

DIVERSITY, DISTRIBUTION AND PRIORITY CONSERVATION AREAS FOR ANNONACEAE IN MEXICO

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Abstract

Annonaceae is a pantropical plant family that is an important component in Neotropical forests, yet its diversity, distribution and conservation status in Mexico has not been comprehensively synthesized. This study provides an updated taxonomic, biogeographic and conservation assessment of Mexican Annonaceae. We aim to consolidate current knowledge to contribute to vegetation surveys, research and the development of conservation strategies. To achieve this, we compiled and validated species records through an exhaustive review of taxonomic literature, herbarium specimens, and curated occurrence data. Geographic distributions were assessed and mapped and spatial patterns were analyzed. Species richness, weighted endemism and corrected weighted endemism were calculated, and preliminary conservation status was evaluated using IUCN Red List criteria. We document 11 genera and 75 species of Mexican Annonaceae, including 44 endemic species, five of which are currently undescribed. Species richness and endemism are concentrated in humid tropical regions, particularly in southern Mexico. Our assessments indicate that 35 species could be considered Endangered and 31 Critically Endangered, especially due to their restricted geographic ranges, indicating elevated risk of extinction. This synthesis highlights Mexico as an important center of Annonaceae diversity and endemism and emphasizes the need for targeted taxonomic research and conservation assessments to prevent further biodiversity loss.

Keywords: Annonaceae checklist, endemism, floristic richness, tropical dry forest, cloud forest.

Resumen

Annonaceae es una familia pantropical que constituye un componente importante de los bosques neotropicales, sin embargo, su diversidad, distribución y estado de conservación en México no han sido sintetizados de manera integral. Este estudio presenta una actualización taxonómica, biogeográfica y de conservación de las Annonaceae mexicanas. Nuestro objetivo es consolidar el conocimiento actual con el fin de contribuir a trabajos florísticos, investigaciones futuras y al desarrollo de estrategias de conservación. Para lograrlo, recopilamos y validamos los registros de especies mediante una revisión exhaustiva de la literatura taxonómica, ejemplares de herbario y datos de ocurrencia curados. Las distribuciones geográficas fueron evaluadas y mapeadas, y se analizaron los patrones espaciales. Se calcularon la riqueza de especies, el endemismo ponderado y el endemismo ponderado corregido, y se realizó una evaluación preliminar del estado de conservación utilizando los criterios de la Lista Roja de la UICN. Documentamos 11 géneros y 75 especies de Annonaceae en México, incluyendo 44 especies endémicas, cinco de las cuales están actualmente no descritas. La riqueza de especies y el endemismo se concentran en regiones tropicales húmedas, particularmente en el sur del país. Nuestras evaluaciones indican que 35 especies podrían considerarse En Peligro y 31 En Peligro Crítico, principalmente debido a sus rangos geográficos restringidos, lo que implica un alto riesgo de extinción. Esta síntesis destaca a México como un importante centro de diversidad y endemismo de Annonaceae y enfatiza la necesidad de impulsar investigaciones taxonómicas dirigidas y evaluaciones de conservación para prevenir una mayor pérdida de biodiversidad.

Palabras clave: Bosque de niebla, bosque tropical seco, listado de anonáceas, endemismo, riqueza florística.

Annonaceae Juss. is one of the most notable tropical plant families, recognized for its high species richness, ecological significance, and broad distribution (Couvreur *et al.* 2011, Onstein *et al.* 2019, Cabral *et al.* 2025). It comprises approximately 2,500 species across 108 genera and is also considered one of the most diverse families within the order Magnoliales (Gentry 1995, Tchouto *et al.* 2006, Punyasena *et al.* 2008, Couvreur *et al.* 2011, Beech *et al.* 2017, Nge *et al.* 2024). The Annonaceae family species richness concentrates in the tropical forests of America, Africa, and Asia (Couvreur *et al.* 2011). Its distribution spans diverse ecosystems, including tropical rainforests, savannas, xeric shrublands, and mangroves, occurring both in well-preserved habitats and across varying degrees of environmental disturbance (Erkens *et al.* 2023).

Furthermore, the Annonaceae family holds significant economic importance, as it includes species with extensive commercial value, such as *Annona muricata* L. (soursop), *Asimina triloba* (L.) Dunal (pawpaw), *Annona reticulata* L. (custard apple), and *Cananga odorata* (Lam.) Hook. f. & Thomson (ylang-ylang) (Pomper & Layne 2010, Badrie & Schauss 2010, Tan *et al.* 2015, Souza *et al.* 2018). Given the ecological and evolutionary significance of Annonaceae, extensive research efforts seek to elucidate its phylogenetic history and its role within the broader evolutionary framework of the plant tree of life (Walker 1972, Ortiz-Rodriguez *et al.* 2016, 2018, Guo *et al.* 2017, Couvreur *et al.* 2019, Xue *et al.* 2020, Nge *et al.* 2024).

Although significant progress has been made in understanding Annonaceae globally, such advances are rarely reflected at local scales, where knowledge of the family often remains limited or outdated (Erkens *et al.* 2017). In many regions, the taxonomy, distribution, and conservation of its species have been overlooked, or have historically received limited attention. A clear understanding of taxonomy and distribution patterns is crucial not only for deciphering the evolutionary processes that shape species diversity, but also for informing effective conservation strategies (Hendry *et al.* 2010). This is essential for the health and development of human communities, whose well-being depends on the ecosystem services provided by biodiversity (Elmqvist *et al.* 2012).

Mexico is considered one of the most biodiverse countries in the world, in terms of plant species richness, with its 23,385 native plant species, ranking it fourth on a global scale (Molina-Paniagua *et al.* 2023, WRF 2025). This great diversity is often attributed to the topographic complexity of its territory, the merging of two major biogeographic realms, as well as the presence of several biomes within its territory (Silveira *et al.* 2019, Perrigo *et al.* 2020).

Despite ongoing research, knowledge of Mexican biodiversity remains incomplete, as evidenced by the high number of new species described each year (Ulloa Ulloa *et al.* 2017, Ortiz-Rodriguez *et al.* 2024). In the case of Annonaceae, significant progress has been made over the past decade in elucidating its phylogenetic relationships, taxonomy, and global distribution (Nge *et al.* 2024, Ortiz-Rodriguez *et al.* 2016, Couvreur *et al.* 2019, Xue *et al.* 2020). Furthermore, taxonomic revisions driven by the improved understanding of phylogenetic relationships within and across groups have led to the reclassification of numerous taxa, highlighting the urgent need to update foundational biodiversity studies (Murray 1993, Schatz & Maas 2010, Maas *et al.* 2015, Junikka *et al.* 2016, Schatz *et al.* 2018a,b, 2023, Ortiz-Rodriguez *et al.* 2024).

Though research intensified in recent decades, the current understanding of species richness and distribution of Annonaceae in Mexico remains outdated and requires revision. This is evident in the inconsistencies among the three major species lists published over the last century (Standley 1922, Villaseñor 2016, De la Cruz-Chacón *et al.* 2016), in which fewer than half of the species names are shared across studies. These discrepancies create uncertainty about the actual number of Annonaceae species, their distribution, phylogenetic relationships, and conservation status.

Recent discoveries further underscore this lack of taxonomic consensus: in just the last nine years, 23 new species have been described for Mexico, most notably within the genera *Desmopsis* Saff. and *Tridimeris* Baill. (Schatz *et al.* 2018a,b, 2023, Ortiz-Rodriguez *et al.* 2018, 2024, Espinosa-Jiménez & Ortiz-Rodriguez 2020, Gómez-Domínguez & Ortiz-Rodriguez 2020, Moreno-Méndez & Ortiz-Rodriguez 2020, Ortiz-Rodriguez 2022, Ortiz-Rodriguez & Marinero-Sobal 2022, Martínez-Velarde *et al.* 2023). Additionally, one species of *Annona* L., three species of *Desmopsis*, and one species of *Sapranthus* Seem. are currently being described. Similarly, taxonomic revisions based on studies of *Annona*, *Guatteria* Ruiz & Pav., *Mosannonna* Chatrou, *Oxandra* A. Rich., *Sapranthus*, *Stenanona* Standl., and

Desmopsis have led to the reclassification of numerous taxa (Rainer 2007, Maas *et al.* 2007, 2015, Schatz & Maas 2010, Ortiz-Rodriguez *et al.* 2016, 2018, Schatz *et al.* 2018a,b, 2023).

Building on this perspective, the present study aims to refine and expand our understanding of the taxonomy and distribution of the Annonaceae family in Mexico through three core objectives. First, it compiles a revised and updated list of native Annonaceae species. Second, it curates and consolidates a comprehensive database reflecting the known distribution of all native species. Finally, it explores distributional patterns to identify regions of high species richness and endemism, and to highlight systems that offer valuable models for studying evolutionary processes, and to identify areas that may warrant high conservation priority.

Materials and methods

Diversity and taxonomic assessment of Annonaceae in Mexico. We conducted a comprehensive review of the literature, including taxonomic revisions, local and regional floras, phylogenetic studies, and species descriptions to compile a preliminary list of Annonaceae species in Mexico ([Appendix 1](#)). The list was refined and validated through an exhaustive examination of herbarium specimens housed at MEXU, XAL, and HEM, complemented by a review of digitized herbarium specimens from online repositories (GBIF 2025, JSTOR 2025). For identification we relied on all taxonomic literature available with mentions of species distributed in Mexico and which we list in [Appendix 2](#). This process enabled us to accurately verify species determinations, resolve taxonomic synonyms, and delineate morphological boundaries among species. We analyzed extremes of morphological variation in leaf size and shape, flower size, shape and texture, type of pubescence, which facilitated the identification and description of novel taxa based on unique and distinguishing character combinations, not fitting the descriptions of species already published.

Distribution patterns of Annonaceae in Mexico. We constructed a geographic database by first compiling a representative herbarium specimen for each species in every Mexican state where it occurs. This foundational dataset was supplemented with records from the Global Biodiversity Information Facility (GBIF 2024). The GBIF data were curated as follows: we retained only records from states with a confirming herbarium specimen and filtered out localities with erroneous identifications, imprecise coordinates (*e.g.*, centroids, urban areas), and duplicates. To verify records that appeared outside current known distributions, we cross-referenced them against physical specimens at MEXU or digitized specimens from other herbaria. We also incorporated observations from [iNaturalist.org](#) but only included photographs where the species was readily identifiable. For this, we obtained permission from the photographers and confirmed the location. Records without verifiable evidence were excluded, except when a specimen voucher from an herbarium existed and/or the location was confirmed by an Annonaceae expert. This curated database formed the basis for all subsequent analyses, including species richness calculations and distribution mapping. Individual species distributions are illustrated using smoothed polygons enclosing verified occurrence records to provide a generalized representation of known geographic extent without displaying exact locality points. Maps were created using QGIS (QGIS 2025), and final map edits were made using *Inkscape* (Inkscape 2024).

Using the terrestrial ecoregions of the world by Olson *et al.* (2001), we discuss broad patterns of distribution of general of Mexican Annonaceae according to biome preference. To extract patterns in species diversity and distribution we performed analyses on the curated database. Number of records, species richness, weighted endemism (WE) and corrected weighted endemism (CWE) were calculated for a fixed 50 × 50 km grid overlaid across the full extent of the distribution of Annonaceae in Mexico. These analyses were conducted in R and using the packages of *sf*, *terra* and *tidyverse* (Pebesma 2018, Wickham *et al.* 2019, Hijmans 2023, R Core Team 2025). We also identified areas which harbor endemic species with strongly restricted ranges, which we consider as those known from a single locality or from an extent of occurrence of less than 100 km², the latter equals the threshold established by IUCN Criterion B1 for Critically Endangered (IUCN 2012).

Identification of priority conservation areas. Considering the resulting patterns of species richness, weighted and corrected weighted endemism as well as distribution of strongly range-restricted species we identify areas which could be considered of high priority for conservation. Finally, we discuss whether these areas currently fall within existing protected area delimitations or require consideration in future conservation initiatives.

Formal conservation status assessments for species were compiled from official Mexican legislation (SEMARNAT 2010) and the IUCN Red List (IUCN 2025). Consequently, as most species lacked this information, we conducted preliminary conservation assessments for all Mexican Annonaceae. This was done using distribution data and considering geographic range thresholds established in Criteria B of the IUCN Red List threatened categories (IUCN 2012). Geographic range was quantified as extent of occurrence (EOO) and/or area of occupancy (AOO). For each species, EOO was estimated as the area of the convex hull enclosing all known occurrences. AOO was estimated using a fixed 2×2 km grid assigning each occurrence to a single cell and adding up the area of occupied cells. The resulting categories are presented as preliminary assessments, as data concerning species' geographic range decline or fluctuation is not available and is necessary to formally establish a threatened status (IUCN 2012). Geographic range calculations were conducted in R and using *sf*, *terra* and *tidyverse* packages (Pebesma 2018, Wickham *et al.* 2019, Hijmans 2023, R Core Team 2025).

Results

Diversity and taxonomic assessment of Annonaceae in Mexico. We compiled a revised list of Annonaceae in Mexico, establishing a current count of 11 genera and 75 species, 44 of which are endemic (60 % of the total). The final database of geographic records for all species consisted of 4,742 occurrences out of an initial pre-curated number of 8,005. This list, along with each species' validated geographic distributions assessed (see *Distribution patterns and priority conservation areas*), resolves the historical discrepancies documented above. Furthermore, five of the total species we accounted for in this paper are in the process of formal description (one *Annona*, three *Desmopsis*, and one *Sapranthus*), which highlights the importance of the work of the botanist in the taxonomy of the family in Mexico ([Table 2](#)).

Distribution patterns of Annonaceae in Mexico. The distribution of Annonaceae in Mexico is mostly limited to biomes in the mid-to-low elevation regions of Southern Mexico. Measures of species diversity showed higher values towards the Neotropical areas of the country ([Figure 1](#), [Table 2](#)). Most genera, including *Anaxagorea*, *Cymbopetalum*, *Desmopsis*, *Guatteria*, *Oxandra*, *Unonopsis* and *Xylopia* are associated with warm and humid tropical forests, which is consistent with the family's general ecology ([Figures S1](#), [S5](#), [S6](#), [S7](#), [S8](#), [S9](#), [S10](#), [S11](#), [S12](#), [S15](#) and [S16](#)). *Desmopsis* is of a particular biogeographic and evolutionary interest as nearly 40 % of its species are endemic to Mexico ([Tables 1](#), [3](#), [Figures S6-S9](#)).

In contrast, other genera have different distribution patterns: *Tridimeris* is the only genus entirely endemic to Mexico, and it is restricted to cloud forests, which are montane ecosystems characterized by persistent humidity throughout the year and cooler temperatures than tropical lowland rainforests ([Figure S14](#)). *Sapranthus* is primarily distributed in lowland dry forests ([Figure S13](#)). The genus *Annona* tolerates a wide range of environments, occurring in tropical rainforests, cloud forests, and lowland forests altogether ([Figures S2-S4](#)).

A distribution pattern observed in several species is that of profound disjunctions. The most common pattern of disjunction involves species with more or less broad distributions along the Gulf of Mexico lowlands that are separated by up to 1,600 km from single or a few isolated populations on Pacific-facing slopes. This pattern is evident in *Annona glabra* L., *A. globiflora* Schltdl., *A. purpurea* Moc. & Sessé ex Dunal, *A. macrophyllata* Donn.Sm., *Desmopsis subnuda* (R.E.Fr.) G.E.Schatz & Maas, *Mosannonia depressa* (Baill.) Chatrou, *Oxandra lanceolata* (Sw.) Baill. and *Sapranthus microcarpus* (Donn.Sm.) R.E.Fr. ([Figures S2](#), [S4](#), [S5](#), [S8](#), [S11](#), [S12](#), [S13](#)). Other species with other forms of fragmented or highly fragmented distributions include *A. liebmanni* Baill., *A. longipes* Saff., *A. palmeri* Saff., *A. rensoniana* (Standl.) H. Rainer, *Cymbopetalum stenophyllum* Donn.Sm., *C. gracile* R.E.Fr., *Desmopsis humilis* (Miranda) G.E.Schatz & Ortiz-Rodr., *D. lanceolata* Lundell and *Oxandra maya* Miranda ([Figures S2](#), [S3](#), [S4](#), [S5](#), [S7](#), [S12](#)).

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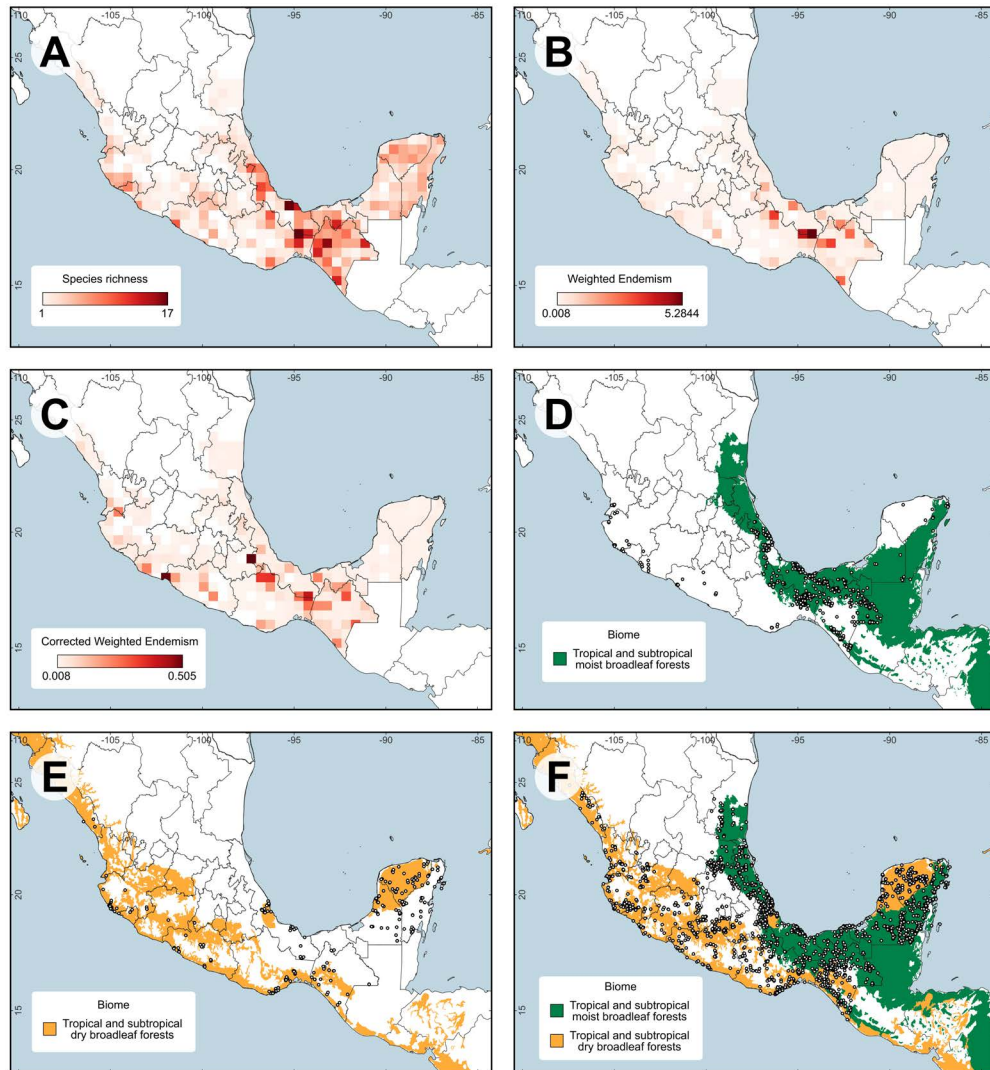


Figure 1. Maps of Annonaceae diversity and endemism in Mexico and distribution of genera according to biome preferences. A) Species richness per cell of 50×50 km. B) Weighted endemism (WE) per cell of 50×50 km. C) Corrected weighted endemism (CWE) per cell of 50×50 km. D) Mapped records for species of the genera *Anaxagorea*, *Cymbopetalum*, *Desmopsis*, *Guatteria*, *Oxandra*, *Unonopsis* and *Xylopia*. E) Mapped records for *Sapranthus* species. F) Mapped records for species of the genera *Annona* and *Mosannonna*.

Species richness is concentrated along the ocean-facing slopes of major mountain chains and in humid lowlands (Figure 1). While collections exist from approximately half of Mexico's territory, a large proportion of this area is represented by only one or a few species. Some places stand out for their high richness, including the Selva de Los Tuxtlas (Veracruz), the Sierra de Juárez (Oaxaca), the Uxpanapa-Chimalapas region (Veracruz-Oaxaca), and the Selva El Ocote (Chiapas) (Figure 1).

Preliminary conservation status assessments revealed that 27 of the 44 Mexican endemic species have an estimated extent of occupancy of less than 100 km^2 or are known from a single locality. These species' distributions are concentrated within 10 areas in the states of Chiapas, Guerrero, Oaxaca, Tabasco and Veracruz that are indicated in Figure 2. Seven of these areas contained more than one restricted-range species, with three regions standing out, each hosting four or more strongly range-restricted endemics: Sierra de Juárez, the Uxpanapa-Chimalapas region and Selva El Ocote. The map created shows that 4 of these 10 areas contained little to no protected territory.

Table 1. Species richness and endemism of Annonaceae in Mexico, values inside parentheses represent the proportion that Mexican species represent according to the global totals.

Genus	Global species richness	Species richness in Mexico	Number of species endemic to Mexico
<i>Anaxagorea</i>	25	1 (4 %)	0 (0 %)
<i>Annona</i>	173	18 (10 %)	5 (28 %)
<i>Cymbopetalum</i>	27	8 (30 %)	4 (50 %)
<i>Desmopsis</i>	46	24 (52 %)	21 (88 %)
<i>Guatteria</i>	185	3 (2 %)	1 (33 %)
<i>Mosannonna</i>	14	1 (7 %)	0 (0 %)
<i>Oxandra</i>	29	3 (10 %)	0 (0 %)
<i>Sapranthus</i>	9	6 (67 %)	3 (50 %)
<i>Tridimeris</i>	10	10 (100 %)	10 (100 %)
<i>Unonopsis</i>	48	1 (2 %)	1 (100 %)
<i>Xylopia</i>	184	1 (1 %)	0 (0 %)
Total (Annonaceae)	2500	75 (3 %)	45 (59 %)

Table 2. List of the native Annonaceae species for Mexico, their distribution in administrative states and preliminary conservation status based only on geographic range and according to Criteria B of the IUCN Red List categories. Names in bold represent species endemic to Mexico. Photographs of live specimens or herbarium samples for each species are shown in [Figures 3](#) to [6](#). The distribution of *Annona cherimola* is included as it is considered naturalized in Mexico, the species is indicated with an asterisk.

Species	Distribution	Preliminary conservation status
<i>Anaxagorea guatemalensis</i> Standl.	Oax., Tab., Ver. (Figure S1)	EN
* <i>Annona cherimola</i> Mill.	Ags., Chis., CDMX, Col., Gto., Gro., Hgo., Jal., Méx., Mich., Mor., Nay., Oax., Pue., Qro., SLP, Sin., Tab., Ver. (Figure S2)	VU
<i>Annona contrerasii</i> J. Jiménez Ram. & J. C. Soto	Gro. (Figure S2)	EN
<i>Annona glabra</i> L.	Camp., Chis., Col., Gro., Jal., Mich., Nay., Oax., Q. Roo, Tab., Ver., Yuc. (Figure S2)	VU
<i>Annona globiflora</i> Schltdl.	Chis., Gto., Hgo., Pue., Qro., SLP, Tamps., Ver. (Figure S2)	VU
<i>Annona holosericea</i> Saff.	Chis. (Figure S2)	EN
<i>Annona liebmanniana</i> Baill.	Chis., Oax. (Figure S2)	EN

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Species	Distribution	Preliminary conservation status
<i>Annona longiflora</i> S. Watson	Col., Gro., Jal., Méx., Mich., Mor., Nay., Zac. (Figure S3)	EN
<i>Annona longipes</i> Saff.	Chis., Ver. (Figure S3)	EN
<i>Annona macrophyllata</i> Donn. Sm.	Chis., Gro., Méx., Mich., Oax., Yuc. (Figure S3)	EN
<i>Annona mucosa</i> Jacq.	Chis., Oax., Pue., Tab., Ver. (Figure S3)	VU
<i>Annona palmeri</i> Saff.	Gro., Jal., Mich., Sin. (Figure S3)	EN
<i>Annona primigenia</i> Standl. & Steyerf.	Camp., Chis., Q. Roo, Tab., Yuc. (Figure S3)	VU
<i>Annona purpurea</i> Moc. & Sessé ex Dunal	Chis., Col., Jal., Mich., Oax., Pue., Q. Roo, Tab., Ver., Yuc. (Figure S4)	EN
<i>Annona rensoniana</i> (Standl.) H. Rainer	Chis., Oax., Pue., Ver. (Figure S4)	EN
<i>Annona reticulata</i> L.	Camp., Chis., Col., Gro., Jal., Méx., Mich., Mor., Nay., Oax., Pue., Q. Roo, Sin., Tab., Tamps., Ver., Yuc. (Figure S4)	VU
<i>Annona squamosa</i> L.	Camp., Chis., Gro., Jal., Méx., Mich., Nay., Oax., Q. Roo, Sin., Tab., Ver., Yuc. (Figure S4)	VU
<i>Annona sp. nov.</i>	Jal., Nay. (Figure S4)	EN
<i>Cymbopetalum baillonii</i> R.E. Fr.	Camp., Chis., Oax., Pue., Tab., Ver. (Figure S5)	EN
<i>Cymbopetalum gracile</i> R.E. Fr.	Gro., Oax. (Figure S5)	EN
<i>Cymbopetalum hintonii</i> Lundell	Col., Jal., Mich., Nay. (Figure S5)	EN
<i>Cymbopetalum mayanum</i> Lundell	Camp., Chis., Tab. (Figure S5)	EN
<i>Cymbopetalum mirabile</i> R.E. Fr.	Chis. (Figure S5)	CR

Species	Distribution	Preliminary conservation status
<i>Cymbopetalum parviflorum</i> N.A. Murray	Oax., Ver. (Figure S5)	CR
<i>Cymbopetalum penduliflorum</i> (Dunal) Baill.	Chis. (Figure S5)	CR
<i>Cymbopetalum stenophyllum</i> Donn. Sm.	Chis., Tab. (Figure S5)	EN
<i>Desmopsis cauliflora</i> (J.W. Walker) G.E. Schatz & Ortiz-Rodr.	Chis., Tab. (Figure S6)	CR
<i>Desmopsis chimalapensis</i> (G.E. Schatz & Maas) G.E. Schatz & Ortiz-Rodr.	Oax., Ver. (Figure S6)	CR
<i>Desmopsis dubia</i> Ortiz-Rodr. & Espinosa-Jim.	Chis., Tab. (Figure S6)	CR
<i>Desmopsis duran</i> Gómez-Domínguez & Ortiz-Rodr.	Chis. (Figure S6)	CR
<i>Desmopsis erythrocarpa</i> Lundell	Chis. (Figure S6)	CR
<i>Desmopsis flagelliflora</i> (T. Wendt & G.E. Schatz) G.E. Schatz & Ortiz-Rodr.	Oax., Ver. (Figure S6)	EN
<i>Desmopsis guerrierensis</i> Gonz.-Martínez & J. Jiménez Ram.	Gro. (Figure S7)	CR
<i>Desmopsis humilis</i> (Miranda) G.E. Schatz & Ortiz-Rodr.	Hgo., Oax., Tab., Ver. (Figure S7)	EN
<i>Desmopsis ibarrarum</i> G.E. Schatz ex Ortiz-Rodr.	Oax., Tab., Ver. (Figure S7)	EN
<i>Desmopsis lanceolata</i> Lundell	Chis. (Figure S7)	EN
<i>Desmopsis mexicana</i> R.E. Fr.	Jal., Mich. (Figure S7)	EN
<i>Desmopsis migueliana</i> (Ortiz-Rodr. & G.E. Schatz) G.E. Schatz & Ortiz-Rodr.	Chis. (Figure S7)	CR
<i>Desmopsis monticola</i> (Maas & G.E. Schatz) G.E. Schatz & Ortiz-Rodr.	Chis. (Figure S8)	EN
<i>Desmopsis morenoi</i> (Ortiz-Rodr. & Mor.-Méndez) G.E. Schatz & Ortiz-Rodr.	Chis. (Figure S8)	CR
<i>Desmopsis stenopetala</i> (Donn. Sm.) R.E. Fr.	Chis., Tab. (Figure S8)	CR
<i>Desmopsis subnuda</i> (R.E. Fr.) G.E. Schatz & Maas	Jal., Oax., Ver. (Figure S8)	EN
<i>Desmopsis terriflora</i> G.E. Schatz, T. Wendt, Ortiz-Rodr. & Mart.-Vel.	Ver. (Figure S8)	CR
<i>Desmopsis trunciflora</i> (Schltdl. & Cham.) G.E. Schatz	Oax., Ver. (Figure S8)	EN
<i>Desmopsis uxpanapensis</i> G.E. Schatz	Ver. (Figure S9)	EN
<i>Desmopsis wendtii</i> G.E. Schatz	Ver. (Figure S9)	CR

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Species	Distribution	Preliminary conservation status
<i>Desmopsis zoque</i> (Ortíz-Rodr. & Gómez-Domínguez) G.E. Schatz & Ortiz-Rodr.	Chis. (Figure S9)	CR
<i>Desmopsis</i> sp. nov. 1	Oax. (Figure S9)	CR
<i>Desmopsis</i> sp. nov. 2	Oax. (Figure S9)	CR
<i>Desmopsis</i> sp. nov. 3	Tab. (Figure S9)	CR
<i>Guatteria amplifolia</i> Triana & Planch.	Chis., Gro., Oax., Pue., Tab., Ver. (Figure S10)	VU
<i>Guatteria galeottiana</i> Baill.	Oax., Ver. (Figure S10)	EN
<i>Guatteria grandiflora</i> Donn. Sm.	Camp., Chis., Oax., Q. Roo, Tab., Ver., Yuc. (Figure S10)	EN
<i>Mosannonna depressa</i> (Baill.) Chatrou	Camp., Chis., Gro., Jal., Mich., Oax., Pue., Q. Roo, Tab., Ver., Yuc. (Figure S11)	VU
<i>Oxandra lanceolata</i> (Sw.) Baill.	Col., Gro., Jal., Mich., Q. Roo, Yuc. (Figure S12)	EN
<i>Oxandra maya</i> Miranda	Chis., Tab. (Figure S12)	EN
<i>Oxandra venezuelana</i> R.E. Fr.	Chis. (Figure S12)	CR
<i>Sapranthus campechianus</i> (Kunth) Standl.	Camp., Chis., Q. Roo, Tab., Yuc. (Figure S13)	EN
<i>Sapranthus chiapensis</i> Standl. ex G.E. Schatz	Chis. (Figure S13)	CR
<i>Sapranthus foetidus</i> (Rose) Saff.	Gro. (Figure S13)	EN
<i>Sapranthus microcarpus</i> (Donn.Sm.) R.E. Fr.	Chis., Col., Gro., Jal., Oax., Sin., Ver. (Figure S13)	EN
<i>Sapranthus violaceus</i> (Dunal) Saff.	Chis., Col., Gro., Jal., Mich., Nay., Oax., Sin. (Figure S13)	EN
<i>Sapranthus</i> sp. nov.	Ver. (Figure S13)	CR
<i>Tridimeris cauliflora</i> G.E. Schatz	Oax. (Figure S14)	CR
<i>Tridimeris chiapensis</i> M. A. Escobar & Ortiz-Rodr.	Chis. (Figure S14)	CR
<i>Tridimeris crotalocarpa</i> Ortiz-Rodr.	Oax. (Figure S14)	CR
<i>Tridimeris globosa</i> Ortiz-Rodr.	Oax. (Figure S14)	CR
<i>Tridimeris hahniana</i> Baill.	Ver. (Figure S14)	CR

Species	Distribution	Preliminary conservation status
<i>Tridimeris huatuscoana</i> Marinero-Sobal & Ortiz-Rodr.	Ver. (Figure S14)	CR
<i>Tridimeris nebulosa</i> Ortiz-Rodr. & Hurt.-Rev.	Hgo., Pue., Qro., SLP, Ver. (Figure S14)	EN
<i>Tridimeris tuxtlensis</i> G.E. Schatz	Ver. (Figure S14)	CR
<i>Tridimeris uxpanapensis</i> G.E. Schatz	Ver., Oax. (Figure S14)	CR
<i>Tridimeris villosa</i> Ortiz-Rodr.	Oax. (Figure S14)	CR
<i>Unonopsis mexicana</i> Maas & Westra	Oax. (Figure S15)	CR
<i>Xylopia frutescens</i> Aubl.	Camp., Chis., Oax., Q. Roo, Tab., Ver. (Figure S16)	EN

Table 3. List of species assessed as vulnerable (VU), endangered (EN) or critically endangered (CR) according to the IUCN Red List or as endangered (A) by the NOM-059 (SEMARNAT 2010).

Species	Assessment
<i>Annona longipes</i>	CR
<i>Annona palmeri</i>	EN
<i>Cymbopetalum gracile</i>	EN
<i>Cymbopetalum hintonii</i>	EN
<i>Cymbopetalum parviflorum</i>	CR
<i>Desmopsis cauliflora</i>	EN
<i>Desmopsis dubia</i>	EN
<i>Desmopsis duran</i>	CR
<i>Desmopsis flagelliflora</i>	CR
<i>Desmopsis guerrerensis</i>	CR
<i>Desmopsis humilis</i>	EN
<i>Desmopsis mexicana</i>	CR
<i>Desmopsis migueliana</i>	CR
<i>Desmopsis monticola</i>	CR
<i>Desmopsis morenoi</i>	CR
<i>Desmopsis subnuda</i>	VU
<i>Desmopsis trunciflora</i>	VU
<i>Desmopsis uxpanapensis</i>	EN
<i>Desmopsis wendtii</i>	CR
<i>Desmopsis zoque</i>	CR
<i>Guatteria galeottiana</i>	VU
<i>Guatteria grandiflora</i>	VU, A
<i>Oxandra maya</i>	VU
<i>Tridimeris chiapensis</i>	EN
<i>Tridimeris hahniana</i>	EN
<i>Tridimeris huatuscoana</i>	CR

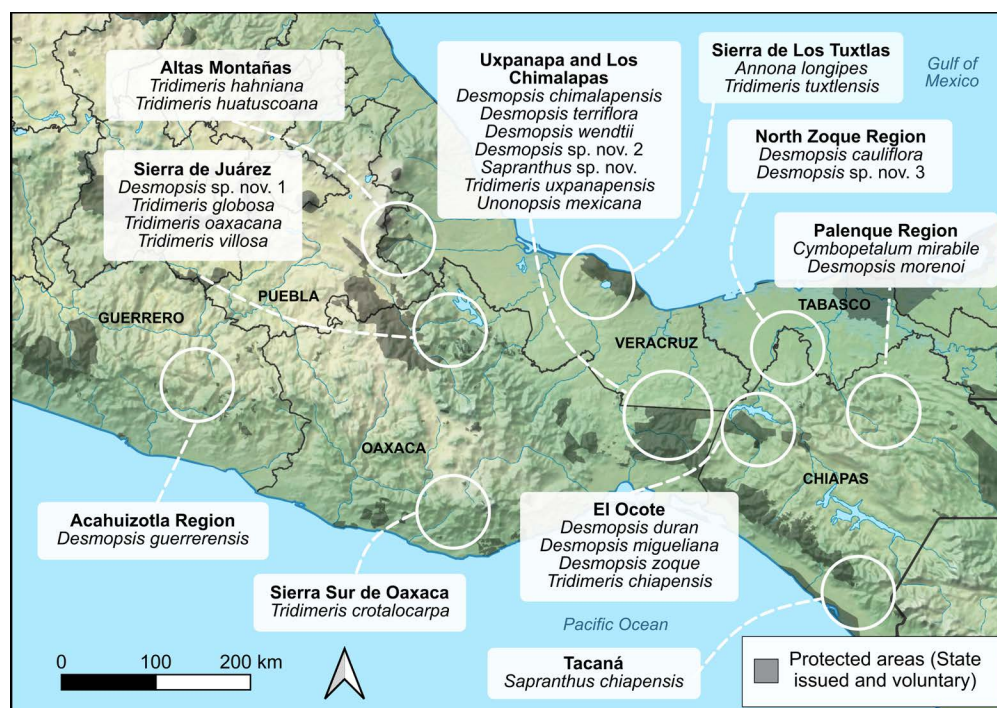


Figure 2. Geographic distribution of single-locality endemic Annonaceae species in Mexico.

Identification of priority conservation areas. By integrating the criteria of high species richness, endemism metrics, concentration of strongly range-restricted endemics and the presence of threatened species, we recognize three areas as the highest conservation priority for Annonaceae in Mexico: 1. Sierra de Juárez in Oaxaca, 2. the Uxpanapa and Chimalapas region in Veracruz and Oaxaca and 3. Selva El Ocote in Chiapas. Each of these regions simultaneously exhibits high total Annonaceae diversity, hosts multiple unique species, and contains species assessed as endangered. It is worth noting that 46 species (61 %) of Mexican Annonaceae have a formally assessed conservation status (Table 3), yet of these most of them are listed as Data Deficient and as such we take into consideration our preliminary assessments conducted for all species (Table 2). Out of the 75 species, nine would be considered as Vulnerable, 35 Endangered and 31 Critically Endangered (Table 2).

Discussion

In this study, we present an updated list of Annonaceae in Mexico, comprising 70 currently documented species across 11 genera. The most species-rich genera are *Annona* (17 spp.), *Desmopsis* (21 spp.), and *Tridimeris* (10 spp.). Additionally, we include five undescribed species from *Annona*, *Desmopsis*, and *Sapranthus*, bringing the total to 75 species. Most species show a distributional affinity with the lowland tropical wet forests of southern Mexico, consistent with the general ecological preferences reported for the family (Punyasena *et al.* 2008, Erkens *et al.* 2023). However, notable exceptions include *Tridimeris*, which is restricted to montane cloud forests, and *Annona*, which occupies a broader range of biomes. The species *Annona glabra*, *A. purpurea*, *Desmopsis subnuda*, *Mosannonia depressa*, *Oxandra lanceolata* and *Sapranthus microcarpus* exhibit disjunct distributions between the Gulf and Pacific slopes, with separations of up to 1,600 km. Finally, we highlight patterns of species richness at multiple geographic scales and identify areas of particular importance for biodiversity and conservation.

Towards an updated taxonomy of Mexican Annonaceae. Historically, comprehensive accounts of Mexican Annonaceae have shown little consensus. In his foundational work on Mexican tree and shrub species, Standley (1922)

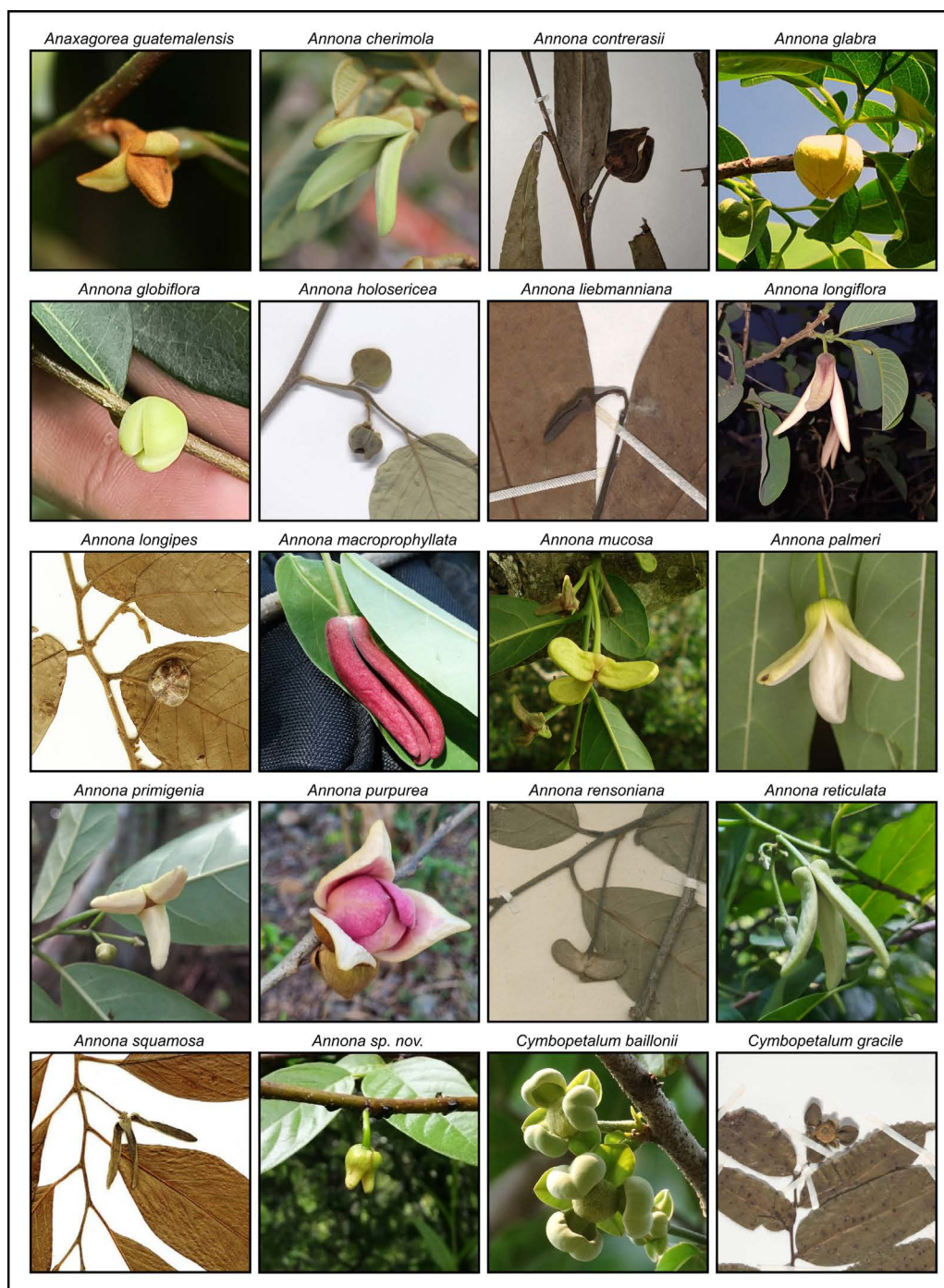


Figure 3. Species of Annonaceae native to Mexico (Part 1), picture or collection credits in parenthesis: *Anaxagorea guatemalensis* (Marlon Aramis González Aguilar), *Annona cherimola* (Aparicio-Aparicio), *Annona contrerasii* (Guízar Nolasco & Pimentel Bribiesca 3038: CHAP4), *Annona glabra* (Alex Popovkin), *Annona globiflora* (Sarahí Díaz-Mota), *Annona holosericea* (Aparicio R. & Rivera R. 144: B), *Annona liebmanniana* (Martínez-C. G. 410: US), *Annona longiflora* (inaturalist.org user kthirann), *Annona longipes* (Hee M. H. 26490: F), *Annona macrophyllata* (M. F. Martínez-Velarde), *Annona mucosa* (Guadalupe Cornejo Tenorio), *Annona palmeri* (Rocío Ramírez Barrios & J. F. Pío León), *Annona primigenia* (inaturalist.org user styvdejesuscalva), *Annona purpurea* (inaturalist.org user gerardotorrescantu), *Annona rensoniana* (Bourgeau E. 2448: MNHM), *Annona reticulata* (Pablo González Maldonado), *Annona squamosa* (Flores G. J. S. 8735: F), *Annona* sp. nov. (Edgar Ramón Gómez-Vega), *Cymbopetalum baillonii* (M. F. Martínez-Velarde), *Cymbopetalum gracile* (Murray N. A. & Johnson D. M. 1435: L).

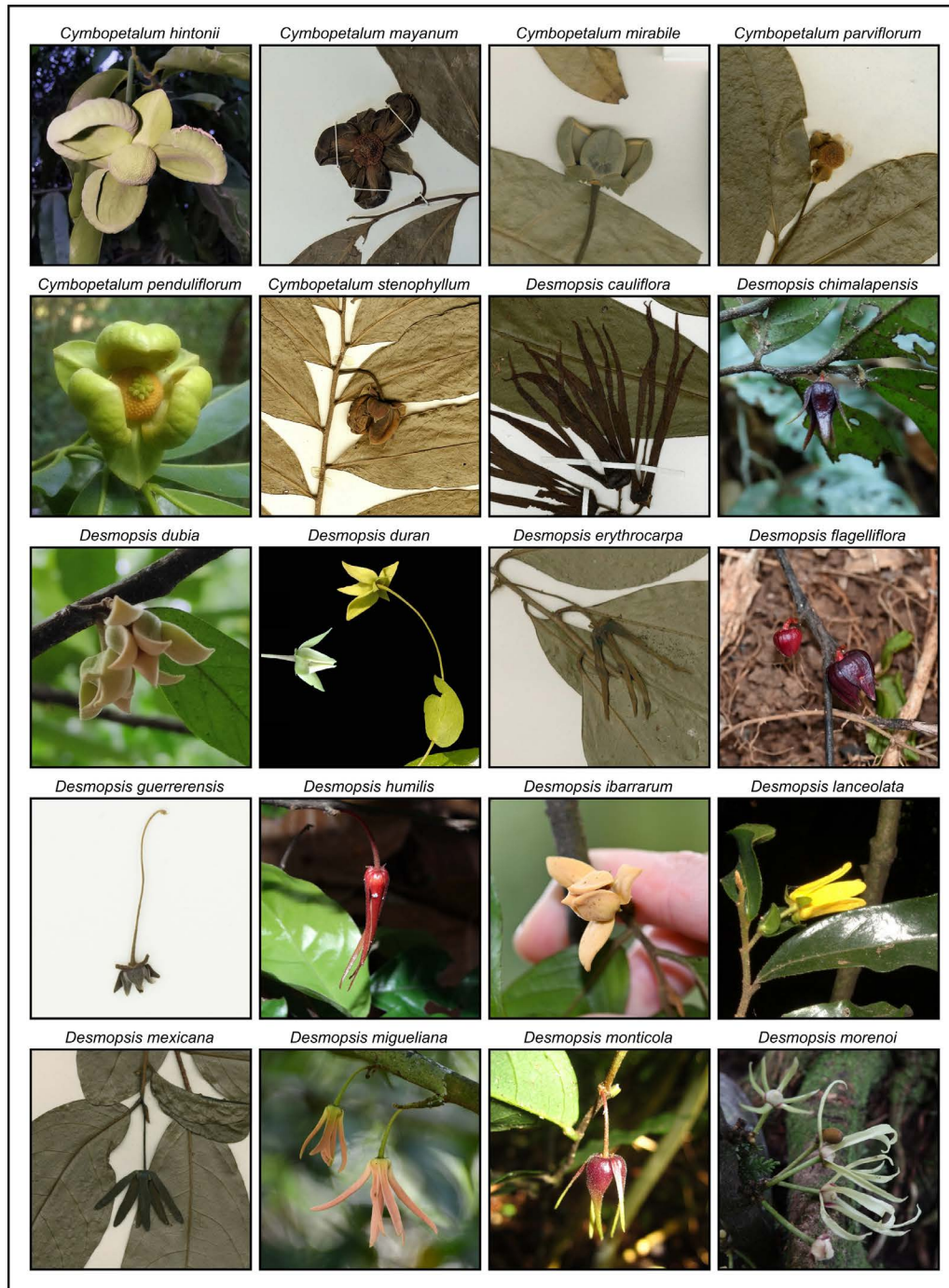


Figure 4. Photographs of Annonaceae species native to Mexico (Part 2), picture or collection credits in parenthesis: *Cymbopetalum hintonii* (Pablo Carrillo Reyes), *Cymbopetalum mayanum* (Martínez S. E. M. 20686: MEXU), *Cymbopetalum mirabile* (Contreras E. 9134: S), *Cymbopetalum parviflorum* (G. Martínez Calderón 200, A), *Cymbopetalum penduliflorum* (inaturalist.org user tsunub), *Cymbopetalum stenophyllum* (Matuda E. 18588: F), *Desmopsis cauliflora* (Walker J. W. 357: GH), *Desmopsis chimalapensis* (M. F. Martínez-Velarde), *Desmopsis dubia* (M. F. Martínez-Velarde), *Desmopsis duran* (Héctor Gómez-Domínguez), *Desmopsis erythrocarpa* (Contreras E. 5976: S), *Desmopsis flagelliflora* (L. Hurtado-Reveles), *Desmopsis guerrensis* (González Martínez C. A. 892: NY), *Desmopsis humilis* (M. F. Martínez-Velarde), *Desmopsis ibarrarum* (L. Hurtado-Reveles), *Desmopsis lanceolata* (Héctor Gómez-Domínguez), *Desmopsis mexicana* (Hinton G. B. et al. 15836: LL), *Desmopsis migueliana* (Neptali Ramírez Marcial), *Desmopsis monticola* (A. E. Ortiz-Rodríguez), *Desmopsis morenoi* (A. E. Ortiz-Rodríguez).

identified 26 species in eight genera: *Annona*, *Cymbopetalum* Benth., *Desmopsis*, *Guatteria*, *Rollinia* A.St.-Hill., *Sapranthus*, *Tridimeris*, and *Xylopia* L. Although his study did not focus specifically on Annonaceae, it was the first to compile a list of all genera and species of this family present in the country. Nearly a century later, studies by Villaseñor (2016) and De la Cruz-Chacón *et al.* (2016) reported conflicting numbers, 13 genera and 59 species vs 12 genera and 60 species, respectively. Interestingly, only 12 species were consistently listed by the three mentioned studies.

The taxonomic richness and/or circumscription of the genera present in Mexico has changed considerably since Standley (1922) with the timeline of genera recognized in Mexico developing with key additions and revisions as follows: Fries (1930, 1956) transferred the species *Guatteria depressa* (Baill.) Saff. ex Standl. to the genus *Malmea* R.E.Fr. and added the genus *Oxandra* in Mexico through the description of a new subspecies of the widely distributed *Oxandra lanceolata* (Sw.) Baill. In subsequent decades, Walker (1971) described a genus endemic to Southern Mexico, *Reedrollinsia* J.W.Walker (1971). This genus was later synonymized with *Stenanona* (Schatz 1987) but was formally published until 1994 by Schatz in Maas *et al.* (1994) and was itself a new record for Mexico. Around the same time, Wendt (1987a) expanded the known distribution of the genus *Anaxagorea* A.St.-Hill. to include southern Mexico. Later, Chatrou (1998) described the genus *Mosannona* and transferred *Malmea depressa* (Baill.) R.E.Fr. into it. Rainer (2007) determined that *Annona* and *Rollinia* are synonymous, retaining only the former name, while Maas *et al.* (2007) recorded *Unonopsis* R.E.Fr. in Mexico for the first time. More recently, Schatz *et al.* (2023) transferred all *Stenanona* species to *Desmopsis*. Thus, we establish that the Annonaceae flora of Mexico currently comprises 11 genera: *Anaxagorea*, *Annona*, *Cymbopetalum*, *Desmopsis*, *Guatteria*, *Mosannona*, *Oxandra*, *Sapranthus*, *Tridimeris*, *Unonopsis* and *Xylopia*.

The history of Annonaceae species in Mexico is notably intricate. An analysis of the species lists published up to 2016 yielded a total of 70 species names, of which only 57 were considered valid, and just 50 were correctly applied to Mexican taxa. This knowledge was largely historical, since of the species then reported, 29 had been described over 80 years prior, 11 had been described between 20 and 77 years earlier, and only five had been described between the years 2000 and 2016. Furthermore, some species formally published and correctly identified in herbarium specimens, e.g., *Oxandra venezuelana* and *O. aberrans* Maas & Junikka (Junikka *et al.* 2016), currently accepted as *Annona globiflora* Schldl. for Mexico (Rainer 2026), were absent from the published lists, highlighting their incompleteness. This indicates that, until 2016, knowledge of Mexican Annonaceae was largely rooted in historical data, derived from intensive botanical explorations conducted during the peak of classical taxonomy in the 19th and early 20th centuries. As a result, many records originated from pioneering expeditions, likely led by European or United States taxonomists, with minimal involvement from local botanists. A significant shift began with the launch of the Annonaceae Project in 1983, which resulted in detailed taxonomic treatments for all Neotropical genera within the family, which significantly influenced estimates of species diversity in Mexico (Maas 1983). This fact, combined with a recent surge in involvement by Mexican botanists, has led to a significant increase in the knowledge of Mexican Annonaceae. After 2016, 23 new species have been formally described and critical nomenclatural revisions have been made, including the transfer of all *Stenanona* species to *Desmopsis*, the reinstatement of *Sapranthus foetidus* (Rose) Saff., and the revision of the genus *Tridimeris* (Appendix 2).

This study emphasizes the role of herbarium revision and rigorous analysis of scientific literature in the development of accurate species lists. It also calls attention to the need to foster greater interest in underrepresented plant groups in Mexico, particularly through the training and sustained support of botanists. The shortage of specialized taxonomists, whether focused on regional floras or specific lineages, remains an obstacle to advancing botanical knowledge. This is not unique to Mexico, for example, Indian savanna plant biodiversity had been underestimated until recent local surveys that have yielded numerous previously unknown endemisms, underscoring the need for locally focused studies (Nerlekar *et al.* 2022). To address this issue in Latin American countries, botany training initiatives and close collaboration between collectors and scientists associated to natural history collections have been proposed as the best approach to shorten the time gap between collection and species formal description (Luján *et al.* 2024). In the case of Annonaceae, much of the taxonomic framework has been built on historical data from research-

ers who are no longer active, creating a gap in continuity due to limited generational succession and minimal local engagement. The genus *Tridimeris* is a good example of this fact: it was considered monospecific for more than a century, yet recent research efforts, dependent mostly on decades old herbarium specimens, revealed the existence of nine additional species (Ortiz-Rodriguez *et al.* 2016, Ortiz-Rodriguez & Marinero-Sobal 2022, Ortiz-Rodriguez *et al.* 2024).

Compounding this issue is the widespread reliance on misidentified herbarium specimens, which often form the basis of floristic inventories and can distort estimates of species diversity (Goodwin *et al.* 2015). The reliance of outdated taxonomic treatments is another factor coming into play, which can be evidenced by the case of Annonaceae in Mexico and in part lead to the development of this study. The revisions of the most speciose genera in Mexico are missing several species described in the last decade and others suffered major circumscription changes, which we saw reflected by the prevalence of invalid names and misidentifications while conducting herbarium work (Rainer 2007, Schatz *et al.* 2018a, Schatz *et al.* 2023, Ortiz-Rodriguez *et al.* 2024). That is also without considering the five new species currently being described which we do account for. Additionally, information gathered from herbaria, recent collections and photographic records lead to modification of the known distribution of many species which this work intends to update. Ongoing herbarium work, specimen re-evaluation, and the critical use and dissemination of up-to-date literature are therefore essential to keep pace with rapid taxonomic developments. In this context, the present study lays a solid foundation for a taxonomic revision of Annonaceae in Mexico, grounded in a thorough review of herbarium material and current scientific literature.

Distribution patterns and evolutionary significance. The distribution of Annonaceae in Mexico reveals biogeographic patterns that align with the country's Neotropical biomes, while also suggesting complex evolutionary histories. The most species-rich genera, primarily associated with tropical rainforests, are concentrated along the Gulf of Mexico lowlands, the southern and eastern Yucatán Peninsula, and eastern Chiapas (Challenger & Soberón 2008). These regions, which we identify with high diversity of Annonaceae, are considered the biome with the lowest overall floristic richness in Mexico (Villaseñor & Ortiz 2014), yet this is calculated based on total species richness and not in terms of how many species per area they harbor.

Though *Sapranthus* is the only genus considered mainly as a seasonally dry tropical forest element (Schatz *et al.* 2018b, Erkens *et al.* 2023), genera like *Annona* include several species distributed in this biome. The ecological affinities of *Annona* are a case worth studying further, as it is found through a wide array of ecosystems, contrary to the remaining genera, which are specific to a particular biome. On the one hand, the pattern found for the genus *Annona* probably obeys the intensive cultivation and naturalization of these species for different uses (Leal & Paull 2023). *Annona* species are appreciated mainly due to their edible fruits. *Annona cherimola* Mill. and *A. squamosa* L. are exploited commercially in Nayarit, Colima, Guerrero, Michoacán, and Tabasco (Andrés-Agustín & Segura Ledesma 2014). Other uses reported are as medicines, as sources of useful chemicals, for fuel, construction, and so on (Farrera Sarmiento 2011, Vidal Lezama *et al.* 2015 and references therein). Species with local, traditional uses, mainly for its edible fruits, which include *A. squamosa*, *A. cherimola*, *A. globiflora*, *A. purpurea*, *A. mucosa* and *A. reticulata*, have been cultivated and carried from place to place widening its distributions. For example, based on genetic, archaeological, and cultural evidence, it has been determined that people dispersed *Annona cherimola* from its origin in Honduras and Guatemala by land routes to Mexico and later by sea routes to Peru, from where it continued to spread through agriculture across the Andes (Larranaga *et al.* 2017, 2021). Since other edible Annonaceae present characteristics similar to *A. cherimola* (perennial trees with large seeds, as well as similar ecological barriers), their dispersal might be similar (Van Zonneveld *et al.* 2018). Finally, *Annona glabra* is a particular case, as it is associated with freshwater swamps with no marine influence, or with flood plains, for which it presents specific adaptations, and its distribution reflects those ecological affinities (Sánchez-García *et al.* 2022).

The endemic genus *Tridimeris* stands out for occurring only in Mesoamerican cloud forests. This type of ecosystem is characterized by harboring a disproportionately high number of species considering its reduced distribution when compared to others (Villaseñor 2010). The reasons for this have been attributed to phenomena like the con-

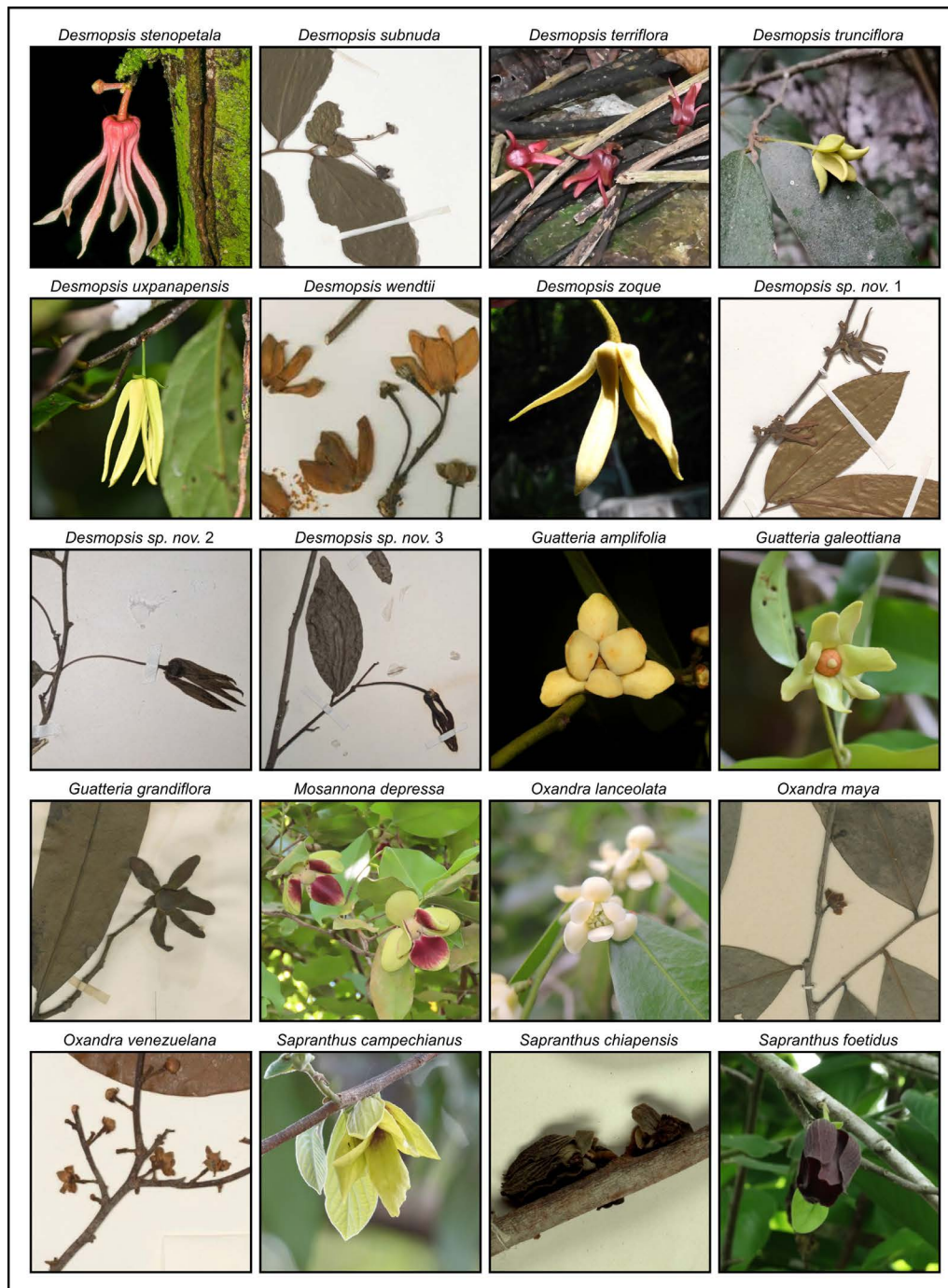


Figure 5. Photographs of Annonaceae species native to Mexico (Part 3), picture or collection credits in parenthesis: *Desmopsis stenopetala* (A. E. Ortiz-Rodríguez), *Desmopsis subnuda* (Schatz G. E. & Alverson B. 1191: L), *Desmopsis terriflora* (L. Hurtado-Reveles), *Desmopsis trunciflora* (Sarahí Díaz-Mota), *Desmopsis uxpanapensis* (L. Hurtado Reveles), *Desmopsis wendtii* (taken from Schatz *et al.* 2018), *Desmopsis zoque* (A. E. Ortiz-Rodríguez), *Desmopsis* sp. nov. 1 (Munn-Estrada X. & Kasey T. 1100: US), *Desmopsis* sp. nov. 2 (Macdougall T. B. 91956: MEXU), *Desmopsis* sp. nov. 3 (Magaña A. M. A. & Curiel R. 200: MEXU), *Guatteria amplifolia* (Mariano Gorostiza Salazar), *Guatteria galeottiana* (L. Hurtado-Reveles), *Guatteria grandiflora* (von Tuerckheim H. 1235: L), *Mosannona depressa* (Francisco José Gómez Marín), *Oxandra lanceolata* (Borja-Molina S.), *Oxandra maya* (Miranda F. 96048: MEXU), *Oxandra venezuelana* (Aguilar R. *et al.* 3746: K), *Sapranthus campechianus* (Héctor Gómez-Domínguez), *Sapranthus chiapensis* (Matuda E. 16366: BR), *Sapranthus foetidus* (M. F. Martínez-Velarde).

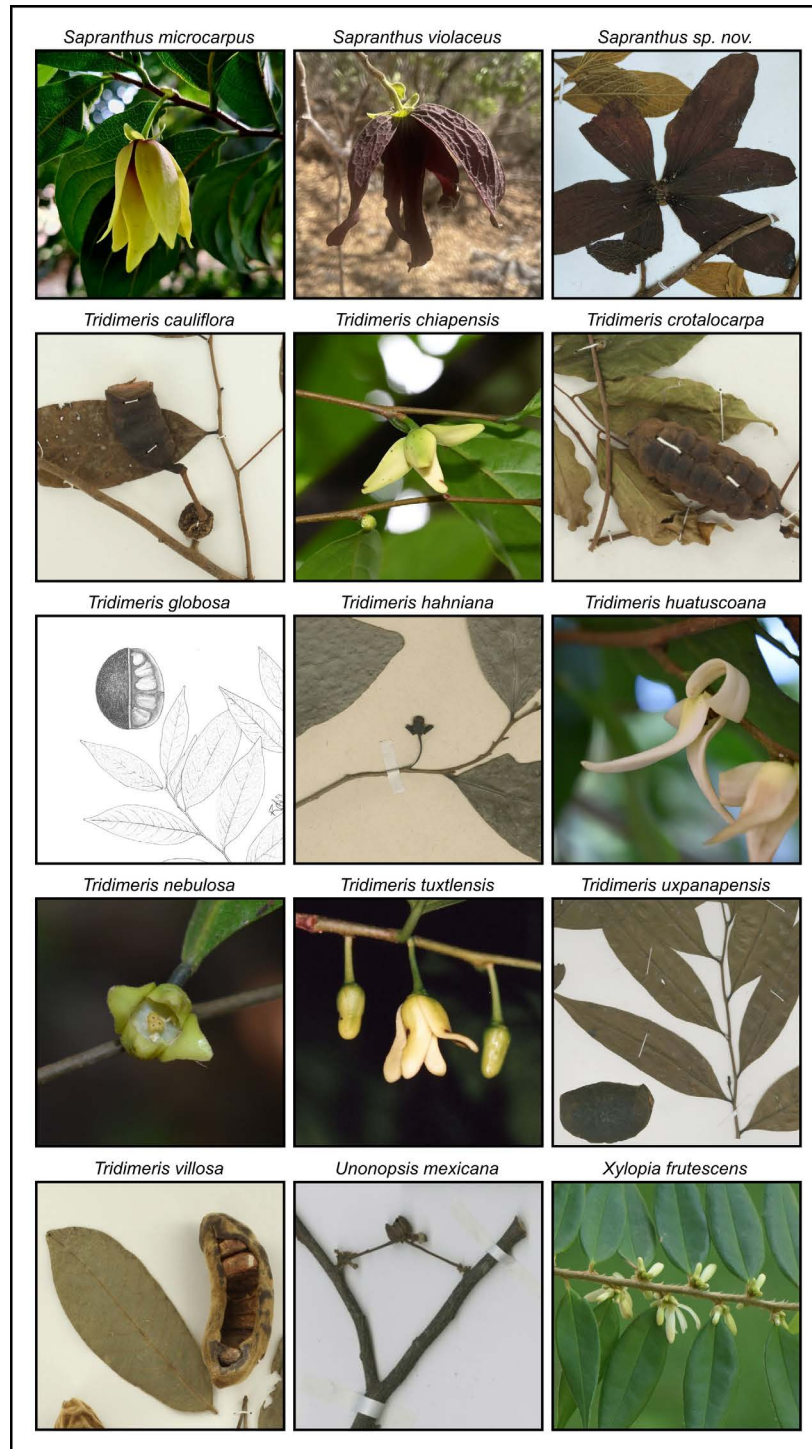


Figure 6. Photographs of Annonaceae species native to Mexico (Part 4), picture or collection credits in parenthesis: *Sapranthus microcarpus* (A. E. Ortiz-Rodríguez), *Sapranthus violaceus* (Roberto Otero Zaragoza), *Sapranthus* sp. nov. (Wendt T. & Hernández H. G. 5661: CHAPA), *Tridimeris cauliflora* (Boyle B. et al. 3879: MEXU), *Tridimeris chiapensis* (L. Hurtado Reveles), *Tridimeris crotalocarpa* (Campos V. A. & Reyes J.1491: MEXU), *Tridimeris globosa* (taken from Ortiz-Rodríguez et al. 2024), *Tridimeris hahniana* (Hahn L.: MNHN), *Tridimeris huatuscoana* (Leopoldo Hurtado-Reveles), *Tridimeris nebulosa* (L. Hurtado-Reveles), *Tridimeris tuxtensis* (C. Davidson), *Tridimeris uxpanapensis* (Schatz G. & Wendt T. 990: MEXU), *Tridimeris villosa* (Ibarra Manríquez G. et al. 3779: MEXU), *Unonopsis mexicana* (Wendt T. et al. 5684: U), *Xylopia frutescens* (inaturalist.org user alexandreallaousampaio).

junction of Nearctic and Neotropical biotas, historical climate change and topographic complexity which reflect in its naturally fragmented distribution (Hamilton *et al.* 2012). The genus *Tridimeris* reflects this, as almost all of its species are restricted to a single locality and together reflect the archipelago-like distribution of Mesoamerican cloud forests. This has important implications not only for its value as a model system to study speciation and the origin of biodiversity in Mesoamerican cloud forests, but also for its conservation (Jarvis & Mulligan 2011, Noroozi *et al.* 2018, Ramírez-Barahona *et al.* 2025).

The disjunct distributions observed for *Annona glabra*, *A. purpurea*, *Desmopsis subnuda*, *Mosannonna depressa*, *Oxandra lanceolata* and *Sapranthus microcarpus* between the Gulf and Pacific slopes, may reflect a combination of historical and ecological factors: Toledo (1982) argues that drought tolerance of tree species such as *Bursera simaruba* (L.) Sarg., allowed them to persist across both slopes during drier climatic periods, when dry forest vegetation could have served as a corridor between regions now separated by mountain barriers. This connectivity is further documented by Becerra (2005) who showed that Mexican tropical dry forest originated in western Mexico between 30 and 20 Ma, expanding as the Sierra Madre Occidental and the Trans-Mexican Volcanic Belt formed. These systems divide the Pacific and Gulf slopes today. Pleistocene glacial cycles may have further shaped connectivity as documented for *Psittacanthus rhyncanthus* (Benth.) Kuijt, whose disjunct distribution across both slopes reflects pre-Pleistocene isolation reinforced by ecological barriers, with glacial maxima expanding suitable habitat northward along both coasts (Ortiz-Rodriguez *et al.* 2020).

Other taxa with similar disjunctions include the Lauraceae *Aiouea montana* (Sw.) R.Rohde, *A. amplexicaulis* (Schltdl. & Cham.) R.Rohde (Rohde *et al.* 2017), *Ocotea disjuncta* Lorea-Hern. & Van der Werff (Lorea-Hernández & Van Der Werff 2002), *Beilschmiedia mexicana* (Mez) Kosterm. (Lorea-Hernández 2002) and the Euphorbiaceae *Enriquebeltrania* Rzed. (Ramírez-Díaz *et al.* 2023). These disjunct distributions seen in several species, especially when accompanied by morphological or ecological variation between populations, represent valuable natural systems to investigate the mechanisms of speciation and the phylogeographic history of the Mesoamerican flora.

Areas of high conservation priority. The areas we point out as critical priorities for conservation of Mexican Annonaceae had already been discussed for their biological richness and their vulnerability. The first, The Sierra de Juárez in Oaxaca, has been classified as a global hotspot, with 70 % of its surface covered by forests (Merino 2008). The region is heterogeneous, containing 19 climatic types, 19 soil types, 34 vegetation types as well as five of the main biomes in the country, which along with abrupt altitudinal changes, generate an extraordinary biological diversity (Suárez-Mota *et al.* 2018). Despite containing 50 % of Oaxaca's plant species (Challenger 1998) there are currently no formal actions for its protection and is further threatened by social marginalization and changes in land use (Suárez-Mota *et al.* 2018).

In Chiapas, The Selva El Ocote Biosphere Reserve (REBISO) is located within the Mesoamerican biodiversity hotspot (SEMARNAT-CONANP 2001). This area protects extensive humid and sub-humid tropical forests of global relevance due to their biodiversity and endemism (Ramírez-Marcial *et al.* 2017, Cruz-Salazar *et al.* 2025). Despite its status as a protected area, this region faces threats by human activities such as forest fires due to agricultural practices and worsen by prolonged drought caused by El Niño, and human encroachment within the core zone (Lira-Torres & Briones-Salas 2012, Pozo-Montuy *et al.* 2019, Flamenco-Sandoval *et al.* 2007). These conditions highlight the problem of ineffective “only in the paper” conservation.

Finally, The Uxpanapa-Chimalapas region in Veracruz and Oaxaca is another area of great biological capital (Mittermeier *et al.* 1999), and one of the most biodiverse and endemic-rich areas of Mexico, a consequence of late Cenozoic climatic changes (Wendt 1987b). The region supports a diversity of vegetation types such as tropical rainforests, sub-deciduous tropical forests, cloud forests, deciduous forests and coniferous forests (Lira-Torres & Briones-Salas 2012). It is also threatened by deforestation, agrarian conflicts, livestock farming, and forest fires (Ortega del Valle *et al.* 2012, Lira-Torres *et al.* 2014). As in the El Ocote region, the complexity of land tenure, agrarian problems, and colonization of the region have been an obstacle to the expansion of conservation areas (Lira-Torres & Briones-Salas 2012).

Another characteristic these three areas share is that they include karstic landscapes and a broad altitudinal gradient (Noroozi *et al.* 2018). Tropical karst forests are among the highest in species richness and play vital roles in climate regulation and human development (Molina-Paniagua *et al.* 2023). In Mexico, they harbor around half of the country's plant diversity (Molina-Paniagua *et al.* 2023). A previous study found areas of highest species richness within this biome for Mexico, which coincide with our three conservation priority areas (Molina-Paniagua *et al.* 2023).

As shown, these areas face serious threats that make their conservation difficult, and as such, represent priorities in which action is urgent. These threats are also a menace to the tropical rich species areas of Mexico. The state of Veracruz, the third richest in Annonaceae, has a landscape heavily degraded by oil enterprises, road construction, expansion of agricultural and livestock activities, anthropogenic fires, tourism, and hunting (Dinerstein *et al.* 1995). It is estimated that only 8.6 % could be considered well-conserved vegetation (Ellis *et al.* 2011). Similarly, the Pacific Lowlands are threatened by the expansion of coffee and citrus crops, overgrazing, deforestation, arson, hunting, cattle ranching, mining, and water exploitation (Maass *et al.* 2010). Dry tropical forests, as well as cloud forests such as the ones in which *Tridimeris* and *Sapranthus* are exclusively distributed, are also some of Mexico's most threatened ecosystems, mostly due to their high rates of deforestation (García-Oliva & Jaramillo 2011).

Understanding patterns of species richness and distribution in Annonaceae is vital for effective conservation. Reliable assessments of their responses to global change and deforestation require high-quality geographic data and detailed ecological insights within a phylogenetic context (Erkens *et al.* 2023). Therefore, an important step in obtaining reliable biodiversity distribution data is prioritizing regional and national-scale efforts, which can subsequently be integrated into global analyses (Araújo *et al.* 2019). This would address a common challenge in studies utilizing global biodiversity data: the sheer volume of information often impedes comprehensive, meticulous, and conscientious analysis (Maldonado *et al.* 2015).

The conservation status of the Mexican Annonaceae is poorly documented since of the 70 currently documented species, only one, *Guatteria grandiflora*, is listed, under its prior names, *G. anomala*, as “Amenazada” (Threatened) under the official Mexican law NOM-059 (SEMARNAT 2010). Formally, only 46 species are catalogued under some criteria by the IUCN Red List or by Mexican law, 19 with an unknown status, with insufficient information for an adequate evaluation, and 27 in some risk category (IUCN 2025, SEMARNAT 2010). Considering how little is known about the conservation status of Annonaceae species, it is urgent to make a comprehensive, family-wide conservation assessment of their current status. Our preliminary assessments suggest that most species are either Endangered or Critically Endangered due to their restricted distribution range. These assessments though preliminary are informative and serve as cautionary because it has been shown that populations with limited ranges are more vulnerable to extinction (Stade *et al.* 2019). These conservation evaluations and other taxonomic and geographic findings provide a foundation to guide efforts and to advocate for the protection of the key biodiversity areas we identified.

Conclusions and final remarks. This study establishes a revised taxonomic and geographic baseline for the Annonaceae in Mexico, confirming the presence of 75 native species (70 described and five in the process of formal description) within 11 genera. This diversity is characterized by a high endemism with 44 species and the entire *Tridimeris* genus exclusively found in the country. Furthermore, 34 of the endemic species are known from single localities, which highlights their vulnerability and the importance of effective conservation plans that target the specific high-diversity areas we documented. This work also emphasizes the role of Mexico as a strategic region for evolutionary studies within the family. The genus *Sapranthus* in seasonally dry tropical forests and *Tridimeris* restricted to mountainous cloud forests represent unique adaptations to biomes not typical in the family. Numerous species exhibiting notably disjunct and fragmented distributions make them valuable systems for the study of the evolution of the conformation of Neotropical biodiversity.

Supplementary material

Supplemental data for this article can be accessed here: <https://doi.org/10.17129/botsci.3834>

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Appendix 1. Annotated checklist of Mexican Annonaceae species, including taxonomic and nomenclatural synonyms relevant to Mexico. Herbarium specimens are cited by federal entities (States), along with common names where applicable and specific notes or comments for selected taxa. Reference herbarium specimens for states are deposited in the MEXU collection unless otherwise specified. States listed for a species and yet missing an herbarium specimen reference are discussed in the corresponding species' note. Synonyms were retrieved from the Annonaceae-taxonomic index (Herbarium Botanik der Universität Wien 2025) from which those relevant for Mexico were selected based on the available literature ([Appendix 2](#)). Full references of all literature cited in this section is included as part of [Appendix 2](#).

1. *Anaxagorea guatemalensis* Standl., *Trop. Woods* 7: 4-5 (1926). Holotype: Guatemala, *Record 41* (US). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 157, t.21 (1985). Sec. Schatz (2025)

Common names: anono

Distribution: Chiapas, Oaxaca (*Ortega O. V. F. & Calzada J. I. 502*), Tabasco, Veracruz (*Dorantes J. et al. D3976*).

Notes: *Anaxagorea* is known as the sister group of all remaining Annonaceae and exhibits features which are considered primitive in comparison to the rest (Scharaschkin & Doyle 2006). The genus known from southeast Asia and the Neotropics was registered for the first time for Mexico in 1987, adding a disjunct extension for the distribution of *A. guatemalensis*, which was previously known only to tropical rainforests of Guatemala, Belize, and Honduras (Wendt 1987). In Mexico it has been collected in Oaxaca and Veracruz and there are photographic records for Tabasco; it is expected to be distributed in the neighboring portion of northern Chiapas.

2. *Annona cherimola* Mill., *Gard. Dict.* (ed. 8) *Annona* no. 5 (1768). Sintype: Cultivated, *Herb. Miller s.n.* (BM). Illustr: not found. Sec. Schatz (2025)

Common names: chirimoya, custard-apple, wild chirimola, rago, anona, bálsamo, yág-guiál (zapoteco), Atsym (Mixe), chirimollo, chirimuya, K' evex, jipil, vinik, K' wex, anona agria, anona fría, Yadi, Batz'ik'evex (Chiapas, Farrera Sarmiento 2011).

Distribution: Aguascalientes (*Martínez-Ramírez J. 1727*), Chiapas (*Calzada J. I. et al. 3571*), Colima, Ciudad de México (*Gonzales V. 2*), Estado de México (*Wolfgang L. B. 1772*), Guerrero (*Cruz Duran R. 3827*), Guanajuato (*Ventura E. & López E. 8003*), Hidalgo (*López R. R. 52*), Jalisco (*Sanders A. C. 11009*), Michoacán (*Contreras León J. 157*), Morelos (*Soto Núñez J. C. 21347*), Nayarit, Oaxaca (*Trujillo-Olazo I. 1999*), Puebla (*Villalobos G. 277*), Querétaro (*Hernández L. 4867*), Sinaloa (*Vega R. A. 2028*), Tabasco (*Ortiz G. 10*), San Luis Potosí, Veracruz (*Orea L. L. 767*).

Notes: A naturalized and widely cultivated species, it is primarily valued for its edible fruits and has been the subject of intense global research due to many chemical components with pharmacological potential uses. It is also the most frequently collected Annonaceae in the country, with over 500 herbarium specimens. When identifying this species in western Mexico, it could be confused with *Annona longiflora* but the latter exhibits longer flowers, orange red petals *in vivo* and leaves glabrous to subglabrous adaxially.

3. *Annona contrerasii* J.Jiménez Ram. & J.C.Soto, *Acta Bot. Mex.* 112: 39-41, f. 1, t. 1. (2015). Holotype: Mexico, *J. C. Soto Núñez 20171* (FCME). Illustr.: J. Jiménez Ram. & J.C. Soto, *Acta Bot. Mex.* 112: 39-41, f. 1, t. 1. (2015). Sec. De La Cruz Chacón (2016)

Common names: anonillo

Distribution: Guerrero (*Soto Núñez J. C. 20171*).

Notes: This species, endemic to western Mexico, is a small tree or shrub (3-5 m tall) with young stems covered in rusty-colored hairs. It distinguished by its linear-lanceolate, *Salix*-like leaves, glabrous or nearly so, and its flowers, with strongly differentiated inner and outer petal whorls, a trait unique among Mexican species; it flowers February to June and has fruits in June (Jiménez-Ramírez & Soto-Núñez 2015).

4. *Annona glabra* L., *Sp. Pl.* 1: 537 (1753). Lectotype (designated by Dandy, 1958): Catesby, *Nat. Hist. Carolina* 2: t. 64 (1743 [1738]). Illustr.: Catesby, *Nat. Hist. Carolina* 2: t. 64 (1743 [1738]). Sec. Schatz (2025)

Annona palustris L., *Guanabanus palustris* (L.) M. Gómez.

Common names: anona de agua, corcho, mak' (maya)

Distribution: Campeche (*Lentz D. L.* 2606), Chiapas (*Gómez Domínguez H.* 2894), Colima (*Miranda F.* 9152), Guerrero (*Lorea F.* 5425), Jalisco (*Pérez A. J.* 2046), Michoacán (*Illescas M. R. & Sparza O. G.* 85), Nayarit (*Castillo G. C.* 5800), Oaxaca (*Sánchez F. L.* 628), Quintana Roo (*Flores J. S.* 8249), Tabasco (*Zamudio S.* 928), Veracruz (*Castillo-Campos G., Pale J. J. P. Medina M. E. A. & Ramos E.* 25981), Yucatán (*Chan C.* 5091).

Notes: A species restricted to freshwater swamps, in the vicinity of coastal lagoons and flood plains with no marine influence (Sánchez-García *et al.* 2022). At the Yucatan Peninsula this species is the dominant element in zones almost permanently flooded known locally as “corchales” (due to the common name of *A. glabra*, “corcho”), observed, for example at the “Reserva Ecológica El Corchito”, Progreso, Yucatán, or at the wetlands “El Corchal” at Solferino, Quintana Roo (Romero-Soler & Cetzal-Ix 2015). It is distinguished mainly by its smooth, glabrous fruit, but also by its coriaceous, elliptical leaves (with 8-10 secondary veins per side) as well as pedicellate flowers with six sub-equal petals, the inner ones bearing a red internal basal blotch.

5. *Annona globiflora* Schltld., *Linnaea* 10: 235 (1836). Mexico, *C.J.W. Schiede s.n.* (HAL-76425). Illustr.: not found. Sec. De La Cruz Chacón (2016)

Annona fruticosa Sessé & Moç., *Oxandra aberrans* Maas & Junikka.

Common names: chirimoya

Distribution: Chiapas (*Calzada J. I.* 10009), Guanajuato (*Ventura E. & López E.* 7988), Hidalgo (Hinton 24787), Puebla (*Bravo H. H.* 8), Querétaro (*Rubio H.* 1290), San Luis Potosí (*Salinas-Rodríguez M. M.* 17-016), Tamaulipas (*Martínez M.* 856), Veracruz (*Luna V. E. M.* 746).

Notes: A species endemic to Mexico but widely distributed throughout the country. It is characterized by its small, glabrous leaves (< 10 cm long, with 8-10 secondary veins per side), and its nearly sessile flowers. The flowers possess three nearly orbicular petals that form globose buds.

6. *Annona holosericea* Saff. *Contr. U.S. Natl. Herb.* 16: 269 (1912-1916 [1913]). Holotype: Costa Rica, *Tonduz 13930* (US). Illustr.: not found. Sec. Schatz (2025)

Common names: none known

Distribution: Chiapas (*Matuda 16888*).

Notes: A Mesoamerican endemic, ranging from southern Mexico to Costa Rica, this species is restricted to montane cloud forests and is distinguished by its large (> 15 cm), membranaceous, sub-orbicular leaves with 16-18 secondary veins, as well as its pedicel flowers and pyramidal buds. Despite these distinctive traits, a specimen collected by Eizi Matuda in 1947 (*Matuda 16888*) was misidentified as *Annona spraguei*, an error that had been perpetuated in Mexican species lists.

7. *Annona liebmanni* Baill., *Adansonia* 8: 266 (1867-1868 [1868]). Sintype: Mexico, *Liebmann 31* (C). Illustr.: Safford, *J. Washington Acad. Sci.* 3: 107, t.1 (1913) as *A. scleroderma*. Sec. Schatz (2025)

Annona scleroderma Saff., *Annona testudinea* Saff.

Common names: anona del monte (CONABIO), chincuya

Distribution: Chiapas (*Martínez E. et al. 25882*), Oaxaca (*de Santiago R. 279*).

Notes: This species is restricted to the tropical rainforests of northern Mesoamerica (southern Mexico to Honduras), and is distinguished by its long-petiolate leaves. These leaves are large (20-35 cm), oblong, and characteristically turn brown when dry, with secondary veins that are often inconspicuous abaxially. The flowers are yellow and banana-like scented, and the fruits are edible (Farrera Sarmiento 2011).

8. *Annona longiflora* S. Watson, *Proc. Amer. Acad. Arts* 22: 397 (1887). Holotype: Mexico, *Palmer E. 85* (GH). Illustr.: not found. Sec. Rainer (2026)

Common names: anona, ilama

Distribution: Colima (*Ibarra M G. 6156*), Estado de México (*H. et al. 7632*), Guerrero (*Calónico Soto J. & Jiménez Duran K. 9438*), Jalisco (*Puga & Suarez 14505*), Michoacán (*Soto Núñez C. J. 21460*), Morelos (*Stevens W. D. 1376: MSC*), Nayarit (*Miller J. S. & Téllez O. V. 3117*), Zacatecas (*Enríquez E. E. D. & Balleza C. J. J. 1356*).

Notes: A small to medium size tree, endemic to western Mexico species. It is characterized by its broadly elliptical leaves with rounded tips and bases and its orange-red flowers with petals over 4 cm long. Leaves are generally glabrous but some young leaves are slightly pubescent, suggesting a trait lost with age or hybridization with *A. cherimola*. It grows in montane pine-oak forests, tropical dry forests, and secondary vegetation at elevations of 1,000-1,510 m.

9. *Annona longipes* Saff., *Contr. U.S. Natl. Herb.* 16: 269, 16(10): 269, t. 89. (1913). Holotype: Mexico, *E.W. Nelson 430* (US-45591). Illustr.: Saff., *Contr. U.S. Natl. Herb.* 16: 269, 16(10): 269, t. 89. (1913). Sec. Schatz (1992)

Common names: ilama, anona

Distribution: Chiapas (*G. Aguilar M. F. et al. 10360*), Veracruz (*Nelson E. W. 430: NY*).

Notes: This species, endemic to Mexico, is distinguished by its twigs, leaves and petioles densely covered with erect, rust-colored hairs, and its flowers with three petals and long petioles, measuring 30 to 42 mm long.

10. *Annona macrophyllata* Donn. Sm., *Bot. Gaz.* 49 (6): 453 (1910). Holotype: Guatemala, *Deam 6191* (US). Illustr.: not found. Sec. Schatz (2025)

Annona diversifolia Saff.

Common names: ilama, anona, papusa, ilamazapote, papausa, K'evex

Distribution: Chiapas (*Reyes-García A. & Gómez D. 4674*), Estado de México (*Medrano F. et al. 5512*), Guerrero (*Soto Núñez J. C. & Sousa M. 14038*), Michoacán (*Soto Núñez J. C. 18195*), Oaxaca (*Sandoval D. 1135*), Yucatán (*Castillo T. s.n.*).

Notes: This highly valued Mesoamerican fruit tree is cultivated for its large, tasty fruits, which have sweet pink to reddish pulp. Morphologically, it is distinguished by the sessile, orbicular, and cordate leaves on its fertile twigs and its long-pedicel flowers with three flesh-red petals. It should be noted that *Annona diversifolia* is considered a synonym of *A. macrophyllata*, as Rainer (2001) found no morphological distinctions between the type specimens.

11. *Annona mucosa* Jacq., *Observ. Bot.* 1:16 (1764). Neotype: designated by Maas *et al.*, 1992): Martinica, *Duss 4620* (NY). Illustr.: Maas *et al.*, *Fl. Neotrop. Monogr.* 57: 127, t. 61 (1992), as *Rollinia mucosa*.

Annona biflora Sessé & Moc., *Annona reticulata* L. var. *mucosa* (Jacq.) Wild, *Rollinia Jimenezii* Saff., *R. jimenezii* var. *nelsonii* R.E. Fr., *R. mucosa* (Jacq.) Baill., *R. permensis* Standl.

Common names: anón, anona de monte, wild sugar-apple, biribá, anonilla, chirimoya, anonilla de mico

Distribution: Chiapas (*Miranda F. 6275*), Oaxaca (*García R. S. 638*), Puebla (*Ibarra M. G. 5619*), Tabasco (*Guadarrama M. A. O. et al. 6298*), Veracruz (*Leonti 299*).

Notes: This species is widely distributed in the Americas, but locally it is restricted to tropical rainforests. It can be easily distinguished by its flowers with basally fused and laterally compressed petals that form three propeller-like projections, and by its leaves, which are densely covered with appressed hairs abaxially. The leaves are morphologically variable, but a distinctive vegetative morphotype from Oaxaca (e.g., *Sanchez-Cruz G. 92*) is characterized by small, narrowly lanceolate leaves that are cuneate at the base and glaucous (blue-colored) beneath. The species is also noted for its edible fruits appreciated locally. Besides its edible fruits, the whole plant is used as shadowing species in the “cacaotal”, as well as fuel (Farrera Sarmiento 2011).

12. *Annona palmeri* Saff., *Contr. U.S. Natl. Herb.* 18: 43, pl. 24 (1914). Holotype: Mexico, *Palmer E. 85* (F). Illustr.: Saff., *Contr. U.S. Natl. Herb.* 18: 43, pl. 24 (1914). Sec. Rainer (2026)

Common names: anona

Distribution: Guerrero (*Velasco K. G. 40106*).

Notes: A narrow endemic of tropical dry forest in western Guerrero, this species is known from only three collections. Its diagnostic traits include narrowly lanceolate to oblong-lanceolate leaves with a scattered pubescence and narrowly acute apex, and flowers with small petals (~ 2 cm long) bearing rounded tips. This distinguishes it from

specimens from Michoacán and Jalisco that have been misidentified as *A. palmeri*. Those individuals possess elliptical leaves with a broad acute to cuspidate apex, are sparsely to densely covered with long appressed hairs beneath, and have broadly elliptical petals only ~1 cm long.

13. *Annona primigenia* Standl. & Steyerl., *Publ. Field Mus. Nat. Hist., Bot. Ser.* 23(1): 7 (1943). Holotype: Guatemala, *Lundell 2213* (F). Illustr.: not found. Sec. Schatz (2025)

Annona reticulata L. var. *primigenia* (Standl. & Steyerl.) Lundell.

Common names: anono

Distribution: Campeche (Álvarez D. 2892), Chiapas (Guizar Nolasco E. 3489), Quintana Roo (Vázquez Sánchez C. CVS218), Tabasco, Yucatán (Simá P. et al. 2397).

Notes: This species is widely distributed in the Mayan region of southern Mexico (Chiapas, Campeche, Quintana Roo, Yucatán, and probably Tabasco). It is characterized by small leaves (< 15 cm) with an acuminate to caudate apex, flower pedicels 20-30 mm long, and small fruits (≤ 20 mm) with a tuberculate surface. These features distinguish it from *Annona reticulata*, which has larger flowers and leaves and smooth fruit. Some specimens from Oaxaca and Guerrero align with *A. primigenia* in leaf and fruit traits but exhibit larger pedicels and petals with denser pubescence. We consider these differences insufficient to define a new species, treating them instead as a morphological variation.

14. *Annona purpurea* Moc. & Sessé ex Dunal, *Monogr. Anonac.* 64, t. 2 (1817). Holotype: *Sessé & Mociño*, illustr. Hunt Inst. 6331.0979. Illustr.: Dunal, *Monogr. Anonac.* t. 2 (1817). Sec. McVaugh (2000)

Annona involucrata Baill., *A. manirote* Kunth, *A. prestoei* Hemsl.

Common names: soncoya, sincuya, cabeza de negro, toreta, Noaj aky, anona colorada, chincuya, chin-jol, K'evex

Distribution: Chiapas (*Palacios E. E. III*), Colima (*Hernández G. & Parra H. 238*), Jalisco (*Arturo J. & Magallanes S. 1677*), Michoacán (*Parra H. & Parra E. Mich324*), Oaxaca (*Hernández H. G. 1273*), Puebla (*Amith J. 1640*), Quintana Roo (*Acosta-B. L. E. 224: UCR*), Tabasco (*Ramón J. V. 11394: UJAT*), Veracruz (*García I. G & Col. 21*), Yucatán (*Gauner G. F. MA-215607-1: MA*).

Notes: This species is easily distinguished by its almost sessile, pyramidal flower buds and its membranaceous leaves with 15-25 secondary veins. Its fruit is also unique, being densely covered in ferruginous (rust-colored) hairs and having a hook-like surface. Valued for its tasty and aromatic fruit, it is cultivated in many parts of Mexico.

15. *Annona rensoniana* (Standl.) H. Rainer, *Ann. Naturhist. Mus. Wien*, B 108: 197 (2006 [2007]). *Rollinia rensoniana* Standl. *J. Washington Acad. Sci.* 13: 351 (1923). Holotype: El Salvador, Standley 23022 (US). Illustr.: Maas et al., *Fl. Neotrop. Monogr.* 57: 125, t.60 (1992), as *R. membranacea*. Sec. Schatz (2025)

Rollinia membranacea Triana & Planch., *R. mexicana* Standl., *R. standleyi* R.E. Fr.

Common names: rensonia, soncoya, anona de montaña, anonillo, chirimoya, cimarrona, anona

Distribution: Chiapas (*Espinosa Flores G. Gi481*), Oaxaca (*López Toledo J. F. 149*), Puebla (*Gómez-Chagala B. 245*), Veracruz (*Barajas J. & Ángeles G. 78*)

Notes: This widely distributed American species is a medium to large tree of tropical rainforests, cloud forests, and secondary vegetation (500-1,000 m asl). It is easily distinguished by its flowers, which have basally fused, laterally compressed petals forming three propeller-like projections, a morphology similar to *Annona mucosa*. However, *A. rensioniana* has leaves densely covered with erect hairs abaxially. While most populations are vegetatively uniform, a distinctive morphotype from the cloud forests of Puebla and Veracruz possesses narrower, long-acuminate, and more densely pubescent leaves. The species produces edible fruits of local importance.

16. *Annona reticulata* L., *Sp. Pl.* 1: 537 (1753). Lectotype (designated by Rainer in Jarvis, 2007): Sloane, *voy. Jamaica*. 2: t. 226 (1725) as *A. maxima*. Illustr.: Sloane, *voy. Jamaica*. 2: t.226 (1725) as *A. maxima*. Sec. Schatz (2025)

Annona lutescens Saff.

Common names: anona, anono, kukay, chirimoya, yati, anona colorada, K'anal, K'evex

Distribution: Campeche (*Tapia J. L. M. et al. 1233*), Chiapas (*Arge et al. 5*), Colima (*Ibarra M. G. 5706*), Estado de México (*Medrano F. G. 3795*), Guerrero (*Gómez A. 2233*), Jalisco (*Ramírez-Delgadillo R. 5228*), Michoacán (*Saucedo-Gudiño M. E. & Rangel-Quintana C. MES-121*), Morelos (*de la Torre C. L. 21*), Nayarit (*Gómez-Romero 4*), Oaxaca (*Gallardo-Hernández 1626*), Puebla (*Rojas-Martínez C. 516*), Quintana Roo (*Cabrera E. C. 4375*), Sinaloa (*Miranda A. & García R. s/n*), Tabasco (*Rodríguez I. E. et al. 398*), Tamaulipas (*Romo C. G. 514*), Veracruz (*Vázquez F. B. 428*), Yucatán (*Narave H. 2304*).

Notes: This species is the second most collected Annonaceae in Mexico with over 400 specimens. Its wide distribution could be attributed to its long-standing cultivation for its edible fruits (“corazon de buey,” “anona”). Diagnostic characters include long often narrowly lanceolate leaves and large, fleshy fruits with a smooth surface. It might be confused with *Annona palmeri* (in Guerrero) and *A. primigenia* (in Yucatán), from which it is separated by its much larger flowers and leaves and its lack of tuberculate fruit. A taxonomic uncertainty exists in Soteapan, Veracruz, where most specimens are vegetatively similar but include one individual with muricate, smaller fruits, suggesting a possible misidentification. Reported uses for this species are the edible fruits, the leaves as remedy against colds and branches and stem are used as fuel (Farrera Sarmiento 2011).

17. *Annona squamosa* L., *Sp. Pl.* 1: 537 (1753). Lectotype (designated by Rainer in Jarvis, 2007): Sloane, *voy. Jamaica*. 2: t. 227, excluding leaves and branches (1725) as *Annona*. Illustr.: Sloane, *voy. Jamaica*. 2: t. 227, excluding leaves and branches (1725) as *Annona*. Sec. Schatz (2025)

Guanabanus squamosus (L.) M. Gómez.

Common names: anona, atis, chirimoya, saramuyo, sugar apple, ts' almuy

Distribution: Campeche (*Alvarez D. M. 87*), Chiapas (*Acevedo-Rodríguez P. 16457*), Estado de México (*Arzate F. S. 499*), Guerrero (*Calzada I. 389*), Jalisco (*Pérez A. 444*), Michoacán (*Soto J. C. N. 15595*), Oaxaca (*Sánchez-Martínez A. 89*), Nayarit (*Bravo-Bolaños O. 2140*), Quintana Roo (*Ucán E. 4049*), Sinaloa (*Vega R. A. & Palazuelos S. N. 788*), Oaxaca (*Elorsa C. M. 2193: SD*), Tabasco (*Martínez-Aldaro M. A. MA1972*), Veracruz (*Guerrero B. C. 2449*), Yucatán (*Chan C. 2428*).

Notes: This species has a wide distribution throughout the Americas, including Mexico, where it is most frequent in Chiapas and ranges westward to Jalisco and Nayarit. Its broad distribution is likely anthropogenically influenced, linked to its cultivation for its edible fruits. Other uses are as fuel and as shadow for cattle (Farrera Sarmiento 2011). The species is readily identified by its distinctive nearly globose fruits, often bearing pronounced rounded excrescences, and its frequently small and elliptical leaves.

18. *Annona* sp. nov.

Common names: none known

Distribution: Jalisco (*Ramírez-Delgadillo R. et al. 5683b*), Nayarit (*Tenorio L. P. et al. 24376*).

Notes: A species endemic to western Mexico. It is distinguished by its small leaves, pedicellate small flowers and globose buds. Specimens have been collected in the state of Jalisco and Nayarit. Morphologically, it most closely resembles *A. globosa* which is distributed in eastern Mexico.

19. *Cymbopetalum baillonii* R.E. Fr, *Acta Horti Berg.* 10: 190 (1931). Holotype: Mexico, *Liebmann 29* (C). Illustr.: not found. Sec. Murray (1993)

Common names: flor de oreja; orejuela; guineillo prieto; anonilla; guineo de montaña, huevo de toro, huevo de caballo, cojón de mono, platanillo, palo de plátano

Distribution: Campeche (*González L. M. & Perez de la Rosa 4794: ENCB*), Chiapas (*Miranda F. 6236*), Oaxaca (*Vera Caletti P. et al. 111*), Puebla (*Ibarra M. G. 5576*), Tabasco (*Sol Sanchez A. 683*), Veracruz (*Cedillo R. T. 2667*).

Notes: Due to geographic overlapping and morphological similarities, *Cymbopetalum baillonii* is most easily confused with *C. mayanum*, but several characteristics distinguish them. *Cymbopetalum baillonii* leaves have a bluntly acuminate apex and a nearly hairless surface, its inner petals dry to a minutely wrinkled texture (vs. smooth in *C. mayanum*), and it has shorter pedicels (4.9-7 cm) and fruit stipes. Furthermore, *C. baillonii* exhibits considerable internal variation reported by Murray (1993) which deserves further study. Its leaf shape ranges from elliptic (northern localities) to straplike (Hidalgotitlán, Veracruz area) depending on the region. Its flowers, while often orange-yellow (Colipa, Veracruz), can be pure yellow (Los Tuxtlas) or yellow with a maroon patch at inner petal's base (Oaxaca).

20. *Cymbopetalum gracile* R.E.Fr., *Ark. Bot.* (n. s.) 3: 436, tab. 4 (1956). Holotype: Mexico, *Hinton 10257* [erroneously cited as 1027] (US). Illustr.: not found. Sec. Murray (1993)

Common names: Barra de jabalí (Guerrero)

Distribution: Guerrero (*Kruse H. 1292*), Oaxaca (*Alvaro Campos V. 4682*).

Notes: This species occurs in moist deciduous forests on limestone and black soils at elevations between 300 and 1,040 meters. Flowering has been reported in March, June, and July, and fruiting in December. *Cymbopetalum gracile* resembles *C. hintonii* but can be distinguished by its fusiform monocarps with a rostrate apex, inner petals adaxially striated, secondary veins only slightly impressed abaxially, and fewer carpels per flower. Another similar species is *C. mirabile* from which it could be distinguished by its smaller leaves, shorter pedicels, and a higher number of ovules and seeds.

21. *Cymbopetalum hintonii* Lundell, *Wrightia* 5(3): 53-54 (1974). Holotype: Mexico, *Hinton 13788* (MO). Illustr.: not found. Sec. Murray (1993)

Cymbopetalum hintonii subsp. *septentrionale* N.A.Murray

Common names: platanillo

Distribution: Colima, Jalisco (*Machuca J. A. N. et al. 7081*), Michoacán (*Soto Núñez J. C. et al. 7197*), Nayarit (*Ramírez R. R. 892*).

Notes: *Cymbopetalum hintonii* is a tree (7-20 m); its leaves are lanceolate to narrowly elliptic and its flowers have hairy outer petals and fleshy, incurved inner petals. Morphological differences along with geographic isolation have previously been acknowledged as different groups according to Murray (1993), yet these differences should be further investigated. The main criteria for their separation include thickness of floral parts and fruit structures, pedicel length, and seed arrangement. For Colima there is photographic evidence from inaturalist.org user @lucia_mendoza (URL: <https://www.inaturalist.org/observations/52405501>).

22. *Cymbopetalum mayanum* Lundell, *Wrightia* 5(2): 25 (1974). Holotype: Guatemala, *Lundell 15964* (LL). Illustr.: not found. Sec. Murray (1993)

Common names: anona de montaña, banana, guanábano, guinellito, guineo, *chikinte* (in the Selva Lacandona)

Distribution: Campeche (*Martínez E. S. 30640*), Chiapas (*Aguilar G. 10699*), Tabasco (*Cowan C. 2901*).

Notes: A tree (4 to 25 m), found in the limestone forests of southern Mexico, Belize, Guatemala, and Honduras. It is characterized by elliptic to oblong leaves with an often rounded base, green-yellow flowers on long pedicels, and sausage-shaped, multi-seeded monocarps. The plant has persistent pubescence on twigs, petioles, and flowers. In Mexico, this species resembles *Cymbopetalum baillonii* but differs in its inner petal surface striated rather than rugulose, longer flower pedicels, and longer, narrower monocarp stipes (Murray 1993).

23. *Cymbopetalum mirabile* R.E.Fr., *Acta Horti Berg.* 10 (2): 192 (1931). Holotype: Mexico, *Ghiesbreght 721* (K). Illustr.: not found. Sec. Murray (1993)

Common names: falsa anona, anonillo

Distribution: Chiapas (*A. Méndez T. 5968*).

Notes: *Cymbopetalum mirabile* is a slender shrub or small tree (1.5-6 m tall), distinguished by its remarkably long and slender flower pedicels ((8.5-) 17.5-25 cm long) and its small (3-4 cm long, 1.2-1.4 cm wide monocarps), torulose (moniliform) fruits with only 4-5 seeds each. It has a relatively low number of carpels (5-10) and yellow-green petals. This species is sympatric with four other congeneric species (*C. steyermarkii*, *C. mayanum*, *C. baillonii*, and *C. penduliflorum*). *C. mirabile* can be differentiated from *C. steyermarkii*, *C. mayanum*, and *C. baillonii* because these species all have larger fruits, a higher number of carpels, and generally thicker and shorter flower pedicels. Additionally, *C. baillonii* and *C. mayanum* also tend to inhabit wetter sites. While *C. penduliflorum* also has a small fruit and long pedicels, its pedicels are thicker. This species also displays larger sepals, velvety brown anther connectives, and distinctive orange to brown flowers, which contrast with the yellow-green flowers and dark-colored anther papillae of *C. mirabile* (Murray 1993).

24. *Cymbopetalum parviflorum* N.A.Murray, *Syst. Bot. Monogr.* 40: 48, f. 16a-b (1993). Holotype: Mexico, *Martínez-C.* 200 (A). Illustr.: N.A. Murray, *Syst. Bot. Monogr.* 40: 48, t. 17a-b (1993). Sec. Murray (1993)

Common names: falsa anona

Distribution: Oaxaca (*Martínez-Calderón G.* 200), Veracruz (*Wendt et al.* 5308: CHAPA).

Notes: *Cymbopetalum parviflorum* is a treelet (3 m tall), notable for its small flowers. Its leaves are narrowly oblong to elliptic with attenuate to cuneate base. The flowers are borne on a glabrate pedicel 3.5-5.5 cm long; outer petals are chartaceous, ovate, 0.6-1 cm long × 0.7-1.0 cm wide; inner petals are fleshy, broadly rounded, with a distinctive involute margin and apex, along with a short, visible claw. The ovaries are hispidulous with 5-8 carpels. The irregularly columnar stigmas distinguish this species from *C. gracile* (Murray 1993).

25. *Cymbopetalum penduliflorum* (Dunal) Baill., *Adansonia* 8: 268 (1867-1868 [1868]). *Unona penduliflora* Dunal, *Monogr. Anonac.* 100 (1817). Lectotype (designated by Murray, 1993): Sessé & Mociño, illustr. Hunt Inst. 6331.0097. Illustr.: Dunal, *Monogr. Anonac.* t.28 (1817) as *U. penduliflora*. Sec. Schatz (2025)

Common names: flor de oreja, orejuela, xochinacatzli (náhuatl), Kewesh, anonillo, ton kuk (Chiapas)

Distribution: Chiapas (*Ventura E. & López E.* 2860).

Notes: This species is notable for its spicy, salmon to chocolate-colored petals and long-pedicellate (6-17 cm) flowers. It can be reliably distinguished from related species by its very large sepals (6-12 mm wide), dark brown papillate anther connectives, and monocarps containing a single row of seeds. While its fruits resemble those of *C. gracile*, their leaf characteristics differ, and its unique floral features separate it from *C. mirabile* and *C. mayanum*. It has a complicated history of cultivation, leading to speculation that it may be a cultigen developed for its valued spice (Murray 1993). It is reported to be used in Chiapas as fodder and that the fruit is edible (Farrera Sarmiento 2011).

26. *Cymbopetalum stenophyllum* Donn.Sm., *Bot. Gaz.* 20 (1): 2. 1895. Sintype: Guatemala, *Donell Smith 1491*(US-[reg. no.] 1391605, US -[reg. no.] 1391606). Illustr.: not found. Sec. Schatz (2025)

Common names: orejuela, orijuela

Distribution: Chiapas (*Matuda* 18588).

Notes: *Cymbopetalum stenophyllum* is a small treelet (2.5-7 m tall) found in the Soconusco region of Mexico. Its unique combination of thin petals and small, torulose monocarps makes it distinct within the genus. Its leaves are narrowly elliptic with a cuneate base. The flowers are borne on short pedicels (2.0-3.8 cm long), and have distinctive thin, fleshy inner petals, and a prominent triangular ridge over the abaxial midrib. The monocarps are small, falciform, strongly torulose, and with a long, rostrate apex. Locally, this species is found in tropical wet forests, typically on the steep, shady slopes of stream banks at 80-600 meters, growing in reddish clay or loamy soils (Murray 1993). Leaves are reported to be used as medicinal and fuel (Farrera Sarmiento 2011).

27. *Desmopsis cauliflora* (J.W.Walker) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 266 (2023). *Reedrollinsia cauliflora* J.W.Walker, *Rhodora* 73: 461 (1971). Holotype: Mexico, *Walker 357* (GH). Illustr.: not found. Sec. Schatz (2025)

Stenanona cauliflora (J.W.Walker) G.E.Schatz.

Common names: *none known*

Distribution: Chiapas (*Gisbert R. A. 22*), Tabasco (*P. Diaz J. 159: UJAT*).

Notes: Known only from a small area in Northern Chiapas and adjacent Tabasco, it is one of the few *Desmopsis* species with tetramerous flowers. It can be distinguished from other species with similar flowers by its glabrous leaves (Schatz & Maas 2010). It grows in tropical rainforests established on a karstic landscape.

28. *Desmopsis chimalapensis* G.E.Schatz & Ortiz-Rodr., *Novon* 31: 266-267 (2023). *Stenanona wendtii* G.E.Schatz & Maas, *Blumea* 55(3): 221-223, f. 6, t. 4, Map 3 (2010). Holotype: Mexico, *Wendt et al. 6841* (MO). Illustr.: Schatz & Maas, *Blumea* 55(3): 221-223, f. 6, t. 4, Map 3 (2010) as *S. wendtii*. Sec. Schatz *et al.* (2023)

Common names: *none known*

Distribution: Oaxaca (*Wendt T. L. et al. 6841*), Veracruz (*Ishiki M. & Rainer H. 2315: U*).

Notes: One of the smallest species of the genus, usually a shrub or small tree. It is also one of the two species that display clonal reproduction by stolons. It is only known from the Uxpanapa-Los Chimalapas region in the Tehuantepec Isthmus (Veracruz and Oaxaca). *Desmopsis chimalapensis* grows in tropical rainforests with deep soils. It is most similar to the other clonal species, *D. humilis*, which has larger flowers (Schatz & Maas 2010)

29. *Desmopsis dubia* Ortiz-Rodr. & Espinosa-Jim., *Nordic. J. Bot.* 38 (4, e06208): 2-6, f. 1A-G, 2, 4A-H (2020). Holotype: Mexico, *Espinosa-Jiménez 1797* (HEM). Illustr.: Espinosa-Jiménez & Ortiz-Rodríguez, *Nordic. J. Bot.* 38 (4, e06208): 2-6, f. 1A-G, 2, 4A-H (2020). Sec. Schatz (2025).

Common names: *none known*

Distribution: Chiapas (*Gómez Domínguez H. 2074: HEM*), Tabasco (*Martínez-Velarde M. F. & Amancio Rosas G. 300*).

Notes: Confined to the karst rainforest of the Selva El Ocote Biosphere Reserve in Chiapas in which it grows in the lower strata. It is different from all remaining *Desmopsis* by the combination of pubescent lower leaf surface, strongly percurrent tertiary venations, sepals with a connate base that persist in fruit, fleshy and stuff petals with food bodies and cylindrical monocarps with ligneous exocarp (Espinosa-Jiménez & Ortiz-Rodríguez 2020). Like some other species, its flowers (*e.g. D. uxpanapensis*) emit a scent reminiscent of ripe bananas.

30. *Desmopsis duran* Gómez-Domínguez & Ortiz-Rodr., *Syst. Bot.* 45(4): 749-752, f. 2-3 (2020). Holotype: Mexico, *Dominguez 1404* (MEXU). Illustr.: Gómez-Domínguez & Ortiz-Rodríguez, *Syst. Bot.* 45(4): 749-752, f. 2-3 (2020). Sec. Schatz (2025)

Common names: *none known*

Distribution: Chiapas (*Domínguez Vázquez M. A. 1404*).

Notes: *Desmopsis duran* is known only from Chiapas where it grows scatteredly on the organic matter accumulated in cavities on spiky, rocky zones, locally named dog-teeth, but with high humidity and water runoff most of the year. This species has outstanding branch-like inflorescences which “are expanded, long pedunculate rhipidia with several leafy bracts borne along the pedicels, which resemble a long branch” (Gómez-Domínguez & Ortiz-Rodríguez 2020). Flowers of this species have 6 to 8 petals, and this trait along with young twigs with persistent erect and appressed hairs and the glabrescent and narrowly elliptic leaves clearly distinguish it from the closely related *D. trunciflora*, *D. subnuda*, *D. wendtii*, and *D. guerrerensis*.

31. *Desmopsis erythrocarpa* Lundell, *Wrightia* 5: 26 (1974). Holotype: Guatemala, Contreras 5976 (LL). Illustr.: not found. Sec. Schatz (2025)

Common names: anona (Guatemala), anonillo, cabo de hacha

Distribution: Chiapas (*González-Espinosa M. et al.* 1723).

Notes: This species is known from Belize, Guatemala and Mexico. It can be found in semi-evergreen forest on limestone soils at 45-420 m. It is recognized by its long, acuminate leaves, scale-like, non foliaceous bracts, and small (8-15 by 6-12 mm) monocarps, with only 1-2 seeds (*Schatz et al.* 2018).

32. *Desmopsis flagelliflora* (T.Wendt & G.E.Schatz) G.E.Schatz & Ortiz-Rodr. *Novon* 31: 267 (2023). *Stenanona flagelliflora* T.Wendt & G.E.Schatz, *Lundellia* 7: 30-36, f. 1-3 (2004). Holotype: Mexico, *Wendt et al.* 3851 (MEXU). Illustr.: Schatz & Wendt, *Lundellia* 7: 30-36, f. 1-3 (2004) as *S. flagelliflora*. Sec. Schatz *et al.* (2023)

Common names: none known

Distribution: Oaxaca (*Wendt T. et al.* 6842), Veracruz (*Ishiki M. & Rainer H.* 2113).

Notes: *Desmopsis flagelliflora* is a small, slender tree (1-4.5 m tall) growing at the Uxpanapa-Chimalapas region and also recorded at Los Tuxtlas region. This species distinctly bears its flowers on whip-like, leafless branchlets arising from the lower 1 m of the trunk, growing to over 3 m. The flowers are small (13-14 × 6-7 mm), fleshy, dark salmon-red to purple-red, while fruits typically bear 1-3 small (21 × 7-8 mm) orange-red monocarps. *D. flagelliflora* thrives at 200-350 m asl, in evergreen rain forest on hills with deep soils. The flowering has been recorded in April, August and October. Though reported locally abundant, a global assessment places it as critically endangered according to the Red List criteria (*Schatz & Wendt* 2004).

33. *Desmopsis guerrerensis* Gonz.-Martínez & J.Jiménez Ram., *Brittonia* 68(1): 51-54, f. 1 (2016). Holotype: Mexico, *González-Martínez & S. Rios-Carrasco* 892 (FCME). Illustr.: Jiménez-Ramírez & González-Martínez, *Brittonia* 68(1): 51-54, f. 1 (2016). Sec. Gómez Domínguez & Ortiz-Rodríguez (2020)

Common names: none known

Distribution: Guerrero (*Gonzalez-Ma C. A. Rios Carrasco* 892: FCME).

Notes: This species is only known from the type locality in Guerrero. It is a small tree (3-4 m tall); the flowers are solitary, with a pedicel up to 4 cm at flowering and a long (14-20 mm), leaf-like basal bract. Characteristically, in this

species the sepals are persistent and accrescent in fruiting, the leaves show evident glandular oil bodies both abaxially and adaxially and the monocarps have 2-3 seeds each (Jiménez-Ramírez & González-Martínez 2016).

34. *Desmopsis humilis* (Miranda) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 267 (2023). *Sapranthus humilis* Miranda, *Ceiba* 4(2): 126, f. 1 (1954). Holotype: Mexico, *Miranda* 6583 (MEXU). Illustr.: Miranda, *Ceiba* 4(2): 126, f. 1 (1954) as *S. humilis*. Sec. Schatz (2025)

Stenanona humilis (Miranda) G.E.Schatz.

Common names: none known

Distribution: Chiapas (*Miranda* F. 6583: GH), Oaxaca (*Ortiz-Rodríguez* A. E. 793), Tabasco, Veracruz (*Schatz* G. E. & *Wendt* T. 986: XAL).

Notes: This species inhabits moist forests on sandy soils and soil pockets within karstic limestone at elevations 100-400 m asl at Uxpanapa region in Veracruz, in Chiapas, and has recently been recorded photographically in Tabasco. Firstly, described as *Sapranthus humilis* by Miranda (1954), due to its connective morphology, this species was posteriorly located in the *Stenanona* genus based on its “globose, inaperturate pollen with coarse verrucate exine sculpturing” (Schatz & Maas 2010), and finally clumped in the genus *Desmopsis* based on phylogenetic evidence (Schatz *et al.* 2023). This is a unique species with an uncommon habit in the family as a woody bush 50-60 cm high, and capacity to clone itself via stolons. These traits are shared with the sympatric species *D. wendtii*. The flowers are striking with long (22-44 mm), narrow (0.5-1 mm), and aristate outer petals, rose to wine colored which differentiates it from *D. monticola* and *D. wendtii* (the Tabasco photographic record can be viewed at <https://www.inaturalist.org/observations/312618161>)

35. *Desmopsis ibarrarum* G.E.Schatz ex Ortiz-Rodr., *Acta Bot. Mex.* 129 (e2110): 3-11, f. 1-2, 3A, 4 (2022). Holotype: Mexico, *Ibarra & Sinaca* 7278 (MEXU). Illustr.: Ortiz-Rodríguez, *Acta Bot. Mex.* 129 (e2110): 3-11, f. 1-2, 3A, 4 (2022). Sec. Schatz (2025)

Common names: Cuerrillo, matacahuite, cáscara prieta, icaco verde (Tabasco), cuerillo, palo de bejuco, matacahuite (Veracruz)

Distribution: Chiapas (*Gonzalez* L. & *Garza* V. 10742), Oaxaca (*Ibarra* M. G. 3661), Tabasco (*Tenorio* P. L. 19551), Veracruz (*Rosas* M. R. 1768).

Notes: This species, confused for a long time with *Guamia mexicana*, was described only in 2022 as a *Desmopsis* species endemic to Mexico based on its morphological characterisation, its phylogenetic relationships, and its specific climatic affinity. It is characterized by leaves with percurrent tertiary venation, absence of leafy bracts on the pedicels, fused sepals and long and cylindrical fruits with many seeds with thick, woody testa. Phylogenetically, this species forms a group along with *Desmopsis dubia* which have affinity to Mexican highly humid, limestone karst forest, and were probably separated by climatic oscillations during the Pleistocene. Currently, these species are allopatric with *D. dubia* being restricted to central Chiapas and *D. ibarrarum* being widely distributed in Veracruz, Oaxaca and Tabasco (Ortiz-Rodríguez 2022).

36. *Desmopsis lanceolata* Lundell, *Lloydia* 2 (2): 85-87, t. 3. (1939). Holotype: Mexico, *Matuda* 2299 (MICH). Illustr.: Lundell, *Lloydia* 2 (2): 85-87, t. 3. (1939). Sec. Schatz (2025)

Desmopsis guatemalensis Standl. & Steyerl., *D. izabalensis* Standl. & Steyerl.

Common names: none known

Distribution: Chiapas (*Alvarado* L. C. 597).

Notes: A species known only from Mexico and Guatemala, inhabiting evergreen and semi-evergreen tropical forest, in a wide altitudinal range (75-2,000 m). This small tree (2.5-6 m) is distinguished by small and narrow leaves (4-10 × 1-3.5 cm), small (4-11 × 4-10 mm) and often spherical monocarps with 1-2 seeds. The stems are reported to be used as fuel in Chiapas (Farrera Sarmiento 2011).

37. *Desmopsis mexicana* R.E.Fr., *Acad. Handl.*, ser. 3, 24(10): 14-15, t. VIc-d (1948). Holotype: Mexico, *Hinton* 15836 (US). Illustr.: not found. Sec. Schatz *et al.* (2018)

Common names: none known

Distribution: Jalisco (*Ramírez-D. R. & Reynoso Dueñas* J. J. 5384Bis), Michoacán (*Hinton et al.* 15823: B).

Notes: A small tree or shrub characterized by leaves with an obtuse to rounded base and an obtuse, rounded apex (Schatz *et al.* 2018). The pedicels bear small, scale-like bracts; sepals are minute (1-1.5 mm long) and reflexed. Monocarps are 1-2-seeded, borne on short stipes (3-5 mm long). The species inhabits tropical humid forests and is restricted to a limited region of Michoacán, Mexico (Schatz *et al.* 2018).

38. *Desmopsis migueliana* (Ortiz-Rodr. & G.E.Schatz) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 267 (2023). *Stenanona migueliana* Ortiz-Rodr. & G.E.Schatz, *Bot. Sci.* 92(1): 38-41, f. 1-2 (2014). Holotype: Mexico, *Ortiz-Rodríguez* 0354 (HEM). Illustr.: Ortiz-Rodríguez *et al.* *Bot. Sci.* 92(1): 38-41, f. 1-2 (2014) as *S. migueliana*. Sec. Schatz (2025)

Common names: none known

Distribution: Chiapas (*Ortiz-Rodríguez* A. E. 354, HEM).

Notes: Similar to *Desmopsis stenopetala*, this small tree is characterized by its longer sepals and flower pedicels, biseriate ovules, and monocarps with a strongly tuberculate surface, resembling *D. tuberculata*. It occurs in lower rain forests in karstic regions of Chiapas, Mexico (Ortiz-Rodríguez *et al.* 2014).

39. *Desmopsis monticola* (Maas & G.E.Schatz) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 267 (2023). *Stenanona monticola* Maas & G.E.Schatz, *Blumea* 55(3): 217, f. 2-3, Map 2 (2010). Holotype: Mexico, *Breedlove* 58440 (CAS). Illustr.: Schatz & Maas, *Blumea* 55(3): 217, f. 2-3, Map 2 (2010) as *S. monticola*. Sec. Schatz (2025)

Common names: none known

Distribution: Chiapas (*Cedillo* R. T. 1998).

Notes: Similar to *Desmopsis humilis* and *D. wendtii*, this small tree or shrub can be distinguished by its long petals (23-44 mm) and occurrence at higher elevations (Schatz *et al.* 2010). It inhabits montane rain forests and is restricted to two fragmented localities in the Chiapas region, Mexico (Schatz *et al.* 2010).

40. *Desmopsis morenoi* (Ortiz-Rodr. & Mor.-Méndez) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 267 (2023). *Stenanona morenoi* Ortiz-Rodr. & Mor.-Méndez, *Acta Bot. Mex.* 127 (e1625): 2-7, f. 1A-E. 2A-G. Holotype: Mexico, *Moreno-Méndez* 87 (HEM). Illustr.: Moreno-Méndez & Ortiz-Rodríguez, *Acta Bot. Mex.* 127 (e1625): 2-7, f. 1A-E. 2A-G, as *S. morenoi*. Sec. Schatz (2025)

Common names: none known

Distribution: Chiapas (*Moreno-Méndez* G. 177).

Notes: This medium-sized tree is distinguished by 2-4-flowered inflorescences, partially fused sepals, and cream to light yellow flowers with a red blotch at the base of the petals (Moreno-Méndez & Ortiz-Rodríguez 2020). Each carpel contains numerous ovules, and the surface of the monocarps is completely covered with short, golden-brown, erect hairs, giving them a velvety texture. It occurs on karst highlands and is restricted to the northern region of Chiapas, Mexico (Moreno-Méndez & Ortiz-Rodríguez 2020).

41. *Desmopsis stenopetala* (Donn.Sm.) R.E.Fr., *Acta Horti Berg.* 10(1): 26-27 (1931 [1930]). *Porcelia stenopetala* Donn.Sm., *Bot. Gaz.* 40(1): 1 (1905). Sintype: Guatemala, *von Tüerckheim* II 868 (= *Donell Smith* 8496) (US). Illustr.: not found. Sec. Schatz (2025)

Sapranthus stenopetalus (Donn.Sm.) Saff. ex Standl., *Stenanona stenopetala* (Donn. Sm.) G. E. Schatz.

Common names: Cacao cimarrón, opicax

Distribution: Chiapas (*Ortiz-Rodríguez* A. E. 803), Tabasco (*Schatz* G. E. *et al.* 1179).

Notes: This species is characterized by dark, glossy green leaves with a dense golden-brown indument along the secondary veins and beneath the primary vein, and a ciliate leaf margin, similar to *Desmopsis carrillensis* and *D. hondurensis* (Schatz *et al.* 2010). The flowers are pinkish and relatively shortly pedicellate, born on the main trunk. It occurs in tropical moist forests across southern Mexico, Guatemala, and Belize (Schatz *et al.* 2010).

42. *Desmopsis subnuda* (R.E.Fr.) G.E. Shatz & Maas, *Blumea* 63(1): 81, f. 3e, map 6 (2018). *Desmopsis galeottiana* (Baill.) Saff. var. *subnuda* R.E.Fr., *Acta Horti Berg.*, 10(1): 22. (1931[1930]). Holotype (designated by Schatz *et al.* 2018): Mexico, *Liebmann* 4 (C-[bc] C-10005573). Illustr.: not found. Sec. Schatz *et al.* (2018)

Common names: none known

Distribution: Jalisco (*Cuevas* G. R. *et al.* 6396: ZEA), Oaxaca (*R. Cedillo* T. *et al.* 1650), Veracruz (*Ibarra* M. G. & *Sinaca* C. S. 3460).

Notes: This small to medium-sized tree or shrub is characterized by glabrous leaves, the presence of usually two leafy bracts, sepals 3-6 mm long, and 2-8 monocarps (Schatz *et al.* 2018). The monocarp wall is 0.3-0.5 mm thick,

with stipes 3-7 mm long. The flowers emit a fragrance reminiscent of *Annona*. It inhabits tropical to deciduous forests across its wide but fragmented distribution in Mexico (Schatz *et al.* 2018a).

43. *Desmopsis terriflora* G.E.Schatz, T.Wendt, Ortiz-Rodr. & Mart.-Vel., *PhytoKeys* 227: 188-194, f. 1-3, 4A, 5-6 (2023). Holotype: Mexico, *María Fernanda Martínez-Velarde* 72 (MEXU). Illustr.: Martínez-Velarde *et al.*, *PhytoKeys* 227: 188-194, f. 1-3, 4A, 5-6 (2023). Sec. Schatz *et al.* (2023)

Common names: *none known*

Distribution: Veracruz (*Ortiz-Rodríguez A. E.* 783).

Notes: Endemic to the Uxpanapa-Chimalapas region, this is an extraordinary tree (7-10 m tall). It features an extreme case of cauliflory where flowers grow attached to specialized, leafless branches called flagella which extend over the forest floor, sometimes semi-buried in the leaf litter, and can reach up to 15 m long. The flowers are also striking with fused sepals and red, thick, rigid petals and during anthesis release a strong banana-like scent. This species presents characteristics similar to *Sapranthus* (e.g. “food bodies” at the base of inner petals), but its inaperturate with rugulate-verrucate ornamented pollen grains contributed to place it in the *Desmopsis* genus (Martínez-Velarde *et al.* 2023).

44. *Desmopsis trunciflora* (Schltdl. & Cham.) G.E.Schatz, *Candollea* 49(2): 419 (1994). *Xylopia trunciflora* Schltdl. & Cham., *Linnaea* 6: 417 (1831). Sintype: Mexico, *Schiede & Deppe* 1287 (B). Illustr.: not found. Sec. Schatz *et al.* (2018)

Annona bibracteata Hook., *Desmopsis galeottiana* (Baill.) Saff., *Guatteria bibracteata* (Hook.) Hemsl., *Trygynaea galeottiana* Baill., *Unonopsis galeottiana* (Baill.) R.E.Fr., *U. trunciflora* (Schltdl. & Cham.) R.E.Fr., *Xylopicrum trunciflorum* (Schltdl. & Cham.) Kuntze.

Common names: Anonacia

Distribution: Oaxaca (*Torres E. B.* 1110), Veracruz (*Calzada J. I.* 7651).

Notes: This tree or shrub is characterized by a dense indument of erect, silvery, long-persisting hairs on young leaves and most parts of the plant (Schatz *et al.* 2018a). It produces a low number of monocarps borne on short stipes (2-3 mm long). It inhabits tropical humid to semideciduous forests across Oaxaca and Veracruz, Mexico (Schatz *et al.* 2018a). This species was reported by Jiménez-Ramírez & González-Martínez 2016 in Guerrero; however, the record likely represents a misidentification with *Desmopsis subnuda*.

45. *Desmopsis uxpanapensis* G.E.Schatz, *Blumea* 63(1): 83, f. 4b (2018). Holotype: Mexico, *Schatz & Wendt* 977 (MEXU). Illustr.: Schatz *et al.*, *Blumea* 63(1): 83, f. 4b (2018). Sec. Schatz *et al.* (2018)

Common names: Anonacia

Distribution: Veracruz (*Vázquez M. T. et al.* 2618).

Notes: This small tree is characterized by young twigs and petioles densely covered with long-persisting, brownish, erect hairs; long pedicels (15-40 mm) bearing a leafy basal bract; narrowly triangular sepals (6-12 mm long);

and monocarps containing 1-3 seeds in a single row, and flowers are fragrant and fruity (Schatz *et al.* 2018a). It is restricted to tropical rain forests in the Uxpanapa region, Mexico (Schatz *et al.* 2018a).

46. *Desmopsis wendtii* G.E.Schatz, *Blumea* 63(1): 83-84, Fig. 4c (2018). Holotype: Mexico, *Wendt et al.* 4053 (MEXU). Illustr.: Schatz *et al.*, *Blumea* 63(1): 83-84, Fig. 4c (2018). Sec. Schatz *et al.* (2018)

Common names: *none known*

Distribution: Veracruz (*Wendt T. L.* 4053).

Notes: This medium-sized tree is characterized by a single basal ovule, imbricate petals, and axillary inflorescences, with flowers emitting a fragrance reminiscent of ripe bananas. The biseriate condition of the ovules is common among Central American species of *Desmopsis* (Schatz *et al.* 2018a). It is restricted to tropical rain forests in the Uxpanapa region, Mexico (Schatz *et al.* 2018a).

47. *Desmopsis zoque* (Ortiz-Rodr. & Gómez-Domínguez) G.E.Schatz & Ortiz-Rodr., *Novon* 31: 267-268 (2023). *Stenanona zoque* Ortiz-Rodr. & Gómez-Domínguez, *Phytotaxa* 383(3): 294-298, f. 1-3 (2018). Holotype: Mexico, *Gómez-Domínguez 3615* (HEM). Illustr.: Ortiz-Rodríguez *et al.* *Phytotaxa* 383(3): 294-298, f. 1-3 (2018) as *S. zoque*. Sec. Schatz (2025)

Common names: *none known*

Distribution: Chiapas (*Gómez Domínguez H.3734*).

Notes: This small to medium-sized tree is characterized by large pedicels, yellow petals with evident venation and slightly involute margins, small triangular sepals, and biseriate ovules (Ortiz-Rodríguez *et al.* 2018). It occurs in tropical dry forests at a single locality within the El Ocote Biosphere Reserve in northwestern Chiapas, Mexico (Ortiz-Rodríguez *et al.* 2018). This species exemplifies the effects of isolation in karst refugia, which can promote morphological and genetic differentiation among disjunct species or populations (Wendt 1989, Xie *et al.* 2017)

48. *Desmopsis* sp. nov. 1

Common names: *none known*

Distribution: Oaxaca (*Munn-Estrada X. & Kasey T. 1100*).

Notes: This species, found in the montane cloud forests of Mexico, belongs to a group of *Desmopsis* species characterized by percurrent tertiary leaf venation, abaxial surfaces that dry reddish, and shortly pedicellate flowers with partially connate sepals and morphologically distinct inner and outer petals. The carpels contain multiple ovules. It is distinguished from similar species by its flowers bearing long, aristate petals of a vivid orange color.

49. *Desmopsis* sp. nov. 2

Common names: *none known*

Distribution: Oaxaca (*MacDougall 18-14*).

Notes: *Desmopsis* sp. nov. 2, distributed in the Isthmus of Tehuantepec region of Oaxaca, is distinguished from other species of *Desmopsis* by its small, elliptic, subglabrescent leaves; elongate pedicels bearing minute, non-foliaceous basal bracts; flowers with equal, linear petals and partially connate sepals; and a conspicuously high number of carpels per flower. It is one of the few species in the genus exhibiting marked affinities to montane ecosystems.

50. *Desmopsis* sp. nov. 3

Common names: none known

Distribution: Tabasco (*Magaña A. M. A. & Curiel R. 200*).

Notes: *Desmopsis* sp. nov. 3, a species endemic to Tabasco, is morphologically distinct from its Mexican congeners based on a unique set of characters: glabrous leaves; flowers opposite the leaves, with pedicels bearing minute basal bracts; markedly reduced sepals; elongate, aristate yellow-green petals; and fruits containing one or two seeds. This taxon was historically misidentified as *Desmopsis schippii*, a name that has long appeared in the Mexican floristic record. However, this attribution is erroneous and does not reflect the true identity of the species.

51. *Guatteria amplifolia* Triana & Planch., *Ann. Sci. Nat., Bot.sér.* 4, 17: 35-36 (1862). Lectotype (designated by Schatz, 2025): Panama, *Fendler 3* (K-[bc] K000487319). Illustr.: not found. Sec. Schatz (2025)

Guatteria diospyroides Baill., *G. diospyroides* subsp. *diospyroides*, *G. diospyroides* subsp. *hondurensis* R.E.Fr., *G. inuncta* R.E.Fr., *G. inuncta* var. *caudata* R.E.Fr., *G. inuncta* var. *inuncta*, *G. inuncta* var. *minor* R.E.Fr., *G. jurgensenii* Hemsl., *G. platypetala* R.E.Fr.

Common names: malagueto; anonillo, aguacatillo, equepetz

Distribution: Chiapas (*Martínez E. S., Ramos C. H., Lombera R. 25429*), Guerrero (*Alvaro-Flores M. I. MAF 470*), Oaxaca (*Vera Caletti P, González M. L., Hernández H. G., & Pacheco D. L. 225*), Puebla (*Gómez Chagala B. 908*), Tabasco (*Guadarrama M. A., O. Ortiz G. et al. 6259*), Veracruz (*Calzada J. I. 11638*).

Notes: Tree or shrub with broad leaves and a glossy crown, bearing white, yellow, or greenish flowers with relatively short pedicels compared to other species (Maas *et al.* 2015). Its fruits are syncarpous, ellipsoid to subglobose, and turn black when ripe (Maas *et al.* 2015). It is considered the most problematic and complex species of *Guatteria*, encompassing several Central American taxa previously treated under this name (Maas *et al.* 2015). This species inhabits tropical rainforests and gallery forests, occurring in lowland and lower montane areas. It exhibits great morphological and phenological variation across its wide distribution range from Mexico to Colombia (Maas *et al.* 2015).

52. *Guatteria galeottiana* Baill., *Adansonia* 8: 268 (1868). Sintype: Mexico, *Liebmann 16* (C-[bc] C10005616). Illustr.: not found. Sec. Maas *et al.* (2015)

Common names: Ya-dua-guixi, Zapote de monte

Distribution: Oaxaca (*Velasco Gutiérrez K. 5768*), Veracruz (*Cedillo R. T. & Calzada J. I. 148*).

Notes: Medium to large-sized tree characterized by oblong-elliptic leaves with a shiny upper surface and prominent, perpendicular secondary veins (Maas *et al.* 2015). The flowers are greenish to cream-colored, displaying a dark spot when mature (as observed in the field), and borne on long pedicels. The fruits are dark purple when ripe, consisting of ellipsoid, apiculate monocarps with rough seeds (Maas *et al.* 2015). This species inhabits tropical evergreen forests along the Isthmus of Tehuantepec in the Oaxaca-Veracruz region (Maas *et al.* 2015).

53. *Guatteria grandiflora* Donn.Sm., *Bot. Gaz.* 14: 25 (1889). Lectotype (designated by Schatz, 2025): Guatemala, *von Türckheim 1235* (K-[bc] K000487206). Illustr.: not found. Sec. Schatz (2025)

Guatteria anomala R.E.Fr.

Common names: palo de zope, ek bache

Distribution: Campeche (*Chavelas P. J. et al. 10616: ICF*), Chiapas (*Davidse G. et al. 20484*), Oaxaca (*Wendt T. et al. 3241: WIS*), Quintana Roo, Tabasco (*Leija González L. & Hernández L. P. CH353*), Veracruz (*Wendt T. et al. 3330: WIS*), Yucatán (*Méndez M. 1109*).

Notes: A medium-to-large tree with elliptical to oblong-lanceolate leaves, this species exhibits distinctive morphology within the genus *Guatteria* (Maas *et al.* 2015). Its large, terminal flowers (either solitary or arranged in paniculate inflorescences with long petals) have led to its recognition as the sister group to the other members of the genus (Maas *et al.* 2015). The species is restricted to northern Mesoamerica, encompassing a wide altitudinal range from coastal lowlands to high mountain areas. Populations in Mexico have sometimes been treated as a separate species from *G. anomala*; they can be distinguished by the arrangement of the flowers and the presence or absence of verruculae (long, compressed hairs along the primary vein on the leaf underside) although these traits overlap across populations (Maas *et al.* 2015). Given its broad distribution throughout the Yucatán Peninsula, it is likely present in Quintana Roo. This species is reported to be used in construction (Farrera Sarmiento 2011).

54. *Mosannonia depressa* (Baill.) Chatrou, *Changing Gen.* 159, pl. 4b (1998). *Annona depressa* Baill., *Adansonia* 8: 267 (1867-1868[1868]). Syntype: Mexico, *Liebmann 20* (C). Illustr.: not found. Sec. Schatz (2025)

Duguetia leiophylla Donn.Sm., *Guatteria depressa* (Baill.) Saff. ex Standl., *Guatteria gaumeri* Greenm., *Guatteria leiophylla* (Donn.Sm.) Saff. ex Standl., *Malmea depressa* (Baill.) R.E.Fr., *M. gaumeri* (Greenm.) Lundell, *M. leiophylla* (Donn.Sm.) Lundell.

Common names: lancewood, wild soursop, elemuy, yumel

Distribution: Campeche (*Chavelas J. P. et al. ES-156*), Chiapas (*Meave J. et al. B-358*), Guerrero (*Alvarado Flores M. I. MAF470*), Jalisco (*Castillo G. et al. 9945*), Michoacán (*Guerrero B. C. et al. 489*), Oaxaca (*Lebrija Trejos E. E. 15*), Puebla (*Ibarra M. G. 5331*), Quintana Roo (*Cabrera E. 6531*), Tabasco (*Matuda 18216*), Veracruz (*Ibarra M. G. 1983*), Yucatán (*Ucan E. 2405*).

Notes: A tree or shrub with elliptic to oblong, sparsely pubescent, leathery leaves, this species bears clusters of dark purple, ellipsoid to globose monocarps, resembling those of *Guatteria*, with which it was formerly associated. It is currently recognized as a separate genus and synonymized with *Malmea* (Chatrou 1998). The species is distinguished

by the insertion of the pedicels on the branches, the absence of a suprabasal joint, a depressed receptacle, short, stiff petals, and thick, opaque, oval leaves (Chatrou 1998). Across its wide distribution, from Jalisco to Yucatán and Honduras, it exhibits considerable morphological variation in leaf traits (Pirie *et al.* 2018). *Mossanona depressa* remains poorly known and may encompass undescribed species.

55. *Oxandra lanceolata* (Sw.) Baill., *Adansonia* 8: 168 (1867-1868 [1868]). *Uvaria lanceolata* Sw. Prodr. 87 (1788). Sintype: Jamaica, Swartz *s.n.* (S). Illustr.: not found. Sec. Schatz (2025)

Bocagea virgata Benth. & Hook. f., *Cananga lancea* Poit. ex Dunal, *C. virgata* DC. ex Baill., *Drymis lancea* Poit. ex Baill., *Guatteria virgata* Dunal, *Oxandra lanceolata* (Sw.) Baill. subsp. *macrocarpa* R.E.Fr., *O. laurifolia* sensu Bello & Espinosa (1881) non A. Rich., *O. punctata* C.Wright ex Griseb., *O. virgata* A.Rich. (1841), *O. virgata* A.Rich. (1845), *Uvaria virgata* Sw.

Common names: chilcahuite, yaya

Distribution: Colima (*Rzedowski 15474: ENCB*), Guerrero (*Gual M. 421*), Jalisco (*Lott E. J. 2895*), Michoacán (*Lott E. J. 1911*), Quintana Roo (*Olmsted I. & Uitzil H. 63*), Yucatán (*Angulo D. & Duno de Stefano R. 112*).

Notes: A species widely distributed across northern Mesoamerica and the Caribbean, it adapts to diverse environmental conditions in both humid and dry forests. Caribbean populations, however, have been reported to exhibit distinctive morphological traits (Junikka *et al.* 2016). It is possible that these differences represent undescribed species, although specific studies are needed to confirm this hypothesis. The species is utilized for various purposes, including wood for tool construction, medicinal applications such as pain and stomach ailment treatments, and its edible fruits (Pino *et al.* 2005, Junikka *et al.* 2016).

56. *Oxandra maya* Miranda, *Bol. Soc. Bot. México* 26: 120, f. 1 (1961). Holotype: Mexico, Miranda 8471/2 (MEXU-[bc] MEXU 00096048). Illustr.: Miranda, *Bol. Soc. Bot. México* 26: 120, f. 1 (1961). Sec. Schatz (2025)

Amyris belizensis Lundell, *Oxandra belizensis* (Lundell) Lundell, *O. guatemalensis* Lundell, *O. proctorii* Lundell.

Common names: Nahuatle, nahuacté

Distribution: Chiapas (*Valle Doménech A. AVD-190*), Tabasco (*Chavelas Polito J. et al. 20301: ENCB*).

Notes: A medium-sized tree with a slender trunk and small leaves bearing short petioles, coriaceous and shiny on the upper surface. The primary vein is slightly raised above, whereas the lower surface is distinctly verrucose. Flower buds are globose, and the petals are glabrous. The inflorescences consist of one to four flowers with long pedicels and fragrant blooms (Junikka *et al.* 2016). This species is restricted to a small region in northern Mesoamerica, occurring in Chiapas, Guatemala, and Belize, where it inhabits calcareous soils within humid forests (Junikka *et al.* 2016).

57. *Oxandra venezuelana* R.E.Fr., *Mem. New York Bot. Gard.* 10 (2): 22 (1960). Holotype: Venezuela, *Bernardi 1923* (NY). Illustr.: not found. Sec. Schatz (2025)

Common names: Yayo, Anonillo

Distribution: Chiapas (*Matuda 18483*).

Notes: This species is known in Mexico only from one Matuda's collection deposited at MEXU. The species is a small to large tree (4-35(-50) m tall) with long, ovate leaves bearing a shiny upper surface, a slightly impressed primary vein, and distinct tertiary venation. The lower leaf surface is glaucous (*Junikka et al.* 2016).

58. *Sapranthus campechianus* (Kunth) Standl., *Contr. U.S. Natl. Herb.* 23(2): 279 (1922). *Asimina campechiana* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.* 5: 61 (1821). Lectotype (designated by Schatz *et al.* 2018): Mexico, *Humboldt & Bonpland s. n.* (P). Illustr.: not found. Sec. Schatz (2025)

Asimina insularis Hemsl.

Common names: Chak-ma'ak

Distribution: Campeche (*Martínez E. 38214*), Chiapas (*Palacios E. E. 680*), Quintana Roo (*Martínez E. 38055*), Tabasco, Yucatán (*Faust B. & Ucan P. 806*).

Notes: A medium-sized tree or shrub with small, almost sessile flowers bearing thin, membranous red petals and sepals (Schatz *et al.* 2018). The species has few carpels and ovules, small leaves with few secondary veins, and smooth, thin-walled carpels. It is found from Southern Mexico to Honduras in lowland forests of Atlantic drainage (Schatz *et al.* 2018). In Mexico, since it is widely found in the states of the Yucatán Peninsula as well as in Northern Chiapas, it is expected to be distributed in Tabasco as well. The species is occasionally used for timber and firewood (Schatz *et al.* 2018).

59. *Sapranthus chiapensis* Standl. ex G.E.Schatz, *Blumea* 63(1): 57-58, f. 1a (2018). Holotype: Mexico, *Matuda 16420* (MEXU). Illustr.: Schatz *et al.*, *Blumea* 63(1): 57-58, f. 1a (2018). Sec. Schatz (2025)

Common names: none known

Distribution: Chiapas (*Vazques M. V 1477*).

Notes: A shrub with several secondary veins on the leaves, bearing large red flowers produced on short perennial shoots (rhipidia) from older wood. It has short pedicels, multiple carpels and ovules, and monocarps with surface ornamentation in the form of lacerate excrescences (Schatz *et al.* 2018). This species was first collected in 1946 but was only recently described by Schatz *et al.* in 2018. It is restricted to a small area in Chiapas and is rarely collected.

60. *Sapranthus foetidus* (Rose) Saff., *Contr. U.S. Natl. Herb.* 23(2): 278 (1922). *Asimina foetida* Rose, *Contr. U.S. Natl. Herb.* 5(3): 134 (1897-1901[1897]). Lectotype (designated by Fries (1931 [1930]): Mexico, *Palmer 394* (US-[bc] US-00323909). Illustr.: not found. Sec. Ortiz-Rodriguez & Martínez-Velarde (2021)

Common names: palanco

Distribution: Guerrero (*E. Palmer 189*).

Notes: A small tree with inflorescences often borne on leafless sections of branches, producing single red flowers

with large petals and long pedicels. The monocarps have plate-like excrescences and are similar in form to those of *Sapranthus chiapensis* and *Stenanona costaricensis* R.E.Fr. (Schatz *et al.* 2010, Schatz *et al.* 2018). This species is restricted to a region of the Guerrero dry forest (Schatz *et al.* 2018).

61. *Sapranthus microcarpus* (Donn.Sm.) R.E.Fr., *Kongl. Svenska Vetensk. Acad. Handl.*, n.s. 34(5): 12 (1901 [1900]). *Porcelia macrocarpa* Donn.Sm., *Bot. Gaz.* 20: 1 (1895). Sintype: Guatemala, *Donell Smith 1484* (B). Illustr.: not found. Sec. Schatz (2025)

Asimina purpusii Brandegee, *Sapranthus ligularis* Saff. ex R.E.Fr.

Common names: Madre de cacao

Distribution: Chiapas (*Reyes García A. 4681*), Colima (*Ibarra-Martínez G. 5659*), Guerrero (*Gallardo C. 576*), Jalisco (*Lott E. J. 3418*), Oaxaca (*Torres C. R. 8323*), Sinaloa (*Trejo I. 2662*), Veracruz (*Guerrero B. C. 2400*)

Notes: A small to medium-sized shrub or tree with small monocarps and red or yellow flowers. It is characterized by single-row ovules, discoid seeds, and few secondary veins on the leaves (Ortiz-Rodríguez & Linares 2023), features that make it one of the most easily recognizable species of *Sapranthus*. This species is widely distributed from Sinaloa in Mexico, to Honduras, exhibiting considerable morphological variation across both humid and dry environments. It is therefore likely a species complex, although specific studies are needed to confirm this. The species is also used medicinally for the treatment of colic (Schatz *et al.* 2018).

62. *Sapranthus violaceus* (Dunal) Saff., *Science* 33(847): 471 (1911). *Unona violacea* Dunal, *Monogr. Anonac.* 105, t. 25 (1817). Lectotype (designated by Maas *et al.* 1994): Mexico, *Sessé & Mociño*, illustr. Hunt Inst. 6331.1791. Illustr.: Dunal, *Monogr. Anonac.* t. 25 (1817), as *U. violacea*. Sec. Ortiz-Rodríguez & Martínez-Velarde (2021)

Asimina nicaraguensis (Seem.) Hemsl., *Porcelia nicaraguensis* (Seem.) Benth. ex Ram. Goyena, *Sapranthus borealis* R.E.Fr., *S. longepedunculatus* R.E.Fr., *S. megistanthus* Standl. & Steyererm., *S. nicaraguensis* Seem., *Uvaria nicaraguensis* (Seem.) Baill.

Common names: murciélagos

Distribution: Chiapas, Colima, Guerrero (*Hinton G. B. 9182*), Jalisco (*Pérez A. J. 1751*), Michoacán (*Rangel-Landa S. 794*), Nayarit (*Tenorio P. L. 15569*), Oaxaca (*Elorsa M. C. 4043*), Sinaloa (*Rose J. N. 1842*).

Notes: A small to medium-sized tree with large, deep purple-brown flowers, broad petals, numerous smooth, stipitate monocarps, and several secondary veins on the leaves (Schatz *et al.* 2018). This species exhibits extensive morphological variation throughout its wide distribution in the dry tropical forests of northern Mesoamerica, ranging from the state of Sinaloa in Mexico to Nicaragua (Schatz *et al.* 2018). It is probably a species complex; however, population-level studies are needed to confirm this hypothesis. No herbarium specimens have been recorded from Colima, although the species likely occurs there, supported by a photographic record by @alana_atl on iNaturalist. Similarly, no specimens have been documented from Chiapas, but its occurrence is considered probable due to the region's extensive dry tropical forests, as noted by Schatz *et al.* (2018).

63. *Sapranthus* sp. nov.

Common names: rosadillo

Distribution: Veracruz (*Wendt T. & Hernandez H. G. 5661: CHAPA*).

Notes: A unique species of *Sapranthus* occurring in the evergreen tropical forests of the Uxpanapa region in Veracruz. It is the largest species in the genus, reaching up to 20 m in height. It is characterized by its large red flowers with short pedicels, leaves with a pointed base resembling the leaf apex, and a high number of carpels and secondary veins. The uncovering of this new species resembles the case of *S. chiapensis* that was collected more than 30 years ago but has been formally described only recently (*Schatz et al. 2018*).

64. *Tridimeris cauliflora* G.E.Schatz, *Pl. Syst. Evol.* 310 (Article 47): 26-27, f. 12 (2024). Holotype: Mexico, *Boyle 3879* (MO). Illustr.: *Ortiz-Rodriguez et al., Pl. Syst. Evol.* 310 (Article 47): 26-27, f. 12 (2024). Sec. *Ortiz-Rodriguez et al.* (2024)

Common names: none known

Distribution: Oaxaca (*Boyle B. et al. 3879*).

Notes: This small tree is characterized by leaves bearing glabrous or nearly glabrous domatia, cauliflorous inflorescences, and elongated monocarps with numerous seeds (*Ortiz-Rodríguez et al. 2024*). The monocarp wall is slightly constricted between the seeds. It inhabits montane cloud forests and is restricted to a limited region of Oaxaca, Mexico (*Ortiz-Rodríguez et al. 2024*).

65. *Tridimeris chiapensis* M.A.Escobar & Ortiz-Rodr., *PhytoKeys* 74: 86-89, f. 1-3 (2016). Holotype: Mexico, *Marcos Alberto Escobar Castellanos 0689* (HEM). Illustr.: *Ortiz-Rodriguez et al., PhytoKeys* 74: 86-89, f. 1-3 (2016). Sec. *Ortiz-Rodriguez et al.* (2024)

Common names: none known

Distribution: Chiapas (*Escobar-Castellanos M. A. 689*).

Notes: This small tree is characterized by broadly elliptic leaves and flowers bearing more than two carpels (*Ortiz-Rodriguez et al. 2024*). It is closely related to *Tridimeris tuxtensis* and *T. uxpanapensis*, but these species are allopatric (*Ortiz-Rodríguez et al. 2024*). It represents the southernmost distribution of the genus, inhabiting montane moist forests and restricted to a limited region of Chiapas, Mexico (*Ortiz-Rodríguez et al. 2024*).

66. *Tridimeris crotalocarpa* Ortiz-Rodr., *Pl. Syst. Evol.* 310(Article 47): 16-17, f. 7 (2024). Holotype: Mexico, *Álvaro Campos Villanueva & Jerónimo Reyes 1491* (MEXU). Illustr.: *Ortiz-Rodriguez et al., Pl. Syst. Evol.* 310(Article 47): 16-17, f. 7 (2024). Sec. *Ortiz-Rodriguez et al.* (2024)

Common names: none known

Distribution: Oaxaca (*Campos Villanueva A. 1839*).

Notes: This species is characterized by small, narrowly elliptic to deltate leaves, less than 10 cm long, lacking leaf domatia (Ortiz-Rodríguez *et al.* 2024). The fruits are narrowly shaped, with walls strongly constricted between the seeds when dry, resembling the rattle of a *Crotalus* snake. It occurs in montane cloud and pine-oak forests within a restricted area of Oaxaca, Mexico (Ortiz-Rodríguez *et al.* 2024).

67. *Tridimeris globosa* Ortiz-Rodr., *Pl. Syst. Evol.* 310 (Article 47): 17-19, f. 8 (2024). Holotype: Mexico, *J. I. Calzada & J. Múgica* 16988 (MEXU). Illustr.: Ortiz-Rodríguez *et al.*, *Pl. Syst. Evol.* 310(Article 47): 17-19, f. 8 (2024). Sec. Ortiz-Rodríguez *et al.* (2024)

Common names: *none known*

Distribution: Oaxaca (*Calzada J. I.* 16988).

Notes: This species has small leaves, less than 10 cm long, with setaceous pocket domatia along the secondary veins (Ortiz-Rodríguez *et al.* 2024). The flowers are borne on short, glabrous pedicels and have orbicular petals (Ortiz-Rodríguez *et al.* 2024). The globose fruits are smooth-walled. Although similar to its sister species *Tridimeris hahniana*, it is allopatric and restricted to montane cloud forests in a limited region of Oaxaca, Mexico (Ortiz-Rodríguez *et al.* 2024).

68. *Tridimeris hahniana* Baill., *Adansonia* 9: 219-220 (1868-1870 [1869]). Holotype: Mexico, *L. Hahn s.n* (P-[bc] P00734865). Illustr.: Ortiz-Rodríguez *et al.*, *Pl. Syst. Evol.* 310(Article 47): 17-19, f. 9 (2024). Sec. Ortiz-Rodríguez *et al.* (2024)

Tridimeris baillonii G.E.Schatz.

Common names: *none known*

Distribution: Veracruz (*Riba R. & Gómez Pompa A.* 280).

Notes: This species is characterized by small leaves, less than 10 cm long, bearing setose pocket domatia (Ortiz-Rodríguez *et al.* 2024). The flowers are globose with orbicular petals and borne on long pedicels (Ortiz-Rodríguez *et al.* 2024). Previously, some parts of a specimen were identified as part of *Tridimeris nebulosa*, but examination of additional material has clarified the taxonomy, and all specimens are now correctly assigned (Ortiz-Rodríguez *et al.* 2024). It inhabits montane cloud forests and is restricted to a single locality in Veracruz, Mexico (Ortiz-Rodríguez *et al.* 2024).

69. *Tridimeris huatuscoana* Marinero-Sobal & Ortiz-Rodr., *Phytotaxa* 548(2): 147, f. 1-3; table 1 (2022). Holotype: Mexico, *E. J. Marinero-Sobal* 425 (MEXU). Illustr.: Ortiz-Rodríguez & Marinero-Sobal, *Phytotaxa* 548(2): 147, f. 1-3; table 1 (2022). Sec. Ortiz-Rodríguez *et al.* (2024)

Common names: *none known*

Distribution: Veracruz (*Marinero Sobal E. J.* 426).

Notes: This medium-sized tree is distinguished by its setose leaf domatia and short, two-flowered inflorescences

(Ortiz-Rodriguez *et al.* 2024). The flowers are nearly sessile, bearing long aristae and white, deltate petals (Ortiz-Rodriguez *et al.* 2024). It inhabits montane cloud forests and is currently known only from the region of Veracruz, Mexico (Ortiz-Rodriguez *et al.* 2024).

70. *Tridimeris nebulosa* Ortiz-Rodr. & Hurt.-Rev., *Pl. Syst. Evol.* 310(Article 47): 22-24, f. 10 (2024). *Uvaria hahniana* Baill., *Adansonia* 8: 347. 1867-1868 [1868] non *Tridimeris hahniana* Baill. (1869). Holotype: Mexico, *L. Hahn* 239 (P). Illustr.: Ortiz-Rodriguez *et al.*, *Pl. Syst. Evol.* 310(Article 47): 22-24, f. 10 (2024). Sec. Ortiz-Rodriguez *et al.* (2024)

Common names: *none known*

Distribution: Hidalgo, Puebla (*Sarukhan J. et al.* 4495), Querétaro (*Zamudio S. et al.* 14778), San Luis Potosí (*Rzedowski 11033: F*), Veracruz (*Schatz G. E. et al.* 1198).

Notes: Medium to large-sized tree, with small leaves bearing glabrous domatia. Flowers nearly sessile; petals deltate, with the base concave to geniculate and cusped around the stamens and monocarps velvety, few-seeded (Ortiz-Rodriguez *et al.* 2024). Occurs in montane cloud forests across Puebla, Querétaro, San Luis Potosí, and Veracruz. Based on its known distribution, the species is expected to occur continuously into Hidalgo (Ortiz-Rodriguez *et al.* 2024).

71. *Tridimeris tuxtlenensis* G.E.Schatz, *Pl. Syst. Evol.* 319 (Article 47): 27-29, f. 13 (2024). Holotype: Mexico, *G. Ibarra* 235 (MEXU). Illustr.: Ortiz-Rodriguez *et al.*, *Pl. Syst. Evol.* 319 (Article 47): 27-29, f. 13 (2024). Sec. Ortiz-Rodriguez *et al.* (2024)

Common names: *none known*

Distribution: Veracruz (*Velasco Sinaca E.* 658).

Notes: A medium to large-sized tree with elliptic to obovate leaves, lacking pubescence and with glabrous domatia (Ortiz-Rodriguez *et al.* 2024). The flowers bear one to two carpels and petals that are obtuse or rounded at the apex (Ortiz-Rodriguez *et al.* 2024). The pollen grains are globose, with a strong rugulate to fossulate ornamentation. This species inhabits tropical rainforests and is endemic to the Los Tuxtlas region of Veracruz, Mexico (Ortiz-Rodriguez *et al.* 2024).

72. *Tridimeris uxpanapensis* G.E.Schatz, *Pl. Syst. Evol.* 310(Article 47): 29-30, f. 14 (2024). Holotype: Mexico, *Schatz & T. Wendt* 990 (MO). Illustr.: Ortiz-Rodriguez *et al.*, *Pl. Syst. Evol.* 310(Article 47): 29-30, f. 14 (2024). Sec. Ortiz-Rodriguez *et al.* (2024)

Common names: *none known*

Distribution: Veracruz (*Lagos Báez K.* 16), Oaxaca (*Schatz G. E. & Wendt T.* 990).

Notes: A small tree characterized by glabrous, narrowly elliptic leaves and glabrous flowers with a single carpel (Ortiz-Rodriguez *et al.* 2024). The monocarps are small, smooth, and glabrous (Ortiz-Rodriguez *et al.* 2024). This species inhabits tropical dry forests and is endemic to a restricted area of the Uxpanapa region, in Oaxaca and Veracruz, Mexico (Ortiz-Rodriguez *et al.* 2024).

73. *Tridimeris villosa* Ortiz-Rodr., *Pl. Syst. Evol.* 310 (Article 47): 24-26, f. 11 (2024). Holotype: Mexico, *Guillermo Ibarra Manríquez et al.* 3779 (MEXU). Illustr.: Ortiz-Rodríguez *et al.*, *Pl. Syst. Evol.* 310 (Article 47): 24-26, f. 11 (2024). Sec. Ortiz-Rodríguez *et al.* (2024)

Common names: *none known*

Distribution: Oaxaca (*Ibarra M. G. et al.* 3660).

Notes: A small to medium-sized tree, this species is the only one within the genus that possesses pubescent leaves (Ortiz-Rodríguez *et al.* 2024). The twigs and leaves are densely covered with yellowish to bronze hairs, and it shares the presence of velvety fruits only with *Tridimeris nebulosa*. It inhabits tropical rainforests within a restricted region of Oaxaca (Ortiz-Rodríguez *et al.* 2024).

74. *Unonopsis mexicana* Maas & Westra, *Blumea* 52(3): 500-502, f. 25, map 14 (2007). Holotype: Mexico, *Wendt et al.* 5684 (U). Illustr.: Maas *et al.*, *Blumea* 52(3): 500-502, f. 25, map 14 (2007). Sec. Maas *et al.* (2007)

Common names: *none known*

Distribution: Oaxaca (*Wendt T. et al.* 5684: CHAPA).

Notes: A medium-sized tree with large, slightly asymmetrical monocarps featuring a thick surface and several seeds, each about 15 mm long (Maas *et al.* 2007). It bears small leaves and few flowers per inflorescence (Maas *et al.* 2007). This is the only representative species of *Unonopsis* in Mexico, occurring in a restricted region of Oaxaca within humid forests (Maas *et al.* 2007).

75. *Xylopia frutescens* Aubl., *Hist. Pl. Guiane* 1: 602, t. 242 (1775). Sintype: Guayana Francesa, *Aublet s. n.* (BM). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49 192: t.158 (1962[1963])

Xylopia frutescens Aubl. var. *glabra* S.Watson, *X. muricata* Vell., *X. setosa* Poir., *Xylopicum frutescens* (Aubl.) Kuntze.

Common names: pimientillo, malagueta

Distribution: Campeche (*Martínez E. S.* 30458), Chiapas (*Jiménez-Fernández J. A.* 528), Oaxaca (*Tenorio P. L.* 5280), Quintana Roo (*Cabrera E.* 2598), Tabasco (*Fernández R. N.* 1420), Veracruz (*Calzada J. I.* 12314).

Notes: A large tree characterized by dense, golden-rusty sericeous pubescence on the underside of the leaves, long petals, smooth cylindrical monocarps, and an anise-like fragrance (Stull *et al.* 2017, Pires *et al.* 2019). It is the only species of *Xylopia* recorded in Mexico, with a wide distribution extending from Oaxaca to Brazil. This species is sometimes misidentified with other members of the genus *Xylopia*, and it is possible that it represents a species complex (Pires *et al.* 2019).

Appendix 2. Full references for Mexican Annonaceae species (current valid names), as well as taxonomic treatments relevant for their identification and historic development.

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