

postponing the initial date of application of this code until internally consistent rules are provided. Members of the Systematic and Evolutionary Biogeographical Association are warmly encouraged to provide a completed version of ICAN. Such a universal naming system will significantly increase the efficiency of communication in biogeography and other related disciplines.

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Editor: David Bellwood

doi:10.1111/j.1365-2699.2009.02106.x

On the International Code of Area Nomenclature (ICAN): a reply to Zaragüeta-Bagils *et al.*

ABSTRACT

In 2007 the Systematic and Evolutionary Biogeographical Association (SEBA) wrote and ratified the first draft of the International Code of Area Nomenclature (ICAN), which was posted subsequently on the SEBA website. The ICAN was published, along with an explanatory discussion, by Ebach *et al.* (*Journal of Biogeography*, 2008, **35**, 1153–1157), an article that is the subject of criticism by Zaragüeta-Bagils *et al.* (*Journal of Biogeography*, 2009, **36**, 1617–1619). We welcome discussion of the issues raised by these authors and respond to them briefly here. For many reasons, we reject the proposition that implementation of the ICAN be postponed until it is flawless. The ICAN has already been implemented. Further, it is the nature of nomenclatural codes to be proposed and then revised periodically to suit our applications. Most importantly, standardization of area names in biogeography is long overdue.

Keywords Area classification, area names, area nomenclature, area ranks, ICAN, standards in biogeography.

The first draft of the International Code of Area Nomenclature (ICAN) was written and ratified by members of the Systematic and Evolutionary Biogeographical Association (SEBA) and posted on its website (Ebach

et al., 2007). An explanatory discussion and the text of the ICAN were published subsequently as a Guest Editorial in the *Journal of Biogeography* (Ebach *et al.*, 2008). That editorial was the subject of a critique by Zaragüeta-Bagils *et al.* (2009) to which we reply briefly here. We are grateful for the attention paid by these authors to the ICAN, particularly by their comment that it '...constitutes a key step toward maturity of [biogeography]'. We offer some comments in anticipation of the benefits of public debate. Our subject headings mirror those in Zaragüeta-Bagils *et al.*'s (2009) critique.

CLASSIFICATION VERSUS NOMENCLATURE

The explanatory discussion and the ICAN in Ebach *et al.* (2008) are explicit about the relationship between classification and nomenclature: the ICAN is concerned with nomenclature, not with particular methods to construct biogeographical classifications. That we mentioned the nomenclatural rules and classification of Linnaeus in the same sentence of the explanatory discussion does not mean that we equate or confuse these concepts (Zaragüeta-Bagils *et al.*, 2009). This is one example of how Zaragüeta-Bagils *et al.* (2009) unfortunately conflate the explanatory discussion accompanying the ICAN and the ICAN itself. Similarly, they state that the 'ICAN stipulates' (Zaragüeta-Bagils *et al.*, 2009) that taxonomic nomenclature is ruled by three codes. The three nomenclatural codes for natural living organisms – not those cultivated or viral – are noted in the explanatory discussion, not the ICAN.

Zaragüeta-Bagils *et al.*'s (2009) rejection of the ICAN statement that '[a]rea names may be grouped under more inclusive area names in order to represent a biogeographical taxonomic hierarchy' using the argument that a hierarchy applies to areas, not names, is beside the point. A hierarchy of areas may be represented by words, by a complex map, or, ideally, both.

RANKS

We agree that the use of classificatory ranks is arbitrary and gave several examples in our explanatory discussion of how in practice these may be applied or even ignored. The ICAN is criticized because '...the typelocality of a higher-rank area can be different from those of included areas', and therefore, in the opinion of Zaragüeta-Bagils *et al.* (2009), it is impossible to make

decisions on synonymy/homonymy. Few fields lack standards in the way that biogeography lacks standards to name areas. Because there have been no standards for naming biogeographical areas, in practice there are no type-localities for large, high-rank areas, such as the Neotropical region or the Austral realm. We explain how type-localities matter below.

In their application of the ICAN to areas occupied by Argentinean freshwater fishes, López *et al.* (2008) presented the following ranked area classification:

- Kingdom Austral (Kuschel, 1969)
 - Region Andean (Shannon, 1927)
 - Province Andean Cuyan
 - Province Patagonian
- Kingdom Holotropical (Rapoport, 1968)
 - Region Neotropical (Sclater, 1858)
 - Province Aymaran
 - Province Great Rivers
 - Province Pampean

In so doing, they rejected Sclater's (1858) broad Neotropical region which subsumed the Andean, and following Morrone (2006) favoured a more restricted concept of the Neotropical region. Had a locality within Patagonia been designated the type-locality for the Neotropical region *sensu* Sclater, it is likely that a different area classification would have been proposed by López *et al.* (2008) because the name 'Neotropical' would also be linked to Patagonia. We anticipate that with implementation of the ICAN, such potential nomenclatural conundrums will be addressed with the same tools available to users of biological nomenclature: discussion, debate, petitions, lists of rejected names and so on.

Ranks and names of ranks have been applied inconsistently to biogeographical areas. The statement in the ICAN that '[a] rank can only have one valid name' (Sec. C, Art. 2.7) is not meaningless, as Zaragüeta-Bagils *et al.* (2009) claim. The statement means that for any given rank in an area classification there should be only one name. In the above example of a ranked area classification by López *et al.* (2008), the name of the Andean region (Shannon, 1927) has precedence over the names Neantarctic region (Monrós, 1958) or Andean Patagonian region (Ringuelet, 1961) (see Morrone, 2001).

AREA DEFINITION

Biogeographical areas are tied to the endemic taxa that live in them. Article 1.1 of the ICAN states: 'The objective of ICAN is to provide a universal naming system or nomenclature for

areas of endemism used in biogeography and elsewhere' (Ebach *et al.*, 2008, p. 1156). An area would not be named or recognized if it had no biogeographical significance.

Zaragüeta-Bagils *et al.* (2009) bemoan the neglect of temporal data in the ICAN. Of course, a time period may be added to any area diagnosis/definition. The relationship between time and areas is abstract: specifying a temporal interval for a biogeographical area may be possible in some cases, not others. Temporal distribution data will enhance our understanding of biological distribution.

DIAGNOSIS VERSUS DESCRIPTION

Diagnosis and description are treated as separate concepts in the ICAN. It would be apparent when a diagnosis and description are identical. Nevertheless, we see a benefit in Zaragüeta-Bagils *et al.*'s (2009) suggestion that an explicit diagnosis and description accompany the naming of an area of endemism.

PUBLICATION

The ICAN needs a more explicit statement on date of publication, especially as we anticipate electronic publication of many, if not most, proposals for names of areas. Examples of the distinction between 'available' and 'valid' where we have implicitly followed zoological rules as they apply to names of areas would also clarify our use of those terms.

AMENDMENTS

Changes to ICAN that we describe above can be made through amendments or revision of the entire code. Most important, they should be public and readily available to all interested biogeographers. The ICAN specifies that amendments be published in *Biogeografía*, the online publication of the Systematic and Evolutionary Biogeographical Association.

IMPLEMENTATION AND CONCLUSION

We reject Zaragüeta-Bagils *et al.*'s (2009) proposal to shelve the ICAN until it is flawless. The ICAN has already been implemented (see López *et al.*, 2008, above). Further, it is the nature of nomenclatural codes to be proposed and then revised periodically or amended as the need arises.

Standardization of area names in biogeography is long overdue. With sleek and

sophisticated technologies, such as GPS and GIS, comes the expectation that biogeographical databases are robust and fool-proof. If only that were true. A disquieting number of papers have recently exposed the long-term detrimental effects of having loose or no standards in documenting the occurrence of rare species (McKelvey *et al.*, 2008), applying taxonomy in ecology (Bortolus, 2008) or building biogeographical databases (Robertson, 2008). Pushing aside standards will encourage vague and idiosyncratic biogeographical analyses that have little generality, comparability, repeatability or testability. Encouraging standards will have the opposite, more positive, effect.

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Editor: David Bellwood

doi:10.1111/j.1365-2699.2009.02171.x

New distribution limits of seagrass beds in West Africa

ABSTRACT

The southern limit of the distribution of seagrass species along the west coast of Africa is not yet clearly defined. In March 2008 an expedition was organized in Senegal to search for seagrass beds from Dakar (14°45'15" N, 17°30'31" W) southwards to Tabakouta–Delta du Saloum (13°46'59" N, 16°28'42" W). *Cymodocea nodosa* and *Halodule wrightii* were observed in sandy areas of some protected bays of Dakar, around Sarène (14°16'18" N, 16°54'17" W), Joal Fadiouth (14°09'08" N, 16°50'03" W) and the Bamboung–Sourou area (13°50'08" N, 16°33'09" W), and they probably occur all along the coast of Senegal and beyond, perhaps much further south as well.

Keywords Coastal conservation, *Cymodocea nodosa*, *Halodule wrightii*, seagrass conservation, seagrass distribution limits, West Africa, *Zostera noltii*.

The west coast of Africa is one of the least known areas for seagrasses in the world (Duarte *et al.*, 2008). Very few publications are available for these regions and they cover only Mauritania. The southern limit of *Cymodocea nodosa* is considered to be the Banc d'Arguin, Mauritania (Alberto *et al.*, 2008). The recent report of high genotypic diversity there showed that the local population was stable and raised the possibility that other *C. nodosa* communities occur further south (Alberto *et al.*, 2008). Banc d'Arguin is the northern limit for another seagrass species, *Halodule wrightii* (Green & Short, 2003). Now we have investigated the coastline from the southern limit of the Banc d'Arguin National Park (Mamghar 9°20'33" N, 16°30'29" W) southwards to Nouakchott (18°05'12" N, 16°01'36" W). *Cymodocea nodosa* occurred with *H. wrightii* all along this coastal sector of Mauritania, intermingled with *Zostera noltii* in sandy sediments, from mid-tide level down to 6 m below low-tide level.

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16°54'17" W), Joal Fadiouth (14°09'08" N, 16°50'03" W) and the Bamboung–Sourou area (13°50'08" N, 16°33'09" W). The southern limit of these species is not yet clearly defined and they probably occur all along the coast of Senegal and beyond, perhaps much further south as well.

The seagrass beds observed ranged from small patches (1 m in diameter) to large meadows along beaches (more than 20 km long). Signs of seagrass habitat destruction were observed at all the sites visited. In the bays around Dakar, serious damage to *C. nodosa* was observed due to boat anchoring. South of Dakar and near fishing villages, large amounts of freshly cut material (leaves and rhizomes) were observed accumulated on the beaches as a result of coastal net-fishing activities. The use of beach seines, a fishing technique still used in many locations and important for local subsistence, seems to be an important threat. Aerial photography (Google Earth) shows seagrass meadows as well as gaps caused by beach seines and boat anchoring.

Seagrass species in the region deserve further research and conservation actions. Due to the economic, ecological and scientific interest of these southernmost seagrass populations, a new project is being developed based on community-based mapping and sustainable use. It aims to provide further information and to ensure the conservation of this important coastal habitat on the west coast of Africa, which is absolutely vital for local fisheries, threatened species and water quality.

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ACKNOWLEDGEMENTS

The authors thank Michel N'Dour, the Fondation Internationale du Banc d'Arguin (FIBA), and the Parc Naturel du Banc d'Arguin (PNBA) for field work support, the Oceanium Dakar for information on the local presence of seagrasses, and Paul Siegel and Christine Maggs for valuable suggestions.

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