

**Supplementary Table S1.** The taxa and GenBank accession of 194 hard ticks used in this study

Taxon	Locality	GeneBank accessions
<i>Amblyomma limbatum</i>	Australian	FJ584434
<i>Amblyomma limbatum</i>	Australian	FJ584430
<i>Amblyomma limbatum</i>	Australian	FJ584435
<i>Amblyomma limbatum</i>	Australian	FJ584433
<i>Amblyomma limbatum</i>	Australian	FJ584429
<i>Amblyomma pattoni</i>	China	HM193875
<i>Amblyomma pattoni</i>	China	HM193876
<i>Amblyomma testudinarium</i>	China	HM193895
<i>Amblyomma testudinarium</i>	China	HM193893
<i>Amblyomma testudinarium</i>	China	HM193894
<i>Amblyomma testudinarium</i>	China	HM193892
<i>Amblyomma trigutta</i>	Japan	AB113317
<i>Amblyomma variegatum</i>	Senegal	GU062743
<i>Bothriocroton hydrosauri</i>	Australian	FJ584426
<i>Bothriocroton hydrosauri</i>	Australian	FJ584424
<i>Bothriocroton hydrosauri</i>	Australian	FJ584422
<i>Bothriocroton hydrosauri</i>	Australian	FJ584427
<i>Bothriocroton hydrosauri</i>	Australian	FJ584425
<i>Bothriocroton hydrosauri</i>	Australian	FJ584423
<i>Dermacentor albipictus</i>	Canada	GU968842
<i>Dermacentor everestianus</i>	China	JQ737079
<i>Dermacentor marginatus</i>	Romania	FN394327
<i>Dermacentor marginatus</i>	Romania	FN394331
<i>Dermacentor marginatus</i>	Romania	FN394332
<i>Dermacentor marginatus</i>	Romania	FN394330
<i>Dermacentor marginatus</i>	Romania	FN394328
<i>Dermacentor marginatus</i>	China	HM193891
<i>Dermacentor marginatus</i>	China	HM193889
<i>Dermacentor marginatus</i>	China	HM193887
<i>Dermacentor marginatus</i>	China	HM193890
<i>Dermacentor niveus</i>	China	JQ737080
<i>Dermacentor reticulatus</i>	China	HM193885
<i>Dermacentor reticulatus</i>	China	HM193883
<i>Dermacentor reticulatus</i>	China	HM193881
<i>Dermacentor reticulatus</i>	China	HM193879
<i>Dermacentor reticulatus</i>	China	HM193886
<i>Dermacentor reticulatus</i>	China	HM193884
<i>Dermacentor reticulatus</i>	China	HM193882
<i>Dermacentor silvarum</i>	China	JQ737075
<i>Dermacentor silvarum</i>	China	JQ737076
<i>Dermacentor silvarum</i>	China	JQ737077
<i>Dermacentor silvarum</i>	China	JQ737078
<i>Dermacentor silvarum</i>	China	JQ737081
<i>Dermacentor steini</i>	China	HM193861
<i>Haemaphysalis concinna</i>	China	EU670047
<i>Haemaphysalis flava</i>	China	JQ737097
<i>Haemaphysalis flava</i>	China	HM193864
<i>Haemaphysalis flava</i>	China	HM193865
<i>Haemaphysalis flava</i>	Japan	AB075954
<i>Haemaphysalis flava</i>	China	JF758632
<i>Haemaphysalis humerosa</i>	Australian	AF132819
<i>Haemaphysalis longicornis</i>	China	JQ737087

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Supplementary Table S1. Continued

Taxon	Locality	GeneBank accessions
<i>Haemaphysalis longicornis</i>	China	JQ737090
<i>Haemaphysalis longicornis</i>	China	JQ737091
<i>Haemaphysalis longicornis</i>	China	JQ737092
<i>Haemaphysalis longicornis</i>	China	JQ737093
<i>Haemaphysalis longicornis</i>	China	JQ737096
<i>Haemaphysalis longicornis</i>	Australian	AF132820
<i>Haemaphysalis longicornis</i>	China	EU670048
<i>Haemaphysalis longicornis</i>	China	JF758631
<i>Haemaphysalis longicornis</i>	China	JF758635
<i>Haemaphysalis punctata</i>	Romania	FN394335
<i>Haemaphysalis punctata</i>	Romania	FN394336
<i>Haemaphysalis punctata</i>	Romania	FN394337
<i>Haemaphysalis punctata</i>	Romania	FN394338
<i>Haemaphysalis punctata</i>	Romania	FN394339
<i>Haemaphysalis punctata</i>	Romania	FN394340
<i>Haemaphysalis punctata</i>	Romania	FN394340
<i>Haemaphysalis qinghaiensis</i>	China	JQ737088
<i>Haemaphysalis qinghaiensis</i>	China	JQ737089
<i>Haemaphysalis qinghaiensis</i>	China	JQ737094
<i>Haemaphysalis qinghaiensis</i>	China	JQ737095
<i>Haemaphysalis qinghaiensis</i>	China	JQ737098
<i>Haemaphysalis qinghaiensis</i>	China	JQ737099
<i>Haemaphysalis qinghaiensis</i>	China	JQ737100
<i>Hyalomma aegyptium</i>	Belgium	AF132821
<i>Hyalomma anatolicum anatolicum</i>	China	JQ737067
<i>Hyalomma asiaticum</i>	China	JQ737072
<i>Hyalomma asiaticum</i>	China	JQ737073
<i>Hyalomma asiaticum asiaticum</i>	China	JQ737070
<i>Hyalomma asiaticum asiaticum</i>	China	JQ737071
<i>Hyalomma detritum</i>	China	JQ737068
<i>Hyalomma detritum</i>	China	JQ737069
<i>Hyalomma detritum</i>	Unknow	EU827695
<i>Hyalomma detritum</i>	Unknow	EU827696
<i>Hyalomma detritum</i>	Unknow	EU827694
<i>Hyalomma dromedarii</i>	China	JQ737066
<i>Hyalomma dromedarii</i>	Egypt	AF132822
<i>Hyalomma dromedarii</i>	Ethiopia	AJ437082
<i>Hyalomma dromedarii</i>	Ethiopia	AJ437080
<i>Hyalomma dromedarii</i>	Ethiopia	AJ437062
<i>Hyalomma lusitanicum</i>	Unknow	EU827739
<i>Hyalomma lusitanicum</i>	Unknow	EU827737
<i>Hyalomma lusitanicum</i>	Unknow	EU827735
<i>Hyalomma lusitanicum</i>	Unknow	EU827697
<i>Hyalomma lusitanicum</i>	Unknow	EU827699
<i>Hyalomma lusitanicum</i>	Unknow	EU827701
<i>Hyalomma lusitanicum</i>	Unknow	EU827703
<i>Hyalomma lusitanicum</i>	Unknow	EU827705
<i>Hyalomma lusitanicum</i>	Unknow	EU827742
<i>Hyalomma marginatum</i>	Unknow	EU827693
<i>Hyalomma marginatum</i>	Unknow	EU827692
<i>Hyalomma marginatum</i>	Ethiopia	AJ437100
<i>Hyalomma marginatum</i>	Ethiopia	AJ437098

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Taxon	Locality	GeneBank accessions
<i>Hyalomma marginatum</i>	Ethiopia	AJ437096
<i>Hyalomma marginatum</i>	Ethiopia	AJ437094
<i>Hyalomma marginatum</i>	Ethiopia	AJ437097
<i>Hyalomma marginatum rufipes</i>	Ethiopia	AF132823
<i>Hyalomma rufipes</i>	China	JQ737074
<i>Hyalomma truncatum</i>	Ethiopia	AF132824
<i>Hyalomma truncatum</i>	Ethiopia	AJ437090
<i>Hyalomma truncatum</i>	Ethiopia	AJ437088
<i>Hyalomma truncatum</i>	Ethiopia	AJ437086
<i>Hyalomma truncatum</i>	Ethiopia	AJ437084
<i>Hyalomma truncatum</i>	Ethiopia	AJ437089
<i>Ixodes acutitarsus</i>	Japan	AB105166
<i>Ixodes acutitarsus</i>	China	HM193862
<i>Ixodes acutitarsus</i>	China	HM193896
<i>Ixodes asanumai</i>	Japan	AB231674
<i>Ixodes bakeri</i>	South African	GU437873
<i>Ixodes cornuatus</i>	Australia	FJ571511
<i>Ixodes feicalis</i>	Australia	FJ571509
<i>Ixodes granulatus</i>	Unknow	AB231673
<i>Ixodes granulatus</i>	China	JF758633
<i>Ixodes hirsti</i>	Australia	FJ571510
<i>Ixodes holocyclus</i>	Japan	AB075955
<i>Ixodes lividus</i>	United Kingdom	GU124743
<i>Ixodes monospinosus</i>	Japan	AB231672
<i>Ixodes nipponensis</i>	Japan	AB231671
<i>Ixodes ovatus</i>	Japan	AB231670
<i>Ixodes pavlovskyi</i>	Japan	AB231669
<i>Ixodes persulcatus</i>	China	HM193868
<i>Ixodes persulcatus</i>	China	HM193870
<i>Ixodes persulcatus</i>	China	HM193872
<i>Ixodes persulcatus</i>	China	HM193867
<i>Ixodes persulcatus</i>	China	HM193869
<i>Ixodes persulcatus</i>	China	HM193871
<i>Ixodes persulcatus</i>	China	JF758629
<i>Ixodes persulcatus</i>	Japan	AB073725
<i>Ixodes philipi</i>	Japan	AB231663
<i>Ixodes philipi</i>	Japan	AB231665
<i>Ixodes philipi</i>	Japan	AB231664
<i>Ixodes philipi</i>	Japan	AB231666
<i>Ixodes pilosus</i>	South African	GU437874
<i>Ixodes ricinus</i>	France	GU074940
<i>Ixodes ricinus</i>	France	GU074942
<i>Ixodes ricinus</i>	France	GU074944
<i>Ixodes ricinus</i>	France	GU074946
<i>Ixodes ricinus</i>	France	GU074948
<i>Ixodes ricinus</i>	France	GU074950
<i>Ixodes ricinus</i>	Romania	FN394342
<i>Ixodes rubicundus</i>	South African	GU437875
<i>Ixodes scapularis</i>	USA	GU074891
<i>Ixodes turdus</i>	Japan	AB231668
<i>Ixodes uriae</i>	Japan	AB087746
<i>Ixodes vespertilionis</i>	Japan	AB231667

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Supplementary Table S1. Continued

Taxon	Locality	GeneBank accessions
<i>Ixodida persulcatus</i>	China	JQ737101
<i>Ixodiphagus hookeri</i>	France	JQ315225
<i>Rhipicephalus annulatus</i>	Israel	AF132825
<i>Rhipicephalus appendicula</i>	Zimbabwe	AF132833
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901363
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901361
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901359
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901357
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901362
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901360
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901356
<i>Rhipicephalus appendicula</i>	Rwanda	DQ901358
<i>Rhipicephalus compositus</i>	Zimbabwe	AF132834
<i>Rhipicephalus decoloratus</i>	Kenya	AF132826
<i>Rhipicephalus evertsi</i>	Kenya	AF132835
<i>Rhipicephalus evertsi</i>	Namibia	AF132836
<i>Rhipicephalus geigy</i>	Unknow	AY008680
<i>Rhipicephalus haemaphysaloid haemaphysaloid</i>	China	JQ737085
<i>Rhipicephalus maculatus</i>	Australia	AY008681
<i>Rhipicephalus microplus</i>	Australia	AF132827
<i>Rhipicephalus microplus</i>	China	JQ737082
<i>Rhipicephalus microplus</i>	China	JQ737083
<i>Rhipicephalus microplus</i>	China	JF758636
<i>Rhipicephalus microplus</i>	China	JF758630
<i>Rhipicephalus microplus</i>	China	HM193863
<i>Rhipicephalus pravus</i>	Zimbabwe	AF132837
<i>Rhipicephalus pulchellus</i>	Australia	AY008682
<i>Rhipicephalus pumilio</i>	China	HM193877
<i>Rhipicephalus pumilio</i>	China	HM193878
<i>Rhipicephalus pumilio</i>	Australia	AY008684
<i>Rhipicephalus punctatus</i>	South Africa	AF132838
<i>Rhipicephalus sanguinens</i>	China	JQ737084
<i>Rhipicephalus sanguineus</i>	China	JF758634
<i>Rhipicephalus sanguineus</i>	China	HM193873
<i>Rhipicephalus sanguineus</i>	Egypt	AF132839
<i>Rhipicephalus simus</i>	Turkey	AF132840
<i>Rhipicephalus turanicus</i>	China	JQ737086
<i>Rhipicephalus turanicus</i>	South Africa	AF132841