**Supplementary Data File 2 |** Stage specific expressed genes in the two parasite stages

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| GenBank Acc. | Gene\_ ID | TPMvalues | | Domains | Product name |
| **Schizont** | **Piroplasm** |
| XM\_758142.1 | TP03\_0217 | 0 | 3318 | SP | Hypothetical protein |
| XM\_757627.1 | TP03\_0905 | 0 | 924 | 3 TMD | Hypothetical protein |
| XM\_758244.1 | TP03\_0319 | 0 | 463 | (-) | Hypothetical protein |
| XM\_757628.1 | TP03\_0906 | 0 | 156 | 5TMD | Hypothetical protein |
| XM\_760967.1 | TP01\_0540 | 0 | 130 | (-) | Hypothetical protein |
| XM\_757644.1 | TP03\_0922 | 0 | 117 | 5TMD | Hypothetical protein |
| XM\_757632.1 | TP03\_0910 | 0 | 109 | 4 TMD | Hypothetical protein |
| XM\_757622.1 | TP03\_0924 | 0 | 76 | 6TMD | Hypothetical protein |
| XM\_757633.1 | TP03\_0911 | 0 | 72 | 5TMD | Hypothetical protein |
| XM\_757626.1 | TP03\_0928 | 0 | 66 | 5TMD | Hypothetical protein |
| XM\_757636.1 | TP03\_0914 | 0 | 66 | 5TMD | Hypothetical protein |
| XM\_757634.1 | TP03\_0912 | 0 | 63 | 9TMD | Hypothetical protein |
| XM\_760347.1 | TP02\_0872 | 0 | 62 | SP | Hypothetical protein |
| XM\_760435.1 | TP01\_0001 | 0 | 55 | (-) | Hypothetical telomeric SfiI 20 protein 1 |
| XM\_757630.1 | TP03\_0908 | 0 | 54 | 4 TMD | Hypothetical protein |
| XM\_757630.1 | TP03\_0908 | 0 | 54 | 4TMD | Hypothetical protein |
| XM\_758678.1 | TP04\_0136 | 0 | 52 | (-) | Hypothetical protein |
| XM\_757646.1 | TP03\_0615 | 0 | 47 | 4TMD | Hypothetical protein |
| XM\_757643.1 | TP03\_0921 | 0 | 46 | 4TMD | Hypothetical protein |
| XM\_761572.1 | TP01\_1144 | 0 | 43 | SP, 1TMD | Hypothetical protein |
| XM\_757647.1 | TP03\_0616 | 0 | 41 | (-) | Hypothetical protein |
| XM\_760770.1 | TP01\_0336 | 0 | 39 | SP | Hypothetical protein |
| XM\_760436.1 | TP01\_0002 | 0 | 38 | SP, 1TMD | Hypothetical telomeric SfiI 20 protein 2 |
| XM\_758627.1 | TP04\_0085 | 0 | 37 | (-) | Hypothetical protein |
| XM\_757641.1 | TP03\_0919 | 0 | 35 | 8TMD | Hypothetical protein |
| XM\_757668.1 | TP03\_0637 | 0 | 33 | (-) | Hypothetical protein |
| XM\_761112.1 | TP01\_0684 | 0 | 30 | (-) | Hypothetical protein |
| XM\_760987.1 | TP01\_0561 | 0 | 29 | (-) | Hypothetical protein |
| XM\_759132.1 | TP04\_0590 | 0 | 29 | 10TMD | Hypothetical protein |
| XM\_759898.1 | TP02\_0425 | 0 | 27 | SP | Hypothetical protein |
| XM\_760612.1 | TP01\_0178 | 0 | 26 | SP | Hypothetical protein |
| XM\_758988.1 | TP04\_0446 | 0 | 25 | (-) | Cell division control protein 2, putative |
| XM\_757645.1 | TP03\_0614 | 0 | 24 | 3 TMD | Hypothetical protein |
| XM\_757624.1 | TP03\_0926 | 0 | 23 | 8TMD | Hypothetical protein |
| XM\_761485.1 | TP01\_1057 | 0 | 23 | SP | Hypothetical protein |
| XM\_761075.1 | TP01\_0647 | 0 | 21 | (-) | Hypothetical protein |
| XM\_760352.1 | TP02\_0877 | 0 | 21 | (-) | Hypothetical protein |
| XM\_760692.1 | TP01\_0258 | 0 | 20 | (-) | Hypothetical protein |
| XM\_758891.1 | TP04\_0349 | 0 | 20 | (-) | Hypothetical protein |
| XM\_758154.1 | TP03\_0229 | 0 | 20 | (-) | Hypothetical protein |
| XM\_760308.1 | TP02\_0833 | 0 | 19 | (-) | Protein kinase domain-containing protein |
| XM\_760966.1 | TP01\_0539 | 0 | 19 | SP | Hypothetical protein |
| XM\_758639.1 | TP04\_0097 | 0 | 18 | SP | Hypothetical protein |
| XM\_760043.1 | TP02\_0570 | 0 | 15 | (-) | Hypothetical protein |
| XM\_758397.1 | TP03\_0903 | 0 | 15 | (-) | Hypothetical protein |
| XM\_761108.1 | TP01\_0680 | 0 | 15 | SP | Hypothetical protein |
| XM\_761402.1 | TP01\_0974 | 0 | 15 | 4TMD | Hypothetical protein |
| XM\_759386.1 | TP04\_0842 | 0 | 15 | (-) | Hypothetical protein |
| XM\_758193.1 | TP03\_0268 | 0 | 14 | SP | 6-Cys domain-containing protein |
| XM\_757666.1 | TP03\_0635 | 0 | 14 | SP | Hypothetical protein |
| XM\_758167.1 | TP03\_0242 | 0 | 14 | (-) | Hypothetical protein |
| XM\_760276.1 | TP02\_0802 | 0 | 14 | (-) | Hypothetical protein |
| XM\_761247.1 | TP01\_0819 | 0 | 14 | (-) | Hypothetical protein |
| XM\_759250.1 | TP04\_0707 | 0 | 14 | 8TMD | Hypothetical protein |
| XM\_758987.1 | TP04\_0445 | 0 | 13 | (-) | Cyclin N-terminal domain-containing protein |
| XM\_761006.1 | TP01\_0578 | 0 | 13 | (-) | Hypothetical protein |
| XM\_760871.1 | TP01\_0437 | 0 | 13 | 7TMD | Hypothetical protein |
| XM\_761050.1 | TP01\_0622 | 0 | 12 | (-) | Hypothetical protein |
| XM\_758006.1 | TP03\_0080 | 0 | 10 | (-) | Hypothetical protein |
| XM\_760291.1 | TP02\_0816 | 0 | 10 | (-) | Hypothetical protein |
| XM\_758416.1 | TP03\_0482 | 0 | 10 | 1TMD | Hypothetical protein |
| XM\_758028.1 | TP03\_0103 | 0 | 10 | (-) | Hypothetical protein |
| XM\_760340.1 | TP02\_0865 | 0 | 10 | (-) | Hypothetical protein |
| XM\_758997.1 | TP04\_0455 | 0 | 10 | 10TMD | Hypothetical protein |
| XM\_758006.1 | TP03\_0080 | 0 | 10 | (-) | Hypothetical protein |
| XM\_760102.1 | TP02\_0629 | 0 | 9 | (-) | 6-Cys domain-containing protein |
| XM\_760768.1 | TP01\_0334 | 0 | 9 | SP | Hypothetical protein |
| XM\_758869.1 | TP04\_0327 | 0 | 9 | (-) | Hypothetical protein |
| XM\_757999.1 | TP03\_0073 | 0 | 9 | (-) | Hypothetical protein |
| XM\_758950.1 | TP04\_0408 | 0 | 8 | (-) | Hypothetical protein |
| XM\_757642.1 | TP03\_0920 | 0 | 8 | 7TMD | Hypothetical protein |
| XM\_757887.1 | TP03\_0856 | 0 | 8 | SP | Hypothetical protein |
| XM\_758144.1 | TP03\_0219 | 0 | 8 | SP | Hypothetical protein |
| XM\_760630.1 | TP01\_0196 | 0 | 7 | (-) | Hypothetical protein |
| XM\_759133.1 | TP04\_0591 | 0 | 7 | 1 TMD | Hypothetical protein |
| XM\_760869.1 | TP01\_0435 | 0 | 7 | (-) | Hypothetical protein |
| XM\_758411.1 | TP03\_0477 | 0 | 7 | (-) | Hypothetical protein |
| XM\_757732.1 | TP03\_0701 | 0 | 7 | (-) | Protein kinase domain-containing protein |
| XM\_758029.1 | TP03\_0104 | 0 | 7 | (-) | Hypothetical protein |
| XM\_758172.1 | TP03\_0247 | 0 | 7 | 2SP | Hypothetical protein |
| XM\_759637.1 | TP02\_0166 | 0 | 6 | SP | MACPF domain-containing protein |
| XM\_758643.1 | TP04\_0101 | 0 | 6 | SP | Hypothetical protein |
| XM\_759946.1 | TP02\_0473 | 0 | 6 | 1TMD | Hypothetical protein |
| XM\_757635.1 | TP03\_0913 | 0 | 6 | 5TMD | Hypothetical protein |
| XM\_759140.1 | TP04\_0598 | 0 | 6 | (-) | Hypothetical protein |
| XM\_758629.1 | TP04\_0087 | 0 | 6 | (-) | Hypothetical protein |
| XM\_758763.1 | TP04\_0221 | 0 | 6 | (-) | Hypothetical protein |
| XM\_757637.1 | TP04\_0247 | 0 | 5.2 | (-) | Hypothetical protein |
| XM\_758789.1 | TP04\_0247 | 0 | 5 | (-) | Hypothetical protein |
| XM\_760262.1 | TP02\_0788 | 0 | 5 | (-) | Hypothetical protein |
| XM\_760259.1 | TP02\_0785 | 0 | 5 | (-) | Hypothetical protein |
| XM\_758224.1 | TP03\_0299 | 0 | 4 | SP | Hypothetical protein |
| XM\_760438.1 | TP01\_0004 | 0 | 4 | SP, 1TMD | Hypothetical protein |
| XM\_759506.1 | TP02\_0030 | 0 | 4 | (-) | Hypothetical protein |
| XM\_758645.1 | TP04\_0103 | 0 | 4 | SP | Hypothetical protein |
| XM\_760968.1 | TP01\_0541 | 0 | 4 | (-) | Hypothetical protein |
| XM\_758720.1 | TP04\_0178 | 0 | 4 | 11TMD | Hypothetical protein |
| XM\_760899.1 | TP01\_0472 | 0 | 4 | (-) | Hypothetical protein |
| XM\_760330.1 | TP02\_0855 | 0 | 4 | (-) | Hypothetical protein |
| XM\_757707.1 | TP03\_0676 | 0 | 4 | 1TMD | Aspartyl protease, putative |
| XM\_758288.1 | TP03\_0361 | 0 | 4 | (-) | Hypothetical protein |
| XM\_758668.1 | TP04\_0126 | 0 | 4 | (-) | Hypothetical protein |
| XM\_759598.1 | TP02\_0122 | 0 | 4 | (-) | Hypothetical protein |
| XM\_758645.1 | TP04\_0103 | 0 | 4 | SP | Hypothetical protein |
| XM\_757947.1 | TP03\_0021 | 0 | 3 | 9 TMD | Hypothetical protein |
| XM\_759867.1 | TP02\_0394 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760868.1 | TP01\_0434 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760341.1 | TP02\_0866 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760567.1 | TP01\_0133 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760867.1 | TP01\_0433 | 0 | 3 | 9 TMD | Hypothetical protein |
| XM\_759385.1 | TP04\_0841 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760329.1 | TP02\_0854 | 0 | 3 | SP | Hypothetical protein |
| XM\_761262.1 | TP01\_0834 | 0 | 3 | (-) | Hypothetical protein |
| XM\_758687.1 | TP04\_0145 | 0 | 3 | (-) | Hypothetical protein |
| XM\_760889.1 | TP01\_0462 | 0 | 3 | (-) | Hypothetical protein |
| XM\_759508.1 | TP02\_0032 | 0 | 3 | (-) | Hypothetical protein |
| XM\_761496.1 | TP01\_1068 | 0 | 3 | (-) | Hypothetical protein |
| XM\_757613.1 | TP05\_0037 | 2060 | 0 | 2TMD | Hypothetical protein |
| XM\_757596.1 | TP05\_0020 | 1714 | 0 | 3TMD | Hypothetical protein |
| XM\_757611.1 | TP05\_0035 | 1496 | 0 | TMD | Hypothetical protein |
| XM\_757616.1 | TP05\_0040 | 1271 | 0 | 2TMD | Hypothetical protein |
| XM\_757610.1 | TP05\_0034 | 992 | 0 | 2TMD | Hypothetical protein |
| XM\_757608.1 | TP05\_0032 | 977 | 0 | 1TMD | Hypothetical protein |
| XM\_757584.1 | TP05\_0008 | 689 | 0 | (-) | Ribosomal protein L14, putative |
| XM\_757605.1 | TP05\_0029 | 586 | 0 | (-) | DNA-directed RNA polymerase beta' chain |
| XM\_757598.1 | TP05\_0022 | 567 | 0 | 1 TMD | Hypothetical protein |
| XM\_757618.1 | TP05\_0042 | 433 | 0 | (-) | [DNA-directed RNA polymerase subunit beta](https://david.ncifcrf.gov/geneReportFull.jsp?rowids=3882263) |
| XM\_757599.1 | TP05\_0023 | 420 | 0 | (-) | ClpC molecular chaperone, putative |
| XM\_757604.1 | TP05\_0028 | 418 | 0 | (-) | DNA-directed RNA polymerase subunit beta (PEP) |
| XM\_757591.1 | TP05\_0015 | 409 | 0 | (-) | 50S ribosomal protein L36, apicoplast |
| XM\_760366.1 | TP02\_0891 | 320 | 0 | (-) | Hypothetical protein |
| XM\_757617.1 | TP05\_0041 | 277 | 0 | 1TMD | Hypothetical protein |
| XM\_760371.1 | TP02\_0896 | 266 | 0 | (-) | Hypothetical protein |
| XM\_757620.1 | TP05\_0044 | 245 | 0 | (-) | Ribosomal protein S2, putative |
| XM\_757614.1 | TP05\_0038 | 212 | 0 | 2TMD | Hypothetical protein |
| XM\_758948.1 | TP04\_0406 | 204 | 0 | SP | Hypothetical protein |
| XM\_761242.1 | TP01\_0814 | 161 | 0 | (-) | Hypothetical protein |
| XM\_757581.1 | TP05\_0005 | 159 | 0 | 3TMD | Ribosomal protein S3, putative |
| XM\_760428.1 | TP02\_0954 | 157 | 0 | SP | Hypothetical protein |
| XM\_761466.1 | TP01\_1038 | 149 | 0 | (-) | Hypothetical protein |
| XM\_761466.1 | TP01\_1038 | 149 | 0 | (-) | Hypothetical protein |
| XM\_761039.1 | TP01\_0611 | 149 | 0 | (-) | Hypothetical protein |
| XM\_759435.1 | TP04\_0891 | 131 | 0 | (-) | FAS1 domain-containing protein |
| XM\_758090.1 | TP03\_0165 | 131 | 0 | 9 TMD | ABC transporter, putative |
| XM\_757587.1 | TP05\_0011 | 130 | 0 | (-) | Ribosomal protein S8 |
| XM\_757927.1 | TP03\_0002 | 123 | 0 | SP | Hypothetical protein |
| XM\_759198.1 | TP04\_0655 | 115 | 0 | 10 TMD | Hypothetical protein |
| XM\_758557.1 | TP04\_0015 | 107 | 0 | SP | Hypothetical protein |
| XM\_759471.1 | TP04\_0002 | 104 | 0 | SP | Hypothetical protein |
| XM\_758558.1 | TP04\_0016 | 103 | 0 | SP | Hypothetical protein |
| XM\_758797.1 | TP04\_0255 | 101 | 0 | (-) | Hypothetical protein |
| XM\_757928.1 | TP03\_0003 | 94 | 0 | SP | Hypothetical protein |
| XM\_757588.1 | TP05\_0012 | 93 | 0 | (-) | Ribosomal protein L6, putative |
| XM\_757619.1 | TP05\_0043 | 90 | 0 | 1TMD | DNA-directed RNA polymerase beta chain |
| XM\_759463.1 | TP04\_0927 | 87 | 0 | SP | Hypothetical protein |
| XM\_759462.1 | TP04\_0918 | 81 | 0 | SP | Hypothetical protein |
| XM\_761044.1 | TP01\_0616 | 76 | 0 | (-) | Tash1 protein, putative |
| XM\_759460.1 | TP04\_0916 | 71 | 0 | SP | Hypothetical protein |
| XM\_759486.1 | TP02\_0010 | 68 | 0 | SP | Hypothetical protein |
| XM\_759461.1 | TP04\_0917 | 62 | 0 | SP | Hypothetical protein |
| XM\_761045.1 | TP01\_0617 | 60 | 0 | (-) | Tash1 protein, putative |
| XM\_761045.1 | TP01\_0617 | 60 | 0 | (-) | Tash1 protein, putative |
| XM\_757601.1 | TP05\_0025 | 57 | 0 | (-) | Hypothetical protein |
| XM\_761041.1 | TP01\_0613 | 55 | 0 | (-) | Hypothetical protein |
| XM\_757921.1 | TP03\_0889 | 51 | 0 | (-) | Hypothetical protein |
| XM\_759464.1 | TP04\_0919 | 47 | 0 | SP | Hypothetical protein |
| XM\_760427.1 | TP02\_0953 | 46 | 0 | SP, TMD | Hypothetical protein |
| XM\_757578.1 | TP05\_0002 | 42 | 0 | (-) | Ribosomal protein L4 |
| XM\_757578.1 | TP05\_0002 | 42 | 0 | (-) | Ribosomal protein L4, putative |
| XM\_761032.1 | TP01\_0604 | 39 | 0 | SP | Hypothetical protein |
| XM\_757607.1 | TP05\_0031 | 38 | 0 | 2TMD | Hypothetical protein |
| XM\_760431.1 | TP02\_0957 | 38 | 0 | (-) | Hypothetical protein |
| XM\_761030.1 | TP01\_0602 | 38 | 0 | (-) | Hypothetical protein |
| XM\_761046.1 | TP01\_0618 | 37 | 0 | SP | Tash1 protein, putative |
| XM\_759688.1 | TP02\_0215 | 36 | 0 | SP | Hypothetical protein |
| XM\_757917.1 | TP03\_0885 | 35 | 0 | SP | Hypothetical protein |
| XM\_759686.1 | TP02\_0961 | 34 | 0 | SP | Hypothetical protein |
| XM\_759687.1 | TP02\_0214 | 34 | 0 | SP | Hypothetical protein |
| XM\_760429.1 | TP02\_0955 | 32 | 0 | SP | Hypothetical protein |
| XM\_761034.1 | TP01\_0606 | 31 | 0 | (-) | Hypothetical protein |
| XM\_757612.1 | TP05\_0036 | 30 | 0 | (-) | Hypothetical protein |
| XM\_758818.1 | TP04\_0276 | 30 | 0 | (-) | Hypothetical protein |
| XM\_761031.1 | TP01\_0603 | 28 | 0 | SP | TashAT2 protein, putative |
| XM\_757922.1 | TP03\_0890 | 28 | 0 | SP | Hypothetical protein |
| XM\_759689.1 | TP02\_0216 | 26 | 0 | 1TMD | Hypothetical protein |
| XM\_761042.1 | TP01\_0614 | 22 | 0 | (-) | Tash1 protein, putative |
| XM\_760432.1 | TP02\_0958 | 20 | 0 | SP | Hypothetical protein |
| XM\_759682.1 | TP02\_0210 | 20 | 0 | SP | Hypothetical protein |
| XM\_757751.1 | TP03\_0720 | 20 | 0 | 8TMD | Hypothetical protein |
| XM\_760434.1 | TP02\_0960 | 19 | 0 | SP | Hypothetical protein |
| XM\_757925.1 | TP03\_0930 | 19 | 0 | SP | Hypothetical protein |
| XM\_760433.1 | TP02\_0959 | 19 | 0 | SP | Hypothetical protein |
| XM\_758553.1 | TP04\_0011 | 19 | 0 | SP | Hypothetical protein |
| XM\_757779.1 | TP03\_0748 | 18 | 0 | 9 TMD | Hypothetical protein |
| XM\_757779.1 | TP03\_0748 | 18 | 0 | 9TMD | Hypothetical protein |
| XM\_757606.1 | TP05\_0030 | 17 | 0 | 2TMD | Hypothetical protein |
| XM\_757908.1 | TP03\_0876 | 16 | 0 | SP | Hypothetical protein |
| XM\_758316.1 | TP03\_0389 | 16 | 0 | (-) | Hypothetical protein |
| XM\_757609.1 | TP05\_0033 | 14 | 0 | 1TMD | Hypothetical protein |
| XM\_760443.1 | TP01\_0009 | 14 | 0 | SP | Hypothetical protein |
| XM\_759747.1 | TP02\_0274 | 13 | 0 | (-) | Hypothetical protein |
| XM\_758171.1 | TP03\_0246 | 13 | 0 | (-) | Hypothetical protein |
| XM\_757597.1 | TP05\_0021 | 13 | 0 | 3TMD | Hypothetical protein |
| XM\_757926.1 | TP03\_0001 | 12 | 0 | SP | Hypothetical protein |
| XM\_759513.1 | TP02\_0037 | 12 | 0 | (-) | Hypothetical protein |
| XM\_757903.1 | TP03\_0871 | 10 | 0 | SP | Hypothetical protein |
| XM\_757916.1 | TP03\_0884 | 10 | 0 | SP | Hypothetical protein |
| XM\_757910.1 | TP03\_0878 | 9 | 0 | SP | Hypothetical protein |
| XM\_757594.1 | TP05\_0018 | 9 | 0 | (-) | Ribosomal protein S7, putative |
| XM\_757577.1 | TP05\_0001 | 9 | 0 | (-) | Ribosomal protein S4, putative |
| XM\_758498.1 | TP03\_0563 | 9 | 0 | 11TMD | Hypothetical protein |
| XM\_761068.1 | TP01\_0640 | 8 | 0 | (-) | Hypothetical protein |
| XM\_760247.1 | TP02\_0773 | 8 | 0 | (-) | Hypothetical protein |
| XM\_759480.1 | TP02\_0004 | 8 | 0 | SP | Hypothetical protein |
| XM\_759964.1 | TP02\_0491 | 7 | 0 | (-) | Hypothetical protein |
| XM\_759470.1 | TP04\_0001 | 6 | 0 | SP | Hypothetical protein |
| XM\_757640.1 | TP03\_0918 | 5 | 0 | 7 TMD | Hypothetical protein |
| XM\_757580.1 | TP05\_0004 | 5 | 0 | (-) | Ribosomal protein S19, putative |
| XM\_757905.1 | TP03\_0873 | 5 | 0 | SP | Hypothetical protein |
| XM\_760891.1 | TP01\_0464 | 4 | 0 | (-) | Hypothetical protein |
| XM\_757585.1 | TP05\_0009 | 4 | 0 | 2TMD | Hypothetical protein |
| XM\_757592.1 | TP05\_0016 | 4 | 0 | (-) | Ribosomal protein S11, putative |
| XM\_760441.1 | TP01\_0007 | 4 | 0 | SP | Hypothetical protein |
| XM\_760613.1 | TP01\_0179 | 4 | 0 | (-) | Hypothetical protein |
| XM\_757901.1 | TP03\_0869 | 3 | 0 | (-) | Hypothetical protein |
| XM\_759431.1 | TP04\_0887 | 3 | 0 | (-) | Hypothetical protein |
| XM\_758212.1 | TP03\_0287 | 3 | 0 | SP, TMD | Sporozoite P67 surface antigen |
| XM\_760000.1 | TP02\_0527 | 3 | 0 | (-) | Hypothetical protein |

Expression threshold = TPM >2.2 (Genes with a TPM values less than or equal to 2.2 were considered as not expressed and their TPM values were set to 0). TPM, Transcripts Per Kilobase Million; SP, Signal peptide; TMD, Trans-membrane domain;(-), none.