

Some contributions to the wall flora in Corfu

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Abstract

The flora of walls in Corfu was investigated between 1993 and 2010. In doing so, 296 taxa growing in walls are recorded, which are distributed to over 75 plant families. The most important families are Asteraceae (34 taxa) and Poaceae (32 taxa), whilst 36 families have only one representative. Like in other investigated regions the flora of the walls in Corfu reflects partially the flora of their neighborhood. At least 31 taxa (10,6%) are neophytes (post-1492 aliens).

Introduction

Walls are artificial, rock-like habitats, absent in nature, but they are highly significant for settlements and man-made environment. Control parameters of this obviously simple systems are rock type, wall jointing, exposition, topography, altitude as well as availability of diaspore sources in the vicinity. This is why walls and their plants are an interesting subject of investigation. Vertical and mortared walls are normally only scarcely overgrown. Lack of water and limited nutrient as well as (at least at the beginning) high pH-values allow, besides several ferns and some specialists, only short-living establishments of numerous casuals in the joints of such walls. With this the age of the wall (deterioration of the mortar, shifting, possible cracks and cavities) as well as their thickness and the available root zone play an important role. If the wall is because of aging no longer vertical the cormophytic vegetation grows more abundant due to a better water supply.



Walls in an olive grove



Retaining wall above Vistonas

Investigated area and methods

Corfu (585,3 km²) is the second largest Ionian Island situated only some kilometres from the Albanian coast separated by the strait of Corfu. It represents the Western edge of Greece. Corfu lies on a shelf base and was separated from the shore by the raising of the sea level about 12. 000 to 10.000 years ago. Corfu's length is ca. 61 km, its maximum width is about 29 km in the north. The subsoil is mesozoic chalk, and breccia, marl and sandstone of the Neogene. The average annual precipitation given by Borkowsky (1994) is between 1230 mm and 1350 mm with a relatively short summer dryness. This is why Corfu leaves a „green“ overall impression and shows even some small perennial rivers. The aim of our research is the investigation of the phytodiversity of the walls with special respect to neighborly influences. Over a time period of 18 years (1993, 1995, 1996, 1999, 2009, 2010) all vascular plants growing on walls in Corfu have been documented by the author.

Results

Till now 296 taxa (mostly species) are documented, which are distributed to 75 plant families. Important families are Asteraceae (34 taxa), Poaceae (32 taxa), Lamiaceae (16 taxa), Brassicaceae (13 taxa), Fabaceae (13 taxa), Apiaceae (11 taxa) and Crassulaceae (10 taxa), whilst 36 families have only one representative. Ferns are represented by 9 taxa, lycopods by 1 taxon. It is to assume that this number of species growing on walls on Corfu is significantly higher. Following about 25% of the flora of Corfu is growing on walls by guess. The most important families are Asteraceae (34 taxa) and Poaceae (32 taxa), whilst 36 families have only one representative. Like in other investigated regions the flora of the walls in Corfu reflects partially the flora of their neighborhood. At least 31 taxa (10,5 %) are neophytes (post-1492 aliens).

A significant cumulation of the following species is seen on the big often inclined walls of fortresses (e.g. old fortress of Corfu):

<i>Ailanthus altissima</i>	<i>Micromeria nervosa</i>
<i>Antirrhinum majus</i> subsp. <i>tortuosum</i>	<i>Phagnalon rupestre</i> subsp. <i>graecum</i>
<i>Artemisia arborescens</i>	<i>Phagnalon rupestre</i> subsp. <i>rupestre</i>
<i>Capparis spinosa</i>	<i>Phlomis fruticosa</i>
<i>Cymbalaria muralis</i>	<i>Pistacia lentiscus</i>
<i>Cupressus sempervirens</i> juv.	<i>Ptilostemon gnaphalooides</i>
<i>Dittrichia viscosa</i>	<i>Rhamnus alaternus</i>
<i>Euphorbia dendroides</i>	<i>Sonchus tenerrimus</i>
<i>Ficus carica</i> juv.	<i>Stachys mollissima</i> (= <i>S. decumbens</i>)
<i>Foeniculum vulgare</i>	<i>Ulmus minor</i>
<i>Glebionis coronaria</i>	<i>Umbilicus chloranthus</i>
<i>Hedera helix</i>	<i>Umbilicus horizontalis</i>
<i>Inula verbascifolia</i> (close to the coast)	<i>Verbena officinalis</i>
<i>Micromeria graeca</i>	

Many of them are phanerophytes or chamaephytes also growing in open rock habitats. They show the ecological vicinity between fortress walls and rock habitats. Even *Blackstonia perfoliata* is growing on walls of the fortress of Corfu with an inclination of 80°. This may be seen as a hint for at least temporary good humidity. In contrast to this *Parietaria Judaica* is indeed not uncommon but reaches only little abundance. A community with *Antirrhinum majus* and *Parietaria judaica* is very common in Corfu Town as well as in villages and on ruined houses (Table 1).

Parietaria judaica forms distinct communities with different species (Table 2).

Parietaria judaica is a widespread taxon in olive groves, may be its spreading occurred end of the 20th century by change in land use (mechanical weed control, watering, application of herbicides).

These large stands of *Parietaria judaica* are partly shaded by trees or buildings. From a phytosociological point of view they were put into the order Urtico-Scrophularietalia by Brandes (1998a: Tab. 6; 1998b) according to Brullo & Marceno (1985: Tab. 14). In contrast to this *Parietaria judaica* shows only reduced vigour on walls and roofs. In general *Parietaria judaica* seems to be one of the most frequent weeds in Corfu with its highest abundance and vitality is without fail when growing in olive groves. Corresponding studies are documented from Athens (Brandes 2021), or from the Monte Baldo area (Brandes & Evers 1996).

Its variability is probably due to the hybridogenous origin: possibly an allotetraploid of *Parietaria officinalis* and *Parietaria cretica* (Runemark unpubl. in Carlström 1997). The species is considered as one of the main causes of pollinosis in Southern Europe because of its aggressive pollen and the long time period of flowering during the year. *Parietaria judaica* is common in old towns and villages in South and Southwest Europe. The species is known as an archaeophyte along the river Rhine since Roman times; nowadays it is spreading as container weed to Central Europe (Brandes 2021), resulting in stable populations existing without walls or artificial rocks.

Shaded walls show an interesting vegetation built up of chasmophytes of the class Asplenietea and of the order Geranio-Cardaminetalia hirsutae, in which communities with short-living and sciophilous nitrophytes are combined (Table 3 - 5). Species of Asplenietea and of Geranio-Cardaminetalia hirsutae are often mixed and not to be separated, they may be classified preferably as basal and/or derivate communities according to (Kopecký & Hejný 1974). The community of *Parietaria lusitanica* and *Veronica cymbalaria* shows close relationship to the *Parietario lusitanicae-Veronicetum cymbalariae* Brullo & Marcenó 1985 which was described from Sicily.

Table 1: Community with *Antirrhinum majus* and *Parietaria Judaica*

Number of the relevé	99/307	99/308	99/309	99/313	99/314
Area [m ²]	40	40	20	40	20
Inclination [°]	85	90	90	85	80
Vegetation cover [%]	20	35	10	20	15
Number of vascular species	14	15	10	9	9
<hr/>					
<u>Species of class Asplenietea:</u>					
<i>Antirrhinum majus</i>	2.1	1.2	(1.2)	3.2	1.1
<i>Parietaria judaica</i> (D)	2.2	+.2	1.1	2.2	2.1
<i>Phagnalon rupestre</i>	2.2	2.2	1.1	.	.
<i>Micromeria juliana</i>	1.2	+	1.2	.	.
<i>Stachys decumbens</i>	.	3.3	1.1	1.2	.
<i>Calamintha nepeta</i>	1.1	1.1	.	.	.
<i>Capparis spinosa</i>	.	2.1	2.2	.	.
<i>Ficus carica</i> Juv.	+	.	.	.	.
<hr/>					
<u>Other wall-dwelling species (Geranio-Cardaminetalia hirsutae):</u>					
<i>Campanula erinus</i>	1.2	2.2	1.2	1.1	2.2
<i>Parietaria lusitanica</i>	1.1	1.1	1.2	.	.
<i>Veronica cymbalaria</i>	+	+	.	.	.
<i>Arenaria leptoclados</i>	.	+.2	.	.	.
<i>Anogramma leptophylla</i>	.	+	.	.	.
<hr/>					
<u>Species of class Stellarietea:</u>					
<i>Sonchus oleraceus</i>	1.1	+	+	+	1.2
<i>Mercurialis annua</i>	1.2	.	+	1.2	1.1
<i>Conyza cf. bonariensis</i>	.	.	.	+	+
<i>Solanum nigrum</i>	r	.	.	.	.
<i>Euphorbia peplus</i>	.	.	.	.	+
<i>Bromus madritensis</i>	.	.	.	.	+
<hr/>					
<u>Others:</u>					
<i>Campanula ramosissima</i>	+	+	.	+.2	+
<i>Poaceae indet.</i>	1.1	.	.	+	.
<i>Oryzopsis miliacea</i>	.	1.2	.	.	.
Musci	.	10%	.	.	.

Table 2: Examples of wall vegetation with *Parietaria judaica*

Number of relevé 93/...	39	45	54	22	17	27	71	72	16	24	28
Area [dm ²]	180	500	400	80	15	100	30	20	40	100	50
Vegetation cover [%]	100	95	85	20	20	40	40	30	30	35	80
Number of species	6	9	4	2	3	6	4	3	7	5	5
<i>Parietaria judaica</i>	3.3	4.4	2.2	2.2	2.2	1.1	2.2	2.2	2.2	2.3	4.4
 <u>Species of class Stellarietea:</u>											
<i>Urtica membranacea</i>	4.3	2.2	1.2	1.1	.	.	.	.	.	.	.
<i>Mercurialis annua</i>	1.2	2.2	.	.	.	.	.	.	.	.	.
 <u>Species of class Asplenietea:</u>											
<i>Cymbalaria muralis</i>	.	.	.	.	1.2	2.2	2.2	2.3	.	.	.
 <u>Species of class Polygono-Poetea:</u>											
<i>Oxalis corniculata</i>	.	.	.	.	.	.	2.1	1.1	+	1.1	1.1
<i>Polykarpon tetraphyllum</i>	.	.	.	.	.	+	.	.	.	.	+
<i>Sagina apetala</i>	.	.	.	.	.	.	.	.	1.2	.	.
<i>Poa annua</i>	.	.	.	.	.	.	.	.	.	1.2	.
 <u>Further species of class Stellarietea:</u>											
<i>Sonchus oleraceus</i>	.	.	.	.	+	r	.	.	1.1	.	.
<i>Sisymbrium officinale</i>	.	1.1	.	.	.	1.2	.	.	.	.	.
<i>Stellaria media</i>	.	.	.	.	.	.	.	.	2.2	+	.
(D) <i>Galium aparine</i>	1.1	.	.	.	.	.	.	.	.	.	.
<i>Galactites tomentosa</i>	1.1.	.	.	.	.	.	.	.	.	.	.
<i>Capsella grandiflora</i>	+2	.	.	.	.	.	.	.	.	.	.
<i>Hordeum leporinum</i>	.	1°.2	.	.	.	.	.	.	.	.	.
<i>Geranium purpureum</i>	.	+	.	.	.	.	.	.	.	.	.
<i>Fumaria capreolata</i>	.	.	4.3	.	.	.	.	.	.	.	.
<i>Urospermum picroides</i>	.	.	.	.	.	2.2	.	.	.	.	.
<i>Conyza bonariensis</i>	.	.	.	.	.	.	1.1	.	.	.	.
<i>Parietaria lusitanica</i>	.	.	.	.	.	.	.	.	1.1	.	.
<i>Campanula erinus</i>	.	.	.	.	.	.	.	.	R	.	.
<i>Bromus madritensis</i>	.	.	.	.	.	.	.	.	.	+	.
 <u>Others:</u>											
<i>Arisarum vulgare</i>	.	1.2	1.1	.	.	.	.	.	.	.	.

Table 3: Community with *Parietaria lusitanica* and *Veronica cymbalaria*

	93/52	93/50	93/83	93/60	93/3	93/37
Number of relevé						
Area [m ²]	3	5	3	3	3	10
Vegetation cover [%]	5	10	20	30	15	20
Number of vascular species	8	11	7	8	6	10
<i>Parietaria lusitanica</i>	1.1	1.1	1.2	.	+	2.2
<i>Veronica cymbalaria</i>	+	1.1	.	+	.	1.1
<i>Ceterach officinarum</i>	1.1	+	+	2.2	2.2	2.1
<i>Geranium purpureum</i>	+	1.1	+	+	+	.
<i>Mercurialis annua</i>	.	r	.	.	r	+
<i>Reichardia picroides</i>	r	.	.	+	.	.
<i>Scleropoa rigida</i>	+	.	.	.	.	+
<i>Brachypodium retusum</i>	.	1.2	.	1.2	.	.
<i>Thelygonum cynocrambe</i>	.	+	.	1.1	.	.
<i>Selaginella denticulata</i>	.	.	2.3	2.3	.	.
<i>Micromeria graeca</i>	.	.	+	.	+	.
<i>Umbilicus horizontalis</i>	.	.	.	+	.	2.2
<i>Valantia muralis</i>	1.2	.	.	.	.	.
<i>Sedum litoreum</i>	+	.	.	.	.	.
<i>Fumaria capreolata</i>	.	1.1	.	.	.	.
<i>Arisarum vulgare</i>	.	+2	.	.	.	.
<i>Stellaria media</i>	.	+	.	.	.	.
<i>Campanula erinus</i>	.	.	+	.	.	.
<i>Urtica membranacea</i>	.	+	.	.	.	.
<i>Polypodium cambricum</i>	.	.	r	.	.	.
<i>Stachys decumbens</i>	.	.	.	.	1.1	.
<i>Parietaria judaica</i>	.	.	.	.	.	2.2
<i>Bromus madritensis</i>	.	.	.	.	.	1.1
<i>Arenaria leptoclados</i>	.	.	.	.	.	+
<i>Campanula ramosissima</i>	.	.	.	.	.	+



Castle in Kassiopi



Walls upon the contrafossa (old fortress of Corfu)

Table 4: Community with *Sedum hispanicum* and *Geranium lucidum*

Number of the relevé	99/281	99/282	99/302	99/303	99/326
Area [m ²]	1	1	4	8	3
Vegetation cover [%]	20	30	20	20	50
Species number (vascular plants)	7	8	6	8	10
<hr/>					
<i>Sedum hispanicum</i>	2.2	3.3	2.3	2.2	2.2
<i>Umbilicus horizontalis</i>	.	.	+	+	1.2
<i>Parietaria judaica</i> (D)	.	+°	.	.	1.1
<i>Asplenium ceterach</i>	.	1.1	.	.	.
<hr/>					
<u>Species of the order Geranio-Cardaminetalia hirsutae:</u>					
<i>Geranium lucidum</i>	.	.	2.2	1.2	3.3
<i>Sedum litoreum</i>	1.1	.	.	.	.
<i>Campanula erinus</i>	+2	.	.	.	.
<i>Arenaria cf. leptoclados</i>	.	+	.	.	.
<i>Geranium rotundifolium</i>	.	r	.	.	.
<i>Veronica cymbalaria</i>	.	.	.	+2	.
<i>Erophila verna</i>	.	.	.	.	1.2
<hr/>					
<u>Companions:</u>					
<i>Catapodium rigidum</i>	+	1.2	.	.	1.2
<i>Rubus ulmifolius</i>	.	.	r°	1.1	.
<i>Saxifraga tridactylites</i>	1.2	.	.	.	.
<i>Sonchus oleraceus</i>	+	.	.	.	.
<i>Foeniculum vulgare</i> juv.	r	.	.	.	.
<i>Festuca danthonii</i> [= <i>Vulpia ciliata</i>]	.	+2	.	.	.
<i>Avena barbata</i>	.	+	.	.	.
<i>Clematis flammula</i>	.	.	1.2	.	.
<i>Brachypodium ramosum</i>	.	.	+2	.	.
<i>Hedera helix</i>	.	.	.	2.2	.
<i>Fumaria capreolata</i>	.	.	.	1.2	.
<i>Ulmus minor</i> juv.	.	.	.	+	.
<i>Campanula ramosissima</i>	.	.	.	.	2.2
<i>Hypericum sprunieri</i>	.	.	.	.	1.2
<i>Carduus pycnocephalus</i>	.	.	.	.	1.1
<i>Crepis rubra</i>	.	.	.	.	+2
Musci	.	5%	25%	25%	25%

Table 5: Community with *Selaginella denticulata* and *Sedum cepaea*

Number of the relevé	95/46	94/47	95/48	96/21	96/20
Area [m ²]	0,5	0,4	1,5	2	5
Vegetation cover [%]	95	85	80	70	50
Species number	6	6	4	8	11
<i>Selaginella denticulata</i>	4.4	4.4	3.3	2.2	+.2
<i>Sedum cepaea</i>	1.2	2.2	+	3.3	1.2
<i>Geranium purpureum</i>	+	+	.	1.1	.
<i>Asplenium onopteris</i>	1.1	1.1	.	.	.
<i>Hedera helix</i>	1.1	1.1	.	.	.
<i>Anogramma leptophylla</i>	+	.	2.2	.	.
<i>Ceterach officinarum</i>	.	.	.	1.1	1.2
<i>Stachys decumbens</i>	.	.	.	1.2	2.2
<i>Campanula ramosissima</i>	.	.	.	1.2	1.1
<i>Cruciata glabra</i>	.	+°	.	.	.
<i>Cyclamen hederifolium</i>	.	.	+.2	.	.
<i>Micromeria juliana</i>	.	.	.	2.2	.
<i>Securigera securidaca</i>	.	.	.	1.1	.
<i>Brachypodium retusum</i>	.	.	.	.	2.3
<i>Arenaria leptoclados</i>	.	.	.	.	1.2
<i>Campanula erinus</i>	.	.	.	.	1.2
<i>Phagnalon graecum</i>	.	.	.	.	1.2
<i>Sedum litoreum</i>	.	.	.	.	+.2
<i>Verbascum</i> spec. juv.	.	.	.	.	R
Musci	5%	1%	15%	.	.



Bastion wall in Corfu town



Staggered walls (old fortress of Corfu)

The walls of the Pantokrator Monastery (approximately 900 m above sea level) harbor a definite community of the class Asplenietea with *Campanula versicolor*, *Scrophularia heterophylla*, *Asplenium ceterach* and *Asplenium trichomanes* (table 6). *Campanula versicolor* shows obviously limited distribution to higher altitudes in the north of Corfu.

Table 6: Community with *Campanula versicolor* (Pantokrator Monastery)

Number of the relevé	93/178	93/179	93/180	93/181
Area [m ²]	4	10	15	15
Exposition	N	N	NNW	NNW
Vegetation cover [%]	5	35	20	5
Inclination [°]	85	85	85	85
Number of species	7	9	7	7

Species of class Asplenietea:

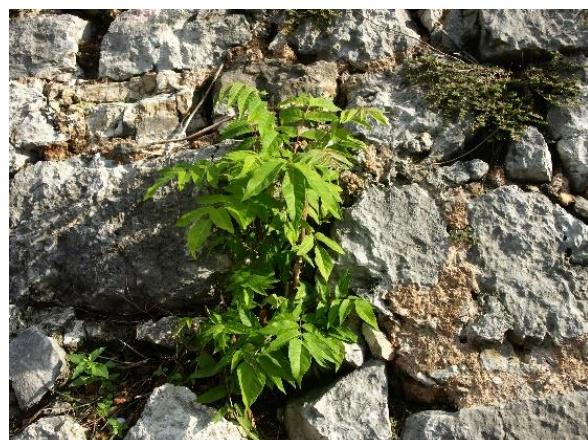
<i>Campanula versicolor</i>	1.1	3.2	2.2	1.1
(D) <i>Scrophularia heterophylla</i>	+	2.1	2.1	2.2
<i>Asplenium ceterach</i>	+	1.1	1.1	.
<i>Asplenium trichomanes</i>	.	1.1	2.1	1.1
<i>Umbilicus horizontalis</i>	+	.	.	.
(D) <i>Parietaria judaica</i>	.	1.2	.	.
<i>Sedum hispanicum</i>	.	+.2	.	.
<i>Micromeria juliana</i>	.	.	.	+

Companions:

<i>Saxifraga tridactylites</i>	1.2	.	+	+
<i>Melica transsyhanica</i>	.	+.2	.	1.2
<i>Dactylis hispanica</i>	.	.	1.2	+.2
<i>Verbascum macrourum</i>	r	.	.	.
<i>Veronica arvensis</i>	r	.	.	.
<i>Scleropoa rigida</i>	.	+.2	.	.
<i>Phlomis fruticosa</i>	.	+°	.	.
<i>Dryopteris villarii</i>	.	.	1.2	.



Adiantum capillus-veneris



Ailanthes altissima

The cracks of retaining walls and enclosing walls in villages harbor many ornamental plants as well as weeds. It is often the first step in the process of naturalization:

<i>Alcea rosea</i>	<i>Matricaria recutita</i>
<i>Amaranthus cruentus</i>	<i>Mercurialis annua</i>
<i>Amaranthus deflexus</i>	<i>Papaver rhoeas</i>
<i>Amaranthus retroflexus</i>	<i>Persicaria capitata</i>
<i>Amaranthus viridis</i>	<i>Putoria calabrica</i>
<i>Anredera cordifolia</i>	<i>Orobanche</i> div. spec.
<i>Antirrhinum majus</i>	<i>Quercus coccifera</i>
<i>Bromus madritensis</i>	<i>Sanguisorba minor</i> subsp. <i>balaearica</i>
<i>Capsella grandiflora</i>	<i>Saponaria officinalis</i>
<i>Centranthus ruber</i>	<i>Sedum cepaea</i>
<i>Crepis neglecta</i>	<i>Sedum hispanicum</i>
<i>Clematis flammula</i>	<i>Selaginella denticulata</i>
<i>Comvolvulus elegantissima</i>	<i>Solanum lycopersicum</i>
<i>Cyanus segetum</i>	<i>Sonchus oleraceus</i>
<i>Erigeron karvinskianus</i>	<i>Thelygonum cynocrambe</i>
<i>Euphorbia helioscopia</i>	<i>Tradescantia fluminensis</i>
<i>Euphorbia peplus</i>	<i>Tradescantia pallida</i>
<i>Ficus carica</i>	<i>Tragopogon porrifolius</i> subsp. <i>eriospermus</i>
<i>Fumaria capreolata</i>	<i>Tropaeolum majus</i>
<i>Galium aparine</i>	<i>Umbilicus chloranthus</i>
<i>Geranium purpureum</i>	<i>Umbilicus horizontalis</i>
<i>Geranium rotundifolium</i>	<i>Vitis vinifera</i>
<i>Ipomoea purpurea</i>	<i>Ziziphus jujuba</i>

The lower parts of walls near their base are characterized by nitrophilous species, weeds and even comparatively hygrophilous plants:

<i>Acanthus spinosus</i>	<i>Lolium multiflorum</i>
<i>Amaranthus deflexus</i>	<i>Marrubium vulgare</i>
<i>Arisarum vulgare</i>	<i>Mercurialis annua</i>
<i>Arum italicum</i>	<i>Notobasis syriaca</i>
<i>Avena sterilis</i>	<i>Oxalis corniculata</i>
<i>Ballota nigra</i>	<i>Papaver rhoeas</i>
<i>Bryonia dioica</i>	<i>Papaver somniferum</i>
<i>Capsella grandiflora</i>	<i>Parietaria judaica</i>
<i>Cardamine hirsuta</i>	<i>Plantago major</i>
<i>Chenopodium murale</i>	<i>Poa annua</i>
<i>Chenopodium opulifolium</i>	<i>Polykarpon tetraphyllum</i>
<i>Chenopodium vulvaria</i>	<i>Rhagadiolus stellatus</i>
<i>Conyza bonariensis</i>	<i>Rumex pulcher</i>
<i>Cymbalaria muralis</i>	<i>Sisymbrium officinale</i>
<i>Cynodon dactylon</i>	<i>Smyrnium olusatrum</i>
<i>Dysphania ambrosioides</i>	<i>Solanum lycopersicum</i>
<i>Eleusine indica</i>	<i>Symplytrichum squamatum</i>
<i>Euphorbia helioscopia</i>	<i>Thelygonum cynocrambe</i>
<i>Ficus carica</i>	<i>Urtica dioica</i>
<i>Fumaria capreolata</i>	<i>Urtica membranacea</i>
<i>Hordeum leporinum</i>	<i>Vinca major</i>
<i>Hyoscyamus albus</i>	
<i>Lactuca serriola</i>	

The plant cover of cracks in concrete walls which more and more replace the conventional retaining walls in villages and along roads is very sparse: only *Scrophularia heterophylla* and *Parietaria judaica* were found occasionally.

Especially ancient wall tops are preferred for growing; e.g. the old and broad enclosing walls of Kassiopi Castle [that is one of the three Byzantine-period castles that defended the island before the Venetian era (1386 –1797)]:

Andropogon distachyos

Arenaria leptoclados

Arenaria serpyllifolia

Asparagus acutifolius

Avena sterilis

Bituminaria bituminosa

Briza maxima

Catapodium rigidum

Clematis flammula

Crepis neglecta

Dasypphyllum villosum

Ephedra foeminea (= *E. campylopoda*)

Galium murale

Geranium purpureum

Glebionis coronaria

Hyparrhenia hirta

Lagurus ovatus

Malabaila aurea

Micromeria graeca

Micromeria juliana

Olea europaea

Orlaya grandiflora

Paliurus spina-christi

Phlomis fruticosa

Piptatherum miliaceum

Rosa sempervirens

Rostraria cristata

Sedum sediforme

Spartium junceum

Trifolium campestre

Trifolium resupinatum

Trigonella corniculata

Urospermum picroides

Vallantia muralis

Crithmum maritimum appears only in walls if the wall lies in striking inshore distance:

Relevé 93/52a:

Wall 2 – 4m above sea level on the coastal road 1 km south of Pérama. 28.9.1993. Area 80 m², vegetation cover 10 %:

2.1 *Crithmum maritimum*,

1.1 *Vitex agnus-castus*, 1.1 *Dittrichia viscosa*, 1.2 *Calystegia sylvatica*, 1.1 *Conyza canadensis*.



Anogramma leptophylla



Anredera cordifolia

Checklist of vascular plants growing on walls of Corfu

- Acanthus spinosus* L. [Acanthaceae]
Acer campestre L. [Aceraceae]
Adiantum capillus-veneris L. [Pteridaceae]
Ailanthus altissima (MILL.) SWINGLE [Simaroubaceae]
Aira elegantissima Schur [Poaceae]
Ajuga orientalis L. [Lamiaceae]
Alcea rosea L. [Malvaceae]
Alkanna tinctoria L. [Boraginaceae]
Allium roseum L. [Amaryllidaceae]
Allium subhirsutum L. [Amaryllidaceae]
Amaranthus albus L. [Amaranthaceae]
Amaranthus cruentus L. [Amaranthaceae]
**Amaranthus deflexus* L. [Amaranthaceae]
**Amaranthus hybridus* L. [Amaranthaceae]
**Amaranthus retroflexus* L. [Amaranthaceae]
**Amaranthus viridis* L. [Amaranthaceae]
Anagallis arvensis L. [Primulaceae]
Andropogon distachyos L. [Poaceae]
Anemone pavonina LAM. [Ranunculaceae]
Anogramma leptophylla L. [Pteridaceae]
Anredera cordifolia (Ten.) Steenis [Basellaceae]
Anthemis chia L. [Asteraceae]
Anthriscus nemorosus (M. BIEB.) SPRENG. [Apicaceae]
Antirrhinum majus L. subsp. *majus* [Plantaginaceae]
Antirrhinum majus L. subsp. *tortuosum* (BOSC) ROUY [Plantaginaceae]
Arabis verna L. [Brassicaceae]
Arenaria leptoclados (RCHB.) GUSS. [Caryophyllaceae]
Arenaria serpyllifolia L. [Caryophyllaceae]
Arisarum vulgare TARG.-TOZZ. [Araceae]
Artemisia arborescens L. [Asteraceae]
Asparagus acutifolius L. [Asparagaceae]
Asplenium ceterach L. [Aspleniaceae]
Asplenium onopteris L. [Aspleniaceae]
Asplenium trichomanes L. [Aspleniaceae]
Athamanta macedonica (L.) SPRENG. [Apiaceae]

- Aurinia saxatilis* L. (DESV.) cf. subsp. *orientalis* (ARD.) DUDLEY [Brassicaceae]
Avena sterilis L. [Poaceae]
Ballota acetabulosa L. [Lamiaceae]
Ballota nigra L. [Lamiaceae]
Bituminaria bituminosa (L.) C. H. STIRT [Fabaceae]
Borago officinalis L. [Boraginaceae]
Blackstonia perfoliata L. [Gentianaceae]
Brachypodium phoenicoides (L.) ROEM. & SCHULT. [Poaceae]
Brachypodium retusum (PERS.) P. BEAUV. [Poaceae]
Brachypodium sylvaticum (HUDSON) P. BEAUV. [Poaceae]
Bromus madritensis L. [Poaceae]
Bromus rigidus L. [Poaceae]
Broussonetia papyrifera (L.) VENT. [Moraceae]
Briza maxima L. [Poaceae]
Bryonia dioica JACQ. [Cucurbitaceae]
Calamintha nepeta (L.) SAVI [Lamiaceae]
Calendula arvensis L. [Asteraceae]
Calystegia sepium L. [Convolvulaceae]
Campanula erinus L. [Campanulaceae]
Campanula ramosissima SM. [Campanulaceae]
Campanula versicolor ANDREWS [Campanulaceae]
Capparis spinosa L. [Capparaceae]
Capsella bursa-pastoris L. [Brassicaceae]
Capsella grandiflora (FAUCHÉ & CHAUB.) BOISS. [Brassicaceae]
Cardamine hirsuta L. [Brassicaceae]
Carduus pycnocephalus L. [Asteraceae]
Carlina graeca BOISS. [Asteraceae]
Carthamus lanatus L. [Asteraceae]
Catapodium rigidum (L.) DONY [Poaceae]
Catharanthus roseus (L.) G. DON [Apocynaceae]
**Celtis australis* L. [Cannabaceae]
**Cercis siliquastrum* L. [Fabaceae]
Cerinthe major L. [Boraginaceae]
Chamaesyce prostrata (AITTON) SMALL [Euphorbiaceae]
Cheilanthes acrostica (BALB.) TOD. [Pteridaceae]
Chenopodiastrum murale (L.) S. FUENTES, UOTILA & BORSCH [Amaranthaceae]

- Chenopodium album* L. [Amaranthaceae]
Chenopodium opulifolium W. D. J. KOCH & ZIZ [Amaranthaceae]
Chenopodium vulvaria L. [Amaranthaceae]
Chondrilla juncea L. [Asteraceae]
Clematis flammula L. [Ranunculaceae]
Clematis vitalba L. [Ranunculaceae]
Clinopodium vulgare L. [Lamiaceae]
Convolvulus althaeoides L. [Convolvulaceae]
Convolvulus cantabrica L. [Convolvulaceae]
Convolvulus elegantissima MILL. [Convolvulaceae]
Coronilla scorpioides (L.) KOCH [Fabaceae]
Coronilla valentina L. subsp. *glaucia* BATT. [Fabaceae]
Convolvulus arvensis L. [Convolvulaceae]
**Conyza bonariensis* L. [Asteraceae]
Crepis neglecta L. [Asteraceae]
Crepis rubra L. [Asteraceae]
Crithmum maritimum L. [Apiaceae]
Crocus boryi GAY [Iridaceae]
Cupressus sempervirens L. [Cupressaceae]
Cyanus segetum Hill (= *Centaurea cyanus* L.) [Asteraceae]
Cyclamen hederifolium AITON [Primulaceae]
Cymbalaria muralis G. GAERTN. & al. [Plantaginaceae]
Cynodon dactylon (L.) PERS. [Poaceae]
Cynoglossum creticum MILL. [Boraginaceae]
Cynosurus echinatus L. [Poaceae]
Dactylis glomerata L. subsp. *bispanica* (ROTH) NYMAN [Poaceae]
Daypyrum villosum (L.) BORBÁS [Poaceae]
Digitaria sanguinalis (L.) SCOP. [Poaceae]
Dittrichia graveolens (L.) GREUTER [Asteraceae]
Dittrichia viscosa (L.) GREUTER [Asteraceae]
Draba verna L. [Brassicaceae]
Dryopteris villarii (BELLARDI) WOYN. ex Schinz. & THELL. [Dryopteridaceae]
Dysphania ambrosioides (L.) MOSYAKIN & CLEMANTS [Amaranthaceae]
Ecballium elaterium (L.) A. RICH. [Cucurbitaceae]
Echinochloa crus-galli (L.) P. BEAUV. [Poaceae]
Echium plantagineum L. [Boraginaceae]
**Eleusine indica* (L.) GAERTN. [Poaceae]

- Ephedra foeminea* FORSSK. [Ephedraceae]
**Equisetum telmateia* EHRH. [Equisetaceae]
Erica manipuliflora SALISB. [Ericaceae]
Erigeron karrinskianus DC. [Asteraceae]
Erodium malacoides (L.) L' HÉR. [Geraniaceae]
Erucastrum incanum (L.) W. D. J. KOCH [Brassicaceae]
Erysimum cheiri L. [Brassicaceae]
Erysimum cf. linearifolium TAUSCH [Brassicaceae]
Euphorbia dendroides L. [Euphorbiaceae]
Euphorbia helioscopia L. [Euphorbiaceae]
Euphorbia peplus L. [Euphorbiaceae]
Festuca danthonii ASCH. & GRAEBN. (= *Vulpia ciliata* DUM.; = *Festuca ambigua* LE GALL) [Poaceae]
Festuca myuros L. (= *Vulpia myuros* (L.) C. GMEL.) [Poaceae]
Ficus carica L. [Moraceae]
Filago pygmaea L. [Asteraceae]
Foeniculum vulgare MILL. [Apiaceae]
Fraxinus ornus L. [Oleaceae]
Fumaria capreolata L. [Papaveraceae]
Fumaria parviflora LAM. [Papaveraceae]
Galactites tomentosa Moench [Asteraceae]
Galium aparine L. [Rubiaceae]
Galium murale L. [Rubiaceae]
Galium cf. parisiense L. [Rubiaceae]
Geranium brutium GASPARR. [Geraniaceae]
Geranium dissectum L. [Geraniaceae]
Geranium lucidum L. [Geraniaceae]
Geranium molle L. [Geraniaceae]
Geranium purpureum L. [Geraniaceae]
Geranium rotundifolium L. [Geraniaceae]
Glebionis coronaria Cass. ex Spach [Asteraceae]
Hedera helix L. [Araliaceae]
Heliotropium europaeum L. [Boraginaceae]
Hesperis laciniata ALL. subsp. *laciniata* [Brassicaceae]
Hirschfeldia incana (L.) LAGR.-FOSS. [Brassicaceae]
Hyoscyamus albus L. [Solanaceae]
Hordeum leporinum L. subsp. *leporinum* (LINK) ARCANG. [Poaceae]

- Hymenocarpos circinnatus* (L.) SAVI [Fabaceae]
Hyparrhenia hirta (L.) STAPF [Poaceae]
Hypericum spruneri Boiss. [Hypericaceae]
Impatiens cf. *balfourii* HOOK. FIL. [Balsaminaceae]
Inula verbascifolia WILLD. [Asteraceae]
Ipomoea purpurea (L.) ROTH [Convolvulaceae]
Lactuca serriola L. [Asteraceae]
Lactuca viminea (L.) PRESL. [Asteraceae]
Lagurus ovatus L. [Poaceae]
Lamium amplexicaule L. [Lamiaceae]
Lantana camara L. [Verbenaceae]
**Laurus nobilis* L. [Lauraceae]
Lavatera arborea L. [Malvaceae]
Lunaria annua L. [Brassicaceae]
Malabaila aurea (SIBTH. & SM.) BOISS. [Apiaceae]
Malva sylvestris L. [Malvaceae]
Marrubium vulgare L. [Lamiaceae]
Medicago minima (L.) L. [Fabaceae]
Melia azedarach L. (Meliaceae)
Melica minuta L. [Poaceae]
Melica transylvanica SCHUR subsp. *klokovii* TZVELEV [Poaceae]
Melissa officinalis L. subsp. *altissima* (SIBTH. & SM.) ARCANG. [Lamiaceae]
Mercurialis annua L. [Euphorbiaceae]
Micromeria graeca L. [Lamiaceae]
Micromeria juliana L. [Lamiaceae]
**Mirabilis jalapa* L. [Nyctaginaceae]
Misopates orontium (L.) RAF. [Plantaginaceae]
Morus alba L. [Moraceae]
**Notobasis syriaca* L. [Asteraceae]
Olea europaea L. [Oleaceae]
Opuntia ficus-indica L. (MILL.) [Cactaceae]
Origanum vulgare L. [Lamiaceae]
Origanum onites L. [Lamiaceae]
Orlaya grandiflora (L.) Hoffm. [Apiaceae]
Orobanche hederae DUBY [Orobanchaceae]
**Oxalis corniculata* L. [Oxalidaceae]
Oxalis pes-caprae L. [Oxalidaceae]

- Palmaria spinosa-christi* MILL. [Rhamnaceae]
Pallenis spinosa (L.) CASS. subsp. *spinosa* [Asteraceae]
Papaver hybridum L. [Papaveraceae]
Papaver rhoeas L. [Papaveraceae]
Papaver somniferum L. [Papaveraceae]
Parietaria cretica L. [Urticaceae]
Parietaria judaica L. [Urticaceae]
Parietaria lusitanica L. [Urticaceae]
Parietaria officinalis L. [Urticaceae]
Persicaria capitata (Buch.-Ham. ex D. Don) H. Gross [Polygonaceae]
Petrorhagia glumacea (Chaub. & Bory) P.W.Ball & Heywood [Caryophyllaceae]
**Petroselinum crispum* (MILL.) A. W. HILL [Apiaceae]
Phagnalon rupestre (L.) DC. subsp. *rupestre* [Asteraceae]
Phagnalon rupestre (L.) DC. subsp. *graecum* BOISS. & HELDR. [Asteraceae]
Phedimus stellatus (L.) RAF. [Crassulaceae]
Phillyrea latifolia L. [Oleaceae]
Phlomis fruticosa L. [Lamiaceae]
**Phoenix canariensis* HORT. ex CHABAUD [Arecaceae]
**Phytolacca americana* L. [Phytolaccaceae]
Piptatherum miliaceum (L.) Coss [Poaceae]
Pistacia lentiscus L. [Anacardiaceae]
Pistacia terebinthus L. [Anacardiaceae]
Plantago afra L. [Plantaginaceae]
Plantago major L. [Plantaginaceae]
Plantago serraria L. [Plantaginaceae]
Poa annua L. [Poaceae]
**Polykarpon tetraphyllum* L. [Caryophyllaceae]
Polygonum aviculare L. [Polygonaceae]
Polypodium cambricum L. [Polypodiaceae]
Polypogon monspeliensis (L.) Desf. [Poaceae]
Portulaca oleracea L. [Portulacaceae]
**Pteridium aquilinum* (L.) KUHN subsp. *aquilinum* [Dennstaedtiaceae]
Ptilostemon gnaphaloides (CYR.) SOJÁK [Asteraceae]
Pulicaria odora (L.) RCHB. [Asteraceae]
Putoria calabrica L. FIL. [Rubiaceae]
Pyrus spinosa FORSSk. [Rosaceae]

- Quercus coccifera* L. [Fagaceae]
**Ranunculus muricatus* L. [Ranunculaceae]
Reichardia picroides L. [Asteraceae]
Rhagadiolus stellatus (L.) GAERTN. [Asteraceae]
Rhamnus alaternus L. [Rhamnaceae]
Robinia pseudoacacia L. [Fabaceae]
Rosa sempervirens L. [Rosaceae]
Rostraria cristata (L.) TZVELEV [Poaceae]
Rubus ulmifolius SCHOTT [Rosaceae]
Rumex pulcher L. [Polygonaceae]
**Sagina apetala* ARD. [Caryophyllaceae]
Salvia verbenaca L. [Lamiaceae]
**Sambucus ebulus* L. [Adoxaceae]
Sambucus nigra L. [Adoxaceae]
Sanguisorba minor SCOP. subsp. *balearica* (NYMAN) MUÑOZ GARM. & C. NAVARRO [Rosaceae]
**Saponaria officinalis* L. [Caryophyllaceae]
Saxifraga rotundifolia L. subsp. *chrysospleniifolia* (BOISS.) D. A. WEBB
Saxifraga tridactylites L. [Saxifragaceae]
Scaligeria napiformis (WILLD. EX SPRENG.) GRANDE [Apiaceae]
Scorpiurus muricatus L. [Fabaceae]
Scrophularia heterophylla WILLD. [Scrophulariaceae]
Scrophularia peregrina L. [Scrophulariaceae]
Securigera securidaca (L.) Degen & Dörfler [Fabaceae]
Sedum caespitosum (Cav.) DC. [Crassulaceae]
Sedum cepaea L. [Crassulaceae]
Sedum hispanicum L. [Crassulaceae]
Sedum litoreum GUSS. [Crassulaceae]
Sedum ochroleucum CHAIX [Crassulaceae]
Sedum sediforme (JACQ.) PAU [Crassulaceae]
Selaginella denticulata (L.) Spring [Selaginellaceae]
Senecio vulgaris L. [Asteraceae]
Setaria adhaerens (Forssk.) Chiov. [Poaceae]
Setaria viridis (L.) P. BEAUV. [Poaceae]
Silene vulgaris (MOENCH) GÄRCKE [Caryophyllaceae]
**Sisymbrium officinale* (L.) SCOP. [Brassicaceae]
Smilax aspera L. [Smilacaceae]
Smyrnium olusatrum L. [Apiaceae]

- Smyrnium rotundifolium* MILL. [Apiaceae]
**Solanum lycopersicum* L. [Solanaceae]
Solanum nigrum L. [Solanaceae]
Solanum villosum MILL. subsp. *vilosum* [Solanaceae]
Sonchus asper (L.) HILL [Asteraceae]
**Sonchus oleraceus* L. [Asteraceae]
Sonchus tenerimus L. [Asteraceae]
Sorghum halepense (L.) PERS. [Poaceae]
Spartium junceum L. [Fabaceae]
Stachys mollissima WILLD. (= *Stachys decumbens* PERS.) [Lamiaceae]
**Stellaria media* L. [Caryophyllaceae]
Symphytum squamatum (SPRENG.) G. L. NESOM [Asteraceae]
Tamus communis L. [Dioscoreaceae]
Teucrium flavum (L.) VILL. [Lamiaceae]
Teucrium capitatum L. [Lamiaceae]
Thelygonum cynocrambe L. [Theligonaceae]
Torilis nodosa (L.) GAERTN. [Apiaceae]
**Trachelium caeruleum* L. subsp. *trachelium* [Campanulaceae]
Tradescantia fluminensis VELL. [Commelinaceae]
Tradescantia pallida (ROSE) D. R. HUNT [Commelinaceae]
Tragopogon porrifolius L. subsp. *eriospermus* (TEN.) GREUTER [Asteraceae]
Trifolium campestre SCHREB. [Fabaceae]
Trifolium repens L. subsp. *repens* [Fabaceae]
Trifolium resupinatum L. [Fabaceae]
Trigonella corniculata (L.) L. [Fabaceae]
Tropaeolum majus L. [Tropaeolaceae]
Ulmus minor Mill. [Ulmaceae]
Umbilicus chlroranthus HELDR. & SART. ex BOISS. [Crassulaceae]
Umbilicus horizontalis (GUSS.) DC. [Crassulaceae]
Urospermum picroides L. [Asteraceae]
**Urtica dioica* L. subsp. *dioica* (Urticaceae)
Urtica membranacea POIRET (Urticaceae)
Valantia muralis L. (Rubiaceae)
Verbascum macrurum TEN. (Scrophulariaceae)
Verbascum pulverulentum VILL. (Scrophulariaceae)
Verbascum sinuatum L. (Scrophulariaceae)

- Veronica arvensis* L. (Plantaginaceae)
Veronica cymbalaria BOD. (Plantaginaceae)
Vinca major L. subsp. *major* (Apocynaceae)
Vitex agnus-castus L. (Verbenaceae)
Vitis vinifera L. (Vitaceae)
Ziziphus jujuba MILL. (Rhamnaceae)

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Antirrhinum majus



Artemisia arborescens



Asplenium trichomanes



Asplenium ceterach



Anthriscus nemorosus



Ballota acetabulosa



Ballota nigra



Aurinia saxatilis



Calendula arvensis



Campanula ramosissima



Campanula versicolor



Capparis spinosa



Catharanthus roseus



Cheilanthes acrostica



Chenopodium vulvaria



Chondrilla juncea



Dittrichia graveolens



Dittrichia viscosa



Ecballium elaterium



Ficus carica



Fumaria capreolata



Geranium lucidum



Geranium purpureum



Heliotropium europaeum



Hyoscyamus albus



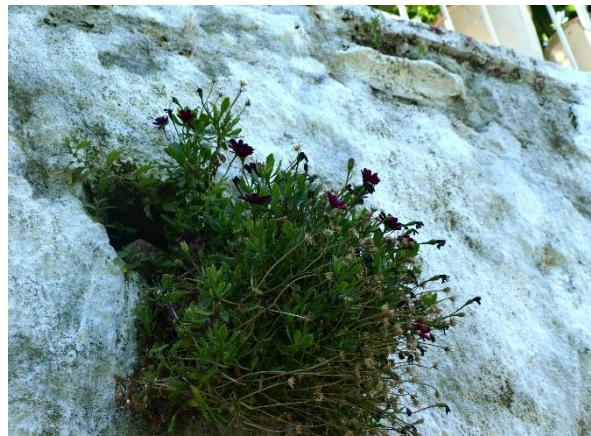
Inula verbascifolia, *Lagurus ovatus*



Laurus nobilis



Micromeria graeca



Osteospermum spec.



Papaver hybridum



Parietaria judaica



Parietaria hispanica



Persicaria capitata



Plantago major



Ptilostemon gnaphaloides



Putoria calabrica



Quercus coccifera



Plantago afra



Blackstonia perfoliate



Campanula spatulata



Rhamnus alaternus



Rosa sempervirens



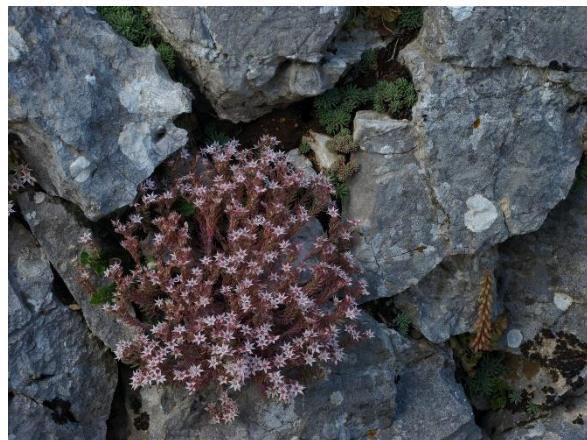
Saxifraga rotundifolia



Scrophularia heterophylla



Scrophularia peregrina



Sedum hispanicum



Phedimus stellatus



Stachys decumbens



Teucrium capitatum



Thelygonum cynocrambe



Tradescantia fluminensis



Tragopogon porrifolius



Tropaeolum majus



Ziziphus jujuba

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