

|            | Feature         | avian <i>C. abortus</i> |                |                | <i>C. abortus</i><br>84/2334 | <i>C. abortus</i><br>S26/3 | <i>C. psittaci</i><br>6BC | <i>C. poikilothermis</i><br>S15-834K | <i>C. caviae</i><br>GPIC | <i>C. felis</i><br>Fe/C-56 | <i>C. avium</i><br>10DC88 | <i>C. gallinacea</i><br>08-1274/3 | <i>C. pneumoniae</i><br>LPCoLN | <i>C. serpentis</i><br>H15-1957-10C | <i>C. pecorum</i><br>E58 | <i>C. muridarum</i><br>Nigg | <i>C. trachomatis</i><br>A/HAR-13 | <i>C. suis</i><br>SWA-14 |
|------------|-----------------|-------------------------|----------------|----------------|------------------------------|----------------------------|---------------------------|--------------------------------------|--------------------------|----------------------------|---------------------------|-----------------------------------|--------------------------------|-------------------------------------|--------------------------|-----------------------------|-----------------------------------|--------------------------|
|            |                 | 15-70d24                | 15-49d3        | 15-58d44       |                              |                            |                           |                                      |                          |                            |                           |                                   |                                |                                     |                          |                             |                                   |                          |
|            |                 | genotype<br>G1          | genotype<br>G2 | genotype<br>1V |                              |                            |                           |                                      |                          |                            |                           |                                   |                                |                                     |                          |                             |                                   |                          |
| Chromosome | Host            | Eurasian teal           | mallard        | magpie         | parrot                       | sheep                      | parakeet                  | snake                                | guinea pig               | cat                        | psittacine                | chicken                           | koala                          | snake                               | cattle                   | mouse                       | human                             | pig                      |
|            | Length (bp)     | 1,141,680               | 1,132,330      | 1,151,406      | 1,165,692                    | 1,144,377                  | 1,171,660                 | 1,155,104                            | 1,173,390                | 1,166,239                  | 1,041,170                 | 1,059,583                         | 1,241,020                      | 1,198,609                           | 1,106,197                | 1,072,950                   | 1,044,459                         | 1,086,692                |
|            | G+C content (%) | 39.9                    | 39.6           | 39.8           | 39.9                         | 39.9                       | 39.1                      | 37.5                                 | 39.2                     | 39.4                       | 36.9                      | 37.9                              | 40.5                           | 37.5                                | 41.1                     | 40.3                        | 41.3                              | 42.1                     |
|            | No. of CDS      | 992                     | 992            | 1002           | 1005                         | 1002                       | 984                       | 995                                  | 989                      | 981                        | 945                       | 904                               | 1028                           | 1001                                | 938                      | 887                         | 903                               | 897                      |
|            | rRNA genes      | 3                       | 3              | 3              | 3                            | 3                          | 3                         | 3                                    | 3                        | 3                          | 2                         | 3                                 | 3                              | 3                                   | 3                        | 6                           | 6                                 | 6                        |
|            | tRNA            | 38                      | 38             | 38             | 38                           | 38                         | 38                        | 38                                   | 38                       | 38                         | 39                        | 39                                | 38                             | 38                                  | 38                       | 37                          | 37                                | 37                       |
|            | tmRNA           | 1                       | 1              | 1              | 1                            | 1                          | 1                         | 1                                    | 1                        | 1                          | 1                         | 1                                 | 1                              | 1                                   | 1                        | 1                           | 1                                 | 1                        |
| Plasmid    | Length (bp)     | 7553                    | 7556           | 7553           | 7553                         | -                          | 7553                      | 7559                                 | 7966                     | 7552                       | 7099                      | 7619                              | 7530                           | 7533                                | -                        | 7501                        | 7510                              | 7494                     |
|            | G+C content (%) | 33.0                    | 32.6           | 33.0           | 33.1                         | -                          | 32.9                      | 33.0                                 | 33.7                     | 33.9                       | 31.2                      | 31.7                              | 33.0                           | 31.1                                | -                        | 35.7                        | 36.3                              | 36.9                     |
|            | No. of ORFs     | 8                       | 8              | 8              | 8                            | -                          | 8                         | 8                                    | 8                        | 8                          | 8                         | 9                                 | 8                              | 8                                   | -                        | 8                           | 8                                 | 8                        |

**Table S1.** Basic genomic parameters of avian *C. abortus* strains and selected representatives of *Chlamydia* spp.

|                                       | avian <i>C. abortus</i> 15-70d24 (G1) | avian <i>C. abortus</i> 15-49d3 (G2) | avian <i>C. abortus</i> 15-58d44 (1V) | <i>C. abortus</i> 84/2334 | <i>C. abortus</i> S26/3 | <i>C. psittaci</i> 6BC | <i>C. buteonis</i> RSHA | <i>C. caviae</i> GPIC | <i>C. poikilothermis</i> S15-834K | <i>C. felis</i> Fe/C-56 | <i>C. avium</i> 10DC88 | <i>C. gallinacea</i> 08-1274/3 | <i>Cand. C. ibidis</i> 10-1398/6 | <i>C. pecorum</i> E58 | <i>C. pneumoniae</i> LPCoLN | <i>C. serpentis</i> H15-1957-10C | <i>Cand. C. corallus</i> G3/2742-324 | <i>Cand. C. sanzinia</i> G4/2742-308 | <i>C. muridarum</i> Nigg | <i>C. trachomatis</i> A/HAR-13 | <i>C. suis</i> SWA-14 |
|---------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------|-------------------------|------------------------|-------------------------|-----------------------|-----------------------------------|-------------------------|------------------------|--------------------------------|----------------------------------|-----------------------|-----------------------------|----------------------------------|--------------------------------------|--------------------------------------|--------------------------|--------------------------------|-----------------------|
| avian <i>C. abortus</i> 15-70d24 (G1) | -                                     | 99.42                                | 99.66                                 | 99.80                     | 99.59                   | 99.49                  | 99.49                   | 98.09                 | 98.19                             | 98.23                   | 96.63                  | 96.25                          | 96.46                            | 96.05                 | 96.97                       | 97.17                            | 96.80                                | 96.01                                | 93.09                    | 92.24                          | 92.55                 |
| avian <i>C. abortus</i> 15-49d3 (G2)  | 99.35                                 | -                                    | 99.56                                 | 99.63                     | 99.42                   | 99.45                  | 99.35                   | 98.13                 | 98.19                             | 98.19                   | 96.63                  | 96.25                          | 96.29                            | 95.84                 | 96.93                       | 97.07                            | 96.80                                | 96.05                                | 93.12                    | 92.17                          | 92.62                 |
| avian <i>C. abortus</i> 15-58d44 (1V) | 99.61                                 | 99.10                                | -                                     | 99.86                     | 99.73                   | 99.63                  | 99.59                   | 98.23                 | 98.30                             | 98.36                   | 96.70                  | 96.39                          | 96.46                            | 96.12                 | 97.10                       | 97.24                            | 96.90                                | 96.29                                | 93.12                    | 92.24                          | 92.55                 |
| <i>C. abortus</i> 84/2334             | 99.94                                 | 99.42                                | 99.68                                 | -                         | 99.80                   | 99.69                  | 99.66                   | 98.30                 | 98.36                             | 98.43                   | 96.76                  | 96.39                          | 96.52                            | 96.15                 | 97.17                       | 97.31                            | 96.97                                | 96.22                                | 93.19                    | 92.31                          | 92.62                 |
| <i>C. abortus</i> S26/3               | 99.81                                 | 99.29                                | 99.55                                 | 99.87                     | -                       | 99.49                  | 99.45                   | 98.09                 | 98.16                             | 98.23                   | 96.63                  | 96.39                          | 96.32                            | 95.98                 | 96.97                       | 97.10                            | 96.76                                | 96.08                                | 93.12                    | 92.24                          | 92.55                 |
| <i>C. psittaci</i> 6BC                | 99.74                                 | 99.48                                | 99.48                                 | 99.81                     | 99.68                   | -                      | 99.69                   | 98.40                 | 98.53                             | 98.53                   | 96.63                  | 96.46                          | 96.59                            | 96.08                 | 97.17                       | 97.31                            | 97.04                                | 96.35                                | 93.33                    | 92.41                          | 92.72                 |
| <i>C. buteonis</i> RSHA               | 99.61                                 | 99.10                                | 99.35                                 | 99.68                     | 99.55                   | 99.61                  | -                       | 98.30                 | 98.36                             | 98.53                   | 96.73                  | 96.32                          | 96.63                            | 96.29                 | 97.34                       | 97.48                            | 97.14                                | 96.32                                | 93.26                    | 92.31                          | 92.62                 |
| <i>C. caviae</i> GPIC                 | 99.35                                 | 99.10                                | 99.10                                 | 99.42                     | 99.29                   | 99.22                  | 99.35                   | -                     | 99.11                             | 98.50                   | 96.05                  | 95.94                          | 96.15                            | 95.40                 | 96.73                       | 96.87                            | 96.80                                | 95.88                                | 93.02                    | 92.34                          | 92.65                 |
| <i>C. poikilothermis</i> S15-834K     | 99.35                                 | 99.03                                | 99.10                                 | 99.42                     | 99.29                   | 99.35                  | 99.35                   | 99.48                 | -                                 | 98.67                   | 96.08                  | 95.95                          | 96.29                            | 95.44                 | 96.90                       | 97.10                            | 97.04                                | 96.22                                | 92.85                    | 92.21                          | 92.38                 |
| <i>C. felis</i> Fe/C-58               | 98.39                                 | 98.26                                | 98.13                                 | 98.45                     | 98.32                   | 98.64                  | 98.51                   | 98.51                 | 98.39                             | -                       | 96.22                  | 95.98                          | 96.42                            | 95.57                 | 96.87                       | 97.00                            | 96.90                                | 96.15                                | 92.79                    | 92.11                          | 92.38                 |
| <i>C. avium</i> 10DC88                | 97.67                                 | 97.48                                | 97.48                                 | 97.74                     | 97.61                   | 97.80                  | 97.67                   | 97.74                 | 97.67                             | 96.96                   | -                      | 98.71                          | 95.37                            | 95.43                 | 96.12                       | 96.22                            | 96.12                                | 95.13                                | 92.99                    | 92.14                          | 92.31                 |
| <i>C. gallinacea</i> 08-1274/3        | 97.80                                 | 97.61                                | 97.67                                 | 97.87                     | 97.74                   | 97.93                  | 97.55                   | 97.48                 | 97.42                             | 96.90                   | 98.38                  | -                              | 95.23                            | 95.09                 | 95.91                       | 95.95                            | 95.95                                | 95.37                                | 92.82                    | 92.07                          | 92.34                 |
| <i>Cand. C. ibidis</i> 10-1398/6      | 96.97                                 | 96.71                                | 96.71                                 | 97.03                     | 96.90                   | 97.09                  | 96.97                   | 96.90                 | 96.77                             | 96.51                   | 95.80                  | 96.45                          | -                                | 95.64                 | 96.08                       | 96.39                            | 96.25                                | 95.74                                | 93.13                    | 92.65                          | 92.78                 |
| <i>C. pecorum</i> E58                 | 96.19                                 | 96.06                                | 96.06                                 | 96.26                     | 96.13                   | 96.32                  | 96.19                   | 96.13                 | 96.13                             | 95.87                   | 95.81                  | 95.81                          | 96.58                            | -                     | 96.28                       | 96.39                            | 96.39                                | 95.98                                | 92.48                    | 91.69                          | 92.07                 |
| <i>C. pneumoniae</i> LPCoLN           | 96.06                                 | 95.81                                | 95.94                                 | 96.13                     | 96.00                   | 96.32                  | 95.94                   | 95.74                 | 95.87                             | 95.48                   | 94.71                  | 94.71                          | 96.52                            | 96.00                 | -                           | 99.35                            | 99.11                                | 97.65                                | 93.70                    | 92.81                          | 93.12                 |
| <i>C. serpentis</i> H15-1957-10C      | 96.26                                 | 96.00                                | 96.13                                 | 96.32                     | 96.19                   | 96.52                  | 96.13                   | 95.94                 | 96.06                             | 95.68                   | 94.90                  | 94.90                          | 96.71                            | 96.19                 | 99.55                       | -                                | 99.15                                | 97.75                                | 93.77                    | 92.85                          | 93.09                 |
| <i>Cand. C. corallus</i> G3/2742-324  | 96.13                                 | 95.87                                | 96.00                                 | 96.19                     | 96.06                   | 96.39                  | 96.00                   | 95.81                 | 95.94                             | 95.42                   | 94.77                  | 94.77                          | 96.39                            | 95.87                 | 99.23                       | 99.68                            | -                                    | 97.68                                | 93.63                    | 92.75                          | 93.05                 |
| <i>Cand. C. sanzinia</i> G4/2742-308  | 95.61                                 | 95.48                                | 95.35                                 | 95.67                     | 95.55                   | 95.87                  | 95.61                   | 95.93                 | 95.80                             | 95.42                   | 95.03                  | 94.51                          | 96.39                            | 96.39                 | 97.23                       | 97.29                            | 97.10                                | -                                    | 93.09                    | 92.17                          | 92.41                 |
| <i>C. muridarum</i> Nigg              | 95.80                                 | 95.55                                | 95.55                                 | 95.74                     | 95.61                   | 95.67                  | 95.61                   | 95.87                 | 95.74                             | 95.67                   | 95.03                  | 94.58                          | 95.80                            | 95.29                 | 94.65                       | 94.71                            | 94.39                                | 94.65                                | -                        | 97.65                          | 97.79                 |
| <i>C. trachomatis</i> A/HAR-13        | 95.10                                 | 95.03                                | 94.84                                 | 95.03                     | 94.90                   | 94.97                  | 94.90                   | 95.16                 | 95.16                             | 94.84                   | 94.58                  | 94.13                          | 95.03                            | 94.72                 | 93.81                       | 94.01                            | 93.75                                | 93.94                                | 98.26                    | -                              | 98.16                 |
| <i>C. suis</i> SWA-14                 | 94.19                                 | 94.13                                | 93.93                                 | 94.13                     | 94.00                   | 94.19                  | 94.00                   | 94.32                 | 94.13                             | 94.06                   | 94.18                  | 93.73                          | 93.80                            | 93.49                 | 92.59                       | 92.78                            | 92.78                                | 93.16                                | 97.03                    | 96.65                          | -                     |

**Table S2.** Lower triangle represents pairwise sequence identity values for 16S rRNA, while upper triangle shows pairwise sequence identity values for 23S rRNA genes extracted from selected representatives of *Chlamydia* spp., *Candidatus* and avian *C. abortus* strains.

| Threshold |     | avian <i>C. abortus</i> 15-70d24 (G1) |        | Whole genome reference strains        |                                      |                           |                         |                        |                         |                                   |                       |                         |                        |                                |                                  |                             |                                      |                                 |                                      |                       |                          |                                |                       |                              |
|-----------|-----|---------------------------------------|--------|---------------------------------------|--------------------------------------|---------------------------|-------------------------|------------------------|-------------------------|-----------------------------------|-----------------------|-------------------------|------------------------|--------------------------------|----------------------------------|-----------------------------|--------------------------------------|---------------------------------|--------------------------------------|-----------------------|--------------------------|--------------------------------|-----------------------|------------------------------|
|           |     | Gene                                  | Length | avian <i>C. abortus</i> 15-58d44 (1V) | avian <i>C. abortus</i> 15-49d3 (G2) | <i>C. abortus</i> 84/2334 | <i>C. abortus</i> S26/3 | <i>C. psittaci</i> 6BC | <i>C. buteonis</i> RSHA | <i>C. poikilothermis</i> S15-834K | <i>C. caviae</i> GPIC | <i>C. felis</i> Fe/C-56 | <i>C. avium</i> 10DC88 | <i>C. gallinacea</i> 08-1274/3 | <i>Cand. C. ibidis</i> 10-1398/6 | <i>C. pneumoniae</i> LPCoLN | <i>Cand. C. corallus</i> G3/2742-324 | <i>C. serpents</i> H15-1957-10C | <i>Cand. C. sanzinia</i> G4/2742-308 | <i>C. pecorum</i> E58 | <i>C. muridarum</i> Nigg | <i>C. trachomatis</i> A/HAR-13 | <i>C. suis</i> SWA-14 | <i>Simkania negevensis</i> Z |
| Genus     | 70% | DnaA                                  | 460 aa | 99.13                                 | 99.13                                | 99.35                     | 99.13                   | 98.26                  | 98.70                   | 92.83                             | 93.48                 | 94.35                   | 85.22                  | 81.74                          | 82.61                            | 81.30                       | 80.39                                | 80.43                           | 78.26                                | 78.04                 | 78.99                    | 79.43                          | 79.21                 | 36.32                        |
|           | 78% | FabI                                  | 299 aa | 99.67                                 | 99.33                                | 99.67                     | 99.67                   | 93.31                  | 96.99                   | 92.31                             | 91.97                 | 90.64                   | 89.30                  | 87.29                          | 82.61                            | 84.62                       | 85.28                                | 85.28                           | 82.94                                | 84.90                 | 84.56                    | 83.22                          | 83.89                 | 66.56                        |
|           | 57% | Hyp325                                | 425 aa | 99.53                                 | 99.29                                | 99.76                     | 99.53                   | 98.35                  | 98.12                   | 92.94                             | 90.59                 | 90.59                   | 78.82                  | 78.55                          | 75.35                            | 73.13                       | 72.66                                | 70.02                           | 72.37                                | 67.84                 | 65.18                    | 64.71                          | 63.06                 | 34.19                        |
|           | 64% | SucA                                  | 919 aa | 99.12                                 | 98.79                                | 99.56                     | 99.34                   | 96.04                  | 96.37                   | 91.30                             | 90.20                 | 89.10                   | 78.33                  | 77.89                          | 76.13                            | 73.27                       | 73.60                                | 73.49                           | 74.75                                | 69.54                 | 69.16                    | 68.17                          | 67.95                 | 39.45                        |
| Species   | 96% | RpoN                                  | 423 aa | 97.87                                 | 97.40                                | 98.11                     | 97.87                   | 94.33                  | 92.91                   | 84.63                             | 84.16                 | 83.45                   | 66.04                  | 65.48                          | 59.20                            | 58.45                       | 58.22                                | 57.01                           | 59.72                                | 57.65                 | 47.76                    | 46.82                          | 49.65                 | 26.81                        |
|           | 96% | PepF                                  | 608 aa | 98.52                                 | 98.19                                | 98.85                     | 98.85                   | 94.57                  | 95.72                   | 86.86                             | 87.19                 | 81.91                   | 77.80                  | 75.66                          | 69.24                            | 66.78                       | 68.09                                | 66.28                           | 66.61                                | 66.94                 | 64.43                    | 64.10                          | 65.25                 | 39.90                        |
|           | 95% | Adk                                   | 213 aa | 99.06                                 | 95.31                                | 98.59                     | 98.59                   | 92.02                  | 91.55                   | 75.59                             | 75.23                 | 71.36                   | 62.20                  | 63.64                          | 49.77                            | 52.58                       | 52.11                                | 53.05                           | 49.77                                | 53.52                 | 44.69                    | 45.13                          | 43.36                 | 34.56                        |
|           | 98% | FtsK                                  | 804 aa | 98.76                                 | 98.38                                | 99.27                     | 98.88                   | 96.39                  | 95.27                   | 90.31                             | 90.06                 | 90.68                   | 80.00                  | 79.53                          | 78.29                            | 70.76                       | 71.13                                | 70.76                           | 71.06                                | 69.63                 | 70.73                    | 71.59                          | 69.79                 | 44.70                        |
|           | 95% | HemL                                  | 437 aa | 99.31                                 | 99.31                                | 99.31                     | 99.54                   | 91.76                  | 92.68                   | 78.03                             | 77.35                 | 78.72                   | 65.44                  | 64.52                          | 58.85                            | 55.61                       | 55.61                                | 55.38                           | 58.24                                | 54.46                 | 55.09                    | 53.24                          | 53.47                 | 36.93                        |

**Table S3-S5.** Nine taxonomically conserved protein sequences extracted from the avian *C. abortus* strains 15-70d24, 15-49d3 and 15-58d44 (G1, G2 and 1V, respectively) compared to strains belonging to *Chlamydia* spp., *Candidatus* to *Chlamydia* species and *Simkania negevensis* Z. Red cells present identity values higher than the defined threshold values, whereas green cells show identity values below the threshold values.

| Threshold |     | avian <i>C. abortus</i><br>15-49d3 (G2) |        | Whole genome reference strains           |  |                              |                            |                           |                            |                                      |                          |                            |                           |                                   |                                     |                                |   |                                     |   |                          |                             |                                   |                          |                                 |
|-----------|-----|---|--------|--|--|------------------------------|----------------------------|---------------------------|----------------------------|--------------------------------------|--------------------------|----------------------------|---------------------------|-----------------------------------|-------------------------------------|--------------------------------|---|-------------------------------------|---|--------------------------|-----------------------------|-----------------------------------|--------------------------|---------------------------------|
|           |     | Gene                                    | Length | avian <i>C. abortus</i><br>15-70d24 (G1) | avian <i>C. abortus</i><br>15-58d44 (1V) | <i>C. abortus</i><br>84/2334 | <i>C. abortus</i><br>S26/3 | <i>C. psittaci</i><br>6BC | <i>C. buteonis</i><br>RSHA | <i>C. poikilothermis</i><br>S15-834K | <i>C. caviae</i><br>GPIC | <i>C. felis</i><br>Fe/C-56 | <i>C. avium</i><br>10DC88 | <i>C. gallinacea</i><br>08-1274/3 | <i>Cand. C. ibidis</i><br>10-1398/6 | <i>C. pneumoniae</i><br>LPCoLN | <i>Cand. C. corallus</i><br>G3/2742-324 | <i>C. serpentis</i><br>H15-1957-10C | <i>Cand. C. sanzinia</i><br>G4/2742-308 | <i>C. pecorum</i><br>E58 | <i>C. muridarum</i><br>Nigg | <i>C. trachomatis</i><br>A/HAR-13 | <i>C. suis</i><br>SWA-14 | <i>Simkania negevensis</i><br>Z |
| Genus     | 70% | DnaA                                    | 460 aa | 99.13                                    | 99.57                                    | 99.78                        | 99.57                      | 98.70                     | 99.13                      | 93.26                                | 93.91                    | 94.78                      | 85.22                     | 81.74                             | 82.83                               | 81.52                          | 80.61                                   | 80.65                               | 78.26                                   | 78.26                    | 79.21                       | 79.43                             | 79.21                    | 36.32                           |
|           | 78% | FabI                                    | 299 aa | 99.33                                    | 99.67                                    | 99.67                        | 99.67                      | 93.31                     | 96.99                      | 92.31                                | 91.97                    | 90.64                      | 89.30                     | 87.29                             | 82.61                               | 84.62                          | 85.28                                   | 85.28                               | 82.94                                   | 84.90                    | 85.23                       | 82.55                             | 83.89                    | 66.56                           |
|           | 57% | Hyp325                                  | 425 aa | 99.29                                    | 98.82                                    | 99.06                        | 98.82                      | 97.65                     | 97.41                      | 92.24                                | 90.12                    | 89.88                      | 78.12                     | 77.86                             | 74.88                               | 73.36                          | 72.90                                   | 70.02                               | 72.37                                   | 67.84                    | 65.18                       | 64.24                             | 63.06                    | 34.19                           |
|           | 64% | SucA                                    | 908 aa | 98.79                                    | 98.79                                    | 99.01                        | 98.79                      | 95.59                     | 95.93                      | 90.86                                | 89.87                    | 88.66                      | 77.78                     | 77.78                             | 76.02                               | 73.38                          | 73.49                                   | 73.60                               | 74.86                                   | 69.76                    | 69.49                       | 68.50                             | 68.17                    | 39.67                           |
| Species   | 96% | RpoN                                    | 423 aa | 97.40                                    | 97.64                                    | 98.11                        | 97.64                      | 95.51                     | 94.09                      | 85.34                                | 84.87                    | 83.92                      | 66.51                     | 67.14                             | 59.67                               | 59.15                          | 58.45                                   | 57.94                               | 60.42                                   | 57.65                    | 48.71                       | 47.29                             | 50.12                    | 26.34                           |
|           | 96% | PepF                                    | 608 aa | 98.19                                    | 98.03                                    | 98.36                        | 98.36                      | 93.42                     | 94.57                      | 86.04                                | 86.37                    | 81.09                      | 77.14                     | 75.16                             | 68.59                               | 66.28                          | 67.60                                   | 65.63                               | 66.12                                   | 66.12                    | 64.26                       | 64.10                             | 65.25                    | 39.74                           |
|           | 95% | Adk                                     | 220 aa | 95.31                                    | 95.77                                    | 95.77                        | 95.31                      | 89.20                     | 89.67                      | 73.15                                | 71.95                    | 69.95                      | 61.72                     | 62.20                             | 49.53                               | 51.64                          | 51.64                                   | 51.64                               | 48.18                                   | 54.46                    | 44.93                       | 44.93                             | 44.05                    | 33.48                           |
|           | 98% | FtsK                                    | 804 aa | 98.38                                    | 98.38                                    | 98.91                        | 98.51                      | 96.39                     | 95.40                      | 90.56                                | 90.31                    | 90.68                      | 79.88                     | 79.90                             | 78.16                               | 70.63                          | 70.63                                   | 70.26                               | 70.81                                   | 69.75                    | 70.73                       | 71.46                             | 69.91                    | 44.83                           |
|           | 95% | HemL                                    | 437 aa | 99.31                                    | 99.08                                    | 99.08                        | 99.31                      | 91.53                     | 92.45                      | 78.26                                | 77.57                    | 78.49                      | 65.21                     | 64.52                             | 58.85                               | 55.38                          | 55.38                                   | 55.15                               | 58.24                                   | 54.23                    | 55.09                       | 53.01                             | 53.47                    | 36.93                           |

**Table S3-S5.** Nine taxonomically conserved protein sequences extracted from the avian *C. abortus* strains 15-70d24, 15-49d3 and 15-58d44 (G1, G2 and 1V, respectively) compared to strains belonging to *Chlamydia* spp., *Candidatus* to *Chlamydia* species and *Simkania negevensis* Z. Red cells present identity values higher than the defined threshold values, whereas green cells show identity values below the threshold values.

| Threshold |     | avian <i>C. abortus</i> 15-58d44 (1V) |        | Whole genome reference strains        |                                      |                           |                         |                        |                         |                                   |                       |                         |                        |                                |                                  |                             |                                      |                                  |                                      |                       |                          |                                |                       |                              |
|-----------|-----|---------------------------------------|--------|---------------------------------------|--------------------------------------|---------------------------|-------------------------|------------------------|-------------------------|-----------------------------------|-----------------------|-------------------------|------------------------|--------------------------------|----------------------------------|-----------------------------|--------------------------------------|----------------------------------|--------------------------------------|-----------------------|--------------------------|--------------------------------|-----------------------|------------------------------|
|           |     | Gene                                  | Length | avian <i>C. abortus</i> 15-70d24 (G1) | avian <i>C. abortus</i> 15-49d3 (G2) | <i>C. abortus</i> 84/2334 | <i>C. abortus</i> S26/3 | <i>C. psittaci</i> 6BC | <i>C. buteonis</i> RSHA | <i>C. poikilothermis</i> S15-834K | <i>C. caviae</i> GPIC | <i>C. felis</i> Fe/C-56 | <i>C. avium</i> 10DC88 | <i>C. gallinacea</i> 08-1274/3 | <i>Cand. C. ibidis</i> 10-1398/6 | <i>C. pneumoniae</i> LPCoLN | <i>Cand. C. corallus</i> G3/2742-324 | <i>C. serpentis</i> H15-1957-10C | <i>Cand. C. sanzinia</i> G4/2742-308 | <i>C. pecorum</i> E58 | <i>C. muridarum</i> Nigg | <i>C. trachomatis</i> A/HAR-13 | <i>C. suis</i> SWA-14 | <i>Simkania negevensis</i> Z |
| Genus     | 70% | DnaA                                  | 460 aa | 99.13                                 | 99.57                                | 99.78                     | 99.57                   | 98.70                  | 99.13                   | 93.26                             | 93.91                 | 95.00                   | 85.22                  | 81.74                          | 82.83                            | 81.74                       | 80.61                                | 80.87                            | 78.48                                | 78.48                 | 79.21                    | 79.43                          | 79.21                 | 36.32                        |
|           | 78% | FabI                                  | 299 aa | 99.67                                 | 99.67                                | 100                       | 100                     | 93.65                  | 97.32                   | 92.64                             | 92.31                 | 90.97                   | 89.63                  | 87.63                          | 82.94                            | 84.95                       | 85.62                                | 85.62                            | 83.28                                | 85.23                 | 84.90                    | 82.89                          | 84.23                 | 66.89                        |
|           | 57% | Hyp325                                | 425 aa | 99.53                                 | 98.82                                | 99.29                     | 99.06                   | 97.88                  | 97.65                   | 92.47                             | 90.12                 | 90.12                   | 78.59                  | 78.55                          | 75.35                            | 72.90                       | 72.66                                | 70.02                            | 72.37                                | 67.61                 | 64.94                    | 64.94                          | 63.29                 | 34.19                        |
|           | 64% | SucA                                  | 908 aa | 99.12                                 | 98.79                                | 99.34                     | 99.12                   | 96.04                  | 96.26                   | 91.30                             | 90.20                 | 89.32                   | 78.22                  | 77.89                          | 76.02                            | 73.27                       | 73.71                                | 73.49                            | 74.86                                | 69.76                 | 69.38                    | 68.39                          | 68.17                 | 39.67                        |
| Species   | 96% | RpoN                                  | 423 aa | 97.87                                 | 97.64                                | 98.82                     | 98.58                   | 94.09                  | 93.14                   | 85.11                             | 84.63                 | 83.92                   | 66.04                  | 66.19                          | 59.43                            | 58.45                       | 58.22                                | 57.01                            | 60.42                                | 57.65                 | 48.24                    | 47.06                          | 50.12                 | 26.81                        |
|           | 96% | PepF                                  | 608 aa | 98.52                                 | 98.03                                | 99.34                     | 99.34                   | 93.75                  | 94.90                   | 86.21                             | 86.54                 | 81.25                   | 76.97                  | 74.84                          | 68.75                            | 66.28                       | 67.93                                | 65.79                            | 66.28                                | 66.28                 | 64.75                    | 64.26                          | 65.90                 | 39.57                        |
|           | 95% | Adk                                   | 213 aa | 99.06                                 | 95.77                                | 99.53                     | 99.53                   | 92.02                  | 92.49                   | 76.53                             | 75.70                 | 71.83                   | 62.68                  | 64.11                          | 50.23                            | 52.58                       | 52.11                                | 53.05                            | 49.30                                | 53.99                 | 45.13                    | 45.58                          | 43.81                 | 35.48                        |
|           | 98% | FtsK                                  | 804 aa | 98.76                                 | 98.38                                | 99.27                     | 98.63                   | 96.52                  | 95.52                   | 90.31                             | 90.06                 | 90.68                   | 79.75                  | 79.28                          | 77.92                            | 70.51                       | 70.63                                | 70.38                            | 70.93                                | 69.63                 | 70.85                    | 71.46                          | 69.91                 | 44.83                        |
|           | 95% | HemL                                  | 437 aa | 99.31                                 | 99.08                                | 99.08                     | 99.31                   | 91.53                  | 92.91                   | 78.03                             | 77.12                 | 78.26                   | 64.98                  | 64.06                          | 58.62                            | 55.38                       | 55.38                                | 55.15                            | 58.47                                | 54.23                 | 55.32                    | 53.47                          | 53.47                 | 37.16                        |

**Table S3-S5.** Nine taxonomically conserved protein sequences extracted from the avian *C. abortus* strains 15-70d24, 15-49d3 and 15-58d44 (G1, G2 and 1V, respectively) compared to strains belonging to *Chlamydia* spp., *Candidatus* to *Chlamydia* species and *Simkania negevensis* Z. Red cells present identity values higher than the defined threshold values, whereas green cells show identity values below the threshold values.

Legend:

- values above the threshold
- values below the threshold

|  | avian <i>C. abortus</i><br>15-70d24 (G1) | avian <i>C. abortus</i><br>15-49d3 (G2) | avian <i>C. abortus</i><br>15-58d44 (1V) | <i>C. abortus</i><br>84/2334 | <i>C. abortus</i><br>S26/3 | <i>C. psittaci</i><br>6BC | <i>C. buteonis</i><br>RSHA | <i>C. caviae</i><br>GPIC | <i>C. felis</i><br>Fe/C-56 | <i>C. avium</i><br>10DC88 | <i>C. gallinacea</i><br>08-1274/3 | <i>C. pneumoniae</i><br>LPCoLN | <i>C. pecorum</i><br>E58 | <i>C. muridarum</i><br>Nigg | <i>C. trachomatis</i><br>A/HAR-13 |
|--|--|---|--|------------------------------|----------------------------|---------------------------|----------------------------|--------------------------|----------------------------|---------------------------|-----------------------------------|--------------------------------|--------------------------|-----------------------------|-----------------------------------|
| avian <i>C. abortus</i><br>15-70d24 (G1) | -  | 97.84                                   | 97.81                                    | 98.07                        | 97.93                      | 92.20                     | 92.42                      | 80.66                    | 80.32                      | 73.57                     | 73.21                             | 69.70                          | 68.98                    | 68.48                       | 68.47                             |
| avian <i>C. abortus</i><br>15-49d3 (G2)  | 0.99845                                  | -                                       | 97.23                                    | 97.47                        | 97.47                      | 92.14                     | 92.34                      | 80.56                    | 80.25                      | 73.72                     | 73.28                             | 69.75                          | 68.95                    | 68.31                       | 68.28                             |
| avian <i>C. abortus</i><br>15-58d44 (1V) | 0.99878                                  | 0.99808                                 | -  | 98.73                        | 98.36                      | 92.46                     | 92.27                      | 80.52                    | 80.24                      | 73.71                     | 73.30                             | 69.83                          | 69.11                    | 68.55                       | 68.51                             |
| <i>C. abortus</i><br>84/2334             | 0.99851                                  | 0.99795                                 | 0.99903                                  | -                            | 98.92                      | 92.68                     | 92.37                      | 80.64                    | 80.22                      | 73.69                     | 73.29                             | 69.77                          | 68.99                    | 68.52                       | 68.39                             |
| <i>C. abortus</i><br>S26/3               | 0.99881                                  | 0.99783                                 | 0.9989                                   | 0.99913                      | -                          | 92.54                     | 92.48                      | 80.64                    | 80.21                      | 73.63                     | 73.46                             | 69.84                          | 69.14                    | 68.65                       | 68.59                             |
| <i>C. psittaci</i><br>6BC                | 0.98791                                  | 0.98905                                 | 0.98773                                  | 0.98646                      | 0.98585                    | -                         | 93.40                      | 80.98                    | 80.59                      | 73.93                     | 73.42                             | 69.92                          | 69.11                    | 68.71                       | 68.52                             |
| <i>C. buteonis</i><br>RSHA               | 0.96938                                  | 0.97309                                 | 0.96843                                  | 0.96628                      | 0.96631                    | 0.9874                    | -                          | 81.41                    | 81.07                      | 74.02                     | 73.61                             | 69.94                          | 69.10                    | 68.49                       | 68.45                             |
| <i>C. caviae</i><br>GPIC                 | 0.95876                                  | 0.95797                                 | 0.95983                                  | 0.95771                      | 0.95704                    | 0.97015                   | 0.96605                    | -                        | 81.81                      | 74.10                     | 73.76                             | 70.06                          | 69.41                    | 68.81                       | 68.60                             |
| <i>C. felis</i><br>Fe/C-56               | 0.96041                                  | 0.96469                                 | 0.95879                                  | 0.95617                      | 0.95665                    | 0.9663                    | 0.97045                    | 0.95143                  | -                          | 73.78                     | 73.47                             | 69.96                          | 68.92                    | 68.46                       | 68.30                             |
| <i>C. avium</i><br>10DC88                | 0.90137                                  | 0.91304                                 | 0.89959                                  | 0.89893                      | 0.89832                    | 0.92367                   | 0.93948                    | 0.89991                  | 0.92731                    | -                         | 81.15                             | 69.44                          | 68.98                    | 68.68                       | 68.51                             |
| <i>C. gallinacea</i><br>08-1274/3        | 0.92814                                  | 0.9374                                  | 0.92524                                  | 0.92356                      | 0.92393                    | 0.94173                   | 0.94845                    | 0.91187                  | 0.94793                    | 0.98642                   | -                                 | 69.28                          | 68.73                    | 68.43                       | 68.32                             |
| <i>C. pneumoniae</i><br>LPCoLN           | 0.90143                                  | 0.89826                                 | 0.90233                                  | 0.90184                      | 0.90352                    | 0.89521                   | 0.86954                    | 0.91119                  | 0.87639                    | 0.80706                   | 0.83060                           | -                              | 69.61                    | 67.58                       | 67.65                             |
| <i>C. pecorum</i><br>E58                 | 0.88269                                  | 0.88284                                 | 0.88567                                  | 0.88429                      | 0.88324                    | 0.88236                   | 0.85674                    | 0.89201                  | 0.87343                    | 0.81059                   | 0.83297                           | 0.90213                        | -                        | 67.43                       | 67.20                             |
| <i>C. muridarum</i><br>Nigg              | 0.83240                                  | 0.84097                                 | 0.83835                                  | 0.83694                      | 0.83601                    | 0.85406                   | 0.8549                     | 0.84306                  | 0.8423                     | 0.80527                   | 0.82163                           | 0.79774                        | 0.77658                  | -                           | 80.21                             |
| <i>C. trachomatis</i><br>A/HAR-13        | 0.83202                                  | 0.83927                                 | 0.83984                                  | 0.83723                      | 0.83561                    | 0.84321                   | 0.8319                     | 0.83390                  | 0.8299                     | 0.76501                   | 0.78840                           | 0.79042                        | 0.79041                  | 0.97216                     | -                                 |

**Table S6.** Pairwise comparison of selected representatives of *Chlamydia* spp. and avian *C. abortus* strains. Lower triangle represents pairwise sequence identity values for tetranucleotide signature correlation index, while upper triangle shows pairwise sequence identity values for average nucleotide identity (ANIb).

Legend:

Upper triangle - Above cutoff (> 95%) Below cutoff (< 95%)

Lower triangle - Above cutoff (> 0.999) In range (> 0.989) Below cutoff (< 0.989)

|  | avian <i>C. abortus</i><br>15-70d24 (G1) | avian <i>C. abortus</i><br>15-49d3 (G2) | avian <i>C. abortus</i><br>15-58d44 (1V) | <i>C. abortus</i><br>84/2334 | <i>C. psittaci</i><br>6BC (genotype A) | <i>C. psittaci</i><br>CP3 (genotype B) | <i>C. psittaci</i><br>NJ1 (genotype D) | <i>C. psittaci</i><br>MN (genotype E) | <i>C. psittaci</i><br>WS/RT/E30 (genotype E/B) | <i>C. psittaci</i><br>VS2255 (genotype F) | <i>C. psittaci</i><br>M56 (genotype M56) | <i>C. psittaci</i><br>WC (genotype WC) | <i>C. caviae</i><br>GPIC | <i>C. poikilothermis</i><br>S15-834K | <i>C. felis</i><br>Fe/C-56 | <i>C. gallinacea</i><br>08-1274/3 | <i>C. avium</i><br>10DC88 | <i>C. pneumoniae</i><br>LPCoLN | <i>Cand. C. sanzinia</i><br>G4/2742-308 | <i>C. serpentis</i><br>H15-1957-10C | <i>Cand. C. corallus</i><br>G3/2742-324 | <i>C. pecorum</i><br>L1 | <i>C. muridarum</i><br>Nigg | <i>C. suis</i><br>SWA-14 | <i>C. trachomatis</i><br>A/HAR-13 |
|--|--|---|--|------------------------------|--|--|--|---------------------------------------|--|---|--|--|--------------------------|--------------------------------------|----------------------------|-----------------------------------|---------------------------|--------------------------------|---|-------------------------------------|---|-------------------------|-----------------------------|--------------------------|-----------------------------------|
| avian <i>C. abortus</i><br>15-70d24 (G1) | -  | 98.73                                   | 97.43                                    | 97.63                        | 94.61                                  | 95.71                                  | 95.71                                  | 94.86                                 | 95.62  | 95.62                                     | 95.51                                    | 95.68                                  | 81.81                    | 82.28                                | 79.85                      | 72.88                             | 70.74                     | 68.41                          | 68.28                                   | 67.92                               | 68.21                                   | 67.16                   | 59.33                       | 59.13                    | 58.69                             |
| avian <i>C. abortus</i><br>15-49d3 (G2)  | 98.73                                    | -                                       | 97.13                                    | 97.33                        | 94.48                                  | 95.46                                  | 95.39                                  | 94.73                                 | 95.47  | 95.47                                     | 95.22                                    | 95.43                                  | 81.59                    | 82.18                                | 79.69                      | 72.80                             | 70.64                     | 68.60                          | 68.48                                   | 67.87                               | 68.17                                   | 67.17                   | 59.41                       | 59.20                    | 58.82                             |
| avian <i>C. abortus</i><br>15-58d44 (1V) | 97.43                                    | 97.13                                   | -  | 99.54                        | 94.68                                  | 95.75                                  | 95.70                                  | 94.89                                 | 95.66  | 95.66                                     | 95.58                                    | 95.72                                  | 81.77                    | 82.40                                | 79.81                      | 72.81                             | 70.55                     | 68.31                          | 68.34                                   | 67.71                               | 68.23                                   | 67.06                   | 58.95                       | 59.16                    | 58.66                             |

**Table S7.** Nucleotide identity values (%) of plasmid sequences of selected *Chlamydia* spp. Distance matrices based on multiple sequence alignment were used for calculation of nucleotide sequence identity values (Geneious Pro 8.0 software; Biomatters, Auckland, New Zealand).

|  | avian <i>C. abortus</i><br>15-70d24 (G1) | avian <i>C. abortus</i><br>15-49d3 (G2) | avian <i>C. abortus</i><br>15-58d44 (1V) | <i>C. abortus</i><br>84/2334 | <i>C. buteonis</i><br>RSHA | <i>C. psittaci</i><br>6BC | <i>Cand. C. ibidis</i><br>10-1398/6 | <i>C. abortus</i><br>S26/3 | <i>C. gallinacea</i><br>08-1274/3 | <i>C. caviae</i><br>GPC | <i>C. felis</i><br>Fe/C-56 | <i>Cand. C. corallus</i><br>G3/2742-324 | <i>C. pneumoniae</i><br>AR39 | <i>C. avium</i><br>10DC88 | <i>C. poikilothermis</i><br>S15-834K | <i>Cand. C. sanzinia</i><br>G4/2742-308 | <i>C. trachomatis</i><br>D/UW-3/CX | <i>C. muridarum</i><br>Nigg | <i>C. suis</i><br>SWA-14 |
|--|--|---|--|------------------------------|----------------------------|---------------------------|-------------------------------------|----------------------------|-----------------------------------|-------------------------|----------------------------|---|------------------------------|---------------------------|--------------------------------------|---|------------------------------------|-----------------------------|--------------------------|
| avian <i>C. abortus</i><br>15-70d24 (G1) | -  | 91.21                                   | 56.70                                    | 51.5                         | 62.06                      | 49.12                     | 41.93                               | 25.54                      | 25.51                             | 25.67                   | 21.35                      | 20.79                                   | 19.53                        | 16.39                     | 13.77                                | 13.46                                   | 13.68                              | 9.38                        | 9.10                     |
| avian <i>C. abortus</i><br>15-49d3 (G2)  | 91.21                                    | -                                       | 69.47                                    | 69.09                        | 70.85                      | 64.19                     | 55.60                               | 32.98                      | 28.46                             | 33.32                   | 24.81                      | 22.90                                   | 21.42                        | 16.23                     | 17.47                                | 15.20                                   | 17.68                              | 17.67                       | 16.95                    |
| avian <i>C. abortus</i><br>15-58d44 (1V) | 56.70                                    | 69.47                                   | -  | 77.67                        | 54.47                      | 62.65                     | 39.89                               | 38.35                      | 26.38                             | 31.24                   | 22.98                      | 21.25                                   | 19.78                        | 15.65                     | 17.24                                | 14.73                                   | 14.72                              | 10.53                       | 9.79                     |

**Table S8.** Nucleotide identity values (%) of plasticity zone sequences of selected representative strains of *Chlamydia* spp. Distance matrices based on multiple sequence alignment were used for calculation of nucleotide sequence identity values (Geneious Pro 8.0 software; Biomatters, Auckland, New Zealand).



|  | avian <i>C. abortus</i><br>15-70d24 (G1) | avian <i>C. abortus</i><br>15-49d3 (G2) | avian <i>C. abortus</i><br>15-58d44 (1V) | <i>C. abortus</i><br>84/2334 | <i>C. abortus</i><br>S26/3 | <i>C. abortus</i><br>AB7 | <i>C. abortus</i><br>B577 | <i>C. abortus</i><br>LLG | <i>C. psittaci</i><br>6BC (genotype A) | <i>C. psittaci</i><br>CP3 (genotype B) | <i>C. psittaci</i><br>GR9 (genotype C) | <i>C. psittaci</i><br>NJ1 (genotype D) | <i>C. psittaci</i><br>MN (genotype E) | <i>C. psittaci</i><br>WS/RT/E30 (genotype E/B) | <i>C. psittaci</i><br>VS2255 (genotype F) | <i>C. psittaci</i><br>M56 (genotype M56) | <i>C. psittaci</i><br>WC (genotype WC) | <i>C. buteonis</i><br>RSHA |
|--|--|---|--|------------------------------|----------------------------|--------------------------|---------------------------|--------------------------|--|--|--|--|---------------------------------------|--|---|--|--|----------------------------|
| avian <i>C. abortus</i><br>15-70d24 (G1)       | -  | 15,562                                  | 13,071                                   | 12,126                       | 11,957                     | 12,084                   | 12,020                    | 12,637                   | 25,107                                 | 25,006                                 | 23,960                                 | 25,032                                 | 28,112                                | 68,907   | 25,190                                    | 28,405                                   | 31,264                                 | 72,856                     |
| avian <i>C. abortus</i><br>15-49d3 (G2)        | 15,562                                   | -                                       | 16,891                                   | 16,328                       | 16,064                     | 16,185                   | 16,142                    | 16,730                   | 28,590                                 | 28,493                                 | 27,105                                 | 28,535                                 | 31,629                                | 69,925   | 28,680                                    | 31,936                                   | 34,814                                 | 74,315                     |
| avian <i>C. abortus</i><br>15-58d44 (1V)       | 13,071                                   | 16,891                                  | -  | 8892                         | 8872                       | 8996                     | 8957                      | 9554                     | 22,573                                 | 22,460                                 | 21,854                                 | 22,530                                 | 25,579                                | 68,768   | 22,675                                    | 25,897                                   | 28,739                                 | 72,206                     |
| <i>C. abortus</i><br>84/2334                   | 12,126                                   | 16,328                                  | 8892                                     | -                            | 2074                       | 2058                     | 2032                      | 2512                     | 15,803                                 | 15,698                                 | 15,047                                 | 15,769                                 | 18,536                                | 67,720   | 15,865                                    | 18,848                                   | 21,490                                 | 71,075                     |
| <i>C. abortus</i><br>S26/3                     | 11,957                                   | 16,064                                  | 8872                                     | 2074                         | -                          | 251                      | 120                       | 1378                     | 15,555                                 | 15,452                                 | 14,847                                 | 15,504                                 | 18,455                                | 67,067   | 15,644                                    | 18,756                                   | 21,522                                 | 70,614                     |
| <i>C. abortus</i><br>AB7                       | 12,084                                   | 16,185                                  | 8996                                     | 2058                         | 251                        | -                        | 221                       | 1392                     | 15,530                                 | 15,431                                 | 14,822                                 | 15,480                                 | 18,407                                | 67,201   | 15,615                                    | 18,717                                   | 21,460                                 | 70,748                     |
| <i>C. abortus</i><br>B577                      | 12,020                                   | 16,142                                  | 8957                                     | 2032                         | 120                        | 221                      | -                         | 1365                     | 15,497                                 | 15,399                                 | 14,802                                 | 15,427                                 | 18,375                                | 67,171   | 15,566                                    | 18,691                                   | 21,434                                 | 70,720                     |
| <i>C. abortus</i><br>LLG                       | 12,637                                   | 16,730                                  | 9554                                     | 2512                         | 1378                       | 1392                     | 1365                      | -                        | 16,000                                 | 15,909                                 | 15,285                                 | 15,965                                 | 18,744                                | 67,764   | 16,095                                    | 19,043                                   | 21,600                                 | 71,262                     |
| <i>C. psittaci</i><br>6BC (genotype A)         | 25,107                                   | 28,590                                  | 22,573                                   | 15,803                       | 15,555                     | 15,530                   | 15,497                    | 16,000                   | -                                      | 472                                    | 3151                                   | 2644                                   | 8572                                  | 56,327   | 1458                                      | 11,816                                   | 15,912                                 | 69,624                     |
| <i>C. psittaci</i><br>CP3 (genotype B)         | 25,006                                   | 28,493                                  | 22,460                                   | 15,698                       | 15,452                     | 15,431                   | 15,399                    | 15,909                   | 472                                    | -                                      | 2951                                   | 2504                                   | 8667                                  | 56,072   | 1349                                      | 11,893                                   | 16,115                                 | 69,446                     |
| <i>C. psittaci</i><br>GR9 (genotype C)         | 23,960                                   | 27,105                                  | 21,854                                   | 15,047                       | 14,847                     | 14,822                   | 14,802                    | 15,285                   | 3151                                   | 2951                                   | -                                      | 4243                                   | 9929                                  | 54,896   | 3381                                      | 12,486                                   | 16,596                                 | 70,044                     |
| <i>C. psittaci</i><br>NJ1 (genotype D)         | 25,032                                   | 28,535                                  | 22,530                                   | 15,769                       | 15,504                     | 15,480                   | 15,427                    | 15,965                   | 2644                                   | 2504                                   | 4243                                   | -                                      | 9493                                  | 57,280   | 2868                                      | 12,241                                   | 16,649                                 | 69,625                     |
| <i>C. psittaci</i><br>MN (genotype E)          | 28,112                                   | 31,629                                  | 25,579                                   | 18,536                       | 18,455                     | 18,407                   | 18,375                    | 18,744                   | 8572                                   | 8667                                   | 9929                                   | 9493                                   | -                                     | 63,412   | 8699                                      | 12,580                                   | 12,976                                 | 74,707                     |
| <i>C. psittaci</i><br>WS/RT/E30 (genotype E/B) | 68,907                                   | 69,925                                  | 68,768                                   | 67,720                       | 67,067                     | 67,201                   | 67,171                    | 67,764                   | 56,327                                 | 56,072                                 | 54,896                                 | 57,280                                 | 63,412                                | -  | 56,649                                    | 66,189                                   | 70,408                                 | 60,903                     |
| <i>C. psittaci</i><br>VS2255 (genotype F)      | 25,190                                   | 28,680                                  | 22,675                                   | 15,865                       | 15,644                     | 15,615                   | 15,566                    | 16,095                   | 1458                                   | 1349                                   | 3381                                   | 2868                                   | 8699                                  | 56,649   | -   | 11,798                                   | 15,801                                 | 69,828                     |
| <i>C. psittaci</i><br>M56 (genotype M56)       | 28,405                                   | 31,936                                  | 25,897                                   | 18,848                       | 18,756                     | 18,717                   | 18,691                    | 19,043                   | 11,816                                 | 11,893                                 | 12,486                                 | 12,241                                 | 12,580                                | 66,189   | 11,796                                    | -  | 13,372                                 | 74,142                     |
| <i>C. psittaci</i><br>WC (genotype WC)         | 31,264                                   | 34,814                                  | 28,739                                   | 21,490                       | 21,522                     | 21,460                   | 21,434                    | 21,600                   | 15,912                                 | 16,115                                 | 16,596                                 | 16,649                                 | 12,976                                | 70,408   | 15,801                                    | 13,372                                   | -                                      | 79,781                     |
| <i>C. buteonis</i><br>RSHA                     | 72,856                                   | 74,315                                  | 72,206                                   | 71,075                       | 70,614                     | 70,748                   | 70,720                    | 71,262                   | 69,624                                 | 69,446                                 | 70,044                                 | 69,625                                 | 74,707                                | 60,903   | 69,828                                    | 74,142                                   | 79,781                                 | -                          |

**Table S9.** The number of SNP differences of selected representatives of *Chlamydia* spp.

| Designation     | Host                                     | Year          | Genotype  | MLST<br>sequence type | GenBank accession number   |             |  |  |
|-----------------|--|---------------|-----------|-----------------------|--|-------------|--|--|
|                 |  |               |           |                       | MLST<br>( <i>gidA</i> , <i>enoA</i> , <i>fumC</i> , <i>gatA</i> ,<br><i>hemN</i> , <i>hflx</i> , <i>oppA</i> ) | <i>ompA</i> | 16S-23S ribosomal RNA<br>intergenic spacer | WGS based on Illumina<br>sequencing  |
| <b>15-70d24</b> | Eurasian teal<br>( <i>Anas crecca</i> )  | 2015/<br>2016 | <b>G1</b> | ST154                 | KX870503<br>KX870475<br>KX870476<br>KX870477<br>KX870478<br>KX870479<br>KX870480<br>KX870481                   | KX870485    | KX870503                                   | chromosome:<br>LS450958.1<br>plasmid:<br>LS450959.1<br>raw reads:<br>ERS2484026.1  |
| <b>15-49d3</b>  | mallard<br>( <i>Anas platyrhynchos</i> ) | 2015/<br>2016 | <b>G2</b> | ST151                 | KX870501<br>KX870454<br>KX870455<br>KX870456<br>KX870457<br>KX870458<br>KX870459<br>KX870460                   | KX870483    | KX870501                                   | chromosome:<br>LS4509561<br>plasmid:<br>LS450957.1<br>raw reads:<br>ERS2484025.1   |
| <b>15-58d44</b> | magpie<br>( <i>Pica pica</i> )           | 2015/<br>2016 | <b>1V</b> | ST152                 | KX870502<br>KX870461<br>KX870462<br>KX870463<br>KX870464<br>KX870465<br>KX870466<br>KX870467                   | KX870484    | KX870502                                   | chromosome:<br>CAJHTZ010000001.1<br>CAJHTZ010000002.1<br>CAJHTZ010000004.1<br>CAJHTZ010000005.1<br>plasmid:<br>CAJHTZ010000003.1<br>raw reads:<br>ERS2484027.1 |

**Table S10.** Characterization of avian *C. abortus* strains.

| 16S rRNA & 23S rRNA<br>phylogenetic analyses         | Molecular typing                                     | ANiB & Tetra-nucleotide<br>signatures                           | Pladsmid comparisons                                 | Plasticity zone                                      | Phylogenetic network<br>analysis                                | SNP analysis  |
|--|--|---|--|--|---|---|
| avian <i>C. abortus</i><br>15-70d24<br>(LS450958.2)  | avian <i>C. abortus</i><br>15-70d24<br>(LS450958.2)  | avian <i>C. abortus</i><br>15-70d24<br>(LS450958.2; LS450959.2) | avian <i>C. abortus</i><br>15-70d24<br>(LS450959.2)  | avian <i>C. abortus</i><br>15-70d24<br>(LS450958.2)  | avian <i>C. abortus</i><br>15-70d24<br>(LS450958.2; LS450959.2) | avian <i>C. abortus</i><br>15-70d24<br>(ERR6415086.1) |
| avian <i>C. abortus</i><br>15-49d3<br>(LS450956.2)   | avian <i>C. abortus</i><br>15-49d3<br>(LS450956.2)   | avian <i>C. abortus</i><br>15-49d3<br>(LS450956.2; LS450957.2)  | avian <i>C. abortus</i><br>15-49d3<br>(LS450957.2)   | avian <i>C. abortus</i><br>15-49d3<br>(LS450956.2)   | avian <i>C. abortus</i><br>15-49d3<br>(LS450956.2; LS450957.2)  | avian <i>C. abortus</i><br>15-49d3<br>(ERR6415087.1)  |
| avian <i>C. abortus</i><br>15-58d44<br>(OU508367.1)  | avian <i>C. abortus</i><br>15-58d44<br>(OU508367.1)  | avian <i>C. abortus</i><br>15-58d44<br>(OU508367.1; OU508368.1) | avian <i>C. abortus</i><br>15-58d44<br>(OU508368.1)  | avian <i>C. abortus</i><br>15-58d44<br>(OU508367.1)  | avian <i>C. abortus</i><br>15-58d44<br>(OU508367.1; OU508368.1) | avian <i>C. abortus</i><br>15-58d44<br>(ERR6415088.1) |
| <i>C. abortus</i><br>84/2334<br>(CP031646.1)         | <i>C. abortus</i><br>84/2334<br>(CP031646.1)         | <i>C. abortus</i><br>84/2334<br>(CP031646.1; CP031647.1)        | <i>C. abortus</i><br>84/2334<br>(CP031647.1)         | <i>C. abortus</i><br>84/2334<br>(CP031646.1)         | <i>C. abortus</i><br>84/2334<br>(CP031646.1; CP031647.1)        | <i>C. abortus</i><br>84/2334<br>(SRR13156196.1)       |
| <i>C. abortus</i><br>S26/3<br>(CR848038.1)           | <i>C. abortus</i><br>S26/3<br>(CR848038.1)           | <i>C. abortus</i><br>S26/3<br>(GCA_000026025.1)                 | <i>C. avium</i><br>10DC88<br>(CP006572.1)            | <i>C. abortus</i><br>S26/3<br>(CR848038.1)           | <i>C. abortus</i><br>AB7<br>(LN554882.1)                        | <i>C. abortus</i><br>AB7<br>(ERR175610.1)             |
| <i>C. avium</i><br>10DC88<br>(CP006571.1)            | <i>C. avium</i><br>10DC88<br>(CP006571.1)            | <i>C. avium</i><br>10DC88<br>(GCA_000583875.1)                  | <i>C. caviae</i><br>GPIC<br>(AE015926.1)             | <i>C. avium</i><br>10DC88<br>(CP006571.1)            | <i>C. abortus</i><br>B577<br>(CP024084.1)                       | <i>C. abortus</i><br>B577<br>(SRR2089367.1)           |
| <i>C. buteonis</i><br>RSHA<br>(CAAAFM010000000.1)    | <i>C. buteonis</i><br>RSHA<br>(CAAAFM010000000.1)    | <i>C. buteonis</i><br>RSHA<br>(CAAAFM010000000.1)               | <i>C. felis</i><br>Fe/C-56<br>(AP006862.1)           | <i>C. buteonis</i><br>RSHA<br>(CAAAFM010000000.1)    | <i>C. abortus</i><br>LLG<br>(CP018296.1)                        | <i>C. abortus</i><br>LLG<br>(ERR175609.1)             |
| <i>C. caviae</i><br>GPIC<br>(AE015925.1)             | <i>C. caviae</i><br>GPIC<br>(AE015925.1)             | <i>C. caviae</i><br>GPIC<br>(GCA_000007605.1)                   | <i>C. gallinacea</i><br>08-1274/3<br>(CP015841.1)    | <i>C. caviae</i><br>GPIC<br>(AE015925.1)             | <i>C. abortus</i><br>S26/3<br>(CR848038.1)                      | <i>C. abortus</i><br>S26/3<br>(NC_004552.2)           |
| <i>C. felis</i><br>Fe/C-56<br>(AP006861.1)           | <i>C. felis</i><br>Fe/C-56<br>(AP006861.1)           | <i>C. felis</i><br>Fe/C-56<br>(AP006861.1; AP006862.1)          | <i>C. muridarum</i><br>Nigg<br>(AE002162.1)          | <i>C. felis</i><br>Fe/C-56<br>(AP006861.1)           | <i>C. muridarum</i><br>RSHA<br>(CAAAFM010000000.1)              | <i>C. buteonis</i><br>RSHA<br>(GCF_900634605.1)       |
| <i>C. gallinacea</i><br>08-1274/3<br>(NZ_CP015840.1) | <i>C. gallinacea</i><br>08-1274/3<br>(NZ_CP015840.1) | <i>C. gallinacea</i><br>08-1274/3<br>(GCA_000471025.2)          | <i>C. pecorum</i><br>L1<br>(CM003639.1)              | <i>C. gallinacea</i><br>08-1274/3<br>(CP015840.1)    | <i>C. psittaci</i><br>6BC<br>(CP002586.1; CP002587.1)           | <i>C. psittaci</i><br>6BC<br>(SRR652458.1)            |
| <i>C. muridarum</i><br>Nigg<br>(AE002160.2)          | <i>C. muridarum</i><br>Nigg<br>(AE002160.2)          | <i>C. muridarum</i><br>Nigg<br>(GCA_000006685.1)                | <i>C. pneumoniae</i><br>LPCoLN<br>(CP001714.1)       | <i>C. muridarum</i><br>Nigg<br>(AE002160.1)          | <i>C. psittaci</i><br>CP3<br>(CP003797.1; CP003813.1)           | <i>C. psittaci</i><br>CP3<br>(SRR652460.1)            |
| <i>C. pecorum</i><br>E58<br>(CP002608.1)             | <i>C. pecorum</i><br>E58<br>(CP002608.1)             | <i>C. pecorum</i><br>E58<br>(GCA_000204135.1)                   | <i>C. poikilothermis</i><br>S15-834C<br>(LS992155.1) | <i>C. pecorum</i><br>E58<br>(CP002608.1)             | <i>C. psittaci</i><br>GR9<br>(CP003791.1)                       | <i>C. psittaci</i><br>GR9<br>(SRR652456.1)            |
| <i>C. pneumoniae</i><br>LPCoLN<br>(CP001713.1)       | <i>C. pneumoniae</i><br>LPCoLN<br>(CP001713.1)       | <i>C. psittaci</i><br>6BC<br>(GCA_000191925.1)                  | <i>C. psittaci</i><br>6BC<br>(CP002550.1)            | <i>C. pneumoniae</i><br>AR39<br>(AE002161.1)         | <i>C. psittaci</i><br>M56<br>(CP003795.1; CP003814.1)           | <i>C. psittaci</i><br>M56<br>(SRR652459.1)            |
| <i>C. poikilothermis</i><br>S15-834K<br>(LS992154.1) | <i>C. poikilothermis</i><br>S15-834K<br>(LS992154.1) | <i>C. pneumoniae</i><br>LPCoLN<br>(GCA_000024145.1)             | <i>C. psittaci</i><br>CP3<br>(CP003813.1)            | <i>C. poikilothermis</i><br>S15-834K<br>(LS992154.1) | <i>C. psittaci</i><br>MN<br>(CP003792.1; CP003815.1)            | <i>C. psittaci</i><br>MN<br>(SRR652461.1)             |
| <i>C. psittaci</i><br>6BC<br>(CP002549.1)            | <i>C. psittaci</i><br>6BC<br>(CP002549.1)            | <i>C. trachomatis</i><br>A/HAR-13<br>(GCA_000012125.1)          | <i>C. psittaci</i><br>M56<br>(CP003814.1)            | <i>C. psittaci</i><br>6BC<br>(CP002549.1)            | <i>C. psittaci</i><br>NJ1<br>(CP003798.1; CP003816.1)           | <i>C. psittaci</i><br>NJ1<br>(SRR652467.1)            |
| <i>C. serpentis</i><br>H15-1957-10C<br>(LT993738.1)  | <i>C. serpentis</i><br>H15-1957-10C<br>(LT993738.1)  |   | <i>C. psittaci</i><br>MN<br>(CP003815.1)             | <i>C. serpentis</i><br>H15-1957-10C<br>(LT993738.1)  | <i>C. psittaci</i><br>VS225<br>(CP003793.1; CP003817.1)         | <i>C. psittaci</i><br>VS225<br>(SRR652453.1)          |
| <i>C. suis</i><br>SWA-14<br>(LT860207.1)             | <i>C. suis</i><br>SWA-14<br>(LT860207.1)             |   | <i>C. psittaci</i><br>NJ1<br>(CP003816.1)            | <i>C. suis</i><br>SWA-14<br>(LT860207.1)             | <i>C. psittaci</i><br>WC<br>(CP003796.1; CP003818.1)            | <i>C. psittaci</i><br>WC<br>(SRR652464.1)             |

|   |   |  |   |   |   |   |
|---|---|--|---|---|---|---|
| <i>C. trachomatis</i><br>A/HAR-13<br>(CP000051.1)           | <i>C. trachomatis</i><br>A/HAR-13<br>(CP000051.1)           |  | <i>C. psittaci</i><br>VS225<br>(CP003817.1)             | <i>C. trachomatis</i><br>D/UW-3/CX<br>(AE001273.1)          | <i>C. psittaci</i><br>WS/RT/E30<br>(CP003794.1; CP003819.1) | <i>C. psittaci</i><br>WS/RT/E30<br>(CP003794.1) |
| <i>Cand. C. corallus</i><br>G3/2742-324<br>(NWQK01000000.1) | <i>Cand. C. corallus</i><br>G3/2742-324<br>(NWQK01000000.1) |  | <i>C. psittaci</i><br>WC<br>(CP003818.1)                | <i>Cand. C. corallus</i><br>G3/2742-324<br>(NWQK01000000.1) |   |   |
| <i>Cand. C. ibidis</i><br>10-1398/6<br>(APJW01000000.1)     | <i>Cand. C. ibidis</i><br>10-1398/6<br>(APJW01000000.1)     |  | <i>C. psittaci</i><br>WS/RT/E30<br>(CP003819.1)         | <i>Cand. C. ibidis</i><br>10-1398/6<br>(APJW01000000.1)     |   |   |
| <i>Cand. C. sanzinia</i><br>G4/2742-308<br>(CP014639.1)     | <i>Cand. C. sanzinia</i><br>G4/2742-308<br>(CP014639.1)     |  | <i>C. serpentis</i><br>H15-1957-10C<br>(LT993739.1)     | <i>Cand. C. sanzinia</i><br>G4/2742-308<br>(CP014639.1)     |   |   |
|   | <i>Simkania negevensis</i><br>Z<br>(FR872582.1)             |  | <i>C. suis</i><br>SWA-14<br>(LT860208.1)                |   |   |   |
|   |   |  | <i>C. trachomatis</i><br>A/HAR-13<br>(CP000052.1)       |   |   |   |
|   |   |  | <i>Cand. C. sanzinia</i><br>G4/2742-308<br>(CP014640.1) |   |   |   |
|   |   |  | <i>Cand. C. corallus</i><br>G3/2742-324<br>(CM008979.1) |   |   |   |

**Table S11.** Strains used in this study and their GenBank accession numbers.