

Seasonal wild dance of dual endosymbionts in the pear psyllid *Cacopsylla pyricola* (Hemiptera: Psylloidea): Endosymbiont titers tell two different stories

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Figure S1. Differences between *Carsonella* and *Psyllophila* titers in (a) immature, (b) female and (c) male individuals of *Cacopsylla pyricola* within the sampling months. All differences are statistically significant with $p = 0.001$.

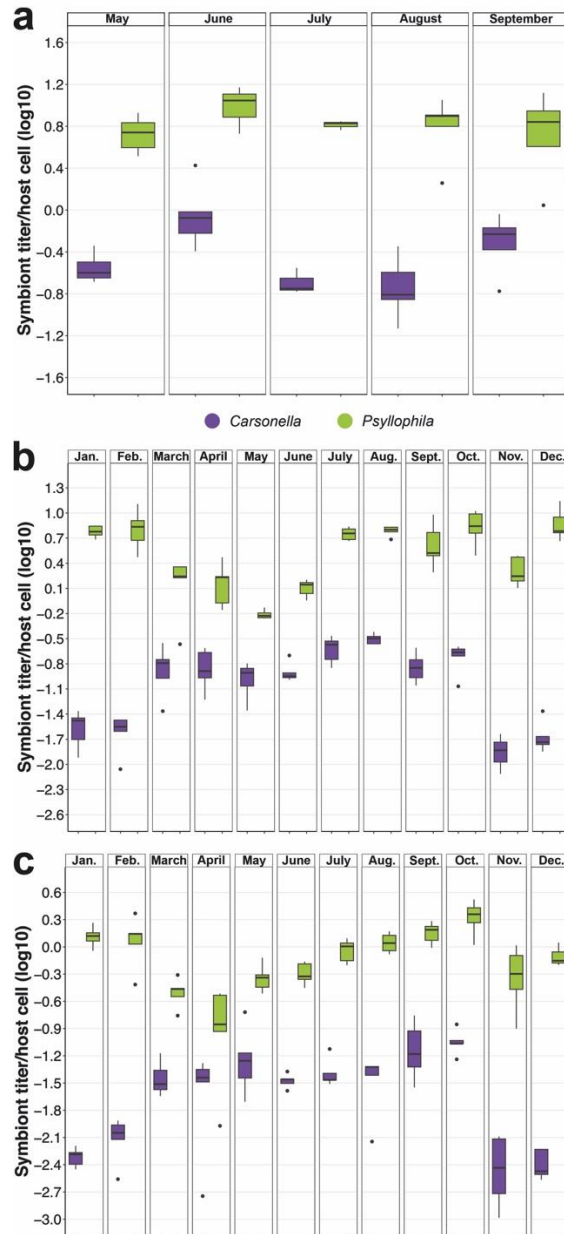


Table S1. The list of *Cacopsylla pyricola* specimens analyzed with qPCR with full information on their developmental stage, sex and collection date. SQ Mean-*Carsonella*, SQ Mean-*Psyllophila* and SQ Mean-*wg* correspond to mean copy numbers of 16S rRNA gene of *Carsonella* and *Psyllophila*, and *wg* gene of the insect host, respectively, based on two technical replicates.

Specimen ID	Sex	Developmental stage	Collection date	SQ Mean- <i>Carsonella</i>	SQ Mean- <i>Psyllophila</i>	SQ Mean- <i>wg</i>
jan_f_1	female	adult	17.01.2021	8.30E+04	2.03E+07	4.19E+06
jan_f_2	female	adult	17.01.2021	1.95E+05	3.21E+07	5.87E+06
jan_f_3	female	adult	17.01.2021	5.43E+04	2.69E+07	4.50E+06
jan_f_4	female	adult	17.01.2021	2.01E+05	3.29E+07	4.66E+06
jan_f_5	female	adult	17.01.2021	1.13E+05	2.20E+07	3.16E+06
jan_m_1	male	adult	17.01.2021	7.20E+03	1.60E+06	1.12E+06
jan_m_2	male	adult	17.01.2021	1.87E+04	4.55E+06	3.45E+06
jan_m_3	male	adult	17.01.2021	3.71E+03	1.07E+06	9.21E+05
jan_m_4	male	adult	17.01.2021	2.85E+03	1.48E+06	8.04E+05
jan_m_5	male	adult	17.01.2021	6.34E+03	1.11E+06	1.22E+06
feb_f_1	female	adult	14.02.2021	1.35E+05	6.14E+07	4.81E+06
feb_f_2	female	adult	14.02.2021	1.40E+05	2.66E+07	5.64E+06
feb_f_3	female	adult	14.02.2021	1.74E+05	4.13E+07	5.10E+06
feb_f_4	female	adult	14.02.2021	8.11E+04	1.64E+07	2.40E+06
feb_f_5	female	adult	14.02.2021	2.20E+04	7.46E+06	2.51E+06
feb_m_1	male	adult	14.02.2021	2.58E+04	2.97E+06	2.12E+06
feb_m_2	male	adult	14.02.2021	1.70E+04	2.17E+06	1.56E+06
feb_m_3	male	adult	14.02.2021	2.25E+04	5.90E+06	2.52E+06
feb_m_4	male	adult	14.02.2021	6.56E+03	9.17E+05	2.38E+06
feb_m_5	male	adult	14.02.2021	1.66E+04	2.35E+06	2.19E+06
mar_f_1	female	adult	16.03.2020	1.44E+06	1.36E+07	8.08E+06
mar_f_2	female	adult	16.03.2020	5.23E+05	8.58E+06	4.90E+06
mar_f_3	female	adult	16.03.2020	1.19E+05	7.51E+05	2.76E+06
mar_f_4	female	adult	16.03.2020	4.93E+05	6.93E+06	3.05E+06
mar_f_5	female	adult	16.03.2020	2.45E+06	1.99E+07	8.75E+06
mar_m_1	male	adult	16.03.2020	4.23E+04	5.51E+05	1.58E+06
mar_m_2	male	adult	16.03.2020	3.00E+04	3.35E+05	9.75E+05
mar_m_3	male	adult	16.03.2020	1.01E+05	7.36E+05	1.50E+06
mar_m_4	male	adult	16.03.2020	4.85E+04	1.94E+05	1.11E+06
mar_m_5	male	adult	16.03.2020	1.53E+04	1.90E+05	6.71E+05
apr_f_1	female	adult	13-19.04.2020	7.53E+05	1.01E+07	5.81E+06

apr_f_2	female	adult	13-19.04.2020	2.61E+06	3.16E+07	1.07E+07
apr_f_3	female	adult	13-19.04.2020	2.53E+06	2.00E+07	1.17E+07
apr_f_4	female	adult	13-19.04.2020	1.91E+05	2.72E+06	3.22E+06
apr_f_5	female	adult	13-19.04.2020	5.56E+05	3.60E+06	5.16E+06
apr_m_1	male	adult	13-19.04.2020	1.20E+05	8.21E+05	2.69E+06
apr_m_2	male	adult	13-19.04.2020	2.66E+03	1.58E+04	1.48E+06
apr_m_3	male	adult	13-19.04.2020	1.04E+05	2.33E+05	1.99E+06
apr_m_4	male	adult	13-19.04.2020	5.92E+04	4.78E+05	1.63E+06
apr_m_5	male	adult	13-19.04.2020	6.73E+04	2.90E+05	2.07E+06
may_f_1	female	adult	17.05.2020	2.56E+05	1.64E+06	2.97E+06
may_f_2	female	adult	17.05.2020	1.28E+06	5.42E+06	9.15E+06
may_f_3	female	adult	17.05.2020	1.49E+06	6.92E+06	9.32E+06
may_f_4	female	adult	17.05.2020	2.24E+05	1.16E+06	1.81E+06
may_f_5	female	adult	17.05.2020	1.34E+04	1.71E+05	3.04E+05
may_m_1	male	adult	17.05.2020	7.62E+04	7.63E+05	2.12E+06
may_m_2	male	adult	17.05.2020	5.73E+04	5.06E+05	1.03E+06
may_m_3	male	adult	17.05.2020	1.41E+05	9.54E+05	2.08E+06
may_m_4	male	adult	17.05.2020	2.80E+04	4.36E+05	1.42E+06
may_m_5	male	adult	17.05.2020	8.25E+05	3.27E+06	4.32E+06
jun_f_1	female	adult	14.06.2020	7.32E+05	5.12E+06	3.67E+06
jun_f_2	female	adult	14.06.2020	7.09E+05	5.71E+06	6.29E+06
jun_f_3	female	adult	14.06.2020	1.95E+05	2.52E+06	1.58E+06
jun_f_4	female	adult	14.06.2020	2.09E+05	3.01E+06	2.04E+06
jun_f_5	female	adult	14.06.2020	2.73E+05	2.76E+06	2.52E+06
jun_m_1	male	adult	14.06.2020	5.00E+04	5.10E+05	1.44E+06
jun_m_2	male	adult	14.06.2020	1.19E+05	1.93E+06	2.81E+06
jun_m_3	male	adult	14.06.2020	1.44E+05	1.82E+06	4.14E+06
jun_m_4	male	adult	14.06.2020	3.64E+04	7.53E+05	1.16E+06
jun_m_5	male	adult	14.06.2020	3.04E+04	5.53E+05	1.17E+06
jul_f_1	female	adult	19.07.2020	9.56E+05	1.93E+07	2.80E+06
jul_f_2	female	adult	19.07.2020	4.44E+05	9.65E+06	1.50E+06
jul_f_3	female	adult	19.07.2020	4.31E+05	9.17E+06	1.61E+06
jul_f_4	female	adult	19.07.2020	1.83E+05	6.22E+06	1.29E+06
jul_f_5	female	adult	19.07.2020	2.51E+05	6.48E+06	1.40E+06
jul_m_1	male	adult	19.07.2020	2.66E+04	7.87E+05	7.77E+05

jul_m_2	male	adult	19.07.2020	5.92E+04	1.22E+06	1.73E+06
jul_m_3	male	adult	19.07.2020	3.55E+04	5.87E+05	4.73E+05
jul_m_4	male	adult	19.07.2020	2.94E+04	8.00E+05	7.26E+05
jul_m_5	male	adult	19.07.2020	1.66E+04	3.38E+05	5.36E+05
aug_f_1	female	adult	09.08.2020	1.29E+06	2.14E+07	3.39E+06
aug_f_2	female	adult	09.08.2020	6.24E+05	1.11E+07	2.29E+06
aug_f_3	female	adult	09.08.2020	8.34E+05	2.07E+07	3.03E+06
aug_f_4	female	adult	09.08.2020	8.00E+05	1.61E+07	2.38E+06
aug_f_5	female	adult	09.08.2020	1.10E+06	2.06E+07	3.46E+06
aug_m_1	male	adult	09.08.2020	2.01E+03	1.56E+04	2.80E+05
aug_m_2	male	adult	09.08.2020	6.80E+04	2.09E+06	1.41E+06
aug_m_3	male	adult	09.08.2020	6.70E+04	1.32E+06	1.41E+06
aug_m_4	male	adult	09.08.2020	4.55E+04	9.82E+05	1.18E+06
aug_m_5	male	adult	09.08.2020	1.09E+05	2.94E+06	2.27E+06
sep_f_1	female	adult	27.09.2020	2.29E+05	8.71E+06	2.62E+06
sep_f_2	female	adult	27.09.2020	4.80E+05	2.58E+07	2.71E+06
sep_f_3	female	adult	27.09.2020	1.94E+05	5.53E+06	1.79E+06
sep_f_4	female	adult	27.09.2020	5.63E+05	1.34E+07	2.29E+06
sep_f_5	female	adult	27.09.2020	5.73E+05	7.94E+06	4.04E+06
sep_m_1	male	adult	27.09.2020	2.88E+05	3.75E+06	2.43E+06
sep_m_2	male	adult	27.09.2020	2.43E+04	8.42E+05	8.57E+05
sep_m_3	male	adult	27.09.2020	9.89E+04	2.46E+06	2.08E+06
sep_m_4	male	adult	27.09.2020	8.51E+04	2.17E+06	1.29E+06
sep_m_5	male	adult	27.09.2020	3.18E+05	3.49E+06	1.82E+06
oct_f_1	female	adult	18.10.2020	7.79E+05	2.50E+07	3.59E+06
oct_f_2	female	adult	18.10.2020	5.87E+05	2.59E+07	2.47E+06
oct_f_3	female	adult	18.10.2020	8.47E+05	1.93E+07	3.36E+06
oct_f_4	female	adult	18.10.2020	1.58E+05	5.75E+06	1.85E+06
oct_f_5	female	adult	18.10.2020	5.39E+05	2.67E+07	2.74E+06
oct_m_1	male	adult	18.10.2020	1.30E+05	2.37E+06	2.25E+06
oct_m_2	male	adult	18.10.2020	1.46E+05	2.90E+06	1.57E+06
oct_m_3	male	adult	18.10.2020	1.65E+05	6.38E+06	1.92E+06
oct_m_4	male	adult	18.10.2020	1.77E+05	5.55E+06	2.06E+06
oct_m_5	male	adult	18.10.2020	2.91E+05	4.76E+06	2.08E+06
nov_f_1	female	adult	15.11.2020	2.55E+04	5.10E+06	3.30E+06

nov_f_2	female	adult	15.11.2020	3.30E+04	5.44E+06	3.09E+06
nov_f_3	female	adult	15.11.2020	6.05E+04	9.74E+06	3.28E+06
nov_f_4	female	adult	15.11.2020	3.74E+04	3.23E+06	2.54E+06
nov_f_5	female	adult	15.11.2020	9.55E+04	1.27E+07	4.14E+06
nov_m_1	male	adult	15.11.2020	2.24E+03	3.99E+05	1.17E+06
nov_m_2	male	adult	15.11.2020	1.65E+03	2.00E+05	1.59E+06
nov_m_3	male	adult	15.11.2020	9.14E+03	1.25E+06	2.48E+06
nov_m_4	male	adult	15.11.2020	1.21E+02	1.27E+04	1.58E+04
nov_m_5	male	adult	15.11.2020	1.48E+04	1.89E+06	1.82E+06
dec_f_1	female	adult	13.12.2020	6.10E+04	2.95E+07	3.31E+06
dec_f_2	female	adult	13.12.2020	4.49E+04	1.51E+07	2.60E+06
dec_f_3	female	adult	13.12.2020	1.75E+05	5.61E+07	4.05E+06
dec_f_4	female	adult	13.12.2020	3.08E+04	1.31E+07	2.16E+06
dec_f_5	female	adult	13.12.2020	8.84E+04	1.90E+07	4.11E+06
dec_m_1	male	adult	13.12.2020	5.70E+03	1.47E+06	2.09E+06
dec_m_2	male	adult	13.12.2020	4.27E+03	4.80E+05	7.22E+05
dec_m_3	male	adult	13.12.2020	4.30E+03	8.74E+05	1.38E+06
dec_m_4	male	adult	13.12.2020	8.87E+03	1.68E+06	1.51E+06
dec_m_5	male	adult	13.12.2020	4.22E+03	1.10E+06	1.25E+06
im1	–	immature	17.05.2020	6.11E+05	9.90E+06	1.34E+06
im2	–	immature	17.05.2020	1.63E+06	1.70E+07	4.54E+06
im3	–	immature	17.05.2020	4.55E+05	7.20E+06	2.20E+06
im4	–	immature	17.05.2020	1.23E+06	2.25E+07	5.41E+06
im5	–	immature	24.05.2020	7.91E+05	1.73E+07	3.14E+06
im6	–	immature	24.05.2020	5.54E+05	1.57E+07	2.49E+06
im7	–	immature	24.05.2020	1.30E+06	3.88E+07	4.58E+06
im8	–	immature	14.06.2020	1.65E+06	2.18E+07	1.96E+06
im9	–	immature	14.06.2020	8.86E+05	–	9.21E+05
im10	–	immature	14.06.2020	2.21E+06	–	8.28E+05
im11	–	immature	14.06.2020	4.82E+05	1.76E+07	1.19E+06
im12	–	immature	14.06.2020	8.60E+05	7.67E+06	1.43E+06
im13	–	immature	12.07.2020	3.51E+05	1.48E+07	2.11E+06
im14	–	immature	12.07.2020	4.76E+05	1.80E+07	2.67E+06
im16	–	immature	19.07.2020	3.45E+05	7.16E+06	1.23E+06
im17	–	immature	30.08.2020	1.43E+05	3.50E+06	1.93E+06

im18	–	immature	30.08.2020	4.10E+05	1.30E+07	1.61E+06
im19	–	immature	30.08.2020	8.60E+05	2.15E+07	1.91E+06
im20	–	immature	30.08.2020	2.07E+05	1.17E+07	1.48E+06
im21	–	immature	30.08.2020	1.62E+05	6.55E+06	1.04E+06
im22	–	immature	07.09.2020	1.95E+05	1.29E+06	1.16E+06
im23	–	immature	13.09.2020	4.85E+05	6.96E+06	5.30E+05
im24	–	immature	13.09.2020	1.36E+05	1.72E+06	2.22E+05
im25	–	immature	20.09.2020	8.38E+05	9.21E+06	1.48E+06

Table S2. Effect of sampling months on *Carsonella* titers in immature, female and male individuals of *Cacopsylla pyricola*. Significant differences are represented by *p*-values in bold.

immatures													
	May	June	July	August	September								
May													
June	0.0226												
July	0.3357	0.0138											
August	0.2178	0.0049	0.8491										
September	0.2178	0.3115	0.0740	0.0309									

females													
	January	February	March	April	May	June	July	August	September	October	November	December	
January													
February	0.8914												
March	0.0001	0.0001											
April	0.0002	0.0001	0.9545										
May	0.0026	0.0016	0.3608	0.3968									
June	0.0009	0.0005	0.5958	0.6307	0.7351								
July	0.0001	0.0001	0.0305	0.0259	0.0019	0.0061							
August	0.0001	0.0001	0.0011	0.0009	0.0001	0.0002	0.2817						
September	0.0001	0.0001	0.9700	0.9386	0.3468	0.5784	0.0326	0.0012					
October	0.0001	0.0001	0.3396	0.3130	0.0499	0.1202	0.2817	0.0220	0.3468				
November	0.2582	0.3261	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
December	0.6307	0.7527	0.0001	0.0001	0.0006	0.0002	0.0001	0.0001	0.0001	0.0001	0.5082		

males													
	January	February	March	April	May	June	July	August	September	October	November	December	
January													
February	0.4664												
March	0.0026	0.0224											
April	0.0056	0.0463	0.7956										
May	0.0001	0.0006	0.1958	0.1124									
June	0.0039	0.0336	0.8803	0.8913	0.1502								
July	0.0008	0.0063	0.6971	0.4988	0.4130	0.5890							
August	0.0007	0.0056	0.6606	0.4664	0.4436	0.9510	0.9510						
September	0.0001	0.0001	0.0722	0.0353	0.6606	0.0485	0.1823	0.1958					
October	0.0001	0.0001	0.0059	0.0027	0.1657	0.0039	0.0213	0.0235	0.3835				
November	0.8803	0.3835	0.0017	0.0038	0.0001	0.0026	0.0005	0.0004	0.0001	0.0001			
December	0.7836	0.2966	0.0011	0.0026	0.0001	0.0017	0.0003	0.0003	0.0001	0.0001	0.8803		

Table S3. Effect of sampling months on *Psyllophila* titers in immature, female and male individuals of *Cacopsylla pyricola*. Significant differences are represented by *p*-values in bold.

immatures													
	May	June	July	August	September								
May													
June	0.8269												
July	0.8269	0.8269											
August	0.8269	0.8269	0.8269										
September	0.8269	0.8269	0.9238	0.8269									

females													
	January	February	March	April	May	June	July	August	September	October	November	December	
January													
February	0.9601												
March	0.0001	0.0001											
April	0.0001	0.0001	0.8356										
May	0.0001	0.0001	0.0804	0.1334									
June	0.0001	0.0001	0.5995	0.7206	0.2914								
July	0.6571	0.6145	0.0004	0.0001	0.0001	0.0001							
August	0.9728	0.9472	0.0001	0.0001	0.0001	0.0001	0.6723						
September	0.2307	0.2081	0.0040	0.0018	0.0001	0.0004	0.5583	0.2398					
October	0.6903	0.7206	0.0001	0.0001	0.0001	0.0001	0.3384	0.6876	0.0844				
November	0.0003	0.0002	0.6903	0.5583	0.0223	0.2914	0.0018	0.0003	0.0176	0.0001			
December	0.7784	0.8211	0.0001	0.0001	0.0001	0.0001	0.4334	0.7635	0.1187	0.9057	0.0001		

males													
	January	February	March	April	May	June	July	August	September	October	November	December	
January													
February	0.6018												
March	0.0001	0.0001											
April	0.0001	0.0001	0.3424										
May	0.0001	0.0005	0.2686	0.0403									
June	0.0002	0.0011	0.1739	0.0219	0.8060								
July	0.1041	0.2686	0.0005	0.0001	0.0139	0.0255							
August	0.4988	0.8575	0.0001	0.0001	0.0016	0.0034	0.3746						
September	0.6946	0.3547	0.0001	0.0001	0.0001	0.0001	0.0427	0.2966					
October	0.1939	0.0695	0.0001	0.0001	0.0001	0.0001	0.0039	0.0610	0.3673				
November	0.0003	0.0016	0.1387	0.0162	0.7099	0.8897	0.0350	0.0045	0.0001	0.0001			
December	0.0219	0.0733	0.0039	0.0002	0.0695	0.1175	0.4988	0.1320	0.0074	0.0005	0.1455		