

## Article

# Identification of Olfactory Genes in *Monochamus saltuarius* and Effects of *Bursaphelenchus xylophilus* Infestation on Their Expression

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**Supplementary Materials:** The following supporting information can be downloaded at: [www.mdpi.com/xxx/s1](http://www.mdpi.com/xxx/s1). Figure S1. Sequence length distribution of the *Monochamus saltuarius* antennal transcriptomes assembly. Figure S2. Maximum likelihood dendrogram based on protein sequences of candidate odorant binding protein (OBP) in *M. saltuarius* and orthologs from other insects. IQ-tree best fit model (VT+R6) was used and bootstrap consensus tree inferred from 1000 replicates. *Monochamus saltuarius* (Msal) (red), *S. bifasciatus* (Sbif), *T. castaneum* (Tcas), *A. corpulenta* (Acor), *A. planipennis* (Apla), *D. ponderosae* (Dpon), *Drosophila melanogaster* (Dmel), and *Bombyx mori* (Bmor). Orco clade was marked with green background. Table S1. Candidate chemosensory genes of *Monochamus saltuarius*. Table S2. FPKM and p values of the differently expressed chemosensory genes of *Monochamus saltuarius*.

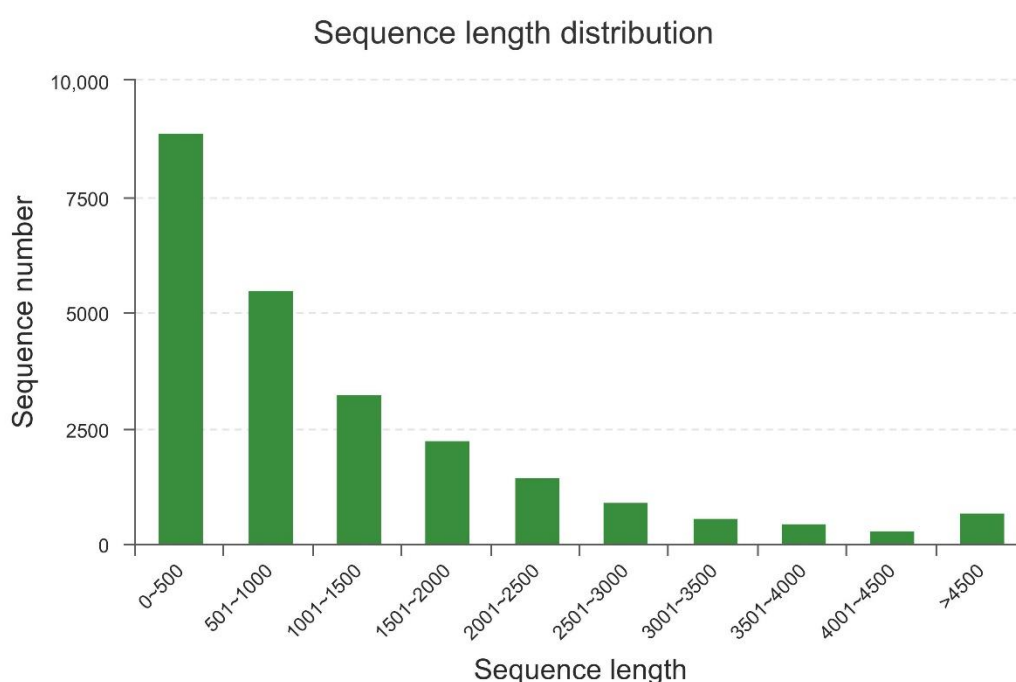


Figure S1. Sequence length distribution of the *Monochamus saltuarius* antennal transcriptomes assembly.

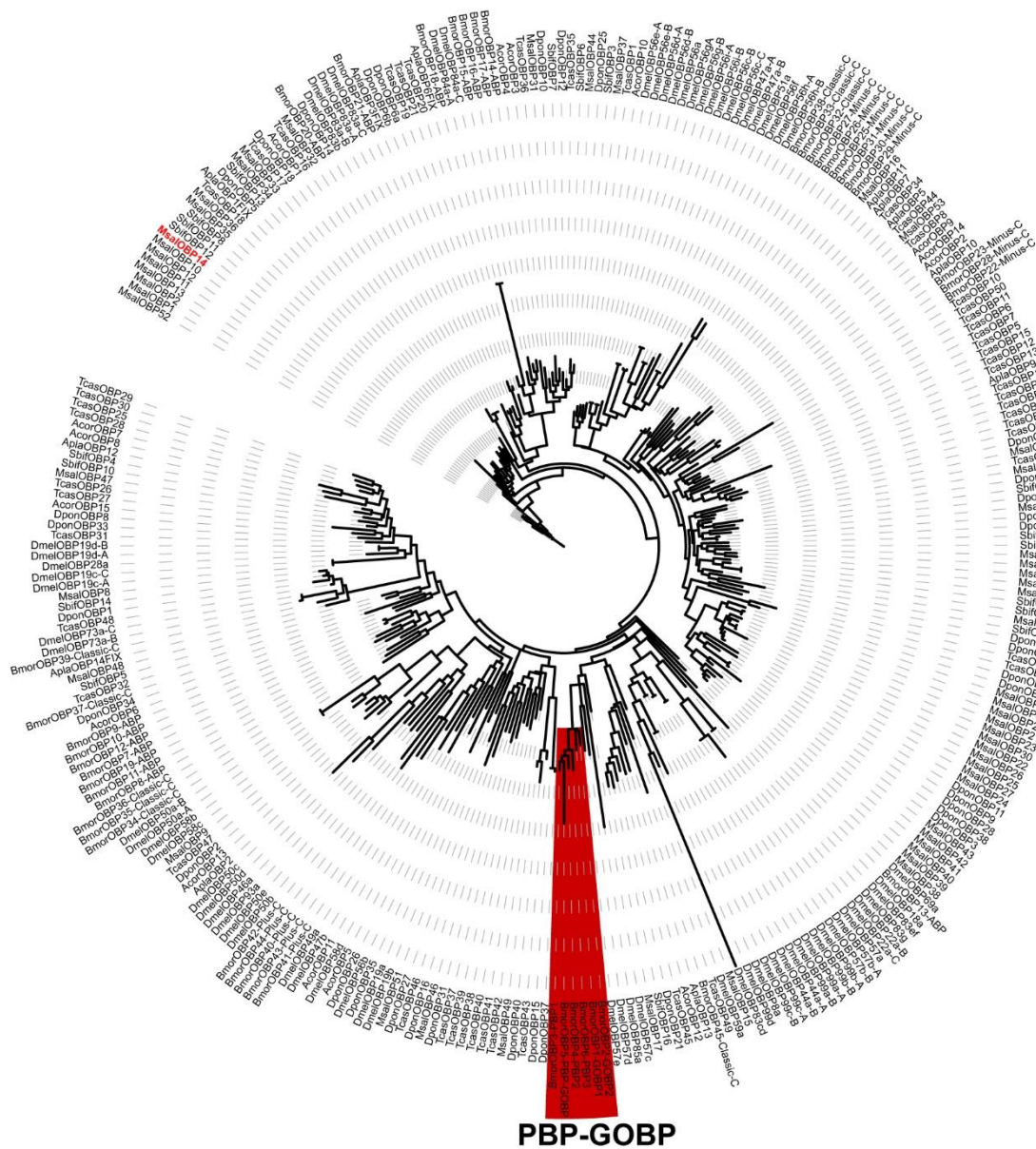


Figure S2. Maximum likelihood dendrogram based on protein sequences of candidate odorant binding protein (OBP) in *M. saltuarius* and orthologs from other insects. IQ-tree best fit model (VT+R6) was used and bootstrap consensus tree inferred from 1000 replicates. *Monochamus saltuarius* (Msal) (red), *S. bifasciatus* (Sbif), *T. castaneum* (Tcas), *A. corpulenta* (Acor), *A. planipennis* (Apla), *D. ponderosae* (Dpon), *Drosophila melanogaster* (Dmel), and *Bombyx mori* (Bmor). Orco clade was marked with green background.

Table S1. Candidate chemosensory genes of *Monochamus saltuarius*.

Genes name	Unigene ID
OBP1	TRINITY_DN48747_c3_g1
OBP2	TRINITY_DN49739_c1_g4
OBP3	TRINITY_DN52500_c0_g2
OBP4	TRINITY_DN61614_c5_g2
OBP5	TRINITY_DN45697_c3_g3

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OBP6	TRINITY_DN41613_c0_g1
OBP7	TRINITY_DN43550_c0_g1
OBP8	TRINITY_DN45684_c1_g2
OBP9	TRINITY_DN43066_c0_g1
OBP10	TRINITY_DN49419_c1_g3
OBP11	TRINITY_DN49419_c1_g1
OBP12	TRINITY_DN50096_c0_g2
OBP13	TRINITY_DN50932_c2_g4
OBP14	TRINITY_DN48747_c2_g1
OBP15	TRINITY_DN55030_c2_g2
OBP16	TRINITY_DN55885_c2_g5
OBP17	TRINITY_DN44831_c0_g1
OBP18	TRINITY_DN43997_c4_g2
OBP19	TRINITY_DN43627_c0_g2
OBP20	TRINITY_DN40316_c0_g1
OBP21	TRINITY_DN57591_c3_g1
OBP22	TRINITY_DN59092_c4_g1
OBP23	TRINITY_DN48897_c0_g2
OBP24	TRINITY_DN55241_c0_g2
OBP25	TRINITY_DN44663_c1_g1
OBP26	TRINITY_DN49365_c4_g2
OBP27	TRINITY_DN46523_c5_g1
OBP28	TRINITY_DN60475_c1_g1
OBP29	TRINITY_DN55241_c0_g4
OBP30	TRINITY_DN48999_c3_g1
OBP31	TRINITY_DN43093_c12_g1
OBP32	TRINITY_DN59954_c3_g7
OBP33	TRINITY_DN47553_c1_g1
OBP34	TRINITY_DN47850_c0_g1
OBP35	TRINITY_DN47802_c3_g9
OBP36	TRINITY_DN47553_c1_g3
OBP37	TRINITY_DN48048_c0_g1
OBP38	TRINITY_DN53939_c0_g2
OBP39	TRINITY_DN62489_c9_g1
OBP40	TRINITY_DN59920_c1_g3
OBP41	TRINITY_DN43551_c0_g1
OBP42	TRINITY_DN44581_c3_g1
OBP43	TRINITY_DN47235_c1_g1
OBP44	TRINITY_DN50036_c2_g2
OBP45	TRINITY_DN48825_c0_g1
OBP46	TRINITY_DN58938_c0_g1
OBP47	TRINITY_DN41839_c0_g1
OBP48	TRINITY_DN42180_c0_g1
OBP49	TRINITY_DN33697_c0_g1
OBP50	TRINITY_DN44513_c2_g2
OBP51	TRINITY_DN39567_c0_g1
OBP52	TRINITY_DN44613_c2_g1
OBP53	TRINITY_DN46824_c0_g1
CSP1	TRINITY_DN58078_c0_g1
CSP2	TRINITY_DN58923_c1_g1
CSP3	TRINITY_DN58224_c3_g1
CSP4	TRINITY_DN59411_c0_g3
CSP5	TRINITY_DN50377_c3_g1
CSP6	TRINITY_DN59050_c0_g1
CSP7	TRINITY_DN44520_c1_g4
CSP8	TRINITY_DN40952_c0_g1

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CSP9	TRINITY_DN56532_c2_g1
CSP10	TRINITY_DN58634_c0_g2
CSP11	TRINITY_DN57178_c1_g6
CSP12	TRINITY_DN43945_c0_g1
CSP13	TRINITY_DN57727_c1_g2
CSP14	TRINITY_DN49747_c2_g2
CSP15	TRINITY_DN58634_c0_g1
OR1	TRINITY_DN51581_c0_g1
OR3	TRINITY_DN52835_c2_g1
OR4	TRINITY_DN54385_c7_g3
OR5	TRINITY_DN42219_c0_g1
OR6	TRINITY_DN58133_c0_g2
OR7	TRINITY_DN50342_c3_g1
OR8	TRINITY_DN52947_c0_g2
OR9	TRINITY_DN54903_c0_g1
OR10	TRINITY_DN46689_c0_g1
OR11	TRINITY_DN40705_c0_g1
OR12	TRINITY_DN42199_c0_g1
OR13	TRINITY_DN46388_c0_g1
OR14	TRINITY_DN41610_c0_g1
OR15	TRINITY_DN52947_c0_g1
OR16	TRINITY_DN53088_c0_g2
GR1	TRINITY_DN62281_c11_g1
GR2	TRINITY_DN48597_c0_g1
GR3	TRINITY_DN47419_c0_g1
GR4	TRINITY_DN54232_c1_g3
GR5	TRINITY_DN46994_c1_g2
GR6	TRINITY_DN41833_c0_g1
GR7	TRINITY_DN54232_c1_g4
GR8	TRINITY_DN46777_c0_g1
GR9	TRINITY_DN40790_c0_g1
GR10	TRINITY_DN61817_c1_g2
IR25	TRINITY_DN61303_c0_g1
IR2	TRINITY_DN46820_c0_g1
IR3	TRINITY_DN60898_c1_g1
IR4	TRINITY_DN55972_c0_g1
IR5	TRINITY_DN50525_c0_g2
IR6	TRINITY_DN60136_c0_g1
IR7	TRINITY_DN50225_c2_g1
IR8	TRINITY_DN50500_c0_g3
IR9	TRINITY_DN54219_c1_g2
IR10	TRINITY_DN60490_c3_g3
IR11	TRINITY_DN50500_c0_g2
IR12	TRINITY_DN54219_c1_g4
IR13	TRINITY_DN54219_c1_g6
IR93a	TRINITY_DN51666_c1_g1
IR14	TRINITY_DN45640_c4_g1
IR15	TRINITY_DN50741_c0_g1
IR16	TRINITY_DN50500_c0_g1
IR17	TRINITY_DN60136_c0_g2
IR18	TRINITY_DN45640_c4_g3
IR19	TRINITY_DN61303_c0_g2
IR20	TRINITY_DN56579_c3_g1
IR21	TRINITY_DN60490_c3_g1
SNMP1	TRINITY_DN57728_c0_g3
SNMP2	TRINITY_DN50560_c1_g1

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Table S2. FPKM and p values of the differently expressed chemosensory genes of *Monochamus saltuarius*.

Differently Expressed OBP	OBP28	OBP52	OBP38	OBP39	OBP32	OBP18	OBP19	OBP31	OBP43	OBP3	OBP6	OBP7	OBP40	OBP51	OBP14
Healthy-Female FPKM average	11786.62	10185.16	3885.51	2453.46	562.04	519.47	474.56	354.52	347.56	289.61	180.58	154.23	135.02	47.69	3.64
Healthy-Male FPKM average	3156.83	4891.67	364.67	510.32	122.31	135.55	193.56	87.20	35.59	78.18	45.30	1.33	15.69	22.48	16618.65
p-Value	0.0404166	0.0444066	0.013818	0.011315	0.013745	0.014822	0.049138	0.034186	0.000706	0.009068	0.04527	0.023058	8.06E-05	0.020855	4.313E-06
Healthy-Female FPKM average															
Infested-Female FPKM average															
p-Value															
	OBP14	OBP30	OBP52	OBP44	OBP35										
Healthy-Male FPKM average	16618.65	5430.36	4891.67	830.90	613.1867										
Infested-Male FPKM average	9190.94	463.08	960.025	275.07	173.86										
p-Value	0.006371	0.046997	0.008222	0.032536	0.015732										
Differently Expressed CSP	CSP1	CSP5	CSP13												
Healthy-Female FPKM average	623.63667	34.4	3.946667												

Healthy-Male FPKM average	154.466 67	5189.5	6.8633 33												
p-Value	0.04528 59	0.00168 83	0.0092 83												
	<b>CSP13</b>														
Healthy-Female FPKM average	18.5633 33														
Infested-Female FPKM average	9.17333 33														
p-Value	0.03585 27														
	<b>CSP9</b>	<b>CSP13</b>													
Healthy-Male FPKM average	306.433 33	8.56333 33													
Infested-Male FPKM average	111.12	3.205													
p-Value	0.01653 12	0.02601 93													
<b>Differently Expressed OR</b>															
Healthy-Female FPKM average															
Healthy-Male FPKM average															
p-Value															

Healthy-Female FPKM average															
Infested-Female FPKM average															
p-Value															
	<b>OR1</b>	<b>OR5</b>	<b>OR10</b>	<b>OR12</b>	<b>OR14</b>	<b>OR16</b>									
Healthy-Male FPKM average	2.26666 67	1.68	0.7166 67	2.8166 67	1.17	0.8566 67									
Infested-Male FPKM average	0.53	0.46	0.23	0.765	0.355	0									
p-Value	0.01580 95	0.00614 82	0.0167 41	0.0156 15	0.0016 92	0.0074 17									
<b>Differently Expressed IR</b>	<b>IR10</b>	<b>IR12</b>													
Healthy-Female FPKM average	11.1333 33	39.1433 33													
Healthy-Male FPKM average	3.08333 33	5.02333 33													
p-Value	0.03362 15	0.04985 97													
	<b>IR4</b>														
Healthy-Female FPKM average	1.66														
Infested-Female FPKM average	2.045														

p-Value	0.001799														
	<b>IR25</b>	<b>IR21</b>													
Healthy-Male FPKM average	9.626667	2.243333													
Infested-Male FPKM average	7.713333	1.12													
p-Value	0.0407848	0.0016468													
<b>Differently Expressed GR</b>															
Healthy-Female FPKM average															
Healthy-Male FPKM average															
p-Value															
	<b>GR8</b>														
Healthy-Female FPKM average	1.663333														
Infested-Female FPKM average	5.97														
p-Value	0.0133062														
Healthy-Male FPKM average															



Infested-Male FPKM average															
p-Value															
<b>Differently Expressed SNMP</b>															
Healthy-Female FPKM average															
Healthy-Male FPKM average															
p-Value															
Healthy-Female FPKM average															
Infested-Female FPKM average															
p-Value															
	<b>SNMP 2</b>														
Healthy-Male FPKM average	1.99														
Infested-Male FPKM average	0.80														
p-Value	0.03101 79														