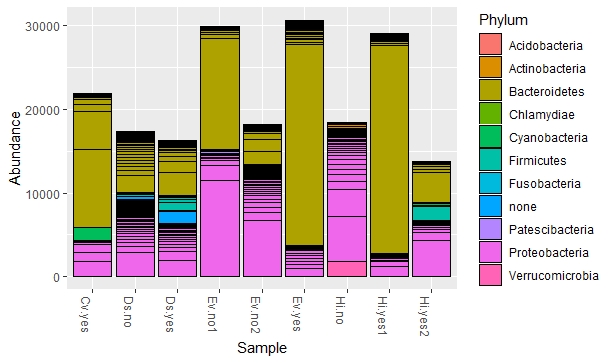
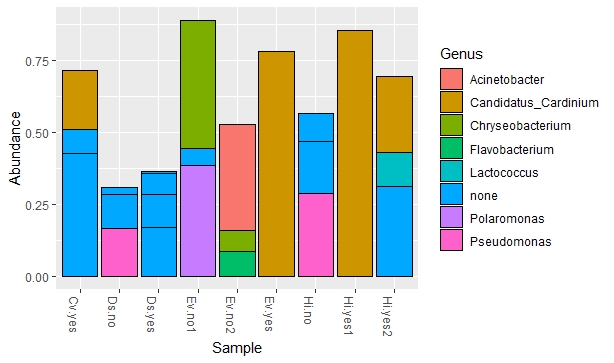
SCHÖN, I. , T. KAMIYA, T. VAN DEN BERGHE, L. VAN DEN BROECKE & K. MARTENS 2019. Novel *Cardinium* strains from non-marine ostracod (Crustacea) hosts from natural populations. Molecular Phylogenetics and Evolution 130 (2019) 406–415. (IF 2017 = 4.412). (DOI: [10.1016/j.ympev.2018.09.008](https://doi.org/10.1016/j.ympev.2018.09.008)).

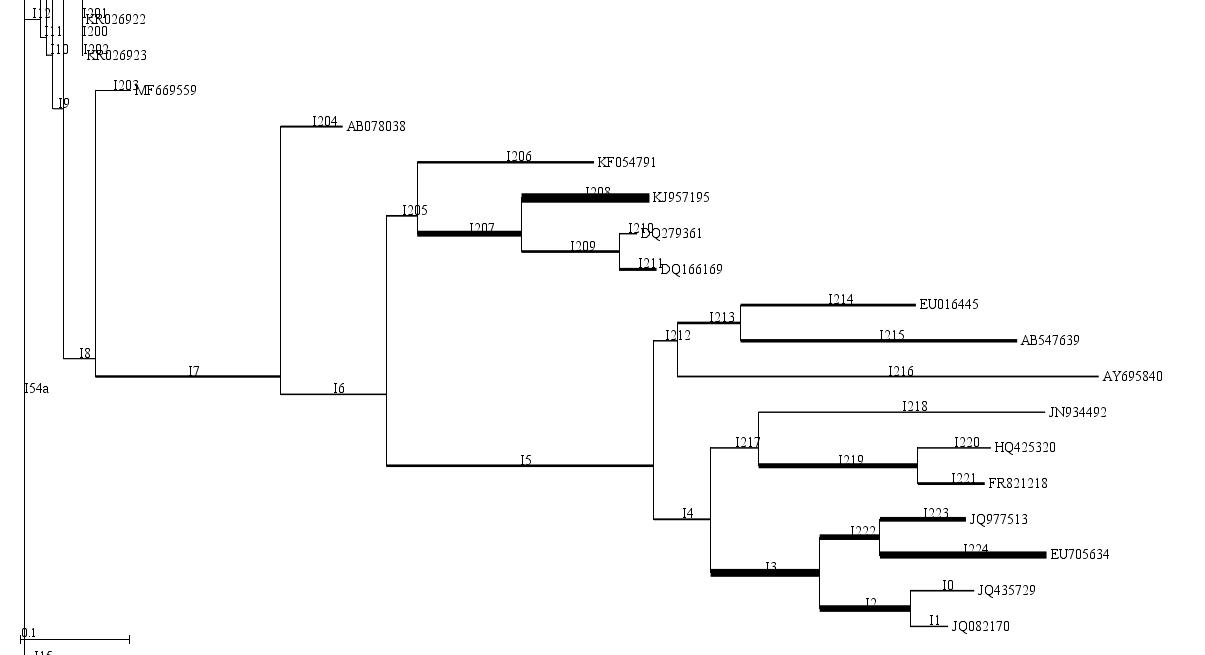
**Supplementary material**

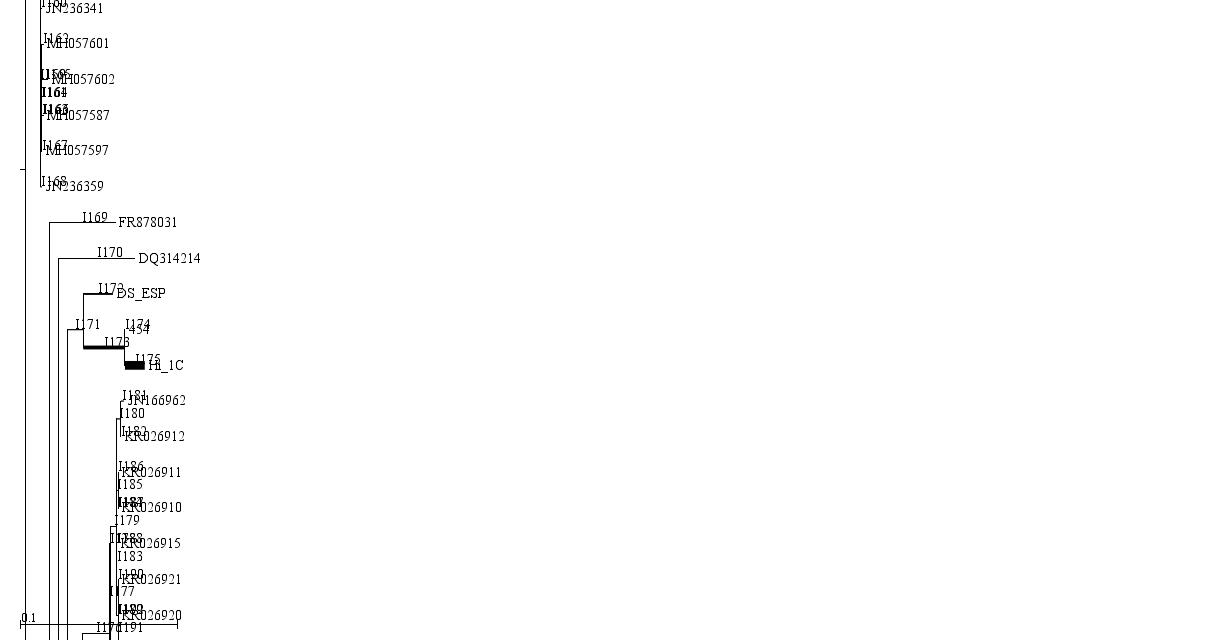
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**Figure S1A: Cumulative bar charts of non-marine ostracod microbiomes.** Ds= *Darwinula stevensoni*; Cv= *Cypridopsis vidua*; Ev = *Eucypris virens;* Hi= *Heterocypris incongruens*. See Table S1A for more details on the investigated specimens and Table S4A on details of all classified ASVs. yes = *Cardinium* present according to classic PCR screening. no= *Cardinium* absent according to classic PCR screening. Based on high-throughput 16S amplicon sequencing, analysed with DADA2 (Callahan et al., 2016) and plotted with phyloseq (McMurdie & Holmes, 2013) and ggplot (Wickham, 2016).

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**Figure S1B: Top 20 bacterial ASVs in investigated non-marine ostracods.** Ds= *Darwinula stevensoni*; Cv= *Cypridopsis vidua*; Ev = *Eucypris virens;* Hi= *Heterocypris incongruens*. ASV= 16S Amplicon sequence variant. See Table S1A for more details on the investigated specimens and Table S4A on details of all classified ASVs. yes = *Cardinium* present according to classic PCR screening. no= *Cardinium* absent according to classic PCR screening. Based on high-throughput 16S amplicon sequencing, analysed with DADA2 (Callahan et al., 2016) and plotted with phyloseq (McMurdie & Holmes, 2013) and ggplot (Wickham, 2016).

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**Figure S2A: Details of the RAxML tree constructed with 16S sequence from non-Cardinium (top) and *Cardinium* (bottom) bacteria with mapped high throughput 16S sequences.** RAxML =Randomized Axelerated Maximum Likelihood (Stamatakis, 2006). Branch width is proportional to the number of mapped sequenced with the Evolutionary Placement Algorithm (EPA; Berger et al., 2011). For more details on the results, see Table S4A. The identity of reference sequences of the tree is provided in Table S1A & B.

**Figure S2B: Details of the RAxML tree constructed with 16S sequences of *Cardinium* with mapped shorter 5‘ and 3’ 16S sequences of non-marine ostracod hosts.** Branch width is proportional to the number of mapped sequenced with EPA. For more details on the results, refer to Table S3B. For sequence identities, refer to Table S1A.

**Figure S3:** Maximum Likelihood (ML) tree constructed from 16S rRNA sequences of *Cardinium* (see Table S1A & 1B for more details on 16S sequence data) with phyml (Guindon & Gascuel, 2003). Numbers above branches are bootstrap of 1000 replicates in %. Only bootstraps above 50% are shown.

**FigureS3A**: ML tree constructed from 1276bp of the 16S rRNA region of *Cardinium* from various hosts, with the TVM+G model and a gamma parameter of 1.67.

Ostracoda

Culicoides-Diptera

DQ314214-Nematoda

FR878031-Copepoda

AY279414-Acari

Pyroglyphidae-Acari

AB241132-Acari

AY327472-Hymenoptera

HE983995-Hymenoptera

DQ854713-Hymenoptera

FJ766341-Hemiptera

Bemisia-Hemiptera

Brevipalpus-Acari

AB001518-Acari

AM042540-Hemiptera

Brevipalpus-Acari

AY635291-Acari

Hemiptera

Tyrophagus-Acari

AB241130-Acari

AY279401-Acari

GQ455428-Hemiptera

AY279410-Acari

Sogatella-Hemiptera

MF669559-Acari-outgroup

100

79

81

57

100

98

98

93

78

83

97

90

99

83

82

68

0.02

**Figure S3:** Maximum Likelihood (ML) tree constructed from 16S rRNA sequences of *Cardinium* (see Table S1A & 1B for more details on 16S sequence data) with phyml (Guindon & Gascuel, 2003). Numbers above branches are bootstrap of 1000 replicates in %. Only bootstraps above 50% are shown.

**Figure S3B**: ML tree constructed from partial 16S rRNA sequences of *Cardinium* of the 3’ end (403bp) from various hosts with the K80 model, kappa=9.10 and ti/tv=4.55.

Culicoides-Diptera

Cypridoidea-Ostracoda

Darwinuloidea-Ostracoda

Cytheroidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

Darwinuloidea-Ostracoda

DQ314214-Nematoda

Acari-Hemiptera-Hymenoptera-Araneae

MF669559-Acari-outgroup

86

86

84

59

96

0.005

***Vestalenula cornelia***

0.001

0.86

1.00

0.005

0.005

1.00

1.00

1.00

0.96

0.82

0.54

1.00

1.00

1.00

1.00

0.95

***Vestalenula cornelia***

***Darwinula stevensoni***

***Darwinula stevensoni***

***Darwinula stevensoni***

***Vestalenula paglioli***

***Vestalenula paglioli***

***Cytherissa lacustris***

***Cytherissa lacustris***

***Cytherissa lacustris***

***Eucypris virens***

***Cypridopsis vidua***

***Heterocypris incongruens***

**Figure S4: Subtree of *Cardinium* from different non-marine ostracod species.**

Details of the collapsed clades of Figure 1B are provided here.

**Table S1: Details of the screened non-marine ostracods and of additional 16S rRNA sequences of *Cardinium* from GenBank that were used for the phylogenetic reconstructions and Bayes Factor tests.**

**A. Information on screened ostracods.**

For each ostracod, the morphospecies, DNA code (ID), geographic origin, infection status, cryptic species identity, latitude and Genbank accession number of the COI sequence is provided if the latter was used for phylogenetic constructions of the hosts. Coordinates are merely indicative for the aquatic habitat and do not include the different sampling points within each habitat. "1" in the column “Cardinium” indicates infection. If no information is provided in this column, the specimen in question was not screened for *Cardinium* but only used to obtain COI DNA sequence data for constructing host phylogenies. For ostracod specimens testing positive with *Cardinium*, also the part of the 16S rRNA that was sequenced and, where applicable, the Genbank accession number is provided. A complete 16S alignment including all 16S sequcens of *Cardinium* from ostracods is available from the first author by request. Ostracod specimens that have been screened for four different symbionts (*Wolbachia*, *Rickettsia*, *Cardinium* & *Spiroplasma*) are indicated in bold. Ostracods that were also screened with high-throughput metagenomics sequencing techniques are underlined. # = number. Genetic species numbers are according to Bode et al. (2010), Schön et al. (2012), Schön et al. in prep. and Cours et al. in prep. Sequences of the 5' end of 16S rRNA of *Cardinium* were used for initial phylogenetic reconstructions and for EPA mapping.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Morpho-species** | **DNA ID** | **Population** | **Habitat** | **Cardinium** | **Latitude** | **Longitude** | **Genetic species #** | **GenBank #  16S Cardinium** | **16S region Cardinium** | **bp 16S data** | **GenBank# host COI** |
| ***Eucypris virens*** | **121** | Drongen, Belgium (DR2) | meadow temporary pool | 0 | 51.04936 | 3.6652778 | 16 |  |  |  | GQ914299 |
| ***Eucypris virens*** | **119** | Drongen, Belgium DR2) | meadow temporary pool | 0 | 51.04936 | 3.6652778 | 16 |  |  |  |  |
| *Eucypris virens* | 221 | Berchem, Belgium (BRC) | temporary pool | 1 | 50.79472 | 3.5175 | 16 | KC167899 | 3' V6-V9 | 403 |  |
| *Eucypris virens* | 529 | Berchem, Belgium (BRC) | temporary pool | 1 | 50.79472 | 3.5175 | 16 | KC167902 | 3' V6-V9 | 403 |  |
| ***Eucypris virens*** | **FR\_FIO137** | Fitou, France (FIO) | temporary pool | 1 | 42.92417 | 2.99083 | 31 | KC167888 | 3' V6-V9 | 403 | GQ914305 |
| ***Eucypris virens*** | **230** | Fitou, France (FIT) | temporary pool | 0 | 42.88333 | 2.96667 | 1 |  |  |  |  |
| ***Eucypris virens*** | **FR\_DUR143** | Durfort, France (DUR) | temporary pool | 1 | 43.99083 | 3.98667 | 36 | KC167896  MH908927 | 3' V6-V9  5' V1 & V2 | 403  376 | GQ914311 |
| *Eucypris virens* | 198 | Urbino, Corsica, France (COU) | temporary pool | 1 | 42.06094 | 9.44797 | 31 |  | 3' V6-V9 | 403 | GQ914325 |
| ***Eucypris virens*** | **IT\_PUP207** | Punta Grossa, Puglia, Italy (PUP) | temporary pool | 1 | 40.29106 | 17.79542 | 26 | KC167889  MH908928 | 3' V6-V9  5’ V1-V2 | 403  376 | GQ914333 |
| ***Eucypris virens*** | **IT\_SIM89** | Macarese, Sicily, Italy (SIM) | temporary pool | 0 | 38.1014 | 12.66080 | 8 |  |  |  | GQ914288 |
| ***Eucypris virens*** | **499** | Piana di Gesturi, Sardinia, Italy (SA5) | temporary pool | 0 | 39.73692 | 8.99775 | 1 |  |  |  |  |
| *Eucypris virens* | IT\_PUS122\_M | Lecce, Puglia, Italy (PUS) | temporary pool | 0 | 39.9489 | 18.29920 | 10 |  |  |  | GQ914300 |
| *Eucypris virens* | IT\_PUS123\_M | Lecce, Puglia, Italy (PUS) | temporary pool | 0 | 39.9489 | 18.29920 | 10 |  |  |  | GQ914301 |
| *Eucypris virens* | IT\_PUS124\_M | Lecce, Puglia, Italy (PUS) | temporary pool | 0 | 39.9489 | 18.29920 | 10 |  |  |  | GQ914302 |
| *Eucypris virens* | 237 | Lecce, Puglia, Italy (PUS) | temporary pool | 0 | 39.9489 | 18.29920 | 10 |  |  |  |  |
| *Eucypris virens* | 238 | Lecce, Puglia, Italy (PUS) | temporary pool | 0 | 39.9489 | 18.29920 | 10 |  |  |  |  |
| *Eucypris virens* | IT\_SIO471\_M | S. Fratello, Sicily, Italy (SIO) | temporary pool | 0 | 37.92497 | 14.67524 | 33 |  |  |  | GQ914491 |
| ***Eucypris virens*** | **IT\_SIP163** | Sicily, Italy | temporary pool | 0 | 37.92497 | 13.36417 | na |  |  |  | KC167997 |
| *Eucypris virens* | HR\_OMI361 | Split, Croatia (OMI) | temporary pool | 1 | 43.45083 | 16.69583 | 31 |  | 3' V6-V9 | 403 | GQ914434 |
| *Eucypris virens* | HR\_OMI362 | Split, Croatia (OMI) | temporary pool | 1 | 43.45083 | 16.69583 | 31 |  | 3' V6-V9 | 403 | GQ914435 |
| *Eucypris virens* | HR\_OMI363 | Split, Croatia (OMI) | temporary pool | 1 | 43.45083 | 16.69583 | 31 |  | 3' V6-V9 | 403 | GQ914436 |
| *Eucypris virens* | HR\_KRK364 | Krk, Croatia (KRK) | temporary pool | 1 | 45.03056 | 14.59444 | 31 |  | 3' V6-V9 | 403 | GQ914437 |
| *Eucypris virens* | HR\_KRK365 | Krk, Croatia (KRK) | temporary pool | 1 | 45.03056 | 14.59444 | 31 |  | 3' V6-V9 | 403 | GQ914438 |
| ***Eucypris virens*** | **ES\_VA1353** | El Saler, Albufera, Spain (VA1) | temporary pool | 0 | 39.32083 | -0.30833 | 31 |  |  |  | KC168003 |
| ***Eucypris virens*** | **ES\_VA486** | El Saler, Albufera, Spain (VA4) | temporary pool | 1 | 39.32083 | -0.31090 | 31 | KC167894 | 3' V6-V9 | 403 | GQ914285 |
| ***Eucypris virens*** | **157** | El Saler, Albufera, Spain (VA4) | temporary pool | 0 | 39.34328 | -0.31090 | 31 |  |  |  |  |
| *Eucypris virens* | ES\_ME3151 | Favaritx, Menorca, Spain (ME3) | temporary pool | 1 | 39.99306 | 4.25306 | 31 |  | 3' V6-V9 | 403 | GQ914315 |
| ***Eucypris virens*** | **150** | **Carniola/Ciutadella, Menorca, Spain (ME1)** | temporary pool | 0 | 40.04667 | 3.90081 | 16 |  |  |  |  |
| ***Eucypris virens*** | **ES\_MF4436\_M** | **Villarreal de San Carlos, Extremadura, Spain (MF4)** | temporary pool | 0 | 39.91167 | -6.06167 | 13 |  |  |  | GQ914468 |
| ***Eucypris virens*** | **MT\_MOS200** | Mosta, Malta (MOS) | temporary pool | 0 | 35.91289 | 14.42506 | 31 |  |  |  | GQ914327 |
| *Eucypris virens* | 202 | Santa Margherita, Malta (MAR) | temporary pool | 0 | 35.91678 | 14.43208 | 31 |  |  |  |  |
| *Eucypris virens* | 203 | Santa Margherita, Malta (MAR) | temporary pool | 0 | 35.91678 | 14.43208 | 31 |  |  |  |  |
| *Eucypris virens* | 204 | Santa Margherita, Malta (MAR) | temporary pool | 0 | 35.91678 | 14.43208 | 31 |  |  |  |  |
| *Eucypris virens* | 201 | Ghiadira S-safra, Malta (GHI) | temporary pool | 0 | 35.95136 | 14.44364 | 31 |  |  |  |  |
| ***Eucypris virens*** | **GR\_COE217** | Melisa, Corfu, Greece (COE) | temporary pool | 1 | 39.475 | 19.91000 | 31 | KC167890 | 3' V6-V9 | 403 | GQ914338 |
| *Eucypris virens* | GR\_COE218 | Melisa, Corfu, Greece (COE) | temporary pool | 1 | 39.475 | 19.91000 | 31 |  | 3' V6-V9 | 403 | GQ914339 |
| ***Eucypris virens*** | **219** | Melisa, Corfu, Greece (COE) | temporary pool | 1 | 39.475 | 19.91000 | 31 | KC167891 | 3' V6-V9 | 403 |  |
| ***Eucypris virens*** | **131** | Skripera, Corfu, Greece (COA) | temporary pool | 0 | 39.6975 | 19.78500 | 34 |  |  |  |  |
| *Eucypris virens* | GR\_COA496\_M | Skripera, Corfu, Greece (COA) | temporary pool | 0 | 39.6975 | 19.78500 | 34 |  |  |  | GQ914592 |
| *Eucypris virens* | 497 | Skripera, Corfu, Greece (COA) | temporary pool | 0 | 39.6975 | 19.78500 | 34 |  |  |  |  |
| *Eucypris virens* | GR\_COA681\_M | Skripera, Corfu, Greece (COA) | temporary pool |  | 39.6975 | 19.78500 | 34 |  |  |  | GQ914618 |
| *Eucypris virens* | GR\_COB658\_M | Skripera, Corfu, Greece (COB) | temporary pool |  | 39.6975 | 19.78556 | 34 |  |  |  | GQ914615 |
| *Eucypris virens* | GR\_COB668\_M | Skripera, Corfu, Greece (COB) | temporary pool |  | 39.6975 | 19.78556 | 34 |  |  |  |  |
| *Eucypris virens* | 132 | Skripera, Corfu, Greece (COB) | temporary pool | 0 | 39.69778 | 19.78556 | 42 |  |  |  |  |
| *Eucypris virens* | 493 | Skripera, Corfu, Greece (COB) | temporary pool | 0 | 39.69778 | 19.78556 | 34 |  |  |  |  |
| *Eucypris virens* | 494 | Skripera, Corfu, Greece (COB) | temporary pool | 0 | 39.69778 | 19.78556 | 34 |  |  |  |  |
| *Eucypris virens* | 495 | Skripera, Corfu, Greece (COB) | temporary pool | 0 | 39.69778 | 19.78556 | 34 |  |  |  |  |
| *Eucypris virens* | 488 | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 34 |  |  |  |  |
| ***Eucypris virens*** | **489** | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 34 |  |  |  |  |
| ***Eucypris virens*** | **212** | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 42 |  |  |  |  |
| *Eucypris virens* | GR\_COD490\_M | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 34 |  |  |  | GQ914590 |
| *Eucypris virens* | 491 | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 34 |  |  |  |  |
| *Eucypris virens* | GR\_COD526\_M | Kefalovryso, Corfu, Greece (COD) | temporary pool |  | 39.6256 | 19.79860 | 34 |  |  |  | GQ914594 |
| *Eucypris virens* | 492 | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 34 |  |  |  |  |
| ***Eucypris virens*** | **215** | Kefalovryso, Corfu, Greece (COD) | temporary pool | 0 | 39.6256 | 19.79860 | 42 |  |  |  |  |
| ***Eucypris virens*** | **225** | Gdańsk, Poland (JAB) | temporary pool | 1 | 54.33139 | 18.56417 | 37 | KC167892  MH908926 | 3' V6-V9  5' V1 & V2 | 403  376 |  |
| *Eucypris virens* | 223 | Gdańsk, Poland (JAB) | temporary pool | 1 | 54.33139 | 18.56417 | 37 | KC167900 | 3' V6-V9 | 403 |  |
| *Eucypris virens* | 224 | Gdańsk, Poland (JAB) | temporary pool | 0 | 54.33139 | 18.56417 | 37 |  |  |  |  |
| *Eucypris virens* | 226 | Chojnowo, Poland (CHO) | temporary pool | 1 | 52.65583 | 21.22806 | 37 |  |  |  |  |
| *Eucypris virens* | 227 | Chojnowo, Poland (CHO) | temporary pool | 0 | 52.65583 | 21.22806 | 37 |  |  |  |  |
| *Eucypris virens* | 246 | Starkowa Huta, Poland (STA) | temporary pool | 0 | 54.22722 | 18.17722 | 37 |  |  |  |  |
| *Eucypris virens* | 247 | Starkowa Huta, Poland (STA) | temporary pool | 0 | 54.22722 | 18.17722 | 37 |  |  |  |  |
| *Eucypris virens* | 248 | Starkowa Huta, Poland (STA) | temporary pool | 0 | 54.22722 | 18.17722 | 37 |  |  |  |  |
| *Eucypris virens* | 249 | Trzepowo, Poland (TRZ) | temporary pool | 1 | 54.18 | 18.29278 | 37 |  |  |  |  |
| *Eucypris virens* | 250 | Trzepowo, Poland (TRZ) | temporary pool | 1 | 54.18 | 18.29278 | 37 |  |  |  |  |
| *Eucypris virens* | 253 | Tohela, Estonia (TOH) | temporary pool | 1 | 58.40167 | 24.00667 | 37 |  |  |  |  |
| *Eucypris virens* | 271 | Vara, Estonia (VAR) | temporary pool | 0 | 58.52694 | 26.95000 | 38 |  |  |  |  |
| *Eucypris virens* | 272 | Vara, Estonia (VAR) | temporary pool | 0 | 58.52694 | 26.95000 | 38 |  |  |  |  |
| *Eucypris virens* | 273 | Vara, Estonia (VAR) | temporary pool | 0 | 58.52694 | 26.95000 | 38 |  |  |  |  |
| *Eucypris virens* | 252 | Puikule, Latvia, (PUI) | temporary pool | 1 | 57.65639 | 24.89389 | 37 |  |  |  |  |
| *Eucypris virens* | 256 | Galgauska, Latvia (GAL) | temporary pool | 0 | 57.16667 | 26.59944 | 37 |  |  |  |  |
| *Eucypris virens* | 257 | Gulbene, Lativa (GUL) | temporary pool | 0 | 57.19056 | 26.89500 | 38 |  |  |  |  |
| *Eucypris virens* | 258 | Gulbene, Lativa (GUL) | temporary pool | 0 | 57.19056 | 26.89500 | 38 |  |  |  |  |
| *Eucypris virens* | 259 | Gulbene, Lativa (GUL) | temporary pool | 0 | 57.19056 | 26.89500 | 38 |  |  |  |  |
| *Eucypris virens* | 260 | Gulbene, Lativa (GUL) | temporary pool | 0 | 57.19056 | 26.89500 | 38 |  |  |  |  |
| ***Eucypris virens*** | **TN\_TUN384** | Ariana, Tunesia (TUN) | temporary pool | 1 | 37.005 | 10.23100 | 8 | KC167893 | 3' V6-V9 | 403 | KC168005 |
| ***Eucypris virens*** | **TN\_TUN386** | Ariana, Tunesia (TUN) | temporary pool | 1 | 37.005 | 10.23100 | 8 | KC167897 | 3' V6-V9 | 403 | KC168006 |
| ***Eucypris virens*** | **392** | El Hisiane, Tunesia (HIS) | temporary pool | 0 | 36.995 | 10.15083 | 8 |  |  |  |  |
| ***Eucypris virens*** | **TN\_HIS395\_FM** | El Hisiane, Tunesia (HIS) | temporary pool | 0 | 36.995 | 10.15083 | 8 |  |  |  | GQ914443 |
| ***Eucypris virens*** | **TN\_OUL\_376** | Ouled Amer, Tunesia (OUL) | temporary pool | 0 | 36.01306 | 10.31833 | 30 |  |  |  | KC168004 |
| *Eucypris virens* | 377 | Ouled Amer, Tunesia (OUL) | temporary pool | 0 | 36.01306 | 10.31833 | 30 |  |  |  |  |
| *Eucypris virens* | 378 | Ouled Amer, Tunesia (OUL) | temporary pool | 0 | 36.01306 | 10.31833 | 30 |  |  |  |  |
| *Eucypris virens* | 379 | Ouled Amer, Tunesia (OUL) | temporary pool | 0 | 36.01306 | 10.31833 | 30 |  |  |  |  |
| *Eucypris virens* | 383 | Ouled Amer, Tunesia (OUL) | temporary pool | 0 | 36.01306 | 10.31833 | 30 |  |  |  |  |
| *Eucypris virens* | TN\_RAO391\_FM | Raoued, Tunesia (RAO) | temporary pool | 1 | 36.95639 | 10.22083 | 8 |  | 3' V6-V9 | 403 | GQ914440 |
| ***Eucypris virens*** | **MA\_MB3145\_FM** | Youssoufia, Morocco (MB3) | temporary pool | 1 | 32.2875 | -8.33222 | 7 |  |  |  | GQ914313 |
| *Eucypris virens* | 429 | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  |  |
| *Eucypris virens* | MA\_ML1426\_M | Chemaia, Morocco (ML1) | temporary pool |  | 31.97944 | -8.37639 | 9 |  |  |  | GQ914463 |
| *Eucypris virens* | MA\_ML1430\_M | Chemaia, Morocco (ML1) | temporary pool |  | 31.97944 | -8.37639 | 9 |  |  |  | GQ914465 |
| ***Eucypris virens*** | **146** | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  |  |
| *Eucypris virens* | 431 | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  |  |
| *Eucypris virens* | 432 | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  |  |
| *Eucypris virens* | 433 | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  |  |
| ***Eucypris virens*** | **MA\_ML1434\_M** | Chemaia, Morocco (ML1) | temporary pool | 0 | 31.97944 | -8.37639 | 9 |  |  |  | GQ914466 |
| *Eucypris virens* | 278 | Chemaia, Morocco (ML2) | temporary pool | 0 | 31.94111 | -8.39889 | 7 |  |  |  |  |
| *Eucypris virens* | MA\_ML2276\_FM | Chemaia, Morocco (ML2) | temporary pool |  | 31.94111 | -8.39889 | 7 |  |  |  | GQ914389 |
| *Eucypris virens* | MA\_MCH515\_M | Chemaia, Morocco (MCH) | temporary pool | 0 | 31.81167 | -8.54528 | 7 |  |  |  | GQ914508 |
| ***Eucypris virens*** | **MA\_ML2275** | Chemaia, Morocco (ML2) | temporary pool | 0 | 31.94111 | -8.39889 | 7 |  |  |  | KC168002 |
| *Eucypris virens* | MA\_MB1476\_M | Bouchane, Morocco (MB1) | temporary pool | 0 | 32.285 | -8.32278 | 7 |  |  |  | GQ914496 |
| *Eucypris virens* | MA\_MB1478\_M | Bouchane, Morocco (MB1) | temporary pool | 0 | 32.285 | -8.32278 | 5 |  |  |  | GQ914498 |
| *Eucypris virens* | MA\_MRI479\_M | Berrechid, Morocco (MRI) | temporary pool | 0 | 33.16444 | -7.39194 | 27 |  |  |  | GQ914499 |
| *Eucypris virens* | MA\_MRI480\_M | Berrechid, Morocco (MRI) | temporary pool | 0 | 33.16444 | -7.39194 | 21 |  |  |  | GQ914500 |
| *Eucypris virens* | MA\_MRI481\_M | Berrechid, Morocco (MRI) | temporary pool | 0 | 33.16444 | -7.39194 | 21 |  |  |  | GQ914501 |
| *Eucypris virens* | MA\_MRI482\_M | Berrechid, Morocco (MRI) | temporary pool | 0 | 33.16444 | -7.39194 | 27 |  |  |  | GQ914502 |
| *Eucypris virens* | MA\_MRI483\_M | Berrechid, Morocco (MRI) | temporary pool | 0 | 33.16444 | -7.39194 | 27 |  |  |  | GQ914503 |
| *Eucypris virens* | MA\_MB2484\_M | Bouchane, Morocco (MB2) | temporary pool | 0 | 32.28833 | -8.33444 | 5 |  |  |  | GQ914504 |
| *Eucypris virens* | MA\_MB2485\_M | Bouchane, Morocco (MB2) | temporary pool | 0 | 32.28833 | -8.33444 | 7 |  |  |  | GQ914505 |
| ***Eucypris virens*** | **MA\_MB2486\_M** | Bouchane, Morocco (MB2) | temporary pool | 0 | 32.28833 | -8.33444 | 7 |  |  |  | GQ914506 |
| ***Eucypris virens*** | **UK\_NEW188** | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  | GQ914322 |
| ***Eucypris virens*** | **UK\_NEW189** | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  | GQ914323 |
| ***Eucypris virens*** | **UK\_NEW190** | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  | GQ914324 |
| ***Eucypris virens*** | **UK\_NEW191** | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  | KC167999 |
| *Eucypris virens* | 501 | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  |  |
| *Eucypris virens* | 502 | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  |  |
| *Eucypris virens* | 503 | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 0 | 54.015 | -2.13444 | 31 |  |  |  |  |
| *Eucypris virens* | 507 | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 1 | 54.015 | -2.13444 | 31 |  |  |  |  |
| *Eucypris virens* | 508 | Newfield Hall pond, Yorkshire, UK (NEW) | temporary pool | 1 | 54.015 | -2.13444 | 31 | KC167901 | 3' V6-V9 | 403 |  |
| ***Eucypris virens*** | **UK\_UPD186** | Upper Denton, Cumbria, UK (UPD) | temporary pool | 0 | 54.89472 | -2.59333 | 28 |  |  |  | GQ914320 |
| *Eucypris virens* | UK\_UPD187 | Upper Denton, Cumbria, UK (UPD) | temporary pool | 0 | 54.89472 | -2.59333 | 28 |  |  |  | GQ914321 |
| *Eucypris virens* | 185 | Upper Denton, Cumbria, UK (UPD) | temporary pool | 0 | 54.89472 | -2.59333 | 28 |  |  |  |  |
| ***Eucypris virens*** | **PT\_COR232\_FM** | Monte dos corvos, Portugal (COR) | temporary pool | 0 | 37.43222 | -7.95528 | 15 |  |  |  | GQ914350 |
| *Eucypris virens* | PT\_COR234\_M | Monte dos corvos, Portugal (COR) | temporary pool | 0 | 37.43222 | -7.95528 | 15 |  |  |  | GQ914352 |
| *Eucypris virens* | PT\_COR235\_M | Monte dos corvos, Portugal (COR) | temporary pool | 0 | 37.43222 | -7.95528 | 15 |  |  |  | GQ914353 |
| *Eucypris virens* | PT\_COR236\_M | Monte dos corvos, Portugal (COR) | temporary pool | 0 | 37.43222 | -7.95528 | 15 |  |  |  | GQ914354 |
| ***Eucypris virens*** | **BG\_KOB442** | Kobleshkovo, Bulgaria (KOB) | temporary pool | 0 | 42.60917 | 27.53500 | 31 |  |  |  | GQ914472 |
| *Eucypris virens* | BG\_RAD450 | Radanovo, Bulgaria (RAD) | temporary pool | 1 | 43.37722 | 25.64278 | 16 | MH908925 | 5', 3', V1 &V2, V6-V9 | 391, 403 | GQ914478 |
| ***Eucypris virens*** | **RO\_TAM438** | Tamburesti, Romania (TAM) | temporary pool | 0 | 44.04778 | 23.93167 | 28 |  |  |  | GQ914470 |
| *Eucypris virens* | RO\_LES451 | Leş, Romania (LES) | temporary pool | 1 | 46.96056 | 21.82944 | 16 |  | 3' V6-V9 | 403 | GQ914479 |
| ***Eucypris virens*** | **454** | Hrkovce, Slovakia (HRK) | temporary pool | 1 | 48.09528 | 18.89250 | 37 | KC167898, MH908935 | 5'-3' V1-V6 | 1276 |  |
| ***Eucypris virens*** | **SK\_HRK455** | Hrkovce, Slovakia (HRK) | temporary pool |  | 48.09528 | 18.89250 | 37 |  |  |  | GQ914482 |
| *Eucypris virens* | TR\_KAB349 | Kavak, Turkey (KAB) | temporary pool | 1 | 41.00139 | 35.82028 | 16 |  | 3' V6-V9 | 403 | GQ914428 |
| *Eucypris virens* | TR\_KAB351 | Kavak, Turkey (KAB) | temporary pool | 1 | 41.00139 | 35.82028 | 16 |  | 3' V6-V9 | 403 | GQ914430 |
| *Eucypris virens* | TR\_LAD341 | Ladik, Turkey (LAD) | temporary pool | 0 | 40.91028 | 35.93194 | 31 |  |  |  | GQ914424 |
| *Eucypris virens* | TR\_LAD342 | Ladik, Turkey (LAD) | temporary pool | 0 | 40.91028 | 35.93194 | 31 |  |  |  |  |
| *Eucypris virens* | TR\_YUK324 | Yukiari, Turkey (YUK) | temporary pool | 1 | 41.22667 | 36.63750 | 31 |  | 3' V6-V9 | 403 | GQ914419 |
| *Eucypris virens* | 262 | Alcaria Ruiva, Portugal (ALC) | temporary pool | 1 | 37.7414 | -7.78890 | 15 |  | 3' V6-V9 | 403 |  |
| ***Eucypris pigra*** | **466** | Ladik, Turkey (LAC) | temporary pool | 1 | 35.91111 | 40.94694 | na |  | 3' V6-V9 | 403 | GQ914730 |
| ***Heterocypris incongruens*** | **HIA** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167903 | 3' V6-V9 | 403 |  |
| ***Heterocypris incongruens*** | **HIB** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167904 | 3' V6-V9 | 403 |  |
| ***Heterocypris incongruens*** | **HIC** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167905, MH908934 | 5'-3' V1-V6 | 1276 | [KC168020](https://www.ncbi.nlm.nih.gov/nuccore/KC168020.1) |
| ***Heterocypris incongruens*** | **HID** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167906 | 3' V6-V9 | 403 | KC168016 |
| ***Heterocypris incongruens*** | **HIE** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167907 | 3' V6-V9 | 403 | XXXXXXXXXX |
| ***Heterocypris incongruens*** | **HIF** | Wuppertal, Germany | flower pot | 1 | 51.24 | 7.106275 | 7 | KC167908 | 3' V6-V9 | 403 |  |
| ***Heterocypris incongruens*** | **IS1** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | na |  |  |  |  |
| ***Heterocypris incongruens*** | **IS2** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | 1 |  |  |  | KC168015 |
| ***Heterocypris incongruens*** | **IS3** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | 1 |  |  |  | KC168016 |
| ***Heterocypris incongruens*** | **IS4** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | 4 |  |  |  | KC168014 |
| ***Heterocypris incongruens*** | **IS5** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | na |  |  |  |  |
| ***Heterocypris incongruens*** | **IS6** | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 | na |  |  |  |  |
| *Heterocypris incongruens* | Hi1A | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  |  |
| *Heterocypris incongruens* | Hi1B | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  |  |
| *Heterocypris incongruens* | HI1C | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  | [KC168038](https://www.ncbi.nlm.nih.gov/nuccore/KC168038.1) |
| *Heterocypris incongruens* | Hi1E | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  |  |
| *Heterocypris incongruens* | Hi1F | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  | [KC168039](https://www.ncbi.nlm.nih.gov/nuccore/KC168039.1) |
| *Heterocypris incongruens* | Hi1G | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  | [KC168035](https://www.ncbi.nlm.nih.gov/nuccore/KC168035.1) |
| *Heterocypris incongruens* | Hi1H | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  | [KC168036](https://www.ncbi.nlm.nih.gov/nuccore/KC168036.1) |
| *Heterocypris incongruens* | Hi1I | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  | [KC168037](https://www.ncbi.nlm.nih.gov/nuccore/KC168037.1) |
| *Heterocypris incongruens* | Hi1D | Monte dos corvos, Portugal | temporary pool (not the same as E. virens) | 1 | 37.43222 | -7.954444 | 5 |  |  |  |  |
| *Heterocypris incongruens* | HI2A | Naunhof, Germany | temporary pool at highway exit | 1 | 51.291 | 12.626283 | 7 |  |  |  | KC168023 |
| *Heterocypris incongruens* | HI2B | Naunhof, Germany | temporary pool at highway exit | 1 | 51.291 | 12.626283 | 7 |  |  |  | KC168031 |
| *Heterocypris incongruens* | HI2C | Naunhof, Germany | temporary pool at highway exit | 1 | 51.291 | 12.626283 | 7 |  |  |  | KC168024 |
| *Heterocypris incongruens* | HI2D | Naunhof, Germany | temporary pool at highway exit | 1 | 51.291 | 12.626283 | 7 |  |  |  | KC168026 |
| ***Heterocypris incongruens*** | **HI3A** | S. Manços, Portugal | pond | 1 | 38.44361 | -7.733611 | 6 | MH908929 | 5' V1 & V2 | 376 | [KC168042](https://www.ncbi.nlm.nih.gov/nuccore/KC168042.1) |
| ***Heterocypris incongruens*** | **HI3B** | S. Manços, Portugal | pond | 1 | 38.44361 | -7.733611 | 6 |  |  |  | [KC168041](https://www.ncbi.nlm.nih.gov/nuccore/KC168041.1) |
| ***Heterocypris incongruens*** | **HI3C** | S. Manços, Portugal | pond | 1 | 38.44361 | -7.733611 | 6 |  |  |  |  |
| ***Heterocypris incongruens*** | **HI3D** | S. Manços, Portugal | pond | 1 | 38.44361 | -7.733611 | 6 |  |  |  | [KC168040](https://www.ncbi.nlm.nih.gov/nuccore/KC168040.1) |
| ***Heterocypris incongruens*** | **HI4A** | Perovlades, Corfu, Greece | temporary pool | 1 | 39.7925 | 19.704167 | 7 |  |  |  | KC168030 |
| ***Heterocypris incongruens*** | **HI4B** | Perovlades, Corfu, Greece | temporary pool | 1 | 39.7925 | 19.704167 | 3 |  |  |  | KC168012 |
| ***Heterocypris incongruens*** | **HI4C** | Perovlades, Corfu, Greece | temporary pool | 1 | 39.7925 | 19.704167 | 3 |  |  |  |  |
| ***Heterocypris incongruens*** | **HI4D** | Perovlades, Corfu, Greece | temporary pool | 1 | 39.7925 | 19.704167 | 3 |  |  |  | KC168013 |
| ***Heterocypris incongruens*** | **HI5A** | Veneto, Vicenza, Italy | permanent pool | 1 | 45.963 | 11.605833 | 7 |  |  |  | KC168033 |
| ***Heterocypris incongruens*** | **HI5B** | Veneto, Vicenza, Italy | permanent pool | 1 | 45.963 | 11.605833 | 7 | MH908931 | 5' V1 & V2 | 376 | KC168032 |
| ***Heterocypris incongruens*** | **HI5C** | Veneto, Vicenza, Italy | permanent pool | 1 | 45.963 | 11.605833 | 7 |  |  |  | KC168018 |
| ***Heterocypris incongruens*** | **HI6A** | Veneto, Vicenza, Italy | permanent pool | 1 | 45.963 | 11.605833 | 2 | XXXXXXXXXX | 5', 3', V1 &V2, V6-V9 | 376, 403 | [KC168009](https://www.ncbi.nlm.nih.gov/nuccore/KC168009.1) |
| ***Heterocypris incongruens*** | **Hi6H** | Veneto, Vicenza, Italy | permanent pool | 1 | 45.963 | 11.605833 | 2 |  |  |  | KC168009 |
| *Heterocypris incongruens* | CALA | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 |  |  |  |  |
| *Heterocypris incongruens* | CALB | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 |  |  |  | KC168021 |
| *Heterocypris incongruens* | CALC | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 | MH908930 | 5' V1 & V2 | 376 | KC168022 |
| *Heterocypris incongruens* | CALD | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 |  |  |  |  |
| *Heterocypris incongruens* | CALE | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 |  |  |  | KC168025 |
| *Heterocypris incongruens* | CALF | Melicuccà, Calabria, Italy | temporary pool | 1 | 38.28536 | 9.8466667 | 7 |  |  |  |  |
| *Heterocypris incongruens* | HI7A | Yukiari,Turkey | temporary pool | 1 | 41.22667 | 36.6375 | 7 |  |  |  |  |
| *Heterocypris incongruens* | HI7B | Yukiari,Turkey | temporary pool | 1 | 41.22667 | 36.6375 | 7 |  |  |  | KC168029 |
| *Heterocypris incongruens* | HI7C | Yukiari,Turkey | temporary pool | 1 | 41.22667 | 36.6375 | 7 |  |  |  | KC168027 |
| *Heterocypris incongruens* | HI7D | Yukiari,Turkey | temporary pool | 1 | 41.22667 | 36.6375 | 7 |  |  |  | KC168028 |
| *Heterocypris incongruens* | TPA | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 | 7 |  |  |  | KC168034 |
| *Heterocypris incongruens* | TPB | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 |  |  |  |  |  |
| *Heterocypris incongruens* | TPC | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 | 2 |  |  |  | KC168011 |
| *Heterocypris incongruens* | TPD | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 |  |  |  |  |  |
| *Heterocypris incongruens* | TPE | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 | 2 |  |  |  | KC168010 |
| *Heterocypris incongruens* | Hi | Orkney Islands, Scotland | temporary pool | 1 | 58.9809 | -2.977261 |  |  |  |  |  |
| *Heterocypris incongruens* | Hi | Orkney Islands, Scotland | temporary pool | 1 | 58.9809 | -2.977261 |  |  |  |  |  |
| *Heterocypris incongruens* | TP\_6 | Trapani, Sicily, Italy | temporary pool | 1 | 37.62688 | 12.635 |  |  |  |  |  |
| *Heterocypris salina* | 153 | Limni Keri, Greece | permanent pool | 1 | 37.68669 | 12.635 |  |  |  |  |  |
| *Heterocypris nov. spec.1* | H139III | Pozza Sanguedolce, Lampedusa, Italy | hatched from sediment | 1 | 35.5086 | 12.547222 |  |  |  |  | MH916762 |
| *Heterocypris nov. spec.1* | 166 | Taccio Vecchio 3, Lampedusa, Italy | hatched from sediment | 0 | 35.5086 | 12.547222 |  |  |  |  |  |
| *Heterocypris nov. spec.1* | 167 | Taccio Vecchio 2, Lampedusa, Italy | hatched from sediment | 0 | 35.5086 | 12.547222 |  |  |  |  |  |
| *Heterocypris nov. spec.1* | 168 | Taccio Vecchio 2, Lampedusa, Italy | hatched from sediment | 0 | 35.5086 | 12.547222 |  |  |  |  |  |
| *Heterocypris nov. spec.1* | 169 | Taccio Vecchio 2, Lampedusa, Italy | hatched from sediment | 1 | 35.5086 | 12.547222 |  |  |  |  |  |
| *Heterocypris nov. spec.1* | H170II | Taccio Vecchio 2, Lampedusa, Italy | hatched from sediment | 0 | 35.5086 | 12.547222 |  |  |  |  | MH916763 |
| *Heterocypris nov. spec.1* | 171 | Taccio Vecchio 2, Lampedusa, Italy | hatched from sediment | 0 | 35.5086 | 12.547222 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | F2 | Fogia 1, Apulia, Italy | temporary pool | 1 | 42.11 | 15.480556 |  |  |  |  | KC168045 |
| *Heterocypris nov. spec.2* | F6 | Fogia 1, Apulia, Italy | temporary pool | 0 | 42.11 | 15.480556 |  |  |  |  | KC168043 |
| *Heterocypris nov. spec.2* | M3 | Fogia 1, Apulia, Italy | temporary pool | 0 | 42.11 | 15.480556 |  |  |  |  | KC168044 |
| *Heterocypris nov. spec.2* | AP\_1 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_2 | Fogia 2, Apulia, Italy | artificial pond | 1 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_3 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_4 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_5 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_6 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_7 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_8 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_9 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_10 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_11 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_12 | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_1M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_2M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_3M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_4M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_5M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_6M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_7M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_8M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_9M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_10M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Heterocypris nov. spec.2* | AP\_11M | Fogia 2, Apulia, Italy | artificial pond | 0 | 42.11 | 15.480556 |  |  |  |  |  |
| *Herpetocypris chevreuxi* | Hc1 | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 |  |  |  |  |  |
| *Herpetocypris chevreuxi* | Hc2 | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 |  |  |  |  |  |
| *Herpetocypris chevreuxi* | Hc3 | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 |  |  |  |  |  |
| *Herpetocypris chevreuxi* | Hc4 | Drongen, Belgium | flower pot | 1 | 51.04936 | 3.6055139 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 1 | Drongen, Belgium | flower pot | 0 | 51.04936 | 3.6055139 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 2 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 3 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 4 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 5 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 6 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 7 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 8 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 9 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Tonnacypris lutaria* | T.l 10 | Drongen, Belgium | temporary pool in ditch | 0 | 51.04936 | 3.6652778 |  |  |  |  |  |
| *Cypridopsis vidua* | MC183 | Melsen Munte, Belgium | farm pond | 1 | 50.96 | 3.7190647 | 2 |  | 3' V6-V9 | 403 |  |
| *Cypridopsis vidua* | MC090 | Attenbeke, Belgium | garden pond | 1 | 50.78417 | 3.9158333 | 1 |  | 3' V6-V9 | 403 | MH916761 |
| *Cypridopsis vidua* | MC110 | Bornem, Belgium | forest pond | 1 | 51.11444 | 4.3248111 | 1 |  | 3' V6-V9 | 403 |  |
| *Cypridopsis vidua* | MC113 | Mechelen, Belgium | park pond | 1 | 51.01889 | 4.4622278 | 1 |  | 3' V6-V9 | 403 | MH916760 |
| *Cypridopsis vidua* | MC003 | Kortenberg Nossegem, Belgium | industrial pond | 0 | 50.87667 | 4.5045361 | 1 |  |  |  | MH916759 |
| *Cypridopsis vidua* | MC025 | Tienen, Belgium | garden pool | 1 | 50.81639 | 4.9064167 | 1 |  | 3' V6-V9 | 403 | MH916758 |
| *Cypridopsis vidua* | MC203 | Kerkom, Belgium | duck pond | 0 | 50.84278 | 4.8608611 | 1 |  |  |  | MH916757 |
| *Cypridopsis vidua* | MC208 | Houwart, Belgium | garden pond | 0 | 50.93056 | 4.8585639 | 1 |  |  |  | MH916756 |
| *Cypridopsis vidua* | MC211 | Rotselaar, Belgium | garden pond | 0 | 50.95806 | 4.7355972 | 2 |  |  |  |  |
| ***Darwinula stevensoni*** | **2A** | Ossiachersee, Austria | lake | 0 | 46.6687 | 13.980833 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **2B** | Ossiachersee, Austria | lake | 0 | 46.6687 | 13.980833 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **2C** | Ossiachersee, Austria | lake | 0 | 46.6687 | 13.980833 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds174 | Ossiachersee, Austria | lake |  | 46.6687 | 13.980833 | 5 |  |  |  | AF031299 |
| ***Darwinula stevensoni*** | **3A** | Keutschachersee, Austria | lake | 0 | 46.5861 | 14.153333 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **3B** | Keutschachersee, Austria | lake | 0 | 46.5861 | 14.153333 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **3C** | Keutschachersee, Austria | lake | 0 | 46.5861 | 14.153333 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **4A** | Mondsee, Austria | lake | 0 | 47.8556 | 14.153333 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds155 | Mondsee, Austria | lake |  | 47.8556 | 14.153333 | 5 |  |  |  | AF031297 |
| ***Darwinula stevensoni*** | **5A** | Faaker See, Austria | lake | 0 | 46.5792 | 13.918611 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **5B** | Faaker See, Austria | lake | 0 | 46.5792 | 13.918611 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **5E** | Faaker See, Austria | lake | 0 | 46.5792 | 13.918611 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds153 | Faaker See, Austria | lake |  | 46.5792 | 13.918611 | 5 |  |  |  | AF031296 |
| ***Darwinula stevensoni*** | **1A** | Wörthersee, Austria | lake | 0 | 46.6246 | 14.140278 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **1B** | Wörthersee, Austria | lake | 0 | 46.6246 | 14.140278 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **1C** | Wörthersee, Austria | lake | 0 | 46.6246 | 14.140278 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds80 | Wörthersee, Austria | lake |  | 46.6246 | 14.140278 | 5 |  |  |  | AF031295 |
| ***Darwinula stevensoni*** | Ds189 | Lake Sibaya, South Africa | lake |  | -27.3097 | 32.573333 | 3 |  |  |  | AF031286 |
| ***Darwinula stevensoni*** | **6A** | Lake Malawi, Malawi | lake | 0 | 11.6701 | 034.968308391''E | 3 |  |  |  |  |
| ***Darwinula stevensoni*** | **6B** | Lake Malawi, Malawi | lake | 0 | 11.6701 | 034.968308391''E | 3 |  |  |  |  |
| ***Darwinula stevensoni*** | **Ds\_A7** | Semerwater, UK | lake | 0 | 54.2802 | 2.1244444 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds59 | Semerwater, UK | lake |  | 54.2802 | 2.1244444 | 5 |  |  |  | AF031292 |
| ***Darwinula stevensoni*** | **11** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **2** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 | 5 |  |  |  | KC168007 |
| ***Darwinula stevensoni*** | **3** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **4** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 | 5 |  |  |  |  |
| ***Darwinula stevensoni*** | **5** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 | 5 |  |  |  |  |
| *Darwinula stevensoni* | Ds162 | Hollandersgaatkreek, Belgium | saline lake |  | 51.26889 | 3.5352778 | 5 |  |  |  | AF031290 |
| *Darwinula stevensoni* | 6 | Hollandersgaatkreek, Belgium | saline lake | 1 | 51.26889 | 3.5352778 | 5 |  |  |  |  |
| *Darwinula stevensoni* | PIK48 | Gregory Gorge, West Australia | spring | 0 | -21.5497 | 116.97083 | na |  |  |  |  |
| *Darwinula stevensoni* | Ds\_US1 | Herrick Fen, Ohio, USA | fen | 0 | 41.21389 | -81.37111 | 1 |  |  |  | JX069266 |
| *Darwinula stevensoni* | DS\_US2 | Herrick Fen, Ohio, USA | fen | 0 | 41.21389 | -81.37111 | 1 |  |  |  |  |
| *Darwinula stevensoni* | Ds\_US5 | Herrick Fen, Ohio, USA | fen | 0 | 41.21389 | -81.37111 | 1 |  |  |  | JX069265 |
| *Darwinula stevensoni* | Ds\_BRAZ | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 2 |  |  |  | JX069267 |
| *Darwinula stevensoni* | Ds\_ESP2 | La Albufera, Valencia, Spain | lake | 1 | 39.34806 | -0.324167 | 4 | MH908933 | 5'-3' V1-V6 | 1276 |  |
| *Darwinula stevensoni* | Ds\_ESP3 | La Albufera, Valencia, Spain | lake | 1 | 39.34806 | -0.324167 | 4 | KC167886  MH908932 | 3' V6-V9  5' V1 & V2 | 403  376 | AF031290 |
| *Darwinula stevensoni* | DS30 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 |  |  |  |  |
| *Darwinula stevensoni* | DS31 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 |  |  |  |  |
| *Darwinula stevensoni* | DS32 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 |  |  |  |  |
| *Darwinula stevensoni* | DS33 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 |  |  |  |  |
| *Darwinula stevensoni* | DS34 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 |  |  |  |  |
| *Darwinula stevensoni* | DS36 | Ulal Fosc, Spain | spring | 1 | 39.0156 | -0.090083 | 4 | MH910345 | 3' V6-V9 | 403 |  |
| *Darwinula stevensoni* | T5 | Zaventem, Belgium | pond | 1 | 50.8855 | 4.4933 | 5 | MH910345 | 3' V6-V9 | 403 | MH916755 |
| *Penthesilenula aotearoa* | Pa1 | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 3 |  |  |  | JX069233 |
| *Penthesilenula brasiliensis* | Pbs2\_08 | Campus of the University of São Paulo, Brazil | leaf litter | 0 | -23.5642 | -46.73 | 4 |  |  |  | JX069247 |
| *Penthesilenula brasiliensis* | PbL06 | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 3 |  |  |  |  |
| *Penthesilenula brasiliensis* | PbL06\_II | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 3 |  |  |  |  |
| *Penthesilenula brasiliensis* | PbL2 | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 3 |  |  |  |  |
| *Penthesilenula brasiliensis* | PbL4 | Boracéia Biological Station, São Paulo, Brazil | leaf litter | 0 | -23.6381 | -45.84028 | 3 |  |  |  | JX069242 |
| *Penthesilenula brasiliensis* | Pb\_AUS41 | Circular Pool Springs, Karijini, Western Australia | spring | 0 | -22.4767 | 118.56027787”E | 2 |  |  |  | JX069238 |
| *Penthesilenula brasiliensis* | PbIRL | Lough Lickeen, Ireland | lake | 0 | 52.96278 | -9.229444 | 1 |  |  |  | AJ319738 |
| *Penthesilenula brasiliensis* | Pb236 | Clue de la Fou, France | spring | 0 | 42.7175 | 2.4988889 | 1 |  |  |  |  |
| *Microdarwinula spec.* | mGabA | Bolapessa, Gabon | leaf litter | 0 | -0.8037 | 12.054333 |  |  |  |  |  |
| *Microdarwinula spec.* | mGabC | Bolapessa, Gabon | leaf litter | 0 | -0.8037 | 12.054333 |  |  |  |  |  |
| *Microdarwinula zimmeri* | Micro | Clue de la Fou, France | spring |  | 42.7175 | 2.4988889 |  |  |  |  | AF031284 |
| *Vestalenula paglioli* | BRAZ17\_09 | Salto Bandeirantes, Santa Fé, Brazil | spring | 1 | 22.982 | -51.82744 |  | KC167883 | 3' V6-V9 | 403 |  |
| *Vestalenula paglioli* | BRAZ18\_09 | Salto Bandeirantes, Santa Fé, Brazil | spring | 1 | 22.982 | -51.82744 |  | KC167884 | 3' V6-V9 | 403 | KR184035 |
| *Vestalenula cylindrica* | Vcyl 8 | Lake Biwa, Biwa museum, Japan | lake | 0 | 35.076 | 135.9335 |  |  |  |  |  |
| *Vestalenula cylindrica* | Vcyl 3 | Lake Biwa, Biwa museum, Japan | lake | 0 | 35.076 | 135.9335 |  |  |  |  |  |
| *Vestalenula molopoensis* | Vmol | Molopo Oog, South Africa | lake | 0 | -25.7778 | 25.341794 |  |  |  |  |  |
| *Vestalenula cornelia* | Vcor2 | Yudomari, South Yakushima, Japan | spring | 1 | 30.23 | 130.48069 |  | KC167885 | 3' V6-V9 | 403 | AJ534411 |
| *Vestalenula cornelia* | Vcor1 | Yudomari, South Yakushima, Japan | spring | 1 | 30.23 | 130.48069 |  | KC167887 | 3' V6-V9 | 403 | KR184023 |
| *Vestalenula nov. spec.* | Pb\_US1 | Herrick Fen, Ohio, USA | fen | 0 | 41.21389 | -81.37111 |  |  |  | 403 | KR184024 |
| *Alicenula serricaudata* | Ainv | Salto Bandeirantes, Santa Fé, Brazil | spring | 0 | -22.982 | -51.82744 |  |  |  |  | AJ534409 |
| ***Cypria opthalmica*** | **Cyp A** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cypria opthalmica*** | **Cyp B** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cypria opthalmica*** | **Cyp 3C** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cypria opthalmica*** | **Cyp D** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cypria opthalmica*** | **Cyp E** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cypria opthalmica*** | **Cyp F** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cyprideis torosa*** | **Ct A** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cyprideis torosa*** | **Ct B** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cyprideis torosa*** | **Ct C** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cyprideis torosa*** | **Ct D** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| ***Cyprideis torosa*** | **Ct E** | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| *Cyprideis torosa* | CT6 | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| *Cyprideis torosa* | CT7 | Hollandersgaatkreek, Belgium | saline lake | 0 | 51.26889 | 3.5352778 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 21 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 22 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 23 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 24 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 25 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 26 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 27 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 28 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 29 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| *Romecytheridea ampla* | Amp 30 | Lake Tanganyika, Katoto, Zambia | lake | 0 | -8.8108 | 31.028889 |  |  |  |  |  |
| ***Cytherissa lacustris*** | **CL 4 II** | Semerwater, UK | lake | 1 | 54.2802 | 2.1244444 |  |  | 3' V6-V9 | 403 |  |
| ***Cytherissa lacustris*** | **CL5 I** | Semerwater, UK | lake | 1 | 54.2802 | 2.1244444 |  |  | 3' V6-V9 | 403 |  |
| ***Cytherissa lacustris*** | **CL3 I** | Semerwater, UK | lake | 1 | 54.2802 | 2.1244444 |  |  | 3' V6-V9 | 403 |  |
| ***Cytherissa lacustris*** | **CL1 II** | Semerwater, UK | lake | 1 | 54.2802 | 2.1244444 |  |  | 3' V6-V9 | 403 |  |

**Table S1B. Origin and identity of 16S *Cardinium* and non-*Cardinium* sequences used for phylogenetic reconstructions, comparisons of genetic diversity, and EPA mapping..** #= number. If no reference is provided, the sequence was directly submitted to GenBank. “short” indicates that this sequence was included in the alignment of 403 basepairs, “long” in the alignments comprising 1276, 1638 and 1777 basepairs, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Cardinium* sequences** | | | | | | |
| **GenBank #** | **Host genus** | **Host family - order** | **Host class** | **short** | **long** | **Reference** |
| AB001518 | Ixodes | Ixodida | Acari-Arachnida | x | x | Kurtti et al. 1996 |
| AB116514 | Brevipalpus | Trombidiformes | Acari-Arachnida |  | x |  |
| AB116515 | Brevipalpus | Trombidiformes | Acari-Arachnida | x | x |  |
| AB241129 | Eotetranychus | Acarina | Acari-Arachnida |  | x |  |
| AB241130 | Oligonychus | Trombidiformis | Acari-Arachnida |  | x |  |
| AB241131 | Amphitetranychus | Acarina | Acari-Arachnida |  | x |  |
| AB241132 | Tetranychus | Acarina | Acari-Arachnida |  | x |  |
| AB241135 | Tetranychus | Acarina | Acari-Arachnida |  | x |  |
| AB506773 | Harmalia | Delphacidae-Hemiptera | Insecta |  | x | Nakamaru et al. 2009 |
| AB506774 | Sogatella | Fulogoromorpha-Hemiptera | Insecta | x | x | Nakamura et al. 2009 |
| AB506775 | Euides | Fulogoromorpha-Hemiptera | Insecta | x | x | Nakamura et al. 2009 |
| AB506776-AB506778 | Culicoides | Diptera | Insecta |  | x | Nakamura et al. 2009 |
| AB506779 | Culicoides | Diptera | Insecta | x | x | Nakamura et al. 2009 |
| AF350221 | Brevipalpus | Trombidiformes | Acari-Arachnida |  | x |  |
| AM042540 | Scaphoideus | Auchorryncha-Hemiptera | Insecta | x | x | Marzorati et al. 2006 |
| AY279401 | Brevipalpus | Trombidiformes | Acari-Arachnida | x | x | Weeks et al. 2003 |
| AY279410 | Petrobia | Trombidiformes | Acari-Arachnida | x | x | Weeks et al. 2003 |
| AY279412 | Brevipalpus | Trombidiformes | Acari-Arachnida |  | x | Weeks et al. 2003 |
| AY279413 | Metaseiulus | Phytoseiidae | Acari-Arachnida |  | x | Weeks et al. 2003 |
| AY279414 | Opiella | Oribatei | Acari-Arachnida |  | x |  |
| AY279415 | Dicantropis | Delphacidae-Hemiptera | Insecta |  | x | Weeks et al. 2003 |
| AY327472 | Plagiomerus | Encyrtidae-Hymenoptera | Insecta | x | x | Zchori-Fein & Perlman 2004 |
| AY635291 | Metaseiulus | Phytoseiidae | Acari-Arachnida |  | x | Jeyaprakash & Hoy 2004 |
| AY753169-AY753170 | Metaseiulus | Phytoseiidae | Acari-Arachnida |  | x | Jeyaprakash & Hoy 2004 |
| DQ314214 | Heterodera | Tylenchida | Nematoda | x |  | Noel & Atibalentja 2006 |
| DQ369961-DQ369965 | Tetranychus | Acarina | Acari-Arachnida |  | x | Liu et al. 2006 |
| DQ449047 | Tetranychus | Acarina | Acari-Arachnida |  | x | Liu et al. 2006 |
| DQ854713 | Encarsia | Chalcidoidea -Hymenoptera | Insecta | x | x |  |
| EU333926 | Cyclosa | Araneae | Arachnida | x |  | Duron et al. 2008 |
| EU333927 | Alopecosa | Araneae | Arachnida | x |  | Duron et al. 2008 |
| EU333928 | Evarcha | Araneae | Arachnida | x |  | Duron et al. 2008 |
| EU333929 | Pachygnatha | Araneae | Arachnida | x |  | Duron et al. 2008 |
| EU333930 | Holocnemus | Araneae | Arachnida | x |  | Duron et al. 2008 |
| EU333931 | Linyphia | Araneae | Arachnida | x |  | Duron et al. 2008 |
| FJ766335 | Bemisia | Aleyrodidae-Hemiptera | Insecta | x |  | Gueguen et al. 2010 |
| FJ766337-FJ766340 | Bemisia | Aleyrodidae-Hemiptera | Insecta | x |  | Gueguen et al. 2010 |
| FJ766341 | Bemisia | Aleyrodidae-Hemiptera | Insecta | x | x | Gueguen et al. 2010 |
| GQ206320 | Sogatella | Fulogoromorpha-Hemiptera | Insecta | x | x |  |
| GQ455411 | Abgrallaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455412 | Unaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455413 | Howardia | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455414 | Leucaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455415 | Hemiberlesia | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455416 | Pseudoparlatoria | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455417 | Melanaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455418 | Prodigiaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455419 | Aonidomytilus | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455420 | Protargionia | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455421 | Lepidosaphes | Sternorryncha-Hemiptera | Insecta | x |  |  |
| GQ455422 | Oceanaspidiotus | Coccoidea-Hemiptera | Insecta | x |  |  |
| GQ455423-GQ455424 | Palinaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455426 | Chionaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455427 | Aspidiotus | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455428 | Poliaspis | Diaspididae-Hemiptera | Insecta | x | x |  |
| GQ455429 | Pallulaspis | Diaspididae-Hemiptera | Insecta | x |  |  |
| GQ455430-GQ455438 | Aspidiotus | Diaspididae-Hemiptera | Insecta | x |  |  |
| GU451191 | Sogatella | Delphacidae-Hemiptera | Insecta |  | x |  |
| GU451193 | Sogatella | Delphacidae-Hemiptera | Insecta |  | x |  |
| GU451207 | Sogatella | Delphacidae-Hemiptera | Insecta |  | x |  |
| GU731426 | Tetranychus | Acarina | Acari-Arachnida |  | x |  |
| HE983995 | Encarsia | Chalcidoidea-Hymenoptera | Insecta | x | x | Penz et al. 2012 |
| JN166961 | Culicoides | Diptera | Insecta |  | x | Morag et al. 2012 |
| JN166962 | Culicoides | Diptera | Insecta | x | x | Morag et al. 2012 |
| JN204479 | Bemisia | Aleyrodidae-Hemiptera | Insecta | x |  | Singh et al. 2012 |
| JN204479-JN204482 | Bemisia | Aleyrodidae-Hemiptera | Insecta |  | x | Sing et al. 2012 |
| JN236327 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236332 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236335-JN236336 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236341 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236354 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236355 | Dermatophagoides | Aracina | Acari-Arachnida | x | x |  |
| JN236357 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JN236359 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| JQ406682-JQ406683 | Dermatophagoides | Aracina | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406686 | Dermatophagoides | Aracina | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406690 | Dermatophagoides | Aracina | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406719 | Glycyphagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406727 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406730 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406732 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406734 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406741 | Acarus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406755 | Tyroborus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406810-JQ406812 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406814 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406816 | Tyrophagus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406830 | Acarus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406831 | Acarus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406834 | Lepidoglyphus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406838 | Lepidoglyphus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JQ406841 | Lepidoglyphus | Sarcoptiformes | Acari-Arachnida | x |  | Kopecky et al. 2013 |
| JX001272 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| JX064607 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| JX064623-JX064624 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| JX064626 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| KC677578 | Phalangium | Opiliones | Arachnida | x |  | Duron 2013 |
| KC677579 | Dermanyssus | Mestostigmata | Acari-Arachnida | x |  | Duron 2013 |
| KC677580 | Tetranychus | Acarina | Acari-Arachnida | x |  | Duron 2013 |
| KC677581 | Acari sp. | Acarina | Acari-Arachnida | x |  | Duron 2013 |
| KC677582 | Encarsia | Chalcidoidea-Hymenoptera | Insecta | x |  | Duron 2013 |
| KC677583 | Scaphoideus | Auchorryncha-Hemiptera | Insecta | x |  | Duron 2013 |
| KC677584 | Bemisia | Aleyrodidae-Hemiptera | Insecta | x |  | Duron 2013 |
| KC677585 | Aspidiotus | Diaspididae-Hemiptera | Insecta | x |  | Duron 2013 |
| KF111022-KF111026 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111028-KF111030 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111033 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111035-KF111038 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111059 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111065 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111069 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111078-KF111080 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111086 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111090 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111092 -KF111093 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111109 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111118 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KF111140 | Cheyletus | Trombidiformes | Acari-Arachnida | x |  |  |
| KM464155 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464157 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464160 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464167 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464187-KM464188 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464203 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KM464281 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x | Kopecky et al. 2014 |
| KR026907 | Culicoides | Diptera | Insecta |  | x | Mee et al. 2015 |
| KR026910-KR026912 | Culicoides | Diptera | Insecta |  | x | Mee et al. 2015 |
| KR026915 | Culicoides | Diptera | Insecta |  | x | Mee et al. 2015 |
| KR026920-KR026923 | Culicoides | Diptera | Insecta |  | x | Mee et al. 2015 |
| KX022130 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| KX022134 | Tyrophagus | Sarcoptiformes | Acari-Arachnida |  | x |  |
| KY660634-KY660637 | Ornithodoros | Ixodida | Acari-Arachnida | x |  |  |
| KY660638 | Ixodes | Ixodida | Acari-Arachnida | x |  |  |
| LC159289 | Bemisia | Aleyrodidae-Hemiptera | Insecta |  | x |  |
| LN829672-LN829682 | Bemisia | Aleyrodidae-Hemiptera | Insecta |  | x |  |
| LN829684-LN829685 | Bemisia | Aleyrodidae-Hemiptera | Insecta |  | x |  |
| LN829688-LN829689 | Bemisia | Aleyrodidae-Hemiptera | Insecta |  | x |  |
| MF188893-MF188900 | Culicoides | Diptera | Insecta | x |  | Pages et al. 2017 |
| MF669559 | Achipteria | Sarcoptiformes | Acari-Arachnida |  | x |  |
| MH057586-MH057593 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |
| MH057587 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| MH057596 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |
| MH057597 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| MH057598-MH057604 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |
| MH057601-MH057602 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| MH057605 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| MH057610 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |
| MH057611 | Dermatophagoides | Aracina | Acari-Arachnida |  | x |  |
| MH057612 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |
| MH057614 | Dermatophagoides | Aracina | Acari-Arachnida | x | x |  |
| MH057615 | Dermatophagoides | Aracina | Acari-Arachnida | x |  |  |

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| --- | --- | --- | --- |
| **Non-*Cardinium* sequences** | | | |
| **GenBank #** | **Bacterial identity** | **long** | **Reference** |
| AB078038 | Flammeovirgaceae; Flexithrix | X | Nakagawa et al. 2002. |
| AB547639 | Firmicutes; Tissierellia | X | Sakamoto & Ohkuma 2010 |
| AY695840 | Opitutus, Opitutaceae | X |  |
| DQ16669 | Chryseobacterium, Flavobacteriaceae | X |  |
| EU016445 | Cellulomonadaceae, Micrococcales | X |  |
| EU705634 | Acinetobacter, Pseudomonodales | X |  |
| FR821218 | Pseudorhodobacter, Rhodobacteraceae | X |  |
| HQ425320 | Paracoccus,Rhodobacteraceae | X |  |
| JN934492 | Bacteriovoracaceae; Bacteriovorax | X |  |
| JQ435729 | Pseudoxanthomonas, Xanthomonadaceae | X |  |
| JQ977513 | Pseudomonas, Pseudomonadaceae | X |  |
| KF054791 | Sphingobacterium, Sphingobacteriaceae; | X |  |
| KJ957195 | Flavobacterium, Flavobacteriaceae | X | Park et al. 2015 |

**Table S2: Overview on PCR primers used to amplify 16S of Cardinium from non-marine ostracod hosts.**

The full length of 16S was assembled from sequences of three different PCR products from non-marine ostracods with the three different primer combinations detailed below. Rev comp= reverse complementary.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aim** | **Primer forward** | **Primer reverse** | **Part of 16S** | **Sequence length in basepairs** |
| Presence of *Cardinium*? | CLO-f1 (5′-GGA ACC TTA CCT GGG CTA GAA TGT ATT) (Gotoh et al., 2007) | CLO-r1 (5′-GCC ACT GTC TTC AAG CTC TAC CAA C) (Gotoh et al., 2007) | V1-V2 | 376 |
| Phylogeny | 16S\_Bact\_fD1 (Weisburg et al., 1991) | 16S\_Bact\_926r (Weisburg et al., 1991) | V6-V9 | 403 |
|  | rev comp of CLO-r1 (5′- G TTG GTA GAG CTT GAA GAC AGT GGC) | rev comp of 16S\_Bact\_fD1 (5’-CTG AGC CAG GAT CAA ACT CTG TTG TCG ACG AAT TCG G) | V2-V6 | 500 |

**Table S3: Results of DADA2 analyses with different parameters for filtering and trimming.**

mEE=maximum expected error; trim64\_64= left hand trimming of 64 bp, including primers, barcodes and Illumina adaptors; maxmismatch=maximum number of mismatches allowed in the overlap region when merging read pairs. truncq=truncation quality score; trim160\_100=trimming 160 bp of forward and 100 bp of reverse reads, respectively; minlength= minimum sequence length kept after trimming and merging read pairs; bimeras= removed *de novo* chimeras; average reads are calculated per sample; OTUs=number of ASVs used to classify bacteria.



**Table S4A: Results of DADA2 analyses and EPA mapping with RAxML.**

The RAxML reference tree was based on an alignment of 1777 basepairs of 16S from various bacteria, including *Cardinium* from different hosts. More details on the identity of ostracod DNA numbers is provided in Table S1A, on the 16S reference sequences in Table S1B. Branch numbers refer to the RAxML reference tree, of which the relevant section is shown in Figure S2A. Green indicates that ASVs are placed on external or internal branches of *Cardinium* from non-marine ostracods. Orange indicates placing on *Cardinium* from a non-ostracod host, blue placing of non-*Cardinium* ASVs on branches of non-*Cardinium* ASVs. EDPL= Expected Distance between Placement Locations (Matsen et al., 2010). Estimated values for EDPL and RAxML weight can range between 0 and 1. Here, only the highest RAxML weights and corresponding EDPL values are shown. The complete EPA results are available from the first author on request.







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**Table S4B: Results of mapping the shorter 5’ and 3’ 16S sequences of Cardinium from ostracod hosts on the RAxML reference tree with EPA.**

The RAxML tree was based on an alignment of 1638 basepairs of 16S from various bacteria, including *Cardinium* from different hosts. More details on the identity of ostracod DNA numbers is provided in Table S1A, on the 16S reference sequences in Table S1B. Branch numbers refer to the RAxML reference tree, of which the relevant section is shown in Figure S2B. Green indicates that 16S sequences are placed on external or internal branches of *Cardinium* from non-marine ostracods. EDPL= Expected Distance between Placement Locations (Matsen et al., 2010). Estimated values for EDPL and RAxML weight can range between 0 and 1. Here, only the highest RAxML weights and corresponding EDPL values are shown. The complete EPA results are available from the first author on request.



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