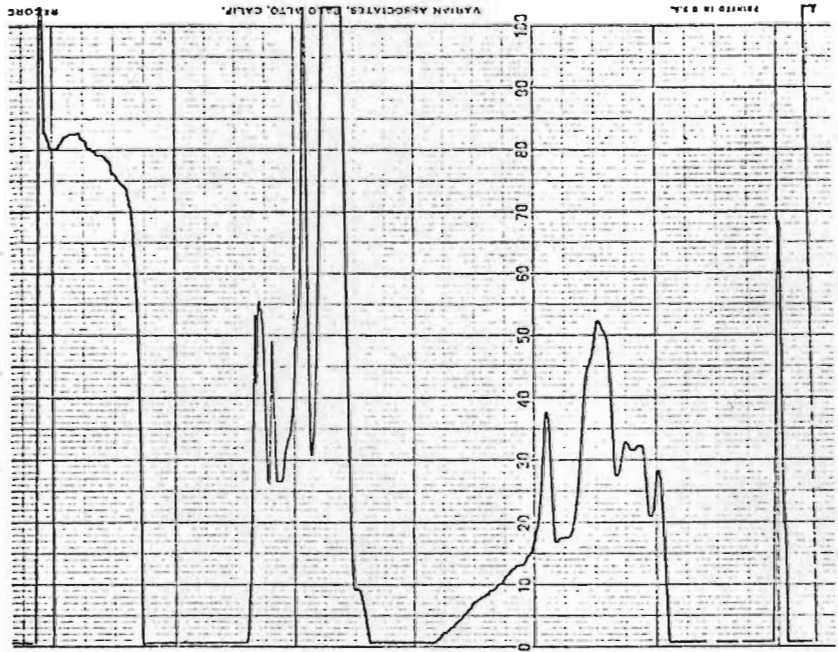


d

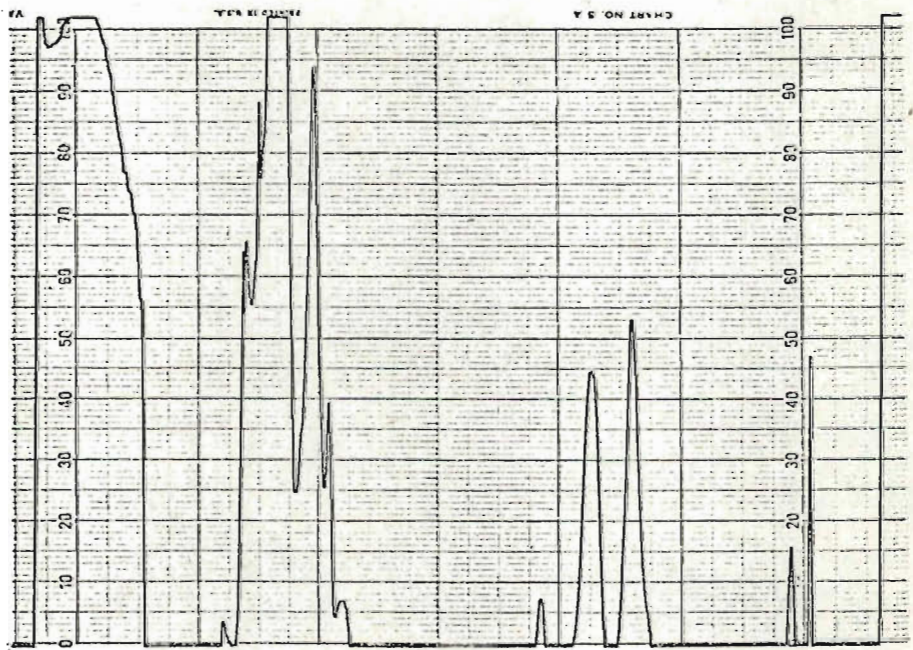


b

Fig. 4.81. Graphic records obtained on scanning haemolymph
phoregrams of: a, Opisthophthalmus holmi; b, O. litoralis.



a



b

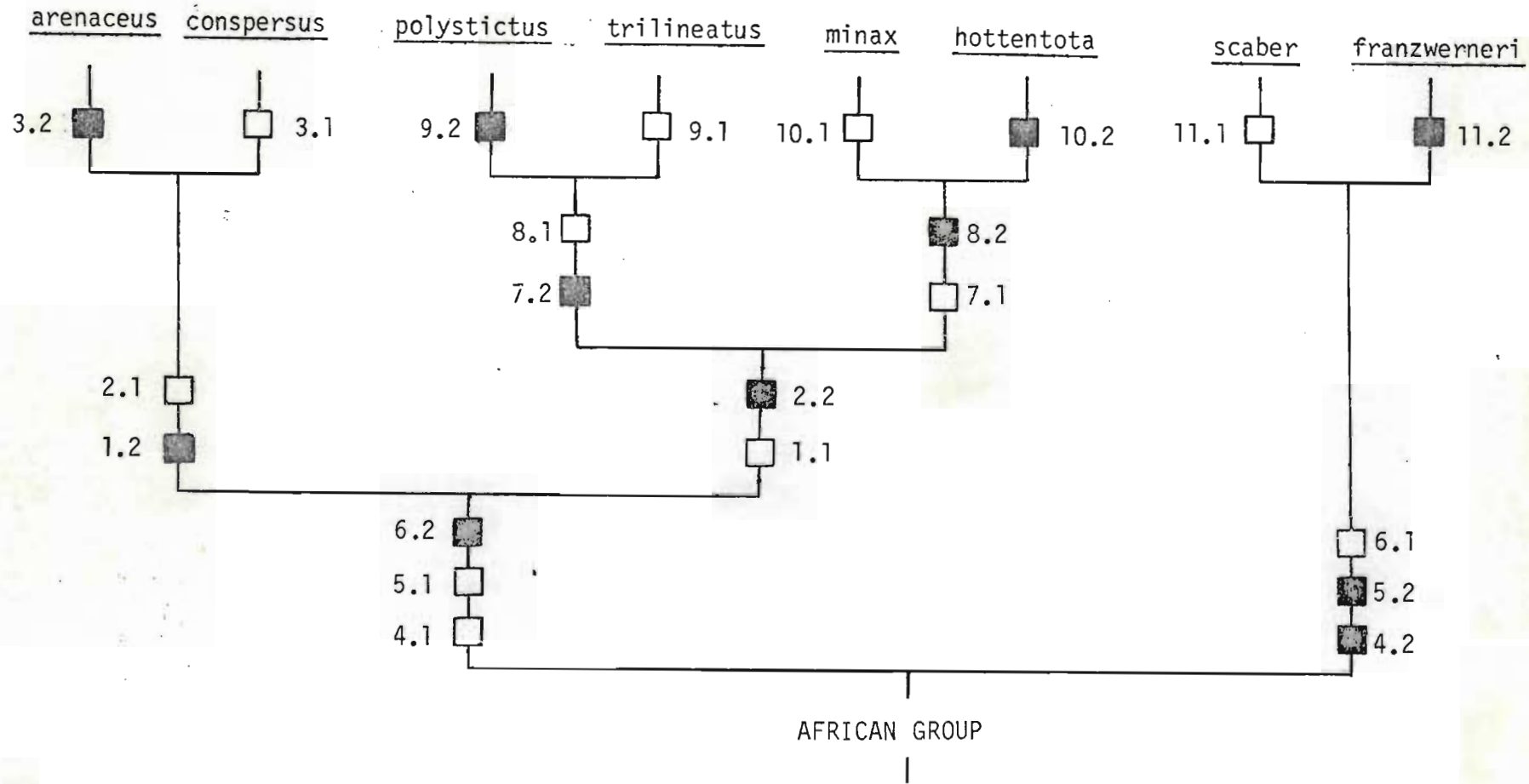


Fig. 5.1. Cladogram of the African Group of species of *Buthotus*, prepared using character states listed in table 5.1. Black squares indicate derived character states, open squares primitive states. Lines show inferred branching sequences only and lengths of branches are neither proportional to distinctness measures nor to evolutionary rates.

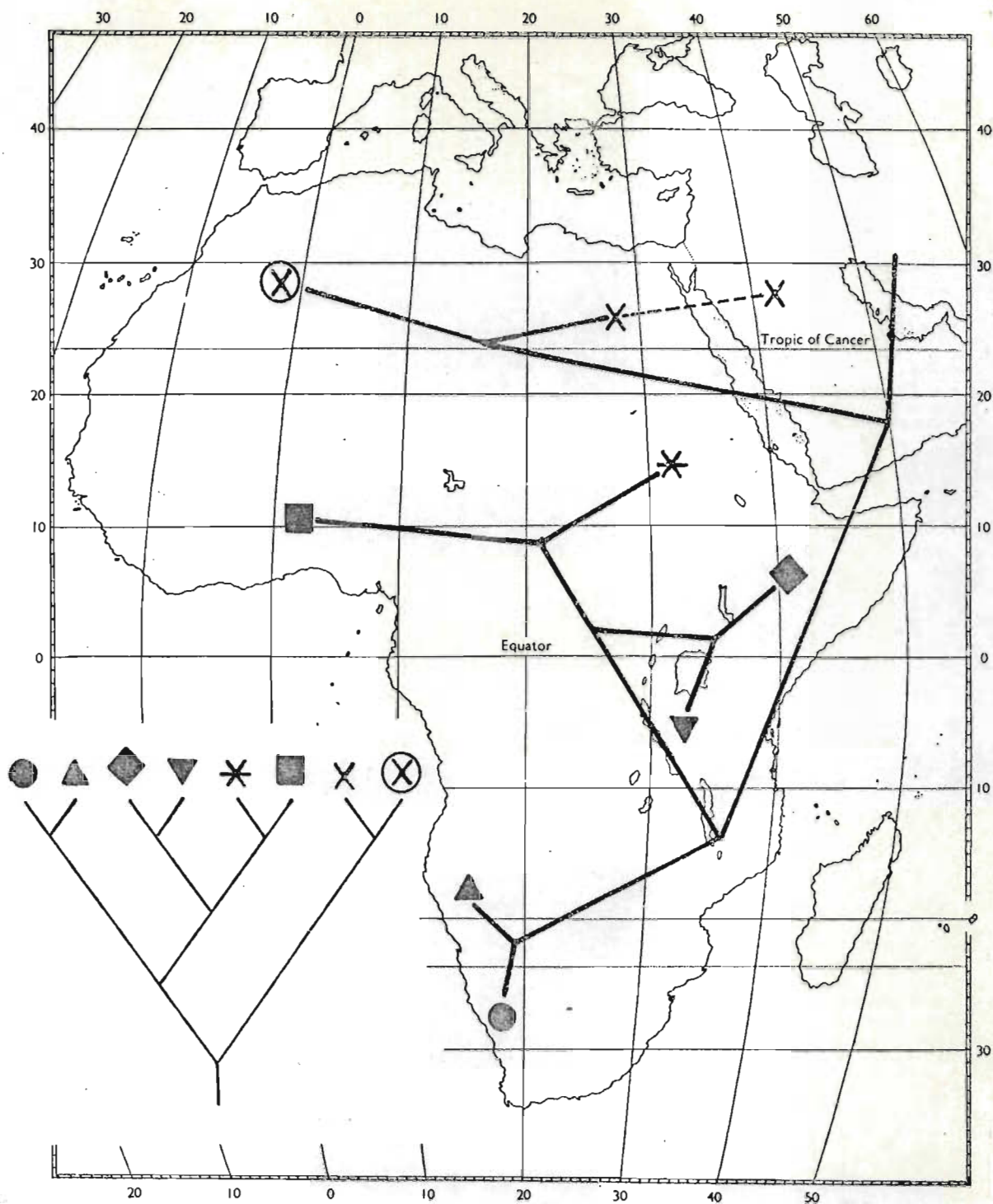


Fig. 5.2. Cladogram of African species of Buthotus (lower left and also see fig. 5.1), superimposed on map of Africa with symbols for species approximately in the centre of their distribution range.

● arenaceus; ▲ conspersus; ◆ polystictus; ▼ trilineatus;
 * minax; ■ hottentota; X scaber; ⊗ franzwernerii. See text for explanations.

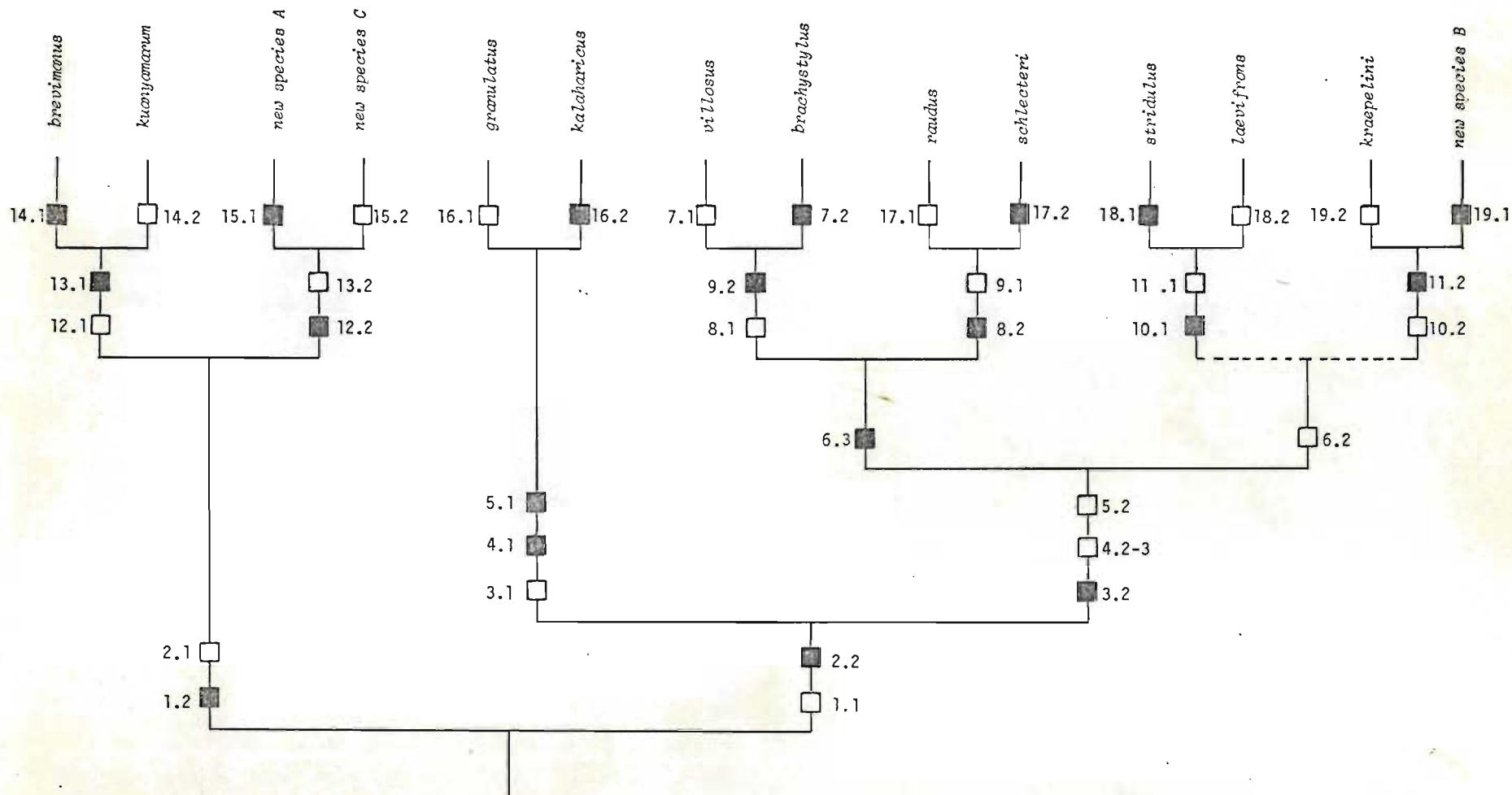


Fig. 5.3. Cladogram of the South West Africa species of *Parabuthus*, prepared using character states listed in table 5.2. Black squares indicate derived character states, open squares primitive states. Lines show inferred branching sequences only and lengths of branches are neither proportional to distinctness measures nor to evolutionary rates. The interrupted line indicates absence of a synapomorphy.

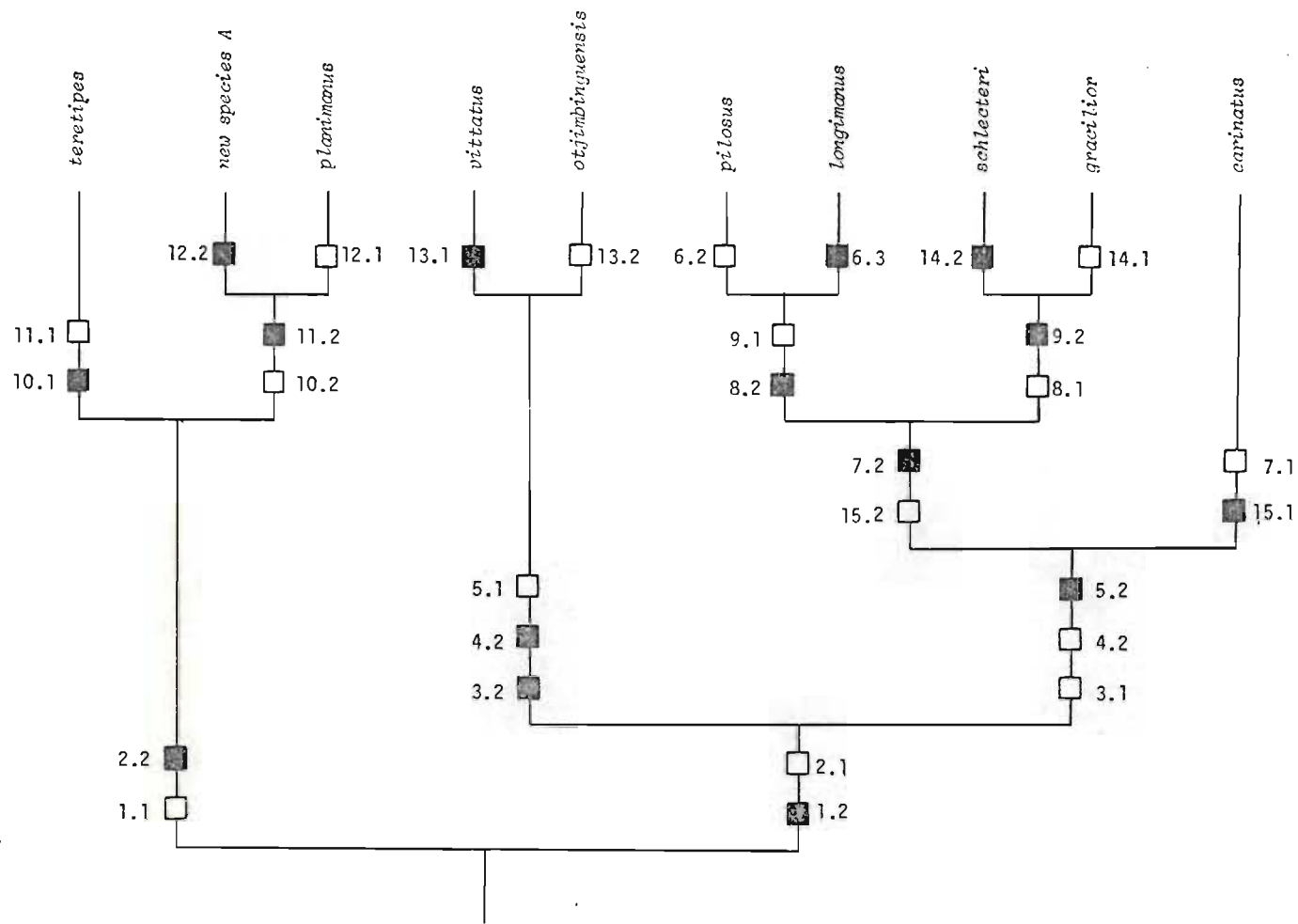


Fig. 5.4. Cladogram of the South West Africa species of *Uroplectes*, prepared using character states listed in table 5.3. Black squares indicate derived character states, open squares primitive states. Lines show inferred branching sequences only and lengths of branches are neither proportional to distinctness measures nor to evolutionary rates.




Fig. 5.5. Cladogram of the South West Africa species of Opisthophthalmus, prepared using character states listed in table 4.2. Black squares indicate derived character states, open squares primitive states. Lines show inferred branching, sequences only and lengths of branches are neither proportional to distinctness measures nor to evolutionary rates.

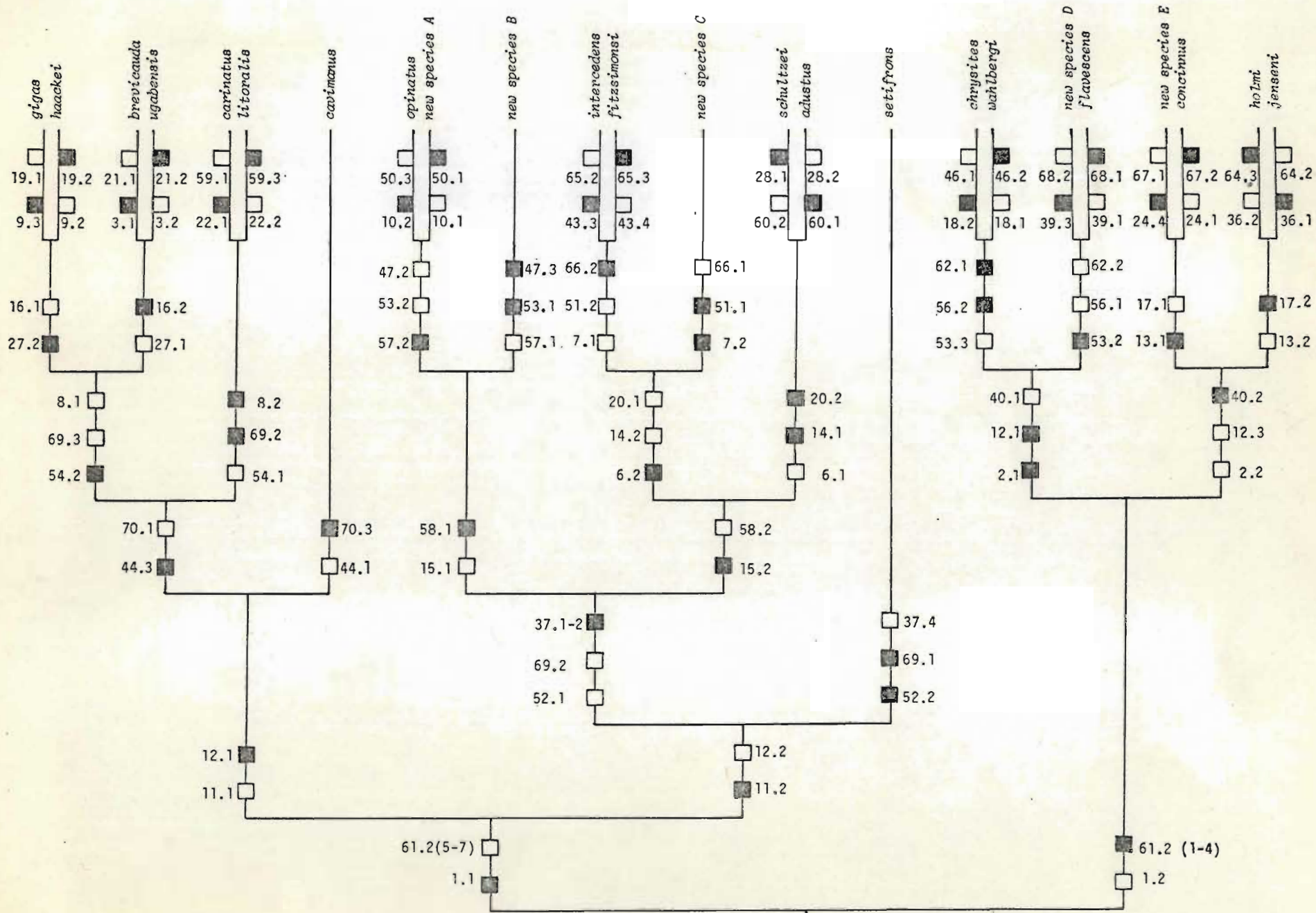


Fig. 5.5. Legend on facing page.



Plate 2.1. Entrance to burrow of Opisthophthalmus wahlbergi on farm Kangas 371.

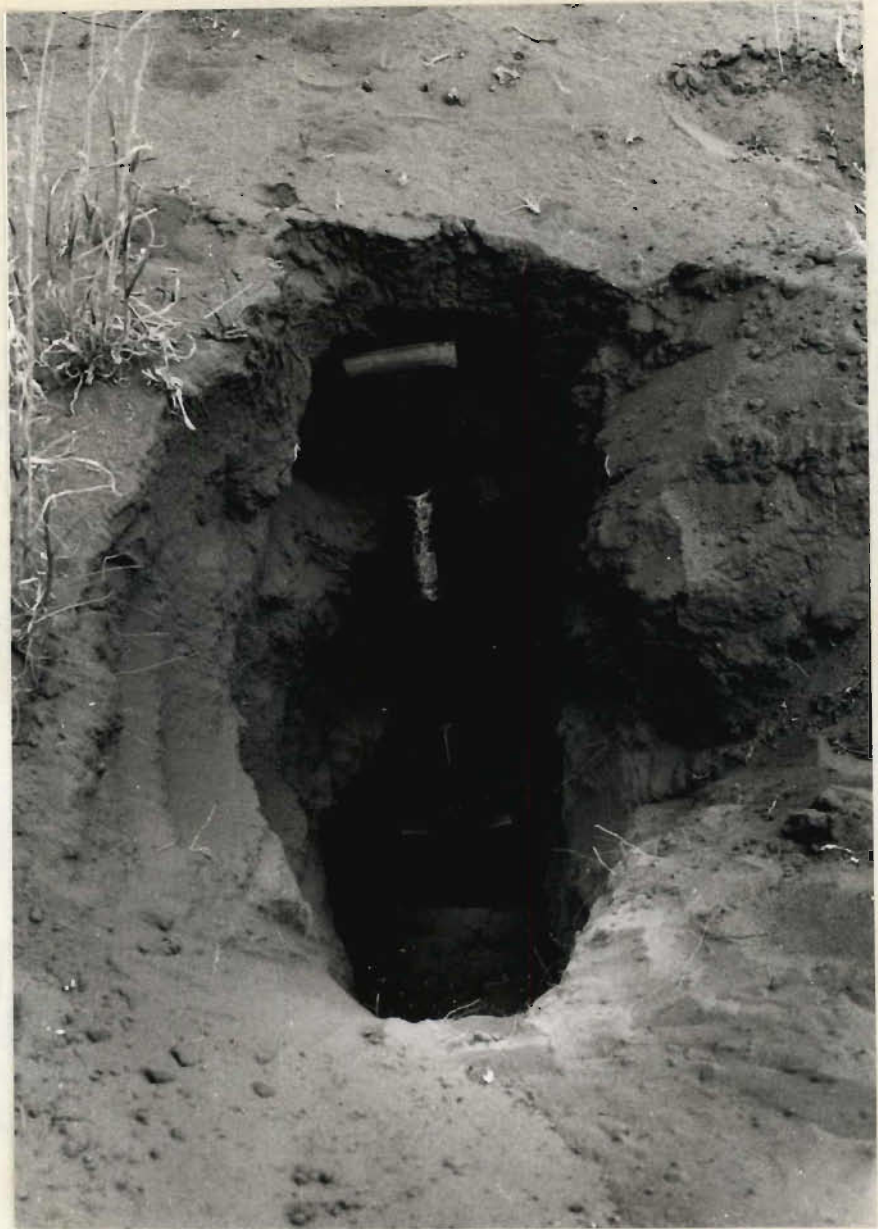


Plate 2.2. Excavated burrow of Opisthophthalmus wahlbergi to show extent of excavation required to reach bottom of burrow one metre below surface. This was the deepest burrow dug out during the survey and it was located in Kalahari sand west of Mata Mata.

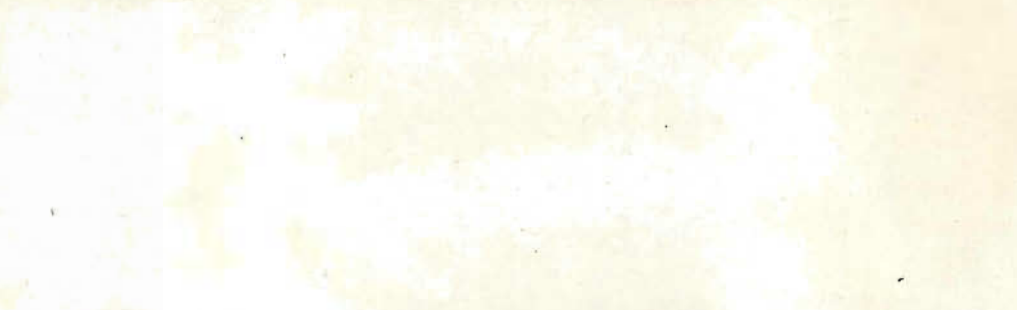


Plate 2.3. Entance to burrow of Opisthophthalmus holmi on slanting side of sand dune shown in plate 2.4.

Plate 2.4. Vegetation type 3, Southern Namib. Northern region. Habitat of Opisthophthalmus holmi showing tufts of Stipagrostis sabulicola on small dunes in one of the valleys between the large dunes near Suidrivier, 10 km west of Gobabeb, Namib Desert Park. The large dune in the background is partly misted over by incoming Namib fog.



Plate 2.19. Vegetation type 4, Semi-desert and Savanna Transition. East of the Brandberg Mountains seen in the distant background.

Plate 2.20. Vegetation type 5, Mopane Savanna. Area N.W. of Sesfontein. Buthotus conspersus and Lisposoma elegans were found among the rocks seen in the foreground and centre left area of this photograph.



Plate 2.5. Excavated burrow of Opisthophthalmus adustus on farm Kubub 15, south of Aus. The white string shows the path followed by the burrow. The entrance to the burrow was at the end of the string near the match box, the bottom (50 cm below surface) at the other end.

Plate 2.6. Vegetation type 3A. Succulent Steppe, on farm Tsirub 13, 35 km S-W of Aus. Typical habitat of Opisthophthalmus adustus.

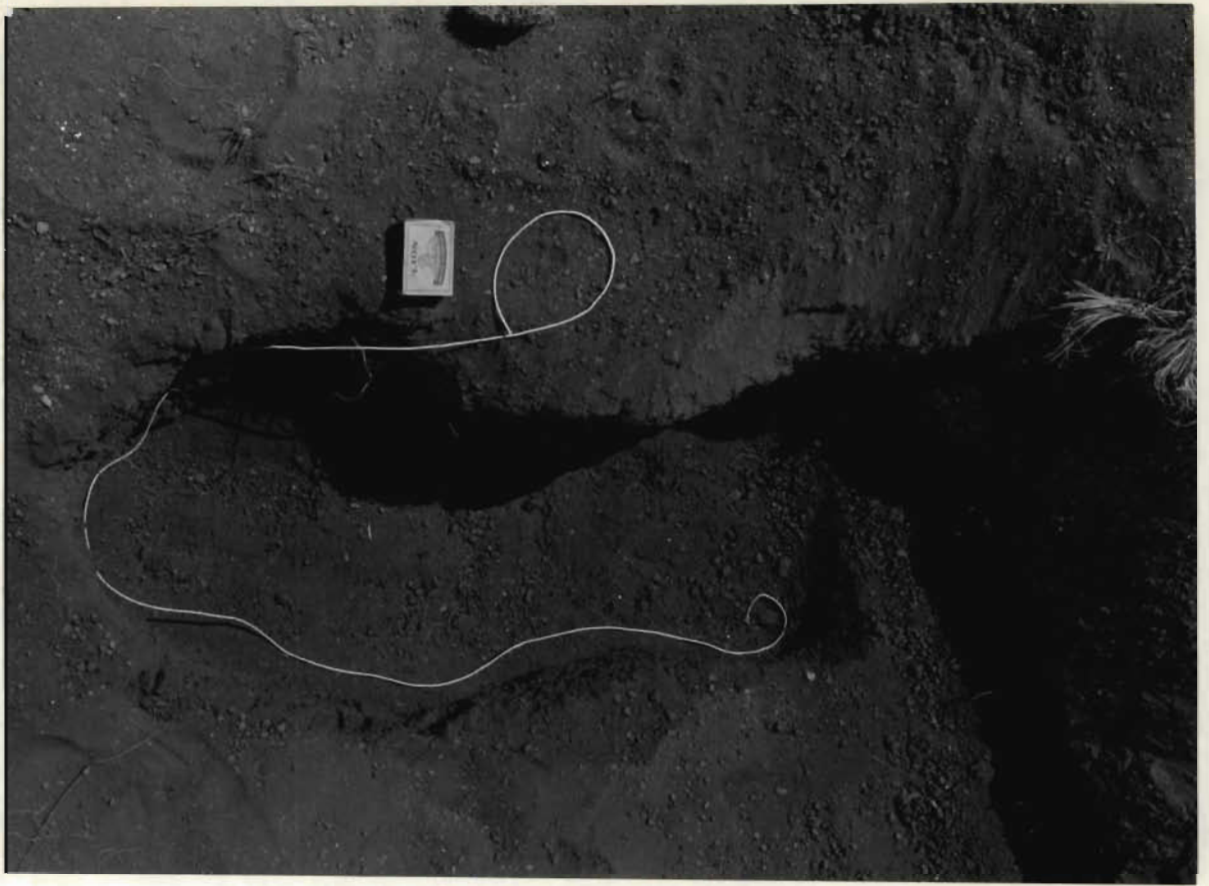


Plate 2.7. Crevice in a large boulder showing typical habitat of lithoclasticolous species such as those of Hadogenes. This boulder was situated in area shown in plate 2.8.

Plate 2.8. Bruckaros gorge, on southern side of Bruckaros extinct volcano. This impressive mountain is situated north of Berseba which falls within vegetation type 9.

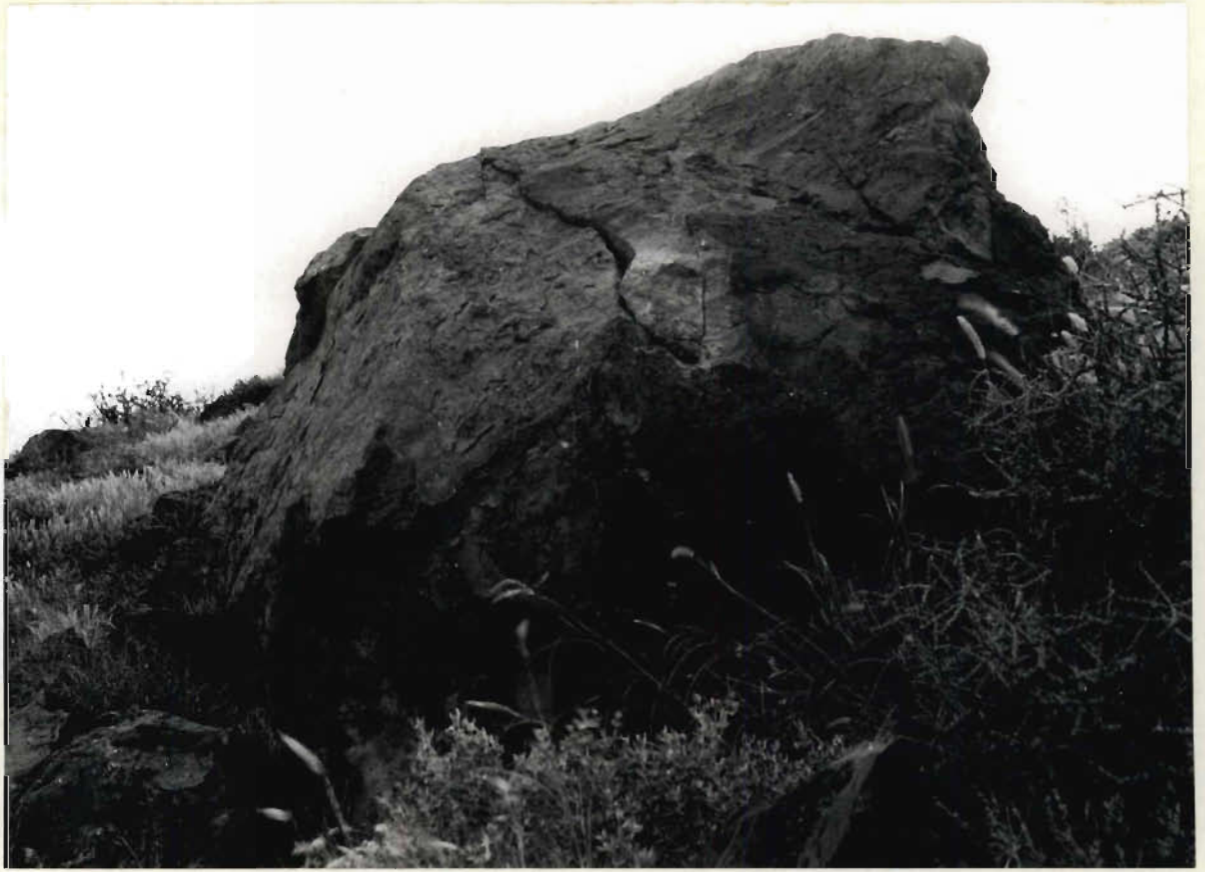


Plate 2.9. Vegetation type 1, Northern Namib. Showing high white sand dune in the right background with bushes of Acanthosicyos horrida and small dunes on gravel plains elsewhere. Area shown is 8 km N.E. of Möwebaai, Skeleton Coast.

Plate 2.10. Vegetation type 1, Northern Namib. Unjab River, banks and portion of river bed (upper left), 2 km inland from river mouth. Banks show typical habitat of Uroplectes terretipes. Skeleton Coast.



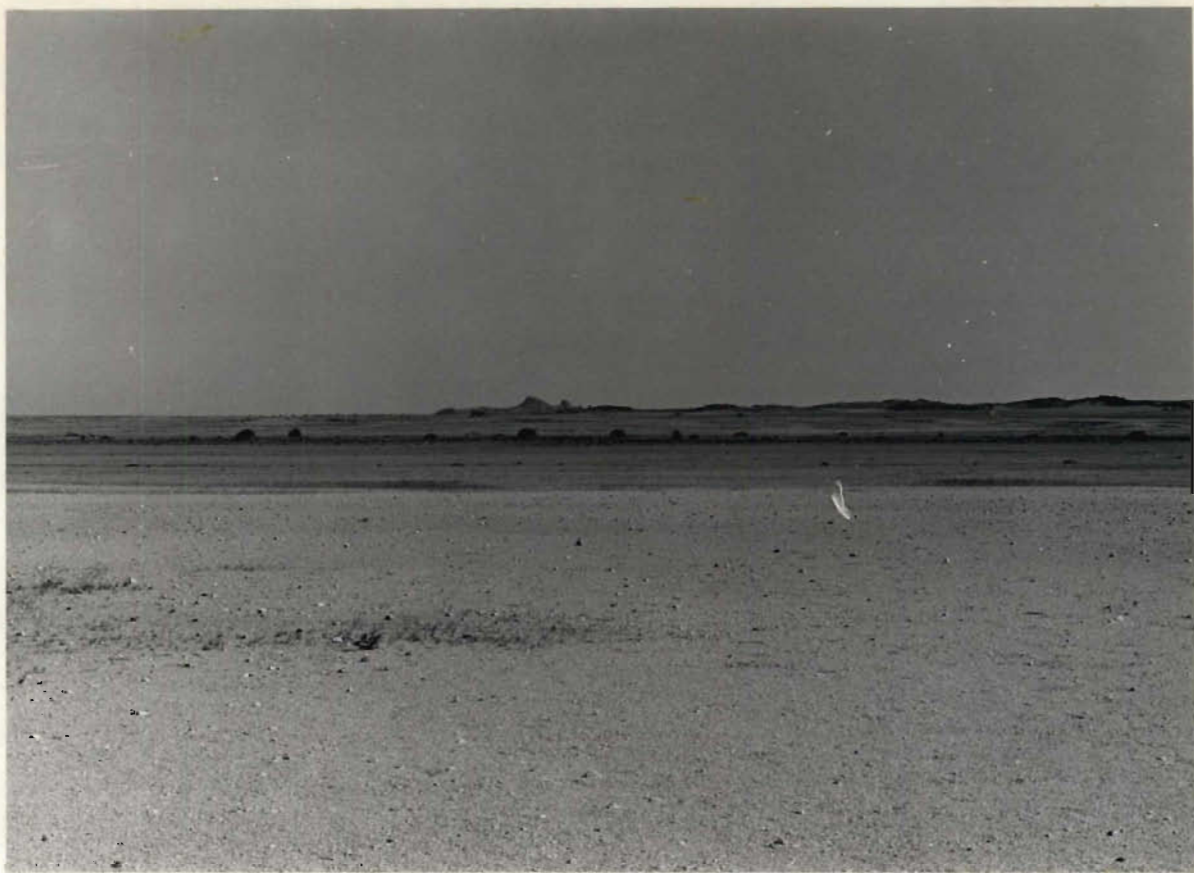
Plate 2.11. Vegetation type 2, Central Namib. North-western region. Showing coastal strip north of Cape Cross of small dunes (less than 90 cm high, 2-3 metres in diameter) covered with perennial small shrubs belonging to the genus Trianthea. Typical habitat of Parabuthus stridulus.

Plate 2.12. Vegetation type 2, Central Namib. Same area as in plate 2.11, showing small sand dunes on gravel plain and their greatly reduced distribution 1 km inland from the coast. Typical habitat of Uroplectes pilosus.



Plate 2.13. Vegetation type 2, Central Namib. South-eastern region. Gravel plains near Zebra Pan, in Namib Desert Park.

Plate 2.14. Vegetation type 2, Central Namib. South-eastern region. Rocky outcrops in gravel plain near Zebra Pan in Namib Desert Park.






Plate 2.15. Marginal zone between vegetation types 2, Central Namib and 3, Southern Namib. Looking north. The beginning of the sand dune system of the southern Namib is seen in the foreground. The Kuiseb river bed and banks with numerous Acacia sp. trees runs across the centre and the beginning of the Central Namib gravel plains is seen beyond that. Area near Homeb.

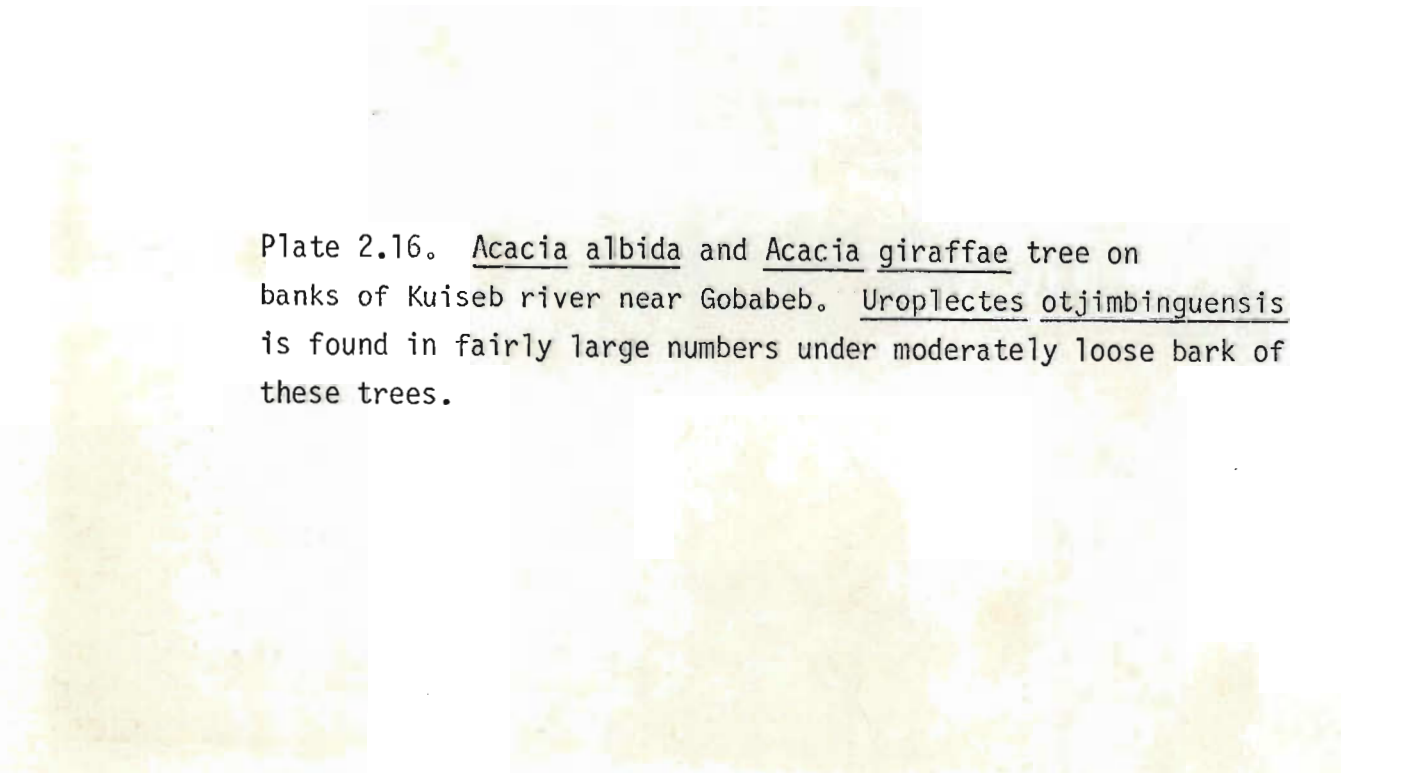


Plate 2.16. Acacia albida and Acacia giraffae tree on banks of Kuiseb river near Gobabeb. Uroplectes otjimbinguensis is found in fairly large numbers under moderately loose bark of these trees.



Plate 2.17. Marginal zone between vegetation types 3, Southern Namib and 3A, Desert and Succulent Steppe. Looking South. The beginning of the high sand dunes system of the Southern Namib is seen in foreground. The Koichab river bed and banks with numerous Acacia sp. trees runs across the upper centre and the beginning of the Desert and Succulent Steppe is seen beyond that. Area photographed is approximately 65 km NN-W of Aus.

Plate 2.18. Same area as in plate 2.17. Looking north from Koichab river bank at beginning of the high sand dunes system of the Southern Namib. Large number of Opisthophthalmus holmi were found near the base of Stipagrostis sabulicola tufts seen here.



Plate 2.21. A change in vegetation within an area that belongs to vegetation type 5, Mopane Savanna, is found in the valley seen here, situated on farms Vrede and Bethanis in Damaraland. Very few Mopane trees are found here, the lower half of the distant hills is covered with sand and shifting dunes are found in various parts of the valley. This valley is the type locality of Opisthophthalmus jenseni. Various faunal components endemic to the Northern and Central Namib are found in this valley which appears to be isolated from these regions.

Plate 2.22. Vegetation type 8, Highland Savanna. Broken terrain in the Khomas Hochland on farm Bergkranz.



Plate 2.23. Vegetation type 8, Highland Savanna, Broken landscape 5 km west of Rehoboth.

Plate 2.24. Vegetation type 9, Dwarf Shrub Savanna. On sandy substratum 8 km south of Berseba. The mountain in the distance is Bruckaros.



Plate 2.25. Vegetation type 9, Dwarf Shrub Savanna. On rocky substratum, east of the Karasberg mountains.

Plate 2.26. Vegetation type 12, Central Kalahari. On Kalahari sand, north of Leonardville.

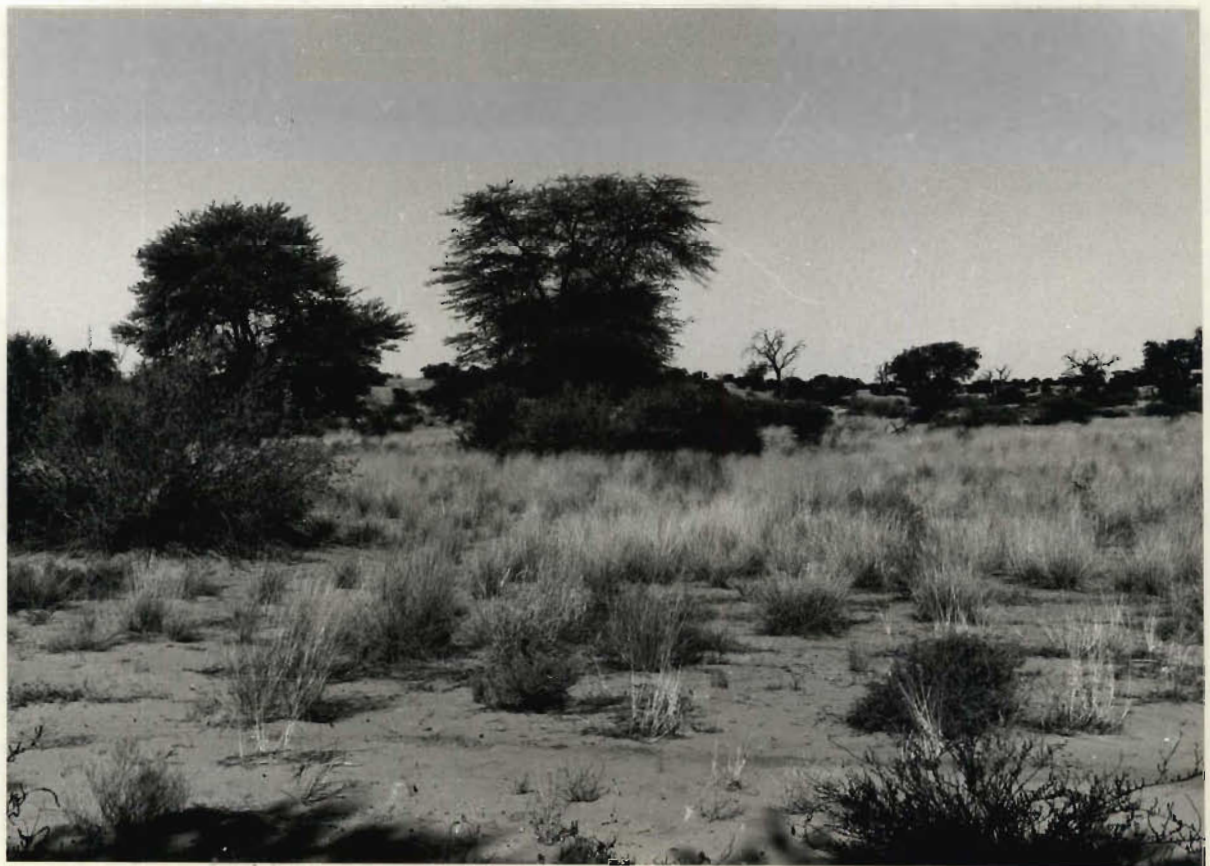


Plate 2.27. Vegetation type 13, Southern Kalahari. On Kalahari sand, west of Mata Mata.

Plate 2.28. Vegetation type 13, Southern Kalahari. Auob river west of Mata Mata, showing transition from river bed in foreground to calcrete banks in upper middle and Kalahari sand dunes in the background.



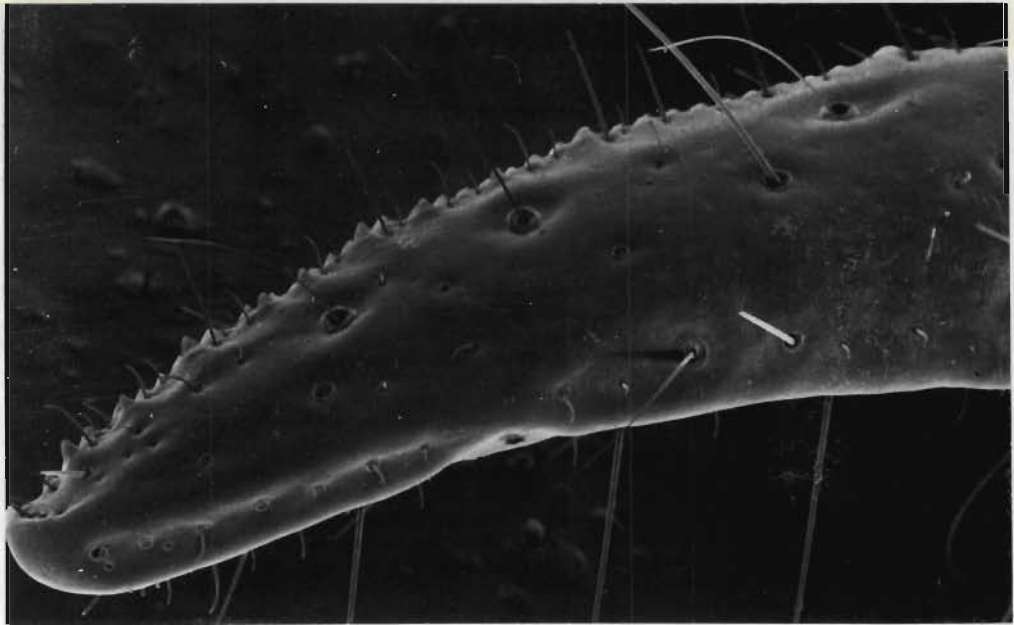


Plate 3.1. S.E.M. of outer aspect of fixed finger of right pedipalp chela of Opisthophthalmus n. sp. C., showing trichobothria et, est, esb (back row), dst, dsb (centre right) and general setation. The dorsal ridge of the fixed finger faces downward (50X).

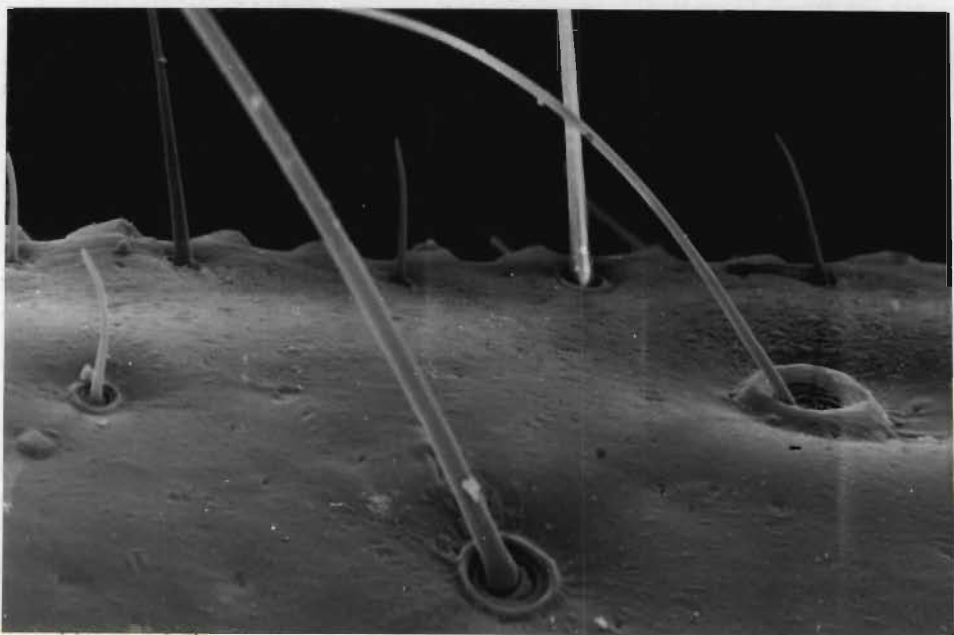


Plate 3.2. Enlarged S.E.M. of basal portion of fixed finger in plate 3.1. above, showing trichobothrium esb (middle right), a normal seta (centre foreground) and a microseta (middle left). The cutting edge of the finger appears as a transverse ridge in the background (150X).



Plate 3.3. S.E.M. of (left to right) trichobothria Et_5 , Et_4 and Et_3 showing size differences of the cup-like areola. Right hand of pedipalp chela of Opisthophthalmus n. sp. C (225X).



Plate 3.4. S.E.M. of a trichobothrium (left) and a normal seta seen from above and clearly showing the striking differences of shaft insertion, shape of cup-like areolae and the inner honeycomb lining, only observed in trichobothrium areolae (275X).

Plate 3.5. Dorsal aspect of distal four segments of right leg I of Parabuthus stridulus showing sweep-like rows of long stiff setae on anterior and posterior edges of tibia, protarsus and tarsus and the long ungues, all indicating a psammophile habit.

Plate 3.6. Posterior aspect of tibia (distal part), protarsus and tarsus of left leg IV of Parabuthus stridulus, showing tibial and pedal spurs. The long ungues and pads of numerous long setae on the ventral side of the tarsus, and to a lesser extent the protarsus, indicate a psammophile habit.

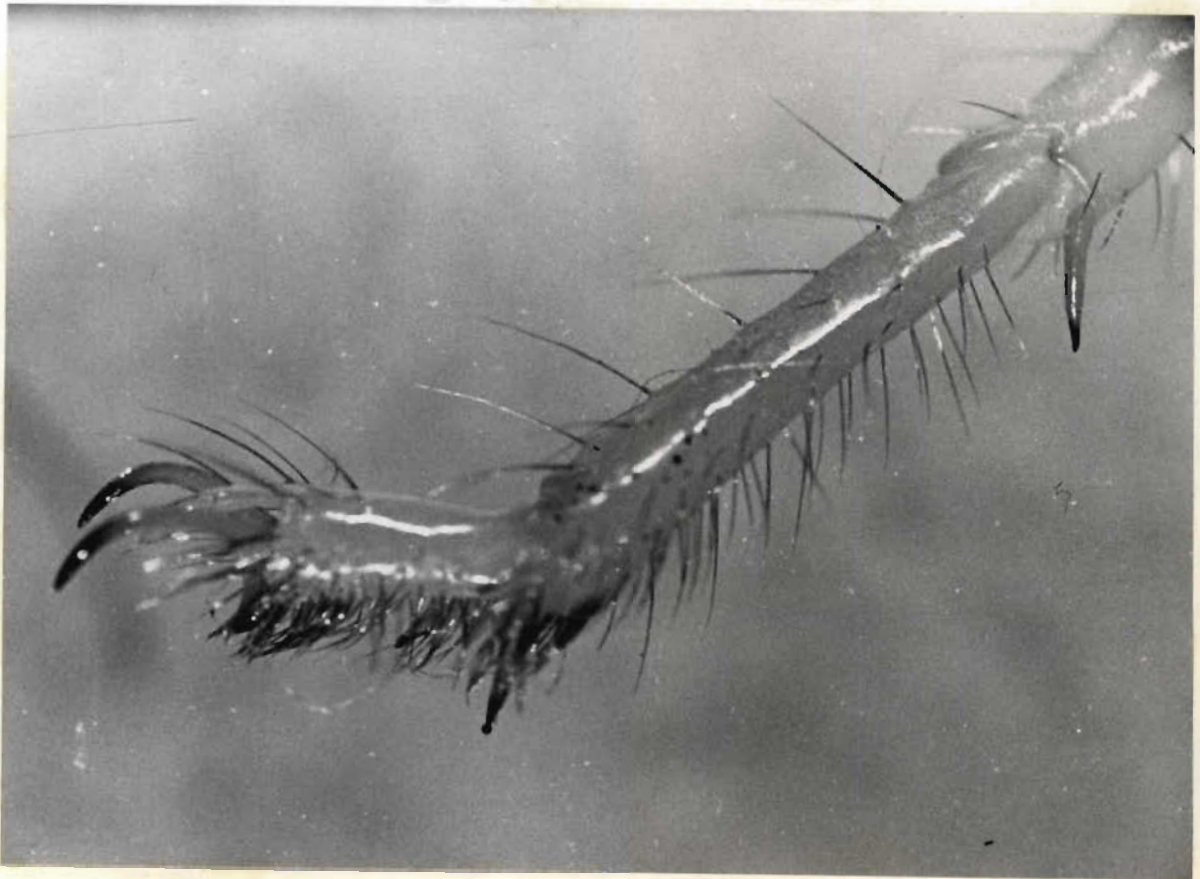
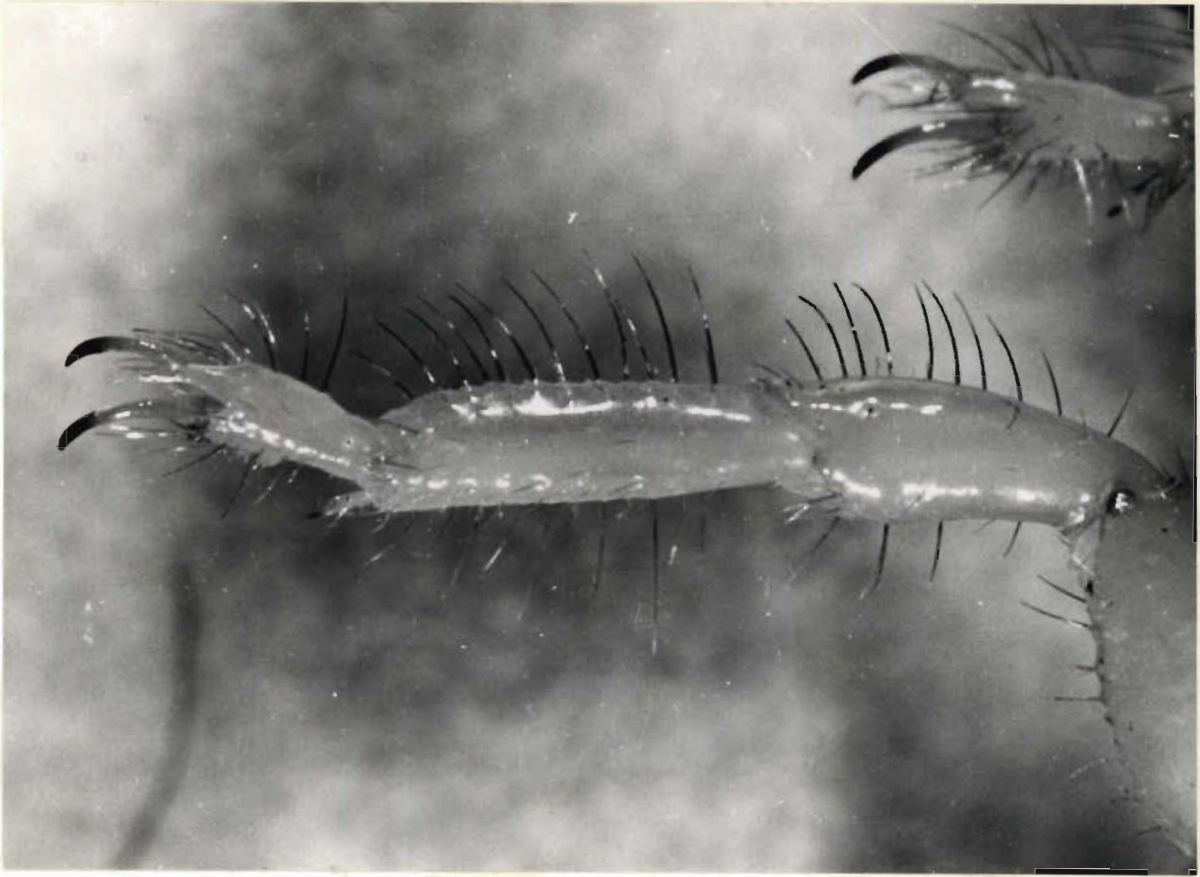




Plate 3.7. S.E.M. of median region, ventral aspect of right hemispermaphore of Opisthophthalmus n.sp. C, showing the structures illustrated in fig. 3.4 for O. carinatus (70X).

Plate 4.1. Buthotus arenaceus (Purcell), largest ♀
from Schwarzkuppen farm, (N.M. 10372). 4X actual size.

a, dorsal

b. ventral

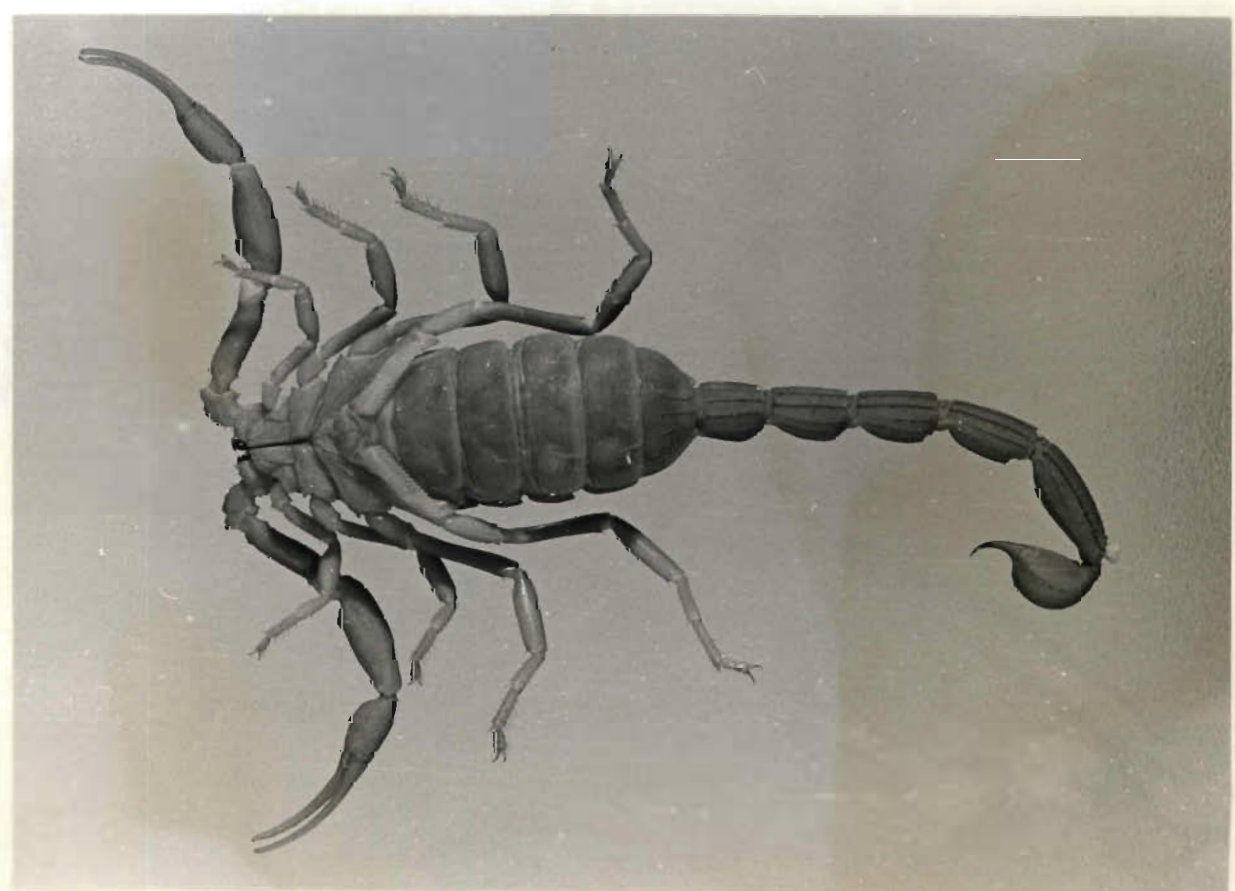
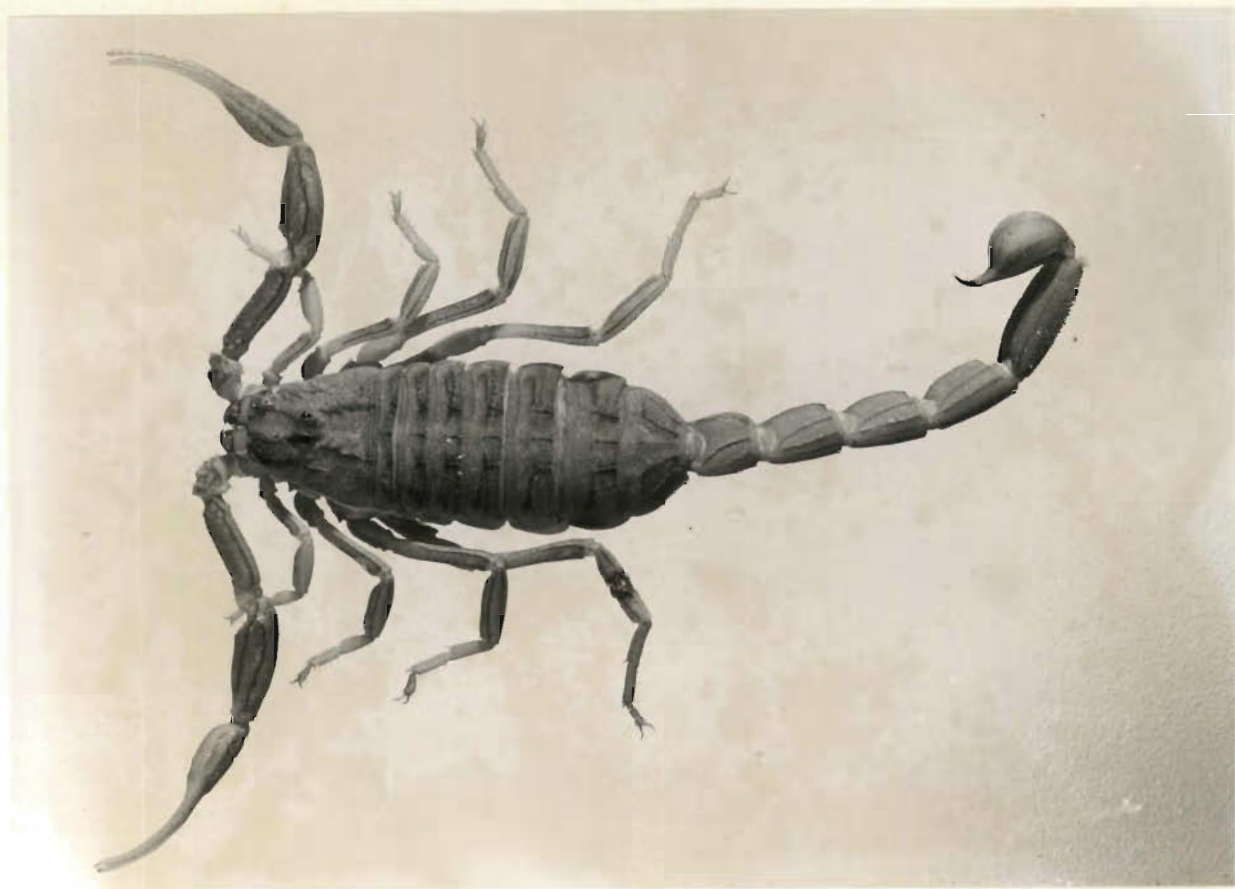


Plate 4.2. Buthotus conspersus (Thorell), ♀ holotype
from Brandberg Mountains (N.M. 9045) with 14 teeth on
pectine. 3X actual size.

a, dorsal

b. ventral




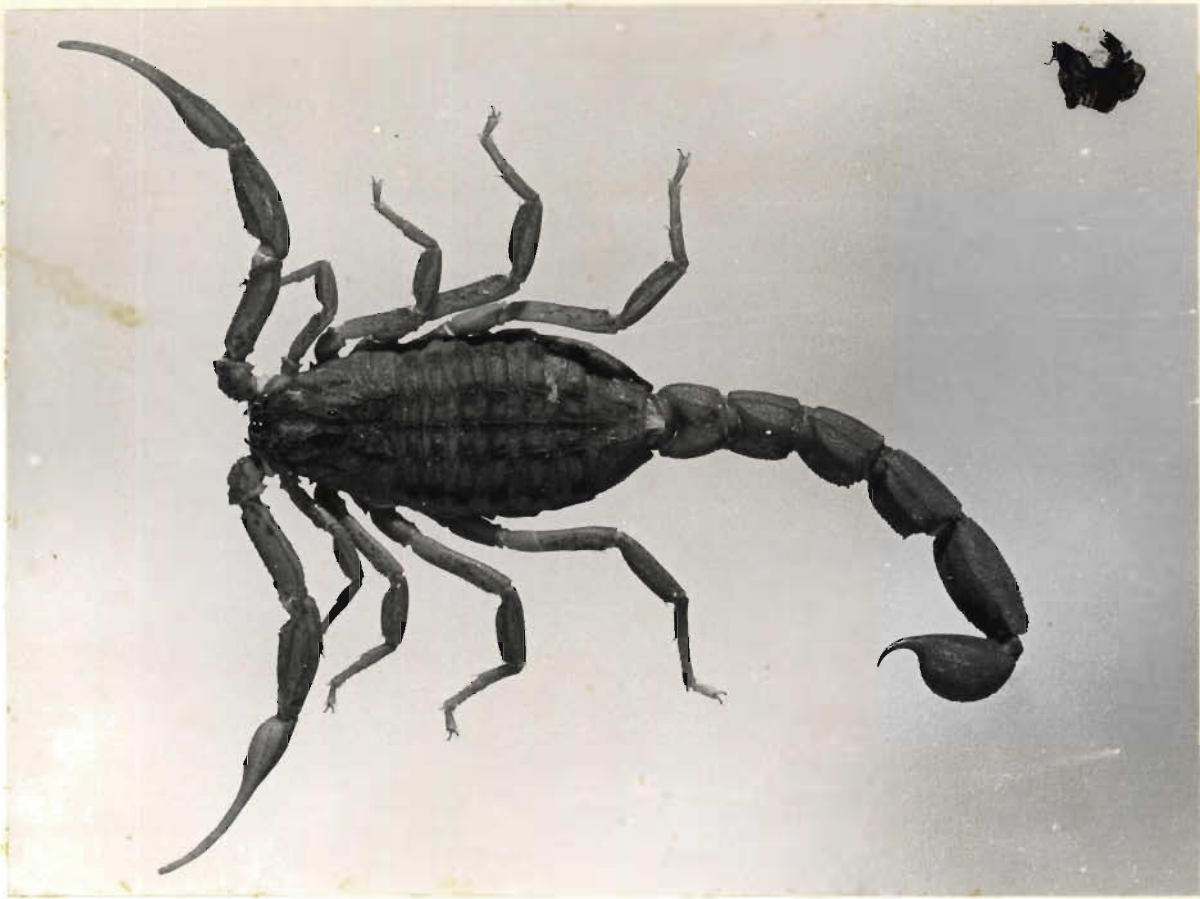


Plate 4.3. Buthotus conspersus (Thorell),
♀ from Kaoko Otavi (S.M. N203) with 18
teeth on pectine. 2,5X actual size.

a, dorsal

b, ventral





a



b

Plate 4.4. Buthotus conspersus (Thorell), ♀ from Kaoko Otavi (S.M. N 203). a ventral view showing scattered fine granulations of sternites; b, ventral aspect of cauda IV, V and telson showing coarse granulation on all 3 segments. 6,5X actual size.

Plate 4.5. Karasbergia methueni Hewitt, ♂ from Tses
(N.M. 10566). Scale in mm.

a, dorsal

b, ventral

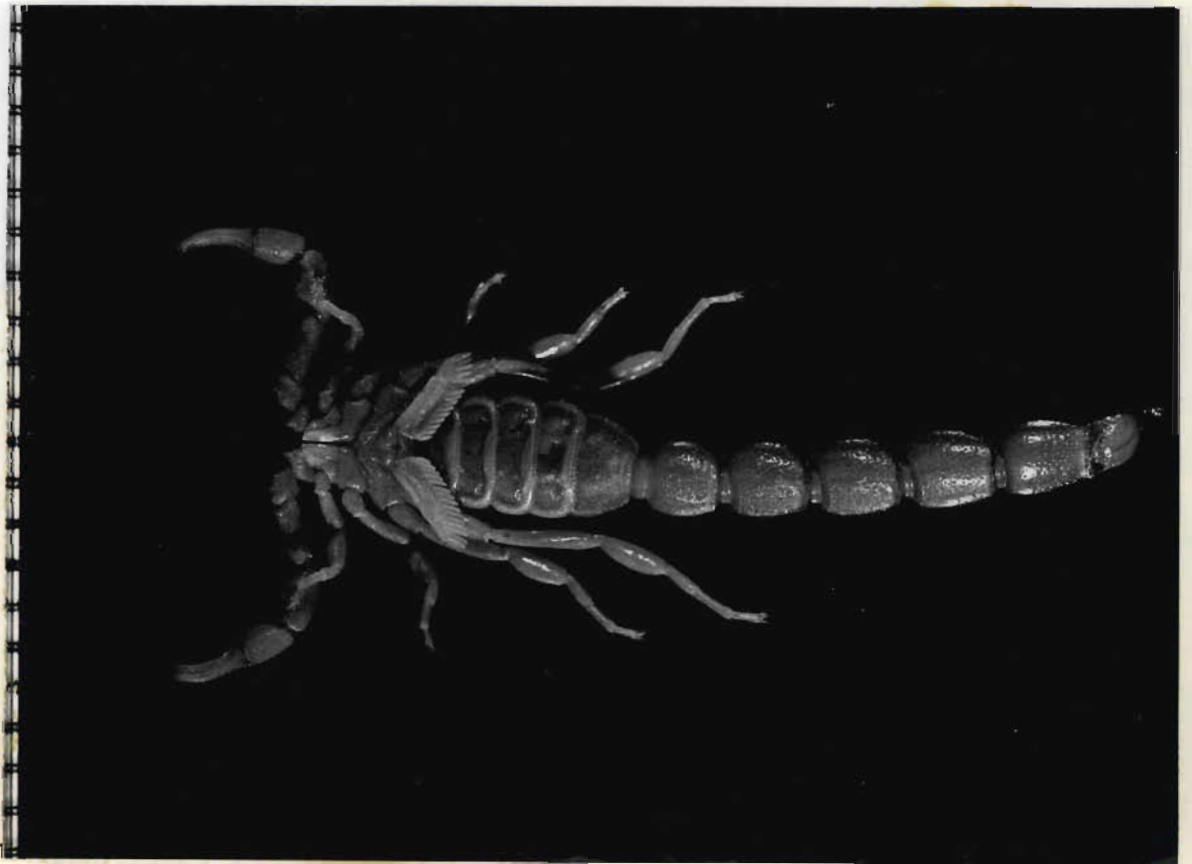
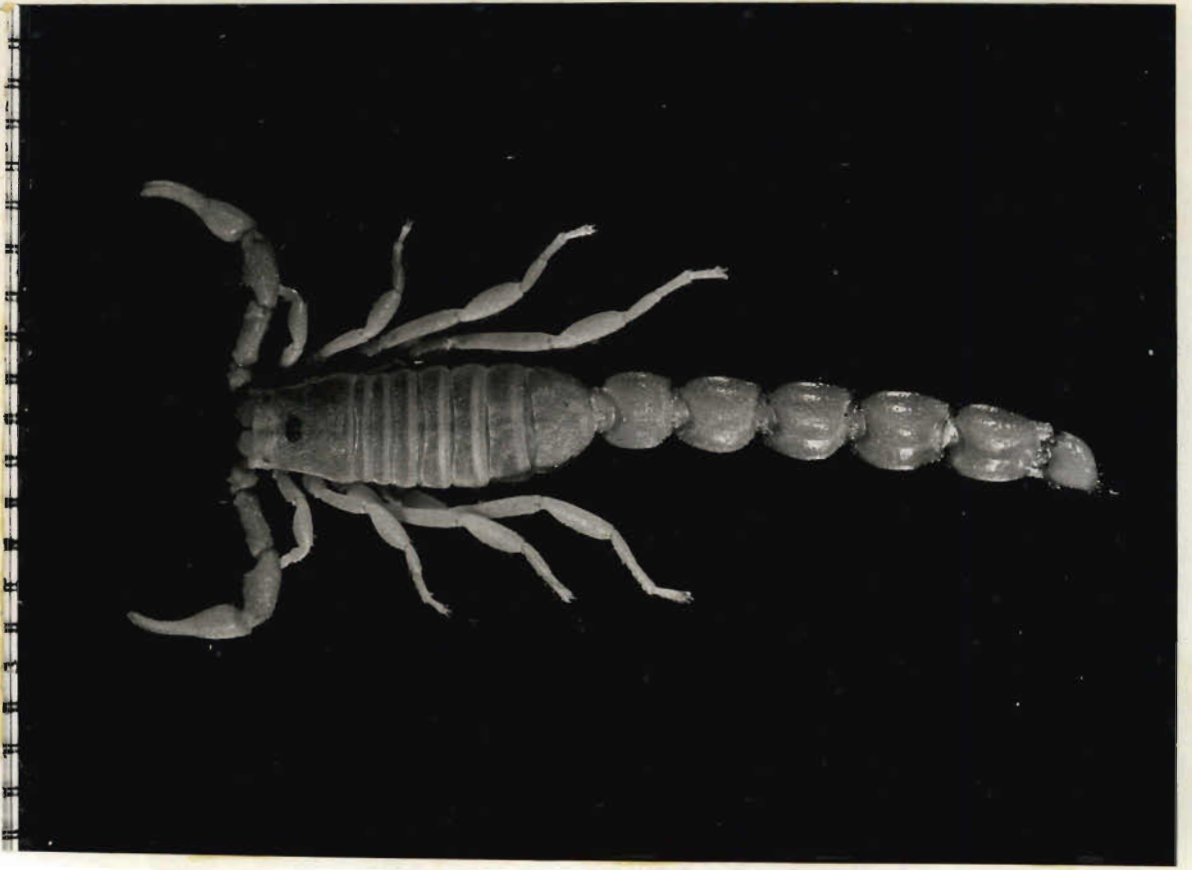




Plate 4.6. Dorsal aspect of Karasbergia methueni Hewitt from the Richtersveld showing unusually pilose cauda (N.M. 10919).
Scale in mm.

Plate 4.7. S.E.M. of areolas of trichobothria Eb₂ (lower right) and much smaller Eb₃ on right pedipalp hand of Karasbergia methueni (♂, N.M. 10566 from Tses). (900 X)

Plate 4.8. Same as plate 4.7. showing absence of Eb₃ which is replaced by a microseta, on right pedipalp hand of another ♂ specimen from the same locality. (900 X).

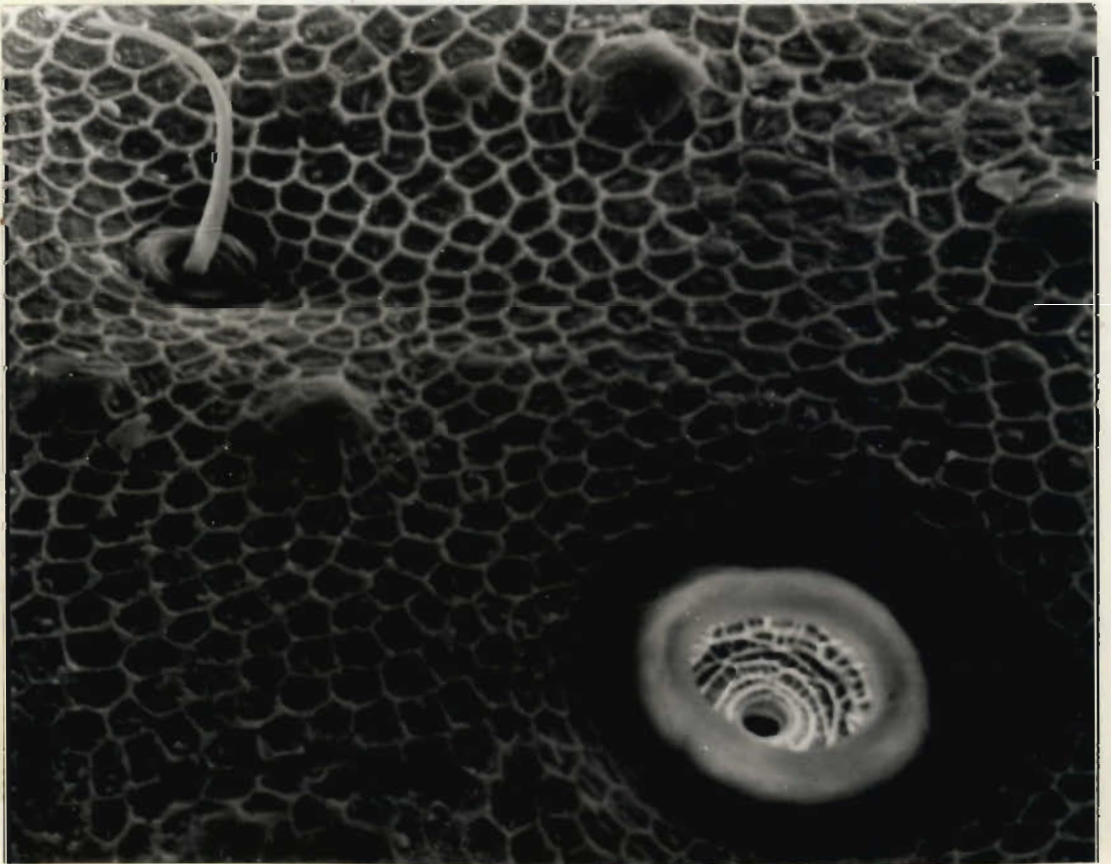
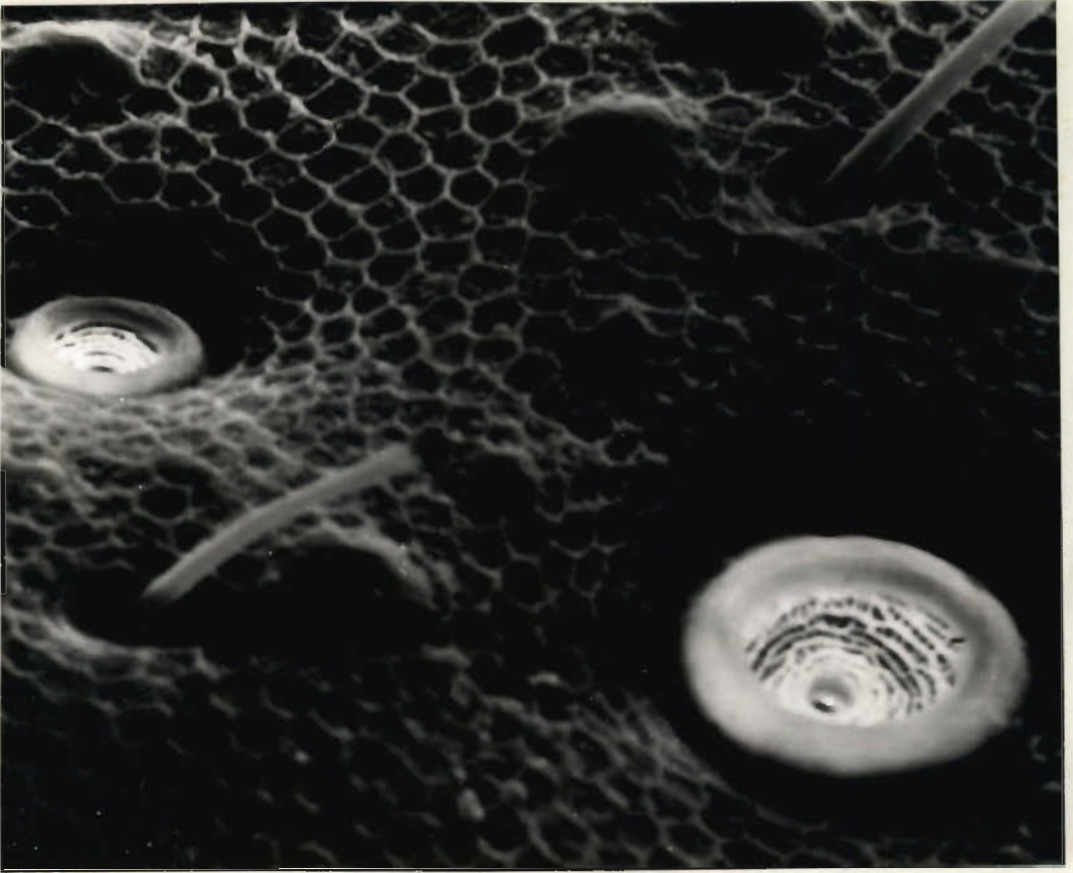


Plate 4.9. Parabuthus brevimanus (Thorell), ♀ homotype
(N.M. 10010). Scale in mm.

a, dorsal

b, ventral

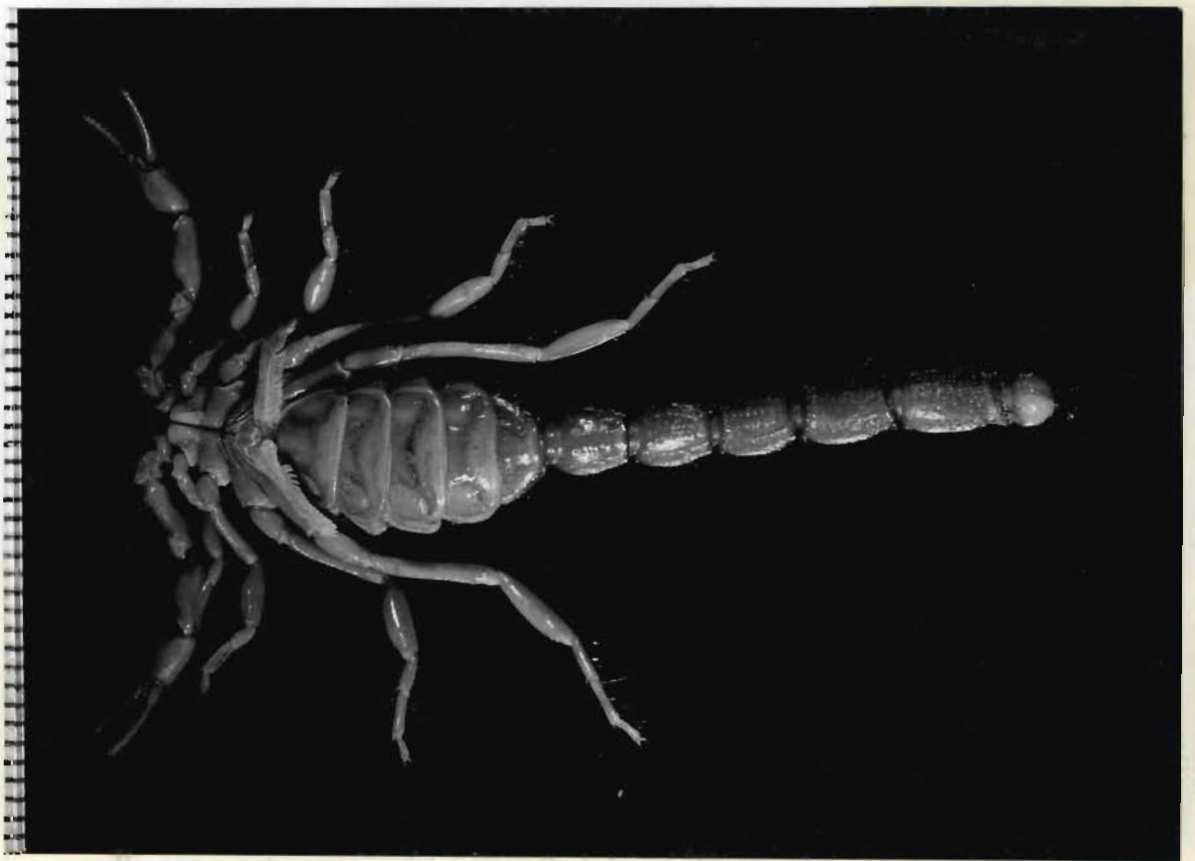
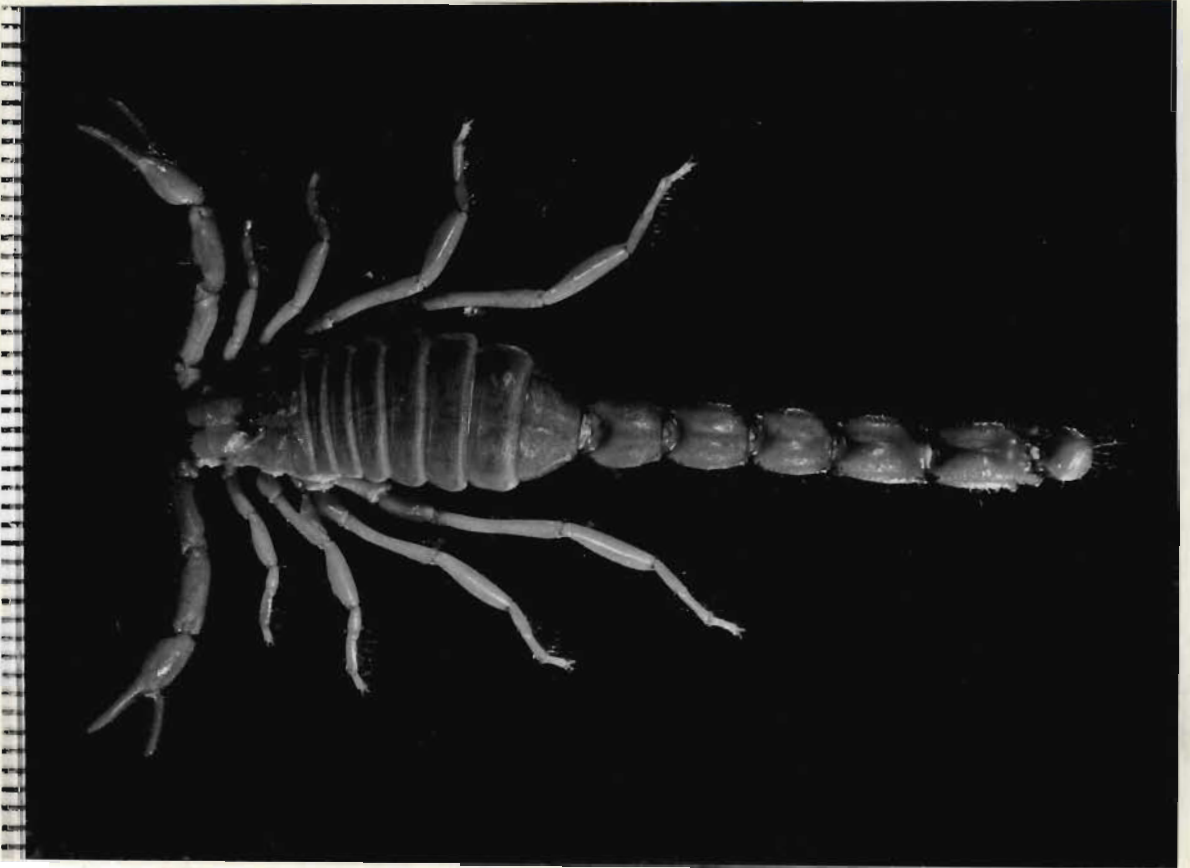


Plate 4.10. Parabuthus brevimanus (Thorell), ♂ (N.M. 10930).
Scale in mm.

a, dorsal

b. ventral

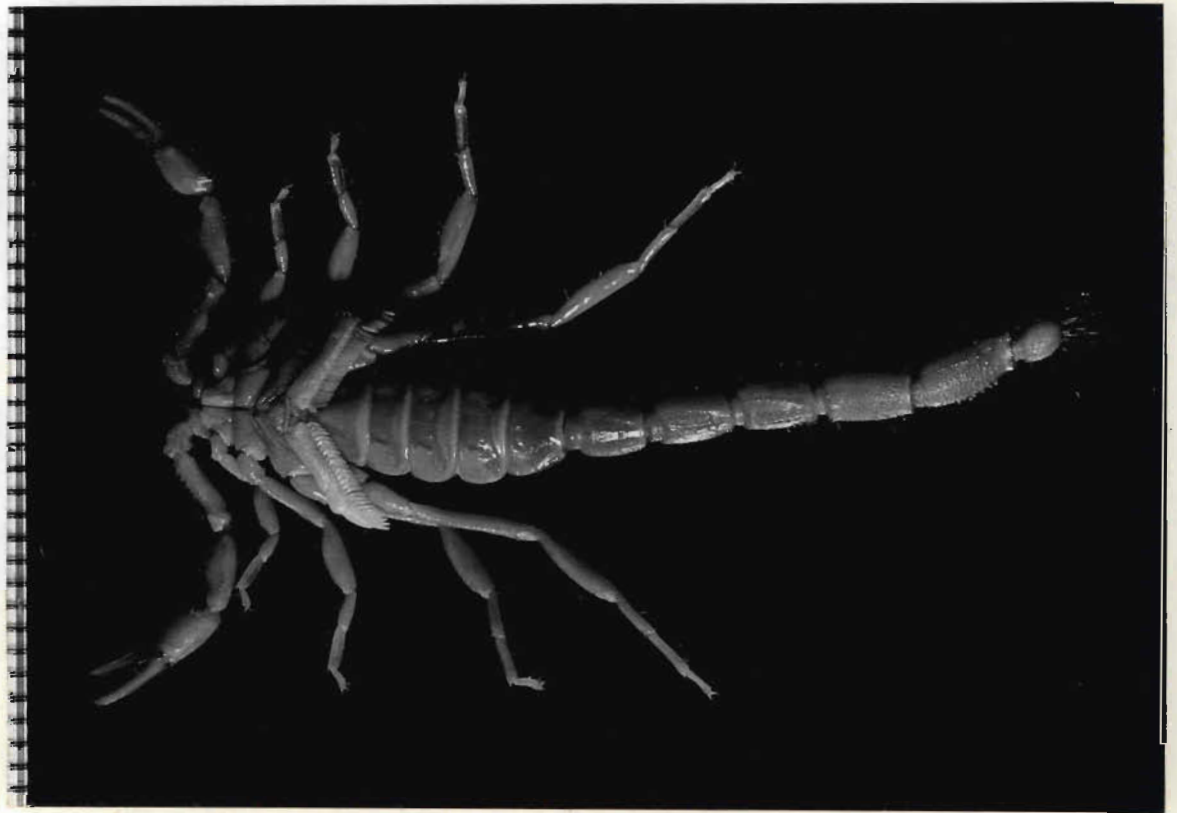
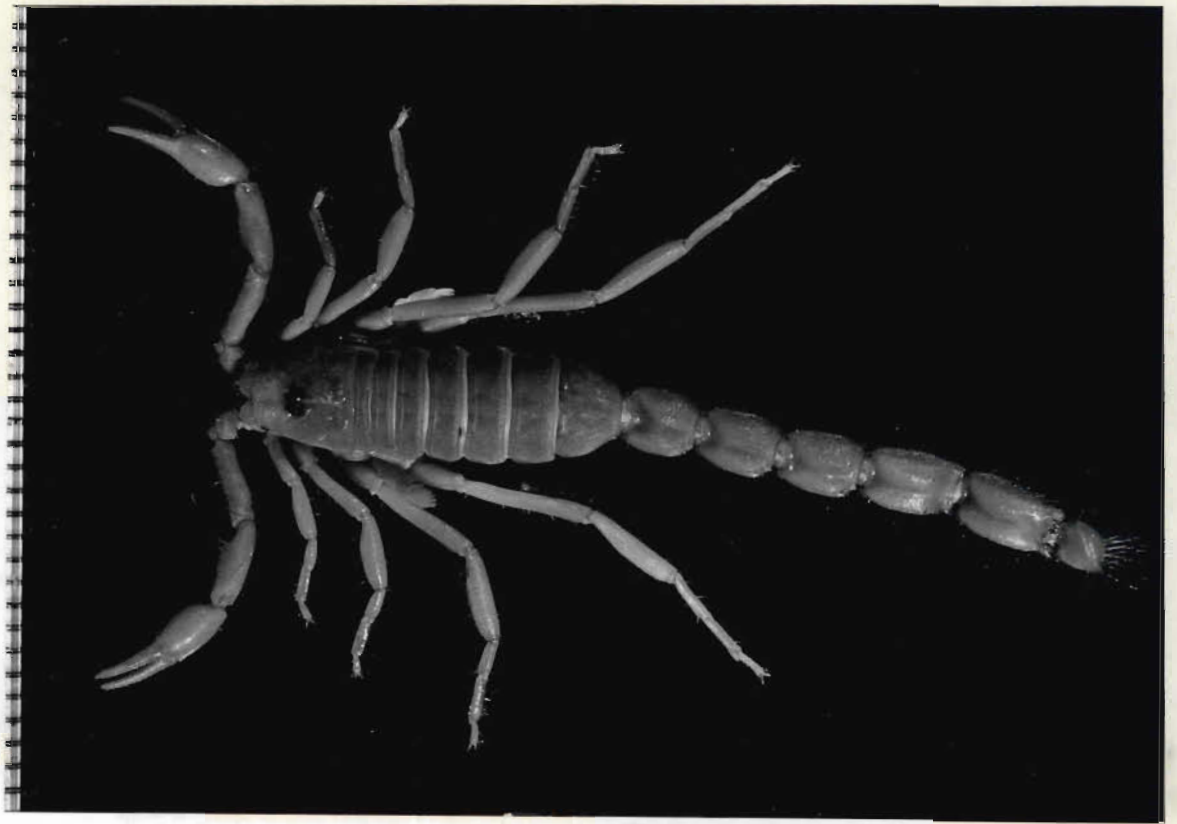


Plate 4.11. Parabuthus new species A ♀ holotype
(N.M. 10925). Scale in mm.

a, dorsal

b, ventral

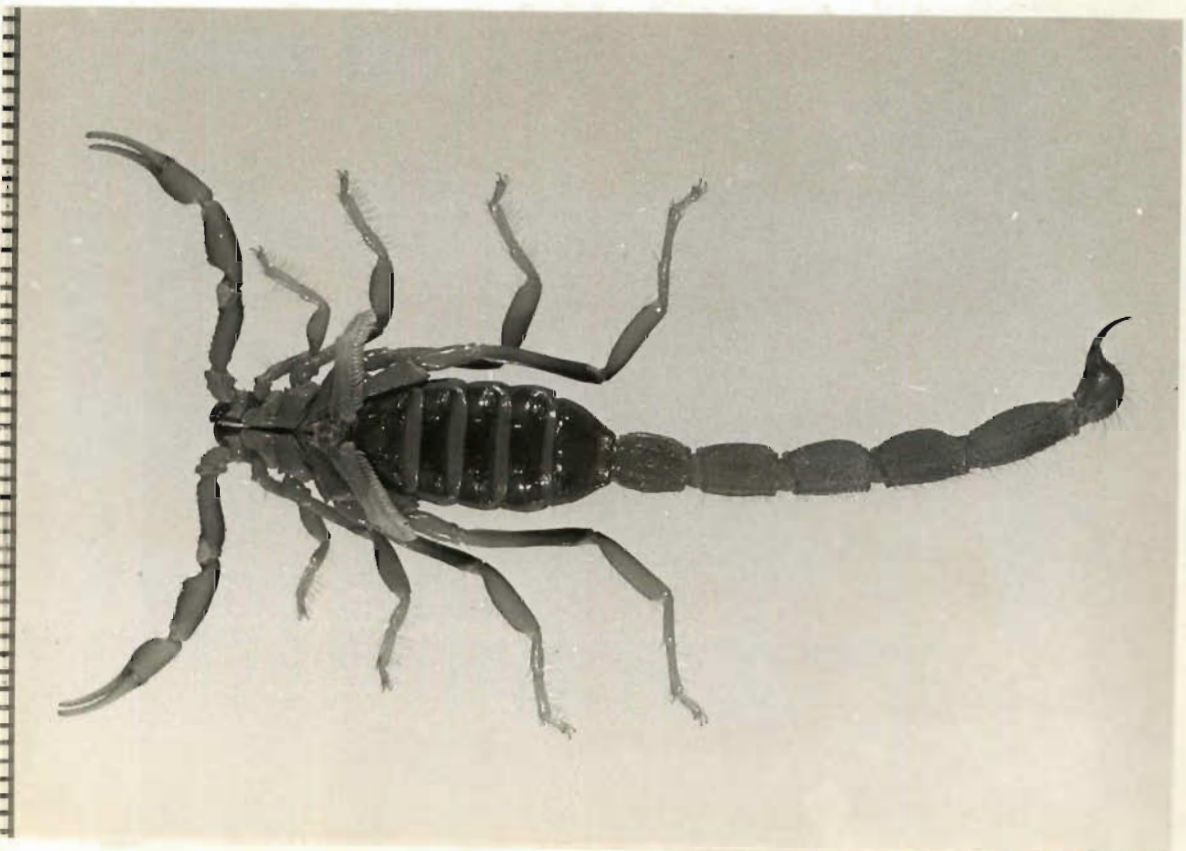
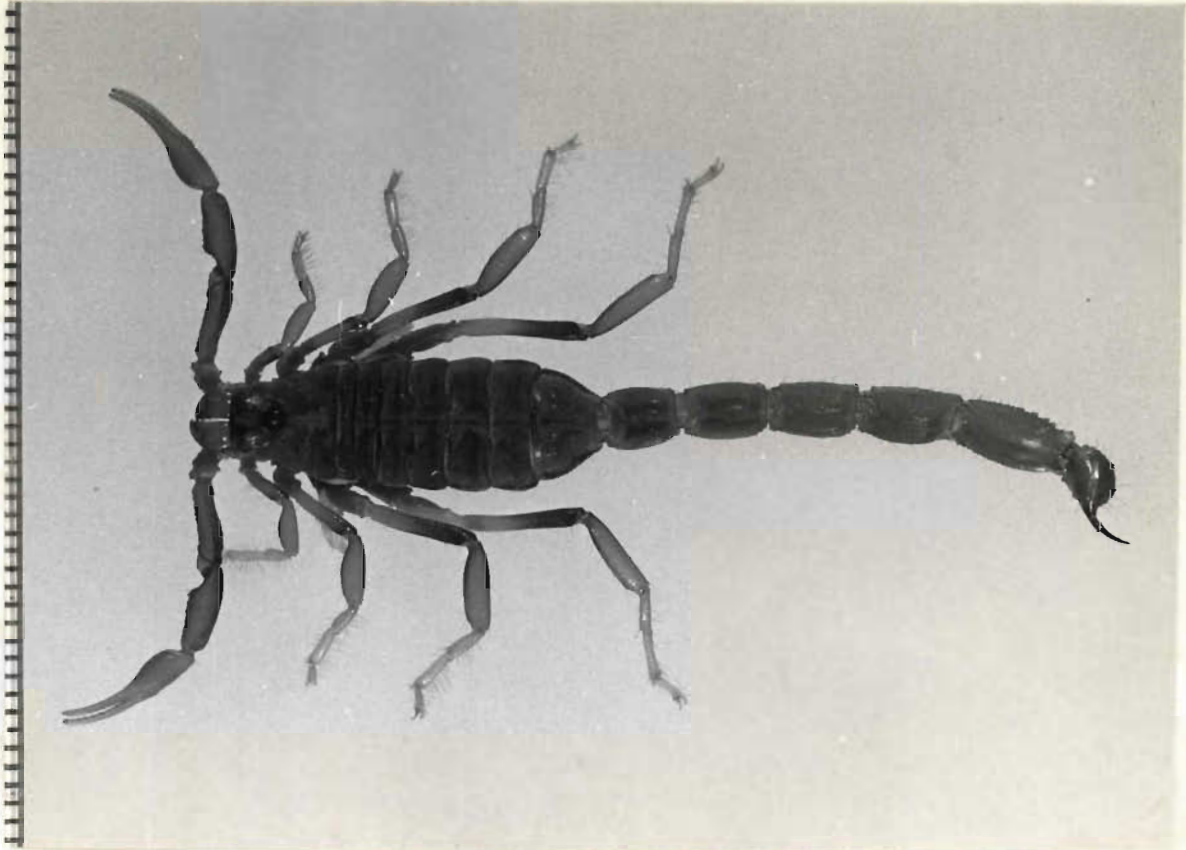


Plate 4.12. Parabuthus new species A, ♂ paratype
(N.M. 10906). Scale in mm.

a, dorsal

b, ventral

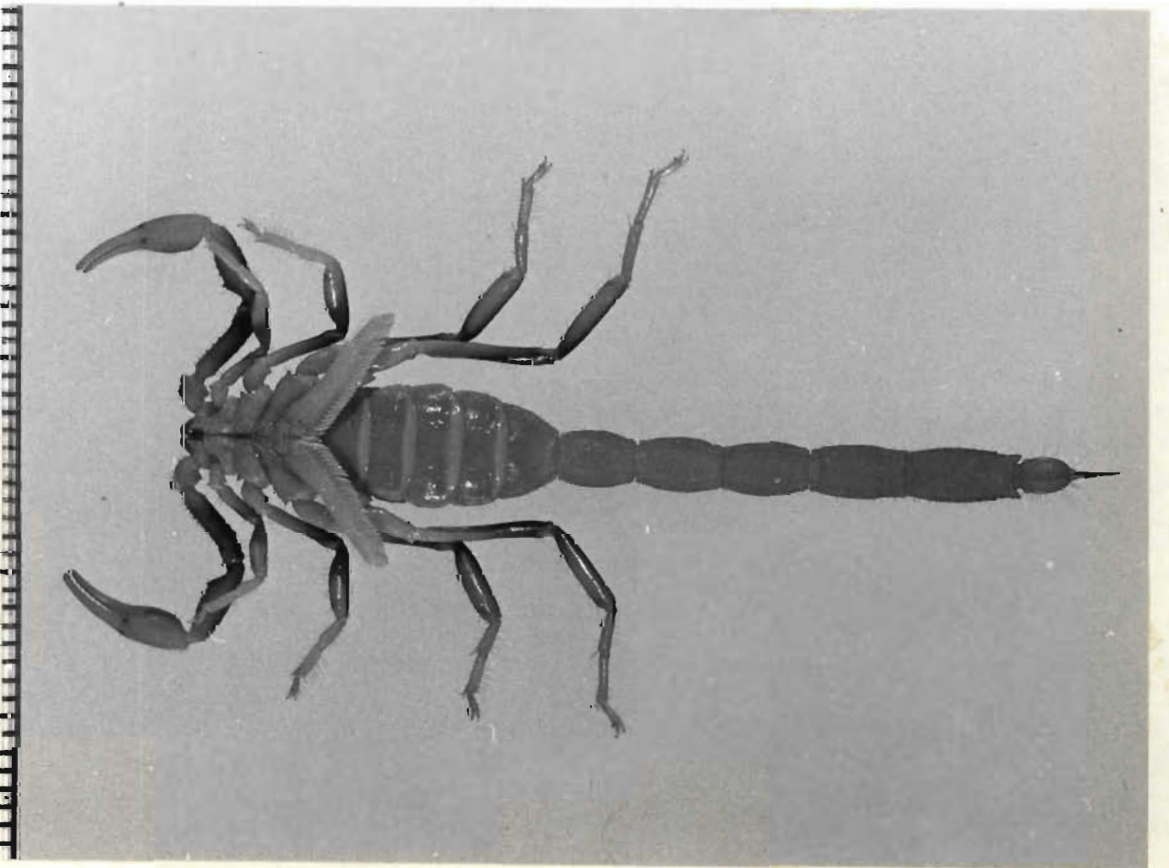
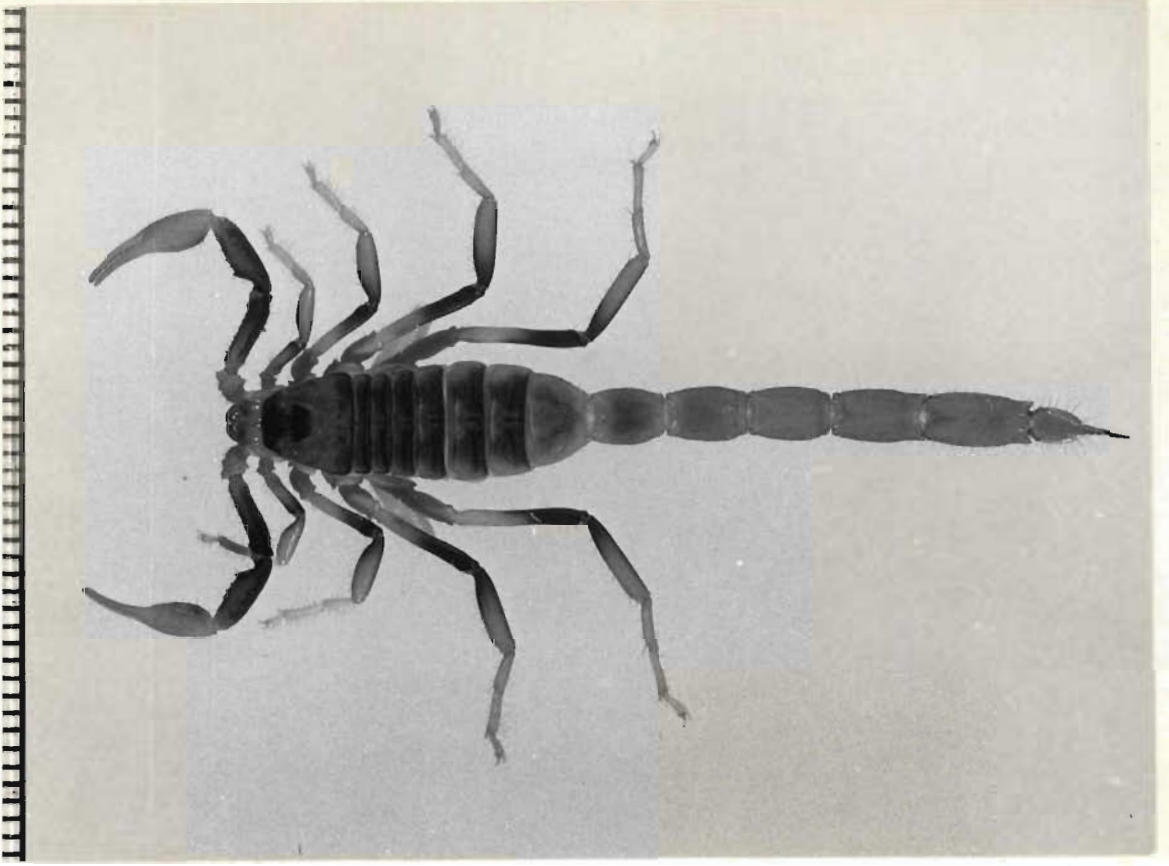
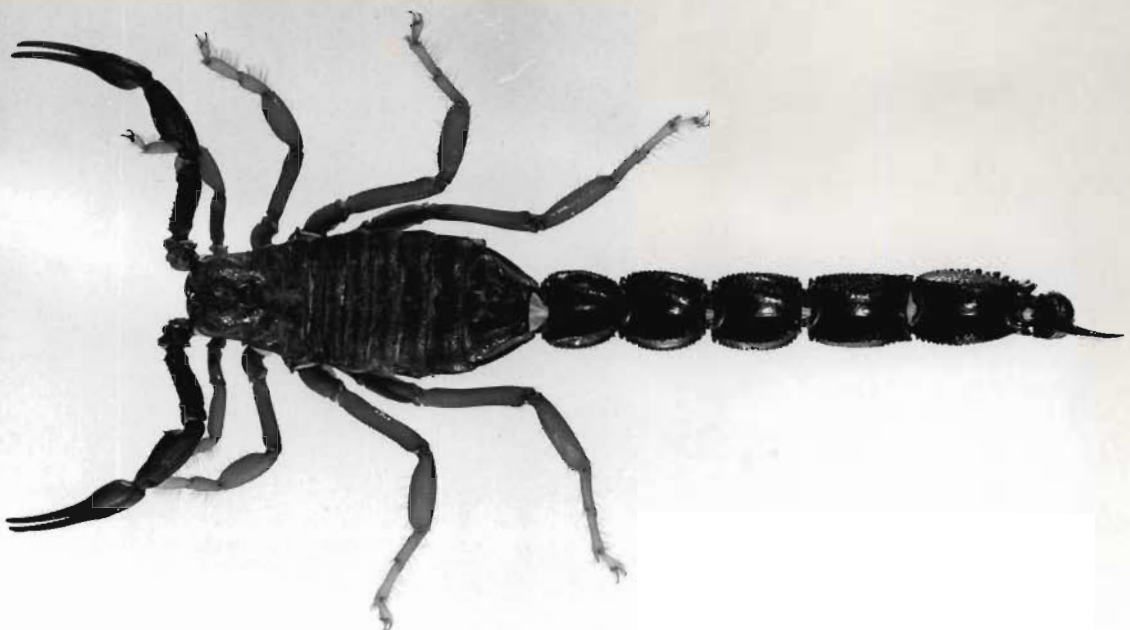


Plate 4.13. Parabuthus granulatus (H. & E.), ♀ from
Tses (N.M. 10513). Scale in mm.

a, dorsal

b, ventral

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000



10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

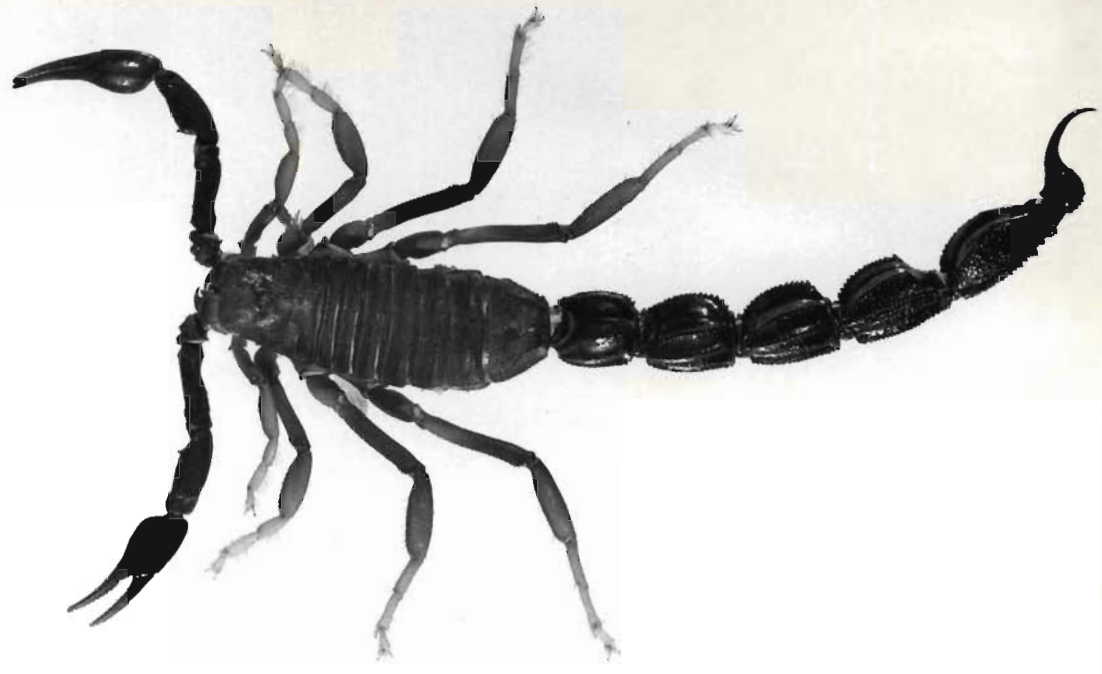


Plate 4.14. Parabuthus granulatus (H. & E.), ♂ from south of Berseba (N.M. 10731). Scale in mm.

a, dorsal

b, ventral

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Plate 4.15. Parabuthus kalaharicus Lamoral, ♂ holotype
(N.M. 10945). Scale in mm.

a, dorsal

b, ventral

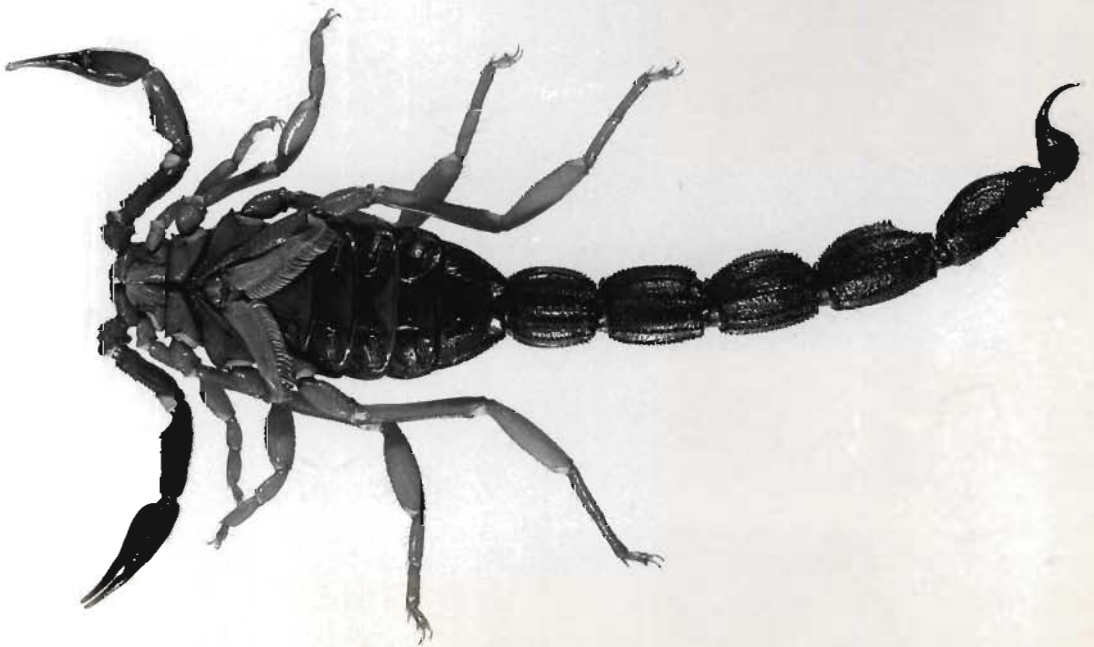


Plate 4.16. Parabuthus kalaharicus Lamoral, ♀ para-
type (N.M. 10946). Scale in mm.

a, dorsal

b, ventral

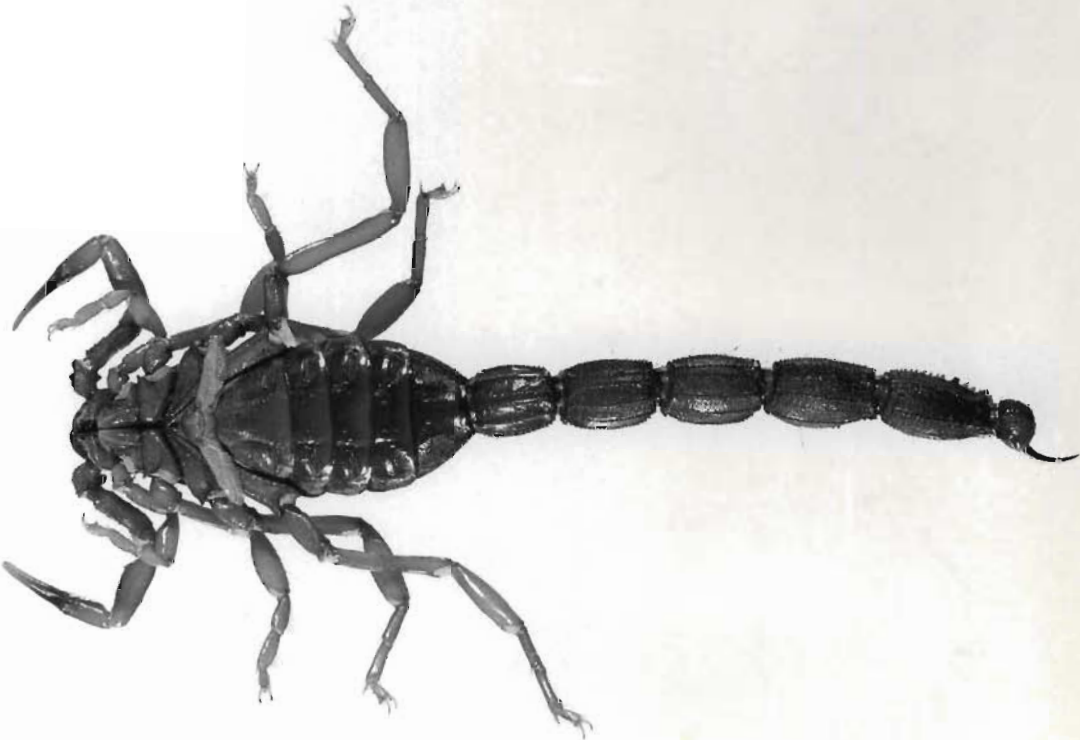
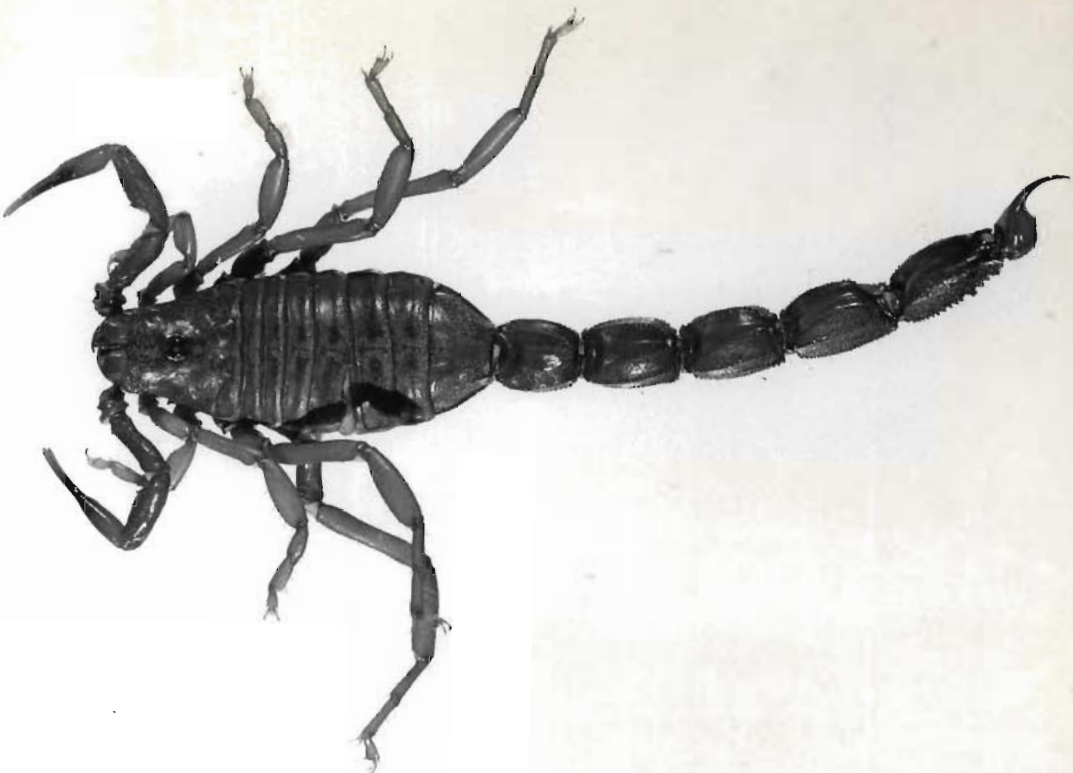


Plate 4.17. Parabuthus kraepelini Werner, ♀
holotype (W.U.S. 2080). Scale in mm.

a, dorsal

b, ventral



Plate 4.18. Parabuthus kuanyamarum Monard, ♀
(N.M. 10430). Scale in mm.

a, dorsal

b, ventral

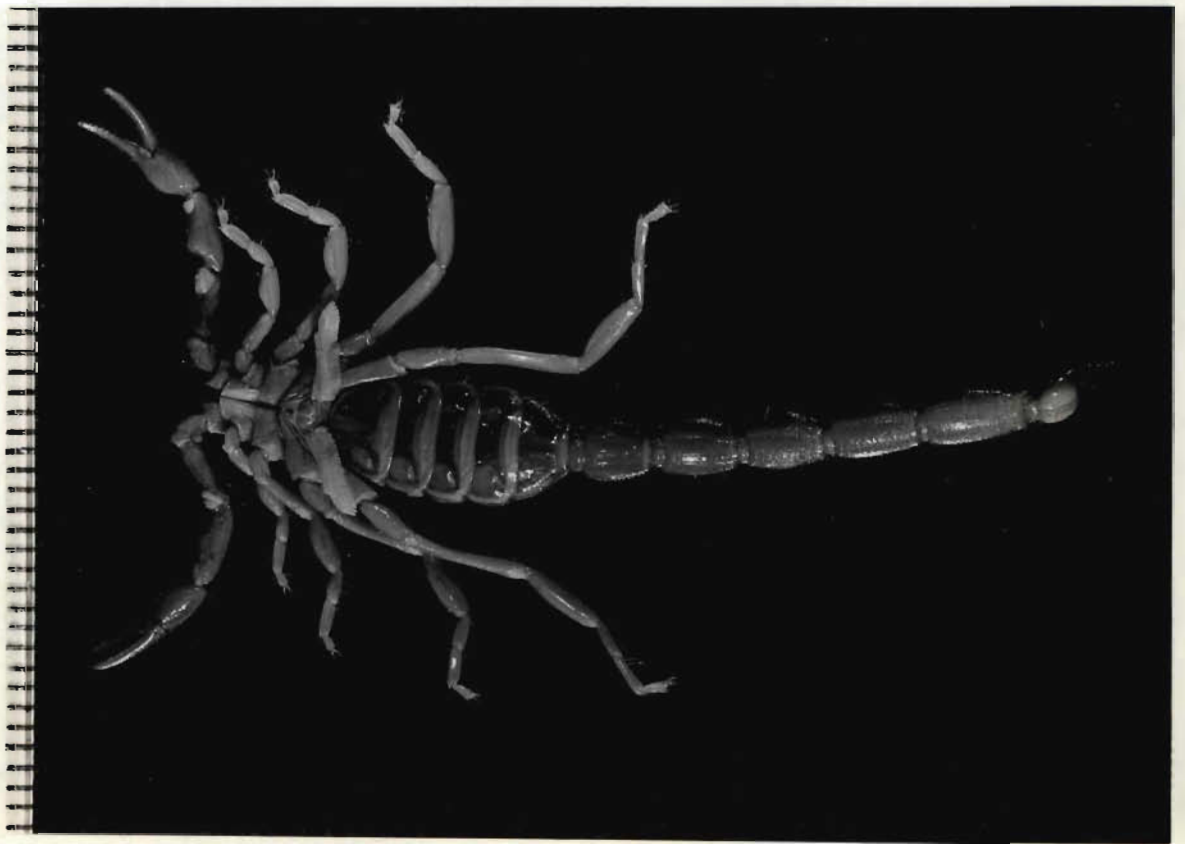
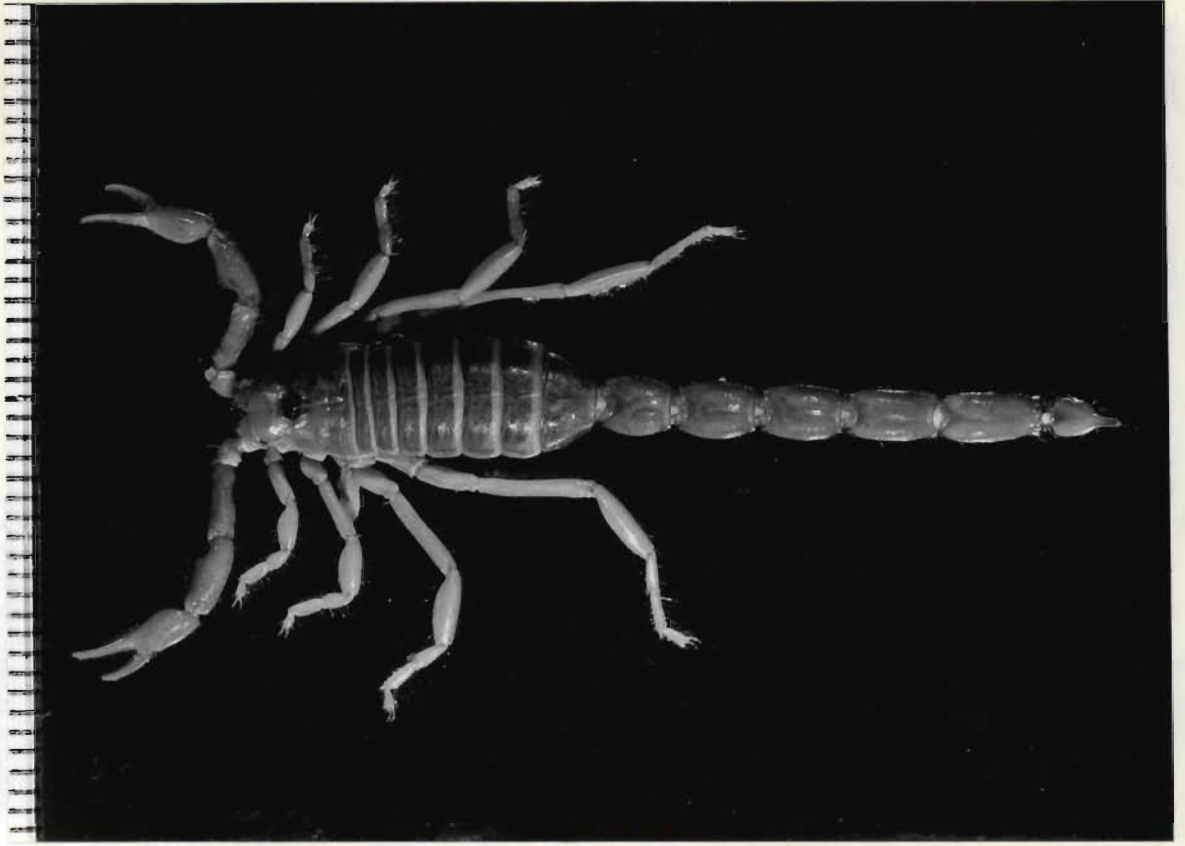


Plate 4.19. Parabuthus kuanyamarum Monard, ♂
(N.M. 10695). Scale in mm.

a, dorsal

b, ventral



Plate 4.20. Parabuthus laevifrons (E. Simon), ♀
neotype (N.M. 10436). Scale in mm.

a, dorsal

b, ventral

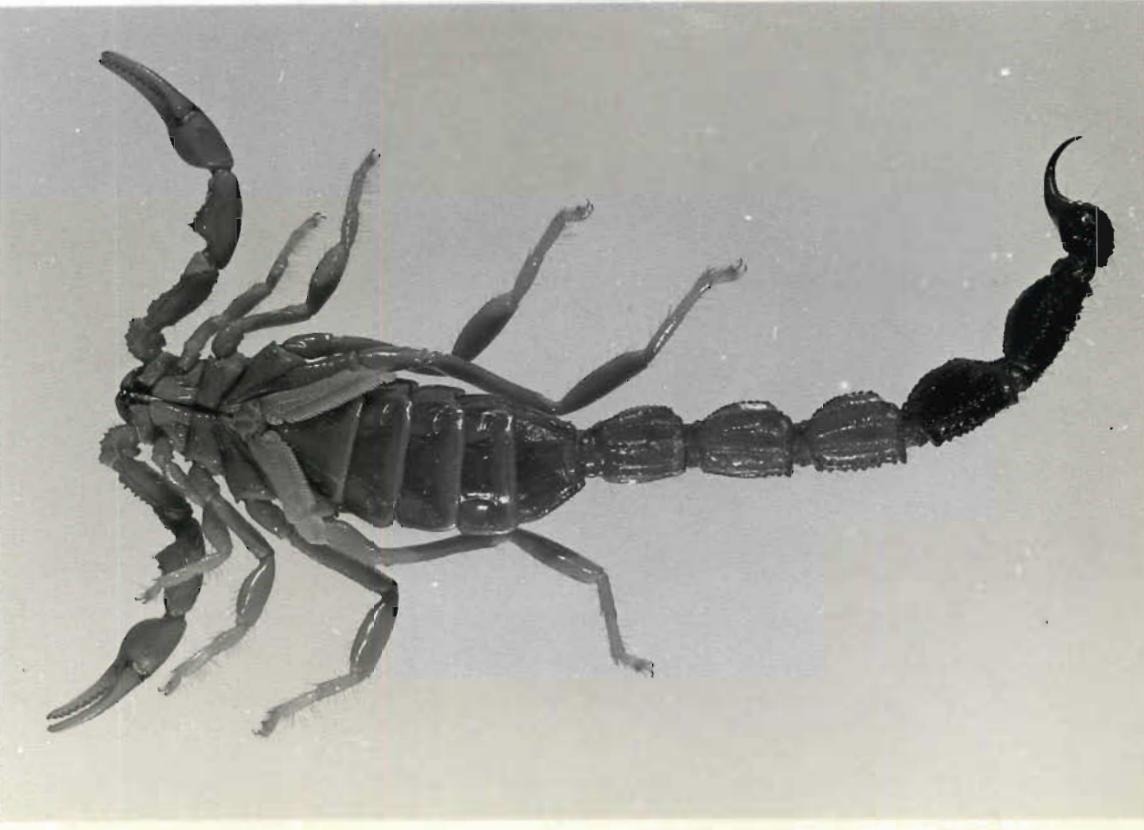
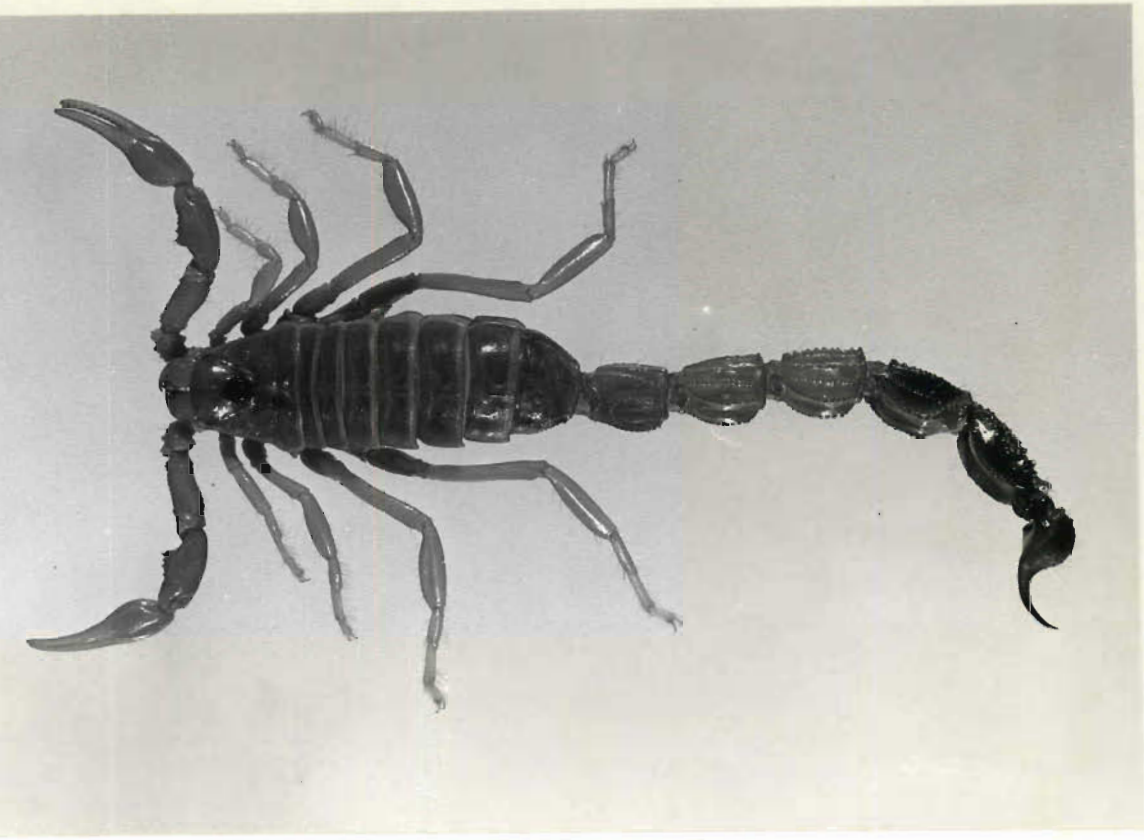


Plate 4.21. Parabuthus new species B, ♂
paratype (T.M. 9787). Scale in mm.

a, dorsal

b, ventral

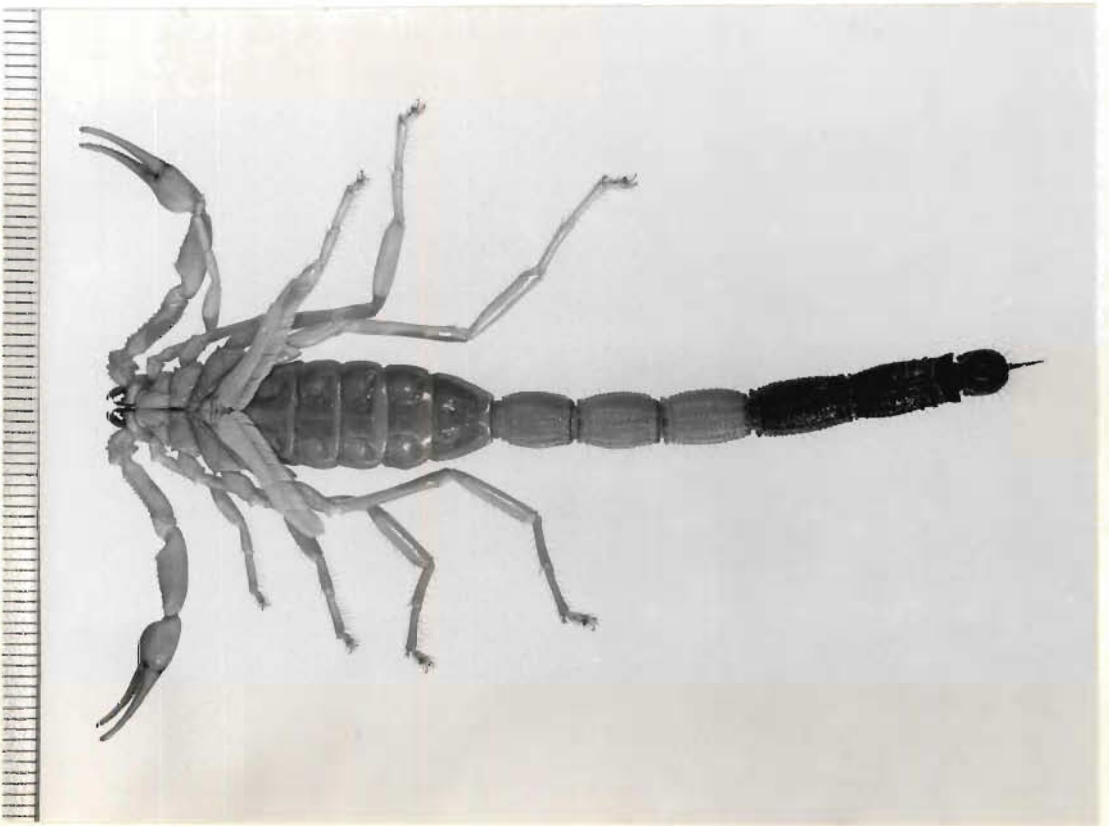
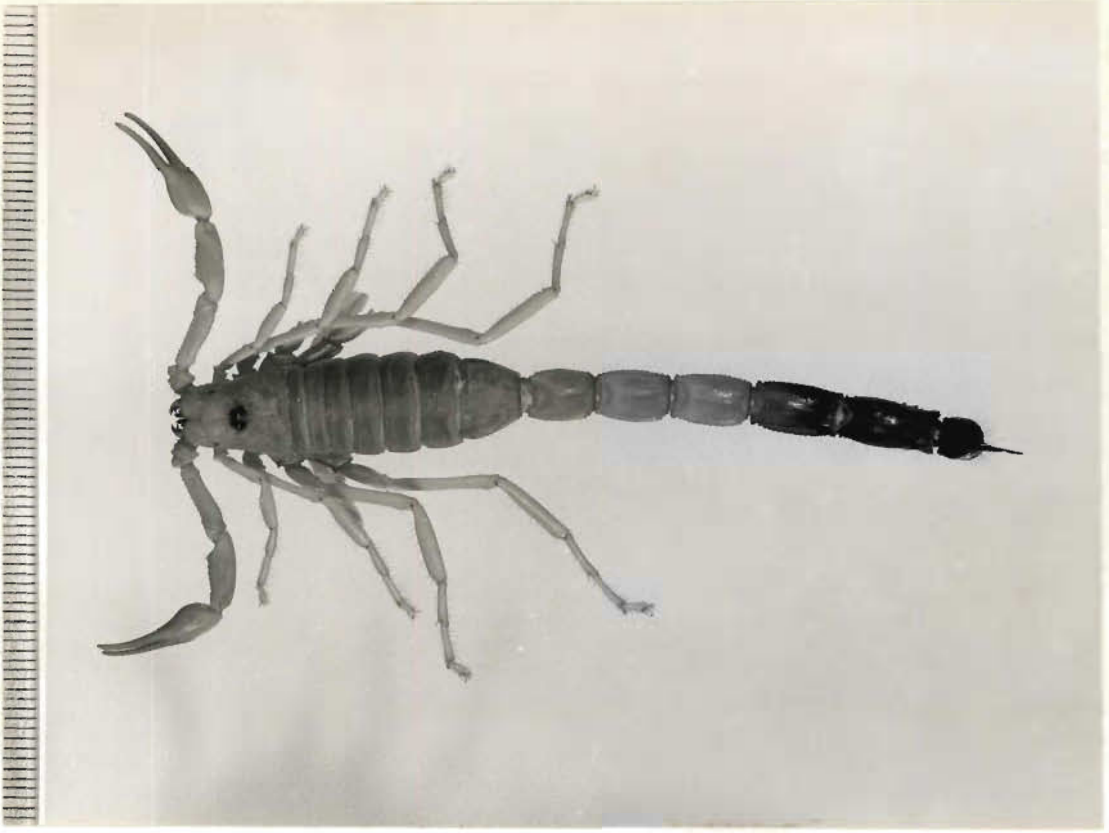


Plate 4.22. Parabuthus new species C, ♀ holotype
(N.M. 10926). Scale in mm.

a, dorsal

b, ventral

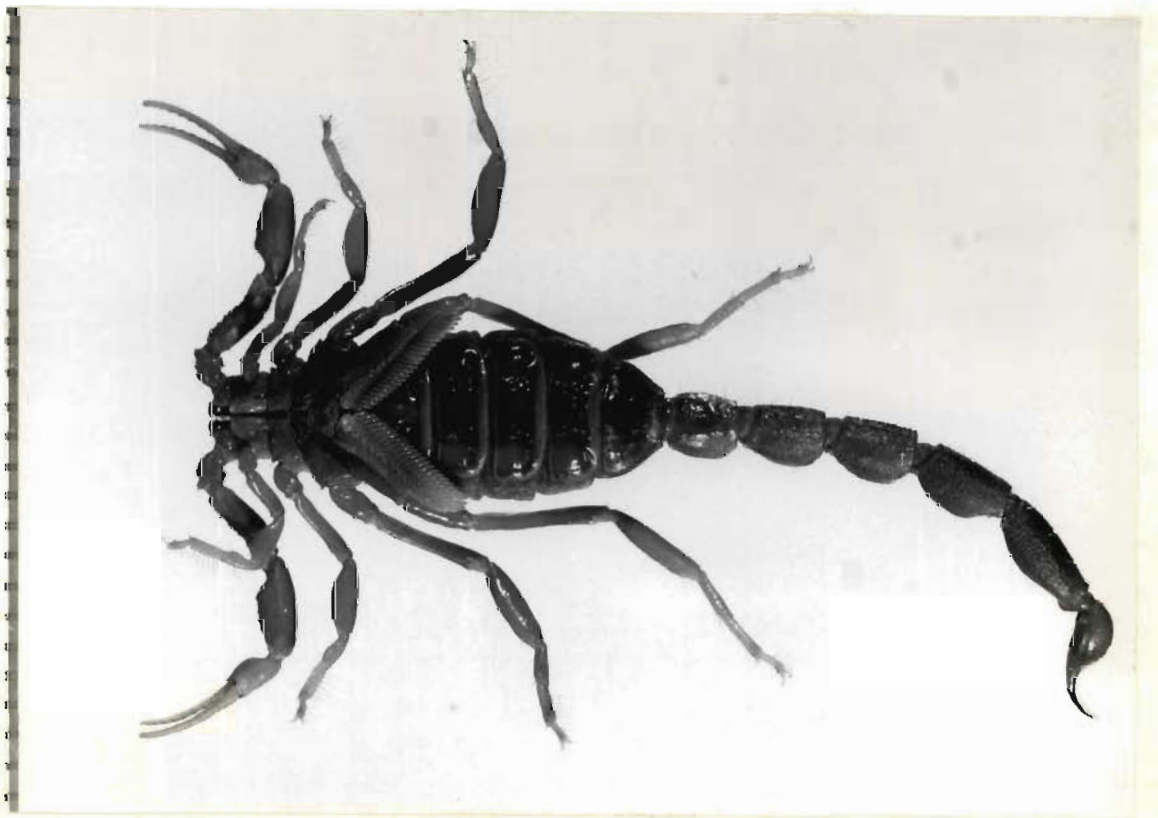
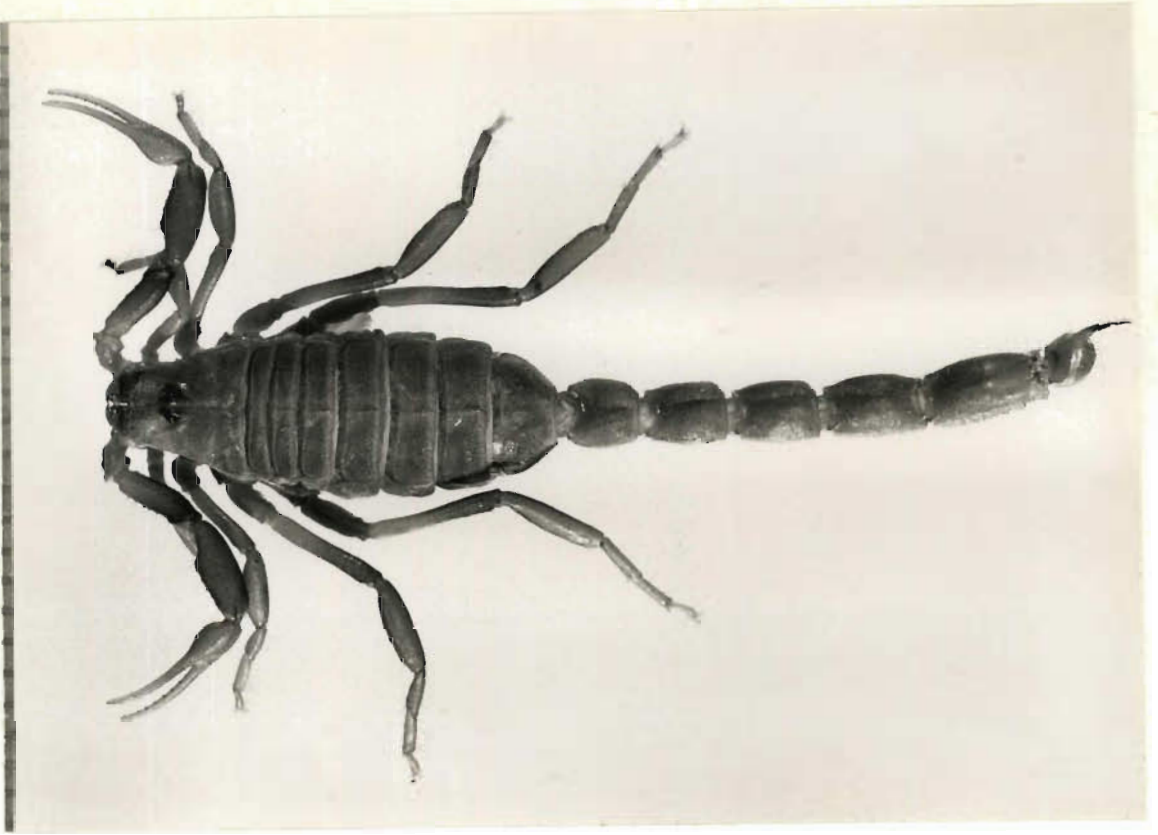


Plate 4.23. Parabuthus new species C, ♂ paratype
(N.M. 10927). Scale in mm.

a, dorsal

b, ventral

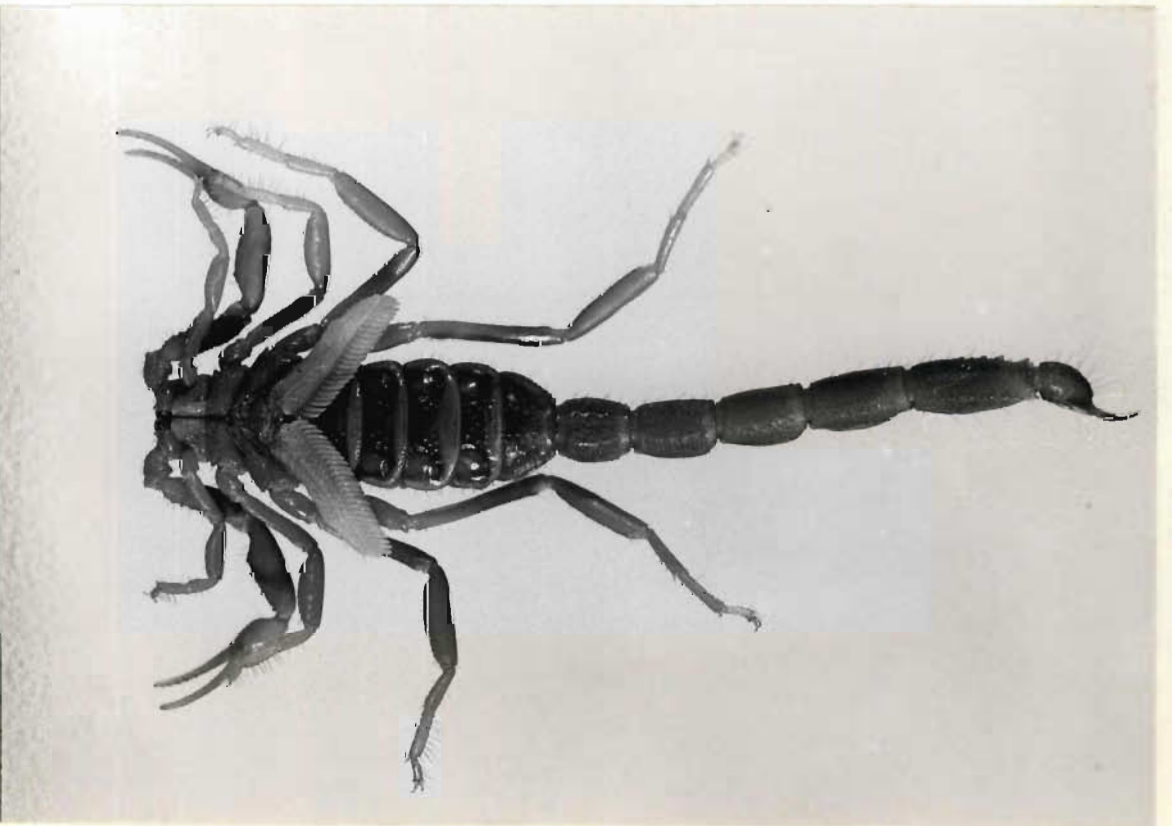


Plate 4.24. Parabuthus raudus (E. Simon), ♀ holotype
(M.N.H.P. RS 0340). Scale in mm.

a, dorsal

b, ventral

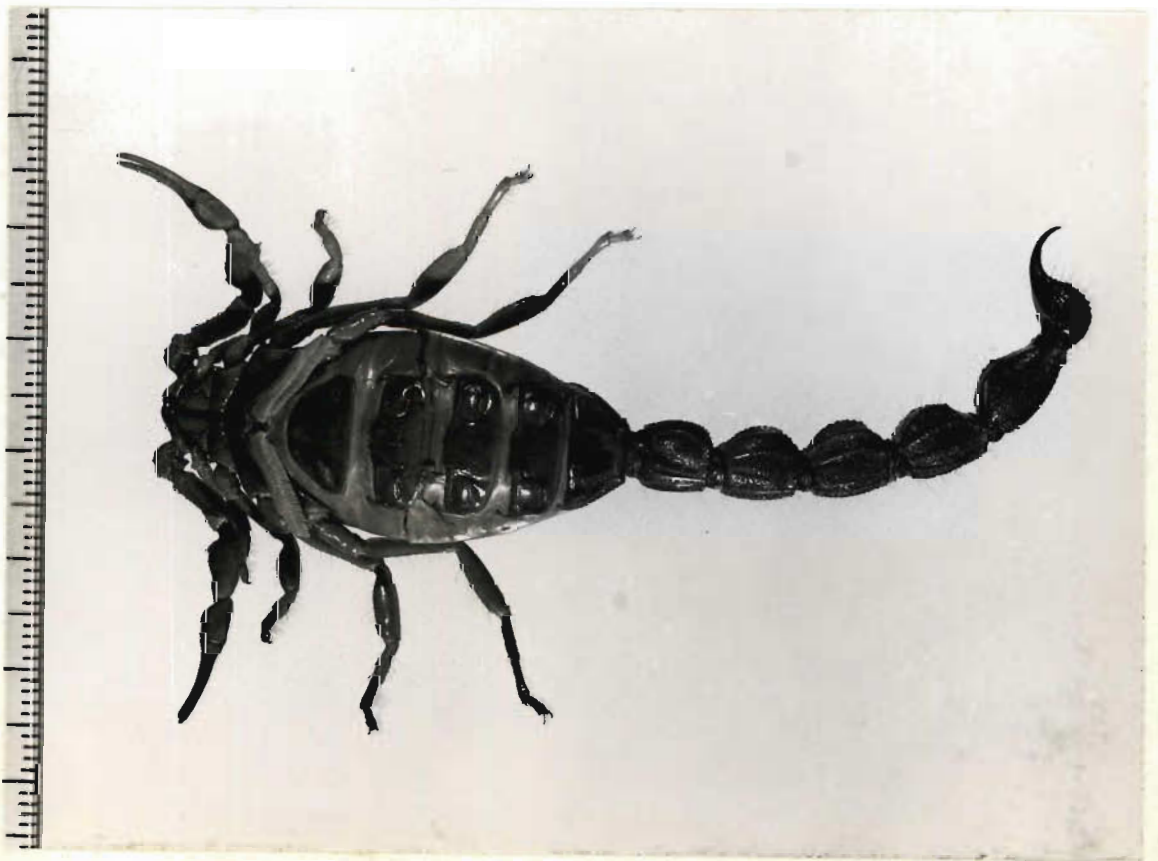
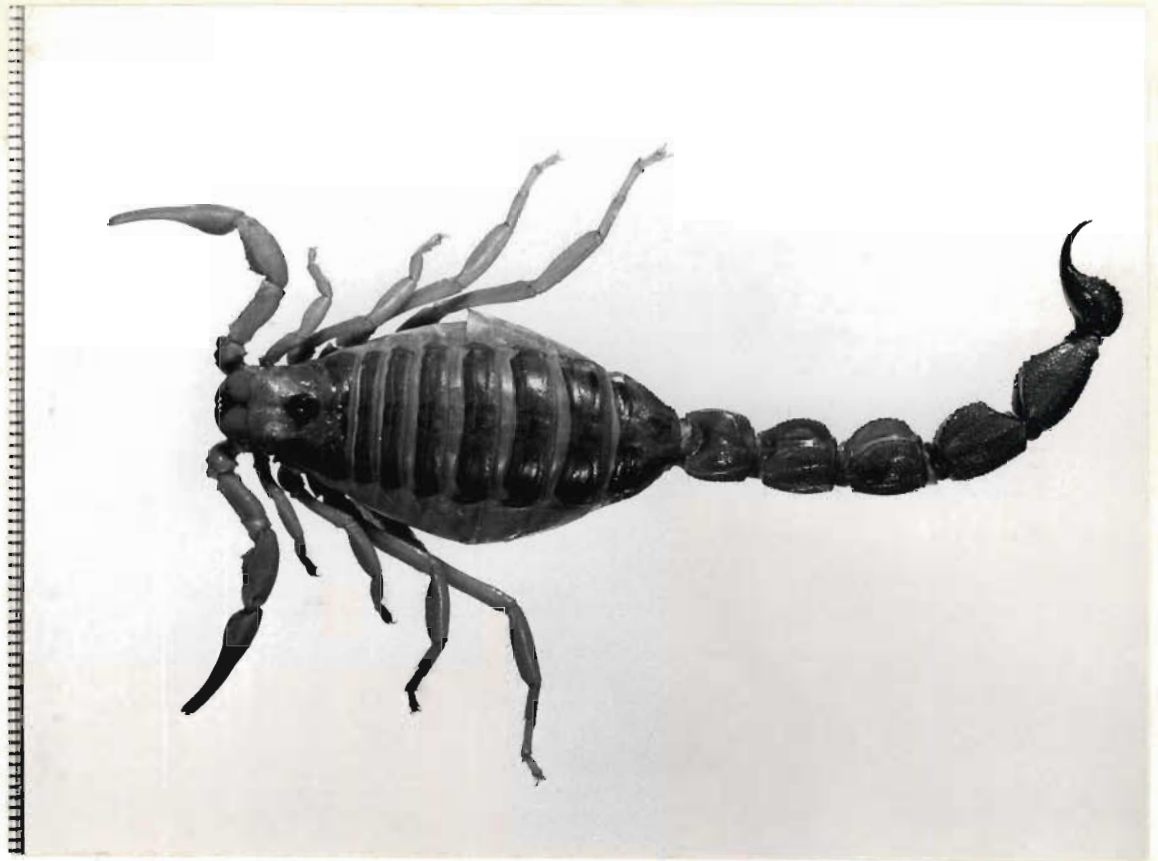


Plate 4.25. Parabuthus schlechteri Purcell, ♂ (S.M.N. 322). Scale in mm.

a, dorsal

b, ventral

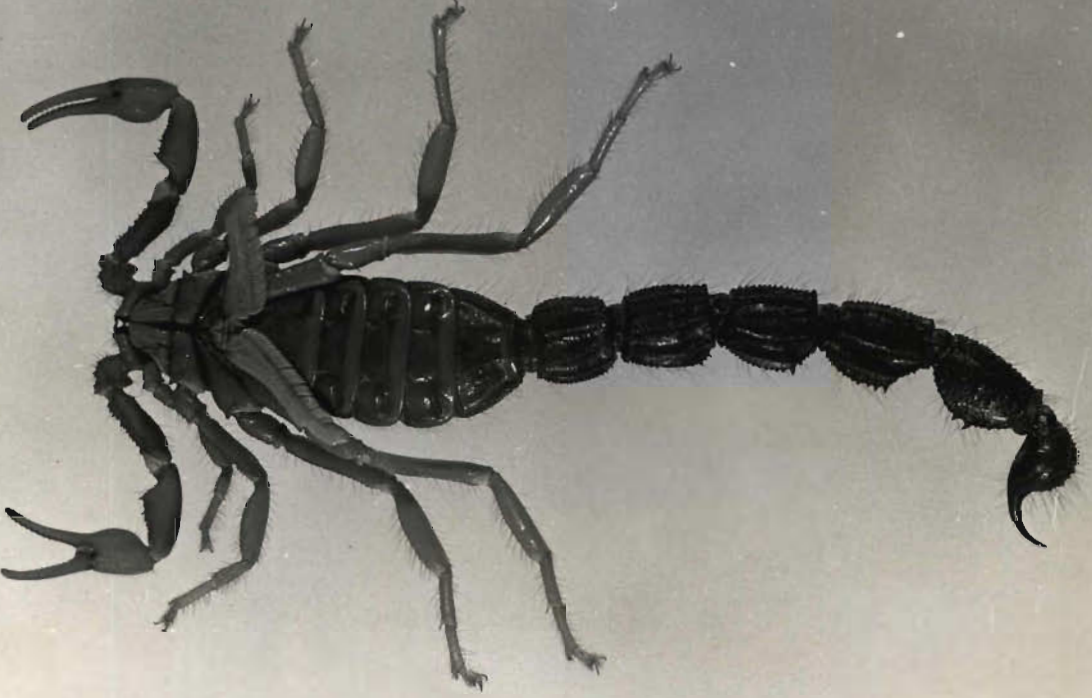
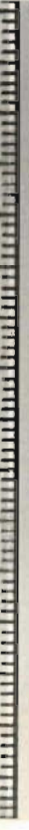
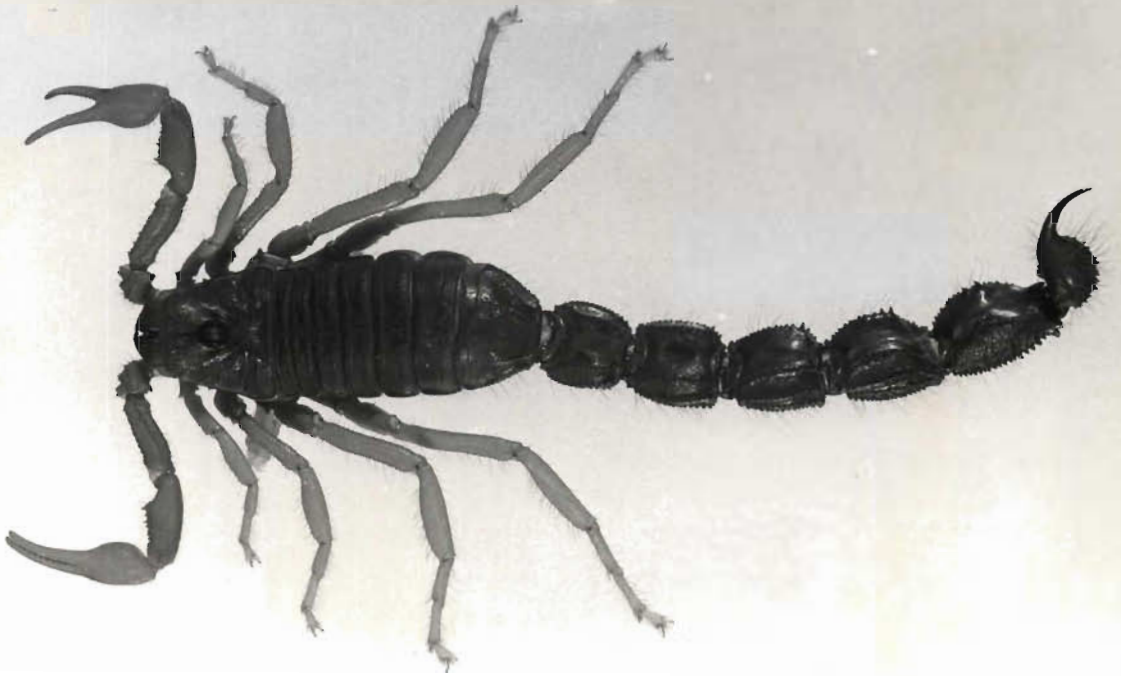


Plate 4.26. Parabuthus stridulus Hewitt, ♂ (N.M. 10704).
Scale in mm.

a, dorsal

b, ventral



Plate 4.27. Parabuthus stridulus Hewitt, ♀ (N.M. 10519).

Scale in mm

a, dorsal

b, ventral

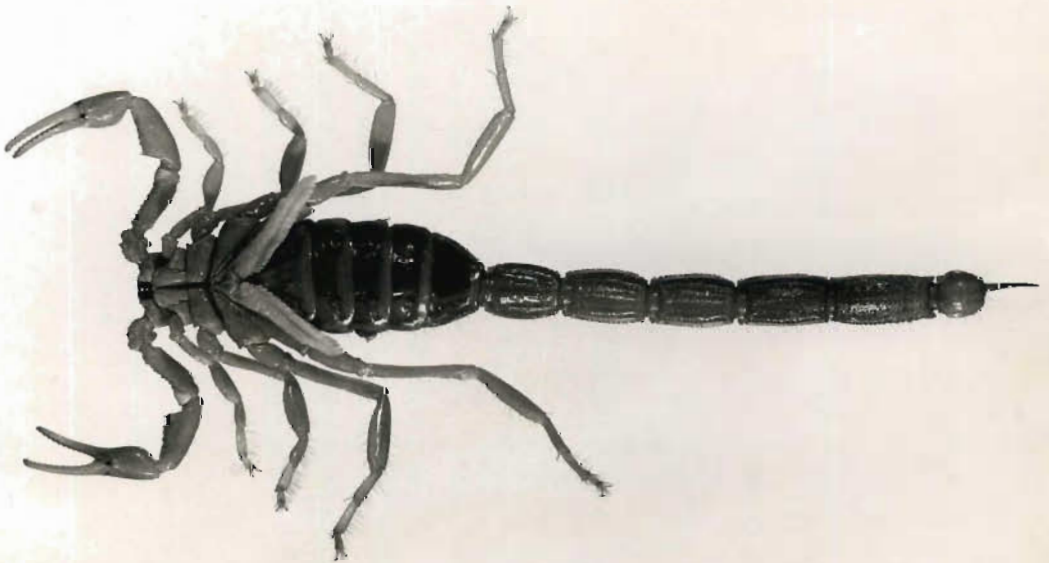
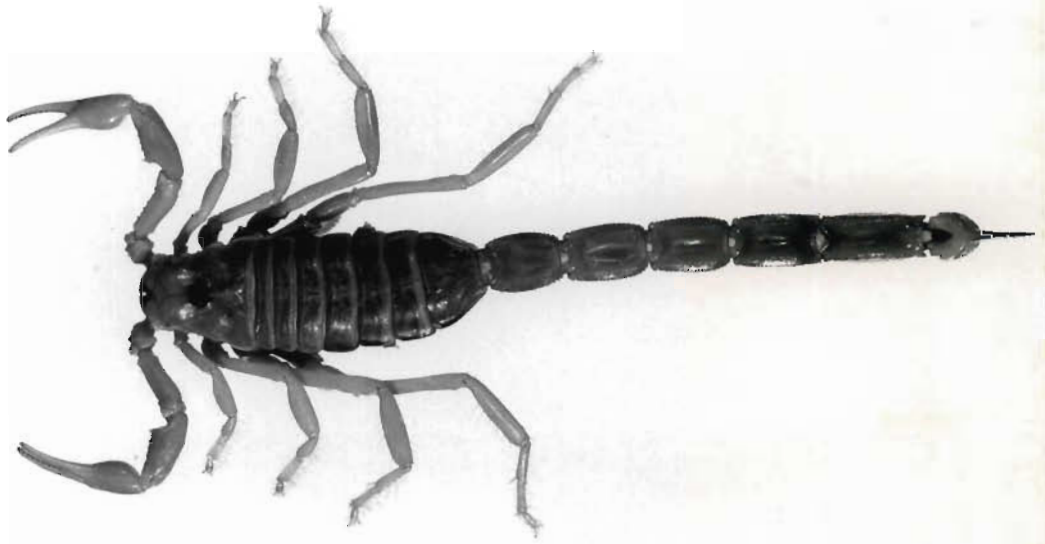


Plate 4.28. Parabuthus stridulus Hewitt, ♂ holotype
(T.M. 1868). Cauda I, dorsal aspect. Anterior
margin on the left. ' 21,5 x actual size.

Plate 4.29. Same as plate 4.28. Cauda II.

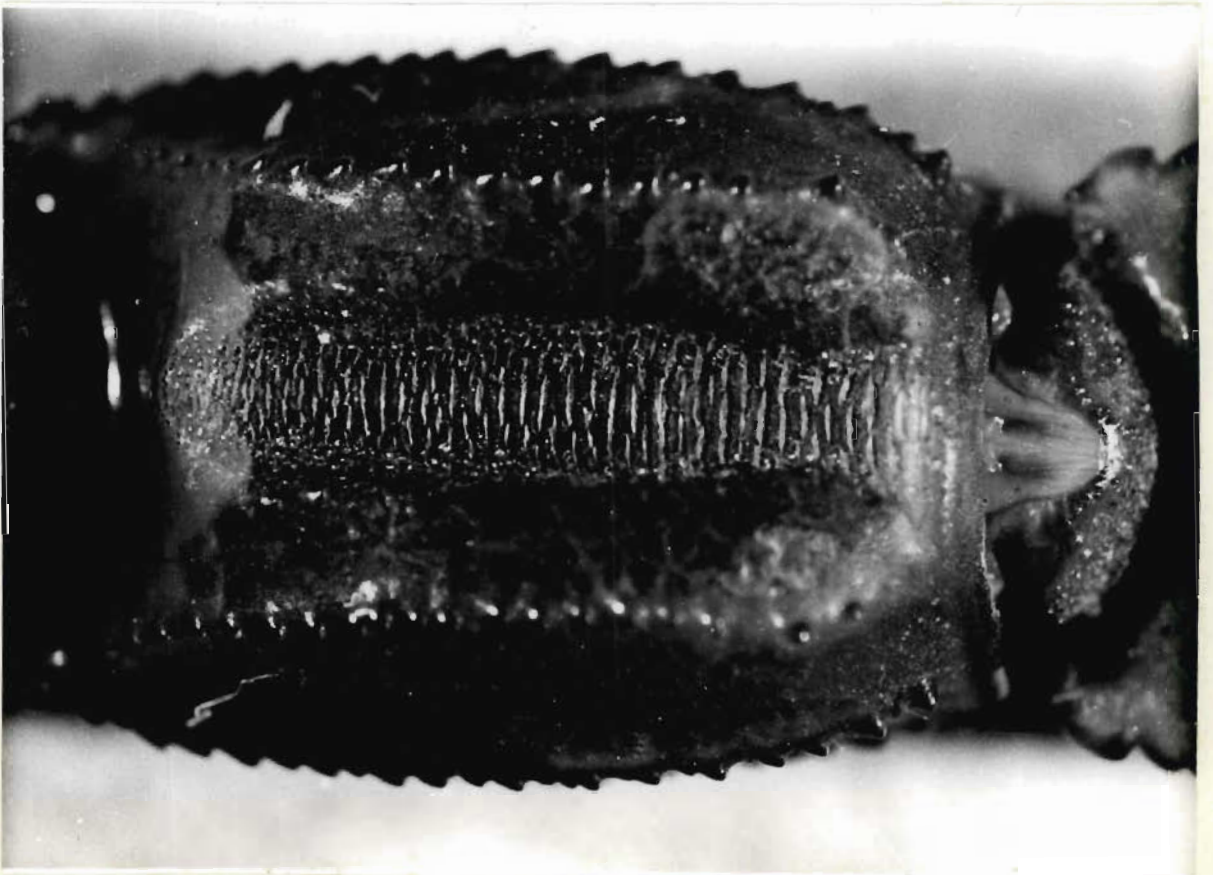


Plate 4.30. Parabuthus villosus (Peters), ♀ (N.M.
10025). Scale in mm.

a, dorsal

b, ventral

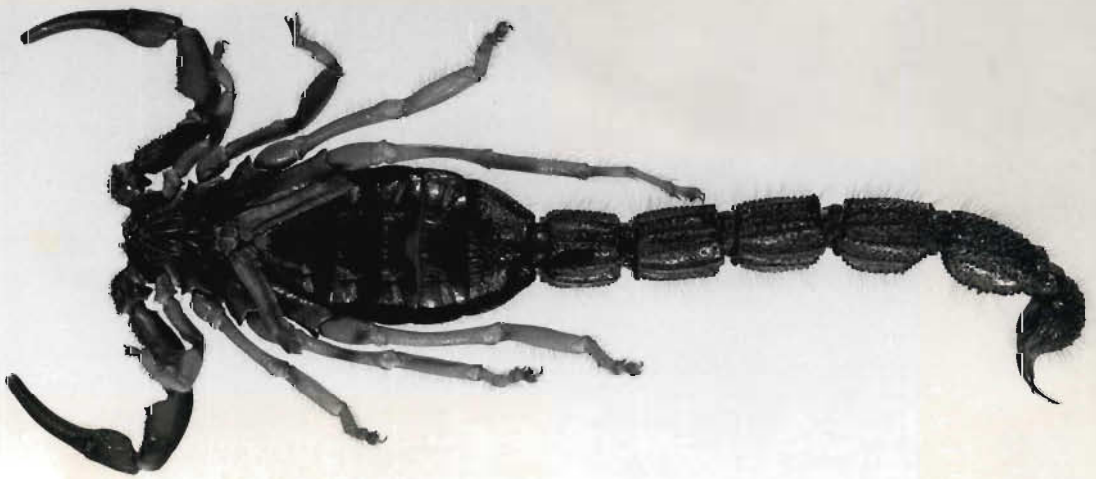
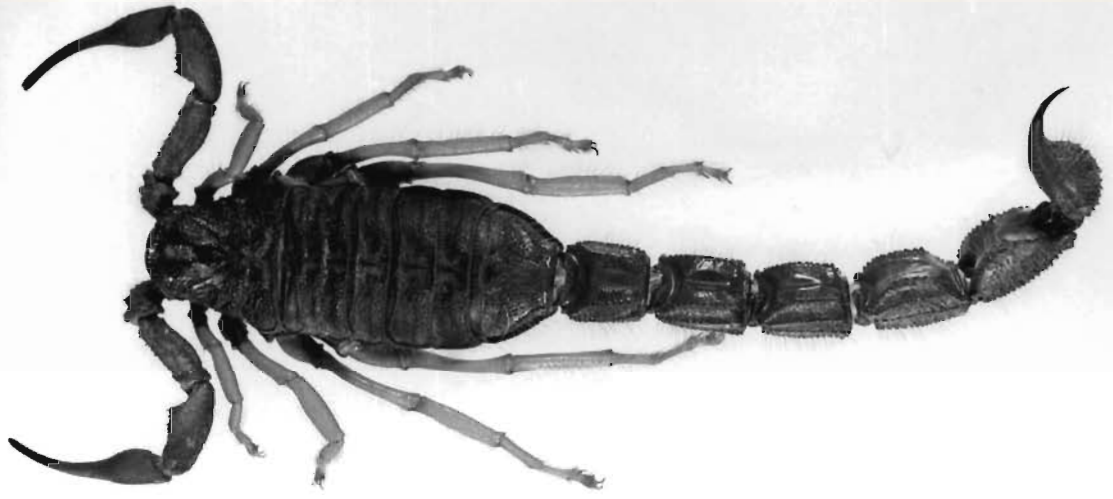


Plate 4.31. Uroplectes carinatus (Pocock),
♀ (N.M. 7303). Scale in mm.

a, dorsal

b, ventral

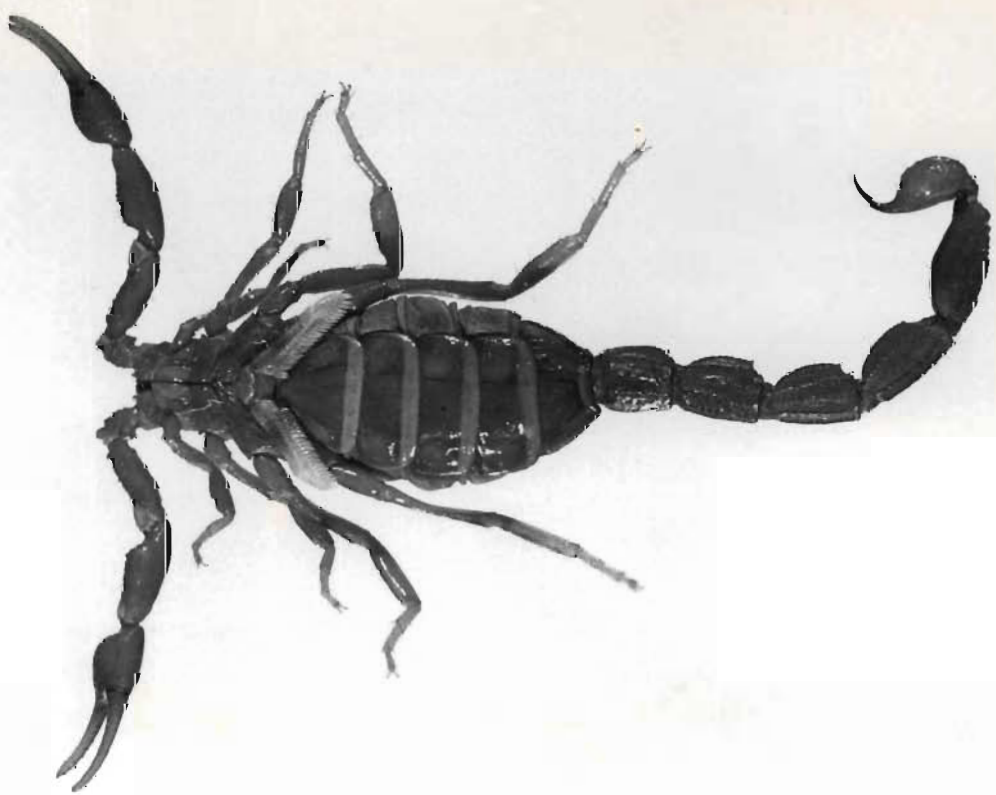
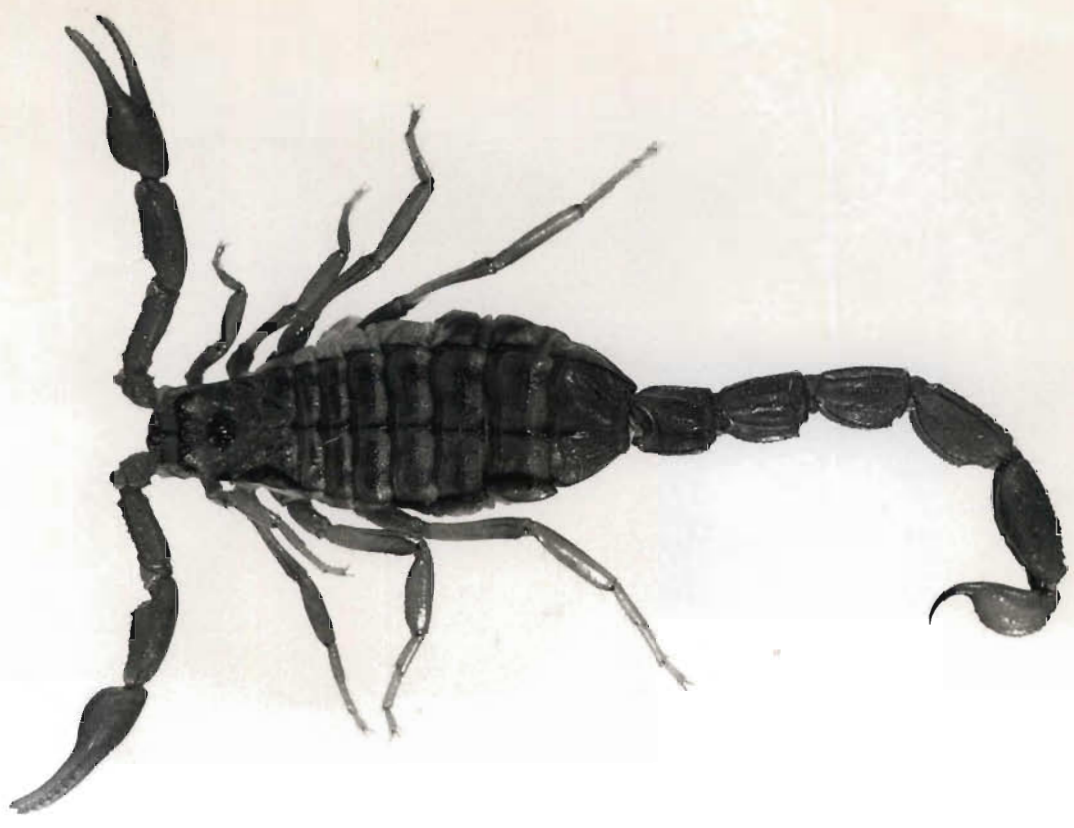


Plate 4.32. Uroplectes gracilior Hewitt, ♂
(S.M.N. 313). Scale in mm.

a, dorsal

b, ventral

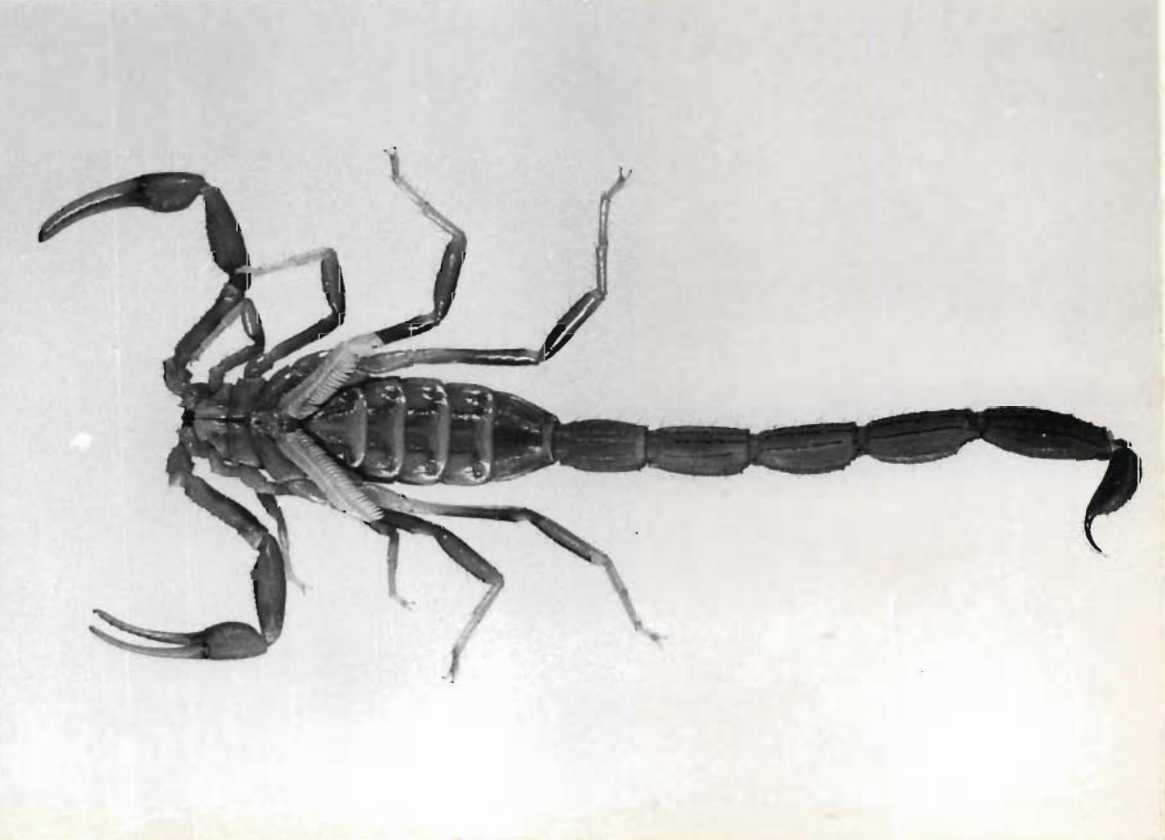
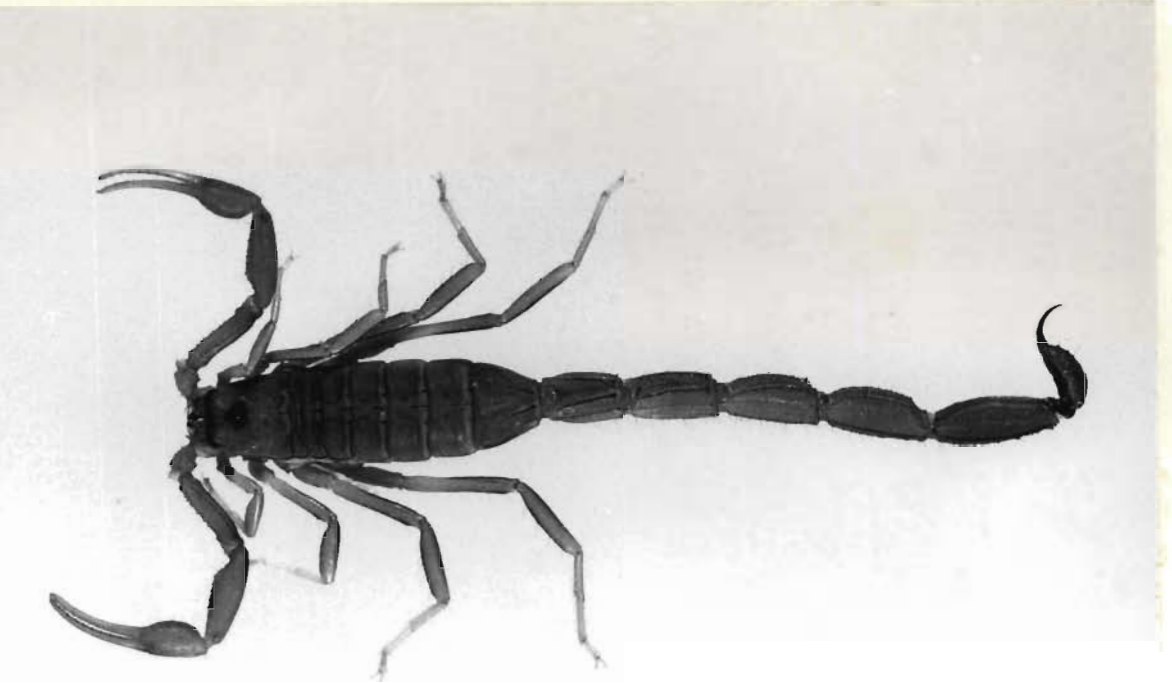


Plate 4.33. Uroplectes longimanus Werner, ♀
holotype (Z.M.H.). Scale in mm.

a, dorsal

b, ventral

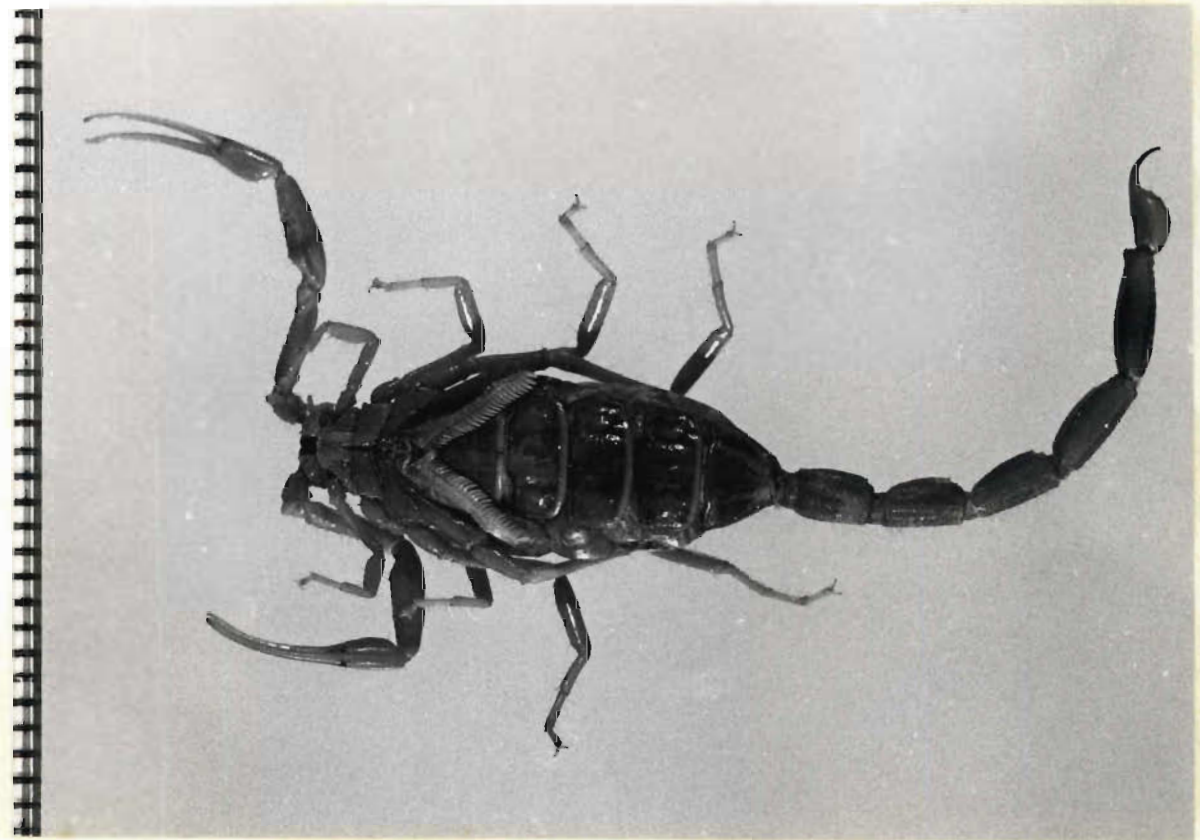
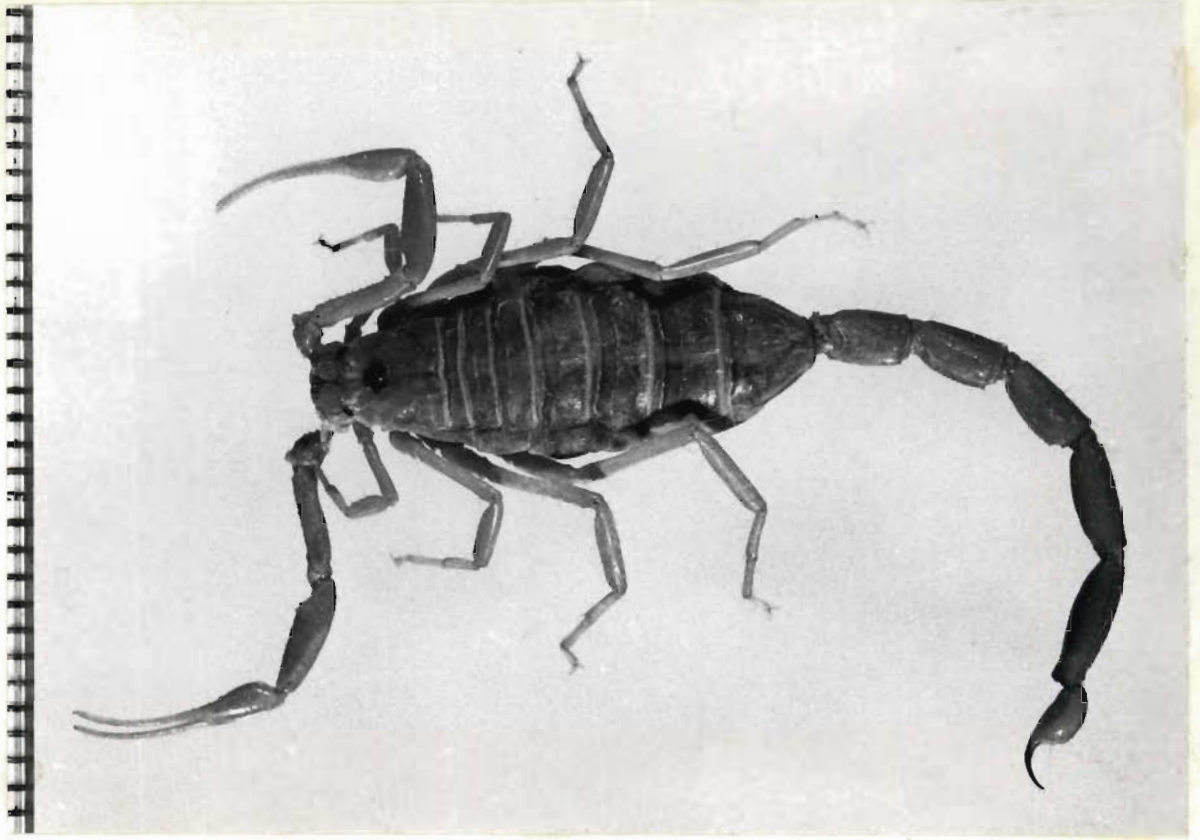


Plate 4.34. Uroplectes otjimbinguensis (Karsch), ♀
(N.M. 10580). Scale in mm.

a, dorsal

b, ventral

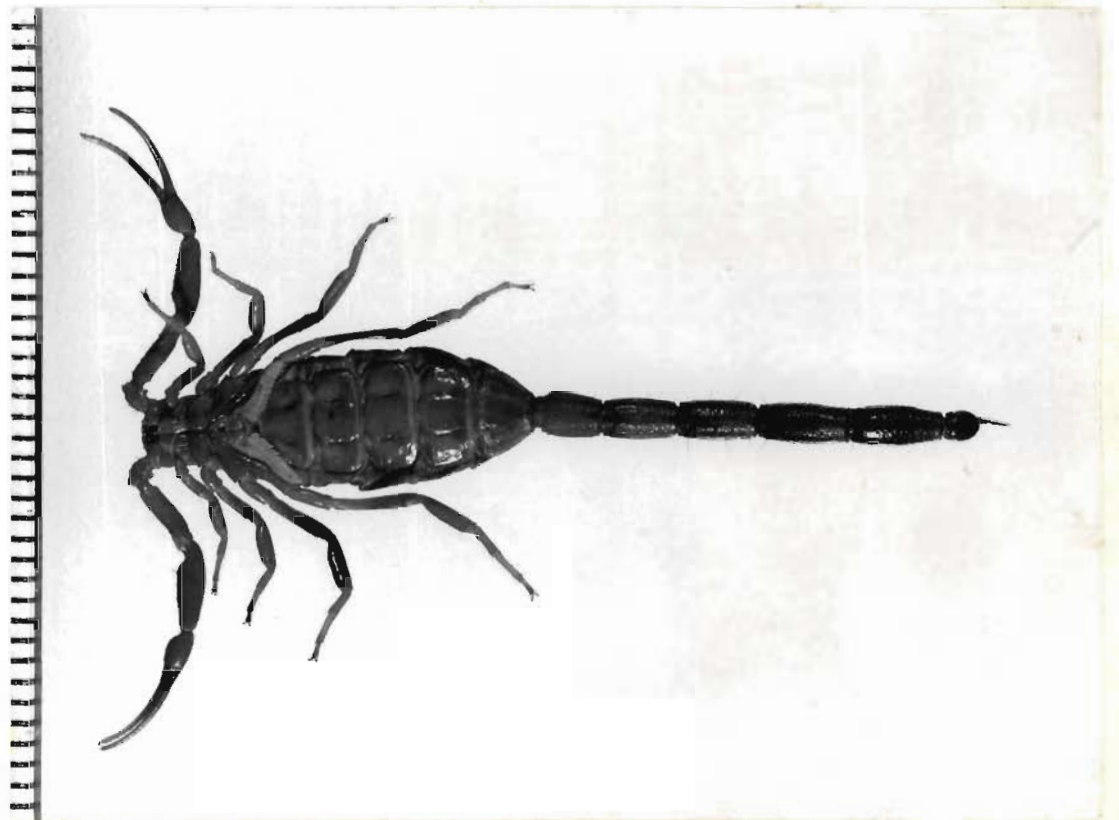
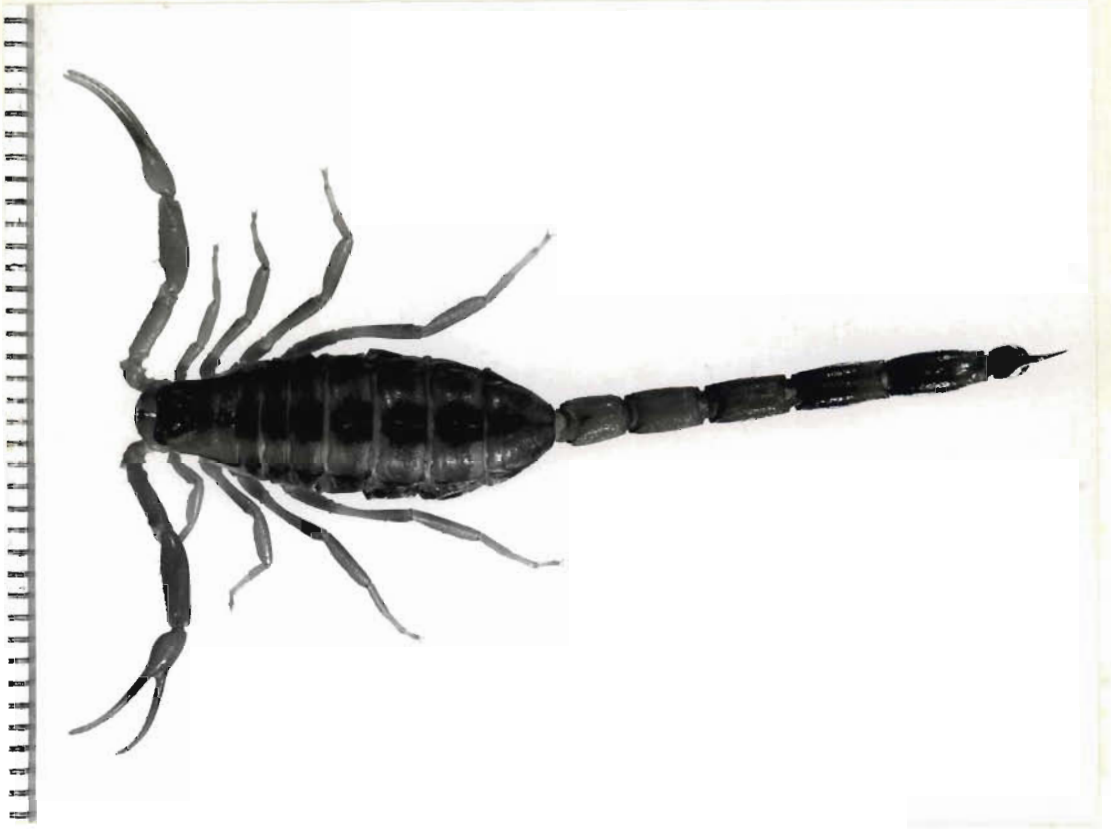


Plate 4.35. Uroplectes otjimbinguensis (Karsch), ♂
(N.M. 10580). Scale in mm.

a, dorsal

b, ventral

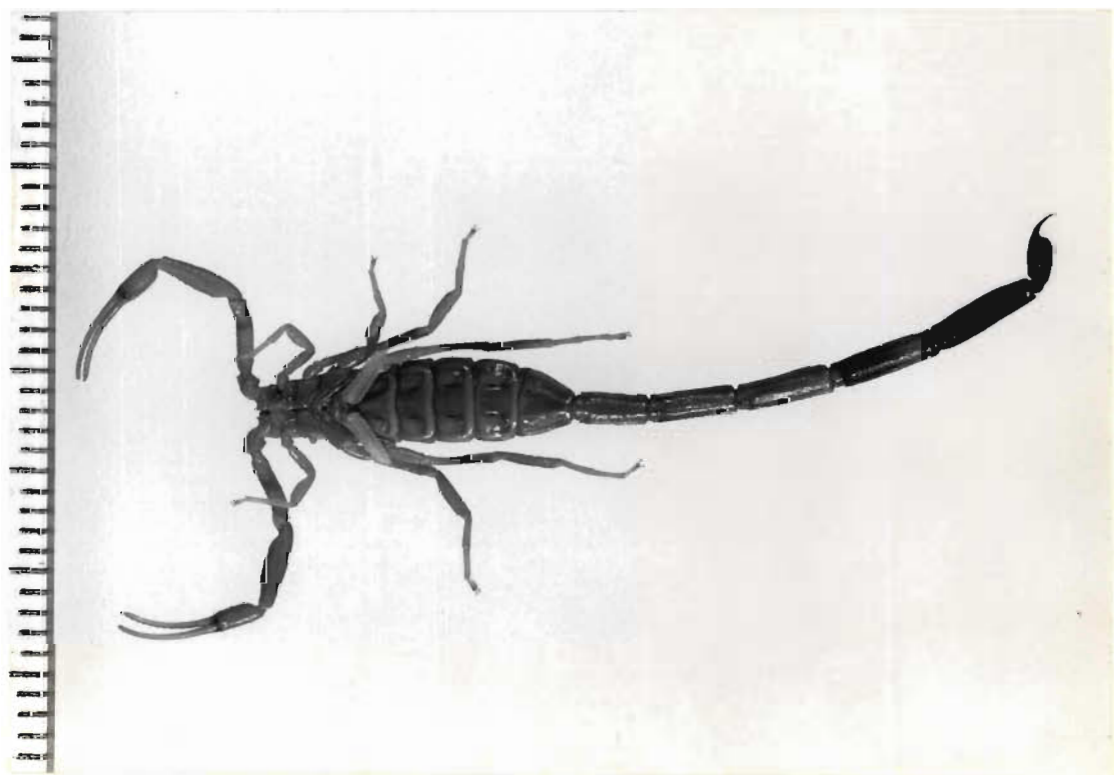
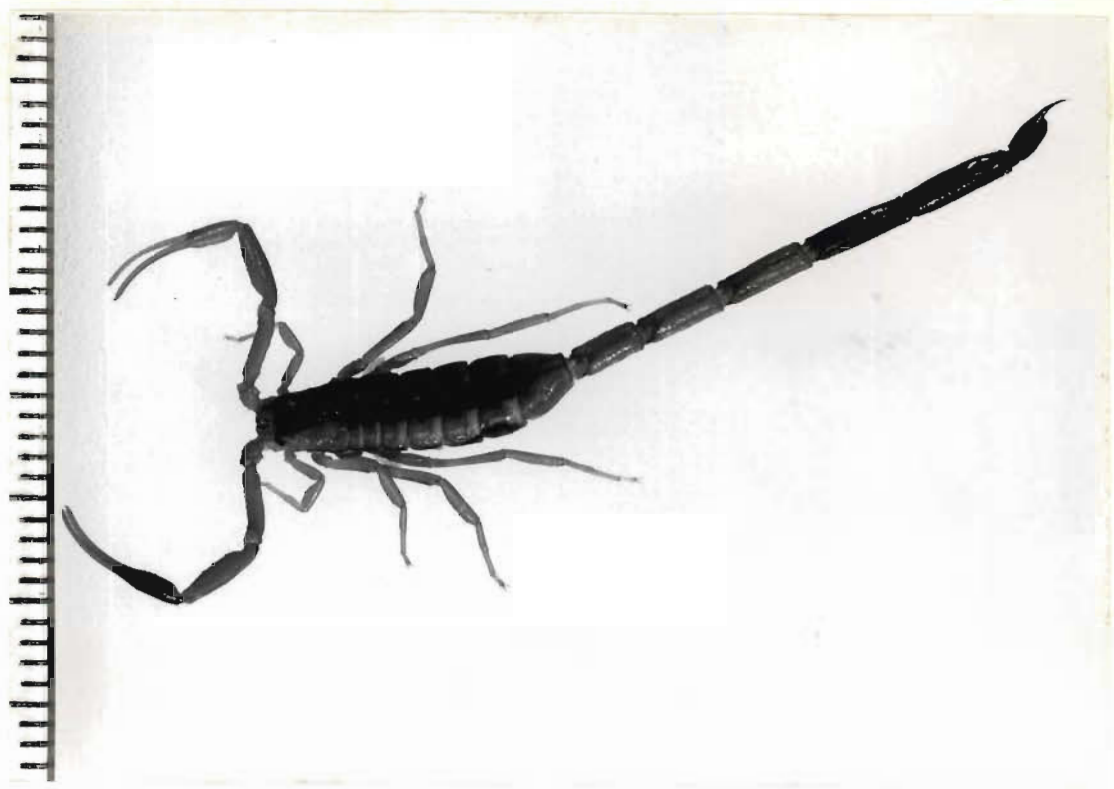


Plate 4.36. Uroplectes pilosus (Thorell), ♂ (N.R.S. 17,
211/214). Scale in mm.

a, dorsal

b, ventral

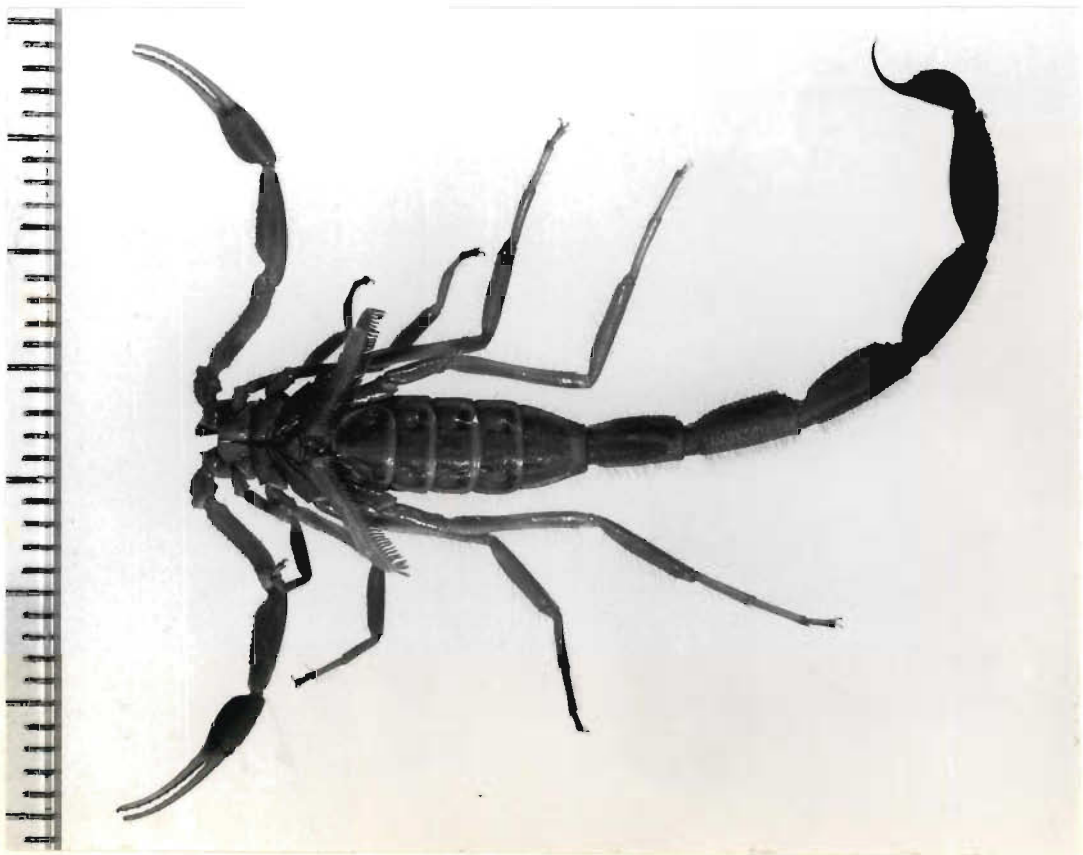
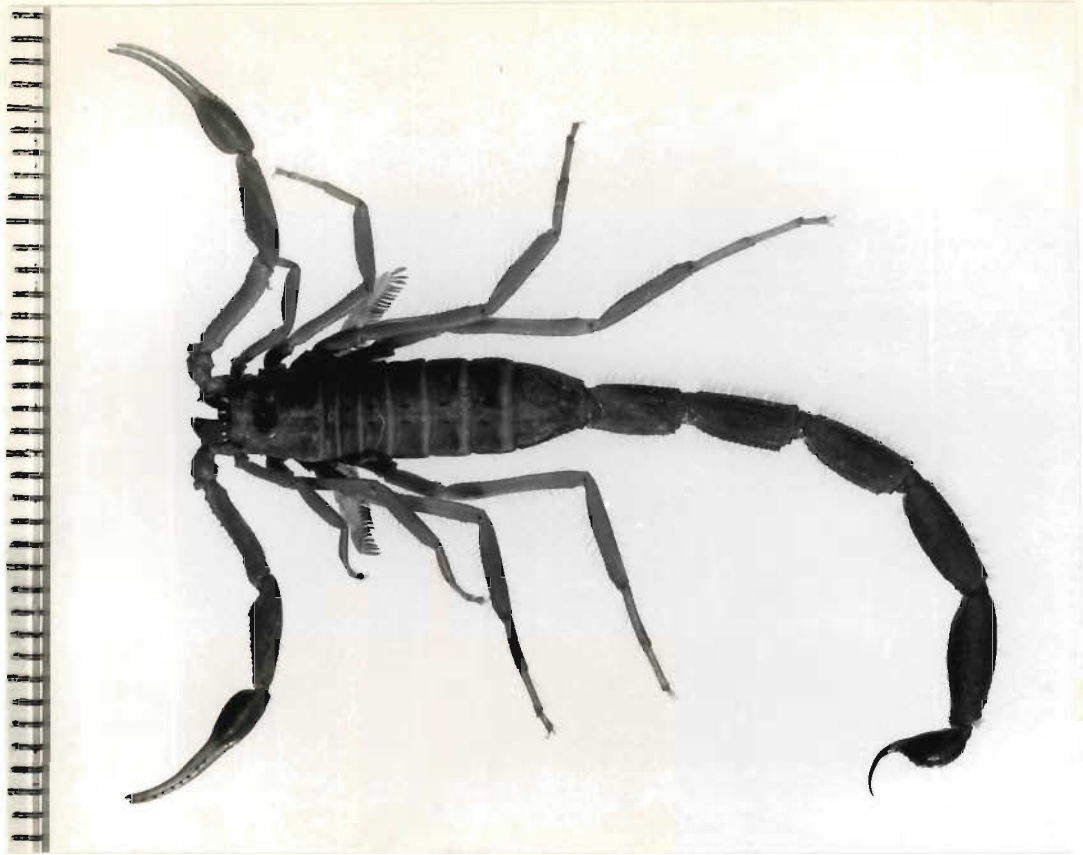


Plate 4.37. Uroplectes planimanus (Karsch), ♀
(N.M. 11037). Scale in mm.

a, dorsal

b, ventral

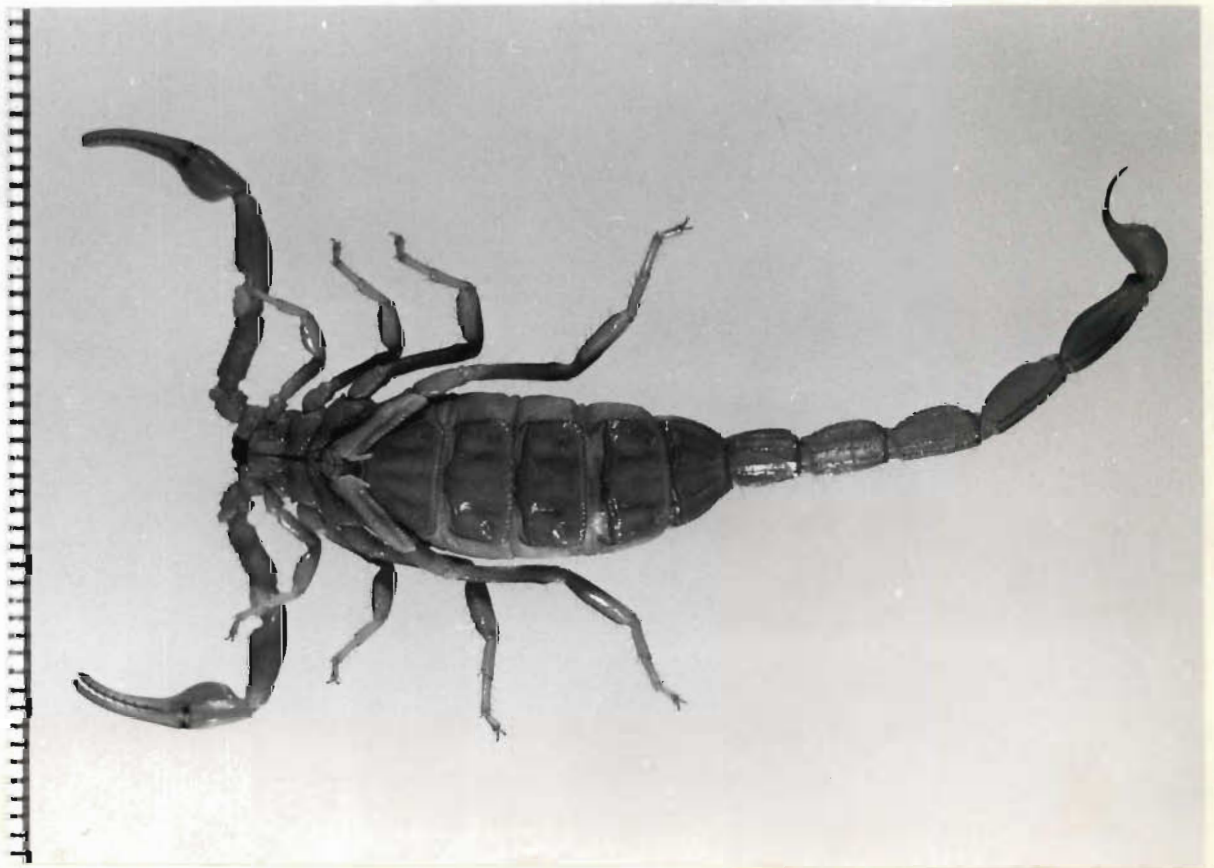
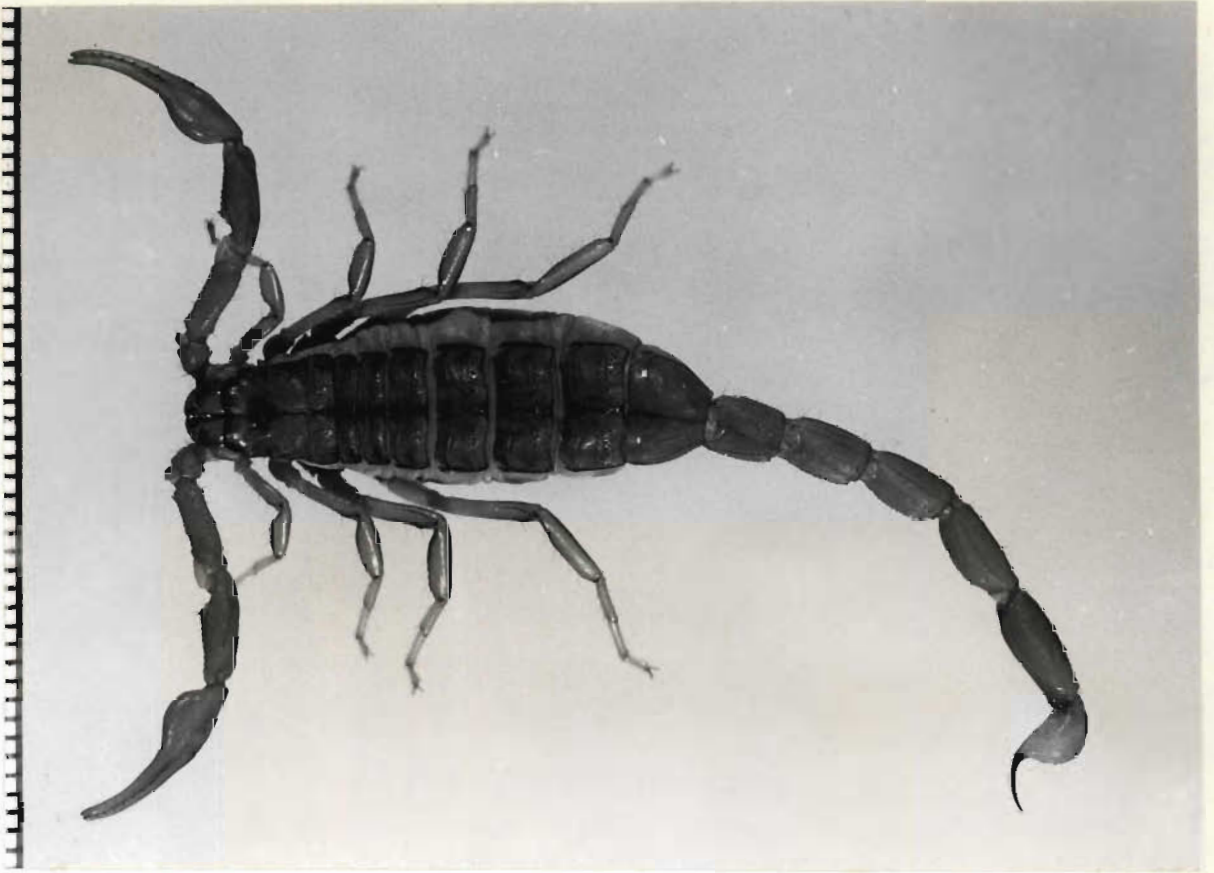


Plate 4.38. Uroplectes schlechteri Purcell, ♂
(N.M. 11041). Scale in mm.

a, dorsal

b, ventral

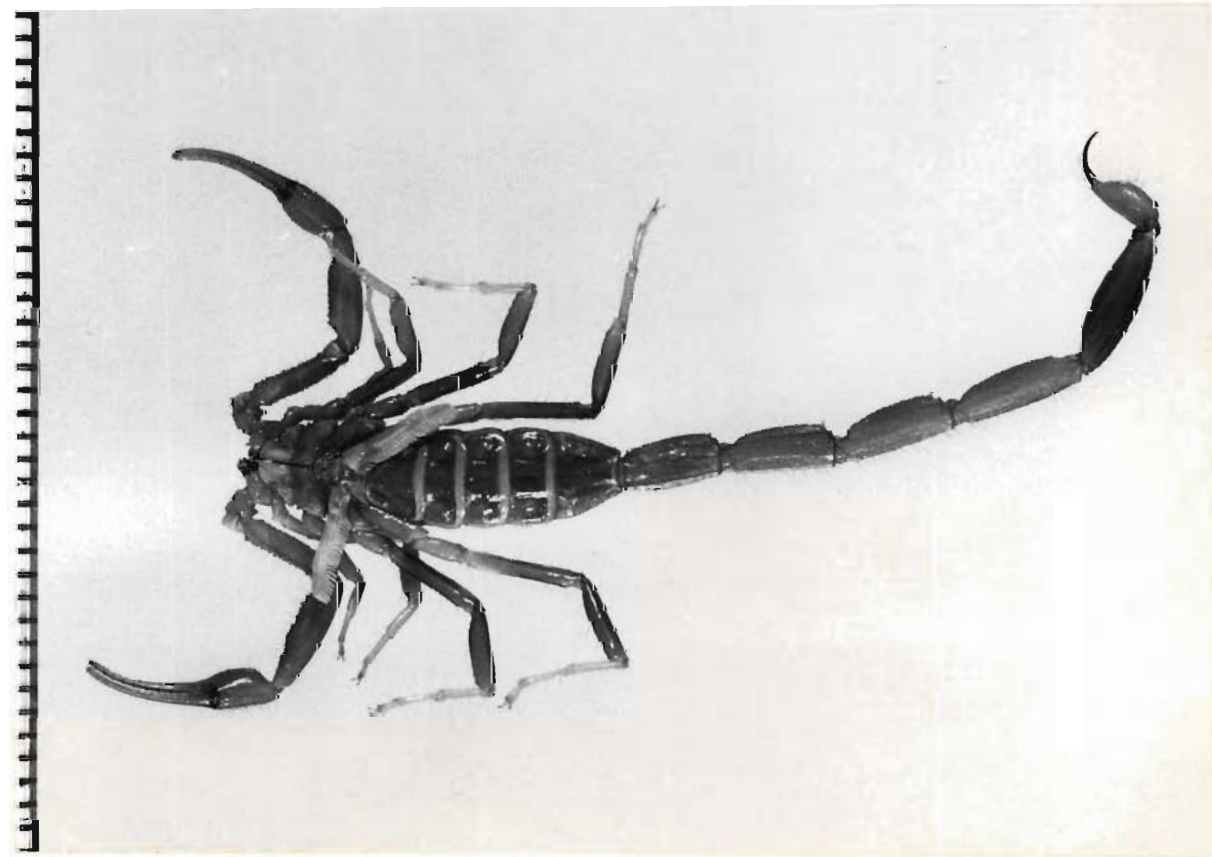
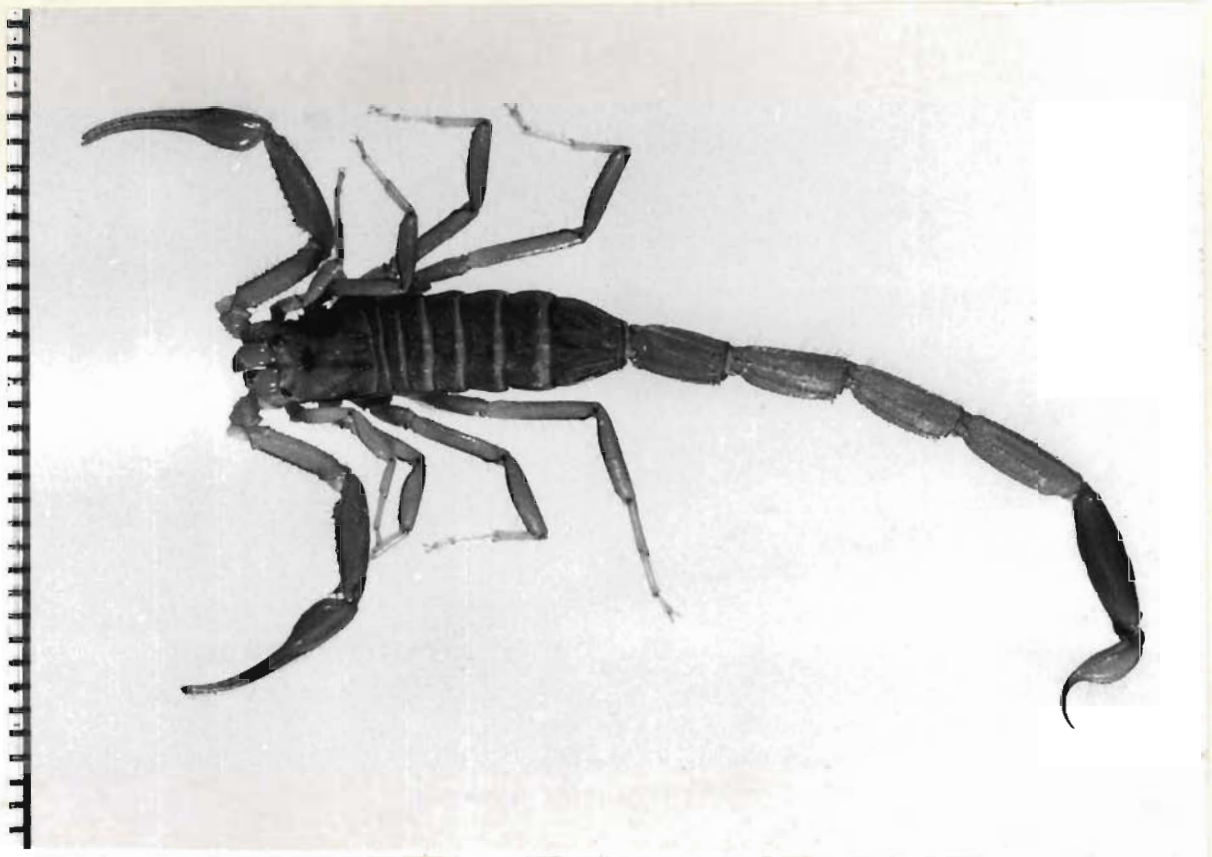


Plate 4.39. Uroplectes teretipes Lawrence, ♀ holotype
(N.M. 9101). Scale in mm.

a, dorsal

b, ventral

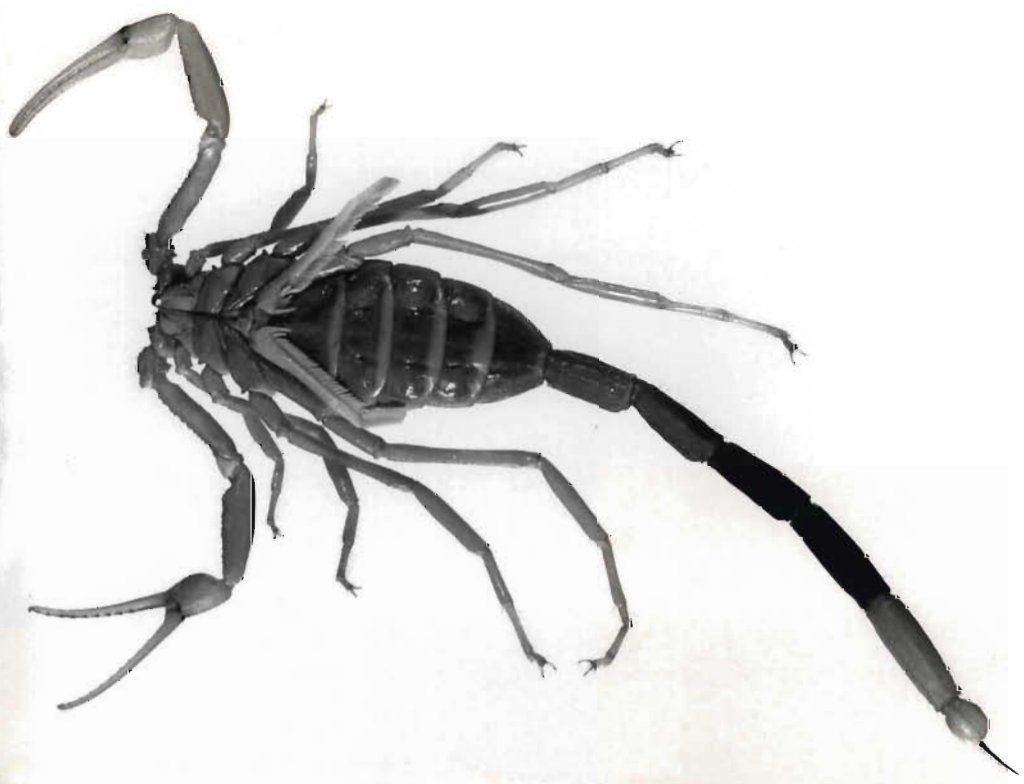


Plate 4.40. Uroplectes teretipes Lawrence, ♂ (N.M.
10696). Scale in mm.

a, dorsal

b, ventral

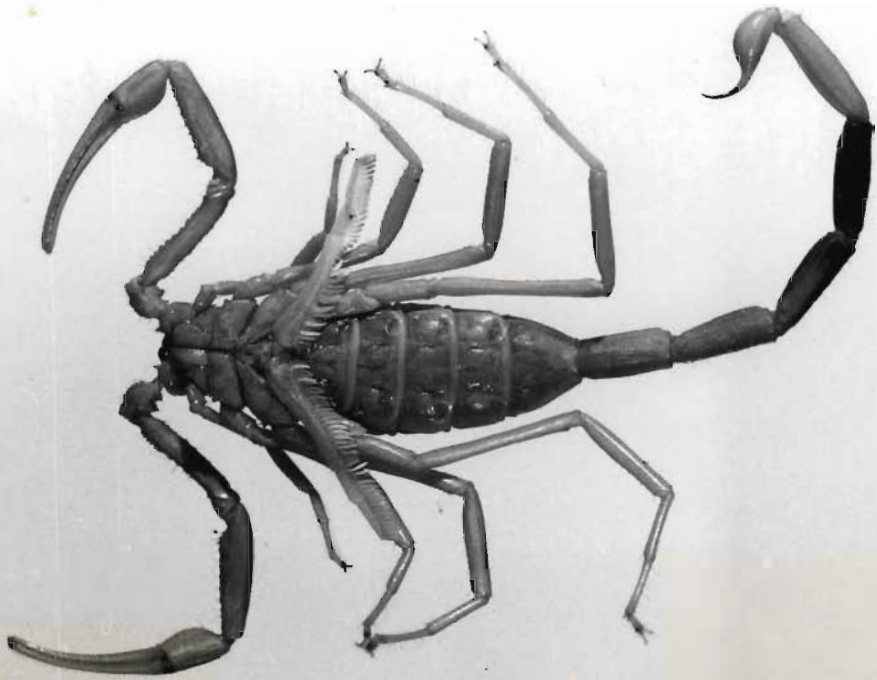
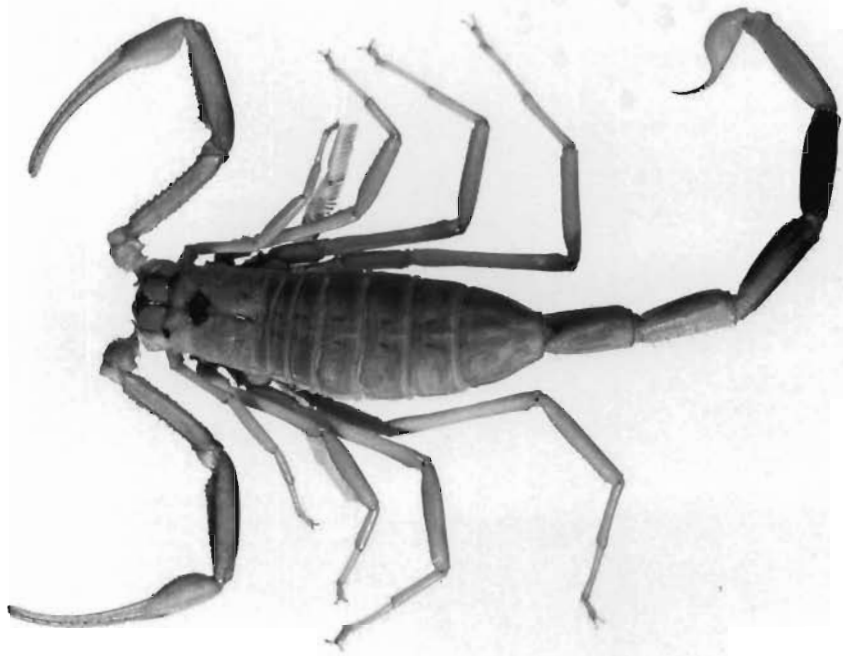


Plate 4.41. Uroplectes new species A, ♀
holotype (N.M. 10866). Scale in mm.

a, dorsal

b, ventral

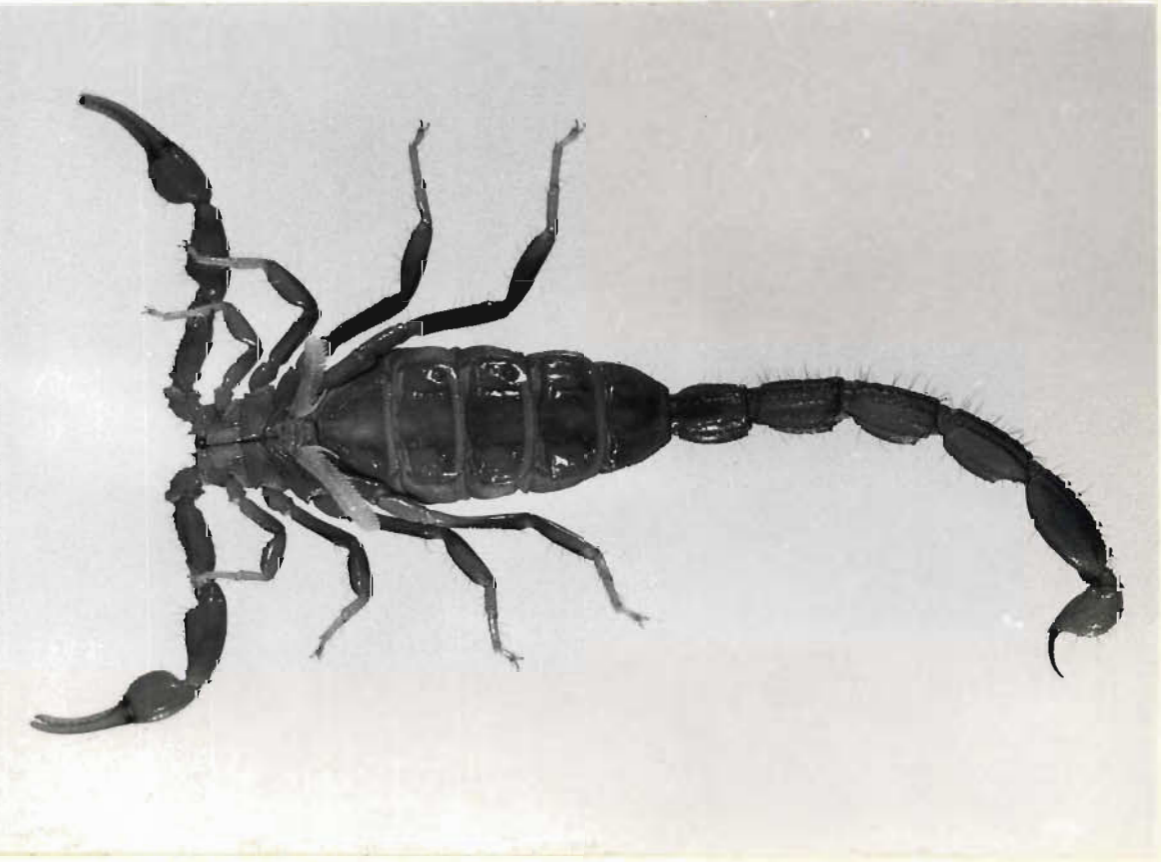
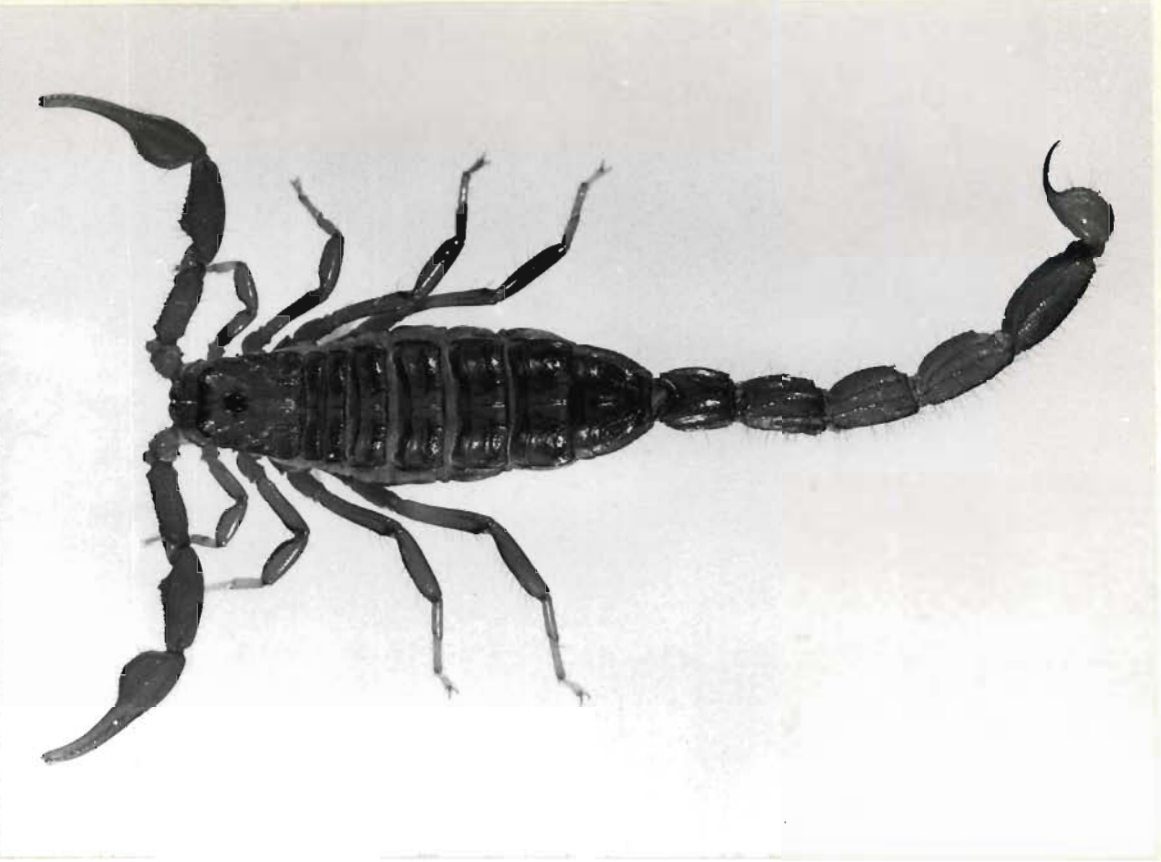


Plate 4.42. Hadogenes phyllodes (Thorell), ♂ (N.M. 9941).
Scale in mm.

a, dorsal

b. ventral

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200



10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200



Plate 4.43. Hadogenes taeniurus (Thorell), ♀ (N.M. 10670).
Scale in mm.

a, dorsal

b. ventral

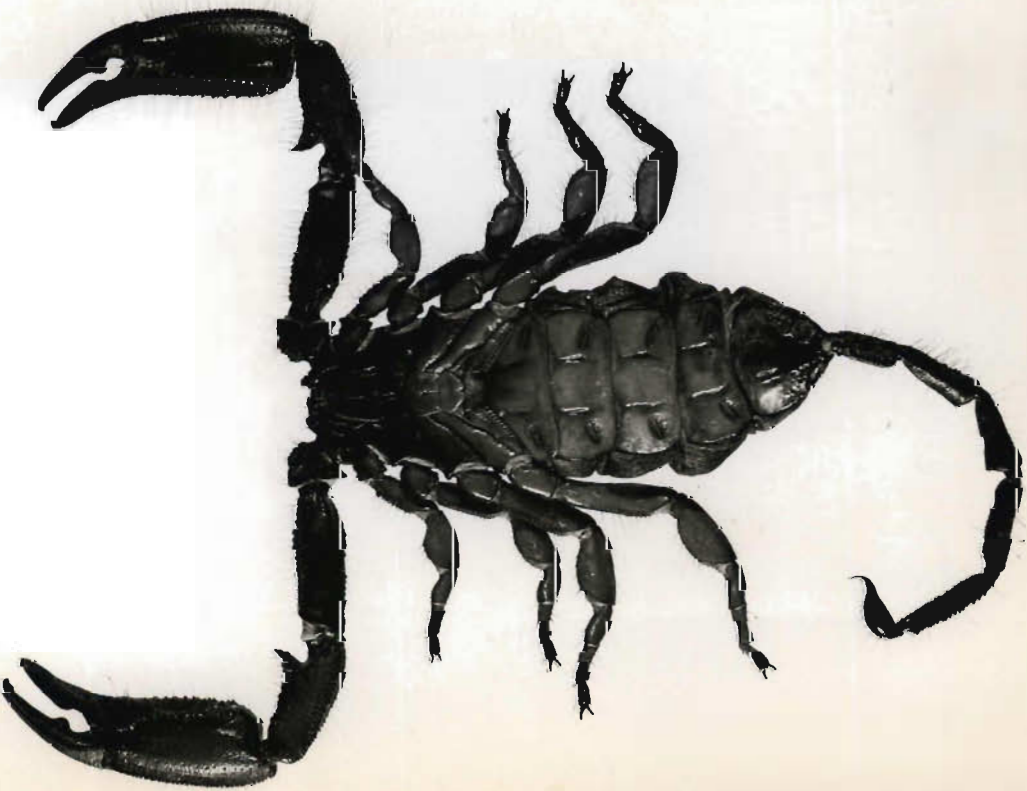
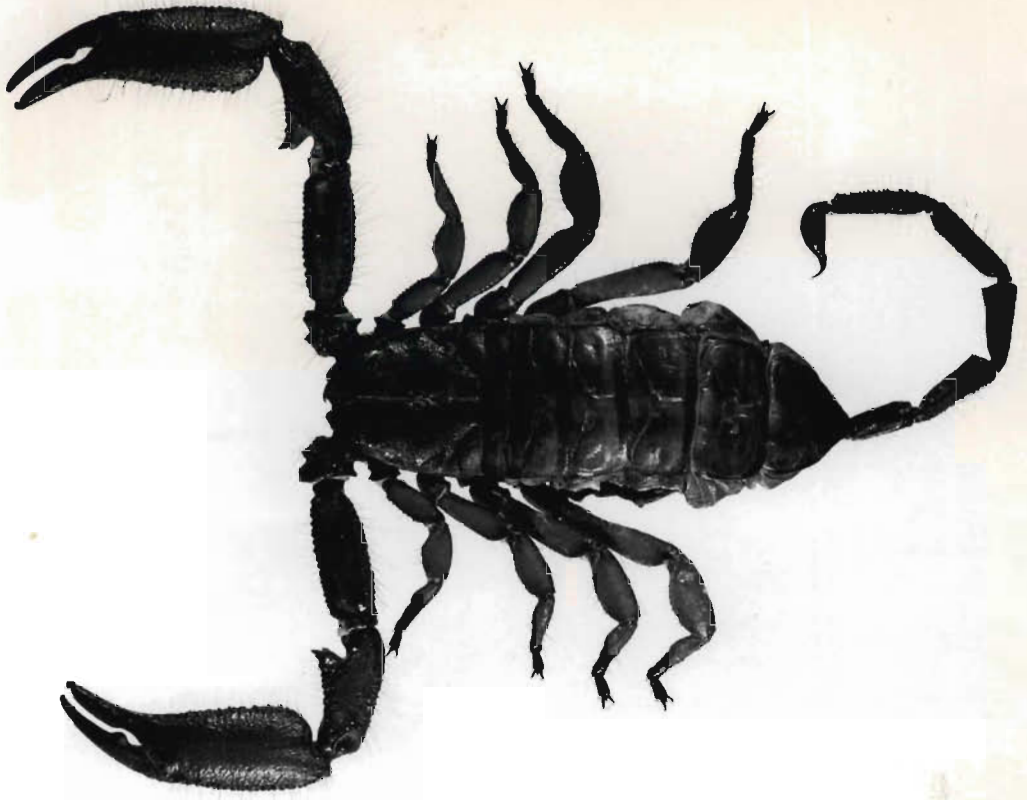


Plate 4.44. Hadogènes tityrus (E. Simon) ♂ (T.M. 9395 -
paratype of H. lawrencei syn. nov.). Scale in mm.

a, dorsal

b, ventral

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Plate 4.45. Lisposoma elegans Lawrence, ♂ (N.M. 10035)
Scale in mm.

a, dorsal

b, ventral

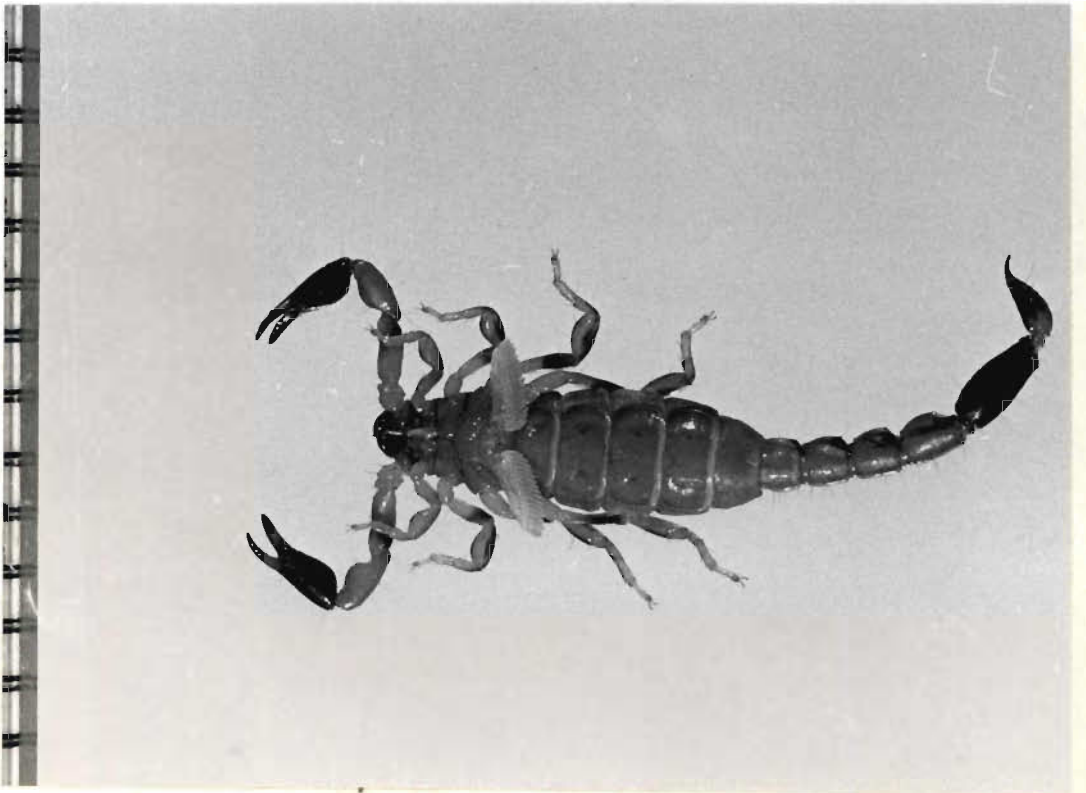
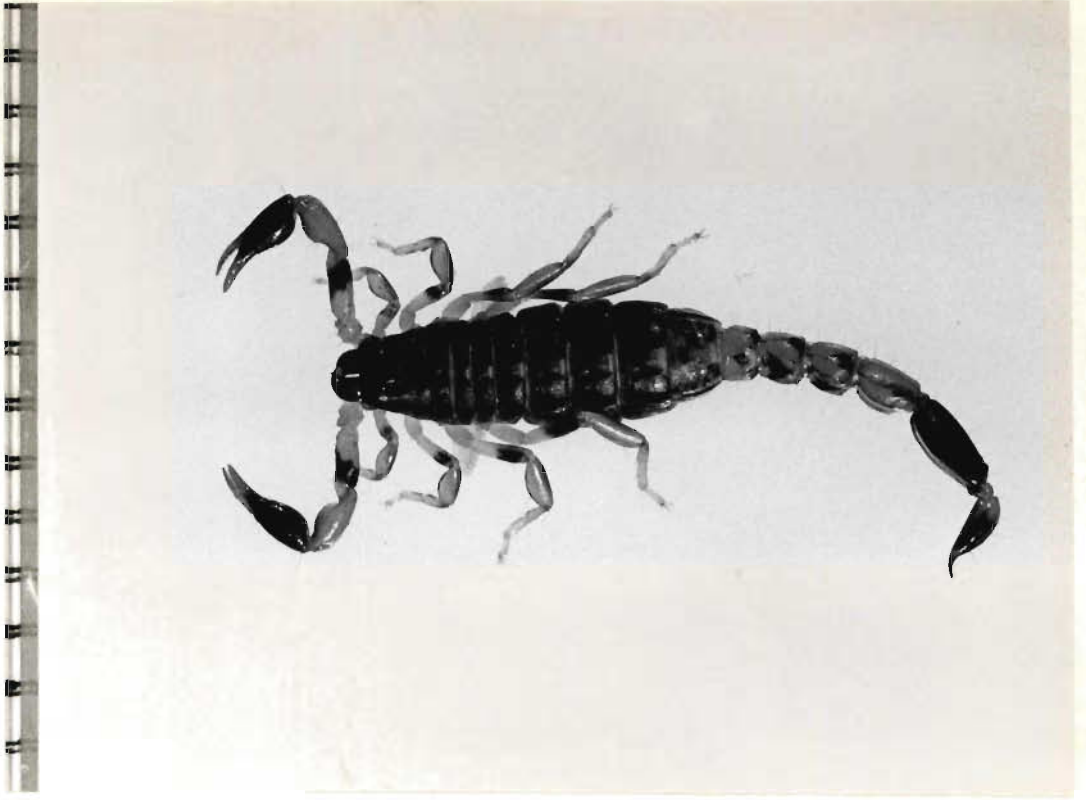


Plate 4.46. Lisposoma new species A, ♂ holotype (N.M. 10697).
Scale in mm.

a, dorsal

b. ventral

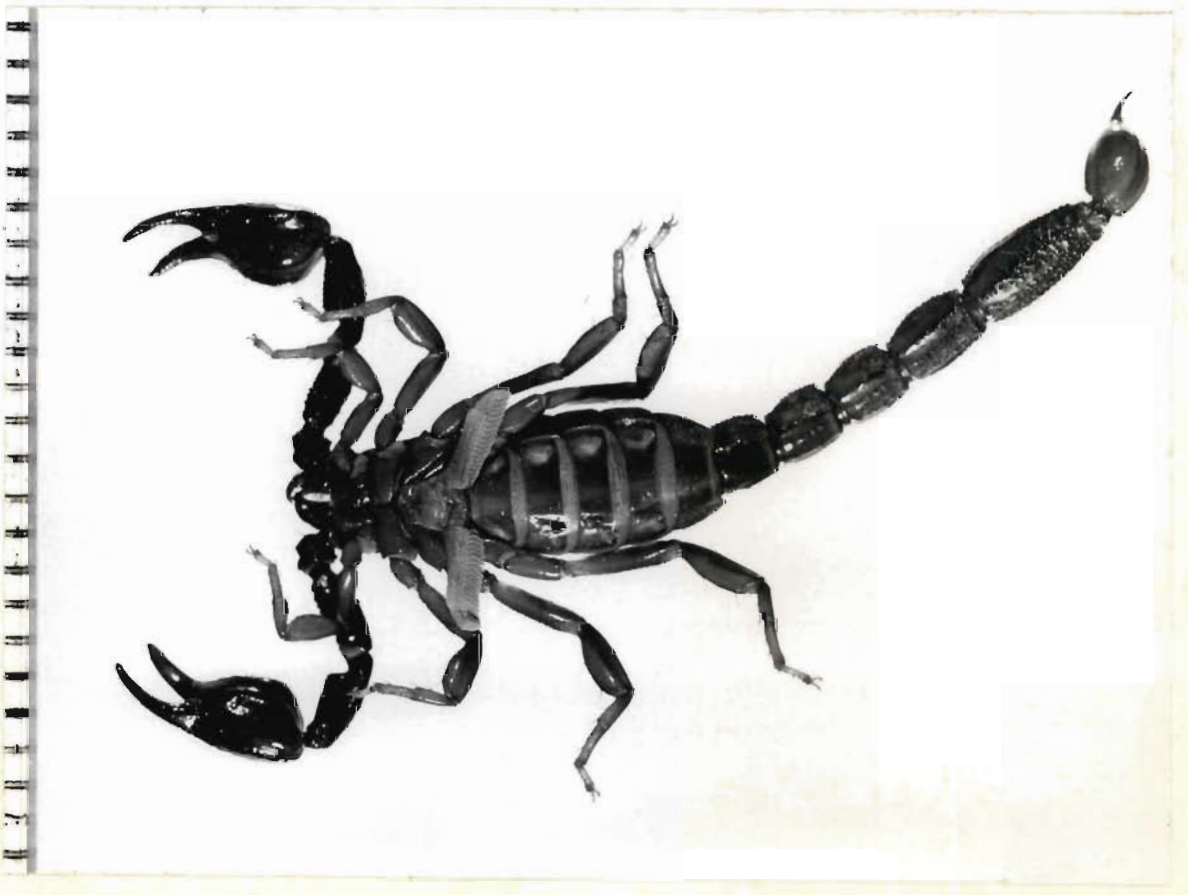


Plate 4.47. Opisthophthalmus adustus Kraepelin, ♀ (N.M.
10654). Scale in mm.

a, dorsal

b, ventral

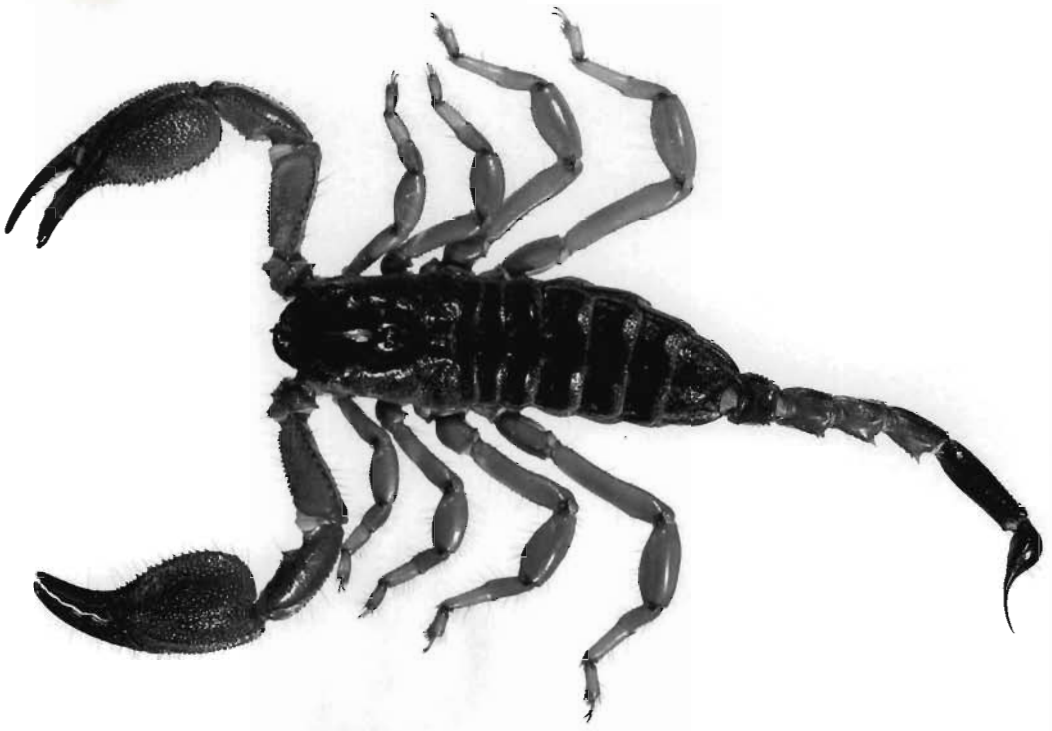


Plate 4.48. Opisthophthalmus adustus Kraepelin, ♂ (N.M.
10654). Scale in mm.

a, dorsal

b, ventral

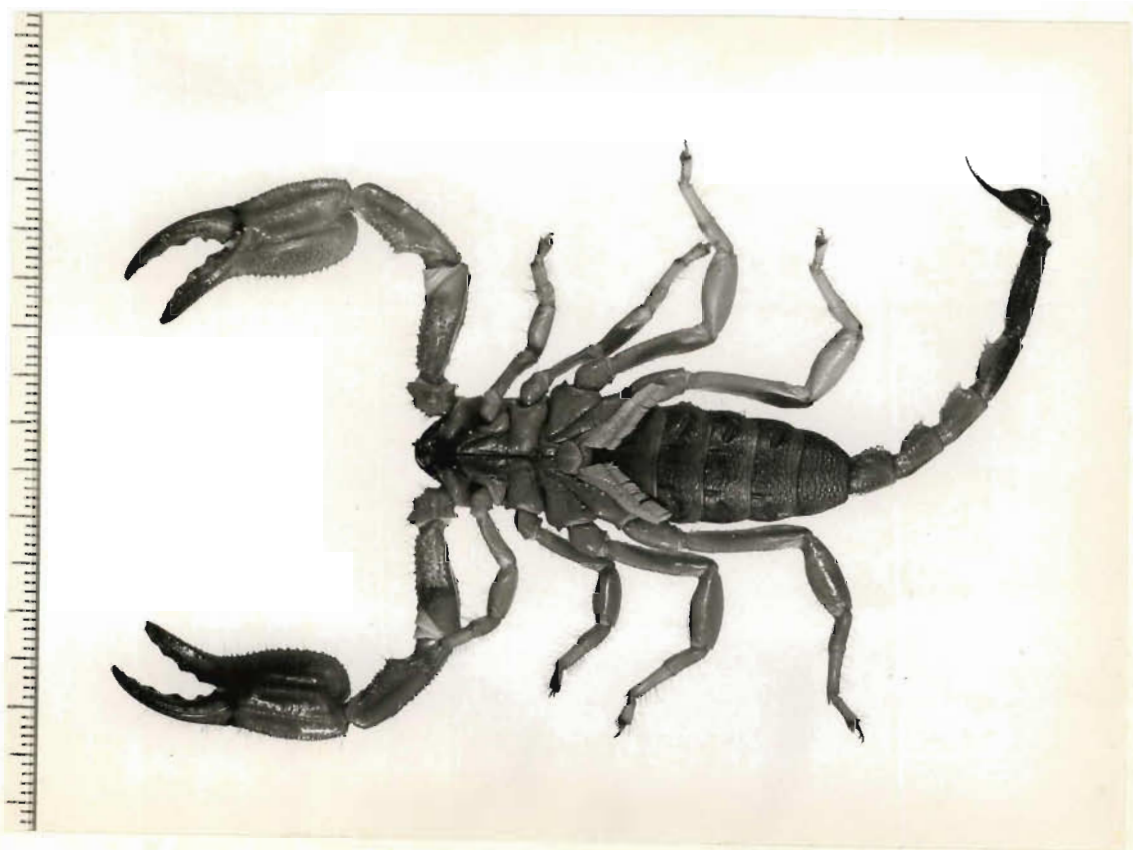
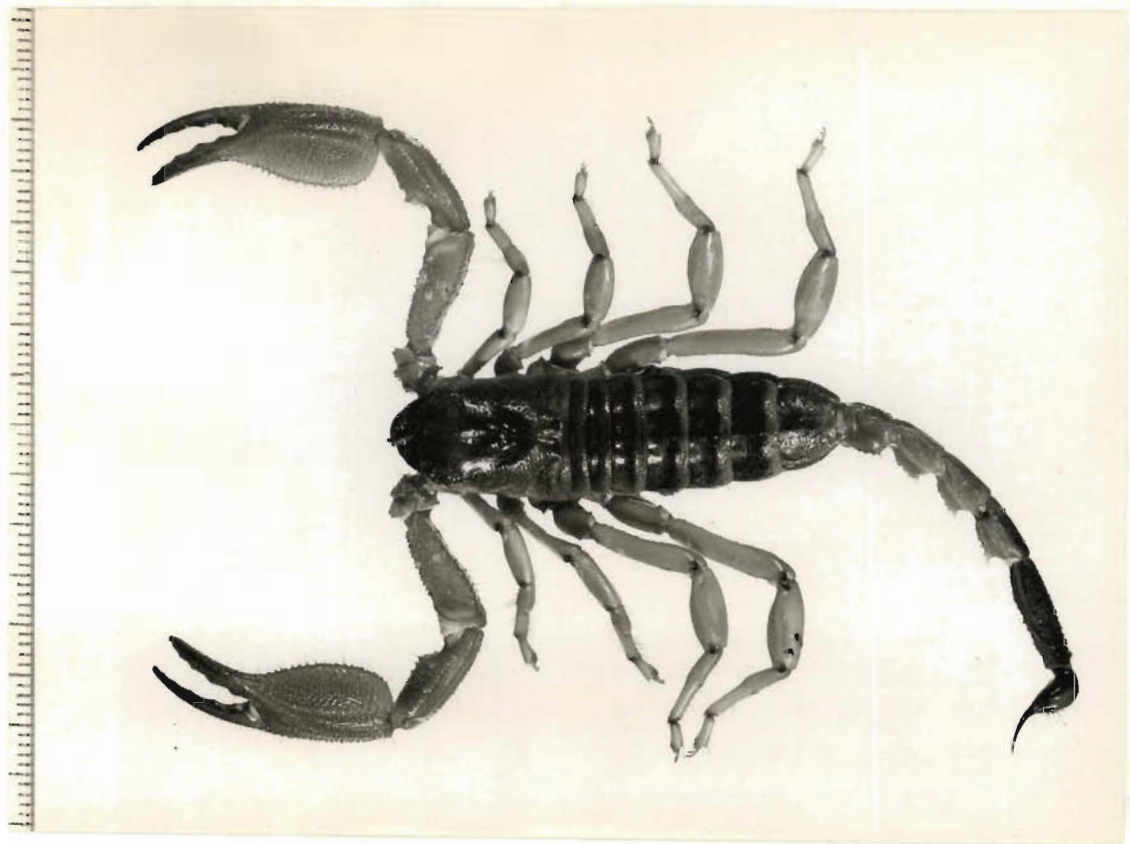


Plate 4.49. Opisthophthalmus brevicauda Lawrence, ♂
(N.M. 8292 - holotype of O. gaerdesi syn. nov.). Scale in
mm.

a, dorsal

b, ventral



Plate 4.50. Opisthophthalmus carinatus (Peters), ♀
(N.M. 10670). Scale in mm.

a, dorsal

b, ventral



Plate 4.51. Opisthophthalmus carinatus (Peters), ♂
(S.M.N. 494). Scale in mm.

a, dorsal

b, ventral



Plate 4.52. Opisthophthalmus cavimanus Lawrence, ♀
(N.M. 10830). Scale in mm.

a, dorsal

b, ventral

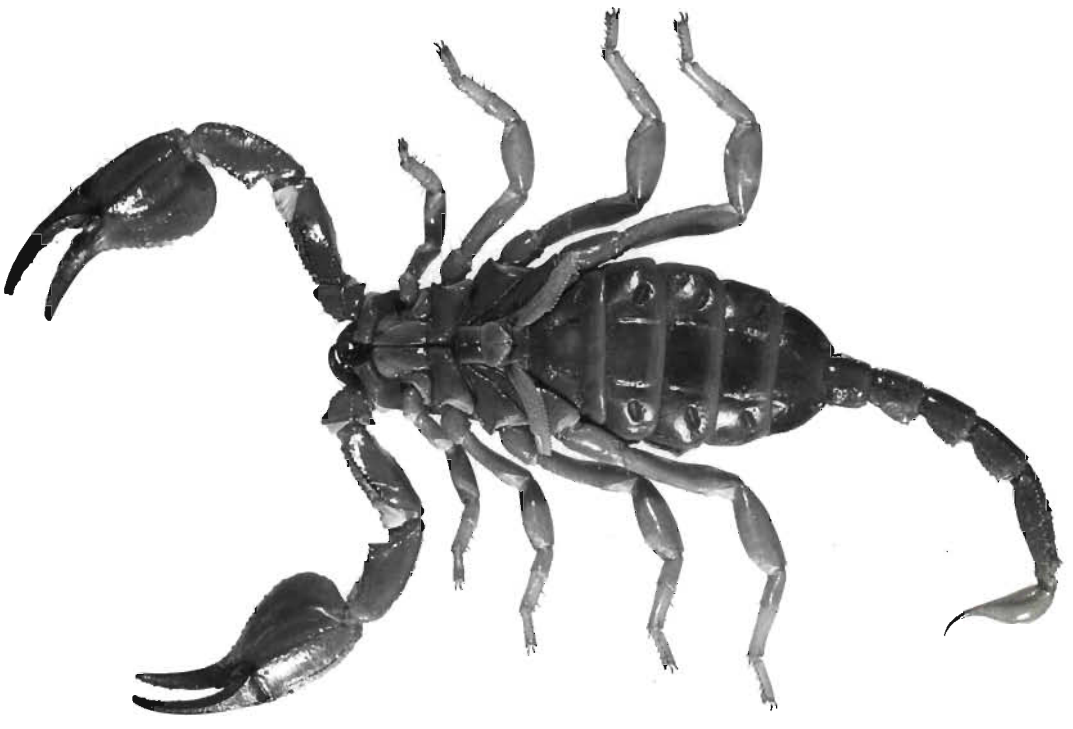
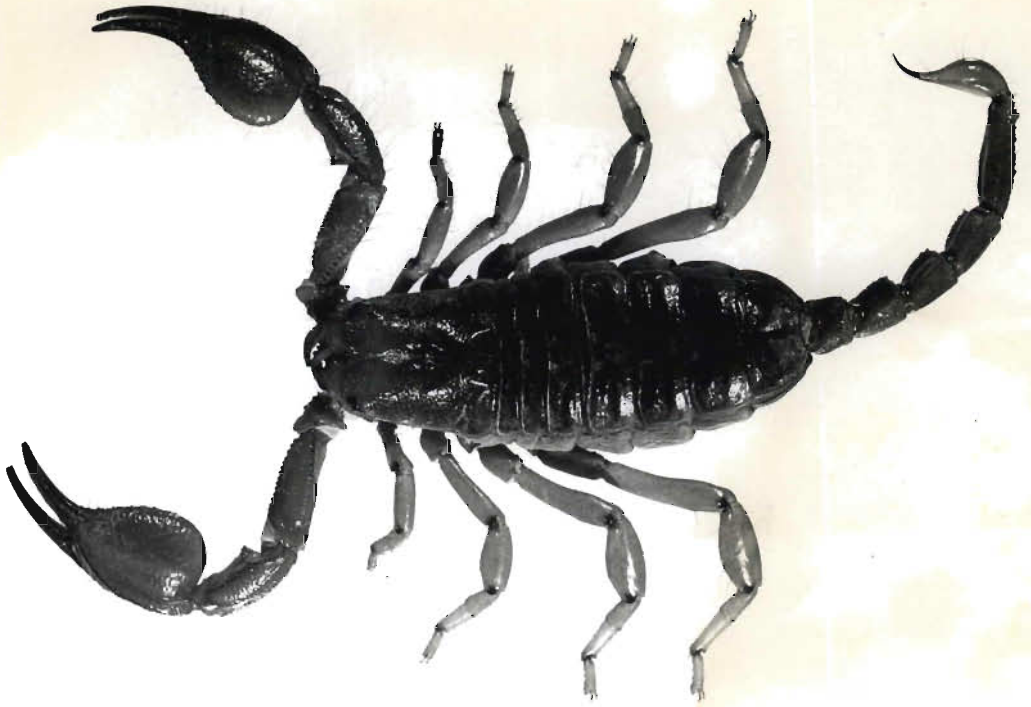


Plate 4.53. Opisthophthalmus cavimanus Lawrence, ♂ (N.M.
10830). Scale in mm.

a, dorsal

b, ventral

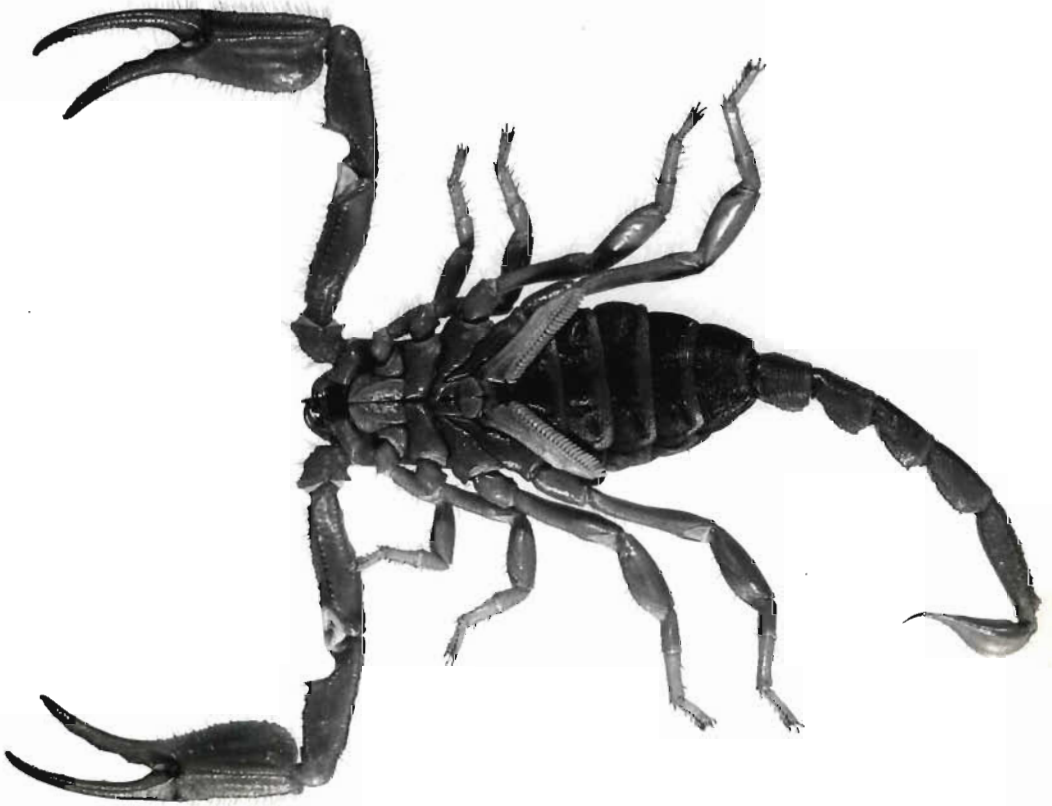


Plate 4.54. Opisthophthalmus chrysites Lawrence, ♂ holotype
(T.M. 9437). Scale in mm.

a, dorsal

b, ventral

Plate 4.55. Opisthophthalmus chrysites Lawrence, ♀ paratype
(T.M. 9438). Scale in mm.

a, dorsal

b, ventral

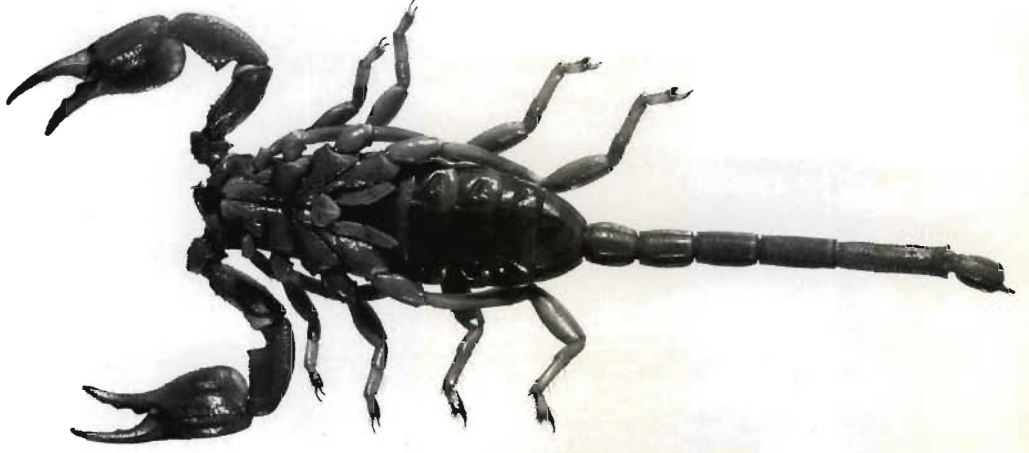
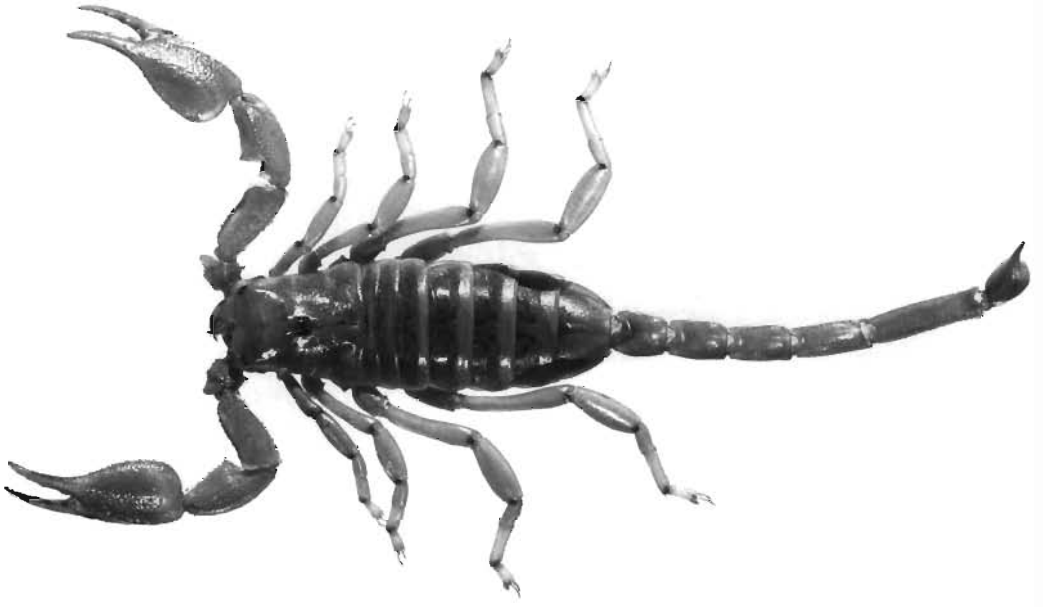


Plate 4.56. Opisthophthalmus new species A, ♂ holotype
(N.M. 10627). Scale in mm.

a, dorsal

b, ventral

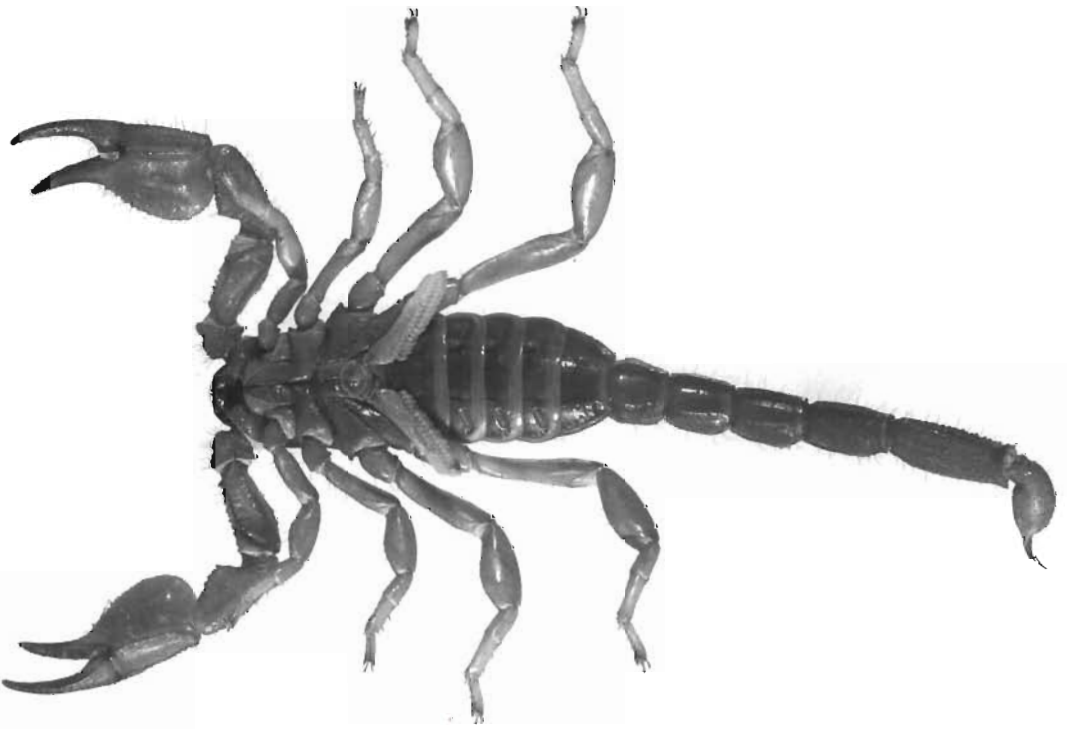


Plate 4.57. Opisthophthalmus concinnus Newlands, ♂ holotype
(T.M. 9530). Scale in mm.

a, dorsal

b, ventral

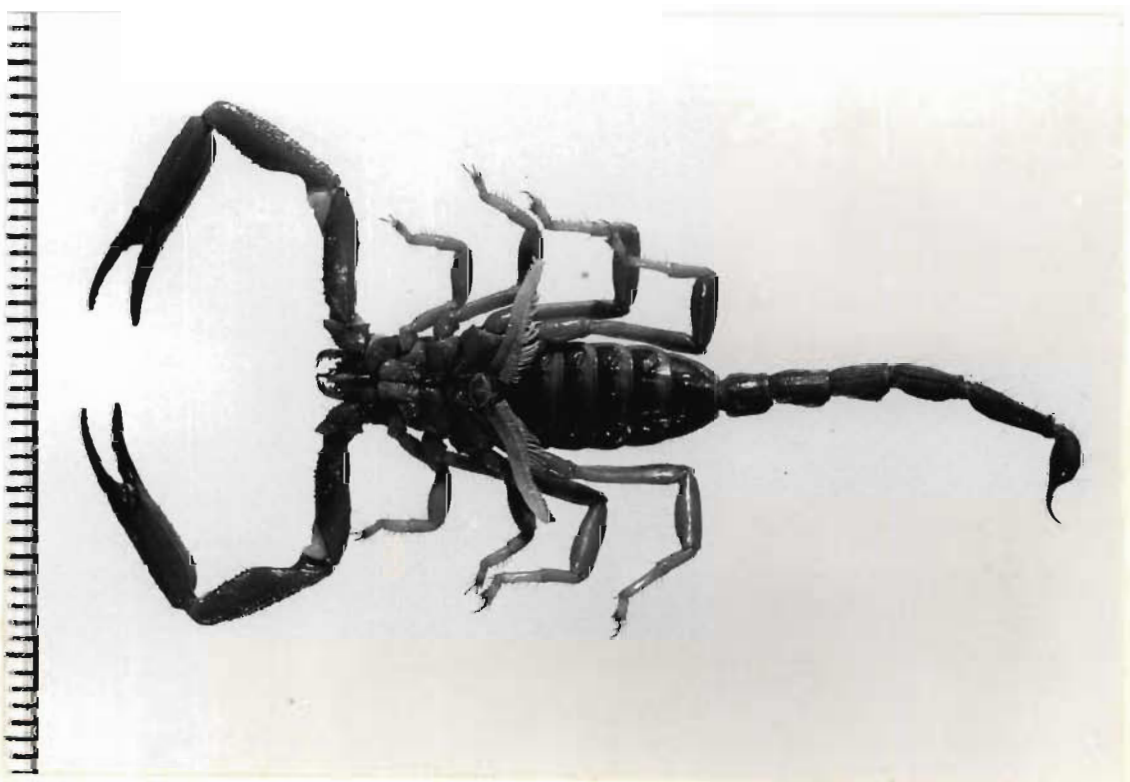
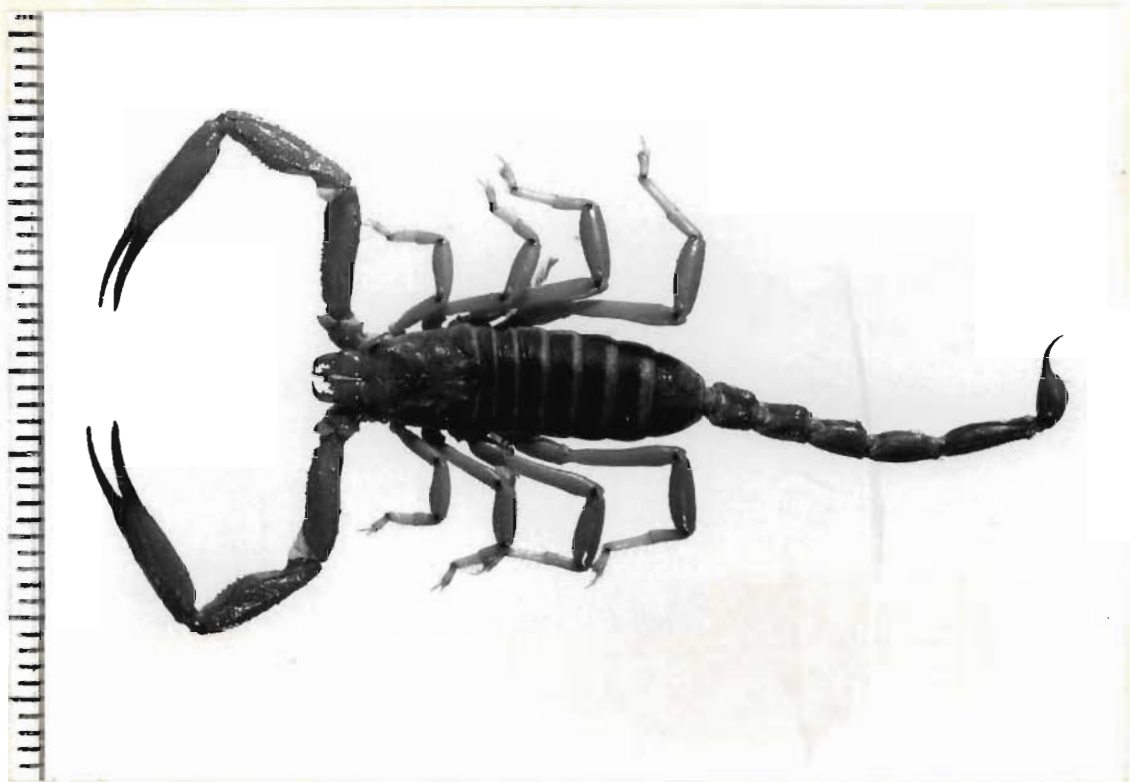


Plate 4.58. Opisthophthalmus concinnus Newlands, ♀ paratype
(T.M. 8796). Scale in mm.

a, dorsal

b, ventral



Plate 4.59. Opisthophthalmus fitzsimonsi Hewitt, ♀ (N.M.
10077). Scale in mm.

a, dorsal

b, ventral

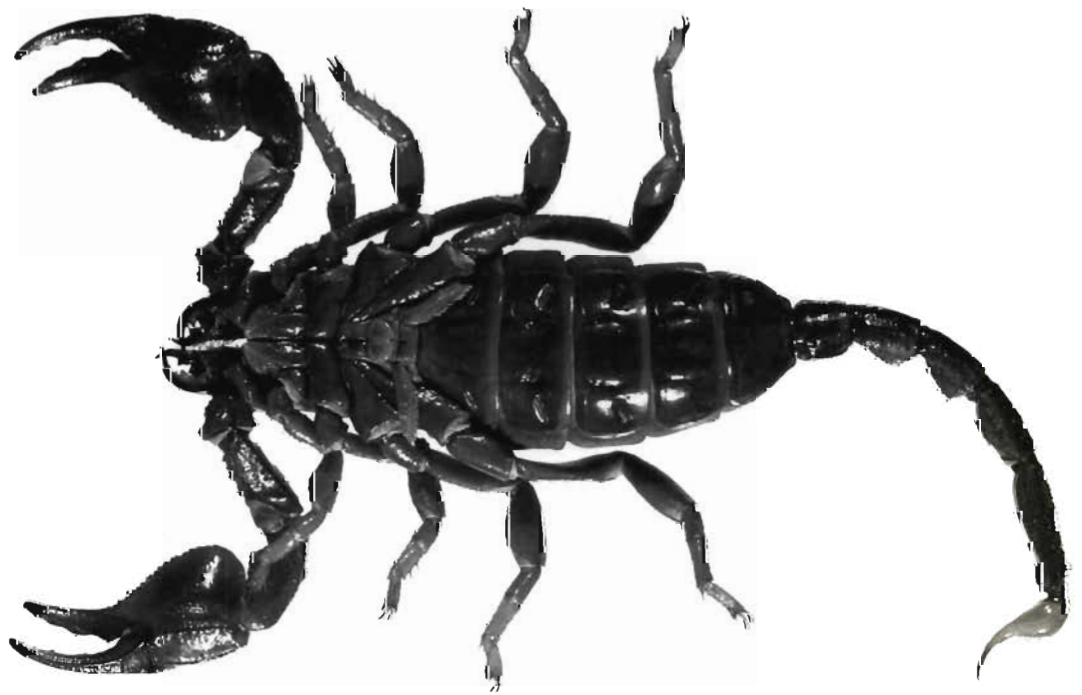


Plate 4.60. Opisthophthalmus flavescens Purcell, ♀ (N.M.
10641). Scale in mm.

a, dorsal

b, ventral

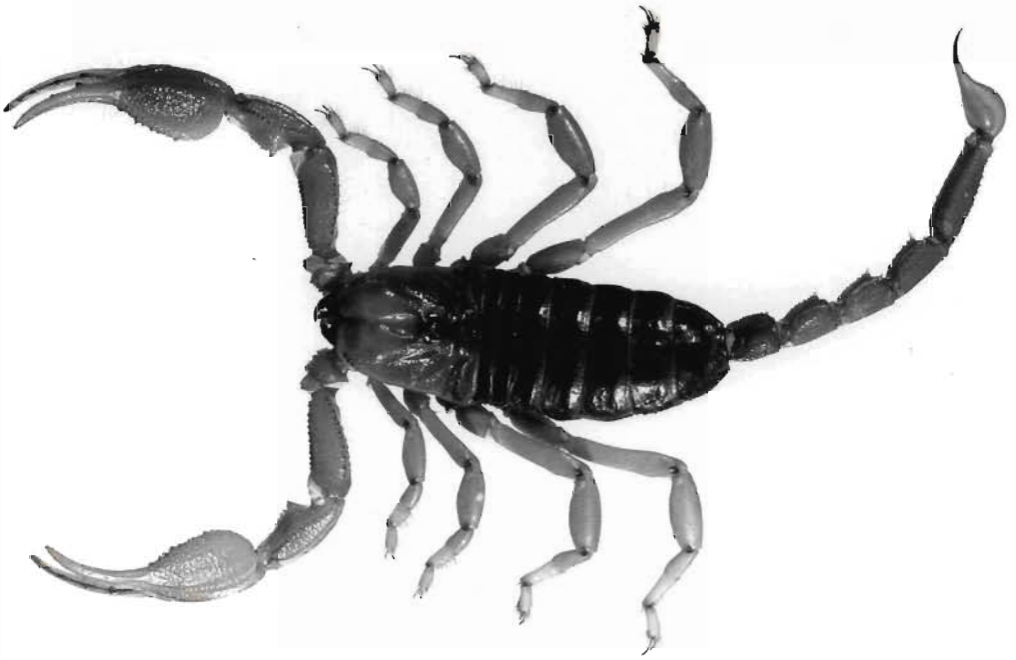


Plate 4.61. Opisthophthalmus new species B, ♂ holotype
(N.M. 11068). Scale in mm.

a, dorsal

b, ventral



Plate 4.62. Opisthophthalmus gigas Purcell, ♂ (N.M. 10586).
Scale in mm.

a, dorsal

b, ventral

Plate 4.63. Opisthophthalmus haackei Lawrence, ♀ (N.M. 10543).
Scale in mm.

a, dorsal

b, ventral

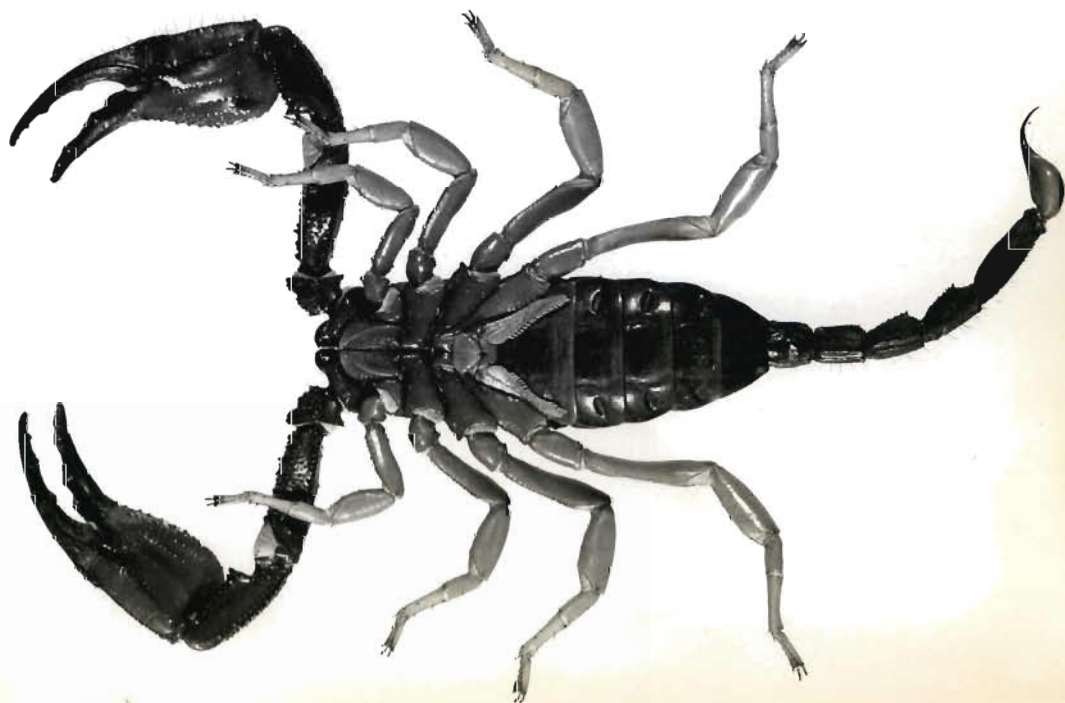


Plate 4.64. Opisthophthalmus holmi (Lawrence), ♀ (N.M. 10676).

a, dorsal

b, ventral

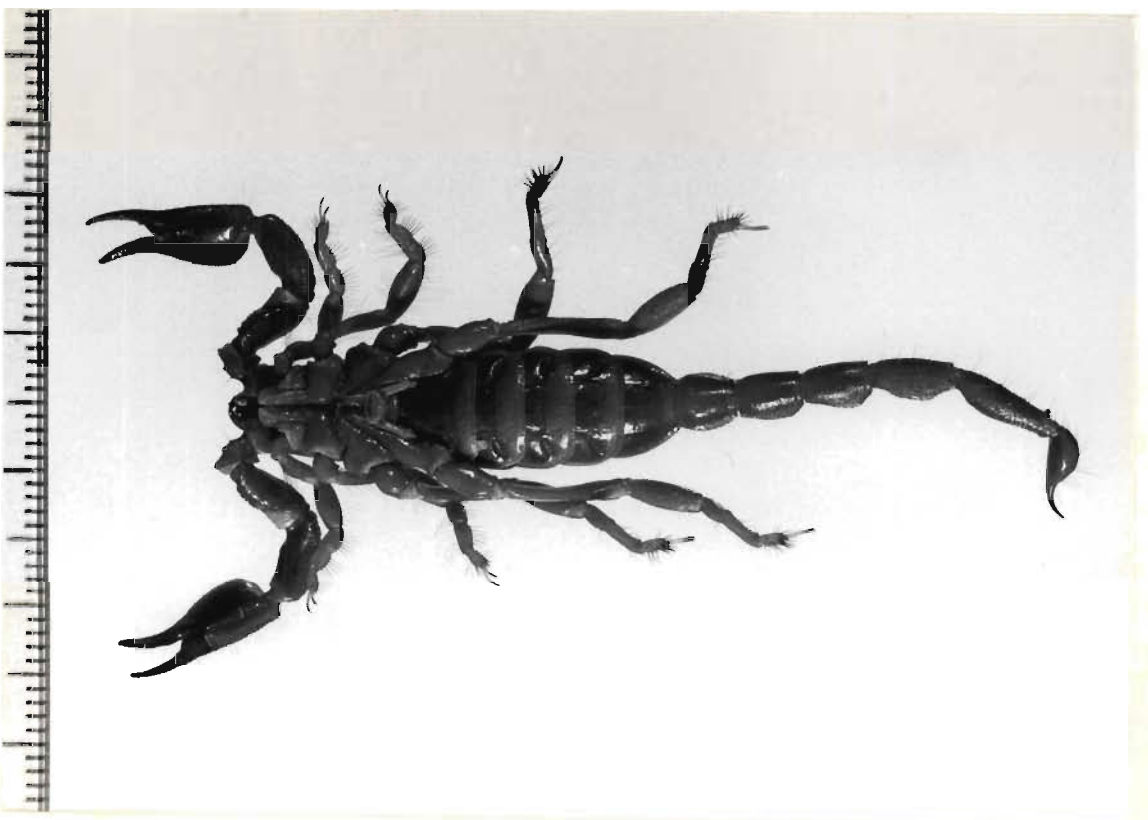
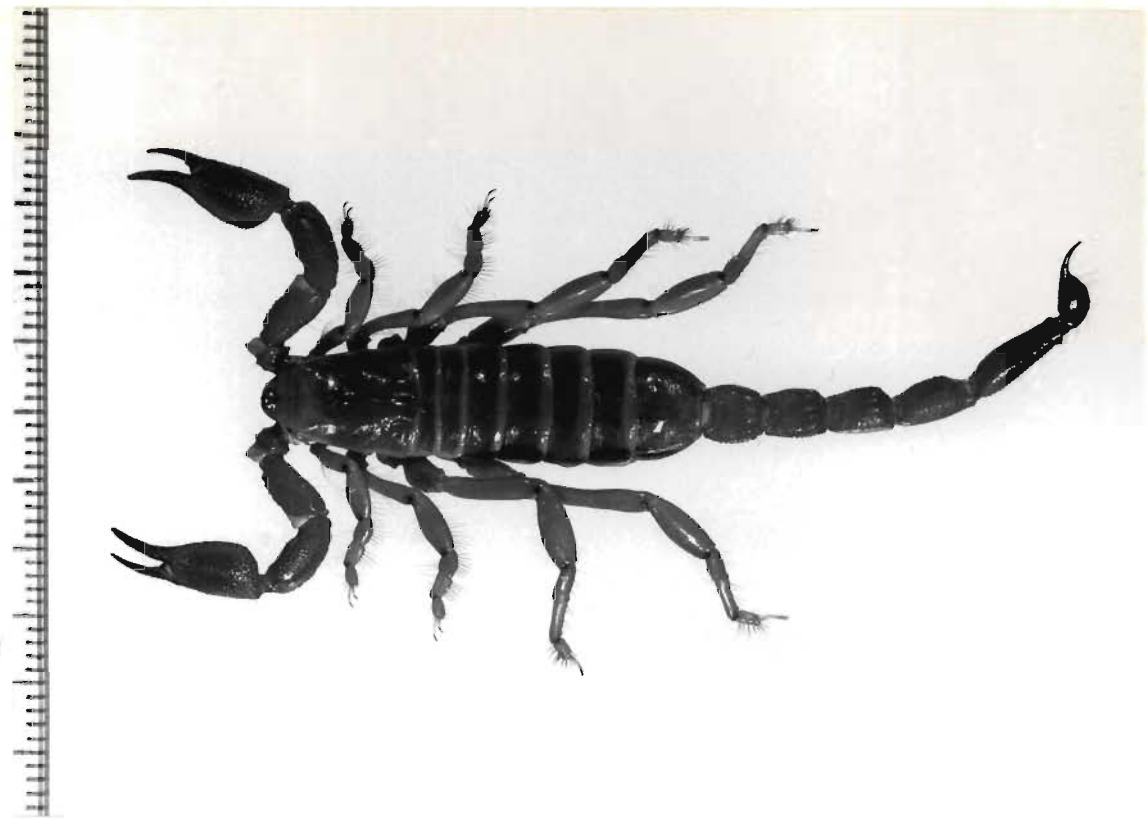


Plate 4.65. Opisthophthalmus holmi (Lawrence), ♂ (N.M.
10676). Scale in mm.

a, dorsal

b, ventral

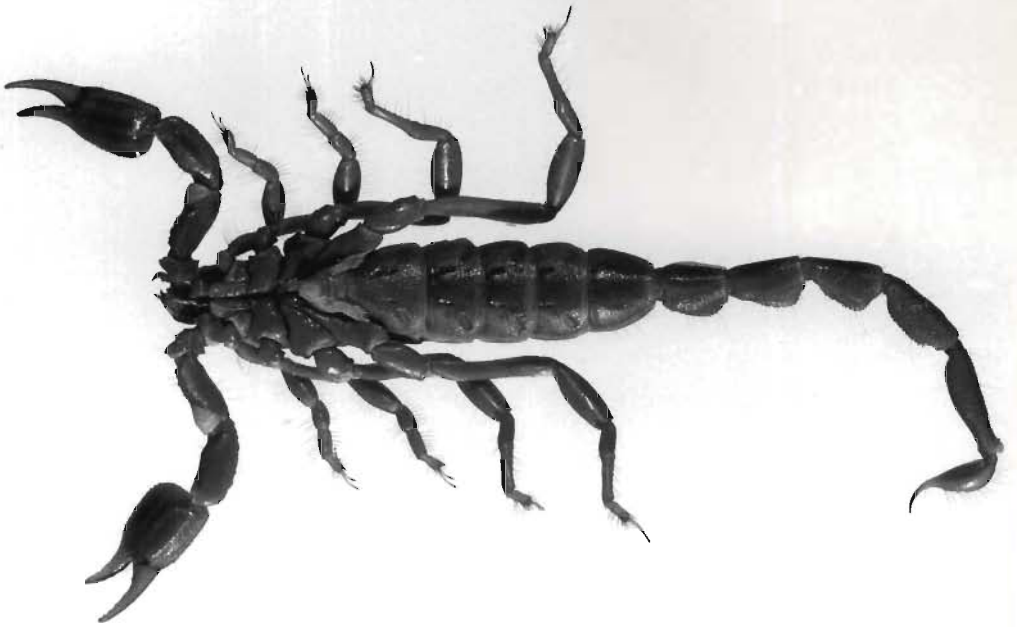
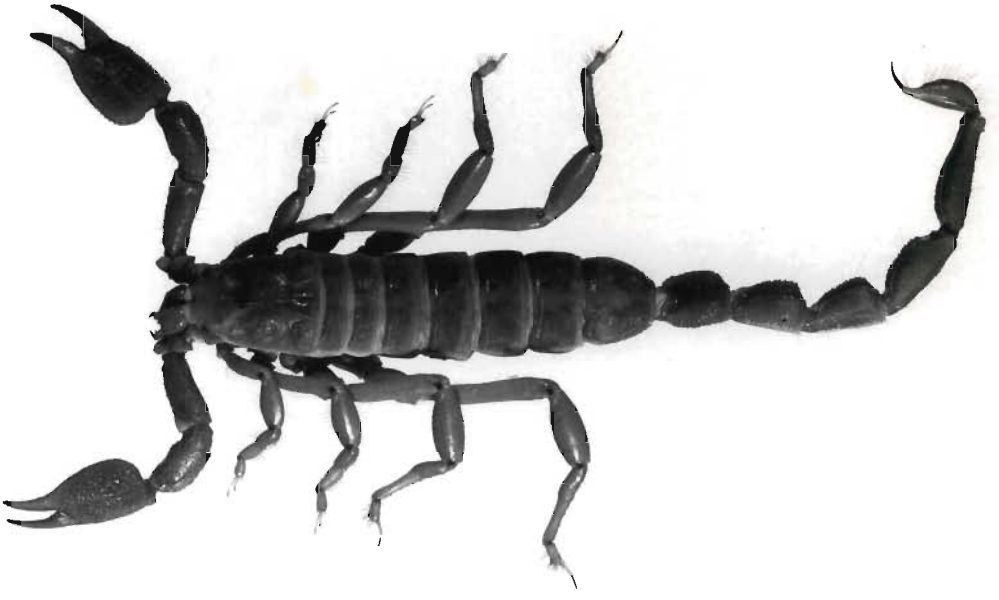


Plate 4.66. Opisthophthalmus intercedens Kraepelin, ♀
lectotype (Z.M.B. 14973). Scale in mm.

a, dorsal

b, ventral

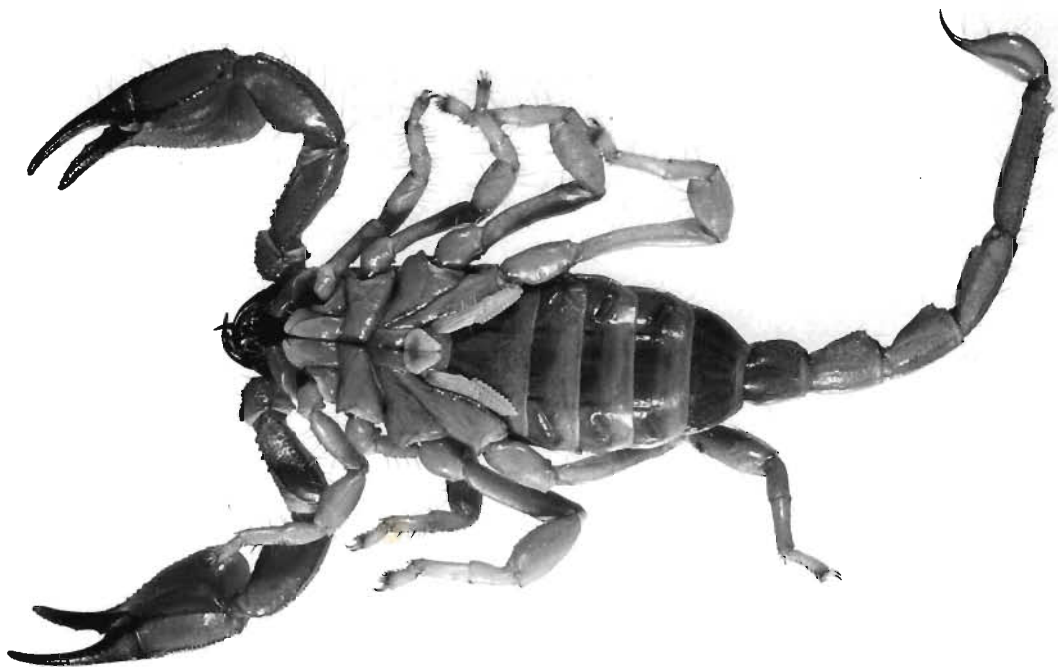
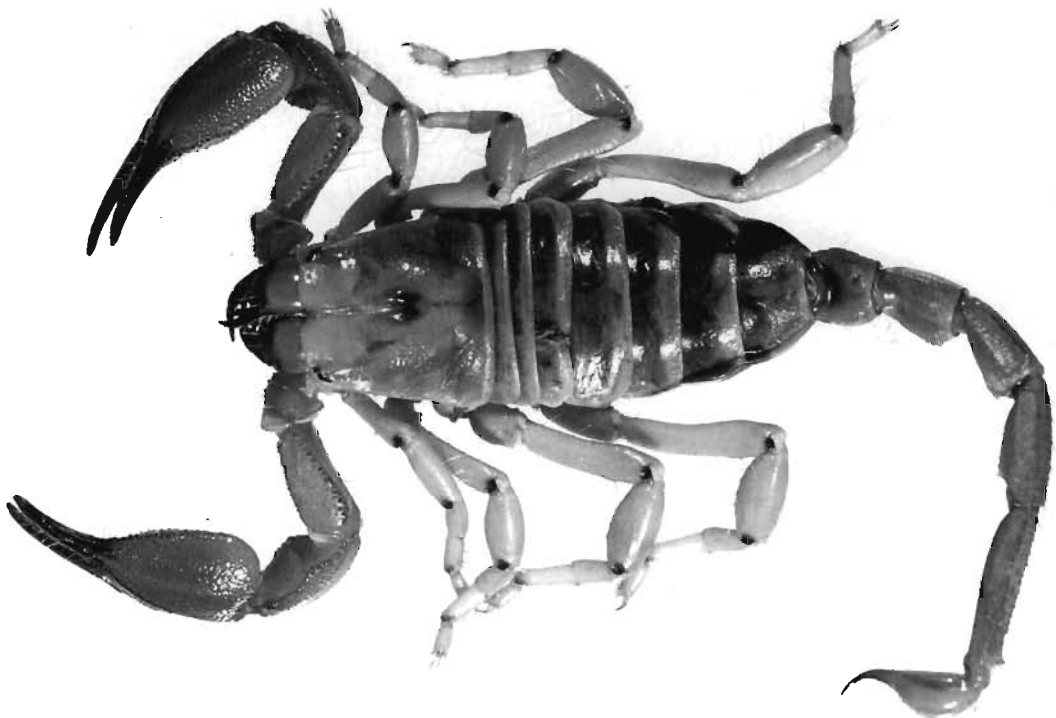


Plate 4.67. Opisthophthalmus jenseni (Lamorai), ♂ holotype
(T.M. 9504). Scale in mm.

a, dorsal

b, ventral

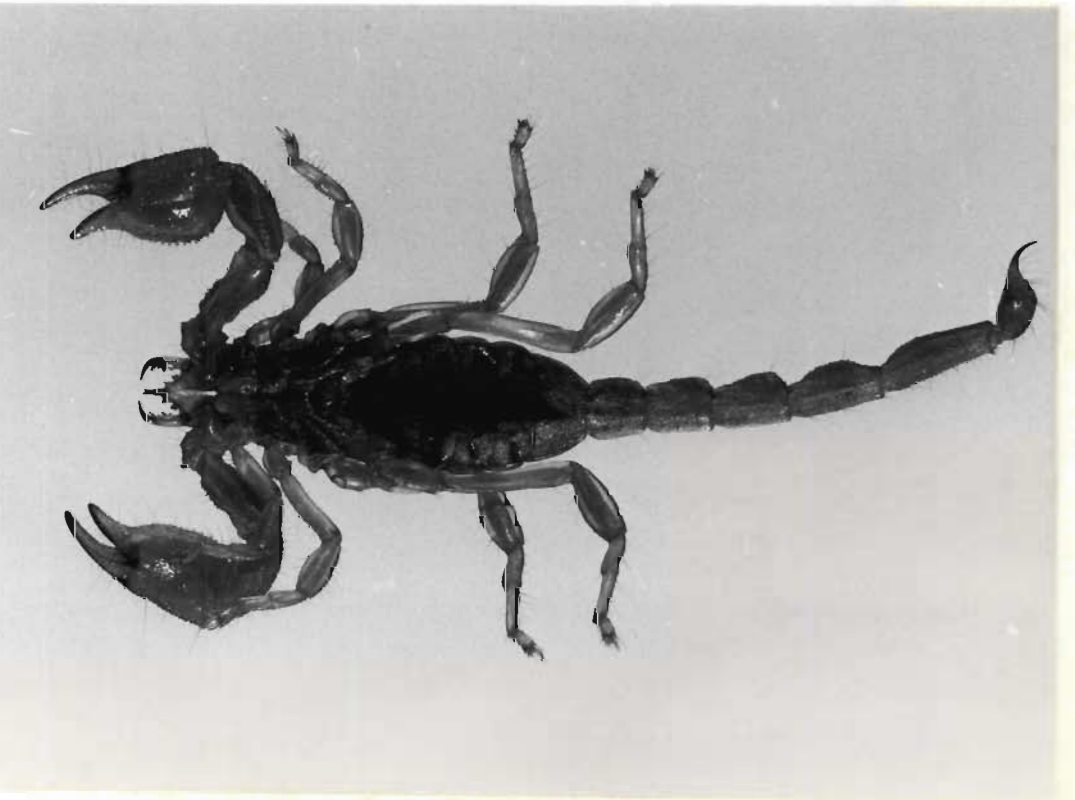
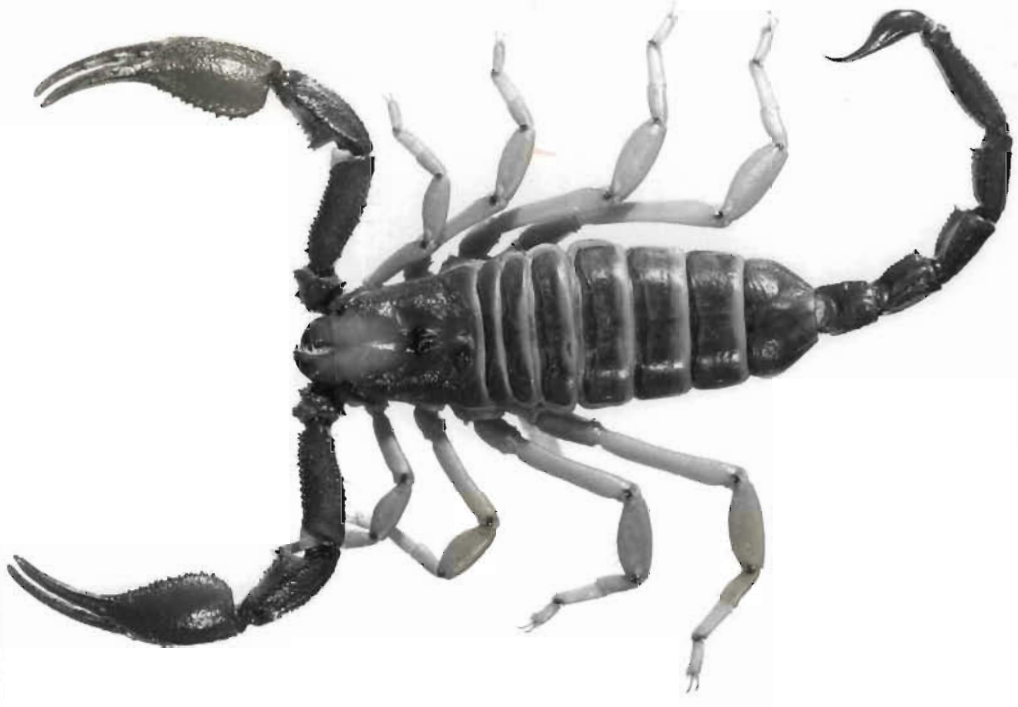


Plate 4.68. Opisthophthalmus litoralis Lawrence, ♂ (S.M.N.
122). Scale in mm.

a, dorsal

b, ventral

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

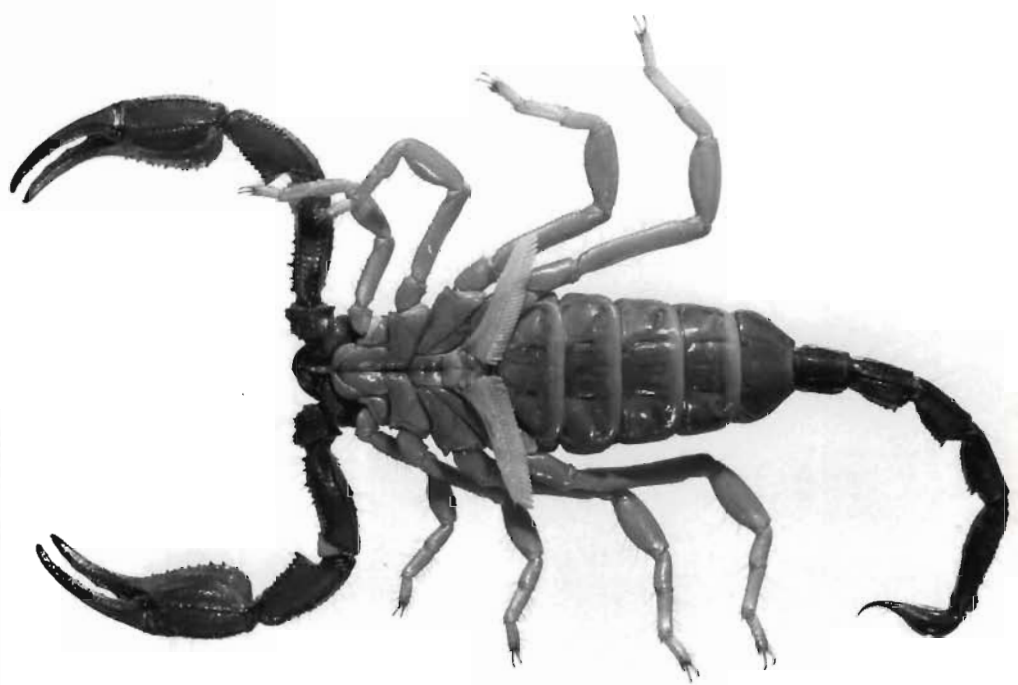


Plate 4.69. Opisthophthalmus new species C, ♂ holotype
(N.M. 11106). Scale in mm.

a, dorsal

b, ventral



Plate 4.70. Opisthophthalmus opinatus (E. Simon), ♀ holotype
(R.S. 0235). Scale in mm.

a, dorsal

b, ventral

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

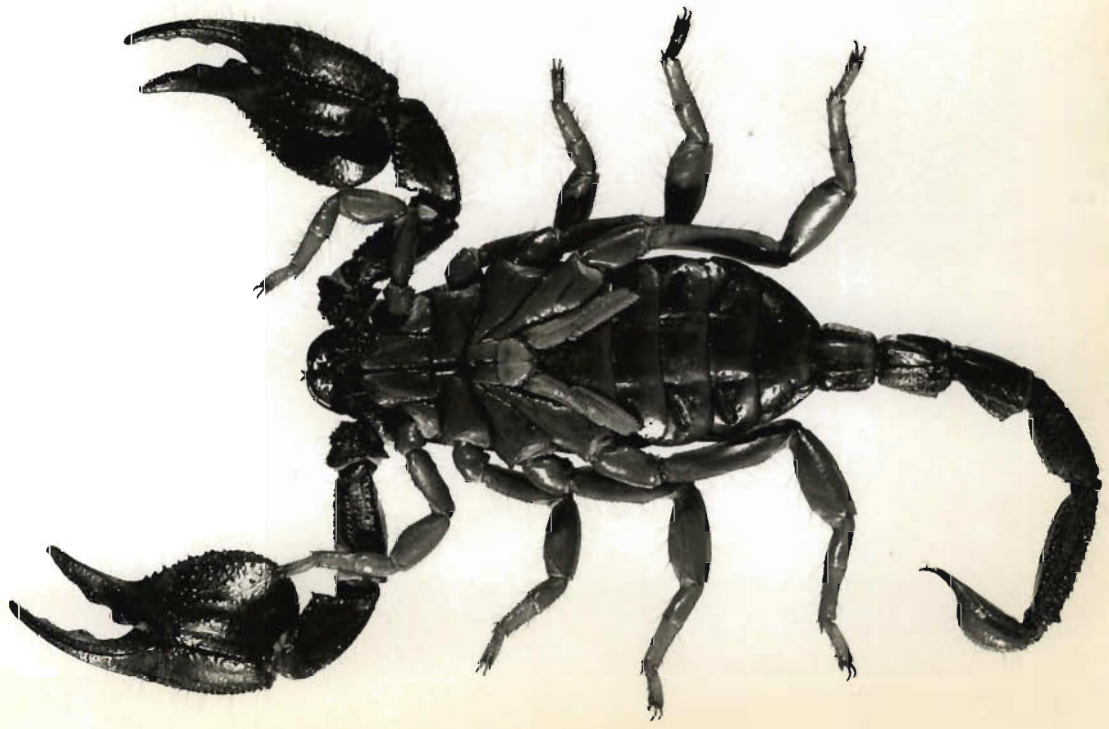


Plate 4.71. Opisthophthalmus opinatus (E. Simon), ♂^r (T.M.
411 - syntype of O. scabrifrons syn. nov.). Scale in mm.

a, dorsal

b, ventral



Plate 4.72. Opisthophthalmus new species D, ♀ holotype
(N.M. 9123). Scale in mm.

a, dorsal

b, ventral

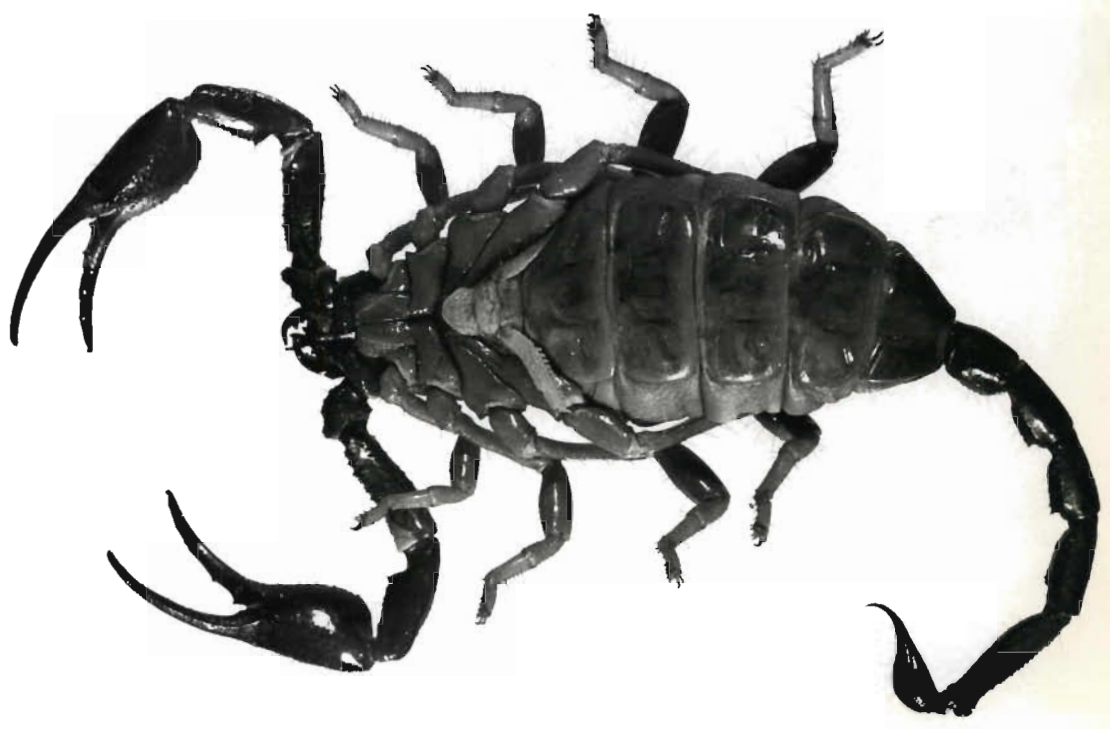


Plate 4.73. Opisthophthalmus new species D, ♂ paratype
(N.M. 10601). Scale in mm.

a, dorsal

b, ventral

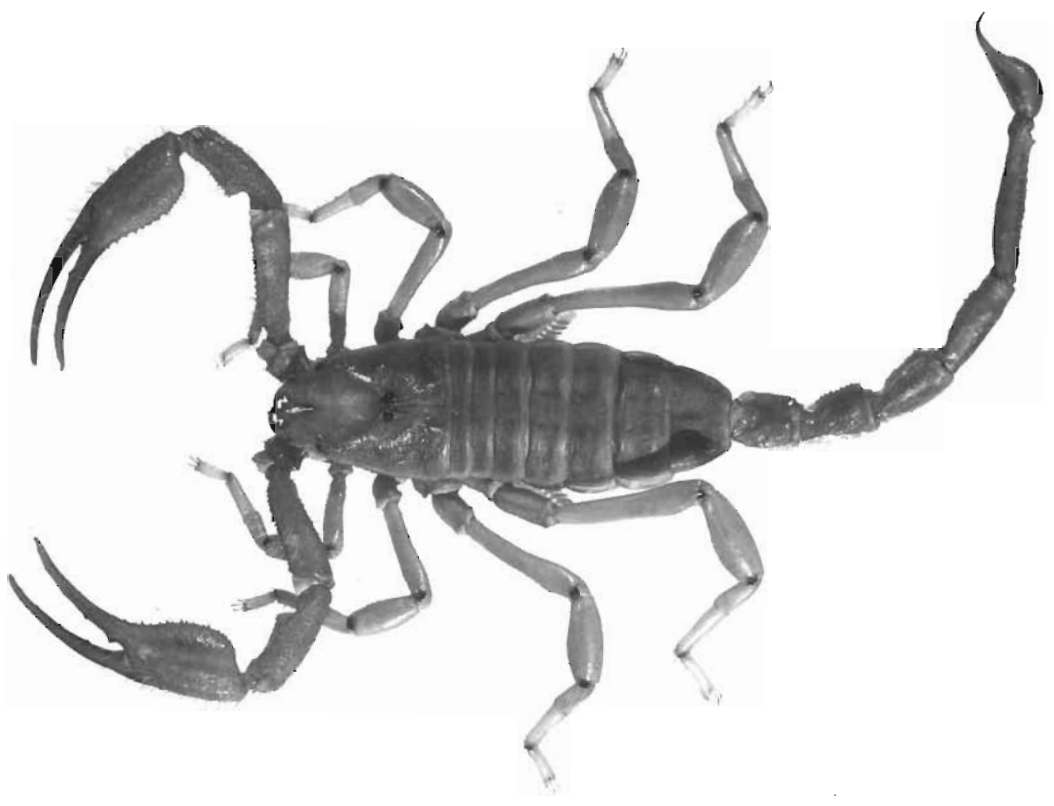


Plate 4.74. Opisthophthalmus new species E, ♀ holotype
(N.M. 11104). Scale in mm.

a, dorsal

b, ventral

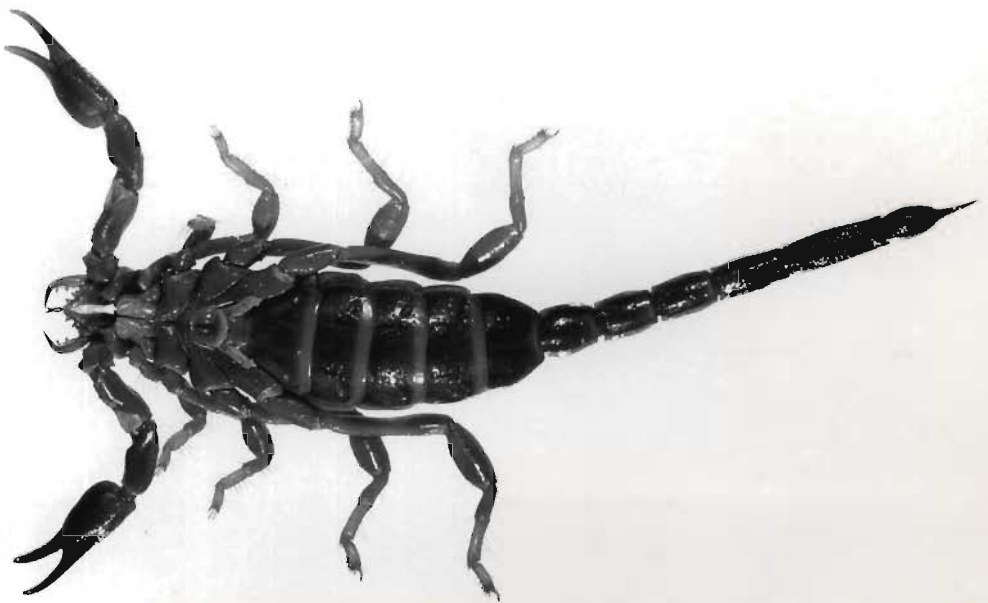
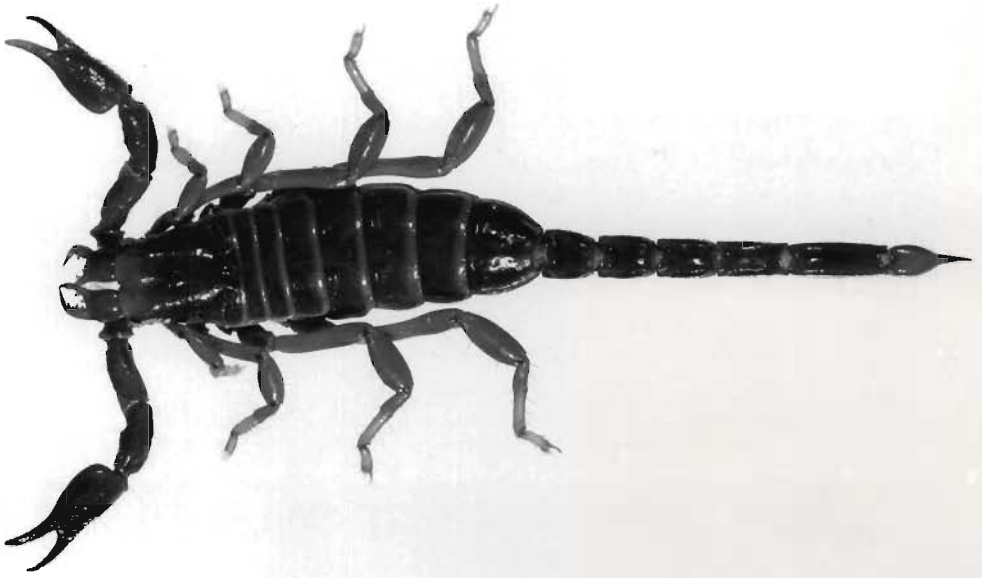


Plate 4.75. Opisthophthalmus new species E, ♂ paratype
(N.M. 10684). Scale in mm.

a, dorsal

b, ventral

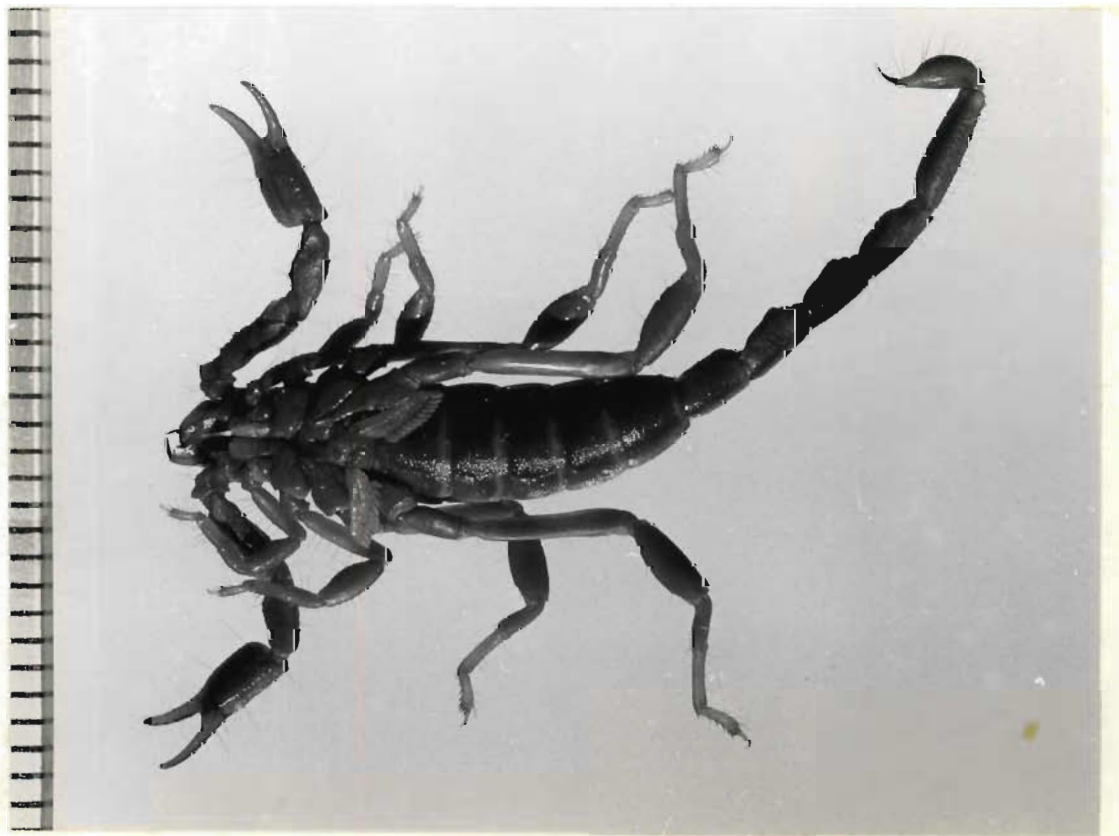
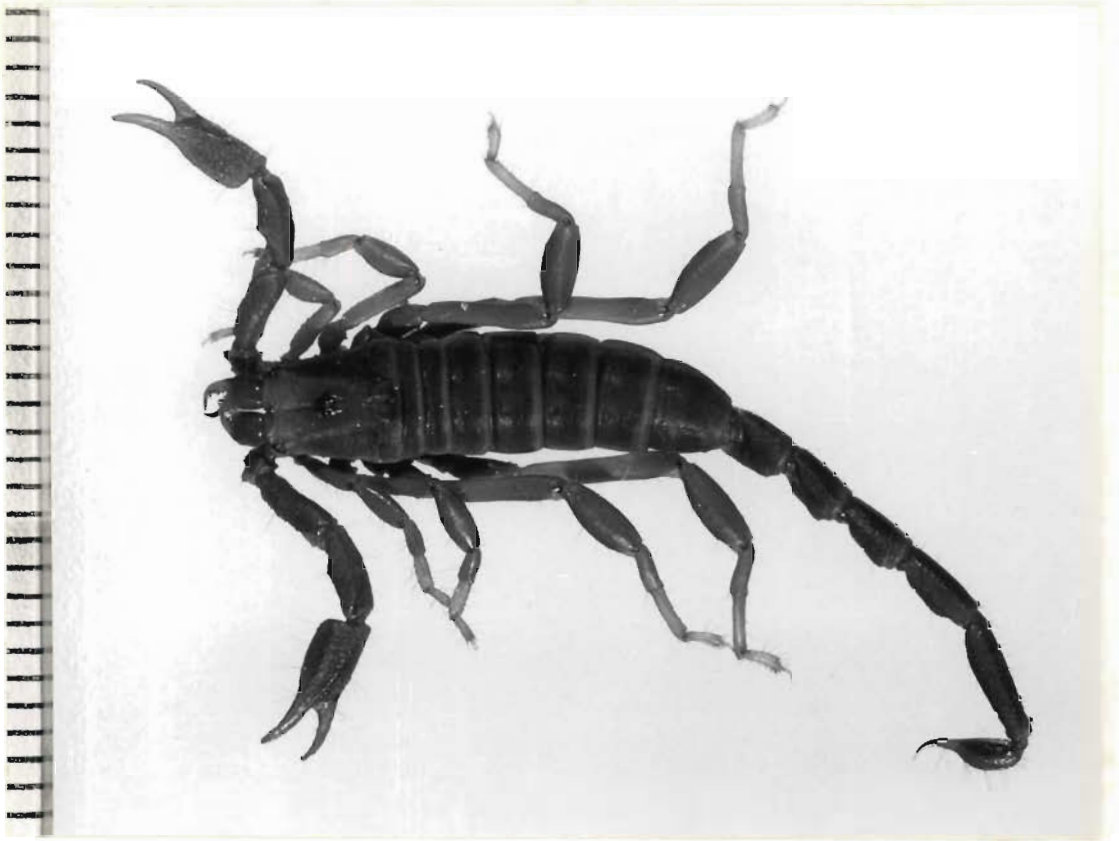


Plate 4.76. Opisthophthalmus schultzei, Kraepelin, ♂
(Z.M.B. 14993 - syntype of O. undulatus syn. nov.)
Scale in mm.

a, dorsal

b, ventral



Plate 4.77. Opisthophthalmus schultzei Kraepelin, ♀ homotype
(N.M. 10720). Scale in mm.

a, dorsal

b, ventral

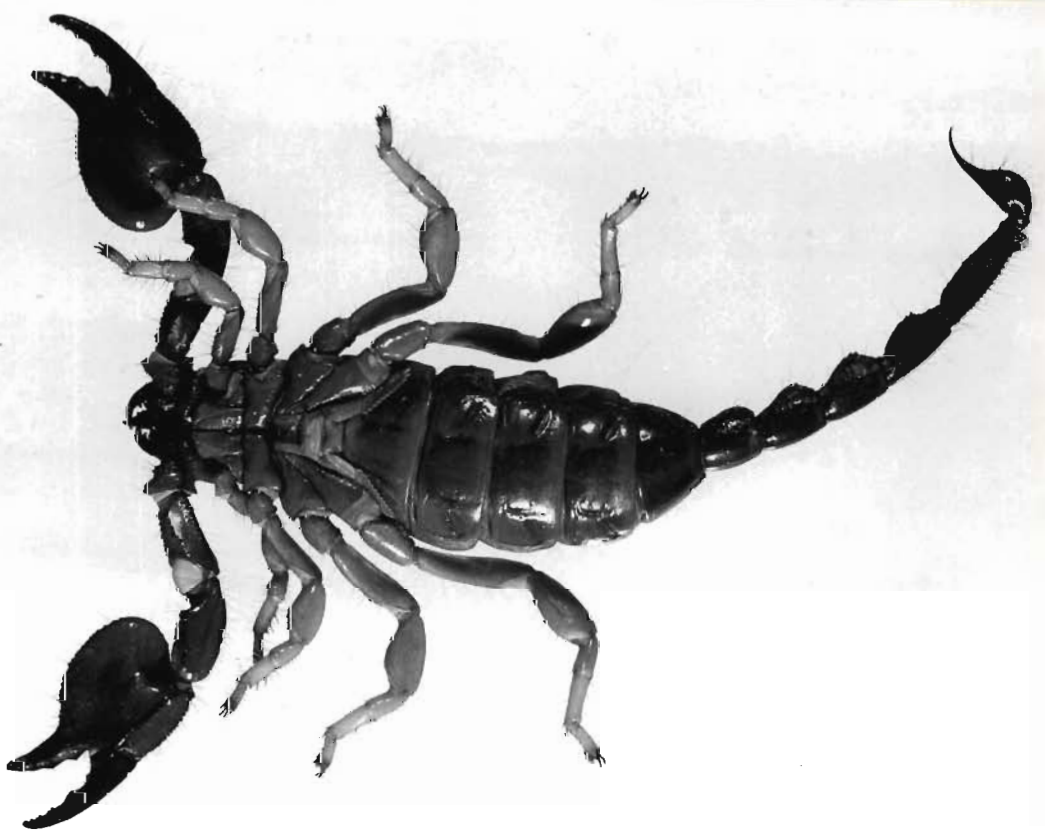


Plate 4.78. Opisthophthalmus setifrons Lawrence, ♂ holotype
(N.M. 8330). Scale in mm.

a, dorsal

b, ventral



Plate 4.79. Opisthophthalmus ugabensis Hewitt, ♀ (T.M. 8939 -
type of O. luciranus syn. nov.). Scale in mm.

a, dorsal

b, ventral

1880



1880

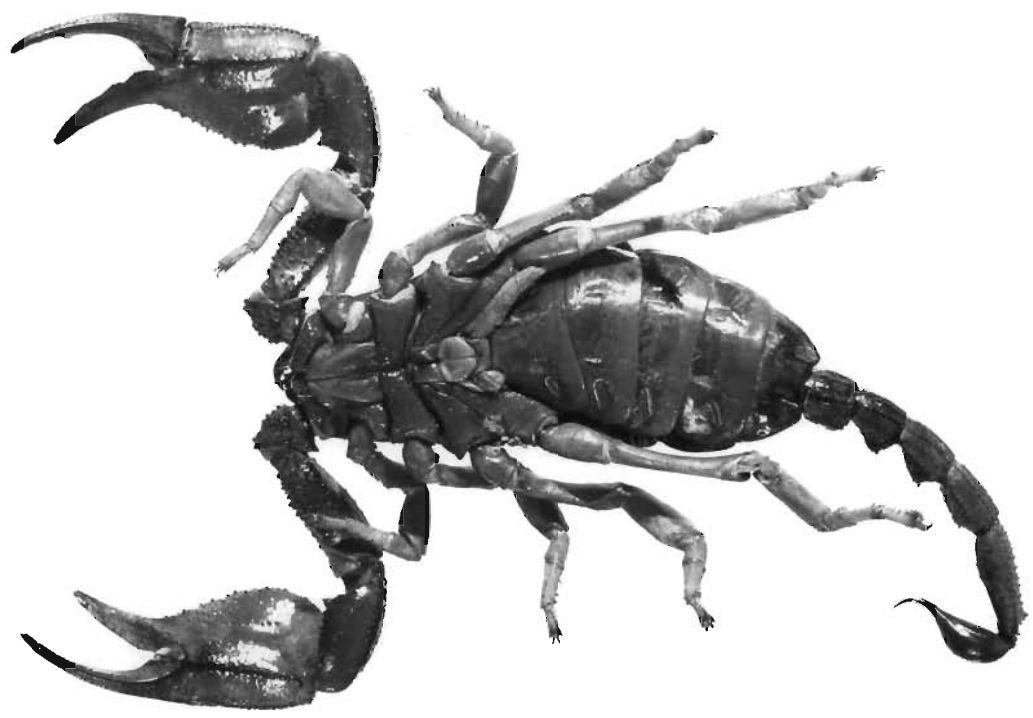


Plate 4.80. Opisthophthalmus wahlbergi (Thorell), ♀ (N.M.
10042) from south eastern region. Scale in mm.

a, dorsal

b, ventral



Plate 4.81. Opisthophthalmus wahlbergi (Thorell), ♂ (N.M.
10540) from south eastern region. Scale in mm.

a, dorsal

b, ventral

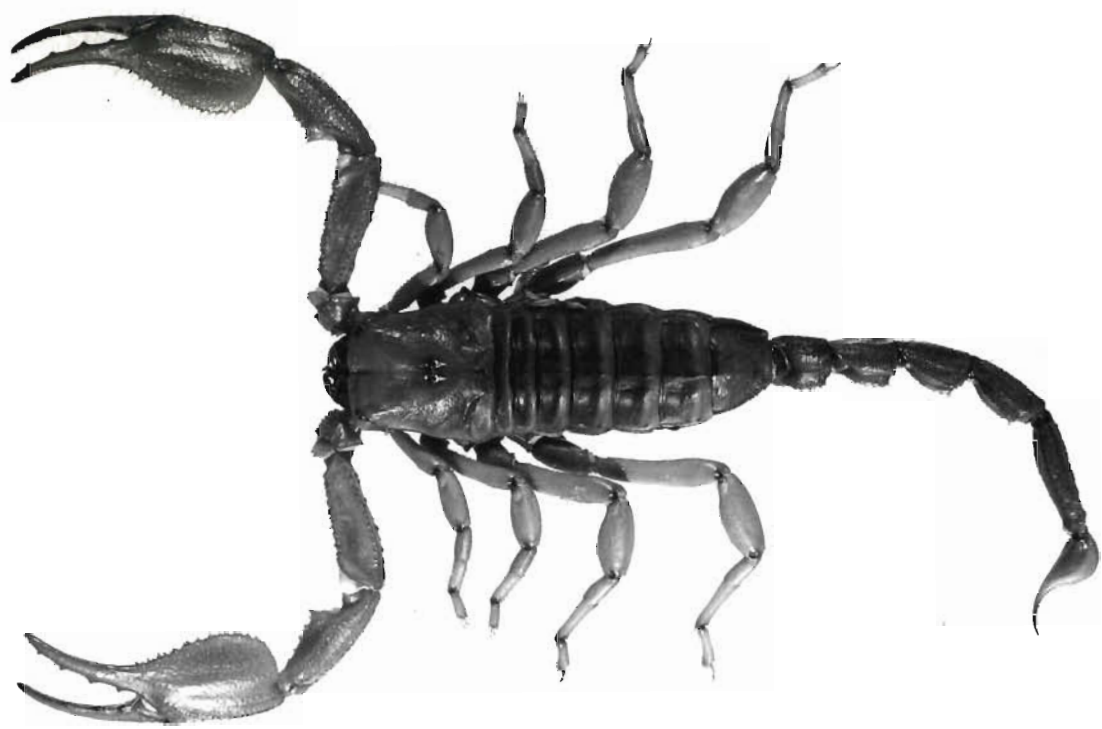


Plate 4.82. Opisthophthalmus wahlbergi (Thorell), ♀ (N.M.
10645) from east of Ai Ais. Scale in mm.

a, dorsal

b, ventral

