Geobotany Studies
Basics, Methods and Case Studies

Alejandro Velázquez
Consuelo Medina García
Elvira Durán Medina · Alfredo Amador
Luis Fernando Gopar Merino

Standardized Hierarchical Vegetation Classification

Mexican and Global Patterns

Springer

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ISSN 2198-2562 ISSN 2198-2570 (electronic)
Geobotany Studies
ISBN 978-3-319-41221-4 ISBN 978-3-319-41222-1 (eBook)
DOI 10.1007/978-3-319-41222-1

Library of Congress Control Number: 2016943442

Printed on acid-free paper

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The registered company is Springer International Publishing AG Switzerland

Apostolado en las Alturas

Ernesto Velázquez Hurtado†

A quien se esfuerce en subir a la montaña
A quien conoce el aire plácido de las Alturas
A quien sudando entre el hielo, la nieve y las alburas
A quien se encuentre esclavo con la hazaña
A quien practique el sermón en la montaña

A quien entienda lo dicho y lo comulgue
A quien a esfuerzo titánico se humille
A quien a esas alturas se arrodille
A quien con valor la verdad divulgue.

To Jerzy Rzedowski and Graciela Calderón who devoted more than half a century to inspiring generations of emerging naturalists to increase the knowledge of botany worldwide. Jerzy and Graciela planted the seed in the authors of this book by making us understand that botanical studies were unthinkable without remote sensing tools. Their vision was innovative and stimulating and we simply express our appreciation and admiration by means of this humble contribution.

Foreword

During this past decade, there have existed two realities in the study of vegetation. On the one hand, there has been an enormous quantity of information amassed, and, on the other, applying any of the existing classification systems to specific conditions in Mexico can be difficult. This has led to reflection, upon analysis, revision, readjustment, and specification, on a newly proposed vegetation classification system, the adoption or rejection of which will serve as an indication of its success.

The first chapter of this work consists of an historic review of the prevalent approaches to the study of vegetation both in Mexico and in other regions of the world. The second chapter analyses succinctly the existing schools of thought which have led to the development of vegetation classification systems based on physiognomic, structural, and floristic approaches.

The nub of the work is found in the third chapter, in which the proposed ―Standardized hierarchical Mexican vegetation classification system‖ (SECLAVEMEX—Sistema jerárquico estandarizado para la clasificación de la vegetación de México) is presented. Organizational levels are laid out along with the criteria defining them and the nomenclatural basis for the denomination of each type of vegetation. Also included is a series of tables explaining and defining precisely the meaning of each concept, criterion, character, and element used with a view to assisting the reader in successfully identifying the type of vegetation in a determined area.

The fourth chapter highlights SECLAVEMEX's inclusive character as evidenced through its compatibility with systems currently prevalent in the Western world and in the tropics. The fifth chapter deals with a core current issue regarding the mixed approach to study land cover/land use/vegetation patterns. This chapter clarifies the (dis)similarities among concepts, tools and advantages of studying vegetation from an inclusive approach where these three concepts and used coherently towards a common goal.

There can be little doubt that the danger to plant life has moved on from being an alarming rate of extinction in terms of individual species to being one of an accelerated rate of habitat loss. In both cases, a good stocktaking is increasingly

urgent, while, equally as crucial, is gathering information on vegetation from the perspective of having an adequate knowledge of natural resources. In Europe, for example, thanks to the adoption of the phytosociological approach more than a century ago as a basis for the study of vegetation, today, there are strategies for the management and conservation of habitats. In Canada and in the USA, the task was undertaken only a few decades ago, and, today, there are already promising results.

An additional motive behind this work is the urgent need to define universal criteria with the aim of creating a common tool in the struggle to preserve natural heritage, not only for the sake of knowledge, but also for future generations.

We, the authors, are convinced that this work is not by any means complete and that it will be the task of those who decide to try to use SECLAVEMEX to refine and adjust it to particular situations. This current work is but an effort to contribute to a rigorous yet user-friendly technical–scientific classification and inventory framework for all types of vegetation in Mexico.

Acknowledgments

We thank the Academic Unit of the Institute of Geography of the National Autonomous University of Mexico (now the Centre of Research in Environmental Geography) for its boundless support towards the accomplishment of this project. José Luis Palacio at the start, and Gerardo Bocco at the conclusion, maintained this institutional support. UNAM-Canada throughout Federico Fernández and Ramón Peralta provided support in the last phase of this book. Rigorous reviews of an earlier version of the book were made by Jerzy Rzedowski, Exequiel Ezcurra and Guillermo Ibarra, and, last but not least, Franco Padrotti, who all devoted outstanding time and energy to help us pursue this endeavor. Discussions took place over a decade with Orlando Rangel, Joaquin Giménez, Arturo Victoria and Sergio Zamudio, all globally-known botanists, whose critiques helped towards building a fruitful outcome. The support of colleagues such as Alejandra Larrazábal, Faustino López, Rocío Aguirre and Azucena Pérez, are all much appreciated. James Fouzie was responsible of the translation from Spanish into English.

A number of significant people have contributed their special gifts to help accomplish this book. The first author (Alejandro) could have not found greater motivation than from his wife Cecy Salgado and his son Erick Velázquez who in the past decade have supplied endless and warm support. The second author (Consuelo) found her motivation from her nephews. Amador acknowledges his wife Laura Torres and his students for pushing him forward in difficult times. To all of them, our most sincere appreciation and love.

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Prologue

In this volume, Alejandro Velázquez, Consuelo Medina, Elvira Duran, and Alfredo Amador and Luis Fernando Gopar (who work in three research centres of the Universities of Morelia and Oaxaca in Mexico) describe a new system of classification of the vegetation of Mexico, SECLAVEMEX (*Standardized Hierarchical Mexican Vegetation Classification System*).

The classification of vegetation cover has always been and remains one of the most important themes in the study of vegetation. The goal of classification was to establish groups, or classes, that cover relatively homogeneous phenomena in wide areas. This goal can be achieved on the basis of various criteria, such as physiognomy and structure, species and ecology, biogeography, dynamism, and genetics, as seen in the proposals of the succession of authors from 1800 to the present, among whom it is well to mention Brockmann-Jerosch, Rübel, Diels, Huguet del Villar, Sukaciov, Sochava, Dansereau, Küchler, Gaussen, Fosberg, Beard, Ellenberg, and Mueller-Dombois.

Chronologically, the first proposals referred to the physiognomy and structure of the vegetation; over the years as our geobotanical knowledge about the earth advanced, they were substituted by more complex and detailed proposals that also took into consideration ecological and floristic aspects.

Vegetation classification can be done deductively, moving from higher hierarchical units to lower ones, or inductively, when one starts from lower units and progresses towards the higher ones. The typological system of classification of plant formations of Brockmann-Jerosch and Rübel (1912) is deductive, while the floristic ecological (or phytosociological or syntaxonomical) system of Braun-Blanquet (1928) is a typical case of an inductive system.

The map of the natural vegetation of Europe on a scale of 1:2,500,000 (Bohn et al. 2000) was based on 19 formations, 14 of which were considered zonal and extrazonal, depending primarily on climate. They represented the main marocimatic zones and belts, while the other five formations represented azonal vegetation, depending on specific soil and hydrological conditions. Thus, the formations were classified into subgroups according to their species composition, finer climatic