Botanical Sciences 101 (2): 632-653. 2023
DOI: 10.17129/botsci.3223

Received: August 3, 2022, Accepted: November 23, 2022
On line first: February 17, 2023

Taxonomy and Floristics / Taxonomía y Florística

The Kew's "World Checklist of Vascular Plants" and its relevance to the knowledge of the flora of Mexico

El "World Checklist of Vascular Plants" de Kew y su relevancia para el conocimiento de la flora de México

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Abstract

Background: The 8th version of the "World Checklist of Vascular Plants" (WCVP) was recently published under the coordination of the Royal Botanic Gardens, Kew. It consists of a list of taxonomic names of species, genera, and families of vascular plants representing the most comprehensive and integrated list available today.
Questions: How many accepted species does the WCVP include? Is the quality of the included information acceptable? How has the publication of worldwide species names evolved over time? Does the checklist include the species recorded for Mexico?
Studied species: Worldwide species of vascular plants included in the WCVP.
Study site: Worldwide and Mexico.
Methods: A database was created based on the WCVP to answer the research questions. The number of genera and species by taxonomic status (accepted and synonyms) was quantified, some information quality tests were carried out, and the potential number of undiscovered species in the world was estimated using non-parametric techniques.
Results: The WCVP contains 1,233,172 names, of which 418,737 are accepted. It is estimated that around 25 % more unknown species remain to be discovered in the world. The quality of the information contained in the WCVP is quite reliable and complete; only 3 % of Mexican species are not included in the WCVP.
Conclusions: The WCVP synthesizes current taxonomic knowledge in an integrated manner and is useful for systematic and automated analyses. At the country level, at least for Mexico, it stands as an important reference source when attempting to understand and evaluate floristic knowledge.
Keywords: Biodiversity informatics, biological databases, data quality control, floristics

Resumen

Antecedentes: La versión 8 del "World Checklist of Vascular Plants" (WCVP) fue recientemente publicada bajo la coordinación de los Jardines Botánicos Reales de Kew. Es una lista de nombres científicos de especies, géneros y familias de plantas vasculares constituyendo la más amplia e integrada actualmente disponible.
Preguntas: ¿Cuántas especies aceptadas incluye? ¿Cuál es su calidad? ¿Cómo ha evolucionado la publicación de los nombres de especies del mundo en el tiempo? ¿El WCVP incluye todas las especies reportadas para México?
Especies estudiadas: Especies de plantas vasculares del mundo incluidas en el WCVP**.**
Lugar de estudio: Mundial y México**.**
Métodos: Con base en el WCVP se conformó una base de datos para contestar las preguntas planteadas. Se cuantificó el número de géneros y especies aceptadas y sinónimos, se realizaron algunas pruebas de calidad de la información y se estimó el número potencial de especies que faltan por descubrir en el mundo.
Resultados: El WCVP contiene 1,233,172 nombres, de los cuales 418,737 son aceptados. Se estima que queda alrededor de un 25 % adicional de especies por descubrir en el mundo. La calidad de la información contenida en el WCVP es bastante confiable y completa; solamente no incluye 3 % de las especies mexicanas conocidas.
Conclusiones: El WCVP sintetiza el conocimiento taxonómico actual de manera integrada y es útil para análisis sistemáticos y automatizados. A nivel de país, al menos para México, se destaca como una referencia de consulta importante cuando se pretende evaluar la riqueza florística.
Palabras clave: Bases de datos biológicas, control de calidad de datos, florística, informática de la biodiversidad

Having an up-to-date inventory of floristic diversity has been the ambition of many taxonomists, and there are currently global, national, and regional projects that set out to achieve this goal (see, for example, BFG 2015, 2022, Borsch *et al.* 2020 and references therein). In March 2022, the 8th version of the "World Checklist of Vascular Plants" (WCVP) was published online, coordinated by the Royal Botanic Gardens, Kew in England (wcvp.science.kew.org). The WCVP consists of a list of taxonomic names of species, genera, and families of vascular plants (WCVP 2022). Table 1 includes two examples of the information content for the more than one million documented records. The database includes the taxonomic status -that is, if the name is accepted or is a synonym, and, in the latter case, the accepted name that corresponds to it- according to the specialists who participated in the creation of the list. Because this checklist represents an important body of taxonomic information, this paper carried out a brief analysis of its content. The analysis aimed to answer the following questions: how many accepted species does the WCVP include?; what is the quality of the information presented?; how has the publication of species names evolved over time?; is it possible to estimate the number of vascular plant species in nature from this checklist?; and does the checklist include all the species reported in the most current checklist for Mexico (Villaseñor 2016)?

Methods

The WCVP (2022) was downloaded from the website where it is published (wcvp.science.kew.org) and imported into a relational database (Codd 1990). Several quick integrity tests were performed, such as establishing the primary key in the "kew_id" field, verifying that the content of each field belonged to its domain (*e.g.*, that the "taxonomic_status" field contained only one of the values "Accepted", "Synonym", "Unplaced"). Then, some normalization steps were made, such as the separation of the year into a single field separated from the publication's information.

After importing the source file with the validations and transformations described above, queries were made to determine totals, such as the number of names for each taxonomic category and the number of species with each taxonomic status. After obtaining the totals, which also served as quality control for subsequent queries, further analyses were designed and executed to quickly evaluate the quality of the information, such as identifying the existence of repeated records or pairs of inconsistent records (for example, homonyms or pairs of names that had different authors but were both recorded as "Accepted").

Once carrying out the quick evaluation process of the quality of the information, queries were designed and applied to synthesize the information, such as the count of names for each publication year and the number of species published per decade. Finally, to estimate the completeness of the information, the names on the WCVP list were compared against the list of names of species of vascular plants in Mexico (Villaseñor 2016, Villaseñor & Meave 2022) to determine how many names from the latter were missing from the former.

Estimating the number of species of vascular plants worldwide. The inclusion of the synonyms for each accepted species in the WCVP makes it possible to estimate the number of species yet to be discovered or published using the $Chao_2$ estimator (Colwell & Coddington 1994). $Chao_2$ is a very simple non-parametric richness estimation index that proposes that

$$S_{est} \equiv S_{obs} + Q_1^2/(2Q_2)$$

where S_{est} is the estimated number of species, S_{obs} is the number of currently known species, Q_1 is the number of species occurring in a single sample (singletons), and Q_2 is the number of species occurring in exactly two samples (doubletons). In this case, singletons (Q_1) are represented by the accepted species with a single synonym, while doubletons (Q_2) are accepted species with two synonyms. The estimate of the number of potential species calculated by this index could theoretically help to determine the extent of taxonomic work that remains to be done. The application of the $Chao_2$ estimator using the number of synonyms supports its heuristics because nonparametric rich-

Table 1. Fields included in the "World Checklist of Vascular Plants" (WCVP). Two examples of records are shown for each field.

Field	Example 1	Example 2
kew_id	822543-1	822540-1
family	Malvaceae	Malvaceae
genus	*Chiranthodendron*	*Cheirostemon*
species	*pentadactylon*	*platanoides*
infraspecies		
taxon_name	*Chiranthodendron pentadactylon*	*Cheirostemon platanoides*
authors	Larreat.	Bonpl.
rank	SPECIES	SPECIES
taxonomic_status	Accepted	Synonym
accepted_kew_id		822543-1
accepted_name		*Chiranthodendron pentadactylon*
accepted_author		Larreat.
publication	Descr. Pl.: 17 (1805)	F.W.H.A.von Humboldt & A.J.A.Bonpland, Pl. Aequinoct. 1: 82 (1808)

ness estimates (like $Chao_2$) use only part of the available information on the distribution of species, for example, singletons and doubletons. In this case, the number of synonyms for each accepted species is also partial information and is not directly related to the number of accepted species. We consider the species estimate based on synonyms a heuristic method that allows exploring the assessment of the number of species.

Relative species richness. To compare the Mexican species richness by family against the worldwide richness, a relative species richness index was defined and calculated as follows:

Absolute species richness (ASR) = Number of species of the family in Mexico (according to Villaseñor 2016 and Villaseñor & Meave 2022).

Relative species richness (RSR) = Number of species of the family in Mexico (ASR) / Number of species of the family worldwide.

Each family was assigned a category in a four-quadrant matrix depending on its RSR and absolute species richness (ASR) values in Mexico: I) High RSR and High ASR, II) High RSR and Low ASR, III) Low RSR and Low ASR, or IV) Low RSR and High ASR. The RSR and ASR values were categorized as high or low depending on whether they were above or below the average of each index, calculated as follows. The average RSR was calculated as the total number of species of all families in Mexico divided by the total number of species worldwide; the average ASR was calculated as the total number of species in Mexico divided by the total number of families in Mexico.

Finally, to order the list of Mexican families in a single dimension that combines their ASR and RSR, an index of relative importance (RI) was defined as the product of the relative species richness and the absolute richness:

$$RI = ASR \times RSR$$

where RI is the index of relative importance, ASR is the absolute species richness, and RSR is the relative species richness.

Results

Plant diversity in a global context. The WCVP contains a total of 999,713 species names and fills an important gap in the knowledge of our planet's biodiversity, placing the knowledge and richness of the different regions of the world

into context. This list reports 350,980 accepted species worldwide (Table 2); meanwhile, approximately 25,000 species have been reported for Mexico, so it can be estimated that 7 % of worldwide vascular plant diversity at the species level and 19.5 % of diversity at the genus level are found in Mexico. The Earth's land surface is approximately 130,000,000 km^2, while Mexico covers about 2,000,000 km^2. Thus, about 7 % of the world's total known vascular plant species are found in Mexico, which accounts for only about 1.5 % of the total land area, placing the floristic richness of the country more diverse than expected.

Table 2. Number of names by taxonomic categories included in the WCVP.

Taxonomic category	Taxonomic status				
	Total	**Accepted**	**Synonyms**	**Artificial hybrid**	**Unresolved names**
Genus	41,302	13,925	24,621	2,499	257
Species	999,713	350,980	608,200	1,388	39,145
Subspecific taxa	192,157	53,832	137,512	1	812
Total	**1,233,172**	**418,737**	**770,333**	**3,888**	**40,214**

A historical accounting of taxonomic work around the world. The WCVP allows an analysis of the evolution of taxonomic work worldwide over time. Figure 1A shows an intense period of taxonomic work between 1820 and 1850, exceeding 2,000 genus names published per decade. Similarly, at the species level (Figure 1B), the decades from 1890 to 1930 had the highest numbers of new species reported per decade, with more than 50,000 new species published per decade. These numbers reflect the immense taxonomic work carried out around the world.

The publication of new species over time (Figure 2) also evidences the influence of modern systematics synthesis, which includes more evolutionary approaches in the taxonomy of vascular plants compared to earlier works. In the 1930s, taxonomists intensified the work of reclassifying previously described species. At the beginning of the 1970s, the number of basionyms increased, probably due to new systematics and molecular tools available to taxonomists.

Almost half of the accepted species in the last four decades correspond to systematic re-arrangements rather than species that are completely new to science. As shown in Figure 2, the 2010 decade contains the highest number of accepted names (39,744), but 17,057 of those species were accepted based on previously published names, mainly constituting new combinations. In summary, the taxonomic activity aimed at the discovery of new species in the last decade was slightly higher than that of the decades from 1900 to 1930, but most of them constituted taxonomic adjustments derived from systematic studies.

Taxonomic information is continuously evolving. Because the WCVP is in a digital medium, the list of taxa can be analyzed automatically. For example, in this exercise, we surveyed duplicate records by searching for homonyms with the same author and same publication, but different id. The search only retrieved 58 pairs of duplicated records (116 records), which should be reviewed and updated or removed. This quick quality test shows that the inconsistencies in the list are minimal and exemplifies one of many possible tests that users of the information can design. As the information provided is improved and used, it will benefit other research areas that depend on better floristic taxonomic knowledge.

An additional quality test was the verification of publication years. We detected only seven records with 5-digit values (for example, 19713 instead of 1913); these errors are easy to correct based on the name of the journal, the volume, and the publication number. Another quick validation detected six pairs of records with the same species name but different authors, both recorded as accepted; for example, *Helichrysum oligocephalum* DC. and *Helichrysum oligocephalum* S.Moore.

There was no completeness test on the list of synonyms; more than half a million synonyms are reported for about 177,000 species. The species with the most synonyms is the potato, *Solanum tuberosum*, with 441 names, published from 1758 to 2006. The years 1930 and 1980 had the largest number of synonyms added, with 126 and 100 names respectively, mainly for infraspecific categories.

One interesting situation is the case of varieties for which there is no published species name. For example, *Wigandia kunthii* var. *eukunthii* Brand, *Wigandia kunthii* var. *intermedia* Brand, *Wigandia kunthii* var. *macrophylla* (Schltdl. & Cham.) Choisy, and *Wigandia kunthii* var. *viscosa* Brand, are all reported in the WCVP as synonyms of *Wigandia urens* (Ruiz & Pav.) Kunth, but there is no record of the species *Wigandia kunthii*. In total there are 2,820 subspecific category names that fall under this scenario.

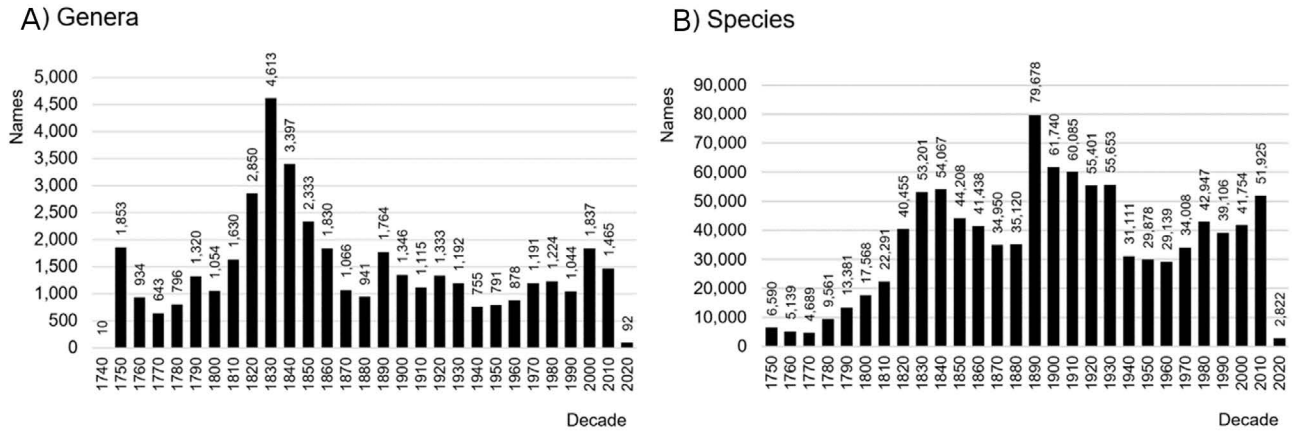

Figure 1. Number of new genus (A) and species (B) names published per decade reported in the WCVP. Both accepted names and synonyms are included.

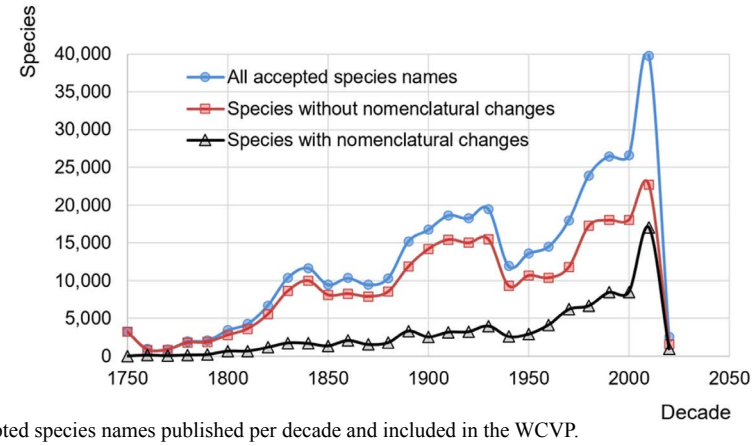

Figure 2. The number of accepted species names published per decade and included in the WCVP.

Among the 350,980 accepted species names, 41 % are marked as "Reviewed" and the remaining 59 % as "In review". This illustrates the immense amount of work that is still required to obtain an even more precise list. Similarly, the number of homonyms (species with the same name but different authors) is 73,050, distributed among a total of 35,600 different accepted species names (on average two homonyms per species name). The name with the largest number of homonyms is *Scorzonera graminifolia*, for which nine homonyms are reported (Table 3). Another curious finding with respect to homonyms is that of the 223 pairs of homonymous species that belong to different families, only 32 of these pairs had one or both names reported as "Accepted". In the remaining pairs, both names

had the status of "Synonym". Finally, since the list is constantly growing and being updated, it still contains a few spelling errors; for example, the species *Solanum rudepannum* is written with an intermediate hyphen, as *Solanum rude-pannum*.

The WCVP includes two families for which no accepted species are reported, and all their names have been considered as synonyms: Adiantaceae (two synonymous species of the family Pteridaceae) and Gigaspermaceae (with the genus *Pomatotheca* given the status of "Synonym" and labeled as "in review").

The publication of names is mostly a solitary activity. The analysis documents that 86 % of the taxonomic names in the WCVP have been published by a single author, 12.6 % by two authors, and only 1.2 % involved three or more authors (Table 4). These data point out that taxonomic work is a predominantly individual activity, a situation that seems to be due to a lack of training for new taxonomists. As this exercise reveals, taxonomic knowledge is mainly learned through personal activity and to a lesser extent through participation in working groups.

Table 3. Homonyms and autonyms of *Scorzonera graminifolia* recorded in the WCVP.

Homonym	Author	Accepted name	Author
Scorzonera graminifolia	Sm.	*Pseudopodospermum elatum*	(Boiss.) Zaika, Sukhor. & N.Kilian
Scorzonera graminifolia	Port. ex Vis.	*Gelasia villosa* subsp. *villosa*	
Scorzonera graminifolia	Schur	*Takhtajaniantha austriaca*	(Willd.) Zaika, Sukhor. & N.Kilian
Scorzonera graminifolia	Aucher ex DC.	*Tragopogon buphthalmoides*	(DC.) Boiss.
Scorzonera graminifolia	Bory & Chaub.	*Pseudopodospermum crocifolium*	(Sm.) Zaika, Sukhor. & N.Kilian
Scorzonera graminifolia	Hoffm.	*Pseudopodospermum hispanicum* subsp. *hispanicum*	
Scorzonera graminifolia	Tausch ex Nyman	*Scorzonera parviflora*	Jacq.
Scorzonera graminifolia	Griseb.	*Pseudopodospermum molle* subsp. *molle*	
Scorzonera graminifolia	All.	*Scorzonera aristata*	Ramond ex DC.

The WCVP in the context of the flora of Mexico. Among the 25,105 accepted names of species recorded in Mexican territory, the WCVP recognizes 21,632 as accepted, 2,671 as synonyms, and 67 as "Unplaced"; 735 are not included in the WCVP. These missing names have probably not been included in the WCVP because they were recently published and have not yet been accessed in the database by the specialists in charge of reviewing the groups to which they belong (107 families). In just the past three years (2019-2021), about 300 new species have been described for Mexico, several of which have not yet been recorded in the WCVP. Without a doubt, these 735 names will be incorporated into the WCVP once they are carefully reviewed.

The consistency (86.2 %) among accepted names (21,632 out of 25,105) shows that unifying criteria in systematics is still a difficult task, which requires time and long academic discussions through publications. However, it is also encouraging to recognize that two different academic groups with different study areas and geographic scales have compiled lists of species names that share such a high percentage. As stated above, the comparison of the two lists shows that Mexican vascular plant diversity represents 7 % of the entire planet's flora at the species level and 19.5 % of total genera.

Appendix I includes the number of species recognized and estimated for each family. The number of estimated species results in 436,013 species. As a result, we postulate 80 % of completeness of the floristic knowledge of the world flora, remaining to be discovered about 20 % additional species to those already included in the WCVP. Thus,

it is predicted that some 85,033 species of vascular plants remain to be described and published. If the current rate of species description worldwide is about 3,000 species per year, then it will still take about 28 years of taxonomic activity to inventory all the vascular world's flora. This assumes that we will be able to overcome the impediments due to a lack of trained taxonomists engaged in the circumscription and description of species, as well as the current disregard for alpha taxonomy.

Table 4. Number of authors per species name included in the WCVP.

Number of authors	Number of taxa	Percentage (%)
1	1,045,849	86.23
2	152,418	12.57
3	12,228	1.01
4	1,826	0.15
5	388	0.03
≥ 6	149	0.01
No author included	20,314	1.67
Total	**1,212,858**	**100.00**

Relative species richness. The average RSR value for the Mexican families was 7.2 % (25,105 / 350,980), while the average value of ASR, that is, the average number of species per family, was 87.2. The number of families per quadrant in the RSR *vs.* ASR matrix (Figure 3) was: quadrant I: 37, II: 110, III: 115, and IV: 25. The 'Relative Importance' index (Appendix I), had a range of 0.003 (Lecythidaceae)-304.1 (Asteraceae), and ranges by quadrant were I: 7.3-304.1; II: 0.08-16.6; III: 0.003-4.15; IV: 2.11-52.05.

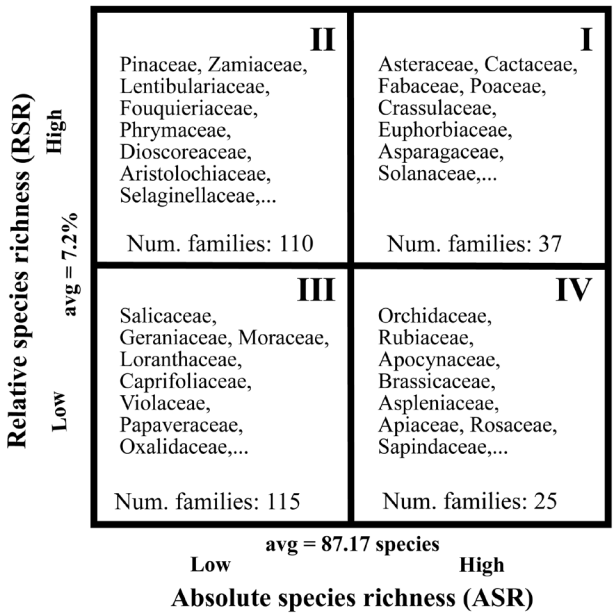

Figure 3. RSR × ASR matrix containing the families of vascular plants of Mexico. The eight families with the highest 'Relative importance' (RI) index in each quadrant are listed.

Of the ten families with the highest species richness in Mexico (high ASR), eight also had high RSR (i.e., placed in quadrant I): Asteraceae (IR = 304.1), Cactaceae (283.1), Fabaceae (189.4), Poaceae (132.9), Crassulaceae (95.1), Euphorbiaceae (81.7), and Asparagaceae (71.7). The two families with high ASR but low RSR (quadrant IV) were Orchidaceae (52.0) and Rubiaceae (38.1).

The ten families placed in quadrant II (low ASR; high RSR) and with high RI index values are Pinaceae (16.6), Zamiaceae (14.4), Lentibulariaceae (13.5), Fouquieriaceae (11.0), Phrymaceae (10.2), Dioscoreaceae (9.1), Aristolochiaceae (8.7), Selaginellaceae (8.7), Loasaceae (8.2), and Bignoniaceae (7.7). On the other hand, the ten families placed in quadrant III (low ASR; low RSR) with high RI index are Salicaceae (4.1), Geraniaceae (4.0), Moraceae (3.6), Loranthaceae (3.2), Caprifoliaceae (3.0), Violaceae (2.8), Papaveraceae (2.4), Oxalidaceae (2.4), Annonaceae (2.0), and Capparaceae (2.0).

Discussion

Plant diversity in a global context. The relevance of the WCVP lies mainly in the synthesis of a query platform for all the species known to date worldwide. It efficiently complements other consultation platforms that people interested in this type of information visit regularly, such as Plants of the World Online (powo.science.kew.org) or Tropicos (www.tropicos.org/home). In addition, there are lists of species published, but none with a worldwide context, being limited to regions of the world. Examples on the national scale are the flora of Brazil (BFG 2015, 2022) or Mexico (Villaseñor 2016) or at the continental scale, Europe (Tutin *et al.* 1964-1980, https://eunis.eea.europa.eu/references/1780/species) or America (Ulloa-Ulloa *et al.* 2017, http://legacy.tropicos.org/Project/VPA). The figure of 436,013 species estimated with the WCVP is quite close to the 400,000 estimated by the World Flora Online project (Borsch *et al*. 2020) and to the 450,000 predicted by Pimm & Joppa (2015).

The WCVP: an epistemological archive. In addition to constituting a worldwide list of taxonomic names of vascular plants, which facilitates further taxonomic work, the WCVP implicitly contains part of the history of the discovery of this plant diversity. It can be considered an epistemological archive of biodiversity, in that it contains the record of the various scientific approaches to taxa by different authors over time. It also contains the thread of its discussion and construction, since the relationships between synonymous and accepted names reflect such scientific work. It can be said that there has been an "epistemic compromise" (sensu Granjou & Arpin 2015) within the community of taxonomists whose different points of view are integrated into their practices and research networks and whose work has been reflected in the WCVP. For example, the decade of 1890 is the one recording the largest number of published names, while the decade of 2010 records the maximum number of accepted species. As shown in this text, many other statements can be deduced by analyzing the WCVP.

The checklist accounts for taxonomic work over 28 decades. From Linnaeus to the present day, more than 1.2 million taxonomic names of vascular plants have been published, of which almost a million correspond to species names, and of these, 35 % are considered accepted. Thus, taxonomic work has not traveled a direct and easy path towards biodiversity knowledge; the activities of describing and publishing have led to a solid and consensual knowledge, where the proposed species go through long and sinuous scrutiny, as indicated by 61 % of synonyms and other data available in the WCVP. It is precisely this epistemological archive that has been used here to estimate the number of species yet to be discovered for each family and described in Appendix I. The estimates are calculated based on the number of synonyms, that is, on the history of the construction of that knowledge. As a result of the long road that taxonomists have traveled with dedication and scrutiny, we may be approaching Linnaeus's dream -an inventory of species from all over the world- at least for vascular plants.

The continuous evolution of taxonomic information. It is not surprising that taxonomic information evolves and increases daily. However, it is important to recognize that this evolution is the result of two main impulses; the first is better taxonomic and evolutionary knowledge of the groups, and the second is more precise and accessible ways of

reporting that knowledge. The first impulse allows an even more systematic and orderly way of compiling this great list of taxa; the second improves every day with better information and communication technologies.

The high quality of WCVP information. The quick quality tests applied here to the WCVP indicate that it contains high-quality information with minimal inconsistencies. The inclusion of a unique identifier for each name, whether accepted or synonymous (the kew_id field), facilitates communication between taxonomists and working groups, as well as the annotation of errata. The proportion of species names of the flora of Mexico not included in the checklist (735/25,105 = 2.9 %) serve as a quick estimate of its completeness (about 97 %).

The WCVP in the context of the flora of Mexico. The most updated list of vascular plant species for Mexico dates back more than five years (Villaseñor 2016). The WCVP allows comparisons from different points of view that will help to improve both worldwide and Mexican lists. Although one can be considered a subset of the other, as reviewed in this study, this is not the case, since both contain some differences in the inclusion criteria and the definition of taxonomic status (e.g., accepted *vs.* synonym). In this non-exhaustive analysis, we calculated that Mexican vascular plant species richness represents about 7 % of the species richness of the entire planet. This percentage may be adjusted as both lists are refined, but above all, adjusted so that they are comparable. Another important parameter is the rate of description of new species for Mexico, which has recently been estimated at close to 100 per year (Alvarado-Cárdenas *et al.* 2021).

The WCVP allows the floristic richness of a country to be placed in a global context. It facilitates contextualization of the species richness of each family in Mexico concerning world richness. The relative species richness (RSR), calculated by dividing the number of species in the country by the number of species in the world, can be a tool for planning floristic work considering geographical contexts. The relative importance index (RI), defined, as the product of the relative species richness and the absolute species richness, is a tool to order the families of a country in a way that prioritizes them considering the global context. One potential application of the RI would be its use as a criterion to prioritize future exploration and study work, especially for the flora of Mexico.

There are at least five efforts to create a database of the world's plants (Qian *et al.* 2022); each one of them deserves an analysis of the content of their information like the one presented here.

As indicated on the WCVP website, its information constitutes a backbone, created from the unification of two major sources of information —the *International Plant Names Index* (IPNI) and the *World Checklist of Selected Plant Families* (WCSP). This backbone can be consulted and downloaded from the web page wcvp.science.kew.org, and constitutes, without a doubt, a milestone in the systematics of vascular plants and the knowledge of our planet's plant diversity. Its consultation and analysis of the information contained will make it easier to carry out a better inventory of the great floristic diversity of Mexico, which is far from being completed.

Acknowledgments

Socorro González and Rodrigo Duno de Stefano reviewed a preliminary version of the manuscript, and their suggestions substantially improved the final version. Lynna M. Kiere reviewed and edited the English version.

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Associate editor: Eduardo Ruiz Sánchez

Author contributions: MMR and JLV developed the original idea and wrote the first draft of the manuscript. EO and BSE helped with the data analyses and commented on the first draft. All authors edited and accepted the final manuscript.

Appendix 1. Vascular plant families accepted in the WCVP and their species richness worldwide compared to their richness in Mexico. *When it was not possible to apply the $Chao_2$ estimator index, the same number of "Accepted" species (WCVP) was included. # Families with rows without data are not distributed in Mexico. **See Figure 3.

Family	Species in the world		Species in Mexico#			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Acanthaceae	5,419	6,923	420	7.8	32.6	I
Achariaceae	173	198	4	2.3	0.1	III
Achatocarpaceae	10	10	5	50.0	2.5	II
Acoraceae	2	2	1	50.0	0.5	II
Actinidiaceae	447	495	21	4.7	1.0	III
Aextoxicaceae	1	1				
Aizoaceae	1,805	2,307	12	0.7	0.1	III
Akaniaceae	2	2				
Alismataceae	118	155	22	18.6	4.1	II
Alseuosmiaceae	10	11				
Alstroemeriaceae	256	282	3	1.2	0.0	III
Altingiaceae	15	40	1	6.7	0.1	III
Alzateaceae	1	1				
Amaranthaceae	2,371	2,980	240	10.1	24.3	I
Amaryllidaceae	2,387	2,852	130	5.4	7.1	IV
Amborellaceae	1	1				
Anacampserotaceae	61	90	2	3.3	0.1	III
Anacardiaceae	943	1,214	74	7.8	5.8	II
Ancistrocladaceae	20	20				
Anisophylleaceae	70	72				
Annonaceae	2,448	2,980	70	2.9	2.0	III
Aphanopetalaceae	2	2				
Aphloiaceae	1	1				
Apiaceae	3,865	4,570	237	6.1	14.5	IV
Apocynaceae	6,473	7,993	443	6.8	30.3	IV
Apodanthaceae	12	12	5	41.7	2.1	II
Aponogetonaceae	60	62				
Aquifoliaceae	572	646	24	4.2	1.0	III
Araceae	4,135	4,784	152	3.7	5.6	IV
Araliaceae	1,662	2,342	41	2.5	1.0	III
Araucariaceae	38	44				
Arecaceae	2,621	3,145	115	4.4	5.0	IV
Argophyllaceae	24	28				
Aristolochiaceae	719	1,000	79	11.0	8.7	II
Asparagaceae	3,307	4,306	487	14.7	71.7	I
Asphodelaceae	1,235	1,504	5	0.4	0.0	III

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Aspleniaceae	3,306	4,261	231	7.0	16.1	IV
Asteliaceae	37	78				
Asteraceae	32,883	40,085	3,162	9.6	304.1	I
Asteropeiaceae	8	8				
Atherospermataceae	20	24				
Austrobaileyaceae	1	1				
Balanopaceae	9	14				
Balanophoraceae	57	69	2	3.5	0.1	III
Balsaminaceae	1,071	1,154	3	0.3	0.0	III
Barbeuiaceae	1	1				
Barbeyaceae	1	1				
Basellaceae	19	21	4	21.1	0.8	II
Bataceae	2	2	1	50.0	0.5	II
Begoniaceae	1,942	2,360	114	5.9	6.7	IV
Berberidaceae	742	913	34	4.6	1.6	III
Berberidopsidaceae	3	3				
Betulaceae	205	233	6	2.9	0.2	III
Biebersteiniaceae	4	4				
Bignoniaceae	896	1,041	83	9.3	7.7	II
Bixaceae	25	43	6	24.0	1.4	II
Blandfordiaceae	4	5				
Bonnetiaceae	41	113				
Boraginaceae	3,435	4,501	400	11.6	46.6	I
Boryaceae	13	14				
Brassicaceae	4,179	4,893	262	6.3	16.4	IV
Bromeliaceae	3,564	4,694	455	12.8	58.1	I
Brunelliaceae	60	121	1	1.7	0.0	III
Bruniaceae	81	111				
Burmanniaceae	218	310	8	3.7	0.3	III
Burseraceae	764	881	103	13.5	13.9	I
Butomaceae	2	2				
Buxaceae	128	203	7	5.5	0.4	III
Byblidaceae	8	10				
Cabombaceae	7	7	2	28.6	0.6	II
Cactaceae	1,796	1,961	713	39.7	283.1	I
Calceolariaceae	273	383	6	2.2	0.1	III
Calophyllaceae	410	538	4	1.0	0.0	III
Calycanthaceae	11	13				
Calyceraceae	49	61				

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Campanulaceae	2,472	2,982	106	4.3	4.5	IV
Campynemataceae	4	4				
Canellaceae	21	23	1	4.8	0.0	III
Cannabaceae	107	119	13	12.1	1.6	II
Cannaceae	12	14	6	50.0	3.0	II
Capparaceae	427	487	29	6.8	2.0	III
Caprifoliaceae	1,093	1,394	57	5.2	3.0	III
Cardiopteridaceae	41	51				
Caricaceae	43	75	9	20.9	1.9	II
Carlemanniaceae	5	5				
Caryocaraceae	26	30				
Caryophyllaceae	3,293	3,985	143	4.3	6.2	IV
Casuarinaceae	91	152	1	1.1	0.0	III
Celastraceae	1,351	1,734	99	7.3	7.3	I
Centroplacaceae	9	11				
Cephalotaceae	1	1				
Ceratophyllaceae	6	6	2	33.3	0.7	II
Cercidiphyllaceae	2	2				
Chloranthaceae	73	106	1	1.4	0.0	III
Chrysobalanaceae	546	857	13	2.4	0.3	III
Circaeasteraceae	2	2				
Cistaceae	280	316	14	5.0	0.7	III
Cleomaceae	224	291	32	14.3	4.6	II
Clethraceae	95	116	27	28.4	7.7	II
Clusiaceae	919	1,251	20	2.2	0.4	III
Colchicaceae	286	402				
Columelliaceae	8	8				
Combretaceae	583	707	17	2.9	0.5	III
Commelinaceae	761	889	129	17.0	21.9	I
Connaraceae	243	293	9	3.7	0.3	III
Convolvulaceae	1,959	2,353	308	15.7	48.4	I
Coriariaceae	17	18	1	5.9	0.1	III
Cornaceae	113	122	4	3.5	0.1	III
Corsiaceae	27	27				
Corynocarpaceae	5	5				
Costaceae	137	156	10	7.3	0.7	II
Crassulaceae	1,717	2,093	404	23.5	95.1	I
Crossosomataceae	9	9	5	55.6	2.8	II

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Crypteroniaceae	12	13				
Ctenolophonaceae	2	2				
Cucurbitaceae	1,049	1,292	161	15.3	24.7	I
Cunoniaceae	334	385	4	1.2	0.0	III
Cupressaceae	172	200	33	19.2	6.3	II
Curtisiaceae	1	1				
Cyatheaceae	794	1,026	21	2.6	0.6	III
Cycadaceae	121	137	2	1.7	0.0	III
Cyclanthaceae	231	300	7	3.0	0.2	III
Cymodoceaceae	17	25	2	11.8	0.2	II
Cynomoriaceae	1	1				
Cyperaceae	5,869	7,185	428	7.3	31.2	I
Cyrillaceae	11	11	1	9.1	0.1	II
Cystodiaceae	2	2				
Cytinaceae	12	14	3	25.0	0.8	II
Daphniphyllaceae	29	32				
Dasypogonaceae	20	20				
Datiscaceae	2	2	1	50.0	0.5	II
Degeneriaceae	2	2				
Dennstaedtiaceae	258	307	24	9.3	2.2	II
Diapensiaceae	18	27				
Dichapetalaceae	206	306	3	1.5	0.0	III
Didiereaceae	20	28				
Dilleniaceae	541	667	8	1.5	0.1	III
Dioncophyllaceae	3	3				
Dioscoreaceae	654	801	77	11.8	9.1	II
Dipentodontaceae	20	20	2	10.0	0.2	II
Dipteridaceae	10	10				
Dipterocarpaceae	539	641				
Dirachmaceae	2	2				
Doryanthaceae	2	2				
Droseraceae	266	340	2	0.8	0.0	III
Drosophyllaceae	1	1				
Ebenaceae	754	917	29	3.8	1.1	III
Ecdeiocoleaceae	3	3				
Elaeagnaceae	106	117				
Elaeocarpaceae	794	971	12	1.5	0.2	III
Elatinaceae	59	82	4	6.8	0.3	III
Emblingiaceae	1	1				

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Ephedraceae	73	79	7	9.6	0.7	II
Equisetaceae	41	43	7	17.1	1.2	II
Ericaceae	4,550	5,715	98	2.2	2.1	IV
Eriocaulaceae	1,203	1,432	15	1.2	0.2	III
Erythroxylaceae	277	358	10	3.6	0.4	III
Escalloniaceae	133	151				
Eucommiaceae	1	1				
Euphorbiaceae	6,543	8,261	731	11.2	81.7	I
Euphroniaceae	3	3				
Eupomatiaceae	3	3				
Eupteleaceae	2	2				
Fabaceae	22,297	28,516	2,055	9.2	189.4	I
Fagaceae	1,155	1,338	177	15.3	27.1	I
Flagellariaceae	5	5				
Fouquieriaceae	11	13	11	100.0	11.0	II
Francoaceae	34	44				
Frankeniaceae	78	206	6	7.7	0.5	II
Garryaceae	27	35	9	33.3	3.0	II
Geissolomataceae	1	1				
Gelsemiaceae	14	15	1	7.1	0.1	III
Gentianaceae	1,853	2,385	89	4.8	4.3	IV
Geraniaceae	813	902	57	7.0	4.0	III
Gerrardinaceae	2	2				
Gesneriaceae	3,774	4,803	117	3.1	3.6	IV
Ginkgoaceae	1	1				
Gisekiaceae	7	7				
Gleicheniaceae	149	170	7	4.7	0.3	III
Gnetaceae	44	88				
Gomortegaceae	1	1				
Goodeniaceae	460	516	3	0.7	0.0	III
Goupiaceae	2	2				
Griseliniaceae	7	9				
Grossulariaceae	195	231	23	11.8	2.7	II
Grubbiaceae	3	3				
Guamatelaceae	1	1	1	100.0	1.0	II
Gunneraceae	64	74	3	4.7	0.1	III
Gyrostemonaceae	20	21				
Haemodoraceae	116	189	1	0.9	0.0	III

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Halophytaceae	1	1				
Haloragaceae	163	198	9	5.5	0.5	III
Hamamelidaceae	112	141	4	3.6	0.1	III
Hanguanaceae	19	20				
Heliconiaceae	202	237	19	9.4	1.8	II
Helwingiaceae	4	4				
Hernandiaceae	70	87	8	11.4	0.9	II
Himantandraceae	1	1				
Huaceae	4	4				
Humiriaceae	65	79				
Hydatellaceae	13	15				
Hydrangeaceae	206	243	36	17.5	6.3	II
Hydrocharitaceae	135	163	10	7.4	0.7	II
Hydroleaceae	14	22	2	14.3	0.3	II
Hydrostachyaceae	22	22				
Hymenophyllaceae	600	747	51	8.5	4.3	II
Hypericaceae	628	768	30	4.8	1.4	III
Hypoxidaceae	161	208	12	7.5	0.9	II
Icacinaceae	159	201	4	2.5	0.1	III
Iridaceae	2,563	3,268	120	4.7	5.6	IV
Irvingiaceae	12	13				
Isoetaceae	213	258	8	3.8	0.3	III
Iteaceae	24	33	3	12.5	0.4	II
Ixioliriaceae	4	5				
Ixonanthaceae	18	18				
Joinvilleaceae	4	5				
Juglandaceae	81	90	16	19.8	3.2	II
Juncaceae	514	588	41	8.0	3.3	II
Juncaginaceae	35	55	3	8.6	0.3	II
Kewaceae	8	8				
Kirkiaceae	6	7				
Koeberliniaceae	2	2	1	50.0	0.5	II
Krameriaceae	17	21	9	52.9	4.8	II
Lacistemataceae	16	18	1	6.3	0.1	III
Lamiaceae	7,977	10,061	672	8.4	56.6	I
Lanariaceae	1	1				
Lardizabalaceae	40	46				
Lauraceae	3,328	3,904	146	4.4	6.4	IV

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Lecythidaceae	381	435	1	0.3	0.0	III
Lentibulariaceae	417	449	75	18.0	13.5	II
Lepidobotryaceae	2	2				
Liliaceae	753	945	27	3.6	1.0	III
Limeaceae	25	25				
Limnanthaceae	8	8				
Linaceae	282	319	26	9.2	2.4	II
Linderniaceae	316	416	11	3.5	0.4	III
Lindsaeaceae	246	312	10	4.1	0.4	III
Loasaceae	330	445	52	15.8	8.2	II
Loganiaceae	496	618	28	5.6	1.6	III
Lonchitidaceae	2	2	1	50.0	0.5	II
Lophiocarpaceae	7	7				
Lophopyxidaceae	1	1				
Loranthaceae	1,065	1,177	58	5.4	3.2	III
Lowiaceae	26	26				
Lycopodiaceae	455	491	23	5.1	1.2	III
Lythraceae	689	899	116	16.8	19.5	I
Macarthuriaceae	9	9				
Magnoliaceae	348	632	39	11.2	4.4	II
Malpighiaceae	1,449	1,662	173	11.9	20.7	I
Malvaceae	5,467	6,559	568	10.4	59.0	I
Marantaceae	577	789	26	4.5	1.2	III
Marattiaceae	155	187	6	3.9	0.2	III
Marcgraviaceae	135	155	8	5.9	0.5	III
Marsileaceae	56	60	8	14.3	1.1	II
Martyniaceae	14	19	7	50.0	3.5	II
Matoniaceae	4	4				
Maundiaceae	1	1				
Mayacaceae	5	5	1	20.0	0.2	II
Mazaceae	40	42				
Melanthiaceae	196	249	36	18.4	6.6	II
Melastomataceae	5,802	8,130	209	3.6	7.5	IV
Meliaceae	746	860	28	3.8	1.1	III
Menispermaceae	544	644	21	3.9	0.8	III
Menyanthaceae	77	95	2	2.6	0.1	III
Metteniusaceae	64	72	7	10.9	0.8	II
Microteaceae	10	10				

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Misodendraceae	8	9				
Mitrastemonaceae	2	2	1	50.0	0.5	II
Molluginaceae	97	121	3	3.1	0.1	III
Monimiaceae	272	410	8	2.9	0.2	III
Montiaceae	282	331	25	8.9	2.2	II
Montiniaceae	5	5				
Moraceae	1,291	1,457	68	5.3	3.6	III
Moringaceae	13	26	1	7.7	0.1	II
Muntingiaceae	3	3	1	33.3	0.3	II
Musaceae	93	149	5	5.4	0.3	III
Myodocarpaceae	15	47				
Myricaceae	51	75	3	5.9	0.2	III
Myristicaceae	524	608	4	0.8	0.0	III
Myrothamnaceae	2	2				
Myrtaceae	6,232	8,691	142	2.3	3.2	IV
Nartheciaceae	37	52				
Nelumbonaceae	2	2	1	50.0	0.5	II
Nepenthaceae	184	259				
Neuradaceae	8	21				
Nitrariaceae	16	19	2	12.5	0.3	II
Nothofagaceae	42	60				
Nyctaginaceae	455	552	116	25.5	29.6	I
Nymphaeaceae	87	94	13	14.9	1.9	II
Nyssaceae	34	37	1	2.9	0.0	III
Ochnaceae	634	728	13	2.1	0.3	III
Olacaceae	180	203	7	3.9	0.3	III
Oleaceae	751	903	64	8.5	5.5	II
Onagraceae	787	883	176	22.4	39.4	I
Oncothecaceae	2	2				
Ophioglossaceae	120	133	16	13.3	2.1	II
Opiliaceae	33	44	4	12.1	0.5	II
Orchidaceae	30,502	38,145	1,260	4.1	52.0	IV
Orobanchaceae	2,257	2,797	181	8.0	14.5	I
Osmundaceae	28	32	2	7.1	0.1	III
Oxalidaceae	658	770	40	6.1	2.4	III
Paeoniaceae	41	45	1	2.4	0.0	III
Pandaceae	17	17				
Pandanaceae	959	1,166				

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Papaveraceae	1,026	1,400	50	4.9	2.4	III
Paracryphiaceae	36	44				
Passifloraceae	1,027	1,231	96	9.3	9.0	I
Paulowniaceae	11	11				
Pedaliaceae	78	96	1	1.3	0.0	III
Penaeaceae	39	55				
Pennantiaceae	3	3				
Pentadiplandraceae	1	1				
Pentaphragmataceae	31	32				
Pentaphylacaceae	523	587	19	3.6	0.7	III
Penthoraceae	2	2				
Peraceae	107	120	1	0.9	0.0	III
Peridiscaceae	11	11				
Petenaeaceae	1	1	1	100.0	1.0	II
Petermanniaceae	1	1				
Petiveriaceae	22	26	4	18.2	0.7	II
Petrosaviaceae	4	6				
Phellinaceae	10	23				
Philesiaceae	2	2				
Philydraceae	6	11				
Phrymaceae	225	269	48	21.3	10.2	II
Phyllanthaceae	2,071	2,524	53	2.6	1.4	III
Phyllonomaceae	5	6	1	20.0	0.2	II
Physenaceae	2	2				
Phytolaccaceae	35	71	10	28.6	2.9	II
Picramniaceae	53	56	13	24.5	3.2	II
Picrodendraceae	98	127	4	4.1	0.2	III
Pinaceae	255	273	65	25.5	16.6	II
Piperaceae	3,821	4,382	299	7.8	23.4	I
Pittosporaceae	297	366	1	0.3	0.0	III
Plantaginaceae	2,164	2,550	229	10.6	24.2	I
Platanaceae	10	10	5	50.0	2.5	II
Plocospermataceae	1	1	1	100.0	1.0	II
Plumbaginaceae	1,132	1,597	6	0.5	0.0	III
Poaceae	12,001	14,034	1,263	10.5	132.9	I
Podocarpaceae	198	230	3	1.5	0.0	III
Podostemaceae	355	427	9	2.5	0.2	III
Polemoniaceae	424	480	107	25.2	27.0	I

Family	Species in the world		Species in Mexico[#]			
	Accepted (WCVP)	Estimated species*	ASR: Absolute species richness	RSR: Relative species richness (%)	Relative Importance Index (RI = ASR × RSR)	RSR *vs.* ASR Quadrant **
Polygalaceae	1,326	1,649	105	7.9	8.3	I
Polygonaceae	1,561	1,887	179	11.5	20.5	I
Polypodiaceae	4,432	5,011	328	7.4	24.3	I
Pontederiaceae	46	60	15	32.6	4.9	II
Portulacaceae	153	203	16	10.5	1.7	II
Posidoniaceae	9	9				
Potamogetonaceae	188	228	12	6.4	0.8	III
Primulaceae	3,301	4,316	126	3.8	4.8	IV
Proteaceae	1,847	2,512	4	0.2	0.0	III
Psilotaceae	19	19	2	10.5	0.2	II
Pteridaceae	1,381	1,613	221	16.0	35.4	I
Putranjivaceae	217	333	3	1.4	0.0	III
Quillajaceae	2	2				
Rafflesiaceae	48	54				
Ranunculaceae	3,847	5,107	103	2.7	2.8	IV
Rapateaceae	97	116				
Resedaceae	117	130	11	9.4	1.0	II
Restionaceae	552	752				
Rhabdodendraceae	3	4				
Rhamnaceae	1,187	1,442	120	10.1	12.1	I
Rhizophoraceae	156	252	3	1.9	0.1	III
Ripogonaceae	6	6				
Roridulaceae	2	2				
Rosaceae	5,445	6,455	226	4.2	9.4	IV
Rousseaceae	15	33				
Rubiaceae	14,117	17,877	733	5.2	38.1	IV
Ruppiaceae	11	11	3	27.3	0.8	II
Rutaceae	2,175	2,812	110	5.1	5.6	IV
Sabiaceae	160	180	14	8.8	1.2	II
Saccolomataceae	24	29	3	12.5	0.4	II
Salicaceae	1,581	1,882	81	5.1	4.1	III
Salvadoraceae	10	10				
Salviniaceae	18	43	5	27.8	1.4	II
Santalaceae	1,118	1,393	98	8.8	8.6	I
Sapindaceae	1,990	2,401	131	6.6	8.6	IV
Sapotaceae	1,333	1,619	48	3.6	1.7	III
Sarcobataceae	2	2	1	50.0	0.5	II
Sarcolaenaceae	72	76				

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Sarraceniaceae	49	53				
Saururaceae	6	6	2	33.3	0.7	II
Saxifragaceae	888	1,039	21	2.4	0.5	III
Scheuchzeriaceae	1	1				
Schisandraceae	80	91	2	2.5	0.1	III
Schizaeaceae	209	262	28	13.4	3.8	II
Schlegeliaceae	37	43	3	8.1	0.2	II
Schoepfiaceae	34	34	5	14.7	0.7	II
Sciadopityaceae	1	1				
Scrophulariaceae	2,265	2,804	43	1.9	0.8	III
Selaginellaceae	720	832	79	11.0	8.7	II
Setchellanthaceae	1	1	1	100.0	1.0	II
Simaroubaceae	121	199	10	8.3	0.8	II
Simmondsiaceae	1	1	1	100.0	1.0	II
Siparunaceae	54	60	3	5.6	0.2	III
Sladeniaceae	3	3				
Smilacaceae	262	299	20	7.6	1.5	II
Solanaceae	2,796	3,398	441	15.8	69.6	I
Sphaerosepalaceae	20	28				
Sphenocleaceae	2	2	1	50.0	0.5	II
Stachyuraceae	10	10				
Staphyleaceae	43	51	5	11.6	0.6	II
Stegnospermataceae	4	4	3	75.0	2.3	II
Stemonaceae	37	41				
Stemonuraceae	79	93				
Stilbaceae	39	56				
Strasburgeriaceae	2	2				
Strelitziaceae	7	7	2	28.6	0.6	II
Stylidiaceae	306	387				
Styracaceae	160	196	14	8.8	1.2	II
Surianaceae	9	10	5	55.6	2.8	II
Symplocaceae	402	458	21	5.2	1.1	III
Talinaceae	28	58	8	28.6	2.3	II
Tamaricaceae	112	119	5	4.5	0.2	III
Tapisciaceae	6	6	1	16.7	0.2	II
Taxaceae	35	36	1	2.9	0.0	III
Tecophilaeaceae	27	31				
Tetracarpaeaceae	1	1				

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Tetrachondraceae	3	3	1	33.3	0.3	II
Tetramelaceae	2	2				
Tetrameristaceae	4	4				
Theaceae	356	481	2	0.6	0.0	III
Thomandersiaceae	6	6				
Thurniaceae	4	4				
Thymelaeaceae	963	1,317	16	1.7	0.3	III
Ticodendraceae	1	1	1	100.0	1.0	II
Tiganophytaceae	1	1				
Tofieldiaceae	29	35				
Torricelliaceae	11	19				
Tovariaceae	2	2	2	100.0	2.0	II
Trigoniaceae	32	50	2	6.3	0.1	III
Trimeniaceae	8	16				
Triuridaceae	63	91	2	3.2	0.1	III
Trochodendraceae	2	2				
Tropaeolaceae	97	135	2	2.1	0.0	III
Typhaceae	74	90	4	5.4	0.2	III
Ulmaceae	65	77	8	12.3	1.0	II
Urticaceae	2,077	2,537	97	4.7	4.5	IV
Vahliaceae	5	5				
Velloziaceae	313	461				
Verbenaceae	919	1,086	178	19.4	34.5	I
Viburnaceae	218	249	19	8.7	1.7	II
Violaceae	1,198	1,506	58	4.8	2.8	III
Vitaceae	1,016	1,372	38	3.7	1.4	III
Vochysiaceae	242	315	2	0.8	0.0	III
Welwitschiaceae	1	1				
Winteraceae	93	127	1	1.1	0.0	III
Xeronemataceae	2	2				
Xyridaceae	406	527	3	0.7	0.0	III
Zamiaceae	241	275	59	24.5	14.4	II
Zingiberaceae	1,870	2,396	14	0.7	0.1	III
Zosteraceae	21	27	3	14.3	0.4	II
Zygophyllaceae	286	432	34	11.9	4.0	II
TOTAL	**350,980**	**436,013**				