

1 **Detection of tick-borne bacteria and babesia with zoonotic potential in**  
2 ***Argas (Carios) vespertilionis* (Latreille, 1802) ticks from British bats**  
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8 **Supplimentary Table S1: Ectoparasites specimens collected from bats submitted**  
9 **from across the UK between 2007 and 2013.**

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Sample number (year)	Hosts	County	<i>Argas vespertilionis</i> (ticks)		No. of collected unidentified Non-ticks parasites
			<i>No. of collected specimens</i>	<i>No. of screened specimens</i>	
96 (2007)	<i>Myotis daubentonii</i>	Buckinghamshire	6 larva	4 larva	
103 (2007)	<i>Pipistrellus pipistrellus</i>	Suffolk			3 specimens
134 (2007)	<i>Pipistrellus pipistrellus</i>	Staffordshire			2 specimens
163 (2007)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	14 larva	6 larva	
167 (2007)	<i>Myotis mystacinus</i>	Derbyshire			7 specimens
171 (2007)	<i>Pipistrellus pipistrellus</i>	Surrey	5 larva	3 larva	
172 (2007)	<i>Plecotus auritus</i>	Buckinghamshire	22 larva	5 larva	
306 (2007)	<i>Nyctalus noctula</i>	Derbyshire			9 specimens
384 (2007)	<i>Pipistrellus pipistrellus</i>	Warwickshire			19 specimens
388 (2007)	<i>Pipistrellus pipistrellus</i>	Yorkshire			10 specimens
408 (2007)	<i>Pipistrellus pipistrellus</i>	Hertfordshire			3 specimens
418 (2007)	<i>Myotis daubentonii</i>	Lincolnshire			11 specimens
584 (2007)	<i>Pipistrellus pipistrellus</i>	Yorkshire			8 specimens
685 (2007)	<i>Pipistrellus pipistrellus</i>	Staffordshire	11 larva	6 larva	
862 (2007)	<i>Pipistrellus pipistrellus</i>	Aberdeenshire			13 specimens
873 (2007)	<i>Pipistrellus pipistrellus</i>	Shropshire	15 larva	6 larva	
952 (2007)	<i>Pipistrellus pipistrellus</i>	Midlothian			21 specimens

041 (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	21 larva	6 larva	
224 (2008)	<i>Pipistrellus pipistrellus</i>	Monmouthshire	7 larva	6 larva	
260 (2008)	<i>Pipistrellus pipistrellus</i>	Oxfordshire	29 larva	6 larva	
262 (2008)	<i>Pipistrellus pipistrellus</i>	Hertfordshire	12 larva	6 larva	
300 (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	14 larva	8 larva	
312 (2008)	<i>Pipistrellus pipistrellus</i>	Cambridgeshire			16 specimens
383-A (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	22 larva	6 larva	
383-B (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire			4 specimens
551 (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	15 larva	6 larva	
552 (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	6 larva	4 larva	
575 (2008)	<i>Myotis nattereri</i>	Shropshire			11 specimens
585 (2008)	<i>Pipistrellus pipistrellus</i>	Oxfordshire	12 larva	6 larva	
702 (2008)	<i>Pipistrellus pipistrellus</i>	Berkshire	30 larva	4 larva	
722 (2008)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	17 larva	6 larva	
922 (2008)	<i>Myotis daubentonii</i>	Ayrshire			9 specimens
1127 (2008)	<i>Pipistrellus pipistrellus</i>	Cambridgeshire	12 larva	6 larva	
070 (2009)	<i>Pipistrellus pipistrellus</i>	Lincolnshire			3 specimens
147 (2009)	<i>Myotis daubentonii</i>	Ayrshire			10 specimens
290 (2009)	<i>Eptesicus serotinus</i>	Somerset			2 specimens
292 (2009)	<i>Pipistrellus pipistrellus</i>	Kent			7 specimens
570 (2009)	<i>Myotis nattereri</i>	Dunbarton			3 specimens
800 (2009)	<i>Pipistrellus pipistrellus</i>	Kent	5 larva	4 larva	

932 (2009)	<i>Myotis daubentonii</i>	Dorset			4 specimens
1046 (2009)	<i>Plecotus auritus</i>	Buckinghamshire			1 specimens
1091 (2009)	<i>Pipistrellus pipistrellus</i>	Sussex			1 specimens
013 (2010)	<i>Plecotus auritus</i>	Leicestershire			2 specimens
089 (2010)	N/A	Lincolnshire			1 specimens
326 (2010)	<i>Pipistrellus pipistrellus</i>	Lancashire			13 specimens
417 (2010)	<i>Pipistrellus pipistrellus</i>	Hertfordshire	1 larva	1 larva	
428 (2010)	<i>Myotis mystacinus</i>	Glamorgan			3 specimens
530 (2010)	<i>Pipistrellus pipistrellus</i>	Buckinghamshire	7 larva	5 larva	
979 (2010)	<i>Myotis daubentonii</i>	Surrey			5 specimens
978 (2010)	<i>Myotis daubentonii</i>	Surrey			2 specimens
2019 (2010)	<i>Myotis daubentonii</i>	Warwickshire			3 specimens
1071 (2010)	<i>Pipistrellus pipistrellus</i>	Leicestershire	1 larva	1 larva	
628 (2011)	<i>Myotis mystacinus</i>	Shropshire			2 specimens
866 (2011)	<i>Pipistrellus pipistrellus</i>	Lincolnshire			2 specimens
886 (2011)	<i>Plecotus auritus</i>	Surrey			8 specimens
1059 (2011)	<i>Nyctalus noctula</i>	Shropshire			1 specimens
1025 (2011)	<i>Pipistrellus pipistrellus</i>	Northumberland	1 larva	1 larva	
04 (2012)	<i>Rhinolophus hipposideros</i>	Devon			8 specimens
115 (2012)	<i>Rhinolophus hipposideros</i>	Devon			13 specimens
566 (2012)	<i>Pipistrellus pipistrellus</i>	Yorkshire	8 larva	6 larva	
45 (2013)	<i>Pipistrellus pipistrellus</i>	Hertfordshire	2 larva	1 larva	

378 (2013)	<i>Plecotus auritus</i>	Somerset	1 larva	1 larva	
Total number			296 larva	120 larva	142 specimens

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13 **Supplementary Table S2: Primers used to detect the pathogens in bat ticks**

14 **collected in UK.**

Target	Gene Target	Primer pairs	Amplicon(bp)
Arthropod species	CO1	HCO1490: 5'-GTTCAACAAATCATAAAGATATTGG-3' LCO2198: 5'-TAAACTTCAGGGTGACCAAAAAATCA-3'	675
Arthropod species	16SrRNA	16S-1: 5'-CCACAGCAATTTAAAAAATCATTGAGCAG-3' 16S+1: 5'-CCGGTCTGAACTCAGATCAAGT-3'	454
Piroplasm spp.	18S rRNA	PIROA: 5'-AATACCCAATCCTGACACAGGG-3' PIROB: 5'-TTAAATACGAATGCCCCAAC-3'	426
<i>Rickettsia</i> spp.	17 kDa	17K-5: 5'-GCTTTACAAAATTCTAAAAACCATATA-3' 17K-3: 5'-TGCTATCAATTCACAACCTTGCC-3' 17kD1: 5'-GCTCTTGCAACTTCTAT GTT-3' 17kD2: 5'-CATTGTTTCGTCAGGTTGGCG-3' First round: 17K-5/17K-3 Second round: 17kD1/17kD2	434
<i>Ehrlichia</i> / <i>Anaplasma</i> spp.	16S rRNA	EHR 16SD: 5'-GGTACCYACAGAAGAAGTCC-3' EBR3: 5'-TTGTAGTCGCCATTGTAGCAC-3' EBR2: 5'-TGCTGACTTGACATCATCCC-3' First round: EHR 16SD/ EBR3 Second round: EHR 16SD/ EBR2	925
<i>Borrelia</i> spp.	Flagellin	F1a: 5'-GCAGTTCAATCAGGTAACGG-3' F2a: 5'-AGGTTTTCAATAGCATACTC-3'	565
Issyk-kul virus	S SEGMENT	BUNV-F2: 5'-TGTGGGCAAGAGGmcttagatcctc-3' BUNV-R1: 5'-AAGCATGCCAGCATAYTGAAGATG-3' BUNV-R2: 5'-AACACTAGTTAAMAGCTACAGATG-3' First round: BUNV-F2/BUNV-R1 Second round: BUNV-F2/BUNV-R2	320
<i>Coxiella burnetii</i>	Cb IS 1111 element	CF: 5'-tatgtatccaccgtagccagtc-3' CR: 5'-cccaacaacacctcctattc-3'	687
Flavivirus	RNA-dependent RNA polymerase	PF1S: 5'-TGYRTBTAYAACATGATGGG-3' PF2R-bis: 5'-GTGTCCCAICCNCGNCTRTC-3' PF3S: 5'-ATHTGGT WYATGTGGYTDGG-3' First round: PF1S / PF2R-bis Second round: PF3S / PF2R-bis	197

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17 **Supplementary Table S3: GenBank Accession numbers for sequences obtained**  
 18 **in this study.**

<b>Species</b>	<b>Sample codes</b>	<b>Target gene</b>	<b>Accession numbers</b>
<i>Argas vespertilionis</i>	702-H	COI	MF510173
<i>Argas vespertilionis</i>	172-F	COI	MF510174
<i>Argas vespertilionis</i>	702-H	16S rRNA	MF510175
<i>Argas vespertilionis</i>	172-F	16S rRNA	MF510176
<i>Argas vespertilionis</i>	383-1	16S rRNA	MF510177
<i>Babesia venatorum</i>	378	18S rRNA	MF510178
<i>Babesia vesperuginis</i>	041-5	18S rRNA	MF510179
<i>Rickettsia spp.</i>	041-4	17 kDa	MF510180
<i>Rickettsia spp.</i>	260-2	17 kDa	MF510181
<i>Rickettsia spp.</i>	262-4	17 kDa	MF510182
<i>Rickettsia spp.</i>	300-5	17 kDa	MF510183
<i>Rickettsia spp.</i>	383-4	17 kDa	MF510184
<i>Rickettsia spp.</i>	530-5	17 kDa	MF510185
<i>Rickettsia spp.</i>	551-5	17 kDa	MF510186
<i>Rickettsia spp.</i>	552-2	17 kDa	MF510187
<i>Rickettsia spp.</i>	722-1	17 kDa	MF510188
<i>Rickettsia spp.</i>	172-3	17 kDa	MF510189
<i>Rickettsia spp.</i>	300-F	17 kDa	MF510190
<i>Rickettsia spp.</i>	702-F	17 kDa	MF510191
<i>Ehrlichia spp.</i>	702-F	16S rRNA	MF510192
<i>Ehrlichia spp.</i>	566-3	16S rRNA	MF510193
<i>Ehrlichia spp.</i>	1025	16S rRNA	MF510194

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