Supplementary Material

Functional olfactory sensory neurons housed in olfactory sensilla on the ovipositor of the hawkmoth *Manduca sexta*.

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# Supplementary Tables

## Supplementary Table S1

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Forward primer** | **Reverse primer** | **Ta** **in °C** |
| MsexGR2 | ATGGCGACACGTGTGAAATC | TGTGGGACGAGAAACACGAC | 62 |
| MsexGR3 | CGATTCTATCGACGGGCTCT | TCTCGCGCTAACTTGCTGAG | 58 |
| MsexIR1 | ACAGCCCGCTCGAACTACTC | TATCTCGTTCGCTCTGCCCG | 61 |
| MsexIR4 | TTCACTGAGCAGCCCTCGTA | CGTCGCATAATTCACGACCA | 59 |
| MsexIR7d | AGGCTGCTTTGGTGACCTGG | CCGTATCGTGTTGCCATCGC | 61 |
| MsexIR8a | CAACCCCGACGCGTATCCGTATCC | TTACGGCCTATATTCATTTTTAGGAAAAACGCTTATATATG | 60 |
| MsexIR25a | GGAGTCCGTATAGCTATCAGAATAATCGAG | TCAAAATTTAGGTTTCAAATTAGATAAACCTAAATTTCTGGATC | 62 |
| MsexIR68 | ATGCGCTGTTTTGCTTGTTG | CCGTCAGTTTTCGTCTGTCG | 59 |
| MsexIR75d | TGCTCGCGTACGACTTTCAT | CACGCCACAGCTTACTCAGG | 58 |
| MsexIR75p.2 | TGGAGTGTGGCTGGCTATCG | CCTGCAGCAACACCACGATG | 61 |
| MsexIR76b | ATGGCCGGGATCGAGCTCATT | TTATCGATACAGAAAAGCAGAAGGCGC | 57 |
| MsexORCo | ATT GTT CAC GGA GTC TGA CG | CTC CAT CAG CGG TTT CAT GA | 60 |
| MsexOR9 | ATACTGGCGTGGCCGTTAGT | CGAATGCGCCTGTATACCAA | 57 |
| MsexOR26 | TGG TGC CTAC ACT ACA GTC A | TGG AGG CTT CTA CGG TAA CA | 62 |
| RL31 | GGA GAG AGG AAA GGC AAA TC  | CGG AAG GGG ACA TTT CTG AC | 60 |

**Supplementary Table S1**: Primer pairs and annealing temperature (Ta) used in RT-PCR. Primers for MsexGR2, MsexGR3, MsexIR4, MsexIR68, MsexIR75d, MsexORCo, MsexOR9 and MsexOR-26 span an intron to detect genomic DNA contamination.

## Supplementary Table S2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical Class** | **Chemical** | **CAS number** | **Company** | **Purity** |
| Acid | hexanoic acid | 000142-62-1 | Aldrich | 99.5% |
| Acid | decanoic acid | 000334-48-5 | FLUKA | purum, =98.0% (GC) |
| Acid | 2-oxopentanoic acid | 1821-02-9 | Aldrich | =98.0%  |
| Acid | butyric acid | 107-92-6 | FLUKA | puriss., =99.5% (GC) |
| Acid | propionic acid | 79-09-4 | FLUKA | puriss. p.a., standard for GC, =99.8% (GC) |
| Acid | acetic acid | 64-19-7 | Aldrich | =99.99% |
| Acid | myristic acid  | 544-63-8 | Sigma | Sigma Grade, 99-100% |
| Acid | palmitic acid | 57-10-3 | Sigma | SigmaUltra, ~99% |
| Acid | palmitoleic acid | 373-49-9 | Sigma | analytical standard =99% |
| Acid | oleic acid  | 112-80-1 | Sigma | reagent grade, ~99% (GC) |
| Acid | linoleic acid | 60-33-3 | Aldrich | =99% |
| Alcohol | cis-2-pentenol | 001576-95-0 | Aldrich | >=96% |
| Alcohol | 4-methyl-1-pentanol | 626-89-1 | Aldrich | 97% |
| Alcohol | prenol | 000556-82-1 | Aldrich | 99% |
| Alcohol | cis-3-hexenol | 000928-96-1 | Aldrich | purum, =98.0% (GC) |
| Alcohol | trans-2-hexen-1-ol | 000928-95-0 | FLUKA | purum, =95.0% (GC) |
| Alcohol | 1-hexanol | 111-27-3 | FLUKA | puriss. p.a., standard for GC, =99.9% (GC) |
| Alcohol | 3-octanol | 000589-98-0 | Aldrich | 99% |
| Alcohol | methionol | 505-10-2 | Aldrich | =98%, Kosher, FG |
| Alcohol | 2,3-butanediol | 513-85-9 | Aldrich | 98% |
| Aldehyde | hexanal  | 000066-25-1 | Aldrich | 98% |
| Aldehyde | cis-3-hexenal | 006789-80-6 | Aldrich | 50% in triacetin, Kosher; 0.10% alpha-tocopherol, synthetic as antioxidant |
| Aldehyde | trans-2-hexenal | 6728-26-3 | Aldrich | 98% |
| Aldehyde | decanal | 000112-31-2 | Aldrich | 98% (GC) |
| Aldehyde | nonanal | 000124-19-6 | FLUKA | purum, =95.0% (GC) |
| Aldehyde (\*) | (E,Z)-10,12-hexadecadienal  |  | Provided by Ales Svatos MPI-CE |  |
| Aldehyde (\*) | (Z)-11-hexadecenal  |  | Provided by Ales Svatos MPI-CE |  |
| Aldehyde (\*) | (E,E)-10,12-hexadecadienal  |  | Provided by Ales Svatos MPI-CE |  |
| Aldehyde (\*) | (E,Z)-11,13-pentadecadienal |  | Provided by Ales Svatos MPI-CE |  |
| Amine | pyrrolidine | 000123-75-1 | Aldrich | 99% |
| Amine | 1,4-diamino butane | 110-60-1 | Aldrich | 99% |
| Amine | cadaverine | 462-94-2 | FLUKA | purum, =97.0% (GC) |
| Amine | ammonium hydroxide solution | 1336-21-6 | Sigma | 28% in H2O, =99.99%  |
| Amine | L(-)-nicotine | 54-11-5 | Riedel-de Haën | PESTANAL®, analytical standard |
| Aromatic | phenyl acetic acid  | 103-82-2 | Aldrich | 99%, FCC |
| Aromatic | *p*-coumaric acid | 501-98-4 | Sigma | =98.0% (HPLC) |
| Aromatic | phloretic acid | 501-97-3 | Aldrich | 98% |
| Aromatic | hydrocaffeic acid | 1078-61-1 | Aldrich | 98% |
| Aromatic | ferulic acid | 537-98-4 | Aldrich | 99% |
| Aromatic | benzyl alcohol | 000100-51-6 | Aldrich | anhydrous, 99.8% |
| Aromatic | 2-phenyl ethanol | 000060-12-8 | FLUKA | purum, =99.0% (GC) |
| Aromatic | furfuryl alcohol | 98-00-0 | Aldrich | =98% |
| Aromatic | benzaldehyde | 000100-52-7 | Sigma | =99% |
| Aromatic | phenylacetaldehyde | 000122-78-1 | Aldrich | 90% |
| Aromatic | cinnamaldehyde | 104-55-2 | Aldrich | =98%, FCC, Kosher |
| Aromatic | 1,2,4-trimethyl benzene | 000095-63-6 | FLUKA | puriss., =98.5% (GC) |
| Aromatic | pyrrole  | 000109-97-7 | ACROS | 99% |
| Aromatic | 3-propyl toluene | 001074-43-7 | ABCR | 99% |
| Aromatic | methyl salicylate | 000119-36-8 | Sigma | ReagentPlus®, =99% (GC) |
| Aromatic | 4-ethyl guaiacol | 002785-89-9 | Aldrich | =98%, FCC, Kosher, FG |
| Aromatic | eugenol | 97-53-0 | FLUKA | purum, =99.0% (GC) |
| Aromatic | 4-ethyltoluene | 622-96-8 | FLUKA | purum, =95.0% (GC) |
| Aromatic | methyl benzoate | 000093-58-3 | Aldrich | 99% |
| Aromatic | benzyl acetate | 000140-11-4 | Aldrich | =99.0% |
| Aromatic | benzyl butyrate | 000103-37-7 | Alfa Aesar | 98% |
| Aromatic | ethyl benzoate | 000093-89-0 | Aldrich | =99% |
| Aromatic | propyl benzoate | 002315-68-6 | Aldrich | 99% |
| Aromatic | benzyl propionate | 000122-63-4 | Alfa Aesar | 99% |
| Aromatic | benzyl salicylate | 000118-58-1 | FLUKA | purum, =99.0% (GC) |
| Aromatic | cis-3-hexenyl benzoate | 025152-85-6 | Aldrich | =97% |
| Aromatic | acetophenone | 000098-86-2 | FLUKA | puriss. p.a., =99.0% (GC) |
| Aromatic | benzyl acetone | 2550-26-7 | Aldrich | 98% |
| Ester | ethyl acetate | 000141-78-6 | Aldrich | anhydrous, 99.8% |
| Ester | cis-2-penten-1-ol acetate | 042125-10-0 | Provided by Ales Svatos MPI-CE | 99,3% |
| Ester | trans-2-hexenyl acetate | 002497-18-9 | Aldrich | =98%, FCC, Kosher |
| Ester | ethyl butyrate | 000105-54-4 | Sigma | 99% |
| Ester | cis-3-hexenyl acetate | 003681-71-8 | Aldrich | =98%, FCC, Kosher |
| Ester | butyl acetate | 000123-86-4 | FLUKA | puriss. p.a., =99.0% (GC) |
| Ester | methyl hexanoate | 000106-70-7 | FLUKA | =99.8% (GC) |
| Ester | ethyl hexanoate | 000123-66-0 | Aldrich | =99% |
| Ester | cis-3-hexenyl valerate | 035852-46-1 | Grau-aromatics | 98,2% |
| Ester | cis-3-hexenyl propionate | 033467-74-2 | Aldrich | >97%, Kosher |
| Ester | cis-3-hexenyl butyrate | 016491-36-4  | Aldrich | =98%, Kosher |
| Ester | triacetin | 000102-76-1 | Aldrich | =98.5%, FCC, FG |
| Ester | amyl acetate | 628-63-7 | Aldrich | =99% |
| Ester | nonyl acetate | 143-13-5 | Aldrich | FCC |
| Ester | ethyl 2-methylbutyrate | 7452-79-1 | Aldrich | 99% |
| Ester | 3-acetoxy-2-butanone | 4906-24-5 | alfa aesar | 98% |
| Ester | (L)-(-)-ethyl lactate | 687-47-8 | Aldrich | 98% |
| Ester | cis-2-penten-1-yl acetate |  | Provided by Ales Svatos MPI-CE | 99,3% |
| Ester | ethyl lactate | 97-64-3 | Aldrich | natural, =98%, FCC, FG |
| Ester | ethyl heptanoate | 106-30-9 | Aldrich | 99% |
| Ketone | 2-heptanone | 000110-43-0 | Sigma | 99% |
| Ketone | 6,10,14-trimethyl-2-pentadecanonefitone  | 000502-69-2 | chemos | 98% |
| Ketone | cis-jasmone | 000488-10-8 | FLUKA | purum, analytical standard, =99.0% (sum of isomers, GC |
| Ketone | 2,5-hexanedione | 110-13-4 | Aldrich | =98% |
| Lactone | γ-octalactone | 104-50-7 | Aldrich | =97%, FCC |
| Lactone | γ-hexalactone | 695-06-7 | Aldrich | =98%, FCC, Kosher, FG |
| Lactone | γ-nonalactone | 104-61-0 | Aldrich | =98%, FCC, Kosher |
| Lactone | γ-undecalactone | 104-67-6 | Aldrich | 99% |
| Lactone | δ-decalactone | 705-86-2 | Aldrich | =98%, Kosher, FCC |
| Lactone | γ-decanolactone | 706-14-9 | Aldrich | 99% |
| Lactone | γ-valerolactone | 108-29-2 | Aldrich | 99% |
| Lactone | δ-​dodecalactone | 713-95-1 | SAFC | =98%, FCC, FG |
| Lactone | γ-​heptalactone | 105-21-5 | SAFC | =98%, FCC, FG |
| Lactone | γ-dodecalactone | 2305-05-7 | Aldrich | =97%, FCC, FG |
| Lactone | (±)​-mevalono-lactone | 674-26-0 | Sigma | ~97% (titration) |
| Others | Henkel 100 |  | Henkel | Mixture containing 93 chemicals.  |
| Others | iodoform | 75-47-8 | Aldrich | 99% |
| Quinone | *p*-benzoquinone | 106-51-4 | Riedel-de Haën | =99% (GC) |
| Quinone | *p*-toluquinone | 553-97-9 | FLUKA | purum, =98.0% (HPLC) |
| Solvent | n-hexane | 110-54-3 | VWR-Chemicals | 99% |
| Solvent | mineral oil | 8042-47-5 | Aldrich | BioReagent |
| Terpene | linalool | 000078-70-6 | Aldrich | 97% |
| Terpene | citral | 005392-40-5 | Aldrich | 95% |
| Terpene | *o*-cymene | 527-84-4 | Aldrich | 99% |
| Terpene | geranyl acetate | 000105-87-3 | Sigma | 98% |
| Terpene | (-)-menthone | 014073-97-3 | FLUKA | puriss. p.a., terpene standard for GC, =99.0% (sum of enantiomers, GC |
| Terpene | sulcatone6-methyl-5-hepten-2-one | 000110-93-0 | Aldrich | 99% |
| Terpene | geranyl acetone | 000689-67-8 | Aldrich | =97%, FG |
| Terpene | ß-Ionone | 79-77-6 | alfa aesar | 96% |
| Terpene | (*S*)-(-)-limonene | 005989-54-8 | Aldrich | 96% |
| Terpene | ocimene | 029714-87-2 | Aldrich | 90+ % (mixture of isomers)  |
| Terpene | ß-myrcene | 000123-35-3 | FLUKA | purum, =95.0% (GC) |
| Terpene | (*R*)-(+)-limonene | 005989-27-5 | FLUKA | analytical standard, for terpene analysis |
| Terpene | β-humulene | 116-04-1 | Aldrich | technical, =90% (GC |
| Terpene | farnesol | 004602-84-0 | Aldrich | 95% |
| Terpene | nerol | 000106-25-2 | Aldrich | FCC, =97%, Kosher |
| Terpene | geraniol | 000106-24-1 | FLUKA | purum, =96.0% (GC) |
| Terpene | trans-nerolidol  | 40716-66-3  | FLUKA | BioChemika, =85% (GC) |
| Terpene | ß-caryophyllene | 000087-44-5 | FLUKA | puriss., =98.5% (sum of enantiomers, GC |
| Terpene | valencene | 4630-07-3 | Aldrich | natural, =65% |
| Terpene | carvacrol | 499-75-2 | Aldrich | natural, 99%, FG |
| Terpene | α-humulene | 6753-98-6 | Aldrich | =96.0% (GC) |
| Terpene | 3-carene | 13466-78-9 | Aldrich | 90% |
| Terpene | ß-pinene | 18172-67-3 | Aldrich | 99% |
| Terpene | farnesene | 502-61-4 | Aldrich | Mixture of isomers, Kosher |
| Terpene | (+;-)-phytol | 7541-49-3 | Aldrich | 97%, mixture of isomers |
| Terpene | nootkatone | 4674-50-4 | Aldrich | =99.0% (GC) |
| Terpene | α-terpineol | 10482-56-1 | Aldrich | natural, ≥96%, FCC |
| Terpene | (-)-camphene | 5794-04-7 | FLUKA | technical, =90% (sum of camphene and fenchene, GC |
| Terpene | (+)-camphene | 5794-03-6 | Aldrich | =80%, FCC, Kosher |
| Terpene | (±)-citronellal | 106-23-0 | FLUKA | analytical standard=98.0% (GC);  |
| Terpene | (±)-sabinene | 3387-41-5 | Carl Roth | rotichrom GC |
| Terpene | 1,8-cineole  | 470-82-6 | FLUKA | =99.7% (GC) |
| Terpene | (*S*)-verbenol | 18881-04-4 | Aldrich | 95% |
| Terpene | (-)-caryophyllene-oxide | 1139-30-6 | Sigma | =99.0% (sum of enantiomers, GC) |
| Terpene | (+)-carvone |  2244-16-8  | Aldrich | 96% |
| Terpene | (1*R)*-(-)-fenchone | 7787-20-4 | Aldrich | =98% |
| Terpene | ß-​cyclocitral | 432-25-7 | Aldrich | =90%, FG |
| Terpene | γ-terpinene | 99-85-4 | Aldrich | =95% |
| Terpene | (-​)​-​α-​cedrene | 469-61-4 | FLUKA | puriss., =99.0% (sum of enantiomers, GC) |
| Terpene | (+)​-​ß-​cedrene | 546-28-1 | FLUKA | purum, =95.0% (sum of enantiomers, GC) |
| Terpene | (1*S*)-(-)-verbenone |  1196-01-6  | Aldrich | 94% |