



Miscellaneous to the vegetation of hard surfaces in old towns in North Portugal (Porto, Braga, Guimarães)

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The densely built-up and multi-colored Ribeira (riverside) of Porto





Bridges shape the silhouette of Porto.
Note the medieval city wall in the background built of granite

Introduction

A short excursion to the historic centres of Porto, Braga and Guimarães in spring 2024 showed a relatively lush vegetation of urban hard surfaces due to mild winters (winter hardiness zone 10a: -1,1°C to 1,7°C) and high rainfall (approx. 1237 to 1706 mm p.a).

In the meanwhile most of the people of the world are living in cities. Urban ecosystems are therefore a very important habitat. The urbanization process involves a remarkable reduction of potential areas for spontaneous vegetation, surface sealing and use of hard construction materials where only the joints can be used by plants. The later is often mentioned as „urban hard surfaces“ (LUNDHOLM 2011). Indeed urban ecology started with the investigation of the flora of walls (DEAKIN 1855) after the very early work of PANAROLI (1643).

The aim of this paper is to document vegetation pattern from the historic centres; mainly of Porto. The vegetation of stone walls in Porto belongs primarily to the alliance Centrantho – Parietarion enriched by some vigorously growing alien species.

Tabl. 1: Species composition of some walls in Porto

Current number of relevé	4999	5001	5006	5000	5002	5005	5003	5004
Area [m ²]	60	50	50	3	20	50	30	15
Vegetation cover [%]	35	20	30	80	15	25	20	15
Number of species	10	6	9	5	6	5	3	3
<i>Cymbalaria muralis</i>	3.2	1.2	1.2	3.3	+	1.2	.	.
<i>Erigeron karvinskianus</i>	2.1	2.2	1.1	.	.	2.3	1.1	.
<i>Parietaria judaica</i>	2.3	+	2.3	3.3	1.1	.	.	.
<i>Adiantum capillus-veneris</i>	.	1.2	.	1.2	2.2	.	2.3	2.2
<i>Pteris vittata</i>	2.1	2.3	.	.	.	2.2	2.2	2.2
<i>Umbilicus rupestris</i>	.	+	2.2	.	+	.	.	.
<i>Centranthus ruber</i>	2.2	.	.	.	.	.	.	.
<i>Anogramma leptophylla</i>	.	.	1.1	.	.	.	.	.
<i>Polypodium cambricum</i>	.	.	1.2	.	.	.	.	.
<i>Ageratina adenophora</i>	2.1	.	1.1	.	.	.	.	.
<i>Salpichroa origanifolia</i>	.	.	.	2.3	.	.	.	.
<i>Poa annua</i>	2.2	.	.	.	+.2	.	.	.
<i>Hedera helix</i>	.	.	(1.2)	.	.	.	.	.
<i>Cortaderia selloana</i>	.	.	.	.	.	2.1	.	.
<i>Pteridium aquilinum</i>	.	.	.	.	.	+	.	.
<i>Sonchus oleraceus</i>	1.1	.	.	1.1	+	.	.	.
<i>Chelidonium majus</i>	.	.	1.1	.	.	.	.	.
<i>Bidens pilosa</i>	+	.	.	.	.	.	.	.
<i>Euphorbia peplus</i>	+	.	.	.	.	.	.	.
<i>Oxalis corniculata</i>	.	.	.	+	.	.	.	.
<i>Lathyrus luteoalbum</i>	.	.	.	.	.	.	.	1.1
Musci indet.	.	.	.	.	5%	.	.	.

Quay wall on the Douro in Porto with *Ficus carica* and *Sambucus nigra*



Ageratina adenophora
Centranthus ruber, Porto

Erigeron karvinskianus, Porto



Spontaneous green of a riparian retaining wall of the Douro, Porto





Campanula erinus, Porto

Persicaria capitata and *Erigeron karvinskianus*, Braga



Cymbalaria muralis and *Sonchus oleraceus* in the joints of a vertical retaining wall, Porto



Granite walls of a lost factory
with *Centranthus ruber*,
Erigeron karvinskianus and
Ageratina adenophora,
Porto

Pteris vittata, Porto



Ageratina adenophora,
walls of a ruined factory in Porto





Adiantum capillus-veneris and
Parietaria judaica, Porto

Sedum hirsutum on rock outcrops, Porto



Adiantum capillus-veneris and
Pteris vittata in joints of a vertical
retaining wall, Porto





Umbilicus rupestris and mosses on rock outcrops in Porto



Phagnalon saxatile - Porto

Quay wall in Porto with *Pteris vittata* and
Trachelium caeruleum subsp. *caeruleum*



Rubus fruticosus agg. and *Bidens pilosa* on rocks of the riverside of Douro





Nephrolepis cordifolia, Porto

Cortaderia selloana, Porto



Ficus carica, Porto



Lost places in Porto



Lost places: inside with dominating *Ageratina adenophora*



Centranthus ruber, *Erigeron karvinskianus*
and invading *Ageratina adenophora* - Porto

Ageratina adenophora
outcompetes the wall flowers
(*Erigeron karwinskianus*
and *Centranthus ruber*)
starting from shaded/ or
moist microhabitats, Porto



Densely overgrown tiled roof, Porto





Densely overgrown tiled roof, Guimarães



Polypodium cf. cambricum,
Guimarães ►



Ornaments carved in stone as
microhabitats for wall plants in
Guimarães



Senecio lividus, city wall of Guimarães

City wall in Guimarães: clear accumulation of
Sedum hirsutum in embrasures





City wall in Guimarães:
Sedum hirsutum and mosses



City wall of Guimarães: view from outside)

Pentaglottis sempervirens, Braga

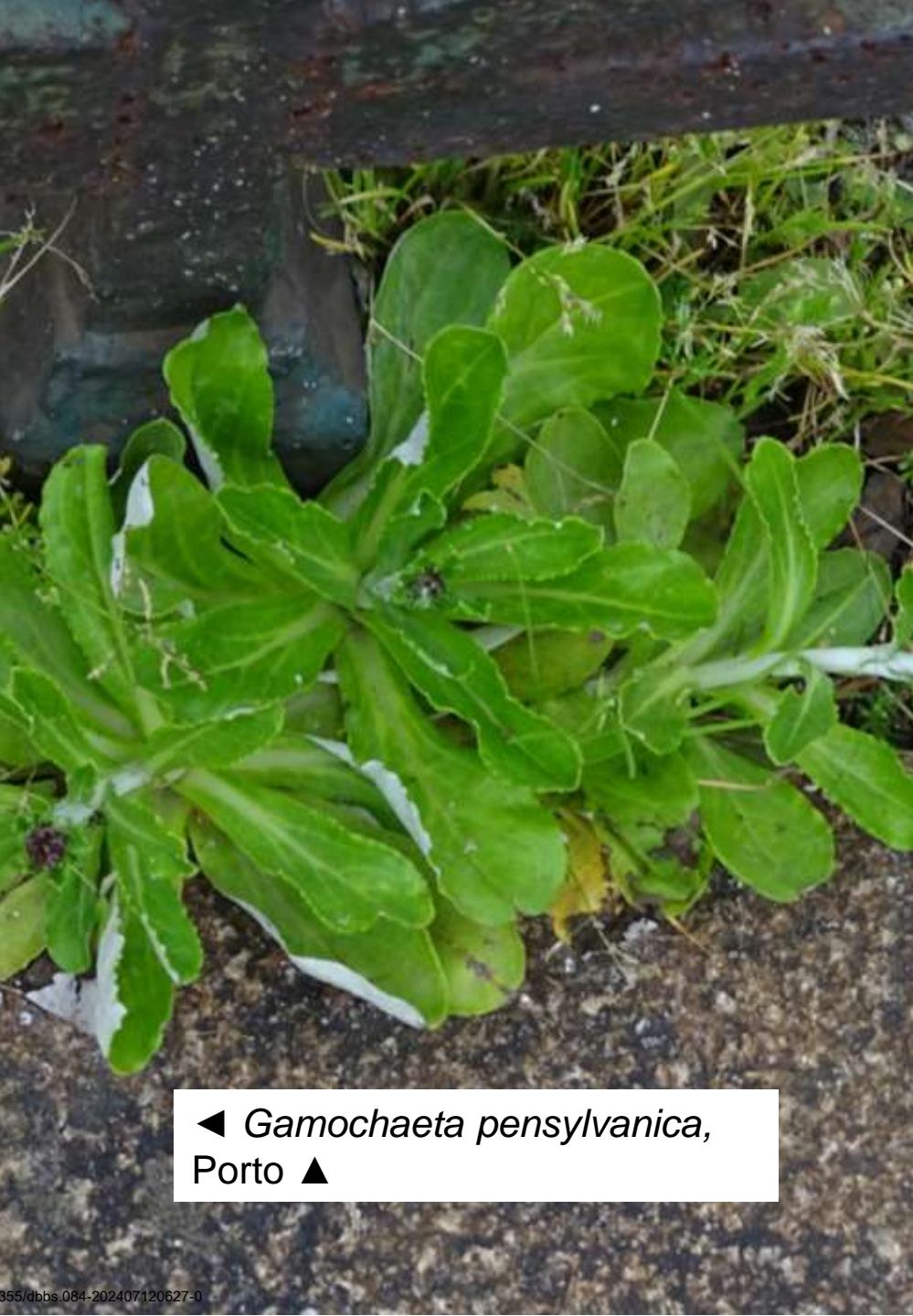


Parietaria judaica and *Anogramma leptophylla*
safe site at a wall base in Porto





Salpichroa organifolia,
Porto



◀ *Gamochaeta pensylvanica*,
Porto ▲

Cymbalaria muralis and *Parietaria judaica*, Porto





Pteris vittata and *Adiantum capillus-veneris*,
Porto

Asplenium [obovatum subsp.] billotii,
city wall of Porto



Parietaria judaica inside and outside of an abandoned shop,
Porto





Vegetation between ruined buildings in Porto



Urban hard surfaces at the riverside of the Douro in Porto

Amaranthus blitum: safe site at a wall base in Porto





Polycarpon tetraphyllum on a paved path in Porto



Aphanes cf. australis, Braga



Urtica membranacea at a wall base
in Porto



Parietaria judaica, *Euphorbia peplus*
and *Bidens pilosa* at a wall base in Braga

Dysphania ambrosioides, Porto



Plantago major, Porto





Silene gallica, Porto



Plantago lanceolata, Porto



Physalis peruviana, Porto



Erodium moschatum on a pavement in Porto





Cerastium glomeratum and *Poa annua*.
Humid area of a pavement in Porto



Rostraria cristata, Porto



Lepidium didymum, Porto



Cotula australis, Braga



Lamarckia aurea, Porto

Literature

CASTROVIEJO, S. et a. (eds.)(1986-2005): Flora Iberica. – Madrid. Vol. I-XXI.

DEAKIN, R. (1855): Flora of the Colosseum of Rome. – London VIII, 237 S.

LUNDHOLM, J. (2011): Vegetation of urban hard surfaces. – In: Niemelä, J. (ed.): Urban ecology: patterns, processes, and applications. – Oxford, XIII, 374p.

PANAROLI, D. (1643): Jatrologismi sive Medicæ Observationes quibus additus est in fine Plantarum Amphitheatralium Catalogus, [5], 37, [6], [1] Bl., Roma.

Portugal interactive plant hardness maps. -

<https://www.plantmaps.com/interactive-portugal-plant-hardiness-zone-map-celsius.php> (vidi 2024-7-1).

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