



A study on the mangrove formations of the Neotropical-Austroamerican Kingdom

Antonio García-Fuentes, M^a Lucía Lendínez-Barriga, Juan Antonio Torres-Cordero, Luis Ruiz-Valenzuela, Juan Quesada, Yolanda León & Carlos Salazar-Mendías

Abstract

According to the most recent literature, although very few plant species are characteristic of American mangrove formations, to date over 30 plant associations, including three orders, seven alliances, and three phytosociological classes have been published. **Location:** The Americas (USA, Mexico, Central America, Caribbean and South America). **Questions:** Are all these mangrove forest associations consistent from a phytosociological point of view? Do they have floristic, biogeographic and dynamic soundness? Have they been described based in mangrove swamp characteristic species? Have all these syntaxa been named and published according to the provisions of the International Code of Phytosociological Nomenclature? **Methods:** A detailed analysis of all American mangrove phytocoenoses described employing phytosociological methodology has been carried out. Based on 592 phytosociological samples, we applied an exploratory data analysis using multivariate classification techniques to calculate the initial number of general groups. As a second step, we performed an exploratory multivariate analysis (cluster) to check for similarities between associations using a synoptic table of the 30 currently described associations. We also applied a correspondence analysis to this table to corroborate the distance between associations. **Conclusions:** A synthesis of all the mangrove plant communities described from the Americas has been performed, which has allowed us to make new syntaxonomic proposals. Several orthographical and grammatical errors have been found in the names of many syntaxa, that have been subsequently corrected by applying the ICPN. In this study, we provide clear evidence of how certain species used to characterize associations are not typical of mangrove swamps. Almost half of the described associations up to date should be rejected for different reasons or at least downgraded to subassociation rank. We propose a new syntaxonomic structure (orthographically and grammatically corrected) consisting of eight associations and eight subassociations.

Keywords: American continent; Mangrove swamps; Multivariate analysis; Phytosociology; *Rhizophoretea mangle*; syntaxonomy.

Taxonomic reference: Flora Mesoamericana (Ulloa-Ulloa et al. 2017; <https://www.tropicos.org/Project/FM>).

Syntaxonomic reference: Galán de Mera et al. (2006).

Abbreviations: APS = Average Partition Silhouette (Rousseeuw 1987); FCM = Fuzzy C-Means (De Cáceres et al. 2010); ICPN = International Code of Phytosociological Nomenclature (Weber et al. 2000).

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Introduction

Mangrove formations are intertidal ecosystems mainly found in the tropics. They play an important economic and ecological role in neighboring terrestrial and marine habitats and are significant economic and social resources for the inhabitants of coastal areas in the

tropics (Field 1999). Likewise, they are a key element in coastal protection as they halt encroachment by the sea in coastal areas and vice versa (i.e. sedimentation, contamination and unwanted nutrient fluxes) (Alongi 2008) and thus are crucial formations for mitigating certain effects of climate change such as the rise in sea level.

*Corresponding author's address: Departamento de Biología Animal, Biología Vegetal y Ecología, Facultad de Ciencias Experimentales, Campus Las Lagunillas, Universidad de Jaén, 23071 Jaén, Spain; agarcia@ujaen.es. Complete addresses of all authors can be found at the bottom of the paper.