doi:10.1038/nature13451

The evolution of the placenta drives a shift in sexual selection in livebearing fish

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The evolution of the placenta from a non-placental ancestor causes a shift of maternal investment from pre- to post-fertilization, creating a venue for parent–offspring conflicts during pregnancy[1–4]. Theory predicts that the rise of these conflicts should drive a shift from a reliance on pre-copulatory female mate choice to polyandry in conjunction with post-zygotic mechanisms of sexual selection[2]. This hypothesis has not yet been empirically tested. Here we apply comparative methods to test a key prediction of this hypothesis, which is that the evolution of placentation is associated with reduced pre-copulatory female mate choice. We exploit a unique quality of the livebearing fish family Poeciliidae: placentas have repeatedly evolved or been lost, creating diversity among closely related lineages in the presence or absence of placentation[5,6]. We show that post-zygotic maternal provisioning by means of a placenta is associated with the absence of bright coloration, courtship behaviour and exaggerated ornamental display traits in males. Furthermore, we found that males of placental species have smaller bodies and longer genitalia, which facilitate sneak or coercive mating and, hence, circumvents female choice. Moreover, we demonstrate that post-zygotic maternal provisioning correlates with superfetation, a female reproductive adaptation that may result in polyandry through the formation of temporally overlapping, mixed-paternity litters. Our results suggest that the emergence of prenatal conflict during the evolution of the placenta correlates with a suite of phenotypic and behavioural male traits that is associated with a reduced reliance on pre-copulatory female mate choice.

Viviparity creates a venue for parent–offspring conflicts *in utero*[7] caused by a fundamental discord between mothers and developing embryos over the level of maternal investment during pregnancy. Females are selected to maximize their lifetime reproductive success by optimizing the allocation to each offspring while individual offspring are selected to demand a greater investment from the mother than is optimal for her to provide[1–4]. The ensuing evolutionary dynamics of perpetual adaptation and counter-adaptation between mother and developing embryo are hypothesized to be the driving force behind a rapid divergence in the genomic, developmental and physiological details of the placenta[1,3,6].

A central tenet of the parent–offspring conflict theory is that offspring must be able to manipulate the transfer of resources[1,7]. However, not all viviparous taxa have this capability[4–6]. Lecithotrophic viviparous species lack placentas and allocate all resources necessary for embryo development to the eggs before fertilization. This limits the potential for viviparity-driven conflict, because maternal investment pre-dates the expression of the paternal genome[1,2,4,6]. The evolution of the placenta from a non-placental lecithotrophic ancestor causes a shift in maternal investment from pre- to post-fertilization[5,6], offering embryos the opportunity to influence maternal investment throughout gestation[6,8,9]. This creates the potential for genomic conflicts, the magnitude of which depend on the extent of post-zygotic investment[1–4,6].

Theory predicts that the emergence of genomic conflicts, early in the evolution of the placenta, should drive a shift from a reliance on pre-copulatory mate choice to increasing levels of polyandry in conjunction with post-zygotic mechanisms of sexual selection[2]. Lecithotrophic species produce large, 'costly' (that is, fully provisioned) eggs[5,6], gaining most reproductive benefits by carefully selecting suitable mates based on phenotype or behaviour[2]. These females, however, run the risk of mating with genetically inferior (for example, closely related or dishonestly signalling) males, because genetically incompatible males are generally not discernable at the phenotypic level[10]. Placental females may reduce these risks by producing tiny, inexpensive eggs and creating large mixed-paternity litters by mating with multiple males. They may then rely on the expression of the paternal genomes to induce differential patterns of post-zygotic maternal investment among the embryos and, in extreme cases, divert resources from genetically defective (incompatible) to viable embryos[1–4,6,11].

Here we apply comparative methods to examine potential conflict-driven shifts in sexual selection associated with the evolution of post-fertilization maternal provisioning within the livebearing fish family Poeciliidae (order Cyprinodontiformes). This family presents a unique opportunity, because (1) it contains closely related species that differ markedly in the degree and timing of maternal provisioning, ranging from strict pre-zygotic yolk provisioning to extreme levels of post-zygotic investment associated with integrated maternal and fetal tissues specialized for nutrient transfer (that is, placentas[5,6]); (2) placentas were lost or evolved multiple times independently[5,6]; and (3) there is great interspecific variation in reproductive traits associated with pre-copulatory sexual selection, including caudal swords, enlarged dorsal fins and bright coloration in males[12–14]. Furthermore, a number of lineages have evolved the ability to carry multiple, temporally overlapping litters that are fertilized at different points in time (that is, superfetation[6,13,14]). In mammals, superfetation facilitates the formation of mixed-paternity litters (polyandry)[15–17]. Finally, molecular and experimental studies suggest that prenatal genomic conflicts occur in this family[18] and can result in differential patterns of post-zygotic maternal investment between developing embryos[19].

If substantial post-fertilization maternal provisioning intensifies fetal–maternal conflict[1,3] causing reduced female reliance on pre-copulatory cues in mate choice[2], then males of species with extensive post-fertilization maternal provisioning should display less developed, or the absence of, traits that facilitate female mate choice before copulation. Such traits include sexual dichromatism, courtship behaviour or ornaments. Moreover, if superfetation facilitates multiple paternity[15–17], then species with relatively high levels of post-fertilization provisioning should also have a higher probability of having superfetation[20,21]. Finally, copulation is known to incur costs to the females (for example, physical injury, reduced feeding opportunity, increased risk of predation and/or sexually transmitted diseases)[13,14]. If substantial post-fertilization maternal provisioning coincides with an increase in the frequency of polyandry, the ensuing sexual conflict should drive the evolution of female (resistance) traits that reduce the costs associated with superfluous mating attempts and, at the same time, male traits that enhance male mating success in the face of female resistance[14]. In Poeciliidae, a smaller male size relative to female size and an increase in gonopodium length (the male copulatory organ) increases the reproductive success of males

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during sneaky or coercive copulation, which enables males to circumvent female choice[14,22–24]. We thus predict that males of species with a relatively higher post-zygotic maternal investment should display relatively smaller body sizes and longer gonopodia.

To test these hypotheses, we first quantified the degree of post-fertilization maternal provisioning for each species with the 'matrotrophy index', which is the estimated dry mass of the offspring at birth divided by the dry mass of the egg at fertilization. The matrotrophy index provides an objective, dimensionless measure of the degree of post-fertilization maternal provisioning that presents a proxy for the level of placentation[5,6]. Lecithotrophic species have matrotrophy index values of less than 1, because embryos lose dry mass during gestation[5,6]. Placentotrophic species have matrotrophy index values greater than 1, because post-fertilization maternal provisioning causes growth during development[5,6]. We employed a well-resolved phylogeny to test for predicted evolutionary shifts in sexual selection with Bayesian tests

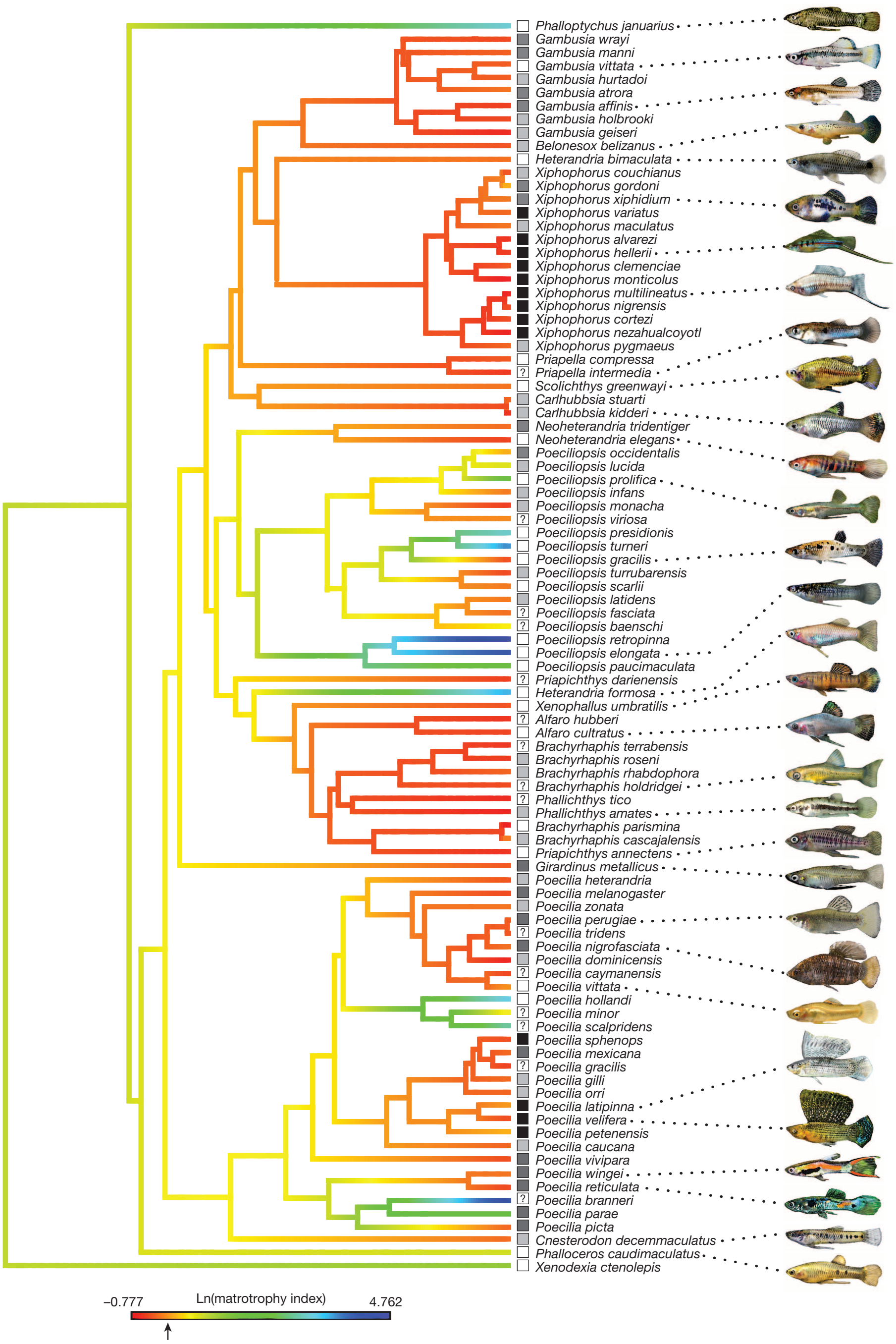

Figure 1 | Phylogenetic tree showing relationships among 94 species of the fish family Poeciliidae. Boxes at the terminal ends of the branches are coded according to the male sexual selection index: black = 3, dark grey = 2, light grey = 1 and white = 0; the boxed question mark indicates incomplete information (Supplementary Table 1). Branch colours depict a maximum likelihood reconstruction of maternal provisioning for log-transformed matrotrophy indices. The ancestral reconstruction was performed with phytools[30] and a Brownian motion model of trait evolution. The arrow on the scale bar corresponds to a matrotrophy index value of 1.0, which indicates the division between lecithotrophic and placentotrophic species. In agreement with previous analyses[5,6], the ancestral reconstruction suggests a complex history for the evolution of placentotrophy. The current analysis suggests that the common ancestor of the family has a placenta and that there were multiple losses and gains of placentation within the family. A caveat is that the single egg-layer within Poeciliidae (*Tomeurus gracilis*) was excluded from the analysis. The inclusion of this taxon, along with outgroups that contain both livebearers and egg-layers, may yield different results for the evolutionary history of placentotrophy within Poeciliidae.

of correlated trait evolution and phylogenetic linear and logistic regressions that explain the variation in sexually selected traits as a function of matrotrophy index (Fig. 1).

Bayesian tests show that matrotrophy index, and sexually dimorphic coloration (dichromatism) and courtship behaviour, respectively, have evolved in a correlated fashion (log(Bayes factor) = 13.308 and 3.438, respectively). Phylogenetic logistic regressions further show that both traits are negatively correlated to matrotrophy index ($b_1 = -0.614$, $P = 0.007$ and $b_1 = -0.763$, $P = 0.007$, respectively), indicating that these are significantly less likely to be found in placental lineages (Fig. 2a, b). The presence of exaggerated male display traits (that is, enlarged dorsal fins and filamentous extensions on upper maxillae in the genus *Poecilia* or extension of ventral part of the caudal fin to form a sword in *Xiphophorus*) is also negatively correlated with matrotrophy index, but this trend is not significant after correcting for phylogeny ($b_1 = -0.413$, $P = 0.429$; log(Bayes factor) = 0.663; Fig. 2c). The sexual selection index, defined as the summed presence of these three male traits (dichromatism, courtship behaviour and ornamental display traits), decreases significantly with increasing matrotrophy index (phylogenetic generalized least-squares regression: $F_{77} = 5.836$, $P = 0.018$; log(Bayes factor) = 2.320), indicating that lecithotrophic males have significantly more traits to facilitate female choice before copulation than highly placental species (Fig. 2d).

Superfetation is strongly correlated with matrotrophy index (phylogenetic logistic regression: $b_1 = 0.776$, $P < 0.001$; log(Bayes factor) = 25.730; Fig. 2e), indicating that placental species are more likely to have it. The relative length of the gonopodium is positively correlated with matrotrophy index (phylogenetic generalized least-squares regression: $F_{89} = 6.379$, $P = 0.013$; log(Bayes factor) = 4.214; Fig. 2f), demonstrating a strong association between longer genitalia and the presence of post-fertilization maternal provisioning. The size dimorphism index is also positively correlated with matrotrophy index, both for body weight ($F_{76} = 18.869$, $P < 0.001$; log(Bayes factor) = 6.664; Fig. 2g) and standard length ($F_{87} = 29.753$, $P < 0.001$; log(Bayes factor) = 4.948; Fig. 2h), indicating that the difference in body size between males and females is larger in lineages with higher levels of post-zygotic maternal investment. This increase is caused by a decrease in male size ($\log_{10}$(male wet mass): $F_{81} = 3.493$, $P = 0.065$, log(Bayes factor) = 3.676; $\log_{10}$(male standard length): $F_{89} = 2.022$, $P = 0.158$, log(Bayes factor) = 1.310; Fig. 2i, j blue lines) in association with increasing matrotrophy index, rather than an increase in female size ($\log_{10}$(female wet mass): $F_{76} = 0.021$, $P = 0.886$. log(Bayes factor) = 0.122; $\log_{10}$(female standard length): $F_{87} = 0.002$, $P = 0.962$, log(Bayes factor) = 0.298; Fig. 2i, j red lines).

Our findings yield three important insights. First, male traits that facilitate pre-copulatory female mate choice are less well developed in placental lineages. This is supported by patterns within individual clades. In the northern clade of the genus *Poeciliopsis*[5], males from lecithotrophic species are melanic whereas males from derived placental species have the same coloration as females. In the subgenus *Micropoecilia* of *Poecilia*, males belonging to the lecithotrophic clade are far more intensely coloured than the males in the derived placental clade, suggesting that here too sexually dimorphic coloration is disappearing. Extreme male ornamental display traits used during courtship are only found in lecithotrophic clades (*Xiphophorus* and subgenus *Mollienesia* of *Poecilia*) and are notably absent in placental species. Since sexual selection in Poeciliidae is influenced by pre-copulatory cues[12–14], these results suggest that phenotype- or behaviourally based female mate choice is of greater importance in lecithotrophic species than in species with substantial post-zygotic maternal provisioning.

Second, male traits that help circumvent female mate choice during sneak or coercive mating are more developed in placental species. These findings concur with the theory that sexual conflict can result in the evolution of sexual dimorphism[25,26] and rapid phenotypic divergence in genitalia[27,28]. In poeciliids, large males and short genitals are associated with courtship behaviour aimed at attracting cooperative females[12–14]. Smaller males and longer genitalia are associated with sneak copulation,

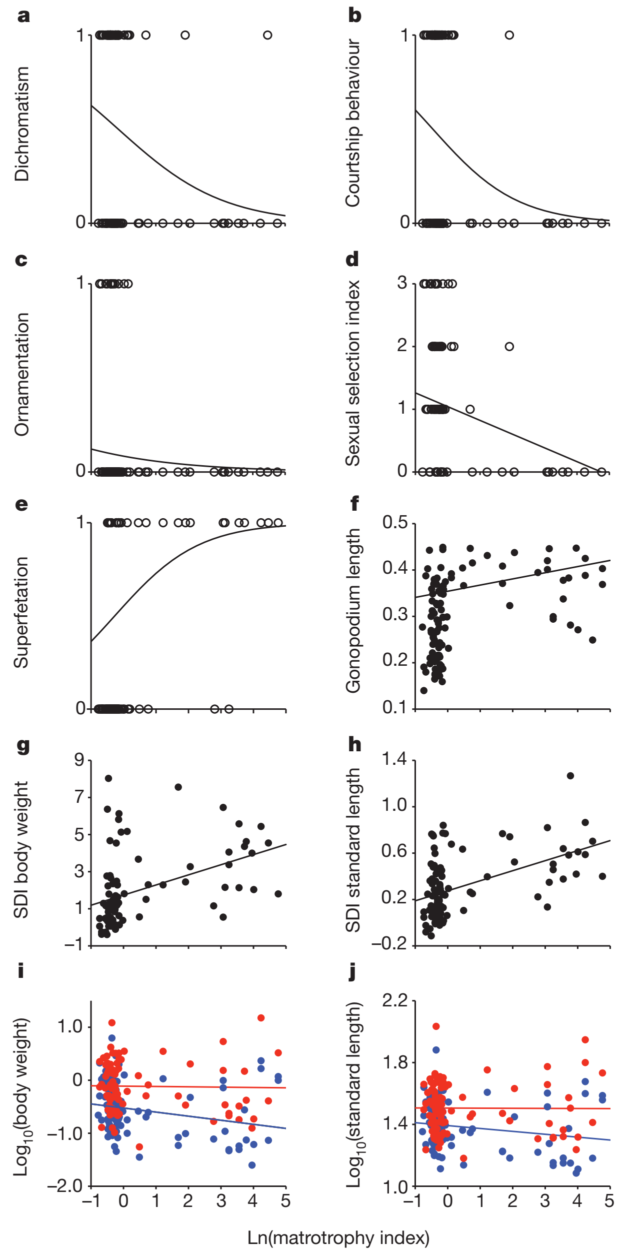

Figure 2 | Phylogenetic logistic and linear regressions. The regressions evaluate the effect of the natural-log-transformed matrotrophy index on (**a**) dichromatism ($n = 94$ taxa), (**b**) courtship behaviour ($n = 79$), (**c**) ornamental male display traits ($n = 94$), (**d**) sexual selection index (defined as the total number of male traits present ranging from 0 (none of the three traits present) to maximum 3 (all three traits present); $n = 79$), (**e**) superfetation ($n = 92$), (**f**) relative gonopodium length ($n = 107$ taxa), (**g**) size dimorphism index (SDI) for body weight ($n = 87$), (**h**) size dimorphism index for standard length ($n = 100$), (**i**) $\log_{10}$-transformed male (blue dots and line, $n = 99$) and female (red dots and line, $n = 87$) body weight, and (**j**) $\log_{10}$-transformed male (blue dots and line, $n = 107$) and female (red dots and line, $n = 100$) standard length.

the small size allowing males to approach females from behind without being detected and enabling them to manoeuvre more easily when inserting the gonopodium into the gonoduct of uncooperative females, while longer gonopodia enable a more efficient sperm transfer during unsolicited matings[12–14,22–24].

Third, the degree of post-zygotic maternal provisioning is strongly correlated with superfetation, which is found in all placental lineages save for *Phalloceros caudimaculatus* and the subgenus *Pamphorichthys* of *Poecilia*. This reproductive adaptation is thought to diminish the probability of a single male monopolizing an entire litter by fertilizing all embryos. Instead, by dividing offspring into multiple, smaller temporally overlapping litters, each fertilized at different points in time, and by using sperm derived from the most recent mating event ('last male sperm precedence'[13,14]), superfetation increases a female's likelihood of creating multiple-paternity litters[15–17].

Prior research has shown that male coloration, courtship behaviour and ornamental display traits play an important role in pre-copulatory female mate choice[13–14], that small male size and long genitalia facilitate sneak copulation (a strategy that circumvents female choice)[13,14,22–24] and that superfetation facilitates the formation of mixed-paternity litters (polyandry)[15–17]. The correlation of these traits with the level of post-zygotic maternal provisioning provides support for an association between the placenta and weaker pre-copulatory mate choice. What remains to be shown is that this relationship is causal and is associated with an increase in multiple paternities. Our study provides the first empirical evidence concurring with the hypothesis[2] that the rise of parent–offspring conflicts during the evolutionary transition from pre- to post-zygotic maternal provisioning correlates with a shift in sexual selection. This study will help to understand the elusive consequences of viviparity-driven conflict and may advance our knowledge about the evolution of reproductive traits in other viviparous lineages that evolved placentas, since all share the same potential for genomic conflict.

METHODS SUMMARY

The maximum likelihood phylogeny was constructed using RAxML 7.0.4 (ref. 29). Different phylogenetic comparative approaches were used to test for correlated trait evolution.

Online Content Methods, along with any additional Extended Data display items and Source Data, are available in the online version of the paper; references unique to these sections appear only in the online paper.

Received 12 August 2013; accepted 2 May 2014.

Published online 9 July; corrected online 10 September 2014 (see full-text HTML version for details).

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Supplementary Information is available in the online version of the paper.

Acknowledgements We thank all individuals and institutions who provided samples for this study (Rehoboth Aquatics, H. Bart Jr, R. Davis, D. Fromm, J. de Greef, H. Hieronimus, B. Hobbs, T. Hrbek, J. Johnson, B. Kohler, J. Langenhammer, C. Li, J. Lundberg, M. Mateos, A. Meyer, D. Nelson, L. Page, L. Parenti, M. Sabaj Pérez, R. Robins, R. de Ruiter, S. Schaefer, M. Schartl, J. Sparks, M. Stiassny, J. Travis, J. Trexler and J. Williams); L. Rowe and A. Furness for discussions and reading the manuscript; and C. Oufiero and M. Banet for help in collecting part of the data. This study was supported by Rubicon grant 825.07.017 of the Netherlands Organisation for Scientific Research and Marie Curie – IIF grant 299048 of the European Union to B.J.A.P. and grant DEB0416085 of the US National Science Foundation to D.N.R. and M.S.S.

Author Contributions B.J.A.P. and D.N.R. designed the study, D.N.R. quantified the matrotrophy indices, R.W.M. and M.S.S. constructed the molecular phylogeny, T.G. taught B.J.A.P. how to do phylogenetic regression and aided in the preliminary analysis of the data, and B.J.A.P. measured the morphological traits, performed the final analyses of the data and wrote the paper. All authors discussed the results and commented on the manuscript.

Author Information Reprints and permissions information is available at www.nature.com/reprints. The authors declare no competing financial interests. Readers are welcome to comment on the online version of the paper. Correspondence and requests for materials should be addressed to B.J.A.P. (b.pollux@gmail.com; bart.pollux@wur.nl) or D.N.R. (david.reznick@ucr.edu).

METHODS

Matrotrophy index. The degree of pre- versus post-fertilization maternal provisioning was estimated for 110 species of the family Poeciliidae by calculating the matrotrophy index, which is defined as the ratio of the estimated dry mass of the offspring at birth divided by the dry mass of the egg at fertilization. The stage of embryo development was assigned on the basis of morphological criteria[5] and converted into a numerical score that ranged from 0 (yolked egg, no development) to 45 (fully developed embryo, ready to be born), with stage 50 representing a newborn young. The numerator and denominator were estimated from a regression line fitted to the log-transformed dry masses of embryos (*y* axis) and their stage of development (*x* axis). The matrotrophy index provides an objective dimensionless measure of the degree of post-fertilization maternal provisioning that can be used as a proxy for the level of placentation[5]. Lecithotrophic species have matrotrophy index values ranging from 0.5 to 0.75, meaning that the embryos lose 25–50% of their dry mass during gestation due to metabolic costs associated with development; similar mass losses are observed in egg-laying species of fish[5]. Placentotrophic species have matrotrophy index values that range from near 1, implying some post-fertilization provisioning to offset the costs of development, to more than 100, indicating extensive post-fertilization maternal provisioning.

Sexually selected traits and superfetation. We obtained information on superfetation and the presence of sexually dimorphic coloration (dichromatism), courtship behaviour and exaggerated display traits in males from the literature and personal observations (all data are provided in Supplementary Table 1). Observed species were monitored twice for 20 min at room temperature in 37.8 l stock tanks containing gravel, aquatic plants and artificial lighting. We calculated a pre-copulatory sexual selection index for each species by assigning a value of 1 to each of the three male traits if they were present and then taking the sum. The sexual selection index indicated the total number of these traits present in the males of each species and ranged from 0 (indicating an absence of these male traits) to maximum 3 (indicating the presence of all three traits).

Morphological measurements. Information on sexual size dimorphism and genital length was obtained from preserved specimens (all data are provided in Supplementary Table 2). Standard length of preserved specimens was measured (to the nearest 0.01 mm) from the tip of the upper jaw to the outer margin of the hypural plate, using digital callipers. Gonopodium length was taken as the distance between the base of the gonopodium and its distal tip. The gonopodium is the male's copulatory organ derived from a metamorphosed anal fin and used to transfer sperm bundles (spermatozeugmata) into the female's urogenital opening. Relative gonopodium length was calculated as the ratio of gonopodium length to male standard length. The wet mass was measured to the nearest 0.01 mg on a Mettler AE 163 Microbalance (Mettler Instruments) after removal of excess liquid. Sexual size dimorphism (for body weight and standard length) was quantified as (1) the log of size ratio between females and males (sexual size dimorphism = log(female size/male size)) and (2) the size dimorphism index, which takes the ratio of the larger to the smaller sex and then subtracts 1 (size dimorphism index = (larger sex/smaller sex) − 1). This latter value is made negative if males are the larger sex and positive if females are the larger sex[31,32]. For all statistical analyses, body weight and standard length were $\log_{10}$ transformed.

Molecular sequences and phylogeny reconstruction. We assembled a data set that consisted of segments from 28 different genes (20 nuclear, 8 mitochondrial). Sequences were extracted from GenBank and supplemented with 920 new sequences for seven nuclear genes (*ENC1*, *Glyt*, *SH3PX3*, *MYH6*, *Rag1*, *Rh*, *X-src*) and two mitochondrial genes (*Cytb*, *ND2*). The data set comprised sequences for 288 species (293 terminals) of clupeocephalans of which 177 were poeciliids. Taxon sampling and GenBank accession numbers are provided in Supplementary Table 3. Tissue/DNA samples for this project were provided to D.N.R. by different individuals/institutions (see Acknowledgements) and are now housed at the University of California Riverside. Genomic DNA was extracted from either whole fish or fin clips using AccuPrep Genomic DNA Extraction Kits (Bioneer). Some samples proved difficult to amplify. In these cases we used Illustra GenomiPhi V2 DNA Amplification Kits (GE Healthcare) to amplify whole genomic DNA before PCR. Two mitochondrial and seven nuclear gene regions were targeted in PCR reactions. Mitochondrial DNA amplicons were as follows: (1) 3′ end of tRNA^{Glu}, complete cytochrome *b* (*cytb*), and 5′ end of tRNA^{Thr}; and (2) 3′ end of tRNA^{Gln}, complete tRNA^{Met}, complete NADH dehydrogenase subunit 2 (ND2), complete tRNA^{Trp}, complete tRNA^{Ala}, and 5′ end of tRNA^{Asn}. Nuclear amplicons were as follows: (1) two partial exons (8 and 10), all of exon 9, and two introns (8 and 9) of the tyrosine kinase gene (*X-src*); (2) exon 1 of myosin, heavy polypeptide 6 (*MYH6*); (3) exon 2 of ectodermal-neural cortex 1 like protein (*ENC1*); (4) exon 2 of glycosyltransferase (*Glyt*); (5) exon 1 of SH3 and PX domain containing 3 (*SH3PX3*); (6) a portion of the 7 transmembrane receptor region of rhodopsin (*Rh*); and (7) exon 3 of recombination activating gene-1 (*Rag1*). The majority of primers used have previously been described: *X-src* (refs 33–35); *MYH6*, *ENC1*, *Glyt*, *SH3PX3* (refs 34–36); *Rh* (refs 34, 35, 37); *Rag1*, *ND2* (refs 34, 35, 38–41); *cytb* (refs 34, 35, 42). Additional primers new to this study were designed as necessary. All primers used in this study can be found in Supplementary Table 4. PCR reactions, including nested PCRs, were performed following protocols outlined in refs 34, 35. All PCR products were run out on 1% agarose gels and the product of interest was excised and cleaned using AccuPrep Gel Purification kits (Bioneer). Cleaned PCR products were sequenced in both directions using an automated DNA sequencer (ABI 3730xl) at the University of California Riverside's Core Genetics Institute. Sequencher 4.8 was used to assemble contigs. All sequences were manually aligned in Se-Al[43]. Alignment ambiguous regions, including several transfer RNA (tRNAs) (Gln, Met, Trp, Ala, Asn), were visually identified and removed before performing phylogenetic analyses. The final DNA alignment for the 28 gene segments without alignment ambiguous regions was 20,828 base pairs. We divided the concatenated data set into 22 partitions. The mitochondrial gene regions were partitioned into protein-coding genes and RNAs (tRNA, ribosomal RNA) and each nuclear gene region was given its own partition. jModelTest was used to determine the best-fit models of DNA substitution[44,45] for each partition as suggested by the Akaike information criterion (Extended Data Table 1). Given that the Γ distribution accounts for rate heterogeneity, we did not include a proportion of invariant sites as recommended in ref. 46. If the model suggested by jModelTest was not implemented in RAxML 7.2.7 (ref. 29), we used the next most complex model. The 22-partition maximum likelihood analysis used RAxML 7.2.7 (ref. 29) (Extended Data Table 1; Supplementary Figs 1 and 2). RAxML analyses started from randomized maximum parsimony starting trees and employed the GTRCAT model with 500 bootstrap pseudoreplicates, and the fast hill-climbing algorithm. All other free parameters were estimated. Bootstrapping and a search for the maximum likelihood tree were performed in the same analysis (TreeBase submission number 15653).

Bayesian inference of correlated evolution. BayesTraits version 2.0 (software available from http://www.evolution.reading.ac.uk) was used to test for correlated evolution between the natural-log-transformed matrotrophy index and all other traits. The BayesTraits-Continuous module was used to compare two models of trait evolution: a dependent model in which two traits are assumed to evolve in a correlated fashion on the phylogeny, and an independent model in which the correlation between traits is set to zero using the *testcorrel* command. Three different sets of analyses were performed: the first set of analyses was run using the maximum likelihood phylogram from RAxML (Extended Data Table 2); the second was performed using ten trees sampled at regular intervals of 50 from the RAxML bootstrap analysis to control for phylogenetic uncertainty[48] (Extended Data Table 3); and the third was conducted using the maximum likelihood phylogram from RAxML and an imputed data set for all 177 poeciliid taxa in our phylogeny to evaluate the potential influence of missing values (Extended Data Table 4). The imputed data set was obtained using the phylogenetic data imputation technique implemented in PhyloPars[49], a web-based program that uses a maximum likelihood based method for estimating missing values assuming a Brownian motion model of trait evolution. The BayesTraits-Continuous module treats binary traits as continuous variables (BayesTraits does not allow mixture of continuous and binary variables, but see phylogenetic logistic regression below). If a binary trait is significantly correlated with the natural-log-transformed matrotrophy index (a quantitative variable), then the mean matrotrophy index for the group coded as zero differs significantly from the mean of the group coded as 1 (ref. 48). Average trait values were calculated for species with data from multiple populations and used in the analyses. Markov chain Monte Carlo analyses were run for 5,050,000 generations sampled every 1,000th iteration, with a burn-in of 50,000. The acceptance values of the transition rate parameter (*ratedev*) were within the required 20–40% for all analyses, ensuring adequate mixing among chains[48]. The scaling parameter lambda (λ) was simultaneously estimated to assess the contribution of the phylogeny to trait evolution ($\lambda = 0$ indicates phylogenetic independence and $\lambda = 1$ indicates phylogenetic dependence[47,48]). Best-fit models of trait evolution were selected by appraisal of the log(Bayes factors)[48,50], calculated as follows: log(Bayes factor) = 2(log[harmonic mean(dependent model)] − log[harmonic mean(independent model)]). On the log-scale, negative log(Bayes factors) argue in favour of the independent model of evolution; positive values support a dependent model of evolution, with log(Bayes factors) greater than 2 offering positive evidence and values greater than 5 strong evidence in favour of the dependent model[48].

Phylogenetic logistic regression. Phylogenetic logistic regressions (with Firth correction) were performed using PLogReg.m version 18Aug10 (ref. 51) in Matlab (Mathworks). The phylogeny was first exported from Mesquite version 2.75 (ref. 52) as a PDI file and converted to a phylogenetic variance–covariance matrix using the DOS program PDDIST[53] (available from the PDAP package in Mesquite). Sexual dimorphic coloration (dichromatism), courtship behaviour, exaggerated display traits and superfetation are binary traits. Their presence within each species was categorized as 1 and their absence as 0. The independent variable (the natural-log-transformed matrotrophy index) was standardized to have mean equal to 0 and standard deviation equal to 1, so that the regression coefficients represented effect sizes of the independent variable whose magnitudes reflected the size of effect of the variable[51]. A bootstrapping procedure with 2,000 simulations was used to generate the confidence intervals and test for statistical significance of the slope of the regression model. Convergence of model parameters was achieved in all cases (Extended Data Table 5).

Phylogenetic generalized least-squares regression. Regressionv2.m version 16Mar11 (ref. 54) was used to assess linear relationships between the natural-log-transformed matrotrophy index and the sexual selection index, relative gonopodium length, sexual size dimorphism and $\log_{10}$-transformed male and female standard lengths and body weights. Mesquite version 2.75 (ref. 52) was employed to add populations as soft polytomies to the phylogeny. Population branch lengths were set at 0.0025 based on the mean of all population branch lengths in the original maximum likelihood phylogram, with the constraint that the tips of the population branches had to be lined up with the tip of the original species branch in the phylogeny. The MODEL procedure in SAS version 9.2 (SAS Institute) was used before all regressions to confirm a constant variance of residuals (homoscedasticity) by means of White's general and Breusch–Pagan tests (Extended Data Table 6; SAS/ETS 12.1 User's Guide[55]). Three regression models were then computed: (1) ordinary linear least-squares regressions assuming a star phylogeny; (2) phylogenetic generalized least-squares regressions assuming a Brownian motion process of trait evolution; and (3) phylogenetic generalized least-squares regressions assuming an Ornstein–Uhlenbeck process of trait evolution, which incorporates stabilizing selection towards an optimum value with different possible means for different groups. Ornstein–Uhlenbeck regression allows branch lengths to vary, estimating the optimal Ornstein–Uhlenbeck transformation parameter, d, with a value of 0 indicating that a star phylogeny (ordinary linear least-squares model) best fits the data, a value of 1 that the original input tree (phylogenetic generalized least-squares model) best fits the data and a value between 0 and 1 that 'intermediate branch lengths' provide the best fit[54]. For all statistical analyses, body weight and standard length were $\log_{10}$ transformed. To allow for soft polytomies, the degrees of freedom was corrected, using an adjusted degrees of freedom when comparing test statistics with critical F values of the total number of branches (N) – ($z + 2$), where z is the number of branches that are set to a length of zero[56,57]. Two approaches were used to select the best-fit linear regression model. First, we assessed differences in the Akaike information criterion (AIC): AIC = ($-2 \times$ ln(ML likelihood)) + ($2 \times$ number of parameters) between models, expressed as $\Delta_i = \text{AIC}_i - \text{AIC}_{\min}$ (where $\text{AIC}_{\min}$ is the value of the model with the lowest AIC value and AIC_i is the value for the alternative model i). Δ_i provides a heuristic measure of the fit of alternative model i relative to the fit of the best model: $\Delta_i < 2$ suggests that there is substantial support for alternative model i relative to the best model; $4 < \Delta_i < 7$ indicates that the alternative model has considerably less support; and $\Delta_i > 10$ signifies that the alternative model is highly unlikely[58]. Second, where one model was a nested subset of the other (compared with the ordinary linear least-squares and phylogenetic generalized least-squares models, the Ornstein–Uhlenbeck model contains one more estimated parameter), we compared them by maximum likelihood ratio tests, where twice the difference in natural-log likelihoods between models ($D = -2$(maximum likelihood for best model $-$ maximum likelihood for alternative model i)) is assumed to be distributed asymptotically as a χ^2 distribution with degrees of freedom equal to the difference in the number of parameters in the two models. Following ref. 54, we also used likelihood ratio tests to compare the phylogenetic generalized least-squares and ordinary linear least-squares models. Although the degrees of freedom in these comparisons is zero (both models have the same number of parameters), a difference in likelihoods greater than 3.841 (which is the ninety-fifth percentile of the distribution of χ^2 with one degree of freedom) is often taken to indicate a significant difference ($P > 0.05$) in the fit of the two models[54,59] (Supplementary Table 6).

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Extended Data Table 1 | Results of models of molecular evolution chosen by jModelltest

Gene Region	DNA
12S 5' Prime End; tRNA Val; 16S 5' Prime End; 16S 3' Prime End; tRNA Leu	GTR+ Γ
Cytb; ND1; ND2; COI	GTR+ Γ
tbr1	TrN+ Γ
Ptr	GTR+ Γ
zic1	GTR+ Γ
Plagl2	GTR+ Γ
RyR3	GTR+ Γ
srbe	TVM+ Γ
D8	TPM2uf+ Γ
T36	GTR+ Γ
D2	GTR+ Γ
D29	TrNef+ Γ
CCND1	TPM1uf+ Γ
RAB27	HKY+ Γ
Beta actin	TPM1uf+ Γ
Glyt	TPM3uf+ Γ
X-src	TrN+ Γ
ENC1	GTR+ Γ
Rag1	TIM1ef+ Γ
Rh	TPM3uf+ Γ
SH3PX3	GTR+ Γ
myh6	TrN+ Γ

Extended Data Table 2 | Bayesian inference of correlated evolution between the natural-log-transformed matrotrophy index and other life-history traits within the family Poeciliidae

Life history trait	N_{taxa}	log harmonic mean dependent model*	log harmonic mean independent model†	log Bayes Factor
Dichromatism	94	-194.869	-197.725	5.712[c]
Courtship behavior	79	-168.683	-169.750	2.134[b]
Ornamental male display traits	94	-150.789	-150.065	-1.448[a]
Sexual selection index	79	-213.129	-214.479	2.700[b]
Superfetation	92	-85.479	-93.698	16.438[c]
Relative gonopodium length	91	25.241	22.536	5.410[c]
Size dimorphism index body weight	78	-270.551	-274.089	7.076[c]
Sexual size dimorphism body weight	78	-113.943	-118.418	8.950[c]
Log_{10} male body weight	83	-152.150	-154.173	4.046[b]
Log_{10} female body weight	78	-161.862	-161.938	0.152[a]
Size dimorphism index standard length	89	-122.821	-125.126	4.610[b]
Sexual size dimorphism standard length	89	-20.562	-22.703	4.282[b]
Log_{10} male standard length	91	-59.788	-61.018	2.460[b]
Log_{10} female standard length	89	-78.310	-76.899	-2.822[a]

*Dependent model: correlation is assumed; †Independent model: correlation is set to zero. No evidence[a], positive evidence[b] and strong evidence[c] for correlated evolution[55].

Extended Data Table 3 | Bayesian inference of correlated evolution between the natural-log-transformed matrotrophy index and other life-history traits within the family Poeciliidae using a subset of ten trees to control for phylogenetic uncertainty

Life history trait	N_{taxa}	log harmonic mean dependent model*	log harmonic mean independent model†	log Bayes Factor
Dichromatism	94	-195.375	-202.029	13.308[c]
Courtship behavior	79	-168.603	-170.322	3.438[b]
Ornamental male display traits	94	-145.954	-146.285	0.663[a]
Sexual selection index	79	-212.830	-213.990	2.320[b]
Superfetation	92	-84.088	-96.953	25.730[c]
Relative gonopodium length	91	24.977	22.870	4.214[b]
Size dimorphism index body weight	78	-269.967	-273.299	6.664[c]
Sexual size dimorphism body weight	78	-115.281	-119.092	7.622[c]
Log_{10} male body weight	83	-152.985	-154.823	3.676[b]
Log_{10} female body weight	78	-161.153	-161.214	0.122[a]
Size dimorphism index standard length	89	-122.960	-125.434	4.948[b]
Sexual size dimorphism standard length	89	-20.190	-22.400	4.420[b]
Log_{10} male standard length	91	-60.527	-61.182	1.310[a]
Log_{10} female standard length	89	-76.677	-76.826	0.298[a]

*Dependent model: correlation is assumed; †Independent model: correlation is set to zero. No evidence[a], positive evidence[b] and strong evidence[c] for correlated evolution[55].

Extended Data Table 4 | Bayesian inference of correlated evolution between the natural-log-transformed matrotrophy index and other life-history traits after data imputation with PhyloPars

Life history trait	PhyloPars data set* (N_{taxa}=177)	$N_{imputed\_taxa}$	$\%_{imputed\_taxa}$	log harmonic mean dependent model	log harmonic mean independent model	log Bayes Factor
Dichromatism	1[†§]	83	46.89	-211.464	-214.952	6.976
	1[†¶]	83	46.89	-234.083	-236.996	5.826
	2[‡§]	83	46.89	-211.248	-215.160	7.824
	2[‡¶]	83	46.89	-233.356	-237.051	7.390
Courtship behaviour	1[†§]	98	55.37	-192.753	-192.774	0.042
	1[†¶]	98	55.37	-207.041	-207.832	1.582
	2[‡§]	98	55.37	-194.552	-195.221	1.338
	2[‡¶]	98	55.37	-207.052	-208.047	1.990
Ornamental male display traits	1[†§]	83	46.89	-93.501	-92.901	-1.200
	1[†¶]	83	46.89	-113.315	-113.147	-0.336
	2[‡§]	83	46.89	-92.892	-92.884	-0.016
	2[‡¶]	83	46.89	-112.383	-111.820	-1.126
Sexual selection index	1[†§]	98	55.37	-287.582	-288.485	1.806
	1[†¶]	98	55.37	-296.858	-297.374	1.032
	2[‡§]	98	55.37	-299.675	-300.724	2.098
	2[‡¶]	98	55.37	-315.085	-316.164	2.158
Superfetation	1[†§]	85	48.02	34.479	18.818	31.322
	1[†¶]	85	48.02	20.440	5.566	29.748
	2[‡§]	85	48.02	33.842	17.441	32.802
	2[‡¶]	85	48.02	19.770	5.592	28.356
Relative gonopodium length	1[†]	86	48.59	261.489	260.072	2.834
	2[‡]	86	48.59	262.196	260.886	2.620
Size dimorphism index body weight	1[†]	99	55.93	-371.865	-373.693	3.656
	2[‡]	99	55.93	-381.858	-384.999	6.282
Sexual size dimorphism body weight	1[†]	99	55.93	-19.479	-20.793	2.628
	2[‡]	99	55.93	-32.578	-36.179	7.202
Log$_{10}$ male body weight	1[†]	94	53.11	-57.651	-60.727	6.152
	2[‡]	94	53.11	-63.672	-64.309	1.274
Log$_{10}$ female body weight	1[†]	99	55.93	-42.388	-41.338	-2.100
	2[‡]	99	55.93	-51.771	-51.054	-1.434
Size dimorphism index standard length	1[†]	88	49.72	-37.529	-38.550	2.042
	2[‡]	88	49.72	-37.779	-40.491	5.424
Sexual size dimorphism standard length	1[†]	88	49.72	166.884	165.203	3.362
	2[‡]	88	49.72	165.629	163.514	4.230
Log$_{10}$ male standard length	1[†]	86	48.59	96.946	96.064	1.764
	2[‡]	86	48.59	97.396	96.619	1.554
Log$_{10}$ female standard length	1[†]	88	49.72	58.561	59.947	-2.772
	2[‡]	88	49.72	58.682	58.096	1.172

*Imputed data sets obtained with PhyloPars[55]: †Data set 1 (PhyloPars settings: correlated evolution of the different features is not allowed); ‡Data set 2 (PhyloPars settings: correlated evolution of the different features is allowed). For discrete traits we performed two separate analyses on each data set, using §raw (continuous) PhyloPars output values and ¶values rounded to the nearest integer, respectively.

Extended Data Table 5 | Ordinary and phylogenetic logistic regression parameter estimates for the effect of the natural-log-transformed matrotrophy index on dichromatism, courtship behaviour, ornamental male display traits and superfetation within the family Poeciliidae

Parameter	Estimate†	SE†	Bootstrap mean‡	Bootstrap 95%CI‡	Bootstrap *P*-value‡
Dichromatism					
Ordinary logistic regression					
b_0 (intercept)	0.263	0.226	0.235	(-0.288, 0.681)	0.322
b_1 (lnMI)	-0.822	0.301	-0.933	(-1.955, -0.374)	< 0.001
Ordinary logistic regression with Firth correction					
b_0 (intercept)	0.281	0.221	0.281	(-0.183, 0.733)	0.222
b_1 (lnMI)	-0.746	0.277	-0.756	(-1.509, -0.296)	< 0.001
Phylogenetic logistic regression with Firth correction*					
a	-1.576		-3.125	(-4.000, -1.917)	0.205
b_0	-0.099	0.343	-0.098	(-0.570, 0.367)	0.676
b_1 (lnMI)	-0.614	0.290	-0.626	(-1.360, -0.149)	0.007
Courtship behavior					
Ordinary logistic regression					
b_0 (intercept)	-0.247	0.279	-0.347	(-1.178, 0.249)	0.308
b_1 (lnMI)	-1.152	0.501	-1.444	(-3.541, -0.529)	< 0.001
Ordinary logistic regression with Firth correction					
b_0 (intercept)	-0.177	0.258	-0.178	(-0.814, 0.331)	0.522
b_1 (lnMI)	-0.953	0.425	-0.982	(-2.461, -0.346)	< 0.001
Phylogenetic logistic regression with Firth correction*					
a	-2.383		-3.146	(-4.000, -1.863)	0.236
b_0	-0.350	0.283	-0.349	(-0.949, 0.163)	0.181
b_1 (lnMI)	-0.763	0.380	-0.772	(-1.895, 0.187)	0.007
Ornamental male display traits					
Ordinary logistic regression					
b_0 (intercept)	-2.404	0.686	-2.709	(-4.623, -1.691)	< 0.001
b_1 (lnMI)	-2.087	1.467	-2.671	(-6.463, -0.742)	< 0.001
Ordinary logistic regression with Firth correction					
b_0 (intercept)	-1.903	0.451	-1.909	(-3.444, -1.280)	< 0.001
b_1 (lnMI)	-0.985	0.975	-0.987	(-4.157, -0.078)	0.023
Phylogenetic logistic regression with Firth correction*					
a	-1.840		-2.559	(-4.000, 1.147)	0.212
b_0	-2.387	0.529	-2.192	(-3.136, -0.720)	0.007
b_1 (lnMI)	-0.413	0.570	-0.361	(-2.095, 0.332)	0.429
Superfetation					
Ordinary logistic regression					
b_0 (intercept)	-1.061	0.278	-1.038	(-1.611, -0.459)	0.002
b_1 (lnMI)	1.314	0.362	1.462	(0.789, 2.659)	< 0.001
Ordinary logistic regression with Firth correction					
b_0 (intercept)	-1.066	0.271	-1.058	(-1.584, -0.545)	< 0.001
b_1 (lnMI)	1.204	0.332	1.204	(0.663, 2.083)	< 0.001
Phylogenetic logistic regression with Firth correction*					
a	1.293		-3.147	(-4.000, -1.922)	0.228
b_0	0.211	1.148	0.220	(-0.251, 0.708)	0.380
b_1 (lnMI)	0.776	0.301	0.788	(0.259, 1.760)	< 0.001

* Recommended models[36].
† Parameters of logistic regression and standard errors of the estimates were obtained using the GEE approximation[36].
‡ Parametric bootstrapping was performed by simulating 2000 data sets to obtain confidence intervals.

Extended Data Table 6 | White's general and Breusch–Pagan tests for homoscedasticity

	White's General test			Breusch-Pagan test		
Life history trait	Chi-sq.	*df*	*P*	Chi-sq.	*df*	*P*
Relative gonopodium length	4.21	4	0.3788	4.10	2	0.1289
Size dimorphism index body weight	0.74	4	0.9461	0.62	2	0.7342
Sexual size dimorphism body weight	2.38	4	0.6654	1.98	2	0.3715
Log_{10} male body weight	7.09	4	0.1314	5.70	2	0.0579
Log_{10} female body weight	5.52	4	0.2378	4.46	2	0.1077
Size dimorphism index standard length	1.47	4	0.8314	0.30	2	0.8613
Sexual size dimorphism standard length	1.47	4	0.8320	0.72	2	0.6975
Log_{10} male standard length	6.97	4	0.1373	6.09	2	0.0476
Log_{10} female standard length	5.82	4	0.2128	5.33	2	0.0697

doi:10.1038/nature13451

Supplementary Table 1 | Taxa, natural log-transformed matrotrophy index (LNMI), dichromatism (DICHROM: 1 = dichromatic, 0 = monochromatic), courtship behavior (COURT: 1 = courtship present, 0 = courtship absent), ornamental display traits (ORNAM: 1 = traits present, 0 = traits absent), sexual selection index (SSI) and superfetation (SUPER: 1 = superfetation present, 0 = superfetation absent).

SPECIES	LMNI	DICHROM	COURT	ORNAM	SSI	SUPER	References
Alfaro cultratus	-0.544727175	0	0	0	0	0	*6,12,13,60*
Alfaro hubberi	-0.446287103	0	-	0	-	0	*13,60*
Belonesox belizanus	-0.356674944	0	1	0	1	0	*6,12,13,65,78*
Brachyrhaphis cascajalensis	-0.083381609	0	1	0	1	0	*12,13,60*
Brachyrhaphis holdridgei	-0.415515444	1	-	0	-	0	*13,60*
Brachyrhaphis parismina	-0.776528789	0	0	0	0	0	*12,13,60*
Brachyrhaphis rhabdophora	-0.265268478	0	1	0	1	0	*6,63,64,65*
Brachyrhaphis roseni	-0.510825624	0	1	0	1	0	*12,60,65*
Brachyrhaphis terrabensis	-0.507497834	1	-	0	-	0	*6,13*
Carlhubbsia kidderi	-0.673344553	1	0	0	1	0	*12,13,60*
Carlhubbsia stuarti	-0.139262067	1	0	0	1	0	*6,12,13*
Cnesterodon decemmaculatus	-0.217360944	1	0	0	1	0	*6,12,13*
Gambusia affinis	-0.476424197	1	1	0	2	0	*6,12,13,66,67*
Gambusia atrora	-0.183922838	1	1	0	2	0	*6,13*
Gambusia geiseri	-0.621757184	0	1	0	1	0	*13,60*
Gambusia holbrooki	-0.441610555	1	0	0	1	0	*12,14,23*
Gambusia hurtadoi	-0.301105093	0	1	0	1	0	*13,60*
Gambusia manni	-0.287682072	1	1	0	2	0	*12,13,60*
Gambusia vittata	-0.30652516	0	0	0	0	0	*6,12,13*
Gambusia wrayi	-0.414001439	1	1	0	2	0	*6,12*
Girardinus metallicus	-0.328504067	1	1	0	2	0	*6,60*
Heterandria bimaculata	-0.198450939	0	0	0	0	0	*6,12,13*
Heterandria formosa	3.555348061	0	0	0	0	1	*6,12,13,60*
Neoheterandria elegans	-0.223143551	0	0	0	0	1	*6,12*
Neoheterandria tridentiger	-0.46203546	1	1	0	2	1	*6,13,70*
Phallichthys amates	-0.616186139	1	0	0	1	0	*6,12,13,80*
Phallichthys tico	-0.673344553	0	-	0	-	0	*6,13,80*
Phalloceros caudimaculatus	0.760805829	0	0	0	0	0	*6,12,13,60*
Phalloptychus januarius	3.124565145	0	0	0	0	1	*6,9,13,60*
Poecilia (Limia) caymanensis	-0.447211175	1	-	0	-	0	*60*
Poecilia (Limia) dominicensis	-0.642702449	1	0	0	1	0	*12,13,35,60,61,68,69*
Poecilia (Limia) heterandria	-0.345308079	1	0	0	1	0	*13,35,60*
Poecilia (Limia) melanogaster	-0.40009186	1	1	0	2	0	*12,13, 35,60,61,68,69*
Poecilia (Limia) nigrofasciata	-0.200141994	1	1	0	2	0	*12,13,60,61,68,69*
Poecilia (Limia) perugiae	-0.359734401	1	1	0	2	0	*12,13,60,61,68,69*
Poecilia (Limia) tridens	-0.272965363	0	-	0	-	0	*6,13,60,68,69*
Poecilia (Limia) vittata	-0.021040716	0	0	0	0	0	*12,13,60,61,68,69*
Poecilia (Limia) zonata	-0.176303586	1	0	0	1	0	*12,13,60,68,69*
Poecilia (Micropoecilia) branneri	4.459096067	1	-	0	-	1	*12,60*
Poecilia (Micropoecilia) parae	1.908921497	1	1	0	2	1	*6,12,13,35,60,61*
Poecilia (Micropoecilia) picta	-0.242592452	1	1	0	2	0	*6,12,13,14,35,60,61*
Poecilia (Micropoecilia) reticulata	-0.412887101	1	1	0	2	0	*6,12,13,14,35,60,61*
Poecilia (Micropoecilia) wingei	-0.17766414	1	1	0	2	0	*14,35,60*
Poecilia (Mollienesia) caucana	-0.264232709	1	0	0	1	0	*6,35,60,71*
Poecilia (Mollienesia) gilli	-0.228605342	1	0	0	1	0	*60*
Poecilia (Mollienesia) gracilis	-0.236988958	1	-	0	-	-	*60*
Poecilia (Mollienesia) latipinna	0.022251567	1	1	1*	3	0	*12,13,60,71*
Poecilia (Mollienesia) mexicana	-0.469236216	1	1	0	2	0	*12,13,60,71*
Poecilia (Mollienesia) orri	-0.256184423	1	0	0	1	0	*60,71*

Poecilia (Mollienesia) petenensis	0.144543391	1	1	1*	3	0	*13,60,71*
Poecilia (Mollienesia) sphenops	-0.382892686	1	1	1†	3	0	*12,13,14,60,72*
Poecilia (Mollienesia) velifera	-0.391562203	1	1	1*	3	-	*60,71*
Poecilia (Mollienesia) vivipara	-0.392259223	1	1	0	2	0	*35,60*
Poecilia (Pamphorichthys) hollandi	3.245490508	0	0	0	0	0	*6,13,60*
Poecilia (Pamphorichthys) minor	0.489052105	0	-	0	-	0	*13,35,60*
Poecilia (Pamphorichthys) scalpridens	2.806375748	0	-	0	-	0	*13,35*
Poeciliopsis baenschi	0.457424847	0	-	0	-	1	*6,13,60*
Poeciliopsis elongata	4.232656178	0	0	0	0	1	*6,13,60,73*
Poeciliopsis fasciata	-0.210721031	0	-	0	-	1	*6,13,60*
Poeciliopsis gracilis	-0.371063681	0	1	0	0	1	*6,12,13,60*
Poeciliopsis infans	-0.15082289	1	0	0	1	1	*6,13,60*
Poeciliopsis latidens	-0.15082289	1	0	0	1	1	*6,13,60*
Poeciliopsis lucida	0.693147181	1	0	0	1	1	*6,12,13,60*
Poeciliopsis monacha	-0.494296322	1	0	0	1	1	*6,12,13,60*
Poeciliopsis occidentalis	0.113328685	1	1	0	2	1	*6,12,13,60,74*
Poeciliopsis paucimaculata	2.054123734	0	0	0	0	1	*6,73*
Poeciliopsis presidionis	3.068052935	0	0	0	0	1	*6,13,60*
Poeciliopsis prolifica	1.686398954	0	0	0	0	1	*6,13,60*
Poeciliopsis retropinna	4.762173935	0	0	0	0	1	*6,13,60,73*
Poeciliopsis scarlii	-0.139262067	0	0	0	0	1	*6,13,60*
Poeciliopsis turneri	3.723280881	0	0	0	0	1	*6,13,60*
Poeciliopsis turrubarensis	-0.415515444	1	0	0	1	1	*6,13,60,73*
Poeciliopsis viriosa	-0.072570693	0	-	0	-	1	*6,13,60*
Priapella compressa	-0.328504067	0	0	0	0	0	*6,12,60*
Priapella intermedia	-0.510825624	0	-	0	-	0	*6,13*
Priapichthys annectens	-0.562118918	0	0	0	0	0	*6,12,13*
Priapichthys darienensis	-0.478035801	1	-	0	-	1	*13,60*
Scolichthys greenwayi	-0.186329578	0	0	0	0	0	*6,12,60*
Xenodexia ctenolepis	1.217875709	0	0	0	0	1	*6,12,13,60*
Xenophallus umbratilis	-0.356674944	0	0	0	0	0	*6, 60*
Xiphophorus alvarezi	-0.544727175	1	1	1‡	3	0	*12,13,60,75*
Xiphophorus clemenciae	-0.314710745	1	1	1‡	3	0	*12,13,60,75*
Xiphophorus cortezi	-0.400477567	1	1	1‡	3	0	*12,13,60,75*
Xiphophorus couchianus	-0.400477567	0	1	0	1	0	*13,60*
Xiphophorus gordoni	0.19062036	1	1	0	2	0	*12,13,60*
Xiphophorus hellerii	-0.494296322	1	1	1‡	3	0	*12,13,60,75*
Xiphophorus maculatus	-0.168418652	1	0	0	1	0	*12,13,60*
Xiphophorus monticolus	-0.733969175	1	1	1‡	3	0	*60,75,76*
Xiphophorus multilineatus	-0.733969175	1	1	1‡	3	0	*60,75,77,79*
Xiphophorus nezahualcoyotl	-0.673344553	1	1	1‡	3	0	*75*
Xiphophorus nigrensis	-0.342490309	1	1	1‡	3	0	*12,13,60,62,75*
Xiphophorus pygmaeus	-0.261364764	0	0	1‡	1	0	*12,13,60,75,76*
Xiphophorus variatus	-0.248461359	1	1	1‡	3	0	*12,13,60*
Xiphophorus xiphidium	-0.15082289	1	1	0	2	0	*12,75*

Type of male ornament: * Enlarged dorsal fin ('sailfin'); † filamentous extensions on upper maxilla ('moustache'); ‡ extension of ventral part of the caudal fin ('sword').

Additional references: [60] this study; [61] Wischnath (1993) *Altas of livebearers of the World*, T.F.H. Publications, Inc., USA; [62] Crapon de Caprona & Ryan (1990) *Anim. Behav.* 39:290-296;[63] Basolo (2004) *Anim. Behav.* 68:75-82; [64] Johnson & Belk (2001) *Oecologia* 126:142-149; [65] Bussing (1988) *Rev. Biol. Trop.* 36:81-87; [66] Hughes (1985) *Behav. Ecol. Sociobiol.* 17:271-278; [67] Itzkowitz (1971) *Chesapeake Science* 12:219-224; [68] Farr (1984) *Z. Tierpsychol.* 65:152-165; [69] Hamilton (2001) *Mol. Phyl. Evol.* 19:277-289; [70] McPhail (1978) Behav. 64:329-339; [71] Ptacek (2005) *Viviparous fishes*, New Life Publications, Florida; [72] Schlupp (2010) *Behav. Ecol. Sociobiol.* 64:1849–1855; [73] BJA Pollux, AI Furness & C Garita-Alvarado, field observations; [74] Constanz (1975) *Ecology* 56:966–973; [75] Marcus & McCune (1999) *Syst. Biol.* 48:491–522; [76] Franck (1964) *Zool. Jb. Physiol.* 71:117-170; [77] Rios-Cardenas *et al.* (2007) *Anim. Behav.* 74:633-640; [78] Horth (2004) *Florida Scientist* 67:159-165; [79] Rios-Cardenas *et al.* (2007) *Anim. Behav.* 74:633-640; [80] Regus *et al.* (2013) *J. Fish Biol.* 83:144-155.

doi:10.1038/nature13451

Supplementary Table 2 | Taxa, natural log-transformed matrotrophy index (LNMI), number of males (NMAL), number of females (NFEM), relative gonopodium length (PROPGL), $\log_{10}$ transformed male standard length (LG10MSL), $\log_{10}$ transformed male body weight (LG10MBW), $\log_{10}$ transformed female standard length (LG10FSL), $\log_{10}$ transformed female body weight (LG10FBW), size dimorphism index body weight (SDIBW), sexual size dimorphism body weight (SSDBW), size dimorphism index standard length (SDISL) and sexual size dimorphism standard length (SSDSL).

SPECIES (POPULATION)	LNMI	NMAL	NFEM	PROPGL	LG10MSL	LG10MBW	LG10FSL	LG10FBW	SDIBW	SSDBW	SDISL	SSDSL
Alfaro cultratus	-0.5447	17	6	0.2102	1.5600	-0.0441	1.6939	0.2913	1.1647	0.3354	0.3612	0.1339
Belonesox belizanus	-0.3567	11	2	0.2674	1.8815	0.7962	2.0342	1.0853	0.9456	0.2890	0.4215	0.1527
Brachyrhaphis cascajalensis	-0.0834	9	4	0.2750	1.3226	-0.8553	1.4152	-	-	-	0.2378	0.0927
Brachyrhaphis episcopi	-0.1278	4	2	0.3579	1.3376	-0.6909	1.3451	-0.6383	0.1288	0.0526	0.0174	0.0075
Brachyrhaphis holdridgei	-0.4155	10	6	0.3066	1.3704	-0.5482	1.3979	-0.5075	0.0984	0.0407	0.0654	0.0275
Brachyrhaphis parismina	-0.7765	6	0	0.2769	1.3532	-0.6602	-	-	-	-	-	-
Brachyrhaphis rhabdophora	-0.2653	10	0	0.2753	1.3962	-0.4641	-	-	-	-	-	-
Brachyrhaphis roseni	-0.5108	10	6	0.3001	1.3927	-0.4697	1.4519	-0.2869	0.5231	0.1827	0.1460	0.0592
Brachyrhaphis terrabensis	-0.5075	2	6	0.2653	1.4547	-0.1583	1.4080	-0.3016	-0.3909	-0.1433	-0.1135	-0.0467
Carlhubbsia stuarti	-0.1393	6	11	0.2979	1.6198	0.3006	1.6727	0.5118	0.6266	0.2113	0.1296	0.0529
Cnesterodon decemmaculatus	-0.2169	16	12	0.3498	1.2970	-0.9656	1.3311	-0.5754	1.4557	0.3902	0.0816	0.0341
Cnesterodon hypselurus	-0.4684	1	5	0.3120	1.4143	-0.5834	1.4498	-0.3204	0.8322	0.2630	0.0853	0.0355
Gambusia affinis	-0.4764	10	6	0.3120	1.2305	-1.0672	1.3560	-0.5578	2.2315	0.5094	0.3352	0.1256
Gambusia holbrooki	-0.4416	2	5	0.2577	1.4151	-	1.6576	-	-	-	0.7480	0.2426
Gambusia manni	-0.2877	6	3	0.2890	1.4135	-	1.4782	-	-	-	0.1605	0.0647
Gambusia punctata	-0.2877	9	9	0.2850	1.5038	-	1.5200	-	-	-	0.0381	0.0162
Girardinus metallicus	-0.3285	16	12	0.3826	1.3568	-0.3111	1.5228	-0.0275	0.9217	0.2837	0.4655	0.1660
Heterandria bimaculata	-0.1985	10	6	0.3142	1.5358	-0.0215	1.6369	0.3206	1.1988	0.3422	0.2622	0.1011
Heterandria formosa (DNR1)	3.5553	6	6	0.3375	1.1824	-1.2403	1.3211	-0.7439	2.1362	0.4964	0.3763	0.1387
Heterandria formosa (DNR2)	3.5553	10	2	0.3778	1.1497	-1.3063	1.3643	-0.4881	5.5789	0.8182	0.6388	0.2145
Neoheterandria cana	-0.4308	10	6	0.3696	1.2687	-0.8398	1.3246	-0.4808	1.2856	0.3590	0.1372	0.0558
Neoheterandria elegans	-0.2231	6	6	0.3283	1.1131	-1.3420	1.2816	-0.5983	4.5421	0.7437	0.4740	0.1685
Neoheterandria tridentiger	-0.4620	7	4	0.3486	1.2810	-0.7765	1.5259	0.1791	8.0295	0.9557	0.7575	0.2449
Phallichthys amates	-0.6162	10	6	0.4027	1.5098	0.0622	1.6056	0.4225	1.2920	0.3602	0.2467	0.0957
Phallichthys tico	-0.6733	3	6	0.3875	1.2697	-0.7520	1.2362	-0.8905	-0.3756	-0.1385	-0.0801	-0.0335
Phalloceros caudimaculatus	0.7608	9	12	0.4153	1.3709	-0.6063	1.4680	-0.0883	2.2962	0.5180	0.2504	0.0971
Phalloptychus januarius	3.1246	16	6	0.4460	1.2760	-0.9631	1.4058	-0.4641	2.1550	0.4990	0.3483	0.1298
Poecilia (Limia) caymanensis	-0.4479	16	5	0.2544	1.4454	-0.1882	1.6155	0.2581	1.7946	0.4463	0.4797	0.1702
Poecilia (Limia) heterandria	-0.3453	16	6	0.2677	1.3169	-0.7073	1.3411	-0.5638	0.3915	0.1435	0.0573	0.0242
Poecilia (Limia) melanogaster	-0.4005	16	6	0.2100	1.4600	-0.2690	1.5135	-0.0824	0.5368	0.1866	0.1309	0.0534
Poecilia (Limia) nigrofasciata	-0.1997	1	1	0.1932	1.6198	-	1.6772	-	-	-	0.1411	0.0573
Poecilia (Limia) sulphurophila	-0.4557	1	1	0.2396	1.4121	-0.3152	1.4464	-0.2890	0.0620	0.0261	0.0821	0.0343
Poecilia (Limia) tridens	-0.2731	16	6	0.2324	1.5024	-0.1424	1.5138	-0.1277	0.0343	0.0147	0.0266	0.0114
Poecilia (Limia) vittata	-0.0212	16	5	0.2988	1.3125	-0.5877	1.3386	-0.4490	0.3763	0.1387	0.0619	0.0261
Poecilia (Micropoecilia) bifurca	4.0083	6	6	0.2711	1.1106	-1.2123	1.3178	-0.7301	2.0353	0.4822	0.6112	0.2072
Poecilia (Micropoecilia) branneri	4.4591	16	6	0.2490	1.1814	-1.1337	1.4125	-0.3897	4.5465	0.7440	0.7026	0.2311
Poecilia (Micropoecilia) obscura	-0.4125	16	12	0.2410	1.2093	-0.9508	1.3835	-0.3725	2.7872	0.5783	0.4937	0.1742
Poecilia (Micropoecilia) parae	1.9089	2	6	0.3232	1.1826	-1.0066	1.4234	-0.4692	2.4467	0.5374	0.7410	0.2408
Poecilia (Micropoecilia) picta (FB)	-0.2421	16	6	0.2433	1.2898	-0.6892	1.3106	-0.6367	0.1284	0.0525	0.0490	0.0208
Poecilia (Micropoecilia) picta (Mausica pool)	-0.2421	6	6	0.2391	1.2973	-0.7492	1.4162	-0.3203	1.6848	0.4289	0.3149	0.1189
Poecilia (Micropoecilia) picta (Rio la Ceiba)	-0.2421	6	6	0.2124	1.3443	-0.6153	1.4678	-0.1834	1.7031	0.4319	0.3289	0.1235
Poecilia (Micropoecilia) reticulata	-0.4125	10	6	0.2495	1.1987	-1.0191	1.3077	-0.6546	1.3145	0.3645	0.2854	0.1090
Poecilia (Micropoecilia) sarrafae	3.7773	10	2	0.2813	1.1498	-1.1273	1.5053	-0.3773	4.6233	0.7500	1.2672	0.3555
Poecilia (Micropoecilia) wingei	-0.1779	16	12	0.2382	1.1844	-1.0842	1.3303	-0.6645	1.6282	0.4197	0.3993	0.1459
Poecilia (Mollienesia) caucana	-0.2640	9	6	0.2158	1.4692	-0.1763	1.5479	0.1118	0.9412	0.2881	0.1986	0.0787
Poecilia (Mollienesia) gilli	-0.2282	8	6	0.2404	1.4637	-0.1848	1.5746	0.1787	1.3098	0.3636	0.2909	0.1109
Poecilia (Mollienesia) gracilis	-0.2370	16	6	0.1960	1.6949	0.4620	1.7088	0.5084	0.1128	0.0464	0.0325	0.0139
Poecilia (Mollienesia) latipinna	0.0227	14	6	0.2312	1.5447	0.0990	1.6569	0.5479	1.8111	0.4489	0.2945	0.1121
Poecilia (Mollienesia) mexicana	-0.4700	10	6	0.2213	1.5362	-0.0223	1.6266	0.2905	1.0549	0.3128	0.2312	0.0903
Poecilia (Mollienesia) salvatoris	-0.3161	7	4	0.2096	1.5928	0.0173	1.6726	-	-	-	0.2016	0.0798
Poecilia (Mollienesia) sphenops	-0.3827	7	6	0.1863	1.5840	0.1814	1.5800	0.2082	0.0637	0.0268	-0.0093	-0.0040
Poecilia (Mollienesia) velifera	-0.3916	7	8	0.1758	1.7162	-	1.7164	-	-	-	0.0004	0.0002
Poecilia (Mollienesia) vivipara	-0.3916	15	5	0.1741	1.5251	0.0601	1.7284	0.6230	2.6546	0.5628	0.5971	0.2033
Poecilia (Pamphorichthys) araguaiensis	2.7748	3	6	0.3945	1.2198	-1.1098	1.3072	-0.7760	1.1567	0.3338	0.2228	0.0874
Poecilia (Pamphorichthys) hasemani	3.9545	4	6	0.4472	1.0848	-1.6021	1.2368	-0.9031	4.0000	0.6990	0.4192	0.1520
Poecilia (Pamphorichthys) hollandi (Magu River)	3.2455	11	12	0.2941	1.1527	-1.3098	1.3162	-0.6687	3.3759	0.6411	0.4572	0.1635

Poecilia (Pamphorichthys) hollandi (Utinga River)	3.2455	5	5	0.2995	1.1343	-1.3298	1.3119	-0.6260	4.0556	0.7038	0.5051	0.1776
Poecilia (Pamphorichthys) minor	0.4892	10	4	0.3664	1.1373	-1.4510	1.1808	-1.2577	0.5607	0.1933	0.1053	0.0435
Poeciliopsis baenschi	0.4574	7	6	0.4044	1.3621	-0.5838	1.5754	0.0856	3.6718	0.6695	0.6342	0.2133
Poeciliopsis elongata (DNR)	4.2327	10	6	0.3883	1.5994	0.2200	1.8001	-	-	-	0.5874	0.2007
Poeciliopsis elongata (Panam Vieja)	4.2327	2	8	0.4250	1.6770	0.3676	1.9476	1.1764	5.4384	0.8088	0.8646	0.2706
Poeciliopsis fasciata	-0.2107	10	6	0.4052	1.2918	-0.8514	1.4499	-0.3089	2.4872	0.5425	0.4392	0.1581
Poeciliopsis gracilis	-0.3711	16	6	0.3774	1.3582	-0.5032	1.4913	-0.1531	1.2392	0.3501	0.3586	0.1331
Poeciliopsis infans	-0.1508	4	6	0.2982	1.4018	-0.6126	1.6505	0.2208	5.8149	0.8335	0.7729	0.2487
Poeciliopsis latidens (El Palillo)	-0.1508	7	0	0.4442	1.2998	-0.8272	-	-	-	-	-	-
Poeciliopsis latidens (Rio Moccorito)	-0.1508	6	6	0.4490	1.3158	-0.7293	1.4103	-0.3640	1.3190	0.3653	0.2431	0.0945
Poeciliopsis lucida	0.6931	2	4	0.4466	1.3467	-0.6936	1.4484	-0.2941	1.5086	0.3994	0.2637	0.1017
Poeciliopsis monacha	-0.4943	15	6	0.3592	1.2969	-0.7391	1.5435	0.1282	6.3675	0.8673	0.7644	0.2466
Poeciliopsis occidentalis (Aguajito Canyon)	0.1133	10	0	0.3833	1.3167	-0.7479	-	-	-	-	-	-
Poeciliopsis occidentalis (DNR)	0.1133	6	6	0.3920	1.2629	-1.0007	1.4875	-0.2104	5.1703	0.7903	0.6772	0.2246
Poeciliopsis paucimaculata	2.0541	5	9	0.4376	1.4491	-0.3237	1.6320	0.3068	3.2703	0.6305	0.5237	0.1829
Poeciliopsis presidionis (DNR)	3.0681	6	6	0.4201	1.6025	-0.0047	1.6575	0.1854	0.5493	0.1901	0.1351	0.0550
Poeciliopsis presidionis (Rio Moccorito)	3.0681	10	6	0.4010	1.5139	-0.1424	1.7740	0.7306	6.4633	0.8729	0.8198	0.2600
Poeciliopsis prolifica (Rio Mocorito)	1.6864	10	0	0.4085	1.2266	-1.0794	-	-	-	-	-	-
Poeciliopsis prolifica (Rio Presidio)	1.6864	6	6	0.3710	1.2239	-1.2304	1.4714	-0.2980	7.5581	0.9324	0.7679	0.2475
Poeciliopsis retropinna (DNR)	4.7622	10	0	0.3689	1.5585	-0.0020	-	-	-	-	-	-
Poeciliopsis retropinna (Rio Ceibo)	4.7622	9	9	0.4031	1.5869	0.0697	1.7329	0.5172	1.8027	0.4476	0.3999	0.1461
Poeciliopsis scarlii (Rio Tomatlon)	-0.1393	10	0	0.3663	1.3976	-0.5519	-	-	-	-	-	-
Poeciliopsis scarlii (Rio San Blas)	-0.1393	9	6	0.3479	1.4375	-0.4438	1.7023	0.4092	6.1291	0.8530	0.8400	0.2648
Poeciliopsis turneri	3.7233	16	12	0.3828	1.3734	-0.5590	1.5729	0.1702	4.3608	0.7292	0.5833	0.1996
Poeciliopsis turrubarensis (Rio Abrojo)	-0.4155	10	6	0.3797	1.3987	-0.5217	1.6147	0.2319	4.6704	0.7536	0.6441	0.2159
Poeciliopsis turrubarensis (Rio la Plata)	-0.4155	1	0	0.3720	1.4921	-0.1838	-	-	-	-	-	-
Poeciliopsis viriosa	-0.0726	5	3	0.3747	1.3956	-0.3971	1.6431	0.3905	5.1319	0.7876	0.7681	0.2475
Priapella chamulae	-0.5108	7	6	0.2697	1.4962	-0.1222	1.6742	0.4536	2.7657	0.5758	0.5067	0.1780
Priapella compressa (DNR)	-0.3285	7	6	0.2924	1.5185	-0.0114	1.6815	0.5138	2.3518	0.5253	0.4556	0.1631
Priapella compressa (Rio Tacotalpa)	-0.3285	4	8	0.3249	1.3485	-0.6846	1.3724	-0.5402	0.3942	0.1443	0.0565	0.0239
Priapella compressa (Rio Usumacinta)	-0.3285	3	7	0.2670	1.5131	-0.1094	1.5689	0.1932	1.0070	0.3026	0.1370	0.0558
Priapichthys annectens	-0.5621	10	6	0.4426	1.4125	-0.3161	1.4572	-0.1467	0.4772	0.1694	0.1084	0.0447
Priapichthys darienensis	-0.4780	10	6	0.3333	1.2996	-0.9194	1.4387	-	-	-	0.3775	0.1391
Pseudopoecilia festae	-0.2744	10	6	0.3544	1.1916	-1.2526	1.2486	-0.9865	0.8456	0.2661	0.1402	0.0570
Scolichthys greenwayi	-0.1863	10	12	0.3623	1.3673	-0.7788	1.5291	-0.2627	2.2823	0.5162	0.4512	0.1617
Scolichthys iota	-0.3425	10	10	0.3691	1.2567	-1.0434	1.2984	-0.8996	0.3923	0.1437	0.1007	0.0417
Xenodexia ctenolepis	1.2179	2	4	0.4313	1.6077	0.0286	1.7527	0.5454	2.2872	0.5168	0.3963	0.1450
Xenophallus umbratilis	-0.3567	6	6	0.3281	1.3726	-0.6514	1.4710	-0.3140	1.1748	0.3374	0.2543	0.0984
Xiphophorus alvarezi	-0.5447	7	6	0.1980	1.5724	0.1741	1.5501	0.0735	-0.2606	-0.1006	-0.0527	-0.0223
Xiphophorus clemenciae	-0.3147	4	4	0.2160	1.4727	-0.2330	1.5423	0.1649	1.5002	0.3980	0.1738	0.0696
Xiphophorus cortezi	-0.4005	6	2	0.1648	1.5837	0.2147	1.6035	0.3003	0.2177	0.0856	0.0466	0.0198
Xiphophorus couchianus	-0.4005	5	10	0.2024	1.3984	-	1.4162	-	-	-	0.0418	0.0178
Xiphophorus hellerii	-0.4943	10	5	0.2097	1.6009	0.1945	1.6230	0.3221	0.3418	0.1277	0.0522	0.0221
Xiphophorus maculatus	-0.1684	3	3	0.1593	1.5624	-	1.5673	-	-	-	0.0114	0.0049
Xiphophorus monticolus	-0.7340	3	2	0.1907	1.4566	-0.2973	1.4951	-0.1278	0.4772	0.1694	0.0928	0.0386
Xiphophorus multilineatus	-0.7340	3	1	0.1400	1.6396	0.3259	1.6593	0.3512	0.0600	0.0253	0.0465	0.0197
Xiphophorus nezahualcoyotl	-0.6733	12	6	0.1800	1.5450	0.0187	1.5348	-0.0785	-0.2507	-0.0972	-0.0237	-0.0102
Xiphophorus nigrensis	-0.3425	9	5	0.1807	1.5605	0.0956	1.5680	0.1337	0.0917	0.0381	0.0175	0.0075
Xiphophorus pygmaeus	-0.2614	5	6	0.1826	1.4347	-0.4056	1.5096	-0.1074	0.9869	0.2982	0.1880	0.0748
Xiphophorus variatus	-0.2485	6	6	0.1714	1.4747	-0.1595	1.4653	-0.2031	-0.1056	-0.0436	-0.0219	-0.0094
Xiphophorus xiphidium	-0.1508	8	8	0.1871	1.4821	-	1.4810	-	-	-	-0.0024	-0.0010

doi:10.1038/nature13451

Supplementary Table 3 | Taxon sampling and Genbank accession numbers.

Table **: Taxon sampling and GenBank accession numbers. X = New to this study (KJ696781-KJ697673); NA = Not present. GenBank taxonomy does not follow the taxonomy of the genus *Poecilia* as used in this paper. Specifically, *Limia*, *Micropoecilia*, and *Pamphorichthys* are recognized as full genera in GenBank, whereas we recognize each of these taxa as subgenera of *Poecilia*[42]. Thus, GenBank nomenclature for *Poecilia* (*Limia*) is *Limia*; *Poecilia* (*Micropoecilia*) is *Micropoecilia*; *Poecilia* (*Pamphorichthys*) is *Pamphorichthys*.

RNAs

Higher Level	**Species**	**12S**	**tRNA Val**	**16S 5 prime end**	**16S 3' End**	**tRNA Leu**
Anablepidae	*Anableps anableps*	NA	NA	NA	NA	NA
Anablepidae	*Anableps dowei*	NA	NA	NA	NA	NA
Anablepidae	*Jenynsia lineata*	NA	NA	NA	NA	NA
Anablepidae	*Jenynsia multidentata*	NA	NA	NA	NA	NA
Anablepidae	*Oxyzygonectes dovii*	NA	NA	NA	NA	NA
Aphredoderidae	*Aphredoderus sayanus*	NC 004372	NC 004372	NC 004372	NC 004372	NC 004372
Aplocheilidae	*Fenerbahce formosus*	NA	NA	NA	NA	NA
Aplocheilidae	*Aphyoplatys duboisi*	NA	NA	NA	NA	NA
Aplocheilidae	*Aphyosemion bitaeniatum*	NA	NA	NA	NA	NA
Aplocheilidae	*Aplocheilus lineatus*	NA	NA	NA	NA	NA
Aplocheilidae	*Epiplatys annulatus*	NA	NA	NA	NA	NA
Aplocheilidae	*Fundulopanchax*	NA	NA	NA	NA	NA
Argentiniformes	*Argentina*	AY430258 *Argentina sialis*	NA	NA	NA	NA
Atheriniformes	Atheriniformes	NC 011174 *Menidia menidia*	NA	NA	NC 011174 *Menidia menidia*	NC 011174 *Menidia menidia*
Aulopiformes	*Synodus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*
Batrachoidiformes	*Porichthys*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*
Beloniformes	*Oryzias latipes*	AP008948	AP008948	AP008948	AP008948	AP008948
Beryciformes	Beryciformes	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*
Characiformes	Characiformes	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*
Cichlidae	Cichlasomatinae	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*
Cichlidae	*Oreochromis*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*
Clupeidae	*Dorosoma cepedianum*	DQ536426	DQ536426	DQ536426	DQ536426	DQ536426
Cypriniformes	*Danio rerio*	NC 002333	NC 002333	NC 002333	NC 002333	NC 002333
Cypriniformes	*Notemigonus crysoleucas*	AB127393	AB127393	AB127393	AB127393	AB127393
Cypriniformes	*Semotilus atromaculatus*	AF023199 *Semotilus atromaculatus*	AF023199 *Semotilus atromaculatus*	AF023199 *Semotilus atromaculatus*	AF023199 *Semotilus atromaculatus*	NA
Cyprinodontidae	*Cubanichthys cubensis*	NA	NA	NA	NA	NA
Cyprinodontidae	*Cubanichthys pengelleyi*	NA	NA	NA	NA	NA

Cyprinodontidae	*Cyprinodon variegatus*	NA	NA	NA	NA	NA
Cyprinodontidae	*Floridichthys carpio*	NA	NA	NA	NA	NA
Cyprinodontidae	*Jordanella floridae*	NA	NA	NA	NA	NA
Cyprinodontidae	*Orestias*	NA	NA	NA	NA	NA
Esociformes	*Esox lucius*	NC 004593	NC 004593	NC 004593	NC 004593	NC 004593
Fundulidae	*Fundulus cingulatus*	NA	NA	NA	NA	NA
Fundulidae	*Fundulus lineolatus*	NA	NA	NA	NA	NA
Fundulidae	*Lucania goodei*	NA	NA	NA	NA	NA
Fundulidae	*Lucania parva*	NA	NA	NA	NA	NA
Gadidae	*Gadus morhua*	NC 002081	NC 002081	NC 002081	NC 002081	NC 002081
Gasterosteiformes	*Gasterosteus aculeatus*	NC 003174	NC 003174	NC 003174	NC 003174	NC 003174
Gonorynchiformes	*Chanos chanos*	NC 004693	NC 004693	NC 004693	NC 004693	NC 004693
Goodeidae	*Allodontichthys hubbsi*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys polylepis*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys tamazulae*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys zonistius*	NA	NA	NA	NA	NA
Goodeidae	*Alloophorus robustus*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca catarinae*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca diazi*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca dugesii*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca goslinei*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca maculata*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca meeki*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca regalis*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	NA	NA	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	NA	NA	NA	NA
Goodeidae	*Ameca splendens*	NA	NA	NA	NA	NA
Goodeidae	*Ataeniobius toweri*	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys encaustus*	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys pardalis*	NA	NA	NA	NA	NA
Goodeidae	*Characodon audax*	NA	NA	NA	NA	NA
Goodeidae	*Characodon lateralis*	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys baileyi*	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys nevadae*	NA	NA	NA	NA	NA
Goodeidae	*Empetrichthys latos*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys viviparus*	NA	NA	NA	NA	NA
Goodeidae	*Goodea atripinnis*	NA	NA	NA	NA	NA
Goodeidae	*Goodea gracilis*	NA	NA	NA	NA	NA
Goodeidae	*Hubbsina turneri*	NA	NA	NA	NA	NA

Goodeidae	*Ilyodon amecae*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon furcidens*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon whitei*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon xantusi*	NA	NA	NA	NA	NA
Goodeidae	*Neotoca bilineata*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus labialis*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus punctatus*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia bilineatus*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia francesae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia lermae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia multipunctata*	NA	NA	NA	NA	NA
Goodeidae	*Xenoophorus captivus*	NA	NA	NA	NA	NA
Goodeidae	*Xenotaenia resolanae*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca eiseni*	NC 011381	NC 011381	NC 011381	NC 011381	NC 011381
Goodeidae	*Xenotoca melanosoma*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca variatus*	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus tequila*	NA	NA	NA	NA	NA
Gymnotiformes	Gymnotiformes	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*
Lampriformes	Lampriformes	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*
Lophiiformes	*Lophius*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*
Lutjanidae	*Lutjanus*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*
Macrouridae	Macrouridae	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*	NA
Moronidae	*Morone*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*
Mugiliformes	*Mugil*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*
Myctophiformes	Myctophiformes	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*
Ophidiiformes	Ophidiiformes	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*
Osmeriformes	Osmeriformes	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*
Pleuronectiformes	Pleuronectiformes	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*
Poeciliidae	*Alfaro cultratus*	EF017480	EF017480	EF017480	EF017580	EF017580
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA	NA

Poeciliidae	*Aplocheilichthys normani*	NA	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys spilauchen*	NA	NA	NA	NA	NA
Poeciliidae	*Belonesox belizanus*	EF017467	EF017467	EF017467	NA	NA
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	EF017469	EF017469	EF017469	EF017571	EF017571
Poeciliidae	*Brachyrhaphis holdridgei*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis rhabdophora*	EF017470	EF017470	EF017470	EF017572	EF017572
Poeciliidae	*Brachyrhaphis roseni*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	EF017468	EF017468	EF017468	EF017570	EF017570
Poeciliidae	*Carlhubbsia kidderi*	NA	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	EF017481	EF017481	EF017481	EF017581	EF017581
Poeciliidae	*Cnesterodon decemmaculatus*	EF017478	EF017478	EF017478	EF017579	EF017579
Poeciliidae	*Cnesterodon hypselurus*	NA	NA	NA	NA	NA
Poeciliidae	*Cnesterodon septentrionalis*	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus denticulatus*	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus ramsdeni*	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	NA	NA	NA	NA
Poeciliidae	*Fluviphylax pygmaeus*	EF017459	EF017459	EF017459	EF017561	EF017561
Poeciliidae	*Fluviphylax simplex*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia affinis*	AP004422	AP004422	AP004422	AP004422	EF017564
Poeciliidae	*Gambusia atrora*	NA	NA	NA	EF017565	EF017565
Poeciliidae	*Gambusia caymanensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia holbrooki*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hubbsi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hurtadoi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia luma*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia manni*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia marshi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia panuco*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia punctata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia puncticulata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia rhizophorae*	NA	NA	NA	NA	NA

Poeciliidae	*Gambusia sexradiata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia vittata*	EF017466	EF017466	EF017466	EF017568	EF017568
Poeciliidae	*Gambusia wrayi*	EF017464	EF017464	EF017464	EF017566	EF017566
Poeciliidae	*Gambusia yucatana*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus creolus*	EF017494	EF017494	EF017494	EF017594	EF017594
Poeciliidae	*Girardinus metallicus*	EF017493	EF017493	EF017493	EF017593	EF017593
Poeciliidae	*Girardinus microdactylus*	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus rivasi*	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus* sp. GMIC19	NA	NA	NA	NA	NA
Poeciliidae	*Glaridichthys falcatus*	NA	NA	NA	NA	NA
Poeciliidae	*Glaridichthys uninotatus*	NA	NA	NA	NA	NA
Poeciliidae	*Heterandria bimaculata*	EF017471	EF017471	EF017471	EF017573	EF017573
Poeciliidae	*Heterandria formosa*	EF017473	EF017473	EF017473	EF017575	EF017575
Poeciliidae	*Heterandria jonesi*	EF017472	EF017472	EF017472	EF017574	EF017574
Poeciliidae	*Heterophallus milleri*	EF017465	EF017465	EF017465	EF017567	EF017567
Poeciliidae	*Heterophallus rachovii*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia caymanensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia dominicensis*	EF017482	EF017482	EF017482	EF017582	EF017582
Poeciliidae	*Poecilia Limia garnieri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia grossidens*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pseudolimia heterandria*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia melanogaster*	EF017483	EF017483	EF017483	EF017583	EF017583
Poeciliidae	*Poecilia Limia melanonotata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia nigrofasciata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia pauciradiata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia perugiae*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia rivasi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia sulfurophila*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia tridens*	EF017484	EF017484	EF017484	EF017584	EF017584
Poeciliidae	*Poecilia Limia versicolor*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia vittata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia zonata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia bifurca*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia branneri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	NA	NA	NA	NA	NA

Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus reticulata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia sarrafae*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	NA	NA	NA	NA	NA
Poeciliidae	*Neoheterandria cana*	NA	NA	NA	NA	NA
Poeciliidae	*Neoheterandria elegans*	EF017476	EF017476	EF017476	NA	NA
Poeciliidae	*Neoheterandria tridentiger*	EF017474	EF017474	EF017474	EF017576	EF017576
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hasemani*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hollandi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys minor*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys amates*	EF017461	EF017461	EF017461	EF017563	EF017563
Poeciliidae	*Phallichthys pittieri*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys quadripunctatus*	DQ386547	NA	NA	NA	NA
Poeciliidae	*Phallichthys tico*	EF017460	EF017460	EF017460	EF017562	EF017562
Poeciliidae	*Phalloceros caudimaculatus*	EF017477	EF017477	EF017477	EF017578	EF017578
Poeciliidae	*Phalloptychus januarius*	EF017479	EF017479	EF017479	NA	NA
Poeciliidae	*Poecilia Mollienesia butleri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia caucana*	EF017489	EF017489	EF017489	EF017589	EF017589
Poeciliidae	*Poecilia Mollienesia chica*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gilli*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gracilis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipinna*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipunctata*	EF017488	EF017488	EF017488	EF017588	EF017588
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia orri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia petenensis*	NA	NA	NA	NA	NA

	Campeche					
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia salvatoris*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sphenops*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia velifera*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis baenschi*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis balsas*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis catemaco*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis elongata*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis fasciata*	EF017495	EF017495	EF017495	EF017595	EF017595
Poeciliidae	*Poeciliopsis gracilis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis hnilickai*	EF017496	EF017496	EF017496	EF017596	EF017596
Poeciliidae	*Poeciliopsis infans*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis latidens*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis lucida*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis monacha*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis occidentalis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis paucimaculata*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis pleurospilus*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis prolifica*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis retropinna*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis scarlii*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis sonoriensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turneri*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turrubarensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis viriosa*	NA	NA	NA	NA	NA
Poeciliidae	*Priapella chamulae*	NA	NA	NA	NA	NA
Poeciliidae	*Priapella compressa*	EF017503	NA	NA	EF017603	EF017603
Poeciliidae	*Priapella intermedia*	EF017502	EF017502	EF017502	EF017602	EF017602
Poeciliidae	*Priapella olmecae*	EF017504	EF017504	EF017504	EF017604	EF017604
Poeciliidae	*Priapichthys annectens*	EF017491	EF017491	EF017491	EF017591	EF017591
Poeciliidae	*Priapichthys darienensis*	NA	NA	NA	NA	NA
Poeciliidae	*Priapichthys panamensis*	DQ386543	NA	NA	NA	NA
Poeciliidae	*Priapichthys puetzi*	DQ386544	NA	NA	NA	NA
Poeciliidae	*Pseudopoecilia festae*	EF017492	EF017492	EF017492	EF017592	EF017592

Poeciliidae	*Quintana atrizona*	EF017505	EF017505	EF017505	EF017605	EF017605
Poeciliidae	*Scolichthys greenwayi*	EF017490	EF017490	EF017490	EF017590	EF017590
Poeciliidae	*Scolichthys iota*	NA	NA	NA	NA	NA
Poeciliidae	*Tomeurus gracilis*	EF017507	EF017507	EF017507	EF017607	EF017607
Poeciliidae	*Xenodexia ctenolepis*	EF017506	EF017506	EF017506	EF017606	EF017606
Poeciliidae	*Xenophallus umbratilis*	EF017475	EF017475	EF017475	EF017577	EF017577
Poeciliidae	*Xiphophorus alvarezi*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus andersi*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus birchmanni*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus clemenciae*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus continens*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus cortezi*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus couchianus*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus evelynae*	EF017499	EF017499	EF017499	EF017599	EF017599
Poeciliidae	*Xiphophorus gordoni*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus hellerii*	FJ234985	FJ234985	FJ234985	FJ234985	EF017597
Poeciliidae	*Xiphophorus maculatus*	AP005982	AP005982	AP005982	AP005982	AP005982
Poeciliidae	*Xiphophorus malinche*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus mayae*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus meyeri*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus milleri*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus mixei*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus monticolus*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus multilineatus*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus nezahualcoyotl*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus nigrensis*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus pygmaeus*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus signum*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus variatus*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus xiphidium*	EF017498	EF017498	EF017498	EF017598	EF017598
Polymixiidae	*Polymixia*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*
Pristigasteridae	*Chirocentrus dorab*	NC 006913	NC 006913	NC 006913	NC 006913	NC 006913
Pristigasteridae	*Pellona*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*
Rivulidae	*Rivulus hartii*	NA	NA	NA	NA	NA
Salmoniformes	*Oncorhynchus mykiss*	NC 001717	NC 001717	NC 001717	NC 001717	NC 001717
Scorpaeniformes	Scorpaeniformes	EU008930 *Sebastes ruberrimus*	EU008930 *Sebastes ruberrimus*	EU008930 *Sebastes ruberrimus*	NA	NA

Siluriformes	*Ictalurus punctatus*	NC 003489	NC 003489	NC 003489	NC 003489	NC 003489
Stomiiformes	*Stomiiformes*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*
Synbranchiformes	*Monopterus albus*	NC 003192	NC 003192	NC 003192	NC 003192	NC 003192
Tetraodontidae	*Takifugu rubripes*	NC 004299	NC 004299	NC 004299	NC 004299	NC 004299
Tetraodontidae	*Tetraodon nigroviridis*	NC 007176	NC 007176	NC 007176	NC 007176	NC 007176
Valenciidae	*Valencia hispanica*	NA	NA	NA	NA	NA
Zeidae	*Zeus faber*	NC 003190	NC 003190	NC 003190	NC 003190	NC 003190
Zoarcoidea	*Lycodes*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*

Mitochondrial Protein Coding Genes

Family	Species	COI	Cytb	ND1	ND2
Anablepidae	*Anableps anableps*	NA	X	NA	EF017558
Anablepidae	*Anableps dowei*	NA	NA	NA	X
Anablepidae	*Jenynsia lineata*	NA	X	NA	X
Anablepidae	*Jenynsia multidentata*	NA	X	NA	X
Anablepidae	*Oxyzygonectes dovii*	NA	EF017510	NA	EF017560
Aphredoderidae	*Aphredoderus sayanus*	NC 004372	NC 004372	NC 004372	NC 004372
Aplocheilidae	*Fenerbahce formosus*	NA	X	NA	NA
Aplocheilidae	*Aphyoplatys duboisi*	NA	X	NA	X
Aplocheilidae	*Aphyosemion bitaeniatum*	NA	X	NA	X
Aplocheilidae	*Aplocheilus lineatus*	NA	X	NA	X
Aplocheilidae	*Epiplatys annulatus*	NA	X	NA	X
Aplocheilidae	*Fundulopanchax*	NA	DQ981782 *Fundulopanchax sjostedti*	NA	X *Fundulopanchax gardneri*
Argentiniformes	*Argentina*	FJ918913 *Argentina striata*	FJ918913 *Argentina striata*	NA	NA
Atheriniformes	Atheriniformes	NC 011174 *Menidia menidia*	NC 011174 *Menidia menidia*	NC 011174 *Menidia menidia*	NC 011174 *Menidia menidia*
Aulopiformes	*Synodus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*	NC 007228 *Synodus variegatus*
Batrachoidiformes	*Porichthys*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*	NC_006920 *Porichthys myriaster*
Beloniformes	*Oryzias latipes*	AP008948	AP008948	AP008948	AP008948
Beryciformes	Beryciformes	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*	AP002940 *Myripristis berndti*
Characiformes	Characiformes	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*	NC 015840 *Pygocentrus nattereri*
Cichlidae	Cichlasomatinae	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*	NC 011168 *Hypselecara temporalis*
Cichlidae	*Oreochromis*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*	GU477628 *Oreochromis niloticus*
Clupeidae	*Dorosoma cepedianum*	DQ536426	DQ536426	DQ536426	DQ536426
Cypriniformes	*Danio rerio*	NC 002333	NC 002333	NC 002333	NC 002333
Cypriniformes	*Notemigonus crysoleucas*	AB127393	AB127393	AB127393	AB127393

Cypriniformes	*Semotilus atromaculatus*	JN028410	HQ446761	NA	NA
Cyprinodontidae	*Cubanichthys cubensis*	NA	X	NA	X
Cyprinodontidae	*Cubanichthys pengelleyi*	NA	X	NA	X
Cyprinodontidae	*Cyprinodon variegatus*	NA	X	NA	AF449344
Cyprinodontidae	*Floridichthys carpio*	NA	X	NA	X
Cyprinodontidae	*Jordanella floridae*	NA	AY902050	NA	X
Cyprinodontidae	*Orestias*	NA	AY155565 *Orestias silustani*	NA	X *Orestias agassizii*
Esociformes	*Esox lucius*	NC 004593	NC 004593	NC 004593	NC 004593
Fundulidae	*Fundulus cingulatus*	NA	X	NA	X
Fundulidae	*Fundulus lineolatus*	NA	X	NA	X
Fundulidae	*Lucania goodei*	NA	X	NA	X
Fundulidae	*Lucania parva*	NA	X	NA	NA
Gadidae	*Gadus morhua*	NC 002081	NC 002081	NC 002081	NC 002081
Gasterosteiformes	*Gasterosteus aculeatus*	NC 003174	NC 003174	NC 003174	NC 003174
Gonorynchiformes	*Chanos chanos*	NC 004693	NC 004693	NC 004693	NC 004693
Goodeidae	*Allodontichthys hubbsi*	AY356553	AF510835	NA	NA
Goodeidae	*Allodontichthys polylepis*	AY356555	AF510839	NA	NA
Goodeidae	*Allodontichthys tamazulae*	AY356556	AF510837	NA	NA
Goodeidae	*Allodontichthys zonistius*	AY356558	AF510840	NA	NA
Goodeidae	*Alloophorus robustus*	AY356561	AF510811	NA	NA
Goodeidae	*Allotoca catarinae*	AY356562	AF510792	NA	NA
Goodeidae	*Allotoca diazi*	AY356554	AF510790	NA	NA
Goodeidae	*Allotoca dugesii*	AY356557	AF510801	NA	NA
Goodeidae	*Allotoca goslinei*	AY356559	AF510800	NA	NA
Goodeidae	*Allotoca maculata*	AY356560	AF510797	NA	NA
Goodeidae	*Allotoca meeki*	NA	AF510791	NA	NA
Goodeidae	*Allotoca regalis*	AY356563	AF510798	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	AF510796	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	AF510789	NA	NA
Goodeidae	*Ameca splendens*	AY356564	X	NA	X
Goodeidae	*Ataeniobius toweri*	AY356566	X	NA	X
Goodeidae	*Chapalichthys encaustus*	AY356570	AF510814	NA	NA
Goodeidae	*Chapalichthys pardalis*	AY356567	X	NA	X
Goodeidae	*Characodon audax*	AY356568	AF510824	NA	NA
Goodeidae	*Characodon lateralis*	AY356569	AF510820	NA	NA
Goodeidae	*Crenichthys baileyi*	AY356571	AF510819	NA	NA
Goodeidae	*Crenichthys nevadae*	NA	X	NA	X
Goodeidae	*Empetrichthys latos*	AY356573	ELU09108	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	AY356576	AF510786	NA	NA
Goodeidae	*Girardinichthys viviparus*	AY356575	X	NA	X

Goodeidae	*Goodea atripinnis*	AY356577	AF510775	NA	NA
Goodeidae	*Goodea gracilis*	NA	X	NA	X
Goodeidae	*Hubbsina turneri*	AY356578	AF510841	NA	NA
Goodeidae	*Ilyodon amecae*	NA	AF510826	NA	NA
Goodeidae	*Ilyodon furcidens*	AY356579	X	NA	X
Goodeidae	*Ilyodon whitei*	AY356580	AF510834	NA	NA
Goodeidae	*Ilyodon xantusi*	NA	AF510830	NA	NA
Goodeidae	*Neotoca bilineata*	NA	AF510749	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	AY155568	NA	NA
Goodeidae	*Profundulus labialis*	NA	AY155567	NA	NA
Goodeidae	*Profundulus punctatus*	NA	AY155566	NA	NA
Goodeidae	*Skiffia bilineatus*	AY356583	NA	NA	NA
Goodeidae	*Skiffia francesae*	AY356582	AF510845	NA	NA
Goodeidae	*Skiffia lermae*	AY356584	AF510782	NA	NA
Goodeidae	*Skiffia multipunctata*	AY356585	AF510842	NA	X
Goodeidae	*Xenoophorus captivus*	AY356586	X	NA	X
Goodeidae	*Xenotaenia resolanae*	AY356590	AF510825	NA	NA
Goodeidae	*Xenotoca eiseni*	NC 011381	NC 011381	NC 011381	NC 011381
Goodeidae	*Xenotoca melanosoma*	AY356588	AF510763	NA	NA
Goodeidae	*Xenotoca variatus*	AY356589	AF510808	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	AY356592	EU679434	NA	X
Goodeidae	*Zoogoneticus tequila*	AY356591	AF510757	NA	NA
Gymnotiformes	Gymnotiformes	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*	AB054132 *Apteronotus albifrons*
Lampriformes	Lampriformes	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*	NC 009948 *Stylephorus chordatus*
Lophiiformes	*Lophius*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*	AP004414 *Lophius americanus*
Lutjanidae	*Lutjanus*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*	NC 012737 *Lutjanus sebae*
Macrouridae	Macrouridae	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*	AP008988 *Bathygadus antrodes*
Moronidae	*Morone*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*	NC 014353 *Morone saxatilis*
Mugiliformes	*Mugil*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*	NC 003182 *Mugil cephalus*
Myctophiformes	Myctophiformes	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*	AP002921 *Neoscopelus microchir*
Ophidiiformes	Ophidiiformes	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*	NC 008123 *Sirembo imberbis*
Osmeriformes	Osmeriformes	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*	AP009570 *Alepocephalus agassizii*
Pleuronectiformes	Pleuronectiformes	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*	GQ380410 *Cynoglossus abbreviatus*
Poeciliidae	*Alfaro cultratus*	NA	X	EF017580	NA
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys normani*	NA	X	NA	X
Poeciliidae	*Aplocheilichthys spilauchen*	NA	X	NA	X

Poeciliidae	*Belonesox belizanus*	EU751665	X	NA	HM443919
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	FJ178767	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	NA	FJ178769	EF017571	EF017571
Poeciliidae	*Brachyrhaphis holdridgei*	NA	BHU68308	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	FJ178768	NA	NA
Poeciliidae	*Brachyrhaphis rhabdophora*	NA	EF017522	EF017572	EF017572
Poeciliidae	*Brachyrhaphis roseni*	NA	BRU68300	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	NA	EF017520	EF017570	EF017570
Poeciliidae	*Carlhubbsia kidderi*	NA	FJ178778	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	NA	EF017532	EF017581	EF017581
Poeciliidae	*Cnesterodon decemmaculatus*	NA	EF017529	EF017579	EF0175791
Poeciliidae	*Cnesterodon hypselurus*	NA	GU179185	NA	GU179231
Poeciliidae	*Cnesterodon septentrionalis*	NA	X	NA	NA
Poeciliidae	*Dactylophallus denticulatus*	FN545606	FJ178725	NA	NA
Poeciliidae	*Dactylophallus ramsdeni*	NA	FJ178733	NA	NA
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	FJ178732	NA	NA
Poeciliidae	*Fluviphylax pygmaeus*	NA	EF017511	EF017561	EF017561
Poeciliidae	*Fluviphylax simplex*	NA	X	NA	X
Poeciliidae	*Gambusia affinis*	AP004422	AP004422	AP004422	AP004422
Poeciliidae	*Gambusia atrora*	NA	EF017515	EF017565	EF017565
Poeciliidae	*Gambusia caymanensis*	NA	GCU18115	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	GEU18206	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	GGU18207	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	GHU18208	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	GHU18209	NA	NA
Poeciliidae	*Gambusia holbrooki*	GU183103	X	NA	X
Poeciliidae	*Gambusia hubbsi*	NA	GHU18211	NA	EF534741
Poeciliidae	*Gambusia hurtadoi*	NA	GHU18212	NA	NA
Poeciliidae	*Gambusia luma*	NA	X	NA	X
Poeciliidae	*Gambusia manni*	NA	GMU18214	NA	NA
Poeciliidae	*Gambusia marshi*	NA	GMU18215	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	GMU18216	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	GNU18217	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	GOU18218	NA	NA
Poeciliidae	*Gambusia panuco*	NA	GPU18219	NA	NA
Poeciliidae	*Gambusia punctata*	FN545628	GPU18220	NA	NA
Poeciliidae	*Gambusia puncticulata*	FN545639	GPU18221	NA	NA
Poeciliidae	*Gambusia rhizophorae*	FN545629	GRU18223	NA	NA
Poeciliidae	*Gambusia sexradiata*	EU751809	GSU18224	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	HM443908	NA	HM443927

Poeciliidae	*Gambusia vittata*	NA	EF017518	EF017568	EF017568
Poeciliidae	*Gambusia wrayi*	NA	EF017516	EF017566	EF017566
Poeciliidae	*Gambusia yucatana*	EU751813	GYU18226	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	GU583795	NA	NA
Poeciliidae	*Girardinus creolus*	FN545612	EF017545	EF017594	EF017594
Poeciliidae	*Girardinus metallicus*	FN545595	FJ178674	EF017593	EF017593
Poeciliidae	*Girardinus microdactylus*	FN545617	FJ178690	NA	NA
Poeciliidae	*Girardinus rivasi*	NA	FJ178695	NA	NA
Poeciliidae	*Girardinus* sp. GMIC19	NA	FJ178693	NA	NA
Poeciliidae	*Glaridichthys falcatus*	FN545684	FJ178759	NA	NA
Poeciliidae	*Glaridichthys uninotatus*	NA	FJ178712	NA	NA
Poeciliidae	*Heterandria bimaculata*	EU751826	EF017523	EF017573	EF017573
Poeciliidae	*Heterandria formosa*	NA	AF412125	EF017575	EF017575
Poeciliidae	*Heterandria jonesi*	NA	EF017524	EF017574	EF017574
Poeciliidae	*Heterophallus milleri*	NA	EF017517	EF017567	EF017567
Poeciliidae	*Heterophallus rachovii*	NA	HM443901	NA	HM443920
Poeciliidae	*Poecilia Limia caymanensis*	NA	X	NA	AF353192
Poeciliidae	*Poecilia Limia dominicensis*	NA	EF017533	EF017582	EF017582
Poeciliidae	*Poecilia Limia garnieri*	NA	X	NA	NA
Poeciliidae	*Poecilia Limia grossidens*	NA	X	NA	NA
Poeciliidae	*Poecilia Pseudolimia heterandria*	NA	HQ857426	NA	HQ857450
Poeciliidae	*Poecilia Limia melanogaster*	NA	EF017534	EF017583	EF017583
Poeciliidae	*Poecilia Limia melanonotata*	NA	X	NA	AF353197
Poeciliidae	*Poecilia Limia nigrofasciata*	NA	X	NA	AF031391
Poeciliidae	*Poecilia Limia pauciradiata*	NA	X	NA	AF353196
Poeciliidae	*Poecilia Limia perugiae*	NA	X	NA	AF031392
Poeciliidae	*Poecilia Limia rivasi*	NA	X	NA	NA
Poeciliidae	*Poecilia Limia sulfurophila*	NA	X	NA	NA
Poeciliidae	*Poecilia Limia tridens*	NA	EF017535	EF017584	EF017584
Poeciliidae	*Poecilia Limia versicolor*	NA	X	NA	AF353193
Poeciliidae	*Poecilia Limia vittata*	FN545667	X	NA	AF353201
Poeciliidae	*Poecilia Limia zonata*	NA	X	NA	AF353194
Poeciliidae	*Poecilia Micropoecilia bifurca*	NA	GU179186	NA	GU179232
Poeciliidae	*Poecilia Micropoecilia branneri*	NA	GU179187	NA	GU179233
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	GQ855713	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	NA	GU179188	NA	GU179234
Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	NA	GU179189	NA	GU179235

Poeciliidae	*Poecilia Micropoecilia picta*	NA	GU179190	NA	GU179236
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	NA	GU179191	NA	GU179237
Poeciliidae	*Poecilia Acanthophacelus reticulata*	NA	GU179192	NA	GU179238
Poeciliidae	*Poecilia Micropoecilia sarrafae*	NA	X	NA	X
Poeciliidae	*Poecilia Acanthophacelus wingei*	NA	GU179193	NA	GU179239
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	NA	GU179194	NA	GU179240
Poeciliidae	*Neoheterandria cana*	NA	X	NA	X
Poeciliidae	*Neoheterandria elegans*	NA	X	NA	X
Poeciliidae	*Neoheterandria tridentiger*	NA	EF017526	EF017576	EF017576
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	NA	GU179195	NA	GU179241
Poeciliidae	*Poecilia Pamphorichthys hasemani*	NA	HQ857427	NA	HQ857451
Poeciliidae	*Poecilia Pamphorichthys hollandi*	HM405171	HQ857428	NA	HQ857452
Poeciliidae	*Poecilia Pamphorichthys minor*	NA	GU179196	NA	GU179242
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	NA	HQ857429	NA	HQ857453
Poeciliidae	*Phallichthys amates*	NA	X	EF017563	X
Poeciliidae	*Phallichthys pittieri*	NA	FJ178770	NA	NA
Poeciliidae	*Phallichthys quadripunctatus*	NA	X	NA	X
Poeciliidae	*Phallichthys tico*	NA	EF017512	EF017562	EF017562
Poeciliidae	*Phalloceros caudimaculatus*	NA	NA	EF017578	EF017578
Poeciliidae	*Phalloptychus januarius*	NA	EF017530	NA	NA
Poeciliidae	*Poecilia Mollienesia butleri*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	AF080487
Poeciliidae	*Poecilia Mollienesia caucana*	NA	EF017540	EF017589	EF017589
Poeciliidae	*Poecilia Mollienesia chica*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia gilli*	NA	X	NA	AF031388
Poeciliidae	*Poecilia Mollienesia gracilis*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia latipinna*	NA	X	NA	AF031389
Poeciliidae	*Poecilia Mollienesia latipunctata*	NA	EF017539	EF017588	EF017588
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia orri*	NA	X	NA	AF031400
Poeciliidae	*Poecilia Mollienesia petenensis Campeche*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	NA	X	NA	X

Poeciliidae	*Poecilia Mollienesia salvatoris*	NA	X	NA	X
Poeciliidae	*Poecilia Mollienesia sphenops*	NA	X	NA	AF031390
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	AF080490
Poeciliidae	*Poecilia Mollienesia velifera*	NA	X	NA	X
Poeciliidae	*Poecilia Poecilia vivipara*	NA	HQ857430	NA	HQ857454
Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	NA	HQ857431	NA	HQ857455
Poeciliidae	*Poeciliopsis baenschi*	NA	AF412148	NA	AF412191
Poeciliidae	*Poeciliopsis balsas*	NA	X	NA	X
Poeciliidae	*Poeciliopsis catemaco*	EU751943	AF412161	NA	AF412201
Poeciliidae	*Poeciliopsis elongata*	NA	AF412129	NA	AF412172
Poeciliidae	*Poeciliopsis fasciata*	NA	AF412149	EF017595	AF412193
Poeciliidae	*Poeciliopsis gracilis*	NA	AF412155	NA	AF412195
Poeciliidae	*Poeciliopsis hnilickai*	NA	AF412156	EF017596	AF412202
Poeciliidae	*Poeciliopsis infans*	NA	AF412138	NA	AF412183
Poeciliidae	*Poeciliopsis latidens*	NA	AF412151	NA	AF412194
Poeciliidae	*Poeciliopsis lucida*	NA	AF412139	NA	AF412184
Poeciliidae	*Poeciliopsis monacha*	NA	AF412131	NA	AF412173
Poeciliidae	*Poeciliopsis occidentalis*	NA	AF412141	NA	AF412185
Poeciliidae	*Poeciliopsis paucimaculata*	NA	AF412128	NA	AF412171
Poeciliidae	*Poeciliopsis pleurospilus*	EU751947	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	NA	AF412157	NA	AF412196
Poeciliidae	*Poeciliopsis prolifica*	NA	AF412146	NA	AF412189
Poeciliidae	*Poeciliopsis retropinna*	NA	AF412130	NA	X
Poeciliidae	*Poeciliopsis scarlii*	NA	AF412159	NA	AF412198
Poeciliidae	*Poeciliopsis sonoriensis*	NA	DQ138944	NA	DQ138947
Poeciliidae	*Poeciliopsis turneri*	NA	AF412158	NA	AF412197
Poeciliidae	*Poeciliopsis turrubarensis*	NA	AF412164	NA	AF412204
Poeciliidae	*Poeciliopsis viriosa*	NA	AF412133	NA	AF412175
Poeciliidae	*Priapella chamulae*	NA	X	NA	X
Poeciliidae	*Priapella compressa*	NA	X	EF017603	X
Poeciliidae	*Priapella intermedia*	AY356595	EF017553	EF017602	EF017602
Poeciliidae	*Priapella olmecae*	NA	EF017555	EF017604	X
Poeciliidae	*Priapichthys annectens*	NA	EF017542	EF017591	EF017591
Poeciliidae	*Priapichthys darienensis*	NA	X	NA	X
Poeciliidae	*Priapichthys panamensis*	NA	NA	NA	X
Poeciliidae	*Priapichthys puetzi*	NA	DQ376991	NA	NA
Poeciliidae	*Pseudopoecilia festae*	NA	EF017543	EF017592	EF017592
Poeciliidae	*Quintana atrizona*	FN545618	EF017556	EF017605	EF017605
Poeciliidae	*Scolichthys greenwayi*	NA	EF017541	EF017590	EF017590

Poeciliidae	*Scolichthys iota*	NA	X	NA	X
Poeciliidae	*Tomeurus gracilis*	NA	NA	EF017607	EF017607
Poeciliidae	*Xenodexia ctenolepis*	NA	EF017557	EF017606	EF017606
Poeciliidae	*Xenophallus umbratilis*	NA	FJ518863	NA	EF017577
Poeciliidae	*Xiphophorus alvarezi*	EU752034	X	NA	X
Poeciliidae	*Xiphophorus andersi*	NA	XAU06495	NA	NA
Poeciliidae	*Xiphophorus birchmanni*	NA	X	NA	X
Poeciliidae	*Xiphophorus clemenciae*	NA	X	NA	NA
Poeciliidae	*Xiphophorus continens*	NA	X	NA	X
Poeciliidae	*Xiphophorus cortezi*	NA	X	NA	X
Poeciliidae	*Xiphophorus couchianus*	NA	X	NA	X
Poeciliidae	*Xiphophorus evelynae*	NA	EF017550	EF017599	EF017599
Poeciliidae	*Xiphophorus gordoni*	NA	X	NA	X
Poeciliidae	*Xiphophorus hellerii*	FJ234985	X	FJ234985	X
Poeciliidae	*Xiphophorus maculatus*	AP005982	AP005982	AP005982	AP005982
Poeciliidae	*Xiphophorus malinche*	NA	XMU06516	NA	NA
Poeciliidae	*Xiphophorus mayae*	NA	AF404296	NA	NA
Poeciliidae	*Xiphophorus meyeri*	NA	X	NA	X
Poeciliidae	*Xiphophorus milleri*	NA	XMU06518	NA	NA
Poeciliidae	*Xiphophorus mixei*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	NA	X	NA	X
Poeciliidae	*Xiphophorus monticolus*	NA	X	NA	X
Poeciliidae	*Xiphophorus multilineatus*	NA	X	NA	X
Poeciliidae	*Xiphophorus nezahualcoyotl*	NA	X	NA	X
Poeciliidae	*Xiphophorus nigrensis*	NA	X	NA	X
Poeciliidae	*Xiphophorus pygmaeus*	NA	X	NA	X
Poeciliidae	*Xiphophorus signum*	NA	X	NA	X
Poeciliidae	*Xiphophorus variatus*	NA	X	NA	X
Poeciliidae	*Xiphophorus xiphidium*	NA	X	EF017598	X
Polymixiidae	*Polymixia*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*	NC 002648 *Polymixia japonica*
Pristigasteridae	*Chirocentrus dorab*	NC 006913	NC 006913	NC 006913	NC 006913
Pristigasteridae	*Pellona*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*	NC 014268 *Pellona flavipinnis*
Rivulidae	*Rivulus hartii*	NA	X	NA	AF092393
Salmoniformes	*Oncorhynchus mykiss*	NC 001717	NC 001717	NC 001717	NC 001717
Scorpaeniformes	Scorpaeniformes	EU008930 *Sebastes ruberrimus*	EU008930 *Sebastes ruberrimus*	NA	EU008930 *Sebastes ruberrimus*
Siluriformes	*Ictalurus punctatus*	NC 003489	NC 003489	NC 003489	NC 003489
Stomiiformes	*Stomiiformes*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*	AP002915 *Chauliodus sloani*
Synbranchiformes	*Monopterus albus*	NC 003192	NC 003192	NC 003192	NC 003192
Tetraodontidae	*Takifugu rubripes*	NC 004299	NC 004299	NC 004299	NC 004299

Tetraodontidae	*Tetraodon nigroviridis*	NC 007176	NC 007176	NC 007176	NC 007176
Valenciidae	*Valencia hispanica*	NA	NA	NA	NA
Zeidae	*Zeus faber*	NC 003190	NC 003190	NC 003190	NC 003190
Zoarcoidea	*Lycodes*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*	NC 004409 *Lycodes toyamensis*

Nuclear Genes

Family	**Species**	**CCND1**	**D2**	**D29**	**D8**	**ENC1**	**Glyt**
Anablepidae	*Anableps anableps*	NA	NA	NA	NA	X	X
Anablepidae	*Anableps dowei*	NA	NA	NA	NA	X	X
Anablepidae	*Jenynsia lineata*	NA	NA	NA	NA	X	X
Anablepidae	*Jenynsia multidentata*	NA	NA	NA	NA	X	X
Anablepidae	*Oxyzygonectes dovii*	NA	NA	NA	NA	X	X
Aphredoderidae	*Aphredoderus sayanus*	NA	NA	NA	NA	EU002019	EU002047
Aplocheilidae	*Fenerbahce formosus*	NA	NA	NA	NA	X	X
Aplocheilidae	*Aphyoplatys duboisi*	NA	NA	NA	NA	X	X
Aplocheilidae	*Aphyosemion bitaeniatum*	NA	NA	NA	NA	NA	X
Aplocheilidae	*Aplocheilus lineatus*	NA	NA	NA	NA	X	X
Aplocheilidae	*Epiplatys annulatus*	NA	NA	NA	NA	X	X
Aplocheilidae	*Fundulopanchax*	NA	NA	NA	NA	X *Fundulopanchax gardneri*	X *Fundulopanchax gardneri*
Argentiniformes	*Argentina*	NA	NA	NA	NA	EU366634 *Argentina sialis*	EU002059 *Argentina sialis*
Atheriniformes	Atheriniformes	NA	NA	NA	NA	NA	NA
Aulopiformes	*Synodus*	NA	NA	NA	NA	EU002028 *Synodus foetens*	EU002057 *Synodus foetens*
Batrachoidiformes	*Porichthys*	NA	NA	NA	NA	EU002021 *Porichthys plectrodon*	NA
Beloniformes	*Oryzias latipes*	NA	NA	NA	NA	EF032979	EF032992
Beryciformes	Beryciformes	NA	NA	NA	NA	EU002026 *Myripristis violacea*	EU002055 *Myripristis violacea*
Characiformes	Characiformes	NA	NA	NA	NA	NA	NA
Cichlidae	Cichlasomatinae	NA	NA	NA	NA	EU002020 *Herichthys cyanoguttatus*	EU002049 *Herichthys cyanoguttatus*
Cichlidae	*Oreochromis*	NA	NA	NA	NA	EF032980 *Oreochromis niloticus*	EF032993 *Oreochromis niloticus*
Clupeidae	*Dorosoma cepedianum*	NA	NA	NA	NA	NA	EU002043
Cypriniformes	*Danio rerio*	NA	NA	NA	NA	EF032975	EF032988
Cypriniformes	*Notemigonus crysoleucas*	NA	NA	NA	NA	EU002022	EU002051
Cypriniformes	*Semotilus atromaculatus*	NA	NA	NA	NA	EF032986	EF032999
Cyprinodontidae	*Cubanichthys cubensis*	NA	NA	NA	NA	X	X
Cyprinodontidae	*Cubanichthys pengelleyi*	NA	NA	NA	NA	X	X
Cyprinodontidae	*Cyprinodon variegatus*	NA	NA	NA	NA	X	X
Cyprinodontidae	*Floridichthys carpio*	NA	NA	NA	NA	X	X
Cyprinodontidae	*Jordanella floridae*	NA	NA	NA	NA	X	X

Cyprinodontidae	*Orestias*	NA	NA	NA	NA	X *Orestius agassizzi*	X *Orestias agassizii*
Esociformes	*Esox lucius*	NA	NA	NA	NA	EU002016	EU002044
Fundulidae	*Fundulus cingulatus*	NA	NA	NA	NA	X	X
Fundulidae	*Fundulus lineolatus*	NA	NA	NA	NA	X	X
Fundulidae	*Lucania goodei*	NA	NA	NA	NA	X	X
Fundulidae	*Lucania parva*	NA	NA	NA	NA	X	X
Gadidae	*Gadus morhua*	NA	NA	NA	NA	EU002017	EU002045
Gasterosteiformes	*Gasterosteus aculeatus*	NA	NA	NA	NA	Ensembl 63	AB445146
Gonorynchiformes	*Chanos chanos*	NA	NA	NA	NA	EU002015	NA
Goodeidae	*Allodontichthys hubbsi*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys polylepis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys tamazulae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys zonistius*	NA	NA	NA	NA	NA	NA
Goodeidae	*Alloophorus robustus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca catarinae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca diazi*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca dugesii*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca goslinei*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca maculata*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca meeki*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca regalis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	NA	NA	NA	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Ameca splendens*	NA	NA	NA	NA	X	X
Goodeidae	*Ataeniobius toweri*	NA	NA	NA	NA	X	X
Goodeidae	*Chapalichthys encaustus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys pardalis*	NA	NA	NA	NA	X	X
Goodeidae	*Characodon audax*	NA	NA	NA	NA	NA	NA
Goodeidae	*Characodon lateralis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys baileyi*	NA	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys nevadae*	NA	NA	NA	NA	X	X
Goodeidae	*Empetrichthys latos*	NA	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys viviparus*	NA	NA	NA	NA	X	X
Goodeidae	*Goodea atripinnis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Goodea gracilis*	NA	NA	NA	NA	X	X
Goodeidae	*Hubbsina turneri*	NA	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon amecae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon furcidens*	NA	NA	NA	NA	X	X
Goodeidae	*Ilyodon whitei*	NA	NA	NA	NA	NA	NA

Goodeidae	*Ilyodon xantusi*	NA	NA	NA	NA	NA	NA
Goodeidae	*Neotoca bilineata*	NA	NA	NA	NA	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	NA	NA	NA	NA	NA
Goodeidae	*Profundulus labialis*	NA	NA	NA	NA	X	X
Goodeidae	*Profundulus punctatus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Skiffia bilineatus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Skiffia francesae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Skiffia lermae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Skiffia multipunctata*	NA	NA	NA	NA	X	X
Goodeidae	*Xenoophorus captivus*	NA	NA	NA	NA	X	X
Goodeidae	*Xenotaenia resolanae*	NA	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca eiseni*	NA	NA	NA	NA	X	X
Goodeidae	*Xenotoca melanosoma*	NA	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca variatus*	NA	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	NA	NA	NA	NA	X	X
Goodeidae	*Zoogoneticus tequila*	NA	NA	NA	NA	NA	NA
Gymnotiformes	Gymnotiformes	NA	NA	NA	NA	NA	AB605482 *Gymnotus carapo*
Lampriformes	Lampriformes	NA	NA	NA	NA	EU366633 *Metavelifer multiradiatus*	EU002048 *Regalecus glesne*
Lophiiformes	*Lophius*	NA	NA	NA	NA	EU002030 *Lophius gastrophysus*	NA
Lutjanidae	*Lutjanus*	NA	NA	NA	NA	EF032984 *Lutjanus mahogoni*	EF032997 *Lutjanus mahogoni*
Macrouridae	Macrouridae	NA	NA	NA	NA	EU002025 *Coryphaenoides rupestris*	EU002054 *Coryphaenoides rupestris*
Moronidae	*Morone*	NA	NA	NA	NA	EF032982 *Morone chrysops*	EF032995 *Morone chrysops*
Mugiliformes	*Mugil*	NA	NA	NA	NA	EU002023 *Mugil curema*	EU002052 *Mugil curema*
Myctophiformes	Myctophiformes	NA	NA	NA	NA	NA	NA
Ophidiiformes	Ophidiiformes	NA	NA	NA	NA	EF032985 *Brotula multibarbata*	EF032998 *Brotula multibarbata*
Osmeriformes	Osmeriformes	NA	NA	NA	NA	NA	NA
Pleuronectiformes	Pleuronectiformes	NA	NA	NA	NA	NA	EU002065 *Pleuronectes platessa*
Poeciliidae	*Alfaro cultratus*	NA	NA	NA	NA	X	X
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys normani*	NA	NA	NA	NA	X	X
Poeciliidae	*Aplocheilichthys spilauchen*	NA	NA	NA	NA	X	X
Poeciliidae	*Belonesox belizanus*	NA	NA	NA	NA	X	X
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis holdridgei*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis rhabdophora*	NA	NA	NA	NA	X	X

Poeciliidae	*Brachyrhaphis roseni*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia kidderi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	NA	NA	NA	NA	X	X
Poeciliidae	*Cnesterodon decemmaculatus*	NA	NA	NA	NA	GU179168	GU179197
Poeciliidae	*Cnesterodon hypselurus*	NA	NA	NA	NA	GU179169	GU179198
Poeciliidae	*Cnesterodon septentrionalis*	NA	NA	NA	NA	X	X
Poeciliidae	*Dactylophallus denticulatus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus ramsdeni*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	NA	NA	NA	NA	NA
Poeciliidae	*Fluviphylax pygmaeus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Fluviphylax simplex*	NA	NA	NA	NA	X	X
Poeciliidae	*Gambusia affinis*	NA	NA	NA	NA	EU002018	EU002046
Poeciliidae	*Gambusia atrora*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia caymanensis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia holbrooki*	NA	NA	NA	NA	X	X
Poeciliidae	*Gambusia hubbsi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hurtadoi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia luma*	NA	NA	NA	NA	X	X
Poeciliidae	*Gambusia manni*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia marshi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia panuco*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia punctata*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia puncticulata*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia rhizophorae*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia sexradiata*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia vittata*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia wrayi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia yucatana*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus creolus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus metallicus*	NA	NA	NA	NA	X	X

Poeciliidae	*Girardinus microdactylus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus rivasi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus* sp. GMIC19	NA	NA	NA	NA	NA	NA
Poeciliidae	*Glaridichthys falcatus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Glaridichthys uninotatus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Heterandria bimaculata*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Heterandria formosa*	NA	NA	NA	NA	X	X
Poeciliidae	*Heterandria jonesi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Heterophallus milleri*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Heterophallus rachovii*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia caymanensis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia dominicensis*	NA	NA	NA	NA	GU179170	GU179199
Poeciliidae	*Poecilia Limia garnieri*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia grossidens*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Pseudolimia heterandria*	NA	NA	NA	NA	HQ857468	HQ857462
Poeciliidae	*Poecilia Limia melanogaster*	NA	NA	NA	NA	GU179171	GU179200
Poeciliidae	*Poecilia Limia melanonotata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia nigrofasciata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia pauciradiata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia perugiae*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia rivasi*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia sulfurophila*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia tridens*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia versicolor*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia vittata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Limia zonata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Micropoecilia bifurca*	NA	NA	NA	NA	GU179172	GU179201
Poeciliidae	*Poecilia Micropoecilia branneri*	NA	NA	NA	NA	GU179173	GU179202
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	NA	NA	NA	NA	GU179174	GU179203
Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	NA	NA	NA	NA	GU179175	GU179204
Poeciliidae	*Poecilia Micropoecilia picta*	NA	NA	NA	NA	GU179176	GU179205
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	NA	NA	NA	NA	GU179177	GU179206
Poeciliidae	*Poecilia Acanthophacelus reticulata*	NA	NA	NA	NA	GU179178	GU179207

Poeciliidae	*Poecilia Micropoecilia sarrafae*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Acanthophacelus wingei*	NA	NA	NA	NA	GU179179	GU179208
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	NA	NA	NA	NA	GU179180	GU179209
Poeciliidae	*Neoheterandria cana*	NA	NA	NA	NA	X	X
Poeciliidae	*Neoheterandria elegans*	NA	NA	NA	NA	X	X
Poeciliidae	*Neoheterandria tridentiger*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	NA	NA	NA	NA	GU179181	GU179210
Poeciliidae	*Poecilia Pamphorichthys hasemani*	NA	NA	NA	NA	HQ857469	HQ857463
Poeciliidae	*Poecilia Pamphorichthys hollandi*	NA	NA	NA	NA	HQ857470	HQ857464
Poeciliidae	*Poecilia Pamphorichthys minor*	NA	NA	NA	NA	GU179182	GU179211
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	NA	NA	NA	NA	HQ857471	HQ857465
Poeciliidae	*Phallichthys amates*	NA	NA	NA	NA	X	X
Poeciliidae	*Phallichthys pittieri*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys quadripunctatus*	NA	NA	NA	NA	X	X
Poeciliidae	*Phallichthys tico*	NA	NA	NA	NA	X	X
Poeciliidae	*Phalloceros caudimaculatus*	NA	NA	NA	NA	X	X
Poeciliidae	*Phalloptychus januarius*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia butleri*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia caucana*	NA	NA	NA	NA	GU179183	GU179212
Poeciliidae	*Poecilia Mollienesia chica*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia gilli*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia gracilis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia latipinna*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia latipunctata*	NA	NA	NA	NA	GU179184	GU179213
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia orri*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia petenensis Campeche*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia salvatoris*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia sphenops*	NA	NA	NA	NA	X	X
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia velifera*	NA	NA	NA	NA	X	X

Poeciliidae	*Poecilia Poecilia vivipara*	NA	NA	NA	NA	HQ857472	HQ857466
Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	NA	NA	NA	NA	HQ857473	HQ857467
Poeciliidae	*Poeciliopsis baenschi*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis balsas*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis catemaco*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis elongata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis fasciata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis gracilis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis hnilickai*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis infans*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis latidens*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis lucida*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis monacha*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis occidentalis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis paucimaculata*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis pleurospilus*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis prolifica*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis retropinna*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis scarlii*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis sonoriensis*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turneri*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis turrubarensis*	NA	NA	NA	NA	X	X
Poeciliidae	*Poeciliopsis viriosa*	NA	NA	NA	NA	X	X
Poeciliidae	*Priapella chamulae*	NA	NA	NA	NA	KJ525890	KJ525870
Poeciliidae	*Priapella compressa*	NA	DQ235931	DQ235884	DQ235908	KJ525891	KJ525871
Poeciliidae	*Priapella intermedia*	AY211327	NA	NA	NA	NA	NA
Poeciliidae	*Priapella olmecae*	NA	NA	NA	NA	X	X
Poeciliidae	*Priapichthys annectens*	NA	NA	NA	NA	X	X
Poeciliidae	*Priapichthys darienensis*	NA	NA	NA	NA	X	X
Poeciliidae	*Priapichthys panamensis*	NA	NA	NA	NA	X	X
Poeciliidae	*Priapichthys puetzi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Pseudopoecilia festae*	NA	NA	NA	NA	X	X
Poeciliidae	*Quintana atrizona*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Scolichthys greenwayi*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Scolichthys iota*	NA	NA	NA	NA	X	X
Poeciliidae	*Tomeurus gracilis*	NA	NA	NA	NA	X	X
Poeciliidae	*Xenodexia ctenolepis*	NA	NA	NA	NA	X	X
Poeciliidae	*Xenophallus umbratilis*	NA	NA	NA	NA	X	X

doi:10.1038/nature13451

Poeciliidae	*Xiphophorus alvarezi*	AY211336	DQ235944	DQ235897	DQ235921	KJ525872	KJ525852
Poeciliidae	*Xiphophorus andersi*	AY211335	DQ235941	DQ235894	DQ235918	NA	NA
Poeciliidae	*Xiphophorus birchmanni*	NA	DQ235949	DQ235902	DQ235926	KJ525873	KJ525853
Poeciliidae	*Xiphophorus clemenciae*	AY211348	DQ235954	DQ235907	DQ235930	KJ525874	KJ525854
Poeciliidae	*Xiphophorus continens*	NA	DQ235934	DQ235887	DQ235911	KJ525875	KJ525855
Poeciliidae	*Xiphophorus cortezi*	NA	DQ235939	DQ235892	DQ235916	KJ525876	KJ525856
Poeciliidae	*Xiphophorus couchianus*	AY211334	DQ235940	DQ235893	DQ235917	KJ525877	KJ525857
Poeciliidae	*Xiphophorus evelynae*	NA	DQ235953	DQ235906	DQ235929	NA	NA
Poeciliidae	*Xiphophorus gordoni*	NA	DQ235937	DQ235890	DQ235914	KJ525878	KJ525858
Poeciliidae	*Xiphophorus hellerii*	AY211331	DQ235943	DQ235896	DQ235920	KJ525879	KJ525859
Poeciliidae	*Xiphophorus maculatus*	AY211330	DQ235951	DQ235904	NA	NA	NA
Poeciliidae	*Xiphophorus malinche*	NA	DQ235938	DQ235891	DQ235915	NA	NA
Poeciliidae	*Xiphophorus mayae*	NA	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus meyeri*	NA	DQ235946	DQ235899	DQ235923	KJ525880	KJ525860
Poeciliidae	*Xiphophorus milleri*	NA	DQ235935	DQ235888	DQ235912	NA	NA
Poeciliidae	*Xiphophorus mixei*	AY211351	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	AY211329	DQ235947	DQ235900	DQ235924	KJ525881	KJ525861
Poeciliidae	*Xiphophorus monticolus*	AY211341	NA	NA	NA	KJ525882	KJ525862
Poeciliidae	*Xiphophorus multilineatus*	NA	DQ235945	DQ235898	DQ235922	KJ525883	KJ525863
Poeciliidae	*Xiphophorus nezahualcoyotl*	NA	DQ235948	DQ235901	DQ235925	KJ525884	KJ525864
Poeciliidae	*Xiphophorus nigrensis*	NA	DQ235933	DQ235886	DQ235910	KJ525885	KJ525865
Poeciliidae	*Xiphophorus pygmaeus*	NA	DQ235936	DQ235889	DQ235913	KJ525886	KJ525866
Poeciliidae	*Xiphophorus signum*	AY211328	DQ235942	DQ235895	DQ235919	KJ525887	KJ525867
Poeciliidae	*Xiphophorus variatus*	NA	DQ235952	DQ235905	DQ235928	KJ525888	KJ525868
Poeciliidae	*Xiphophorus xiphidium*	NA	DQ235950	DQ235903	DQ235927	KJ525889	KJ525869
Polymixiidae	*Polymixia*	NA	NA	NA	NA	EU366636 *Polymixia japonica*	EU002061 *Polymixia japonica*
Pristigasteridae	*Chirocentrus dorab*	NA	NA	NA	NA	EU002010	EU002042
Pristigasteridae	*Pellona*	NA	NA	NA	NA	EU002009 *Pellona flavipinnis*	EU002041 *Pellona flavipinnis*
Rivulidae	*Rivulus hartii*	NA	NA	NA	NA	X	X
Salmoniformes	*Oncorhynchus mykiss*	NA	NA	NA	NA	EF032976	EF032989
Scorpaeniformes	Scorpaeniformes	NA	NA	NA	NA	EU002040 *Sebastes ruberrimus*	EU002064 *Sebastes ruberrimus*
Siluriformes	*Ictalurus punctatus*	NA	NA	NA	NA	EF032981	EF032994
Stomiiformes	*Stomiiformes*	NA	NA	NA	NA	EU002024 *Stomias boa*	EU002053 *Stomias boa*
Synbranchiformes	*Monopterus albus*	NA	NA	NA	NA	EU002039	EU002063
Tetraodontidae	*Takifugu rubripes*	NA	NA	NA	NA	Ensembl 63	NM 001078581
Tetraodontidae	*Tetraodon nigroviridis*	NA	NA	NA	NA	Ensembl 63	AJ868541
Valenciidae	*Valencia hispanica*	NA	NA	NA	NA	X	X
Zeidae	*Zeus faber*	NA	NA	NA	NA	EU002038	EU002062

Zoarcoidea	*Lycodes*	NA	NA	NA	NA	EF032983 *Lycodes terraenovae*	EF032996 *Lycodes terraenovae*

Family	Species	myh6	RH	Rag1	SH3PX3	x-src
Anablepidae	*Anableps anableps*	X	X	X	X	X
Anablepidae	*Anableps dowei*	X	X	X	X	X
Anablepidae	*Jenynsia lineata*	X	X	X	X	X
Anablepidae	*Jenynsia multidentata*	X	X	X	X	X
Anablepidae	*Oxyzygonectes dovii*	X	X	X	X	X
Aphredoderidae	*Aphredoderus sayanus*	EU001908	DQ021403	FJ215201	EU002072	NA
Aplocheilidae	*Fenerbahce formosus*	X	X	X	X	X
Aplocheilidae	*Aphyoplatys duboisi*	X	X	X	X	X
Aplocheilidae	*Aphyosemion bitaeniatum*	X	NA	X	X	NA
Aplocheilidae	*Aplocheilus lineatus*	X	X	X	X	NA
Aplocheilidae	*Epiplatys annulatus*	X	X	X	X	NA
Aplocheilidae	*Fundulopanchax*	X *Fundulopanchax gardneri*	X *Fundulopanchax gardneri*	X *Fundulopanchax gardneri*	X *Fundulopanchax gardneri*	X *Fundulopanchax gardneri*
Argentiniformes	*Argentina*	EU001924 *Argentina sialis*	EU492229 *Argentina silus*	FJ896426; *Argentina sialis*	EU002085 *Argentina sialis*	NA
Atheriniformes	Atheriniformes	EU001919 *Labidesthes sicculus*	FJ940704 *Melanotaenia australis*	AY430225	NA	NA
Aulopiformes	*Synodus*	EU001918 *Synodus foetens*	DQ874823 *Synodus foetens*	AY308763 *Synodus intermedius*	EU002080 *Synodus foetens*	NA
Batrachoidiformes	*Porichthys*	EU001911 *Porichthys plectrodon*	NA	NA	NA	NA
Beloniformes	*Oryzias latipes*	EF032927	Ensembl 63	EF095641	EF033005	Ensembl 63
Beryciformes	Beryciformes	EU001916 *Myripristis violacea*	MBU57538 *Myripristis berndti*	EU167745 *Sargocentron cornutum*	EU002078 *Myripristis violacea*	NA
Characiformes	Characiformes	EU001902 *Pygocentrus nattereri*	AMU12328; *Astyanax mexicanus*	EU409607 *Chalceus macrolepidotus*	NA	NA
Cichlidae	Cichlasomatinae	EU001910 *Cichlasoma Herichthys cyanoguttatus*	GU376822	HQ427498 *Herichthys cyanoguttatus*	EU002074 *Herichthys cyanoguttatus*	NA
Cichlidae	*Oreochromis*	EF032928 *Oreochromis niloticus*	AY775108 *Oreochromis niloticus*	DQ012223 *Oreochromis tanganicae*	EF033006 *Oreochromis niloticus*	NA
Clupeidae	*Dorosoma cepedianum*	EU001901	NA	DQ912099	NA	NA
Cypriniformes	*Danio rerio*	EF032923	NM 131084	NM 131389	EF033001	NA
Cypriniformes	*Notemigonus crysoleucas*	EU001912	FJ197062	EF452831	NA	NA
Cypriniformes	*Semotilus atromaculatus*	EF032934	EU409658	GU136361	JF949896	NA
Cyprinodontidae	*Cubanichthys cubensis*	X	X	NA	X	X
Cyprinodontidae	*Cubanichthys pengelleyi*	X	X	NA	X	U02347
Cyprinodontidae	*Cyprinodon variegatus*	X	X	NA	X	X
Cyprinodontidae	*Floridichthys carpio*	X	X	NA	X	X
Cyprinodontidae	*Jordanella floridae*	X	X	NA	X	X
Cyprinodontidae	*Orestias*	X *Orestias agassizii*	X *Orestias agassizii*	NA	X *Orestias agassizii*	X *Orestias agassizii*

Esociformes	*Esox lucius*	EU001905	AY158044	AY380542	EU002069	NA
Fundulidae	*Fundulus cingulatus*	X	X	X	X	X
Fundulidae	*Fundulus lineolatus*	X	X	X	X	X
Fundulidae	*Lucania goodei*	X	X	X	X	X
Fundulidae	*Lucania parva*	X	X	NA	X	X
Gadidae	*Gadus morhua*	EU001906	AF385832	FJ215242	EU002070	NA
Gasterosteiformes	*Gasterosteus aculeatus*	AB445155	EU637962	Ensembl 63	AB445191	Ensembl 63
Gonorynchiformes	*Chanos chanos*	EU001904	NA	AY430207	NA	NA
Goodeidae	*Allodontichthys hubbsi*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys polylepis*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys tamazulae*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys zonistius*	NA	NA	NA	NA	NA
Goodeidae	*Alloophorus robustus*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca catarinae*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca diazi*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca dugesii*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca goslinei*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca maculata*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca meeki*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca regalis*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	NA	NA	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	NA	NA	NA	NA
Goodeidae	*Ameca splendens*	X	X	X	X	X
Goodeidae	*Ataeniobius toweri*	X	X	X	X	X
Goodeidae	*Chapalichthys encaustus*	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys pardalis*	X	X	X	X	X
Goodeidae	*Characodon audax*	NA	NA	NA	NA	NA
Goodeidae	*Characodon lateralis*	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys baileyi*	NA	NA	FJ185089	NA	NA
Goodeidae	*Crenichthys nevadae*	X	X	X	X	X
Goodeidae	*Empetrichthys latos*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys viviparus*	X	X	X	X	X
Goodeidae	*Goodea atripinnis*	NA	NA	NA	NA	NA
Goodeidae	*Goodea gracilis*	X	X	X	X	X
Goodeidae	*Hubbsina turneri*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon amecae*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon furcidens*	X	X	X	X	X
Goodeidae	*Ilyodon whitei*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon xantusi*	NA	NA	NA	NA	NA

Goodeidae	*Neotoca bilineata*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus labialis*	X	X	NA	X	X
Goodeidae	*Profundulus punctatus*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia bilineatus*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia francesae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia lermae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia multipunctata*	X	X	X	X	X
Goodeidae	*Xenoophorus captivus*	X	X	X	X	X
Goodeidae	*Xenotaenia resolanae*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca eiseni*	X	X	X	X	X
Goodeidae	*Xenotoca melanosoma*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca variatus*	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	X	X	X	X	X
Goodeidae	*Zoogoneticus tequila*	NA	NA	NA	NA	NA
Gymnotiformes	Gymnotiformes	FJ918846 *Apteronotus albifrons*	NA	FJ896425 *Apteronotus albifrons*	EU002084 *Apteronotus albifrons*	NA
Lampriformes	Lampriformes	EU001909 *Regalecus glesne*	AY368328 *Regalecus glesne*	EF107625 *Regalecus glesne*	EU002073 *Regalecus glesne*	NA
Lophiiformes	*Lophius*	EU001920 *Lophius gastrophysus*	EF095608 *Lophius budegassa*	EF095637 *Lophius budegassa*	EU002082 *Lophius gastrophysus*	NA
Lutjanidae	*Lutjanus*	EF032932 *Lutjanus mahogoni*	EF095620 *Lutjanus analis*	EU182625 *Lutjanus mahogoni*	EF033010 *Lutjanus mahogoni*	NA
Macrouridae	Macrouridae	EU001915 *Coryphaenoides rupestris*	AY368319 *Coryphaenoides rupestris*	FJ215233 *Coryphaenoides rupestris*	EU002077 *Coryphaenoides rupestris*	NA
Moronidae	*Morone*	EF536278 Morone chrysops	EU637981 Morone saxatilis	GU368823 Morone chrysops	EF033008 Morone chrysops	NA
Mugiliformes	*Mugil*	EU001913 *Mugil curema*	EF095609 *Mugil cephalus*	AY308783 *Mugil curema*	EU002075 *Mugil curema*	NA
Myctophiformes	Myctophiformes	EU001917 *Neoscopelus macrolepidotus*	EU407251 *Stenobrachius leucopsarus*	EU366727 *Neoscopelus macrolepidotus*	EU002079 *Neoscopelus macrolepidotus*	NA
Ophidiiformes	Ophidiiformes	EF032933 *Brotula multibarbata*	EF456038 *Brotula barbata*	AY308782 *Petrotyx sanguineus*	EF033011 *Brotula multibarbata*	NA
Osmeriformes	Osmeriformes	EU001925 *Thaleichthys pacificus*	EU637933 *Alepocephalus antipodianus*	AY380537 *Thaleichthys pacificus*	EU002086 *Thaleichthys pacificus*	NA
Pleuronectiformes	Pleuronectiformes	EU001930 *Pleuronectes platessa*	EU492199 *Pleuronectes platessa*	AF369067 *Pseudopleuronectes americanus*	EU002091 *Pleuronectes platessa*	NA
Poeciliidae	*Alfaro cultratus*	X	X	EF017429	X	X
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA	AHU06589
Poeciliidae	*Aplocheilichthys normani*	X	X	X	X	X
Poeciliidae	*Aplocheilichthys spilauchen*	X	X	X	X	X
Poeciliidae	*Belonesox belizanus*	X	X	EF017416	X	X
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	NA	NA	EF017418	NA	NA
Poeciliidae	*Brachyrhaphis holdridgei*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis*	X	X	EF017419	X	X

	rhabdophora					
Poeciliidae	*Brachyrhaphis roseni*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	NA	NA	EF017417	NA	NA
Poeciliidae	*Carlhubbsia kidderi*	NA	NA	FJ185091	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	X	X	EF017430	X	X
Poeciliidae	*Cnesterodon decemmaculatus*	GU179243	GU179271	EF017427	GU179214	GU179152
Poeciliidae	*Cnesterodon hypselurus*	GU179244	GU179272	GU179260	GU179215	GU179153
Poeciliidae	*Cnesterodon septentrionalis*	X	X	X	X	X
Poeciliidae	*Dactylophallus denticulatus*	NA	NA	FJ185102	NA	NA
Poeciliidae	*Dactylophallus ramsdeni*	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	NA	FJ185100	NA	NA
Poeciliidae	*Fluviphylax pygmaeus*	NA	NA	EF017408	NA	U02350
Poeciliidae	*Fluviphylax simplex*	X	X	X	X	X
Poeciliidae	*Gambusia affinis*	EU001907	NA	EF017411	EU002071	NA
Poeciliidae	*Gambusia atrora*	NA	NA	EF017412	NA	NA
Poeciliidae	*Gambusia caymanensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia holbrooki*	X	X	X	X	X
Poeciliidae	*Gambusia hubbsi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hurtadoi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia luma*	X	X	X	X	X
Poeciliidae	*Gambusia manni*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia marshi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia panuco*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia punctata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia puncticulata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia rhizophorae*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia sexradiata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia vittata*	NA	NA	EF017415	NA	NA
Poeciliidae	*Gambusia wrayi*	NA	NA	EF017413	NA	NA
Poeciliidae	*Gambusia yucatana*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus creolus*	NA	NA	EF017442	NA	NA

Poeciliidae	*Girardinus metallicus*	X	X	EF017441	X	X
Poeciliidae	*Girardinus microdactylus*	NA	NA	FJ185097	NA	NA
Poeciliidae	*Girardinus rivasi*	NA	NA	FJ185099	NA	NA
Poeciliidae	*Girardinus* sp. GMIC19	NA	NA	FJ185101	NA	NA
Poeciliidae	*Glaridichthys falcatus*	NA	NA	FJ185098	NA	NA
Poeciliidae	*Glaridichthys uninotatus*	NA	NA	FJ185093	NA	NA
Poeciliidae	*Heterandria bimaculata*	NA	NA	EF017420	NA	NA
Poeciliidae	*Heterandria formosa*	X	X	EF017422	X	X
Poeciliidae	*Heterandria jonesi*	NA	NA	EF017421	NA	NA
Poeciliidae	*Heterophallus milleri*	NA	NA	EF017414	NA	NA
Poeciliidae	*Heterophallus rachovii*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia caymanensis*	X	X	X	X	X
Poeciliidae	*Poecilia Limia dominicensis*	GU179245	GU179273	EF017431	GU179216	GU179154
Poeciliidae	*Poecilia Limia garnieri*	X	X	X	X	X
Poeciliidae	*Poecilia Limia grossidens*	X	X	X	X	X
Poeciliidae	*Poecilia Pseudolimia heterandria*	HQ857456	HQ857438	HQ857444	HQ857420	HQ857432
Poeciliidae	*Poecilia Limia melanogaster*	GU179246	GU179274	EF017432	GU179217	GU179155
Poeciliidae	*Poecilia Limia melanonotata*	X	X	X	X	X
Poeciliidae	*Poecilia Limia nigrofasciata*	X	X	X	X	X
Poeciliidae	*Poecilia Limia pauciradiata*	X	X	X	X	X
Poeciliidae	*Poecilia Limia perugiae*	X	X	X	X	X
Poeciliidae	*Poecilia Limia rivasi*	X	X	X	X	X
Poeciliidae	*Poecilia Limia sulfurophila*	X	X	X	X	X
Poeciliidae	*Poecilia Limia tridens*	X	X	X	X	X
Poeciliidae	*Poecilia Limia versicolor*	X	X	X	X	X
Poeciliidae	*Poecilia Limia vittata*	X	X	X	X	X
Poeciliidae	*Poecilia Limia zonata*	X	X	X	X	X
Poeciliidae	*Poecilia Micropoecilia bifurca*	GU179247	GU179275	GU179261	GU179218	GU179156
Poeciliidae	*Poecilia Micropoecilia branneri*	GU179248	GU179276	GU179262	GU179219	GU179157
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	GU179249	GU179277	GU179263	GU179220	GU179158
Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	GU179250	GU179278	GU179264	GU179221	GU179159
Poeciliidae	*Poecilia Micropoecilia picta*	GU179251	GU179279	GU179265	GU179222	GU179160
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	GU179252	GU179280	GU179266	GU179223	GU179161
Poeciliidae	*Poecilia Acanthophacelus reticulata*	GU179253	GU179281	EF017434	GU179224	GU179162
Poeciliidae	*Poecilia Micropoecilia*	X				

	sarrafae		X	X	X	X
Poeciliidae	*Poecilia Acanthophacelus wingei*	GU179254	GU179282	GU179267	GU179225	GU179163
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	GU179255	GU179283	GU179268	GU179226	GU179164
Poeciliidae	*Neoheterandria cana*	X	X	X	X	X
Poeciliidae	*Neoheterandria elegans*	X	X	EF017425	X	X
Poeciliidae	*Neoheterandria tridentiger*	X	X	EF017423	X	X
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	GU179256	GU179284	GU179269	GU179227	GU179165
Poeciliidae	*Poecilia Pamphorichthys hasemani*	HQ857457	HQ857439	HQ857445	HQ857421	HQ857433
Poeciliidae	*Poecilia Pamphorichthys hollandi*	HQ857458	HQ857440	HQ857446	HQ857422	HQ857434
Poeciliidae	*Poecilia Pamphorichthys minor*	GU179257	GU179285	GU179270	GU179228	GU179166
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	HQ857459	HQ857441	HQ857447	HQ857423	HQ857435
Poeciliidae	*Phallichthys amates*	X	X	X	X	X
Poeciliidae	*Phallichthys pittieri*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys quadripunctatus*	X	X	X	X	X
Poeciliidae	*Phallichthys tico*	X	X	EF017409	X	X
Poeciliidae	*Phalloceros caudimaculatus*	X	X	EF017426	X	X
Poeciliidae	*Phalloptychus januarius*	X	X	EF017428	X	X
Poeciliidae	*Poecilia Mollienesia butleri*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia caucana*	GU179258	GU179286	EF017437	GU179229	U02355
Poeciliidae	*Poecilia Mollienesia chica*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia gilli*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia gracilis*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia latipinna*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia latipunctata*	GU179259	GU179287	EF017436	GU179230	GU179167
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia orri*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia petenensis Campeche*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia salvatoris*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia sphenops*	X	X	X	X	X
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia velifera*	X	X	X	X	X
Poeciliidae	*Poecilia Poecilia vivipara*	HQ857460	HQ857442	HQ857448	HQ857424	HQ857436

Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	HQ857461	HQ857443	HQ857449	HQ857425	HQ857437
Poeciliidae	*Poeciliopsis baenschi*	X	X	X	X	X
Poeciliidae	*Poeciliopsis balsas*	X	X	X	X	X
Poeciliidae	*Poeciliopsis catemaco*	X	X	X	X	X
Poeciliidae	*Poeciliopsis elongata*	X	X	X	X	X
Poeciliidae	*Poeciliopsis fasciata*	X	X	EF017443	X	X
Poeciliidae	*Poeciliopsis gracilis*	X	X	X	X	X
Poeciliidae	*Poeciliopsis hnilickai*	NA	NA	EF017444	NA	NA
Poeciliidae	*Poeciliopsis infans*	X	X	X	X	X
Poeciliidae	*Poeciliopsis latidens*	X	X	X	X	X
Poeciliidae	*Poeciliopsis lucida*	X	X	X	X	X
Poeciliidae	*Poeciliopsis monacha*	X	X	X	X	X
Poeciliidae	*Poeciliopsis occidentalis*	X	X	X	X	X
Poeciliidae	*Poeciliopsis paucimaculata*	X	X	X	X	X
Poeciliidae	*Poeciliopsis pleurospilus*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	X	X	X	X	X
Poeciliidae	*Poeciliopsis prolifica*	X	X	X	X	X
Poeciliidae	*Poeciliopsis retropinna*	X	X	X	X	X
Poeciliidae	*Poeciliopsis scarlii*	X	X	X	X	X
Poeciliidae	*Poeciliopsis sonoriensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turneri*	X	X	X	X	X
Poeciliidae	*Poeciliopsis turrubarensis*	X	X	X	X	X
Poeciliidae	*Poeciliopsis viriosa*	X	X	X	X	X
Poeciliidae	*Priapella chamulae*	KJ525850	KJ525810	KJ525830	KJ525790	KJ525910
Poeciliidae	*Priapella compressa*	KJ525851	KJ525811	KJ525831	KJ525791	KJ525911
Poeciliidae	*Priapella intermedia*	NA	NA	EF017450	NA	X
Poeciliidae	*Priapella olmecae*	X	X	EF017452	X	X
Poeciliidae	*Priapichthys annectens*	X	X	EF017439	X	X
Poeciliidae	*Priapichthys darienensis*	X	X	X	X	X
Poeciliidae	*Priapichthys panamensis*	X	X	X	X	X
Poeciliidae	*Priapichthys puetzi*	NA	NA	NA	NA	NA
Poeciliidae	*Pseudopoecilia festae*	X	X	EF017440	X	X
Poeciliidae	*Quintana atrizona*	NA	NA	EF017453	NA	NA
Poeciliidae	*Scolichthys greenwayi*	NA	NA	EF017438	NA	NA
Poeciliidae	*Scolichthys iota*	X	X	X	X	X
Poeciliidae	*Tomeurus gracilis*	X	X	EF017455	X	X
Poeciliidae	*Xenodexia ctenolepis*	X	X	EF017454	X	NA
Poeciliidae	*Xenophallus umbratilis*	X	X	X	X	X
Poeciliidae	*Xiphophorus alvarezi*	KJ525832	KJ525792	KJ525812	KJ525772	KJ525892

Poeciliidae	*Xiphophorus andersi*	NA	NA	DQ235870	NA	NA
Poeciliidae	*Xiphophorus birchmanni*	KJ525833	KJ525793	KJ525813	KJ525773	KJ525893
Poeciliidae	*Xiphophorus clemenciae*	KJ525834	KJ525794	KJ525814	KJ525774	KJ525894
Poeciliidae	*Xiphophorus continens*	KJ525835	KJ525795	KJ525815	KJ525775	KJ525895
Poeciliidae	*Xiphophorus cortezi*	KJ525836	KJ525796	KJ525816	KJ525776	KJ525896
Poeciliidae	*Xiphophorus couchianus*	KJ525837	KJ525797	KJ525817	KJ525777	KJ525897
Poeciliidae	*Xiphophorus evelynae*	NA	NA	DQ235882	NA	NA
Poeciliidae	*Xiphophorus gordoni*	KJ525838	KJ525798	KJ525818	KJ525778	KJ525898
Poeciliidae	*Xiphophorus hellerii*	KJ525839	KJ525799	KJ525819	KJ525779	KJ525899
Poeciliidae	*Xiphophorus maculatus*	NA	NA	DQ235880	NA	NA
Poeciliidae	*Xiphophorus malinche*	NA	NA	DQ235867	NA	XMU06614
Poeciliidae	*Xiphophorus mayae*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus meyeri*	KJ525840	KJ525800	KJ525820	KJ525780	KJ525900
Poeciliidae	*Xiphophorus milleri*	NA	NA	DQ235864	NA	XMU06616
Poeciliidae	*Xiphophorus mixei*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	KJ525841	KJ525801	KJ525821	KJ525781	KJ525901
Poeciliidae	*Xiphophorus monticolus*	KJ525842	KJ525802	KJ525822	KJ525782	KJ525902
Poeciliidae	*Xiphophorus multilineatus*	KJ525843	KJ525803	KJ525823	KJ525783	KJ525903
Poeciliidae	*Xiphophorus nezahualcoyotl*	KJ525844	KJ525804	KJ525824	KJ525784	KJ525904
Poeciliidae	*Xiphophorus nigrensis*	KJ525845	KJ525805	KJ525825	KJ525785	KJ525905
Poeciliidae	*Xiphophorus pygmaeus*	KJ525846	KJ525806	KJ525826	KJ525786	KJ525906
Poeciliidae	*Xiphophorus signum*	KJ525847	KJ525807	KJ525827	KJ525787	KJ525907
Poeciliidae	*Xiphophorus variatus*	KJ525848	KJ525808	KJ525828	KJ525788	KJ525908
Poeciliidae	*Xiphophorus xiphidium*	KJ525849	KJ525809	KJ525829	KJ525789	KJ525909
Polymixiidae	*Polymixia*	EU001926 *Polymixia japonica*	AY368320 *Polymixia nobilis*	AY308765 *Polymixia japonica*	EU002087 *Polymixia japonica*	NA
Pristigasteridae	*Chirocentrus dorab*	EU001899	NA	DQ912127	NA	NA
Pristigasteridae	*Pellona*	EU001898 *Pellona flavipinnis*	NA	AY430206 *Pellona flavipinnis*	NA	NA
Rivulidae	*Rivulus hartii*	X	X	NA	X	U02357
Salmoniformes	*Oncorhynchus mykiss*	EF032924	NM 001124319	NM 001124737	EF033002	NA
Scorpaeniformes	Scorpaeniformes	EU001929 *Sebastes ruberrimus*	EF212435 *Sebastes rubrivinctus*	EU167898 *Pterois lunulata*	EU002090 *Sebastes ruberrimus*	NA
Siluriformes	*Ictalurus punctatus*	EF032929	AF028016	DQ492511	EF033007	NA
Stomiiformes	*Stomiiformes*	EU001914 *Stomias boa*	NA	GQ860325 *Stomias atriventer*	EU002076 *Stomias boa*	NA
Synbranchiformes	*Monopterus albus*	EU001928	AY141276	NA	EU002089	NA
Tetraodontidae	*Takifugu rubripes*	Ensembl 63	Ensembl 63	AY700363	Ensembl 63	NA
Tetraodontidae	*Tetraodon nigroviridis*	Ensembl 63	Ensembl 63	Ensembl 63	Ensembl 63	NA
Valenciidae	*Valencia hispanica*	X	X	NA	X	X
Zeidae	*Zeus faber*	EU001927	EU638023	FJ215202	EU002088	NA
Zoarcoidea	*Lycodes*	EF032931 *Lycodes terraenovae*	NA	EU167890 *Lycodes brevipes*	EF033009 *Lycodes terraenovae*	NA

Family	Species	Ptr	RAB27	RYR3	T36	beta_actin
Anablepidae	*Anableps anableps*	NA	NA	NA	NA	NA
Anablepidae	*Anableps dowei*	NA	NA	NA	NA	NA
Anablepidae	*Jenynsia lineata*	NA	NA	NA	NA	NA
Anablepidae	*Jenynsia multidentata*	NA	NA	NA	NA	NA
Anablepidae	*Oxyzygonectes dovii*	NA	NA	NA	NA	NA
Aphredoderidae	*Aphredoderus sayanus*	EU001962	NA	EU001939	NA	NA
Aplocheilidae	*Fenerbahce formosus*	NA	NA	NA	NA	NA
Aplocheilidae	*Aphyoplatys duboisi*	NA	NA	NA	NA	NA
Aplocheilidae	*Aphyosemion bitaeniatum*	NA	NA	NA	NA	NA
Aplocheilidae	*Aplocheilus lineatus*	NA	NA	NA	NA	NA
Aplocheilidae	*Epiplatys annulatus*	NA	NA	NA	NA	NA
Aplocheilidae	*Fundulopanchax*	NA	NA	NA	NA	NA
Argentiniformes	*Argentina*	EU001979 *Argentina sialis*	NA	EU001947 *Argentina sialis*	NA	NA
Atheriniformes	Atheriniformes	EU001974 *Labidesthes sicculus*	NA	EU001944 *Labidesthes sicculus*	NA	NA
Aulopiformes	*Synodus*	EU001973 *Synodus foetens*	NA	EU001943 *Synodus foetens*	NA	NA
Batrachoidiformes	*Porichthys*	EU001965 *Porichthys plectrodon*	NA	NA	NA	NA
Beloniformes	*Oryzias latipes*	EF032953	NA	EF032940	NA	NA
Beryciformes	Beryciformes	EU001971 *Myripristis violacea*	NA	EU001942 *Myripristis violacea*	NA	NA
Characiformes	Characiformes	EU001956 *Pygocentrus nattereri*	NA	EU001936 *Pygocentrus nattereri*	NA	NA
Cichlidae	Cichlasomatinae	HQ427605 *Cichlasoma Herichthys cyanoguttatus*	NA	NA	NA	NA
Cichlidae	*Oreochromis*	EF032954 *Oreochromis niloticus*	NA	EF032941 *Oreochromis niloticus*	NA	NA
Clupeidae	*Dorosoma cepedianum*	NA	NA	EU001935	NA	NA
Cypriniformes	*Danio rerio*	EF032949	NA	EF032936	NA	NA
Cypriniformes	*Notemigonus crysoleucas*	EU001966	NA	EU001940	NA	NA
Cypriniformes	*Semotilus atromaculatus*	EF032960	NA	EF032947	NA	NA
Cyprinodontidae	*Cubanichthys cubensis*	NA	NA	NA	NA	NA
Cyprinodontidae	*Cubanichthys pengelleyi*	NA	NA	NA	NA	NA
Cyprinodontidae	*Cyprinodon variegatus*	NA	NA	NA	NA	NA
Cyprinodontidae	*Floridichthys carpio*	NA	NA	NA	NA	NA
Cyprinodontidae	*Jordanella floridae*	NA	NA	NA	NA	NA
Cyprinodontidae	*Orestias*	NA	NA	NA	NA	NA
Esociformes	*Esox lucius*	EU001959	NA	EU001938	NA	NA
Fundulidae	*Fundulus cingulatus*	NA	NA	NA	NA	NA
Fundulidae	*Fundulus lineolatus*	NA	NA	NA	NA	NA
Fundulidae	*Lucania goodei*	NA	NA	NA	NA	NA

Fundulidae	*Lucania parva*	NA	NA	NA	NA	NA
Gadidae	*Gadus morhua*	EU001960	NA	NA	NA	NA
Gasterosteiformes	*Gasterosteus aculeatus*	EF032951	NA	EF032938	NA	NA
Gonorynchiformes	*Chanos chanos*	EU001958	NA	NA	NA	NA
Goodeidae	*Allodontichthys hubbsi*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys polylepis*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys tamazulae*	NA	NA	NA	NA	NA
Goodeidae	*Allodontichthys zonistius*	NA	NA	NA	NA	NA
Goodeidae	*Alloophorus robustus*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca catarinae*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca diazi*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca dugesii*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca goslinei*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca maculata*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca meeki*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca regalis*	NA	NA	NA	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	NA	NA	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	NA	NA	NA	NA
Goodeidae	*Ameca splendens*	NA	NA	NA	NA	NA
Goodeidae	*Ataeniobius toweri*	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys encaustus*	NA	NA	NA	NA	NA
Goodeidae	*Chapalichthys pardalis*	NA	NA	NA	NA	NA
Goodeidae	*Characodon audax*	NA	NA	NA	NA	NA
Goodeidae	*Characodon lateralis*	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys baileyi*	NA	NA	NA	NA	NA
Goodeidae	*Crenichthys nevadae*	NA	NA	NA	NA	NA
Goodeidae	*Empetrichthys latos*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	NA	NA	NA	NA	NA
Goodeidae	*Girardinichthys viviparus*	NA	NA	NA	NA	NA
Goodeidae	*Goodea atripinnis*	NA	NA	NA	NA	NA
Goodeidae	*Goodea gracilis*	NA	NA	NA	NA	NA
Goodeidae	*Hubbsina turneri*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon amecae*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon furcidens*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon whitei*	NA	NA	NA	NA	NA
Goodeidae	*Ilyodon xantusi*	NA	NA	NA	NA	NA
Goodeidae	*Neotoca bilineata*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus labialis*	NA	NA	NA	NA	NA
Goodeidae	*Profundulus punctatus*	NA	NA	NA	NA	NA

Goodeidae	*Skiffia bilineatus*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia francesae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia lermae*	NA	NA	NA	NA	NA
Goodeidae	*Skiffia multipunctata*	NA	NA	NA	NA	NA
Goodeidae	*Xenoophorus captivus*	NA	NA	NA	NA	NA
Goodeidae	*Xenotaenia resolanae*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca eiseni*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca melanosoma*	NA	NA	NA	NA	NA
Goodeidae	*Xenotoca variatus*	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	NA	NA	NA	NA	NA
Goodeidae	*Zoogoneticus tequila*	NA	NA	NA	NA	NA
Gymnotiformes	Gymnotiformes	EU001978 *Apteronotus albifrons*	NA	NA	NA	NA
Lampriformes	Lampriformes	EU001963 *Regalecus glesne*	NA	NA	NA	NA
Lophiiformes	*Lophius*	EU001975 *Lophius gastrophysus*	NA	NA	NA	NA
Lutjanidae	*Lutjanus*	EF032958 *Lutjanus mahogoni*	NA	EF032945 *Lutjanus mahogoni*	NA	NA
Macrouridae	Macrouridae	EU001969 *Coryphaenoides rupestris*	NA	NA	NA	NA
Moronidae	*Morone*	EF032956 *Morone chrysops*	NA	EF032943 *Morone chrysops*	NA	NA
Mugiliformes	*Mugil*	EU001967 *Mugil curema*	NA	EU001941 *Mugil curema*	NA	NA
Myctophiformes	Myctophiformes	EU001972 *Neoscopelus macrolepidotus*	NA	NA	NA	NA
Ophidiiformes	Ophidiiformes	EF032959 *Brotula multibarbata*	NA	EF032946 *Brotula multibarbata*	NA	NA
Osmeriformes	Osmeriformes	EU001980 *Thaleichthys pacificus*	NA	NA	NA	NA
Pleuronectiformes	Pleuronectiformes	HM050192 Pleuronectes platessa	NA	EU001952 *Pleuronectes platessa*	NA	NA
Poeciliidae	*Alfaro cultratus*	NA	NA	NA	NA	NA
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys normani*	NA	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys spilauchen*	NA	NA	NA	NA	NA
Poeciliidae	*Belonesox belizanus*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	NA	NA	NA	NA	FJ194976
Poeciliidae	*Brachyrhaphis holdridgei*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis rhabdophora*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis roseni*	NA	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	NA	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia kidderi*	NA	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	NA	NA	NA	NA	NA

Poeciliidae	*Cnesterodon decemmaculatus*	NA	NA	NA	NA	NA
Poeciliidae	*Cnesterodon hypselurus*	NA	NA	NA	NA	NA
Poeciliidae	*Cnesterodon septentrionalis*	NA	NA	NA	NA	NA
Poeciliidae	*Dactylophallus denticulatus*	NA	NA	NA	NA	FJ194991
Poeciliidae	*Dactylophallus ramsdeni*	NA	NA	NA	NA	FJ194993
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	NA	NA	NA	FJ194989
Poeciliidae	*Fluviphylax pygmaeus*	NA	NA	NA	NA	NA
Poeciliidae	*Fluviphylax simplex*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia affinis*	EU001961	NA	NA	NA	NA
Poeciliidae	*Gambusia atrora*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia caymanensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia holbrooki*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hubbsi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia hurtadoi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia luma*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia manni*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia marshi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia panuco*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia punctata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia puncticulata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia rhizophorae*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia sexradiata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia vittata*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia wrayi*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia yucatana*	NA	NA	NA	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	NA	NA	NA	NA
Poeciliidae	*Girardinus creolus*	NA	NA	NA	NA	FJ194984
Poeciliidae	*Girardinus metallicus*	NA	NA	NA	NA	FJ194992
Poeciliidae	*Girardinus microdactylus*	NA	NA	NA	NA	FJ194985
Poeciliidae	*Girardinus rivasi*	NA	NA	NA	NA	FJ194986
Poeciliidae	*Girardinus* sp. GMIC19	NA	NA	NA	NA	FJ194990
Poeciliidae	*Glaridichthys falcatus*	NA	NA	NA	NA	FJ194987

doi:10.1038/nature13451

Poeciliidae	*Glaridichthys uninotatus*	NA	NA	NA	NA	FJ194980
Poeciliidae	*Heterandria bimaculata*	NA	NA	NA	NA	NA
Poeciliidae	*Heterandria formosa*	NA	NA	NA	NA	NA
Poeciliidae	*Heterandria jonesi*	NA	NA	NA	NA	NA
Poeciliidae	*Heterophallus milleri*	NA	NA	NA	NA	NA
Poeciliidae	*Heterophallus rachovii*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia caymanensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia dominicensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia garnieri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia grossidens*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pseudolimia heterandria*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia melanogaster*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia melanonotata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia nigrofasciata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia pauciradiata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia perugiae*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia rivasi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia sulfurophila*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia tridens*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia versicolor*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia vittata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia zonata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia bifurca*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia branneri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus reticulata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia sarrafae*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	NA	NA	NA	NA	NA

Poeciliidae	*Neoheterandria cana*	NA	NA	NA	NA	NA
Poeciliidae	*Neoheterandria elegans*	NA	NA	NA	NA	NA
Poeciliidae	*Neoheterandria tridentiger*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hasemani*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hollandi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys minor*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys amates*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys pittieri*	NA	NA	NA	NA	FJ194977
Poeciliidae	*Phallichthys quadripunctatus*	NA	NA	NA	NA	NA
Poeciliidae	*Phallichthys tico*	NA	NA	NA	NA	NA
Poeciliidae	*Phalloceros caudimaculatus*	NA	NA	NA	NA	NA
Poeciliidae	*Phalloptychus januarius*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia butleri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia caucana*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia chica*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gilli*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gracilis*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipinna*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipunctata*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia orri*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia petenensis Campeche*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia salvatoris*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sphenops*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	NA	NA

Poeciliidae	*Poecilia Mollienesia velifera*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara*	NA	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis baenschi*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis balsas*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis catemaco*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis elongata*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis fasciata*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis gracilis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis hnilickai*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis infans*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis latidens*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis lucida*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis monacha*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis occidentalis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis paucimaculata*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis pleurospilus*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis prolifica*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis retropinna*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis scarlii*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis sonoriensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turneri*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turrubarensis*	NA	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis viriosa*	NA	NA	NA	NA	NA
Poeciliidae	*Priapella chamulae*	NA	NA	NA	NA	NA
Poeciliidae	*Priapella compressa*	NA	NA	NA	DQ235836	NA
Poeciliidae	*Priapella intermedia*	NA	AY211356	NA	NA	NA
Poeciliidae	*Priapella olmecae*	NA	NA	NA	NA	NA
Poeciliidae	*Priapichthys annectens*	NA	NA	NA	NA	NA
Poeciliidae	*Priapichthys darienensis*	NA	NA	NA	NA	NA
Poeciliidae	*Priapichthys panamensis*	NA	NA	NA	NA	NA
Poeciliidae	*Priapichthys puetzi*	NA	NA	NA	NA	NA
Poeciliidae	*Pseudopoecilia festae*	NA	NA	NA	NA	NA
Poeciliidae	*Quintana atrizona*	NA	NA	NA	NA	FJ194978
Poeciliidae	*Scolichthys greenwayi*	NA	NA	NA	NA	NA
Poeciliidae	*Scolichthys iota*	NA	NA	NA	NA	NA
Poeciliidae	*Tomeurus gracilis*	NA	NA	NA	NA	NA
Poeciliidae	*Xenodexia ctenolepis*	NA	NA	NA	NA	NA

Poeciliidae	*Xenophallus umbratilis*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus alvarezi*	NA	AY211365	NA	DQ235849	NA
Poeciliidae	*Xiphophorus andersi*	NA	AY211364	NA	DQ235846	NA
Poeciliidae	*Xiphophorus birchmanni*	NA	NA	NA	DQ235854	NA
Poeciliidae	*Xiphophorus clemenciae*	NA	AY211366	NA	DQ235859	NA
Poeciliidae	*Xiphophorus continens*	NA	NA	NA	DQ235839	NA
Poeciliidae	*Xiphophorus cortezi*	NA	NA	NA	DQ235844	NA
Poeciliidae	*Xiphophorus couchianus*	NA	AY211363	NA	DQ235845	NA
Poeciliidae	*Xiphophorus evelynae*	NA	NA	NA	DQ235858	NA
Poeciliidae	*Xiphophorus gordoni*	NA	NA	NA	DQ235842	NA
Poeciliidae	*Xiphophorus hellerii*	NA	AY211361	NA	DQ235848	NA
Poeciliidae	*Xiphophorus maculatus*	NA	AY211359	NA	DQ235856	NA
Poeciliidae	*Xiphophorus malinche*	NA	NA	NA	DQ235843	NA
Poeciliidae	*Xiphophorus mayae*	NA	NA	NA	NA	NA
Poeciliidae	*Xiphophorus meyeri*	NA	NA	NA	DQ235851	NA
Poeciliidae	*Xiphophorus milleri*	NA	NA	NA	DQ235840	NA
Poeciliidae	*Xiphophorus mixei*	NA	AY211380	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	NA	AY211358	NA	DQ235852	NA
Poeciliidae	*Xiphophorus monticolus*	NA	AY211370	NA	NA	NA
Poeciliidae	*Xiphophorus multilineatus*	NA	NA	NA	DQ235850	NA
Poeciliidae	*Xiphophorus nezahualcoyotl*	NA	NA	NA	DQ235853	NA
Poeciliidae	*Xiphophorus nigrensis*	NA	NA	NA	DQ235838	NA
Poeciliidae	*Xiphophorus pygmaeus*	NA	NA	NA	DQ235841	NA
Poeciliidae	*Xiphophorus signum*	NA	AY211357	NA	DQ235847	NA
Poeciliidae	*Xiphophorus variatus*	NA	NA	NA	DQ235857	NA
Poeciliidae	*Xiphophorus xiphidium*	NA	NA	NA	DQ235855	NA
Polymixiidae	*Polymixia*	EU001981 *Polymixia japonica*	NA	EU001948 *Polymixia japonica*	NA	NA
Pristigasteridae	*Chirocentrus dorab*	NA	NA	EU001932	NA	NA
Pristigasteridae	*Pellona*	EU001953 *Pellona flavipinnis*	NA	EU001931 *Pellona flavipinnis*	NA	NA
Rivulidae	*Rivulus hartii*	NA	NA	NA	NA	NA
Salmoniformes	*Oncorhynchus mykiss*	EF032950	NA	EF032937	NA	NA
Scorpaeniformes	Scorpaeniformes	EU001984 *Sebastes ruberrimus*	NA	EU001951 *Sebastes ruberrimus*	NA	NA
Siluriformes	*Ictalurus punctatus*	EF032955	NA	EF032942	NA	NA
Stomiiformes	*Stomiiformes*	EU001968 *Stomias boa*	NA	NA	NA	NA
Synbranchiformes	*Monopterus albus*	EU001983	NA	EU001950	NA	NA
Tetraodontidae	*Takifugu rubripes*	Ensembl 63	NA	Ensembl 63	NA	NA
Tetraodontidae	*Tetraodon nigroviridis*	Ensembl 63	NA	Ensembl 63	NA	NA
Valenciidae	*Valencia hispanica*	NA	NA	NA	NA	NA

Zeidae	*Zeus faber*	EU001982	NA	EU001949	NA	NA
Zoarcoidea	*Lycodes*	EF032957 *Lycodes terraenovae*	NA	EF032944 *Lycodes terraenovae*	NA	NA

Family	**Species**	**sreb**	**tbr1**	**zic1**	**Plagl2Z**
Anablepidae	*Anableps anableps*	NA	NA	NA	NA
Anablepidae	*Anableps dowei*	NA	NA	NA	NA
Anablepidae	*Jenynsia lineata*	NA	NA	NA	NA
Anablepidae	*Jenynsia multidentata*	NA	NA	NA	NA
Anablepidae	*Oxyzygonectes dovii*	NA	NA	NA	NA
Aphredoderidae	*Aphredoderus sayanus*	EU002128	EU001990	EU001873	NA
Aplocheilidae	*Fenerbahce formosus*	NA	NA	NA	NA
Aplocheilidae	*Aphyoplatys duboisi*	NA	NA	NA	NA
Aplocheilidae	*Aphyosemion bitaeniatum*	NA	NA	NA	NA
Aplocheilidae	*Aplocheilus lineatus*	NA	NA	NA	NA
Aplocheilidae	*Epiplatys annulatus*	NA	NA	NA	NA
Aplocheilidae	*Fundulopanchax*	NA	NA	NA	NA
Argentiniformes	*Argentina*	EU002144 *Argentina sialis*	EU002004 *Argentina sialis*	EU366773 *Argentina sialis*	EU366680 *Argentina sialis*
Atheriniformes	Atheriniformes	EU002138 *Labidesthes sicculus*	EU001999 *Labidesthes sicculus*	EU001883 *Labidesthes sicculus*	NA
Aulopiformes	*Synodus*	EU002137 *Synodus foetens*	EU001998 *Synodus foetens*	EU001882 *Synodus foetens*	EU366674 *Synodus intermedius*
Batrachoidiformes	*Porichthys*	NA	EU001992 *Porichthys plectrodon*	EU001876 *Porichthys plectrodon*	NA
Beloniformes	*Oryzias latipes*	EF033031	EF032966	EF032914	EF033018
Beryciformes	Beryciformes	EU002135 *Myripristis violacea*	EU001996 *Myripristis violacea*	EU001880 *Myripristis violacea*	EU002107 *Myripristis violacea*
Characiformes	Characiformes	EU002122 *Pygocentrus nattereri*	NA	AB605470 *Citharinus congicus*	EU002096 *Pygocentrus nattereri*
Cichlidae	Cichlasomatinae	HQ427651 *Cichlasoma Herichthys cyanoguttatus*	EU001991 *Cichlasoma Herichthys cyanoguttatus*	EU001875 *Cichlasoma Herichthys cyanoguttatus*	EU002103 *Cichlasoma Herichthys cyanoguttatus*
Cichlidae	*Oreochromis*	EF033032 Oreochromis *niloticus*	EF032967 *Oreochromis niloticus*	EF032915 *Oreochromis niloticus*	EF033019 *Oreochromis niloticus*
Clupeidae	*Dorosoma cepedianum*	EU002121	NA	EU366767	NA
Cypriniformes	*Danio rerio*	EF033027	EF032962	EF032910	EF033014
Cypriniformes	*Notemigonus crysoleucas*	EU002132	EU001993	EU001877	EU002105
Cypriniformes	*Semotilus atromaculatus*	EF033038	JF949879	EF032921	EF033025
Cyprinodontidae	*Cubanichthys cubensis*	NA	NA	NA	NA
Cyprinodontidae	*Cubanichthys pengelleyi*	NA	NA	NA	NA
Cyprinodontidae	*Cyprinodon variegatus*	NA	NA	NA	NA
Cyprinodontidae	*Floridichthys carpio*	NA	NA	NA	NA
Cyprinodontidae	*Jordanella floridae*	NA	NA	NA	NA
Cyprinodontidae	*Orestias*	NA	NA	NA	NA

Esociformes	*Esox lucius*	EU002125	NA	EU001870	EU002099
Fundulidae	*Fundulus cingulatus*	NA	NA	NA	NA
Fundulidae	*Fundulus lineolatus*	NA	NA	NA	NA
Fundulidae	*Lucania goodei*	NA	NA	NA	NA
Fundulidae	*Lucania parva*	NA	NA	NA	NA
Gadidae	*Gadus morhua*	EU002126	NA	EU001871	EU002100
Gasterosteiformes	*Gasterosteus aculeatus*	AB445200	AB445209	AB445218	EF033016
Gonorynchiformes	*Chanos chanos*	EU002124	EU001988	EU001869	EU002098
Goodeidae	*Allodontichthys hubbsi*	NA	NA	NA	NA
Goodeidae	*Allodontichthys polylepis*	NA	NA	NA	NA
Goodeidae	*Allodontichthys tamazulae*	NA	NA	NA	NA
Goodeidae	*Allodontichthys zonistius*	NA	NA	NA	NA
Goodeidae	*Alloophorus robustus*	NA	NA	NA	NA
Goodeidae	*Allotoca catarinae*	NA	NA	NA	NA
Goodeidae	*Allotoca diazi*	NA	NA	NA	NA
Goodeidae	*Allotoca dugesii*	NA	NA	NA	NA
Goodeidae	*Allotoca goslinei*	NA	NA	NA	NA
Goodeidae	*Allotoca maculata*	NA	NA	NA	NA
Goodeidae	*Allotoca meeki*	NA	NA	NA	NA
Goodeidae	*Allotoca regalis*	NA	NA	NA	NA
Goodeidae	*Allotoca* sp. MNCN3676	NA	NA	NA	NA
Goodeidae	*Allotoca zacapuensis*	NA	NA	NA	NA
Goodeidae	*Ameca splendens*	NA	NA	NA	NA
Goodeidae	*Ataeniobius toweri*	NA	NA	NA	NA
Goodeidae	*Chapalichthys encaustus*	NA	NA	NA	NA
Goodeidae	*Chapalichthys pardalis*	NA	NA	NA	NA
Goodeidae	*Characodon audax*	NA	NA	NA	NA
Goodeidae	*Characodon lateralis*	NA	NA	NA	NA
Goodeidae	*Crenichthys baileyi*	NA	NA	NA	NA
Goodeidae	*Crenichthys nevadae*	NA	NA	NA	NA
Goodeidae	*Empetrichthys latos*	NA	NA	NA	NA
Goodeidae	*Girardinichthys multiradiatus*	NA	NA	NA	NA
Goodeidae	*Girardinichthys viviparus*	NA	NA	NA	NA
Goodeidae	*Goodea atripinnis*	NA	NA	NA	NA
Goodeidae	*Goodea gracilis*	NA	NA	NA	NA
Goodeidae	*Hubbsina turneri*	NA	NA	NA	NA
Goodeidae	*Ilyodon amecae*	NA	NA	NA	NA
Goodeidae	*Ilyodon furcidens*	NA	NA	NA	NA
Goodeidae	*Ilyodon whitei*	NA	NA	NA	NA
Goodeidae	*Ilyodon xantusi*	NA	NA	NA	NA

Goodeidae	*Neotoca bilineata*	NA	NA	NA	NA
Goodeidae	*Profundulus guatemalensis*	NA	NA	NA	NA
Goodeidae	*Profundulus labialis*	NA	NA	NA	NA
Goodeidae	*Profundulus punctatus*	NA	NA	NA	NA
Goodeidae	*Skiffia bilineatus*	NA	NA	NA	NA
Goodeidae	*Skiffia francesae*	NA	NA	NA	NA
Goodeidae	*Skiffia lermae*	NA	NA	NA	NA
Goodeidae	*Skiffia multipunctata*	NA	NA	NA	NA
Goodeidae	*Xenoophorus captivus*	NA	NA	NA	NA
Goodeidae	*Xenotaenia resolanae*	NA	NA	NA	NA
Goodeidae	*Xenotoca eiseni*	NA	NA	NA	NA
Goodeidae	*Xenotoca melanosoma*	NA	NA	NA	NA
Goodeidae	*Xenotoca variatus*	NA	NA	NA	NA
Goodeidae	*Zoogoneticus quitzeoensis*	NA	NA	NA	NA
Goodeidae	*Zoogoneticus tequila*	NA	NA	NA	NA
Gymnotiformes	Gymnotiformes	EU002143 *Apteronotus albifrons*	EU002003 *Apteronotus albifrons*	EU001890 *Apteronotus albifrons*	EU002112 *Apteronotus albifrons*
Lampriformes	Lampriformes	EU002129 *Regalecus glesne*	NA	EU001874 *Regalecus glesne*	EU002102 *Regalecus glesne*
Lophiiformes	*Lophius*	EU002139 *Lophius gastrophysus*	EU002000 *i*	EU001884 *Lophius gastrophysus*	EU002108 *Lophius gastrophysus*
Lutjanidae	*Lutjanus*	EF033036 *Lutjanus mahogoni*	EF032971 *Lutjanus mahogoni*	EF032919 *Lutjanus mahogoni*	EU182637 *Lutjanus mahogoni*
Macrouridae	Macrouridae	NA	NA	NA	NA
Moronidae	*Morone*	EF033034 *Morone chrysops*	EF032969 *Morone chrysops*	EF533901 Morone chrysops	EF536241 Morone chrysops
Mugiliformes	*Mugil*	EU002133 *Mugil curema*	EU001994 *Mugil curema*	EU001878 *Mugil curema*	EU002106 *Mugil curema*
Myctophiformes	Myctophiformes	EU002136 *Neoscopelus macrolepidotus*	NA	EU366771 *Neoscopelus macrolepidotus*	EU366678 *Neoscopelus macrolepidotus*
Ophidiiformes	Ophidiiformes	EF033037 *Brotula multibarbata*	EF032972 *Brotula multibarbata*	EF032920 *Brotula multibarbata*	EF033024 *Brotula multibarbata*
Osmeriformes	Osmeriformes	EU002145 *Thaleichthys pacificus*	EU002005 *Thaleichthys pacificus*	EU366774 *Thaleichthys pacificus*	EU366681 *Thaleichthys pacificus*
Pleuronectiformes	Pleuronectiformes	*EU002148 Pleuronectes platessa*	EU002008 *Pleuronectes platessa*	EU001897 *Pleuronectes platessa*	EU002116 *Pleuronectes platessa*
Poeciliidae	*Alfaro cultratus*	NA	NA	NA	NA
Poeciliidae	*Alfaro hubberi*	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys normani*	NA	NA	NA	NA
Poeciliidae	*Aplocheilichthys spilauchen*	NA	NA	NA	NA
Poeciliidae	*Belonesox belizanus*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis cascajalensis*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis hartwegi*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis holdridgei*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis parismina*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis rhabdophora*	NA	NA	NA	NA

Poeciliidae	*Brachyrhaphis roseni*	NA	NA	NA	NA
Poeciliidae	*Brachyrhaphis terrabensis*	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia kidderi*	NA	NA	NA	NA
Poeciliidae	*Carlhubbsia stuarti*	NA	NA	NA	NA
Poeciliidae	*Cnesterodon decemmaculatus*	NA	NA	NA	NA
Poeciliidae	*Cnesterodon hypselurus*	NA	NA	NA	NA
Poeciliidae	*Cnesterodon septentrionalis*	NA	NA	NA	NA
Poeciliidae	*Dactylophallus denticulatus*	NA	NA	NA	NA
Poeciliidae	*Dactylophallus ramsdeni*	NA	NA	NA	NA
Poeciliidae	*Dactylophallus* sp. DDEN10	NA	NA	NA	NA
Poeciliidae	*Fluviphylax pygmaeus*	NA	NA	NA	NA
Poeciliidae	*Fluviphylax simplex*	NA	NA	NA	NA
Poeciliidae	*Gambusia affinis*	EU002127	EU001989	EU001872	EU002101
Poeciliidae	*Gambusia atrora*	NA	NA	NA	NA
Poeciliidae	*Gambusia caymanensis*	NA	NA	NA	NA
Poeciliidae	*Gambusia eurystoma*	NA	NA	NA	NA
Poeciliidae	*Gambusia geiseri*	NA	NA	NA	NA
Poeciliidae	*Gambusia heterochir*	NA	NA	NA	NA
Poeciliidae	*Gambusia hispaniolae*	NA	NA	NA	NA
Poeciliidae	*Gambusia holbrooki*	NA	NA	NA	NA
Poeciliidae	*Gambusia hubbsi*	NA	NA	NA	NA
Poeciliidae	*Gambusia hurtadoi*	NA	NA	NA	NA
Poeciliidae	*Gambusia luma*	NA	NA	NA	NA
Poeciliidae	*Gambusia manni*	NA	NA	NA	NA
Poeciliidae	*Gambusia marshi*	NA	NA	NA	NA
Poeciliidae	*Gambusia melapleura*	NA	NA	NA	NA
Poeciliidae	*Gambusia nicaraguensis*	NA	NA	NA	NA
Poeciliidae	*Gambusia oligosticta*	NA	NA	NA	NA
Poeciliidae	*Gambusia panuco*	NA	NA	NA	NA
Poeciliidae	*Gambusia punctata*	NA	NA	NA	NA
Poeciliidae	*Gambusia puncticulata*	NA	NA	NA	NA
Poeciliidae	*Gambusia rhizophorae*	NA	NA	NA	NA
Poeciliidae	*Gambusia sexradiata*	NA	NA	NA	NA
Poeciliidae	*Gambusia* sp. LLSTC4571	NA	NA	NA	NA
Poeciliidae	*Gambusia vittata*	NA	NA	NA	NA
Poeciliidae	*Gambusia wrayi*	NA	NA	NA	NA
Poeciliidae	*Gambusia yucatana*	NA	NA	NA	NA
Poeciliidae	*Gambusia zarskei*	NA	NA	NA	NA
Poeciliidae	*Girardinus creolus*	NA	NA	NA	NA

Poeciliidae	*Girardinus metallicus*	NA	NA	NA	NA
Poeciliidae	*Girardinus microdactylus*	NA	NA	NA	NA
Poeciliidae	*Girardinus rivasi*	NA	NA	NA	NA
Poeciliidae	*Girardinus* sp. GMIC19	NA	NA	NA	NA
Poeciliidae	*Glaridichthys falcatus*	NA	NA	NA	NA
Poeciliidae	*Glaridichthys uninotatus*	NA	NA	NA	NA
Poeciliidae	*Heterandria bimaculata*	NA	NA	NA	NA
Poeciliidae	*Heterandria formosa*	NA	NA	NA	NA
Poeciliidae	*Heterandria jonesi*	NA	NA	NA	NA
Poeciliidae	*Heterophallus milleri*	NA	NA	NA	NA
Poeciliidae	*Heterophallus rachovii*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia caymanensis*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia dominicensis*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia garnieri*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia grossidens*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pseudolimia heterandria*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia melanogaster*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia melanonotata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia nigrofasciata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia pauciradiata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia perugiae*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia rivasi*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia sulfurophila*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia tridens*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia versicolor*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia vittata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Limia zonata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia bifurca*	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia branneri*	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus obscura*	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (French Guiana)	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia parae* (Suriname)	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta*	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia picta* (Trinidad and Tobago)	NA	NA	NA	NA

Poeciliidae	*Poecilia Acanthophacelus reticulata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Micropoecilia sarrafae*	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei*	NA	NA	NA	NA
Poeciliidae	*Poecilia Acanthophacelus wingei* (Venezuela)	NA	NA	NA	NA
Poeciliidae	*Neoheterandria cana*	NA	NA	NA	NA
Poeciliidae	*Neoheterandria elegans*	NA	NA	NA	NA
Poeciliidae	*Neoheterandria tridentiger*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys araguaiensis*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hasemani*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys hollandi*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys minor*	NA	NA	NA	NA
Poeciliidae	*Poecilia Pamphorichthys scalpridens*	NA	NA	NA	NA
Poeciliidae	*Phallichthys amates*	NA	NA	NA	NA
Poeciliidae	*Phallichthys pittieri*	NA	NA	NA	NA
Poeciliidae	*Phallichthys quadripunctatus*	NA	NA	NA	NA
Poeciliidae	*Phallichthys tico*	NA	NA	NA	NA
Poeciliidae	*Phalloceros caudimaculatus*	NA	NA	NA	NA
Poeciliidae	*Phalloptychus januarius*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia butleri*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia catemaconis*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia caucana*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia chica*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gilli*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia gracilis*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipinna*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia latipunctata*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia mexicana limanturi*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia mexicana mexicana*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia orri*	NA	NA	NA	NA

Poeciliidae	*Poecilia Mollienesia petenensis Campeche*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia petenensis MP523*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia salvatoris*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sphenops*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia sulphuraria*	NA	NA	NA	NA
Poeciliidae	*Poecilia Mollienesia velifera*	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara*	NA	NA	NA	NA
Poeciliidae	*Poecilia Poecilia vivipara* (Trinidad and Tobago)	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis baenschi*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis balsas*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis catemaco*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis elongata*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis fasciata*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis gracilis*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis hnilickai*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis infans*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis latidens*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis lucida*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis monacha*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis occidentalis*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis paucimaculata*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis pleurospilus*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis presidionis*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis prolifica*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis retropinna*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis scarlii*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis sonoriensis*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turneri*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis turrubarensis*	NA	NA	NA	NA
Poeciliidae	*Poeciliopsis viriosa*	NA	NA	NA	NA
Poeciliidae	*Priapella chamulae*	NA	NA	NA	NA
Poeciliidae	*Priapella compressa*	NA	NA	NA	NA
Poeciliidae	*Priapella intermedia*	NA	NA	NA	NA
Poeciliidae	*Priapella olmecae*	NA	NA	NA	NA

Poeciliidae	*Priapichthys annectens*	NA	NA	NA	NA
Poeciliidae	*Priapichthys darienensis*	NA	NA	NA	NA
Poeciliidae	*Priapichthys panamensis*	NA	NA	NA	NA
Poeciliidae	*Priapichthys puetzi*	NA	NA	NA	NA
Poeciliidae	*Pseudopoecilia festae*	NA	NA	NA	NA
Poeciliidae	*Quintana atrizona*	NA	NA	NA	NA
Poeciliidae	*Scolichthys greenwayi*	NA	NA	NA	NA
Poeciliidae	*Scolichthys iota*	NA	NA	NA	NA
Poeciliidae	*Tomeurus gracilis*	NA	NA	NA	NA
Poeciliidae	*Xenodexia ctenolepis*	NA	NA	NA	NA
Poeciliidae	*Xenophallus umbratilis*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus alvarezi*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus andersi*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus birchmanni*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus clemenciae*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus continens*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus cortezi*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus couchianus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus evelynae*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus gordoni*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus hellerii*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus maculatus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus malinche*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus mayae*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus meyeri*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus milleri*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus mixei*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus montezumae*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus monticolus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus multilineatus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus nezahualcoyotl*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus nigrensis*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus pygmaeus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus signum*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus variatus*	NA	NA	NA	NA
Poeciliidae	*Xiphophorus xiphidium*	NA	NA	NA	NA
Polymixiidae	*Polymixia*	NA	HM050257 *Polymixia nobilis*	EU001893 *Polymixia japonica*	EU366682 *Polymixia japonica*
Pristigasteridae	*Chirocentrus dorab*	EU002118	NA	EU001864	EU002093

Pristigasteridae	*Pellona*	EU002117 *Pellona castelnaeana*	NA	EU001863 *Pellona flavipinnis*	EU002092 *Pellona flavipinnis*
Rivulidae	*Rivulus hartii*	NA	NA	NA	NA
Salmoniformes	*Oncorhynchus mykiss*	EF033028	EF032963	EF032911	EF033015
Scorpaeniformes	Scorpaeniformes	NA	EU002007 *Sebastes ruberrimus*	EU001896 *Sebastes ruberrimus*	EU002115 *Sebastes ruberrimus*
Siluriformes	*Ictalurus punctatus*	EF033033	EF032968	EF032916	EF033020
Stomiiformes	*Stomiiformes*	EU002134 *Stomias boa*	EU001995 *Stomias boa*	EU001879 *Stomias boa*	NA
Synbranchiformes	*Monopterus albus*	EU002147	EU002006	EU001895	EU002114
Tetraodontidae	*Takifugu rubripes*	Ensembl 63	Ensembl 63	Ensembl 63	Ensembl 63
Tetraodontidae	*Tetraodon nigroviridis*	Ensembl 63	Ensembl 63	Ensembl 63	Ensembl 63
Valenciidae	*Valencia hispanica*	NA	NA	NA	NA
Zeidae	*Zeus faber*	EU002146	NA	EU001894	EU002113
Zoarcoidea	*Lycodes*	EF033035 *Lycodes terraenovae*	EF032970 *Lycodes terraenovae*	EF032918 *Lycodes terraenovae*	EF033022 *Lycodes terraenovae*

doi:10.1038/nature13451

Supplementary Table 4 | Gene segments and primers.

GENE	PRIMER NAME	PRIMER SEQUENCE (5'-3')
Cytb	cytb-IF	CAATGAATYTGRGGNGGYTTYTC
	Cytb-IF2	GTHGGNTAYGTCCTCCCMTGAGGAC
	Cytb-IR2	GGARAAKCCHCCTCARATTCAYTG
	CytbMicro-IF2	CAGTAGACAACGCCACCYTAAC
	CytbPamp-IF2	GGGGCTACCGTAATTACCAACC
	HA (16249)	CAACGATCTCCGGTTTACAAGAC
	LA (15058)	GTGACTTGAAAAACCACCGTTG
	LimIF-cytb	CAGTTGACAACGCCACCCTAAC
	LimIR-cytb	GGGTTAGGGTGGCGTTGTCAAC
	MicroIF-cytb	CAATGAATCTGAGGGGGATTTTC
	MicroIR-cytb	GCGTTGTCTACTGAAAATCC
ND2	C-Trp_ND2_REV	CTGAGGGCTTTGAAGGCCC
	C-Trp_Pam_ND2_REV	GTCTAAGGAATTATCCTAAG
	ND2-IF1	CTCCGAAAAATCYTAGCRTAYTC
	ND2-IF2	CTMCGAAAARTYCTYGCATACTC
	ND2-IR1	CGGAGYTGGACTTGGTTAAAHCC
	ND2-IR2	CGKAGTTGKACTTGGTTAAAVCC
	ND2-IRPamp	GTGGGAAGGTTATTGTTAAATAG
	ND2ASN	CGCGTTTAGCTGTTAACTAA
	ND2GLN	CTACCTGAAGAGATCAAAC
	ND2Pamp-IR1	GAGGGGCAAGTTTTTGTCAGG
	ND2Pamp-IR2	GGGAGTTAATGTGTGTGGTGCG
ENC1	CutA-IF	GACCTAGAAAAGAGGCACTG
	CutA-IR	GCTTCATCTACCAGTTCCTTGC
	cutAinF	ATTGGATTAACTATGACCTAGAA
	cutAinM	GCCAAAGAGATAATCCC
	CutAinR	TTAATCCAATTAAGGGCAGC
	LF1	GACATGCTGGAGTTTCAGGA
	LF2	ATGCTGGAGTTTCAGGACAT
	LR1	ACTTGTTRGCMACTGGGTCAAA
	LR2	AGCMACTGGGTCAAACTGCTC
Glyt	BrachrhapIR-Gylt	GGATCCATACCTCGTACTTAAC
	MF1	GGACTGTCMAAGATGACCACMT
	MF2	ACATGGTACCAGTATGGCTTTGT
	MF2-IF	CCAGGCATGGACCTTCACTAC
	MR1	CCCAAGAGGTTCTTGTTRAAGAT
	MR2	GTAAGGCATATASGTGTTCTCTCC
	MR2-IR	CTGCTCATCTTTTTCTAAGTG
	TomgracIR-Gylt	CTGCTCGTCTTTGTCTAAGTG
SH3PX3	FundcingIF-HMG20A	CATCCAAAGGATCAGCCGCCGC
	PF1	GTATGGTSGGCAGGAACYTGAA
	PF2	GACGTTCCCATGATGGCWAAAAT
	PF2-IF	CATCCACAGTATCAGTCGCCTC
	PR1	CAAACAKCTCYCCGATGTTCTC
	PR2	CATCTCYCCGATGTTCTCGTA

	PR2-IR	CTGTGATCTCTGTGCCTCACCTC
	LucGoodIF-HMG20A	CATCCAGAGTATCAGCCGCCGC
MYH6	AF1	CATMTTYTCCATCTCAGATAATGC
	AF2	GGAGAATCARTCKGTGCTCATCA
	AR1	ATTCTCACCACCATCCAGTTGAA
	AR2	CTCACCACCATCCAGTTGAACAT
	Pak6-IF	GAGACGTAYCTGCTGGARAAGTC
	Pak6-IR	GGCTTYTGRTTGGACAGGATYTG
Rag1	H2932 RAG1	GAGAARCGRACAGCCTTYTC
	H3405 RAG1	GCNGAGACTCCTTTGACTCTGTC
	H4054 RAG1	GTGTAGAGCCARTGRTGYTT
	L2492 RAG1	CCWGCTGTITGYYTGGCCATIMG
	L2891 RAG1	AAGGAGTGYTGYGATGGCATGGG
	L3371 RAG1	GARCGYTAYGAAATATGGAG
	Pamp-IFRag1	GCCACCTGTCCAGCCAAGGAGTG
	Pamp-IFRag1	GCCACCTGTCCAGCCAAGGAGTG
	PampRag1-IF2	GGAACGTTATGAAATTTGGAGAAC
	PampRag1-IF2	GGAACGTTATGAAATTTGGAGAAC
	Rag1PampIF	GCCAGTGATGAGGATGAATG
	Rag1GoodIF	GCCGAGGTAGTTTGTGAACTG
Rh	Rh1039R	TGCTTGTTCATGCAGATGTAGA
	Rh193F	CNTATGAATAYCCTCAGTACTACC
	Rh545F	GCAAGCCCATCAGCAACTTCCG
	Rh667R	AYGAGCACUGCAUGCCCU
X-src	FundgairdIF-xsrc	GCTCGGAGATCTCTGTGCACGTAGTTC
	Girardin-xsrcF	GCGAGCCAACCAAAATCAGCCAC
	IFAnableps-xsrx	CCCTAAATGTTCCCACCTTTCATC
	IFFluv-xsrc	CGCCTCCCTCAGCTGGTGGAC
	IFGamhol-xsrc	CGGAGCATTGCACTATACTGTC
	IFJenynsia-xsrx	CCCTAAATGTTCCCTCTTTTCGTCAG
	IFLuc-xsrc	GCCGGAGCATTGAACTATATTG
	IFLimia-xsrx	CAAGCTAAAGGTAAGAAAATATTC
	IFLimia-xsrx	CAAGCTAAAGGTAAGAAAATATTC
	IFPoec-xsrc	GCGTACAGCTGAACCAGCTTC
	IFPoeciliop-xsrx	GCTAATGGTAAGAAAATATTC
	IFXiphoph-xsrc	CGCAGCAAATCTTTAAACAAC
	IR2Cyp-xsrc	GGTCAGAATAAAACCTTAAATC
	IRAnableps-xsrc	CTCAAGTTAGTGGTAGAAAATAC
	IRGamhol1-xsrc	GCTTGAGATGCTATACCTTTTTG
	IRJennynsia-xsrc	CTCAAGTTGGTTGTAAAAAG
	IRLuc-xsrc	CAGCCTCATTACTGAATTTCTC
	Luc-xsrcR	GGRACCATGTCCCCCGAGGCBTTC
	X-src C	CTCAATCAGGCGAGCCAACCAAAATC
	X-src D	ACGGCACCACACAGGTGGCGATCAA

Primer abbreviations:
Micro=*Micropoecilia*
Pamp=*Pamphorichthys*
Lim=*Limia*

Brachrhap=*Brachyrhaphis*
Tomgrac=*Tomerus*
Fundgaird=*Fundulopanchax*
Girardin= *Girardinichthys*
Luc=*Lucania*
Fluv=*Fluviphylax*
Gamhol=*Gambusia*
Poec=*Poecilia*
Xiphoph=*Xiphophorus*
Cyp=*Cyprinodon*
Poeciliop=*Poeciliopsis*

doi:10.1038/nature13451

Supplementary Table 5 | Newick ML phylogram (-ln -444504.220385) for 22 partitions and 293 terminals.

((Gambusia_hurtadoi:0.02826218879161224,Gambusia_vittata:0.00794989836232396):0.00892542478537206,(Gamb
usia_panuco:0.009120988822790221,Gambusia_marshi:0.013145825208463968):0.008916049012979155):0.0023199128889095366,Gambusia_atr
ora:0.0191640064567995):0.0013374203317371158,(Gambusia_rhizophorae:0.010432331402275952,Gambusia_punctata:0.013863133049916154):
0.01694636345551037):0.0022168370675927918,Gambusia_zarskei:0.008568540541550984):8.009036400449254E-
4,((((Gambusia_oligosticta:0.0010070612768986464,Gambusia_caymanensis:2.9877494540642147E-
6):0.001513012891608101,Gambusia_puncticulata:0.003494010209682985):0.005332165240703568,Gambusia_yucatana:0.009936336815033364):
0.006284655600919842,((Gambusia_manni:2.987749454175237E-
6,Gambusia_hubbsi:0.004317183554327753):0.009944352510099064,Gambusia_nicaraguensis:0.019633321963175798):0.0014546006585914872):
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07101381072685653,Gambusia_hispaniolae:0.03118945566930842):0.01097494811209887):0.00253255011569641 9,(((Gambusia_affinis:0.0031003
283820968397,Gambusia_sp_LLSTC4571:0.005224720352875134):0.007206249093415273,Gambusia_holbrooki:0.005722441103516718):0.00762
7106344686663,(Gambusia_geiseri:0.011001491973061439,Gambusia_heterochir:0.011394443558322642):0.00892687510573209):0.00299412873
75988557):0.006408629421472134,(Gambusia_eurystoma:0.005651875222926428,Gambusia_sexradiata:0.003101354211588081):0.031949815374
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eterophallus_rachovii:0.006919956494930268):0.05021831717275638):0.015102409364703862,Belonesox_belizanus:0.0529262671799382):0.0206
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4,Xiphophorus_meyeri:0.00251846114088472):0.0027340616431713594,Xiphophorus_xiphidium:0.005736572888398683):0.00142587964087304,Xi
phophorus_variatus:0.003933070124616744):3.1731611109431235E-
4,Xiphophorus_evelynae:0.002600758049444707):0.002990414420398934 7,Xiphophorus_milleri:0.005186562470925970 6):0.002214030176265202
6,Xiphophorus_maculatus:0.009398235654024312):5.921026197205359E-
4,Xiphophorus_andersi:0.007877560291208563):0.0015560552551795448,(((Xiphophorus_signum:0.002373818897614788,Xiphophorus_mayae:0.0
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6):0.03246784922035051,(Scolichthys_greenwayi:0.0033216818491741407,Scolichthys_iota:0.0013224896084009785):0.04280363900084316):0.00
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sis_sonoriensis:0.0012991280383349846):0.004335371127715426,Poeciliopsis_lucida:0.006478800886702496):0.001549258203819015,Poeciliopsis
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.022014527718049903):0.007740628831817253):0.034625834499014685,((Poeciliopsis_retropinna:0.025028053090745406,Poeciliopsis_elongata:0.
02429543712063431):0.005072270512315624,Poeciliopsis_paucimaculata:0.02927817521605902):0.015267200493962019):0.0042361686251238 8
2,((Neoheterandria_cana:0.0026494122027140854,Neoheterandria_tridentiger:0.0057467453306701):0.03339399629311135,Neoheterandria_elegan
s:0.0430641169757898 2):0.01978711177883119):0.005292832504311229,((((((((((Brachyrhaphis_terrabensis:0.009147157541877338,Brachyrhaphis
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doi:10.1038/nature13451

Supplementary Table 6 | Regression models that explain variation in life history traits within the family Poeciliidae as a function of the natural log-transformed matrotrophy index.

		Regression parameters					Fit parameters			Model comparisons				
Model		Coef	SE	*df* / *df*$_{adj}$*	*F*	*P*	*d*	ln ML	AIC	Best[§] vs Alternative Model	Δ_i[§]	χ^2 for LRT[¶]	*df*	*P* for LRT
Sexual selection index														
OLS	Y-Int	1.3221	0.1092	77 / 77	1.5 x 10^2	0.0000		-108.123	222.246	OU vs OLS	14.396	16.396	1	0.0000
	Slope	-0.3676	0.0856	77 / 77	17.2209	0.0000				OU vs PGLS	29.618	31.618	1	0.0000
PGLS	Y-Int	0.4783	1.1860	77 / 77	0.1626	0.6879		-115.734	237.468					
	Slope	-0.0203	0.1240	77 / 77	0.0269	0.8702								
OU	**Y-Int**	**1.0420**	**0.1431**	**77 / 77**	**53.0443**	**0.0000**	**0.2563**	**-99.925**	**207.850**[†]					
	Slope	**-0.2193**	**0.0908**	**77 / 77**	**5.8362**	**0.0181**								
Relative gonopodium length														
OLS	Y-Int	0.2950	0.0078	105 / 89	1.4 x 10^3	0.0000		123.059	-240.117	OU vs OLS	121.476	123.474	1	0.0000
	Slope	0.0221	0.0049	105 / 89	20.4084	0.0000				OU vs PGLS	4.34	6.336	1	0.0118
PGLS	Y-Int	0.3627	0.0573	105 / 89	40.0315	0.0000		181.628	-357.256					
	Slope	0.0128	0.0057	105 / 89	5.0754	0.0267								
OU	**Y-Int**	**0.3542**	**0.0296**	**105 / 89**	**14.2963**	**0.0003**	**0.8171**	**184.796**	**-361.593**[†]					
	Slope	**0.0133**	**0.0053**	**105 / 89**	**6.3787**	**0.0133**								
Size dimorphism index body weight														
OLS	**Y-Int**	**1.7371**	**0.2026**	**85 / 76**	**73.5359**	**0.0000**		**-173.783**	**353.566**[‡]	OLS vs PGLS	65.235	> 3.841[#]	0[#]	< 0.05[#]
	Slope	**0.5457**	**0.1256**	**85 / 76**	**18.8692**	**0.0000**				OLS vs OU	1.927	0.072	1	0.7884
PGLS	Y-Int	1.5753	3.0848	85 / 76	0.2609	0.6110		-206.401	418.801					
	Slope	0.4426	0.3265	85 / 76	1.8374	0.1793								
OU	Y-Int	1.7427	0.2016	85 / 76	72.5815	0.0000	1.8 x 10^{-7}	-173.747	355.493[‡]					
	Slope	0.5434	0.1263	85 / 76	18.5077	0.0000								
Sexual size dimorphism body weight														
OLS	**Y-Int**	**0.3504**	**0.0277**	**85 / 76**	**1.6 x 10^2**	**0.0000**		**-0.756**	**7.511**[‡]	OLS vs PGLS	60.402	> 3.841[#]	0[#]	< 0.05[#]
	Slope	**0.0833**	**0.0172**	**85 / 76**	**23.4881**	**0.0000**				OLS vs OU	1.318	0.684	1	0.4082
PGLS	Y-Int	0.3898	0.4106	85 / 76	0.9014	0.3454		-30.956	67.913					
	Slope	0.0605	0.0435	85 / 76	1.9378	0.1680								
OU	Y-Int	0.3559	0.0292	85 / 76	1.5 x 10^2	0.0000	3.0 x 10^{-3}	-0.414	8.829[‡]					
	Slope	0.0813	0.0180	85 / 76	20.5089	0.0000								
Log$_{10}$ *male body weight*														
OLS	Y-Int	-0.4640	0.0518	97 / 81	80.2858	0.0000		-69.017	144.035	OU vs OLS	68.922	70.926	1	0.0000
	Slope	-0.0750	0.0313	97 / 81	5.7382	0.0189				OU vs PGLS	2.953	4.96	1	0.0259
PGLS	Y-Int	-0.3332	0.4441	97 / 81	0.5629	0.4553		-36.031	78.061					
	Slope	-0.0838	0.0444	97 / 81	3.5643	0.0626								
OU	**Y-Int**	**-0.5239**	**0.2204**	**97 / 81**	**5.6505**	**0.0198**	**0.8009**	**-33.554**	**75.108**[†]					
	Slope	**-0.0770**	**0.0412**	**97 / 81**	**3.4934**	**0.0652**								
Log$_{10}$ *female body weight*														
OLS	Y-Int	-0.0976	0.0539	85 / 76	3.2793	0.0741		-58.620	123.239	OU vs OLS	8.396	10.396	1	0.0013
	Slope	-0.0281	0.0334	85 / 76	0.7065	0.4032				OU vs PGLS	26.472	28.472	1	0.0000
PGLS	Y-Int	0.0411	0.6261	85 / 76	0.0043	0.9479		-67.658	141.315					
	Slope	0.0014	0.0663	85 / 76	0.0004	0.9841								
OU	**Y-Int**	**-0.1111**	**0.0872**	**85 / 76**	**1.6242**	**0.2064**	**0.4225**	**-53.422**	**114.843**[†]					
	Slope	**-0.0064**	**0.0442**	**85 / 76**	**0.0208**	**0.8857**								
Size dimorphism index standard length														

doi:10.1038/nature13451

OLS	**Y-Int**	**0.2752**	**0.0250**	**97 / 87**	**1.2×10^2**	**0.0000**		**2.139**	**1.723**[‡]	OLS vs PGLS	63.653	> 3.841[#]	0[#]	< 0.05[#]
	Slope	**0.0866**	**0.0159**	**97 / 87**	**29.7530**	**0.0000**				OLS vs OU	1.731	0.268	1	0.6047
PGLS	Y-Int	0.3020	0.3997	97 / 87	0.5709	0.4519		-29.688	65.376					
	Slope	0.0330	0.0420	97 / 87	0.6166	0.4344								
OU	Y-Int	0.2891	0.0289	97 / 87	1.0×10^2	0.0000	0.0519	2.273	3.454[‡]					
	Slope	0.0805	0.0182	97 / 87	19.5994	0.0000								
Sexual size dimorphism standard length														
OLS	**Y-Int**	**0.0977**	**0.0080**	**97 / 87**	**1.5×10^2**	**0.0000**		**115.499**	**-224.997**[‡]	OLS vs PGLS	62.24	> 3.841[#]	0[#]	< 0.05[#]
	Slope	**0.0274**	**0.0051**	**97 / 87**	**29.3606**	**0.0000**				OLS vs OU	1.649	0.35	1	0.5541
PGLS	Y-Int	0.1109	0.1263	97 / 87	0.7712	0.3822		84.379	-162.757					
	Slope	0.0114	0.0133	97 / 87	0.7346	0.3937								
OU	Y-Int	0.1033	0.0095	97 / 87	1.2×10^2	0.0000	0.0815	115.674	-223.348[‡]					
	Slope	0.0250	0.0059	97 / 87	17.9415	0.0000								
Log_{10} male standard length														
OLS	Y-Int	1.4093	0.0154	105 / 89	8.4×10^3	0.0000		50.356	-94.711	OU vs OLS	66.917	68.916	1	0.0000
	Slope	-0.0229	0.0096	105 / 89	5.6631	0.0195				OU vs PGLS	5.687	7.686	1	0.0056
PGLS	Y-Int	1.4557	0.1469	105 / 89	98.2545	0.0000		80.971	-155.941					
	Slope	-0.0183	0.0146	105 / 89	1.5660	0.2141								
OU	**Y-Int**	**1.3924**	**0.0602**	**105 / 89**	**5.4×10^2**	**0.0000**	**0.7563**	**84.814**	**-161.628**[†]					
	Slope	**-0.0187**	**0.1312**	**105 / 89**	**2.0218**	**0.1586**								
Log_{10} female standard length														
OLS	Y-Int	1.5103	0.0165	97 / 87	8.4×10^3	0.0000		43.520	-81.039	OU vs OLS	15.563	17.562	1	0.0000
	Slope	-0.0003	0.0105	97 / 87	0.0009	0.9761				OU vs PGLS	27.36	29.36	1	0.0000
PGLS	Y-Int	1.5629	0.2025	97 / 87	59.5418	0.0000		37.621	-69.242					
	Slope	-0.0027	0.0213	97 / 87	0.0160	0.8996								
OU	**Y-Int**	**1.5057**	**0.0271**	**97 / 87**	**3.1×10^3**	**0.0000**	**0.427**	**52.301**	**-96.602**[†]					
	Slope	**-0.0007**	**0.0141**	**97 / 87**	**0.0023**	**0.9619**								

Best-fit models are indicated in bold.

[*] Degrees of freedom were corrected to allow for soft polytomies[59,60].

[†] Based on Δ_i and LRTs, the OU model is statistically significantly better than the two alternative models.

[‡] Based on Δ_i and LRTs, there is statistically no significant difference in the fit between the OLS and OU models (both are statistically significantly better than PGLS).

Notes on model comparisons (for more details see Lavin *et al.*, 2008):

[§] When comparing models, nested or not, the one with the lowest AIC is considered to be the best. The difference in AIC between models ($\Delta_i = AIC_i - AIC_{min}$, where AIC_i is the AIC value for alternative model *i* and AIC_{min} is the AIC value of the best model) provides an heuristic indicator of the support for the alternative model: $\Delta_i < 2$ suggests that there is substantial support for alternative model *i*; $4 < \Delta_i < 7$ indicates that the alternative model has considerably less support and; $\Delta_i > 10$ signifies that the alternative model is very unlikely[61].

[¶] When one model is a nested subset of the other, likelihood ratio tests (LRTs) can be used to compare them. Twice the difference in ln likelihoods between models (*D* = -2 [maximum likelihood for best model – maximum likelihood for alternative model]) is assumed to be distributed asymptotically as a χ^2 distribution with degrees of freedom equal to the difference in the number of parameters in the two models.

[#] LRTs can also be used to compare PGLS and OLS models, which have the same number of parameters. In such comparisons with 0 df, a difference in likelihoods > 3.841 (which is the ninety-fifth percentile of the distribution of χ^2 with 1 df) is often taken to indicate a significant difference (*P* > 0.05) in the fit of the two models[62].

Fig. S1. ML phylogram (-ln likelihood = 444504.220385) obtained with RAxML for the 22 partitions. Bootstrap support percentages are provided in Fig. S2.

Fig. S2. Maximum likelihood bootstrap support percentages mapped onto the ML tree.