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Freshwater fishes of the Northeastern Mata Atlântica ecoregion, Brazil: an updated checklist with distributional patterns of a highly endemic ichthyofauna

FELIPE VIEIRA-GUIMARÃES[1,3], RONALDO FERNANDO MARTINS-PINHEIRO[2,4] & LUISA MARIA SARMENTO-SOARES[1,2,5]

[1]*Programa de Pós-Graduação em Ciências Biológicas (Biologia Animal), Universidade Federal do Espírito Santo (UFES), Campus Goiabeiras. Av. Fernando Ferrari, 514, Goiabeiras, CEP 29075-910, Vitória, ES, Brazil.*
[2]*Instituto Nossos Riachos. Estrada de Itacoatiara, 356, Itacoatiara, CEP 24348-095, Niterói, RJ, Brazil.*
[3] *felipevieiragui@gmail.com; https://orcid.org/0000-0001-9920-9178*
[4] *pinheiro.martins@gmail.com; https://orcid.org/0000-0003-1839-133X*
[5] *sarmento.soares@gmail.com; https://orcid.org/0000-0002-8621-1794*

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Table of Contents

Abstract

We present an annotated and updated checklist of freshwater fish species occurring in the Northeastern Mata Atlântica ecoregion (NMAF), Eastern Brazil. A total of 305 native freshwater fish species are documented for this ecoregion, of which 210 are endemic. Distribution maps of 298 species are provided. There is a general pattern of increased sampling intensity in coastal zones, gradually diminishing towards the west as elevation increases. A bioregionalization algorithm identified four biogeographic units in the NMAF ecoregion: Northern Bioregion, Central Bioregion, Coastal Tablelands Bioregion and Southern Bioregion. The heterogeneous nature of the ichthyofauna in this area, along with the significant faunal overlap observed between NMAF and adjacent ecoregions, suggests that the approach of ecoregion delimitation may not be fully congruent with the current faunal compositions. This underscores the need for novel regionalization approaches that reinforce outcomes consistent with the diversity patterns evident within the ecoregion.

Key words: Biodiversity, bioregion, Eastern Brazil, endemism, sampling effort

Resumo

Apresentamos uma lista anotada e atualizada de peixes de água doce que ocorrem na ecorregião Mata Atlântica Nordeste (NMAF), Leste do Brasil. Um total de 305 espécies nativas de peixes de água doce são documentados para essa ecorregião, das quais 210 são endêmicas. Mapas de distribuição de 298 espécies são apresentados. Há um padrão geral de maior intensidade de amostragem nas zonas costeiras, diminuindo gradualmente em direção ao oeste à medida que a elevação aumenta. Um algoritmo de biorregionalização identificou quatro unidades biogeográficas na ecorregião NMAF: Biorregião Norte, Biorregião Central, Biorregião dos Tabuleiros Costeiros e Biorregião Sul. A natureza heterogênea da ictiofauna nessa área, associada à significativa sobreposição faunística observada entre a NMAF e as ecorregiões adjacentes, sugere que a abordagem de delimitação de ecorregiões pode não ser totalmente congruente com as composições faunísticas atuais. Isso ressalta a necessidade de novas abordagens de regionalização que reforcem os resultados consistentes com os padrões de diversidade evidentes na ecorregião.

Palavras-chave: Biodiversidade, biorregião, endemismo, esforço amostral, leste do Brasil

Introduction

The Northeastern Mata Atlântica freshwater ecoregion (NMAF) is an ecological and biogeographic unit proposed by Abell *et al.* (2008), which extends from northernmost Rio de Janeiro state to Sergipe state. It encompasses all the basins that flow into the Atlantic Ocean present in this part of the Atlantic Forest biome, between the Rio São Francisco basin to the north and the basins of the Rio Paraíba do Sul and Upper Rio Paraná to the south (Camelier & Zanata 2014a; Sarmento-Soares, Alves, Melo, Moraes, Lima & Ramos 2017). The region has large river systems, such as the Rio Doce, Rio Jequitinhonha, Rio de Contas and Rio Paraguaçu. These basins have most of their headwaters in the Serra do Espinhaço to the west, a highland formation that is part of the eastern margin of the Brazilian Shield and separates the NMAF ecoregion from the Rio São Francisco basin (Buckup 2011). Smaller drainages located in between those, originating from lower altitude areas, include the Recôncavo Baiano, the Coastal Tablelands region and Central-Southern Espírito Santo basins. Most of the hydric systems in Eastern Brazil consist of low-order streams (Menezes 1972; Bizerril 1994), which are home to a wide diversity of small-sized fish, often endemic. Previous compilations and estimates indicate the presence of at least 187 species of freshwater fishes, of which at least 100 were endemic (Albert *et al.* 2011; Camelier & Zanata 2014a; Silva *et al.* 2020), distributed in river basins with different extensions and species-area densities.

Population growth and disordered urban development in the metropolitan areas of the region have led to significant degradation of natural environments. Despite the Atlantic Forest being a hotspot for species diversity, it now retains less than 5% of its original cover intact (Myers *et al*. 2000; Menezes *et al*. 2007). In freshwater ecosystems, which are among the most threatened on the planet (Lévêque *et al*. 2008), the loss of natural habitats has outpaced the exploration and understanding of fish fauna. Habitat loss and the removal of riparian forest, two major anthropogenic impacts on organisms in freshwater environments, lead to a reduction in the allochthonous resources that species rely on (Menezes *et al.* 2007; Lobón-Cerviá *et al.* 2016). These activities also directly impact species distribution and the preservation of native biodiversity and ecosystem services (Giannini *et al.* 2012; Azevedo-Santos *et al.* 2019). These impacts are particularly severe for many stream fish species, which often have limited dispersal capabilities. Consequently, freshwater ecosystems exhibit the highest global extinction rates (Dudgeon *et al*. 2006) and this is particularly true for rare, restricted-range fish species (Nogueira *et al.* 2010; Leitão *et al.* 2016).

Several of the remaining forested fragments shelter stream headwaters, especially areas on the eastern edge of the Brazilian Shield, which are favorable locations for the isolation of populations and vicariance events, with high rates of endemism (Menezes *et al.* 2007; Abell *et al.* 2008; Buckup 2011). In the last decade, more than 70 endemic fish species have been described for the NMAF ecoregion (*e.g*., Zanata & Camelier 2015; Pereira *et al.* 2016, 2017, 2018; Zanata *et al.* 2017, 2018; Costa *et al.* 2019, 2023; Reis & de Pinna 2022), a considerable increase that fills several gaps in the taxonomic knowledge (Linnean shortfall) of the ichthyofauna of Eastern Brazil, which has pronounced endemism (Menezes 1972; Bizerril 1994; Buckup 2011).

Understanding which species occur in a region and how they are distributed establishes baselines for various types of studies. However, we may not always fully comprehend the true extent of the geographic distribution of species (Wallacean shortfall) or the biogeographical and ecological histories they share. In this context, to shed light on these questions, several studies have focused on delineating biogeographical units within the river basins of eastern Brazil based on their ichthyofauna. Authors such as Géry (1969), Vari (1988), Menezes (1988), Weitzman *et al.* (1988), Bizerril (1994), Carvalho (2007), and more recently Camelier & Zanata (2014a) have proposed various biogeographical units, encompassing nearly a few or most of the major coastal basins in this region. However, the intricacy and heterogeneity of the ichthyofauna in the NMAF ecoregion, as highlighted by Camelier & Zanata (2014a), calls for a more comprehensive, detailed and novel approach to bioregionalization, which is a method that categorizes areas based on the occurrence of taxa, usually endemic (Morrone 1994, 2018; Escalante 2009). Another argument for the need of a more in-depth biogeographical regionalization in the area is that a significant number of small basins within the ecoregion provide habitat for numerous endemic species, and yet these often isolated watercourses are typically overlooked in broader-scale biogeographical analyses, as well as the interconnectivity of large aquatic systems.

In this study, we provide a revised and updated annotated list of native freshwater fishes from this ecoregion described up to March 2024, presenting data on their distribution, conservation status and literature sources. Additionally, we present an evaluation of the sampling effort conducted to date and propose a hypothesis of regionalization of the ecoregion according to the freshwater ichthyofauna, highlighting biogeographic and diversity patterns in the basins of the Northeastern Mata Atlântica ecoregion.

Material and methods

Study area. The Northeastern Mata Atlântica freshwater ecoregion (Fig. 1) encompasses an area exceeding 454,000 km² (Albert *et al.* 2011). It extends from the Rio Itabapoana basin in the northern region of Rio de Janeiro and the southern part of Espírito Santo to the Rio Japaratuba basin in northern Sergipe. The ecoregion is drained by more than 50 river basins and microbasins. To the west, the Serra do Espinhaço acts as a significant boundary, separating it from the Rio São Francisco basin ecoregion and giving rise to various drainage systems along its slopes. Its southern border is adjacent to the Rio Paraíba do Sul ecoregion, separated by the Rio Itabapoana basin, and the Upper Rio Paraná ecoregion, abutting the Serra da Mantiqueira, which separates it from the Rio Doce basin. This ecoregion is situated within three Brazilian biomes: Caatinga to the northwest, Atlantic Forest along the coastal and southern regions, which encompasses most of the NMAF, and a patch of Cerrado to the west. Throughout the region, a range of phytophysiognomies and landscapes are found. The basins in the southern portion of the NMAF ecoregion present significant ichthyofaunal resemblance to the Rio Paraíba do Sul basin (Bizerril 1999; Sarmento-Soares & Martins-Pinheiro 2013a), as well as other southeastern Brazilian ecoregions such as the Fluminense, Southeastern Mata Atlântica, and the Rio Ribeira do Iguape ecoregion (Albert & Carvalho 2011). At its northern portion, the fish fauna is shared to a great extent with the Rio São Francisco ecoregion (Camelier & Zanata 2014a; Silva *et al*. 2020).

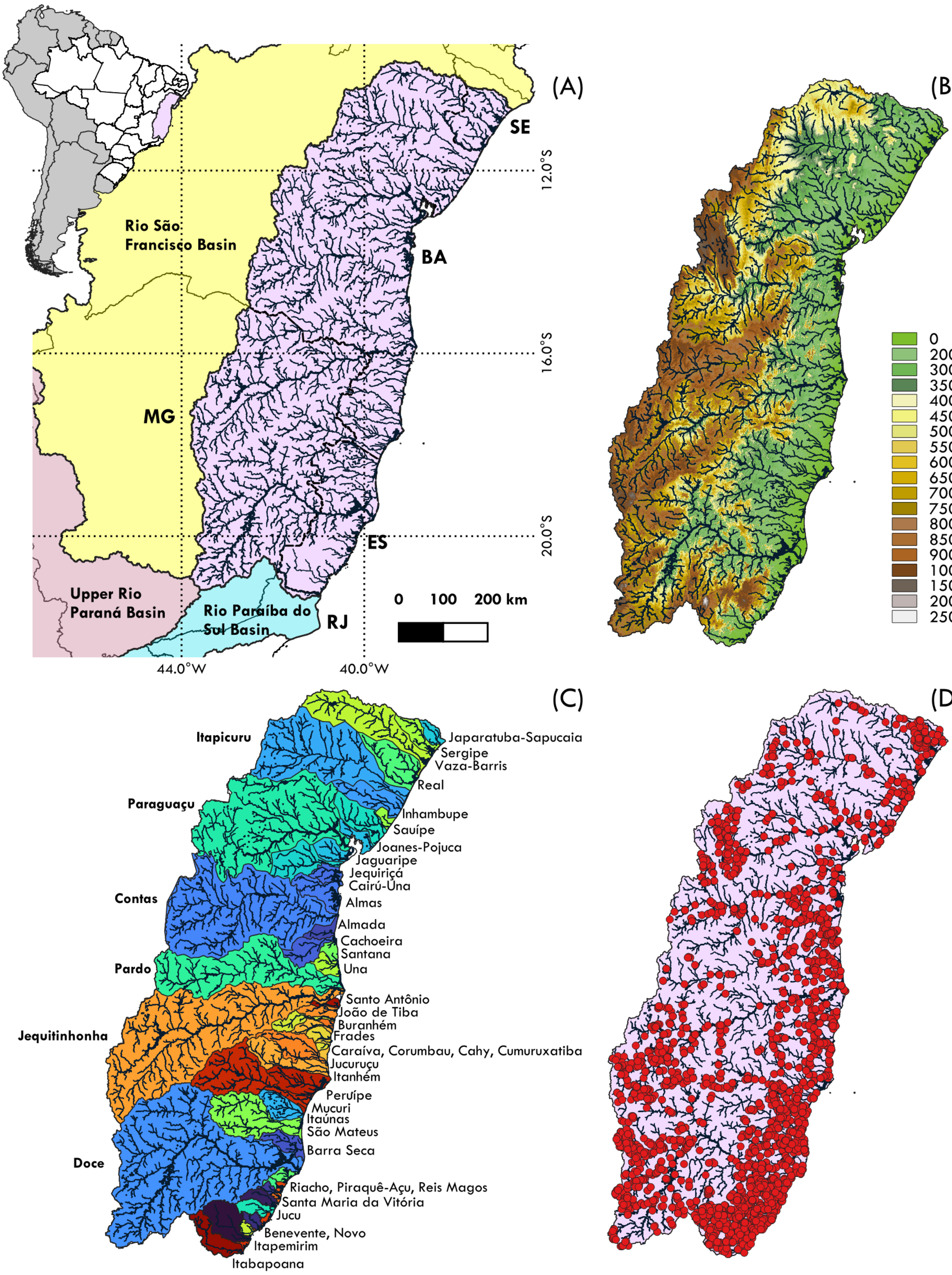

FIGURE 1. Maps of the Northeastern Mata Atlântica ecoregion. (A) Geographic location of the ecoregion in Brazil and South America, adjacent ecoregions, hydrographic system, and state political division. BA (Bahia), ES (Espírito Santo), MG (Minas Gerais), RJ (Rio de Janeiro), SE (Sergipe); (B) Hypsometric map of the ecoregion; (C) Basins draining the ecoregion; (D) Sampling records of freshwater fishes in the ecoregion. Each point may represent more than one sampling site.

Data compilation. A preliminary list of species present in the ecoregion was compiled based on occurrence information in the literature (Bizerril 1994; Santos & Caramaschi 2007, 2011; Sarmento-Soares *et al*. 2007, 2008, 2009a, 2009b, 2010, 2012, 2020, 2022; Sarmento-Soares & Martins-Pinheiro 2009, 2010, 2012, 2013a, 2013b, 2014, 2019; Andrade 2010; Cetra *et al*. 2009, 2010; Pompeu 2010; Trindade *et al.* 2010; Vieira 2010; Burger *et al*. 2011; Camelier & Zanata 2014a; Roldi *et al*. 2014; Silva *et al*. 2015; Sarmento-Soares, Martins-Pinheiro & Rodrigues 2017; Silva *et al*. 2020; Silva *et al*. 2021; Vita *et al*. 2020, 2021; Rodrigues *et al*. 2021; Guimarães, Sarmento-Soares, Martins-Pinheiro & Duboc 2022; Santos *et al.* 2023, plus a large number of taxonomic papers). We subsequently built up a dataset with 18,980 georeferenced records of freshwater fish species native to the Northeastern Mata Atlântica ecoregion, of which 7,540 are within the boundaries of the NMAF, using data from the literature, ichthyological collections and online databases. The authors examined a few dubious records at the ichthyological collections of the Museu de Biologia Mello Leitão (MBML) and Museu Nacional da Universidade Federal do Rio de Janeiro (MNRJ). Taxonomic status, classification, and species name updates follow Fricke *et al*. (2024). In cases where no georeferenced coordinates for specimens in species descriptions or databases were available, an approximate coordinate was assigned using the locality information. Other records were obtained from the online databases SpeciesLink (https://splink.cria.org.br), GBIF (https://www.gbif.org), and SiBBr (https://sibbr.gov.br), with proper procedures for data filtering and cleaning. For this study, we exclusively considered native freshwater species, while also discussing the presence of non-autochthonous species.

For each species, we present its conservation status according to ICMBio (2018) and MMA (2022), following the criteria established by IUCN (2022), bioregions where it occurs in the NMAF, occurrence in adjacent ecoregions, references on the distribution of the species in the NMAF ecorregion and a map highlighting its distribution within the ecoregion. A detailed list of species occurrence in the NMAF basins is available online in Supplementary Material 1, in the FigShare data repository (https://doi.org/10.6084/m9.figshare.23998905).

Data cleaning. We carried out a rigorous routine of filtering and cleaning the records in the R software (R Core Team 2023) using the Coordinate Cleaner package (Zizka *et al.* 2019), removing entries with missing or inaccurate locality information, duplicate coordinates for each species to avoid pseudoreplication in the analyses, coordinates automatically positioned in municipality centroids, coordinates in the ocean, records outside the known distribution of the species according to published literature, and records unassociated with material preserved in museums (*e.g.*, human observation records, indirect citations). Each record was visually checked in Google Earth Pro software using shapefiles of the river basins, to ensure as much accuracy as possible in the data set.

Bioregionalization. The subdivision of the NMAF into smaller biogeographic units was accomplished using the Infomap Bioregions algorithm (Edler *et al*. 2017). This algorithm uses species distribution data, even in cases of inconsistent sampling efforts. It employs an adaptive resolution method that generates a bipartite network of species and grids, followed by a clustering analysis to create bioregions based on the presence of specific taxa. In this analysis, we considered only endemic fish species of the NMAF and only those occurring in two or more drainages, as non-endemic and restricted species are not biogeographically informative for this purpose. The following parameters were employed: cell size ranging from 1° to 2° and cell capacity ranging from 5 to 500 samples. The remaining settings followed the program defaults.

All species native to the ecoregion were included in the analyses, except for *Brycon devillei* (Castelnau, 1855) and *Trichogenes beagle* de Pinna, Reis & Britski, 2020. These exclusions were based on the absence of valid and published georeferenced records or uncertainties regarding their type-localities. Additionally, we removed *Astyanax* aff. *A. bimaculatus*, *Astyanax* aff. *A. lacustris*, *Pimelodella bahiana* (Castelnau, 1855), *Psalidodon* aff. *P. fasciatus*, and *Deuterodon parahybae* Eigenmann, 1908, due to the inconclusive nature of their geographic distributions and taxonomy, whose investigation is beyond the scope of this paper. These species pose challenges in their accurate classification and may represent cryptic taxa or synonyms. The output maps were produced using the QGIS software (Qgis Development Team 2022).

Results

Taxonomic composition. This checklist includes 305 native species from the Northeastern Mata Atlântica ecoregion, from which 210 (69%) are endemics (Table 1). These species are distributed across seven orders, 27 families, and 103 genera. The orders with the highest species richness were Siluriformes (141 species, 46.2% of the total species), Characiformes (115 species, 37.7%), and Cyprinodontiformes (29 species, 9.5%), accounting for 93.4% of all species.

Characidae (62 species, 20.3%), Loricariidae (57 species, 18.7%), Trichomycteridae (48 species, 15.7%), and Rivulidae (22 species, 7.2%) were the most species-rich families, accounting for approximately 61.9% of the total species in the region. *Trichomycterus* (29 species), *Astyanax* (14 species), and *Parotocinclus* (13 species) are the most speciose genera. Figures 6 to 20 depict the distribution of 298 species in the NMAF ecoregion. Most of the non-endemic species in the NMAF are shared with one or more adjacent ecoregions: 44 species with the Rio São Francisco (14.4%), 28 species with the Upper Rio Paraná (9.2%), and 57 species with the Rio Paraíba do Sul (18.7%).

Endemic species. The 210 endemic species (Figs. 2–4) are distributed across five orders, 21 families, and 72 genera, out of which 12 are exclusive to the ecoregion: *Chauliocheilos*, *Copionodon*, *Euryochus*, *Glaphyropoma*, *Henochilus*, *Hirtella*, *Kalyptodoras*, *Mucurilebias*, *Nematocharax*, *Prorivulus*, *Wertheimeria*, and *Xenurolebias*. Siluriformes (109 species, 51.9%) and Characiformes (67 species, 31.9%) are the orders with the highest richness of endemic species in the region. The most species-rich families are Loricariidae (47 species, 22.4%) and Characidae (38 species, 18.1%). *Trichomycterus* (27 species), *Astyanax* (12 species), and *Parotocinclus* (12 species) and *Pareiorhaphis* (11 species) are the most species-rich genera in terms of endemism within the NMAF.

Bioregionalization. Four bioregions have been delineated based on patterns of distribution of endemic freshwater fish fauna (Fig. 5, Table 1). From north to south, these areas are herein referred to as Northern Bioregion, Central Bioregion, Coastal Tablelands Bioregion and Southern Bioregion. These encompass entire basins or stretches of adjacent drainages, such as headwater streams, that share a biogeographically congruent pool of species.

Northern Bioregion: This bioregion, located in the northernmost part of the NMAF, consists of the basins of Rio Japaratuba, Rio Sergipe, Rio Vaza-Barris, Rio Piauí, Rio Real, Rio Itapicuru, Rio Inhambupe, Rio Paraguaçu, basins of the Recôncavo Baiano Sul region and the upper and left-margin tributaries of the Rio de Contas basin. Species supporting this grouping include *Hyphessobrycon parvellus*, present in all basins that compose the bioregion, as well as *Characidium bahiense* and *Parotocinclus bahiensis*, found in almost all basins except in the upper Rio de Contas and its left bank tributaries. This area exhibits the highest endemism rate in the ecoregion, with 109 native species, 59 of which (54.1%) are endemic to this unit. The genera *Copionodon*, *Glaphyropoma*, *Kalyptodoras*, and *Prorivulus* are exclusively found in this bioregion. The basins of the Northern bioregion share 36 species with the Rio São Francisco ecoregion, 20 with the Upper Rio Paraná ecoregion, and 11 with the Rio Paraíba do Sul ecoregion (Table 1).

Central Bioregion: This bioregion comprises the middle and lower Rio de Contas, Rio Cachoeira, Rio Almada, Rio Santana, Rio Una, Rio Pardo, and upper Rio Jequitinhonha. Species that delineate the area include *Oligosarcus macrolepis*, occurring in all basins of the bioregion, along with *Nematocharax venustus*, *Pareiorhaphis bahiana*, and *Parotocinclus cristatus*, present in almost all main basins except in the upper Rio Jequitinhonha. A subgroup formed by Rio Pardo and upper Rio Jequitinhonha is supported by the species *Prochilodus hartii* and *Wertheimeria maculata*. The bioregion presents 98 species, 41 (41.8%) of them endemic to this unit. The monotypic genera *Chauliocheilos*, *Hirtella*, and *Wertheimeria* are endemic to this area. It shares 23 species with the Rio São Francisco ecoregion, 17 with the Upper Rio Paraná ecoregion, and 16 with the Rio Paraíba do Sul ecoregion.

Coastal Tablelands Bioregion: This area comprises the middle and lower Rio Jequitinhonha, Rio Santo Antônio, Rio João de Tiba, Rio Buranhém, Rio Trancoso, Rio dos Frades, Rio Caraíva, Rio Corumbau, Rio Cahy, Rio Jucuruçu, Rio Itanhém, Rio Peruípe, Rio Mucuri, Riacho Doce, Rio Itaúnas, Rio São Mateus, Rio Barra Seca, lower Rio Doce, Rio Riacho, Rio Piraquê-Açu, and Rio Reis Magos. This bioregion is defined by species such as *Moenkhausia vittata*, *Otothyris travassosi*, and *Phalloceros ocellatus*, which are present in all the main basins of the bioregion, along with *Characidium cricarense* and *Pogonopoma wertheimeri*, supporting the subgroup formed by the Mucuri, Itaúnas, São Mateus, and lower Doce drainages. It comprises 113 species, 31 of which (27.4%) are found exclusively in this area. The rivulid genera *Mucurilebias* and *Xenurolebias* are endemic to this bioregion. It shares 17 species with the Rio São Francisco ecoregion, 17 with the Upper Rio Paraná ecoregion, and 42 with the Rio Paraíba do Sul ecoregion.

Southern Bioregion: This area is formed by the upper and middle Rio Doce, Rio Santa Maria da Vitória, Rio Jucu, Rio Benevente, Rio Novo, Rio Itapemirim, and Rio Itabapoana. This biogeographic unit is supported by *Characidium timbuiense*, found in all basins, as well as in the Rio Reis Magos in the Coastal Tablelands bioregion, along with *Astyanax microschemos*, *Trichomycterus brunoi*, and *T. caudofasciatus*, occurring in the basins of Rio Itapemirim, Rio Itabapoana, and middle Rio Doce. A subgroup of basins formed by the Rio Santa Maria da Vitória and Rio Jucu share the species *Neoplecostomus espiritosantensis* and *Trichomycterus pantherinus*. The area presents 107 species, with 35 (32.7%) of them endemic to the bioregion. The genus *Henochilus* is endemic to this area. The bioregion shares 17 species with the Rio São Francisco ecoregion, 18 species with the Upper Rio Paraná ecoregion, and 53 species with the Rio Paraíba do Sul ecoregion.

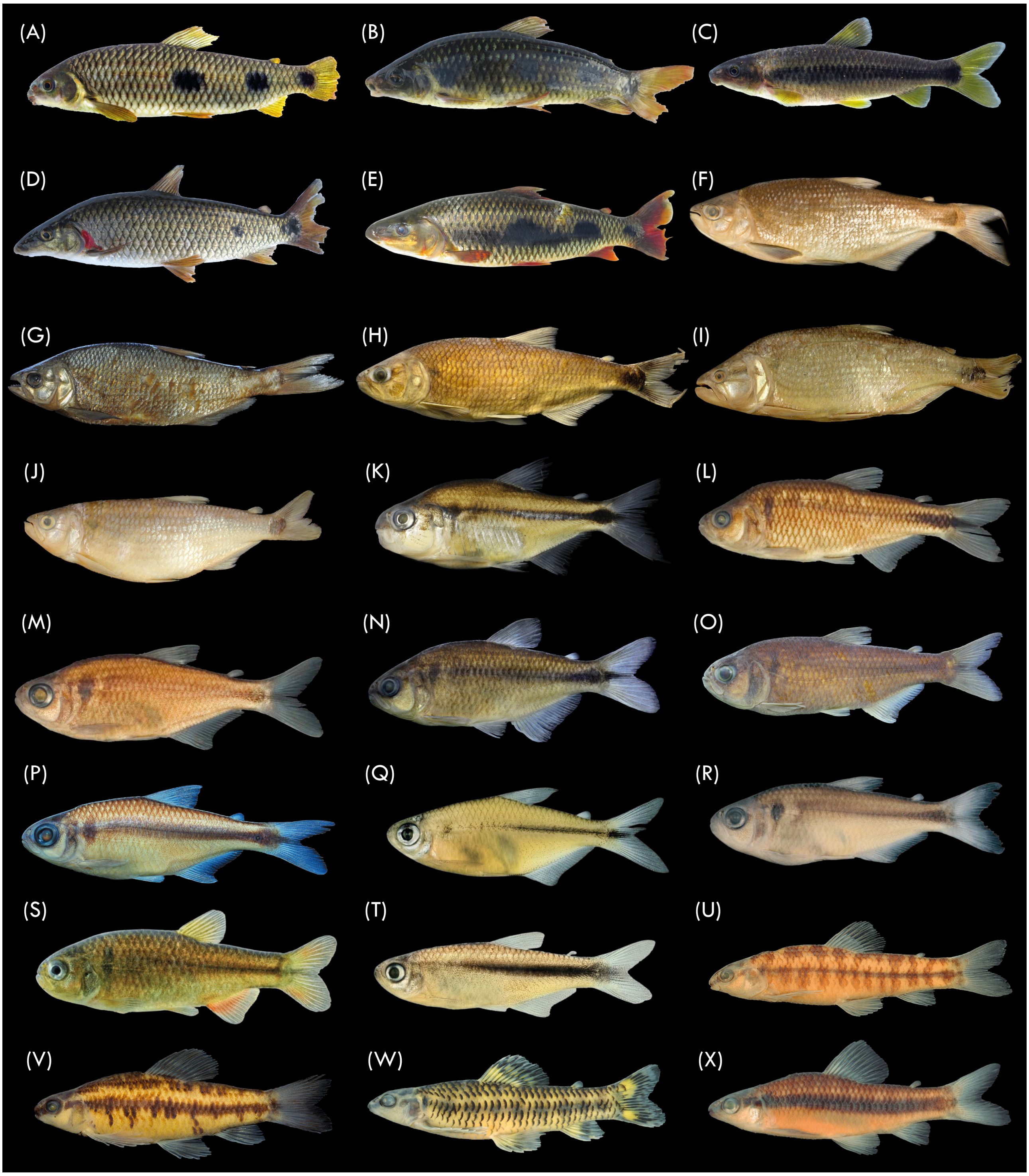

FIGURE 2. Sample of Characiformes species endemic to the Northeastern Mata Atlântica ecoregion. (A) *Hypomasticus santanai*, (B) *Leporinus bahiensis*, (C) *Leporinus melanopleurodes*, (D) *Megaleporinus brinco*, (E) *Megaleporinus gaiero* (Photos by J.L.O. Birindelli); (F) *Brycon dulcis*; (G) *Brycon ferox*; (H) *Brycon howesi*; (I) *Brycon vermelha*; (J) *Brycon vonoi* (Photos by Lima 2017); (K) *Astyanax brucutu* (Photo by Zanata *et al*. 2017); (L) *Astyanax epiagos*; (M) *Astyanax jacobinae* (Photos by Zanata & Camelier 2008); (N) *Astyanax lorien*; (O) *Astyanax rupestris* (Photos by Zanata *et al*. 2018); (P) *Astyanax varii* (Photo by Zanata *et al*. 2019); (Q) *Astyanax vermillion*; (R) *Deuterodon burgerai* (Photos by Zanata & Camelier 2009); (S) *Hasemania piatan* (Photo by Zanata & Serra 2010); (T) *Hyphessobrycon brumado* (Photo by Zanata & Camelier 2010); (U) *Characidium deludens* (Photo by Zanata & Camelier 2015); (V) *Characidium helmeri* (Photo by Zanata *et al*. 2015); (W) *Characidium kamakan* (Photo by Zanata & Camelier 2015); (X) *Characidium samurai* (Photo by Zanata & Camelier 2014).

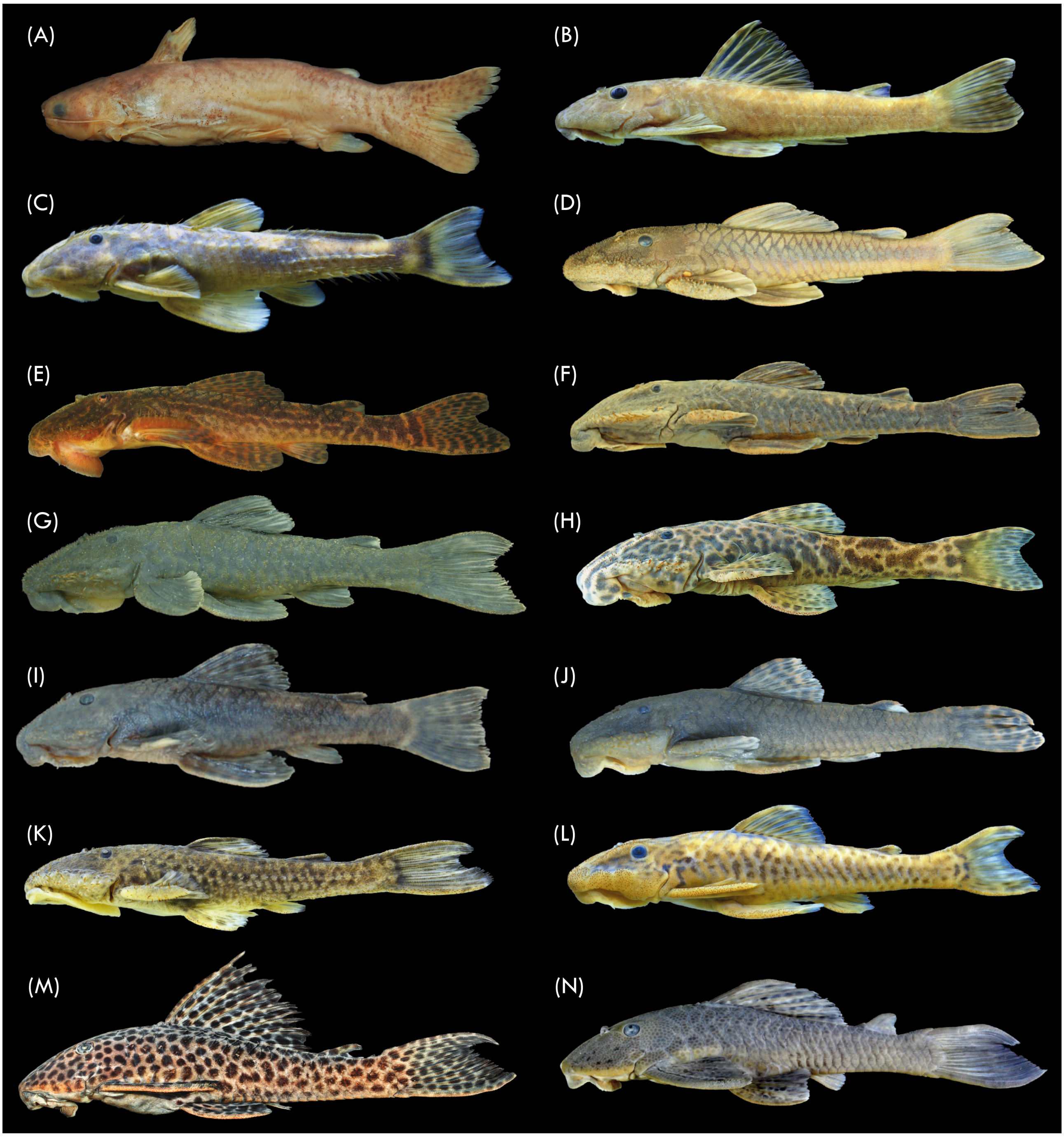

FIGURE 3. Sample of Siluriformes species (Auchenipteridae and Loricariidae) endemic to the Northeastern Mata Atlântica ecoregion. (A) *Glanidium botocudo* (Photo by Sarmento-Soares & Martins-Pinheiro 2013c), (B) *Euryochus thysanos* (Photo by Pereira & Reis 2017); (C) *Hirtella carinata* (Photo by Pereira *et al*. 2014); (D) *Pareiorhaphis lineata* (Photo by Pereira *et al*. 2017); (E) *Pareiorhaphis lophia* (Photo by Pereira & Zanata 2014); (F) *Pareiorhaphis mucurina* (Photo by Pereira *et al*. 2018); (G) *Pareiorhaphis nasuta* (Photo by Pereira *et al*. 2007); (H) *Pareiorhaphis proskynita* (Photo by Pereira & Britto 2012); (I) *Pareiorhaphis ruschii* (Photo by Pereira *et al*. 2012); (J) *Pareiorhaphis scutula* (Photo by Pereira *et al*. 2010); (K) *Pareiorhaphis vetula* (Photo by Pereira *et al*. 2016); (L) *Parotocinclus adamanteus* (Photo by Pereira *et al*. 2019); (M) *Hypostomus jaguar* (Photo by Zanata *et al*. 2013); (N) *Hypostomus leucophaeus* (Photo by Zanata & Pitanga 2016).

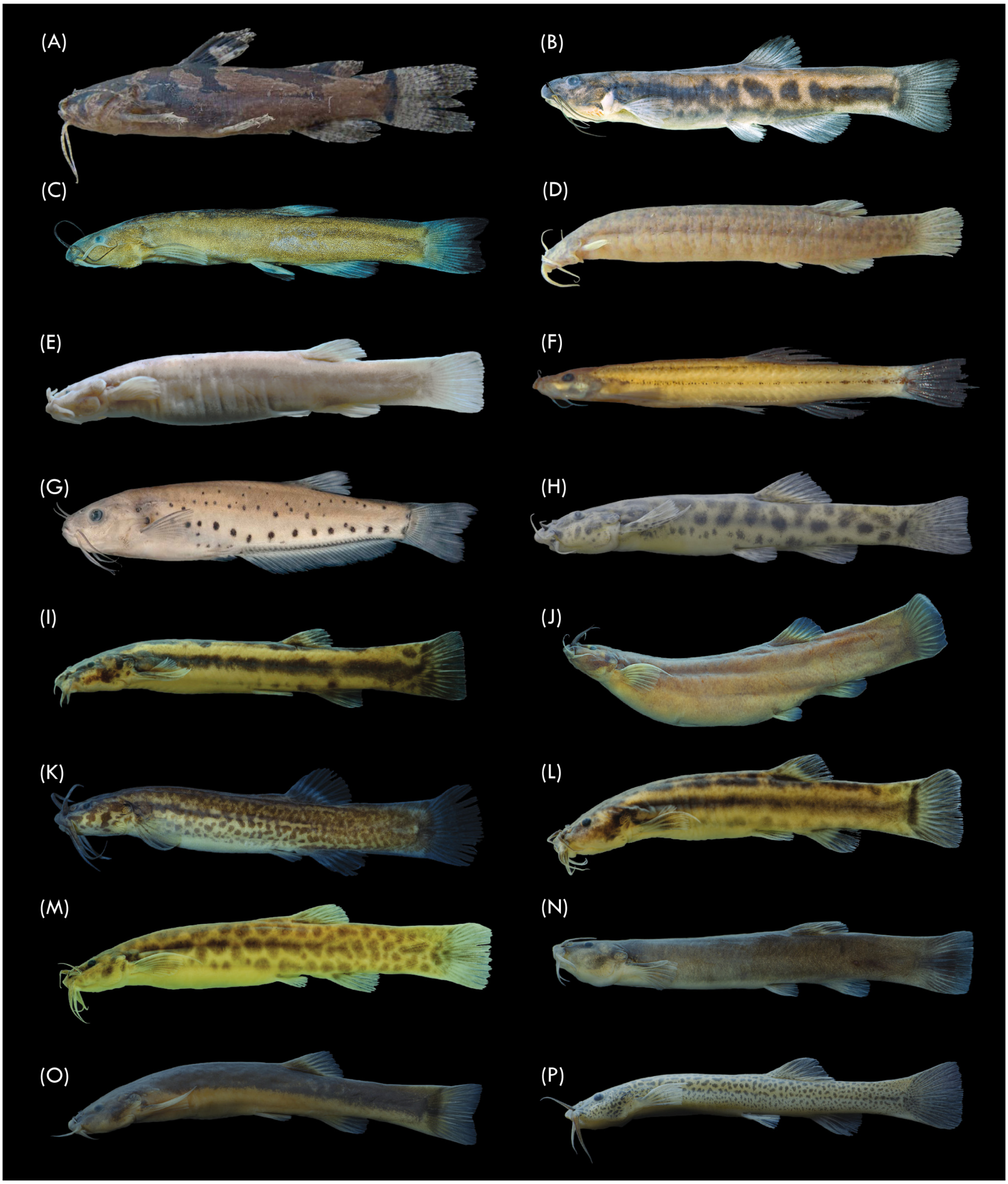

FIGURE 4. Sample of Siluriformes species (Pseudopimelodidae and Trichomycteridae) endemic to the Northeastern Mata Atlântica ecoregion. (A) *Microglanis pataxo* (Photo by Sarmento-Soares *et al*. 2006a); (B) *Copionodon elysium* (Photo by de Pinna, Burger & Zanata 2018); (C) *Copionodon exotatos* (Photo by de Pinna, Abrahão, Reis & Zanata 2018); (D) *Ituglanis cahyensis* (Photo by Sarmento-Soares *et al*. 2006b); (E) *Ituglanis payaya* (Photo by Sarmento-Soares *et al*. 2011); (F) *Microcambeva watu* (Photo by Medeiros *et al*. 2021); (G) *Trichogenes claviger* (Photo by de Pinna *et al*. 2010); (H) *Trichomycterus astromycterus*; (I) *Trichomycterus barrocus*; (J) *Trichomycterus brucutu*; (K) *Trichomycterus brunoi*; (L) *Trichomycterus illuvies*; (M) *Trichomycterus ipatinga*; (N) *Trichomycterus melanopygius*; (O) *Trichomycterus tantalus*; (P) *Trichomycterus vinnulus* (Photos by Reis & de Pinna 2022).

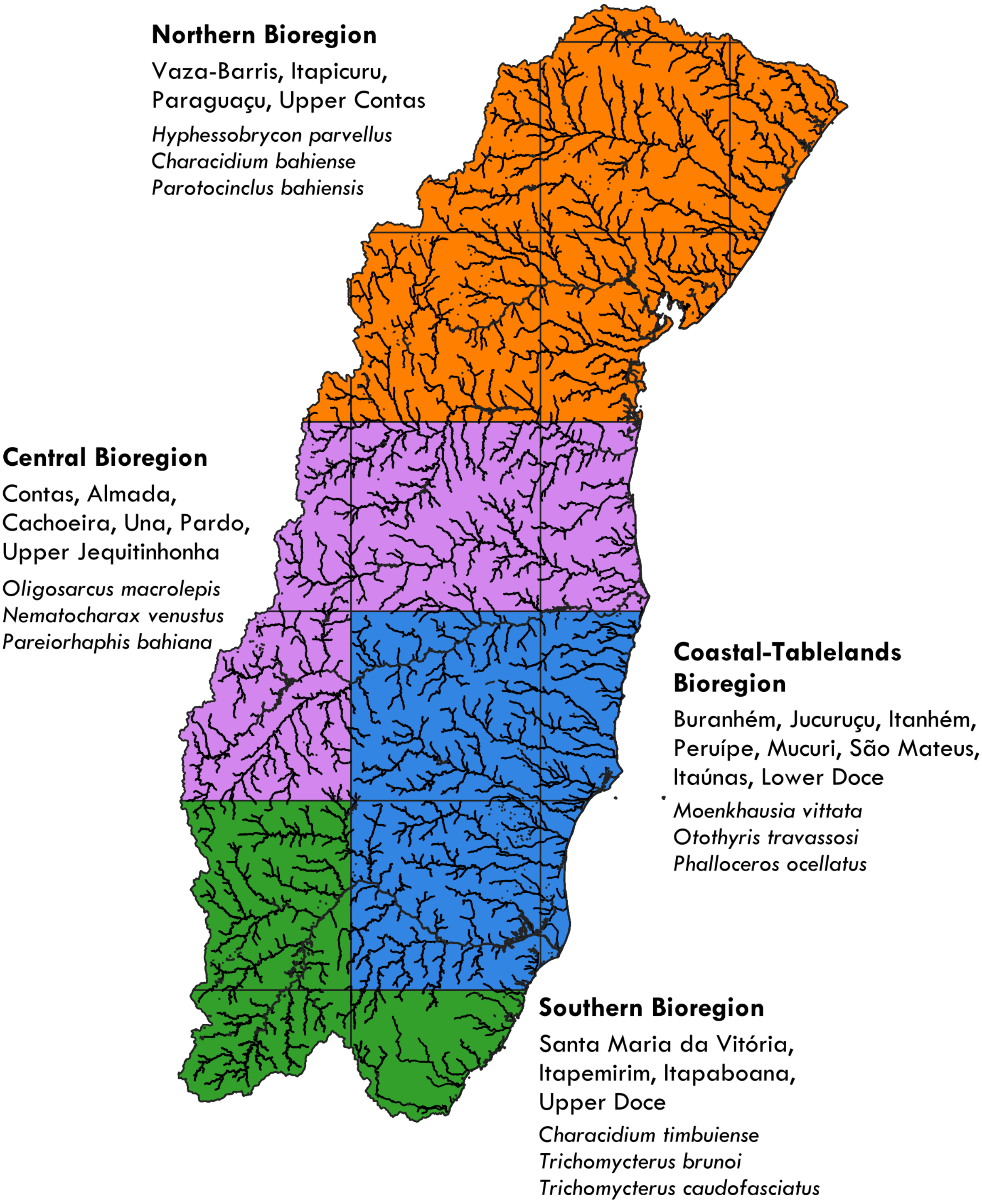

FIGURE 5. Bioregions of the freshwater ichthyofauna of the Northeastern Mata Atlântica ecoregion, their main drainages and supporting species.

Discussion

Taxonomic patterns. Following patterns commonly found in drainage systems of the Neotropical region, especially within the Atlantic Forest biome, Characiformes and Siluriformes are the most representative orders in the Northeastern Mata Atlântica freshwater ecoregion (Bizerril 1994; Lowe-McConnell 1999; Menezes *et al*. 2007). Likewise, Characidae and Loricariidae are the families with the highest species richness, agreeing with various comprehensive (*e.g.*, Castro 1999, 2021; Albert *et al.* 2011; Camelier & Zanata 2014a; Silva *et al*. 2020) and more regional studies (*e.g.*, Sarmento-Soares *et al*. 2007, 2008, 2009a; Andrade 2010; Pompeu 2010; Vieira 2010; Burger *et al*. 2011; Sarmento-Soares & Martins-Pinheiro 2009, 2012, 2013a). The western region of the NMAF is dominated by the eastern edge of the Brazilian Shield (Ribeiro 2006; Buckup 2011), with elevations exceeding 2800m. Areas such as the Chapada Diamantina and headwaters of the Rio de Contas, Rio Pardo, Rio Jequitinhonha, and Rio Doce basins are situated at higher altitudes, as evidenced in Fig. 1, resulting in a diverse array of taxa adapted to steep fluvial gradients/rapids, which are common feature throughout Atlantic Forest watersheds (*e.g.*, Casatti 2005). As previously reported by Camelier & Zanata (2014a), Siluriformes exhibit a higher species richness in the southern basins of the ecoregion, primarily because of the significant diversity of Loricariidae found in those drainages. Additionally, we have identified a considerable presence of loricariids in the upper areas of the major rivers in the western region of the NMAF, as well as in higher altitudes of smaller basins (*e.g.*, Rio Mucuri, Rio Itapemirim). There are 32 species predominantly restricted to areas in the ecoregion of at least 450 m above sea level, accounting for approximately 56.1% of the total loricariid species. The exception is the Chapada Diamantina, where Characiformes species are dominant (Vita *et al.* 2021; Santos *et al*. 2023).

The number of species described within the ecoregion has shown a significant increase since the last estimates. Albert *et al.* (2011) estimated the presence of 180 species, of which 109 were considered endemic. Camelier & Zanata (2014a) considered 192 species, excluding complex taxa from the genera *Astyanax*, *Geophagus*, and *Hypostomus*, as well as some basins. Nearly a decade later, 305 species of freshwater fishes are herein recorded for the ecoregion, from which a total of 75 native species (72 of them endemic to the ecoregion, mostly Siluriformes) within the NMAF were described or revalidated between 2014 and 2024. Additionally, many species in the ecoregion have had their distributions reevaluated, expanded, or reduced. Also, fish originally described in adjacent ecoregions have been documented within the NMAF (*e.g*., *Corydoras garbei*, *Glanidium melanopterum*, *Hypomasticus thayeri*, *Imparfinis borodini*, *Kryptolebias ocellatus*, *Megaleporinus reinhardti*, *Phenacorhamdia tenebrosa*). This process of continuous updates and species descriptions reinforces the notion that the basins within the NMAF ecoregion (and consequently in Eastern Brazil) harbor a significant diversity and endemism of freshwater fish species.

Non-autochthonous species. According to our literature review, 17 non-native species are recorded in the NMAF ecoregion (Table 2), excluding unidentified species-level morphotypes and hybrid specimens. Species such as *Astronotus ocellatus*, *Cichla pinima*, *Clarias gariepinus*, *Coptodon rendalli*, *Oreochromis niloticus*, and *Poecilia reticulata*, are widely distributed throughout the basins of the ecoregion as result of accidental or deliberate introductions originating from aquaculture, biological control, sport fishing, and river translocation (Vitule *et al*. 2009; Latini *et al*. 2016). Species introductions are one of the main causes of loss of native biodiversity due to environmental changes, food web alterations, and biotic simplification (Latini & Petrere Jr. 2004; Agostinho, Pelicice & Júlio 2005; Agostinho, Thomaz & Gomez 2005; Alves *et al*. 2007). Fishes with piscivorous habits such as *C. gariepinus*, *Pygocentrus nattereri,* as well as the omnivorous tilapias *C. rendalli* and *O. niloticus* are known to be tolerant to physiological and environmental changes (and exhibit greater adaptability to anthropogenically altered environments), exhibit trophic plasticity, and possess high reproductive capacity, gradually changing native community structure (Agostinho *et al*. 2007; Attayde *et al.* 2007; Vitule *et al.* 2006, 2009; Novaes & Carvalho 2012; Zaganini *et al.* 2012). In the NMAF, there are records of impacts caused by the introduction of *A. ocellatus*, *C. pinima*, *C. gariepinus* and other species in the basins of Rio Doce (Latini & Petrere Jr. 2004; Alves *et al*. 2007), Rio Jequitinhonha (Bizerril & Lima 2005; Andrade 2010), and Rio Paraguaçu (Reis & Santos 2014). These fish pose a potential risk to various native species, especially in sensitive areas in the ecoregion hosting numerous small-sized endemic fishes.

Sampling effort. Research based on incomplete sampling data can potentially lead to misleading conclusions. In the study of patterns of endemism in tropical taxa, one significant challenge is our limited understanding of the distribution of these species. Recognizing patterns of species richness is also highly dependent on the extent of sampling effort (Anjos & Zuanon 2007; Soria-Auza & Kessler 2008). Compounding this issue is the insufficient representation of available data concerning the ichthyofauna of many regions in Eastern Brazil, particularly in the Northeastern region. Many studies are (a) constrained to a handful of basins of economic, social, and conservationist relevance and (b) particularly concentrated in the South and Southeast regions of Brazil (Rosa *et al.* 2003; Langeani *et al*. 2009; Silveira *et al*. 2010; Albert *et al*. 2011), where active research groups in ichthyology are located.

The taxonomic diversity and distribution patterns of the ichthyofauna in Espírito Santo and southern Bahia has undergone intensive investigation in recent decades (*e.g*., Sarmento-Soares & Martins-Pinheiro 2010, 2012, 2013a, Cetra *et al.* 2010; Sarmento-Soares *et al*. 2007, 2008, 2009a, 2009b; Camelier & Zanata 2014a; Rodrigues *et al.* 2021; Vieira-Guimarães *et al.* 2023). Additionally, research has been concentrated in areas of heightened conservation interest and endemism, such as the upper courses of the Rio Doce and Rio Jequitinhonha basins, the Chapada Diamantina rivers, and the lower course of the Rio de Contas basin, as well as other nearby drainages within the Recôncavo Baiano region. Numerous species descriptions (*e.g*., Pereira & Zanata 2014; Zanata & Camelier 2015; Pereira *et al.* 2016; Zanata *et al.* 2017, 2018; Teixeira *et al.* 2020; Birindelli, Britski & Ramirez 2020; Reis & de Pinna 2022) and ichthyofaunistic compilations (*e.g*., Andrade 2010; Trindade *et al.* 2010; Vieira 2010; Burger *et al.* 2011; Vita *et al.* 2020, 2021; Santos *et al.* 2023) have been made for these areas in the last few years. A higher number of sampling points are located along the coastal stretch of the ecoregion, with a significant gap in the central portion, and areas with concentrated sampling efforts dispersed across the western region, particularly in the highlands where the headwaters of major basins are located. The uneven allocation of sampling effort across the river basins in Eastern Brazil underscores the need for additional surveys in these regions, seeking to address knowledge gaps regarding both undescribed taxa and the distributional patterns of described species.

Bioregions, endemism and faunal share. Carvalho (2007) and Camelier & Zanata (2014a) previously conducted Parsimony Analyses of Endemism to delineate biogeographic units in the basins of Eastern Brazil and NMAF, respectively. Those authors recognized the diverse and heterogeneous fauna of this region and the need to subdivide this large region into smaller areas that more faithfully align with the ecological and biogeographic histories these species have undergone. Various areas with shared endemic species distributed throughout the NMAF, for instance, stand as evidence of established biogeographic units within this ecoregion (Bizerril 1994; Morrone 1994; Ribeiro 2006). The Infomap Bioregions algorithm, as a novel network-based approach, permits researchers to unveil distinct communities within species distribution patterns and delineate bioregions grounded on species similarities and spatial connections. These bioregions hold significance for conservation, historical biogeography, ecology, and evolution (Vilhena & Antonelli 2015; Edler *et al.* 2017). The bioregions proposed here are very similar to the groups presented by Camelier & Zanata (2014a).

Northern Bioregion. This area extends from the Rio Japaratuba basin to the upper Rio de Contas in the Chapada Diamantina and is analogous to the "North Group" identified by Camelier & Zanata (2014a), which spans from the Rio Sergipe to the Rio Paraguaçu. This biogeographic unit is marked by significant overlap in fauna with the Rio São Francisco basin (Camelier & Zanata 2014a; Silva *et al*. 2020). A few areas of interest can be highlighted within this bioregion, such as the Rio Vaza-Barris and Rio Itapicuru drainages to the north, the Chapada Diamantina, and the Recôncavo Baiano Sul basins. In the northern portion of this bioregion, studies focusing on the ichthyofauna are primarily restricted to descriptions of the few endemic species found in these basins (*e.g*., Eigenmann 1917; Garavello 1977; Costa 2001; Zanata & Camelier 2008; Costa 2011a; Sarmento-Soares *et al.* 2011; Zanata & Pitanga 2016), with almost minimal representation of comprehensive works on freshwater fishes, including for relevant river basins such as the Rio Itapicuru and the Rio Vaza-Barris. Endemic species in this area include *Astyanax jacobinae*, *Geophagus itapicuruensis*, the rivulids *Cynolebias itapicuruensis*, *C. vazabarrisensis*, and *Hypsolebias nudiorbitatus*, as well the catfishes *Aspidoras maculosus*, *Hypostomus leucophaeus*, *Ituglanis payaya*, *Parotocinclus minutus*, and *Pimelodella itapicuruensis*.

Within the Chapada Diamantina, the intricate topography of the Serra do Sincorá gives rise to a network of headwater streams that mainly contribute to the formation of the Rio Paraguaçu drainage, such as the Rio Santo Antônio and Rio Una. This chain of mountains and highlands also features headwaters of the Rio de Contas to the south, Rio Itapicuru to the north, and Rio São Francisco to the west. The geographical isolation provided by these streams creates suitable conditions for allopatric speciation and population divergence (Menezes *et al.* 2007; Sarmento-Soares *et al.* 2020). Previous checklists for this area report more than 70 species, encompassing both native and non-native species, as well as potential undescribed morphotypes, and roughly a third of these were endemics (Santos & Caramaschi 2007; Sarmento-Soares *et al.* 2020; Vita *et al.* 2021; Santos *et al.* 2023). This area is distinguished by the occurrence of basal genera within the family Trichomycteridae, *Copionodon* and

Glaphyropoma, which exclusively inhabit the area. Additionally, it hosts an array of characid species such as *Astyanax brucutu*, *A. lorien*, *A. rupestris*, *A. sincora*, *Deuterodon aphos*, *D. hamatilis*, *Hasemania piatan* and *Lepidocharax diamantina* (Zanata & Akama 2004; Zanata & Serra 2010; Ferreira *et al.* 2011; Camelier & Zanata 2014b; Zanata *et al.* 2017, 2018; Burger *et al.* 2019), the remarkable troglobitic species *Rhamdiopsis krugi* (Bockmann & Castro 2010), hypoptopomatin catfishes such as *Parotocinclus adamanteus* and *P. nandae* (Pereira *et al.* 2019; Lehmann A. *et al.* 2020), and the few *Trichomycterus* species occurring in this bioregion, *T. tete* (Barbosa & Costa 2011) and the recently described *T. diamantinensis* (Costa *et al.* 2024). Most of the recently described endemic species from the NMAF are found solely in the watercourses of the Chapada Diamantina, such as *A. brucutu*, *Hyphessobrycon negodagua*, and *Kolpotocheirodon figueiredoi* (Vita *et al.* 2021).

The small basins comprising the Recôncavo Baiano Sul, such as the Jaguaripe, Dona, Jequiriçá, and Almas, are situated between the Rio Paraguaçu and Rio de Contas drainages (Burger *et al.* 2011; Vita *et al.* 2020). *Aspidoras kiriri*, endemic to the Rio da Dona basin (Oliveira *et al.* 2017; Vita *et al.* 2020); *Prorivulus auriferus*, *Leporinus melanopleurodes*, and *Characidium samurai* from the Rio das Almas basin (Costa 2004a; Burger *et al.* 2011; Birindelli *et al.* 2013; Zanata & Camelier 2014) are some of the species restricted to this set of drainages, characterized by pronounced endemism and conservation interest. Burger *et al.* (2011) indicates the presence of other undescribed and potentially endemic species to the region, such as *Brycon* sp., *Characidium* sp. B, *Characidium* sp. C, *Parotocinclus* sp. A, among others.

Central Bioregion. The Central bioregion is predominantly characterized by the Rio de Contas, Rio Pardo and Upper Rio Jequitinhonha drainages, alongside other smaller independent basins like the Rio Cachoeira, Rio Almada, and Rio Una. This configuration bears strong resemblance to the "Central Group" delineated by Camelier & Zanata (2014a). The Rio de Contas basin stands out as one of the most noteworthy in terms of ichthyofaunal endemism, with species such as *Cyphocharax pinnilepis, Gymnotus interruptus, Hypomasticus santanai*, *Ituglanis agreste, Megaleporinus brinco*, *M. gaiero*, and *Parotocinclis jimi* occurring only in this drainage. A few endemic species are shared with the other basins of the bioregion, such as *Geophagus multiocellus*, *Gymnotus bahianus*, *Nematocharax venustus Oligosarcus macrolepis, Pareiorhaphis bahiana*, and *Parotocinclus cristatus*. This was previously acknowledged by Camelier & Zanata (2014a), who also identified faunal similarities between the Rio Pardo and Rio Jequitinhonha drainages.

The Rio Pardo drainage shares a few exclusive species with the Rio Jequitinhonha, such as *Megaleporinus elongatus*, *Prochilodus harttii*, *Psalidodon jequitinhonhae*, *Wertheimeria maculata*, and *Hypostomus nigrolineatus* (Camelier & Zanata 2014a; Zawadzki *et al.* 2016; Queiroz *et al.* 2023). On its own, the Rio Pardo drainage showcases remarkable species richness, totaling 44 species, out of which nine are endemic: *Brycon vonoi*, *Deuterodon pelecus*, *Hyphessobrycon vinaceus*, *Characidium kamakan*, *Hirtella carinata* (a monotypic endemic genus of the Rio Pardo, Pereira *et al*. 2014; Pereira & Reis 2017), *Microlepidogaster roseae*, *Parotocinclus pukuixe*, as well as the rivulids *Ophthalmolebias rosaceus* and *O. suzarti*.

The ichthyofauna of the Rio Jequitinhonha basin is notably distinctive (Ribeiro 2006). The Upper Jequitinhonha bioregion, as delineated by Dagosta *et al*. (2020), has been recovered here as part of the Central bioregion, representing an area of marked endemism and a priority for ichthyofaunal conservation within the basin (Vieira 2005; Andrade 2010). Endemic fishes such as *Brycon howesi*, *Serrapinnus zanatae*, *Hyphessobrycon veredus*, *Cyphocharax jagunco*, *Chauliocheilos saxatilis*, *Microlepidogaster discus*, *Pareiorhaphis lineata*, *Parotocinclus jequi*, and *Simpsonichthys espinhacensis* have been described for the Jequitinhonha over the past decade, marking a substantial increase since the last estimates of species richness in the basin (Godinho *et al.* 1999; Bizerril & Lima 2005; Andrade 2010).

Coastal Tablelands Bioregion. Two main areas can be highlighted in this bioregion, presenting interconnected biogeographic histories: the basins of the coastal tablelands and the lower Rio Doce. The coastal tablelands comprise a region of slightly undulating relief in sedimentary base extending from northern Espírito Santo to southern Bahia, comprising short low-gradient river basins with their entire courses within this bioregion, which is named after its peculiar landscape (Braun & Ramalho 1980; Garay & Rizzini 2004; Sarmento-Soares & Martins-Pinheiro 2010, 2012). The characteristic fauna of this area is mostly restricted between the Rio Jequitinhonha basin to the north and the Rio Doce to the south. Species such as *Brycon ferox*, *Characidium cricarense*, *Hypostomus scabriceps*, *Microglanis pataxo*, *Moenkhausia vittata*, *Phalloceros ocellatus* and *Scleromystax virgulatus* are distributed throughout several basins and are endemic to this unit (Sarmento-Soares & Martins-Pinheiro 2012; Camelier & Zanata 2014a), although all of them have distributions that do not go beyond the northern and southern limits of the Rio Jequitinhonha and Rio Doce basins, respectively. Furthermore, several species present in the ecoregion have as their northern limit of distribution the Rio Jequitinhonha basin, which appears to be a significant boundary of the ichthyofauna of eastern Brazil, as evidenced in the distribution maps.

The similarity between the ichthyofauna of the drainages of northern Espírito Santo and eastern Minas Gerais, such as Rio Doce, Rio São Mateus and Rio Itaúnas, and the basins of southern Bahia, especially the Rio Mucuri, has been previously reported by several authors (*e.g*., Ribeiro 2006; Sarmento-Soares & Martins-Pinheiro 2012; Camelier & Zanata 2014a), particularly because of the sharing of basal taxa such as *Pogonopoma wertheimeri*. Likewise, the basins forming the "South Group" outlined by Camelier & Zanata (2014a) exhibits a configuration similar to that of the Coastal Tablelands bioregion, except for the segmentation of the Rio Doce basin, whose lower course exhibits greater faunal similarity with independent basins to the north and south. The agreement in the groupings of these drainages by different methodologies reflects a congruent biogeographic history of the species in these basins (Sarmento-Soares & Martins-Pinheiro 2012). Thomaz & Knowles (2018) hypothesize that these basins (except for the lower Rio Doce) constituted only four paleodrainages during the Pleistocene glacial periods, when the sea was 123 meters below the current level, with the Rio Mucuri as the main paleodrainage, extending significantly onto the continental shelf and incorporating several other current-day basins.

Southern Bioregion. The area defined here as the Southern bioregion consists of watercourses originating in the Serra do Espinhaço to the west, in the state of Minas Gerais, and in the Serra do Caparaó and Serra do Castelo, both extensions of the Serra da Mantiqueira, in the state of Espírito Santo. The species supporting this group are shared among the three main basins of the bioregion: the Rio Itapemirim, Rio Itabapoana, and headwater streams of the Rio Doce in the state of Minas Gerais, whose tributaries abut upon the Serra do Caparaó. River headwaters are typically areas of faunal exchange between adjacent regions (Costa 2001; Ribeiro 2006; Oliveira & Oyakawa 2019), which might explain the similarity of the ichthyofauna between the headwaters of adjacent rivers on different slopes of the mountain range.

The Rio Doce tributaries originate in the Espinhaço, Mantiqueira and Caparaó mountain ranges and feature several endemic species, mostly catfishes (Vieira 2010; Sarmento-Soares *et al.* 2022). Over the past two decades, numerous species have been described within the headwater tributaries of the Rio Doce in this area, such as the loricariids *Harttia intermontana*, *Neoplecostomus doceensis*, *N. pirangaensis* (Roxo *et al.* 2014; Oliveira & Oyakawa 2019) and a significative number of *Pareiorhaphis* species, such as *P. nasuta*, *P. proskynita*, *P. scutula*, *P. torrenticola* and *P. vetula*, distributed in different tributaries in the basin (Pereira *et al.* 2007, 2010, 2016, 2024; Pereira & Britto 2012). Highly representative within this bioregion are also the catfishes of the genus *Trichomycterus*, such as *Trichomycterus astromycterus*, *T. barrocus*, *T. brigadeirensis*, *T. brucutu*, *T. caparaoensis*, *T. caratinguensis*, *T. castelensis*, *T. espinhacensis*, *T. illuvies*, *T. ipatinga*, *T. tantalus*, and *T. vinnulus* (Reis & de Pinna 2022; Costa *et al.* 2023). The Southern bioregion exhibits the highest species diversity of *Trichomycterus* in the NMAF ecoregion, as 21 species are reported to this area, 16 of which are restricted to these basins. Affected by an unprecedented environmental disaster, a tailings dam collapse in 2015, the Rio Doce basin is still recovering from the ecological and social damage (Fernandes *et al*. 2016; Zhouri *et al.* 2017), and the extent of this impact on biodiversity is in early stages of assessment (*e.g.*, Ferreira *et al.* 2020; Passos *et al.* 2020; Weber *et al.* 2020; Vergilio *et al.* 2021).

The significant sharing of fauna between the basins from southern Espírito Santo state and the lower Rio Paraíba do Sul has been well documented by authors such as Bizerril (1994, 1999), Bizerril & Primo (2001), Carvalho (2007), Sarmento-Soares *et al.* (2012), Sarmento-Soares & Martins-Pinheiro (2013a), and Vieira-Guimarães *et al.* (2023). Bizerril (1999) proposed the existence of units of ichthyogeographic affinity between the Rio Paraíba do Sul and other drainages, including "Unit 1", which encompasses the lower course of the Rio Paraíba do Sul, Rio Itabapoana, Rio Itapemirim, Rio Novo and Rio Benevente. Carvalho (2007) groups the Rio Itabapoana and the Rio Paraíba do Sul basins into the "East clade", a broader group of drainages from the Rio Itanhém to coastal basins of the state of São Paulo. In this context, this bioregion can also be understood as an area that, along with the lower Rio Paraíba do Sul, forms a cohesive ichthyogeographic unit, akin to the "Unit 1" proposed by Bizerril (1999). During Pleistocene glacial periods, the regression of sea levels and the extension of paleodrainages across the continental shelf possibly led to events of lateral tributary capture or basin aggregation, and coastal fish species could disperse between adjacent basins, as suggested by evidences of fluvial systems submerged under the ocean and riverine connections inferred from the hypothesized paleodrainages (Abreu & Calliari 2005; Menezes *et al.* 2008; Buckup 2011; Sarmento-Soares *et al.* 2012; Thomaz & Knowles 2018).

The substantial sharing of nearly 100 fish species between the NMAF basins and those of adjacent ecoregions underscores that the delineation of freshwater ecoregions proposed by Abell *et al*. (2008) is not entirely congruent with ichthyofaunal distributions (Abreu *et al*. 2019; Dagosta *et al*. 2020). Ecoregion demarcation primarily considers the present configuration of basins. However, the species pool within a region displays much greater heterogeneity than contemporary drainage layouts might reveal, particularly when accounting for the ecological and biogeographic interplay that encompasses species dispersal across basins that, though currently isolated, may have been interconnected in distant geological periods (Dagosta *et al*. 2020).

Taxonomic uncertainties, novelties, and recent approaches on complex phylogenies. *Psalidodon fasciatus* (Cuvier) was recently transferred by Terán *et al*. (2020) from the genus *Astyanax* to *Psalidodon*. Melo (2005) suggests that the name *A. fasciatus* should be restricted to specimens from the Rio São Francisco basin, a conclusion further supported by Gavazzoni *et al*. (2023), who confirm that the population in the Rio São Francisco basin is the only one that should be designated as *P. fasciatus*. On the other hand, other populations represent putative cryptic species that are yet to be described or recognized as separate species. To provide a comprehensive species list, we have chosen to include the presence of the morphotype *Psalidodon* aff. *P. fasciatus* only in the annotated list, following a similar approach applied to *A*. aff. *A. bimaculatus* and *A*. aff. *A. lacustris*. Nevertheless, the intricacy of the *P. fasciatus* species complex (Garutti & Britski 2000) underlines the necessity for further investigations, not only for this complex but also for other species groups, such as the *A. bimaculatus* species group (Garutti 1999; Garutti & Britski 2000; Garutti & Langeani 2009; Lucena & Soares 2016).

The cichlid *Geophagus brasiliensis* (Quoy & Gaimard) is part of a species complex with controversial taxonomy (the *"G." brasiliensis* species group *sensu* Kullander 1998), widely distributed across coastal basins from the Brazilian state of Bahia to Uruguay, including the São Francisco and La Plata basins (Kullander 2003; Mattos *et al*. 2015; Mattos & Costa 2018; Argolo *et al*. 2020). Despite its inclusion in this study, it is important to notice that the phylogenetic relationships and specific boundaries within this complex are only beginning to be unraveled, which means many of the records currently attributed to *Geophagus brasiliensis* may pertain to other species. In a recent phylogenetic analysis presented by Argolo *et al*. (2020), the authors found that the species "*G*." *brasiliensis sensu stricto* has a much smaller distribution than originally described, exhibiting three highly disjointed population groups: one in the Rio Paraíba do Sul basin near the supposed type locality of the species, one in the central portion of the NMAF ecoregion, and another in the Northeastern Caatinga ecoregion. They further concluded that the more widely distributed species within the genus is "*G*." *iporangensis* Haseman, 1911. Notably, the authors identified two undescribed lineages of "*Geophagus*" in the NMAF ecoregion, one in the upper Rio de Contas and another in the Rio Doce, possibly representing species yet to be described and restricted to a region that already harbors five endemic species within the genus (*G. diamantinensis*, *G. itapicuruensis*, *G. multiocellus*, *G. obscurus*, and *G. santosi*). Within the same study, the authors extended the distribution range of *G. rufomarginatus*. Previously regarded as endemic to the Rio Buranhém basin in the state of Bahia, its range now includes the Rio Paraíba do Sul basin and other coastal drainages in the states of Espírito Santo and Rio de Janeiro.

The records of *Rhamdia* aff. *quelen* considered herein correspond to several cis-Andean morphotypes distributed throughout the drainages of Brazil. Silfvergrip (1996) synonymized 49 species of different genera with *R. quelen* (Quoy & Gaimard), in some cases unnecessarily assigning neotypes to improbable type-localities (Koerber & Reis 2019, 2020; Angrizani & Malabarba 2020). Recently, a process of species delimitation and elucidation of the phylogeny in *Rhamdia* has begun, resulting in descriptions and reappraisal of species previously synonymized with or described as *R. quelen*, such as *R. branneri* and *R. voulezi* (Garavello & Shibatta 2016), *R. gabrielae* and *R. eurycephala* (Angrizani & Malabarba 2018), and the redescription of *R. quelen* (Angrizani & Malabarba 2020), which now has its distribution restricted to coastal drainages from the state of Rio de Janeiro in the north to the Rio Tubarão basin, state of Santa Catarina, in the south. In the NMAF ecoregion, Angrizani & Malabarba (2020) identified a distinct lineage of *Rhamdia* in the Rio Doce basin, closely related to a lineage of the Rio Paraíba do Sul basin, potentially corresponding to an undescribed species.

Gymnotus is a broadly distributed genus of Neotropical electric fishes currently comprising more than 40 formally described species, with some clades and subgenera proposed to resolve its highly complex phylogeny (Craig *et al*. 2018, 2019). The NMAF ecoregion has five species of the genus according to the literature: *G. bahianus* Campos-da-Paz & Costa, *G. capitimaculatus* Rangel-Pereira, *G.* aff. *carapo* Linnaeus, *G. interruptus* Rangel-Pereira, and *G.* cf. *pantherinus* (Steindachner). Whereas *G. bahianus*, *G. capitimaculatus*, and *G. interruptus* do not seem to present complex taxonomic and phylogenetic problems, *G. carapo* poses a challenge. Albert & Crampton (2003) recognize six distinct allopatric populations of this species in distinct drainages of northern South America, mainly in the Amazon basin, possibly forming a paraphyletic clade (Albert *et al*. 2005). The authors conclude, however, that the species is not known for drainages south of the Amazon and the Brazilian state of Piauí, a distribution that has been extended in later studies to the basins of Rio São Francisco and Rio de La Plata, including the Rio Paraná-Paraguay basins and drainages of Paraguay and Argentina (Albert *et al*. 2005; Craig *et al*. 2017, 2018). Craig *et al*. (2017) describes seven subspecies of *G. carapo* and further suggest that the species appears to be absent from the coastal drainages of Northeastern and Southeastern Brazil, despite several records tentatively identified as *G. carapo*, *G*. aff. *carapo* or *G*. cf. *carapo* for these regions in museum collections and databases. Thus, although we have considered the species as such here, the populations in the Atlantic coastal drainages require further studies as they potentially represent undescribed taxa or other allopatric populations of the species.

Specimens tentatively named as *Gymnotus* cf. *pantherinus*, found in small basins of Espírito Santo (Sarmento-Soares *et al*. 2012, as *G. pantherinus*; Sarmento-Soares & Martins-Pinheiro 2014, as *G*. aff. *pantherinus*), are identified in the collections as *G. pantherinus*, which calls for a revision of these records, since the species is known from coastal drainages ranging from Rio de Janeiro to Rio Grande do Sul, as well as the upper Rio Paraná (Campos-da-Paz 2003; Craig *et al.* 2019; Dagosta *et al.* 2024).

In addition to the potentially problematic morphotypes for which we did not gather records for the analyses and database, some others lack conclusive identifications: *Characidium* sp., *Eigenmannia* sp., *Hoplias* aff. *malabaricus*, and *Synbranchus* aff. *marmoratus*, Regarding *Characidium* sp., found in basins in the south and southeast of Espírito Santo, these morphotypes have been identified as *Characidium* sp. 1 aff. *alipioi* by Sarmento-Soares *et al*. (2012) and *Characidium* sp. by Sarmento-Soares & Martins-Pinheiro (2013a), and potentially correspond to undescribed species. Records of *Eigenmannia* sp., named as such for southern basins of Espírito Santo (Sarmento-Soares *et al*. 2012; Sarmento-Soares & Martins-Pinheiro 2013a), are identified as *Eigenmannia virescens* in databases and collections, a possible misidentification since in Brazil the species is found in the hydrographic system of Rio Paraná, Rio Paraguai, Rio Uruguai, and Río de la Plata (Buckup *et al*. 2007; Peixoto *et al*. 2015, Bertaco *et al*. 2016, Reis *et al*. 2020). *Hoplias* aff. *malabaricus* and *Synbranchus* aff. *marmoratus* most likely represent species complexes that require revision (Dergam *et al*. 1998; Torres *et al*. 2005; Bertaco *et al*. 2016; Guimarães, Rosso, Gonzáles-Castro, Souza, Astarloa & Rodrigues 2022).

Conservation issues. The threat levels of Brazilian fish species have been recently reevaluated (MMA 2022), and several species described in the last decade have been included in the current assessment. As a result, the NMAF presents 36 threatened species (11.8% of the total), with 24 of them occurring in areas of endemism and significant conservation interest within the ecoregion: in the Chapada Diamantina (*Kolpotocheirodon figueiredoi*, *Lepidocharax diamantina*, *Glaphyropoma spinosum*, and *Rhamdiopsis krugi*); in the Coastal Tablelands basins (*Brycon vermelha*, *Microcambeva draco*, *Ituglanis cahyensis*, *Mucurilebias leitaoi*, and *Xenurolebias myersi*); in the Eastern Bahia basins (*Rachoviscus graciliceps* and *Mimagoniates sylvicola*—both also found in the Coastal Tablelands basins—, along with *Hasemania piatan*, *Corydoras lacerdai* and several rivulid species such as *Ophthalmolebias bokermanni*, *O. ilheusensis*, *O. rosaceus*, and *O. suzarti*); in the headwaters of the Rio Jequitinhonha basin (the catfishes *Rhamdia jequitinhonha* and *Steindachneridion amblyurum*, and the rivulids *Ophthalmolebias perpendicularis* and *Simpsonichthys espinhacensis*); and in the upper and middle Rio Doce basin (*Henochilus wheatlandii*, *Pareiorhaphis scutula*, *P. vetula*, and *Steindachneridion doceanum*). Cyprinodontiformes and Siluriformes are the orders with the highest number of threatened species in the coastal drainages of Eastern Brazil (Santana *et al*. 2021).

However, many of these fish species do not appear within the boundaries of established conservation units in the ecoregion. These units frequently prioritize terrestrial fauna, neglecting the protection of crucial areas for aquatic fauna, which harbor numerous endemic and sensitive species that are vulnerable to anthropogenic impacts, including species introductions, habitat alterations, aquatic pollution, and removal of riparian vegetation (Castro 1999; Menezes *et al*. 2007; Azevedo-Santos *et al*. 2019). In this context, National Action Plans (PANs) and Territorial Action Plans (PATs) have been developed to assist in the formulation of conservation policies for threatened species and natural environments, coordinating research and priority actions across different regional scales. The NMAF area currently has a few ongoing action plans: the PAN Peixes e Eglas da Mata Atlântica (MMA/ICMBio 2019), focused on the conservation and promotion of freshwater fish and crustacean species in rivers of the Atlantic Forest; the PAN Rivulídeos (ICMBio 2013), with an emphasis on conserving species within the family Rivulidae, which includes a higher number of threatened species among freshwater fish, primarily due to habitat loss; and the PAT Capixaba-Gerais (Pró-Espécies 2021), targeting conservation efforts for threatened species in the states of Espírito Santo and Minas Gerais, encompassing a territory extending from the Rio Itabapoana to the Rio Mucuri basins.

Characterized by a remarkable ichthyofaunal endemism that has evolved partially isolated from the inland plateau basins, the Northeastern Mata Atlântica ecoregion exhibits significant diversity in fish species. The number of described species has consistently increased in recent years, necessitating frequent updates to species checklists. Additionally, numerous yet undescribed morphotypes deposited in fish collections potentially represent new species that could further enhance our knowledge of the ichthyofaunistic diversity in the Eastern Brazilian basins. Understanding which species occur in a region, their distribution (including areas where they no longer occur), their ecological roles, and how their evolutionary histories are reflected in their distribution are crucial for both the development of public policies aimed at conserving these taxa and establishing baselines that underpin future studies in the NMAF ecoregion and other areas.

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TABLE 1. Annotated list of freshwater fishes of the Northeastern Mata Atlântica ecoregion. We provide the conservation status according to the most recent national assessment (MMA 2022) and the threat categories CR (Critically Endangered), EN (Endangered), and VU (Vulnerable). DD (Data Deficient), LC (Least Concern), NT (Near Threatened) correspond to non-threatened species. We present the occurrence of the species in the bioregions of NMAF, presence in the adjacent ecoregions SF (São Francisco), UP (Upper Paraná), and PS (Paraíba do Sul), and sources. Species in **bold** are endemic to the NMAF ecoregion. Species with an * were excluded of the analyses. Biogeographic units: 1 = Northern Bioregion; 2 = Central Bioregion; 3 = Coastal Tablelands Bioregion; 4 = Southern Bioregion.

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
CHARACIFORMES									
Acestrorhynchidae									
1. *Acestrorhynchus falcatus* (Bloch, 1794)	LC	X	X						Silva *et al.* 2020, Santos *et al.* 2023
2. *Acestrorhynchus lacustris* (Lütken, 1875)	LC	X	X			X	X		Camelier 2010; Silva *et al.* 2020
Anostomidae									
3. *Hypomasticus copelandii* (Steindachner, 1875)	LC			X	X			X	Sarmento-Soares & Martins-Pinheiro 2009; Sarmento-Soares *et al.* 2010; Pompeu 2010; Vieira 2010; Birindelli, Melo, Ribeiro-Silva, Diniz & Oliveira 2020; Mendes *et al.* 2022
4. *Hypomasticus mormyrops* (Steindachner, 1875)	LC			X	X			X	Pompeu 2010; Vieira 2010; Birindelli & Britski 2013; Sarmento-Soares e Martins-Pinheiro 2013a; Birindelli, Melo, Ribeiro-Silva, Diniz & Oliveira 2020
5. ***Hypomasticus santanai* Birindelli & Melo, 2020**	Not evaluated		X						Birindelli, Melo, Ribeiro-Silva, Diniz & Oliveira, 2020
6. *Hypomasticus steindachneri* (Eigenmann, 1907)	LC		X	X	X			X	Sarmento-Soares *et al.* 2008, 2009a, 2010; Andrade 2010; Pompeu 2010; Vieira 2010; Birindelli, Melo, Ribeiro-Silva, Diniz & Oliveira 2020
7. *Hypomasticus thayeri* (Borodin, 1929)	VU				X			X	Vieira 2010; Birindelli, Melo, Ribeiro-Silva, Diniz & Oliveira 2020
8. ***Leporinus bahiensis* Steindachner, 1875**	LC	X	X						Garavello & Britski 2003a; Burger *et al.* 2011
9. ***Leporinus melanopleura* Günther, 1864**	LC		X						Birindelli *et al.* 2013
10. ***Leporinus melanopleurodes* Birindelli, Britski & Garavello, 2013**	NT	X							Birindelli *et al.* 2013
11. *Leporinus taeniatus* Lütken, 1875	LC	X				X			Silva *et al.* 2020
12. ***Megaleporinus brinco* (Birindelli, Britski & Garavello, 2013)**	LC	X	X						Birindelli *et al.* 2013

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
13. *Megaleporinus conirostris* Steindachner, 1875	LC			X	X			X	Garavello & Britski 2003a; Sarmento-Soares *et al.* 2009a, 2010; Pompeu 2010; Vieira 2010; Ramirez *et al.* 2017
14. ***Megaleporinus elongatus* Valenciennes, 1850**	LC		X	X					Britski *et al.* 2012; Ramirez *et al.* 2017; Birindelli, Britski & Ramirez 2020
15. ***Megaleporinus gaiero* Birindelli, Britski & Ramirez, 2020**	Not evaluated	X	X						Birindelli, Britski & Ramirez 2020
16. ***Megaleporinus garmani* (Borodin, 1929)**	LC		X						Ramirez *et al.* 2017; Birindelli, Britski & Ramirez 2020
17. *Megaleporinus reinhardti* (Lütken 1875)	LC	X				X			Ramirez *et al.* 2017
Bryconidae									
18. *Brycon devillei* (Castelnau, 1855)*	EN								Vieira 2010; Lima 2017
19. ***Brycon dulcis* Lima & Vieira, 2017**	Not evaluated			X	X				Lima 2017; Rodrigues *et al.* 2021
20. ***Brycon ferox* Steindachner, 1877**	LC			X					Pompeu 2010; Lima 2017; Rodrigues *et al.* 2021
21. ***Brycon howesi* Lima, 2017**	NT		X	X					Lima 2017
22. *Brycon insignis* Steindachner, 1877	EN				X			X	Lima 2017; Rodrigues *et al.* 2021
23. *Brycon opalinus* (Cuvier, 1819)	VU				X			X	Vieira 2010; Lima 2017; Rodrigues *et al.* 2021
24. ***Brycon vermelha* Lima & Castro, 2000**	EN			X					Lima e Castro 2000; Pompeu 2010; Lima 2017
25. ***Brycon vonoi* Lima, 2017**	Not evaluated		X						Lima 2017
26. ***Henochilus wheatlandii* Garman, 1890**	CR				X				Vieira *et al.* 2000; Castro *et al.* 2004; Vieira 2010
Characidae									
Characinae									
27. *Phenacogaster franciscoensis* Eigenmann, 1911	LC	X				X			Lucena & Malabarba 2010; Santos *et al.* 2023
Cheirodontinae									
28. *Acinocheirodon melanogramma* Malabarba & Weitzman, 1999	LC		X	X		X			Malabarba & Weitzman 1999; Andrade 2010
29. *Compsura heterura* Eigenmann, 1915	LC	X				X			Rosa *et al.* 2003; Malabarba 2003; Silva *et al.* 2020
30. ***Kolpotocheirodon figueiredoi* Malabarba, Lima & Weitzman, 2004**	CR	X							Malabarba *et al.* 2004; Malabarba & Jerep 2014; Vita *et al.* 2021

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TABLE 1. (Continued)

ORDER/Family/*Species*	Conservation status (MMA 2022)	Bioregions				Adjacent Ecoregions			Record in the NMAF ecoregion
		1	2	3	4	SF	UP	PS	
31. *Serrapinnus heterodon* (Eigenmann, 1915)	LC	X	X			X	X		Camelier 2010; Burger *et al.* 2011; Malabarba & Jerep 2014; Silva 2015; Silva *et al.* 2020; Silva *et al.* 2021; Vita *et al.* 2021; Santos *et al.* 2023
32. *Serrapinnus piaba* (Lütken, 1875)	LC	X	X			X			Camelier 2010; Malabarba & Jerep 2014; Zanata *et al.* 2019; Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
33. ***Serrapinnus zanatae* Jerep, Camelier & Malabarba, 2016**	LC		X	X					Jerep *et al.* 2016
Stethaprioninae									
34. *Astyanax* aff. *bimaculatus* (Linnaeus 1785)*	-								Andrade 2010; Pompeu 2010; Vieira 2010; Silva *et al.* 2020
35. ***Astyanax brevirhinus* Eigenmann, 1908**	LC		X	X					Sarmento-Soares *et al.* 2008; Andrade 2010
36. ***Astyanax brucutu* Zanata, Lima, di Dario & Gerhard, 2017**	Not evaluated	X							Zanata *et al.* 2017
37. ***Astyanax epiagos* Zanata & Camelier, 2008**	LC	X							Zanata & Camelier 2008; Silva *et al.* 2021; Santos *et al.* 2023
38. ***Astyanax jacobinae* Zanata & Camelier, 2008**	LC	X							Zanata & Camelier 2008
39. *Astyanax* aff. *lacustris* (Lütken 1875)*	-								Sarmento-Soares *et al.* 2008, 2009a, 2009b, 2010; Burger *et al.* 2011; dos Santos & Britto 2021; Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
40. ***Astyanax lorien* Zanata, Burger & Camelier, 2018**	LC	X							Zanata *et al.* 2018; Santos *et al.* 2023
41. ***Astyanax microschemos* Bertaco & Lucena, 2006**	LC				X				Bertaco e Lucena 2006; Sarmento-Soares & Martins-Pinheiro 2013a
42. ***Astyanax pardensis* Salgado, 2021**	Not evaluated		X						Salgado 2021
43. ***Astyanax rupestris* Zanata, Burger & Camelier, 2018**	LC	X							Zanata *et al.* 2018; Santos *et al.* 2023
44. ***Astyanax sincora* Burger, Carvalho & Zanata, 2019**	LC	X							Burger *et al.* 2019; Santos *et al.* 2023
45. ***Astyanax turmalinensis* Triques, Vono & Caiafa, 2003**	LC		X	X					Triques *et al.* 2003; Andrade 2010
46. ***Astyanax varii* Zanata, Burger, Vita & Camelier, 2019**	LC	X	X						Zanata *et al.* 2019
47. ***Astyanax vermilion* Zanata & Camelier, 2009**	LC		X						Zanata e Camelier 2009
48. ***Deuterodon aphos* (Zanata & Akama, 2004)**	LC	X							Zanata e Akama 2004; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	Conservation status (MMA 2022)	Bioregions				Adjacent Ecoregions			Record in the NMAF ecoregion
		1	2	3	4	SF	UP	PS	
49. ***Deuterodon burgerai* Zanata & Camelier, 2009**	LC		X						Zanata e Camelier 2009; Vita *et al.* 2020
50. *Deuterodon giton* (Eigenmann, 1908)	LC			X	X			X	Lima *et al.* 2003; Sarmento-Soares *et al.* 2008; 2012; Sarmento-Soares & Martins-Pinheiro 2013a; dos Santos & Britto 2021
51. ***Deuterodon hamatilis* (Camelier & Zanata, 2014)**	LC	X							Camelier & Zanata 2014b
52. *Deuterodon intermedius* (Eigenmann, 1908)	LC			X	X			X	Pompeu 2010; Lezama *et al.* 2011; Sarmento-Soares *et al.* 2012; Coswosck & Duboc 2015; dos Santos & Britto 2021
53. *Deuterodon janeiroensis* (Eigenmann, 1908)	LC			X	X			X	Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2010; 2013a; Silva *et al.* 2015
54. *Deuterodon parahybae* Eigenmann, 1908*	LC								Melo 2001; Sarmento-Soares *et al.* 2012
55. ***Deuterodon pedri* Eigenmann, 1908**	LC				X				Lucena & Lucena 2002; Silva *et al.* 2017; dos Santos & Britto 2021
56. ***Deuterodon pelecus* (Bertaco & Lucena, 2006)**	LC		X						Bertaco & Lucena 2006
57. ***Deuterodon sazimai* (Santos & Castro, 2014)**	NT				X				Santos & Castro 2014
58. *Deuterodon taeniatus* (Jenyns, 1842)	LC			X	X			X	Lima *et al.* 2003; Vieira 2010; dos Santos & Britto 2021
59. ***Hasemania piatan* Zanata & Serra, 2010**	EN	X							Zanata & Serra 2010
60. *Hemigrammus brevis* Ellis, 1911	LC	X				X			Silva *et al.* 2020
61. *Hemigrammus marginatus* Ellis, 1911	LC	X	X			X	X		Buckup *et al.* 2007; Silva *et al.* 2020; Santos *et al.* 2023
62. *Hyphessobrycon bifasciatus* Ellis, 1911	LC			X	X		X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2009a; 2009b; 2010; 2012; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; Pompeu 2010; Silva *et al.* 2020
63. ***Hyphessobrycon brumado* Zanata & Camelier, 2010**	LC	X							Zanata & Camelier 2010
64. ***Hyphessobrycon itaparicensis* Lima & Costa, 2001**	LC	X							Burger *et al.* 2011; Vita *et al.* 2020
65. *Hyphessobrycon micropterus* (Eigenmann, 1915)	LC	X				X			Silva *et al.* 2020

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
66. ***Hyphessobrycon negodagua* Lima & Gerhard, 2001**	NT	X							Vita *et al.* 2021; Silva *et al.* 2021; Santos *et al.* 2023
67. ***Hyphessobrycon parvellus* Ellis, 1911**	LC	X							Burger *et al.* 2011; Silva *et al.* 2020; Silva *et al.* 2021; Vita *et al.* 2020
68. ***Hyphessobrycon veredus* Teixeira, Dutra, Penido, Santos & Pessali, 2019**	Not evaluated		X						Teixeira *et al.* 2020; Silva *et al.* 2020
69. ***Hyphessobrycon vinaceus* Bertaco, Malabarba & Dergam, 2007**	LC		X						Bertaco *et al.* 2007; Silva *et al.* 2020
70. *Moenkhausia costae* (Steindachner, 1907)	LC	X				X			Lima *et al.* 2003; Camelier 2010
71. ***Moenkhausia diamantina* Benine, Castro & Santos, 2007**	LC	X							Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
72. ***Moenkhausia vittata* (Steindachner, 1877)**	LC			X					Pompeu 2010; Vieira 2010; Carvalho *et al.* 2014
73. ***Nematocharax varii* Barreto, Silva, Batalha-Filho, Affonso & Zanata, 2018**	Not evaluated	X							Barreto *et al.* 2018
74. ***Nematocharax venustus* Weitzman, Menezes & Britski, 1986**	LC		X	X					Menezes *et al.* 2015; Silva *et al.* 2020
75. ***Oligosarcus acutirostris* Menezes, 1987**	LC		X	X	X				Pompeu 2010; Vieira 2010; Burger *et al.* 2011; Sarmento-Soares & Martins-Pinheiro 2012; 2013a; Silva *et al.* 2020
76. *Oligosarcus argenteus* Günther, 1864	LC				X	X			Vieira 2010; dos Santos & Britto 2021
77. ***Oligosarcus macrolepis* (Steindachner, 1877)**	LC		X	X					Ribeiro & Menezes 2015; Silva 2020
78. ***Oligosarcus solitarius* Menezes, 1987**	LC				X				Vieira 2010
79. *Psalidodon* aff. *fasciatus* (Cuvier 1819)*	-								Andrade 2010; Vieira 2010; Burger *et al.* 2011; Gavazzoni *et al.* 2023; Santos *et al.* 2023
80. ***Psalidodon jequitinhonhae* (Steindachner, 1877)**	LC		X						Queiroz *et al.* 2023
81. ***Rachoviscus graciliceps* Weitzman & Cruz, 1981**	EN		X	X					Sarmento-Soares *et al.* 2009b, Camelier & Zanata 2014a; Silva *et al.* 2020
82. *Tetragonopterus franciscoensis* Silva, Melo, Oliveira & Benine, 2016	LC	X				X			Silva *et al.* 2016; Silva *et al.* 2020
Stevardiinae									
83. *Lepidocharax burnsi* Ferreira, Menezes & Quagio-Grassiotto, 2011	LC				X	X			Ferreira *et al.* 2011
84. ***Lepidocharax diamantina* Ferreira, Menezes & Quagio-Grassiotto, 2011**	EN	X							Ferreira *et al.* 2011; Vita *et al.* 2020; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
85. *Mimagoniates microlepis* (Steindachner, 1877)	LC		X	X	X		X	X	Sarmento-Soares *et al.* 2007; 2009a; 2009b; 2012; Menezes & Weitzman 2009; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2013b; 2014
86. ***Mimagoniates sylvicola* Menezes & Weitzman, 1990**	EN	X	X	X					Menezes & Weitzman 2009; Sarmento-Soares *et al.* 2009b; Burger *et al.* 2011; Sarmento-Soares & Martins-Pinheiro 2013b; Silva *et al.* 2020
87. *Piabina argentea* Reinhardt, 1867	LC	X				X	X	X	Vari & Harold 2001; Vita *et al.* 2021; Silva *et al.* 2020; Santos *et al.* 2023
Incertae sedis									
88. *Psellogrammus kennedyi* (Eigenmann, 1903)	LC	X				X	X		Camelier 2010; Silva *et al.* 2020
Crenuchidae									
89. ***Characidium bahiense* Almeida, 1971**	LC	X							Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
90. ***Characidium clistenesi* Melo & Espíndola, 2016**	LC	X							Melo & Espíndola 2016
91. ***Characidium cricarense* Malanski, Sarmento-Soares, Silva-Malanski, Lopes, Ingenito & Buckup, 2019**	LC			X					Malanski *et al.* 2019
92. ***Characidium deludens* Zanata & Camelier, 2015**	DD	X							Zanata & Camelier 2015; Vita *et al.* 2021; Santos *et al.* 2023
93. ***Characidium helmeri* Zanata, Sarmento-Soares & Martins-Pinheiro, 2015**	LC			X					Zanata *et al.* 2015
94. ***Characidium kamakan* Zanata & Camelier, 2015**	LC		X						Zanata & Camelier 2015
95. ***Characidium krenak* Oliveira-Silva, Santos, Lopes & Zanata, 2022**	Not evaluated				X				Oliveira-Silva *et al.* 2022
96. ***Characidium samurai* Zanata & Camelier, 2014**	LC	X							Zanata & Camelier 2014
97. ***Characidium timbuiense* Travassos, 1946**	LC			X	X				Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2010; Silva *et al.* 2015; Sarmento-Soares *et al.* 2022
98. *Characidium* sp.	-				X			X	Sarmento-Sarmento *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a
Curimatidae									

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
99. *Curimatella lepidura* (Eigenmann & Eigenmann, 1889)	LC	X				X			Camelier 2010; Silva *et al.* 2020
100. *Cyphocharax gilbert* (Quoy & Gaimard, 1824)	LC	X	X	X	X	X		X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2010; 2012; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2014; Silva *et al.* 2020; Vita *et al.* 2021; Santos *et al.* 2023
101. ***Cyphocharax jagunco* Dutra, Penido, Guimarães de Mello & Pessali, 2016**	Not evaluated		X						Dutra *et al.* 2016
102. ***Cyphocharax pinnilepis* Vari, Zanata & Camelier, 2010**	LC		X						Vari *et al.* 2010
103. *Steindachnerina elegans* (Steindachner, 1875)	LC	X	X	X		X			Andrade 2010; Camelier 2010; Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
Erythrinidae									
104. *Erythrinus erythrinus* (Bloch & Schneider, 1801)	LC	X	X	X			X		Buckup *et al.* 2007; Camelier & Zanata 2014a
105. *Hoplerythrinus unitaeniatus* (Spix & Agassiz, 1829)	LC	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2009a; 2009b; 2012; Camelier 2010; Pompeu 2010; Burger *et al.* 2011; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2014; Silva *et al.* 2021; Santos *et al.* 2023
106. ***Hoplias brasiliensis* (Spix & Agassiz, 1829)**	LC	X	X	X					Oyakawa & Mattox 2009
107. *Hoplias intermedius* (Günther, 1864)	LC			X	X	X	X		Oyakawa & Mattox 2009; Vieira 2010; dos Santos & Britto 2021
108. *Hoplias* aff. *malabaricus* (Bloch, 1794)	LC	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; 2010; 2012; Andrade 2010; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2013b; 2014; Cetra *et al.* 2010; Trindade *et al.* 2010; Burger *et al.* 2011; Silva 2015; Silva *et al.* 2020; Vita *et al.* 2021; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
Parodontidae									
109. ***Apareiodon itapicuruensis*** **Eigenmann & Henn, 1916**	LC	X	X						Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
Prochilodontidae									
110. *Prochilodus brevis* Steindachner, 1875	LC	X	X			X			Castro & Vari 2004; Silva *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
111. ***Prochilodus harttii*** **Steindachner, 1875**	DD		X						Andrade 2010; Silva *et al.* 2020
112. *Prochilodus vimboides* Kner, 1859	VU		X	X	X	X	X	X	Castro & Vari 2004; Sarmento-Soares *et al.* 2009a; 2012; Pompeu 2010; Sarmento-Soares & Martins-Pinheiro 2013a; 2014; Silva *et al.* 2020
Serrasalmidae									
113. *Serrasalmus brandtii* Lütken, 1875	LC	X	X			X			Camelier 2010; Silva 2015; Silva *et al.* 2020; Santos *et al.* 2023
Triportheidae									
114. ***Lignobrycon myersi*** **(Miranda Ribeiro, 1956)**	NT	X	X						Castro & Vari 1990; Camelier 2010; Silva *et al.* 2020
115. *Triportheus guentheri* (Garman, 1890)	LC	X				X			Silva *et al.* 2021; Santos *et al.* 2023
SILURIFORMES									
Ariidae									
116. *Paragenidens grandoculis* (Steindachner, 1877)	CR			X				X	Marceniuk *et al.* 2019
Auchenipteridae									
117. ***Glanidium botocudo*** **Sarmento-Soares & Martins-Pinheiro, 2013**	LC			X	X				Sarmento-Soares & Martins-Pinheiro 2013c
118. *Glanidium melanopterum* Miranda Ribeiro, 1918	LC				X			X	Sarmento-Soares & Martins-Pinheiro 2013a; Sarmento-Soares *et al.* 2012
119. ***Pseudauchenipterus affinis*** **(Steindachner, 1877)**	LC			X	X				Akama & Sarmento-Soares 2007; Sarmento-Soares *et al.* 2008; 2009a; 2010; Pompeu 2010; Sarmento-Soares & Martins-Pinheiro 2012
120. ***Pseudauchenipterus jequitinhonhae*** **(Steindachner, 1877)**	LC		X	X					Andrade 2010; Silva *et al.* 2020
121. *Trachelyopterus galeatus* (Linnaeus, 1766)	LC	X	X	X		X	X		Camelier 2010; Silva *et al.* 2020; Vita *et al.* 2021; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
122. *Trachelyopterus striatulus* (Steindachner, 1877)	LC		X	X	X			X	Sarmento-Soares *et al.* 2007; 2009a; 2012; Pompeu 2010; Camelier 2010; Sarmento-Soares & Martins-Pinheiro 2012; 2013a; 2014; Petry *et al.* 2016
Callichthyidae									
123. ***Aspidoras kiriri* Oliveira, Zanata, Tencatt & Britto, 2017**	LC	X							Oliveira *et al.* 2017; Vita *et al.* 2020
124. ***Aspidoras maculosus* Nijssen & Isbrücker, 1976**	NT	X							Reis 2003; Silva *et al.* 2020
125. ***Aspidoras psammatides* Britto, Lima & Santos, 2005**	LC	X							Britto *et al.* 2005; Santos & Caramaschi 2007; Santos *et al.* 2023
126. *Callichthys callichthys* (Linnaeus, 1758)	LC	X	X	X	X	X	X	X	Reis 2003; Buckup *et al.* 2007; Andrade 2010; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Trindade *et al.* 2010; Burger *et al.* 2011; Sarmento-Soares *et al.* 2012; Petry *et al.* 2016; Silva *et al.* 2020; dos Santos & Britto 2021; Santos *et al.* 2023
127. *Corydoras garbei* Ihering, 1911	LC	X				X			Santos *et al.* 2023
128. ***Corydoras lacerdai* Hieronimus, 1995**	EN		X						Hieronimus 1995; Reis 2003; Silva *et al.* 2020
129. *Corydoras nattereri* Steindachner, 1876	LC			X	X		X	X	Reis 2003; Buckup *et al.* 2007; Sarmento-Soares *et al.* 2008; 2012; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Silva *et al.* 2020
130. *Hoplosternum littorale* (Hancock, 1828)	LC	X	X	X	X	X	X	X	Reis 2003; Buckup *et al.* 2007; Camelier 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Sarmento-Soares *et al.* 2012; Petry *et al.* 2016; Silva *et al.* 2020; dos Santos & Britto 2021; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
131. *Scleromystax prionotos* (Nijssen & Isbrücker, 1980)	LC			X	X			X	Reis 2003; Britto & Reis 2005; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Vieira 2010
132. ***Scleromystax virgulatus* (Nijssen & Isbrücker, 1980)**	LC			X					Sarmento-Soares *et al.* 2007; Sarmento-Soares & Martins-Pinheiro 2009; 2014; Silva *et al.* 2020
Doradidae									
133. ***Kalyptodoras bahiensis* Higuchi, Britski & Garavello, 1990**	EN	X							Higuchi *et al.* 1990; Sabaj & Ferraris 2003; Birindelli 2014
134. ***Wertheimeria maculata* Steindachner, 1877**	LC		X						Vono & Birindelli 2007; Andrade 2010
Heptapteridae									
135. *Acentronichthys leptos* Eigenmann & Eigenmann, 1889	LC			X				X	Bockmann & Guazzelli 2003; Sarmento-Soares e Martins-Pinheiro 2009; 2012; 2013a; Silva *et al.* 2020
136. *Cetopsorhamdia iheringi* Schubart & Gomes, 1959	LC	X				X	X		Burger *et al.* 2011; Camelier & Zanata 2014a; Santos *et al.* 2023
137. *Imparfinis borodini* Mees & Cala, 1989	LC	X				X	X		Sarmento-Soares *et al.* 2016; Silva *et al*. 2020
138. *Imparfinis minutus* (Lütken, 1874)	LC		X	X		X			Sarmento-Soares *et al.* 2007; 2009a; 2009b; Camelier & Zanata 2014a; Silva *et al.* 2020
139. *Phenacorhamdia tenebrosa* (Schubart, 1964)	LC	X				X	X		Silva *et al.* 2020; Santos *et al.* 2023
140. *Pimelodella bahiana* (Castelnau, 1855)*	LC								Slobodian *et al.* 2017; 2021; V. Slobodian (pers. comm.)
141. *Pimelodella harttii* (Steindachner, 1877)	DD		X	X	X			X	Camelier 2010; Slobodian 2017; Slobodian *et al.* 2021
142. ***Pimelodella itapicuruensis* Eigenmann, 1917**	LC	X							Slobodian *et al.* 2017; 2021; Silva *et al.* 2020; Santos *et al.* 2023
143. *Pimelodella lateristriga* (Lichtenstein, 1823)	LC		X	X	X			X	Camelier 2010; Pompeu 2010; Slobodian 2017; Slobodian *et al.* 2017; 2021; Silva *et al.* 2020
144. ***Rhamdia jequitinhonha* Silfvergrip, 1996**	VU		X						Andrade 2010; Silva *et al.* 2020

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
145. *Rhamdia* aff. *quelen* Quoy & Gaimard, 1824	-	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; 2010; 2012; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2014; Andrade 2010; Pompeu 2010; Vieira 2010; Trindade *et al.* 2010; Burger *et al.* 2011; Koerber & Reis 2019; 2020; Angrizani & Malabarba 2020; Silva *et al.* 2020; Vita *et al.* 2021; dos Santos & Britto 2021; Santos *et al.* 2023
146. ***Rhamdiopsis krugi* Bockmann & Castro, 2010**	VU	X							Bockmann & Castro 2010; Santos *et al.* 2023
Loricariidae									
Delturinae									
147. ***Delturus angulicauda* (Steindachner, 1877)**	LC			X					Reis *et al.* 2006; Pompeu & Martinez 2007; Pompeu 2010
148. ***Delturus brevis* Reis & Pereira, 2006**	LC		X						Reis *et al.* 2006; Andrade 2010
149. ***Delturus carinotus* (La Monte, 1933)**	LC			X	X				Reis *et al.* 2006; Vieira 2010
Hypoptopomatinae									
150. ***Chauliocheilos saxatilis* Martins, Andrade, Rosa & Langeani, 2014**	Not evaluated		X						Martins, Andrade, Rosa & Langeani 2014
151. ***Euryochus thysanos* Pereira & Reis, 2017**	LC			X	X				Pereira & Reis 2017
152. ***Hirtella carinata* Pereira, Zanata, Cetra & Reis, 2014**	LC		X						Pereira *et al.* 2014
153. *Hisonotus thayeri* Martins & Langeani, 2016	LC			X	X			X	Martins & Langeani 2016
154. ***Microlepidogaster discus* Martins, Rosa & Langeani, 2014**	LC		X						Martins, Rosa & Langeani 2014
155. ***Microlepidogaster roseae* Martins, 2022**	Not evaluated		X						Martins 2022
156. ***Neoplecostomus doceensis* Roxo, Silva, Zawadzki & Oliveira, 2014**	LC			X					Roxo *et al.* 2014; Oliveira & Oyakawa 2019
157. ***Neoplecostomus espiritosantensis* Langeani, 1990**	NT				X				Langeani 1990; Sarmento-Soares & Martins-Pinheiro 2010
158. *Neoplecostomus microps* (Steindachner, 1877)	Not evaluated				X			X	Buckup *et al.* 2007; Sarmento-Soares & Martins-Pinheiro 2013a

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
159. ***Neoplecostomus pirangaensis*** **Oliveira & Oyakawa, 2019**	NT				X				Oliveira & Oyakawa 2019
160. *Otothyris lophophanes* (Eigenmann & Eigenmann 1889)	LC				X			X	Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a
161. ***Otothyris travassosi*** **Garavello, Britski & Schaefer, 1998**	LC			X					Garavello *et al.* 1998; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2014; Pompeu 2010; Burger *et al.* 2011
162. ***Pareiorhaphis bahiana*** **(Gosline, 1947)**	LC		X						Pereira & Reis 2002; Pereira & Zanata 2014; Silva *et al.* 2020
163. ***Pareiorhaphis lineata*** **Pereira, Pessali, Andrade & Reis, 2017**	LC		X	X					Pereira *et al.* 2017
164. ***Pareiorhaphis lophia*** **Pereira & Zanata, 2014**	LC	X							Pereira & Zanata 2014
165. ***Pareiorhaphis mucurina*** **Pereira, Pessali & Reis, 2018**	Not evaluated			X					Pereira *et al.* 2018
166. ***Pareiorhaphis nasuta*** **Pereira, Vieira & Reis, 2007**	CR				X				Pereira *et al.* 2007; Vieira 2010; Pereira *et al.* 2016
167. ***Pareiorhaphis proskynita*** **Pereira & Britto, 2012**	LC				X				Pereira & Britto 2012; Pereira *et al.* 2016
168. ***Pareiorhaphis ruschii*** **Pereira, Lehmann A. & Reis, 2012**	LC			X					Pereira *et al.* 2012; Roldi *et al.* 2014; Silva *et al.* 2015
169. ***Pareiorhaphis scutula*** **Pereira, Vieira & Reis, 2010**	EN				X				Pereira *et al.* 2010; Pereira *et al.* 2016
170. ***Pareiorhaphis stephana*** **(Oliveira & Oyakawa, 1999)**	LC		X						Oliveira & Oyakawa 1999; Pereira & Reis 2002; Pereira 2005
171. ***Pareiorhaphis torrenticola*** **Pereira, Pessali & Reis, 2024**	Not evaluated				X				Pereira *et al*. 2024
172. ***Pareiorhaphis vetula*** **Pereira, Lehmann A. & Reis, 2016**	LC				X				Pereira *et al.* 2016
173. ***Parotocinclus adamanteus*** **Pereira, A. Santos, de Pinna & Reis, 2019**	LC	X							Pereira *et al.* 2019; Santos *et al.* 2023
174. ***Parotocinclus arandai*** **Sarmento-Soares, Lehmann A. & Martins-Pinheiro, 2009**	LC			X					Sarmento-Soares, Lehmann A. & Martins-Pinheiro 2009, Sarmento-Soares *et al.* 2010
175. ***Parotocinclus bahiensis*** **(Miranda Ribeiro, 1918)**	LC	X							Britski & Garavello 2009; Burger *et al.* 2011; Silva *et al.* 2021; Santos *et al.* 2023

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
176. ***Parotocinclus cristatus*** **Garavello, 1977**	LC		X						Garavello & Britski 2003b; Cetra *et al.* 2010; Trindade *et al.* 2010; Vita *et al.* 2020
177. ***Parotocinclus doceanus*** **(Miranda Ribeiro, 1918)**	LC			X	X				Reis & Carvalho 2007; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2012
178. ***Parotocinclus jacumirim*** **Silva-Junior, Ramos & Zanata, 2020**	DD	X							Silva-Junior *et al.* 2020
179. ***Parotocinclus jequi*** **Lehmann A., Koech Braun, Pereira & Reis, 2013**	LC		X	X					Lehmann A *et al.* 2013
180. ***Parotocinclus jimi*** **Garavello, 1977**	LC	X	X						Garavello & Britski 2003b; Reis & Carvalho 2007
181. *Parotocinclus maculicauda* (Steindachner, 1877)	LC			X	X			X	Reis & Carvalho 2007; Sarmento-Soares & Martins-Pinheiro 2010; 2013a; Sarmento-Soares *et al.* 2012; Silva-Junior *et al.* 2020
182. ***Parotocinclus minutus*** **Garavello, 1977**	LC	X							Reis & Carvalho 2007; Silva *et al.* 2020
183. ***Parotocinclus nandae*** **Lehmann A., Camelier & Zanata, 2020**	LC	X							Lehmann A. *et al.* 2020
184. ***Parotocinclus planicauda*** **Garavello & Britski, 2003**	LC			X	X				Garavello & Britski 2003b; Vieira 2010
185. ***Parotocinclus pukuixe*** **Silva-Junior & Zanata, 2022**	Not evaluated		X						Silva-Junior & Zanata 2022
Hypostominae									
186. *Ancistrus multispinis* (Regan, 1912)	LC				X			X	Sarmento-Soares & Martins-Pinheiro 2013a
187. *Hypostomus affinis* (Steindachner, 1877)	LC			X	X			X	Sarmento-Soares *et al.* 2009a; 2010; 2012; Pompeu 2010; Sarmento-Soares & Martins-Pinheiro 2010; Vieira 2010; Zawadzki *et al.* 2016; Zanata & Pitanga 2016
188. *Hypostomus auroguttatus* Kner, 1854	LC			X	X			X	Akama *et al.* 2024; Sarmento-Soares & Martins-Pinheiro 2013a
189. ***Hypostomus brevicauda*** **(Günther, 1864)**	LC		X						Zawadzki *et al.* 2017; Silva *et al.* 2020
190. ***Hypostomus jaguar*** **Zanata, Sardeiro & Zawadzki, 2013**	LC	X							Zanata *et al.* 2013
191. ***Hypostomus leucophaeus*** **Zanata & Pitanga, 2016**	LC	X							Zanata & Pitanga 2016
192. ***Hypostomus nigrolineatus*** **Zawadzki, Carvalho, Birindelli & Azevedo, 2016**	LC		X	X					Zawadzki *et al.* 2016

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
193. ***Hypostomus scabriceps* (Eigenmann & Eigenmann, 1888)**	LC			X					Weber 2003; Sarmento-Soares & Martins-Pinheiro 2012; 2014
194. ***Hypostomus unae* (Steindachner, 1878)**	LC		X						Vita *et al.* 2020; Anjos *et al.* 2021, M. Anjos (pers. comm.)
195. ***Hypostomus wuchereri* (Günther, 1864)**	LC	X	X						Silva *et al.* 2020; 2024; Anjos *et al.* 2021
196. ***Pterygoplichthys chrysostiktos* (Birindelli, Zanata & Lima, 2007)**	LC	X							Birindelli *et al.* 2007; Anjos *et al.* 2020; Santos *et al.* 2023
Loricariinae									
197. ***Harttia garavelloi* Oyakawa, 1993**	LC		X						Oyakawa 1993; Andrade 2010
198. ***Harttia intermontana* Oliveira & Oyakawa, 2019**	LC				X				Oliveira & Oyakawa 2019
199. *Harttia loricariformis* Steindachner, 1877	LC				X			X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a
200. *Loricariichthys castaneus* (Castelnau, 1855)	LC			X	X			X	Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2013a; Reis *et al.* 2021
201. ***Loricariichthys melanurus* Reis, Vieira & Pereira, 2021**	LC				X				Reis *et al.* 2021
202. *Rineloricaria steindachneri* (Regan, 1904)	LC				X			X	Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a
Rhinelepinae									
203. ***Pogonopoma wertheimeri* (Steindachner, 1867)**	LC			X	X				Pompeu & Martinez 2007; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2012; Silva *et al.* 2020
Pimelodidae									
204. ***Steindachneridion amblyurum* (Eigenmann & Eigenmann, 1888)**	CR			X					Garavello 2005; Andrade 2010
205. ***Steindachneridion doceanum* (Eigenmann & Eigenmann, 1889)**	CR				X				Garavello 2005; Vieira 2010
Pseudopimelodidae									
206. ***Microglanis minutus* Ottoni, Mattos & Barbosa, 2010**	LC			X					Ottoni *et al.* 2010; Sarmento-Soares & Martins-Pinheiro 2012; 2014
207. *Microglanis parahybae* (Steindachner 1880)	LC			X	X			X	Pompeu 2010; Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
208. ***Microglanis pataxo* Sarmento-Soares, Martins-Pinheiro, Aranda & Chamon, 2006**	LC			X					Sarmento-Soares *et al.* 2006a; 2007; 2009a; 2009b; Sarmento-Soares & Martins-Pinheiro 2012; 2014
Trichomycteridae									
209. ***Ammoglanis multidentatus* Costa, Mattos & Santos, 2019**	Not evaluated	X							Costa *et al.* 2020; Santos *et al.* 2023
210. ***Copionodon elysium* de Pinna, Burger & Zanata, 2018**	LC	X							de Pinna, Burger & Zanata 2018; Santos *et al.* 2023
211. ***Copionodon exotatos* de Pinna, Abrahão, Reis & Zanata, 2018**	DD	X							de Pinna, Abrahão, Reis & Zanata 2018
212. ***Copionodon lianae* Campanario & de Pinna, 2000**	NT	X							Campanario & de Pinna 2000; Santos *et al.* 2023
213. ***Copionodon orthiocarinatus* de Pinna, 1992**	NT	X							de Pinna 1992; Santos *et al.* 2023
214. ***Copionodon pecten* de Pinna, 1992**	NT	X							de Pinna 1992; Santos *et al.* 2023
215. ***Glaphyropoma rodriguesi* de Pinna, 1992**	DD	X							de Pinna 1992; Santos *et al.* 2023
216. ***Glaphyropoma spinosum* Bichuette, de Pinna & Trajano, 2008**	VU	X							Bichuette *et al.* 2008; Santos *et al.* 2023
217. ***Ituglanis agreste* Lima, Neves & Campos-Paiva, 2013**	LC		X						Lima *et al.* 2013; Silva *et al.* 2020
218. ***Ituglanis cahyensis* Sarmento-Soares, Martins-Pinheiro, Aranda & Chamon, 2006**	EN			X					Sarmento-Soares *et al.* 2006b
219. ***Ituglanis paraguassuensis* Campos-Paiva & Costa, 2007**	LC	X							Campos-Paiva & Costa 2007; Datovo *et al.* 2016; Vita *et al.* 2021; Santos *et al.* 2023
220. *Ituglanis parahybae* (Eigenmann, 1918)	LC			X	X			X	de Pinna & Wosiacki 2003; Sarmento-Soares & Martins-Pinheiro 2013a; Datovo *et al.* 2016
221. ***Ituglanis payaya* (Sarmento-Soares, Zanata & Martins-Pinheiro, 2011)**	DD	X							Sarmento-Soares *et al.* 2011; Silva *et al.* 2020; Costa *et al.* 2021
222. ***Microcambeva draco* Mattos & Lima, 2010**	EN			X					Mattos & Lima 2010; Sarmento-Soares *et al.* 2019
223. ***Microcambeva jucuensis* Costa, Katz, Mattos & Rangel-Pereira, 2019**	DD				X				Costa *et al.* 2019; Medeiros *et al.* 2021
224. ***Microcambeva mucuriensis* Costa, Katz, Mattos & Rangel-Pereira, 2019**	DD			X					Costa *et al.* 2019; Medeiros *et al.* 2021
225. ***Microcambeva watu* Medeiros, Sarmento-Soares & Lima, 2021**	NT			X	X				Medeiros *et al.* 2021

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
226. ***Trichogenes beagle*** **de Pinna, Reis & Britski, 2020***	DD								de Pinna *et al.* 2020
227. ***Trichogenes claviger*** **de Pinna, Helmer, Britski & Nunes, 2010**	CR				X				de Pinna *et al.* 2010; 2020; Sarmento-Soares & Martins-Pinheiro 2013a
228. *Trichomycterus alternatus* (Eigenmann, 1917)	LC			X	X			X	Costa *et al.* 2022; Reis & de Pinna 2019; 2022
229. ***Trichomycterus argos*** **Lezama, Triques & Santos, 2012**	LC				X				Lezama *et al.* 2012; Reis & de Pinna 2022
230. ***Trichomycterus astromycterus*** **Reis, de Pinna & Pessali, 2019**	LC				X				Reis *et al.* 2019; Reis & de Pinna 2022
231. ***Trichomycterus bahianus*** **Costa, 1992**	LC		X						de Pinna & Wosiacki 2003
232. ***Trichomycterus barrocus*** **Reis & de Pinna, 2022**	Not evaluated				X				Reis & de Pinna 2022
233. ***Trichomycterus brigadeirensis*** **Costa, Katz & Vilardo, 2023**	Not evaluated				X				Costa *et al.* 2023
234. ***Trichomycterus brucutu*** **Reis & de Pinna, 2022**	Not evaluated				X				Reis & de Pinna 2022
235. ***Trichomycterus brunoi*** **Barbosa & Costa, 2010**	LC				X				Barbosa & Costa 2010; Sarmento-Soares & Martins-Pinheiro 2013a
236. ***Trichomycterus caparaoensis*** **Costa, Barbosa & Katz, 2023**	Not evaluated				X				Costa *et al.* 2023
237. ***Trichomycterus caratinguensis*** **Costa, Katz & Vilardo, 2023**	Not evaluated				X				Costa *et al.* 2023
238. ***Trichomycterus castelensis*** **Costa, Katz & Vilardo, 2023**	Not evaluated				X				Costa *et al.* 2023
239. ***Trichomycterus caudofasciatus*** **Alencar & Costa, 2004**	LC				X				Alencar & Costa 2004; Roldi *et al.* 2011; Sarmento-Soares & Martins-Pinheiro 2013a
240. ***Trichomycterus diamantinensis*** **Costa, Feltrin, Mattos & Katz, 2024**	Not evaluated	X							Costa *et al.* 2024
241. ***Trichomycterus espinhacensis*** **Costa & Katz, 2023**	Not evaluated				X				Costa *et al.* 2023
242. ***Trichomycterus gasparinii*** **Barbosa, 2013**	LC			X					Barbosa 2013
243. ***Trichomycterus illuvies*** **Reis & de Pinna, 2022**	Not evaluated				X				Reis & de Pinna 2022
244. *Trichomycterus immaculatus* (Eigenmann & Eigenmann, 1889)	LC			X	X			X	Costa *et al.* 2022; Reis & de Pinna 2022
245. ***Trichomycterus ipatinga*** **Reis & de Pinna, 2022**	Not evaluated			X	X				Reis & de Pinna 2022

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
246. ***Trichomycterus itacambirussu*** **Triques & Vono, 2004**	LC		X	X					Triques & Vono 2004; Andrade 2010
247. ***Trichomycterus jequitinhonhae*** **Triques & Vono, 2004**	LC		X	X					Triques & Vono 2004; Andrade 2010
248. ***Trichomycterus landinga*** **Triques & Vono, 2004**	LC		X						Triques & Vono 2004; Andrade 2010
249. ***Trichomycterus longibarbatus*** **Costa, 1992**	LC			X					Sarmento-Soares & Martins-Pinheiro 2010; Roldi *et al.* 2014; Silva *et al.* 2015
250. ***Trichomycterus melanopygius*** **Reis, Santos, Britto, Volpi & de Pinna, 2020**	LC			X	X				Reis *et al.* 2020; Reis & de Pinna 2022
251. ***Trichomycterus mimosensis*** **Barbosa, 2013**	LC				X				Barbosa 2013
252. ***Trichomycterus pantherinus*** **Alencar & Costa, 2004**	LC				X				Alencar & Costa 2004; Roldi *et al.* 2011
253. ***Trichomycterus pradensis*** **Sarmento-Soares, Martins-Pinheiro, Aranda & Chamon, 2005**	LC			X	X				Sarmento-Soares *et al.* 2005; 2007; 2008; 2009a; 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2012; 2014; Roldi *et al.* 2011; Silva *et al.* 2020; Vilardo *et al.* 2023
254. ***Trichomycterus tantalus*** **Reis, Vieira & de Pinna, 2022**	Not evaluated				X				Reis & de Pinna 2022
255. ***Trichomycterus tete*** **Barbosa & Costa, 2011**	LC	X							Barbosa & Costa 2011; Silva *et al.* 2020
256. ***Trichomycterus vinnulus*** **Reis & de Pinna, 2022**	Not evaluated				X				Reis & de Pinna 2022
GYMNOTIFORMES									
Gymnotidae									
257. ***Gymnotus bahianus*** **Campos-da-Paz & Costa, 1996**	LC	X	X						Campos-da-Paz & Costa 1996; Cetra *et al.* 2010; Burger *et al.* 2011; Silva *et al.* 2020
258. ***Gymnotus capitimaculatus*** **Rangel-Pereira, 2014**	DD			X					Rangel-Pereira 2014; Silva *et al.* 2020

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
259. *Gymnotus* aff. *carapo* Linnaeus, 1758	-	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; 2010; 2012; Andrade 2010; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2014; Burger *et al.* 2011; Rangel-Pereira 2012; Camelier & Zanata 2014a; Petry *et al.* 2016; Silva *et al.* 2020; Vita *et al.* 2021
260. ***Gymnotus interruptus* Rangel-Pereira, 2012**	DD		X						Rangel-Pereira 2012; Silva *et al.* 2020
261. *Gymnotus* cf. *pantherinus* (Steindachner, 1908)	-			X	X			X	Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2014
Sternopygidae									
262. *Eigenmannia* sp.	-				X	X	X	X	Sarmento-Soares *et al.* 2012; Sarmento-Soares & Martins-Pinheiro 2013a
CICHLIFORMES									
Cichlidae									
263. *Australoheros ipatinguensis* Ottoni & Costa, 2008	LC			X	X			X	Ottoni *et al.* 2020; Lucena *et al.* 2022
264. *Australoheros oblongus* (Castelnau, 1855)	Not evaluated				X	X	X	X	Lucena *et al.* 2022
265. *Cichlasoma sanctifranciscense* Kullander, 1983	LC	X	X			X			Burger *et al.* 2011; Camelier & Zanata 2014a; Silva *et al.* 2020; Silva *et al.* 2021; Vita *et al.* 2020; 2021; Santos *et al.* 2023
266. *Crenicichla lacustris* (Castelnau, 1855)	LC			X	X			X	Kullander & Lucena 2006; Sarmento-Soares *et al.* 2007; 2008; 2012; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2013; Camelier & Zanata 2014a; Silva *et al.* 2020
267. ***Crenicichla mucuryna* Ihering, 1914**	NT			X					Kullander & Lucena 2006; Pompeu 2010

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TABLE 1. (Continued)

ORDER/Family/*Species*	Conservation status (MMA 2022)	Bioregions				Adjacent Ecoregions			Record in the NMAF ecoregion
		1	2	3	4	SF	UP	PS	
268. *Geophagus* cf. *brasiliensis* (Quoy & Gaymard, 1824)	-	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; 2010; 2012; Andrade 2010; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2013b; 2014; Cetra *et al.* 2010; Trindade *et al.* 2010; Burger *et al.* 2011; Camelier & Zanata 2014a; Petry *et al.* 2016; Argolo *et al.* 2020; Silva *et al.* 2020; Vita *et al.* 2020
269. ***Geophagus diamantinensis* Mattos, Costa & Santos, 2015**	LC	X							Mattos *et al.* 2015; Silva *et al.* 2021; Santos *et al.* 2023; Argolo *et al.* 2020
270. ***Geophagus itapicuruensis* Haseman, 1911**	LC	X							Mattos *et al.* 2015; Silva *et al.* 2020; Argolo *et al.* 2020
271. ***Geophagus multiocellus* Mattos & Costa, 2018**	LC	X	X						Mattos & Costa 2018; Argolo *et al.* 2020
272. ***Geophagus obscurus* (Castelnau, 1855)**	LC	X							Argolo *et al.* 2020; Silva *et al.* 2021
273. *Geophagus rufomarginatus* Mattos & Costa, 2018	LC			X	X			X	Mattos & Costa 2018; Argolo *et al.* 2020; Silva *et al.* 2020
274. ***Geophagus santosi* Mattos & Costa, 2018**	LC	X							Mattos & Costa 2018; Argolo *et al.* 2020; Silva *et al.* 2020
ACANTHURIFORMES									
Sciaenidae									
275. *Pachyurus adspersus* Steindachner, 1879	LC			X	X			X	Casatti 2001; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2012
SYNBRANCHIFORMES									
Synbranchidae									
276. *Synbranchus* aff. *marmoratus* Bloch 1795	-	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2009b; 2012; Andrade 2010; Pompeu 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2014; Burger *et al.* 2011; Camelier & Zanata 2014a; Petry *et al.* 2016; Silva *et al.* 2020; Vita *et al.* 2020; dos Santos & Britto 2021
CYPRINODONTIFORMES									
Poeciliidae									

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
277. ***Phalloceros elachistos* Lucinda, 2008**	LC			X	X				Lucinda 2008; Sarmento-Soares & Martins-Pinheiro 2010; Vieira 2010; Sarmento-Soares *et al.* 2012; Thomaz *et al.* 2019
278. *Phalloceros harpagos* Lucinda, 2008	LC				X		X	X	Lucinda 2008; Sarmento-Soares & Martins-Pinheiro 2013a; Thomaz *et al.* 2019
279. ***Phalloceros mikrommatos* Lucinda, 2008**	LC			X					Lucinda 2008; Thomaz *et al.* 2019
280. ***Phalloceros ocellatus* Lucinda, 2008**	LC			X					Lucinda 2008; Sarmento-Soares & Martins-Pinheiro 2009; 2012; 2014; Sarmento-Soares *et al.* 2019; Thomaz *et al.* 2019
281. ***Phalloptychus eigenmanni* Henn, 1916**	CR	X							Lucinda 2005
282. *Poecilia hollandi* (Henn, 1916)	LC	X	X	X	X	X	X		Lucinda & Reis 2005; Camelier & Zanata 2014a; Vita *et al.* 2021; Santos *et al.* 2023
283. *Poecilia vivipara* Bloch & Schneider, 1801	LC	X	X	X	X	X	X	X	Buckup *et al.* 2007; Sarmento-Soares *et al.* 2007; 2008; 2009a; 2009b; 2010; 2012; Camelier 2010; Vieira 2010; Sarmento-Soares & Martins-Pinheiro 2009; 2010; 2012; 2013a; 2013b; 2014; Trindade *et al.* 2010; Burger *et al.* 2011; Camelier & Zanata 2014a; Petry *et al.* 2016; Silva *et al.* 2020; Vita *et al.* 2020; Silva *et al.* 2021; Santos *et al.* 2023
Rivulidae									
284. ***Anablepsoides bahianus* (Huber, 1990)**	LC	X							Costa 2003; 2011a
285. ***Atlantirivulus depressus* (Costa, 1991)**	LC			X					Costa 2003; 2008
286. ***Atlantirivulus nudiventris* (Costa & Brasil, 1991)**	CR				X				Costa 2003; 2008
287. ***Atlantirivulus unaensis* (Costa & de Luca, 2009)**	LC		X						Costa & de Luca 2009; Silva *et al.* 2020
288. ***Cynolebias itapicuruensis* Costa, 2001**	DD	X							Costa 2001; Silva *et al.* 2020
289. ***Cynolebias paraguassuensis* Costa, Suzart & Nielsen, 2007**	DD	X							Costa *et al.* 2007; Silva *et al.* 2020
290. ***Cynolebias vazabarrisensis* Costa, 2001**	DD	X							Costa 2001; 2003
291. ***Hypsolebias nudiorbitatus* Costa, 2011**	VU	X							Costa 2011b; Silva *et al.* 2020

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TABLE 1. (Continued)

ORDER/Family/*Species*	**Conservation status (MMA 2022)**	**Bioregions**				**Adjacent Ecoregions**			**Record in the NMAF ecoregion**
		1	**2**	**3**	**4**	**SF**	**UP**	**PS**	
292. ***Hypsolebias ocellatus*** **(Costa, Nielsen & de Luca, 2001)**	LC			X					Costa *et al.* 2001; Andrade 2010
293. *Kryptolebias ocellatus* (Hensel, 1868)	LC			X					Sarmento-Soares *et al.* 2014
294. ***Mucurilebias leitaoi*** **(Da Cruz & Peixoto, 1992)**	CR			X					Costa 2014; 2016
295. ***Ophthalmolebias bokermanni*** **(Carvalho & Da Cruz, 1987)**	CR		X						Costa 2003; 2007
296. ***Ophthalmolebias ilheusensis*** **(Costa & Lima, 2010)**	EN		X						Costa & Lima 2010
297. ***Ophthalmolebias perpendicularis*** **(Costa, Nielsen & de Luca, 2001)**	CR		X						Costa *et al.* 2001; Andrade 2010
298. ***Ophthalmolebias rosaceus*** **(Costa, Nielsen & de Luca, 2001**	CR		X						Costa *et al.* 2001; Costa 2007
299. ***Ophthalmolebias suzarti*** **(Costa, 2004)**	VU		X						Costa 2004b; 2007
300. ***Prorivulus auriferus*** **Costa, Lima & Suzart, 2004**	DD	X							Costa 2004a; Silva *et al.* 2020
301. ***Simpsonichthys espinhacensis*** **Nielsen, Pessali & Dutra, 2017**	EN		X						Nielsen *et al.* 2017
302. ***Xenurolebias cricarensis*** **Costa, 2014**	DD			X					Costa & Amorim 2014
303. ***Xenurolebias izecksohni*** **(Da Cruz, 1983)**	LC			X					Costa & Amorim 2014
304. ***Xenurolebias myersi*** **(Carvalho 1971)**	EN			X					Costa & Amorim 2014
305. ***Xenurolebias pataxo*** **Costa 2014**	Not evaluated			X					Costa & Amorim 2014

TABLE 2. Non-autochthonous species ocurring in the drainages of the Northeastern Mata Atlântica ecoregion.

Species	**Ocurrence in the NMAF ecoregion**	**Original distribution (Fricke *et al.* 2024)**	**Sources**
CHARACIFORMES			
Bryconidae			
1. *Salminus brasiliensis* (Cuvier, 1816)	Doce and adjacent basins	La Plata, Madeira and Jacuí River basins, in Argentina, Bolivia, Brazil, Paraguay, Peru and Uruguay	Sarmento-Soares & Martins-Pinheiro 2014; Lima 2022; Sarmento-Soares *et al*. 2022
Characidae			
2. *Knodus moenkhausii* (Eigenmann & Kennedy 1903)	Doce, Jequitinhonha	Amazon and Paraná basins	Vieira *et al.* 2015; dos Santos & Britto 2021
Serrasalmidae			

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TABLE 2. (Continued)

Species	Ocurrence in the NMAF ecoregion	Original distribution (Fricke *et al.* 2024)	Sources
3. *Metynnis lippincottianus* (Cope 1870)	Widespread	Amazon basin	Vieira 2010; Silva *et al*. 2020; F.C.T. Lima (pers. comm.)
4. *Pygocentrus nattereri* Kner, 1858	Doce and adjacent basins	Amazon River basin, Paraguay-Paraná River basin, northeastern Brazilian coastal rivers and Essequibo River basin	Sarmento-Soares & Martins-Pinheiro 2014; Sarmento-Soares *et al*. 2022
5. *Pygocentrus piraya* (Cuvier, 1819)	Doce	São Francisco basin	Silva *et al*. 2020; Sarmento-Soares *et al*. 2022
SILURIFORMES			
Clariidae			
6. *Clarias gariepinus* (Burchell, 1822)	Widespread	Africa, Asia Minor and Middle East	Sarmento-Soares & Martins-Pinheiro 2009; 2012; 2014; Sarmento-Soares *et al*. 2010; 2022; Silva *et al*. 2020
Pseudopimelodidae			
7. *Lophiosilurus alexandri* Steindachner, 1876	Doce	São Francisco basin	Sarmento-Soares, Martins-Pinheiro, Rodrigues 2017; 2022
ACANTHURIFORMES			
Sciaenidae			
8. *Plagioscion squamosissimus* (Heckel, 1840)	Widespread	Amazon, Orinoco, Paraná, Paraguay and São Francisco basins and rivers of the Guianas	Silva *et al*. 2020
CICHLIFORMES			
Cichlidae			
9. *Astronotus ocellatus* (Agassiz, 1831)	Widespread	Northern South America	Bizerril & Lima 2005; Burger *et al*. 2011; Reis & Santos 2014; Silva *et al*. 2020; Sarmento-Soares *et al*. 2020; Silva *et al*. 2021
10. *Cichla kelberi* Kullander & Ferreira, 2006	Doce and adjacent basins	Araguaia River and lower Tocantins River drainages	Sarmento-Soares & Martins-Pinheiro 2014; Sarmento-Soares *et al*. 2022

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TABLE 2. (Continued)

Species	Ocurrence in the NMAF ecoregion	Original distribution (Fricke *et al.* 2024)	Sources
11. *Cichla pinima* Kullander & Ferreira, 2006	Widespread	Lower Amazon basin, Brazil	Kullander & Ferreira 2006; Sarmento-Soares & Martins-Pinheiro 2010; Burger *et al*. 2011; Sarmento-Soares *et al*. 2012; 2021; Reis & Santos 2014; Vita *et al*. 2020; Silva *et al*. 2021
12. *Coptodon rendalli* (Boulenger, 1897)	Widespread	Southern-central Africa	Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Sarmento-Soares *et al*. 2012; Silva *et al*. 2015; Silva *et al*. 2020; Vita *et al*. 2020; 2021
13. *Oreochromis niloticus* (Linnaeus, 1758)	Widespread	Northern and Northeastern Africa	Bizerril & Lima 2005; Sarmento-Soares *et al*. 2008; 2009b; 2010; Burger *et al*. 2011; Silva *et al*. 2020; Silva *et al*. 2021
CYPRINIFORMES			
Xenocyprididae			
14. *Hypophthalmichthys molitrix* (Valenciennes, 1844)	Jequitinhonha	Yangtze River basin, China and Russia	Alves *et al*. 2007
CYPRINODONTIFORMES			
Poeciliidae			
15. *Poecilia reticulata* Peters, 1859	Widespread	Coastal drainages between the Orinoco delta (Venezuela) and the Essequibo River delta, Guyana, Venezuelan Islands, the Netherlands Antilles and Trinidad and Tabago	Bizerril & Lima 2005; Sarmento-Soares *et al*. 2008; 2009a; 2012; 2021; Sarmento-Soares & Martins-Pinheiro 2010; 2012; 2013a; 2014; Burger *et al*. 2011; Silva *et al*. 2015; Silva *et al*. 2020; Vita *et al*. 2020; 2021
16. *Xiphophorus hellerii* Heckel, 1848	Benevente, Doce	Atlantic slope of Central America in Belize, Guatemala, Honduras and Mexico	Sarmento-Soares *et al*. 2012; 2022
17. *Xiphophorus maculatus* (Günther, 1866)	Benevente	Atlantic slope of Mexico, Belize and Guatemala	Sarmento-Soares *et al*. 2012

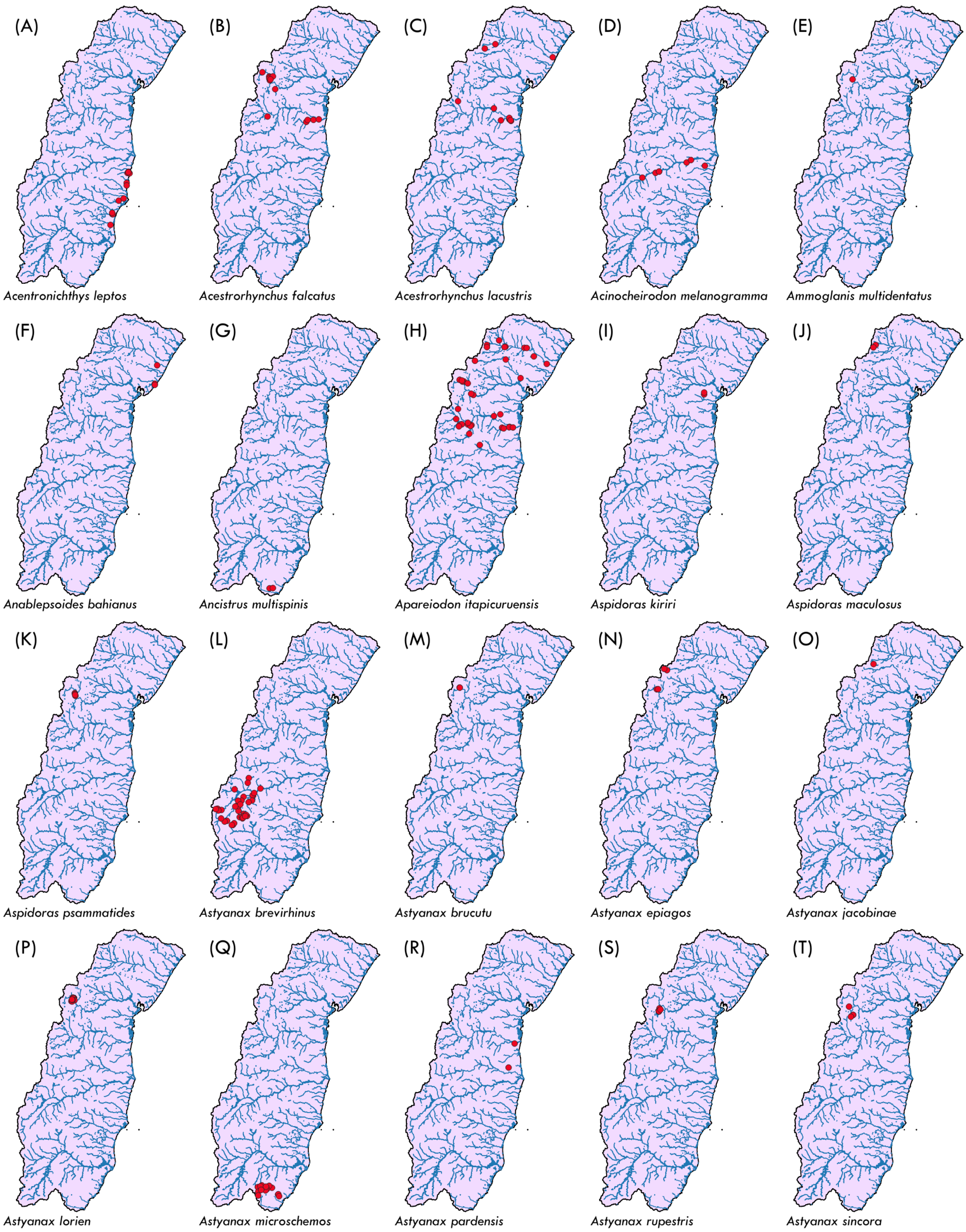

FIGURE 6. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Acentronichthys leptos*; (B) *Acestrorhynchus falcatus*; (C) *Acestrorhynchus lacustris*; (D) *Acinocheirodon melanogramma*; (E) *Ammoglanis multidentatus*; (F) *Anablepsoides bahianus*; (G) *Ancistrus multispinis*; (H) *Apareiodon itapicuruensis*; (I) *Aspidoras kiriri*; (J) *Aspidoras maculosus*; (K) *Aspidoras psammatides*; (L) *Astyanax brevirhinus*; (M) *Astyanax brucutu*; (N) *Astyanax epiagos*; (O) *Astyanax jacobinae*; (P) *Astyanax lorien*; (Q) *Astyanax microschemos*; (R) *Astyanax pardensis*; (S) *Astyanax rupestris*; (T) *Astyanax sincora*.

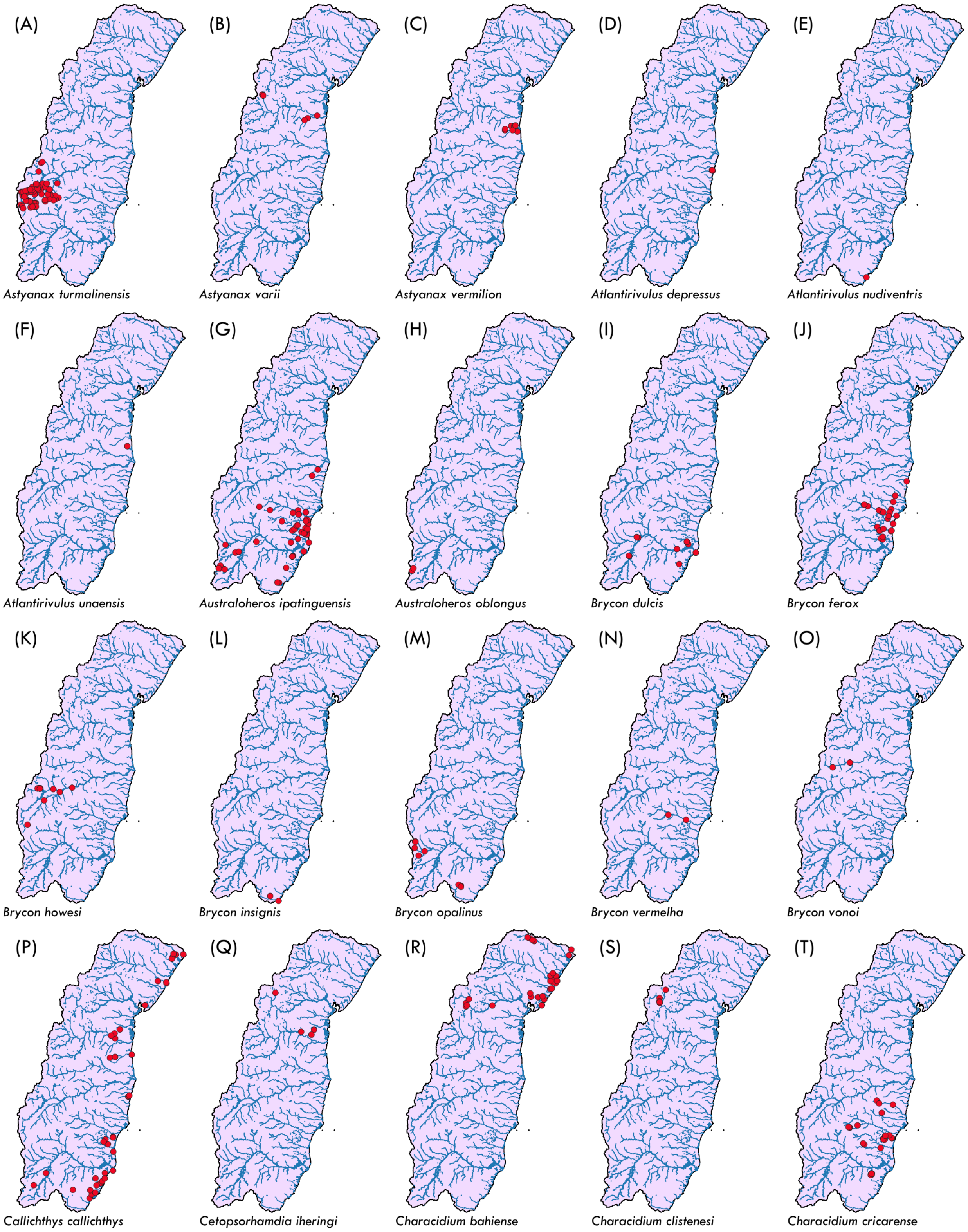

FIGURE 7. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Astyanax turmalinensis*; (B) *Astyanax varii*; (C) *Astyanax vermilion*; (D) *Atlantirivulus depressus*; (E) *Atlantirivulus nudiventris*; (F) *Atlantirivulus unaensis*; (G) *Australoheros ipatinguensis*; (H) *Australoheros oblongus*; (I) *Brycon dulcis*; (J) *Brycon ferox*; (K) *Brycon howesi*; (L) *Brycon insignis*; (M) *Brycon opalinus*; (N) *Brycon vermelha*; (O) *Brycon vonoi*; (P) *Callichthys callichthys*; (Q) *Cetopsorhamdia iheringi*; (R) *Characidium bahiense*; (S) *Characidium clistenesi*; (T) *Characidium cricarense*.

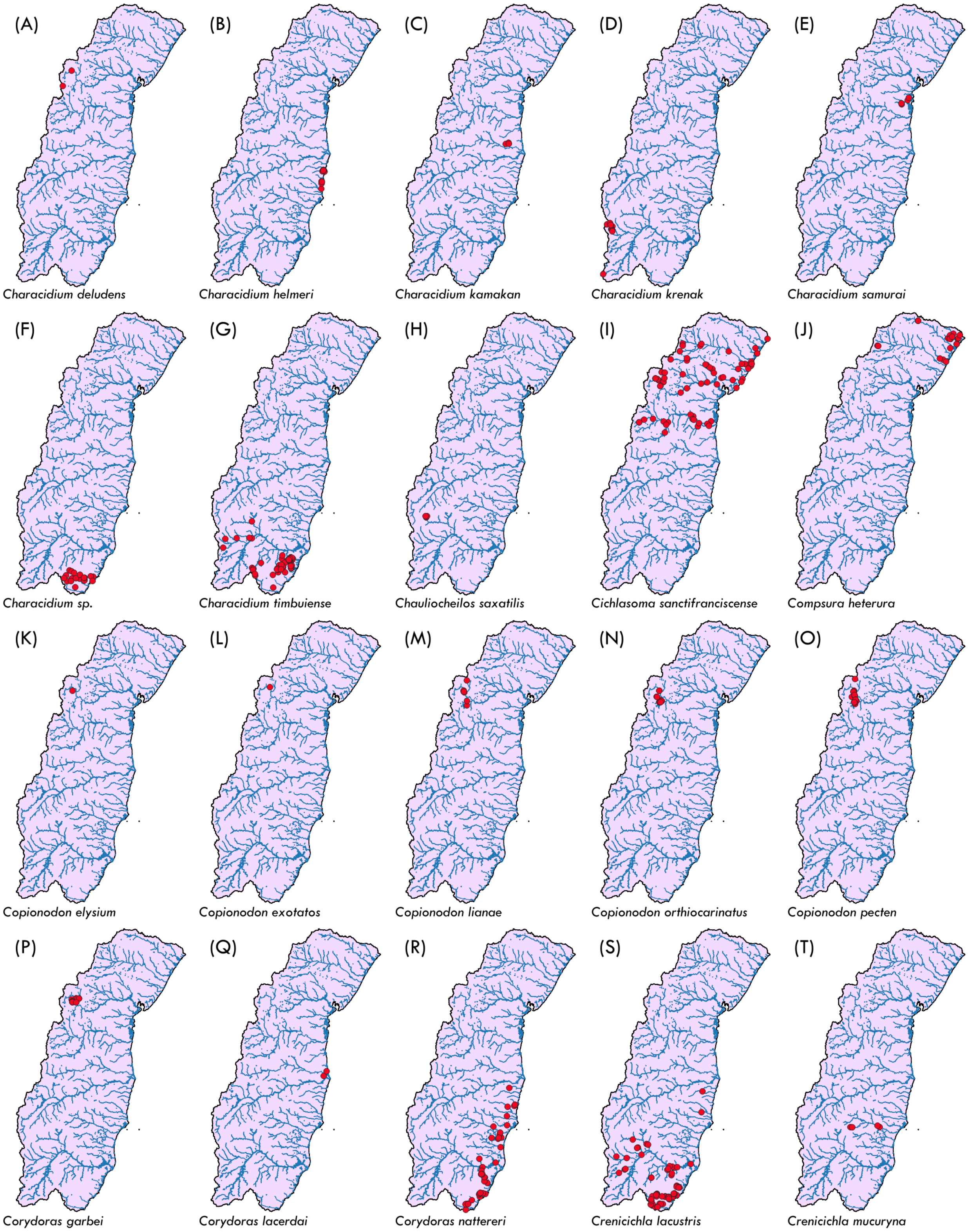

FIGURE 8. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Characidium deludens*; (B) *Characidium helmeri*; (C) *Characidium kamakan*; (D) *Characidium krenak*; (E) *Characidium samurai*; (F) *Characidium* sp.; (G) *Characidium timbuiense*; (H) *Chauliocheilos saxatilis*; (I) *Cichlasoma sanctifranciscense*; (J) *Compsura heterura*; (K) *Copionodon elysium*; (L) *Copionodon exotatos*; (M) *Copionodon lianae*; (N) *Copionodon orthiocarinatus*; (O) *Copionodon pecten*; (P) *Corydoras garbei*; (Q) *Corydoras lacerdai*; (R) *Corydoras nattereri*; (S) *Crenicichla lacustris*; (T) *Crenicichla mucuryna*.

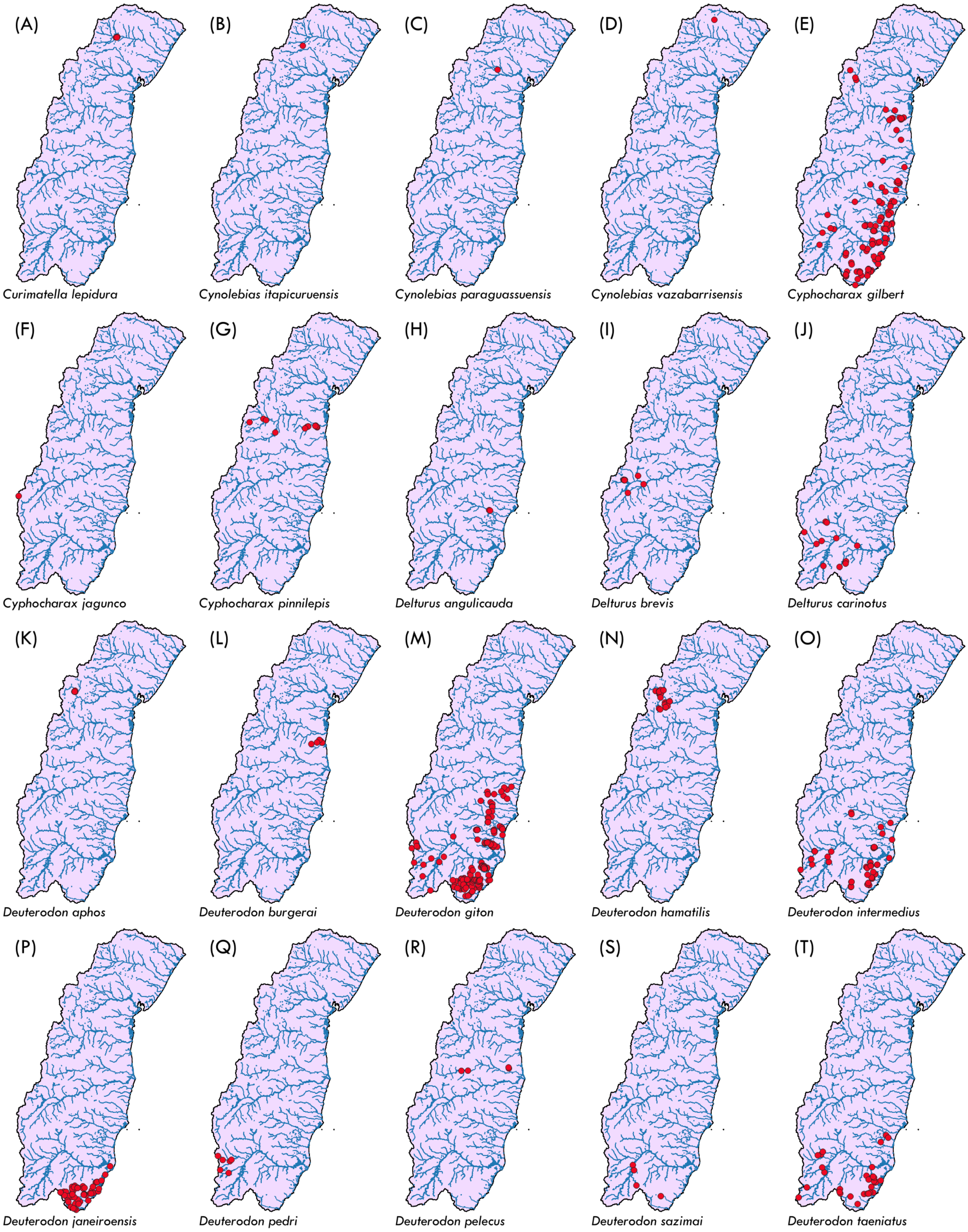

FIGURE 9. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Curimatella lepidura*; (B) *Cynolebias itapicuruensis*; (C) *Cynolebias paraguassuensis*; (D) *Cynolebias vazabarrisensis*; (E) *Cyphocharax gilbert*; (F) *Cyphocharax jagunco*; (G) *Cyphocharax pinnilepis*; (H) *Delturus angulicauda*; (I) *Delturus brevis*; (J) *Delturus carinotus*; (K) *Deuterodon aphos*; (L) *Deuterodon burgerai*; (M) *Deuterodon giton*; (N) *Deuterodon hamatilis*; (O) *Deuterodon intermedius*; (P) *Deuterodon janeiroensis*; (Q) *Deuterodon pedri*; (R) *Deuterodon pelecus*; (S) *Deuterodon sazimai*; (T) *Deuterodon taeniatus*.

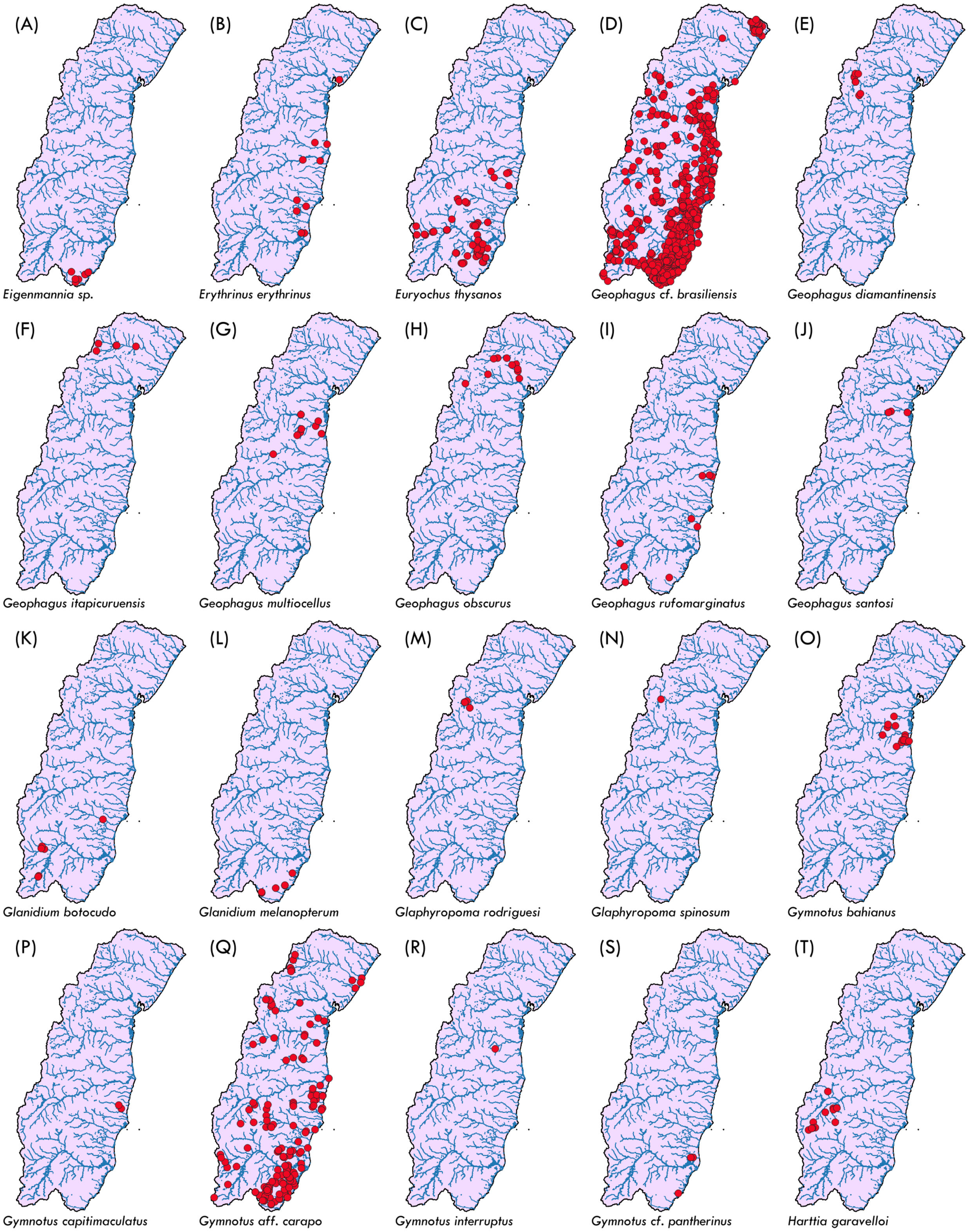

FIGURE 10. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Eigenmannia* sp.; (B) *Erythrinus erythrinus*; (C) *Euryochus thysanos*; (D) *Geophagus* cf. *brasiliensis*; (E) *Geophagus diamantinensis*; (F) *Geophagus itapicuruensis*; (G) *Geophagus multiocellus*; (H) *Geophagus obscurus*; (I) *Geophagus rufomarginatus*; (J) *Geophagus santosi*; (K) *Glanidium botocudo*; (L) *Glanidium melanopterum*; (M) *Glaphyropoma rodriguesi*; (N) *Glaphyropoma spinosum*; (O) *Gymnotus bahianus*; (P) *Gymnotus capitimaculatus*; (Q) *Gymnotus* aff. *carapo*; (R) *Gymnotus interruptus*; (S) *Gymnotus* cf. *pantherinus*; (T) *Harttia garavelloi*.

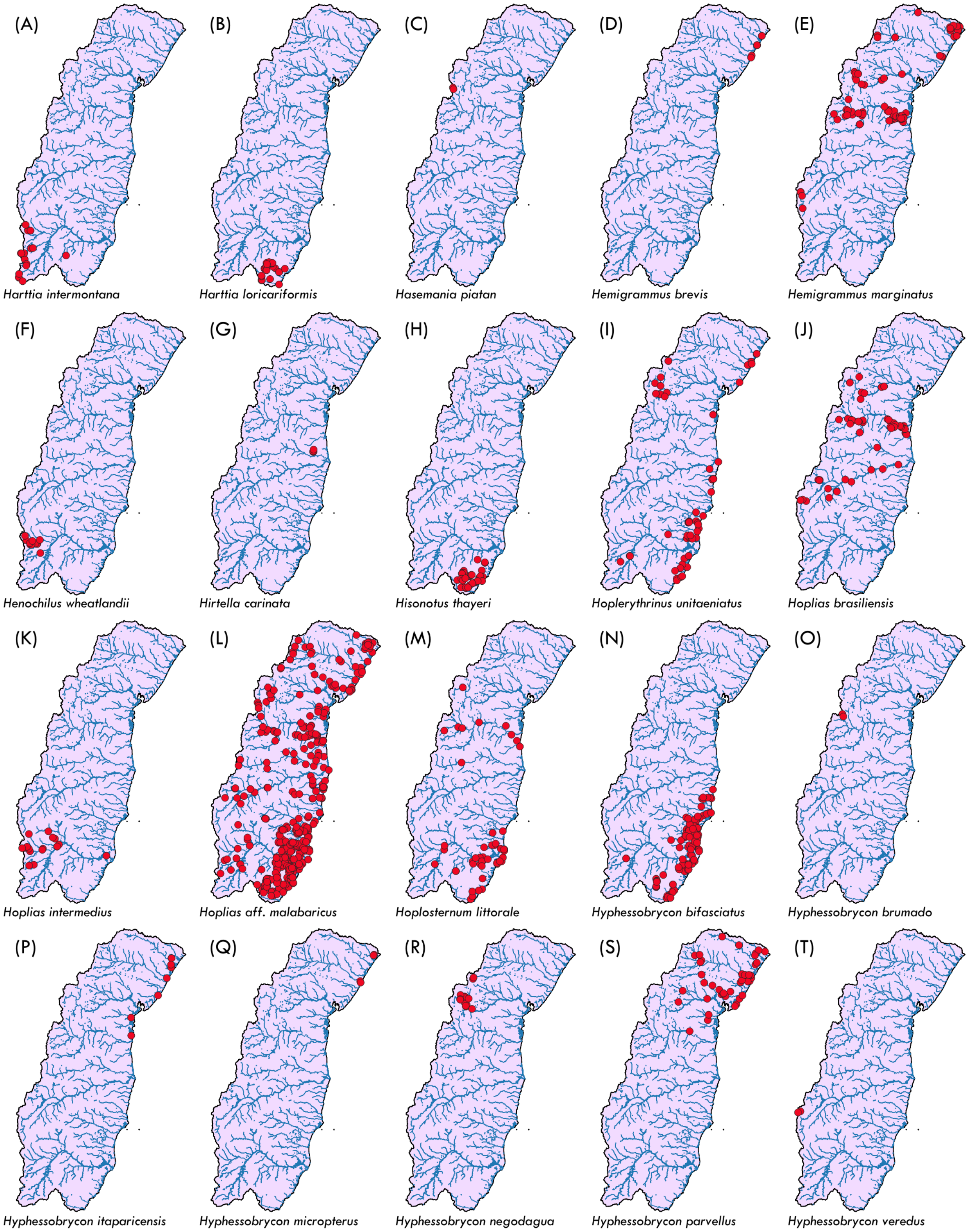

FIGURE 11. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Harttia intermontana*; (B) *Harttia loricariformis*; (C) *Hasemania piatan*; (D) *Hemigrammus brevis*; (E) *Hemigrammus marginatus*; (F) *Henochilus wheatlandii*; (G) *Hirtella carinata*; (H) *Hisonotus thayeri*; (I) *Hoplerythrinus unitaeniatus*; (J) *Hoplias brasiliensis*; (K) *Hoplias intermedius*; (L) *Hoplias* aff. *malabaricus*; (M) *Hoplosternum littorale*; (N) *Hyphessobrycon bifasciatus*; (O) *Hyphessobrycon brumado*; (P) *Hyphessobrycon itaparicensis*; (Q) *Hyphessobrycon micropterus*; (R) *Hyphessobrycon negodagua*; (S) *Hyphessobrycon parvellus*; (T) *Hyphessobrycon veredus*.

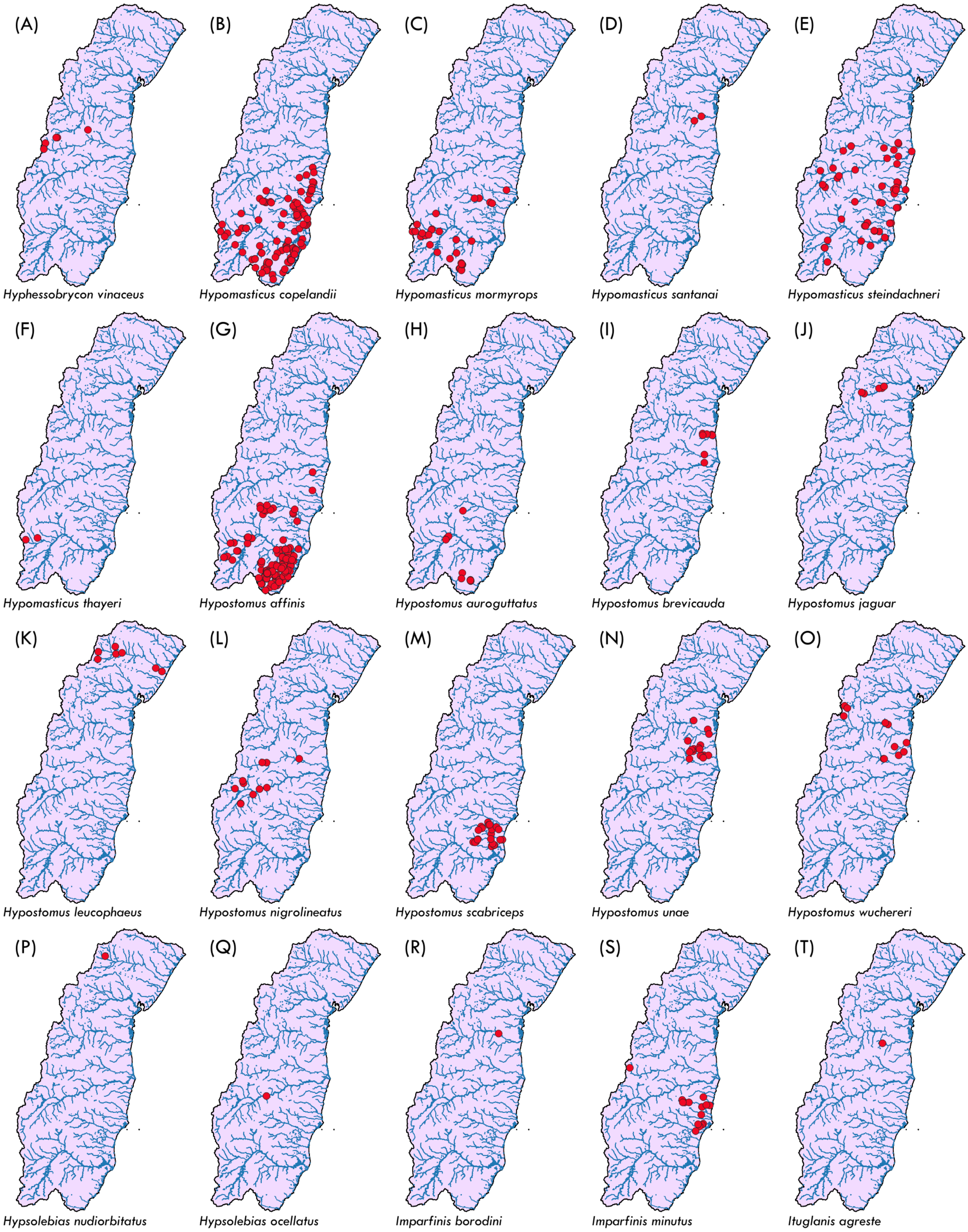

FIGURE 12. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Hyphessobrycon vinaceus*; (B) *Hypomasticus copelandii*; (C) *Hypomasticus mormyrops*; (D) *Hypomasticus santanai*; (E) *Hypomasticus steindachneri*; (F) *Hypomasticus thayeri*; (G) *Hypostomus affinis*; (H) *Hypostomus auroguttatus*; (I) *Hypostomus brevicauda*; (J) *Hypostomus jaguar*; (K) *Hypostomus leucophaeus*; (L) *Hypostomus nigrolineatus*; (M) *Hypostomus scabriceps*; (N) *Hypostomus unae*; (O) *Hypostomus wuchereri*; (P) *Hypsolebias nudiorbitatus*; (Q) *Hypsolebias ocellatus*; (R) *Imparfinis borodini*; (S) *Imparfinis minutus*; (T) *Ituglanis agreste*.

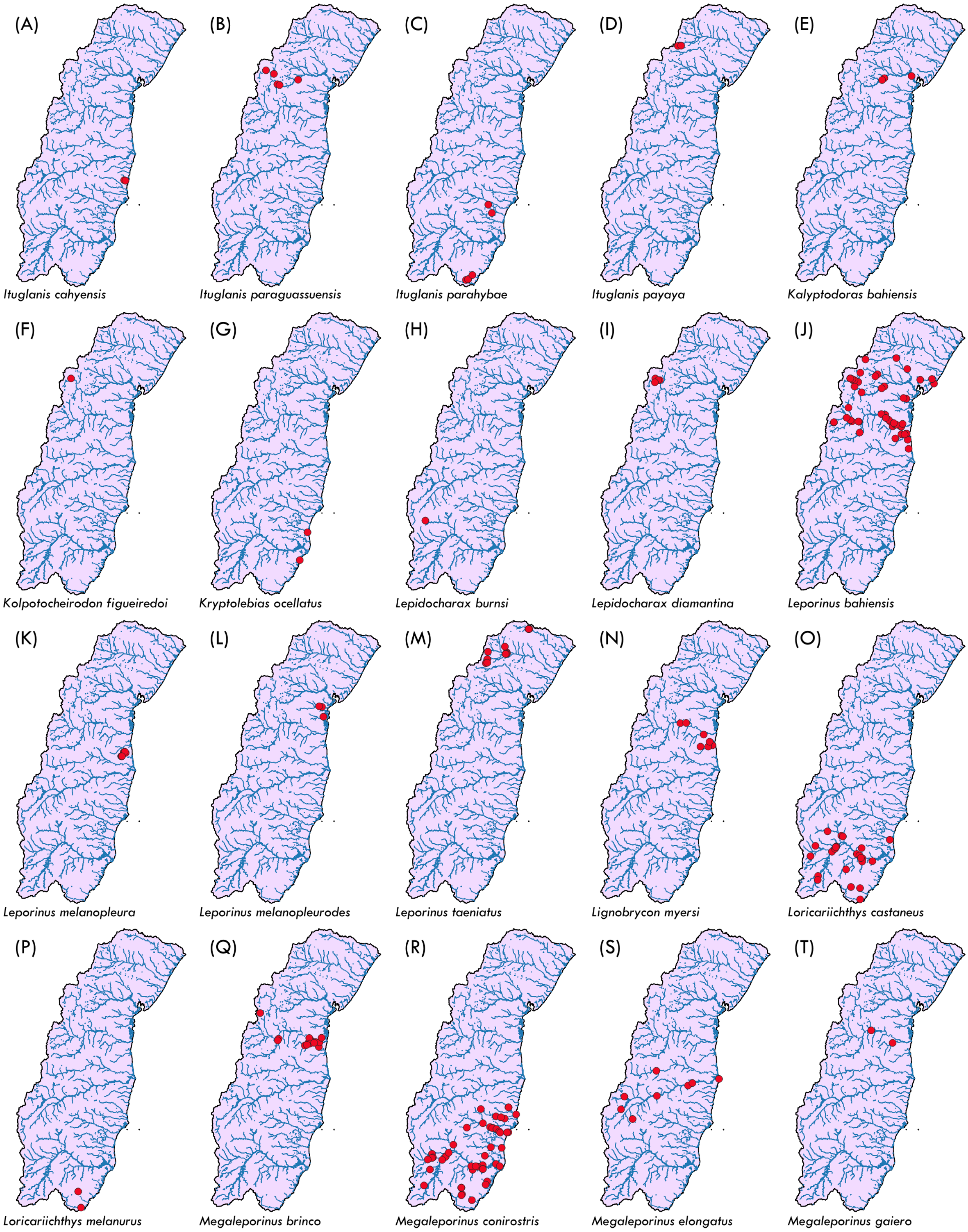

FIGURE 13. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Ituglanis cahyensis*; (B) *Ituglanis paraguassuensis*; (C) *Ituglanis parahybae*; (D) *Ituglanis payaya*; (E) *Kalyptodoras bahiensis*; (F) *Kolpotocheirodon figueiredoi*; (G) *Kryptolebias ocellatus*; (H) *Lepidocharax burnsi*; (I) *Lepidocharax diamantina*; (J) *Leporinus bahiensis*; (K) *Leporinus melanopleura*; (L) *Leporinus melanopleurodes*; (M) *Leporinus taeniatus*; (N) *Lignobrycon myersi*; (O) *Loricariichthys castaneus*; (P) *Loricariichthys melanurus*; (Q) *Megaleporinus brinco*; (R) *Megaleporinus conirostris*; (S) *Megaleporinus elongatus*; (T) *Megaleporinus gaiero*.

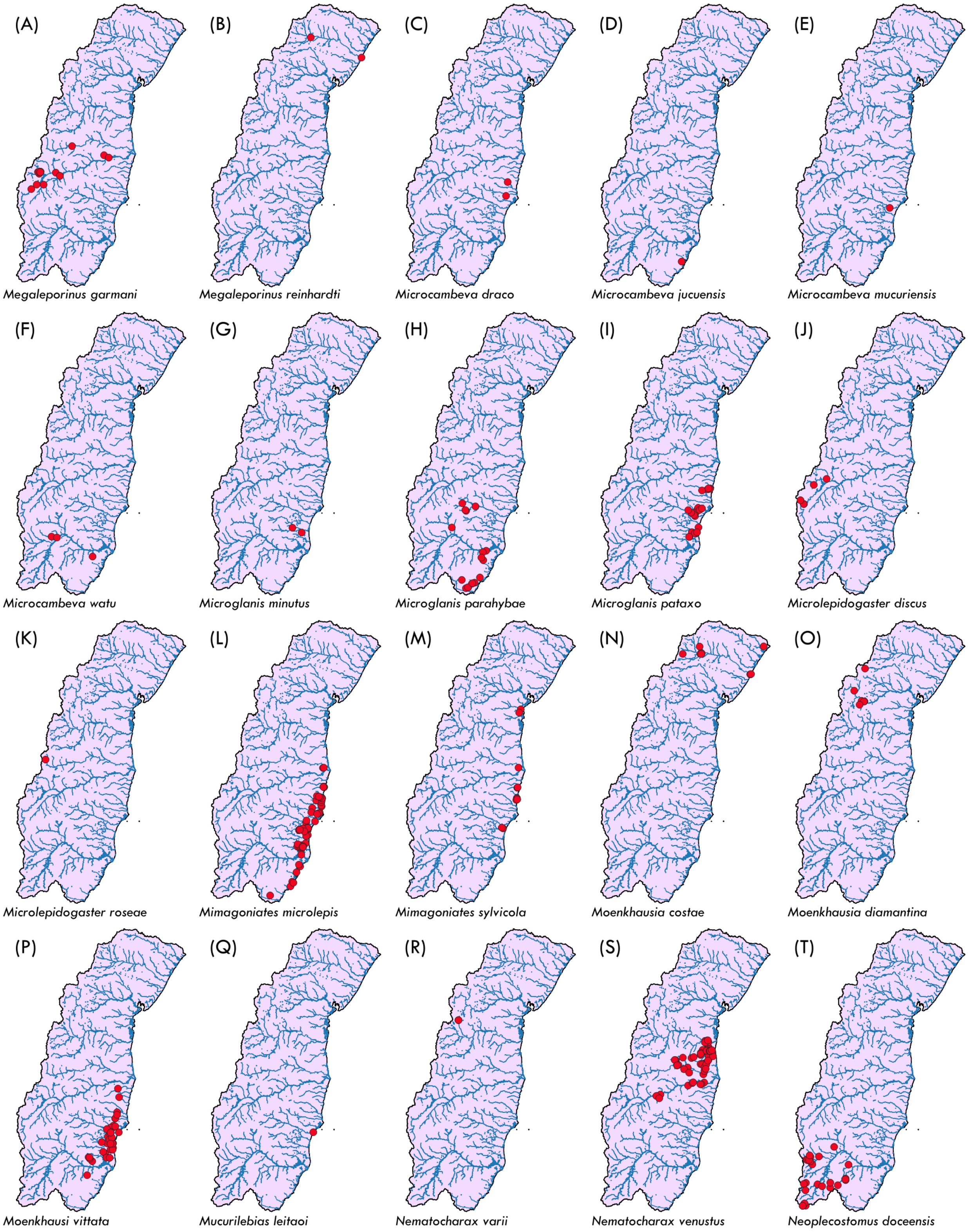

FIGURE 14. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Megaleporinus garmani*; (B) *Megaleporinus reinhardti*; (C) *Microcambeva draco*; (D) *Microcambeva jucuensis*; (E) *Microcambeva mucuriensis*; (F) *Microcambeva watu*; (G) *Microglanis minutus*; (H) *Microglanis parahybae*; (I) *Microglanis pataxo*; (J) *Microlepidogaster discus*; (K) *Microlepidogaster roseae*; (L) *Mimagoniates microlepis*; (M) *Mimagoniates sylvicola*; (N) *Moenkhausia costae*; (O) *Moenkhausia diamantina*; (P) *Moenkhausia vittata*; (Q) *Mucurilebias leitaoi*; (R) *Nematocharax varii*; (S) *Nematocharax venustus*; (T) *Neoplecostomus doceensis*.

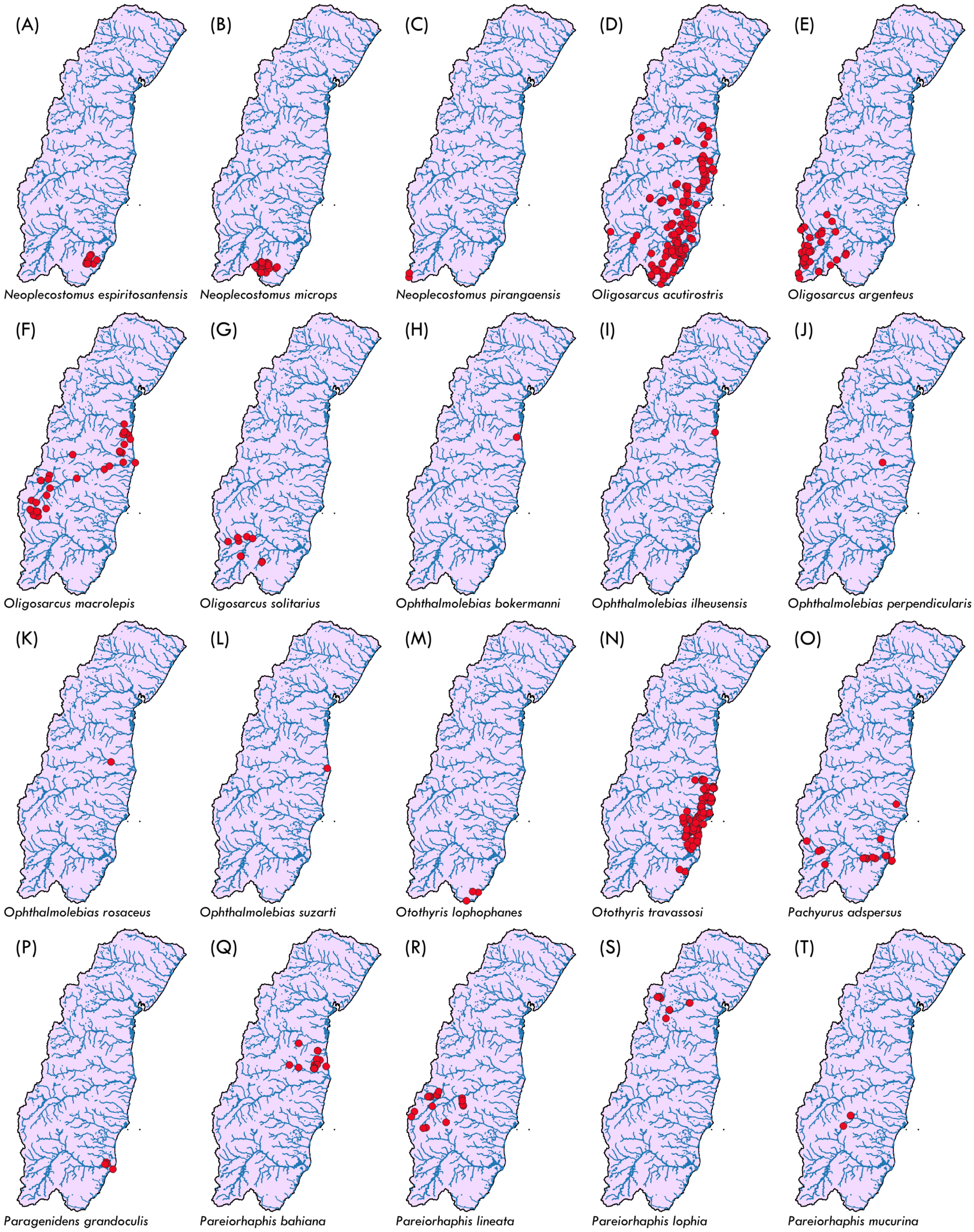

FIGURE 15. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Neoplecostomus espiritosantensis*; (B) *Neoplecostomus microps*; (C) *Neoplecostomus pirangaensis*; (D) *Oligosarcus acutirostris*; (E) *Oligosarcus argenteus*; (F) *Oligosarcus macrolepis*; (G) *Oligosarcus solitarius*; (H) *Ophthalmolebias bokermanni*; (I) *Ophthalmolebias ilheusensis*; (J) *Ophthalmolebias perpendicularis*; (K) *Ophthalmolebias rosaceus*; (L) *Ophthalmolebias suzarti*; (M) *Otothyris lophophanes*; (N) *Otothyris travassosi*; (O) *Pachyurus adspersus*; (P) *Paragenidens grandoculis*; (Q) *Pareiorhaphis bahiana*; (R) *Pareiorhaphis lineata*; (S) *Pareiorhaphis lophia*; (T) *Pareiorhaphis mucurina*.

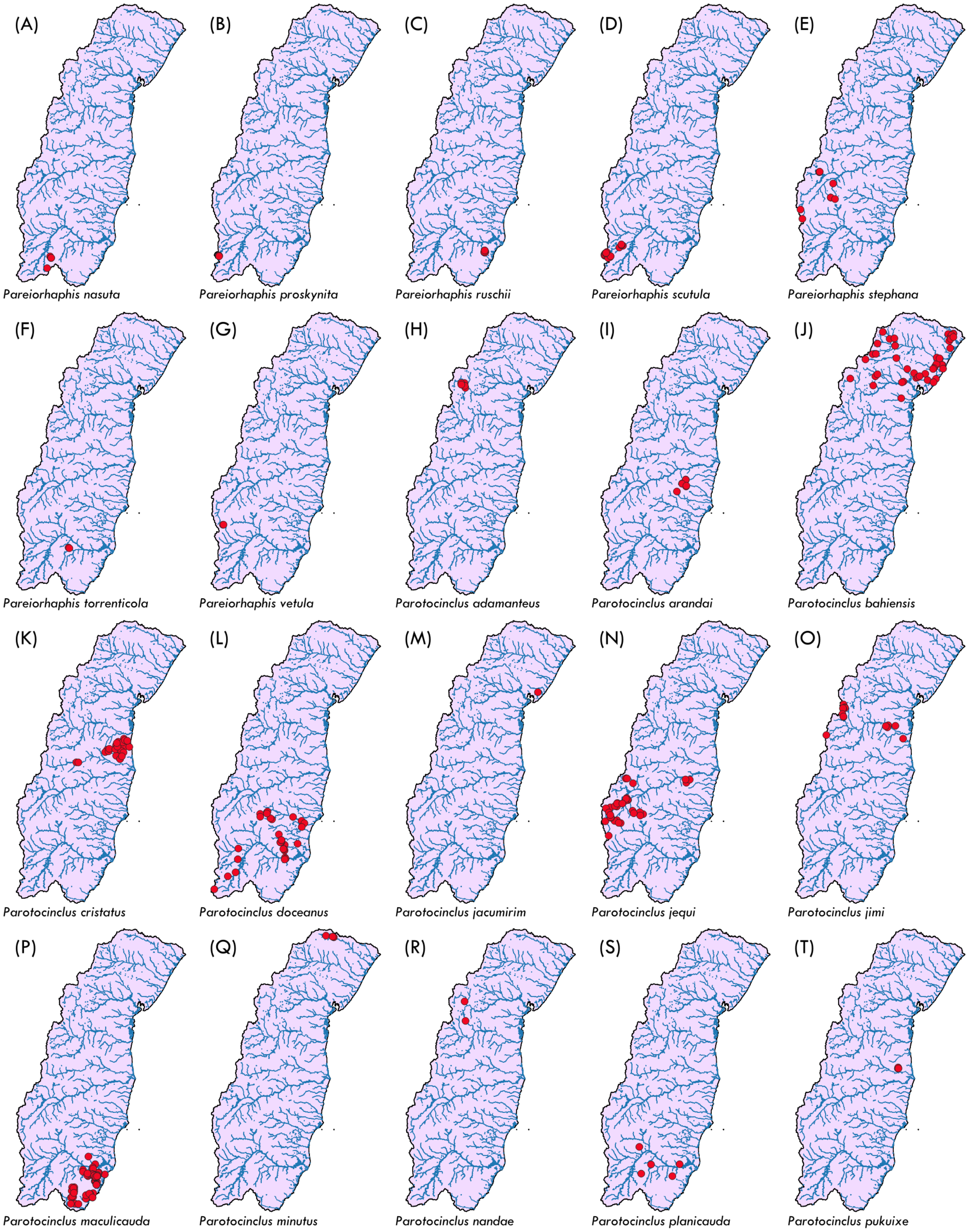

FIGURE 16. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Pareiorhaphis nasuta*; (B) *Pareiorhaphis proskynita*; (C) *Pareiorhaphis ruschii*; (D) *Pareiorhaphis scutula*; (E) *Pareiorhaphis stephana*; (F) *Pareiorhaphis torrenticola*; (G) *Pareiorhaphis vetula*; (H) *Parotocinclus adamanteus*; (I) *Parotocinclus arandai*; (J) *Parotocinclus bahiensis*; (K) *Parotocinclus cristatus*; (L) *Parotocinclus doceanus*; (M) *Parotocinclus jacumirim*; (N) *Parotocinclus jequi*; (O) *Parotocinclus jimi*; (P) *Parotocinclus maculicauda*; (Q) *Parotocinclus minutus*; (R) *Parotocinclus nandae*; (S) *Parotocinclus planicauda*; (T) *Parotocinclus pukuixe*.

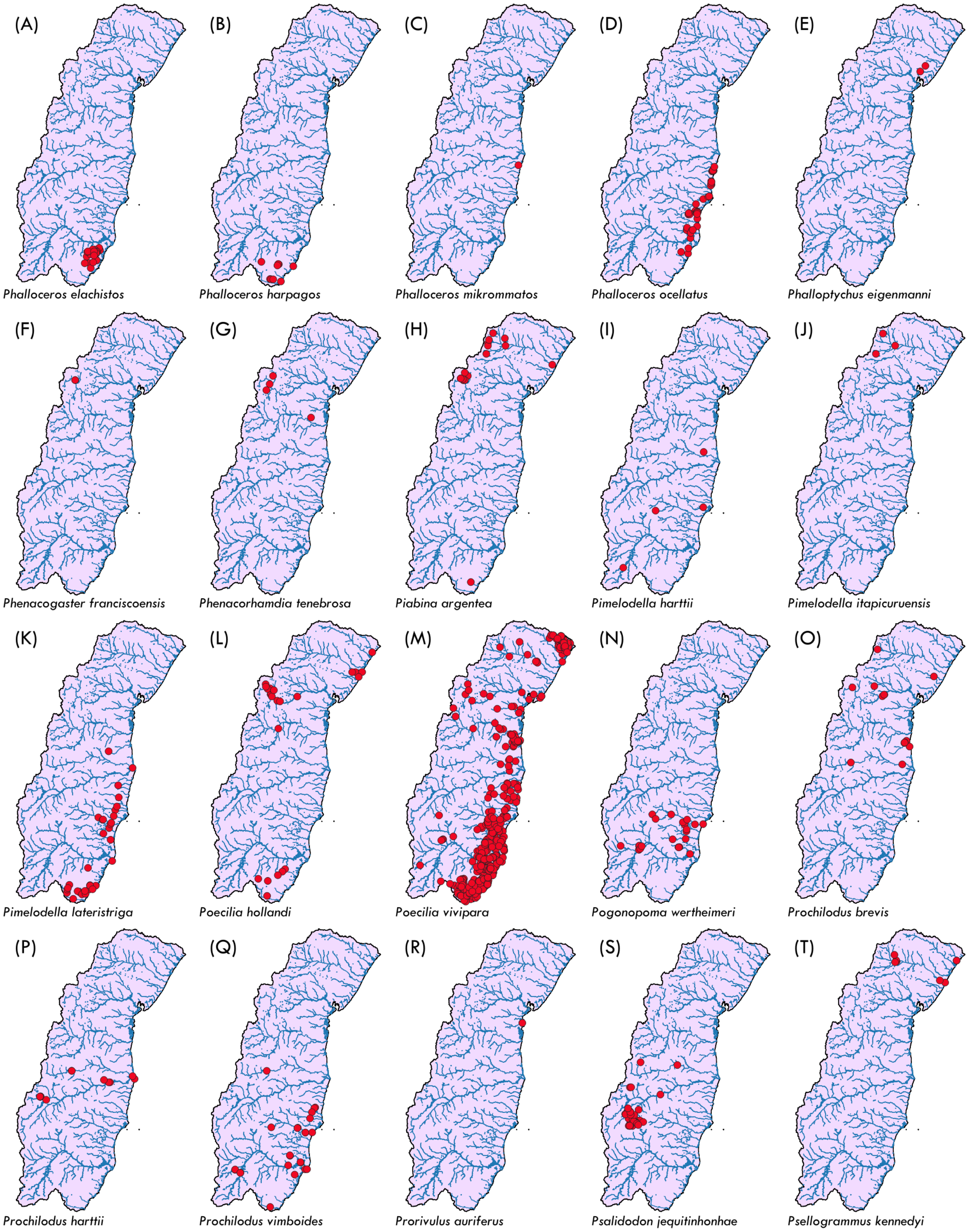

FIGURE 17. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Phalloceros elachistos*; (B) *Phalloceros harpagos*; (C) *Phalloceros mikrommatos*; (D) *Phalloceros ocellatus*; (E) *Phalloptychus eigenmanni*; (F) *Phenacogaster franciscoensis*; (G) *Phenacorhamdia tenebrosa*; (H) *Piabina argentea*; (I) *Pimelodella harttii*; (J) *Pimelodella itapicuruensis*; (K) *Pimelodella lateristriga*; (L) *Poecilia hollandi*; (M) *Poecilia vivipara*; (N) *Pogonopoma wertheimeri*; (O) *Prochilodus brevis*; (P) *Prochilodus harttii*; (Q) *Prochilodus vimboides*; (R) *Prorivulus auriferus*; (S) *Psalidodon jequitinhonhae*; (T) *Psellogrammus kennedyi*.

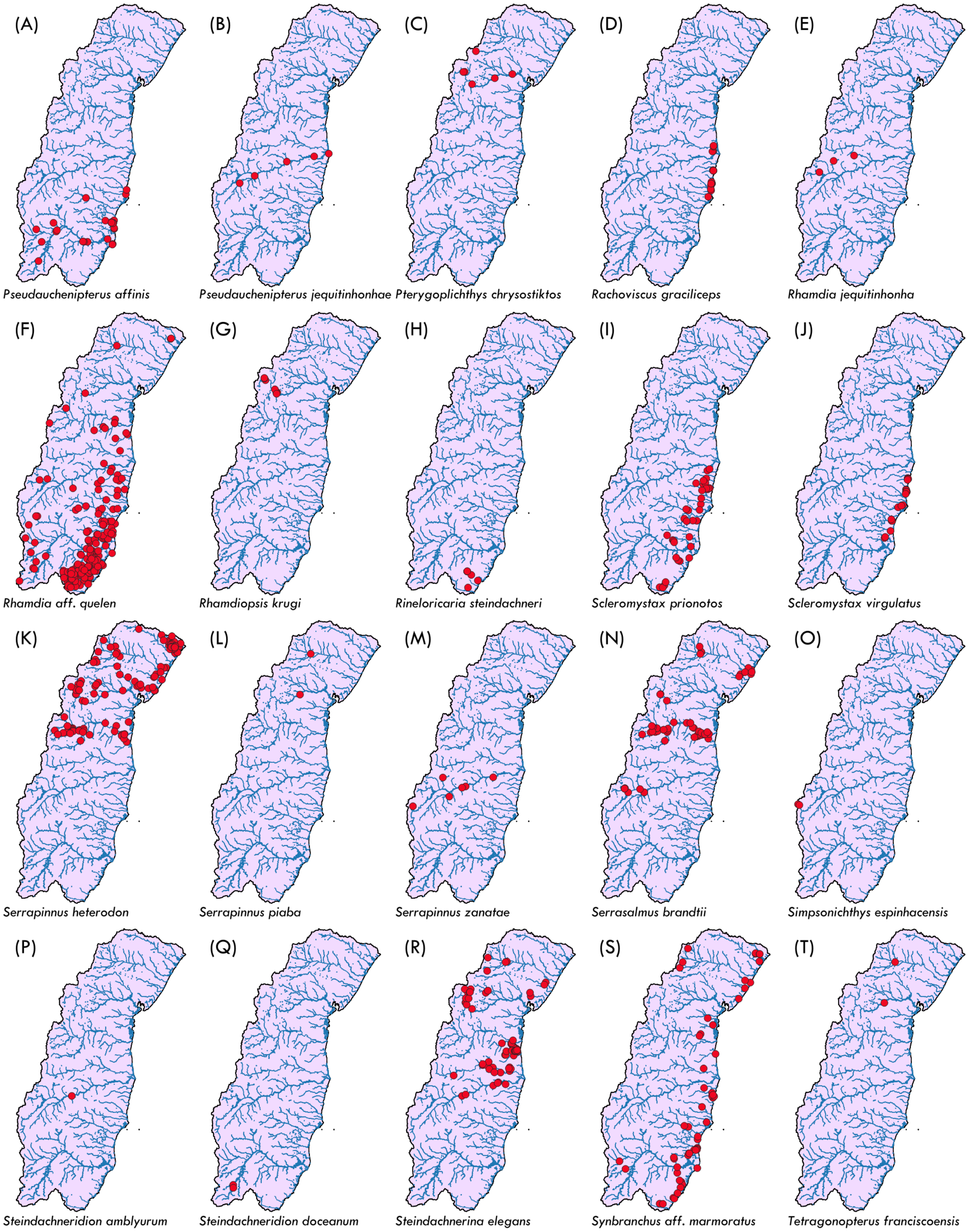

FIGURE 18. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Pseudauchenipterus affinis*; (B) *Pseudauchenipterus jequitinhonhae*; (C) *Pterygoplichthys chrysostiktos*; (D) *Rachoviscus graciliceps*; (E) *Rhamdia jequitinhonha*; (F) *Rhamdia* aff. *quelen*; (G) *Rhamdiopsis krugi*; (H) *Rineloricaria steindachneri*; (I) *Scleromystax prionotos*; (J) *Scleromystax virgulatus*; (K) *Serrapinnus heterodon*; (L) *Serrapinnus piaba*; (M) *Serrapinnus zanatae*; (N) *Serrasalmus brandtii*; (O) *Simpsonichthys espinhacensis*; (P) *Steindachneridion amblyurum*; (Q) *Steindachneridion doceanum*; (R) *Steindachnerina elegans*; (S) *Synbranchus* aff. *marmoratus*; (T) *Tetragonopterus franciscoensis*.

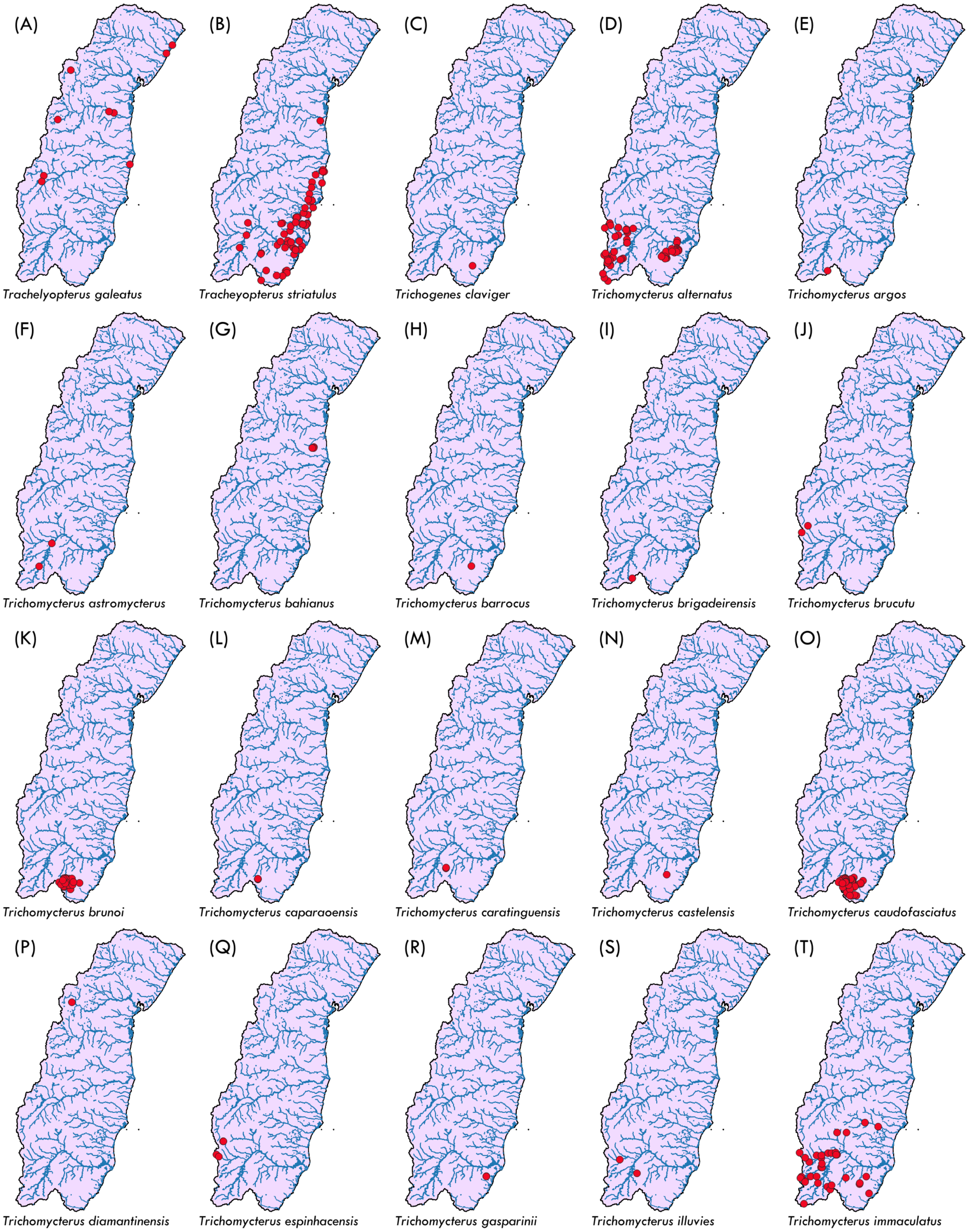

FIGURE 19. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Trachelyopterus galeatus*; (B) *Trachelyopterus striatulus*; (C) *Trichogenes claviger*; (D) *Trichomycterus alternatus*; (E) *Trichomycterus argos*; (F) *Trichomycterus astromycterus*; (G) *Trichomycterus bahianus*; (H) *Trichomycterus barrocus*; (I) *Trichomycterus brigadeirensis*; (J) *Trichomycterus brucutu*; (K) *Trichomycterus brunoi*; (L) *Trichomycterus caparaoensis*; (M) *Trichomycterus caratinguensis*; (N) *Trichomycterus castelensis*; (O) *Trichomycterus caudofasciatus*; (P) *Trichomycterus diamantinensis*; (Q) *Trichomycterus espinhacensis*; (R) *Trichomycterus gasparinii*; (S) *Trichomycterus illuvies*; (T) *Trichomycterus immaculatus*.

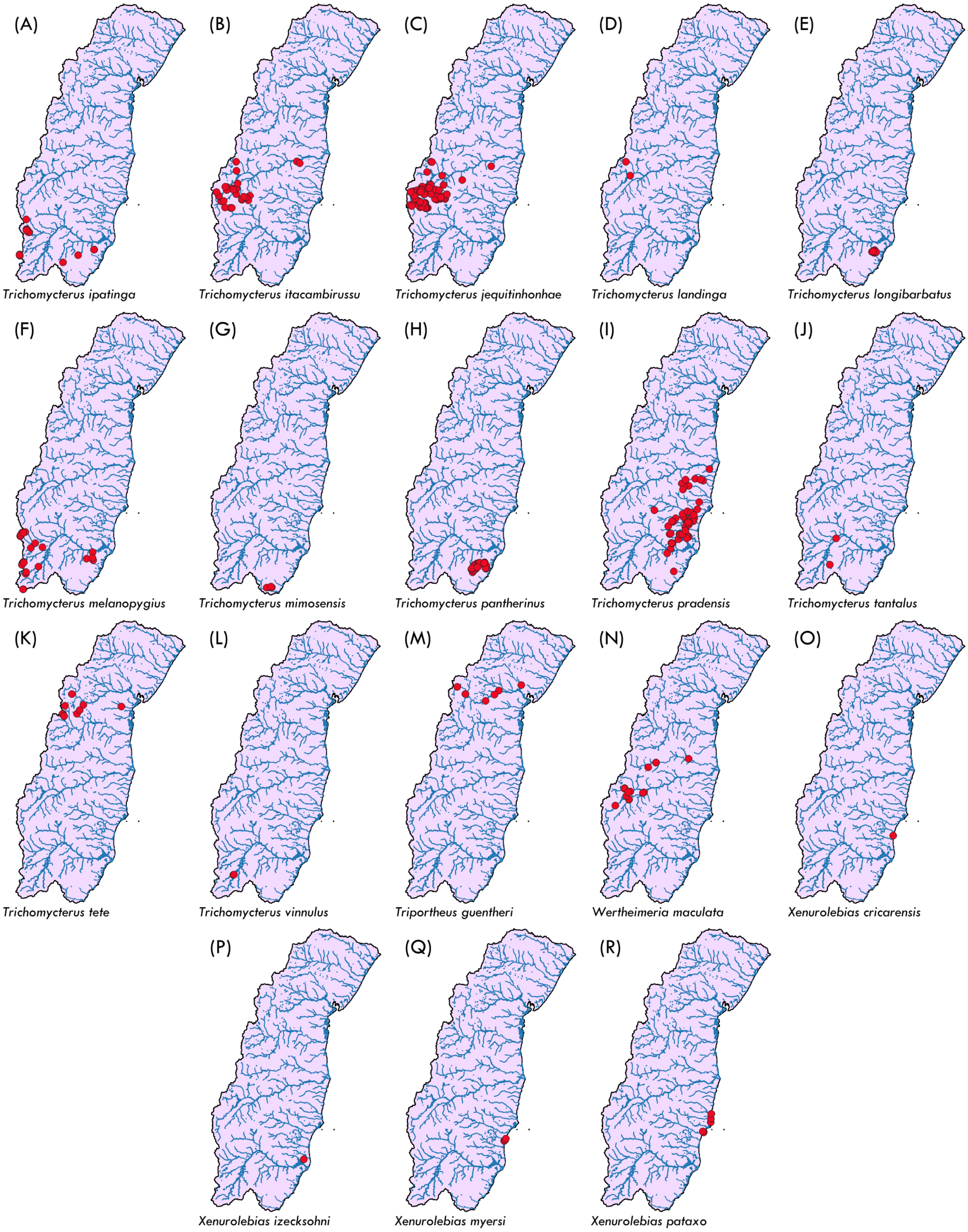

FIGURE 20. Distribution maps of native freshwater fishes occurring in the Northeastern Mata Atlântica ecoregion. (A) *Trichomycterus ipatinga*; (B) *Trichomycterus itacambirussu*; (C) *Trichomycterus jequitinhonhae*; (D) *Trichomycterus landinga*; (E) *Trichomycterus longibarbatus*; (F) *Trichomycterus melanopygius*; (G) *Trichomycterus mimosensis*; (H) *Trichomycterus pantherinus*; (I) *Trichomycterus pradensis*; (J) *Trichomycterus tantalus*; (K) *Trichomycterus tete*; (L) *Trichomycterus vinnulus*; (M) *Triportheus guentheri*; (N) *Wertheimeria maculata*; (O) *Xenurolebias cricarensis*; (P) *Xenurolebias izecksohni*; (Q) *Xenurolebias myersi*; (R) *Xenurolebias pataxo*.