

**Comment on ‘Genetic evidence and new morphometric data
as essential tools to identify the Patagonian seahorse
Hippocampus patagonicus (Pisces, Syngnathidae)
by González *et al.* (2014)’**

D. C. LUZZATTO*, M. L. ESTALLES AND J. M. DÍAZ DE ASTARLOA

*Instituto de Investigaciones Marinas y Costeras, CONICET, Facultad de Ciencias Exactas y
Naturales, Universidad Nacional de Mar del Plata, Argentina*

(Received 18 March 2014, Accepted 8 July 2014)

The aim of the contribution of González *et al.* (2014) was to improve the original description and validate the taxonomic status of the Patagonian seahorse *Hippocampus patagonicus* Piacentino & Luzzatto 2004. To do so, the authors analysed morphological and genetic characteristics of seahorses of San Antonio Bay, Argentina. Concerning both issues, the information presented lacks validity and originality.

MORPHOLOGICAL ANALYSIS

A weak methodology was applied by González *et al.* (2014) to compare taxa. Referenced material was not examined. In their contribution, the comparisons were only made using information of *Hippocampus erectus* Perry 1810 published by Vari (1982). In addition, although they mentioned significant differences among species, the statistical tests performed were not stated.

The authors justified the incorporation of new data to that already analysed by Piacentino & Luzzatto (2004) because it would offer an ‘easier’ and a ‘clearer’ diagnosis of *H. patagonicus*. This information, however, did not appear to facilitate the identification and after their analysis, González *et al.* (2014) concluded that the morphological differences among species were only perceptible when a large number of fish and a broad range of sizes were analysed. They stated that definite identification relies on genetic analysis.

On the other hand, the relationships between morphological variables proposed by González *et al.* (2014) may not be diagnostic of *H. patagonicus*. The only analysed data presented came from samples of *H. patagonicus* of San Antonio Bay, which is located at the southern limit of the wide distribution of the species (Boehm *et al.*, 2013). The morphological variables provided could be representative of individuals of

*Author to whom correspondence should be addressed. Tel.: +54 011 15 6259 2531; email: diegoluzzatto@conicet.gov.ar

San Antonio Bay, but to validate those values as diagnostic of the species, individuals of other localities should have been incorporated in their analysis.

GENETIC ANALYSIS

The genetic analysis published by González *et al.* (2014) lacks originality. The input data comprised partial sequences of the mitochondrial gene cytochrome b (*cytb*), 17 of the 25 sequences were the same as used by Luzzatto *et al.* (2012). The phylogenetic tree that González *et al.* (2014) obtained was also similar to the one published by Luzzatto *et al.* (2012). The results of Luzzatto *et al.* (2012) already statistically differentiated *H. patagonicus* from other taxa, allowing for the taxonomic identification of the species.

To justify the originality of the genetic analysis performed, González *et al.* (2014) made fallacious phrases and manipulated contexts. It was stated in their introduction: 'Recent studies, focused on the phylogeny of the *H. erectus* complex (Luzzatto *et al.*, 2012) and the biogeography of Atlantic seahorses (Boehm *et al.*, 2013), have assumed *H. patagonicus* as a valid species. In one of these papers, however, Luzzatto *et al.* (2012) pointed out that this status needed to be confirmed because the differentiation from *H. erectus* is not clear based on morphometric and meristic data published to date'. The phrase quoted corresponds to the introduction of the study of Luzzatto *et al.* (2012). This introduction gave a general remark about the difficulties of differentiating seahorses when relying only on morphological characteristics. Literally, this introduction read: 'Given that classical morphological measurements (Lourie *et al.*, 2004) could not be sufficient to separate related species of seahorses (Teske *et al.*, 2007), the name *H. patagonicus* should be validated'. To achieve this goal, Luzzatto *et al.* (2012) analysed sequences of *cytb* of Argentinean seahorses. The molecular analysis performed differentiated *H. patagonicus* from other taxa, thus validating the status of the species.

Then, González *et al.* (2014) concluded: 'Luzzatto *et al.* (2012) suggested the presence of *H. patagonicus* in southern Brazil, highlighting the need to resolve the taxonomic status of *H. erectus* in the south-western Atlantic Ocean and the validation of the name *H. patagonicus*, as has been done in this study'. Luzzatto *et al.* (2012) did not conclude that the name of the species needed to be validated. Moreover, their molecular analysis had already done so.

CONCLUSION

The morphological variables analysed by González *et al.* (2014) should have been compared to referenced material of other species of *Hippocampus*, and analysed in specimens of *H. patagonicus* from other localities than that of San Antonio Bay, if the aim of the authors was to improve the original description of the species.

Luzzatto *et al.* (2012) did not leave pending the confirmation of the taxonomic status of *H. patagonicus*, for it was the main result of the study. The work presented by González *et al.* (2014) was based on misinterpretations of the original study they claimed to be improving, and no new considerations were provided about the taxonomic status of *H. patagonicus*.

References

- Boehm, J., Woodall, L., Teske, P., Lourie, S., Baldwin, C., Waldman, J. & Hickerson, M. (2013). Marine dispersal and barriers drive Atlantic seahorse diversification. *Journal of Biogeography* **40**, 1839–1849.
- González, R., Dinghi, P., Corio, C., Medina, A., Maggioni, M., Storero, L. & Gosztonyi, A. (2014). Genetic evidence and new morphometric data as essential tools to identify the Patagonian seahorse *Hippocampus patagonicus* (Pisces, Syngnathidae). *Journal of Fish Biology* **84**, 459–474.
- Lourie, S., Foster, S., Cooper, E. & Vincent, A. (2004). *A Guide to the Identification of Seahorses*. Washington, DC: University of British Columbia and World Wildlife Fund (Project Seahorse and TRAFFIC North America).
- Luzzatto, D., Sieira, R., Pujol, M. & Díaz de Astarloa, J. (2012). The presence of the seahorse *Hippocampus patagonicus* in the Argentine Sea based on the cytochrome b sequence of mitochondrial DNA. *Cybium* **36**, 329–333.
- Piacentino, G. & Luzzatto, D. (2004). *Hippocampus patagonicus* sp. nov., nuevo caballito de mar para a Argentina (Pisces, Syngnathiformes). *Revista del Museo Argentino de Ciencias Naturales*, n.s. **6**, 339–349.
- Teske, P., Lourie, S., Matthee, C. & Green, D. (2007). *Hippocampus queenslandicus* Horne, 2001, a new seahorse species or yet another synonym? *Australian Journal of Zoology* **55**, 139–145.
- Vari, R. (1982). The seahorses (Subfam. Hippocampinae). In *Fishes of the Western North Atlantic* (Bolhke, J., Cohen, D., Collette, B., Eschmeyer, W., Gibbs, R., Pietsch, T. Jr., Richards, W., Smith, C. & Thompson, K., eds) Part 8, pp. 173–189. New Haven, CT: Memoir Sears Foundation for Marine Research.