



A century of tick taxonomy in South Africa

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ABSTRACT

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Eighty ixodid tick species, 25 argasid tick species and *Nuttalliella namaqua* occur in South Africa. Twenty-one of the 80 ixodid species and two of the argasid species occur only in this country, while *N. namaqua* is present only in South Africa and Namibia. Forty-six of the 80 ixodid species and 16 of the 25 argasid species as well as *N. namaqua* have been described as new species since 1908. People working in South Africa have written or contributed to the descriptions of 24 of these 63 new species, while foreign researchers have described the remainder. New species indigenous to South Africa are still being discovered, while the names of some species, well known because of their veterinary importance, have been altered.

CONTEXT

The most recently compiled world list of valid tick names contains the names of 692 ixodid and 186 argasid tick species as well as that of *Nuttalliella namaqua*, the only species in this genus (Nava, Guglielmone & Mangold 2008). Of these 879 species, 80 ixodid and 25 argasid species and *N. namaqua* occur in South Africa. Twenty-one of the 80 ixodid species and two of the argasid species have distributions confined to this country (Theiler 1962; Walker 1991; Walker, Keirans & Horak 2000), and *N. namaqua* has only been recorded in South Africa and Namibia. Forty-six of the 80 ixodid and 16 of the 25 argasid species and *N. namaqua* have been described since 1908, and this review is confined to the latter 63 ticks. Twenty-four of these descriptions were written, or contributed to by people in South Africa, and the remainder by researchers in England, France, Germany, Israel, Russia, Mozambique and the USA.

The South African authors and the South African ticks that they have described as being new to sci-

ence since 1908 are summarized in tabular format. A similar format has been followed for tick species with South African distributions, but described by foreign researchers during the same period.

The earliest description of a tick that has a strictly South African distribution is that by De Geer in 1778 for *Amblyomma sylvaticum*, a tick of tortoises and more particularly the angulate tortoise, *Chersina angulata* (Horak, McKay, Henen, Heyne, Hofmeyr & De Villiers 2006). The most recent description is that of *Haemaphysalis colesbergensis*, a tick of domestic and wild felids (Apanaskevich & Horak 2008c).

South Africans have in recent times also been involved in some of the more controversial name changes of well-known ticks of veterinary importance. The name changes of the common blue tick, *Boophilus decoloratus* and the Asiatic blue tick *Boophilus microplus* to *Rhipicephalus* (*Boophilus*) *decoloratus* and *Rhipicephalus* (*Boophilus*) *microplus* were first published by Horak, Camicas & Keirans (2002) in their world list of valid tick names.

TABLE 1 Authors who have worked in South Africa and the South African tick species that they have described as new to science since 1908

South African author and species	South African author and species
Bedford, G.A.H. (1912–1938)	Walker, Jane (1966–2000)
<i>Argas peringueyi</i> (Bedford & Hewitt 1925)	<i>Haemaphysalis hyracophila</i> Hoogstraal, Walker & Neitz, 1971
<i>Rhipicephalus theileri</i> Bedford & Hewitt, 1925	<i>Argas africanus</i> Hoogstraal, Kaiser, Walker, Ledger, Converse & Rice, 1975
<i>Haemaphysalis cooleyi</i> Bedford, 1929	<i>Ixodes neitzi</i> Clifford, Walker & Keirans, 1977
<i>Ixodes elongatus</i> Bedford, 1929	<i>Rhipicephalus zambeziensis</i> Walker, Norval & Corwin, 1981
<i>Nuttalliella namaqua</i> Bedford, 1931	<i>Ixodes catherinei</i> Keirans, Clifford & Walker, 1982
<i>Argas striatus</i> Bedford, 1932	<i>Ixodes corwini</i> Keirans, Clifford & Walker, 1982
<i>Rhipicephalus distinctus</i> Bedford, 1932	<i>Rhipicephalus lounsburyi</i> Walker, 1990
Du Toit, R. (1929–1964)	<i>Rhipicephalus neumanni</i> Walker, 1990
<i>Rhipicephalus glabroscutatum</i> Du Toit, 1941	<i>Rhipicephalus exophthalmos</i> Keirans & Walker, 1993
Theiler, Gertrud (1940–1983)	<i>Rhipicephalus oreotragi</i> Walker & Horak, 2000
<i>Argas eboris</i> (Theiler, 1959)	<i>Rhipicephalus warburtoni</i> Walker & Horak, 2000
<i>Ixodes drakensbergensis</i> Clifford, Theiler & Baker, 1975	Horak I.G. (1974–present)
<i>Rhipicephalus arnoldi</i> Theiler & Zumpt, 1949	<i>Haemaphysalis colesbergensis</i> Apanaskevich & Horak, 2008
Zumpt, F. (SA Institute of Medical Research) (1948–1980)	
<i>Rhipicephalus muelhensi</i> Zumpt, 1943*	

* Zumpt was working at the Bernard Nocht-Institut in Hamburg at the time he described this species

TABLE 2 Tick species with South African distributions described as new to science by foreign researchers since 1908

Tick species and foreign authors*	Tick species and foreign authors*
Ixodid ticks	
<i>Amblyomma nuttalli</i> Dönitz, 1909	<i>Ixodes spiculae</i> Arthur, 1956
<i>Haemaphysalis aciculifer</i> Warburton, 1913	<i>Ixodes spinae</i> Arthur, 1958
<i>Haemaphysalis hoodi</i> Warburton & Nuttall, 1909	<i>Ixodes theilerae</i> Arthur, 1953
<i>Haemaphysalis pedetes</i> Hoogstraal, 1972	<i>Ixodes transvaalensis</i> Clifford & Hoogstraal, 1966
<i>Haemaphysalis silacea</i> Robinson, 1912	<i>Rhipicentor bicornis</i> Nuttall & Warburton, 1908
<i>Haemaphysalis zumpti</i> Hoogstraal & El Kammah, 1974	<i>Rhipicentor nuttalli</i> Cooper & Robinson, 1908
<i>Ixodes alluaudi</i> Neumann, 1913	<i>Rhipicephalus evertsi mimeticus</i> Dönitz, 1910
<i>Ixodes aulacodi</i> Arthur, 1956	<i>Rhipicephalus follis</i> Dönitz, 1910
<i>Ixodes bakeri</i> Arthur & Clifford, 1961	<i>Rhipicephalus gertrudae</i> Feldman-Muhsam, 1960
<i>Ixodes bedfordi</i> Arthur, 1959	<i>Rhipicephalus simpsoni</i> Nuttall, 1910
<i>Ixodes cavipalpus</i> Nuttall & Warburton, 1908	<i>Rhipicephalus sulcatus</i> Neumann, 1908
<i>Ixodes myotomys</i> Clifford & Hoogstraal, 1970	<i>Rhipicephalus turanicus</i> Pomerantsev, 1936
<i>Ixodes procaviae</i> Arthur & Burrow, 1957	<i>Rhipicephalus zumpti</i> Santos Dias, 1950
<i>Ixodes rhabdomysae</i> Arthur, 1959	
Argasid ticks	
<i>Argas arboreus</i> Kaiser, Hoogstraal & Kohls, 1964	<i>Carios confusus</i> (Hoogstraal, 1955)
<i>Argas streptopelia</i> Kaiser, Hoogstraal & Horner, 1970	<i>Carios cordiformis</i> (Hoogstraal & Kohls, 1967)
<i>Argas theilerae</i> Hoogstraal & Kaiser, 1970	<i>Carios faini</i> (Hoogstraal, 1960)
<i>Argas walkerae</i> Kaiser & Hoogstraal, 1969	<i>Ornithodoros compactus</i> Walton, 1962
<i>Argas zumpti</i> Hoogstraal, Kaiser & Kohls, 1968	<i>Ornithodoros porcinus</i> Walton, 1962
<i>Carios boueti</i> (Roubad, & Colas-Belcour, 1933)	<i>Ornithodoros zumpti</i> Heisch & Guggisberg, 1953

* Not listed in references

TABLE 3 South African ticks, other than *Rhipicephalus* species, described by foreign researchers, for which additional descriptions have been produced by researchers in South Africa since 1908

Species and authors*	Descriptions by researchers working in South Africa**
<i>Amblyomma hebraeum</i> Koch, 1844	Walker & Olwage (1987)
<i>Amblyomma marmoreum</i> Koch, 1844	Theiler & Salisbury (1959); Walker & Olwage (1987)
<i>Amblyomma nuttalli</i> Dönitz, 1909	Theiler & Salisbury (1959)
<i>Amblyomma sylvaticum</i> (De Geer, 1778)	Theiler (1943a)
<i>Amblyomma tholloni</i> Neumann, 1899	Walker & Olwage (1987)
<i>Aponomma exornatum</i> (Koch, 1844)	Theiler (1945a)
<i>Aponomma latum</i> (Koch, 1844)	Theiler (1945b)
<i>Aponomma transversale</i> (Lucas, 1844)	Theiler (1945b)
<i>Dermacentor rhinoceros</i> (Denny, 1843)	Keirans (1993)
<i>Haemaphysalis aciculifer</i> Warburton, 1913	Theiler (1945c)
<i>Haemaphysalis elliptica</i> (Koch, 1844)	Apanaskevich, Horak & Camicas (2007)
<i>Haemaphysalis parvata</i> Neumann, 1905	Theiler (1945c)
<i>Haemaphysalis silacea</i> Robinson, 1912	Theiler (1945c)
<i>Hyalomma glabrum</i> Delpy, 1949	Apanaskevich & Horak (2006)
<i>Hyalomma rufipes</i> Koch, 1844	Apanaskevich & Horak (2008a)
<i>Hyalomma truncatum</i> Koch, 1844	Apanaskevich & Horak (2008b)
<i>Ixodes alluaudi</i> Neumann, 1913	Theiler (1941)
<i>Ixodes bakeri</i> Arthur & Clifford, 1961	Clifford, Walker & Keirans (1976)
<i>Margaropus winthemi</i> Karsch, 1879	Walker & Laurence (1973); Gothe (1967)
<i>Rhipicentor bicornis</i> Nuttall & Warburton, 1908	Theiler (1961)
<i>Rhipicentor nuttalli</i> Cooper & Robinson, 1908	Theiler (1961)

* Not listed in references

** Listed in references

TABLE 4 South African *Rhipicephalus* species described by foreign researchers, for which additional descriptions have been produced since 1908 by researchers in South Africa

<i>Rhipicephalus</i> species and original authors*	Descriptions by researchers in South Africa**
<i>Rhipicephalus (Boophilus) decoloratus</i> (Koch, 1844)	Gothé (1967); Arthur & Londt (1973); Heyne (1986)
<i>Rhipicephalus (Boophilus) microplus</i> (Canestrini, 1887)	Gothé (1967); Londt & Arthur (1975); Heyne (1986)
<i>Rhipicephalus appendiculatus</i> Neumann, 1901	Walker, Norval & Corwin (1981)
<i>Rhipicephalus capensis</i> Koch, 1844	Walker, Keirans & Horak (2000)
<i>Rhipicephalus evertsi evertsi</i> Neumann, 1897	Walker <i>et al.</i> (2000)
<i>Rhipicephalus follis</i> Dönitz, 1910	Walker <i>et al.</i> (2000)
<i>Rhipicephalus gertrudae</i> Feldman-Muhsam, 1960	Walker <i>et al.</i> (2000)
<i>Rhipicephalus kochi</i> Dönitz, 1905	Walker <i>et al.</i> (2000)
<i>Rhipicephalus lunulatus</i> Neumann, 1907	Walker, Keirans, Pegram & Clifford (1988); Walker <i>et al.</i> (2000)
<i>Rhipicephalus maculatus</i> Neumann, 1901	Theiler & Robinson (1953b); Walker <i>et al.</i> (2000)
<i>Rhipicephalus muelhensii</i> Zumpt, 1943	Salisbury (1959); Walker <i>et al.</i> (2000)
<i>Rhipicephalus nitens</i> Neumann, 1904	Walker <i>et al.</i> (2000)
<i>Rhipicephalus oculatus</i> Neumann, 1901	Keirans, Walker, Horak & Heyne (1993); Walker <i>et al.</i> (2000)
<i>Rhipicephalus sanguineus</i> (Latreille, 1806)	Pegram, Keirans, Clifford & Walker (1987b); Walker <i>et al.</i> (2000)
<i>Rhipicephalus simpsoni</i> Nuttall, 1910	Theiler 1949; Walker <i>et al.</i> 2000
<i>Rhipicephalus simus</i> Koch, 1844	Pegram, Walker, Clifford & Keirans (1987c); Walker <i>et al.</i> (2000)
<i>Rhipicephalus sulcatus</i> Neumann, 1908	Pegram, Clifford, Walker & Keirans (1987a); Walker <i>et al.</i> (2000)
<i>Rhipicephalus tricuspis</i> Dönitz, 1906	Walker <i>et al.</i> (1988; 2000)
<i>Rhipicephalus turanicus</i> Pomerantsev, 1936	Pegram <i>et al.</i> (1987a); Walker <i>et al.</i> (2000)
<i>Rhipicephalus zumpti</i> Santos Dias, 1950	Walker <i>et al.</i> (2000)

* Not listed in references

** Listed in references

This was done after molecular and morphological studies by Murrell, Campbell & Barker (2000) and Beati & Keirans (2001) had indicated that the genus *Rhipicephalus* was paraphyletic in respect of the genus *Boophilus*. Murrell & Barker (2003) later confirmed these name changes. The yellow dog tick of South Africa, previously lumped with *Haemaphysalis leachi* of North and East Africa, has been reinstated as *Haemaphysalis elliptica*, an old taxon originally described from the Cape of Good Hope by Koch in 1844 (Apanaskevich, Horak & Camicas 2007). While the bont-legged ticks, to which sub-specific status within the *Hyalomma marginatum* species group had previously been assigned, have all been raised to specific status (Apanaskevich & Horak 2008a). Furthermore the tick previously known as *Hyalomma marginatum turanicum* in South Africa has been reinstated as *Hyalomma glabrum*, the only *Hyalomma* with a strictly southern hemisphere, and with that a strictly South African distribution (Apanaskevich & Horak 2006).

Three of the abovementioned ticks are of considerable veterinary importance in that *R. (B.) decoloratus* and *R. (B.) microplus* are the vectors of *Babesia* species, the cause of babesiosis or redwater in domestic cattle (De Vos, De Waal & Jackson 2004), while *H. elliptica*, and not *H. leachi*, is now the only proven vector of *Babesia canis rossi* the cause of the virulent form of babesiosis encountered in domestic dogs in South Africa (Lewis, Penzhorn, Lopez-Rebollar & De Waal 1996; Apanaskevich *et al.* 2007). A fourth member of this group, *Hyalomma rufipes*, is the principal vector in South Africa of the virus causing Crimean-Congo haemorrhagic fever in humans (Horak, Swanepoel & Gummow 2002). The name changes are thus not only of academic importance, but of scientific concern as they are often used in the literature concerning the diseases that they transmit and in which the correct use of taxonomic epithets is essential.

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I have been fortunate in having two monographs to consult, namely those by Theiler (1962) and Walker (1991), and I pay tribute to both authors and to their attention to detail.

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