

**Supplementary Table S51:** 14 minimal bacterial genomes studied + *Escherichia coli* K12 (as reference).

| Genome # | Accession | Full Name   | Class | Length       | GC %   |       |
|----------|-----------|---|-------|--------------|--------|-------|
|          |           |   |       |              | global | ORFs  |
| 01       | NC_006833 | <i>Wolbachia</i> endosymbiont strain TRS of <i>Brugia malayi</i>              | α     | 1,080,084 nt | 34.18  | 35.29 |
| 02       | NC_010981 | <i>Wolbachia</i> endosymbiont of <i>Culex quinquefasciatus</i>                | α     | 1,482,455 nt | 34.19  | 34.72 |
| 03       | NC_002978 | <i>Wolbachia</i> endosymbiont of <i>Drosophila melanogaster</i>               | α     | 1,267,782 nt | 35.23  | 35.45 |
| 04       | NC_011834 | <i>Buchnera aphidicola</i> str. Tuc7 ( <i>Acyrtosiphon pisum</i> )            | γ     | 641,895 nt   | 26.29  | 27.38 |
| 05       | NC_011833 | <i>Buchnera aphidicola</i> str. 5A ( <i>Acyrtosiphon pisum</i> )              | γ     | 642,122 nt   | 26.29  | 27.38 |
| 06       | NC_002528 | <i>Buchnera aphidicola</i> str. APS ( <i>Acyrtosiphon pisum</i> )             | γ     | 640,681 nt   | 26.31  | 27.40 |
| 07       | NC_004545 | <i>Buchnera aphidicola</i> str. Bp ( <i>Baizongia pistaciae</i> )             | γ     | 615,980 nt   | 25.34  | 27.02 |
| 08       | NC_008513 | <i>Buchnera aphidicola</i> str. Cc ( <i>Cinara cedri</i> )                    | γ     | 416,380 nt   | 20.10  | 26.21 |
| 09       | NC_004061 | <i>Buchnera aphidicola</i> str. Sg ( <i>Schizaphis graminum</i> )             | γ     | 641,454 nt   | 25.33  | 26.27 |
| 10       | NC_007292 | Candidatus <i>Blochmannia pennsylvanicus</i> str. BPEN                        | γ     | 791,654 nt   | 29.56  | 32.06 |
| 11       | NC_005061 | Candidatus <i>Blochmannia floridanus</i>                                      | γ     | 705,557 nt   | 27.38  | 32.06 |
| 12       | NC_007984 | <i>Baumannia cicadellinicola</i> str. Hc ( <i>Homalodisca coagulata</i> )     | γ     | 686,194 nt   | 33.24  | 34.31 |
| 13       | NC_004344 | <i>Wigglesworthia glossinidia</i> endosymbiont of <i>Glossina brevipalpis</i> | γ     | 697,724 nt   | 22.48  | 23.64 |
| 14       | NC_014109 | Candidatus <i>Riesia pediculicola</i> USDA                                    | γ     | 574,390 nt   | 28.48  | 29.80 |
| 15       | NC_000913 | <i>Escherichia coli</i> K12   | γ     | 4,639,675 nt | 50.79  | 52.00 |

**Supplementary Table SS2.** Codon Usage in 14 minimal bacterial genomes + *Escherichia coli* K12.

Codon Usage deduced from the automatic determination of all non overlapping ORFs >100 codons.  
 First value is the number of codons, second value is the frequency with respect to 61 sense codons summing to 1.0.

|   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
|---|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|---------|--|--|
| 01 NC_006833 <i>Wolbachia</i> endosymbiont strain TRS of <i>Brugia malayi</i>   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| 236424 codons   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| TTT phe <b>F</b>  | 8820  | 0.03731 | TCT ser <b>S</b> | 4656 | 0.01969 | TAT tyr <b>Y</b> | 5880  | 0.02487 | TGT cys <b>C</b> | 2115 | 0.00895 |  |  |
| TTC phe <b>F</b>  | 2241  | 0.00948 | TCC ser <b>S</b> | 1205 | 0.00510 | TAC tyr <b>Y</b> | 2434  | 0.01030 | TGC cys <b>C</b> | 1237 | 0.00523 |  |  |
| TTA leu <b>L</b>  | 7851  | 0.03321 | TCA ser <b>S</b> | 4164 | 0.01761 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |  |  |
| TTG leu <b>L</b>  | 4015  | 0.01698 | TCG ser <b>S</b> | 938  | 0.00397 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1812 | 0.00766 |  |  |
| CTT leu <b>L</b>  | 4515  | 0.01910 | CCT pro <b>P</b> | 2874 | 0.01216 | CAT his <b>H</b> | 3083  | 0.01304 | CGT arg <b>R</b> | 1669 | 0.00706 |  |  |
| CTC leu <b>L</b>  | 1336  | 0.00565 | CCC pro <b>P</b> | 513  | 0.00217 | CAC his <b>H</b> | 1462  | 0.00618 | CGC arg <b>R</b> | 844  | 0.00357 |  |  |
| CTA leu <b>L</b>  | 3432  | 0.01452 | CCA pro <b>P</b> | 3420 | 0.01447 | CAA gln <b>Q</b> | 4763  | 0.02015 | CGA arg <b>R</b> | 585  | 0.00247 |  |  |
| CTG leu <b>L</b>  | 1883  | 0.00796 | CCG pro <b>P</b> | 718  | 0.00304 | CAG gln <b>Q</b> | 2280  | 0.00964 | CGG arg <b>R</b> | 263  | 0.00111 |  |  |
| ATT ile <b>I</b>  | 8994  | 0.03804 | ACT thr <b>T</b> | 4600 | 0.01946 | AAT asn <b>N</b> | 9698  | 0.04102 | AGT ser <b>S</b> | 4529 | 0.01916 |  |  |
| ATC ile <b>I</b>  | 2858  | 0.01209 | ACC thr <b>T</b> | 1295 | 0.00548 | AAC asn <b>N</b> | 3888  | 0.01645 | AGC ser <b>S</b> | 2617 | 0.01107 |  |  |
| ATA ile <b>I</b>  | 9955  | 0.04211 | ACA thr <b>T</b> | 4040 | 0.01709 | AAA lys <b>K</b> | 13241 | 0.05601 | AGA arg <b>R</b> | 4030 | 0.01705 |  |  |
| ATG met <b>M</b>  | 5356  | 0.02265 | ACG thr <b>T</b> | 1026 | 0.00434 | AAG lys <b>K</b> | 5822  | 0.02463 | AGG arg <b>R</b> | 1956 | 0.00827 |  |  |
| GTT val <b>V</b>  | 6185  | 0.02616 | GCT ala <b>A</b> | 5345 | 0.02261 | GAT asp <b>D</b> | 9200  | 0.03891 | GGT gly <b>G</b> | 5577 | 0.02359 |  |  |
| GTC val <b>V</b>  | 1267  | 0.00536 | GCC ala <b>A</b> | 1051 | 0.00445 | GAC asp <b>D</b> | 2768  | 0.01171 | GGC gly <b>G</b> | 2306 | 0.00975 |  |  |
| GTA val <b>V</b>  | 5560  | 0.02352 | GCA ala <b>A</b> | 6703 | 0.02835 | GAA glu <b>E</b> | 10493 | 0.04438 | GGA gly <b>G</b> | 4586 | 0.01940 |  |  |
| GTG val <b>V</b>  | 2866  | 0.01212 | GCG ala <b>A</b> | 1300 | 0.00550 | GAG glu <b>E</b> | 4538  | 0.01919 | GGG gly <b>G</b> | 1766 | 0.00747 |  |  |
| 02 NC_010981 <i>Wolbachia</i> endosymbiont of <i>Culex quinquefasciatus</i> Pel |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| 410749 codons (34 undefined)  |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| TTT phe <b>F</b>  | 14956 | 0.03641 | TCT ser <b>S</b> | 7778 | 0.01894 | TAT tyr <b>Y</b> | 10381 | 0.02527 | TGT cys <b>C</b> | 3593 | 0.00875 |  |  |
| TTC phe <b>F</b>  | 3590  | 0.00874 | TCC ser <b>S</b> | 1687 | 0.00411 | TAC tyr <b>Y</b> | 3834  | 0.00933 | TGC cys <b>C</b> | 1978 | 0.00482 |  |  |
| TTA leu <b>L</b>  | 13824 | 0.03366 | TCA ser <b>S</b> | 7381 | 0.01797 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |  |  |
| TTG leu <b>L</b>  | 6551  | 0.01595 | TCG ser <b>S</b> | 1551 | 0.00378 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 3444 | 0.00838 |  |  |
| CTT leu <b>L</b>  | 8035  | 0.01956 | CCT pro <b>P</b> | 4937 | 0.01202 | CAT his <b>H</b> | 5640  | 0.01373 | CGT arg <b>R</b> | 2809 | 0.00684 |  |  |
| CTC leu <b>L</b>  | 2174  | 0.00529 | CCC pro <b>P</b> | 709  | 0.00173 | CAC his <b>H</b> | 2429  | 0.00591 | CGC arg <b>R</b> | 1130 | 0.00275 |  |  |

Supplementary Table SS2 continued..

|   |       |         |                  |       |         |                  |       |         |                  |      |         |
|---|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|------|---------|
| CTA leu <b>L</b>  | 6039  | 0.01470 | CCA pro <b>P</b> | 5941  | 0.01446 | CAA gln <b>Q</b> | 9201  | 0.02240 | CGA arg <b>R</b> | 1261 | 0.00307 |
| CTG leu <b>L</b>  | 3320  | 0.00808 | CCG pro <b>P</b> | 1238  | 0.00301 | CAG gln <b>Q</b> | 3923  | 0.00955 | CGG arg <b>R</b> | 380  | 0.00093 |
| ATT ile <b>I</b>  | 15263 | 0.03716 | ACT thr <b>T</b> | 7888  | 0.01920 | AAT asn <b>N</b> | 18021 | 0.04387 | AGT ser <b>S</b> | 8264 | 0.02012 |
| ATC ile <b>I</b>  | 4587  | 0.01117 | ACC thr <b>T</b> | 2226  | 0.00542 | AAC asn <b>N</b> | 6062  | 0.01476 | AGC ser <b>S</b> | 4427 | 0.01078 |
| ATA ile <b>I</b>  | 15881 | 0.03866 | ACA thr <b>T</b> | 7439  | 0.01811 | AAA lys <b>K</b> | 24826 | 0.06044 | AGA arg <b>R</b> | 7833 | 0.01907 |
| ATG met <b>M</b>  | 8555  | 0.02083 | ACG thr <b>T</b> | 1773  | 0.00432 | AAG lys <b>K</b> | 10503 | 0.02557 | AGG arg <b>R</b> | 3238 | 0.00788 |
| GTT val <b>V</b>  | 9991  | 0.02432 | GCT ala <b>A</b> | 8933  | 0.02175 | GAT asp <b>D</b> | 17107 | 0.04165 | GGT gly <b>G</b> | 9110 | 0.02218 |
| GTC val <b>V</b>  | 1839  | 0.00448 | GCC ala <b>A</b> | 1756  | 0.00428 | GAC asp <b>D</b> | 4102  | 0.00999 | GGC gly <b>G</b> | 3670 | 0.00893 |
| GTA val <b>V</b>  | 9599  | 0.02337 | GCA ala <b>A</b> | 11667 | 0.02840 | GAA glu <b>E</b> | 20505 | 0.04992 | GGA gly <b>G</b> | 8461 | 0.02060 |
| GTG val <b>V</b>  | 4270  | 0.01040 | GCG ala <b>A</b> | 2101  | 0.00512 | GAG glu <b>E</b> | 8754  | 0.02131 | GGG gly <b>G</b> | 2384 | 0.00580 |
| <b>03 NC_002978 Wolbachia endosymbiont of Drosophila melanogaster</b> |       |         |                  |       |         |                  |       |         |                  |      |         |
| 334919 codons   |       |         |                  |       |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>  | 12247 | 0.03657 | TCT ser <b>S</b> | 6257  | 0.01868 | TAT tyr <b>Y</b> | 8377  | 0.02501 | TGT cys <b>C</b> | 2667 | 0.00796 |
| TTC phe <b>F</b>  | 2921  | 0.00872 | TCC ser <b>S</b> | 1605  | 0.00479 | TAC tyr <b>Y</b> | 3181  | 0.00950 | TGC cys <b>C</b> | 1808 | 0.00540 |
| TTA leu <b>L</b>  | 11195 | 0.03343 | TCA ser <b>S</b> | 5849  | 0.01746 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |
| TTG leu <b>L</b>  | 5555  | 0.01659 | TCG ser <b>S</b> | 1355  | 0.00405 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 2889 | 0.00863 |
| CTT leu <b>L</b>  | 6380  | 0.01905 | CCT pro <b>P</b> | 4005  | 0.01196 | CAT his <b>H</b> | 4342  | 0.01296 | CGT arg <b>R</b> | 2314 | 0.00691 |
| CTC leu <b>L</b>  | 1894  | 0.00566 | CCC pro <b>P</b> | 675   | 0.00202 | CAC his <b>H</b> | 2148  | 0.00641 | CGC arg <b>R</b> | 1178 | 0.00352 |
| CTA leu <b>L</b>  | 4723  | 0.01410 | CCA pro <b>P</b> | 4975  | 0.01485 | CAA gln <b>Q</b> | 7394  | 0.02208 | CGA arg <b>R</b> | 904  | 0.00270 |
| CTG leu <b>L</b>  | 2728  | 0.00815 | CCG pro <b>P</b> | 1121  | 0.00335 | CAG gln <b>Q</b> | 3293  | 0.00983 | CGG arg <b>R</b> | 421  | 0.00126 |
| ATT ile <b>I</b>  | 12032 | 0.03593 | ACT thr <b>T</b> | 6498  | 0.01940 | AAT asn <b>N</b> | 13619 | 0.04066 | AGT ser <b>S</b> | 6288 | 0.01877 |
| ATC ile <b>I</b>  | 4048  | 0.01209 | ACC thr <b>T</b> | 1842  | 0.00550 | AAC asn <b>N</b> | 5409  | 0.01615 | AGC ser <b>S</b> | 3853 | 0.01150 |
| ATA ile <b>I</b>  | 13203 | 0.03942 | ACA thr <b>T</b> | 5975  | 0.01784 | AAA lys <b>K</b> | 19793 | 0.05910 | AGA arg <b>R</b> | 5925 | 0.01769 |
| ATG met <b>M</b>  | 7371  | 0.02201 | ACG thr <b>T</b> | 1589  | 0.00474 | AAG lys <b>K</b> | 8167  | 0.02439 | AGG arg <b>R</b> | 2719 | 0.00812 |
| GTT val <b>V</b>  | 8469  | 0.02529 | GCT ala <b>A</b> | 7539  | 0.02251 | GAT asp <b>D</b> | 13463 | 0.04020 | GGT gly <b>G</b> | 7310 | 0.02183 |
| GTC val <b>V</b>  | 1522  | 0.00454 | GCC ala <b>A</b> | 1528  | 0.00456 | GAC asp <b>D</b> | 3722  | 0.01111 | GGC gly <b>G</b> | 3291 | 0.00983 |
| GTA val <b>V</b>  | 7435  | 0.02220 | GCA ala <b>A</b> | 9607  | 0.02868 | GAA glu <b>E</b> | 16295 | 0.04865 | GGA gly <b>G</b> | 6654 | 0.01987 |
| GTG val <b>V</b>  | 4277  | 0.01277 | GCG ala <b>A</b> | 1928  | 0.00576 | GAG glu <b>E</b> | 6734  | 0.02011 | GGG gly <b>G</b> | 2413 | 0.00720 |

## Supplementary Table S2 continued..

| 04 NC_011834 <i>Buchnera aphidicola</i> str. Tuc7 ( <i>Acyrtosiphon pisum</i> ) |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
|---|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|---------|--|--|
| 181313 codons   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| TTT phe <b>F</b>  | 8482  | 0.04678 | TCT ser <b>S</b> | 5662 | 0.03123 | TAT tyr <b>Y</b> | 5723  | 0.03156 | TGT cys <b>C</b> | 1803 | 0.00994 |  |  |
| TTC phe <b>F</b>  | 799   | 0.00441 | TCC ser <b>S</b> | 543  | 0.00299 | TAC tyr <b>Y</b> | 878   | 0.00484 | TGC cys <b>C</b> | 392  | 0.00216 |  |  |
| TTA leu <b>L</b>  | 11624 | 0.06411 | TCA ser <b>S</b> | 3278 | 0.01808 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |  |  |
| TTG leu <b>L</b>  | 1826  | 0.01007 | TCG ser <b>S</b> | 457  | 0.00252 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1664 | 0.00918 |  |  |
| CTT leu <b>L</b>  | 2179  | 0.01202 | CCT pro <b>P</b> | 2588 | 0.01427 | CAT his <b>H</b> | 3337  | 0.01840 | CGT arg <b>R</b> | 2259 | 0.01246 |  |  |
| CTC leu <b>L</b>  | 321   | 0.00177 | CCC pro <b>P</b> | 389  | 0.00215 | CAC his <b>H</b> | 487   | 0.00269 | CGC arg <b>R</b> | 328  | 0.00181 |  |  |
| CTA leu <b>L</b>  | 1698  | 0.00937 | CCA pro <b>P</b> | 2094 | 0.01155 | CAA gln <b>Q</b> | 5004  | 0.02760 | CGA arg <b>R</b> | 1068 | 0.00589 |  |  |
| CTG leu <b>L</b>  | 359   | 0.00198 | CCG pro <b>P</b> | 406  | 0.00224 | CAG gln <b>Q</b> | 760   | 0.00419 | CGG arg <b>R</b> | 95   | 0.00052 |  |  |
| ATT ile <b>I</b>  | 11463 | 0.06322 | ACT thr <b>T</b> | 3777 | 0.02083 | AAT asn <b>N</b> | 11220 | 0.06188 | AGT ser <b>S</b> | 2718 | 0.01499 |  |  |
| ATC ile <b>I</b>  | 1723  | 0.00950 | ACC thr <b>T</b> | 519  | 0.00286 | AAC asn <b>N</b> | 1810  | 0.00998 | AGC ser <b>S</b> | 589  | 0.00325 |  |  |
| ATA ile <b>I</b>  | 7812  | 0.04309 | ACA thr <b>T</b> | 3540 | 0.01952 | AAA lys <b>K</b> | 16342 | 0.09013 | AGA arg <b>R</b> | 2832 | 0.01562 |  |  |
| ATG met <b>M</b>  | 3939  | 0.02172 | ACG thr <b>T</b> | 452  | 0.00249 | AAG lys <b>K</b> | 1423  | 0.00785 | AGG arg <b>R</b> | 209  | 0.00115 |  |  |
| GTT val <b>V</b>  | 3938  | 0.02172 | GCT ala <b>A</b> | 3539 | 0.01952 | GAT asp <b>D</b> | 6905  | 0.03808 | GGT gly <b>G</b> | 4099 | 0.02261 |  |  |
| GTC val <b>V</b>  | 611   | 0.00337 | GCC ala <b>A</b> | 500  | 0.00276 | GAC asp <b>D</b> | 926   | 0.00511 | GGC gly <b>G</b> | 748  | 0.00413 |  |  |
| GTA val <b>V</b>  | 3557  | 0.01962 | GCA ala <b>A</b> | 3467 | 0.01912 | GAA glu <b>E</b> | 9039  | 0.04985 | GGG gly <b>G</b> | 4395 | 0.02424 |  |  |
| GTG val <b>V</b>  | 667   | 0.00368 | GCG ala <b>A</b> | 536  | 0.00296 | GAG glu <b>E</b> | 914   | 0.00504 | GGG gly <b>G</b> | 601  | 0.00331 |  |  |
| 05 NC_011833 <i>Buchnera aphidicola</i> str. 5A ( <i>Acyrtosiphon pisum</i> )   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| 181330 codons   |       |         |                  |      |         |                  |       |         |                  |      |         |  |  |
| TTT phe <b>F</b>  | 8467  | 0.04669 | TCT ser <b>S</b> | 5658 | 0.03120 | TAT tyr <b>Y</b> | 5725  | 0.03157 | TGT cys <b>C</b> | 1802 | 0.00994 |  |  |
| TTC phe <b>F</b>  | 802   | 0.00442 | TCC ser <b>S</b> | 538  | 0.00297 | TAC tyr <b>Y</b> | 884   | 0.00488 | TGC cys <b>C</b> | 394  | 0.00217 |  |  |
| TTA leu <b>L</b>  | 11617 | 0.06407 | TCA ser <b>S</b> | 3283 | 0.01811 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |  |  |
| TTG leu <b>L</b>  | 1836  | 0.01013 | TCG ser <b>S</b> | 455  | 0.00251 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1662 | 0.00917 |  |  |
| CTT leu <b>L</b>  | 2189  | 0.01207 | CCT pro <b>P</b> | 2602 | 0.01435 | CAT his <b>H</b> | 3341  | 0.01842 | CGT arg <b>R</b> | 2257 | 0.01245 |  |  |
| CTC leu <b>L</b>  | 313   | 0.00173 | CCC pro <b>P</b> | 381  | 0.00210 | CAC his <b>H</b> | 488   | 0.00269 | CGC arg <b>R</b> | 329  | 0.00181 |  |  |
| CTA leu <b>L</b>  | 1687  | 0.00930 | CCA pro <b>P</b> | 2093 | 0.01154 | CAA gln <b>Q</b> | 5007  | 0.02761 | CGA arg <b>R</b> | 1061 | 0.00585 |  |  |
| CTG leu <b>L</b>  | 362   | 0.00200 | CCG pro <b>P</b> | 407  | 0.00224 | CAG gln <b>Q</b> | 754   | 0.00416 | CGG arg <b>R</b> | 97   | 0.00053 |  |  |

Supplementary Table SS2 continued..

|  |       |         |                  |      |         |                  |       |         |                  |      |         |
|--|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|---------|
| ATT ile <b>I</b>   | 11468 | 0.06324 | ACT thr <b>T</b> | 3782 | 0.02086 | AAT asn <b>N</b> | 11240 | 0.06199 | AGT ser <b>S</b> | 2716 | 0.01498 |
| ATC ile <b>I</b>   | 1723  | 0.00950 | ACC thr <b>T</b> | 512  | 0.00282 | AAC asn <b>N</b> | 1797  | 0.00991 | AGC ser <b>S</b> | 586  | 0.00323 |
| ATA ile <b>I</b>   | 7813  | 0.04309 | ACA thr <b>T</b> | 3549 | 0.01957 | AAA lys <b>K</b> | 16348 | 0.09016 | AGA arg <b>R</b> | 2830 | 0.01561 |
| ATG met <b>M</b>   | 3940  | 0.02173 | ACG thr <b>T</b> | 451  | 0.00249 | AAG lys <b>K</b> | 1437  | 0.00792 | AGG arg <b>R</b> | 208  | 0.00115 |
| GTT val <b>V</b>   | 3933  | 0.02169 | GCT ala <b>A</b> | 3539 | 0.01952 | GAT asp <b>D</b> | 6913  | 0.03812 | GGT gly <b>G</b> | 4097 | 0.02259 |
| GTC val <b>V</b>   | 611   | 0.00337 | GCC ala <b>A</b> | 499  | 0.00275 | GAC asp <b>D</b> | 912   | 0.00503 | GGC gly <b>G</b> | 758  | 0.00418 |
| GTA val <b>V</b>   | 3548  | 0.01957 | GCA ala <b>A</b> | 3461 | 0.01909 | GAA glu <b>E</b> | 9048  | 0.04990 | GGA gly <b>G</b> | 4389 | 0.02420 |
| GTG val <b>V</b>   | 673   | 0.00371 | GCG ala <b>A</b> | 542  | 0.00299 | GAG glu <b>E</b> | 908   | 0.00501 | GGG gly <b>G</b> | 608  | 0.00335 |
| 06 NC_002528 <i>Buchnera aphidicola</i> str. APS ( <i>Acyrtosiphon pisum</i> ) |       |         |                  |      |         |                  |       |         |                  |      |         |
| 180449 codons  |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 8421  | 0.04667 | TCT ser <b>S</b> | 5630 | 0.03120 | TAT tyr <b>Y</b> | 5701  | 0.03159 | TGT cys <b>C</b> | 1796 | 0.00995 |
| TTC phe <b>F</b>   | 795   | 0.00441 | TCC ser <b>S</b> | 548  | 0.00304 | TAC tyr <b>Y</b> | 881   | 0.00488 | TGC cys <b>C</b> | 390  | 0.00216 |
| TTA leu <b>L</b>   | 11562 | 0.06407 | TCA ser <b>S</b> | 3265 | 0.01809 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |
| TTG leu <b>L</b>   | 1827  | 0.01012 | TCG ser <b>S</b> | 446  | 0.00247 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1659 | 0.00919 |
| CTT leu <b>L</b>   | 2166  | 0.01200 | CCT pro <b>P</b> | 2586 | 0.01433 | CAT his <b>H</b> | 3325  | 0.01843 | CGT arg <b>R</b> | 2254 | 0.01249 |
| CTC leu <b>L</b>   | 315   | 0.00175 | CCC pro <b>P</b> | 380  | 0.00211 | CAC his <b>H</b> | 481   | 0.00267 | CGC arg <b>R</b> | 328  | 0.00182 |
| CTA leu <b>L</b>   | 1680  | 0.00931 | CCA pro <b>P</b> | 2082 | 0.01154 | CAA gln <b>Q</b> | 4989  | 0.02765 | CGA arg <b>R</b> | 1069 | 0.00592 |
| CTG leu <b>L</b>   | 357   | 0.00198 | CCG pro <b>P</b> | 405  | 0.00224 | CAG gln <b>Q</b> | 753   | 0.00417 | CGG arg <b>R</b> | 97   | 0.00054 |
| ATT ile <b>I</b>   | 11421 | 0.06329 | ACT thr <b>T</b> | 3759 | 0.02083 | AAT asn <b>N</b> | 11141 | 0.06174 | AGT ser <b>S</b> | 2708 | 0.01501 |
| ATC ile <b>I</b>   | 1709  | 0.00947 | ACC thr <b>T</b> | 516  | 0.00286 | AAC asn <b>N</b> | 1800  | 0.00998 | AGC ser <b>S</b> | 580  | 0.00321 |
| ATA ile <b>I</b>   | 7767  | 0.04304 | ACA thr <b>T</b> | 3525 | 0.01953 | AAA lys <b>K</b> | 16241 | 0.09000 | AGA arg <b>R</b> | 2816 | 0.01561 |
| ATG met <b>M</b>   | 3923  | 0.02174 | ACG thr <b>T</b> | 443  | 0.00245 | AAG lys <b>K</b> | 1425  | 0.00790 | AGG arg <b>R</b> | 211  | 0.00117 |
| GTT val <b>V</b>   | 3917  | 0.02171 | GCT ala <b>A</b> | 3528 | 0.01955 | GAT asp <b>D</b> | 6881  | 0.03813 | GGT gly <b>G</b> | 4095 | 0.02269 |
| GTC val <b>V</b>   | 609   | 0.00337 | GCC ala <b>A</b> | 498  | 0.00276 | GAC asp <b>D</b> | 917   | 0.00508 | GGC gly <b>G</b> | 740  | 0.00410 |
| GTA val <b>V</b>   | 3530  | 0.01956 | GCA ala <b>A</b> | 3464 | 0.01920 | GAA glu <b>E</b> | 9012  | 0.04994 | GGA gly <b>G</b> | 4356 | 0.02414 |
| GTG val <b>V</b>   | 667   | 0.00370 | GCG ala <b>A</b> | 541  | 0.00300 | GAG glu <b>E</b> | 909   | 0.00504 | GGG gly <b>G</b> | 612  | 0.00339 |
| 07 NC_004545 <i>Buchnera aphidicola</i> str. Bp ( <i>Baizongia pistaciae</i> ) |       |         |                  |      |         |                  |       |         |                  |      |         |
| 162548 codons  |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 7606  | 0.04679 | TCT ser <b>S</b> | 4684 | 0.02882 | TAT tyr <b>Y</b> | 5282  | 0.03250 | TGT cys <b>C</b> | 1936 | 0.01191 |
| TTC phe <b>F</b>   | 672   | 0.00413 | TCC ser <b>S</b> | 399  | 0.00245 | TAC tyr <b>Y</b> | 898   | 0.00552 | TGC cys <b>C</b> | 473  | 0.00291 |

Supplementary Table SS2 continued..

|  |       |         |                  |      |         |                  |       |         |                  |      |
|--|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|
| TTA leu <b>L</b>   | 11018 | 0.06778 | TCA ser <b>S</b> | 3196 | 0.01966 | TAA OCH <b>*</b> | -     | -       | TGA OPA <b>*</b> | -    |
| TTG leu <b>L</b>   | 2153  | 0.01325 | TCG ser <b>S</b> | 652  | 0.00401 | TAG AMB <b>*</b> | -     | -       | TGG trp <b>W</b> | 1482 |
| CTT leu <b>L</b>   | 1317  | 0.00810 | CCT pro <b>P</b> | 2212 | 0.01361 | CAT his <b>H</b> | 3078  | 0.01894 | CGT arg <b>R</b> | 1477 |
| CTC leu <b>L</b>   | 203   | 0.00125 | CCC pro <b>P</b> | 259  | 0.00159 | CAC his <b>H</b> | 583   | 0.00359 | CGC arg <b>R</b> | 330  |
| CTA leu <b>L</b>   | 1651  | 0.01016 | CCA pro <b>P</b> | 1978 | 0.01217 | CAA gln <b>Q</b> | 4488  | 0.02761 | CGA arg <b>R</b> | 1190 |
| CTG leu <b>L</b>   | 202   | 0.00124 | CCG pro <b>P</b> | 322  | 0.00198 | CAG gln <b>Q</b> | 613   | 0.00377 | CGG arg <b>R</b> | 143  |
| ATT ile <b>I</b>   | 10399 | 0.06397 | ACT thr <b>T</b> | 3636 | 0.02237 | AAT asn <b>N</b> | 10269 | 0.06318 | AGT ser <b>S</b> | 2559 |
| ATC ile <b>I</b>   | 1171  | 0.00720 | ACC thr <b>T</b> | 455  | 0.00280 | AAC asn <b>N</b> | 2252  | 0.01385 | AGC ser <b>S</b> | 556  |
| ATA ile <b>I</b>   | 7510  | 0.04620 | ACA thr <b>T</b> | 3229 | 0.01986 | AAA lys <b>K</b> | 13790 | 0.08484 | AGA arg <b>R</b> | 2418 |
| ATG met <b>M</b>   | 3589  | 0.02208 | ACG thr <b>T</b> | 666  | 0.00410 | AAG lys <b>K</b> | 1584  | 0.00974 | AGG arg <b>R</b> | 321  |
| GTT val <b>V</b>   | 3844  | 0.02365 | GCT ala <b>A</b> | 3162 | 0.01945 | GAT asp <b>D</b> | 5592  | 0.03440 | GGT gly <b>G</b> | 2909 |
| GTC val <b>V</b>   | 384   | 0.00236 | GCC ala <b>A</b> | 246  | 0.00151 | GAC asp <b>D</b> | 958   | 0.00589 | GGC gly <b>G</b> | 431  |
| GTA val <b>V</b>   | 3644  | 0.02242 | GCA ala <b>A</b> | 2845 | 0.01750 | GAA glu <b>E</b> | 6603  | 0.04062 | GGA gly <b>G</b> | 4524 |
| GTG val <b>V</b>   | 625   | 0.00385 | GCG ala <b>A</b> | 496  | 0.00305 | GAG glu <b>E</b> | 718   | 0.00442 | GGG gly <b>G</b> | 666  |
| 08 NC_008513 Buchnera aphidicola str. Cc ( <i>Cinara cedri</i> ) |       |         |                  |      |         |                  |       |         |                  |      |
| 113588 codons  |       |         |                  |      |         |                  |       |         |                  |      |
| TTT phe <b>F</b>   | 6386  | 0.05622 | TCT ser <b>S</b> | 3527 | 0.03105 | TAT tyr <b>Y</b> | 4690  | 0.04129 | TGT cys <b>C</b> | 1327 |
| TTC phe <b>F</b>   | 276   | 0.00243 | TCC ser <b>S</b> | 173  | 0.00152 | TAC tyr <b>Y</b> | 270   | 0.00238 | TGC cys <b>C</b> | 112  |
| TTA leu <b>L</b>   | 8964  | 0.07892 | TCA ser <b>S</b> | 2564 | 0.02257 | TAA OCH <b>*</b> | -     | -       | TGA OPA <b>*</b> | -    |
| TTG leu <b>L</b>   | 549   | 0.00483 | TCG ser <b>S</b> | 132  | 0.00116 | TAG AMB <b>*</b> | -     | -       | TGG trp <b>W</b> | 935  |
| CTT leu <b>L</b>   | 751   | 0.00661 | CCT pro <b>P</b> | 1449 | 0.01276 | CAT his <b>H</b> | 1914  | 0.01685 | CGT arg <b>R</b> | 792  |
| CTC leu <b>L</b>   | 43    | 0.00038 | CCC pro <b>P</b> | 82   | 0.00072 | CAC his <b>H</b> | 122   | 0.00107 | CGC arg <b>R</b> | 44   |
| CTA leu <b>L</b>   | 573   | 0.00504 | CCA pro <b>P</b> | 1331 | 0.01172 | CAA gln <b>Q</b> | 2852  | 0.02511 | CGA arg <b>R</b> | 534  |
| CTG leu <b>L</b>   | 56    | 0.00049 | CCG pro <b>P</b> | 176  | 0.00155 | CAG gln <b>Q</b> | 208   | 0.00183 | CGG arg <b>R</b> | 26   |
| ATT ile <b>I</b>   | 8942  | 0.07872 | ACT thr <b>T</b> | 2100 | 0.01849 | AAT asn <b>N</b> | 8600  | 0.07571 | AGT ser <b>S</b> | 1376 |
| ATC ile <b>I</b>   | 503   | 0.00443 | ACC thr <b>T</b> | 133  | 0.00117 | AAC asn <b>N</b> | 691   | 0.00608 | AGC ser <b>S</b> | 119  |
| ATA ile <b>I</b>   | 5854  | 0.05154 | ACA thr <b>T</b> | 2302 | 0.02027 | AAA lys <b>K</b> | 14878 | 0.13098 | AGA arg <b>R</b> | 2053 |
| GTG val <b>V</b>   | 160   | 0.00141 | GCG ala <b>A</b> | 164  | 0.00144 | GAG glu <b>E</b> | 205   | 0.00180 | GGG gly <b>G</b> | 188  |

## Supplementary Table SS2 continued..

| 09 NC_004061 <i>Buchnera aphidicola</i> str. Sg ( <i>Schizaphis graminum</i> ) |       |         |                  |      |         |                  |       |         |                  |      |         |
|--|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|---------|
| 179622 codons  |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 8848  | 0.04926 | TCT ser <b>S</b> | 5584 | 0.03109 | TAT tyr <b>Y</b> | 5586  | 0.03110 | TGT cys <b>C</b> | 1810 | 0.01008 |
| TTC phe <b>F</b>   | 775   | 0.00431 | TCC ser <b>S</b> | 362  | 0.00202 | TAC tyr <b>Y</b> | 838   | 0.00467 | TGC cys <b>C</b> | 384  | 0.00214 |
| TTA leu <b>L</b>   | 12096 | 0.06734 | TCA ser <b>S</b> | 3396 | 0.01891 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |
| TTG leu <b>L</b>   | 1670  | 0.00930 | TCG ser <b>S</b> | 405  | 0.00225 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1640 | 0.00913 |
| CTT leu <b>L</b>   | 2211  | 0.01231 | CCT pro <b>P</b> | 2611 | 0.01454 | CAT his <b>H</b> | 3075  | 0.01712 | CGT arg <b>R</b> | 2090 | 0.01164 |
| CTC leu <b>L</b>   | 235   | 0.00131 | CCC pro <b>P</b> | 285  | 0.00159 | CAC his <b>H</b> | 405   | 0.00225 | CGC arg <b>R</b> | 277  | 0.00154 |
| CTA leu <b>L</b>   | 1435  | 0.00799 | CCA pro <b>P</b> | 2121 | 0.01181 | CAA gln <b>Q</b> | 4861  | 0.02706 | CGA arg <b>R</b> | 986  | 0.00549 |
| CTG leu <b>L</b>   | 288   | 0.00160 | CCG pro <b>P</b> | 304  | 0.00169 | CAG gln <b>Q</b> | 553   | 0.00308 | CGG arg <b>R</b> | 81   | 0.00045 |
| ATT ile <b>I</b>   | 11715 | 0.06522 | ACT thr <b>T</b> | 3557 | 0.01980 | AAT asn <b>N</b> | 11272 | 0.06275 | AGT ser <b>S</b> | 2691 | 0.01498 |
| ATC ile <b>I</b>   | 1413  | 0.00787 | ACC thr <b>T</b> | 400  | 0.00223 | AAC asn <b>N</b> | 1874  | 0.01043 | AGC ser <b>S</b> | 454  | 0.00253 |
| ATA ile <b>I</b>   | 7894  | 0.04395 | ACA thr <b>T</b> | 3525 | 0.01962 | AAA lys <b>K</b> | 17502 | 0.09744 | AGA arg <b>R</b> | 2815 | 0.01567 |
| ATG met <b>M</b>   | 3774  | 0.02101 | ACG thr <b>T</b> | 387  | 0.00215 | AAG lys <b>K</b> | 1509  | 0.00840 | AGG arg <b>R</b> | 230  | 0.00128 |
| GTT val <b>V</b>   | 3970  | 0.02210 | GCT ala <b>A</b> | 3593 | 0.02000 | GAT asp <b>D</b> | 6715  | 0.03738 | GGT gly <b>G</b> | 4124 | 0.02296 |
| GTC val <b>V</b>   | 510   | 0.00284 | GCC ala <b>A</b> | 356  | 0.00198 | GAC asp <b>D</b> | 855   | 0.00476 | GGC gly <b>G</b> | 499  | 0.00278 |
| GTA val <b>V</b>   | 3425  | 0.01907 | GCA ala <b>A</b> | 3458 | 0.01925 | GAA glu <b>E</b> | 9218  | 0.05132 | GGA gly <b>G</b> | 4580 | 0.02550 |
| GTG val <b>V</b>   | 516   | 0.00287 | GCG ala <b>A</b> | 369  | 0.00205 | GAG glu <b>E</b> | 780   | 0.00434 | GGG gly <b>G</b> | 430  | 0.00239 |
| 10 NC_007292 <i>Candidatus Blochmannia pennsylvanicus</i> str. BpEN            |       |         |                  |      |         |                  |       |         |                  |      |         |
| 196557 codons  |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 7293  | 0.03710 | TCT ser <b>S</b> | 5085 | 0.02587 | TAT tyr <b>Y</b> | 6220  | 0.03164 | TGT cys <b>C</b> | 2314 | 0.01177 |
| TTC phe <b>F</b>   | 1106  | 0.00563 | TCC ser <b>S</b> | 925  | 0.00471 | TAC tyr <b>Y</b> | 1258  | 0.00640 | TGC cys <b>C</b> | 748  | 0.00381 |
| TTA leu <b>L</b>   | 11819 | 0.06013 | TCA ser <b>S</b> | 3048 | 0.01551 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |
| TTG leu <b>L</b>   | 3253  | 0.01655 | TCG ser <b>S</b> | 690  | 0.00351 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 2146 | 0.01092 |
| CTT leu <b>L</b>   | 1996  | 0.01015 | CCT pro <b>P</b> | 2766 | 0.01407 | CAT his <b>H</b> | 4686  | 0.02384 | CGT arg <b>R</b> | 3520 | 0.01791 |
| CTC leu <b>L</b>   | 395   | 0.00201 | CCC pro <b>P</b> | 562  | 0.00286 | CAC his <b>H</b> | 857   | 0.00436 | CGC arg <b>R</b> | 979  | 0.00498 |
| CTA leu <b>L</b>   | 1692  | 0.00861 | CCA pro <b>P</b> | 2710 | 0.01379 | CAA gln <b>Q</b> | 6048  | 0.03077 | CGA arg <b>R</b> | 1595 | 0.00811 |
| CTG leu <b>L</b>   | 640   | 0.00326 | CCG pro <b>P</b> | 704  | 0.00358 | CAG gln <b>Q</b> | 1120  | 0.00570 | CGG arg <b>R</b> | 389  | 0.00198 |

Supplementary Table S2 continued..

|  |       |         |                  |      |         |                  |       |         |                  |      |         |
|--|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|---------|
| ATT ile <b>I</b>   | 10951 | 0.05571 | ACT thr <b>T</b> | 4664 | 0.02373 | AAT asn <b>N</b> | 10193 | 0.05186 | AGT ser <b>S</b> | 2628 | 0.01337 |
| ATC ile <b>I</b>   | 2240  | 0.01140 | ACC thr <b>T</b> | 1070 | 0.00544 | AAC asn <b>N</b> | 2208  | 0.01123 | AGC ser <b>S</b> | 1059 | 0.00539 |
| ATA ile <b>I</b>   | 7884  | 0.04011 | ACA thr <b>T</b> | 3604 | 0.01834 | AAA lys <b>K</b> | 11452 | 0.05826 | AGA arg <b>R</b> | 2168 | 0.01103 |
| ATG met <b>M</b>   | 5037  | 0.02563 | ACG thr <b>T</b> | 876  | 0.00446 | AAG lys <b>K</b> | 1631  | 0.00830 | AGG arg <b>R</b> | 378  | 0.00192 |
| GTT val <b>V</b>   | 4074  | 0.02073 | GCT ala <b>A</b> | 4694 | 0.02388 | GAT asp <b>D</b> | 7746  | 0.03941 | GGT gly <b>G</b> | 3815 | 0.01941 |
| GTC val <b>V</b>   | 729   | 0.00371 | GCC ala <b>A</b> | 804  | 0.00409 | GAC asp <b>D</b> | 1281  | 0.00652 | GGC gly <b>G</b> | 1109 | 0.00564 |
| GTA val <b>V</b>   | 4896  | 0.02491 | GCA ala <b>A</b> | 3911 | 0.01990 | GAA glu <b>E</b> | 7821  | 0.03979 | GGA gly <b>G</b> | 5454 | 0.02775 |
| GTG val <b>V</b>   | 1623  | 0.00826 | GCG ala <b>A</b> | 1272 | 0.00647 | GAG glu <b>E</b> | 1397  | 0.00711 | GGG gly <b>G</b> | 1324 | 0.00674 |
| 11 NC_005061 Candidatus <i>Blochmannia floridanus</i>                                  |       |         |                  |      |         |                  |       |         |                  |      |         |
| 191731 codons  |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 7821  | 0.04079 | TCT ser <b>S</b> | 5519 | 0.02879 | TAT tyr <b>Y</b> | 7304  | 0.03810 | TGT cys <b>C</b> | 2611 | 0.01362 |
| TTC phe <b>F</b>   | 729   | 0.00380 | TCC ser <b>S</b> | 656  | 0.00342 | TAC tyr <b>Y</b> | 855   | 0.00446 | TGC cys <b>C</b> | 400  | 0.00209 |
| TTA leu <b>L</b>   | 13188 | 0.06878 | TCA ser <b>S</b> | 3179 | 0.01658 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -    | -       |
| TTG leu <b>L</b>   | 3007  | 0.01568 | TCG ser <b>S</b> | 617  | 0.00322 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 2015 | 0.01051 |
| CTT leu <b>L</b>   | 1364  | 0.00711 | CCT pro <b>P</b> | 2873 | 0.01498 | CAT his <b>H</b> | 4361  | 0.02275 | CGT arg <b>R</b> | 2537 | 0.01323 |
| CTC leu <b>L</b>   | 251   | 0.00131 | CCC pro <b>P</b> | 280  | 0.00146 | CAC his <b>H</b> | 565   | 0.00295 | CGC arg <b>R</b> | 280  | 0.00146 |
| CTA leu <b>L</b>   | 1196  | 0.00624 | CCA pro <b>P</b> | 2459 | 0.01283 | CAA gln <b>Q</b> | 6306  | 0.03289 | CGA arg <b>R</b> | 1647 | 0.00859 |
| CTG leu <b>L</b>   | 299   | 0.00156 | CCG pro <b>P</b> | 517  | 0.00270 | CAG gln <b>Q</b> | 1158  | 0.00604 | CGG arg <b>R</b> | 316  | 0.00165 |
| ATT ile <b>I</b>   | 11807 | 0.06158 | ACT thr <b>T</b> | 4683 | 0.02442 | AAT asn <b>N</b> | 11737 | 0.06122 | AGT ser <b>S</b> | 3010 | 0.01570 |
| ATC ile <b>I</b>   | 1638  | 0.00854 | ACC thr <b>T</b> | 721  | 0.00376 | AAC asn <b>N</b> | 1520  | 0.00793 | AGC ser <b>S</b> | 515  | 0.00269 |
| ATA ile <b>I</b>   | 8513  | 0.04440 | ACA thr <b>T</b> | 3304 | 0.01723 | AAA lys <b>K</b> | 11648 | 0.06075 | AGA arg <b>R</b> | 2437 | 0.01271 |
| ATG met <b>M</b>   | 4854  | 0.02532 | ACG thr <b>T</b> | 625  | 0.00326 | AAG lys <b>K</b> | 1961  | 0.01023 | AGG arg <b>R</b> | 493  | 0.00257 |
| GTT val <b>V</b>   | 4312  | 0.02249 | GCT ala <b>A</b> | 4309 | 0.02247 | GAT asp <b>D</b> | 8211  | 0.04283 | GGT gly <b>G</b> | 3819 | 0.01992 |
| GTC val <b>V</b>   | 390   | 0.00203 | GCC ala <b>A</b> | 393  | 0.00205 | GAC asp <b>D</b> | 600   | 0.00313 | GGC gly <b>G</b> | 418  | 0.00218 |
| GTA val <b>V</b>   | 4846  | 0.02527 | GCA ala <b>A</b> | 3258 | 0.01699 | GAA glu <b>E</b> | 7136  | 0.03722 | GGA gly <b>G</b> | 5640 | 0.02942 |
| GTG val <b>V</b>   | 1437  | 0.00749 | GCG ala <b>A</b> | 754  | 0.00393 | GAG glu <b>E</b> | 1374  | 0.00717 | GGG gly <b>G</b> | 1058 | 0.00552 |
| 12 NC_007984 <i>Baumannia cicadellinicola</i> str. Hc ( <i>Homalodisca coagulata</i> ) |       |         |                  |      |         |                  |       |         |                  |      |         |
| 191706 codons (17 undefined)   |       |         |                  |      |         |                  |       |         |                  |      |         |
| TTT phe <b>F</b>   | 5945  | 0.03101 | TCT ser <b>S</b> | 3298 | 0.01720 | TAT tyr <b>Y</b> | 5531  | 0.02885 | TGT cys <b>C</b> | 1892 | 0.00987 |
| TTC phe <b>F</b>   | 1208  | 0.00630 | TCC ser <b>S</b> | 502  | 0.00262 | TAC tyr <b>Y</b> | 1277  | 0.00666 | TGC cys <b>C</b> | 621  | 0.00324 |



Supplementary Table S2 continued..

|  |       |         |                  |      |         |                  |       |         |                  |      |
|--|-------|---------|------------------|------|---------|------------------|-------|---------|------------------|------|
| TTA leu <b>L</b>   | 10274 | 0.05359 | TCA ser <b>S</b> | 2465 | 0.01286 | TAA OCH *        | -     | -       | TGA OPA *        | -    |
| TTG leu <b>L</b>   | 1341  | 0.00700 | TCG ser <b>S</b> | 543  | 0.00283 | TAG AMB *        | -     | -       | TGG trp <b>W</b> | 2124 |
| CTT leu <b>L</b>   | 2882  | 0.01503 | CCT pro <b>P</b> | 2686 | 0.01401 | CAT his <b>H</b> | 4128  | 0.02153 | CGT arg <b>R</b> | 4938 |
| CTC leu <b>L</b>   | 700   | 0.00365 | CCC pro <b>P</b> | 376  | 0.00196 | CAC his <b>H</b> | 769   | 0.00401 | CGC arg <b>R</b> | 1123 |
| CTA leu <b>L</b>   | 4934  | 0.02574 | CCA pro <b>P</b> | 3372 | 0.01759 | CAA gln <b>Q</b> | 6053  | 0.03157 | CGA arg <b>R</b> | 1098 |
| CTG leu <b>L</b>   | 750   | 0.00391 | CCG pro <b>P</b> | 567  | 0.00296 | CAG gln <b>Q</b> | 2530  | 0.01320 | CGG arg <b>R</b> | 423  |
| ATT ile <b>I</b>   | 9949  | 0.05190 | ACT thr <b>T</b> | 5076 | 0.02648 | AAT asn <b>N</b> | 8869  | 0.04626 | AGT ser <b>S</b> | 3519 |
| ATC ile <b>I</b>   | 2015  | 0.01051 | ACC thr <b>T</b> | 1108 | 0.00578 | AAC asn <b>N</b> | 2074  | 0.01082 | AGC ser <b>S</b> | 1336 |
| ATA ile <b>I</b>   | 7002  | 0.03652 | ACA thr <b>T</b> | 3222 | 0.01681 | AAA lys <b>K</b> | 9010  | 0.04700 | AGA arg <b>R</b> | 1479 |
| ATG met <b>M</b>   | 4798  | 0.02503 | ACG thr <b>T</b> | 756  | 0.00394 | AAG lys <b>K</b> | 2237  | 0.01167 | AGG arg <b>R</b> | 424  |
| GTT val <b>V</b>   | 4120  | 0.02149 | GCT ala <b>A</b> | 6441 | 0.03360 | GAT asp <b>D</b> | 7489  | 0.03907 | GGT gly <b>G</b> | 6669 |
| GTC val <b>V</b>   | 763   | 0.00398 | GCC ala <b>A</b> | 976  | 0.00509 | GAC asp <b>D</b> | 1071  | 0.00559 | GGC gly <b>G</b> | 1278 |
| GTA val <b>V</b>   | 5521  | 0.02880 | GCA ala <b>A</b> | 5083 | 0.02651 | GAA glu <b>E</b> | 7824  | 0.04081 | GGG gly <b>G</b> | 3055 |
| GTG val <b>V</b>   | 775   | 0.00404 | GCG ala <b>A</b> | 872  | 0.00455 | GAG glu <b>E</b> | 1846  | 0.00963 | GGG gly <b>G</b> | 699  |
| 13 NC_004344 <i>Wigglesworthia glossinidia</i> endosymbiont of <i>Glossina brevipalpis</i> |       |         |                  |      |         |                  |       |         |                  |      |
| 196110 codons  |       |         |                  |      |         |                  |       |         |                  |      |
| TTT phe <b>F</b>   | 10193 | 0.05198 | TCT ser <b>S</b> | 7224 | 0.03684 | TAT tyr <b>Y</b> | 7064  | 0.03602 | TGT cys <b>C</b> | 1775 |
| TTC phe <b>F</b>   | 829   | 0.00423 | TCC ser <b>S</b> | 484  | 0.00247 | TAC tyr <b>Y</b> | 1025  | 0.00523 | TGC cys <b>C</b> | 713  |
| TTA leu <b>L</b>   | 13050 | 0.06654 | TCA ser <b>S</b> | 3876 | 0.01976 | TAA OCH *        | -     | -       | TGA OPA *        | -    |
| TTG leu <b>L</b>   | 2353  | 0.01200 | TCG ser <b>S</b> | 272  | 0.00139 | TAG AMB *        | -     | -       | TGG trp <b>W</b> | 1661 |
| CTT leu <b>L</b>   | 1670  | 0.00852 | CCT pro <b>P</b> | 2326 | 0.01186 | CAT his <b>H</b> | 2834  | 0.01445 | CGT arg <b>R</b> | 747  |
| CTC leu <b>L</b>   | 101   | 0.00052 | CCC pro <b>P</b> | 116  | 0.00059 | CAC his <b>H</b> | 339   | 0.00173 | CGC arg <b>R</b> | 109  |
| CTA leu <b>L</b>   | 1281  | 0.00653 | CCA pro <b>P</b> | 2951 | 0.01505 | CAA gln <b>Q</b> | 4066  | 0.02073 | CGA arg <b>R</b> | 139  |
| CTG leu <b>L</b>   | 145   | 0.00074 | CCG pro <b>P</b> | 200  | 0.00102 | CAG gln <b>Q</b> | 364   | 0.00186 | CGG arg <b>R</b> | 17   |
| ATT ile <b>I</b>   | 11816 | 0.06025 | ACT thr <b>T</b> | 3420 | 0.01744 | AAT asn <b>N</b> | 14398 | 0.07342 | AGT ser <b>S</b> | 2097 |
| ATC ile <b>I</b>   | 919   | 0.00469 | ACC thr <b>T</b> | 292  | 0.00149 | AAC asn <b>N</b> | 2195  | 0.01119 | AGC ser <b>S</b> | 1138 |
| ATA ile <b>I</b>   | 13309 | 0.06786 | ACA thr <b>T</b> | 3368 | 0.01717 | AAA lys <b>K</b> | 21359 | 0.10891 | AGA arg <b>R</b> | 4585 |
| ATG met <b>M</b>   | 3958  | 0.02018 | ACG thr <b>T</b> | 186  | 0.00095 | AAG lys <b>K</b> | 1369  | 0.00698 | AGG arg <b>R</b> | 426  |

## Supplementary Table S2 continued..

|   |       |         |                  |       |         |                  |       |         |                  |       |         |
|---|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|
| GTT val <b>V</b>  | 3715  | 0.01894 | GCT ala <b>A</b> | 3304  | 0.01685 | GAT asp <b>D</b> | 6888  | 0.03512 | GGT gly <b>G</b> | 2002  | 0.01021 |
| GTC val <b>V</b>  | 209   | 0.00107 | GCC ala <b>A</b> | 278   | 0.00142 | GAC asp <b>D</b> | 973   | 0.00496 | GGC gly <b>G</b> | 415   | 0.00212 |
| GTA val <b>V</b>  | 3879  | 0.01978 | GCA ala <b>A</b> | 3231  | 0.01648 | GAA glu <b>E</b> | 9198  | 0.04690 | GGA gly <b>G</b> | 7097  | 0.03619 |
| GTG val <b>V</b>  | 437   | 0.00223 | GCG ala <b>A</b> | 307   | 0.00157 | GAG glu <b>E</b> | 755   | 0.00385 | GGG gly <b>G</b> | 663   | 0.00338 |
| 14 NC_014109 <i>Candidatus Riesia pediculicola</i> USDA |       |         |                  |       |         |                  |       |         |                  |       |         |
| 147981 codons   |       |         |                  |       |         |                  |       |         |                  |       |         |
| TTT phe <b>F</b>  | 6625  | 0.04477 | TCT ser <b>S</b> | 5202  | 0.03515 | TAT tyr <b>Y</b> | 4157  | 0.02809 | TGT cys <b>C</b> | 1468  | 0.00992 |
| TTC phe <b>F</b>  | 1769  | 0.01195 | TCC ser <b>S</b> | 1172  | 0.00792 | TAC tyr <b>Y</b> | 1072  | 0.00724 | TGC cys <b>C</b> | 403   | 0.00272 |
| TTA leu <b>L</b>  | 6288  | 0.04249 | TCA ser <b>S</b> | 2571  | 0.01737 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -     | -       |
| TTG leu <b>L</b>  | 2565  | 0.01733 | TCG ser <b>S</b> | 913   | 0.00617 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 1239  | 0.00837 |
| CTT leu <b>L</b>  | 2207  | 0.01491 | CCT pro <b>P</b> | 1465  | 0.00990 | CAT his <b>H</b> | 2511  | 0.01697 | CGT arg <b>R</b> | 789   | 0.00533 |
| CTC leu <b>L</b>  | 565   | 0.00382 | CCC pro <b>P</b> | 219   | 0.00148 | CAC his <b>H</b> | 410   | 0.00277 | CGC arg <b>R</b> | 84    | 0.00057 |
| CTA leu <b>L</b>  | 1600  | 0.01081 | CCA pro <b>P</b> | 1969  | 0.01331 | CAA gln <b>Q</b> | 3771  | 0.02548 | CGA arg <b>R</b> | 1228  | 0.00830 |
| CTG leu <b>L</b>  | 582   | 0.00393 | CCG pro <b>P</b> | 516   | 0.00349 | CAG gln <b>Q</b> | 869   | 0.00587 | CGG arg <b>R</b> | 125   | 0.00084 |
| ATT ile <b>I</b>  | 8237  | 0.05566 | ACT thr <b>T</b> | 2519  | 0.01702 | AAT asn <b>N</b> | 6774  | 0.04578 | AGT ser <b>S</b> | 1900  | 0.01284 |
| ATC ile <b>I</b>  | 3042  | 0.02056 | ACC thr <b>T</b> | 564   | 0.00381 | AAC asn <b>N</b> | 1978  | 0.01337 | AGC ser <b>S</b> | 529   | 0.00357 |
| ATA ile <b>I</b>  | 5671  | 0.03832 | ACA thr <b>T</b> | 1972  | 0.01333 | AAA lys <b>K</b> | 12272 | 0.08293 | AGA arg <b>R</b> | 4470  | 0.03021 |
| ATG met <b>M</b>  | 3429  | 0.02317 | ACG thr <b>T</b> | 585   | 0.00395 | AAG lys <b>K</b> | 2976  | 0.02011 | AGG arg <b>R</b> | 609   | 0.00412 |
| GTT val <b>V</b>  | 3638  | 0.02458 | GCT ala <b>A</b> | 2267  | 0.01532 | GAT asp <b>D</b> | 5554  | 0.03753 | GGT gly <b>G</b> | 1611  | 0.01089 |
| GTC val <b>V</b>  | 820   | 0.00554 | GCC ala <b>A</b> | 364   | 0.00246 | GAC asp <b>D</b> | 906   | 0.00612 | GGC gly <b>G</b> | 189   | 0.00128 |
| GTA val <b>V</b>  | 2444  | 0.01652 | GCA ala <b>A</b> | 1962  | 0.01326 | GAA glu <b>E</b> | 7253  | 0.04901 | GGA gly <b>G</b> | 5817  | 0.03931 |
| GTG val <b>V</b>  | 784   | 0.00530 | GCG ala <b>A</b> | 439   | 0.00297 | GAG glu <b>E</b> | 1493  | 0.01009 | GGG gly <b>G</b> | 559   | 0.00378 |
| 15 NC_000913 <i>Escherichia coli</i> K12                |       |         |                  |       |         |                  |       |         |                  |       |         |
| 1425506 codon   |       |         |                  |       |         |                  |       |         |                  |       |         |
| TTT phe <b>F</b>  | 32912 | 0.02309 | TCT ser <b>S</b> | 11774 | 0.00826 | TAT tyr <b>Y</b> | 21912 | 0.01537 | TGT cys <b>C</b> | 7667  | 0.00538 |
| TTC phe <b>F</b>  | 25719 | 0.01804 | TCC ser <b>S</b> | 12577 | 0.00882 | TAC tyr <b>Y</b> | 17352 | 0.01217 | TGC cys <b>C</b> | 10861 | 0.00762 |
| TTA leu <b>L</b>  | 19236 | 0.01349 | TCA ser <b>S</b> | 10640 | 0.00746 | TAA och <b>*</b> | -     | -       | TGA opa <b>*</b> | -     | -       |
| TTG leu <b>L</b>  | 19511 | 0.01369 | TCG ser <b>S</b> | 12972 | 0.00910 | TAG amb <b>*</b> | -     | -       | TGG trp <b>W</b> | 21321 | 0.01496 |

Supplementary Table SS2 continued..

|                  |       |         |                  |       |         |                  |       |         |                  |       |         |
|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|------------------|-------|---------|
| CTT leu <b>L</b> | 15824 | 0.01110 | CCT pro <b>P</b> | 10016 | 0.00703 | CAT his <b>H</b> | 19563 | 0.01372 | CGT arg <b>R</b> | 28865 | 0.02025 |
| CTC leu <b>L</b> | 16276 | 0.01142 | CCC pro <b>P</b> | 8402  | 0.00589 | CAC his <b>H</b> | 15114 | 0.01060 | CGC arg <b>R</b> | 32523 | 0.02282 |
| CTA leu <b>L</b> | 5453  | 0.00383 | CCA pro <b>P</b> | 12975 | 0.00910 | CAA gln <b>Q</b> | 21401 | 0.01501 | CGA arg <b>R</b> | 5695  | 0.00400 |
| CTG leu <b>L</b> | 72361 | 0.05076 | CCG pro <b>P</b> | 32179 | 0.02257 | CAG gln <b>Q</b> | 42707 | 0.02996 | CGG arg <b>R</b> | 9696  | 0.00680 |
| ATT ile <b>I</b> | 41550 | 0.02915 | ACT thr <b>T</b> | 12561 | 0.00881 | AAT asn <b>N</b> | 25777 | 0.01808 | AGT ser <b>S</b> | 12829 | 0.00900 |
| ATC ile <b>I</b> | 36299 | 0.02546 | ACC thr <b>T</b> | 33728 | 0.02366 | AAC asn <b>N</b> | 31031 | 0.02177 | AGC ser <b>S</b> | 23494 | 0.01648 |
| ATA ile <b>I</b> | 7339  | 0.00515 | ACA thr <b>T</b> | 10300 | 0.00723 | AAA lys <b>K</b> | 45979 | 0.03225 | AGA arg <b>R</b> | 4039  | 0.00283 |
| ATG met <b>M</b> | 39448 | 0.02767 | ACG thr <b>T</b> | 21684 | 0.01521 | AAG lys <b>K</b> | 14603 | 0.01024 | AGG arg <b>R</b> | 2623  | 0.00184 |
| GTT val <b>V</b> | 26387 | 0.01851 | GCT ala <b>A</b> | 21692 | 0.01522 | GAT asp <b>D</b> | 45132 | 0.03166 | GGT gly <b>G</b> | 34941 | 0.02451 |
| GTC val <b>V</b> | 22331 | 0.01567 | GCC ala <b>A</b> | 37104 | 0.02603 | GAC asp <b>D</b> | 26548 | 0.01862 | GGC gly <b>G</b> | 41781 | 0.02931 |
| GTA val <b>V</b> | 15833 | 0.01111 | GCA ala <b>A</b> | 28093 | 0.01971 | GAA glu <b>E</b> | 53753 | 0.03771 | GGA gly <b>G</b> | 11693 | 0.00820 |
| GTG val <b>V</b> | 35936 | 0.02521 | GCG ala <b>A</b> | 47542 | 0.03335 | GAG glu <b>E</b> | 24548 | 0.01722 | GGG gly <b>G</b> | 15404 | 0.01081 |