



Biogeography

Biogeographic regionalization of the Sierra Madre del Sur province, Mexico

Regionalización biogeográfica de la provincia de la Sierra Madre del Sur, México

Juan J. Morrone

Museo de Zoología “Alfonso L. Herrera”, Departamento de Biología Evolutiva, Facultad de Ciencias, Universidad Nacional Autónoma de México, Circuito Exterior s/n, Coyoacán, Cd. Universitaria, 04510 Ciudad de México, Mexico

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Abstract

The biogeographic regionalization of the Sierra Madre del Sur province is reviewed, considering recent proposals and applying the International Code of Area Nomenclature to name the 3 subprovinces and 5 districts recognized. The Western Sierra Madre del Sur subprovince, situated in the states of Jalisco, Colima and Michoacán, comprises the Jaliscan and Jaliscan-Manantlán districts. The Central Sierra Madre del Sur subprov. nov., situated in the state of Michoacán, comprises the Michoacán district. The Eastern Sierra Madre del Sur subprovince, situated in the states of Guerrero, Oaxaca and Puebla, comprises the Guerreran and Oaxacan Highlands districts. Diagnoses of these areas are provided and their endemic taxa are listed.

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Keywords: Biogeography; Mexican Transition Zone; Nomenclature

Resumen

Se revisa la regionalización biogeográfica de la provincia de la Sierra Madre del Sur, considerando propuestas recientes y aplicando el Código Internacional de Nomenclatura de Áreas para nombrar las 3 subprovincias y 5 distritos reconocidos. La subprovincia de la Sierra Madre del Sur Occidental, situada en los estados de Jalisco, Colima y Michoacán comprende los distritos Jaliscense y Jaliscense-Manantlán. La subprovincia de la Sierra Madre del Sur Central subprov. nov., situada en Michoacán, comprende el distrito de Michoacán. La subprovincia de la Sierra Madre del Sur Oriental, situada en los estados de Guerrero, Oaxaca y Puebla, comprende los distritos Guerrerense y de las Tierras Altas Oaxaqueñas. Se proveen las descripciones de estas áreas y se listan sus taxones endémicos.

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Palabras clave: Biogeografía; Zona de Transición Mexicana; Nomenclatura

Introduction

The Sierra Madre del Sur biogeographic province, situated in south-central Mexico mainly between the Balsas Basin and the Pacific Lowlands provinces, has been assigned to the Mexican transition zone (Morrone, 2010, 2014). Several authors have recognized the Sierra Madre del Sur as a distinct biogeographic province, although its boundaries differ widely among differ-

ent regionalizations (see Santiago-Alvarado, Montaña-Arias, & Espinosa, 2016). Some nested units that have been identified within this province (Arriaga, Aguilar, Espinosa, & Jiménez, 1997; Escalante, Navarro, & Peterson, 1998; Ferrusquía-Villafranca, 1990; Smith, 1941) were treated preliminary by Morrone (2014) as the Guerrero, Central Valley, Isthmian, Nudo de Zempoaltépetl, Oaxacan Highland and Sierra de Miahuatlán districts. Santiago-Alvarado et al. (2016) recently reviewed the delimitation of the Sierra Madre del Sur biogeographic province and its regionalization. They considered that the boundaries of the Sierra Madre del Sur ecoregion (Inegi-Conabio-INE, 2008) were more appropriate, because they are based on climatic, geological and biological criteria, unifying different schemes

E-mail address: juanmorrone2001@yahoo.com.mx

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into a single system, as suggested by [Challenger and Soberón \(2008\)](#). This new circumscription incorporates, in addition to the province as previously recognized by most authors (e.g., [Arriaga et al., 1997](#); [Goldman & Moore, 1945](#); [Morrone, 2005, 2010, 2014](#)), 2 disjunct areas in the states of Jalisco and Michoacán. Additionally, [Santiago-Alvarado et al. \(2016\)](#) recognized 2 subprovinces: Western Sierra Madre del Sur (with the Jaliscan-Tuito, Jaliscan-Manantlán and Michoacán districts) and Eastern Sierra Madre del Sur (with the Guerreroan and Oaxacan districts).

The objectives herein are to review the biogeographic regionalization of the Sierra Madre del Sur province, especially considering the schemes proposed by [Morrone \(2014\)](#) and [Santiago-Alvarado et al. \(2016\)](#); to provide the valid names of the areas recognized, applying the International Code of Area Nomenclature (ICAN; [Ebach, Morrone, Parenti, & Viloría, 2008](#)); and to list the diagnostic taxa of the different areas recognized.

Biogeographic regionalization

Sierra Madre del Sur province [Goldman and Moore, 1945](#)

Sierra Madre del Sur province [Goldman and Moore, 1945](#): 358; [Morrone, 2014](#): 33; [Santiago-Alvarado et al., 2016](#): 432.

Sierra and Mesa del Sur region [West, 1964](#): 368.

Meridional Mountains province (in part) [Rzedowski, 1978](#): 103.

Sierra Madre del Sur Pine-oak Forests ecoregion [Dinerstein et al., 1995](#): 97.

Sierra Madre del Sur area [Marshall and Liebherr, 2000](#): 206.

Sierra Madre del Sur Highlands area [Flores-Villela and Goyenechea, 2001](#): 174.

Sierra Madre del Sur ecoregion [Abell et al., 2008](#): 408; [Challenger and Soberón, 2008](#): 103.

Highlands of Southern Mexico area [Flores-Villela and Martínez-Salazar, 2009](#): 820.

Diagnosis. South-central Mexico, in the states of Jalisco, Colima, Michoacán, Guerrero, Oaxaca and parts of Puebla. It spans for ca. 1,100 km, has an average width of 120 km and an altitude above 1,000 m ([Santiago-Alvarado et al., 2016](#)). It is situated south of the Balsas Basin biogeographic province and north of the Pacific Lowlands province. As circumscribed by [Santiago-Alvarado et al. \(2016\)](#), it is not continuous but it splits into 3 disjunct areas, treated herein as subprovinces.

Subprovinces. Three subprovinces are recognized, corresponding to the 3 disjunct areas of the province ([Fig. 1](#)): Western Sierra Madre del Sur, Central Sierra Madre del Sur and Eastern Sierra Madre del Sur. [Santiago-Alvarado et al. \(2016\)](#) considered the 2 former as a single subprovince, but based on the evidence available I consider it better to split it into 2 subprovinces.

Western Sierra Madre del Sur subprovince

[Santiago-Alvarado et al., 2016](#)

Western Sierra Madre del Sur subprovince (in part)

[Santiago-Alvarado et al., 2016](#): 439.

Diagnosis. Western portion of the Sierra Madre del Sur province, in the states of Jalisco, Colima and Michoacán.

Endemic taxa. Coniferophyta. Pinaceae: *Pinus jaliscana* ([Santiago-Alvarado et al., 2016](#)). Arthropoda. Scarabaeidae: *Canthon riverai* ([Halffter, Rivera-Cervantes, & Halffter, 2015](#)).

Districts. It comprises 2 districts ([Fig. 1](#)): Jaliscan and Jaliscan-Manantlán.

Jaliscan district [Moore, 1945](#)

Jaliscan district [Moore, 1945](#): 218; [Morrone, 2014](#): 32.

Western district [Torres-Miranda and Luna, 2007](#): 512.

Jaliscan-Tuito district [Santiago-Alvarado et al., 2016](#): 439, syn. nov.

Diagnosis. Northern portion of the subprovince, in the state of Jalisco ([Santiago-Alvarado et al., 2016](#)).

Endemic taxa. Magnoliophyta. Fagaceae: *Quercus cualensis* and *Q. tuitensis* ([González-Villareal, 2003](#); [Santiago-Alvarado et al., 2016](#)).

Jaliscan-Manantlán district [Santiago-Alvarado et al., 2016](#)

Jaliscan-Manantlán district [Santiago-Alvarado et al., 2016](#): 440.

Diagnosis. Southern portion of the subprovince, in the state of Jalisco and a portion of northern Colima ([Santiago-Alvarado et al., 2016](#)).

Endemic taxa. Magnoliophyta. Lauraceae: *Beilschmiedia manantlanensis* ([Santiago-Alvarado et al., 2016](#)); Salicaceae: *Populus guzmanantlanensis* ([Santiago-Alvarado et al., 2016](#)). Nematoda. Rhabdiasidae: *Rhabdias manantlanensis* ([Martínez-Salazar, 2008](#)). Arthropoda. Scarabaeidae: *Canthon occidentalis* ([Halffter, Rivera-Cervantes, & Halffter, 2015](#)).

Central Sierra Madre del Sur subprov. nov.

Western Sierra Madre del Sur subprovince (in part) [Santiago-Alvarado et al., 2016](#): 439.

Diagnosis. Central portion of the Sierra Madre del Sur province, in the state of Michoacán.

Endemic taxa. Coniferophyta. Pinaceae: *Pinus rzedowskii* ([Delgado, Piñero, Chaos, Pérez-Nasser, & Álvarez-Buylla, 1999](#); [Santiago-Alvarado et al., 2016](#)). Magnoliophyta. Burseraceae: *Bursera confusa* ([Santiago-Alvarado et al., 2016](#)). Vertebrata. Cricetidae: *Peromyscus sagax* and *P. winkelmanni* ([Ceballos & Oliva, 2005](#); [Santiago-Alvarado et al., 2016](#)).

Michoacán district [Santiago-Alvarado et al., 2016](#)

Michoacán district [Santiago-Alvarado et al., 2016](#): 440.

Diagnosis. The same as the subprovince.

Endemic taxa. The same as the subprovince.

Eastern Sierra Madre del Sur subprovince

[Santiago-Alvarado et al., 2016](#)

Eastern Sierra Madre del Sur subprovince

[Santiago-Alvarado et al., 2016](#): 440.

Diagnosis. Eastern portion of the Sierra Madre del Sur province, in the states of Guerrero, Oaxaca and part of Puebla ([Santiago-Alvarado et al., 2016](#)). It corresponds to the Sierra Madre del Sur province of previous authors (e.g. [Arriaga et al., 1997](#); [Morrone, 2014](#)).

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