

Synanthropic flora of Roman archaeological sites in Tunisia

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Introduction

Archaeological sites may present interesting ruderal habitats. Often there grows a mixture of common ruderal resp. segetal plants and in the meanwhile rare weeds which arise again after a long time by mobilizing the seed bank. The recent vegetation often reflects the signs of different time horizons. Normally the difference between the excavation areas and the neighboring vegetation is clearly seen even from afar. The excavation areas often show an intensive flowerage of short living weeds. The succession starts with forming interesting vegetation mosaics after the excavation activities have been finished. The local variety in plants is enlarged by planted ornamental shrubs.

At the same time the intensity of the excavations (disturbance!) is reflected by the vegetation. As far as we know till now excavation areas are investigated only selectively and by chance. A literature review including a weighing of the excavation areas importance for the synanthropic flora and vegetation will be prepared.

After the 3. Punic War the roman province Africa proconsularis developed to an important production area for wheat, temporary 75% of the roman wheat needs was produced in North Africa. We visited the roman excavation areas Karthago (Carthage), Thugga (Dougga) and Thuburbo Maius (Thuburbo Majus) as well as the ruins of the amphitheater Thysdrus (El Djem) and have documented the spontaneous flora. This more or less random data reflect the situation of the 1990s.

Karthago [Carthage]

According to a legend Carthage was founded in 814 BC by a princess who fled from Tyros. It developed to an important commercial power, which finally resulted in the Punic Wars where Carthage was completely destroyed by the Romans in 146 BC. Already in the second century AD Carthage developed obviously to the third largest city with about 300.000 inhabitants. In 692 AD Carthage was destroyed again completely by Arabs.



Cisterns of La Malga



Thermal baths of Antoninus

The spring time aspects of the synanthropic vegetation was dominated by luxuriant stands of the class Stellarietea mediae, but also of recently planted ornamental shrubs and some trees. Often seen: *Mercurialis perennis* stands as well as in the partial shadow of trees and ruins - nitrophyllous stands of the alliance *Allion triquetri* with *Smyrniolum olusatrum*, *Urtica pilulifera*, *Urtica membranacea*, *Acanthus*

mollis, *Chenopodium murale*, *Fumaria capreolata* and *Ricinus communis*. Trampled areas are dominated by *Hordeum murinum* and *Echium plantagineum*. Within the area of historic cisterns cattle grazed in large *Emex spinosa* stands. These stands are replaced by a community with *Marrubium vulgare* when heavily grazed. The flora of the wall gaps belongs to the class Stellarietea as well. *Parietaria judaica* is the only species connecting to the class Asplenietea (Table 1, relevé N. 1).

In March 1990 the following species were recorded; however we were not able to identify some of the species (e. g. *Avena*, *Bromus*, *Carduus*, *Lathyrus*, *Onopordum*) finally, because our visit was in march.

<i>Acanthus mollis</i>	<i>Malva multiflora</i> [syn. <i>Lavatera cretica</i>]
<i>Anagallis arvensis</i>	<i>Marrubium vulgare</i>
<i>Artemisia arborescens</i>	<i>Medicago arborescens</i>
<i>Astragalus boeticus</i>	[subspontaneous]
<i>Beta vulgaris</i> subsp. <i>maritima</i>	<i>Mercurialis annua</i>
<i>Calendula arvensis</i>	<i>Nicotiana glauca</i>
<i>Carduus pycnocephalus</i>	<i>Opuntia ficus-indica</i> [subspontaneous]
<i>Chenopodium murale</i>	<i>Orobanche</i> cf. <i>ramosa</i>
<i>Conyza bonariensis</i>	<i>Oxalis pes-caprae</i>
<i>Cynara cardunculus</i>	<i>Parietaria judaica</i>
<i>Cynodon dactylon</i>	<i>Piptatherum miliaceum</i>
<i>Daucus carota</i>	<i>Plantago lagopus</i>
<i>Echinops spinosissimus</i>	<i>Prasium majus</i>
<i>Echium plantagineum</i>	<i>Ricinus communis</i>
<i>Emex spinosa</i>	<i>Salvia verbenaca</i>
<i>Erodium moschatum</i>	<i>Senecio</i> cf. <i>leucanthemifolius</i>
<i>Eryngium campestre</i>	<i>Sherardia arvensis</i>
<i>Euphorbia serrata</i>	<i>Sisymbrium irio</i>
<i>Ferula communis</i>	<i>Smyrniolum olusatrum</i>
<i>Fumaria capreolata</i>	<i>Solanum nigrum</i>
<i>Geranium rotundifolium</i>	<i>Sonchus oleraceus</i>
<i>Glebionis coronaria</i>	<i>Sonchus tenerrimus</i>
<i>Hordeum murinum</i>	<i>Tropaeolum majus</i> [subspontaneous]
<i>Hyoscyamus albus</i>	<i>Urtica membranacea</i>
<i>Lobularia maritima</i>	<i>Urtica pilulifera</i>
<i>Lycium europaeum</i>	<i>Verbascum sinuatum</i>



Lobularia maritima



Ferula communis, *Oxalis pes-caprae*

Table 1: Community with *Parietaria judaica*, *Mercurialis annua* and *Oxalis pes-caprae*

Number of relevé	1	2	3	4	5
Area [m ²]	2	10	20	10	30
Vegetation cover [%]	15	100	100	90	100
Species number	2	6	5	10	11
<i>Parietaria judaica</i>	1.2	4.3	4.5	2.2	2.2
<i>Mercurialis annua</i>	1.1	1.2	.	2.2	1.2
<i>Oxalis pes-caprae</i>	.	3.3	2.3	3.4	2.3
<i>Sherardia arvensis</i>	.	+	.	1.1	.
<i>Daucus carota</i>	.	+	.	.	+
<i>Oryzopsis miliacea</i>	.	+	+	.	.
<i>Geranium rotundifolium</i>	.	.	+	1.1	.
<i>Sonchus tenerrimus</i>	.	.	1.1	.	.
<i>Smyrniolum olusatrum</i>	.	.	.	4.3	4.4
<i>Sonchus oleraceus</i>	.	.	.	1.1	1.1
<i>Erodium moschatum</i>	.	.	.	+	.
<i>Senecio leucanthemifolius</i>	.	.	.	1.1	.
<i>Urtica membranacea</i>	.	.	.	(1.2)	3.3
<i>Carduus pycnocephalus</i>	.	.	.	.	1.2
<i>Hordeum leporinum</i>	.	.	.	.	1.2
<i>Malva multiflora</i>	.	.	.	.	+
<i>Solanum nigrum</i>	.	.	.	.	1.2

Nr. 1: Wall joints of a vertical wall (not mortared); Nr. 2: foot of a wall foot (shaded); Nr. 3: foot of a wall (partially shaded); Nr. 4: *Smyrniolum olusatrum* stand (shaded); Nr. 5: weed community in a depression (partially shaded).

The following stands recorded within the area of the thermal baths seem to belong to the alliance *Chenopodium muralis*

Area 20 m², vegetation cover 100 %:

4.4 *Chenopodium murale*, 2.3 *Mercurialis annua*, 2.3 *Urtica pilulifera*, 2.2 *Fumaria capreolata*, 1.2 *Malva multiflora*, 1.2 *Oxalis pes-caprae*, 1.1 *Sonchus oleraceus*, 1.1 *Emex spinosa*, 1.1 *Sisymbrium irio*, 1.1 *Carduus pycnocephalus*, + *Glebionis coronaria*, + *Smyrniolum olusatrum*, + *Beta vulgaris* subsp. *maritima*, + *Hordeum murinum*, + *Ricinus communis*.



Oxalis pes-caprae



Lycium europaeum

*Urtica membranacea**Urtica pilulifera**Fumaria capreolata**Astragalus boeticus*

The following often cultivated ornamental plants were recorded as well:

Acacia cf. tortilis, *Araucaria heterophylla*, *Bougainvillea glabra*, *Citrus aurantium*, *Cupressus sempervirens*, *Eryobotria japonica*, *Ficus elastica*, *Jasminum polyanthemum*, *Lantana camara*, *Myoporum acuminatum*, *Phoenix canariensis*, *Pittosporum tobira*, *Senecio mikanoides*.

Thuburbo majus

The Roman excavation site Thuburbo Majus is situated 62 km in the south of Tunis some 200 m above sea level.

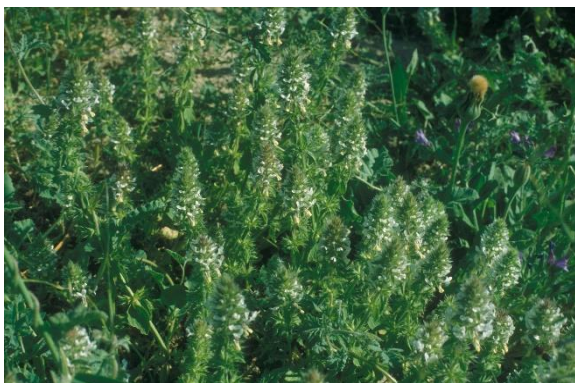


View of Thuburbo Majus



Capitol

<i>Ammi majus</i>	<i>Hypochoeris achyrophorus</i>
<i>Anacyclus clavatus</i>	<i>Lagurus ovatus</i>
<i>Asparagus albus</i>	<i>Lolium rigidum</i>
<i>Avena barbata</i>	<i>Lotus tetragonolobus</i>
<i>Avena sterilis</i>	<i>Malva sylvestris</i>
<i>Beta vulgaris</i> subsp. <i>maritima</i>	<i>Medicago orbicularis</i>
<i>Biscutella didyma</i>	<i>Melica minuta</i>
<i>Borago officinalis</i>	<i>Mercurialis annua</i>
<i>Brachypodium distachyon</i>	<i>Nigella damascena</i>
<i>Bromus rubens</i>	<i>Onopordum arabicum</i>
<i>Bromus madritensis</i>	<i>Pallenis spinosa</i>
<i>Calendula arvensis</i>	<i>Parentucellia viscosa</i>
<i>Catapodium rigidum</i>	<i>Parietaria judaica</i>
<i>Centaurea nicaeensis</i>	<i>Paronychia argentea</i>
<i>Cerinthe major</i>	<i>Phagnalon saxatile</i>
<i>Chenopodium album</i>	<i>Piptatherum miliaceum</i>
<i>Convolvulus althaeoides</i>	<i>Plantago albicans</i>
<i>Convolvulus lineatus</i>	<i>Plantago lagopus</i>
<i>Echinops spinosissimus</i>	<i>Reseda alba</i>
<i>Echium plantagineum</i>	<i>Salvia verbenaca</i>
<i>Erodium moschatum</i>	<i>Sanguisorba minor</i> subsp. <i>balearica</i>
<i>Eryngium campestre</i>	<i>Scolymus grandiflorus</i>
<i>Euphorbia serrata</i>	<i>Sherardia arvensis</i>
<i>Ferula communis</i>	<i>Silene</i> cf. <i>secundiflora</i>
<i>Fumaria capreolata</i>	<i>Sonchus oleraceus</i>
<i>Geranium molle</i>	<i>Sonchus tenerrimus</i>
<i>Glebionis coronaria</i>	<i>Stachys ocymastrum</i>
<i>Hirschfeldia incana</i>	<i>Stipa capensis</i>
<i>Hordeum murinum</i>	<i>Urospermum dalechampii</i>
<i>Hypericum triquetrum</i>	<i>Verbascum sinuatum</i>

*Stachys ocymastrum**Scolymus grandiflorus*



Convolvulus lineatus



Hypochoeris achyrophorus



Catapodium rigidum



Cerinthe major



Echium plantagineum



Calendula arvensis



Pallenis spinosa

Thugga [Dougga]



View on the archaeological sites of Thugga with dominant *Glebionis coronaria*

We found the following species at the archaeological sites of Thugga:

<i>Anacyclus clavatus</i>	<i>Euphorbia serrata</i>
<i>Anagallis monelii</i>	<i>Ferula communis</i>
<i>Antirrhinum orontium</i>	<i>Ficus carica</i>
<i>Arenaria cf. serpyllifolia</i>	<i>Geranium molle</i>
<i>Asparagus albus</i>	<i>Glebionis coronaria</i>
<i>Asphodelus microcarpus</i>	<i>Herniaria hirsuta</i>
<i>Avena barbata</i>	<i>Hirschfeldia incana</i>
<i>Avena sterilis</i>	<i>Hordeum murinum</i>
<i>Beta vulgaris</i> subsp. <i>maritima</i>	<i>Hyoscyamus albus</i>
<i>Borago officinalis</i>	<i>Hyoseris radiata</i>
<i>Bromus madritensis</i>	<i>Hypericum triquetrum</i>
<i>Bromus rubens</i>	<i>Lamarckia aurea</i>
<i>Calendula arvensis</i>	<i>Lathyrus articulatus</i>
<i>Campanula erinus</i>	<i>Lolium rigidum</i>
<i>Capsella bursa-pastoris</i>	<i>Lotus tetragonolobus</i>
<i>Catapodium rigidum</i>	<i>Malva parviflora</i>
<i>Centaurea solstitialis</i>	<i>Malva sylvestris</i>
<i>Centranthus calcitrapae</i>	<i>Marrubium vulgare</i>
<i>Cerinth major</i>	<i>Medicago orbicularis</i>
<i>Conium maculatum</i>	<i>Mercurialis annua</i>
<i>Convolvulus althaeoides</i>	<i>Onopordum acanthium</i>
<i>Convolvulus lineatus</i>	<i>Papaver rhoeas</i>
<i>Conyza bonariensis</i>	<i>Parietaria judaica</i>
<i>Ecballium elaterium</i>	<i>Parietaria lusitanica</i>
<i>Echinops spinosissima</i>	<i>Phagnalon saxatile</i>
<i>Echium parviflorum</i>	<i>Plantago afra</i>
<i>Echium plantagineum</i>	<i>Plantago lagopus</i>
<i>Erodium moschatum</i>	<i>Polycarpon tetraphyllum</i>
<i>Eruca cf. vesicaria</i>	<i>Prasium majus</i>
<i>Eryngium campestre</i>	<i>Reseda alba</i>
<i>Euphorbia helioscopia</i>	<i>Salvia verbenaca</i>

Sanguisorba minor subsp. *balearica*
Satureja nervosa
Senecio leucanthemifolius
Sherardia arvensis
Silybum marianum
Smyrniolum olusatrum
Sonchus oleraceus
Sonchus tenerrimus

Spergularia cf. bocconeii
Stachys ocymastrum
Stipa capensis
Trachynia distachya
Trifolium stellatum
Umbilicus horizontalis
Urospermum dalechampii
Verbascum sinuatum



Lathyrus articulatus



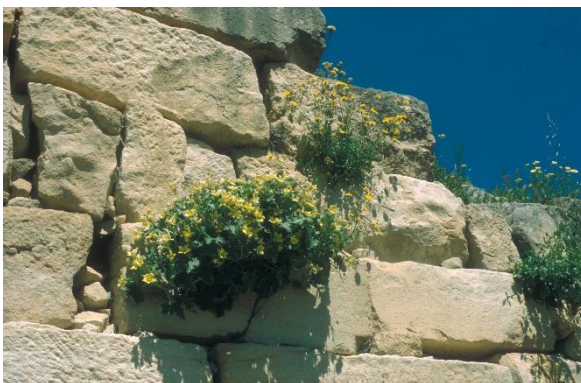
Roman theatre



Euphorbia serrata



Silybum marianum, *Glebionis coronaria*



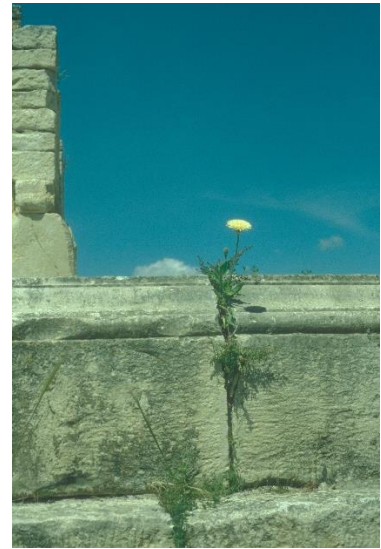
Ecballium elaterium



Echinops spinosissimus



Punic-numidian mausoleum

*Ferula communis**Urospermum dalechampii*

Thysdrus (El Djem)

Thysdrus was founded in 46 BC by Julius Caesar and was situated in the centre of the most important growing area of olives in Northern Africa. The amphitheater built up in the second century AD is obviously the greatest (preserved) roman building in Northern Africa. At a later date it was converted into a fortress for the battle of the Berber against the Arabs in 699 AD.

At our visit in 1995 the site was nearly free of vegetation, sterile to some extend.



Amphitheatre of Thysdrus (El Djem)

with *Sonchus tenerrimus* and *Parietaria judaica*

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