Table S1. GenBank accession numbers used for designing species specific primers for INNS target taxa.

|  |  |
| --- | --- |
| Species | GenBank Accession number |
| *Dreissena polymorpha* | JX099437, EF414495, HM210079, EU484444, AF492005, KY091877, KX537632. KC429149, AM746677, EU484441, EU484431, EU414494, AF120663, AF474404, EU484433. EF414493, AM748999, EU484435, AM748975, EU484448, AF479636, U47653, AM749001, AM7489900, AM748988, AM748996, AM748992, AM748989, AM748997, JQ771951, DQ840122 |
| *Dreissena rostriformis bugensis* | EF080862, JX945980, EF080861, U47651, AF495877, EU484436, KJ881409 |
| *Dikerogammarus villosus* | KP814111, KM208862, KM208874, KM208872, KM208866, KM208865, KF478540, KF478533, KM208871, KM208870, KM208869, KM208868, KM208867, KM208863, KM208873, KM208864, AY529048, KT075266, KT075265, KT075264, KF478581, EF570297 |
| *Dikerogammaurs haemobaphes* | KT075268, KT075267, KM009057, AJ44092, AJ440920, AJ440919, AY529049 |

Table S2: Tissue samples used in species specific primer testing.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lane | Gel A | Gel B | Gel C | Gel D |
| 1 | *Dreissena rostriformis bugensis* tissue (5 ng/μl) | *Dreissena polymorpha* tissue (5ng/μl) | *Dikerogammarus villosus* tissue (3ng/μl) | *Dikerogammarus haemobaphes* tissue (5ng/μl) |
| 2 | Tissue dilution series 1:10  (~0.5 ng/μl) | Tissue dilution series 1:10  (~0.5 ng/μl) | Tissue dilution series 1:10  (~0.3 ng/μl) | Tissue dilution series 1:10  (~0.5 ng/μl) |
| 3 | Tissue dilution series 1:100  (~0.05 ng/μl) | Tissue dilution series 1:100  (~0.05 ng/μl) | Tissue dilution series 1:100  (~0.03 ng/μl) | Tissue dilution series 1:100  (~0.05 ng/μl) |
| 4 | Tissue dilution series 1:1000  (~0.005 ng/μl) | Tissue dilution series 1:1000  (~0.005 ng/μl) | Tissue dilution series 1:1000  (~0.003 ng/μl) | Tissue dilution series 1:1000  (~0.005 ng/μl) |
| 5 | *Anadonta anatine*  (5 ng/μl) | *Anadonta anatine*  (5 ng/μl) | *Crangonyx pseudogracalis*  (5 ng/μl) | *Crangonyx pseudogracalis*  (5 ng/μl) |
| 6 | *Sphaerium corneum*  (5 ng/μl) | *Sphaerium corneum*  (5 ng/μl) | *Gammarus sp.*  (5 ng/μl) | *Gammarus sp.*  (5 ng/μl) |
| 7 | *Dreissena polymorpha*  (5 ng/μl) | *Dreissena rostriformis bugensis*  (5 ng/μl) | *Dikerogammarus haemobaphes*  (5 ng/μl) | *Dikerogammarus villosus*  (5 ng/μl) |
| 8 | ddH2O | ddH2O | ddH2O | ddH2O |

Table S3: Specimen biomass pre and post mesocosm experiment, *Dreissena rostriformis bugenisis*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tank number | Specimen number | Average specimen biomass prior to experiment (g) | Total specimen biomass before experiment (g) | Average specimen biomass after experiment (g) | Total specimen biomass after experiment (g) |
| Control | N/A | N/A | N/A | N/A | N/A |
| 2 | 1 | 2 | 2 | 1.94 | 1.94 |
| 3 | 1 | 1.3 | 1.3 | 1.29 | 1.29 |
| 4 | 1 | 1.6 | 1.6 | 1.59 | 1.59 |
| 5 | 5 | 1.38 | 6.9 | 1.38 | 6.91 |
| 6 | 5 | 1.1 | 5.5 | 1.15 | 5.78 |
| 7 | 5 | 1.26 | 6.3 | 1.28 | 6.42 |
| 8 | 20 | 0.99 | 19.8 | 0.96 | 19.36 |
| 9 | 20 | 1.09 | 21.8 | 1.03 | 20.74 |
| 10 | 20 | 0.98 | 19.7 | 0.93 | 18.61 |

Table S4: Temperature measurements during mesocosm experiment, *Dreissena rostriformis bugenisis*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample date | Sampling event | Room temp °C | Control tank Temp °C |
| 12/1/2016 | 0 hours | 15 | 9 |
| 12/1/2016 | 4 hours | 14 | 9 |
| 12/1/2016 | 8 hours | 14 | 8 |
| 13/1/2016 | 24 hours | 14 | 9 |
| 18/1/2016 | 7 days | 14 | 8 |
| 26/1/2016 | 15 days | 15 | 9 |
| 1/2/2016 | 21 days | 14 | 9 |
| 2/2/2016 | 22 days (24 hours after removal) | 15 | 8 |
| 15/2/2016 | 28 days (7 days after removal) | 14 | 9 |
| 22/2/2016 | 42 days (21 days after removal) | 16 | 8 |

Table S5: Specimen biomass pre and post mesocosm experiment, *Dreissena polymorpha*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tank number | Specimen number | Average specimen biomass prior to experiment (g) | Total specimen biomass before experiment (g) | Average specimen biomass after experiment (g) | Total specimen biomass after experiment (g) |
| Control | N/A | N/A | N/A | N/A | N/A |
| 2 | 1 | 1.10 | 1.10 | 1.10 | 1.10 |
| 3 | 1 | 1.80 | 1.80 | 0.58 | 0.58 |
| 4 | 1 | 2.36 | 2.36 | 0.64 | 0.64 |
| 5 | 5 | 0.36 | 1.78 | 0.36 | 1.78 |
| 6 | 5 | 0.86 | 4.82 | 0.97 | 4.83 |
| 7 | 5 | 0.81 | 4.03 | 0.81 | 4.03 |
| 8 | 20 | 1.05 | 21.24 | 0.69 | 13.75 |
| 9 | 20 | 0.99 | 19.83 | 1.07 | 20.45 |
| 10 | 20 | 0.93 | 18.53 | 1.89 | 18.77 |

Table S6: Temperature measurements during mesocosm experiment, *Dreissena polymorpha*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample date | Sampling event | Room temp °C | Control tank Temp °C |
| 12/7/2016 | 0 hours | 15 | 8 |
| 12/7/2016 | 4 hours | 14 | 8 |
| 12/7/2016 | 8 hours | 15 | 8 |
| 13/7/2016 | 24 hours | 15 | 9 |
| 17/7/2016 | 7 days | 17 | 8 |
| 26/7/2016 | 15 days | 16 | 8 |
| 1/8/2016 | 21 days | 17 | 8 |
| 2/8/2016 | 22 days (24 hours after removal) | 16 | 8 |
| 8/8/2016 | 28 days (7 days after removal) | 14 | 9 |
| 22/8/2016 | 42 days (21 days after removal) | 16 | 9 |

Table S7: Specimen biomass pre and post mesocosm experiment, *Dikerogammarus villosus*

|  |  |  |  |
| --- | --- | --- | --- |
| Tank number | Specimen number | Total specimen biomass before experiment (g) | Total specimen biomass after experiment (g) |
| Control | N/A | N/A | N/A |
| 2 | 1 | 0.0943 | 0.07 |
| 3 | 1 | 0.1799 | 0.9630 |
| 4 | 1 | 0.1864 | 0.0996 |
| 5 | 5 | 0.5097 | 0.3563 |
| 6 | 5 | 0.6527 | 0.3962 |
| 7 | 5 | 0.6647 | 0.4023 |
| 8 | 20 | 2.3291 | 0.9365 |
| 9 | 20 | 1.9828 | 0.5620 |
| 10 | 20 | 1.8622 | 0.6325 |

Table S8: Temperature measurements during mesocosm experiment, *Dikerogammarus villosus*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample date | Sampling event | Room temp °C | Control tank Temp °C |
| 01/03/2016 | 0 hours | 14 | 8 |
| 01/03/2016 | 4 hours | 14 | 8 |
| 01/03/2016 | 8 hours | 14 | 8 |
| 02/03/2016 | 24 hours | 14 | 9 |
| 07/03/2016 | 7 days | 15 | 8 |
| 15/03/2016 | 15 days | 16 | 9 |
| 21/03/2016 | 21 days | 14 | 8 |
| 22/03/2016 | 22 days (24 hours after removal) | 14 | 9 |
| 29/03/2016 | 28 days (7 days after removal) | 17 | 10 |
| 11/04/2016 | 42 days (21 days after removal) | 16 | 9 |

Table S9: Specimen biomass pre and post mesocosm experiment, *Dikerogammarus haemobaphes*

|  |  |  |  |
| --- | --- | --- | --- |
| Tank number | Specimen number | Total specimen biomass before experiment (g) | Total specimen biomass after experiment (g) |
| Control | N/A | N/A | N/A |
| 2 | 1 | 0.0943 | 0.0943 |
| 3 | 1 | 0.1799 | 0.1799 |
| 4 | 1 | 0.1864 | 0.1864 |
| 5 | 5 | 0.5097 | 0.10194 |
| 6 | 5 | 0.6527 | 0.13054 |
| 7 | 5 | 0.6647 | 0.13294 |
| 8 | 20 | 2.3291 | 0.116455 |
| 9 | 20 | 1.9828 | 0.09914 |
| 10 | 20 | 1.8622 | 0.09311 |

Table S10: Temperature measurements during mesocosm experiment, *Dikerogammarus haemobaphes*

|  |  |  |  |
| --- | --- | --- | --- |
| Sample date | Sampling event | Room temp °C | Control tank Temp °C |
| 17/05/2016 | 0 hours | 16 | 11 |
| 17/05/2016 | 4 hours | 16 | 11 |
| 17/05/2016 | 8 hours | 16 | 12 |
| 18/05/2016 | 24 hours | 18 | 12 |
| 23/05/2016 | 7 days | 16 | 12 |
| 31/05/2016 | 15 days | 18 | 10 |
| 06/06/2016 | 21 days | 15 | 12 |
| 07/06/2016 | 22 days (24 hours after removal) | 16 | 14 |
| 13/06/2016 | 28 days (7 days after removal) | 14 | 12 |
| 27/06/2016 | 42 days (21 days after removal) | 16 | 14 |

Table S11: Species specific primer mismatches. Details of mismatch amplification with reference sequences taken from Genbank.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Primer Name | Sequence | Mis -matches | GenBank accession No. | Species |
| DV1\_F | TCTTGGCAGGT**C**CCATTACG | 1 | KM208873 | *D. villosus* |
| DV1\_R | GAATCGGATC**C**CCCCCGCCT | 2 | EF570297 | *D. villosus* |
| DH2\_F | TAGGTCACGGGGG**G**GCTTCT | 2 | KM086443 | *Thuridilla albopustulosa* |
| DH2\_R | AAGTG**T**TG**A**TAAAGAATAGGATC**A** | 3 |
| DH2\_F | TTGGTCACAG**T**GGTGCTTCT | 2 | GU598226 | *Hemicycla pouchadan* |
| DH2\_R | AA**A**T**T**CTGGTAAAGAATAGGATC**A** | 3 |
| DH2\_F | TAGGTCAC**T**GG**A**GTGCTTCT | 2 | KT794407 | *Caucasotachea calligera* |
| DH2\_R | AA**A**TGCTGGTA**C**A**A**AATAGGATCT | 3 |
| DP1\_F | TA**A**AGCTAAGGGCACCTGGAA | 1 | AF510508 | *D. polymorpha* |
| DP1\_F | **G**AGAGC**C**AAGGGCACCTGGAA | 2 | JQ435817 | *D. polymorpha* |
| DP1\_R | AGCCC**C**TGAGTGGTGACAAT | 1 |

Table S12: *D. r. bugensis* mesocosm GLM.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | AIC | ∆ AIC | Estimate Std. Error | z value | Pr(>|z|) | Residual deviance  P-val  (1-pchisq)\* | Overdispersion statistic (>2 is overdispersed)  Model deviance/modeldf. residuals | Residual deviance |
| 1 | Hours + Total biomass | 55.368 | 0 | Hours -0.002695 0.001782 -1.512 0.1305  TotalBio 0.151357 0.066920 2.262 0.0237 \* | 0.5384768 | 0.9680094 | 49.368 on 51 |
| 2 | Hours + ave bio | 58.305 | 2.9 | Hours -0.002592 0.001738 -1.491 0.13600  AvBio -2.261811 1.016088 -2.226 0.02601 \* | 0.4230644 | 1.0225595 | 52.305 on 51 |
| 3 | Hours + Density | 55.656 | 0.3 | Hours -0.002675 0.001774 -1.508 0.1316  Density 0.146698 0.066534 2.205 0.0275 \* | 0 | 0.9736466 | 49.656 on 51 |
| 4 | Total biomass | 55.718 | 0.3 | TotalBio 0.14508 0.06526 2.223 0.0262 \* | 0.4849402 | 0.9945711 | 51.718 on 52 |
| 5 | Hours | 61.584 | 6.2 | Hours -0.002302 0.001621 -1.420 0.155559 | 0.2762671 | 1.107375 | 57.584 on 52 |
| 6 | Density | 55.988 | 0.6 | Density 0.14087 0.06508 2.165 0.0304 \* | 0.4743832 | 0.9997754 | 51.988 on 52 |
| 7 | Ave bio | 58.573 | 3.2 | AvBio -2.1457 0.9791 -2.192 0.02841 \* | 0.3769788 | 1.049474 | 54.573 on 52 |

Table S13: *D. polymorpha* mesocosm GLM.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | AIC | ∆ AIC | Estimate Std. Error | z value | Pr(>|z|) | Residual deviance  P-val  (1-pchisq)\* | Overdispersion statistic (>2 is overdispersed)  Model deviance/modeldf. residuals | Residual deviance |
| 1 | Hours + Total biomass | 32.827 | 0 | Hours -0.004596 0.002496 -1.842 0.0655 .  TotalBio 1.072240 0.608773 1.761 0.0782 . | 0.5260276 | 0.821663 | 41.654 on 51 |
| 2 | Hours + ave bio | 43.128 | 0.3 | Hours -0.003650 0.002138 -1.707 0.08777 .  AvBio -0.811548 0.657108 -1.235 0.21682 | 0.7280015 | 0.9271444 | 37.128 on 51 |
| 3 | Hours + Density | 32.823 | 0 | Hours -0.004656 0.002529 -1.841 0.0656 .  Density 0.602961 0.306233 1.969 0.0490 \* | 0.5259437 | 0.9978976 | 26.823 on 51 |
| 4 | Total biomass | 34.607 | 1.8 | TotalBio 0.9572 0.5625 1.702 0.0888 . | 0.5885999 | 0.9921429 | 30.607 on 52 |
| 5 | Hours | 42.683 | 9.9 | Hours -0.003520 0.002088 -1.686 0.091790 . | 0.7438954 | 0.9147678 | 38.683 on 52 |
| 6 | Density | 34.639 | 1.8 | Density 0.5355 0.2849 1.880 0.0601 . | 0.5892179 | 0.9920454 | 30.639 on 52 |
| 7 | Ave bio | 44.199 | 11.4 | AvBio -0.7564 0.6300 -1.201 0.22994 | 0.7730648 | 0.8833234 | 40.199 on 52 |

Table S14: *D. villosus* mesocosm GLM.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | AIC | ∆ AIC | Estimate Std. Error | z value | Pr(>|z|) | Residual deviance  P-val  (1-pchisq)\* | Overdispersion statistic (>2  is overdispersed)  Model deviance/modeldf. residuals | Residual deviance |
| 1 | Hours + Total biomass | 41.827 | 1.5 | Hours -0.001691 0.002327 -0.727 0.467425  TotalBio 2.455670 0.571173 4.299 1.71e-05 \*\*\* | 0.9469812 | 0.7024895 | 35.827 on 51 |
| 2 | Hours + ave bio | 64.888 | 24.5 | Hours -8.846e-04 1.665e-03 -0.531 0.5953  AvBio -3.166e+01 1.346e+01 -2.351 0.0187 \* | 0.2091693 | 1.154663 | 58.888 on 51 |
| 3 | Hours + Density | 43.044 | 2.7 | Hours -0.001631 0.002281 -0.715 0.474421  Density 0.233118 0.053434 4.363 1.28e-05 \*\*\* | 0.9285603 | 0.726352 | 37.044 on 51 |
| 4 | Total biomass | 40.372 | 0.0 | TotalBio 2.4109 0.5548 4.346 1.39e-05 \*\*\* | 0.9921429 | 0.6994582 | 36.372 on 52 |
| 5 | Hours | 71.024 | 30.7 | Hours -0.0007709 0.0015568 -0.495 0.62 | 0.07849078 | 1.288917 | 67.024 on 52 |
| 6 | Density | 41.57 | 1.2 | Density 0.22906 0.05195 4.409 1.04e-05 \*\*\* | 0.9338592 | 0.7225066 | 37.570 on 52 |
| 7 | Ave bio | 63.174 | 22.8 | AvBio -31.507 13.423 -2.347 0.0189 \* | 0.2301939 | 1.137967 | 59.174 on 52 |

Table S15: *D. haemobaphes* mesocosm GLM.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | AIC | ∆ AIC | Estimate Std. Error z value Pr(>|z|) | Residual deviance  P-val (1-pchisq)\* | Overdispersion statistic (>2  is overdispersed)  Model deviance/modeldf. residuals | Residual deviance |
| 1 | Hours + Total biomass | 64.595 | 0 | Hours -0.005073 0.001911 -2.655 0.00793 \*\*  TotalBio 1.133532 0.427435 2.652 0.00800 \*\* | 0.2168376 | 1.148926 | 58.595 on 51 |
| 2 | House + Ave bio | 69.832 | 5.2 | Hours -0.004470 0.001727 -2.588 0.00964 \*\*  AvBio -16.389781 9.478834 -1.729 0.08379 . | 0.1070951 | 1.251602 | 63.832 on 51 |
| 3 | Hours + Density | 65.239 | 0.6 | Hours -0.004998 0.001888 -2.647 0.00812 \*\*  Density 0.108173 0.041974 2.577 0.00996 \*\* | 0.2002284 | 1.161545 | 59.239 on 51 |
| 4 | Total biomass | 71.402 | 6.8 | TotalBio 0.9320 0.3672 2.538 0.0111 \* | 0.07401047 | 1.296199 | 67.402 on 52 |
| 5 | Hours | 71.068 | 6.5 | Hours -0.004213 0.001662 -2.534 0.0113 \* | 0.07795807 | 1.289764 | 67.068 on 52 |
| 6 | Density | 71.936 | 7.3 | Density 0.08922 0.03620 2.464 0.0137 \* | 0.0680431 | 1.306465 | 67.936 on 52 |
| 7 | Av Bio | 75.751 | 11.2 | AvBio -14.218 8.787 -1.618 0.106 | 0.03606653 | 1.379822 | 71.751 on 52 |