

Digital supplementary material to

HAAPANIEMI, K. & PAMILO, P. 2015: Social parasitism and transfer of symbiotic bacteria in ants (Hymenoptera: Formicidae). – Myrmecological News 21: 49-57.

**Appendix S1:** Sampling locations and the number of nests sampled from each location.

Location	Coordinates N	Coordinates E	<i>F. sanguinea</i>	<i>Serviformica</i> in <i>F. sanguinea</i> nests	<i>Serviformica</i> , independent nests
Hanko	59°53'	23°12'	12	0	1
Juupajoki	61°51'	24°11'	4	4	0
Alajärvi	62°58'	23°57'	0	0	1
Pellinen	63°00'	23°22'	3	3	0
Kauhajärvi	63°08'	23°04'	7	4	0
Evijärvi	63°20'	23°18'	1	0	1
Kaustinen	63°32'	23°40'	3	1	1
Toholampi	63°48'	24°20'	2	1	0
Oulainen	64°17'	24°51'	1	1	2
Tyrnävä	64°42'	25°22'	31	27	14
Muhos	64°47'	26°12'	17	10	0
Kiiminki	65°10'	26°00'	14	6	2
Pudasjärvi	65°31'	27°32'	4	1	0
<b>Total</b>			<b>99</b>	<b>58</b>	<b>22</b>

**Appendix S2:** The number of nests in which the different bacterial strains were detected.

		wFex1	wFex2	wFex4	wRi	Ent_1	Ent_2	Ent_3	Ent_4	Spi_1	Spi_2	Spi_3	Spi_4
Hanko	<i>F. sanguinea</i>	5	0	0	0	1	0	1	1	0	4	0	3
	<i>Serviformica</i>	0	1	0	0	0	0	0	0	0	0	0	0
Juupajoki	<i>F. sanguinea</i>	4	0	0	0	0	0	0	0	0	0	0	4
	<i>Serviformica</i>	0	1	3	0	0	0	0	0	0	0	0	0
Alajärvi	<i>F. sanguinea</i>	–	–	–	–	–	–	–	–	–	–	–	–
	<i>Serviformica</i>	1	0	1	0	0	0	0	0	0	0	0	0
Pellinen	<i>F. sanguinea</i>	3	0	0	0	0	0	0	0	0	0	0	3
	<i>Serviformica</i>	1	0	2	0	0	0	0	0	0	0	0	1
Kauhajärvi	<i>F. sanguinea</i>	7	0	0	0	0	0	0	0	0	0	0	7
	<i>Serviformica</i>	0	3	2	0	0	0	0	0	0	0	0	0
Evijärvi	<i>F. sanguinea</i>	1	0	0	0	0	0	0	0	0	0	0	1
	<i>Serviformica</i>	0	0	1	0	0	0	0	0	0	0	0	0
Kaustinen	<i>F. sanguinea</i>	3	0	0	0	0	0	0	0	0	0	0	3
	<i>Serviformica</i>	0	2	1	0	0	0	0	0	0	0	0	1
Toholampi	<i>F. sanguinea</i>	1	0	0	0	0	0	0	0	0	0	0	2
	<i>Serviformica</i>	0	1	1	0	0	0	0	0	0	0	0	0
Oulainen	<i>F. sanguinea</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Serviformica</i>	0	0	3	0	0	0	0	0	0	0	0	0
Tyrnävä	<i>F. sanguinea</i>	1	0	0	0	0	1	8	11	4	0	0	22
	<i>Serviformica</i>	1	7	36	0	0	0	1	1	0	0	0	1

Muhos	<i>F. sanguinea</i> <i>Serviformica</i>	11 0	0 4	0 7	0 0	1 0	1 0	6 0	8 1	0 0	5 1	0 0	16 0
Kiiminki	<i>F. sanguinea</i> <i>Serviformica</i>	14 0	1 1	0 4	1 4	0 1	1 0	0 1	5 2	2 0	0 0	0 1	13 3
Pudasjärvi	<i>F. sanguinea</i> <i>Serviformica</i>	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Total	<i>F. sanguinea</i> <i>Serviformica</i>	50 3	1 20	0 61	1 4	2 1	3 0	14 2	25 4	6 0	9 1	0 1	75 7

**Appendix S3:** Number of nucleotide differences between the strains of *Entomoplasma* (Ent\_1 - Ent\_4) and *Spiroplasma* (Spi\_1 - Spi\_4). The total length of the aligned sequence was 495 nucleotides.

	Ent_1	Ent_2	Ent_3	Ent_4	Spi_1	Spi_2	Spi_3	Spi_4
Ent_1	–							
Ent_2	34	–						
Ent_3	28	19	–					
Ent_4	26	24	7	–				
Spi_1	53	66	47	47	–			
Spi_2	65	53	72	70	27	–		
Spi_3	59	47	66	64	19	8	–	
Spi_4	60	50	64	64	21	15	7	–

**Appendix S4:** Lists of sequences used for the phylogenies of *Entomoplasma* and *Spiroplasma* (Fig. 2) with the accession number and source organism.

(a) *Entomoplasma*

Ent\_1 - Ent\_4 refer to the four types detected in this study.

Ent\_1: KJ778174 from *Formica sanguinea* (Hymenoptera)  
Ent\_2: KJ778175 from *Formica sanguinea* (Hymenoptera)  
Ent\_3: KJ778176 from *Formica sanguinea* (Hymenoptera)  
Ent\_4: KJ778179 from *Formica (Serviformica) fusca* (Hymenoptera)  
ant1: KF015828 from *Cephalotes* sp. (Hymenoptera)  
ant2: KF015826 from *Paraponera clavata* (Hymenoptera)  
ant3: KF015825 from *Paraponera clavata* (Hymenoptera)  
ant4: GQ275128 from *Ocymyrmex picardi* (Hymenoptera)  
ant5: GQ275106 from *Tetramorium hispidum* (Hymenoptera)  
ant6: HM996844 from *Eciton burchellii* (Hymenoptera)  
ant7: HM996870 from *Cheliomyrmex* sp. (Hymenoptera)  
ant8: HM996871 from *Cheliomyrmex* sp. (Hymenoptera)  
ant9: HM996876 from *Nomamyrmex hartigii* (Hymenoptera)  
wasp: NR\_042194 from *Monobia quadridens* (Hymenoptera)  
beetle1: HM920589 from *Gonasida inferna* (Coleoptera)  
beetle2: NR\_025676 from *Photinus marginellus* (Coleoptera)  
beetle3: NR\_025677 *Entomoplasma somnilux* from firefly (Coleoptera)  
beetle4: NR\_028860 from a firefly (Coleoptera)  
beetle5: NR\_028691 from a green tiger beetle (Coleoptera)  
beetle6: NR\_029066 from firefly *Photuris pennsylvanica* (Coleoptera)  
beetle7: DQ163950 from *Tenebrio molitor* (Coleoptera)  
beetle8: NR\_025687 from *Grammoptera* sp. (Coleoptera)  
beetle9: NR\_104751 from *Diabrotica undecimpunctata* (Coleoptera)  
fly1: NR\_025704 from a horse fly (Diptera)  
fly2: NR\_025695 from *Tabanus abactor* (Diptera)  
fly3: NR\_025728 from a syrphid fly (Diptera)  
mosquito: NR\_121702 from *Culex annulus* (Diptera)

worm: JF276619 from earthworm  
plant1: NR\_118704 from lettuce *Lactuca saliva*  
plant2: NR\_042858 from *Citrus sinensis*  
soil1: FM252493/4 from a soil sample  
soil2: FM252828/253028 from a soil sample

(b) *Spiroplasma*

Spi\_1 - Spi\_4 refer to the four types detected in this study.

Spi\_1: KJ778180 from *Formica sanguinea* (Hymenoptera)  
Spi\_2: KJ778181 from *Formica sanguinea* (Hymenoptera)  
Spi\_3: KJ778182 from *Formica (Serviformica) picea* (Hymenoptera)  
Spi\_4: KJ778183 from *Formica sanguinea* (Hymenoptera)  
ant1: KC137027 from *Polyrhachis ornata* (Hymenoptera)  
ant2: KC137053 from *Polyrhachis* sp (Hymenoptera)  
ant3: KF015800 from *Polyrhachis* sp. (Hymenoptera)  
ant4: KF015797 from *Pseudomyrmex gracilis* (Hymenoptera)  
bee1: HM598634 from *Xylocopa* sp.(Hymenoptera)  
bee2: HM037702 from *Apis mellifera* (Hymenoptera)  
bee3: HM111003 from *Halictus patellatus* (Hymenoptera)  
bee4: HM111161 from *Halictus patellatus* (Hymenoptera)  
bee5: HM598632 from *Megachile tranquilla* (Hymenoptera)  
bee6: HM598631 from *Tetralonia chinensis* (Hymenoptera)  
beetle1: KJ494866 from *Irenimus aequalis* (Coleoptera)  
beetle2: AB545039 from *Curculio sikkimensis* (Coleoptera)  
bug1: AB753848 from *Orius sauteri* (Hemiptera)  
bug3: AB809073 from *Antestiopsis thunbergii* (Hemiptera)  
fly1: FJ657240 from *Drosophila hydei* (Diptera)  
fly2: AB252475 from *Drosophila hydei* (Diptera)  
fly3: DQ412088 from *Drosophila mojavensis* (Diptera)  
fly4: NR\_044672 from *Drosophila willistoni* (Diptera)  
fly5: AB253487 from *Drosophila melanogaster* (Diptera)  
fly6: FJ657236 from *Drosophila aldrichi* (Diptera)  
fly7: NR\_104720 from *Atrichopogon* sp.(Diptera)  
moth1: DQ186642 from *Leucoma salicis* (Lepidoptera)  
moth2: NR\_104721 from *Stilpnotia salicis* (Lepidoptera)  
plant1: DQ319068 from *Zea mays*  
plant2: HQ456302 from *Catharanthus roseus*  
plant3: DQ112020 from carrot