

**Supplementary Data 2. Details of differential expressed genes (DEGs) between antennae of uncontaminated and contaminated male houseflies collected in spring.**

Readcount is the average read count of each gen, log2FoldChange is calculated by formular  $\log_2(\text{readcount\_CMA}/\text{readcount\_UMA})$ , pval is the *p* value, padj is the *fdr* corrected *p* value using Benjamini/Hochberg method. All *p*-values are based on two-sided tests. CMA: contaminated male antennae, UMA: uncontaminated male antennae.

| Gene_id           | readcount_CMA | readcount_UMA | log2FoldChange | pval     | padj     | gene_name    | description                                                                                                                       |
|-------------------|---------------|---------------|----------------|----------|----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Novel00983        | 133.5351      | 340.7551      | -1.3515        | 4.71E-06 | 0.002175 | -            | -                                                                                                                                 |
| Novel01663        | 75.60713      | 271.1517      | -1.8425        | 5.87E-14 | 4.74E-10 | -            | -                                                                                                                                 |
| Novel01969        | 24.89299      | 70.30523      | -1.4979        | 0.000219 | 0.04591  | -            | -                                                                                                                                 |
| gene-CYP6D8       | 1433.515      | 3470.511      | -1.2756        | 1.83E-05 | 0.006899 | CYP6D8       | probable cytochrome P450 6d5-like                                                                                                 |
| gene-LOC101887475 | 71.12814      | 21.21828      | 1.7451         | 1.91E-05 | 0.007019 | LOC101887475 | farnesyl pyrophosphate synthase-like                                                                                              |
| gene-LOC101887522 | 146.9218      | 60.38857      | 1.2827         | 6.47E-06 | 0.002751 | LOC101887522 | nuclear receptor corepressor 2                                                                                                    |
| gene-LOC101887828 | 286.0006      | 503.4456      | -0.81582       | 2.00E-05 | 0.007203 | LOC101887828 | F-box only protein 28%2C transcript variant X3  F-box only protein 28 isoform X3                                                  |
| gene-LOC101887978 | 119.4878      | 296.3497      | -1.3104        | 1.04E-08 | 1.68E-05 | LOC101887978 | protein OPI10 homolog                                                                                                             |
| gene-LOC101888348 | 1309.703      | 2031.85       | -0.63355       | 4.44E-05 | 0.014081 | LOC101888348 | hypothetical protein%2C transcript variant X2  uncharacterized protein LOC101888348 isoform X2                                    |
| gene-LOC101888467 | 15.3547       | 63.42879      | -2.0465        | 5.98E-06 | 0.002613 | LOC101888467 | alpha-methyldopa hypersensitive protein                                                                                           |
| gene-LOC101888799 | 38.00021      | 167.7738      | -2.1424        | 4.06E-05 | 0.01366  | LOC101888799 | phosphoenolpyruvate carboxykinase [GTP]                                                                                           |
| gene-LOC101888919 | 77.99366      | 20.41282      | 1.9339         | 3.57E-06 | 0.001988 | LOC101888919 | larval cuticle protein 8                                                                                                          |
| gene-LOC101889374 | 3457.835      | 2002.089      | 0.78836        | 1.52E-07 | 0.000143 | LOC101889374 | dynein beta chain%2C ciliary                                                                                                      |
| gene-LOC101889838 | 2713.452      | 1844.567      | 0.55685        | 0.000227 | 0.047079 | LOC101889838 | murinoglobulin-2%2C transcript variant X3  murinoglobulin-2 isoform X3                                                            |
| gene-LOC101889844 | 61.88433      | 139.1976      | -1.1695        | 9.59E-05 | 0.025827 | LOC101889844 | elongation of very long chain fatty acids protein 7%2C transcript variant X1  elongation of very long chain fatty acids protein 7 |
| gene-LOC101890440 | 98.40305      | 32.08187      | 1.6169         | 3.86E-06 | 0.001988 | LOC101890440 | lipase 3-like                                                                                                                     |
| gene-LOC101890607 | 1417.933      | 745.3969      | 0.92771        | 1.02E-08 | 1.68E-05 | LOC101890607 | lipase 3-like                                                                                                                     |
| gene-LOC101890854 | 2262.856      | 1510.283      | 0.58333        | 0.00016  | 0.036036 | LOC101890854 | glucose dehydrogenase [FAD%2C quinone]                                                                                            |

|                   |          |          |          |          |          |              |                                                                                                              |
|-------------------|----------|----------|----------|----------|----------|--------------|--------------------------------------------------------------------------------------------------------------|
| gene-LOC101890896 | 61.05515 | 8.5828   | 2.8306   | 1.40E-08 | 1.89E-05 | LOC101890896 | peptidoglycan-recognition protein SA-like                                                                    |
| gene-LOC101891486 | 1229.98  | 2356.631 | -0.93809 | 1.45E-09 | 2.93E-06 | LOC101891486 | uncharacterized protein<br>LOC101891486  uncharacterized LOC101891486                                        |
| gene-LOC101891572 | 614.5047 | 959.1787 | -0.64238 | 0.000162 | 0.036036 | LOC101891572 | membrane alanyl aminopeptidase                                                                               |
| gene-LOC101891684 | 5730.264 | 10207.23 | -0.83292 | 1.40E-08 | 1.89E-05 | LOC101891684 | proton-coupled amino acid transporter 2                                                                      |
| gene-LOC101891759 | 1719.219 | 908.4507 | 0.92027  | 8.47E-06 | 0.003422 | LOC101891759 | probable cytochrome P450 4d14                                                                                |
| gene-LOC101891996 | 108.2609 | 235.1102 | -1.1188  | 3.87E-06 | 0.001988 | LOC101891996 | venom acid phosphatase Acph-1                                                                                |
| gene-LOC101891997 | 762.7584 | 327.3872 | 1.2202   | 0.000154 | 0.036036 | LOC101891997 | general odorant-binding protein 56h                                                                          |
| gene-LOC101892159 | 302.4076 | 157.2431 | 0.9435   | 7.64E-05 | 0.021307 | LOC101892159 | probable RNA helicase armi                                                                                   |
| gene-LOC101892265 | 114.6319 | 268.3705 | -1.2272  | 1.80E-07 | 0.000145 | LOC101892265 | transcription factor Adf-1                                                                                   |
| gene-LOC101892323 | 92.2972  | 235.3462 | -1.3504  | 5.76E-08 | 6.20E-05 | LOC101892323 | nucleoside diphosphate kinase 7                                                                              |
| gene-LOC101892630 | 12.71143 | 49.00098 | -1.9467  | 7.16E-05 | 0.020319 | LOC101892630 | uncharacterized LOC101892630%2C transcript variant<br>X2  uncharacterized protein LOC101892630 isoform<br>X2 |
| gene-LOC101892684 | 111.6239 | 48.39453 | 1.2057   | 0.000203 | 0.043188 | LOC101892684 | EF-hand calcium-binding domain-containing protein 1                                                          |
| gene-LOC101892760 | 2325.13  | 1332.415 | 0.80327  | 1.90E-07 | 0.000147 | LOC101892760 | protein FAM188B2                                                                                             |
| gene-LOC101892829 | 566.5641 | 298.2531 | 0.9257   | 4.06E-06 | 0.001988 | LOC101892829 | peptide methionine sulfoxide reductase  LOW<br>QUALITY PROTEIN: peptide methionine sulfoxide<br>reductase    |
| gene-LOC101893184 | 127.5855 | 54.11361 | 1.2374   | 3.39E-05 | 0.011672 | LOC101893184 | peptidoglycan-recognition protein SB1<br>precursor  peptidoglycan-recognition protein SB1                    |
| gene-LOC101893361 | 90.25747 | 175.6611 | -0.96068 | 0.0002   | 0.043022 | LOC101893361 | acyl-CoA synthetase family member 2%2C<br>mitochondrial                                                      |
| gene-LOC101893628 | 234.8054 | 108.9126 | 1.1083   | 3.10E-06 | 0.001791 | LOC101893628 | pancreatic lipase-related protein 2                                                                          |
| gene-LOC101894001 | 536.7598 | 201.773  | 1.4115   | 5.36E-12 | 2.17E-08 | LOC101894001 | probable asparagine synthetase [glutamine-<br>hydrolyzing]                                                   |
| gene-LOC101894147 | 427.2666 | 881.2854 | -1.0445  | 1.24E-09 | 2.86E-06 | LOC101894147 | transcription factor Adf-1                                                                                   |
| gene-LOC101894235 | 30.89586 | 87.63281 | -1.5041  | 7.00E-05 | 0.020199 | LOC101894235 | uncharacterized protein LOC101894235  Chitin                                                                 |

|                   |          |          |          |          |          |              |                                                                                                    |
|-------------------|----------|----------|----------|----------|----------|--------------|----------------------------------------------------------------------------------------------------|
| gene-LOC101894425 | 735.6978 | 444.281  | 0.72764  | 5.10E-05 | 0.015305 | LOC101894425 | binding protein<br>cytochrome P450 4d8%2C transcript variant X2  cytochrome P450 4d8 isoform X2    |
| gene-LOC101894603 | 90.49587 | 35.27809 | 1.3591   | 0.000186 | 0.040612 | LOC101894603 | protein still life%2C isoforms C/SIF type 2                                                        |
| gene-LOC101895121 | 1036.962 | 640.9333 | 0.69412  | 0.000143 | 0.034849 | LOC101895121 | esterase B1-like                                                                                   |
| gene-LOC101895965 | 191.3794 | 1222.151 | -2.6749  | 3.29E-49 | 5.32E-45 | LOC101895965 | partner of bursicon                                                                                |
| gene-LOC101896469 | 391.9876 | 231.1796 | 0.76179  | 0.000116 | 0.030275 | LOC101896469 | probable cytochrome P450 313a4%2C transcript variant X2  probable cytochrome P450 313a4 isoform X2 |
| gene-LOC101896501 | 10589.15 | 20373.66 | -0.94412 | 7.25E-11 | 1.95E-07 | LOC101896501 | heat shock protein 83                                                                              |
| gene-LOC101896676 | 1304.443 | 767.8418 | 0.76455  | 4.60E-06 | 0.002175 | LOC101896676 | glycine-rich cell wall structural protein                                                          |
| gene-LOC101896690 | 238.3936 | 91.58144 | 1.3802   | 2.57E-08 | 3.10E-05 | LOC101896690 | alkaline phosphatase 4%2C transcript variant X1  alkaline phosphatase 4 isoform X1                 |
| gene-LOC101896765 | 149.0686 | 296.574  | -0.99242 | 7.60E-06 | 0.00315  | LOC101896765 | zinc finger protein jing isoform X2  zinc finger protein jing%2C transcript variant X3             |
| gene-LOC101896897 | 29.713   | 4.199663 | 2.8227   | 5.11E-05 | 0.015305 | LOC101896897 | dipteracin-D-like                                                                                  |
| gene-LOC101897064 | 228.3544 | 123.3979 | 0.88796  | 0.000163 | 0.036036 | LOC101897064 | growth arrest and DNA damage-inducible protein GADD45 alpha                                        |
| gene-LOC101897095 | 869.977  | 435.4729 | 0.99839  | 1.15E-06 | 0.000743 | LOC101897095 | -                                                                                                  |
| gene-LOC101897194 | 145.9097 | 49.60792 | 1.5564   | 1.77E-07 | 0.000145 | LOC101897194 | double-headed protease inhibitor%2C submandibular gland                                            |
| gene-LOC101897223 | 132.657  | 45.73079 | 1.5365   | 3.56E-07 | 0.000262 | LOC101897223 | uncharacterized LOC101897223  uncharacterized protein LOC101897223                                 |
| gene-LOC101897347 | 1371.473 | 2123.041 | -0.63041 | 4.58E-05 | 0.01423  | LOC101897347 | dnaJ protein homolog 1%2C transcript variant X2  dnaJ protein homolog 1                            |
| gene-LOC101897373 | 47.13483 | 11.0446  | 2.0935   | 4.41E-05 | 0.014081 | LOC101897373 | double-headed protease inhibitor%2C submandibular gland-like                                       |
| gene-LOC101897406 | 483.869  | 290.1412 | 0.73786  | 0.00016  | 0.036036 | LOC101897406 | cytochrome b561 domain-containing protein 2-                                                       |

|                   |          |          |          |          |          |              |                                                                                                                                        |
|-------------------|----------|----------|----------|----------|----------|--------------|----------------------------------------------------------------------------------------------------------------------------------------|
|                   |          |          |          |          |          |              | like  cytochrome b561 domain-containing protein 2-like%2C transcript variant X2                                                        |
| gene-LOC101897453 | 76.65491 | 18.22299 | 2.0726   | 8.35E-07 | 0.000563 | LOC101897453 | arginine/serine-rich coiled-coil protein 2-like                                                                                        |
| gene-LOC101897488 | 103.1226 | 17.96004 | 2.5215   | 8.14E-05 | 0.022295 | LOC101897488 | vasotab-like                                                                                                                           |
| gene-LOC101897542 | 468.3662 | 284.1276 | 0.7211   | 0.00023  | 0.047079 | LOC101897542 | sodium-independent sulfate anion transporter isoform X1  sodium-independent sulfate anion transporter%2C transcript variant X1         |
| gene-LOC101897560 | 880.2383 | 1357.674 | -0.62517 | 0.000119 | 0.030447 | LOC101897560 | protein boule%2C transcript variant X1                                                                                                 |
| gene-LOC101897660 | 527.9993 | 94.91478 | 2.4758   | 2.13E-13 | 1.15E-09 | LOC101897660 | vasotab                                                                                                                                |
| gene-LOC101897678 | 778.6336 | 1236.346 | -0.66707 | 5.49E-05 | 0.016142 | LOC101897678 | solute carrier family 25 member 36 isoform X2  solute carrier family 25 member 36%2C transcript variant X4                             |
| gene-LOC101897731 | 167.2045 | 82.5747  | 1.0178   | 0.000158 | 0.036036 | LOC101897731 | phospholipase B1%2C membrane-associated-like                                                                                           |
| gene-LOC101898324 | 7441.769 | 5041.689 | 0.56174  | 0.000144 | 0.034849 | LOC101898324 | very long-chain-fatty-acid--CoA ligase bubblegum                                                                                       |
| gene-LOC101898526 | 30658.08 | 44900.06 | -0.55045 | 0.000107 | 0.028254 | LOC101898526 | esterase B1%2C transcript variant X2  esterase B1                                                                                      |
| gene-LOC101898644 | 351.661  | 618.5677 | -0.81475 | 9.78E-06 | 0.003854 | LOC101898644 | purine nucleoside phosphorylase%2C transcript variant X3  purine nucleoside phosphorylase isoform X3                                   |
| gene-LOC101898663 | 3220.613 | 5760.809 | -0.83894 | 2.69E-08 | 3.10E-05 | LOC101898663 | carnitine O-palmitoyltransferase 1%2C liver isoform%2C transcript variant X2                                                           |
| gene-LOC101899240 | 427.1694 | 813.9368 | -0.93011 | 1.59E-07 | 0.000143 | LOC101899240 | carbohydrate sulfotransferase 13 isoform X1  carbohydrate sulfotransferase 13%2C transcript variant X1                                 |
| gene-LOC101899684 | 319.0514 | 162.4386 | 0.97389  | 3.00E-05 | 0.010556 | LOC101899684 | vitellogenin-1-like                                                                                                                    |
| gene-LOC101900622 | 1708.167 | 2575.088 | -0.59217 | 0.000137 | 0.033956 | LOC101900622 | lipid storage droplets surface-binding protein 2%2C transcript variant X4  lipid storage droplets surface-binding protein 2 isoform X4 |
| gene-LOC101900736 | 121.8936 | 256.4569 | -1.0731  | 5.93E-06 | 0.002613 | LOC101900736 | serine palmitoyltransferase 2 isoform X1  serine palmitoyltransferase 2%2C transcript variant X1                                       |
| gene-LOC101901151 | 82.64153 | 12.47847 | 2.7274   | 7.90E-07 | 0.000555 | LOC101901151 | nose resistant to fluoxetine protein 6                                                                                                 |

|                   |          |          |         |          |          |              |                                                                                                  |
|-------------------|----------|----------|---------|----------|----------|--------------|--------------------------------------------------------------------------------------------------|
| gene-LOC101901643 | 2432.947 | 1606.99  | 0.59834 | 0.000135 | 0.033956 | LOC101901643 | probable cytochrome P450 4ac1%2C transcript variant X2  probable cytochrome P450 4ac1 isoform X2 |
| gene-LOC105261927 | 114.1245 | 38.37932 | 1.5722  | 2.52E-06 | 0.001569 | LOC105261927 | farnesyl pyrophosphate synthase                                                                  |
| gene-LOC105262272 | 49.1274  | 2.467303 | 4.3155  | 6.23E-11 | 1.95E-07 | LOC105262272 | lectin subunit alpha-like                                                                        |
| gene-LOC105262391 | 92.9014  | 28.5317  | 1.7031  | 0.000242 | 0.048806 | LOC105262391 | turriptide Pal9.2-like                                                                           |
| gene-LOC105262393 | 27.14866 | 1.73886  | 3.9647  | 2.66E-06 | 0.001592 | LOC105262393 | uncharacterized protein<br>LOC105262393  uncharacterized LOC105262393                            |
| gene-LOC109613852 | 95.55221 | 217.5883 | -1.1872 | 3.97E-06 | 0.001988 | LOC109613852 | von Willebrand factor D and EGF domain-containing protein                                        |
| gene-LOC109613860 | 54.41317 | 134.565  | -1.3063 | 1.43E-05 | 0.005516 | LOC109613860 | uncharacterized LOC109613860  uncharacterized protein LOC109613860                               |
| gene-LOC109614246 | 786.8491 | 2450.648 | -1.639  | 9.88E-08 | 9.98E-05 | LOC109614246 | -                                                                                                |
| gene-defensin-1   | 114.2811 | 45.94871 | 1.3145  | 4.20E-05 | 0.013862 | defensin-1   | phormicin-like  uncharacterized protein<br>LOC101887540                                          |