

## Morphological and genetic variation in *Iguanodectes spilurus* and *I. purusii* (Characiformes, Iguanodectidae) from the Amazon Basin

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## INTRODUCTION & AIM

The family Iguanodectidae comprises small characiform fishes widely distributed across the Amazon Basin, yet species boundaries within some taxa remain poorly understood. In this study, we analyzed specimens of *Iguanodectes purusi*, collected from the Purus River, and *Iguanodectes spilurus*, from different localities including the Madeira River (Aveiro).



Figure 1. Some specimens of the genus *Iguanodectes*.

## METHOD

The samples were obtained from the Fish Collection of the Fish Biology and Genetics Laboratory (LBP) at São Paulo State University, in Botucatu/SP. Morphological identification was performed based on available literature, including original descriptions, revisions, and identification keys (Géry, 1970, 1977; Vari, 1977; Van der Sleen & Moreira, 2017), in addition to the collaboration of specialists in the group, including Dr. Cristiano Moreira. 263 samples of Iguanodectidae were analyzed, of which 36 were obtained from databases such as GenBank (ncbi.nlm.nih.gov/genbank) and BOLD (boldsystems.org). Among these, 106 specimens belong to the genus *Iguanodectes* (six species; 95%), 18 to the genus *Piabucus* (three species; 100%), and 139 to the genus *Bryconops* (13 species; 46.4%).

## RESULTS & DISCUSSION

Phylogenetic analyses based on molecular markers recovered *I. purusi* nested within the *I. spilurus* (sensu stricto) clade, with extremely low genetic divergence between them ( $0.005 \pm 0.005$ ). Morphological analyses revealed strong similarities between the two taxa, including a complete lateral line with 60–64 perforated scales, eight scales between the lateral line and the dorsal-fin origin, five scales between the lateral line and the pelvic fin, and an anal fin with 32–34 branched rays. General coloration is light, with a silvery stripe along the midline of the body and a dark blotch on the upper caudal-fin lobe. *I. spilurus* is the only species of the genus recorded in the main channel of the Madeira River, whereas the other congeners were found exclusively in terra firme streams. Despite these similarities, *I. purusi* exhibits subtle differences, such as a higher number of predorsal scales ( $\geq 27$  in *I. purusi* vs.  $\leq 26$  in *I. spilurus*) and more perforated scales on the lateral line ( $> 65$  in *I. purusi* vs. 60–64 in *I. spilurus*). However, these differences may represent geographic (clinal) variation among populations distributed across the Amazon Basin rather than valid species-level differentiation. Our findings highlight the need for taxonomic revisions integrating molecular, morphological, and ecological data to clarify the status of *I. purusi* and to better understand diversity patterns within Iguanodectidae.

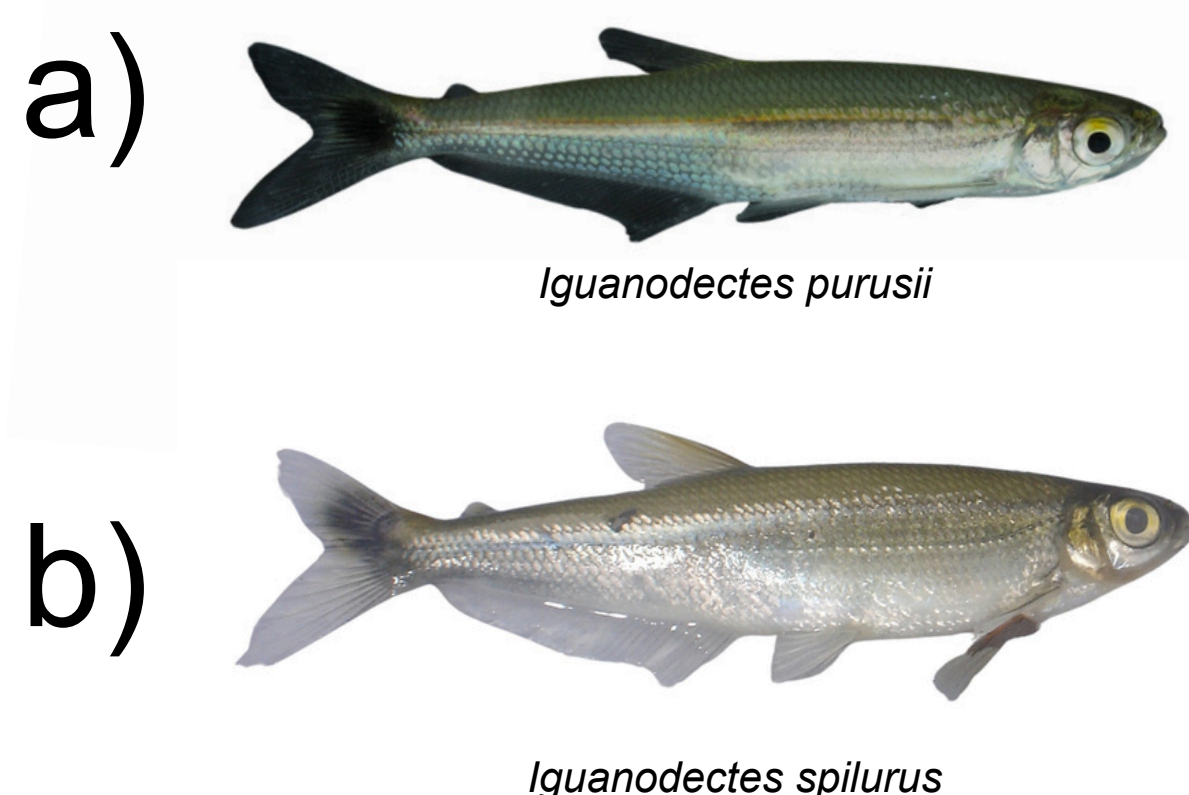


Figure 2. Specimens of a) *Iguanodectes purusii* and b) *Iguanodectes spilurus*

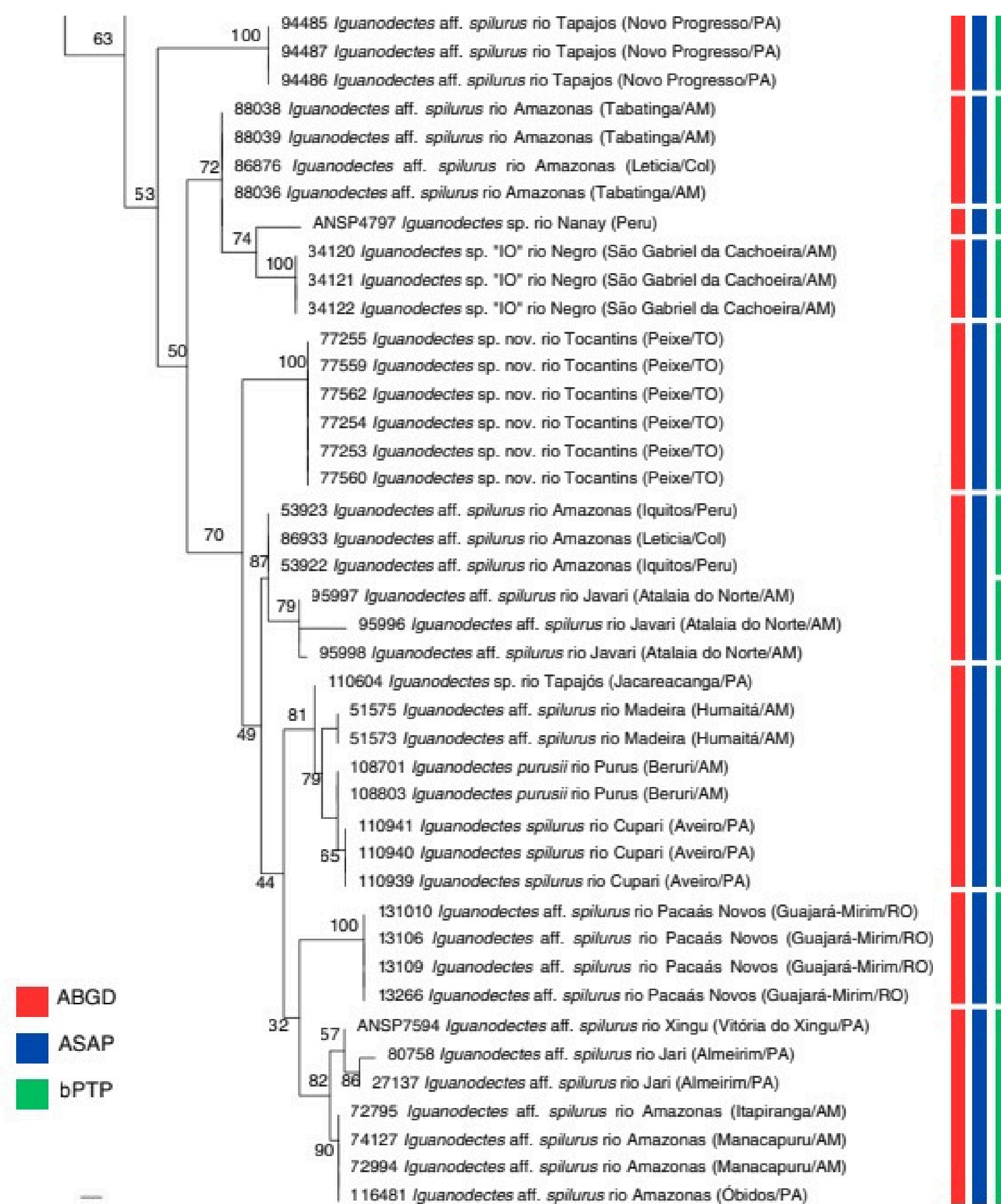


Figure 3. Best maximum likelihood tree of Iguanodectidae based on the cytochrome c oxidase subunit I gene obtained by RAXML. Internode values represent bootstrap percentages.

## CONCLUSION

The results of this study demonstrate that *Iguanodectes purusi* and *I. spilurus* exhibit minimal genetic and morphological differences, suggesting that the distinctions traditionally used to separate them may only reflect geographic variation within the same complex of populations widely distributed in the Amazon. The low genetic divergence, coupled with strong morphological similarity, indicates that *I. purusi* may not constitute a valid species, reinforcing the need for a comprehensive taxonomic revision. Future studies integrating molecular, morphological, and ecological data, along with broader sampling throughout the Amazon basin, will be essential to resolve species boundaries within the group and deepen knowledge about the diversity of the Iguanodectidae family.

## FUTURE WORK / REFERENCES

Future research should broaden sampling and use genomic, ecological, and morphological data to determine whether *I. purusi* represents a distinct species or geographic variation of *I. spilurus*.

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