

**Table S1. Related to Figure 1: OR and glomerulus numbers for ants and other insects.** For social insects, glomerulus counts refer to workers. OR numbers refer to putatively functional genes.

| Common name               | Scientific name                | OR number                    | Antennal lobe glomerulus number                       |
|---------------------------|--------------------------------|------------------------------|---|
| Dampwood termite          | <i>Zootermopsis nevadensis</i> | 63 (Terrapon et al., 2014)   | 70-74 (Terrapon et al., 2014)                         |
| Pea aphid                 | <i>Acyrtosiphon pisum</i>      | 62 (Smadja et al., 2009)     | 25-40 (Kollmann et al., 2011)                         |
| Vinegar fly               | <i>Drosophila melanogaster</i> | 60 (Robertson et al., 2003)  | 42 (Laissue and Vosshall, 2008; Laissue et al., 1999) |
| Red flour beetle          | <i>Tribolium castaneum</i>     | 259 (Engsontia et al., 2008) | 90 (Dippel et al., 2016)                              |
| Jewel wasp                | <i>Nasonia vitripennis</i>     | 225 (Robertson et al., 2010) | Not published   |
| Honey bee                 | <i>Apis mellifera</i>          | 163 (Robertson et al., 2010) | 156-166 (Flanagan and Mercer, 1989)                   |
| Jerdon's jumping ant      | <i>Harpegnathos saltator</i>   | 347 (Zhou et al., 2012)      | 275 (Yan et al., 2017)                                |
| Clonal raider ant         | <i>Ooceraea biroi</i>          | 369 (Oxley et al., 2014)     | 493-509 (McKenzie et al., 2016)                       |
| Florida carpenter ant     | <i>Camponotus floridanus</i>   | 352 (Zhou et al., 2012)      | 434-464 (Zube et al., 2008)                           |
| Big headed leafcutter ant | <i>Atta cephalotes</i>         | 376 (Engsontia et al., 2015) | 349 (Kelber et al., 2009)                             |

**Table S2. Related to Figure 1: HMMer alignment scores for best matches in eight insect genomes to the *D. melanogaster* (*orco*) and *O. biroi* (*LOC105284785*) *orco* orthologs.**

The best three matches for *O. biroi* and *D. melanogaster* and the best match for each remaining species are shown. aa: amino acids. Full names of species are: *Ooceraea biroi*, *Drosophila melanogaster*, *Nasonia vitripennis*, *Papilio canadensis*, *Apis mellifera*, *Tribolium castaneum*, *Acyrtosiphon pisum*, and *Bombyx mori*.

| Gene                | Species                | Length<br>(aa) | E-value <i>cf</i><br><i>orco</i> | HMMer<br>score <i>cf</i><br><i>orco</i> | E-value <i>cf</i><br><i>LOC1052</i><br><i>84785</i> | HMMer<br>score <i>cf</i><br><i>LOC105284</i><br><i>785</i> |
|---------------------|------------------------|----------------|----------------------------------|---|---|--|
| <i>LOC105284785</i> | <i>O. biroi</i>        | 478            | 3.10e-188                        | 625.9                                   | 0.00e-00  | 1094.6   |
| <i>LOC105278136</i> | <i>O. biroi</i>        | 673            | 2.60e-22                         | 78.9                                    | 1.10e-25  | 89.9   |
| <i>LOC105284729</i> | <i>O. biroi</i>        | 818            | 7.00e-20                         | 70.9                                    | 2.80e-20  | 72.1   |
| <i>orco</i>         | <i>D. melanogaster</i> | 486            | 0.00e-00                         | 1099.4                                  | 1.00e-187   | 624.4  |
| <i>Or22c</i>        | <i>D. melanogaster</i> | 402            | 7.70e-14                         | 51.2                                    | 1.80e-14  | 53.2   |
| <i>Or49a</i>        | <i>D. melanogaster</i> | 396            | 1.60e-12                         | 46.9                                    | 6.70e-14  | 51.3   |
| <i>Or1</i>          | <i>N. vitripennis</i>  | 475            | 2.70e-192                        | 639.4                                   | 2.10e-256   | 850.7  |
| <i>LOC106785700</i> | <i>P. canadensis</i>   | 494            | 2.60e-190                        | 632.5                                   | 2.20e-260   | 863.4  |
| <i>Or2</i>          | <i>A. mellifera</i>    | 478            | 3.00e-197                        | 655.4                                   | 1.40e-261   | 867.5  |
| <i>LOC661975</i>    | <i>T. castaneum</i>    | 475            | 3.00e-206                        | 685.3                                   | 9.00e-202   | 670.5  |
| <i>LOC100165095</i> | <i>A. pisum</i>        | 486            | 1.30e-159                        | 532.0                                   | 8.20e-159   | 529.4  |
| <i>Or-2</i>         | <i>B. mori</i>         | 476            | 1.80e-201                        | 669.7                                   | 1.00e-189   | 630.9  |