

TABLE 1 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>I.G. Horak collection (South Africa &amp; Mozambique) (cont.)</b>						
2 426	3 720	<i>Canis familiaris</i>	Grahamstown 3319 S, 2632 E (Horak <i>et al.</i> 1987)	Aug 1983 to Jul 1986	Owners	
87	269	<i>Canis familiaris</i>	Boschkop, North West Province	Oct 1999 to May 2000	Z. v.d. Merwe	
6	9	<i>Canis familiaris</i>	Luala, 1744 S, 3615 E, Zambesia Prov. Mozambique (Neves <i>et al.</i> 2004)		G. Bester	
2	2	<i>Canis familiaris</i>	Xai-Xai, 2506 S, 3334 E Gaza Prov. Mozambique (Neves <i>et al.</i> 2004)		G. Bester	
70	65	Domestic cats	Vet. clinic Stellenbosch 3355 S, 1850 E (Horak & Matthee 2003)	Oct 2000 to Dec 2002	Assistant	Cats
604	663	Domestic cat	Pretoria	Sep 2003 to May 2006	N. Donkin	Cats
3	1	<i>Canis mesomelas</i> (1)	KNP (Horak <i>et al.</i> 2000)		I.G. Horak	
4	5	<i>Canis mesomelas</i> (1)	Vekeerdevlei, Free State (Horak <i>et al.</i> 2000)			
159	34	<i>Acinonyx jubatus</i> (3)	KNP (Horak <i>et al.</i> 2000)		I.G. Horak	
2 198	831	<i>Panthera leo</i> (19)	KNP (Horak <i>et al.</i> 2000)		I.G. Horak	
63	26	<i>Panthera pardus</i> (3)	KNP (Horak <i>et al.</i> 2000)		I.G. Horak	
1	6	<i>Panthera pardus</i> (1)	Roodplaat Dam, Gauteng (Horak <i>et al.</i> 2000)			
85	23	<i>Civettictis civetta</i> (4)	KNP (Horak <i>et al.</i> 2000)		I.G. Horak	
8	7	<i>Parahyaena brunnea</i> (1)	Bon Accord, Gauteng (Horak <i>et al.</i> 2000)		I.G. Horak	

\* All the collection numbers are those of specimens in the United States National Tick Collection

+ Reared specimens

TABLE 2 *Haemaphysalis (Rhipistoma) leachi* (Audouin, 1826), material examined

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Cameroon</b>						
1		Domestic dog		26 Dec 1949		094716
<b>Central African Republic</b>						
4	4	<i>Panthera leo</i>	Bamingui Bangoran, Bamingui, Gazao		J. Thal	096988
2	3	Domestic dog	La Topia	12 Aug 1969	G. Uilenberg	096991
3	18	Domestic dog	Nana Nambere, Bouar	23 Jul 1969	M. Giret	096982
6	16	Domestic dog	Nana Nambere, Bouar	24 Jul 1969	M. Giret	096977
22	31	Domestic dog	Nana Nambere, Bouar	Late Aug 1969	M. Giret	096990
12	46	Domestic dog	Nana Nambere, Bouar	Aug 1969	M. Giret	096996
16	51	Domestic dog	Nana Nambere, Bouar	Aug 1969	M. Giret	096987
1	2	Domestic cat	Nana Nambere, Bouar	27 Jul 1969	M. Giret	096995
3	2	Domestic cat	Nana Nambere, Bouar	Aug 1969	M. Giret	096985
2	4	Domestic cat	Nana Nambere, Bouar	07 Jan 1970	R. Lacotte	096984
8	4	Domestic cat	Nana Nambere, Bouar	11 Jan 1970	R. Lacotte	096986
1	5	Domestic cat	Nana Nambere, Bouar	18 Jan 1970	G. Uilenberg	096993
13	5	<i>Civettictis civetta</i>		14 Apr 1971	J. Thal	097149
28	7	<i>Panthera leo</i>		26 Feb 1971	J. Thal	097150
<b>Democratic Republic of Congo</b>						
1	1	<i>Panthera leo</i>	Bodio	15 Dec 1950		086264
6	1	<i>Genetta maculata</i>	Garamba Park	16 Sep 1951	H. de Saeger	036711
2		<i>Panthera pardus</i>	Kasai, Luluaburg	1925	C. Waert	046717
1			Katanga (N), Muhilo	1966	J. Bafort	123771
1	3	<i>Crocuta crocuta</i>		12 Apr 1951	P. Schoemaker	037461
19	2	<i>Leptailurus serval</i>		17 Aug 1951	J.V.	037454
8	3	<i>Leptailurus serval</i>		29 Sep 1951	H. de Saeger	037452
<b>Egypt</b>						
1		<i>Felis chaus</i>	Alexandria, Amiriya road	29 Jan 1965	I. Helmy, D. Osborn	078789
5		<i>Felis chaus</i>	Alexandria, 14 km SW of Alexandria	09 Nov 1965	I. Helmy, D. Osborn	078791
35	6	<i>Vulpes vulpes</i>	Beni Suef, Beni Suef, Al Hakamnah	20 Jan 1982	Local hunter	123769
2	3	<i>Arvicanthis niloticus</i> nest	Daqahliya, Aga, Minshat El Ikhwa	12 Nov 1953	H. Hoogstraal	078732
4		<i>Vulpes vulpes</i>	Daqahliya, Village of Tanboul (5 miles W of Simbillawein)	24 Feb 1947		025480

TABLE 2 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Egypt (cont.)</b>						
	1	<i>Felis silvestris</i> (= <i>lybica</i> )	El Wadi El Gedeed, Dakhla Oasis, Mut	26 Apr 1974	I. Helmy, S. Tawfik	094366
1	9	<i>Canis aureus</i>	Faiyum, Faiyum	15 Aug 1956	H. Hoogstraal	078760
1		<i>Canis aureus</i>	Faiyum, Faiyum (near)	02 Feb 1955	H. Hoogstraal	078756
4		<i>Vulpes vulpes</i>	Faiyum, Ibshawai, Abu Dinqash	09 Feb 1983	Local hunter	123768
12	3	<i>Vulpes vulpes</i>	Faiyum, Ibshawai, El Nazla	09 Feb 1983	Local hunter	123773
24		<i>Canis aureus</i>	Faiyum, Ibshawai, Qasr El Gibali	09 Feb 1983	Local hunter	121756
1		<i>Vulpes vulpes</i>	Faiyum, Kom Oshim	06 Feb 1948	H. Hoogstraal	078759
1		<i>Felis chaus</i>	Faiyum, Kom Oshim (1 mile North of)	28 Dec 1953	H. Hoogstraal	078761
1	1	<i>Felis chaus</i>	Faiyum, Tamiya, Fanus	12 Apr 1954	H. Hoogstraal	078763
5		<i>Felis chaus</i>	Faiyum, Tamiya, Fanus	12 Apr 1954	H. Hoogstraal	078764
5	4	<i>Felis chaus</i>	Faiyum, Tamiya, Fanus	12 Apr 1954	H. Hoogstraal	034583
1			Giza, Aiyat, Kafr Ammar		H. Hoogstraal	078755
2	2	<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Beni Magdul	14 Jun 1953	H. Hoogstraal	078737
6		<i>Felis chaus</i>	Giza, Imbaba, El Baragil	04 Nov 1958	H. Hoogstraal	078784
1	2	<i>Vulpes vulpes</i>	Giza, Imbaba, Gizzaya	30 Apr 1954	H. Hoogstraal	078785
5	5	<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	14 Feb 1957	H. Hoogstraal	078730
3	3	<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	14 Jun 1953	H. Hoogstraal	078738
9+	11+	<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	28-29 Jun 1953	H. Hoogstraal	078736
1		<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	15 Jul 1953	H. Hoogstraal	078741
1+	2+	<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	14 Jun 1953	H. Hoogstraal	056757
1		<i>Arvicanthis niloticus</i> nest	Giza, Imbaba, Kirdasa	03 Jan 1955	H. Hoogstraal	078731
1		<i>Vulpes vulpes</i>	Giza, Imbaba, Tanash	14 Jan 1960	H. Hoogstraal	078765
	2	<i>Arvicanthis niloticus</i> burrow	Miniya, Maghagha, Maghagha	12 Mar 1952	H. Hoogstraal	078744
1		<i>Vulpes vulpes</i>	Miniya, Maghagha, Saft	01 Jan 1979	Local hunter	123772
1		<i>Canis aureus</i>	Miniya, Minya	11 Jan 1981	Local hunter	123767
13	7	<i>Felis chaus</i>	Qalyubiya, El Amar El Kubra	15 Jan 1954	H. Hoogstraal	078757
4	2	<i>Canis aureus</i>	Qalyubiya, Qalyubiya, Sanatir, Ezbet Ihsan	03 Feb 1966	I. Helmy, D. Osborn	078790
4		<i>Felis chaus</i>	Qena, Isna, Wadi Nassim	07 Apr 1953	H. Hoogstraal	078762
<b>Ethiopia</b>						
1		Vegetation	Gamo-Gofa, Arba Mineh	14 Jan 1966	H. Hoogstraal	092735
5	1	<i>Colobus polykomos</i>	Harer, Hirna valley, Dire Dawa College (80 km W of)	21 Sep 1982	B. Glass	092730
1		<i>Canis mesomelas</i>	Harer, Rd. between Dacata and Erer Rivers		B. Glass	092732

TABLE 2 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Ethiopia (cont.)</b>						
9	1	<i>Ichneumia albicauda</i>	Harer, Rd. between Dacata and Erer Rivers	04 Jul 1962	B. Glass	092731
1	2	Domestic cat	Ilubabor, Gambella		J.S. Ash	092741
1		Human	Ilubabor, Gambella	30 Jul 1972	J.S. Ash	092742
17	10	<i>Civettictis civetta</i>	Kefa, Mezan Tefari	10 Mar 1980	H.K. Lall	123760
7	3	<i>Vulpes</i> sp.	Kefa, Sokoru/Deke	Aug 1979	H.K. Lall	123770
19		<i>Hyaena hyaena</i>	Rock Valley		B. Glass	092733
1	3	Domestic dog	Shashamani	25 Jun 1961	L.W. Teller	092726
1	1	Human	Shoa, Addis Ababa	11 Mar 1970	J.S. Ash	092743
1		"Black-tailed mongoose"	Shoa, Koka	25 Feb 1973	R. Traub, J.S. Ash	092747
22	11	<i>Leptailurus serval</i>	Shoa, Lake Langono Rd (10 miles N of)	28 Dec 1974	L. Sholdt	092746
<b>Kenya</b>						
16	2	<i>Civettictis civetta</i>	Central, Muranga, Mitubiri	08 Feb 1953	D.G. MacInnes	095066
<b>Liberia</b>						
1	1	Domestic dog	Bolahim	1930	T. Kolbe	046716
8	5	Domestic cat	Harbel		R. Fox	087923
<b>Mali</b>						
64	5	<i>Civettictis civetta</i>	Kayes, Niore du Sahel, Lorak Banc	12 Feb 1956		084578
14	2	<i>Leptailurus serval</i>	Kayes, Niore du Sahel, Lorak Banc	06 Feb 1956		089579
3		<i>Panthera pardus</i>	Sikasso, Sikasso	20 Aug 1954		089576
<b>Senegal</b>						
1		<i>Leptailurus serval</i>	Casamance, Bignona	21 Oct 1945	From P.C. Morel	088278
1		Vegetation	Sangalkam	05 Apr 1945	L. Kartman	021793
3		<i>Felis silvestris</i> (= <i>lybica</i> )	Senegal Oriental, Niokolo Koba, Badi	Mar 1957	From P.C. Morel	088277
7		<i>Civettictis civetta</i>	Senegal Oriental, Niokolo Koba	Feb 1956	From P.C. Morel	088276
9	39	<i>Leptailurus serval</i>	Thies, Mbour, Sandiara	18 May 1956	From P.C. Morel	088279
<b>Sudan</b>						
1		<i>Hyaena hyaena</i>	Bahr El Ghazal, Tirol	21 Jan 1955	E.T.M. Reid	093012
1	3	Domestic cat	Bahr El Ghazal, Wau	Oct 1953	S.V.S.	093025
2	1	<i>Arvicanthis</i> sp. burrow	Equatoria, Juba, Juba	10 Dec 1952		093013
8		<i>Civettictis civetta</i>	Equatoria, Torit, Obbo	09 Apr 1950	H. Hoogstraal	093031

TABLE 2 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Sudan (cont.)</b>						
13	5	<i>Canis aureus</i>	Equatoria, Torit, Torit	25 Nov 1949	H. Hoogstraal	094959
14		<i>Canis aureus</i>	Equatoria, Torit, Torit	06 Dec 1949		093014
22	2	<i>Canis aureus</i>	Equatoria, Torit, Torit	02 Dec 1949		093016
1		<i>Canis aureus</i>	Equatoria, Torit, Torit	06 Dec 1949	H. Hoogstraal	093015
1	1	<i>Civettictis civetta</i>	Equatoria, Torit, Torit	08 Feb 1951	H. Hoogstraal	093023
1	4	Domestic dog	Equatoria, Torit, Torit	04 Jan 1952		093024
1		<i>Mungos mungo</i>	Equatoria, Torit, Torit	13 Apr 1950	J. Owen	093011
6		<i>Panthera leo</i>	Equatoria, Torit, Torit	15 Mar 1952		093028
14	3	<i>Canis mesomelas</i>	Equatoria, Ubo	08 May 1948		093018
1		<i>Canis adustus</i>	Upper Nile, Malakal (near)	14 Mar 1964	H. Hoogstraal, S. Gaber	094960
2		<i>Canis adustus</i>	Upper Nile, Malakal, Malakal (7 miles N of)	01 Feb 1962	H. Hoogstraal, S. Gaber	094961
1	8	<i>Panthera leo</i>	Upper Nile, 40 mi S of Malakal, Abwong	27 Feb 1961	H. Hoogstraal	092978
		<i>Canis adustus</i>	Upper Nile, Paloich, Gelhak Forest	23 May 1962	H. Hoogstraal, S. Gaber	092881
1		<i>Felis silvestris</i> (=lybica)	Upper Nile, Paloich, Paloich (5 miles N of)	27 Feb 1962	H. Hoogstraal, S. Gaber	094962
2		<i>Felis silvestris</i>	Upper Nile, Paloich, Tir (near)	23 Feb 1961	H. Hoogstraal, S. Gaber	092973
2	1	<i>Leptailurus serval</i>	Upper Nile, Paloich, Tir (near)	07 Feb 1961	H. Hoogstraal, S. Gaber	094958
<b>Tanzania</b>						
1		<i>Canis mesomelas</i>	Mara, Serengeti Plains, Seronera	25 Sep 1974	D. Schmidt	095204
1		<i>Connochaetes taurinus</i>	Yeida, Swamps	04 Oct 1938	L.R. Paddock	115774
<b>Uganda</b>						
11	1	<i>Panthera leo</i>	Ankole, Nyabushozi	22 Oct 1965	J. Matthyse	123763
1	2	<i>Panthera leo</i>	Ankole, Nyabushozi	09 Oct 1965	J. Matthyse	120367
7	6	<i>Panthera pardus</i>	Ankole, Mbarara	09 Aug 1965	J. Matthyse	123762
2		<i>Panthera leo</i>	Ankole, Mbarara (35 miles SW of)	14 Apr 1962	Major Price	089542
7	2	Domestic dog	Baganda, Entebbe	27 Apr 1966	J. Matthyse	053826
3	1	Domestic dog	Karamoja, Kampala	05 Feb 1940	G.H.E. Hopkins	120365
		<i>Panthera pardus</i>	Karamoja, Moroto, Labwor	16 Aug 1965	J. Matthyse	123764

TABLE 2 (cont.)

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
♂	♀					
<b>Uganda (cont.)</b>						
2			Kigezi, Nakabande	25 Oct 1940		
1	1	Domestic dog	Pacota, Aswa, Acholi	21 Jun 1966	J. Matthyse	120366
10	2	<i>Panthera leo</i>	Ruwenzori National Park	31 Jul 1969	M.H. Woodford	053835
3		<i>Panthera leo</i>	Ruwenzori National Park, Mweya	19 Jun 1974	M.H. Woodford	088634
21		<i>Civettictis civetta</i>	W. Mengo, Entebbe	Apr 1979	M.N. Kaiser	120363 123761
<b>Zambia</b>						
10	17	<i>Panthera leo</i>	Southern, Namwala	19 Aug 1951	J.G. Matthyse	091294
1	10	Domestic dog	Barotseland, Kalabo (E of)	Apr 1965	R.G. Japp	091297
1	1	<i>Felis silvestris</i> (= <i>lybicus</i> )	Barotseland, Kalabo (E of)	30 Dec 1964	R.G. Japp	091296
1		<i>Mastomys natalensis</i>	Mt. Makulu	16 Jun 1970	M.H. Colbo	091300
6		<i>Civettictis civetta</i>	Eastern, Lundazi, Chibembe Pontoon (10 mi N of)	07 Aug 1962	G. Corbet, J. Ingles	091304
15	1	<i>Civettictis civetta</i>	Lochinvar	Jul 1959		123765
1		<i>Potamochoerus porcus</i>	Susa Camp, Chipata, Eastern	24 Jul 1980	S.G.A. Weak	123766
<b>Zimbabwe</b>						
16		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Atlantica Foundation Research Station	07 Jul 1977	R.A.I. Norval	107272
13		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Calgary Farm	16 May 1977	R.A.I. Norval	107096
3		<i>Civettictis civetta</i>	Mashonaland South, Salisbury, Calgary Farm	14 Feb 1977	R.A.I. Norval	121599
6		<i>Leptailurus serval</i>	Mashonaland South, Salisbury, Calgary Farm	09 Feb 1977	R.A.I. Norval	121603
7		<i>Felis silvestris</i> (= <i>libyca</i> )	Mashonaland South, Salisbury, Mazoe Veterinary Farm	06 Sep 1976	R.A.I. Norval	103047
8	9	<i>Leptailurus serval</i>	Mashonaland South, Sinoia	25 May 1977	R.A.I. Norval	121595

\* All the collection numbers are those of specimens in the United States National Tick Collection

+ Reared specimens from engorged nymphs found in *Arvicanthis niloticus* nests

TABLE 3 *Haemaphysalis (Rhipistoma) elliptica* and *Haemaphysalis (Rhipistoma) leachi*, immature stages examined

No. of ticks		Host	Locality	Date of collection	Collector	Collection no.*
N	L					
<b><i>Haemaphysalis (Rhipistoma) elliptica</i></b>						
16 <sup>+</sup>	30 <sup>+</sup>	Domestic dog	South Africa	13 Jul 2005	K. Junker	IGH
16 <sup>+</sup>	30 <sup>+</sup>	<i>Acinonyx jubatus</i>	South Africa, Pretoria	21 Feb 2006	I. Hubmer	IGH
<b><i>Haemaphysalis (Rhipistoma) leachi</i></b>						
8 <sup>+</sup>		Domestic dog	Central African Republic, Nana Nambere, Bouar	10 Oct 1969 to 14 Jan 1970	R. Lacotte	096992
	30 <sup>+</sup>	Domestic dog	Central African Republic, Nana Nambere, Bouar	16 Oct to 10 Dec 1969	R. Lacotte	096979
	30 <sup>+</sup>	Domestic dog	Central African Republic, Nana Nambere, Bouar	02 Aug to 03 Sep 1969	M. Giret	096980
2 <sup>+</sup>	30 <sup>+</sup>	Domestic dog	Egypt, El Wadi El Gedeed, Dakhla Oasis, El Hindaw	20 Nov 1972	I. Helmy	078801
	30 <sup>+</sup>	<i>Arvicanthis niloticus</i> nest	Egypt, Giza, Imbaba, Ausim	Sep 1953	H. Hoogstraal	078734
	30 <sup>+</sup>	<i>Vulpes vulpes</i>	Egypt, Giza, Imbaba, Saft El Laban	06 Mar 1958	H. Hoogstraal	078749

\* All the collection numbers are those of specimens in the United States National Tick Collection

+ Reared specimens

TABLE 4 Differential diagnosis between *Haemaphysalis (Rhipistoma) elliptica* and *Haemaphysalis (Rhipistoma) leachi*

<i>Haemaphysalis (R.) elliptica</i>	<i>Haemaphysalis (R.) leachi</i>
<b>Male</b> (Fig. 2, 3, 8 and 9)	
1. Longer and broader tick: <ul style="list-style-type: none"> <li>– Length (from palpal apices to posterior margin of conscutum) avg. 3.00 mm</li> <li>– Width (of conscutum) avg. 1.47 mm</li> <li>– Ratio length to width avg. 2.05</li> </ul> 2. One or two of first festoons enclosed by marginal groove                     3. Dorsally median margin of palpal segment II gradually widening anteriorly from the segment's mid-length                     4. Lateral margin of ventral spur on palpal segment II straight	1. Shorter and more slender tick: <ul style="list-style-type: none"> <li>– Length (from palpal apices to posterior margin of conscutum) avg. 2.45 mm</li> <li>– Width (of conscutum) avg. 1.06 mm</li> <li>– Ratio length to width avg. 2.30</li> </ul> 2. Two or three of first festoons enclosed by marginal groove                     3. Dorsally median margin of palpal segment II abruptly widening anteriorly from the segment's mid-length                     4. Lateral margin of ventral spur on palpal segment II concave
<b>Female</b> (Fig. 4, 5, 10 and 11)	
1. Longer and broader tick: <ul style="list-style-type: none"> <li>– Length (from palpal apices to posterior margin of scutum) avg. 1.73 mm</li> <li>– Width (of scutum) avg. 1.02 mm</li> <li>– Ratio length to width avg. 1.70</li> </ul> 2. Dorsal cornua shorter, approximately 1/6 length of basis capituli                     3. Dorsally median margin of palpal segment II gradually widening anteriorly at segment's mid-length	1. Shorter and more slender tick: <ul style="list-style-type: none"> <li>– Length (from palpal apices to posterior margin of scutum) avg. 1.53 mm</li> <li>– Width (of scutum) avg. 0.84 mm</li> <li>– Ratio length to width avg. 1.81</li> </ul> 2. Dorsal cornua longer, approximately 1/4 length of basis capituli                     3. Dorsally median margin of palpal segment II abruptly widening anteriorly at segment's mid-length
<b>Nymph</b> (Fig. 6 and 12)	
1. Larger (see description)                     2. Dorsally median margin of palpal segment II widening gradually anteriorly                     3. Ventral spur of palpal segment II broad                     4. Denticles of hypostome in files of 7 to 9 (usually 8)	1. Smaller (see description)                     2. Dorsally median margin of palpal segment II widening sharply anteriorly                     3. Ventral spur of palpal segment II narrow                     4. Denticles of hypostome in files of 5 or 6
<b>Larva</b> (Fig. 7 and 13)	
1. Larger (see description)                     2. Ventral spur of palpal segment II broad                     3. Ventral spur of palpal segment III indistinct, fold-like                     4. Denticles in files of 7 or 8	1. Smaller (see description)                     2. Ventral spur of palpal segment II narrow                     3. Ventral spur of palpal segment III distinct, triangular                     4. Denticles in files of 4 to 6 (usually 5)

## REMARKS ON IDENTIFICATION

Our study has shown that *H. (R.) elliptica* is an independent species belonging to the *H. (R.) leachi* subgroup and that it is clearly distinguishable from *H. (R.) leachi*. However, the value of diagnostic characters varies from stage to stage.

The easiest stage to distinguish is the larval. All the larval characters that we have chosen clearly differentiate the larvae of *H. (R.) elliptica* from those of *H. (R.) leachi*. Males of *H. (R.) elliptica* are also quite easily distinguishable from those of *H. (R.) leachi*. The main differentiating characters are the shape of

the lateral margin of the ventral spur on palpal segment II and total size of the ticks. The most obvious character for nymphs is the number of denticles per file on the hypostome, and total size. Females are the most difficult to distinguish. The main characters are total size and the size of the dorsal cornua, and because both characters have a metric value, difficult specimens do not have to be excluded during routine examinations. The females of most closely related species within the *H. (R.) leachi* group are difficult to distinguish interspecifically. However, because of the morphological stability of *Haemaphysalis* species, the size of various structures is of consid-



erable value for discriminating between all the parasitic stages of closely related species.

Finally, unpublished molecular data confirm our opinion on the species independency of *H. (R.) elliptica*.

## DISTRIBUTION AND HOSTS

*Haemaphysalis (R.) elliptica* is present in East and southern Africa, and DAA and IGH have recorded it in the *Democratic Republic of Congo, Kenya, Mozambique, South Africa, Tanzania, Uganda, Zambia* and *Zimbabwe* (Table 1). JLC adds *Ethiopia, Malawi* and *Rwanda* to this list.

*Haemaphysalis (R.) leachi* has chiefly been recorded from North (Egypt) and East Africa south to the north of Zimbabwe. Judging by collection data this species is probably quite common in Central Africa. A few collections have been made in West Africa. DAA and IGH record this species from *Cameroon, Central African Republic, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Liberia, Mali, Senegal, Sudan, Tanzania, Uganda, Zambia* and *Zimbabwe* (Table 2). JLC adds *Burundi, Chad* and *Guinea* to this list. Both species share a large area of sympatry in East Africa.

The hosts of adult *H. (R.) elliptica* are various carnivore species, amongst which are the domestic dog, domestic cat, lion, *Panthera leo*, and leopard, *Panthera pardus* (Table 1). The hosts of the immature stages are diverse rodent species, and they may very occasionally be present on the same hosts as the adults. The hosts of adult *H. (R.) leachi* are similar to those of *H. (R.) elliptica*, namely domestic and wild carnivores (Table 2). The immature stages use various rodents and other small mammals as hosts. It will, however, only be possible to determine the actual host range of the immature stages of *H. (R.) elliptica* and *H. (R.) leachi* once a taxonomic revision of the whole *H. (R.) leachi* group has been completed.

The adults of both species have been found in a number of collections taken from a single host. Both geographic and host sympatry indirectly confirm the specific independency of *H. (R.) elliptica* and *H. (R.) leachi*.

## DISEASE RELATIONSHIPS

*Haemaphysalis (R.) elliptica* (then referred to as *H. leachi*) is the vector of *Babesia canis rossi*, the

cause of virulent babesiosis in domestic dogs in South Africa (Lewis, Penzhorn, Lopez-Rebollar & De Waal 1996). We are, however, unable to find any records of *H. (R.) leachi* transmitting *Babesia canis* in Egypt. In South Africa, *H. (R.) elliptica* (as *H. leachi*) has been recorded as transmitting *Rickettsia conori*, resulting in tick bite fever in humans (Gear 1954). Possibly because of its preference for carnivores, adult *H. (R.) elliptica* (then recorded as *H. leachi*) is one of the tick species most frequently collected from humans working in the field (Horak, Fourie, Heyne, Walker & Needham 2002).

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