IOCTX 2025 Conference

The 1st International Online Conference on Taxonomy

03–04 December 2025 | Online

MDPI

INTEGRATIVE TAXONOMY OF A NEW SPECIES OF *HOPLIAS* GILL (CHARACIFORMES: ERYTHRINIDAE) FROM THE UPPER PARANÁ RIVER BASIN, BRAZIL

José Vitor Costa (jvd.costa@unesp.br)[1], Fernando Carvalho[2]

[1]Department of Biological Sciences, Institute of Biosciences, Letters and Exact Sciences (IBILCE), São José do Rio Preto Campus, São Paulo State University (UNESP), São José do Rio Preto, 15054-000, Brazil

[2]Três Lagoas Campus (CPTL), Federal University of Mato Grosso do Sul (UFMS), Três Lagoas, 79613-000, Brazil

INTRODUCTION & AIM

Hoplias Gill has long been considered taxonomically challenging among Neotropical freshwater fishes, particularly due to the presence of cryptic species within the *H. malabaricus* complex, which exhibits extensive morphological overlap among lineages of many Neotropical drainages. In this study, an integrative approach combining morphological and molecular data was employed to describe a new taxon from the upper Paraná River basin, Brazil.

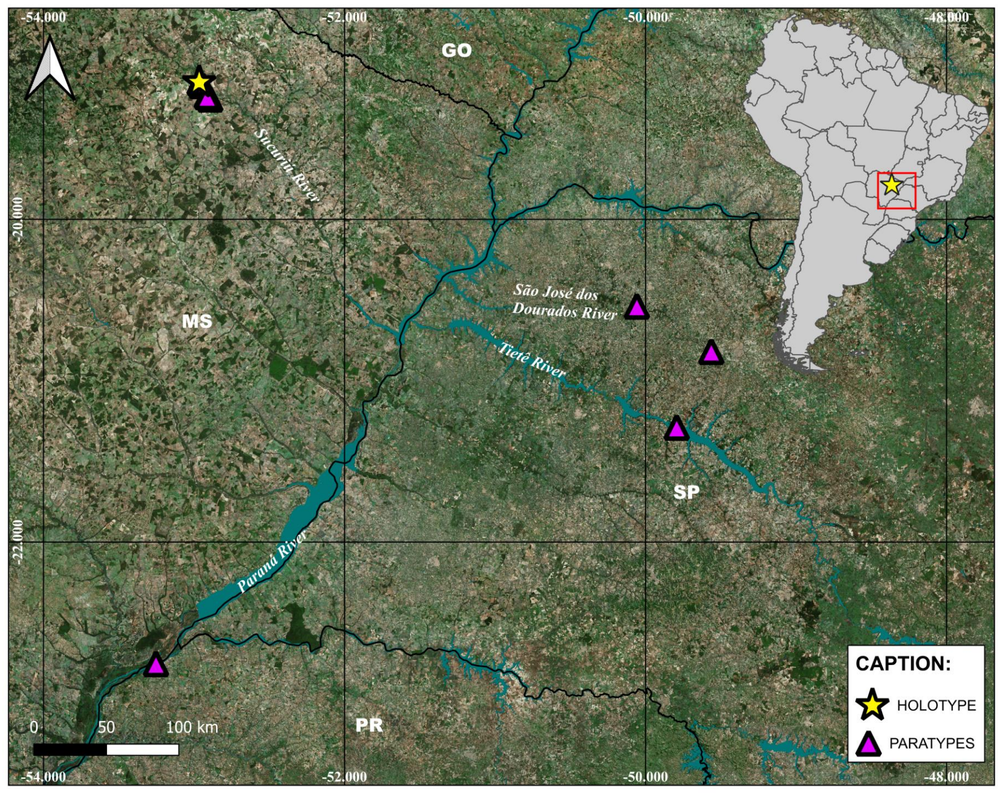
METHOD

A total of 22 specimens were analyzed using morphometric and meristic assessments, along with mitochondrial COI gene sequencing. Species delimitation was performed through multiple methods, including genetic distance analysis on the BOLD Systems platform, Automatic Partitioning (ASAP), Generalized Mixed Yule Coalescent (GMYC), and Poisson Tree Processes (PTP). Phylogenetic trees were reconstructed using Bayesian inference.

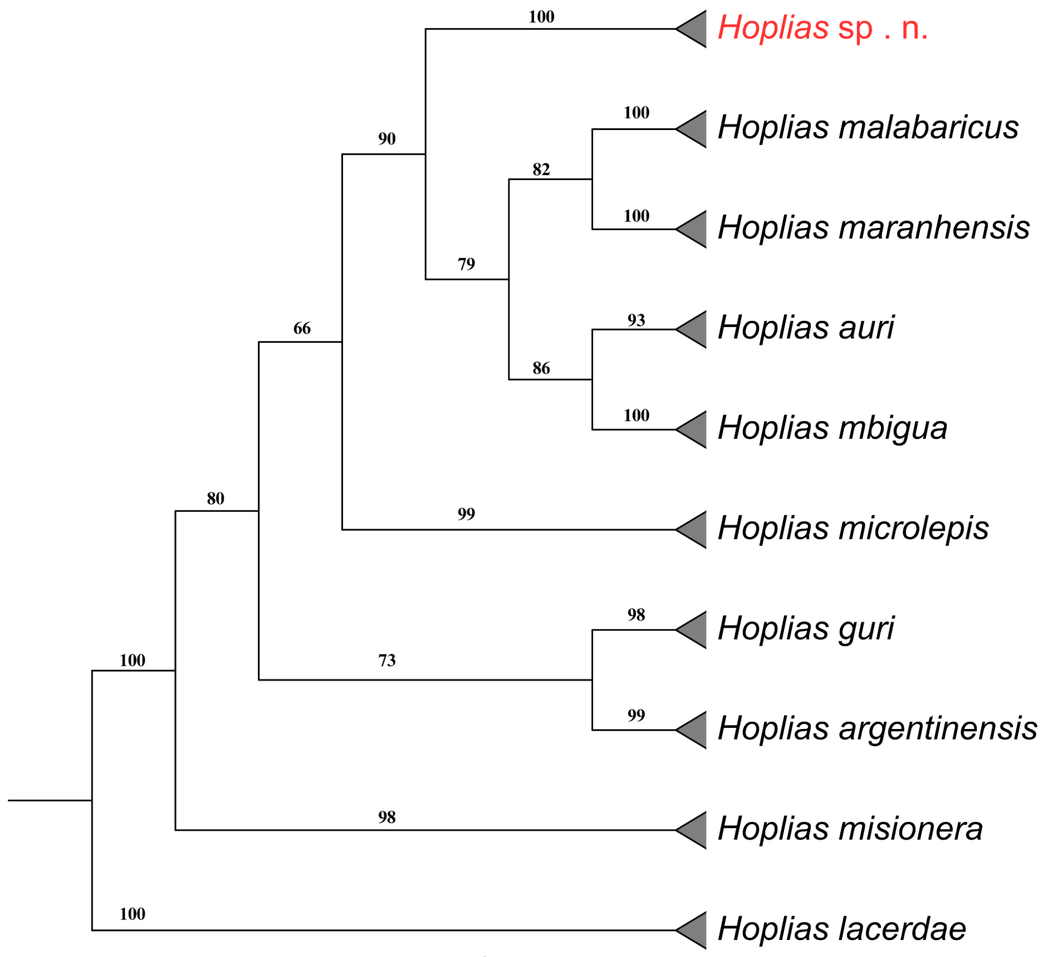
RESULTS & DISCUSSION

Hoplias sp. n. presents distinct diagnostic characters among congeners: 36–37 perforated lateral-line scales (vs. 37–43), 13–15 predorsal scales (vs. 15–19), 37–38 total vertebrae (vs. 39–45), and a rectilinear arrangement of scales at the base of the caudal fin. Molecularly, it forms a distinct clade with minimum K2P genetic distances of 3.7% from its closest relative (*H. auri*), exceeding the commonly accepted 2–3% threshold for species delimitation. All applied methods consistently recovered the new taxon as an independent evolutionary unit: ASAP (nine groups; $p = 8.79\times10^{-3}$), GMYC (nine entities; $p = 0.0007$), and PTP (support = 0.999).

➤ *Hoplias* sp. nov., CITL 1023, 288 mm SL (standard length), Sucuriú River, Paraíso das Águas, Mato Grosso do Sul, Brazil.



➤ Occurrence of *Hoplias* sp. nov. in the upper Paraná River basin. Each point on the map may represent more than one analyzed lot.



➤ Ultrametric tree comparing species of *Hoplias*.

CONCLUSION

The convergence of morphological and molecular evidence strongly supports the recognition of *Hoplias* sp. n. as a valid new species for the upper Paraná River basin. These findings enhance our understanding of the genus diversity and underscore the power of integrative taxonomy in resolving cryptic species complexes among Neotropical fishes, thereby helping to reduce the Linnean shortfall.

FUTURE WORK / REFERENCES

OYAKAWA, O. T.; MATTOX, G. M. T. Revision of the Neotropical trahiras of the *Hoplias lacerdae* species group (Ostariophysi: Characiformes: Erythrinidae) with descriptions of two new species. Neotropical Ichthyology, v. 7, n. 1, p. 117–140, 2009.

GUIMARÃES, K. L. A.; LIMA, M. P.; SANTANA, D. J.; et al. DNA barcoding and phylogeography of the *Hoplias malabaricus* species complex. Scientific Reports, v. 12, p. 5288, 2022a. DOI: 10.1038/s41598-022-09121-z.

CARDOSO, Y. P.; ROSSO, J. J.; MABRAGAÑA, E.; GONZÁLEZ-CASTRO, M.; DELPIANI, M.; AVIGLIANO, E.; et al. A continental-wide molecular approach unraveling mtDNA diversity and geographic distribution of the Neotropical genus *Hoplias*. PLoS ONE, v. 13, n. 8, e0202024, 2018. DOI: 10.1371/journal.pone.0202024.