

**Table S1. Primer pairs used for the manuscript**

Name	Primer sequences
<i>HparOBP1 (RT-qPCR)</i>	Forward: 5'-TGTGTGGTAGCTTGCGTAAA-3' Reverse: 5'-TGTTACATTCGTCGCTATCG-3'
<i>HparOBP3 (RT-qPCR)</i>	Forward: 5'-TGCATAAGGGAATCTGGAAT-3' Reverse: 5'-AGAGTCAGCGCACCCCTCCA-3'
<i>HparOBP6 (RT-qPCR)</i>	Forward: 5'-AATGCGTACTGGTGTGGAA-3' Reverse: 5'-CTCGCAACTATCATCATCAC-3'
<i>HparOBP10 (RT-qPCR)</i>	Forward: 5'-TCATAGATAAGGCCGACGCA-3' Reverse: 5'-TTGCACAGATCGAGAATCGC-3'
<i>HparOBP12 (RT-qPCR)</i>	Forward: 5'-TTCATGCCTCTTCAAAAAAT-3' Reverse: 5'-TATGGCTGGGCGTTTATAGAT-3'
<i>HparOBP13 (RT-qPCR)</i>	Forward: 5'-GATTACGGCGTATTTGCG-3' Reverse: 5'-TCGTAAGCTGTTTCACATGA-3'
<i>HparOBP14 (RT-qPCR)</i>	Forward: 5'-TCCAGGAGCTGTTGCTATAATG-3' Reverse: 5'-TTAATGGTCCTCTGATTTGTGAA-3'
<i>HparOBP15 (RT-qPCR)</i>	Forward: 5'-GGGAAAGGTAGGTGCGTC-3' Reverse: 5'-CCTCCAAGGTCTTCAAAGTG-3'
<i>HparOBP16 (RT-qPCR)</i>	Forward: 5'-TATGCGTTGCAGAATGTATG-3' Reverse: 5'-CGCTTCTTTGCTTCTGCTA-3'
<i>HparOBP23 (RT-qPCR)</i>	Forward: 5'-ACAGTGAAGGATCAAAAGGG-3' Reverse: 5'-TGGATTGGCACCAGGTATTA-3'
<i>HparOBP26 (RT-qPCR)</i>	Forward: 5'-CCGATGAGTGTTTGCAAGAG-3' Reverse: 5'-CAAAGTTTACAGAAACGCCA-3'
<i>HparOBP27 (RT-qPCR)</i>	Forward: 5'-GTTCTCGTTTTCGCTCTACA-3' Reverse: 5'-GTCACCAAATACGCGTTGTC-3'
<i>HparOBP29 (RT-qPCR)</i>	Forward: 5'-ACTGTCTCAAATCCAGCGAA-3' Reverse: 5'-CGAAGTCGTAAAAGTCCAAG-3'
<i>HparOBP33 (RT-qPCR)</i>	Forward: 5'-TGGAAGAATTAGCCAAACAA-3' Reverse: 5'-TGGTTCTGCTTTCGCTTTAT-3'
<i>HparOBP34 (RT-qPCR)</i>	Forward: 5'-GCCATGTTGACTACGATTCA-3' Reverse: 5'-AAACATTTGCAAATTCATG-3'
<i>HparOBP35 (RT-qPCR)</i>	Forward: 5'-TTGTCACTGCGCTTTGGGTA-3' Reverse: 5'-GTCAACCCTTCTCCCGCATT-3'
<i>HparOBP36 (RT-qPCR)</i>	Forward: 5'-CTTGCAAAACAAAAGGGAAA-3' Reverse: 5'-AGGCGGTAAAATAGCGGA-3'
<i>HparOBP37 (RT-qPCR)</i>	Forward: 5'-TGCCTGGCGACTATGAAACT-3' Reverse: 5'-ACGCACTTGAAGAAAGCATA-3'
<i>HparOBP38 (RT-qPCR)</i>	Forward: 5'-TTGCTCGAGGATGAAAGTGA-3' Reverse: 5'-CAAGCACTTATCCTCGTTCT-3'
<i>HparOBP39 (RT-qPCR)</i>	Forward: 5'-AGTCCGTTGCCTGGCTGG-3' Reverse: 5'-CGGGAATTGATTATGCGTTG-3'
<i>GADPH</i>	Forward: 5'-AATACCTTTTAGTGGTCCCTCCG-3' Reverse: 5'-TGCATGCTATCACAGCTACGC-3'

<i>HparOBP14 (cloning)</i>	Forward: 5'-CGGGATCCTATG ATTTTGAAGATCACGCAT-3' Reverse: 5'-CCCAAGCTTCA CCACCTATACGTTGTTAG-3'
<i>dsOBP14</i>	Forward: 5'-GGATCCTAATACGACTCACTA TAGGATTTTGAAGATCACGCATATAAT-3' Reverse: 5'-GGATCCTAATACGACTCACTA TAGGGACATTCCAGTTGTATTTCTTTC-3'
<i>dsGFP</i>	Forward: 5'-GGATCCTAATACGACTCACT ATAGGCTACCAGCCAAATCTAAACG-3' Reverse: 5'-GGATCCTAATACGACTCAC TATAGGGCTAACCGAGAAAAGATGAC-3'

*Bam*HI and *Hind*III restriction sites marked with double underline.

GGATCCTAATACGACTCACTATAGG is the enhancer and T7 promoter sequence, which is required for dsRNA synthesis.

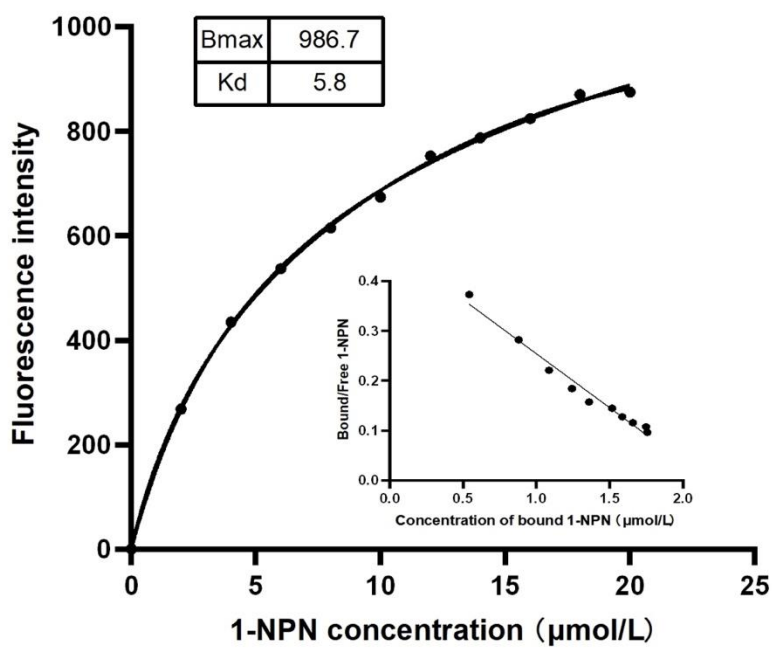
## Supplementary Figures

1 ATGAAGTTCGTTATTGTTCTATTATTATCTGCCCTTGCATTTATCAATGCTTATGATTTT  
1 M K F V I V L L L S A L A F I N A Y D F  
61 GAAGATCACGCATATAATGAAC TATTAGTTGAACAATATTCTCTCGCCCATCCAAGACTA  
21 E D H A Y N E L L V E Q Y S L A H P R L  
121 CGAAGAGCCGCAGAAAATAACTGCATAGATTCCAGGAGCTGTTGCTATAATGATGCCGTA  
41 R R A A E N N C I D S R S C C Y N D A V  
181 CCACAATATCACGCTAATGAAACAGAAGAGTGCTCGAAAGAACTAGGTTTCGATCGTTCA  
61 P Q Y H A N E T E E C S K E L G F D R S  
241 CAAATCAGAGGACCATTAACTGATGCACAAATAAATCAAATTAATGTCTTGCTGAATGT  
81 Q I R G P L T D A Q I N Q I K C L A E C  
301 ATTTCCAAGAAGAAGGGACATTTTCGACGCCGATGGTAACCTATTGAAAGATGAACTGTTG  
101 I S K K K G H F D A D G N L L K D E L L  
361 AAGGATATCAGGAAACCCTTAGAACAGGTAGCGTGGTTGAAGCCAAAAGTTGAGGATATA  
121 K D I R K P L E Q V A W L K P K V E D I  
421 TTTAATAAATGCTTGGATGGTCTACCTACGAAAGTACCAGAGAATCAATGCAATGACATT  
141 F N K C L D G L P T K V P E N Q C N D I  
481 GGCATGACGATTGGACATTGTATTTGGAAAGAAATACAAC TGGAAATGTCCAAAGGATAGA  
161 G M T I G H C I W K E I Q L E C P K D R  
541 CAAGCAAATCTTGAAAAATGTGAGGCGCTTCAAGTATATTTGAAGGAGAACAAAGGCTTTC  
181 Q A N L E K C E A L Q V Y L K E N K A F  
601 CCACCACCACCACCTATACGTTGTTAG  
201 P P P P P I R C

**Figure S1.** Nucleotide sequence and deduced amino acid sequence of HparOBP14 from *H. parallela*. The signal peptide is represented by a single underscore, and the start codon and stop codon are represented by a rectangle.

HparOBP14	.MKFVIVLLLSALAFIN...AYDEFTHAYNELIVEQYS.....LAHPRLRAAENNC.....IDSRS.....CCYNDAVPQYHAN...ETEECSK	73
HparOBP16	.MNKILVSTVILGIAS...AYDESDAYFNQLITKEFDDLTLSE.SSIAHPRARRDDEAAK...CHHKH...KECCAEDLLFELYDKIRDMKKECLK	86
AcorOBP11	.MKTSTITLFLCALAAVN...AYEEDQAYNQLIAEELH.....PLHYRGARDTQKC.....IDQNS.....CGSGPPISNFHASDKEASQCSK	76
AcorOBP13	.MKNIVLVSSLLGLSS...AYDFSDEFNQLLSQEYDDFASGE.SVFLHPRVRRDDDEASK.....CHHRH...KECCGDELMKSLHDKYRDTKRECFK	86
DponOBP2	.MNKLVTLVAVLLGAACHLVQTYDFQDATFNEILLSDFEDIFDTLDNTYLHPRAKRNEEAVNSDEKCRRRHHRKPKLCCGEDVLDLSLQEKKEIVRLCFK	99
AchiOBP3	.MNNVAFECALLVATVS...AYNFEDPDFNILLSDDLEELSSGV.ASFSHPRSRRDDDEAVN.DKDKCHHRKRWGELCOAEDVVAKMRDVEKDLKRECFK	93
CbowOBP25	MYYALLPRSAVLAVIIVVVA.AYNFEDTEFNQILANLEEDVYS...FTYSHPRSRRDDKAVEEDKCHPPRRGR..PLCCAEETMRKLHDDKKEIKRACFK	94
TcasOBP5E	.MNNQIAVVTFLIAVAALTA.AYEFNDPLFNQILANLEVELES...SAYPHRSRRDEDAVT.EKCRPFRRK...KLCCAEETFEDELHDKDRDFKRECFK	91
AgamOBPjj7A	..MLKLALFVGLVGCVV...AYDFQDSFYNEVIMEDLLDNAD...EPIMFGRFRRSASEVQ..DDKCKRKYK...CCNDANTENMEKIH.EIKKQCFM	84
DmelOBP49a	...MLSKSQLLLLVVG...FCLNAAVSAEVDCKSRP.....SFVNPKT.....CCPMPDEFVTAECLKCKIFMTMP	60
	** C1	
HparOBP14	ELGFD.RSQIRG.....PTDAQINQ...IKLAEICISKKKGHFDADGNLLKDELLKDIRKPLEQVAVLKPKVEDIFNKLGLDGLPTKVE....	154
HparOBP16	EVTG..KEFHGG.....PPTCEELEQRKKEMICVABCMGKKKGVLADAGNIKEEELKKSVEKSSMSGLDWQPLMDDVITKCLAEAKEAADKREA.	174
AcorOBP11	EVNFN.RGSIRG.....PTAEQKQD...IKLAEICIGKKKGYLTADELKIDKLLSSMKERLQSVAVLAPKLSMFELCLPQNETAKQP...	158
AcorOBP13	QVTG..KEFGGG.....PPTCEELEERKKEMICVABCMGKKKGAVDDKGNKEDEVKKLVAECTAELEWFKPMLDEVTTKCLAEAKAAAEKYDK.	174
DponOBP2	DTGGVKEKSPDRGFGNHRNFDLSCAEAVEKRRKSDMICVEGCKLQCKGLVSDDGSPKEQISTYLYKEAFTTQTWFEKVSQGVVEKGVNEAINTATKNPVKF	199
AchiOBP3	EVVG...KDKHDK.....FDPENCETMDQKKQIVVIEGVGKKKDLLTEGPNKEEFERSFLKESFSESSEWLAALQDKVISTCLDEGKNATANDAS	183
CbowOBP25	EITG..KEKPERPDRHHGPPDFPSCKEIKQHRDMNCIQCQGVGEKLDYLDADGPKPEQFEKYVEGIFEKEDYLLPLKDKIVSVGLDEAKNATEKVSS.	191
TcasOBP5E	QVVG.S.KDGPPE.....FDPFRCDKVDKHRDMTICVSCQVQCKKDVLLKDKGNVKEAEGFGEFVKETMAKESWFSVSIQDKVVSTGLAEARNAATANDTS	182
AgamOBPjj7A	EVNR..KNKADG...AYEPVDFESCERLNKTKMEVTCAMEGVGKKKEVVNEDGLIEPKLMEFVKSNFAADDWQQPLLAGHIETGVKEAKEKAAMPR.	177
DmelOBP49a	PPPP..DGEASG.....SESKRHHHPHPPECFFSIFNETGIYQ.NRKLDKAKLNAYLQEVFEEDSSDLQTATQATLTATKVAIDFEANLPPR	147
	C2 C3 C4	
HparOBP14	.....NCCNDIGMTIGFCIWKEIQLECKDRQANLEKCEALQVYLKE.NKAFPPPPPIRC.....	208
HparOBP16	.....GCCNPSDLKLVRCFFKEIQLSCEADQIKDQABDALRESVKK...HDFPPPH.....	223
AcorOBP11	.....KKCNVDGLTVGCIWQIQIQELNEQONPONCKNLQEYILT.HNQFPAPPVVK.....	212
AcorOBP13	.....KCCNPSDIKFSICIFKEIQLNCEADQIKDQERCDAMRASLKK...HDFPPVH.....	223
DponOBP2	YTB.....GNKICSRSGIVLKECLNSIQLSCEAGQIKDKNACERFQERAKKGKDLFDQPPGPPFDDNREEQ	267
AchiOBP3	DS.....TSCNPAGIKIAECLHREIQLNCEADQIKDEKSCARLQERLKR.RDFHFPFPPPGGFDEPDN..	245
CbowOBP25	.....DFCKSTGLVLEECIFINTQLNCEADQIKDKKNSKQFDRLRQGGDKRSSPFE...AEDE...	248
TcasOBP5E	DT.....ESCNPAVGKLMCMFERIQLCCETEQIKDKQKARARDKIKR.HNEFLPPPPQ...FLNDE...	241
AgamOBPjj7A	.....EAGCSCSETSNFEGYCMWRQMALACEKDKQVANKHCDRIREKIANNEPLHYKAELEDM.....	235
DmelOBP49a	PAPSPPPGFPCPHDAGHLMCGVFRNMKNKCEDSIRNDSQCTDMKEFFTKCKPPRGPPPSAEDM.....	212
	C4a C5 C6P C6a	

**Figure S2.** Alignment of the deduced amino acid sequence of HparOBP14 with homologous proteins from other OBPs. The eight conserved Cys residues are labelled by 'C'. '\*' indicates the conserved cysteine residue before C1. The species are *Anomala corpulenta* (Acor), *Anoplophora chinensis* (Achi), *Dendroctonus ponderosae* (Dpon), *Tribolium castaneum* (Tcas), *Colaphellus bowringi* (Cbow), *Anopheles gambiae* (Agam) and *Drosophila melanogaster* (Dmel). Their GenBank accession numbers are AcorOBP11 (AKC58532.1), AcorOBP13 (AKC58534.1), HparOBP16 (AKI84374.1), AchiOBP3 (AUF72950.1), CbowOBP25 (ALR72513.1), DponOBP2 (AKK25130.1), TcasOBP5E (EFA03231.1), AgamOBPjj7A (EAA43809), DmelOBP49a (NP\_610812.1).



**Figure S3.** Binding curve and Scatchard plots of HparOBP14 protein with fluorescent probe 1-NPN.