

**Coxae** (Fig. 6E): coxae I spur prominent, triangular; coxae II and III spur small, triangular; no spur on coxae IV. *Genu*: length 168–212 ( $193 \pm 8.92$ ,  $n = 32$ ), breadth 78–93 ( $86 \pm 4.06$ ,  $n = 32$ ), ratio 2.08–2.43 ( $2.26 \pm 0.09$ ,  $n = 32$ ).

**Larva** (Fig. 7A–D)

*Length* (unengorged) from palpal apices to posterior body margin 657–755 ( $704 \pm 22.01$ ,  $n = 90$ ); *breadth* of idiosoma (at widest point) 461–529 ( $498 \pm 16.80$ ,  $n = 90$ ); *ratio* 1.31–1.53 ( $1.41 \pm 0.04$ ,  $n = 90$ ).

**Scutum** (Fig. 7A): length 220–269 ( $237 \pm 10.24$ ,  $n = 90$ ), breadth 294–372 ( $324 \pm 14.60$ ,  $n = 90$ ), ratio 0.66–0.80 ( $0.73 \pm 0.02$ ,  $n = 90$ ); margins markedly diverging to level of ca. anterior 1/3 of scutal length, subparallel along mid-third; thence abruptly converging, bluntly rounded posteriorly.

**Capitulum** (Fig. 7B, C): length 126–159 ( $143 \pm 6.21$ ,  $n = 90$ ), breadth (palps combined) 189–221 ( $206 \pm 6.25$ ,  $n = 90$ ), ratio 0.65–0.76 ( $0.70 \pm 0.02$ ,  $n = 90$ ). *Basis capituli* dorsally subrectangular; cornua as slight marginal bulges; ventrally as illustrated. *Palps*: length 90–111 ( $99 \pm 4.47$ ,  $n = 90$ ), breadth 74–87 ( $82 \pm 2.92$ ,  $n = 90$ ), ratio 1.12–1.37 ( $1.21 \pm 0.04$ ,  $n = 90$ ); broadly salient; lateral margin slightly concave. Dorsal spur of segment II prominent, broadly rounded; ventral spur of segment II long, broad; lateral margin of spur slightly concave. Ventral spur of segment III distinct, fold-like. **Hypostome** (Fig. 7C): length 57–74 ( $66 \pm 3.43$ ,  $n = 90$ ), breadth 25–30 ( $28 \pm 1.17$ ,  $n = 90$ ), ratio 2.08–2.70 ( $2.38 \pm 0.13$ ,  $n = 90$ ); longer than palps; dental formula 2/2; denticles in files of 7 or 8.

**Coxae** (Fig. 7D): coxae I spur moderate, triangular; coxae II and III spur short, fold-like. *Genu*: length 99–129 ( $112 \pm 5.69$ ,  $n = 90$ ), breadth 48–61 ( $54 \pm 2.82$ ,  $n = 90$ ), ratio 1.83–2.22 ( $2.06 \pm 0.09$ ,  $n = 90$ ).

***Haemaphysalis (Rhipistoma) leachi* (Audouin, 1826)**

THE YELLOW DOG HAEMAPHYSALID  
(Fig. 8–13)

**Synonyms**

*Haemaphysalis leachi humerosoides* Theiler, 1943 *sensu* Hoogstraal 1956.

*Haemaphysalis leachi humerosoides* Theiler, 1943 *sensu* Santos Dias, 1958.

*Haemaphysalis leachi humerosoides* Theiler, 1943 *sensu* Theiler, 1962.

*Haemaphysalis leachi humerosoides* Theiler, 1943 *sensu* Camicas *et al.* 1998.

**Neotype**

Male, collected as an engorged nymph in a nest of *Arvicanthis niloticus niloticus* (Desmarest, 1822) at Kirdasa, Imbaba, Giza, Egypt, 14 June 1953 by H. Hoogstraal (moulted to adult in laboratory, 28 June 1953). The neotype was selected by Hoogstraal and

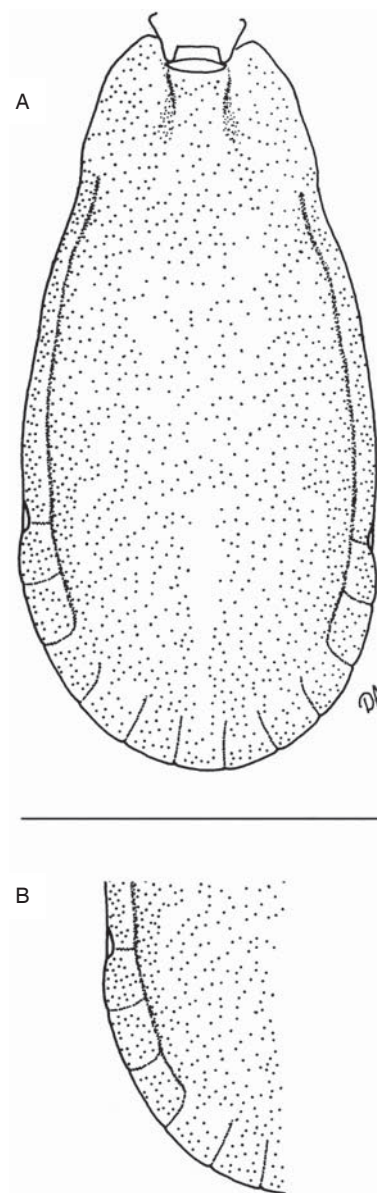


FIG. 8 *Haemaphysalis leachi*, male, A, conscutum. Bar = 1 mm; B, left posterior half of conscutum. Bar = 1 mm. All setation is omitted

deposited in the United States National Tick Collection, Georgia Southern University, Statesboro, USA; collection number: 56757. This specimen has been examined by DAA.

## REDESCRIPTION

### Male (Fig. 8A, B, 9A–F)

*Length* from palpal apices to posterior body margin 1.88–2.97 ( $2.45 \pm 0.15$ ,  $n = 714$ ); *breadth* of conscutum (at widest point) 0.82–1.29 ( $1.06 \pm 0.07$ ,  $n = 718$ ); *ratio* 1.94–2.78 ( $2.30 \pm 0.12$ ,  $n = 698$ ). *Colour* yellowish brown.

*Conscutum* (Fig. 8A, B): ca. 2.1 times as long as broad; margins slightly convex, broadest at level of spiracular plates, smoothly rounded posteriorly. *Cervical pits* narrow, deep, converging. *Cervical grooves* indistinct, short, shallow, diverging. *Lateral grooves* deep, distinct, extend to anterior 1/4 of scutal length; enclose first two or three festoons. *Punctations* dense, medium-sized, discrete, walls vertical, relatively deep. *Festoons* number 11. *Genital apron* (Fig. 9A): as illustrated. *Spiracular plates* (Fig. 9B): variable in size, usually slightly longer than broad; suboval or subrectangular; dorsal projection bluntly triangular.

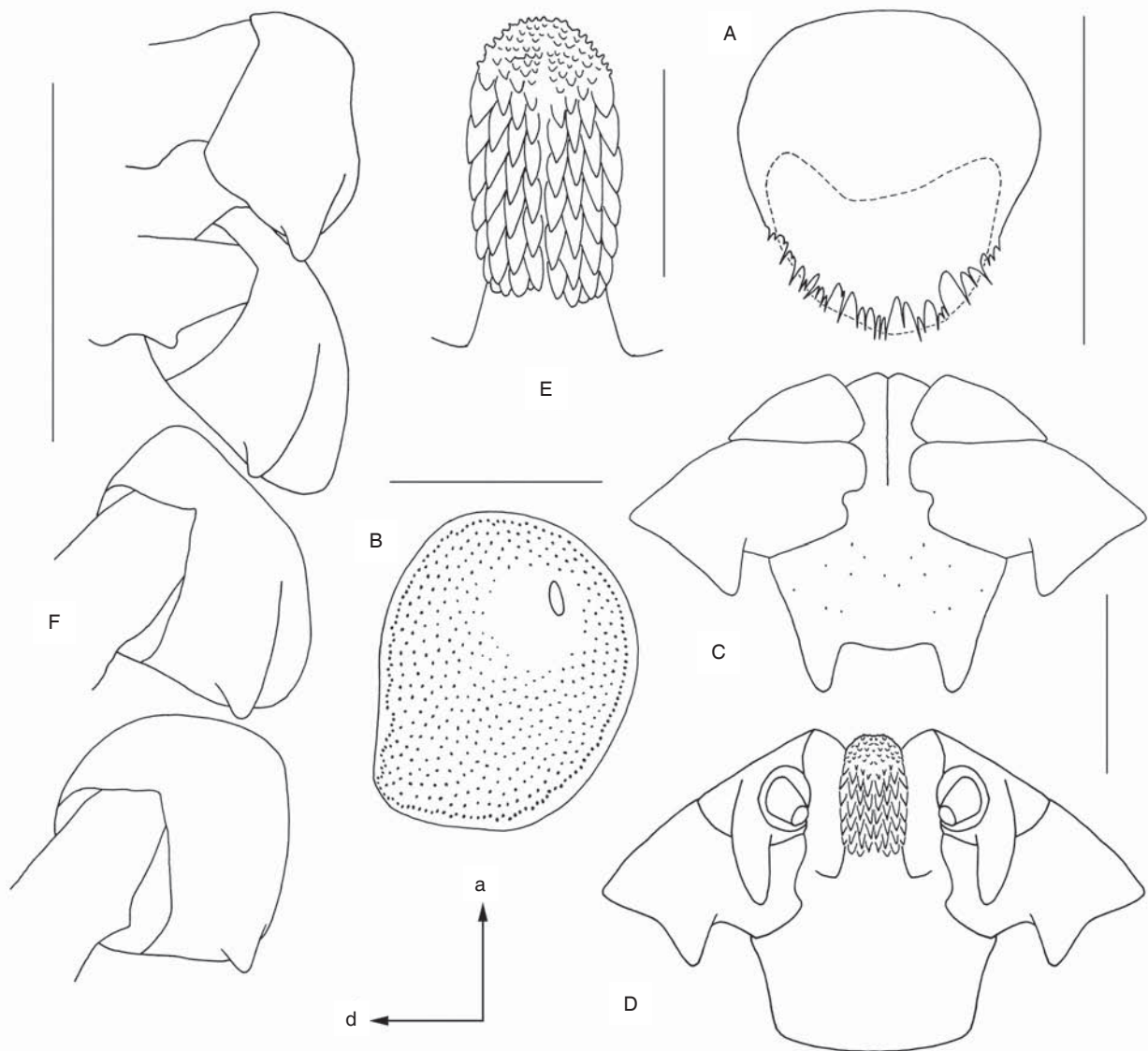


FIG. 9 *Haemaphysalis leachi*, male, A, genital structures: apron and postgenital sclerite. Bar = 200  $\mu$ m; B, spiracular plate (a – anterior; d – dorsal). Bar = 200  $\mu$ m; C, gnathosoma dorsally. Bar = 200  $\mu$ m; D, gnathosoma ventrally. Bar = 200  $\mu$ m; E, hypostome. Bar = 100  $\mu$ m; F, coxae. Bar = 500  $\mu$ m. All setation is omitted

**Capitulum** (Fig. 9C, D): *Basis capituli* dorsally ca. 1.7 times as broad as long; lateral margins diverging slightly anteriorly; cornua elongately triangular, apices rounded, ca. 1/3 as long as length of basis capituli; ventrally as illustrated. *Palps* broadly salient (*leachi* type); combined breadth ca. 2.1 times breadth of basis capituli. Segment II ca. 1.8 times as broad as long; dorsomedian margin of segment II sharply bulging anteriorly at mid-length; postero-dorsal spur large, triangular; posteroventral spur large, triangular; lateral margin of spur markedly concave. Segment III ca. 1.7 times as broad as long; ca. 1/2 as long as segment II; ventral spur of segment III narrowly elongate, apex at level of mid-length of segment II. *Hypostome* (Fig. 9E): slightly shorter than palps; dental formula 4/4; denticles in subequal-length files of 6 or 7.

**Coxae** (Fig. 9F): I to IV each with a short, subtriangular, more or less bluntly pointed spur, extending somewhat beyond coxal margin; spur of coxae IV usually shorter than that of coxae III.

#### Female (Fig. 10, 11A–F)

**Length** from palpal apices to posterior scutal margin 1.17–1.70 ( $1.53 \pm 0.08$ ,  $n = 267$ ); **breadth** of scutum

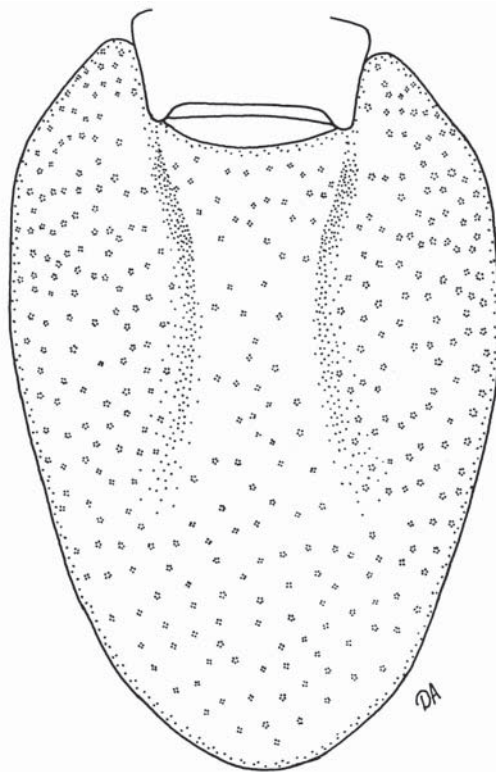


FIG. 10 *Haemaphysalis leachi*, female, scutum. Bar = 1 mm. All setation is omitted

(at widest point) 0.66–0.96 ( $0.84 \pm 0.04$ ,  $n = 267$ ); **ratio** 1.58–2.14 ( $1.81 \pm 0.08$ ,  $n = 267$ ). **Colour** yellowish brown.

**Scutum** (Fig. 10): ca. 1.4 times as long as broad; margins diverging for anterior 1/5 of total length, subparallel 1/5 of length, thence gradually converging, bluntly rounded posteriorly; slight postero-lateral angles. **Cervical grooves** narrow arcs extending 2/3 of total scutal length. **Punctations** moderately dense, denser on lateral fields, absent in cervical grooves; medium-sized, discrete, walls vertical, relatively deep. **Genital aperture** (Fig. 11A): posterior lip broadly U-shaped. **Spiracular plates** (Fig. 11B): variable in size; irregularly subcircular; dorsal projection short, broadly triangular.

**Capitulum** (Fig. 11C, D): *Basis capituli* dorsally ca. 2.2 times as broad as long; external margins slightly diverging anteriorly; cornua relatively long, broadly triangular, bluntly pointed, ca. 1/4 as long as length of basis capituli; porose areas elongately-oval, tilted inwards, moderate size, widely spaced. *Basis capituli* ventrally as illustrated. *Palps* broadly salient (*leachi* type); combined breadth ca. 1.8 times breadth of basis capituli. Segment II ca. 1.5 times as broad as long; dorsomedian margin of segment II sharply bulging anteriorly at mid-length; postero-dorsal spur large, triangular; posterolateral margin slightly concave; posteroventral spur reduced to short, rounded projection or curve. Segment III ca. 1.4 times as broad as long; ca. 0.6 times as long as segment II; ventral spur of segment III narrowly elongate, apex at level of mid-length of segment II. *Hypostome* (Fig. 11E): nearly as long as palps; dental formula 4/4; denticles in files usually of 8 or 9.

**Coxae** (Fig. 11F): I to IV each with a short, subtriangular, more or less bluntly pointed spur, extending somewhat beyond coxal margin; spur on coxae IV subequal or shorter than that on coxae III.

#### Nymph (Fig. 12A–E)

**Length** (unengorged) from palpal apices to posterior body margin 1 293–1 427 ( $1 344 \pm 45.04$ ,  $n = 8$ ); **breadth** of idiosoma (at widest point) 707–817 ( $755 \pm 36.55$ ,  $n = 8$ ); **ratio** 1.66–1.84 ( $1.78 \pm 0.06$ ,  $n = 8$ ).

**Scutum** (Fig. 12A): length 392–431 ( $412 \pm 13.86$ ,  $n = 10$ ), breadth 402–446 ( $416 \pm 12.53$ ,  $n = 10$ ), ratio 0.95–1.02 ( $0.99 \pm 0.02$ ,  $n = 10$ ); irregularly sub-circular. **Spiracular plates** (Fig. 12B): suboval.

**Capitulum** (Fig. 12C, D): length 208–252 ( $236 \pm 11.62$ ,  $n = 10$ ), breadth (palps combined) 326–363 ( $339 \pm 13.53$ ,  $n = 10$ ), ratio 0.64–0.72 ( $0.70 \pm 0.02$ ,



$n = 10$ ). *Basis capituli* dorsally subrectangular; cornua slight bulges; ventrally as illustrated. *Palps*: length 152–167 ( $158 \pm 4.48$ ,  $n = 10$ ), breadth 142–162 ( $150 \pm 6.68$ ,  $n = 10$ ), ratio 1.00–1.12 ( $1.06 \pm 0.04$ ,  $n = 10$ ); broadly salient; anterolateral margin markedly concave. Dorsomedian margin of segment II widening sharply anteriorly at level of its midlength; dorsal spur moderate; ventral spur large, narrow; posterolateral margin distinctly concave. Ventral spur of segment III distinct, triangular, with sharp apex.

*Hypostome* (Fig. 12D): length 76–94 ( $87 \pm 5.68$ ,  $n = 10$ ), breadth 36–41 ( $38 \pm 1.63$ ,  $n = 10$ ), ratio 1.94–2.50 ( $2.28 \pm 0.16$ ,  $n = 10$ ); nearly as long as palps; dental formula 2/2; denticles in files of 5 or 6.

*Coxae* (Fig. 12E): coxae I spur moderate, triangular; coxae II and III spur small, triangular; no spur on coxae IV. *Genu*: length 160–184 ( $167 \pm 7.24$ ,  $n = 10$ ), breadth 71–80 ( $76 \pm 2.92$ ,  $n = 9$ ), ratio 2.03–2.42 ( $2.19 \pm 0.11$ ,  $n = 9$ ).

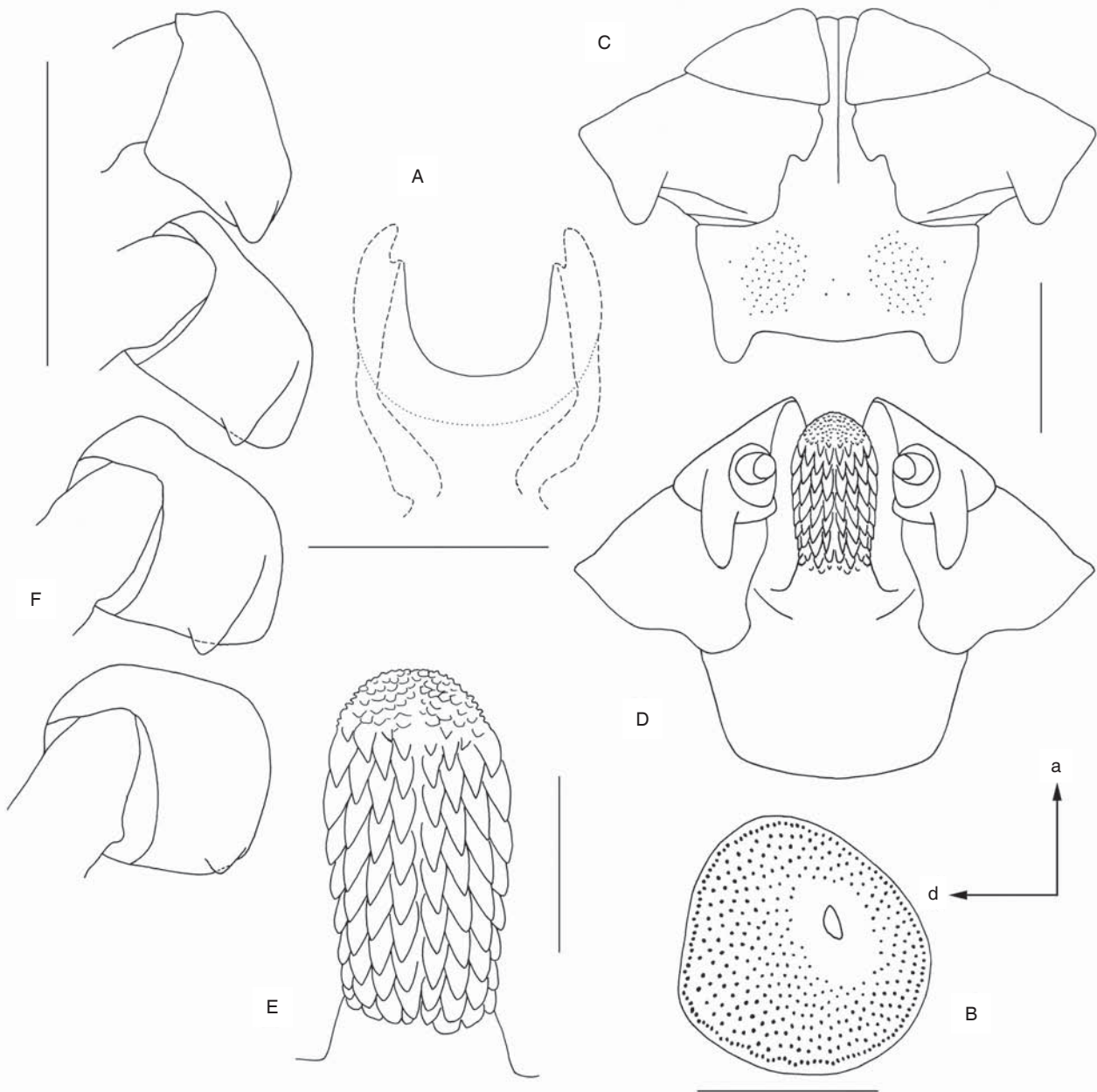


FIG. 11 *Haemaphysalis leachi*, female, A, genital structures: posterior lip of the genital aperture and vestibular part of vagina. Bar = 200  $\mu$ m; B, spiracular plate (a – anterior; d – dorsal). Bar = 200  $\mu$ m; C, gnathosoma dorsally. Bar = 200  $\mu$ m; D, gnathosoma ventrally. Bar = 200  $\mu$ m; E, hypostome. Bar = 100  $\mu$ m; F, coxae. Bar = 500  $\mu$ m. All setation is omitted

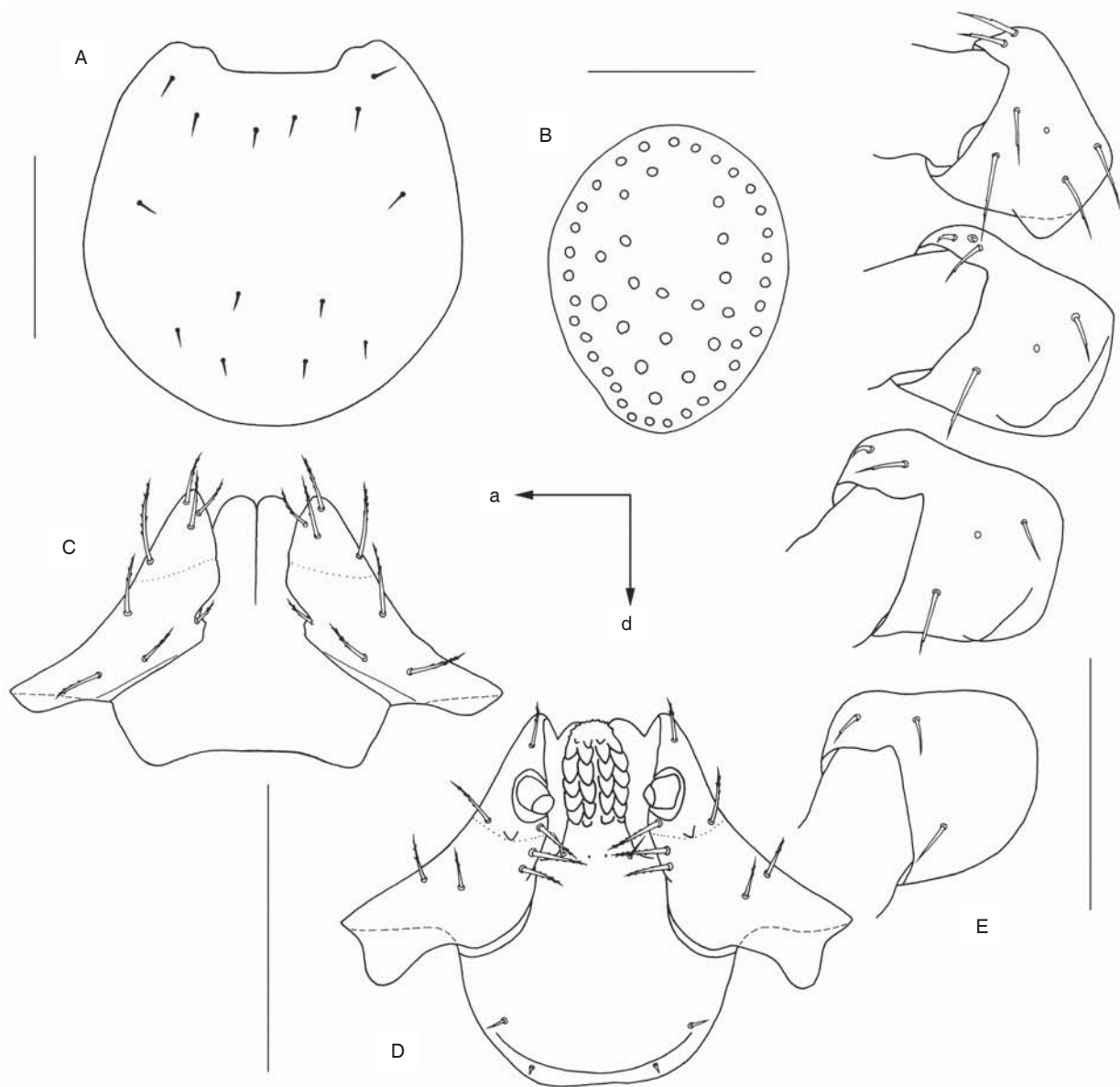


FIG. 12 *Haemaphysalis leachi*, nymph, A, scutum. Bar = 200  $\mu$ m; B, spiracular plate (a – anterior; d – dorsal). Bar = 50  $\mu$ m; C, gnathosoma dorsally. Bar = 200  $\mu$ m; D, gnathosoma ventrally. Bar = 200  $\mu$ m; E, coxae. Bar = 200  $\mu$ m. Setation of palpal segment IV is omitted

### Larva (Fig. 13A–D)

*Length* (unengorged) from palpal apices to posterior body margin 608–681 ( $652 \pm 17.56$ ,  $n = 116$ ); *breadth* of idiosoma (at widest point) 431–559 ( $457 \pm 16.05$ ,  $n = 112$ ); *ratio* 1.14–1.50 ( $1.43 \pm 0.05$ ,  $n = 112$ ).

*Scutum* (Fig. 13A): length 196–225 ( $208 \pm 6.64$ ,  $n = 117$ ), breadth 279–323 ( $302 \pm 9.30$ ,  $n = 120$ ), ratio 0.62–0.74 ( $0.69 \pm 0.02$ ,  $n = 117$ ); margins sharply diverging to level of ca. anterior 1/3 of scutal length, subparallel along mid-third; thence abruptly converging, bluntly rounded posteriorly.

*Capitulum* (Fig. 13B, C): length 117–140 ( $128 \pm 4.74$ ,  $n = 119$ ), breadth (palps combined) 177–205 ( $192 \pm 4.78$ ,  $n = 118$ ), ratio 0.61–0.73 ( $0.67 \pm 0.02$ ,  $n = 117$ ). *Basis capituli* dorsally subrectangular; cornua as slight marginal bulges; ventrally as illustrated. *Palps*: length 87–108 ( $97 \pm 4.25$ ,  $n = 120$ ), breadth 67–80 ( $73 \pm 2.61$ ,  $n = 120$ ), ratio 1.18–1.44 ( $1.32 \pm 0.06$ ,  $n = 120$ ); broadly salient; lateral margin slightly concave. Dorsal spur of segment II prominent, slightly tapering to apex; ventral spur of segment II long, relatively narrow; lateral margin of spur distinctly concave. Ventral spur of segment III dis-

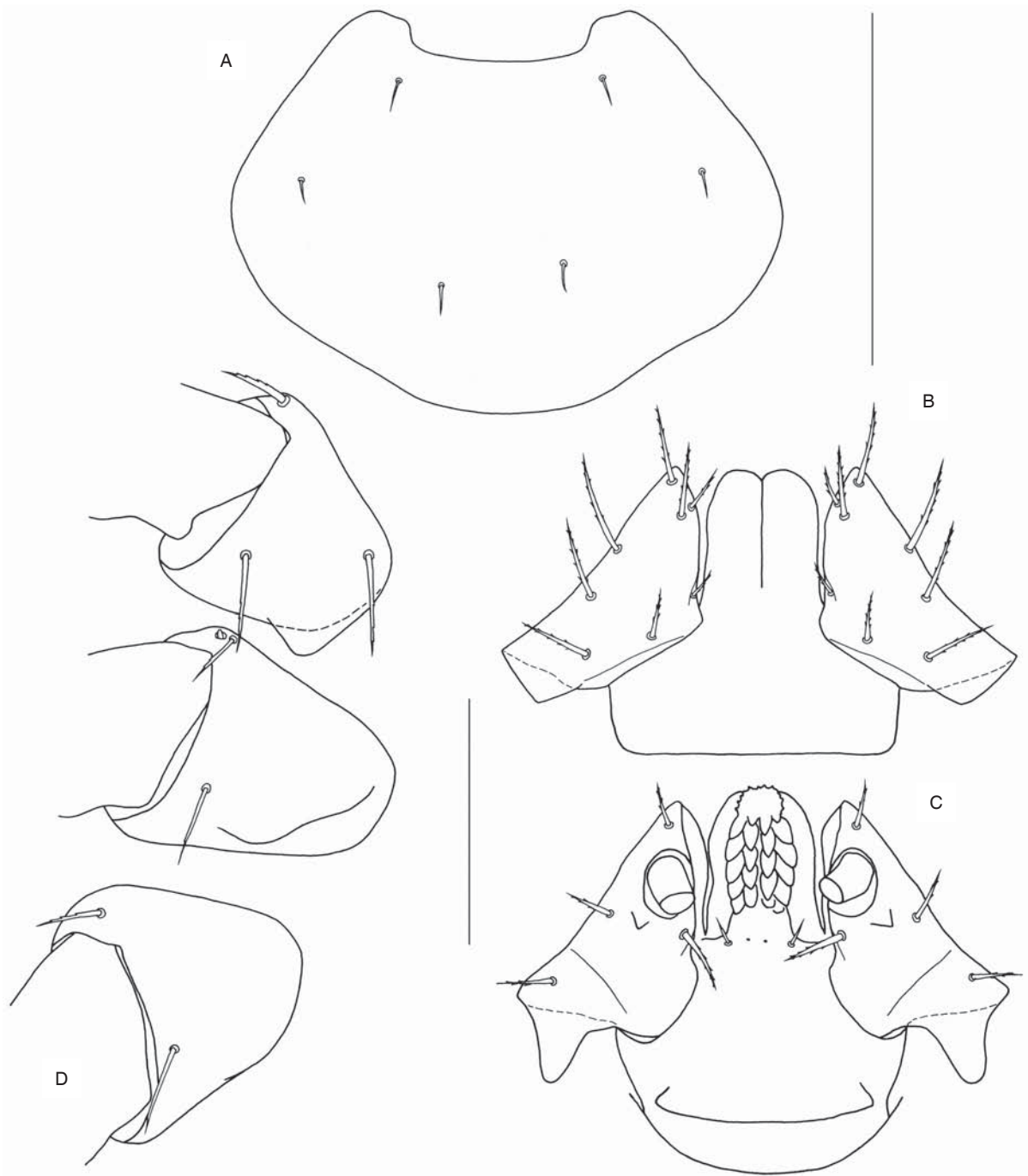


FIG. 13 *Haemaphysalis leachi*, larva, A, scutum. Bar = 200  $\mu$ m; B, gnathosoma dorsally. Bar = 100  $\mu$ m; C, gnathosoma ventrally. Bar = 100  $\mu$ m; D, coxae. Bar = 100  $\mu$ m. Setation of palpal segment IV is omitted

tinct, triangular, pointed apex. *Hypostome* (Fig. 13C): length 52–62 ( $57 \pm 2.36$ ), breadth 22–28 ( $25 \pm 1.53$ ,  $n = 120$ ), ratio 1.92–2.74 ( $2.28 \pm 0.19$ ,  $n = 119$ ); longer than palps; dental formula 2/2; denticles in files of 4 to 6 (usually 5).

*Coxae* (Fig. 13D): coxae I spur moderate, triangular;

coxae II and III spur short, fold-like. *Genu*: length 103–120 ( $114 \pm 3.51$ ,  $n = 119$ ), breadth 48–60 ( $54 \pm 2.27$ ,  $n = 110$ ), ratio 1.88–2.38 ( $2.11 \pm 0.11$ ,  $n = 110$ ).

The differential diagnosis of the two species is summarized in Table 4.

TABLE 1 *Haemaphysalis (Rhipistoma) elliptica* (Koch, 1844), material examined

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Democratic Republic of Congo</b>						
13	10	Domestic dog	Monigi	05 Aug 1949	F. Schoenaers	027837
<b>Kenya</b>						
1		<i>Lepus capensis</i>	Nairobi	09 Jan 1968	J.E.C. Flux	095065
	2	Domestic dog	Nairobi airport	22 Sep 1954	C.B. Philip	032318
1	2	Domestic dog	Nairobi-Kilimani area	22 Sep 1953	C.B. Philip	032319
1	1	Domestic dog	Rift Valley, Nakuru dist., Subukiya	26 Jun 1948	H. Hoogstraal	123754
28	12	<i>Civettictis civetta</i>	Rift Valley, Narok, Langata	Mar 1964	R. Harnsen	095064
3		<i>Civettictis civetta</i>	Sultan Hamud	26 Sep 1953	C.B. Philip, Barnett	032320
1				1976	A.E. Bianco	123755
1	2			1976	A.E. Bianco	123756
<b>South Africa</b>						
10	12	Domestic cat	Grahamstown	23 Jul 1936	F. Zumpt	123748
4+	2+	<i>Otomys irroratus</i> (nest of)	Johannesburg	Aug 1957		123759
2		<i>Canis mesomelas</i>	Johannesburg (imported into USA: Missouri, Jackson County, Kansas City, Kansas City Zoo)	1995	E.C. Greiner	121742
	1		Kruger National Park, Krugertabletkop			
2		<i>Canis mesomelas</i>	Kruger National Park, Skukuza	03 Mar 1989	J.E. Keirans	119549
	7	Domestic dog	North Transvaal, Naboomspruit	20 Feb 1969		123749
	1		Transvaal, Bon Accord			123750
1			Transvaal, Bon Accord, Onderstepoort	Nov 1951	R.A. Cooley	120362
	1		Transvaal, Bon Accord, Onderstepoort	Nov 1951	R.A. Cooley	120364
2	1	<i>Canis mesomelas</i>	Transvaal, Potchefstroom	14 Apr 1952	R.A. Cooley	120368
	4	<i>Tatera nest</i>	Transvaal, Randfontein	06 Oct 1965		123751
2	1					123752
						123747
<b>Tanzania</b>						
4		<i>Civettictis civetta</i>	Coast, Dar es Salaam, University campus	15 Sep 1974	K.M. Howell	106728
3	4	<i>Panthera leo</i>	Mara, Serengeti National Park	16 Oct 1966	G.R. Schaller	094949
1		<i>Canis mesomelas</i>	Mara, Serengeti Plains, Seronera	25 Sep 1974	D. Schmidt	095204
1	1	<i>Canis mesomelas</i>	Mara, Serengeti Plains, Seronera	22 Nov 1974	D. Schmidt	094955
	1	<i>Panthera leo</i>	Serengeti National Park	21 Aug 1985	L. Herbst	118227
	1	<i>Panthera leo</i>	Serengeti National Park	21 Aug 1985	L. Herbst	118254

TABLE 1 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Tanzania (cont.)</b>						
1	2	<i>Panthera leo</i>	Serengeti National Park	21 Aug 1985	L. Herbst	118206
1		<i>Panthera leo</i>	Serengeti National Park	02 Oct 1985	L. Herbst	118219
1	4	<i>Panthera leo</i>	Serengeti National Park	21 Aug 1985	L. Herbst	118251
2	1	<i>Panthera leo</i>	Serengeti National Park	11 Sep 1985	L. Herbst	118235
	3	<i>Panthera leo</i>	Serengeti National Park	26 Sep 1985	L. Herbst	118237
4	1	<i>Panthera leo</i>	Serengeti National Park	25 Aug 1985	L. Herbst	118226
	2	<i>Panthera leo</i>	Serengeti National Park, along Seronera River	03 Oct 1985	L. Herbst	118215
1	2	<i>Panthera leo</i>	Serengeti National Park, at Downey's Dam	26 Sep 1985	L. Herbst	118257
	1	<i>Panthera leo</i>	Serengeti National Park, base of Nyamanga River	02 Aug 1985	L. Herbst	118248
3	1	<i>Panthera leo</i>	Serengeti National Park, base of Nyamanga River	02 Aug 1985	L. Herbst	118246
	1	<i>Panthera leo</i>	Serengeti National Park, base of Nyamanga River	05 Sep 1985	L. Herbst	118225
4	6	<i>Panthera leo</i>	Serengeti National Park, base of Nyamanga River	05 Sep 1985	L. Herbst	118212
	3	<i>Panthera leo</i>	Serengeti National Park, Loliondo South Kopjes	02 Sep 1985	L. Herbst	118218
3	1	<i>Panthera leo</i>	Serengeti National Park, near Masai Marsh	31 Aug 1985	L. Herbst	118220
	1	<i>Panthera leo</i>	Serengeti National Park, near Masai Marsh	31 Aug 1985	L. Herbst	118229
	1	<i>Panthera leo</i>	Serengeti National Park, Simba Kopjes	21 Sep 1985	L. Herbst	118240
	1	<i>Panthera leo</i>	Serengeti National Park, Simba Kopjes	21 Sep 1985	L. Herbst	118209
<b>Uganda</b>						
22	3	<i>Canis aureus</i>	Ruwenzori National Park		M.H. Woodford	088635
<b>Zambia</b>						
Many	Many	<i>Canis adustus</i>	Chipata, Susa Camp	08 Aug 1980	S.G.A. Weak	123753
1		<i>Civettictis civetta</i>	Lochinvar	Jul 1959		123757
4		<i>Civettictis civetta</i>	Lochinvar	Jul 1959	F. Zumpt	091302
1		<i>Panthera leo</i>	Southern, Namwala	19 Aug 1951	J.G. Matthysse	091294
<b>Zimbabwe</b>						
2	2	Domestic cat	Manicaland, Umtali, Maranke T.T.L.	1976	R.A.I. Norval	103030
5	4	Domestic dog	Mashonaland North, Mukwichi T.T.L., Kadunga Dip	19 Aug 1976	R.A.I. Norval	103028
2+	2+	<i>Canis familiaris</i>	Mashonaland South, Salisbury	1980	R.A.I. Norval	121602
21		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Atlantica Foundation Research Station	07 Jul 1977	R.A.I. Norval	107272
5		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Calgary Farm	16 May 1977	R.A.I. Norval	107096
1		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Calgary Farm	14 Feb 1977	R.A.I. Norval	121599



TABLE 1 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Zimbabwe (cont.)</b>						
3	2	<i>Felis silvestris</i> (= <i>lybica</i> )	Mashonaland South, Salisbury, Mazoe Vet. Farm	06 Sep 1976	R.A.I. Norval	103029
10	10	<i>Canis mesomelas</i>	Mashonaland South, Salisbury, Mt. Pleasant	10 Sep 1976	R.A.I. Norval	103026
30	14	<i>Canis adustus</i>	Mashonaland South, Salisbury, Wingate Club	23 Dec 1976	R.A.I. Norval	107097
1		<i>Atelerix albiventris</i>	Matabeleland, Bulawayo	04 Feb 1981	R.A.I. Norval	121600
5	3	<i>Felis silvestris</i> (= <i>lybica</i> )	Matabeleland, Bulawayo, Khami prison	05 May 1976	R.A.I. Norval	103032
3	6	Domestic dog	Matabeleland, Shashani, Tribal Trust Land (T.T.L.), Sinti Dip	14 Oct 1976	R.A.I. Norval	103027
16	2	<i>Civettictis civetta</i>	N Rhodesia, Chizarira Nat. Park, Manzituba Camp	03 Jun 1976	R.A.I. Norval	103033
2	1	<i>Panthera pardus</i>	NW Rhodesia, Matetsi, Safari Area, Dibangombe Siding	18 Jun 1976	R.A.I. Norval	103031
<b>I.G. Horak collection (South Africa &amp; Mozambique)</b>						
23	18	Vegetation	Kruger National Park (KNP) 2510 S, 3144 E (Horak <i>et al.</i> 2006)	Jan to Dec 1999	I.G. Horak	Burnplots
31	28	Vegetation	KNP 2508 S, 3138 E (Horak <i>et al.</i> 2006)	Jan to Dec 1999	I.G. Horak	Burnplots
358	327	Vegetation	KNP 2510 S, 3144 E (Horak <i>et al.</i> 2006)	Jan to Dec 2000	I.G. Horak	Burnplots
287	316	Vegetation	KNP 2508 S, 3138 E (Horak <i>et al.</i> 2006)	Jan to Dec 2000	I.G. Horak	Burnplots
65	77	Vegetation	KNP 2510 S, 3144 E (Horak <i>et al.</i> 2006)	Jan to Dec 2001	I.G. Horak	Burnplots
116	95	Vegetation	KNP 2508 S, 3138 E (Horak <i>et al.</i> 2006)	Jan to Dec 2001	I.G. Horak	Burnplots
24	29	Vegetation	KNP 2510 S, 3144 E (Horak <i>et al.</i> 2006)	Jan to Dec 2002	I.G. Horak	Burnplots
43	45	Vegetation	KNP 2508 S, 3138 E (Horak <i>et al.</i> 2006)	Jan to Mar 2002	I.G. Horak	Burnplots
167	194	Vegetation	KNP 2516 S, 3204 E (Spickett <i>et al.</i> 1992)	Jan to Mar 2002	I.G. Horak	Burnplots
98	100	Vegetation	KNP 2458 S, 3136 E (Spickett <i>et al.</i> 1992)	Aug 1988 to Mar 2002	I.G. Horak	Burnplots
77	573	<i>Canis familiaris</i>	Maputaland, KwaZulu-Natal (Horak <i>et al.</i> 2001)	Aug 1988 to Mar 2002	I.G. Horak	Burnplots
107	100	<i>Canis familiaris</i>	Maputo 2557 S, 3235 E and vicinity, Mozambique (Neves <i>et al.</i> 2004)	Feb 1999 to Apr 2000	I.G. Horak	Burnplots
410	826	<i>Canis familiaris</i>	Individual owners, Stellenbosch 3355 S, 1850 E (Horak & Matthee 2003)	Sep 2000 to Dec 2001	Various	Zone 17N Zone 4
1 560	4 566	<i>Canis familiaris</i>	Vet. clinics and animal shelter, Stellenbosch 3355 S, 1850 E (Horak & Matthee 2003)	Oct 2000 to Dec 2002	Owners	WP Dogs
506	449	<i>Canis familiaris</i>	Animal shelter, Franschoek 3350 S, 1907 E (Horak & Matthee 2003)	Dec 2001 to Dec 2002	Vet. assistants	WP Dogs
25	168	<i>Canis familiaris</i>	Eastern Eastern Cape Province (Nyangiwe <i>et al.</i> 2006)	Jan 2004 to May 2005	Assistants	WP dogs
1 184	843	<i>Canis familiaris</i>	Vet. Faculty Clinic, Onderstepoort (Horak 1995)	Jun 1991 to May 1994	N. Nyangiwe Vet. students	OP dogs