Checklist of the tick (Acari: Argasidae, Ixodidae) species of Pakistan

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Summary
In developed and underdeveloped countries, ticks are important vectors transmitting various pathogens that cause diseases of veterinary and public health importance, like babesiosis, theileriosis, Crimean-Congo haemorrhagic fever (CCHF) and many more. Many species of ticks have been reported in scientific literature from Pakistan, which need to be listed for ready reference. For this purpose, a checklist of tick species recorded in Pakistan is presented here after comprehensive review of the available literature on the subject. Overall, nine genera and 53 species of ticks infesting animals in Pakistan are presented in this checklist.

Introduction

Ticks are of major concern in the 21st century. There are increasing evidences that incriminate them in the transmission of disease pathogens to human and animals. They are vectors of several protozoal, viral and bacterial diseases (Ahmad *et al.* 2006, Alam *et al.* 2013, Garcia 2003, Kakar and Kakarsulemankhel 2008, Tasawar *et al.* 2014, Warburton 1913), causing economic losses in animals. They are eight-legged arthropods belonging to the class Arachnida (Ghosh *et al.* 2007) and have vast diversity of species world-wide (Khalil *et al.* 2018, Rasul and Akhtar 1975, Wall and Shearer 2008). There are nearly 860 species which have been reported throughout the globe (Horak *et al.* 2003). Ticks are classified into four families *i.e.* Ixodidae, Argasidae, Laelaptidae and Nuttalliellidae (Anderson and Magnarelli, 2008). Members of the Ixodidae and Argasidae are considered the most important vectors of pathogens causing diseases in humans and animals (Gosh *et al.* 2007, Omer *et al.* 2007). Ixodidae (hard ticks) contain 650 while the Argasidae (soft ticks) includes 150 species (Anderson and Magnarelli 2008).

Pakistan alone presents huge diversity of ticks due to its geographical location in subtropical region (Rasul and Akhtar 1975). In the country, the most commonly distributed genera are *Rhipicephalus, Boophilus, Dermacentor, Amblyomma, Hyalomma, Haemaphysalis, Argas* and *Ornithodoros* (Audouin 1826, Hoogstraal and Varma 1962). Hard tick species have been documented to constitute threat for the human and animal life (Dantas-Torres 2008, Walker 2003) as they act as a carrier of diseases like theileriosis, anaplasmosis, babesiosis and Crimean-Congo Haemorrhagic Fever (CCHF) (Jabbar *et al.* 2015, Ramzan *et al.* 2018).

Checklists are important source of information for any faunal group. It also provides information about its spatial distribution in a particular region or country. No comprehensive check list for tick species of Pakistan is available so far, except a combined list of India, Pakistan and Bangladesh ticks (Gosh *et al.* 2007) that lacks complete information about tick fauna of the country. Therefore, there is a need for an updated and comprehensive checklist of tick species in Pakistan to serve as a ready reference

and a guide to the research community. The aim of this paper is to provide an updated checklist of tick species identified in Pakistan.

Materials and methods

The current checklist has been prepared after a comprehensive and thorough review of literature on the subject with the help of google scholar. It is being written in following pages, according to style and format given below.

In the checklist, genus names are written in bold while author names and year of publication are not in bold. From very next line, with an interval given by one "Tab", species names are given also in bold, authorship and year of publication are written using normal characters. Host animals and references are then given (each after one "Tab" space). At the very next line, synonyms (where available) including binomial names with authors and year of publication are added.

Checklist of tick species at Pakistan level

Previous checklist of ticks which has been published in 2007, enlists only 23 species from Pakistan (Ghosh *et al.* 2007). In the present list, 53 species under 9 genera, from the country along with their documented hosts are presented.

Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Superfamily **Ixodoidea**		Birula 1894, Leach 1815, Banks 1894		
Family **Argasidae**		Canestrini 1890		
Genus ***Argas***		Latreille 1795		
	abdussalami		Poultry	Ghosh *et al.* 2007, Iqbal 1971, Hoogstraal & McCarthy 1965
	persicus		Poultry	Abbasi *et al.* 2017, Ghosh *et al.* 2007, Kakarsulemankhel 2011, Oken 1818, Ramzan *et al.* 2008, Rafique *et al.* 2015
Synonyms	*Rhynchoprion persicus*			Oken 1818
	Argas mauritianus			Guérin-Méneville 1844
	Argas firmatus			Neumann 1896
	Argas persicus dissimiles			Oken 1818
	reflexus		Poultry, Fowl	Kaiser & Hoogstraal 1964, Ghosh *et al.* 2007, Fabricius 1794, WHO 1976
Synonyms	*Acarus reflexus*			Fabricius 1794
	Acarus columbarum			Shaw 1793
	Acarus marginatus			Fabricius 1794
	Rhynchoprion columbae			Hermann 1804
	Ixodes espagnol			Brebisson 1827
	Ixodes hispanus			Brebisson 1827
	Argas reflescus			Rondelli 1930
	vespertilionis		Poultry	Latreille 1796, Ali 1986, Murray 1877, Kaiser & Hoogstraal 1964, Rafique *et al.* 2015
Synonyms	*Argaspipistrellae*			Audoin 1832
Genus ***Ornithodoros***		Koch 1844		
	thokozani	Mégnin 1882	Poultry, Donkey	Razzak & Shaikh 1969
Family **Ixodidae**		Murray 1877		
Genus ***Amblyomma***		Koch 1844		
	pomposum		Buffalo, Cattle, Goat, Sheep	Donitz 1909, Rehman *et al.* 2004
Synonyms	*Amblyomma nocens*			
	Amblyomma superbum			
	Amblyomma variegatum nocens			
	Amblyomma variegatum pomposum			

continued

Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Amblyomma***				
	variegatum		Cattle, Buffalo	Fabricius 1794, Fuller 1899, Perveen 2011, Kakersulemankhel 2011, Shah *et al.* 2015, Razzak & Shaikh 1969
Synonyms	*Acarus variegatus*			Fabricius 1798
	Amblyomma elegans			Guérin-Méneville 1844
	Amblyomma variegatum variegatum			
	Amblyomma variegatus			Fabricius 1798
	Amblyomma venustum			
	Haemalastor elegans			Guérin-Méneville 1844)
	Hyalomma venustum			
	Ixodes elegans			Guérin-Méneville 1844
	Ixodes variegates			Fabricius 1798
Genus ***Boophilus***		Curtice 1891		
	sharifi		Cattle Buffalo	Kishida 1939, Ghosh *et al.* 2007, Kishida & Nakamura 1939
Synonyms	*Uroboophilus sharifi*			Minning 1934
	annulatus		Sheep, Goat, Buffalo, Cow	Say 1821, Ghosh *et al.* 2007, Rana *et al.* 2014, Kakarsulemankhel 2010, Riaz & Tasawar 2017, Sajid *et al.* 2007
Synonyms	*Ixodes annulatus*			Say 1821
	Haemaphysalis rosea			Koch 1844a
	Ixodes indentatus			Gamgee 1869
	Ixodes calcaratus			Birula 1894
	Boophilus balcanicus			Minning 1934
	Boophilus congolensis			Minning 1934
	Boophilus palestinensis			Minning 1934
	Boophilus schulzei			Minning 1934
Genus ***Dermacentor***		Koch 1844a		
	andersoni		Cattle, Sheep	Duges 1834, Stiles 1908, Karim *et al.* 2017
Synonyms	*Dermacentor venustus*			Banks 1908
	circumguttatus		Buffaloes, Cattle	Neumann, 1897, Rehman *et al.* 2004
Synonyms	*Amblyocentor circumguttatus*			
	Dermacentor circumguttatus circumguttatus			
	Dermacentor circumguttatus cunhasilvai			
	marginatus		Dog, Cattle, Goat, Horse, Sheep	Sulzer 1776, Ghosh *et al.* 2007, Uzakov 1964
Synonyms	*Acarus marginatus*			Sulzer 1776
	Ixodes marmoratus			Risso 1826
	Dermacentor dentipes			Koch 1844a
	Dermacentor parabolicus			Koch 1844a
	Dermacentor gynaecoides			Olenev 1927
	Dermacentor longicoxalis			Olenev 1927
	Dermacentor rotundicoxalis			Olenev 1931b, Olenev 1929a
	Dermacentor lacteolus			Schulze 1933
	Dermacentor antrorum			Reznik 1950
	raskimensis		Horses, Deer, Cattle	Shah *et al.* 2015, Pomerantsev 1946

continued

Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Dermacentor***		Koch 1844a		
	rhinocerinus		Buffaloes, Cattle	Denny 1843
Synonyms	*Amblyocentor rhinocerinus*			
	Amblyomma rhinocerinus			
	Dermacentor rhinocerinus otis			
	Dermacentor rhinocerinus schillingsi			
	Dermacentor rhinocerotis arangis			
	Dermacentor rhinocerotis permaculatus			
	Dermacentor rhinocerotis rhinocerotis			De Geer 1778
	Ixodes rhinocerinus			
Genus ***Haemaphysalis***		Koch 1844		
	aciculifer		Buffalo, Cattle	Warburton 1913, Reznik 1950
Synonyms	*Haemaphysalis aciculifer aciculifer*			
	bispinosa		Horse	Neumann 1897, Risso 1826
Synonyms	*Haemaphysalis bispinosa bispinosa*			
	punctata		Cattle, Sheep, Goat, Horse	Hasselquist 1762, Hoogstraal & Varma 1962, Neumann 1897
	flava		Sheep	Neumann 1897
Synonyms	*Haemaphysalis flava armata*			
	Haemaphysalis flava flava			Neumann 1897
	Haemaphysalis watanabei			
	houyi		Buffalo, Cattle	Nuttall & Warburton 1915, Kamensky 1928
	Haemaphysalis calcarata houyi			
	kashmirensis			Hoogstraal & Varma 1962
	parmata		Buffalo, Cattle	Neumann 1905
	sulcata		Sheep	Canestrini & Fanzago 1878, Canestrini & Fanzago 1978
	Ixodes viperarum			Koch 1844b
	Herpetobia sulcata			Canestrini 1890
	Haemaphysalis nicollei			Larrousse 1925
	Haemaphysalis angorense			Schulze & Schlottke 1927
	Haemaphysalis cholodkovskyi			Olenev 1928
	Haemaphysalis montana			Kamensky 1928
	Haemaphysalis sewelli			Sharif 1928
	Haemaphysalis montana			Pospelova-Shtrom 1935a, Pospelova-Shtron 1935b
	Haemaphysalis cretica			Senevet & Caminopetros 1936
	Haemaphysalis beneditoi			Gil Collado 1938
	Haemaphysalis recta			Oswald 1941
	Hyalomma sulcata			Mamikonyan 1950, Airapetyan *et al.* 1960
	Haemaphysalis cretica			Feldman-Muhsam 1952
Genus ***Hyalomma***		Koch 1844a		
	anatolicum anatolicum		Buffalo, Sheep, Goat, Cattle, Dog	Linnaeus 1758, Iqbal 1971, Khalid *et al.* 1991, Ahmad 1991, Durrani 1992, Ahmad *et al.* 2012
Synonyms	*Hyalomma depressum*			Schulze 1919
	Hyalomma cicatricosum			Schulze & Schlottke 1930

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Hyalomma***		Koch 1844a		
	anatolicum *(Anadolu Kenesi)*		Cattle, Sheep, Goat, Camel, Horse	Koch 1844b, Donitz 1905, Ramzan *et al.* 2020
Synonyms	*Hyalomma aegyptium aegyptium brunnipes*			
	Hyalomma aegyptium excavata			
	Hyalomma aegyptium excavatum			
	Hyalomma aegyptium mesopotamium			
	Hyalomma aegyptium ornatipes			
	Hyalomma anatolicum anatolicum			
	Hyalomma armeniorum			
	Hyalomma depressum			
	Hyalomma detritum albipictum ornatipes			
	Hyalomma lusitanicum depressum			
	Hyalomma marginatum balcanicum brunnipes			
	Hyalomma marginatum marginatum brunnipes			
	Hyalomma mesopotamium			
	Hyalomma pavlovskyi			Schulze & Schlottke 1929
	Hyalomma pusillum			
	Hyalomma pusillum alexandrinum			
	Hyalomma pusillum ornatipes			
	Hyalomma pusillum pusillum			
	Hyalomma savignyi armeniorum			
	Hyalomma savignyi exsul			
	Hyalomma savignyi mesopotamium			
	Hyalomma savignyi pusillum			
	aegyptium		Cattle	Linnaeus 1758
Synonyms	*Acarus aegyptius*			Linnaeus 1758
	Acarus testudinis			Hasselquist1762
	Cynorhaestes aegyptius			Linnaeus 1758
	Hyalomma aegyptium syriacum			
	Hyalomma aegyptius			Linnaeus, 1758
	Hyalomma affine			
	Hyalomma syriacum			
	Hyalomma syriacum punctata			Schulze 1920
	Hyalomma syriacum punctatum			Schulze 1920
	Hyalomma testudinis			Hasselquist 1762
	Ixodes aegyptius			Linnaeus 1758
	Ixodes testudinis			Leydig 1855
	dromedarii		Buffalo, Cattle, Goat, Sheep, Dog, Camel, Horse	Koch 1844b
Synonyms	*Ixodes trilineatus*			Lucas 1836
	Ixodes cinctus			Lucas 1840
	Hyalomma margaropoides			Senevet 1922
	Hyalomma canariense			Schulze and Schlottke 1930
	Hyalomma persiacum			Olenev 1931
	Hyalomma yakimovi			Olenev 1931
	Hyalomma delpyi			Schulze & Gossel 1936

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Hyalomma***		Koch 1844a		
	detritum		Camel	Schulze 1919, Schulze 1920
Synonyms	*Hyalomma*			Schulze & Gossel 1936
	excavatum		Buffalo	Koch 1844
Synonyms	*Acarus aegyptium*			Linnaeus 1758
	Hyalomma syriacum			Koch 1844
	Ixodes cornuger			Kolenati 1857
	Hyalomma affine			Neumann 1899
	Hyalomma punctata			Schulze 1919
	Hyalomma suriacum			Oswald 1941
	hussaini		Cattle, Buffalo	Sharif 1928, Feldwan-Muhsam 1951
Synonyms	*Hyalomma hussaini typica*			Sharif 1928
	impeltatum		Cattle, Camel	Schulze & Schlottke 1930
Synonyms	*Hyalomma brumpti*			Delpy 1946
	Hyalomma dromedarii leptosoma			
	Hyalomma erythraeum			
	Hyalomma fezzanensis			
	Hyalomma impeltatum impeltatum			
	Hyalomma leptosoma			
	Hyalomma savignyi impeltatum			
	Hyalomma sinaii			
	isaaci	Sharif, 1928	Cattle, Buffalo	Ghosh *et al.* 2007
Synonyms	*Hyalomma aegyptium isaaci*			
	Hyalomma dromedarii indosinensis			
	Hyalomma marginatum isaaci			
	Hyalomma sharifi isaaci			
	kumari	Sharif, 1928	Cattle, Buffalo	Ghosh *et al.* 2007
	marginatum		Buffalo	Koch 1844
Synonyms	*Hyalomma aegyptium marginatum*			
	Hyalomma cypriacum			
	Hyalomma dentatum,			
	Hyalomma marginatum bacuense			
	Hyalomma marginatum balcanicum			Schulze & Schlottke 1929
	Hyalomma marginatum brionicum			
	Hyalomma marginatum caspium			
	Hyalomma marginatum espanoli			
	Hyalomma marginatum hispanum			Fabricius 1787
	Hyalomma marginatum marginatum			
	Hyalomma marginatum olenevi			
	Hyalomma plumbeum nigricum			
	Hyalomma rufipes glabratum			
	Hyalomma steineri codinai			
	Hyalomma transcaucasicum			
	marginatum toranicum			Koch 1844a, Durrani & Kamal 2008

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Hyalomma***		Koch 1844a		
	rufipes	Koch 1844	Buffalo, Cattle, Sheep, Goats	Koch 1844a
Synonyms	*Hyalomma aegyptium impressum rufipes*			Koch 1844a
	Hyalomma aequipunctatum			
	Hyalomma impressum rufipes			Koch 1844a
	Hyalomma marginatum impressum			
	Hyalomma marginatum rufipes			Koch 1844a
	Hyalomma plumbeum impressum			
	Hyalomma rufipes rufipes			Koch 1844
	Hyalomma savignyi impressa			Rousselot 1946
	schulzei		Camel	Olenev 1931
	scupense		Buffalo, Cattle, Sheep, Goat, Dog, Cat, Poultry	Schulze 1919, Sharif 1928
Synonyms	*Hyalomma aegyptium ferozedini*			
	Hyalomma dardanicum			
	Hyalomma detritum			
	Hyalomma detritum albipictum			
	Hyalomma detritum annulatum			
	Hyalomma detritum damascenium			
	Hyalomma detritum dardanicum			
	Hyalomma detritum detritum			
	Hyalomma detritum mauritanicum			
	Hyalomma detritum perstrigatum			
	Hyalomma detritum rubrum			
	Hyalomma detritum scupense			
	Hyalomma mauritanicum			
	Hyalomma mauritanicum annulatum			
	Hyalomma scupense detritum			
	Hyalomma scupense scupense			
	Hyalomma sharifi			Schulze and Schlottke 1929
	Hyalomma steineri			
	Hyalomma steineri enigkianum			
	Hyalomma steineri steineri			
	Hyalomma uralense			
	Hyalomma verae			
	Hyalomma volgense			
	turanicum		Buffaloes, Dog, Cat, Poultry, Goat, Cattle, Sheep	Pomerantse 1946
Synonyms	*Hyalomma aegyptium impressum transiens*			
	Hyalomma impressum luteipes			
	Hyalomma impressum planum			
	Hyalomma impressum planum rhinocerotis			Schulze and Schlottke 1929a
	Hyalomma impressum transiens			
	Hyalomma lewisi			Schulze 1936e

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Hyalomma***		Koch 1844a		
	turanicum		Buffaloes, Dog, Cat, Poultry, Goat, Cattle, Sheep	Pomerantse 1946
Synonyms	*Hyalomma planum*			
	Hyalomma planum rhinocerotis			Schulze and Schlottke 1929a
	Hyalomma rhinocerotis			Schulze and Schlottke 1929a
	Hyalomma savignyi typica			Rousselot 1946
	Hyalomma transiens			
	Hyalomma zambesianum			
	Hyalommina lewisi			Schulze 1936e
Genus ***Ixodes***		Latreille 1795		
	ricinus		Cattle, Sheep	Linnaeus 1758, Lucas 1844 a, b, Leydig 1855, Iqbal *et al.* 2014
Synonyms	*Acarus ricinoides*			de Geer 1778
	Ixodesreduvius			Latreille 1806
	Acarus caraborum			
	Acarus reduvius			Linnaeus 1758
	Acarus ricinus			
	Crotonus ricinus			
	Cynorhaestes hermanni			
	Cynorhaestes megathyreus			
	Cynohraestes reduvius			Linnaeus 1758
	Cynorhaestes ricinus			
	Euixodes reduvius			Linnaeus 1758
	Euixodes ricinus			
	Ixodes areolaris, Ixodes bipunctatus			
	Ixodes fodiens			
	Ixodes fouisseur			
	Ixodes fuscus			Koch 1844b)
	Ixodes lacertae			
	Ixodes megathyreus			
	Ixodes nigricans			
	Ixodes obscurus			Neumann 1899
	Ixodes pustularum			
	Ixodes reduvius			Linnaeus 1758
	Ixodes reticulatus			Koch 1856
	Ixodes ricinus onchorhyncha			
	Ixodes rufus			
	Ixodes sciuri			Koch 1844c
	Ixodes sulcatus			Koch 1844a
	Ixodes trabeatus			
	Ixodes vulgaris			Fabricius 1805
	Phauloixodes rufus			
	Rhipicephalus rufus			

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Rhipicephalus***		Koch 1844b		
	appendiculatus		Cattle, Buffalo, Dog	Neumann 1901
Synonyms	*Eurhipicephalus appendiculatus*			
	arnoldi		Buffalo, Cattle	Theiler and Zumpt 1949
	decoloratus		Buffalo, Cattle	Koch 1867
Synonyms	*Boophilus annulatus decoloratus*			
	Boophilus capensis			Massey 1908
	Boophilus decoloratus			
	Boophilus florae			
	Boophilus scheepersi			
	Eurhipicephalus decoloratus			
	Margaropus annulatus decoloratus			
	Margaropus decoloratus			
	Palpoboophilus decoloratus			
	Rhipicephalus annulatus decoloratus			
	evertsi		Buffalo, Cattle	Neumann 1897, Neumann 1899, Neumann 1996, Neumann 1905
Synonyms	*Eurhipicephalus evertsi*			
	Rhipicephalus evertsi albigeniculatus			
	Rhipicephalus evertsi evertsi			
	Rhipicephalus evertsi mimeticus			
	Rhipicephalus mimeticus			
	haemaphysaloides		Sheep, Cattle, Goat	Supino 1897, Irshad *et al.* 2010
Synonyms	*Rhipicephalus expeditus*			
	Rhipicephalus haemaphysaloides expedita			
	Rhipicephalus haemaphysaloides expeditus			
	Rhipicephalus haemaphysaloides haemaphysaloides			
	Rhipicephalus haemaphysaloides niger			
	Rhipicephalus haemaphysaloides ruber			
	Rhipicephalus ruber			
	kochi		Buffalo, Cattle	Dönitz 1905, Dönitz 1907a
Synonyms	*Rhipicephalus neavei*			
	longus		Buffalo, Cattle	Razzak and Shaikh 1969, Neumann 1907
Synonyms	*Rhipicephalus capensis longus*			
	Rhipicephalus confusus			Santos Dias 1956c
	Rhipicephalus falcatus			
	microplus		Cattle, Camel	Canestrini 1888, Farooqi *et al.* 2017, Karim *et al.* 2017, Asim *et al.* 2009, Sultana *et al.* 2015
Synonyms	*Margaropus microplus*			Canestrini 1888
	Margaropus annulatus microplusRohr			
	Margaropus annulatus australis (Fuller)			
	Boophilus annulatus argentinus			
	Boophilus annulatus australis			Fuller 1899
	Boophilus annulatus caudatus			
	Boophilus annulatus microplus			
	Boophilus argentinus, Boophilus australis			Fuller 1899

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Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Rhipicephalus***		Koch 1844b		
	microplus		Cattle, Camel	Canestrini 1888, Farooqi *et al.* 2017, Karim *et al.* 2017, Asim *et al.* 2009, Sultana *et al.* 2015
	Boophilus caudatus, Boophilus cyclops			
	Boophilus distans, Boophilus microplus			
	Boophilus microplus annulatus			
	Boophilus minningi			
	Boophilus sharifi			Siddiqi & Jan 1984a
	Rhipicephalus sharifi			Siddiqi & Jan 1984
	Haemaphysalis micropla			
	Margaropus annulatus argentinus			
	Margaropus annulatus australis			Fuller 1899, Fabricicus 1798
	Margaropus annulatus caudatus			
	Margaropus annulatus mexicanus			
	Margaropus annulatus microplus			
	Margaropus argentinus			
	Margaropus australis			Fuller 1899
	Margaropus caudatus			
	Margaropus micropla			
	Margaropus microplus			
	Palpoboophilus brachyuris			
	Palpoboophilus minningi			
	Rhipicephalus annulatus argentinus			
	Rhipicephalus annulatus australis			Fuller 1899
	Rhipicephalus annulatus caudatus			
	Rhipicephalus annulatus microplus			
	Rhipicephalus argentinus			
	Rhipicephalus caudatus			
	Uroboophilus australis			Fuller 1899
	Uroboophilus caudatus			
	Uroboophilus cyclops			
	Uroboophilus distans			
	Uroboophilus indicus			
	Uroboophilus microplus			
	pravus		Sheep, Goat, Pig,Camel, Dog, Donkey	Dönitz 1910
Synonyms	*Rhipicephalus pravus pravus*			
	sanguineus		Buffalo, Cattle,Goat, Camel, Dog, Horse	Latreille 1806, Ahmad 1991, Atif *et al.* 2012, Bashir *et al.* 2009, Durrani & Shakoori 2009, Hussain & Kumar 1985, Roy *et al.* 2018, Shah *et al.* 2015, Theiler 1947
Synonyms	*Ixodes sanguineus*			Latreille 1806
	Ixodes linnaei			Audouin 1826, Audouin & Milne-Edwards 1832
	Ixodes plumbeus			Donitz 1910, Duges 1834
	Ixodes dugesi			Gervais 1844
	Rhipicephalus limbatus			Koch 1844b
	Rhipicephalus linnei			Koch 1844b

continued

Table I. *Checklist of tick species of Pakistan. —cont'd*

	Species	Authors and year of publication	Host animals	References
Genus ***Rhipicephalus***		Koch 1844b		
	sanguineus		Buffalo, Cattle,Goat, Camel, Dog, Horse	Latreille 1806, Ahmad 1991, Atif *et al.* 2012, Bashir *et al.* 2009, Durrani & Shakoori 2009, Hussain & Kumar 1985, Roy *et al.* 2018, Shah *et al.* 2015, Theiler 1947
Synonyms	*Rhipicephalus rutilus*			Koch 1844b
	Rhipicephalussiculus			Koch 1844b
	Rhipicephalus carinatus			Frauenfeld 1867, Warburton 1910
	Rhipicephalus rubicundus			Frauenfeld 1867, Warburton 1910
	Rhipicephalus stigmaticus			Gerstacker 1873
	Rhipicephalus bhamensis			Supino 1897
	Rhipicephalus brevicollis			Neumann 1897
	Rhipicephalusflavus			Supino 1897
	Boophilus dugesi			Donitz 1907
	Eurhipicephalus sanguineus			Stephens & Christophers 1908
	Rhipicephalus texanus			Banks 1908
	Rhipicephalus breviceps			Warburton 1910
	Rhipicephalus dugesi			Neumann 1911 a, b
	Rhipicephalus macropis			Schulze 1936
	turanicus		Dog, Cattle, Sheep	Pomerantzev 1946, Manan *et al.* 2007
Synonyms	*Rhipicephalus secundus*			Feldman-Muhsam 1952
	Rhipicephalus turamicus			Uzakov 1964

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