

Pteridoflora of the Área de Protección de Flora y Fauna La Primavera, Jalisco, Mexico

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Abstract

A taxonomic list of the pteridophytes of the Área de Protección de Flora y Fauna La Primavera is presented. This area is located on the west of the Zona Metropolitana de Guadalajara and comprises an area of 30,500 ha, which includes four municipalities and extends from an altitude of 1,400 to 2,200 m. The information about ferns and fern allies in the Natural Area is scarce, so the main goal of this research was to contribute to the knowledge of the richness and distribution of pteridoflora in different plant communities. The study was based on exhaustive checking literature, exicatae and specimen collection in in different types of vegetation. We found 77 species, which are grouped into 35 genera and 17 families. The most diverse genera are *Cheilanthes* (14 spp.), *Adiantum* (7 spp.) and *Thelypteris* (6 spp.). 33 species are cited for the first time for this area and *Macrothelypteris torresiana* for the state. Three species were recorded in Official Mexican Standard NOM-059-SEMARNAT-2010, *Campyloneurum phyllitidis*, *Nephrolepis cordifolia* and *Selaginella porphyrosphora* in the category of non-endemic and endangered species. In addition, *Psilotum nudum*, *Dennstaedtia bipinnata*, *Lycopodiella cernua* and *Equisetum hyemale* var. *affine* are sparse in the area.

Ferns and fern allies, Floristic checklist, Bosque La Primavera, Jalisco

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Introduction

The pteridophytes are vascular plants without flowers and they reproduce through spores instead of seeds, they differ of Bryophytes and Spermatophytes by their life cycles where sporophyte and gametophyte are independent at maturity (Martínez-Salas y Ramos, 2014).

Worldwide there are around 12,000 species of pteridophytes, concentrating up to 70-80% in the intertropical regions, while only 20% are found in the temperate regions of the globe (Salvo, 1997). They are more common in humid and slightly seasonal tropical and subtropical mountains. The greatest diversity of species is located in two large regions where about 75% of the 9,000 species are found. One of those centers of diversity is the southeast of Mexico and the other Central America (Tryon and Tryon, 1982).

In general, this group of plants has not been part of the conservation programs of the threatened floras and to decree the degree of threat of the species that inhabit certain areas it is very necessary to have an updated list of the taxonomic entities present in them (De la Sota et al., 2009). The search for biodiversity patterns without previous taxonomic knowledge can not be conceived and this supposes not only knowing in a reliable way the species that inhabit a given space, but also their distributions through that space (Toledo, 1994). Therefore, in this paper we report a pteridofloristic checklist of the Area of Protection of Flora and Fauna La Primavera (APFFLP), Jalisco.

Justification

The APFFLP is a priority area for conservation in the Zona Metropolitana de Guadalajara and in Jalisco. However, until now there is no specific publication regarding its pteridophytes.

Therefore, there is no accurate knowledge of which species live there, since the lists that exist are very general, for specific areas and / or are incomplete. Díaz-Barriga and Palacios-Ríos (1992) mention that ferns and related plants are a group of plants of great biological importance, due to their good representation in the fossil record and their high dispersion capacity. In addition, knowledge of the list of species that grow there contributes to their management and conservation.

Problem

The APFFLP is the largest natural reserve within the ZMG. This makes it a laboratory and object of several kinds of scientific research. In addition, due to its proximity to the ZMG it is constantly visited by the general public; thus, the species are affected by the increase in the disturbance of their different ecosystems. Some examples of these types of alterations are logging, fires, subdivision development, pollution or other anthropogenic factors are examples of these types of alterations. The ignorance of the pteridological richness of the area makes them vulnerable to these problems.

General objective

Know the pterido floristic diversity of the Area of Protection of Flora and Fauna La Primavera, Jalisco.

Specific objectives

- Perform the inventory of the fern and similar plants of the APFFLP.
- Provide information about the distribution of species in the study area by vegetation types.

Theoretical framework

Pteridofloristic diversity in Mexico is high, which has been reflected in recent works (Mickel and Smith 2004, Martínez-Salas and Ramos, 2014). In western Mexico, within the area called Nueva Galicia, according to Mickel (1992), there are 281 species of this group of plants. And specifically for the state of Jalisco there are registered 24 families, 66 genera and 259 species of pteridophytes (Ramírez-Delgado et al., 2010a). In addition, different floristic studies of important natural areas in Jalisco have been published, among those that report a greater number of species of the group under study are:

Vázquez and collaborators (1995), refer to the Flora de Manantlán a total of 165 taxa of pteridophytes distributed in 18 families, being the genus *Asplenium* the most diverse with 18 species. On the other hand, Cuevas-Guzmán and Jardel-Peláez (2004) reported 73 species to the Flora of the Scientific Station Las Joyas. In Flora of Northern Jalisco, Vázquez et al. (2004) reported 74 taxa of pteridophytes, which represent 3.55% of a total of 2081 species inventoried in the region. Machuca-Sánchez (1986) records 40 taxa for the northern region of the municipality of Jocotepec. Cortés-Romero (2000) considers 35 species for the Cajititlán region in the municipality of Tlajomulco de Zúñiga, Jalisco. And in El Tepopote hill, Jalisco Mexico, Frías-Castro et al. (2013) indicate the presence of 31 species of pteridophytes.

Regarding the floristic character works that have been carried out in the La Primavera Forest (BLP) and nearby areas, we can mention the following: Rodríguez-Pastrana (1953) cites 59 species for the surroundings of Guadalajara, the Management Plan of the BLP reports 21 species (Anónimo, 1988); later in a more specific area (Bosque-Escuela CUCEI, in Tala, Jalisco) Rodríguez and Reynoso-Dueñas (1992) list 11 species.

On the other hand, SEMARNAP (2000) registered 16 species in the Management Program of the ANFFLP; In another area of BLP, called El Colli hill, the authors Macías-Rodríguez and Ramírez-Delgado (2001) contemplate seven species. Finally, Cedano-Maldonado et al., In 2006 report nine wild species of pteridophytes useful for the metropolitan area of Guadalajara.

Research Methodology

Study area

The area called APFFLP has an area of 30,500 ha, its geographical location corresponds to the coordinates: 20 ° 37 'and 20 ° 45' latitude N and -103 ° 35 '-103 ° 28' longitude O belongs to four municipalities, here mentioned by order, and the percentage is referred to the extension the protected area occupies within them: Zapopan (48%), Tala (37%), Tlajomulco (12.5%) and Arenal (2.5%) (Figure 1).

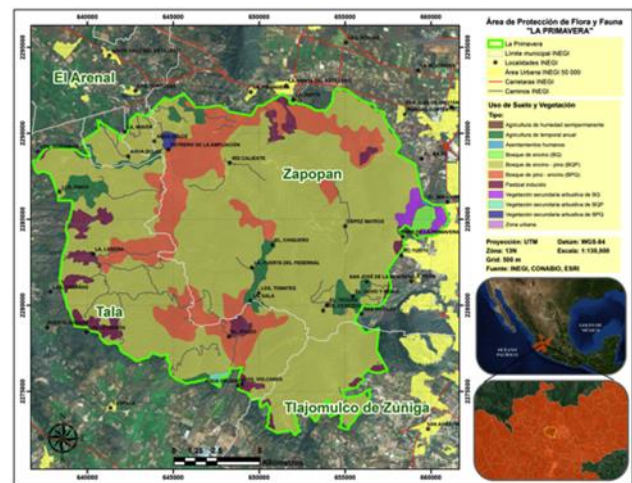


Figure 1 Location of the study area

It is located in a set of five valleys (Tala, Tesistán, Toluquilla, Atemajac y San Isidro Mazatepec) (Anónimo, 1988). In the APFFLP, the physiographic variation is manifested in an altitudinal range of 1400-2200 m and comprises the overlap zone between two floristic provinces:

The Sierra Madre Occidental and The Sierras Meridionales or Eje Neovolcánico Transversal, and is made up of mountainous areas, where different plant communities are found. According to Reyna (2004), in La Primavera there are five types of vegetation: pine forest, oak forest, tropical deciduous forest, riparian vegetation and secondary vegetation or altered sites. In the area, approximately 1000 species of plants are distributed (SEMARNAP, 2000).

Material and methods

Specialized literature for the study area was reviewed, and the specimens corresponding to collections of pteridophytes made within the APFFLP of the herbariums of the Institute of Botany "Luz María Villarreal de Puga" of the University of Guadalajara (IBUG) and of the Faculty of Biology "Carlos Luis Díaz Luna" of the Autonomous University of Guadalajara (GUADA) were checked exhaustively.

For this study, it was collected in 49 localities with easy access in terms of roads, throughout the APFFLP. Preferably in those humid places such as streams and ponds. The explorations were developed from 2011 to 2013, with some sporadic outings in 2014.

The herborization was done in the traditional way for this group of plants and its determination was based on Tryon and Tryon (1982), Mickel and Beitel (1988), Mickel (1992) and Mickel and Smith (2004). The first set of vouchers was deposited in the herbarium IBUG, other collections to which the duplicates were distributed include MEXU, ZEA, IEB, ENCB, HUAA, XAL and CIDIIR.

Results

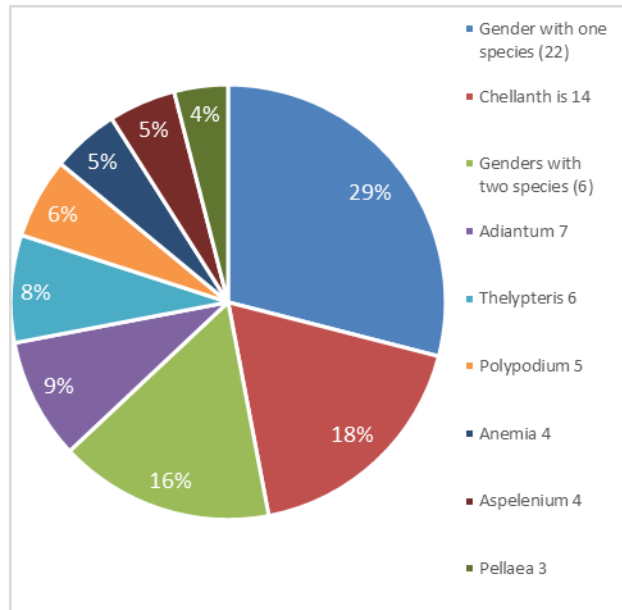
Through the review of 215 records in the IBUG herbarium and 119 records in GUADA, as well as 415 collection numbers, the presence of 77 species of pteridophytes was determined in the APFFLP, which are grouped into two divisions, six orders, 18 families and 35 genera (Appendix 1).

The most representative families in terms of number of species are Pteridaceae, which contributes the most, with 42%, Polypodiaceae with 10%, Thelypteridaceae with 9% and the 5% for families Aspleniaceae and Schizaceae. In Table 1 the families of the species included in this work are cataloged. In addition, the number of genera and species grouped is shown.

Family	No. of genera / Species
Aspleniaceae	1/4
Athyriaceae	3/3
Azollaceae	1/1
Blechnaceae	2/2
Dennstaedtiaceae	2/2
Dryopteridaceae	3/5
Equisetaceae	1/1
Lycopodiaceae	1/1
Marsileaceae	1/1
Ophioglossaceae	1/2
Osmundaceae	1/1
Polypodiaceae	4/8
Psilotaceae	1/1
Pteridaceae	8/32
Schizaceae	1/4
Selaginellaceae	1/2
Thelypteridaceae	2/7

Table 1 Families of pteridophytes present in the APFFLP and their number of genera and species. (arranged alphabetically).

The most diverse genera are Cheilanthes with 14 species, Adiantum (7), Thelypteris (6) and Polypodium (5) (Graph 1).



Graph 1 Genres with the highest number of species and their percentage with respect to the total species of this study.

Compared with Mickel & Smith (2004), 58% of the families, 28% of the genera and 7% of the species mentioned for Mexico are present in the study area. In addition, 17 of the 25 families were found, 34 of the 65 genera and 77 of the 265 species of ferns and allies that Ramírez-Delgadillo et al. (2010) reported for Jalisco.

Among the genera with greater richness we have *Cheilanthes*, *Adiantum* and *Thelypteris*, this is similar to other floristic works such as those of Vázquez-García et al. (1995), Hernández-Toro (2003) and Vázquez-García et al. (2004).

Rodríguez-Pastrana (1953) mentions 17 species for the area of La Primavera. But while the revision of herbarium was made, it was detected that its collections contribute to the present list with nine more species. These were included in his thesis, but without detailing his presence in the area.

And also two other species are added by the specimens *Rodríguez 104* and *Rodríguez 61*, *Thelypteris cheilanthoides* var. *cheilanthoides* and *Thelypteris pilosa* respectively, but these are absent in his work. On the other hand, it was determined that *Rodríguez 19* previously identified as *Pteridium caudatum* is *Pteridium aquilinum* var. *feei*. Another species cited in his study that is presumed to be misidentified was *Dryopteris patula* (17 and 25 August 1952, specimens not seen) and probably *Dryopteris rossi*. Finally, the species that were not found during the field trips were *Bommeria hispida*, *Azolla microphylla* [= *Azolla mexicana*] and *Tectaria trifoliata*, the last two are cited in their work, but no specimens were found.

Anónimo (1988) lists the species *Woodwardia radicans* and *Dryopteris mexicana* which were not found in field, and since that work does not mention exsiccatae, it is not possible to know exactly what these species are, but it is probable that they are *W. spinulosa* and *D. rossi*.

Mickel (1992) presents 37 species and a total of 39 records for the study area. Of these, the species that were not found in the botanical explorations carried out were *Asplenium hallbergii*, *Campyloneuron phyllitidis*, *Mildella fallax* [= *Mildella intramarginalis* var. *serratifolia*], *Ophioglossum reticulatum* and *Thelypteris cheilanthoides* var. *cheilanthoides*.

The specimen *Rodríguez August 17, 1952* previously identified as *Diplazium lonchophyllum* is about *Thelypteris pilosa*. And the specimen *Puga 7099*, cited in the same work as *Psilotum complanatum*, is a homonymous locality (Arroyo de Agua Caliente) and the specimen is identified by the own Mickel in 1990 as *P. nudum*.

Otherwise, in SEMARNAP (2000), *Blechnum occidentale* and *Selaginella lepidophylla* are mentioned. These species were not found in the area so they could have been misidentified. Since there are no exsiccatae, it is believed that they could correspond to *B. appendiculatum* and *S. pallescens*.

In this study *Macrothelypteris torresiana* is cited to the state for the first time, this species is invasive and is increasing its distribution area within Mexico (Mickel & Smith, 2004) and in the study area it was observed in disturbed areas; in addition, the following species are new records for the APFFLP: *Adiantum andicola*, *A. tricholepis*, *Anemia tomentosa* var. *mexicana*, *Asplenium monanthes*, *A. pringlei*, *A. pumilum*, *Astrolepis sinuata*, *Athyrium palmense*, *Bommeria hispida*, *Cheilanthes allosuroides*, *C. aurantiaca*, *C. bonariensis*, *C. brachypus*, *C. chaerophylla*, *C. cucullans*, *C. lozanoi* var. *seemannii*, *C. membranacea*, *C. skinneri*, *Cheilopteron rigidum* var. *rigidum*, *Cystopteris fragilis*, *Dennstaedtia bipinnata*, *Dryopteris maxonii*, *Nephrolepis cordifolia*, *Ophioglossum crotalophoroides*, *Osmunda regalis* var. *spectabilis*, *Pellaea ovata*, *Pityrogramma calomelanos*, *Pleopeltis mexicana*, *Selaginella pallescens*, *Thelypteris hispidula*, *Thelypteris resinifera* var. *resinifera* and *Thelypteris oligocarpa*.

The species that have a protection category in the Official Mexican Standard NOM-059-SEMARNAT-2010 (non-endemic and endangered) are *Nephrolepis cordifolia* and *Selaginella porphyrosphora*. In addition, *Psilotum nudum*, *Dennstaedtia bipinnata*, *Lycopodiella cernua* and *Equisetum hyemale* var. *affine* are scarce in the APFFLP. No endemic species was found to the state of Jalisco.

Conclusions

With 77 species found, the APFFLP presents a high richness of fern and allied species in Jalisco. Many of them detected only through herbarium specimens. Therefore, it is suggested to implement conservation and restoration actions in order to prevent the loss and maintain the number of species. As it is appreciated, the area is an important habitat for this group of plants. Figure 3 shows some of the main species registered.

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Figure 3 Diversity of pteridophytes present in different APFFLP habitats: **a)** *Selaginella pallescens* in oak forest; **b)** *Thelypteris pilosa* in gallery forest with oak forest; **c)** *Anogramma leptophylla* in oak forest; **d)** *Adiantum patens* in tropical deciduous forest; **e)** *Cheilanthes brachypus* in oak forest; **f)** *Asplenium pringlei* in tropical deciduous forest; **g)** *Cheilanthes myriophylla* in tropical deciduous forest; **h)** *Dryopteris rossii* in tropical deciduous forest; **i)** *Elaphoglossum muelleri* in oak forest; **j)** *Phlebodium areolatum* in deciduous tropical forest; **k)** *Polypodium thysanolepis* in tropical deciduous forest and **l)** *Psilotum nudum* in gallery forest with oak forest.

Species	Collections./Num collection	Habitat	Type of vegetation	No. Records	
LYCOPHYTA					
<i>Lycopodiaceae</i>					
1	<i>Lycopodiella cernua</i> (L.) Pic. Be M.	JQ 10 febrero 1976, LFCN & EC 450	T	VS c/ elem. BPE	4
<i>Selaginellaceae</i>					
2	<i>Selaginella pallescens</i> (C. Presl) Spring	EE 5447, LFCN et al. 772	T, R	BPE, BG, VS, BEP, BE, BTC	34
3	<i>Selaginella</i> aff. <i>porphyrospora</i> Mickel & Beitel	DLG 6, IH 1041	T	BPE	2
MONILOPHYTA					
<i>Aspleniaceae</i>					
4	<i>Asplenium hallbergii</i> Mickel & Beitel	Acosta 17783	T	BPE	1
5	<i>Asplenium monanthes</i> L.	AR 66, LFCN & LHL 1101	T	BPE c/elem. BTC, BE	6
6	<i>Asplenium pringlei</i> Davenp.	LFCN et al. 536, LFCN & FJMN 765	T	BTC, BG c/elem. BTC	2
7	<i>Asplenium pumilum</i> Sw.	EPA 17010, LFCN 421	T	BG, BPE	2
<i>Athyriaceae</i>					
8	<i>Athyrium palmense</i> (Christ) Lellinger	LFCN et al. 205, LFCN & ARR 961	T, E	BG	2
9	<i>Cystopteris fragilis</i> (L.) Bernh	LHL et al. 1038, LFCN et al. 441	T	BG, BPE, BEP	4
10	<i>Woodsia mollis</i> (Kaulf.) J. Sm.	JAG 16, LFCN et al. 436	T	BEP, BPE, BG, BE, BTC, VS	16
<i>Azollaceae</i>					
11	<i>Azolla Mexican</i> Presl.		A	BG	1
<i>Blechnaceae</i>					
12	<i>Blechnum appendiculatum</i> Willd.	LMVP 14849, LFCN et al. 565	T	BG, BPE, BE	15
13	<i>Woodwardia spinulosa</i> M. Martens & Galeottii	AR 26, LFCN et al. 586	T	BPE, BG, VS	29
<i>Dennstaedtiaceae</i>					
14	<i>Bipinnate dennstaedtia</i> (Cav.) Maxon	LFCN 680	T	BG	2
15	<i>Pteridium aquilinum</i> var. <i>feeii</i> (W. Schaffn ex Fée) Maxon ex Yunck.	AR 19, LFCN et al. 678	T	BPE, BG, VS, BEP, BE, BP	41
<i>Dryopteridaceae</i>					
16	<i>Dryopteris maxonii</i> Underw. & Chr.	LL 25 agosto 1985, LFCN 549	T	BG, BPE, BEP, BTC, BE, VS	13
17	<i>Dryopteris rossii</i> C. Chr.	LMVP 3116, LFCN et al. 577	T	BPE, BEP, BG, VS, BP, BE, BTC	46

18	<i>Elaphoglossum muelleri</i> (E. Fourn.) C. Chr.	DG 4959, LFCN et al. 587	T	BPE	8
19	<i>Nephrolepis cordifolia</i> (L.) C. Presl	LFCN et al. 125	T	BG	1
20	<i>Nephrolepis undulata</i> (Afzel, Ex Sw.) J. Sm.	AR 53, LFCN 558	T	BG, BEP, BE, VS	11
Equisetaceae					
21	<i>Equisetum hyemale</i> var. <i>affine</i> (Engelm.) A. A. Eaton	CLDL 853, LFCN 422	T	BG c/ elem. BPE	8
Marsileaceae					
22	<i>Marsilea mollis</i> B. L. Rob. & Fernald	LMVP 5692, LFCN et al. 975	A	VA	7
Ophioglossaceae					
23	<i>Ophioglossum crotalophoroides</i> Walter	LFCN 250, 439	T	BTC, BEP	2
24	<i>Ophioglossum reticulatum</i> L.	LMVP 599	T	BPE	4
Osmundaceae					
25	<i>Osmunda regalis</i> var. <i>spectabilis</i> (Willd.) A. Gray	MAMR 20 enero 1982	T	Áreas inundadas y BPE en Mickel (1992).	1
Polypodiaceae					
26	<i>Campyloneurum phyllitidis</i> (L.) C. Presl	DG 4957	E, R	BE	2
27	<i>Phlebodium areolatum</i> (Humb. & Bonpl. Ex Willd.) J. Sm.	AR 18, LFCN et al. 560	E, R	BPE, BEP, BG, BTC, VS, BE	20
28	<i>Pleopeltis mexicana</i> (Fée) Mickel & Beitel	LFCN & JPL 958	E	BG	1
29	<i>Polypodium furfuraceum</i> Schlecht. & Cham.	DG 15, LFCN et al. 569	E	BPE, BG, BE	8
30	<i>Polypodium madrense</i> J. Sm.	LFCN 338, 438, 679, 1100	E	BPE, BEP, BG	4
31	<i>Polypodium plesiosorum</i> Kunze	LMVP 3132, LFCN et al. 537	T, R	BPE, BEP, BG, BTC, VS	15
32	<i>Polypodium polypodioides</i> var. <i>aciculare</i> Weath.	FML 24 agosto 1985, LFCN & JPL 957	E	BG, BPE	3
33	<i>Polypodium thysanolepis</i> A. Braun ex Klotzsch	AR 29, LFCN & JPL 366	T, E	BTC	5
Psilotaceae					
34	<i>Psilotum nudum</i>	LMVP 9503, LFCN 575	R, E	BG c/ elem. BPE y BE	4
Pteridaceae					
35	<i>Adiantum andicola</i> Liebm.	AR 110, 201 C	T	BPE	2
36	<i>Adiantum braunii</i> Mett. ex Kuhn	AR 63, LFCN et al. 584	T	BG, BE, BEP, BPE, BTC.	21
37	<i>Adiantum capillus-veneris</i> L.	LFCN 572	T	BG c/elem. BPE	2
38	<i>Adiantum concinnum</i> Humb. & Bonpl. ex Willd.	AR 48, LFCN et al. 576	T	BPE, BG, BEP, BE	34
39	<i>Adiantum patens</i> Willd.	LMVP 3117, LFCN & JPL 253	T	BG, BPE, VS	13
40	<i>Adiantum poiretii</i> Wikstr.	LMVP 2448, LFCN et al. 675	T	BPE, BG, BP, VS	19
41	<i>Adiantum tricholepis</i> Fée	AR 17 agosto 1952	T		1
42	<i>Anogramma leptophylla</i> (L.) Link	LFCN 442, 952	T, R	BPE	3

43	<i>Astrolepis sinuata</i> (Lag. Ex Sw.) D.M. Benham & Windham	DG 4956, LFCN et al. 312	T	BPE	2
44	<i>Bompl hispida</i> (Mett. Ex Kuhn) Underw.	AR 38	T	BPE, BTC	1
45	<i>Bomma pedata</i> (Sw.) E. Fourn	LMVP 4604, LFCN 574	T, R	BPE, BG, BEP, BTC, VS	32
46	<i>Cheilanthes allosuroides</i> Mett.	LFCN & JPL 373	T	BTC, BG c/elem. BTC	4
47	<i>Cheilanthes aurantiaca</i> (Cav.) Moore	LMVP 4076, LFCN et al. 582	T	BPE	4
48	<i>Cheilanthes angustifolia</i> Kunth	LMVP 1609, LFCN et al. 539	T, E	BPE, BG, BEP, VS	44
49	<i>Cheilanthes bonariensis</i> (Willd.) Proctor	LMVP 1968, LFCN et al. 678	T	BPE, BEP, BE, BTC	14
50	<i>Cheilanthes brachypus</i> (Kunze) Kunze	LMVP 4094, LFCN et al. 581	T, R	BPE, BG, VS, BEP	27
51	<i>Cheilanthes chaerophylla</i> (M. Martens & Galeotti) Kunze	PESH 18 julio 1997, LFCN 171	T	BG, BE	5
52	<i>Cheilanthes cucullans</i> Fée	LFCN & ARR 20		BG c/elem. BTC y BE	1
53	<i>Cheilanthes farinosa</i> (Forssk.) Kaulf.	EE 5454, LFCN 316	T, R	BPE, BEP	4
54	<i>Cheilanthes kaufussii</i> Kunze	DG 27 julio 1969, LFCN et al. 676	T	BPE, VS, BG, BEP, BP, BE, BTC	52
55	<i>Cheilanthes lozanoii</i> var. <i>seemannii</i> (Hook.) Mickel & Beitel	DG 27 julio 1969	T	BPE	2
56	<i>Cheilanthes membranacea</i> (Davenp.) Maxon	MEC 18 octubre 1979	T	BPE	1
57	<i>Cheilanthes myriophylla</i> Dev.	AR 27, LFCN & JPL 371	T	BTC, BPE	6
58	<i>Cheilanthes pyramidalis</i> Fée	AR 22, LFCN et al. 959	T	BPE, BEP, BE, VS	21
59	<i>Cheilanthes skinneri</i> (Hook.) T. Moore	DG 27 agosto 1969	T	BPE	1
60	<i>Cheilopteron rigidum</i> var. <i>rigidum</i> (Sw.) Fée	CSC 27 septiembre 1986, LFCN et al. 771	R, T	BEP, BPE, BE, VS	5
61	<i>Mildella falax</i> (M. Martens & Galeotti) G. L. Nesom	CLDL 5575	T	BPE	2
62	<i>Pellaea cordifolia</i> (Sessé & Moc.) A. R. Sm.	ORB & AAR 676	T	BPE	1
63	<i>Pellaea ovata</i> (Dev.) Weath.	DG 55, LFCN 955	T	BPE	3
64	<i>Pellaea ternifolia</i> (Cav.) Link	AR 13, LFCN et al. 579	T	BPE, BEP, BE, BG, BTC	13
65	<i>Pityrogramma calomelanos</i> (L.) Link	AE 29 marzo 1972, LFCN et al. 28	T	BG	3
66	<i>Pityrogramma ebenea</i> (L.) Proctor	LMVP 4099, LFCN et al. 677		BPE, BG, VS, BE, BP	29
Schizaceae					
67	<i>Anemia hirsuta</i> (L.) Sw.	GPR 17036, LFCN et al. 169	T	BG, BPE	4
68	<i>Anemia jaliscana</i> Maxon	LMVP 2105, LFCN & EC 451	T	VS, BPE, BTC, BG	6

69	<i>Anemia karwinskiana</i> (C. Presl) Prantl	ECG 11113, LFCN et al. 535	T	BPE, BE, BG, BTC	8
70	<i>Anemia tomentosa</i> var. <i>mexican</i>	DG 24	T	BPE	1
	<i>Thelypteridaceae</i>				
71	<i>Macrothelypteris torresiana</i> (Gaudich.) Ching	LHL et al. 1040, LFCN et al. 552	T	BG, BEP, BPE, VS	11
72	<i>Thelypteris cheilanthoides</i> var. <i>cheilanthoides</i>	AR 104 (19 agosto 1952)	T	BPE (según Mickel, 1992)	2
73	<i>Thelypteris hispidula</i> (Decne.) C.F. Reed	LFCN 570	T	BG c/ elem. BPE	9
74	<i>Thelypteris pilosa</i> (M. Martens & Galeotti) Crawford	AR 61 (17 agosto 1952), LFCN 571	T	BG c/ elem. BPE	10
75	<i>Thelypteris resinifera</i> var. <i>resinifera</i>	DG 5389, LFCN et al. 566	T	BG c/ elem. BPE	18
76	<i>Thelypteris oligocarpa</i> (Willd.) Ching.	IH 1042	T	BPE	1
77	<i>Thelypteris puberula</i> var. <i>sonorensis</i> A. R. Sm.	ARC & JJRD 1121	T	BG	2

Table 2 Pteridoflora of the Flora and Fauna Protection Area La Primavera, Jalisco, Mexico. The list is presented in alphabetical order by family, gender and species and is divided into the following groups Lycophyta and Monilophyta