Individual Species Accounts

1 – *R. annulatus* (Say, 1821) (J. Acad. Natl. Sci. Philadelphia, 2: 59–82)
This species was formerly considered a member of the genus *Boophilus.*

Type depository: lost (Guglielmone, A.A., Estrada-Peña, A., Keirans, J.E. & Robbins, R.G. 2003. Ticks (Acari: Ixodida) of the Neotropical Zoogeographic Region. Special Publication of the International Consortium on Ticks and Tick-borne Diseases, Atalanta, Houten, The Netherlands, 173 pp.), as *Ixodes annulatus*

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Nearctic, Palearctic

Ecoregions: mediterranean forests, woodlands and scrub; tropical and subtropical moist broadleaf forests in sub-Saharan Africa

Hosts: usual hosts are Artiodactyla: Bovidae, while Aves and Squamata are considered exceptional hosts.
Mammalia (several orders); Galliformes: Phasianidae; Passeriformes: Alaudidae, Sturnidae; Squamata: Agamidae, Lacertidae

Human infestation: yes (Burridge 2011)

Remarks: because this is a one-host tick, we do not separately record the various life stages present on hosts. Camicas et al. (1998) include the Australasian and Neotropical Regions within the range of this tick. We, however, concur with Guglielmone et al. (2003) and regard Neotropical localities for this species as doubtful. We can find no *bona fide* records for the Australasian Region. Kuntz and Myers (1969) include Oriental localities for this species, but we also consider these records doubtful, while Ghosh et al. (2007) list *R. annulatus* for India, but state that such records require confirmation, a position with which we agree, although Ravindran et al. (2011) assert the opposite. Serdjukova (1956) and Kerbabayev (1965) refer to this tick as *Boophilus calcaratus*, while others cited below refer to it as *Boophilus annulatus.* Kolonin (2009) limits the hosts of this species to ungulates, but in the references cited below there are several records from other occasional hosts.

A.A. Guglielmone et al., *The Hard Ticks of the World: (Acari: Ixodida: Ixodidae)*,
DOI 10.1007/978-94-007-7497-1_9, © Springer Science+Business Media Dordrecht 2014

Burridge (2011) excludes Squamata as hosts for *R. annulatus*, but we regard the odd records for this type of host in Serdjukova (1965) as tentatively valid. Leprince et al. (1988) report a male of *R. annulatus* allegedly feeding on *Tabanus americanus* (Diptera: Tabanidae). See also *R. kohlsi.*

References

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Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

Chavarría, C. M. 1941. Garrapatas determinadas en México. Caracteres genéricos de las más comunes. Rev. Inst. Pecu., 1: 18–24.

Ghosh, S., Bansal, G.C., Gupta, S.C., Ray, D., Khan, M.Q., Irshad, H., Shahiduzzaman, M., Seitzer, U. & Ahmed, J.S. 2007. Status of tick distribution in Bangladesh, India and Pakistan. Parasitol. Res., 101 (Suppl. 2): 207–216.

Guglielmone, A.A., Estrada-Peña, A., Keirans, J.E. & Robbins, R.G. 2003. Ticks (Acari: Ixodida) of the Neotropical Zoogeographic Region. Special Publication of the International Consortium on Ticks and Tick-borne Diseases-2, Atalanta, Houten, The Netherlands, 173 pp.

Hoogstraal, H. & Kaiser, M.N. 1959. Ticks (Ixodoidea) of Arabia with special reference to the Yemen. Fieldiana Zool., 39: 297–322.

Kerbabayev, E.B. 1965. Ecology of the tick *Boophilus calcaratus* Bir., 1895 in Turkmenia. Izv. Akad. Nauk Turkmen. SSR Ser. Biol. Nauk (6): 73–77. In Russian.

Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/

Kuntz, R.E. & Myers, B.J. 1969. A checklist of parasites and commensals reported for the Taiwan macaque (*Macaca cyclopis* Swinhoe, 1862). Primates, 10: 71–80.

Leprince, D.J., Foil, L.D. & Mullen, G.R. 1988. Parasitism of *Tabanus americanus* (Diptera: Tabanidae) by *Boophilus annulatus* (Acari: Ixodidae). J. Entomol. Sci., 23: 274–275.

Ravindran, R., Juliet, S., Sunil, A.R., Kumar, K.G.A., Nair, S.N., Amithamol, K.K., Shynu, M., Rawat, A.K.S. & Ghosh, S. 2011. Eclosion blocking effect of ethanolic extract of *Leucas aspera* (Lamiaceae) on *Rhipicephalus* (*Boophilus*) *annulatus.* Vet. Parasitol., 179: 287–290.

Serdjukova, G.V. 1956. Ixodid ticks of the fauna of USSR. Opred. Faune SSSR. Zool. Inst. Akad. Nauk SSSR (64), 121 pp. In Russian.

2 – *R. appendiculatus* Neumann, 1901 (Mém. Soc. Zool. Fr., 14: 249–372)

Type depositories: BMNH (lectotype, paralectotype), ZMB (paralectotypes) (Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: many ecoregions, most prevalent in montane grasslands and shrublands; tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for larvae, nymphs and adults are Artiodactyla: Bovidae, while Aves and Testudines are exceptional hosts.
Mammalia (several orders); Galliformes: Numididae, Phasianidae (ANL)
Passeriformes: Laniidae; Testudines (unknown order) (A)
Coliiformes: Coliidae; Coraciiformes: Alcedinidae; Passeriformes: Sturnidae; Piciformes: Picidae (N and/or L)
Struthioniformes: Struthionidae (stage unknown)

Human infestation: yes (Walker et al. 2000)

Remarks: Keirans (1985) states that this tick has been confused with several species of *Rhipicephalus*, while Walker et al. (2000) stress the similarities between *R. appendiculatus* and *R. zambeziensis* and confusion with *R. duttoni* and *R. nitens.* Keirans and Durden (2001) record *R. appendiculatus* as having been introduced into the Nearctic Region, but there is no evidence that it has become established there. Clavijo et al. (2009) state that a Venezuelan tick collection contains *R. appendiculatus* from England (Palearctic Region), but we assume that the specimens were collected in Africa and sent to Venezuela from England. Theiler (1962) uses the term "immatures" without specifying whether larvae, nymphs or both immature stages of *R. appendiculatus* were present on hosts. Theiler (1959) lists Coliiformes and Piciformes as hosts for the adults of *R. appendiculatus*, but subsequent evidence indicates that these are exceptional hosts and only of the immature stages. Kolonin (2009) excludes Aves as hosts for *R. appendiculatus*, but birds are recognized as hosts for this species in the references below. We also consider provisionally valid the record in Colbo (1973) of adults of *R. appendiculatus* on Testudines, but this record has been ignored by other workers. See also *R. warburtoni.*

References

Clavijo, J.J., Vásquez, C.L. & Valera, N.C. 2009. Garrapatas duras de los géneros *Amblyomma* Koch y *Rhipicephalus* Koch (Acari: Ixodidae) presentes en la colección de zoología agrícola, decanato de agronomía, Universidad Centro Occidental Lisandro Alvarado, Venezuela. Entomotrópica, 24: 41–50

Colbo, M.H. 1973. Ticks of Zambian wild animals: a preliminary checklist. Puku (7): 97–105.

Cooper, R.G. 2005. Bacterial, fungal and parasitic infections in the ostrich (*Struthio camelus* var. *domesticus*). Anim. Sci. J., 76: 97–106.

Keirans, J.E. 1985. George Henry Falkiner Nuttall and the Nuttall tick catalogue. U. S. Dept. Agric., Agric. Res. Ser. Misc. Pub. (1438), 1785 pp.

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Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

3 – *R. aquatilis* Walker, Keirans & Pegram, 1993 (Onderstepoort J. Vet. Res., 60: 205–210)

Type depositories: BMNH (holotype, paratypes), OVI, USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

According to Walker et al. (2000, *op. cit.* under *R. appendiculatus*), this species was originally listed as *Rhipicephalus* sp. III in Yeoman, G.H. & Walker, J.B. (1967. The ixodid ticks of Tanzania. A study of the zoogeography of the Ixodidae of an East African Country. Commonwealth Institute of Entomology, London, 215 pp.)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregion: Victoria Basin forest-savanna mosaic

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Carnivora: Felidae (A)

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

4 – *R. armatus* Pocock, 1900 (Proc. Zool. Soc. London, Part 1: 48–55)

Type depositories: BMNH, MHO (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: northern *Acacia-Commiphora* bushlands and thickets; few ticks in Somali *Acacia-Commiphora* bushlands and thickets

Hosts: Artiodactyla: Bovidae; Carnivora: Canidae, Felidae (AN)
Mammalia (several orders) (A)
Lagomorpha: Leporidae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) state that only the male and female of *R. armatus* have been described. However, Walker et al. (2000) subsequently described the larva and nymph. These authors also mention an uncertain record of a nymph of *R. armatus* on Aves, and we have therefore not included this record in our list of hosts for this species.

References

Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

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5 – *R. arnoldi* Theiler & Zumpt, 1950 (*In* Zumpt, F. 1950. Moçambique (60): 57–169)
This species is usually cited as having been described in 1949, but the publication containing the description of *R. arnoldi* appeared in 1950, as indicated on the cover of the original issue.

Type depositories: OVI, ZSH, ZMB (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*). Moritz, M. & Fischer, S.C. (1981. Die Typen der Arachniden-Sammlung des Zoologischen Museums Berlin. Mitt. Zool. Mus. Berlin, 57: 341–364) state that there are paratypes in the ZMB. This museum was not included as a type depository in Walker et al. (2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; montane grasslands and shrublands

Hosts: usual hosts for larvae, nymphs and adults are Lagomorpha: Leporidae; usual hosts for larvae and nymphs are also Macroscelidea: Macroscelididae and Hyracoidea: Procaviidae.
Lagomorpha: Leporidae; Hyracoidea: Procaviidae (ANL)
Artiodactyla: Bovidae; Perissodactyla: Equidae; Rodentia (unknown family) (A)
Carnivora: Felidae; Macroscelidea: Macroscelididae; Rodentia: Muridae (NL)
Rodentia: Muridae (N and/or L)

Human infestation: no

Remarks: Kolonin (2009) ignores Rodentia as hosts for *R. arnoldi*, but there are good records of this relationship in Walker et al. (2000), although these authors use the term "immatures" without specifying whether larvae, nymphs or both immature stages of *R. arnoldi* were present on hosts.

References

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Horak, I.G., Jacot Guillarmod, A., Moolman, L.C. & De Vos, V. 1987. Parasites of domestic and wild animals in South Africa. XXII. Ixodid ticks on domestic dogs and wild carnivores. Onderstepoort J. Vet. Res., 54: 573–580.

Horak, I.G., Fourie, L.J., Novellie, P.A. & Williams, E.J. 1991. Parasites of domestic and wild animals in South Africa. XXVI. The mosaic of ixodid tick infestations on birds and mammals in the Mountain Zebra National Park. Onderstepoort J. Vet. Res., 58: 125–136.

Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

6 – *R. aurantiacus* Neumann, 1907 (Notes Leyden Mus., 29: 88–100)
Walker et al. (2000, *op. cit*. under *R. appendiculatus*) treat *R. aurantiacus* as a probable junior synonym of *R. ziemanni*, and Kolonin, G.V. (2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/) does not include this species in his list of Ixodidae of the world. We, however, agree with Guglielmone, A.A., Robbins, R.G., Apaneskevich, D.A., Petney, T.N., Estrada-Peña, A. & Horak, I.G. (2009. Comments on controversial tick (Acari: Ixodida) species names and species described or resurrected from 2003 to 2008. Exp. Appl. Acarol., 48: 311–327), who believe that this synonymy has not been definitively proven and accordingly treat this species as valid.

Type depository: LMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: western Guinea lowland forests. This ecoregion is tentative pending validation of this tick species. See below.

Hosts: Artiodactyla: Bovidae, Suidae (A)

Human infestation: yes (Morel 2003)

Remarks: the type locality for *R. aurantiacus* is Liberia. The information contained in Morel (2003) for this country was used when creating a provisional delineation of the ecoregion for this species.

References

Aeschlimann, A. 1967. Biologie et écologie des tiques (Ixodoidea) de Côte d'Ivoire. Acta Trop., 24: 281–405.

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Morel, P.-C. 2003. Les tiques d'Afrique et du Bassin méditerranéen (1965–1995). CIRAD- EMVT, 1342 pp.

7 – *R. australis* Fuller, 1899 (Queensland Agric. J., 4: 389–394)

Type depository: USNTC (neotype) (Estrada-Peña, A., Venzal, J.M., Nava, S., Mangold, A., Guglielmone, A.A., Labruna, M.B. & de la Fuente, J. 2012. Reinstatement of *Rhipicephalus* (*Boophilus*) *australis* Fuller, the Australian cattle tick (Acari: Ixodidae) with redescription of the adult and larval stages. J. Med. Entomol., 49: 794–802)

Known stages: male, female, nymph, larva

Zoogeographic Region: Australasian, Oriental, Pacific islands

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts are Artiodactyla: Bovidae, all other hosts are considered exceptional. Mammalia (several orders)

Human infestation: no

Remarks: because this is a one-host tick, we do not separately record the various life stages present on hosts. This species has been revalidated recently by Estrada-Peña et al. (2012) from specimens from the Australasian and Oriental Regions and remote Pacific islands. *Rhipicephalus australis* was previously treated as *R. microplus*, thereby creating uncertainty about the actual distribution of both taxa. Hosts for *R. australis* were obtained from Estrada-Peña (2012) and from Roberts (1970 as *R. microplus*). See also *R. microplus.*

References

Estrada-Peña, A., Venzal, J.M., Nava, S., Mangold, A., Guglielmone, A.A., Labruna, M.B. & de la Fuente, J. 2012. Reinstatement of *Rhipicephalus* (*Boophilus*) *australis* Fuller, the Australian cattle tick (Acari: Ixodidae) with redescription of the adult and larval stages. J. Med. Entomol., 49: 794–802.

Roberts, F.H.S. 1970. Australian ticks. CSIRO, Melbourne, 267 pp.

8 – *R. bequaerti* Zumpt, 1950 (Moçambique (60): 57–169)
This species is usually cited as having been described in 1949, but the publication containing the description of *R. bequaerti* appeared in 1950, as indicated of the cover of the original issue.

Type depository: SAIMR (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical moist broadleaf forests; few ticks in tropical and subtropical grasslands, savannas and shrublands

Hosts: Artiodactyla: Bovidae, Suidae (A)

Human infestation: yes (Walker et al. 2000)

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

9 – *R. bergeoni* Morel & Balis, 1976 (Rev. Élev. Méd. Vét. Pays Trop., 29: 141–148)
Walker et al. (2000, *op. cit.* under *R. appendiculatus*), on page 95, wrongly state that the pagination for the description of this species is pp. 337–340.

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: Ethiopian montane grasslands and woodlands; Ethiopian montane forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Suidae; Perissodactyla: Equidae; Carnivora: Hyaenidae (A)

Human infestation: no

Remarks: Kolonin (2009) excludes Equidae as hosts for *R. bergeoni*, but we accept the records for this type of host in Walker et al. (2000).

References

Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/
Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

10 – *R. boueti* Morel, 1957 (Bull. Soc. Pathol. Exot., 50: 696–700)

Type depositories: ENV (holotype), LFE (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregion: Guinean forest-savanna mosaic

Hosts: Hyracoidea: Procaviidae (A)

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

11 – *R. bursa* Canestrini & Fanzago, 1878 (Atti R. Ist. Veneto Sci. Lett. Arti (1877–1878), Ser. 5, 4: 69–208)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva.

Zoogeographic Region: Palearctic

Ecoregions: mediterranean forests, woodlands and scrub

Hosts: usual hosts for larvae, nymphs and adults are Artiodactyla: Bovidae. Aves and Squamata are considered exceptional hosts.
Mammalia (several orders) (ANL)
Aves (several orders); Squamata: Lacertidae (stages unknown)

Human infestation: yes (Walker et al. 2000; Bursali et al. 2012 among others)

Remarks: a two-host tick, with the larva and nymph feeding on the same first host and adults feeding on the second host. Walker et al. (2000) state that records of this species from outside the Palearctic Region are misidentifications or accidental importations – *R. bursa* has not become established outside the Palearctic. These authors use the term "immatures" without specifying whether larvae, nymphs or both immature stages were present on Rodentia. Walker et al. (2000) and Kolonin (2009) ignore Aves and Squamata as hosts of *R. bursa*; however, we regard these unusual records, described in Gusev et al. (1961) and Serdjukova (1956), as tentatively valid.

References

Bursali, A., Keskin, A. & Tekin, S. 2012. A review of the ticks (Acari: Ixodida) of Turkey: species diversity, hosts and geographical distribution. Exp. Appl. Acarol., 57: 91–104.

Encinas Grandes, A. 1986. Ticks of the Province of Salamanca (Central/NW Spain). Ann. Parasitol. Hum. Comp., 61: 95–107.

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Gusev, V.M., Bednyy, S.N., Guseva, A.A., Labunets, N.F. & Bakeyev, N.N. 1961. The ecological groups of birds on the Caucasus and their role in the life cycle of ticks and fleas. Trudy Nauch.-Issled. Protiv. Inst. Kavk. Zakav. (5): 217–267. In Russian.
Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/
Krčmar, S. 2012. Hard ticks (Acari, Ixodidae) of Croatia. ZooKeys, 234: 19–57.
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12 – *R. camicasi* Morel, Mouchet & Rodhain, 1976 (Rev. Élev. Méd. Vét. Pays Trop., 29: 337–340)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Palearctic

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; desert and xeric shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Mammalia (several orders) (A)

Human infestation: no

Remarks: natural hosts for larvae and nymphs of *R. camicasi* have not been found; the immature stages are known only from laboratory-reared specimens (Walker et al. 2000).

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

13 – *R. capensis* Koch, 1844 (Arch. Naturgesch., 10: 217–239)

Type depository: ZMB (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: Nama Karoo and succulent Karoo, montane and lowland fynbos and renosterbosveld

Hosts: Artiodactyla: Bovidae; Carnivora: Canidae, Felidae; Perissodactyla: Equidae (A) Rodentia: Muridae (N)

Human infestation: no

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. capensis* have not been described; however, these stages were subsequently described by Walker et al. (2000). Natural hosts for the larvae of *R. capensis* are not known but are probably Rodentia (Matthee et al. 2007); this stage has been described from laboratory-reared specimens (Walker et al. 2000). Keirans and Durden (2001) record a single incident of *R. capensis* being introduced into the Nearctic Region, but there is no evidence of it having become established there. Walker et al. (2000) discuss the earlier confusion attending the diagnosis of this species and we have therefore elected not to include host records prior to their work.

References

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Horak, I.G., Heyne, H. & Donkin, E.F. 2010. Parasites of domestic and wild animals in South Africa. XLVIII. Ticks (Acari: Ixodidae) infesting domestic cats and wild felids in southern Africa. Onderstepoort J. Vet. Res., 36, doi:10.4102/ojvr.v77i1.3

Keirans, J.E. & Durden, L.A. 2001. Invasion: exotic ticks (Acari: Argasidae, Ixodidae) imported into the United States. A review and new records. J. Med. Entomol., 38: 850–861.

Matthee, S., Horak, I.G., Beaucournu, J.-C., Durden, L.A., Ueckermann, E.A. & McGeoch, M.A. 2007. Epifaunistic arthropod parasites of the four-striped mouse, *Rhabdomys pumilio*, in the Western Cape Province, South Africa. J. Parasitol., 93: 47–59.

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

14 – *R. carnivoralis* Walker, 1966 (Parasitology, 56: 1–12)

Type depositories: BMNH (holotype, paratypes), EAVRO, OVI, HH, WC (paratypes) (Keirans, J.E. & Hillyard, P.D. 2001. A catalogue of the type specimens of Ixodida (Acari: Argasidae, Ixodidae) deposited in The Natural History Museum, London. Occ. Pap. Syst. Entomol. (13), 74 pp.)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; few ticks in East African montane forests

Hosts: usual hosts for adult ticks are Carnivora: Felidae.
Carnivora (several families); Artiodactyla: Bovidae (A)
Hyracoidea: Procaviidae (N)

Human infestation: yes (Walker et al. 2000)

Remarks: natural hosts for the larvae of *R. carnivoralis* are unknown. This stage was described from laboratory-reared specimens (Walker et al. 2000).

References

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15 – *R. cliffordi* Morel, 1965 (Rev. Élev. Méd. Vét. Pays Trop., 17, 637–654)
According to Walker et al. (2000, *op. cit*. under *R. appendiculatus*), volume 17 of this journal corresponds to the year 1964, but the issue with the description of *R. cliffordi* was published in 1965. Walker et al. (2000, *op. cit*. under *R. appendiculatus*) treat *R. cliffordi* as a probable junior synonym of *R. pseudolongus*, and Kolonin (2009, *op. cit*. under *R. aurantiacus*) shares this opinion. We, however, concur with Guglielmone et al. (2009, *op. cit*. under *R. aurantiacus*), who argue that this synonymy has not been definitively proven. Walker et al. (2000, *op. cit.* under *R. appendiculatus*) discuss the complex nomenclature and taxonomic problems accompanying the correct identification of *R. cliffordi*, *R. compositus*, *R. longus* and *R. pseudolongus*.

Type depository: unknown (Walker et al. 2000 *op. cit.* under *R. appendiculatus*).

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical moist broadleaf forests. These ecoregions for *R. cliffordi* must be considered tentative, pending validation of the species.

Hosts: Artiodactyla: Bovidae, Suidae (A)

Human infestation: no

References

Morel, P.-C. 1965. Description de *Rhipicephalus cliffordi* n. sp. d'Afrique occidentale (groupe de *Rh. compositus*; Acariens, Ixodoidea). Rev. Élev. Méd. Vét. Pays Trop., 17: 637–654. (see above for year of publication).

Morel, P.-C. 1976. Contribution à la connaissance de la distribution des tiques (Acariens, Ixodidae et Amblyommidae) en Afrique éthiopienne continentale. Annexe cartographique. Institut d'Élevage et de Médecine Vétérinaire des Pays Tropicaux, Paris, 326 pp.

16 – *R. complanatus* Neumann, 1911 (Arch. Parasitol., 14: 415)

Type depository: MNHN (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Rhipicephalus planus* Neumann, 1910, a name preoccupied by *Rhipicephalus simus planus* Neumann, 1907, as stated in Walker et al. (2000, *op. cit*. under *R. appendiculatus*) and consequently renamed.

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical moist broadleaf forests; tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Suidae.
Artiodactyla: Suidae (AN)
Artiodactyla: Bovidae; Carnivora: Viverridae; Rodentia: Muridae (A)

Human infestation: yes (Walker et al. 2000)

Remarks: the immature stages of *R. complanatus* remain undescribed but we accept the record of a nymph of this tick from Suidae in Elbl and Anastos (1966). Kolonin (2009) recognizes only Artiodactyla as hosts for *R. complanatus*, but we consider infestations on other types of hosts, described in the references below, to be valid.

References

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17 – *R. compositus* Neumann, 1897 (Mém. Soc. Zool. Fr., 10: 324–420)
See *R. cliffordi.*

Type depository: MNHN (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: mainly in central Zambezian miombo woodlands; southern Rift montane forest-grassland mosaic; *Acacia-Commiphora* bushlands and thickets; East African montane forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Suidae; Perissodactyla: Equidae, Rhinocerotidae; Carnivora: Felidae, Canidae (A)
Rodentia: Muridae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Keirans and Durden (2001) record a single instance of *R. compositus* being introduced into the Nearctic Region, but there is no evidence that it has become established there. Walker et al. (2000) discuss the difficulties attending diagnosis of this species, and we have therefore elected not to include records published prior to their work.

References

Fyumagwa, R.D., Runyoro, V., Horak, I.G. & Hoare, R. 2007. Ecology and control of ticks as disease vectors in wildlife of the Ngorongoro Crater, Tanzania. S. Afr. J. Wildl. Res., 37: 79–90.

Keirans, J.E. & Durden, L.A. 2001. Invasion: exotic ticks (Acari: Argasidae, Ixodidae) imported into the United States. A review and new records. J. Med. Entomol., 38: 850–861.

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18 – *R. congolensis* Apanaskevich, Horak & Mulumba-Mfumu, 2013 (J. Med. Entomol., 50: 479–484)

Type depository: USNTC (holotype, paratypes), OVI, ZIAC (paratypes) (Apanaskevich, D.A., Horak, I.G. & Mulumba-Mfumu, L.K. 2013. A new species of *Rhipicephalus* (Acari: Ixodidae), a parasite of red river hogs and domestic pigs in the Democratic Republic of Congo. J. Med. Entomol., 50: 479–484)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: eastern Congolian swamp forests

Hosts: Artiodactyla: Suidae

Human infestation: no

Reference

Apanaskevich, D.A., Horak, I.G. & Mulumba-Mfumu, L.K. 2013. A new species of *Rhipicephalus* (Acari: Ixodidae), a parasite of red river hogs and domestic pigs in the Democratic Republic of Congo. J. Med. Entomol., 50: 479–484.

19 – *R. cuspidatus* Neumann, 1906 (Arch. Parasitol., 10: 195–219)

Type depository: BMNH (syntypes) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: west Sudanian savanna; Sahelian *Acacia* savanna

Hosts: usual hosts for adult ticks are Artiodactyla: Suidae. Aves are exceptional hosts.
Artiodactyla: Suidae; Rodentia: Hystricidae (ANL)
Carnivora: Canidae, Hyaenidae; Rodentia: Thryonomyidae; Tubulidentata: Orycteropodidae (AN)
Artiodactyla: Bovidae; Carnivora: Felidae, Herpestidae; Galliformes: Phasianidae (N)

Human infestation: no

Remarks: Camicas et al. (1998) state that only the male and female of *R. cuspidatus* have been described; however, the larva and nymph were subsequently described by Walker et al. (2000). Kolonin (2009) does not include the only record of this species on Aves (Morel 2003), which we consider valid.

References

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20 – *R. decoloratus* Koch, 1844 (Arch. Naturgesch., 10: 217–239)
This tick species was formerly considered a member of the genus *Boophilus.*

Type depository: ZMB (holotype) (Moritz and Fischer 1981, *op. cit.* under *R. arnoldi*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts are Artiodactyla: Bovidae, while Aves, Squamata and Testudines are exceptional hosts for this tick.
Mammalia (several orders), Aves (several orders); Squamata: Boidae; Testudines: Testudinidae

Human infestation: yes (Horak et al. 2002 as *Boophilus decoloratus*)

Remarks: because this is a one-host tick, we do not separately record the various life stages present on hosts. There are records of the introduction of *R. decoloratus* into the Neotropical and Nearctic Regions in Lahille (1914) and Keirans and Durden (2001), but there is no evidence of its establishment in these regions. The Neotropical records of this tick published by Seifert (1959) are considered erroneous (Guglielmone et al. 2003), as are records of its occurrence outside the Afrotropical Region, such as those of Geevarghese et al. (1997) and other workers in India (Oriental Region). Most authors listed below refer to this tick as *Boophilus decoloratus*.

References

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Horak, I.G., De Vos, V. & De Klerk, B.D. 1984. Parasites of domestic and wild animals in South Africa. XVII. Arthropod parasites of Burchell's zebra, *Equus burchelli*, in the eastern Transvaal Lowveld. Onderstepoort J. Vet. Res., 51: 145–154.

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Uys, A.C. & Horak, I.G. 2005. Ticks on crested francolins, *Francolinus sephaena*, and on the vegetation on a farm in Limpopo Province, South Africa. Onderstepoort J. Vet. Res., 72: 339–343.

Wanzala, W. & Okanga, S. 2006. Ticks (Acari: Ixodidae) associated with wildlife and vegetation of Haller Park along the Kenyan coastline. J. Med. Entomol., 43: 789–794.

21 – *R. deltoideus* Neumann, 1910 (Tijdschr. Entomol., 53: 11–17)

Type depository: BMNH (syntype) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregion: highveld grasslands

Hosts: unknown but see remarks below.

Human infestation: no

Remarks: Camicas et al. (1998) list pholeophilic (burrowing) mammals as hosts for the adults of *R. deltoideus*; however, Walker et al. (2000) state that ticks previously identified as *R. deltoideus* were re-identified as belonging to other species within *Rhipicephalus*, such as *R. arnoldi* and alleged *R. turanicus*, while the hosts for the original description of this species are unknown. We believe that the hosts for *R. deltoideus* remain unknown. Durden and Keirans (1996) list *R. deltoideus* as an endangered species.

References

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22 – *R. distinctus* Bedford, 1932 (18th Report of the Director of Veterinary Services and Animal Industry, Union of South Africa, pp. 223–523)

Type depository: OVI (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Rhipicephalus punctatus* Bedford, 1929, a name preoccupied by *Rhipicephalus neavei punctatus* Warburton, 1912 and consequently renamed.

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: deserts and xeric shrublands; few ticks in tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for larvae, nymphs and adults are Hyracoidea: Procaviidae.
Hyracoidea: Procaviidae; Carnivora: Felidae (ANL)
Lagomorpha: Leporidae (AL)
Carnivora: Herpestidae; Macroscelidea: Macroscelididae; Rodentia: Muridae (NL)
Rodentia: Pedetidae (L)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) state that the larva of *R. distinctus* is undescribed, but it was subsequently described by Walker et al. (2000). Walker (1991) considers the record of Theiler (1962) on Artiodactyla: Suidae to be erroneous, and Walker et al. (2000) believe that the adults on Artiodactyla: Bovidae recorded as *Rhipicephalus simpsoni* by Baker and Keep (1970) and as *R. distinctus* by Walker (1991) are in fact *Rhipicephalus oreotragi*. We have not included these records in our list of hosts for *R. distinctus*. Kolonin (2009) ignores hosts other than Procaviidae for the adults of *R. distinctus*, but we regard this as an error.

References

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23 – *R. duttoni* Neumann, 1907 (Ann. Trop. Med. Parasitol., 1: 115–120)

Type depository: unknown. Keirans and Hillyard. (2001, *op. cit.* under *R. carnivoralis*) state that there is a syntype of *R. duttoni* in the BMNH. However, Keirans and Hillyard (2001, *op. cit.* under *R. carnivoralis*) and Walker et al. (2000, *op. cit.* under *R. appendiculatus*) agree that the description of *R. duttoni* was based on a

single male specimen, for which the depository was not stated. We therefore conclude that there are no grounds to designate the specimen deposited in the BMNH as a syntype.

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands.

Hosts: usual hosts for nymphs and adults are Artiodactyla: Bovidae. Aves are exceptional hosts.
Artiodactyla: Bovidae (ANL)
Lagomorpha: Leporidae (AN)
Carnivora: Canidae, Viverridae; Perissodactyla: Equidae; Gruiformes: Otidae (A)

Human infestation: no

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. duttoni* are undescribed; however, they were subsequently described by Walker et al. (2000). Aves are excluded as hosts of *R. duttoni* by Kolonin (2009), but there is a *bona fide* record for this uncommon host-tick relationship in Walker et al. (2000). See also *R. appendiculatus.*

References

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24 – *R. dux* Dönitz, 1910 (Sber. Ges. Naturf. Freunde Berlin (6): 275–280)

Type depository: ZMB (syntype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical moist broadleaf forests; tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Suidae; Proboscidea: Elephantidae (A)

Human infestation: no

Remarks: Camicas et al. (1998) consider Proboscidea the main host for *R. dux*, but the information provided in Walker et al. (2000) indicates that the most common hosts for this tick are Artiodactyla. There is a record of unattached *R. dux* on a human in Walker et al. (2000), but we have not included humans as hosts of this tick.

References

Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

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25 – *R. evertsi* Neumann, 1897 (Mém. Soc. Zool. Fr., 10: 324–420)
This species is generally thought to comprise two subspecies, *R. e. evertsi* and *R. e. mimeticus* (Walker et al. 2000, *op. cit.* under *R. appendiculatus*), an indication that more than one taxon may be included under the name *R. evertsi.*

Type depository: LMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: this tick species is present in many ecoregions, but mainly in montane grasslands and shrublands and tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for larvae, nymphs and adults are Artiodactyla: Bovidae. Macroscelidea and Testudines are considered exceptional hosts.
Mammalia (several orders); Passeriformes: Alaudidae, Hirundinidae (ANL)
Falconiformes: Accipitridae; Testudines: Testudinidae (A)
Aves (several orders) (NL)

Human infestation: yes (Horak et al. 2002)

Remarks: a two-host tick, with larvae and nymphs infesting the same first host and adults infesting the second host. Keirans and Durden (2001) record several introductions of *R. evertsi* into the Nearctic Region, while Morel (2003) lists Neotropical and Palearctic records for this species, and Bouhous et al. (2011) present a Palearctic record as *R. evertsi evertsi*, but there is no evidence that *R. evertsi* has become established in any of these regions. Theiler (1959) lists Coliiformes and Passeriformes (Malaconotidae and Ploceidae) as hosts for adult *R. evertsi*, but subsequent studies

indicate that these birds actually host the immature stages. Fourie et al. (2005) treat as "stragglers" the few immatures of this tick found on Macroscelidea. The references below contain records of adult *R. evertsi* parasitizing Aves and Testudines, but these hosts are not included in Kolonin (2009), probably because such host-parasite relationships are infrequent.

References

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Horak, I.G., Fourie, L.J., Heyne, H., Walker, J.B. & Needham, G.R. 2002. Ixodid ticks feeding on humans in South Africa: with notes on preferred hosts, geographic distribution, seasonal occurrence and transmission of pathogens. Exp. Appl. Acarol., 27: 113–136.

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26 – *R. exophthalmos* Keirans & Walker, 1993 (*In* Keirans et al. 1993. Onderstepoort J. Vet. Res., 60: 229–246)

Type depositories: OVI (holotype, paratypes), BMNH, USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: deserts and xeric shrublands; few ticks in tropical and subtropical grasslands, savannas and shrublands

Hosts: Aves are exceptional hosts for this tick.
Lagomorpha: Leporidae (ANL)
Artiodactyla: Bovidae, Suidae; Carnivora: Canidae, Felidae; Perissodactyla: Equidae (A)
Macroscelidea: Macroscelididae (NL)
Galliformes: Phasianidae (L)

Human infestation: no

Remarks: Uys and Horak (2005) record the collection of larvae from Aves, but these hosts are not included in Kolonin (2009), probably because avian parasitism is an unusual event.

References

Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/
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27 – *R. follis* Dönitz, 1910 (Denkschr. Med.-Naturw. Ges. Jena, 16: 397–494)

Type depository: BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: Drakensberg montane grasslands, woodlands and forests; highveld grasslands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae; usual hosts for larvae and nymphs are Rodentia: Muridae.
Carnivora: Canidae (AL)
Artiodactyla: Bovidae, Giraffidae, Suidae; Perissodactyla: Equidae; Carnivora: Felidae (A)
Rodentia: Muridae (NL)

Human infestation: yes (Horak et al. 2002)

Remarks: Kolonin (2009) does not include Carnivora as hosts for *R. follis*, but there is *bona fide* information on this tick-host relationship in Walker et al. (2000).

References

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28 – *R. fulvus* Neumann, 1913 (Bull. Soc. Zool. Fr., 38: 147–151)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Palearctic

Ecoregions: north and south Saharan steppe and woodlands

Hosts: Artiodactyla: Bovidae, Camelidae; Rodentia: Ctenodactylidae (ANL)
Rodentia: Muridae (stage unknown)

Human infestation: yes (Walker et al. 2000)

Remarks: there is a record of *R. fulvus* on Muridae (tick stage unknown) in Walker et al. (2000) that is not included in Kolonin (2009).

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29 – *R. geigyi* (Aeschlimann & Morel, 1965) (Acta Trop., 22: 162–168)
This tick was formerly considered to be a member of the genus *Boophilus.*

Type depository: ITS (holotype, paratype) (Aeschlimann, A. & Morel, P.-C. 1965. *Boophilus geigyi* n. sp. (Acarina: Ixodoidea) une nouvelle tique du bétail de l'Ouest africaine. Acta Trop., 22: 162–168) as *Boophilus geigyi*

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical moist broadleaf forests; few ticks in tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for this tick are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Carnivora: Canidae, Felidae

Human infestation: no

Remarks: because this is a one-host tick we do not separately record the various life stages present on hosts. All authors cited below refer to this tick as *Boophilus geigyi.* Morel (1978) and Cumming (1998) list Suidae as hosts for this tick. Morel (1978) gives Hoffmann and Lindau (1971) as the source for this host-parasite relationship, but we were unable to confirm this from their publication. Consequently, we have not included Suidae as hosts of *R. geigyi*. Felidae are ignored as hosts for *R. geigyi* in Kolonin (2009), but we regard a record for this type of host in Aeschlimann (1967) as valid.

References

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30 – *R. gertrudae* Feldman-Muhsam, 1960 (J. Parasitol., 46: 101–108)

Type depository: FMC (holotype, paratype), OVI, ZMB (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: deserts and xeric shrublands; montane grasslands and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae; usual hosts for larvae and nymphs are Rodentia: Muridae. Aves and Testudines are exceptional hosts for this tick.
Mammalia (several orders); Testudines: Testudinidae (A)
Macroscelidea: Macroscelididae; Rodentia: Muridae (NL)
Lagomorpha: Leporidae; Rodentia: Hystricidae (N)
Galliformes: Numididae; Passeriformes: Muscicapidae, Pycnonotidae (L)

Human infestation: yes (Horak et al. 2002)

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. gertrudae* are undescribed, but they were subsequently described by Walker et al. (2000). Horak et al. (2006) found adult *R. gertrudae* on Testudines, while Van Niekerk et al. (2006) found larvae on Aves, but these unusual hosts were ignored in Kolonin (2009).

References

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31 – *R. glabroscutatus* Du Toit, 1941 (Onderstepoort J. Vet. Sci. Anim. Ind., 16: 115–118)

See "Remarks on some invalid names" at the beginning of this chapter for the correct spelling of the specific epithet, which in the past has been spelled *R. glabroscutatum.*

Type depository: OVI (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *R. glabroscutatum*

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: montane grasslands and shrublands; mediterranean forests, woodlands and scrub; deserts and xeric shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae; usual hosts for larvae and nymphs are Artiodactyla: Bovidae and Lagomorpha: Leporidae.

Artiodactyla: Bovidae; Lagomorpha: Leporidae; Perissodactyla: Equidae (ANL)
Hyracoidea: Procaviidae (AL)
Carnivora: Canidae, Felidae; Rodentia: Pedetidae; Galliformes: Numididae (NL)
Rodentia: Muridae (L)

Human infestation: yes (Horak et al. 2002)

Remarks: a two-host tick, with the larva and nymph feeding on the same first host and adults infesting the second host. Kolonin (2009) limits the range of hosts of adult *R. glabroscutatus* to ungulates, adding hares as hosts for larvae and nymphs, but the references cited below reveal a wider array of hosts for this tick.

References

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32 – *R. guilhoni* Morel & Vassiliades, 1963 (Rev. Élev. Méd. Vét. Pays Trop., 15: 343–386)
According to Walker et al. (2000, *op. cit*. under *R. appendiculatus*) volume 15 of this journal should have been published in 1962, but the issue containing the description of *R. guiloni* was not published until 1963.

Type depository: MNHN (holotype, paratypes) (Walker et al. 2000, *op. cit.* under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical, Palearctic

Ecoregions: Sahelian *Acacia* savanna; west Sudanian savanna; deserts and xeric shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Mammalia (several orders); Aves (several orders) (A)
Lagomorpha: Leporidae; Rodentia: Muridae, Sciuridae (NL)

Human infestation: yes (Morel 2003)

References

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33 – *R. haemaphysaloides* Supino, 1897 (Atti Soc. Veneto-Trentina Sci. Nat. Residente Padova, Ser. 2, 3: 230–238)
Walker et al. (2000, *op. cit.* under *R. appendiculatus*) enclose the author's name in parentheses – (Supino, 1897) – but this is an error because *R. haemaphysaloides* was originally described as a species of *Rhipicephalus.* See also *R. pilans*

Type depository: BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*). Originally named *R. haemaphysaloides niger* Supino, 1897.

Known stages: male, female, nymph, larva

Zoogeographic Regions: Australasian, Oriental, Palearctic

Ecoregions: tropical and subtropical moist broadleaf forests

Hosts: Aves are exceptional hosts for this tick.
Carnivora: Canidae; Rodentia: Muridae (ANL)
Artiodactyla: Bovidae (AN)
Mammalia (several orders) (A)
Carnívora: Herpestidae (N)
Soricomorpha: Soricidae; Cuculiformes: Cuculidae; Passeriformes: Timaliidae (NL)
Galliformes: Phasianidae (stages unknown)

Human infestation: yes (Durden et al. 2008)

Remarks: Camicas et al. (1998) state that *R. haemaphysaloides* is found exclusively in the Oriental Region. However, Teng and Jiang (1991) and Walker et al. (2000) record Palearctic localities for this species, and the latter authors, as well as Durden et al. (2008), clearly indicate the presence of this tick in Sulawesi

(Australasian Region). Kolonin (2009) does not include Aves as hosts for *R. haemaphysaloides*, but we regard the records from Aves reported in the studies of Kaul and co-workers (see below) and Walker et al. (2000) as valid.

References

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34 – *R. humeralis* Tonelli Rondelli, 1926 (Res. Biol. 1: 33–43)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *R. pulchellus humeralis*

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: northern *Acacia-Commiphora* bushlands and thickets; few ticks in northern Zanzibar-Inhambane coastal forest mosaic

Hosts: Aves are exceptional hosts for this tick.
Mammalia (several orders); Falconiformes: Accipitridae (A)

Human infestation: yes (Walker et al. 2000)

Remarks: natural hosts for the larvae and nymphs of *R. humeralis* are unknown; these stages were described from laboratory-reared specimens (Walker et al. 2000). There is a valid record of *R. humeralis* on Aves in Walker et al. (2000), but this was not included in Kolonin (2009).

References

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35 – *R. hurti* Wilson, 1954 (Parasitology, 44: 277–284)

Type depository: BMNH, HH, OVI, SDC, USNTC (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Suidae; Carnivora: Canidae, Felidae, Viverridae; Perissodactyla: Rhinocerotidae (A)
Rodentia: Muridae (L)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. hurti* have not been described, but they were subsequently described by Walker et al. (2000), who record a larva of *R. hurti* on Muridae, but no host for the nymph, which was described from laboratory-reared specimens. Kolonin (2009) states that hosts for the immature stages are unknown.

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36 – *R. interventus* Walker, Pegram & Keirans, 1995 (Onderstepoort J. Vet. Res., 62: 89–95)

Type depository: USNTC (holotype, paratypes), BMNH, OVI (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Carnivora: Canidae (A)

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

37 – *R. jeanneli* Neumann, 1913 (*In* Voyage de Ch. Alluad et R. Jeannel en Afrique orientale (1911–1912). Résultats scientifiques. A. Schulze, Paris, pp. 25–35)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: Victoria Basin forest-savanna mosaic; *Acacia* bushlands and thickets

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae, while Aves are considered exceptional hosts for this tick.
Artiodactyla: Bovidae, Suidae; Perissodactyla: Equidae, Rhinocerotidae; Carnivora: Canidae, Felidae; Galliformes: Phasianidae (A)
Rodentia: Muridae, Spalacidae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. jeanneli* have not been described, but they were subsequently described by Walker et al. (2000). Njanja et al. (1991) recorded this species from Artiodactyla: Camelidae, but we consider this record doubtful because the authors fail to describe how they identified their ticks. Kolonin (2009) limits the host range of *R. jeanneli* to Artiodactyla: Bovidae and Suidae plus Rodentia: Muridae. However, we accept the wide variety of hosts for this species presented in Walker et al. (2000).

References

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38 – *R. kochi* Dönitz, 1905 (Sber. Ges. Naturf. Freunde Berlin (4): 105–134)

Type depository: ZMB (lectotype), BMNH (paralectotypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae. Aves are exceptional hosts.
Artiodactyla: Bovidae; Lagomorpha: Leporidae (ANL)
Macroscelidea: Macroscelididae (AN)
Mammalia (several orders); Gruiformes: Otidae (A)
Carnivora: Viverridae (N)

Human infestation: yes (Morel 2003, see below)

Remarks: the difficulties associated with diagnosing *R. kochi* have been discussed by Clifford et al. (1983), and we have therefore excluded earlier records from our analysis. Walker et al. (2000) use the term "immatures" without stating whether it refers to nymphs, larvae (apparently known only from laboratory-reared specimens), or both preimaginal stages of *R. kochi.* However, Horak et al. (1995) and Horak et al. (2003) have collected all development stages from Lagomorpha: Leporidae and Artiodactyla: Bovidae, respectively. Morel (2003) reports humans as parasitized by *R. neavei* = *R. kochi*? [sic]. *Rhipicephalus neavei* is now considered a synonym of *R. kochi*, and we

provisionally include humans as infested by *R. kochi.* Keirans and Durden (2001) record *R. kochi* as having been introduced into the Nearctic Region, but there is no evidence that it has become established there. Kolonin (2009) ignores the record from Aves in Walker et al. (2000), but we accept this record as valid.

References

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39 – *R. kohlsi* (Hoogstraal & Kaiser, 1960) (J. Parasitol., 46: 441–448)
This species was formerly considered to be a member of the genus *Boophilus*.

Type depositories: USNTC (holotype, paratypes), BMNH, EAVRO, FMNH, OVI, UM, USNPC (paratypes) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*) as *Boophilus kohlsi*

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Palearctic

Ecoregions: southwestern Arabian foothills and savanna

Hosts: usual hosts for this tick are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Camelidae, Cervidae; Perissodactyla: Equidae

Human infestation: no

Remarks: because this is a one-host tick, we do not separately record the various life stages present on hosts. Camicas et al. (1998) regard *R. kohlsi* as exclusively Palearctic; however, Hussein et al. (1988) provide *bona fide* records for the Afrotropical Region. Rasulov (2007) states that *R. kohlsi* (referred to as *Boophilus kohlsi*) is present in Uzbekistan. However, when listing hosts for various tick species he uses the name *Boophilus calcaratus* (a name commonly considered a synonym of *R. annulatus*). Consequently, we have ignored his results. All authors cited below refer to this tick as *Boophilus kohlsi.*

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40 – *R. leporis* Pomerantzev, 1946 (Opred. Faune SSR Zool. Inst. Akad. Nauk SSSR (26), 28 pp. In Russian)

Type depository: ZIAC (lectotype, paralectotype) (Filippova, N.A. 2008. Type specimens of argasid and ixodid ticks (Ixodoidea: Argasidae, Ixodidae) in the collection of the Zoological Institute, Russian Academy of Sciences (St. Petersburg). Entomol. Rev., 88: 1002–1011). Walker et al. (2000, *op. cit*. under *R. appendiculatus*) do not record a type depository for *R. leporis.*

Known stages: male, female, nymph

Zoogeographic Region: Palearctic

Ecoregions: deserts and xeric shrublands

Hosts: usual hosts for nymphs and adults are Lagomorpha: Leporidae.
Lagomorpha: Leporidae (ANL)
Carnivora: Canidae (AN)
Mammalia (several orders) (A)

Human infestation: no

Remarks: Camicas et al. (1998) indicate that the larva of this species has been described, but we were unable to find any description of it; nonetheless, Walker et al. (2000) state that the larva of *R. leporis* feeds on Leporidae and we accept this statement. Rasulov (2007) records the presence of *R. leporis* on Aves (tick stage not given), but we feel that this record needs confirmation and have provisionally excluded it from our host list.

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41 – *R. longiceps* Warburton, 1912 (Parasitology, 5: 1–20)

Type depository: BMNH (lectotype, paralectotypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: deserts and xeric shrublands

Hosts: Artiodactyla: Bovidae, Suidae, Giraffidae; Perissodactyla: Rhinocerotidae (A)

Human infestation: no

References

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42 – *R. longicoxatus* Neumann, 1905 (Arch. Parasitol., 9: 225–241)
See "remarks on some invalid names" at the beginning of this chapter for synonymy of *R. camelopardalis* with *R. longicoxatus.*

Type depository: ZMB (paratype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, larva

Zoogeographic Region: Afrotropical

Ecoregions: various types of *Acacia-Commiphora* bushlands and thickets

Hosts: most adult ticks on Artiodactyla: Giraffidae. Canidae are exceptional hosts for this tick.
Artiodactyla: Giraffidae; Carnivora: Canidae (A)

Human infestation: no

Remarks: natural hosts for the larva of *R. longicoxatus* are unknown. The larval stage was not included in Camicas et al. (1998) but was later described from laboratory-reared specimens (Walker et al. 2000). These authors discuss the problems attending diagnosis of *R. longicoxatus*, and we have accordingly excluded records published prior to their work.

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43 – *R. longus* Neumann, 1907 (Ann. Trop. Med. Parasitol., 1: 115–120)
See *R. cliffordi.*

Type depository: BMNH (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: mainly in tropical and subtropical grasslands, savannas and shrublands; few ticks in tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae and Suidae. The immature stages have been collected from rodent burrows.
Mammalia (several orders) (A)
Rodentia; Muridae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) state that the larva of *R. longus* is undescribed; however, it was subsequently described by Walker et al. (2000). These latter authors did not include the record of *R. longus* on Charadriiformes: Recurvirostridae contained in Theiler (1962) and we have also excluded this record from our list. Kolonin (2009) limits the hosts of adult *R. longus* to Artiodactyla and Carnivora. Diagnoses of *R. longus* can be difficult, as discussed in Walker et al. (2000).

References

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44 – *R. lounsburyi* Walker, 1990 (Onderstepoort J. Vet. Res., 57: 57–75)

Type depository: OVI (holotype, paratypes), USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) originally named *Rhipicephalus follis* in Theiler, G. & Robinson, B.N. (1953. Ticks in the South African Zoological Survey Collection. Part VII. Six lesser known African rhipicephalids. Onderstepoort J. Vet. Res., 26, 93–136) as stated in Walker et al. (2000, *op. cit.* under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: montane grasslands and lowland fynbos and renosterbosveld

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Carnivora: Felidae (A)
Rodentia: Muridae (N)

Human infestation: no

Remarks: natural hosts for the larva of *R. lounsburyi* are unknown; this stage was described from laboratory-reared specimens (Walker et al. 2000).

References

Horak, I.G., Golezardy, H. & Uys, A.C. 2007. Ticks associated with the three largest wild ruminant species in southern Africa. Onderstepoort J. Vet. Res., 74: 231–242.

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45 – *R. lunulatus* Neumann, 1907 (Arch. Parasitol., 11: 215–232)

Type depository: BMNH (lectotype, paralectotype) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: mainly in tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae. Aves are exceptional hosts.
Artiodactyla: Bovidae (AL)
Mammalia (several orders); Anseriformes: Anatidae; Gruiformes: Rallidae (A)
Lagomorpha: Leporidae; Rodentia: Muridae (N)

Human infestation: yes (Ntiamoa-Baidu et al. 2004)

Remarks: considerable difficulties attend the determination of *R. lunulatus*, and host records prior to or at variance with those of Walker et al. (2000) have not been included in our list of hosts for this species. Kolonin (2009) omits the records on Aves in Walker et al. (2000), but we regard these odd records as valid.

References

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46 – *R. maculatus* Neumann, 1901 (Mem. Soc. Zool. Fr., 14: 249–372)

Type depository: ZMB (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: mainly in tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: Squamata and Macroscelidea are considered exceptional hosts.
Artiodactyla: Bovidae, Suidae (ANL)
Carnivora: Felidae; Perissodactyla: Rhinocerotidae (A, N and/or L)
Carnivora: Hyaenidae; Perissodactyla: Equidae; Proboscidea: Elephantidae; Squamata: Varanidae (A)

Lagomorpha: Leporidae (N)
Macroscelidea: Macroscelididae (L)
Carnivora: Viverridae; Hyracoidea: Procaviidae (N and/or L)

Human infestation: yes (Horak et al. 2002)

Remarks: the type host for *R. maculatus* is an insect of the family Reduviidae, which is an obvious error, as stated in Walker et al. (2000). The records of immature stages in Theiler (1962) are not considered valid by Walker et al. (2000) and have not been included in either their or our host list for *R. maculatus*. In addition to reporting that nymphs are present on Leporidae and three species of Bovidae, Walker (1991) and Walker et al. (2000) use the term "immatures" without specifying which immature stages of *R. maculatus* are present on different types of hosts. Although Walker et al. (2000) record infestation of Squamata with adult *R. maculatus*, this odd record is not included in Kolonin (2009).

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47 – *R. masseyi* Nuttall & Warburton, 1908 (Proc. Cambridge Philos. Soc., 14: 392–416)

Type depository: BMNH (lectotype, paralectotypes) (Walker et al. 2000, *op. cit.* under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregion: miombo woodlands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae, Suidae; Carnivora: Canidae, Felidae, Herpestidae; Perissodactyla: Equidae; Tubulidentata: Orycteropodidae (A)

Human infestation: no

Remarks: Walker et al. (2000) discuss the difficulties involved in determining this species, and we have therefore not included records published prior to their work. Camicas et al. (1998) treat the nymph of *R. masseyi* as having been described; however, Walker et al. (2000) discuss this problem and conclude that the nymph remains undescribed, a position with which we agree.

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48 – *R. microplus* (Canestrini, 1888) (Atti Soc. Veneto-Trentina Sci. Nat. Residente Padova, 11: 100–109)
Some authors consider 1887 as the year in which *Rhipicephalus microplus* was described (as *Haemophysalis* [sic] *micropla*), while others believe that it was described in 1888. According to Guglielmone, A.A., Robbins, R.G., Apanaskevich, D.A., Petney, T.N., Estrada-Peña, A., Horak, I.G., Shao, R. & Barker, S.C. (2010. The Argasidae, Ixodidae and Nuttalliellidae (Acari: Ixodida) of the world: a list of valid species names. Zootaxa, 2528: 1–28), an inquiry directed to the Library of Congress, U.S.A., revealed that the Canestrini paper was actually published in Padova by Stabilimento Prosperini in 1888. Consequently, we believe the latter year is correct. See also remarks below.
This tick was previously considered to be a member of the genus *Boophilus.*

Type depository: GM (holotype?) (Kohls, G.M. 1957. Insects of Micronesia. Acarina: Ixodoidea. Insects Micronesia, 3: 85–104), as *Hemophysalis* [sic] *micropla*

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Australasian, Nearctic, Neotropical, Oriental, Palearctic, and several islands around the world

Ecoregions: many ecoregions, chiefly in tropical and sub-tropical areas worldwide

Hosts: usual hosts are Artiodactyla: Bovidae, while Aves, Anura and Squamata are exceptional hosts.
Mammalia (several orders); Aves (several orders); Anura: Bufonidae; Squamata: Chamaeleonidae, Elapidae

Human infestation: yes (Guglielmone et al. 2006 as *Boophilus microplus*)

Remarks: because this is a one-host tick, we do not separately record the various life stages present on hosts. Camicas et al. (1998) state that *R. microplus* is not found in the Palearctic Region, but there are *bona fide* records for this region in Yamaguti et al. (1971) and other authors. Several authors below refer to this species as *Boophilus microplus*. Recent studies by Labruna et al. (2009) present evidence that populations of *R. microplus* from Australia are not conspecific with Afrotropical and Neotropical populations of *R. microplus*, which are conspecific. This conclusion had been anticipated by Guglielmone et al. (2003), who regarded populations of *R. microplus* (named *Boophilus microplus*) from Australia and South Africa as representing sibling species. Consequently, the information on hosts and, especially, the distribution of the tick that we presently know as *R. microplus* may change drastically in the near future. This statement was recently confirmed with the reinstatement of *Rhipicephalus australis* (Estrada-Peña et al. 2012). See also *R. australis.*

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49 – *R. moucheti* Morel, 1965 (Rev. Élev. Méd. Vét. Pays Trop., 17: 615–617)
According to Walker et al. (2000, *op. cit*. under *R. appendiculatus*), volume 17 of this journal was supposed to have been published in 1964, but the issue containing the description of *R. moucheti* was not published until 1965.

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregion: Sudanian savanna

Hosts: usual hosts for adult ticks are Carnivora: Canidae.
Carnivora: Canidae, Viverridae; Artiodactyla: Bovidae; Primates: Cercopithecidae (A)

Human infestation: no

Remarks: natural hosts for the larva and nymph of *R. moucheti* are unknown; these stages were described from laboratory-reared specimens (Saratsiotis 1981).

References

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50 – *R. muehlensi* Zumpt, 1943 (Z. Parasitenkd., 13: 102–117)

Type depository: ZMB (holotype, paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae; usual hosts for larvae and nymphs are Artiodactyla: Bovidae; Lagomorpha: Leporidae; Macroscelidea: Macroscelididae.
Mammalia (several orders) (ANL)

Human infestation: yes (Horak et al. 2002)

Remarks: Walker et al. (2000) discuss the difficulties involved in determining this species, and we have therefore not included records published prior to their work. Keirans and Durden (2001) record an introduction of *R. muehlensi* into the Nearctic Region, but there is no evidence that it has become established there.

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51 – *R. muhsamae* Morel & Vassiliades, 1965 (Rev. Élev. Méd. Vét. Pays Trop., 17: 619–636)
According to Walker et al. (2000, *op. cit*. under *R. appendiculatus*), volume 17 of this journal was supposed to have been published in 1964, but the issue containing the description *R. muhsamae* was not published until 1965.

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: mainly in forest-savanna mosaic; few ticks in tropical and subtropical moist broadleaf forests

Hosts: Mammalia (several orders) (A)
Rodentia: Sciuridae (NL)
Lagomoprha: Leporidae; Rodentia: Muridae (N)

Human infestation: yes (Walker et al. 2000)

Remarks: most hosts of the larvae and nymphs of *R. muhsamae* are inferred from the presence of unfed adult ticks and nymphs in host nests, as reported by Walker et al. (2000) and Morel (2003). We consider this inferred host-parasite relationship to be correct.

References

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52 – *R. neumanni* Walker, 1990 (Onderstepoort J. Vet. Res., 57: 57–75)

Type depositories: OVI (holotype, paratypes), BMNH, USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregion: desert and xeric shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Carnivora: Canidae; Perissodactyla: Equidae (A)
Rodentia: Muridae (N)

Human infestation: no

Remarks: natural hosts for the larva of *R. neumanni* are not known; this stage was described by Walker et al. (2000) from laboratory-reared specimens. These authors include a valid record of adult *R. neumanni* on Equidae that does not appear in Kolonin (2009).

References

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53 – *R. nitens* Neumann, 1904 (Arch. Parasitol., 8: 444–464)

Type depository: BMNH, OVI (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: restricted to fynbos and renosterbosveld

Hosts: usual hosts for larvae, nymphs and adults are Artiodactyla: Bovidae and Lagomorpha: Leporidae, while Aves are considered exceptional hosts for this tick.
Artiodactyla: Bovidae; Lagomorpha: Leporidae (ANL)
Carnivora: Canidae (AL)
Perissodactyla: Equidae (A)
Galliformes: Numididae (L)

Human infestation: no

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. nitens* are undescribed, but they were subsequently described by Walker et al. (2000). A valid and unique record of the larva of *R. nitens* on Aves is presented in Walker et al. (2000) but does not appear in Kolonin (2009). See also *R. appendiculatus*.

References

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54 – *R. oculatus* Neumann, 1901 (Mem. Soc. Zool. Fr., 14: 249–372)

Type depositories: ZMB, ZSH (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: deserts and xeric shrublands and montane grasslands and shrublands

Hosts: usual hosts for larvae, nymphs and adults are Lagomorpha: Leporidae.
Lagomorpha: Leporidae; Artiodactyla: Bovidae (ANL)
Galliformes: Numididae (NL)
Rodentia: Pedetidae (L)

Human infestation: no

Remarks: the records of *R. oculatus* listed in Theiler (1962) have not been included in our host list because Walker (1991) believes that Theiler included several *R. oculatus* group species under this name.

References

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55 – *R. oreotragi* Walker & Horak, 2000 (*In* Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.)

Type depositories: OVI (holotype, paratypes), BMNH, USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: southern Africa bushveld

Hosts: Artiodactyla: Bovidae (A)

Human infestation: no

Remarks: see *R. distinctus.*

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

56 – *R. pilans* Schulze, 1935 (Acarina: Ixodoidea *In* Wissenschaftliche Ergebnisse der Niederländischen Expeditionen in dem Karakorum 1922–1930, 1: 178–186)
Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. (1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.) treat *R. pilans* as a subspecies of *R. haemaphysaloides*, but we agree with Walker et al. (2000, *op. cit*. under *R. appendiculatus*), who describe *R. pilans* as a valid taxon and delineate the morphological differences between these taxa.

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Regions: Australasian, Oriental

Ecoregions: tropical and subtropical moist broadleaf forests

Hosts: Mammalia (several orders) (ANL)

Human infestation: yes (Durden et al. 2008)

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. pilans* (under the name *R. haemaphysaloides pilans*) are undescribed, but they were subsequently described by Walker et al. (2000). See also above.

References

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57 – *R. planus* Neumann, 1907 (Ixodidae, *In* Wissenchaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru und den umgebenden Massaisteppen, Deutsch-Ostafrikas 1905–1906, Almqvist and Wiksells Boktryckeri-A-B, Arachnoidea 3, 20 Arachnoidea (2): 17–30).

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Rhipicephalus simus planus*

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; few ticks in tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae and Suidae.
Mammalia (several orders) (A)
Rodentia: Muridae (N)
Lagomorpha: Leporidae (L)

Human infestation: yes (Walker et al. 2000)

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

58 – *R. praetextatus* Gerstäcker, 1873 (Gliederthiere (Insekten, Arachniden, Myriopoden und Isopoden). *In* O. Kersten (editor), Baron Carl Claus von der Decken's Reisen in Ost Afrika in den Jahren 1859 bis 1861. C.J. Winter'sche Verlagshandlung, Leipzig und Heidelberg, 542 pp.)

Type depository: ZMB (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Regions: Afrotropical, Palearctic

Ecoregions: many ecoregions, but prevalent in tropical and subtropical grasslands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae, while Aves are considered exceptional hosts.
Mammalia (several orders); Galliformes: Phasianidae (A)
Rodentia: Hystricidae, Muridae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Adler et al. (2011) mention the presence of a male of *R. praetextatus* on *Orycteropus afer* in a zoo in the Nearctic Region, but there is no evidence that this tick has become established there. Matthysse and Colbo (1987) provide a valid but unusual record of adult *R. praetextatus* on Aves that was not included in Walker et al. (2000) or Kolonin (2009).

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59 – *R. pravus* Dönitz, 1910 (Denkschr. Med.-Naturw. Ges. Jena, 16: 397–494)

Type depositories: ZMB, BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests; few ticks in montane grasslands and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Lagomorpha: Leporidae (ANL)
Artiodactyla: Bovidae; Carnivora: Viverridae; Macroscelidea: Macroscelididae (AN)
Mammalia (several orders); Falconiformes: Accipitridae; Passeriformes: Laniidae; Struthioniformes: Struthionidae (A)
Gruiformes: Otidae (N)

Human infestation: yes (Walker et al. 2000)

Remarks: there is considerable uncertainty concerning published determinations of *R. pravus*. Walker et al. (2000) present records for *R. pravus* and also for *Rhipicephalus* near *pravus*. This situation is still unresolved and adult ticks in Free State Province, South Africa, identified as *Rhipicephalus pravus*-like in Fourie et al. (1988), are in fact *Rhipicephalus warburtoni* (Walker et al. 2000). Fourie et al. (2005) and Horak et al. (2007) placed immature ticks that they had collected from elephant shrews and adult ticks collected from giraffes in the *R. pravus* group. We therefore based our host list for this tick on that of Walker et al. (2000), who state that Leporidae are infested with "immatures" but do not specify whether larvae, nymphs or both stages of this tick are present. We accept the records of Leporidae infested with larvae and

nymphs of *R. pravus*, as presented in Zumpt (1958). An unconfirmed record on Testudinidae has not been included in our list of hosts of this species. Walker et al. (2000) provide several *bona fide* records of *R. pravus* on Aves that were not included in the Kolonin (2009) host list. See also *R. punctatus* and *R. warburtoni*.

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Zumpt, F. 1958. Preliminary survey of the distribution and host-specificity of ticks (Ixodoidea) in the Bechuanaland Protectorate. Bull. Entomol. Res., 49: 201–233.

60 – *R. pseudolongus* Santos Dias, 1953 (Mem. Estud. Mus. Zool. Univ. Coimbra (214), 15 pp.)

Guglielmone et al. (2010, *op. cit*. under *R. microplus*) state that some authors consider this name a synonym of *R. longus*, but no evidence has been found to support this view; consequently, we regard *R. pseudolongus* as tentatively valid. See also *R. cliffordi.*

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Rhipicephalus capensis pseudolongus*

Known stages: male, female, nymph

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: Artiodactyla: Bovidae (A)
Rodentia: Muridae (NL)
Macroscelidea: Macroscelididae (L)

Human infestation: no

Remarks: Clifford and Anastos (1964) reported several collections of adults and nymphs of *R. pseudolongus* in nests of Muridae, and a nymph from a burrow of Macroscelididae. These apparently originated from molted engorged larvae and nymphs, and we regard these records as tentatively valid.

References

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61 – *R. pulchellus* (Gerstäcker, 1873) (Gliederthiere (Insekten, Arachniden, Myriopoden und Isopoden). *In* O. Kersten (editor), Baron Carl Claus von der Decken's Reisen in Ost Afrika in den Jahren 1859 bis 1861. C.J. Winter'sche Verlagshandlung, Leipzig und Heidelberg, 542 pp.)

Type depository: ZMB (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Dermacentor pulchellus.*

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests; montane grasslands and shrublands; deserts and xeric shrublands

Hosts: Aves are considered exceptional hosts for this tick.
Mammalia (several orders) (ANL)
Galliformes: Phasianidae; Struthioniformes: Struthionidae (A)

Human infestation: yes (Walker et al. 2000)

Remarks: Adham et al. (2009) record the presence of *R. pulchellus* in the Palearctic Region, but we feel that this record requires confirmation and regard this tick as present only in the Afrotropical Region. Keirans and Durden (2001) cite records of the introduction of *R. pulchellus* into the Nearctic Region, but there is no evidence that this species has become established there. Most records of larvae and nymphs in Theiler (1962) and Walker et al. (2000) are tentative because these authors used the term "immatures" extensively without specifying exact developmental stages. Kolonin (2009) ignores the few valid records on Aves presented in Walker et al. (2000).

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Wanzala, W. & Okanga, S. 2006. Ticks (Acari: Ixodidae) associated with wildlife and vegetation of Haller Park along the Kenyan coastline. J. Med. Entomol., 43: 789–794.

62 – *R. pumilio* Schulze, 1935 (Acarina: Ixodoidea *In* Wissenschaftliche Ergebnisse der Niederländischen Expeditionen in dem Karakorum 1922–1930, 1: 178–186)
Zahler, M., Filippova, N.A., Morel, P.-C., Gothe, R. & Rinders, H. (1997. Relationship between species of the *Rhipicephalus sanguineus* group: a molecular approach. J. Parasitol., 83: 802–806) described an identical DNA sequence in *R. pumilio* and *R. rossicus* and suggested that they may be conspecific.

Type depository: ZMA (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Regions: Oriental, Palearctic

Ecoregions: temperate grasslands, savannas and shrublands; xeric shrublands

Hosts: Aves are exceptional hosts for adult ticks.
Erinaceomorpha: Erinaceidae; Lagomorpha: Leporidae, Ochotonidae; Rodentia: Muridae, Sciuridae (ANL)
Mammalia (several orders); Falconiformes: Accipitridae; Gruiformes: Otidae (A)
Rodentia: Dipodidae; Passeriformes: Corvidae, Muscicapidae, Sylviidae (NL)
Coraciiformes: Upupidae; Galliformes: Phasianidae; Passeriformes: Alaudidae, Corvidae (stages unknown)

Human infestation: yes (Walker et al. 2000)

Remarks: this species was thought to be confined to the Palearctic Zoogeographic Region, but Liao and Lai (1995) and Chen et al. (2010) record *R. pumilio* in Guanxi Province (China), thus extending its range into the Oriental Region. Kolonin (2009) ignores Aves as hosts for adult *R. pumilio*, but we accept the few records from these hosts in Filippova (1997) and Morel (2003).

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63 – *R. punctatus* Warburton, 1912 (Parasitology, 5: 1–20)

Type depository: BMNH (lectotype, paralectotypes) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*) as *Rhipicephalus neavei punctatus*

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Artiodactyla: Bovidae; Perissodactyla: Equidae; Lagomorpha: Leporidae (A)

Human infestation: no

Remarks: there is considerable uncertainty concerning published determinations of *R. punctatus*. Walker et al. (2000) supply records for both *R. punctatus* and for *Rhipicephalus* sp. near *punctatus*, and map the distribution of *R. punctatus* as chiefly in Tanzania and that of *R.* sp. near *punctatus* as mainly in Zimbabwe, Zambia and northern Mozambique. Adult ticks identified as *R.* sp. near *punctatus* by Fourie and Horak (1990) in Free State Province, South Africa, and as *R. punctatus* by Fourie and Horak (1991) and Fourie et al. (1996), and larvae and nymphs identified as *R. punctatus* by Fourie et al. (1992), are in reality all *Rhipicephalus warburtoni* (Walker et al. 2000). The nymph collected from a helmeted guinea fowl by Horak et al. (1991) and identified as *R. punctatus* is in fact a nymph of *Rhipicephalus* near *pravus*. Colbo (1973) and Njanja et al. (1991) recorded *R. punctatus* from Macroscelidea: Macroscelididae and Artiodactyla: Camelidae, respectively, but we regard these records as doubtful because there is no indication as to how the authors arrived at a diagnosis. Our host records for *R. punctatus* are based exclusively on Walker et al. (2000), excluding records for *Rhipicephalus* sp. near *punctatus* in the same publication. See also *R. pravus* and *R. warburtoni*.

References

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64 – *R. pusillus* Gil Collado, 1936 (Treb. Mus. Cienc. Nat. Barcelona Ser. Entomol., 11: 1–8)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *R. bursa pusillus*

Known stages: male, female, nymph, larva

Zoogeographic Region: Palearctic

Ecoregions: Iberian conifer forests; southwest Iberian mediterranean sclerophyllous and mixed forests

Hosts: usual hosts for larvae, nymphs and adults are Lagomorpha: Leporidae, while Aves are considered exceptional hosts.
Lagomorpha: Leporidae; Carnivora: Mustelidae (ANL)
Mammalia (several orders) (AN)
Strigiformes: Strigidae (A)
Rodentia: Gliridae (NL)

Human infestation: yes (Santos-Silva et al. 2011)

Remarks: a report of *R. pusillus* on Aves by Silva et al. (2001) was not included in Kolonin (2009). We consider Aves valid but unusual hosts for this tick.

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65 – *R. ramachandrai* Dhanda, 1966 (J. Parasitol., 52: 1025–1031)

Type depositories: VRC (holotype, paratypes), BMNH, HH, IM, USNTC (paratypes) (Keirans and Hillyard 2001, *op. cit.* under *R. carnivoralis*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Oriental

Ecoregions: tropical and subtropical dry broadleaf forests

Hosts: usual hosts for adult ticks are Rodentia: Muridae.
Rodentia: Muridae (ANL)
Carnivora: Canidae; Rodentia: Sciuridae (A)

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

66 – *R. rossicus* Yakimov & Kohl-Yakimova, 1911 (Arch. Parasitol., 14: 416–425) See *R. pumilio.*

Type depository: BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*). Filippova, N.A. (1996. Designation of the neotypes for two species of ticks family Ixodidae. Parazitologiya, 30: 404–409. In Russian) designated a neotype for *R. rossicus*; however, because of the existence of syntypes the neotype is considered invalid.

Known stages: male, female, nymph, larva

Zoogeographic Region: Palearctic

Ecoregions: deserts and xeric shrublands

Hosts: Aves and Squamata are exceptional hosts.
Mammalia (several orders); Aves (several orders) (ANL)
Squamata: Lacertidae (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Walker et al. (2000) ignore Aves and Squamata as hosts of *R. rossicus*, and Kolonin (2009) ignores Squamata. We accept the records on these hosts in Filippova (1997) but consider them infrequent events.

References

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67 – *R. sanguineus* (Latreille, 1806) (*Genera crustaceorum et insectorum secundum ordinem naturalem infamilia disposita, iconibus exemplisque plurimis explicata*. Parisiis et Argentorati (1), 302 pp.)

Type depository: unknown (Walker et al. 2000, *op. cit*. under *R. appendiculatus*) as *Ixodes sanguineus.*

Known stages: male? female? nymph? larva?

Zoogeographic Region: Palearctic because the species was described in Latreille (1806 *op. cit.* see above) from ticks collected in Gallia [sic]. All other records of *R. sanguineus* from around the world are currently considered speculative. See remarks below.

Ecoregions: impossible to determine from our current muddled knowledge of this species.

Hosts: without doubt Carnivora: Canidae are hosts for all stages of *R. sanguineus*, and several other hosts are possibly infested with this species. However, because the type specimen is probably lost and other descriptions are obviously not based on comparisons with the type specimen, there are no sound descriptions by which ticks resembling *R. sanguineus* can be identified with certainty.

Human infestation: yes? (see below)

Remarks: the conventional identification of *R. sanguineus sensu stricto* is considered difficult enough, and recent biological, morphological and molecular studies have revealed a complex situation involving both *R. turanicus* and probably various cryptic species, as detailed in Beati and Keirans (2001), Szabó et al. (2005), Nava et al. (2009, 2012), Moraes-Filho et al. (2010) and Levin et al. (2012). A recent publication on the systematics and ecology of *R. sanguineus* fails to address the crucial point of species definition despite an assertive title (Gray et al. 2013). Current information indicates that it is impossible to identify *R. sanguineus sensu stricto* with any certainty, and studies with ticks identified as this species, from different parts of the world, will be required to solve this problem. Until this information has been obtained, it will not be possible to definitively assign a specific name to any population worldwide, including Gallia.

References

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Moraes-Filho, J., Marcili, A., Nieri-Bastos, F.A., Richrzenhain, L.J. & Labruna, M.B. 2010. Genetic analysis of ticks belonging to the *Rhipicephalus sanguineus* group in Latin America. Acta Trop., 117: 51–55.

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68 – *R. scalpturatus* Santos Dias, 1959 (Mem. Estud. Mus. Zool. Univ. Coimbra (256): 1–6)

Type depository: ZSH (holotype, paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Oriental

Ecoregions: Chhota-Nagpur dry deciduous forests

Hosts: unknown

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

69 – *R. schulzei* Olenev, 1929 (Vestn. Sovr. Vet., 5: 191–193. In Russian)

Type depository: ZIAC (lectotype, paralectotype) (Filippova 2008, *op. cit*. under *R. leporis*). Walker et al. (2000, *op. cit*. under *R. appendiculatus*) do not list a depository for the type specimens of *R. schulzei*.

Known stages: male, female, nymph, larva

Zoogeographic Region: Palearctic

Ecoregions: deserts and xeric shrublands

Hosts: usual hosts for larvae, nymphs and adults are Rodentia: Sciuridae.
Carnivora: Canidae, Mustelidae; Lagomorpha: Leporidae, Ochotonidae; Rodentia: Muridae, Sciuridae; Falconiformes: Accipitridae (ANL)
Mammalia (several orders) (NL)

Human infestation: yes (Walker et al. 2000)

Remarks: Kolonin (2009) limits the hosts of *R. schulzei* to Rodentia: Sciuridae and Carnivora, while Walker et al. (2000) ignore Lagomorpha and Aves as hosts for this tick. We regard the records from these hosts in Filippova (1997) as valid.

References

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70 – *R. sculptus* Warburton, 1912 (Parasitology, 5: 1–20)

Type depository: BMNH (lectotype, paralectotypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: miombo woodlands

Hosts: Artiodactyla: Bovidae, Giraffidae, Suidae; Perissodactyla: Equidae (A)

Human infestation: no

Remarks: natural hosts for the larva and nymph of *R. sculptus* are unknown; these stages were described from laboratory-reared specimens (Walker et al. 2000) and, obviously, not included in Camicas et al. (1998).

References

Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

Morel, P.-C. 2003. Les tiques d'Afrique et du Bassin méditerranéen (1965–1995). CIRAD- EMVT, 1342 pp.

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71 – *R. senegalensis* Koch, 1844 (Arch. Naturgesch., 10: 217–239)

Type depository: ZMB (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; few ticks in tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae, while Aves are considered exceptional hosts for this tick.
Rodentia: Muridae (ANL)
Rodentia: Thryonomyidae (AN)
Mammalia (several orders); Anseriformes: Anatidae (A)
Carnivora: Herpestidae; Rodentia: Sciruridae; Macroscelidea: Macroscelididae (N)

Human infestation: yes (Burridge 2011)

Remarks: Walker et al. (2000) discuss the difficulties involved in determining this species, and we have therefore not included records published prior to their work. Burridge (2011) records an introduction of *R. senegalensis* into the Nearctic Region, but there is no evidence that this tick has become established there. Kolonin (2009) limits the hosts of the immature stages of *R. senegalensis* to Rodentia, and does not include Aves as hosts for this tick. We regard the unusual record from Aves in Walker et al. (2000) as valid.

References

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Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/

Ntiamoa-Baidu, Y., Carr-Saunders, C., Matthews, B.E., Preston, P.M. & Walker, A.R. 2004. An updated list of the ticks of Ghana and an assessment of the distribution of the ticks of Ghanaian wild mammals in different vegetation zones. Bull. Entomol. Res., 94: 245–260.

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

72 – *R. serranoi* Santos Dias, 1950 (Moçambique (63): 143–151)

Camicas et al. (1998, *op. cit.* under *R. pilans*) treat *R. serranoi* as a synonym of *R. punctatus*; however, characters that can be used for separating the two species have been published by Walker et al. (2000, *op. cit*. under *R. appendiculatus*). We regard both these taxa as valid.

Type depository: VLM (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregion: central Zambezian miombo woodlands

Hosts: Hyracoidea: Procaviidae; Artiodactyla: Bovidae; Carnivora: Felidae (A)

Human infestation: no

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

73 – *R. simpsoni* Nuttall, 1910 (Parasitology, 3: 408–416)

Type depository: BMNH (lectotype, paralectotypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; few ticks in tropical and subtropical moist broadleaf forests

Hosts: usual hosts for nymphs and adults are Rodentia: Thryonomyidae.
Rodentia: Thryonomyidae (ANL)
Rodentia: Hystricidae (AN)
Mammalia (several orders) (A)

Human infestation: no

Remarks: Camicas et al. (1998) list the larva of *R. simpsoni* as undescribed, but it was subsequently described by Walker et al. (2000). The latter authors present a record of *R. simpsoni* on Passeriformes that is marked with an "X," probably referring to the record in Clifford and Anastos (1962). A second record of *R. simpsoni* from a different species of Passeriformes appears in Clifford and Anastos (1964). In both cases the authors state that their findings on Aves require confirmation, and we have therefore tentatively excluded these records from our host list above.

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Clifford, C.M. & Anastos, G. 1962. Ticks. Exploration du Parc National de l'Upemba. Mission G.F. de Witte. Fascicule 66: 3–47.

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74 – *R. simus* Koch, 1844 (Arch. Naturgesch., 10: 217–239)

Type depository: ZMB (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: montane grasslands and shrublands; tropical and subtropical grasslands, savannas and shrublands; few ticks in deserts and xeric shrublands (Karoo and Namibian shrublands)

Hosts: Aves are exceptional hosts.
Carnivora: Felidae (ANL)
Carnivora: Herpestidae; Lagomorpha: Leporidae; Primates: Cercopithecidae (AN)
Carnivora: Canidae, Hyaenidae, Viverridae (AL)
Mammalia (several orders); Pelecaniformes: Phalacrocoracidae (A)
Lagomorpha: Leporidae; Rodentia: Muridae, Sciuridae (NL)
Soricomorpha: Soricidae (N)

Human infestation: yes (Horak et al. 2002)

Remarks: there are records in Keirans and Durden (2001) of the introduction of *R. simus* into the Nearctic Region, but there is no evidence of its subsequent establishment. Rivas (1919) allegedly found *R. simus* (under the name *R. simus simus*) in the Neotropical Region, but Guglielmone et al. (2003) consider this an incorrect diagnosis and we agree. However, it should be noted that Díaz Ungría (1957), Camicas et al. (1998) and Guglielmone et al. (2003) cite this record under the name *R. sanguineus simus* (*lapsus*). According to Walker et al. (2000), many earlier records of supposed *R. simus* are actually related tick species, and with the exception of the avian record cited below, these have been excluded from our host list. The latter authors also refer to Leporidae being infested with "immatures" without specifying whether larvae, nymphs or both stages of *R. simus* were present. We recognize Leporidae as hosts of *R. simus* larvae and nymphs, as reported in Horak et al. (1993). Kolonin (2009) lists only rodents and hares as hosts for the immature stages of *R. simus*, but the references below suggest a broader pattern of parasitism. Kolonin (2009) also ignores the odd record of adult *R. simus* on Aves, which is listed in Walker et al. (2000) and which we accept.

References

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Rivas, J.A. 1919. Contribución al estudio de los Ixodidae de Venezuela. An. Dir. San. Nac., 1: 90–96.

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75 – *R. sulcatus* Neumann, 1908 (Bull. Mus. Natl. Hist. Nat., 14: 352–355)

Type depository: MNHN (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: Mammalia (several orders) (A)

Human infestation: yes (Walker et al. 2000)

Remarks: natural hosts of the larva and nymph of *R. sulcatus* are unknown; these stages were described from laboratory-reared specimens (Walker et al. 2000). There is a single record in Keirans and Durden (2001) of the introduction of *R. sulcatus* into the Nearctic Region, but there is no evidence of its subsequent establishment. Rivas (1919) allegedly found this species (under the name *R. sanguineus punctatissimus* Gerstäcker, 1873, which is regarded by some authors as a synonym of *R. sulcatus*) in the Neotropical Region, but because of the difficulties attending determination of this species (Walker et al. 2000), it is considered a misdiagnosis. We have not included records published prior to Walker et al. (2000). These authors also focus on the problem of differentiation of *R. sulcatus* from *R. sanguineus* and *R. turanicus* – a major impediment to accurate identification, as are the large number of unconfirmed host records. We consequently regard the diagnosis and specific host records of *R. sulcatus* as tentative. See also *R. sanguineus* and *R. turanicus*.

References

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76 – *R. supertritus* Neumann, 1907 (Arch. Parasitol., 11: 215–232)

Type depository: BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Mammalia (several orders) (A)

Human infestation: yes (Walker et al. 2000)

Remarks: Walker et al. (2000) discuss the difficulties involved in determining this species, and we have therefore not included records published prior to their work. Kolonin (2009) limits the hosts of *R. supertritus* to Bovidae, but we accept as correct the wider array of hosts listed in Walker et al. (2000).

References

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Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

77 – *R. tetracornus* Kitaoka & Suzuki, 1983 (Trop. Med., 25: 205–219)
Kolonin (2009, *op. cit*. under *R. aurantiacus*) does not include this species in his list of ixodid ticks of the world. On the other hand, Walker et al. (2000, *op. cit*. under *R. appendiculatus*) classify this species as *incertae sedis* because all the adults and some larvae and nymphs have been lost. However, the species is reasonably well described in Kitaoka, S. & Suzuki, H. (1983. Studies on the parasite fauna of Thailand. 5. Parasitic ticks on mammals and description of *Ixodes siamensis* sp. n. and *Rhipicephalus tetracornus* sp. n. (Acarina: Ixodidae). Trop. Med., 25: 205–219) and paratype nymphs are available. We have therefore decided to follow Guglielmone et al. (2009, *op. cit.* under *R. aurantiacus*) in considering this species valid.

Type depository: NSM (paratypes) (Kitaoka and Suzuki 1983, *op. cit.* above)

Known stages: male, female, nymph, (larva?)

Zoogeographic Region: Oriental

Ecoregion: Kayah-Karen montane rain forests

Hosts: Rodentia: Muridae (N)
Rodentia: Muridae, Cricetidae; Soricomorpha: Soricidae (L)

Human infestation: no

Remarks: it is uncertain whether the larva and larval hosts are those of *R. tetracornus* (Kitaoka and Suzuki 1983), but Camicas et al. (1998) accept both as definite.

References

Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

Kitaoka, S. & Suzuki, H. 1983. Studies on the parasite fauna of Thailand 5. Parasitic ticks on mammals and description of *Ixodes siamensis* sp. n. and *Rhipicephalus tetracornus* sp. n. (Acarina: Ixodidae). Trop. Med., 25: 205–219.

78 – *R. theileri* Bedford & Hewitt, 1925 (S. Afr. J. Nat. Hist., 5: 259–266)

Type depository: OVI (holotype, paratype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: Kalahari xeric savanna; Namibian savanna woodlands

Hosts: usual hosts for larvae, nymphs and adults are Carnivora: Herpestidae and Rodentia: Sciuridae.
Carnivora: Herpestidae; Rodentia: Sciuridae (ANL)
Carnivora: Canidae (AN)
Mammalia (several orders) (A)

Human infestation: no

Remarks: Camicas et al. (1998) state that the larva and nymph of *R. theileri* are undescribed, but they were subsequently described by Walker et al. (2000). Records from Testudines and Rodentia in Theiler (1962) are questioned by Walker et al. (2000) and have not been included in the present list of hosts of *R. theileri*. The latter authors also use the word "immatures" extensively without specifying whether they are referring to nymphs, larvae or both stages. Horak et al. (1999) have collected all stages of development from Herpestidae.

References

Camicas, J.-L., Hervy, J.P., Adam, F. & Morel, P.-C. 1998. Les tiques du monde (Acarida, Ixodida). Nomenclature, stades décrits, hôtes, répartition. ORSTOM, Paris, 233 pp.

Horak, I.G., Chaparro, F., Beaucournu, J.-C. & Louw, J.P. 1999. Parasites of domestic and wild animals in South Africa. XXXVI. Arthropod parasites of yellow mongooses, *Cynictis penicillata* (G. Cuvier, 1829). Onderstepoort J. Vet. Res., 66: 33–38.

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Morel, P.-C. 2003. Les tiques d'Afrique et du Bassin méditerranéen (1965–1995). CIRAD- EMVT, 1342 pp.

Theiler, G. 1962. The Ixodoidea parasites of vertebrates in Africa south of the Sahara (Ethiopian Region). Report to the Director of Veterinary Services, Onderstepoort, South Africa, Project S.9958, 260 pp.

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

79 – *R. tricuspis* Dönitz, 1906 (Sber. Ges. Naturf. Freunde Berlin (5): 143–148)

Type depository: ZMB (lectotype) (Walker, J.B., Keirans, J.E., Pegram, R.G. & Clifford, C.M. 1988. Clarification of the status of *Rhipicephalus tricuspis* Dönitz, 1906 and *Rhipicephalus lunulatus* Neumann, 1907 (Ixodoidea, Ixodidae). Syst. Parasitol., 12: 159–186)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: Mammalia (several orders) (A)

Human infestation: no

Remarks: natural hosts for the larva and nymph of *R. tricuspis* are unknown; these stages were described from laboratory-reared specimens (Walker et al. 2000). *Rhipicephalus tricuspis* is a difficult species to identify, and host records prior to or at variance with those of Walker et al. (2000) have not been included in our list.

Reference

Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

80 – *R. turanicus* Pomerantzev, 1940 (*In* Pomerantzev, B.I., Matikashvily, N.V. & Lotozky, B.V. 1940. Parazitol. Sborn. Zool. Inst. Akad. Nauk SSSR, 7: 100–133. In Russian)
Walker et al. (2000, *op. cit*. under *R. appendiculatus*) give the authority for this species as Pomerantzev, B.I. (1936. Parazitol. Sborn. Zool. Inst. Akad. Nauk SSSR, 6: 5–32). We, however, have followed Filippova, N.A. (1997. Ixodid tick of subfamily Amblyomminae. Fauna of Russia and neighbouring countries, 4 (5), Nauka, St. Petersburg, 436 pp. In Russian) in assigning 1940 as the year of description of this species. Filippova (1997) considered *R. turanicus* in Pomerantzev (1936, *op. cit.* above) a *nomen nudum.* Camicas et al. (1998, *op cit.* under *R. pilans*) record the authority of *R. turanicus* as "1940, Pomerantzev, B.I., Matikashvily, N.V. & Lotozky, B.V.," but this is incorrect. See also remarks below.

Type depository: ZIAC (lectotype, paralectotype) (Filippova 2008, *op. cit*. under *R. leporis*). Walker et al. (2000, *op. cit*. under *R. appendiculatus*) do not give a depository for the types of *R. turanicus* because they believe that the types have been lost, but the information contained in Filippova (2008, *op. cit*. under *R. leporis*) indicates otherwise.

Known stages: male, female, nymph, larva, taking into account the descriptions in Filippova (1997, *op. cit.* above)

Zoogeographic Region: Palearctic. Many records of *R. turanicus* from around the world are currently only speculative (see remarks).

Ecoregions: lowland desert and semi-desert, steppe and open woodlands. These ecoregions were determined through exclusive use of the data in Filippova (1997), confirmed by this author.

Hosts: Aves and Squamata are considered exceptional hosts.
Mammalia (several orders)
Squamata: Agamidae (A)
Passeriformes: Alaudidae (NL)
This list was constructed using only the *R. turanicus* identified by Filippova, N.A. in Filippova (1997). Therefore, many host records identified by other workers and also included in Filippova (1997), as well as records from other sources, are excluded until the relationship of *R. turanicus* with *R. sanguineus* and related species is resolved. Adult ticks from Agamidae refer to specimens found in a burrow. See remarks below.

Human infestation: yes (Filippova 1997)

Remarks: the conventional identification of *R. turanicus sensu stricto* has always been fraught with difficulty, and recent biological, morphological and molecular studies have revealed a complex situation in relation to *R. sanguineus*, with probable cryptic species, as discussed in Beati and Keirans (2001), Szabó et al. (2005) and Nava et al. (2009). All sources indicate that it is extremely difficult to identify *R. turanicus sensu stricto* with certainty, and studies with ticks from different parts

of the world will be needed to solve this problem. Until such studies have been completed, it will not be possible to definitively assign the specific epithet *turanicus* to any population apart from those identified in Filippova (1997). We argue that the study by Pegram et al. (1987), comparing Palearctic and Afrotropical populations, did not clarify the status of *R. turanicus* because there is no guarantee that these investigators were working with *bona fide R. turanicus*. Nevertheless, any problems pertaining to the identification of *R. turanicus* pale in comparison with those relating to *R. sanguineus*. Since we know the type locality and type host of *R. turanicus*, new specimens can be collected from the type host and locality, and compared with the type material. If such specimens prove to be identical to the types, the species can be morphologically and molecularly redescribed, thus providing data for comparison with other so- called *R. turanicus* worldwide.

References

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Filippova, N.A. 1997. Ixodid ticks of subfamily Amblyomminae. Fauna of Russia and neighbouring countries, 4 (5), Nauka, St. Petersburg, 436 pp. In Russian.

Nava, S., Guglielmone, A.A. & Mangold, A.J. 2009. An overview of systematics and evolution of ticks. Front. Biosci., 14: 2857–2877.

Pegram, R.G., Clifford, C.M., Walker, J.B. & Keirans, J.E. 1987. Clarification of the *Rhipicephalus sanguineus* group (Acari, Ixodoidea, Ixodidae). I. *R. sulcatus* Neumann, 1908 and *R. turanicus* Pomerantzev, 1936. Syst. Parasitol., 10: 3–26.

Szabó, M.P., Mangold, A.J., Fao, C.F., Bechara, G.H. & Guglielmone, A.A. 2005. Biological and DNA evidence of two dissimilar populations of the *Rhipicephalus sanguineus* tick group (Acari: Ixodidae) in South America. Vet. Parasitol., 130: 131–140.

81 – *R. warburtoni* Walker & Horak, 2000 (*In* Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.)

Type depositories: OVI (holotype, paratype), BMNH, USNTC (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregion: Nama Karoo

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae and Lagomorpha: Leporidae; usual hosts for larvae and nymphs are Lagomorpha: Leporidae and Macroscelidea: Macroscelididae. Aves are considered exceptional hosts.
Lagomorpha: Leporidae (ANL)

Artiodactyla: Bovidae; Carnivora: Canidae, Felidae (A)
Macroscelidea: Macroscelididae; Passeriformes: Alaudidae (NL)
Rodentia: Pedetidae (N)
Rodentia: Muridae (L)

Human infestation: yes (Horak et al. 2002)

Remarks: adults of this tick were originally referred to as *Rhipicephalus* near *punctatus* by Fourie and Horak (1990) and as *R. punctatus* by Fourie and Horak (1991) and Fourie et al. (1996); larvae and nymphs were referred to as *R. punctatus* by Fourie et al. (1992). These ticks were subsequently recognized as belonging to a new species, namely *Rhipicephalus warburtoni* (Walker et al. 2000). *Rhipicephalus appendiculatus* in Tonetti et al. (2009) are in fact *R. warburtoni*, as recognized in Tonetti and Walters (2010). Aves are not included as hosts of this tick in Kolonin (2009). See also *R. pravus* and *R. punctatus*.

References

Fourie, L.J. & Horak, I.G. 1990. Parasites of cattle in the south western Orange Free State. J. S. Afr. Vet. Assoc., 61: 27–28.

Fourie, L.J. & Horak, I.G. 1991. The seasonal activity of adult ixodid ticks on Angora goats in the south western Orange Free State. J. S. Afr. Vet. Assoc., 62:104–106.

Fourie, L.J., Horak, I.G. & van den Heever, J.J. 1992. The relative host status of rock elephant shrews *Elephantulus myurus* and Namaqua rock mice *Aethomys namaquensis* for economically important ticks. S. Afr. J. Zool., 27: 108–114.

Fourie, L.J., Kok, D.J. & Heyne, H. 1996. Adult ixodid ticks on two cattle breeds in the south-western Free State, and their seasonal dynamics. Onderstepoort J. Vet. Res., 63: 19–23.

Fourie, L.J., Horak, I.G. & Woodall, P.F. 2005. Elephant shrews as hosts of immature ixodid ticks. Onderstepoort J. Vet. Res., 72: 293–301.

Horak, I.G., Fourie, L.J., Heyne, H., Walker, J.B. & Needham, G.R. 2002. Ixodid ticks feeding on humans in South Africa: with notes on preferred hosts, geographic distribution, seasonal occurrence and transmission of pathogens. Exp. Appl. Acarol., 27: 113–136.

Horak, I.G., Fourie, L.J. & Braack, L.E.O. 2005. Small mammals as hosts of immature ixodid ticks. Onderstepoort J. Vet. Res., 72: 255–261.

Kolonin, G.V. 2009. Fauna of ixodid ticks of the world. http://www.kolonin.org/

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Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

82 – *R. zambeziensis* Walker, Norval & Corwin, 1981 (Onderstepoort J. Vet. Res., 48: 87–104)

Type depositories: OVI (holotype, paratypes), BMNH, USNTC, VRLH (paratypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae; usual hosts for larvae and nymphs are Artiodactyla: Bovidae and Lagomorpha: Leporidae.
Artiodactyla: Bovidae; Carnivora (several families); Lagomorpha: Leporidae; Rodentia: Sciuridae (ANL)
Artiodactyla: Giraffidae; Rodentia: Hystricidae; Tubulidentata: Orycteropodidae (A)
Artiodactyla: Suidae; Perissodactyla: Equidae (A, N and/or L)
Galliformes: Numididae, Phasianidae (NL)
Perissodactyla: Rhinocerotidae; Rodentia: Pedetidae (N)

Human infestation: yes (Horak et al. 2002)

Remarks: Walker et al. (2000) use the term "immatures" extensively without specifying which immature stages of *R. zambeziensis* were found on hosts. See also *R. appendiculatus.*

References

Horak, I.G., De Vos, V. & De Klerk, B.D. 1984. Parasites of domestic and wild animals in South Africa. XVII. Arthropod parasites of Burchell's zebra *Equus burchelli*, in the Eastern Transvaal Lowveld. Onderstepoort J. Vet. Res., 51: 145–154.

Horak, I.G., Boomker, J., De Vos, V. & Potgieter, F.T. 1988. Parasites of domestic and wild animals in South Africa. XXIII. Helminth and arthropod parasites of warthogs, *Phacochoerus aethiopicus*, in the Eastern Transvaal Lowveld. Onderstepoort J. Vet. Res., 55: 145–152.

Horak, I.G., Spickett, A.M., Braack, L.E.O. & Williams, E.J. 1991. Parasites of domestic and wild animals in South Africa. XXVII. Ticks on helmeted guineafowls in the Eastern Cape Province and Eastern Transvaal lowveld. Onderstepoort J. Vet. Res., 58: 137–143.

Horak, I.G., Boomker, J., Spickett, A.M. & De Vos, V. 1992. Parasites of domestic and wild animals in South Africa. XXX. Ectoparasites of kudus in the Eastern Transvaal Lowveld and the Eastern Cape Province. Onderstepoort J. Vet. Res., 59: 259–273.

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Horak, I.G., Fourie, L.J. & Braack, L.E.O. 2005. Small mammals as hosts of immature ixodid ticks. Onderstepoort J. Vet. Res., 72: 255–261.
Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

83 – *R. ziemanni* Neumann, 1904 (Arch. Parasitol., 8: 444–464)
See *R. aurantiacus.*

Type depository: BMNH (syntypes) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female

Zoogeographic Region: Afrotropical

Ecoregions: tropical and subtropical grasslands, savannas and shrublands; tropical and subtropical moist broadleaf forests

Hosts: usual hosts for adult ticks are Artiodactyla: Bovidae.
Carnivora: Felidae; Rodentia: Hystricidae (AN)
Mammalia (several orders) (A)

Human infestation: yes (Walker et al. 2000)

Remarks: Camicas et al. (1998) report that the nymph of *R. ziemanni* has been described, but we follow Walker et al. (2000), who state that the nymph of this species is known but undescribed. We also follow Walker et al. (2000) in regarding Felidae and Hystricidae as provisional hosts for nymphs.

References

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Walker, J.B., Keirans, J.E. & Horak, I.G. 2000. The genus *Rhipicephalus* (Acari: Ixodidae): a guide to the brown ticks of the world. Cambridge University Press, Cambridge, 643 pp.

84 – *R. zumpti* Santos Dias, 1950 (Moçambique (61): 113–170)

Type depository: SDC (holotype) (Walker et al. 2000, *op. cit*. under *R. appendiculatus*)

Known stages: male, female, nymph, larva

Zoogeographic Region: Afrotropical

Ecoregions: southern miombo woodlands; Maputaland coastal forest mosaic; Nama Karoo

Hosts: Mammalia (several orders) (A)

Human infestation: yes (Walker et al. 2000)

Remarks: Walker et al. (2000) state that the hosts of larvae and nymphs of *R. zumpti* are probably Muridae. However, the natural hosts of these stages are unknown because they were described from laboratory-reared specimens (Walker et al. 2000). Consequently, we have excluded Muridae from the host list above.

References

Horak, I.G., Braack, L.E.O., Fourie, L.J. & Walker, J.B. 2000. Parasites of domestic and wild animals in South Africa. XXXVIII. Ixodid ticks collected from 23 wild carnivore species. Onderstepoort J. Vet. Res., 67: 239–250.

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Synopsis of the Genus *Rhipicephalus*

A synopsis of the genus *Rhipicephalus* is presented in Tables 1 and 2. Most species of *Rhipicephalus* are found exclusively in the Afrotropical Region (63 or 75 % of all species), while 7 (8 %) and 3 (4 %) are found exclusively in the Palearctic and Oriental Zoogeographic Regions, respectively. No species of *Rhipicephalus* are present exclusively in the Australasian, Nearctic and Neotropical Regions. The status of *R. sanguineus* and *R. turanicus* is difficult to define; *R. sanguineus* is considered to be cosmopolitan, but the species itself is not morphologically well characterized, and its source is a Palearctic locality. On the other hand, *R. turanicus* is morphologically well defined and there are *bona fide* records for it in the Palearctic Region, but a multitude of records from other zoogeographic regions remain unconfirmed (see *R. sanguineus* and *R. turanicus* above). For the purposes of this review, we consider both species to be established exclusively in the Palearctic Region. Future analyses, however, may overturn this view.

Four *Rhipicephalus* species are widespread, being present in three or more zoogeographic regions: *R. haemaphysaloides* is established in the Australasian, Oriental and Palearctic Regions, *R. annulatus* is present in the Afrotropical, Oriental and Palearctic Regions, *R. australis* is found in the Australasian and Oriental Regions but also on Pacific islands, and *R. microplus* is established in all zoogeographic regions, including some remote islands. Thus, the distribution of the genus *Rhipicephalus* encompasses all zoogeographic regions as well as some remote islands, for a total of ten combinations of land utilization. This genus is absent

Table 1 Numbers and percentages of all species of *Rhipicephalus*, by zoogeographic region(s), number known to feed on humans (% of the total number of species in a particular region), and number of species for which all stages (larva, nymph, male and/or female) are known (% of the total number of species in a particular region)

Regions	No of species	%	No of species on humans	No of species of which all stages are known
Afrotropical	63	75.0	33 (52.4)	42 (66.7)
Palearctic[a]	7	8.4	5 (71.4)	6 (85.7)
Afrotropical-Palearctic	5	6.0	3 (60.0)	5 (100)
Oriental	3	3.6	0	1 (33.3)
Australasian-Oriental	1	1.2	1 (100)	1 (100)
Oriental-Palearctic	1	1.2	1 (100)	1 (100)
Afrotropical-Nearctic-Palearctic	1	1.2	1 (100)	1 (100)
Australasian-Oriental-Palearctic	1	1.2	1 (100)	1 (100)
Australasian-Oriental-Pacific slands	1	1.2	0	1 (100)
All Zoogeographic Regions and several islands around the world	1	1.2	1 (100)	1 (100)
Total	**84**		**46 (54.8)**	**60 (71.4)**

[a]Two Palearctic species (*R. sanguineus* and *R. turanicus*) probably have wider distributions than we have recorded, but we are unable to determine the extent of these. Both species feed on humans and all stages of *R. turanicus* are known, but not those of *R. sanguineus*

Table 2 Numbers and percentages of the 46 species of *Rhipicephalus* whose adult (female and/or male), larval and nymphal stages as well as natural hosts are known, including or excluding exceptional hosts

Hosts	No of species Including exceptional hosts	%	No of species Excluding exceptional hosts	%
Aves + Mammalia	20	43.5	8	17.3
Mammalia	16	34.7	38	82.6
Aves + Mammalia + Squamata	4	8.7	0	0
Aves + Mammalia + Testudines	3	6.5	0	0
Anura + Aves + Mammalia + Squamata	1	2.2	0	0
Aves + Mammalia + Squamata + Testudines	1	2.2	0	0
Mammalia + Squamata	1	2.2	0	0
Total	**46**		**46**	

around the poles, but the earths's islands have been colonized by *R. microplus* and, to a lesser extent, by *R. australis* via settlement of humans and their infested cattle.

Our analyses show that 68 species (81 % of the genus) are found exclusively in regions that constituted the ancient continent Gondwana; 7 species (8 %) are established in regions that formed Laurasia, and 8 species (10 %) are present in regions that were part of both ancient continents.

The larva, nymph and at least one adult stage are known for 60 (71 %) of the 84 species of *Rhipicephalus* that we recognize as valid. Although this is a comparatively high proportion, descriptive and diagnostic problems associated with important ticks belonging to the *R. sanguineus* group of species need to be addressed to better understand the phylogenetic relationships within this genus.

A total of 46 species (55 %) have been recorded as feeding on humans.

Hosts for 46 species (55 % of the total) of *Rhipicephalus* whose adult (female and/or male) and immature stages and natural hosts are known are presented in Table 2, including or excluding exceptional hosts. All parasitic stages of *R. camicasi*, *R. capensis*, *R. carnivoralis*, *R. humeralis*, *R. hurti*, *R. kochi*, *R. lounsburyi*, *R. moucheti*, *R. neumanni*, *R. sculptus*, *R. sulcatus*, *R. tricuspis* and *R. zumpti* are known, but one or both immature stages are known only from laboratory-reared specimens. Therefore, these species have been excluded from our host analysis.

When exceptional hosts are included in the analysis, ticks of the genus *Rhipicephalus* are recorded from seven different categories of hosts (Table 2). However, the only exclusive hosts for *Rhipicephalus* are Mammalia (16 species or 35 % of the total taxa analyzed), while all the remaining species have also been collected from Mammalia. The most common combination of hosts for this genus is Mammalia + Aves (20 species, 43 %), and Aves are also non-exclusive hosts of 29 species (63 %). Squamata are non-exclusive hosts of seven species (15 %) of *Rhipicephalus.* The contribution of Testudines and Anura as hosts for ticks of this genus is meager. Testudines are exceptional hosts of four species (*R. appendiculatus*, *R. decoloratus*, *R. evertsi* and *R. gertrudae*), while Anura are a rare host for a single species, *R. microplus*. No *Rhipicephalus* ticks have been collected from Crocodilia.

The above situation changes dramatically when exceptional hosts are excluded from the analysis. No *Rhipicephalus* species are now associated with Anura, Squamata and Testudines, and the categories of host utilization decrease from seven to just two (Mammalia and, Aves + Mammalia). Aves are recognized as non-exclusive but relevant hosts for eight species (17 % of the total of species analyzed), while the role of Mammalia as exclusively relevant hosts is further consolidated, with all parasitic stages of 38 *Rhipicephalus* species (83 % of the total) feeding on this class of vertebrates.