An annotated check-list of the Balearic vascular Flora. I. Pteridophyta-Coniferophytina

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ABSTRACT

ROSSELLÓ, J. A., P. CUBAS & N. TORRES (1992). An annotated check-list of the Balearic vascular Flora. I. Pteridophyta-Coniferophytina. *Candollea* 47: 61-69. In English, English and Spanish abstracts.

First part of a series covering the revised check-list of the vascular flora of the Balearic Islands. Species, subspecies and hybrid taxa have been included. Their insular distribution in the larger islands, i.e. Mallorca (Ma), Menorca (Me), Eivissa (Ei), Formentera (Fo) and Cabrera (Ca) is provided. The combination *Pinus halepensis* Mill. var. *ceciliae* (A. Llorens & L. Llorens) L. Llorens is validated.

RESUMEN

ROSSELLÓ, J. A., P. CUBAS & N. TORRES (1992). Catálogo anotado de la Flora Vascular de las islas Baleares. I. Pteridophyta-Coniferophytina. *Candollea* 47: 61-69. En inglés, resúmenes en inglés y en español.

Se presenta la primera parte del catálogo revisado de la flora vascular de las Islas Baleares. En este catálogo se incluyen las plantas nativas y naturalizadas con rango específico, subespecífico y nothotáxones, indicándose su distribución en las islas mayores, i.e. Mallorca (Ma), Menorca (Me), Eivissa (Ei), Formentera (Fo) and Cabrera (Ca). Se valida una nueva combinación: *Pinus halepensis* Mill. var. *ceciliae* (A. Llorens & L. Llorens) L. Llorens.

For the last 170 years, the vascular plants of the Balearic Islands have attracted the attention of many European botanists and have been the subject of many papers. However, compilations of the floristic knowledge of the islands are scanty. Some of the most important early contributions covering the Balearic Flora were those of BARCELO (1879-1881), MARES & VIGINEIX (1880), RODRÍGUEZ (1904) and KNOCHE (1921-1922). BARCELO (1879-1881) and KNOCHE (1921-1922) have been followed as basic floras for more comprehensive works such as "Flora Europaea" (TUTIN & al., 1964-1980) and "Flora Ibérica" (CASTROVIEJO & al., 1986-1990). Unfortunately, these basic floras of Baleares have become outdated due to the amount of information gained during the last 40 years.

More recently, DUVIGNEAUD (1974, 1979) published a check-list of the Balearic vascular Flora. This valuable contribution lacks, however, explanatory notes on the insular distribution of the taxa, and no bibliographic references are given for the most doubtful or puzzling records. Besides, the precise location, and references, to published data or to the herbarium specimens are not provided for the new reported taxa. Moreover, old misidentifications and imprecise determinations have been included.

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Later, BONAFE (1980) published a check-list of the Balearic Flora which, unfortunately, did not improve Duvigneaud's work.

Check-lists of territories including the Balearic Islands (GREUTER & al., 1984-1989; BOLÓS & VIGO, 1984-1990; CASTROVIEJO & al., 1986-1990) have not been at present finished and the scope of some of them is so great that not equal accuracy can be claimed for all the countries included. The work of SMYTHIES (1984, 1986) has paid little attention to the problematic Balearic flora and his results come from earlier bibliographic works.

The lack of adequate synthetic work concerning the whole Balearic flora has moved us to present this check-list, which is the result of extensive field work through all the islands, herbarium revision and a thorough bibliographic compilation. Only native and naturalized plants, including hybrid taxa, have been added to the check-list, whereas cultivated plants and aliens have been excluded from the main text. However, the most important ones are included at the notes. Taxa pointed out in the Balearic or insular floras and believed to be misidentifications are reported in the notes. Insular distributions are reported for the larger islands, i.e. Mallorca (Ma), Menorca (Me), Eivissa (Ei), Formentera (Fo) and Cabrera (Ca). The flora of Dragonera, Vedrà and those smaller islets surrounding the five major islands is, as a rule, not comprehensively detailed, however, details may be provided if requested to the authors. Only the distribution of those taxa occurring in the islets and with a restricted distribution or having biogeographical, taxonomical or ecological interest are presented. Arrangement of the families follows CASTROVIEJO & al. (1986) for Pteridophyta and Coniferophytina and CRONQUIST (1988) for Magnoliophytina. Nomenclature for Pteridophytes is that of DERRICK & al. (1987), whereas TUTIN & al. (1964-1980), GREUTER & al. (1984, 1986, 1989) and CASTROVIEJO & al. (1986-1990) are followed for Spermatophyta. However, some taxonomic or nomenclatural inconsistencies between these authorities and our point of view exist, so these will be pointed out in the notes.

Comments, mainly taxonomic and chorological, are presented for each taxon when needed after the taxonomic part of each paper. Only specific and subspecific ranks are used in this check-list. Taxa below these ranks, if worth of mention, are reported in the notes. The following symbols will be used: (●) native plants, (○) naturalized plants, (□) plants whose presence is doubtful.

For the sake of convenience this Balearic catalogue is divided in four parts, the first of which is here published and cover Pteridophyta and Coniferophytina. The other three parts will include *Magnoliidae-Caryophyllidae, Dilleniidae-Rosidae,* and *Asteridae-Liliidae.*

PTERIDOPHYTA (1)

	Ma	Me	Ei	Fo	Ca
Fam. *Selaginellaceae*					
Selaginella denticulata (L.) Spring	●	●	●	●	
Fam. *Isoetaceae*					
Isoetes durieui Bory (2)		●			
Isoetes histrix Bory (3)	●	●			
Isoetes velatum A. Br. in Bory & Durieu (4)		●			
Fam. *Equisetaceae*					
Equisetum arvense L. (5)	●				
Equisetum ramossisimum Desf. (6)	●	●	●		
Equisetum telmateia Ehrh	●	●			

Fam. *Ophioglossaceae*					
Ophioglossum lusitanicum L.	●	●	●	●	
Fam. *Polypodiaceae*					
Polypodium cambricum L. subsp. *serrulatum* (Sch. ex Arcangeli) Pichi-Serm. (7)	●	●	●	●	●
Fam. *Sinopteridaceae*					
Cheilanthes acrosticha (Balbis) Tod. (8)	●		●	●	
Fam. *Pteridaceae*					
Pteris vittata L. (9)	●				
Fam. *Adiantaceae*					
Adiantum capillus-veneris L.	●	●	●	●	●
Fam. *Hemionitidaceae*					
Anogramma leptophylla (L.) Link (10)	●	●	●	●	●
Cosentinia vellea (Ait.) Tod. (11)	●	●	●	●	●
Fam. *Marsileaceae*					
Marsilea strigosa Willd. (12)	●	●			
Pilularia minuta Durieu in Bory & Durieu (13)		●			
Fam. *Hypolepidaceae*					
Pteridium aquilinum (L.) Kuhn in Kersten (14)	●	●	●		
Fam. *Aspleniaceae*					
Asplenium azomanes Rosselló, Cubas & Rebassa (15)	●		●	●	
Asplenium balearicum Shivas (16)		●			
Asplenium ceterach L.	●	●	●	●	●
Asplenium fontanum (L.) Bernh. (17)	●				
Asplenium marinum L.	●	●			
Asplenium majoricum Litard. (18)	●				
Asplenium onopteris L. (19)	●	●	●	●	
Asplenium petrarchae (Guérin) DC. in Lam. & DC. subsp. *petrarchae* (20)	●	●	●		●
subsp. *bivalens* (D. E. Meyer) Lovis & Reichst. (21)	●				
Asplenium ruta-muraria L. (22)	●				
Asplenium sagittatum (DC.) A. J. Bange (23)	●	●	●	●	●
Asplenium scolopendrium L.	●				
Asplenium trichomanes L. subsp. *inexpectans* Lovis (24)	●	●			●

subsp. *quadrivalens* D. E. Meyer	●	●	●		
nothosubsp. *lucanum* Cubas, Rosselló & Pangua (25)	●				
Asplenium × *artanense* Rosselló, Cubas, Gradaille & Sastre (26)	●				
Asplenium × *barrancense* (Bennert & D. E. Meyer) Pericás & Rosselló (27)	●				
Asplenium × *helii* Lusina					
nothosubsp. *helii* (28)	●				
nothosubsp. *calobraense* Bennert, H. Rasbach & K. Rasbach (29)	●				
Asplenium × *orellii* Lovis & Reichst. (30)	●				
Asplenium × *reichstenii* Bennert, H. Rasbach & K. Rasbach (31)	●				
Asplenium × *sollerense* Lovis, Sleep & Reichst. (32)	●				
Asplenium × *tubalense* Rosselló, Cubas & Rebassa (33)	●				
Asplenium × *tyrrhenicum* Cubas, Pangua & Rosselló (34)		●			
Fam. *Athyriaceae*					
Athyrium filix-femina (L.) Roth (35)	●				
Cystopteris fragilis (L.) Bernh. (36)	●				
Fam. *Aspidiaceae*					
Dryopteris filix-mas (L.) Schott (37)	●				
Dryopteris pallida (Bory) C. Chr. ex Maire & Petitmengin					
subsp. *balearica* (Litard.) Fraser-Jenkins (38)	●				
Dryopteris tyrrhena Fraser-Jenkins & Reichst. (39)	●				
Polystichum aculeatum (L.) Roth (40)	●				
Polystichum setiferum (Forsskål) Woynar	●				
Polystichum × *bicknellii* (Christ) Hahne (41)	●				
CONIFEROPHYTINA					
Fam. *Cupressaceae*					
Juniperus oxycedrus L.					
subsp. *oxycedrus*	●	●	●	●	●
subsp. *macrocarpa* (Sm.) Ball	●				
Juniperus phoenicea L. (42)	●	●	●	●	●
Fam. *Ephedraceae*					
Ephedra fragilis L. (43)	●	●			●
Fam. *Pinaceae*					
Pinus halepensis Miller (44)	●	●	●	●	●
Pinus pinea L. (45)	○	○	○	○	
Fam. *Taxaceae*					
Taxus baccata L. (46)	●				

NOTES

[1]GANDOGER (1891) published several illegitimate taxa from the Balearic flora, all of them without taxonomic relevance: *Selaginella balearica* (Mallorca), *S. platyclada* (Menorca), *Isoetes balearica* (Menorca), *I. tenuicola* (Menorca), *Asplenium balearicum* (Menorca), *A. temerarium* (Menorca), *Polypodium balearicum* (Menorca) and *Polystichum balearicum* (Mallorca).

[2]Even if early reports had indicated the existence of *I. durieui* in Mallorca (DUVIGNEAUD, 1979), no evidence has been provided to support the actual presence of this taxon in the island. In fact, all the herbarium specimens previously ascribed to *I. durieui* have proved to be *I. histrix.*

[3]For more details regarding the distribution of this taxon in Mallorca and Menorca see ROSSELLÓ & ALOMAR (1987) and BALLESTEROS (1989).

[4]In the Balearic Islands these plants have been identified as subspecies *velatum* (PRADA, 1983; 1986). Recently, SMYTHIES (1984a) and DERRICK & al. (1987) have ascribed them to the subspecies *tenuissima* (no details are given), suggesting that a revision of the *I. velatum* aggr. is needed. Furthermore, plants from Menorca display some differences (morphology and spore characteristics) when compared to the typical subsp. *velatum.*

[5]A doubtful first indication of this taxon for Menorca (RODRIGUEZ, 1874), it was later referred as *E. telmateia* (RODRIGUEZ, 1904). At present, its existence has only been confirmed for Mallorca.

[6]Previous reports indicating the existence of *E. fluviatile* L. (sub *E. limosum*) in Eivissa (CAMBESSEDES, 1827) and in Mallorca (GARCIAS, 1919) are in fact misidentifications of *E. ramossisimum.* Contrary to SALVO & al. (1984), there is not any record of *E. ramossisimum* from Formentera.

[7]Contrary to the comments of FONT QUER (1919), *P. vulgare* L. is not present in the Balearic Islands and the old records are misidentifications of *P. cambricum.* Plants collected in the neighbourhood of Valldemossa (Mallorca) have been ascribed to *P. cambricum* L. subsp. *cambricum* (PALAU, 1954; BONAFE, 1977). They show laciniated pinnae and numerous and well developed sporangia. Despite their anomalous morphology they must be included within *P. cambricum* subsp. *serrulatum.*

[8]The record of *Ch. hispanica* from Mallorca (JAQUOTOT & ORELL, 1968) is erroneous; the plants are in fact *Ch. acrosticha. Ch. pteridioides* (Reichard) C. Chr. (= *Ch. maderensis* Lowe) has been cited by DERRICK & al. (1987), however no references are given. Furthermore, it should be noted that the ecological requirements of this taxon make its presence in the Balearic Islands very improbable. We consider that the only one species of *Cheilanthes* growing in Baleares is *Ch. acrosticha.* MORALES & FERNANDEZ CASAS (1989) erroneously consider that all the Balearic *Cheilanthes* plants are *Ch. maderensis.*

[9]The indication of *Blechnum spicant* L. in Mallorca (BARCELO, 1867) is an erroneous identification of *P. vittata. B. spicant* L. is not to be regarded as extinguished in the islands as reported (ORMONDE, 1986), in fact, it never existed in the Balearic Islands. Regarding *P. vittata,* the authors bear in mind some doubts regarding the autochthony of the taxon in Mallorca.

[10]Cited for Eivissa from one locality (Puig de Sa Fita, 29.4.1948, P. Font Quer, BC *79094*). It has not been found again.

[11]Reported from Menorca by LLORENS (1979). The Balearic populations of *C. vellea* might belong to the tetraploid cytotype (subsp. *vellea*), however, cytological confirmation is required.

[12]Recently reported from Menorca (ALOMAR & al., 1991).

[13]Found in Menorca by RITA (1987).

[14]Known in only one locality of Eivissa (Puig de Ses Roques, Sant Joan, N. Torres; pers. herb.). SHEFFIELD & al. (1986) suggested that the Mallorcan populations, living in calcareous soils, were diploid (*Pteridium herediae* (Colmeiro) Löve & Kjellqvist). However, chromosome counts in gametophytic tissues and complementary observations have established that they are tetraploid (SHEFFIELD & al., 1989) i.e. *P. aquilinum* subsp. *aquilinum.*

[15]Considered as a subspecies of *A. trichomanes (A. trichomanes* subsp. *coriaceifolium)* by RASBACH & al. (1990). Taxonomic and chorological details are shown in ROSSELLÓ & al. (1991).

[16]All the records of *A. obovatum* Viv. subsp. *obovatum* and *A. obovatum* subsp. *lanceolatum* P. Silva (RODRIGUEZ, 1904; KNOCHE, 1921; MONTSERRAT, 1974; SMYTHIES, 1984; BOLÓS & VIGO, 1984) in Menorca are erroneous and those plants must be ascribed to *A. balearicum.* The record of *A. obovatum* s.l. in the southeast of Mallorca (MAHEU, 1912) is also erroneous. The existence of *A. balearicum* in Mallorca (JALAS & SUOMINEN, 1972; SALVO & al., 1984) is not supported by any evidence (ROSSELLÓ & al., 1986; ROSSELLÓ & SERRA, 1987; CUBAS & al., 1988).

[17]Reported from Sóller (BIANOR, 1917), this taxon has not been found again in this locality, where it has probably been extinguished due to an excess of collecting. At present, only one alive specimen is known in Mallorca (ROSSELLÓ & al., 1986).

[18]Until now regarded as a Balearic endemism; recently found in Continental Spain (C. Prada & E. Pangua, pers. comm.).

[19]First finding in Formentera (Torrent des Gat, 31.3.1988, Rosselló & Torres; pers. herb.). Previously mistaken with *A. adiantum-nigrum* L. and *A. cuneifolium* Viv. (MARES & VIGINEIX, 1880; JALAS & SUOMINEN, 1972) due to its morphological variability in the Balearic Islands. *A. adiantum-nigrum* and *A. cuneifolium* have not been found in the islands.

[20]Chromosome counts available only from Mallorca (LOVIS & al., 1970; CUBAS, unpublished data). Lacking adequate chromosome data from other places, the distribution of both subspecies has to be regarded as provisional. Not reported from Formentera, however, its presence in the island is probable.

[21]The diploid cytotype (subsp. *bivalens*) has been unequivocally identified in Sa Calobra (BENNERT & al., 1990).

[22]The old records from Menorca have never been confirmed and they are probably erroneous. There is a herbarium sheet of this species at the Institut Botanic of Barcelona (Eivissa, Els Puntals, 25.6.1920, Gros, BC *77592*). However, since the locality name (Els Puntals) does not actually exist in Eivissa but is common in Mallorca, this report is probably a labeling error.

[23]The plants recorded as *A. hybridum* from Mallorca (TRABUT, 1917) are here considered to be a lobed form of *A. sagittatum*. This theratological form has been sporadically found growing among normal populations of *A. sagittatum,* and does not, in our opinion, deserve taxonomic recognition.

[24]*A. trichomanes* subsp. *trichomanes* is not present in the Balearic Islands. The records of this subspecies (GREUTER & al., 1984; SMYTHIES, 1984a; SALVO & al., 1984; MORALES & FERNANDEZ CASAS, 1989) have to be referred to subsp. *inexpectans* or to subsp. *quadrivalens*. For details on the distribution of the *A. trichomanes* complex in the Balearic Islands see ROSSELLÓ (1989).

[25]Intraspecific cross between the subspecies *quadrivalens* and *inexpectans* (CUBAS & al., 1989). The type material is from Mallorca, even though this taxon is also found in other European localities. *A. trichomanes* nothosubsp. *menzeri* (LOVIS & al., 1989) is a later synonym of nothosubsp. *lucanum*.

[26]Diploid hybrid between *A. sagittatum* and *A. trichomanes* subsp. *inexpectans*. See ROSSELLÓ & al. (1990) for details regardin its origin, morphology and distribution.

[27]Tetraploid hybrid between *A. ceterach* subsp. *ceterach* and *A. majoricum*. Described as ×*Asplenoceterach barrancense* (BENNERT & MEYER, 1972) and later combined by ROSSELLÓ & al. (1986). See MUS & al. (1990) for the taxonomical position of ×*Asplenoceterach* D. E. Meyer in *Asplenium* L. Cytological data can be obtained from RASBACH & al. (1987).

[28]Triploid hybrid between *A. petrarchae* subsp. *petrarchae* and *A. trichomanes* subsp. *inexpectans*. *A* × *litardierei* Bennert & Meyer, the triploid hybrid described from Mallorca (BENNERT & MEYER, 1974) is to be regarded as a synonym of *A.* × *helii* nothosubsp. *helii*. See BENNERT & al. (1988, 1989) for the nomenclature of the hybrids between *A. petrarchae* and *A. trichomanes*.

[29]Triploid hybrid between *A. petrarchae* subsp. *bivalens* and *A. trichomanes* subsp. *quadrivalens* (BENNERT & al., 1990).

[30]Tetraploid hybrid between *A. majoricum* and *A. trichomanes* subsp. *quadrivalens* (LOVIS & REICHSTEIN, 1970).

[31]Triploid hybrid between *A. fontanum* and *A. majoricum* (BENNERT & al., 1987).

[32]Tetraploid hybrid between *A. majoricum* and *A. petrarchae* subsp. *petrarchae* (LOVIS & al., 1970).

[33]Tetraploid hybrid between *A. azomanes* and *A. trichomanes* subsp. *quadrivalens* (ROSSELLÓ & al., 1991). *A. trichomanes* nothosubsp. *barreraense* (RASBACH & al., 1990) is a synonym of *A.* × *tubalense*.

[34]Triploid hybrid between *A. balearicum* and *A. onopteris*. Known only from Menorca (CUBAS & al., 1987, 1989; BENNERT & al., 1988), from where it was described. It could probably be found in Sardinia and other Italian islands where its parents grow (PICHI-SERMOLLI, 1988). *A.* × *rosselloi* (BENNERT & al., 1988) is a later synonym of *A.* × *tyrrhenicum*.

[35]Reported for the Balearic flora by SALVO & al. (1984) based on a single frond included within a sheet also containing fronds of *D. pallida* subsp. *balearica* (Barranco de Sóller, E. Bourgeau; MA 236455). *A. filix-femina* has not been found again in the islands and perhaps it is a labeling error.

[36]Very rare in Mallorca and showing a slightly different morphology when compared to *C. fragilis* subsp. *fragilis*. The scarcity of herbarium specimens and the difficult taxonomy of the *Cystopteris fragilis* complex prevent a more accurate identification.

[37]Recently reported in the Balearic flora (ROSSELLÓ & al., unpubl. data).

[38]FRASER-JENKINS (1982) reports the presence of *D. pallida* subsp. *pallida* in the Balearic flora. However, in our opinion, the specimen studied by this author (MPU) is only a peculiar extreme form of *D. pallida* subsp. *balearica,* approaching in some morphological details to subsp. *pallida* but, nevertheless, falling within the range of variation of subsp. *balearica*. Herbarium specimens with similar characteristics have been collected from scattered localitis in Mallorca, which in any case, are well within the distribution area of subsp. *balearica*. Similarly, even if some plants from Sardinia (MPU) are morphologically approaching to subsp. *balearica* (DERRICK & al., 1987) they are to be regarded as morphological variations of subsp. *pallida*. The great polymorphism shown by *D. pallida* in the Balearic Islands is far away from the limits indicated by FRASER-JENKINS (1982) and does not allow us to recognize more than one taxon. Therefore, only *D. pallida* subsp. *balearica* would be present in the Balearic flora. Other taxonomic comments about *D. pallida* subsp. *balearica* can be found in NARDI (1976) and VIANE (1990).

[39]The discovery of this species in Mallorca was reported by ROSSELLÓ & al. (1989).

[40]See ROSSELLÓ & ALOMAR (1987) for details on its presence in Mallorca.

[41]A single plant with meiotic irregularities and growing in the neighbouring of *P. aculeatum* and *P. setiferum* has been referred to this hybrid (CUBAS & ROSSELLÓ, unpubl. data).

[42]The taxonomy of the infraspecific taxa of *J. phoenicea* has not been yet adequately solved. The subspecies *phoenicea, turbinata* (Guss.) Nyman and *eumediterranea* Lebreton & Thivend are reported in the Balearic flora (LEBRETON & THIVEND, 1981; GREUTER & al., 1984; AMARAL FRANCO, 1986). We have not found any clear morphological discontinuity among the Balearic populations, and in our opinion, only one polymorphic taxon of *J. phoenicea* exists in the Balearic Islands.

[43]*E. fragilis* is not present in Eivissa and Formentera. The unlocated record from Eivissa of BARCELO (1879-1881), later expanded to Formentera (BOLOS & VIGO, 1984) has never been confirmed.

[44]*P. ceciliae* A. Llorens & L. Llorens was described from specimens of southern Mallorca (LLORENS & LLORENS, 1972; LLORENS, 1984) and its distribution was later expanded to Menorca and Eivissa (LLORENS, 1979). The characters given by LLORENS & LLORENS (1972) to differentiate *P. ceciliae* from *P. halepensis* are poor and intermediate forms between them are known. Also, most seeds sown from wild *P. ceciliae* cones develop as normal *P. halepensis* (J. L. Gradaille, pers. com.). Populations of *P. ceciliae* are always small and they are found mixed with specimens of *P. halepensis*. From the above statements

we think that *P. ceciliae* is only a local mutation of *P. halepensis,* however, other possibilities cannot be, at present, excluded. Degenerating genetic forms of other pine species from islands of eastern Mediterranean have also been documented (PANETSOS, 1989). If the *P. ceciliae* specimens are to be considered as a different taxon, we think that a varietal rank would be the most adequate. We propose the following nomenclatural change:

Pinus halepensis Miller var. **ceciliae** (A. Llorens & L. Llorens) L. Llorens, **comb. nov.**

Basionym: *Pinus ceciliae* A. Llorens & L. Llorens, Bol. Soc. Hist. Nat. Bal. 17: 51 (1972); Folia Bot. Misc. 4: 55 (1984).

Synonym: *P. halepensis* var. *ceciliae* (A. Llorens & L. Llorens) L. Llorens, Mediterranea 3: 116 (1979), comb. inval.

[45]Contrary to the statements of BONAFE (1980) and GREUTER & al. (1984), *P. pinea* is not native in the Balearic flora. All the populations are naturalized.

[46]Distribution given in ALOMAR (1982).

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