Supplemental Figures

Drozdova *et al.*

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1 Diversity of opsin transcripts and their phylogenetic distribution
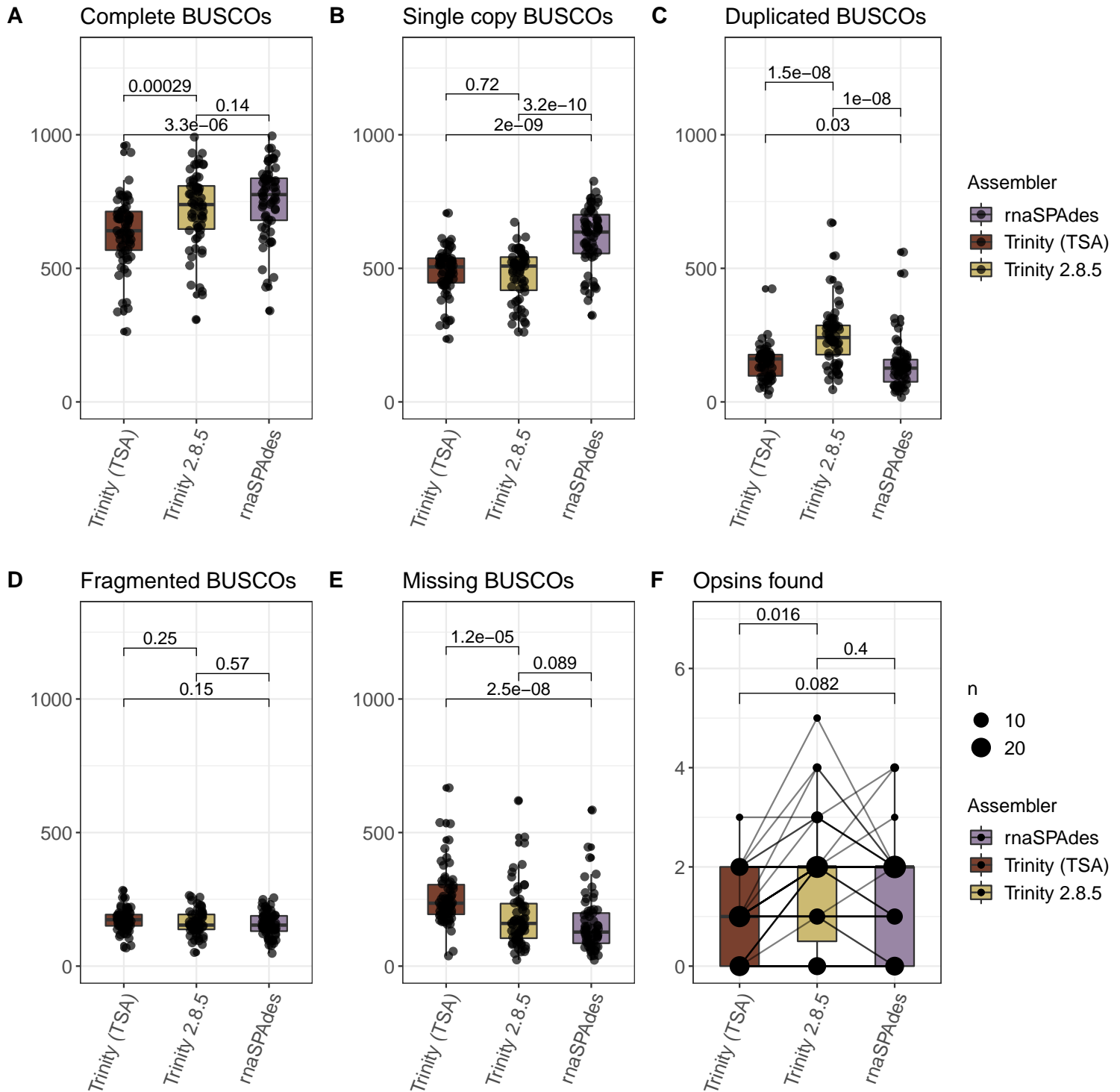

Figure S1: Quality of transcriptome assemblies according to BUSCO metrics (A-E) and the number of opsins found in each assembly (F).
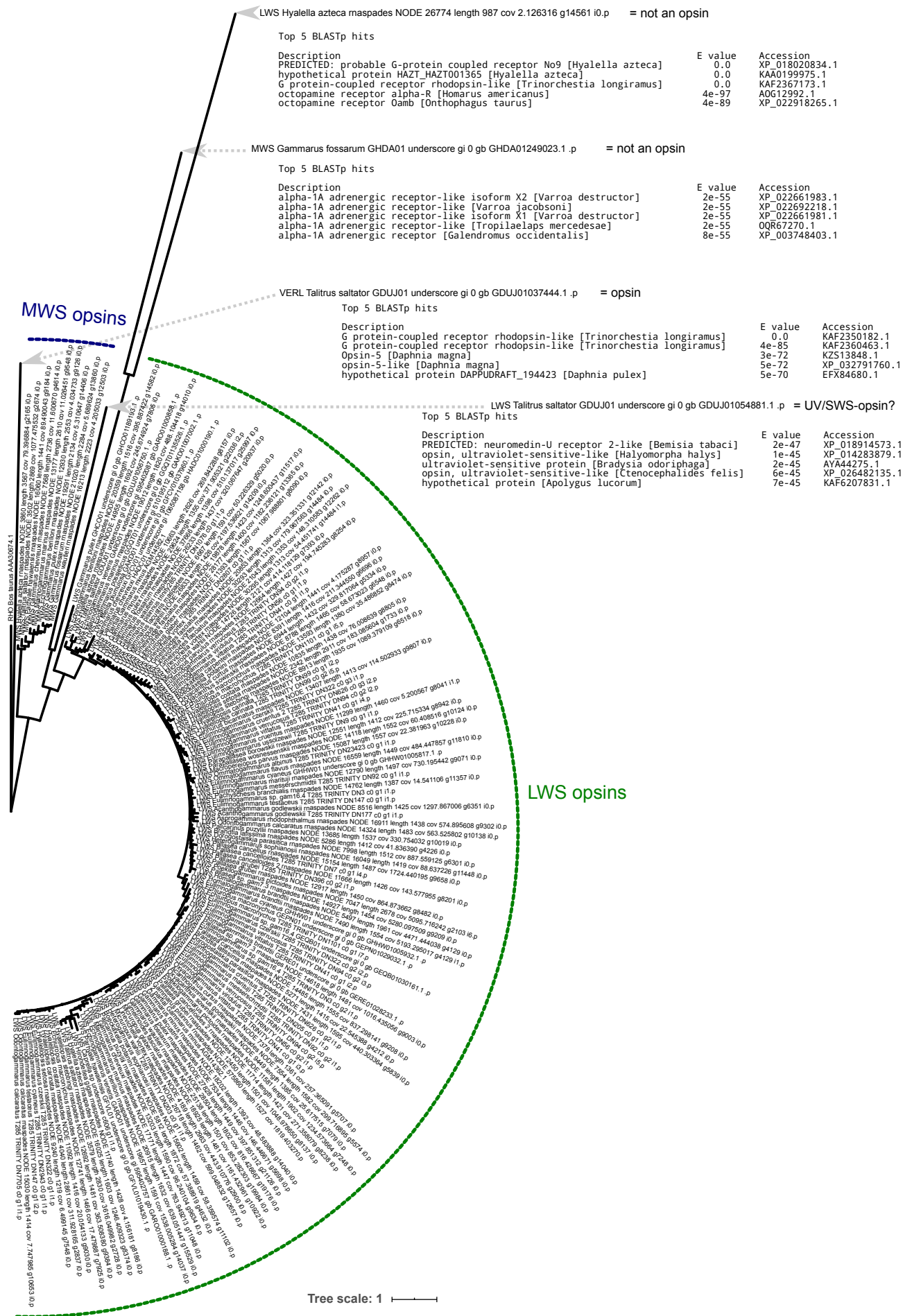
LWS Hyalella azteca rnaspades NODE 26774 length 987 cov 2.126316 g14561 i0.p   = not an opsin

Top 5 BLASTp hits

Description	E value	Accession
PREDICTED: probable G-protein coupled receptor No9 [Hyalella azteca]	0.0	XP_018020834.1
hypothetical protein HAZT_HAZT001365 [Hyalella azteca]	0.0	KAA0199975.1
G protein-coupled receptor rhodopsin-like [Trinorchestia longiramus]	0.0	KAF2367173.1
octopamine receptor alpha-R [Homarus americanus]	4e-97	AOG12992.1
octopamine receptor Oamb [Onthophagus taurus]	4e-89	XP_022918265.1

MWS Gammarus fossarum GHDA01 underscore gi 0 gb GHDA01249023.1 .p   = not an opsin

Top 5 BLASTp hits

Description	E value	Accession
alpha-1A adrenergic receptor-like isoform X2 [Varroa destructor]	2e-55	XP_022661983.1
alpha-1A adrenergic receptor-like [Varroa jacobsoni]	2e-55	XP_022692218.1
alpha-1A adrenergic receptor-like isoform X1 [Varroa destructor]	2e-55	XP_022661981.1
alpha-1A adrenergic receptor-like [Tropilaelaps mercedesae]	2e-55	OQR67270.1
alpha-1A adrenergic receptor [Galendromus occidentalis]	8e-55	XP_003748403.1

VERL Talitrus saltator GDUJ01 underscore gi 0 gb GDUJ01037444.1 .p   = opsin

Top 5 BLASTp hits

Description	E value	Accession
G protein-coupled receptor rhodopsin-like [Trinorchestia longiramus]	0.0	KAF2350182.1
G protein-coupled receptor rhodopsin-like [Trinorchestia longiramus]	4e-85	KAF2360463.1
Opsin-5 [Daphnia magna]	3e-72	KZS13848.1
opsin-5-like [Daphnia magna]	5e-72	XP_032791760.1
hypothetical protein DAPPUDRAFT_194423 [Daphnia pulex]	5e-70	EFX84680.1

LWS Talitrus saltator GDUJ01 underscore gi 0 gb GDUJ01054881.1 .p   = UV/SWS-opsin?

Top 5 BLASTp hits

Description	E value	Accession
PREDICTED: neuromedin-U receptor 2-like [Bemisia tabaci]	2e-47	XP_018914573.1
opsin, ultraviolet-sensitive-like [Halyomorpha halys]	1e-45	XP_014283879.1
ultraviolet-sensitive protein [Bradysia odoriphaga]	2e-45	AYA44275.1
opsin, ultraviolet-sensitive-like [Ctenocephalides felis]	6e-45	XP_026482135.1
hypothetical protein [Apolygus lucorum]	7e-45	KAF6207831.1

MWS opsins

LWS opsins

Tree scale: 1

Figure S2: (A) An amino acid-based maximum likelihood tree of all found opsin sequences and reanalysis of long branches with NCBI BLAST.
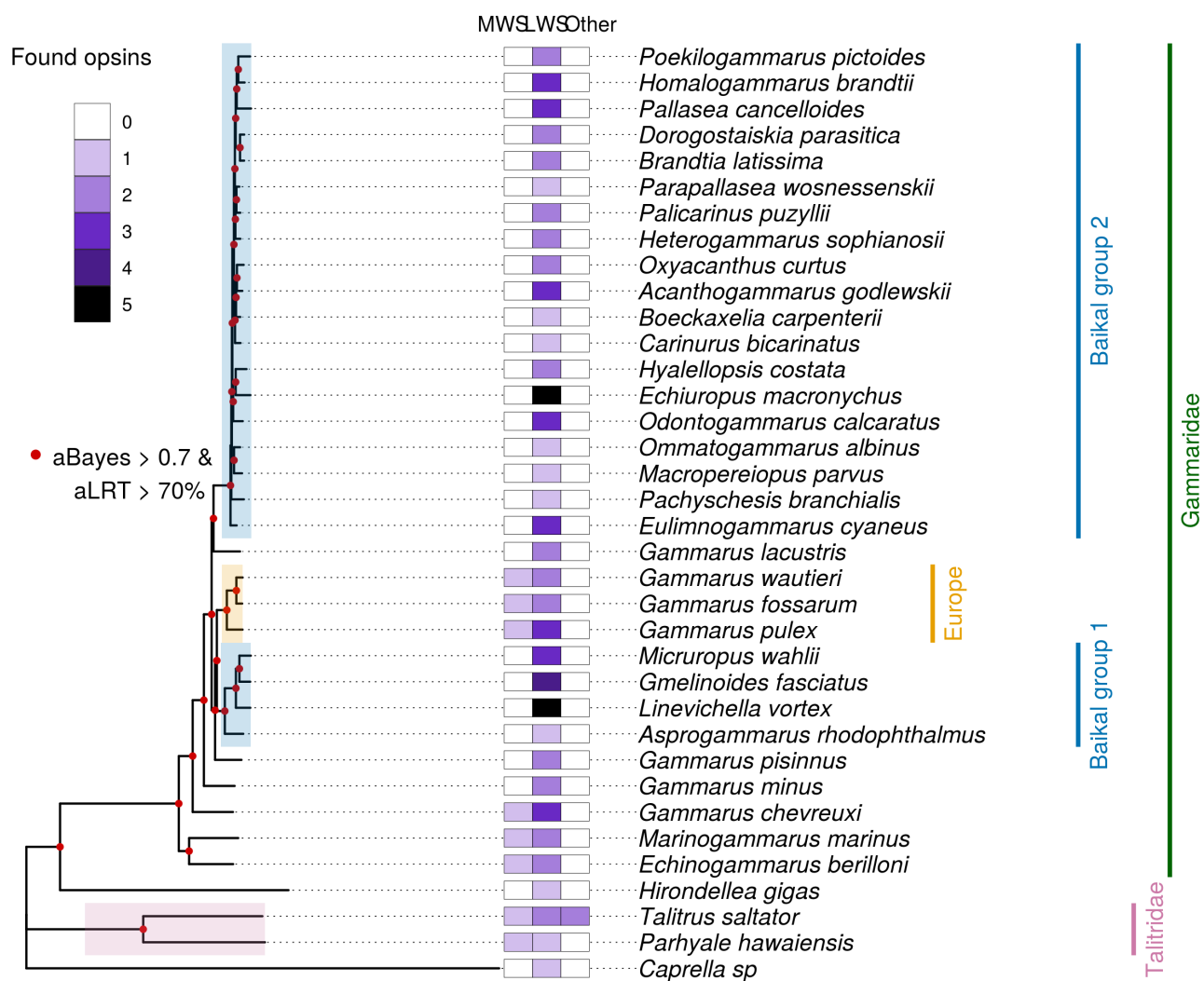
3

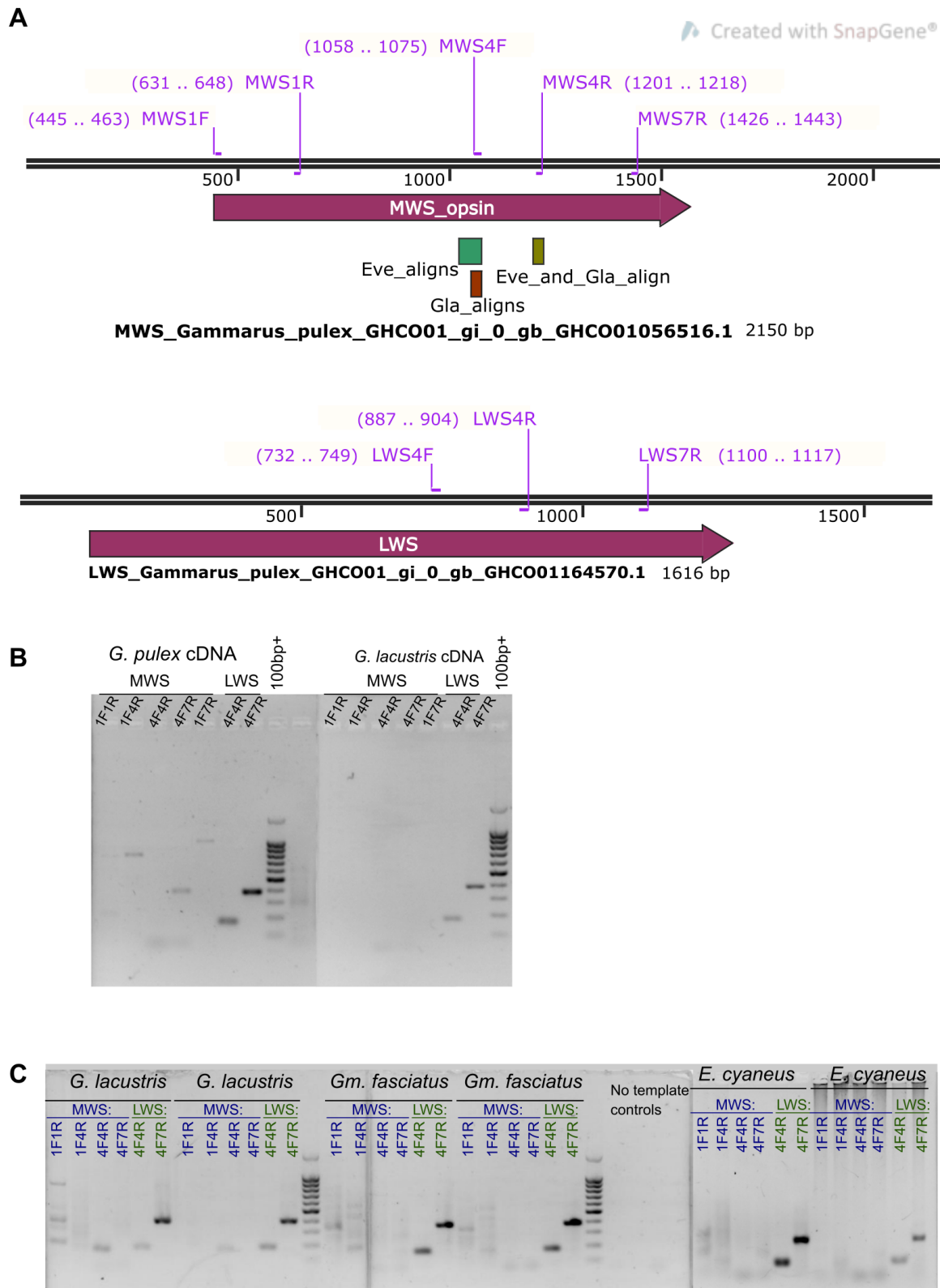Figure S2: (B) Amino acid-based species tree based on one-copy orthologous proteins.

Figure S3: Amplification of MWS and LWS opsins from extracted genomic DNA of several species. (A) Schematic of primer binding sites. (B) Opsin amplification from *G. pulex* and *G. lacustris* cDNA. (C) Opsin amplification from genomic DNA of several species.
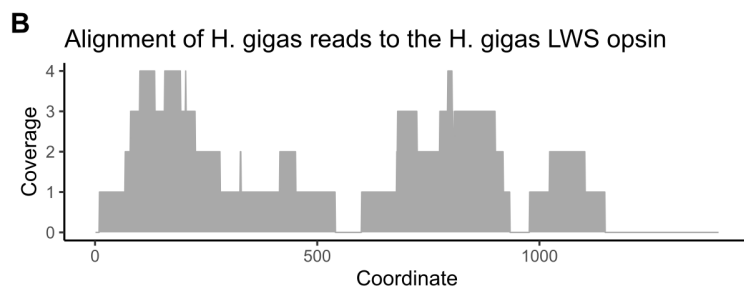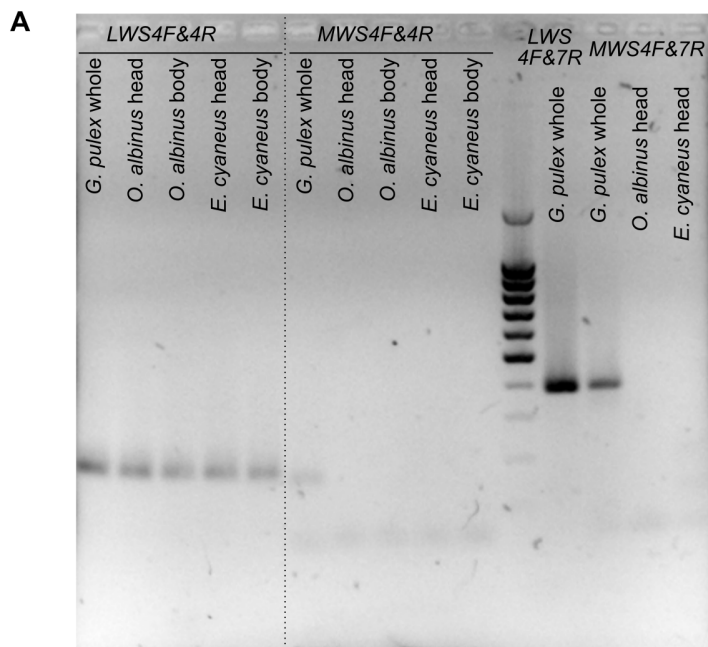
A

B

Alignment of H. gigas reads to the H. gigas LWS opsin

Figure S4: Evidence for extraocular expression of opsins in amphipods. (A) Opsin amplification from cDNA of several species. (B) Expression of the *H. gigas* LWS opsin in the sample from pereon and pleon.
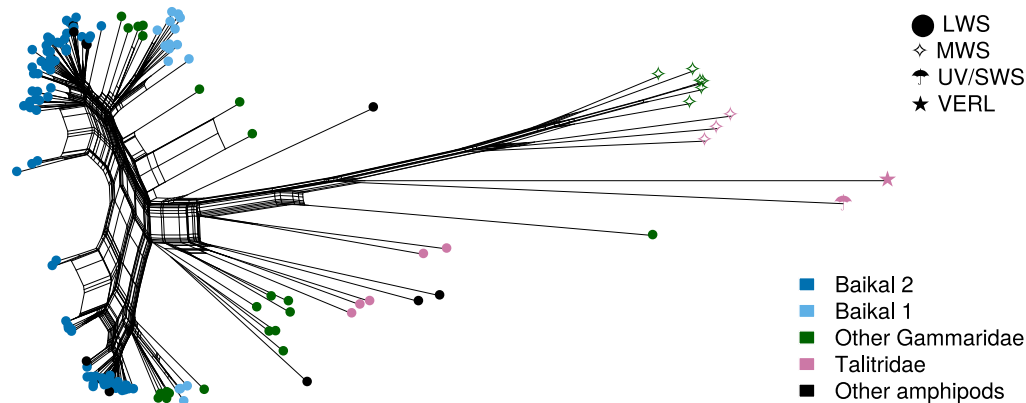
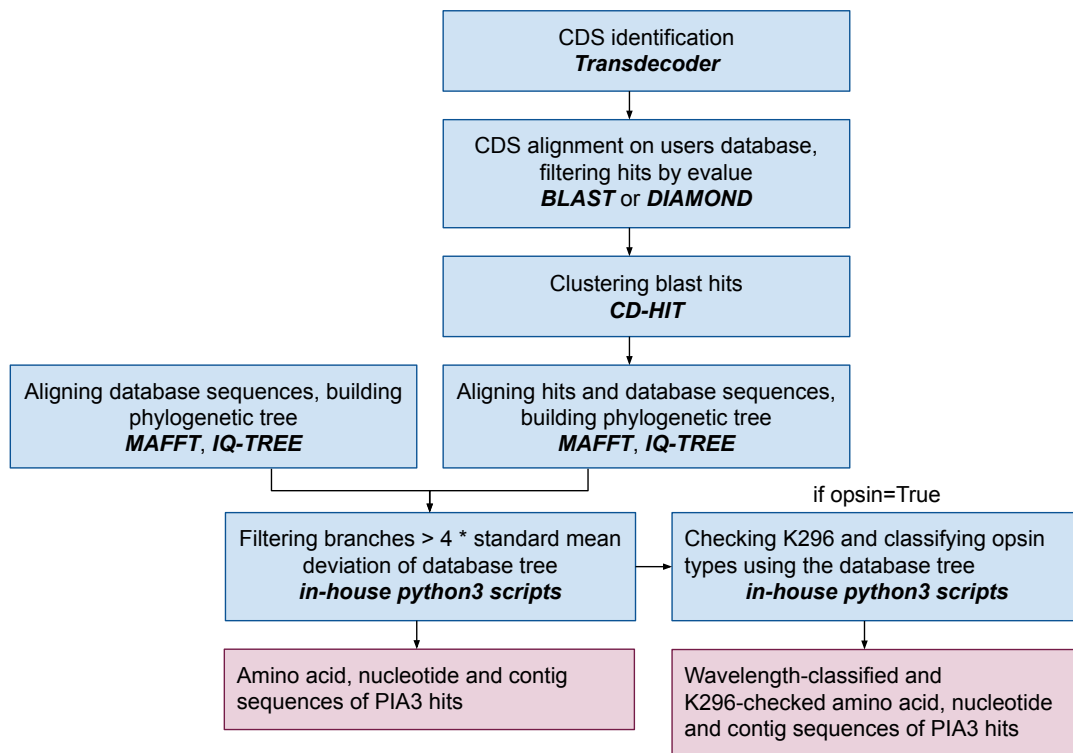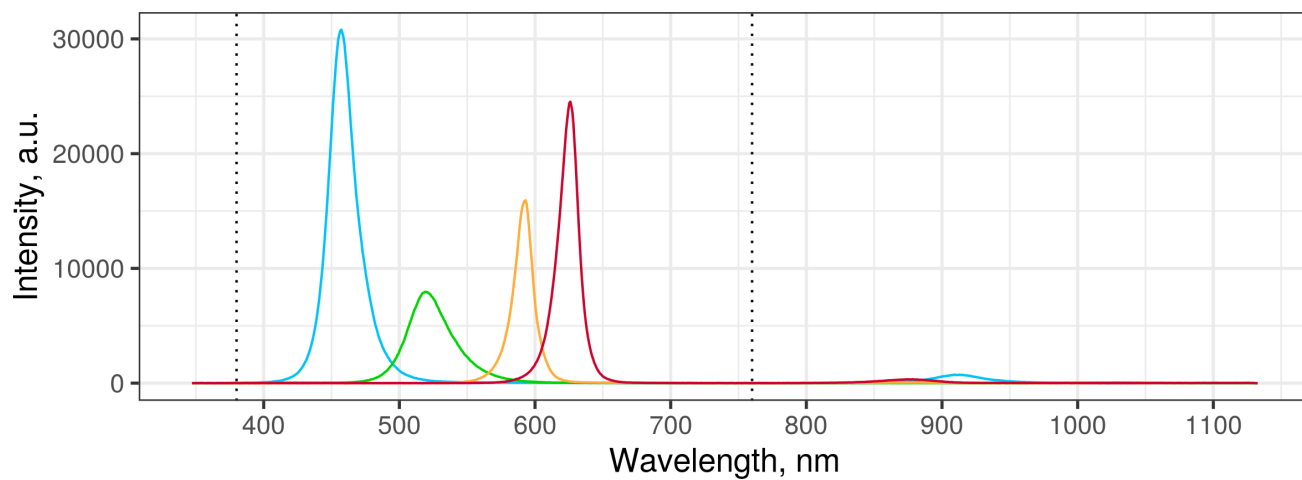Figure S5: Phylogenetic network of all found amphipod opsins based on nucleotide sequences.

Figure S6: PIA principle.

Figure S7: Emission spectra of the LED light sources.