

SUPPLEMENTARY MATERIAL

Figure S1

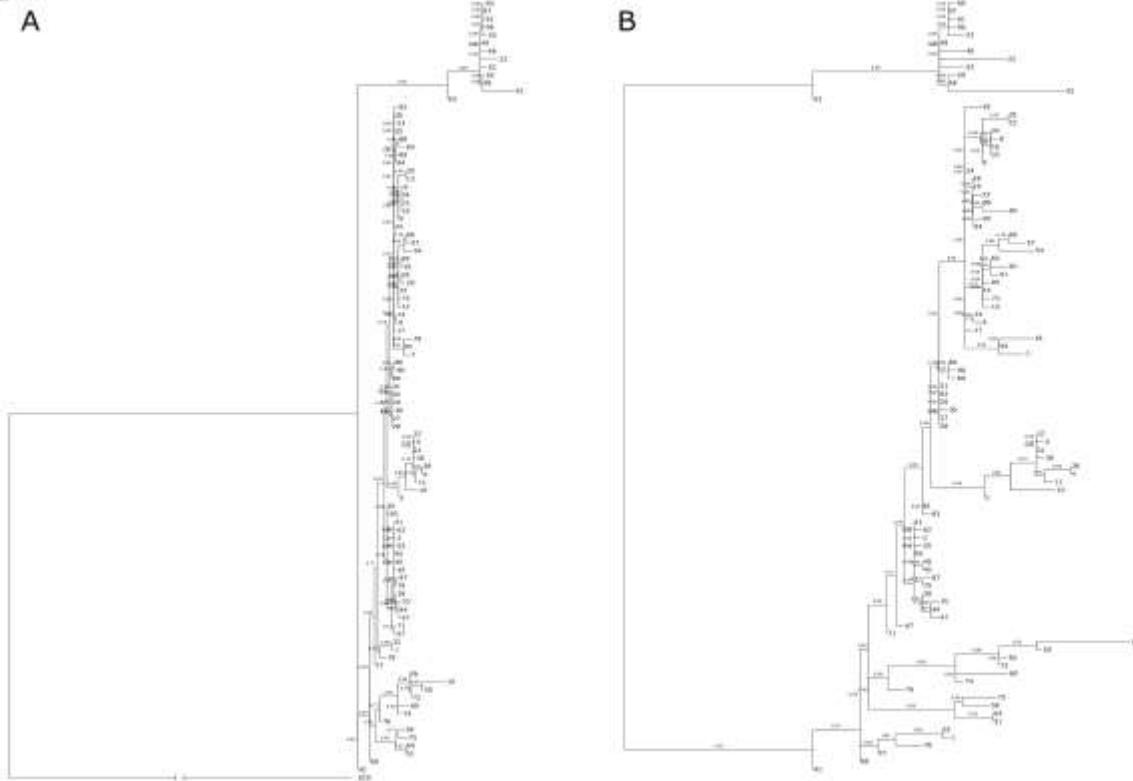


Figure S1 Maximum likelihood phylogeny constructed with PhyML under a GTR+G+I model of evolution with (a) and without (b) *E. chaffeensis* as an outgroup. Branch support was calculated using the aLRT method, and low support values are possible indicative of short branches or mixed phylogenetic signals in the data, potentially introduced by recombination or other forms of homoplasy. The outgroup branch is not to scale to allow legibility of the figure.

Figure S2

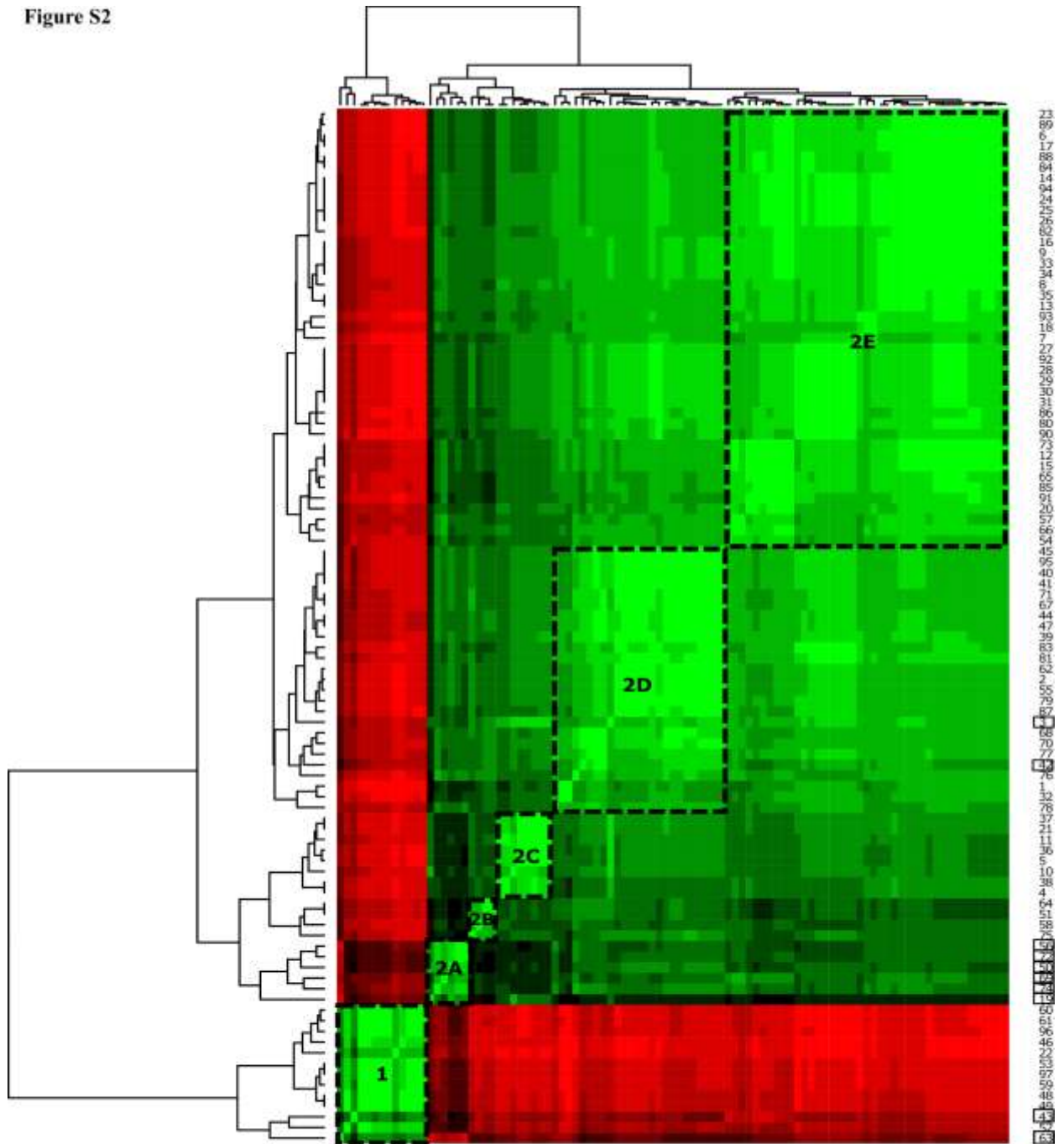


Figure S2 Heat map of similarity and differences of 5 concatenated housekeeping genes among 97 unique *E. ruminantium* sequences. Hypothetical groups and subgroups 1, 2A, G2B, 2C, 2D and 2D are marked by dashes. Degree of relatedness is indicated by colours from white (different) to red (similar). The name of each isolate was labelled on the right side of the graphs and corresponds to the same strains on the bottom of the graph. Dendrograms representing the clusters were placed on the left side and on top of the graphs. Strains 3, 19, 42, 43, 50, 56, 63, 69, 72 and 74 are marked with a square and represent recombinants.

Figure S3

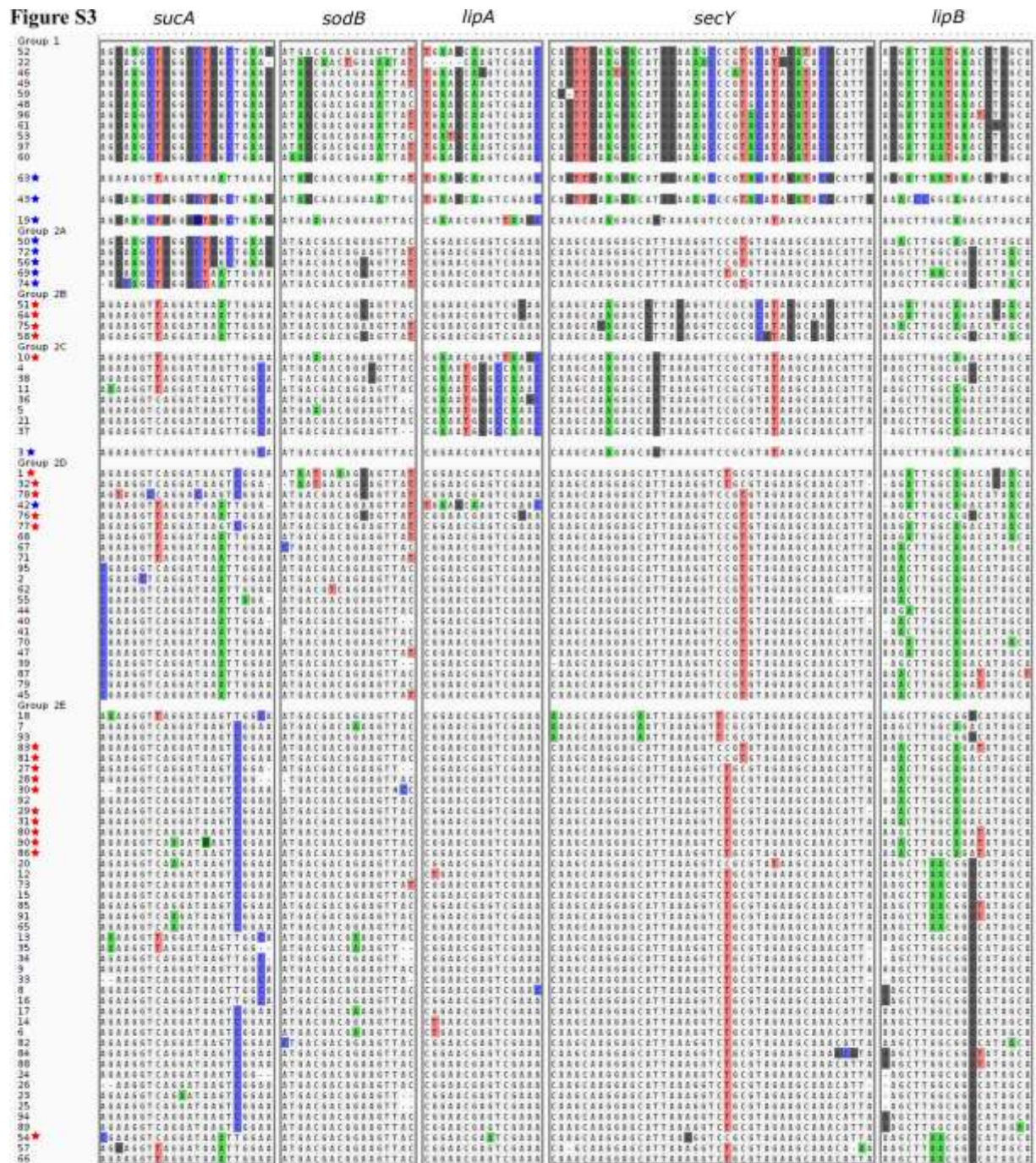


Figure S3 Multiple alignment of the different genotypes containing only variable positions. The subgroups clusters are separated by horizontal gaps, and the five different genes are boxed and separated by vertical gaps. Coloured residues represent non-consensus characters over the whole alignment. Blue stars indicate recombinant genotypes and red stars represent sequence types that are inferred to have less than 80% ancestry from a single population in STRUCTURE.

Table S1 Number of *E. ruminantium* isolates/strains per geographic region and country

Geographic region	Country	Number of isolates	Total
North and Central Africa	Chad	1	2
	Sudan	1	
West Africa	Burkina Faso	44	55
	Cameroon	1	
	Gambia	1	
	Ghana	2	
	Nigeria	2	
	São Tome and Principe	1	
	Senegal	4	
East Africa	Kenya	1	3
	Tanzania	1	
	Uganda	1	
Southern Africa	Mozambique	58	64
	South Africa	4	
	Zambia	1	
	Zimbabwe	1	
Indian Ocean	Comoros	9	29
	Madagascar	13	
	Mayotte	5	
	Reunion	2	
Caribbean	Antigua	1	41
	Guadeloupe	40	
			194

Table S2 Description of *E. ruminantium* isolates/strains based on the sequence type number, genetic group, geographic origin, country of isolation, isolate name, DNA origin, date of isolation and reference.

Sequence type number	Genetic group	Geographic origin	Country	Isolate/Strain name	DNA origin	Date of isolation	Isolate Reference
1	G2D	East Africa	Kenya	Kiswani	B	1985	Raliniaina et al. (2010)
2	G2D	Central Africa	Chad	TCH6	T	2008	Our study
3	No group	Southern Africa	South Africa	SAZeerust	CC	1979	Nakao et al. (2011)
4	G2C	Southern Africa	Mozambique	GAH1MH2	T	2012	Our study
4*	G2C			GAH4MH1	T	2012	Our study
5	G2C			CIT9MH1	T	2012	Our study
5*	G2C			GAH7MH1	T	2012	Our study
5*	G2C			MWAB11FH1	T	2012	Our study
5*	G2C			CIT28MH1	T	2012	Our study
5*	G2C			Umpala	B	1995	Raliniaina et al. (2010)
5*	G2C			MWAB11MH1	T	2012	Our study
5*	G2C			MAT14MH2	T	2012	Our study
5*	G2C			MAS13MH1	T	2012	Our study
6	G2E			CHIPO29MH1	T	2012	Our study
6*	G2E			ZIM15MH1	T	2012	Our study
7	G2E			CHIPO17MH1	T	2012	Our study
8	G2E			MAS27MH2	T	2012	Our study
8*	G2E			ZIM31MH1	T	2013	Our study
9	G2E			CHIPO12MH1	T	2012	Our study
10	G2C			MAH12MH1	T	2012	Our study
10*	G2C			VUL29MH1	T	2012	Our study
10*	G2C			MWAB3MH1	T	2012	Our study
10*	G2C			ZIM28MH1	T	2012	Our study
10*	G2C			Crystal Springs	CC	1990	Nakao et al. (2011)
11	G2C			MAT13MH2	T	2012	Our study
12	G2E			ZIM16MH2	T	2012	Our study
13	G2E			VUL17MH1	T	2012	Our study
14	G2E			CHIPO22MH1	T	2012	Our study
15	G2E			GAH5MH2	T	2012	Our study
16	G2E			CHIPO2MH1	T	2012	Our study
16*	G2E			CHIPA3MH1	T	2012	Our study
17	G2E			ZIM2MH1	T	2012	Our study
17*	G2E			ZIM4MH1	T	2012	Our study
18	G2E			GAH9MH1	T	2012	Our study
18*	G2E	Southern Africa	South Africa	SABall3	CC	1952	Nakao et al. (2011)
19	No group	Southern Africa	South Africa	Mara	CC	1998	Raliniaina et al. (2010)
20	G2E	Southern Africa	Mozambique	MAH6MH1	T	2012	Our study
21	G2C			MAS14MH1	T	2012	Our study
22	G1			303-GOV1-MV8	T	2012	Our study
23	G2E			335-MAMMV13	T	2013	Our study
24	G2E			445-MAP32MH1	T	2013	Our study
25	G2E			550-NHAMV12	T	2014	Our study
26	G2E			559-NHAMV21	T	2014	Our study
27	G2E			330-MAMMV8	T	2013	Our study
28	G2E			347-MAMMV22	T	2013	Our study

29	G2E			319-MAMMV2	T	2013	Our study
30	G2E			336-MAMFV6	T	2013	Our study
31	G2E			342-MAMMV17	T	2013	Our study
32	G2D			709-DAR5MV1	T	2014	Our study
33	G2E			765-ESP2-4MV1	T	2014	Our study
34	G2E			777-DAC8MH1	T	2014	Our study
35	G2E			823-MAG7MH1	T	2014	Our study
36	G2C			431-MAP21MH1	T	2013	Our study
37	G2C			832-MAG12MH1	T	2014	Our study
38	G2C			801-MUE3FH1	T	2014	Our study
39	G2D			488-FINMV13	T	2014	Our study
40	G2D			595-MANINMV19	T	2014	Our study
41	G2D			385-MUX3MV1	T	2013	Our study
42	G2D			394-MUX9MV1	T	2013	Our study
43	No group	West Africa	Burkina Faso	Sara401	T	2002	Raliniaina et al. (2010)
44	G2D			Lamba194	B	2003	Raliniaina et al. (2010)
44*	G2D			Banankeledaga	CC	1998	Raliniaina et al. (2010)
44*	G2D			BF629	T	2009	Adakal et al. (2010)
44*	G2D			BF630	T	2009	Adakal et al. (2010)
44*	G2D			BF635	T	2009	Adakal et al. (2010)
45	G2D			Banan455	B	2003	Raliniaina et al. (2010)
46	G1	West Africa	Senegal	M310	T	2002	Our study
47	G2D	West Africa	Burkina Faso	Banan033F1	T	2002	Raliniaina et al. (2010)
48	G1	West Africa	Ghana	Sankat430	CC	1996	Nakao et al. (2011)
48*	G1	West Africa	Burkina Faso	BF1210	T	2007	Adakal et al. (2010)
48*	G1			BF1795	T	2007	Adakal et al. (2010)
48*	G1			BF1796	T	2007	Adakal et al. (2010)
48*	G1			BF1798	T	2007	Adakal et al. (2010)
48*	G1			BF19	T	2007	Adakal et al. (2010)
49	G1	West Africa	Gambia	Kerr Seringe	CC	2001	Nakao et al. (2011)
49*	G1	West Africa	Senegal	M10T	T	2002	Raliniaina et al. (2010)
50	G2A			M16T	T	2002	Raliniaina et al. (2010)
51	G2B	West Africa	Burkina Faso	BF623	T	2007	Adakal et al. (2010)
52	G1	West Africa	Nigeria	SK43M1	T	2010	Our study
53	G1	West Africa	Burkina Faso	BF331	T	2007	Adakal et al. (2010)
54	G2E	West Africa	São Tome and Principe	São Tome	CC	1981	Nakao et al. (2011)
55	G2D	West Africa	Burkina Faso	BF1042	T	2007	Adakal et al. (2010)
56	G2A			BF1062	T	2007	Adakal et al. (2010)
57	G2E			BF1232	T	2007	Adakal et al. (2010)
58	G2B			BF1267	T	2007	Adakal et al. (2010)
59	G1			BF1799	T	2007	Adakal et al. (2010)
60	G1			BF1905	T	2007	Adakal et al. (2010)
61	G1			BF1948	T	2007	Adakal et al. (2010)
62	G2D			BF1951	T	2007	Adakal et al. (2010)
63	No group			BF2185	T	2007	Adakal et al. (2010)
64	G2B			BF631	T	2007	Adakal et al. (2010)
65	G2E			BF668	T	2007	Adakal et al. (2010)
66	G2E			BF708	T	2007	Adakal et al. (2010)
67	G2D	Caribbean	Antigua	GeorgesM3	T	2005	Raliniaina et al. (2010)
68	G2D	Caribbean	Guadeloupe	34-0205CM01	B	2011	Our study
68*	G2D			Gardel	CC	1962	Raliniaina et al. (2010)

68*	G2D			27-2103JMR03	B	2011	Our study
69	G2A			11-1711BP02	B	2010	Our study
70	G2D			25-2103JMR01	B	2011	Our study
70*	G2D			49-250112VL01	B	2012	Our study
70*	G2D			38-0507AS01	B	2011	Our study
70*	G2D			46-061211JCA01	B	2011	Our study
70*	G2D			SUI22M1B1	B	2008	Our study
70*	G2D			n6631	B	2009	Our study
71	G2D			35-0805JMR01	B	2011	Our study
71*	G2D			n5697	B	2005	Our study
71*	G2D			n5097	B	2002	Our study
72	G2A			13-2112JCA01	B	2011	Our study
72*	G2A			SUI24JM	B	2008	Our study
72*	G2A			14-2112JCA02	B	2011	Our study
72*	G2A			6-2709EH03	B	2010	Our study
72*	G2A			48-291111FB01	B	2011	Our study
72*	G2A			n971128610M2	B	2005	Our study
72*	G2A			15-2112JCA03	B	2011	Our study
73	G2E			33-2704AS01	B	2011	Our study
73*	G2E			42-1509JE01	B	2011	Our study
73*	G2E			39-2008FB01	B	2011	Our study
73*	G2E			32-1104FB01	B	2011	Our study
73*	G2E			40-2408FB02	B	2011	Our study
74	G2A			19-0202BP01	B	2011	Our study
75	G2B			44-2110JE01	B	2011	Our study
75*	G2B			26-2103JMR02	B	2011	Our study
75*	G2B			43-2610VL01	B	2011	Our study
76	G2D			36-1405BP01	B	2011	Our study
76*	G2D			30-1304MC01	B	2011	Our study
77	G2D			45-161111MM01	B	2011	Our study
77*	G2D			n6001	B	2000	Our study
77*	G2D			29-2903JMR01	B	2011	Our study
78	G2D			n6653/1-2313	B	2002	Our study
79	G2D	Indian Ocean	Comoros	AY0024	T	2010	Our study
80	G2E	Indian Ocean	Reunion	APLSM1	T	2010	Our study
81	G2D	Indian Ocean	Madagascar	Madaman1	T	2008	Our study
82	G2E	Indian Ocean	Comoros	n1690	T	2007	Our study
83	G2D	Indian Ocean	Madagascar	n13BM1	T	2010	Our study
84	G2E	Indian Ocean	Mayotte	n164B2458	T	2010	Our study
85	G2E	Indian Ocean	Madagascar	n8EM3	T	2010	Our study
86	G2E	Indian Ocean	Comoros	AY0015	T	2010	Our study
87	G2D			AY0041	T	2010	Our study
88	G2E	Indian Ocean	Mayotte	TiquesM3	T	2010	Our study
88*	G2E	Indian Ocean	Madagascar	n8DF3	T	2010	Our study
88*	G2E	Indian Ocean	Mayotte	n206B	T	2010	Our study
88*	G2E			YTBARA8M1	T	2009	Our study
89	G2E	Indian Ocean	Madagascar	n2CM4	T	2009	Our study
90	G2E			n14AF1	T	2010	Our study
91	G2E	Indian Ocean	Comoros	AY0091	T	2010	Our study
91*	G2E			AY0087	T	2010	Our study
92	G2E	Indian Ocean	Madagascar	KJSF	T	2001	Our study
92*	G2E			Madaman3	T	2008	Our study

92*	G2E			n14CM1	T	2010	Our study
92*	G2E			Madaman13	T	2008	Our study
92*	G2E	Indian Ocean	Comoros	n3700	T	2007	Our study
92*	G2E			n3683	T	2007	Our study
92*	G2E	Indian Ocean	Reunion	BDLSM3	T	2010	Our study
92*	G2E	Indian Ocean	Madagascar	Madaman4	T	2008	Our study
92*	G2E	Indian Ocean	Comoros	n3655	T	2007	Our study
92*	G2E	Indian Ocean	Madagascar	RZF	T	2001	Raliniaina et al. (2010)
93	G2E	Southern Africa	Mozambique	CHIPO26MH1	T	2012	Our study
93*	G2E			CHIPA2MH1	T	2012	Our study
93*	G2E	West Africa	Cameroon	Cameroun	CC	1994	Raliniaina et al. (2010)
93*	G2E	Southern Africa	Mozambique	MAS1MH1	T	2012	Our study
93*	G2E	Southern Africa	South Africa	Welgevonden	CC	1985	Raliniaina et al. (2010)
93*	G2E	Southern Africa	Mozambique	CHIPO24MH2	T	2012	Our study
93*	G2E			ZIM1MH1	T	2012	Our study
94	G2E	Southern Africa	Zambia	Lutale	CC	1988	Raliniaina et al. (2010)
94*	G2E	North Africa	Sudan	Umbanein	CC	1981	Raliniaina et al. (2010)
94*	G2E	Indian Ocean	Madagascar	Madamora3	T	2008	Our study
94*	G2E	East Africa	Uganda	KBL4M	T	1999	Our study
94*	G2E	Indian Ocean	Mayotte	YTAVI001	T	2009	Our study
95	G2D	West Africa	Nigeria	Nigeriaife	B	1983	Nakao et al. (2011)
95*	G2D	Caribbean	Guadeloupe	4-2007AS02	T	2010	Our study
95*	G2D	West Africa	Burkina Faso	BF2	T	2007	Adakal et al. (2010)
95*	G2D	Caribbean	Guadeloupe	37-0806FB01	T	2011	Our study
95*	G2D			21-2702VL01	T	2011	Our study
95*	G2D			41-0309FB01	T	2011	Our study
96	G1	East Africa	Tanzania	AB014TAN	T	2010	Our study
96*	G1	West Africa	Ghana	Pokoase	CC	1996	Raliniaina et al. (2010)
97	G1	West Africa	Burkina Faso	lamba479	T	2001	Raliniaina et al. (2010)
97*	G1	Caribbean	Guadeloupe	17-2701GM01	T	2011	Our study
97*	G1	West Africa	Burkina Faso	bankouma421	T	2001	Raliniaina et al. (2010)
97*	G1	West Africa	Senegal	Senegal	CC	1994	Raliniaina et al. (2010)
97*	G1	West Africa	Burkina Faso	Sara292	T	2001	Raliniaina et al. (2010)
97*	G1			Lamba107	T	2002	Raliniaina et al. (2010)
97*	G1			Bekuy255	CC	2001	Raliniaina et al. (2010)
97*	G1			BF395	T	2007	Adakal et al. (2010)
97*	G1			BF1114	T	2007	Adakal et al. (2010)
97*	G1			BF1946	T	2007	Adakal et al. (2010)
97*	G1			BF2165	T	2007	Adakal et al. (2010)
97*	G1			BF461	T	2007	Adakal et al. (2010)
97*	G1			BF463	T	2007	Adakal et al. (2010)
97*	G1			BF466	T	2007	Adakal et al. (2010)
97*	G1			BF469	T	2007	Adakal et al. (2010)
97*	G1			BF474	T	2008	Adakal et al. (2010)
97*	G1			BF476	T	2007	Adakal et al. (2010)
97*	G1			BF810	T	2007	Adakal et al. (2010)

*Identical DNA sequence (clone). Reference strains are highlighted in bold. CC: Cell culture; T: Tick, B: Blood.

Table S3 Number of *E. ruminantium* isolates per genetic group and country

Group	Country	Number of samples	Total
1	Burkina Faso	25	
	Gambia	1	
	Ghana	2	
	Guadeloupe	1	
	Mozambique	1	
	Nigeria	1	
	Senegal	3	
	Tanzania	1	35
2A	Burkina Faso	1	
	Guadeloupe	9	
	Senegal	1	11
2B	Burkina Faso	3	
	Guadeloupe	3	6
2C	Mozambique	19	
	Zimbabwe	1	20
2D	Antigua	1	
	Burkina Faso	10	
	Chad	1	
	Comoros	2	
	Guadeloupe	22	
	Kenya	1	
	Madagascar	2	
	Mozambique	5	
	Nigeria	1	
	South Africa	1	46
2E	Burkina Faso	3	
	Cameroon	1	
	Comoros	7	
	Guadeloupe	5	
	Madagascar	11	
	Mayotte	5	
	Mozambique	33	
	Reunion	2	
	São Tome e Principe	1	
	South Africa	2	
	Sudan	1	
	Uganda	1	
	Zambia	1	73
No group	Burkina Faso	2	
	South Africa	1	3
Total			194

Table S4 GeneBank accession number corresponding to each gene sequence (order *sucA-sodB-lipA-secY-lipB*) for 67 *E. ruminantium* sequence type

Sequence type number	Accession number				
	<i>sucA</i>	<i>sodB</i>	<i>lipA</i>	<i>secY</i>	<i>lipB</i>
1	KX821405	KX821339	KX889850	KX821470	KX821537
2	KX821406	KX821340	KX889851	KX821471	KX821538
3	KX821407	KX821341	KX889852	KX821472	KX821539
4	KX821408	KX821342	KX889853	KX821473	KX821540
5	KX821409	KX821343	KX889854	KX821474	KX821541
6	KX821410	KX821344	KX889855	KX821475	KX821542
7	KX821411	KX821345	KX889856	KX821476	KX821543
8	KX821412	KX821346	KX889857	KX821477	KX821544
9	KX821413	KX821347	KX889858	KX821478	KX821545
10	KX821414	KX821348	KX889859	KX821479	KX821546
11	KX821415	KX821349	KX889860	KX821480	KX821547
12	KX821416	KX821350	KX889861	KX821481	KX821548
13	KX821417	KX821351	KX889862	KX821482	KX821549
14	KX821418	KX821352	KX889863	KX821483	KX821550
15	KX821419	KX821353	KX889864	KX821484	KX821551
16	KX821420	KX821354	KX889865	KX821485	KX821552
17	KX821421	KX821355	KX889866	KX821486	KX821553
18	KX821422	KX821356	KX889867	KX821487	KX821554
19	KX821423	KX821357	KX889868	KX821488	KX821555
20	KX821424	KX821358	KX889869	KX821489	KX821556
21	KX821425	KX821359	KX889870	KX821490	KX821557
22	KX821426	KX821360	KX889871	KX821491	KX821558
23	KX821427	KX821361	KX889872	KX821492	KX821559
24	KX821428	KX821362	KX889873	KX821493	KX821560
25	KX821429	KX821363	KX889874	KX821494	KX821561
26	KX821430	KX821364	KX889875	KX821495	KX821562
27	KX821431	KX821365	KX889876	KX821496	KX821563
28	KX821432	KX821366	KX889877	KX821497	KX821564
29	KX821433	KX821367	KX889878	KX821498	KX821565
30	KX821434	KX821368	KX889879	KX821499	KX821566
31	KX821435	KX821369	KX889880	KX821500	KX821567
32	KX821436	KX821370	KX889881	KX821501	KX821568
33	KX821437	KX821371	KX889882	KX821502	KX821569
34	KX821438	KX821372	KX889883	KX821503	KX821570
35	KX821439	KX821373	KX889884	KX821504	KX821571
36	KX821440	KX821374	KX889885	KX821505	KX821572

37	KX821441	KX821375	KX889886	KX821506	KX821573
38	KX821442	KX821376	KX889887	KX821507	KX821574
39	KX821443	KX821377	KX889888	KX821508	KX821575
40	KX821444	KX821378	KX889889	KX821509	KX821576
41	KX821445	KX821379	KX889890	KX821510	KX821577
42	KX821446	KX821380	KX889891	KX821511	KX821578
43	KX821447	KX821381	KX889892	KX821512	KX821579
44	KX821448	KX821382	KX889893	KX821513	KX821580
45	KX821449	KX821383	KX889894	KX821514	KX821581
46	KX821450	KX821384	KX889895	KX821515	KX821582
47	KX821451	KX821385	KX889896	KX821516	KX821583
48	KX821452	KX821386	KX889897	KX821517	KX821584
49	KX821453	KX821387	KX889898	KX821518	KX821585
50	KX821454	KX821388	KX889899	KX821519	KX821586
51	KX821455	KX821389	KX889900	KX821520	KX821587
52	KX821456	KX821390	KX889901	KX821521	KX821588
53	KX821457	KX821391	KX889902	KX821522	KX821589
54	KX821458	KX821392	KX889903	KX821523	KX821590
55	KX821459	KX821393	KX889904	KX821524	KX821591
56	KX821460	KX821394	KX889905	KX821525	KX821592
57	KX821461	KX821395	KX889906	KX821526	KX821593
58	KX821462	KX821396	KX889907	KX821527	KX821594
59	KX821463	KX821397	KX889908	KX821528	KX821595
60	KX821464	KX821398	KX889909	KX821529	KX821596
61	KX821465	KX821399	KX889910	KX821530	KX821597
62	KX821466	KX821400	KX889911	KX821531	KX821598
63	KX821467	KX821401	KX889912	KX821532	KX821599
64	KX821468	KX821402	KX889913	KX821533	KX821600
65	KX821469	KX821403	KX889914	KX821534	KX821601
66	x ^a	KX821404	KX889915	KX821535	KX821602
67	x ^a	x ^a	KX889916	KX821536	KX821603

^a: Not possible to have accession number for this DNA sequences