

Contribution to the prodromus of the vegetation of France

The *Nerio oleandri – Tamaricetea africanae* Braun-Blanq. & O. Bolòs 1958



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe
Les 15 et 16 octobre 2012, à Saint-Mandé (94) - France
Bensettiti Farid (MNHN/SPN)



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

- Work completed within the framework of the prodromus of the vegetation of France, under the aegis of the French Society of phytosociology by :
Bruno de Foucault (bdefoucault@yahoo.fr), Farid Bensettiti (bensettiti@mnhn.fr), Virgile Noble (v.noble@cbnmed.fr) et Guilhan Paradis (guilhan.paradis@orange.fr)
- Synthesis of the *Nerio Tamaricetea* across its range, i.e. southern Europe of the South mediterranean, North africa as far as the Eastern mediterranean and also, in saharo-arabic area
- Variation and reorganization of the phytosociological units and definition of a new order (*Nerio oleandri – Viticetalia agni-casti*) and of a new alliance (*Tamaricion nilotico – articulatae*)
- Also, will be presented associations known from France



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Prodromus of vegetations of France - PVF1 (Bardat *et al.*, 2004)

Cl. *Nerio oleandri-Tamaricetea africanae* Br.-Bl. & O. Bolòs 1958

Vegetation thermoméditerranéenne and mesoméditerranéenne of shrubs of banks and beds of the temporary streams, especially characterized by *Tamarix africana* and *Nerium oleander*

Ord. *Tamaricetalia africanae* Br.-Bl. & O. Bolòs 1958

All. *Tamaricion africanae* Br.-Bl. & O. Bolòs 1958

Communities of the brackish circles dominated by tamarisks ; especially in Corsica

All. *Rubo ulmifolii-Nerion oleandri* O. Bolòs 1985

Communities of the not brackish circles with *Nerium oleander*

All. *Imperato cylindrica-Erianthion ravennae* Br.-Bl. & O. Bolòs 1958

Communities with high grasses



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Restructuring of the phytosociological units

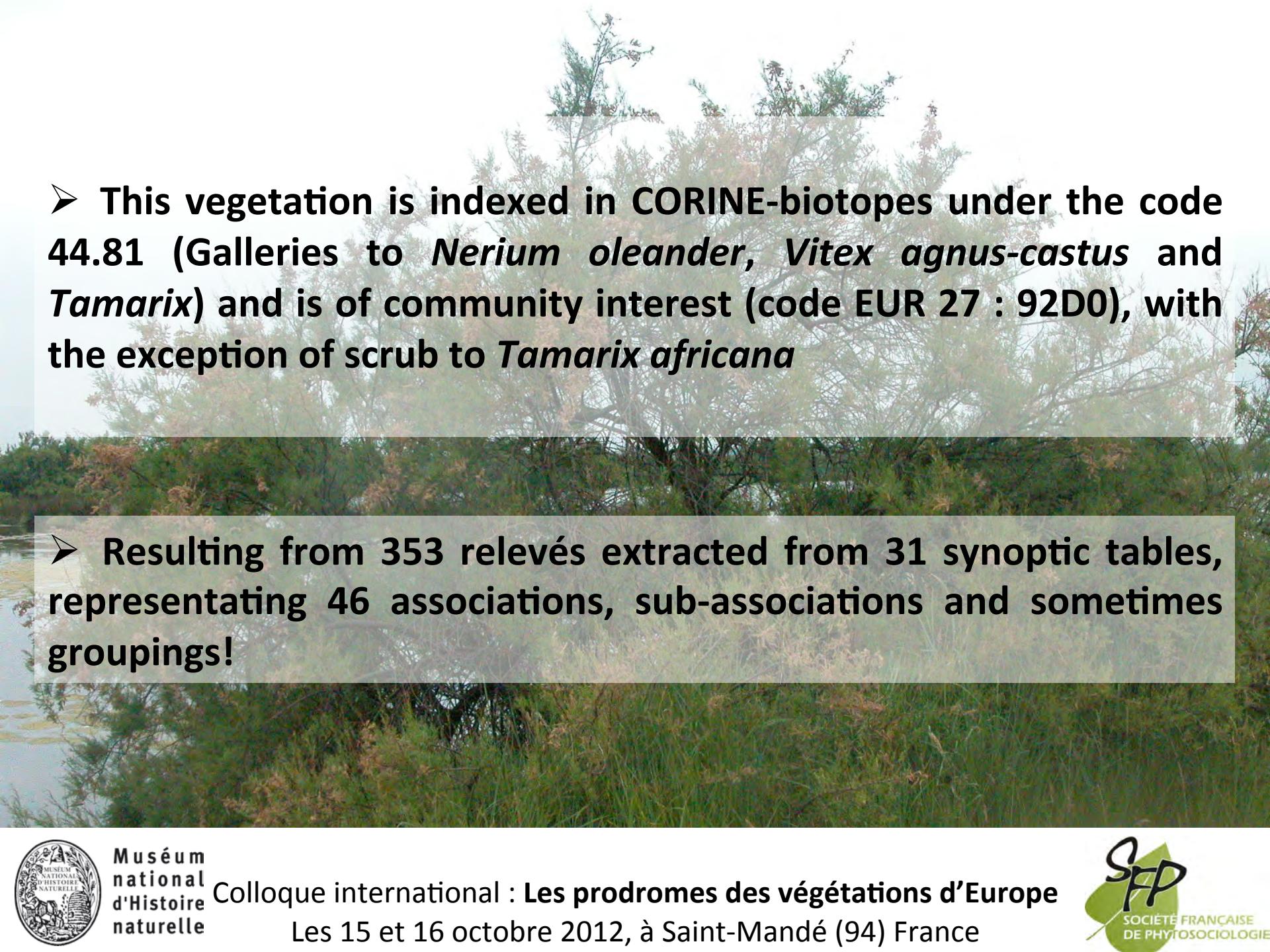
From the point of view of reorganization of the phytosociological units of this class, we withdrew :

- The alliance de l'*Imperato cylindrica* – *Erianthion ravennae* Braun-Blanq. & O. Bolòs 1958 with herbaceous structure, as already proposed by Izco & al. (1984), Julve (1993) and Asensi & Diez Garretas (2011)
- ✓ *Phragmito* – *Magnocaricetea* ; *Brachypodietalia phoenicoidis* ; *Holoschoenetalia vulgaris*. [Izco et al. (1984)]
- ✓ *Phragmito* – *Magnocaricetea elatae* [Julve (1993) and Asensi & Diez Garretas (2011)]
- ✓ Based on our summary table, could also be attached to the Mediterranean halophilous meadows of the *Juncetea maritimi* in particular by bringing it closer to *Plantaginion crassifoliae* Braun-Blanq. ex Braun-Blanq. et al. 1952, at least for some syntaxa



All. *Imperato cylindrica*-*Eranthion ravennae* Br.-Bl. & O. Bolos 1958

	Numéro de syntaxon								
	Nombre de relevés		16	4	14	10	10	28	10
	F 46		06	07	08	09			
<i>Imperata cylindrica</i>			V	.	V	.	.	V	.
<i>Cynodon dactylon</i>			V	.	I	.	+	.	.
<i>Equisetum ramosissimum</i>			IV	1	.	.	+	II	.
<i>Salix purpurea</i>			IV	.	.	.	.	.	.
<i>Scirpoides holoschoenus</i> *h.			IV	.	.	.	.	.	.
<i>Cynanchum acutum</i>			II	.	.	.	.	.	.
<i>Glycyrrhiza glabra</i>			II	.	.	.	.	.	.
<i>Brachypodium phoenicoides</i>			II	.	+	.	.	.	.
<i>Arundo plinii</i>			II	.	.	.	.	.	.
<i>Juncus maritimus</i>			.	2	+	III	.	I	.
<i>Helichrysum stoechas</i> *maritima			.	.	V	.	.	.	.
<i>Aethorhiza bulbosa</i> *b.			.	.	IV	.	.	.	.
<i>Agrostis stolonifera</i> *maritima			.	.	.	V	.	.	.
<i>Linum maritimum</i>			.	.	.	IV	II	.	.
<i>Dorycnium gracile</i>			.	.	.	III	.	.	.
<i>Artemisia campestris</i> *glutinosa			II	.	II	II	.	.	.
<i>Saccharum egyptiacum</i>			IV	II
<i>Carex extensa</i>			.	.	I	.	.	III	.
<i>Arundo donax</i>			II	.
<i>Juncus littoralis</i>			V	V	.
<i>Scirpoides holoschoenus</i> *globiferus			IV
<i>Rubia peregrina</i> *p.			II
<i>Imperato - Erianthion ravennae</i>									
<i>Erianthus ravennae</i>		V	4	IV	IV	IV	IV	IV	III
<i>Scirpoides holoschoenus</i> *romanus		.	4	V	V	IV	III	.	.
<i>Plantaginion crassifoliae, Juncetea maritim</i>									
<i>Juncus acutus</i>		.	1	IV	V	.	III	V	.
<i>Plantago crassifolia</i>		.	2	.	V	.	II	.	.
<i>Inula crithmoides</i> *c.		.	.	.	II	.	I	.	.
<i>Schoenus nigricans</i>		.	2	III	V	V	II	III	.
Autres taxons									
<i>Hypochaeris radicata</i> s.l.		V	2	III	.	+	.	.	.
<i>Phragmites australis</i> *a.		II	.	II	.	+	II	.	II
<i>Dittrichia viscosa</i>		V	1	III	.	.	III	IV	.
<i>Tamarix gallica</i>		V	.	+	.	.	.	.	III



➤ This vegetation is indexed in CORINE-biotopes under the code 44.81 (Galleries to *Nerium oleander*, *Vitex agnus-castus* and *Tamarix*) and is of community interest (code EUR 27 : 92D0), with the exception of scrub to *Tamarix africana*

➤ Resulting from 353 relevés extracted from 31 synoptic tables, representing 46 associations, sub-associations and sometimes groupings!



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**
Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

	O.1															O.2								A.2.2										
	A.1															A.1.2		A.1.3		A.2.1														
Numéro de syntaxon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15							16	17	18	19	20	21	22	23	24	25	26	27	28
Nombre de relevés	16	5	13	6	48	3	1	5	6	6	3	7	13	9	21		5		5			3	4	5	19	6	2	10	90	13	18	8	2	
Nombre de syntaxons	F 46	01					02	03	04								05	06				07	08	09									4	
Tamaricion africanae Br.-Bl. & O. Bolos 1958																																		
Polygonum equisetiformis	.	V																			
Suaeda braun-blanchetii	.	.	V	.	.	.	.	.	.	.	.	.	.	.	.							
Atriplex halimus	I	.	IV	.	.	.	.	.	.	.	.	.	.	.	.		+					
Lonicera biflora	.	.	.	V	.	.	.	.	.	.	.	.	.	.	.								
Cynanchum acutum	I	.	+	III	.	.	.	.	.	.	.	.	.	.	.		I	.													
Populus alba	I	.	.	III	.	.	.	.	.	.	1	.	.	.	.		I	.	.												
Rubia tinctorum	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.								
Solanum dulcamara	.	.	.	.	V	.	.	I	.	.	.	.	.	.	.												
Crataegus monogyna	.	.	.	.	II	.	.	.	.	.	1																			
Prunus spinosa	.	.	.	.	II	.	.	.	I	.	.	.	.	.	.													
Halimione portulacoides	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.										
Calystegia sepium	.	.	.	.	II	.	.	IV	V	.	.	.	.	.	.													
Althaea officinalis	.	.	.	.	.	.	.	III	I	.	.	.	.	.	.													
Aster tripolium	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.												
Salix purpurea	+	.	.	.	.	.	.	.	3	IV	.	.	.	I	.																
Pyracantha coccinea	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.													
Salix alba	.	.	.	.	.	.	.	.	.	IV	.	.	.	.	.														
Artemisia arborescens	.	.	.	.	.	.	.	.	.	IV	.	.	.	.	.														
Salix gussonei	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.														
Tamarix arborea	.	.	.	.	.	.	.	.	.	V	.	.	.	.	.														
Bryonia dioica	.	.	.	.	+	.	.	.	.	V	.	.	.	.	.														
Rosa sempervirens	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.		1	.	.	.	.	.	.	.	.	.	.	.	.	.
Tamaricion boveano - canariensis Izco et al., 1984																																		
Tamarix boveana		III																		
Suaeda brevifolia		II																		
Inula crithmoides *c.	1		II																		
Launaea arborescens		II																		
Atriplex ifniensis		I																		
Tamaricion nilotico - articulatae all. nov. Hoc loco																																		
Tamarix articulata		III																		
Tamarix nilotica		III																		
Calotropis procera		II																		
Ziziphus lotus		I																		
Tamarix pauciovulata		I																		
Tamarix balansae		I																		
Tamarix speciosa		+																		
Tamaricetalia africanae Br.-Bl. & O. Bolos 1958																																		
Tamarix gallica	V	.	II	.	V	.	.	.	.	V	IV	.	V	.		IV	.												V	12	.
Tamarix canariensis	.	V	I		IV	.																	

Communautés ouest-méditerranéennes
à thermo-atlantiques

Communautés sud-ouest-méditerranéennes (Espagne, îles Canaries, Afrique du Nord) – Sites salés

Tamariçaias Sahariennes

Rubo ulmifolii – Nerion oleandri O. Bolòs 1985

Osyris alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vinca major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Quercus ilex *i.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Clematis flammula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.
Euphorbia characias	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica terminalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica erigena	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leucojum aestivum	* <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td>
Crataegus maura	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Arum italicum	.	.	.	.	.	.	.	.
*neglectum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Crataegus maura	.	.	.	.	.	.	.	.
Asparagus acutifolius	I	I	+	I	.	.	.	.	.	.	.	.	.	.	.	.	Arum italicum	+	II	I	.	.	.	.	.
Smilax aspera	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	Asparagus acutifolius	.	.	.	.	.	.	.	.
Rubia peregrina *p.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Smilax aspera	.	.	.	.	.	.	.	.
Erica scoparia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Rubia peregrina *p.	.	.	.	.	.	.	.	.
Fraxinus angustifolia	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Erica scoparia	.	.	.	.	.	.	.	.
Myrtus communis	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	Fraxinus angustifolia	.	III	.	.	.	.	.	.
Laurus nobilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Myrtus communis	.	.	.	.	.	.	.	.
Coriaria myrtifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Laurus nobilis	.	.	.	.	.	.	.	.
Piptatherum miliaceum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Coriaria myrtifolia	.	.	.	.	.	.	.	.
Ampelodesmos tenax	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Piptatherum miliaceum	.	.	.	.	.	.	.	.
Spartium junceum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Ampelodesmos tenax	.	.	.	.	.	.	.	.
Calicotome infesta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Spartium junceum	.	.	.	.	.	.	.	.
Platanus orientalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Calicotome infesta	.	.	.	.	.	.	.	.
Tamarix tetrandra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Platanus orientalis	.	.	.	.	.	.	.	.
Tamarix smyrniensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Tamarix tetrandra	.	.	.	.	.	.	.	.

Communautés ouest et centre
méditerranéenne

2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.
.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.
2	2	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	r	.	.	.	.	.
1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	11	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	+	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	+	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.	+	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	II	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
.	+

Rubo sancti - Nerion oleandri Brullo et al. 2004

Rubus sanctus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III
Tamarix parviflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I

Communautés de
méditerranée orientale

Nerio - Viticetalia agni-casti ord.nov.hoc loco

Vitex agnus-castus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV
Ficus carica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I

Tamaricetalia et Nerio – Tamaricetea africanae Braun-Blanquet. & O. Bolòs 1958

Tamarix africana	I	V	.	.	3	1	V	V	V	3	V	V	V	V	V	V	.	II	3	.	.	V	IV	.
Nerium oleander	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V

.	4	.	IV	.	2	V	V	.	.	.	IV	2	IV
1	.	II	.	.	1	+	+	.	.	.	.	.	I

.	.	.	V	IV	V	.	V	.	V	I	V	+	V	V	.	V	2	V	V	V	V	V
.	.	.	V	IV	V	.	V	.	V	V	V	V	V	V	.	V	2	V	V	V	V	V

Tamaricetalia africanae Braun-Blanq. & O. Bolòs 1958

Tamaricion africanae Braun-Blanq. & O. Bolòs 1958

All. *Tamaricion africanae* Braun-Blanq. & O. Bolòs 1958

- West - Mediterranean to thermo-Atlantic communities where *Tamarix africana* and *T. gallica* find their optimum
- 4 associations are described in France

1. *Tamaricetum gallicae* Braun-Blanq. & O. Bolòs 1958

2. *Solano dulcamarae – Tamaricetum gallicae* de Foucault 2008

3. *Inulo crithmoidis – Tamaricetum africanae* Gamisans 1992

4. *Althaeo officinalis – Tamaricetum africanae* Gamisans 1992

- Physionomie
- Synécologie
- Combinaison de caractéristique d'espèces
- Synchorologie



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Tamaricetalia africanae Braun-Blanq. & O. Bolòs 1958

Tamaricion africanae Braun-Blanq. & O. Bolòs 1958

1. Tamaricetum gallicae Braun-Blanq. & O Bolòs 1958

- Dense, closed scrubs reaching 3 m height, largely dominated by *Tamarix gallica*
- West-Mediterranean oligohalophile mésohygrophile scrubs on muddy pooly drainage ground
- Characterized by a combination of *Tamarix gallica* and *T. africana* (but rare), *Atriplex halimus*
- Syntaxon described from the Ebro delta and more generally Eastern Spain, being impoverished in the Balearic Islands, reaching Italy and at least Languedoc-Roussillon in southernmost France

2. Solano dulcamarae – Tamaricetum gallicae de Foucault 2008

- Scrub often of linear extension largely dominated by *Tamarix gallica* over which climbs frequently the *Solanum dulcamara*
- Scrub oligohalophile mésohygrophile the thermo-Atlantic, especially developed along the channels back-littorals
- Combination characteristic of species: *Tamarix gallica*, *Solanum dulcamara*
- Syntaxon describes Atlantic frontage of France corresponding to an extreme increase of *Nerio – Tamaricetea*



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Tamaricetalia africanae Braun-Blanq. & O. Bolòs

Tamaricion africanae Braun-Blanq. & O. Bolòs 1958, 1958

3. *Inulo crithmoidis – Tamaricetum africanae* Gamisans 1992

- Scrubs largely dominated by *Tamarix africana* with a understorey of halophilous chamephytes
- Mediterranean definitely halophilous scrubs, of the edges of marshes, on strongly saline soils
- Characterized by a combination of *Tamarix africana*, *Inula crithmoides* subsp. *crithmoides*, *Halimione portulacoides*
- Syntaxon described from the Corsican coast (Gamisans, 1992)

4. *Althaeo officinalis – Tamaricetum africanae* Gamisans 1992

- Scrubs largely dominated by *Tamarix africana* with tall or climbing grasses
- Oligohalophile Mediterranean scrubs
- Characterized by a combination of *Tamarix africana*, *Althaea officinalis*, *Rubus ulmifolius*, *Calystegia sepium*
- Syntaxon described from the Corsican coast (Gamisans, 1992)



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Tamarisk in Corsica...



Tamaricetalia africanae Braun-Blanq. & O. Bolòs
Tamaricion boveano-canariensis Izco, Fernández-González & A. Molina 1984

All. ***Tamaricion boveano-canariensis*** Izco, Fernández-González & A. Molina 1984

- Halophilous scrubs with hyperhalophiles dominated by the *Tamarix*
- Characterized by *Tamarix boveana* and *Tamarix canariensis*
- Syntaxa south-west-Mediterranean, eastern coast of Spain to the Canaries and North Africa, especially close to salt lakes



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



***Tamaricetalia africanae* Braun-Blanq. & O. Bolòs *Tamaricion nilotico – articulatae* all. nov. Hoc loco**

□ All. *Tamaricion nilotico – articulatae* all. Nov. Hoc loco

- Scrub forming a more or less broad gallery along the wadis
- Characterized by *Tamarix nilotica*, *Tamarix articulata*
- Scrub affinity Saharan



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**
Les 15 et 16 octobre 2012, à Saint-Mandé (94) France





Viticetalia agni-casti ord. nov. hoc loco
Rubo ulmifolii – Nerion oleandri O. Bolòs 1985

❖ *Nerio oleandri – Viticetalia agni-casti* ord. Nov. hoc loco

- Oligohalophile scrubs, poor in *Tamarix* except for *T. africana* rather *Vitex agnus-castus* and an optimum *Nerium oleander* for the class
- The slightly mineralized character of the substrate supports taxa characteristic of the classes *Quercetea ilicis* and *Pistacio lentisci – Rhamnetea alaterni*



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe
Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Viticetalia agni-casti ord. nov. hoc loco *Rubo ulmifolii – Nerion oleandri* O. Bolòs 1985

All. Rubo ulmifolii – Nerion oleandri O Bolòs 1985

- A unit especially of western and center-mediterranean on less saline soils
- 5 associations are described in France

1. *Rubo ulmifolii – Nerietum oleandri* O Bolòs 1956

2. *Vinco majoris – Viticetum agni-casti* O Bolòs 1956

3. *Nerio oleandri – Viticetum agni-casti* Paradis 2006

4. *Rubo ulmifolii – Viticetum agni-casti* Paradis 2006

5. *Erico scopariae – Nerietum oleandri* (Lavagne & Moutte 1971) ass. nov.
hoc loco.



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Viticetalia agni-casti ord. nov. hoc loco *Rubo ulmifolii – Nerion oleandri* O. Bolòs 1985

1. *Rubo ulmifolii – Nerietum oleandri* O Bolòs 1956

- Dense closed scrubs reaching 2,5 m, largely dominated by *Nerium oleander* secondarily by *Rubus ulmifolius*, *Osyris alba*
- Mediterranean hygrophile scrubs on argillaceous substrates
- Characterized by a combination of: *Rubus ulmifolius*, *Nerium oleander*, *Smilax aspera*, *Asparagus acutifolius*, *Osyris alba*, *Clematis flammula*
- The Communities described from Catalonia extend to most of Spain, Italy and southernmost France including Corsica

2. *Vinco majoris – Viticetum agni-casti* O Bolòs 1956

- Dense scrubs, from 1,5 to 3-4 m height, largely dominated by *Vitex agnus-castus* over which climbs *Vinca major*
- Mediterranean hygrophile scrubs on sandy-silty substrates
- Characterized by a combination of: *Vitex agnus-castus*, *Vinca major*
- Syntaxon described from Catalonia. In France it seems to reach Roussillon, in the Albères



Muséum
national
d'Histoire
naturelle

Colloque international : Les prodromes des végétations d'Europe

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Viticetalia agni-casti ord. nov. hoc loco *Rubo ulmifolii – Nerion oleandri* O. Bolòs 1985

3. *Nerio oleandri – Viticetum agni-casti* Paradis 2006

- Very dense, oligohalophile hygrophile scrubs of the Corsican coast overwhelmingly dominated by *Vitex agnus-castus* and *Nerium oleander*
- Characterized by a combination of: *Vitex agnus-castus*, *Nerium oleander*, *Rubus ulmifolius* et *Smilax aspera*
- Syntaxon described from the coast of northern Corsica, this syntaxon could perhaps extend to communities with *Vitex agnus-castus* of the Maritime Alps

4. *Rubo ulmifolii – Viticetum agni-casti* Paradis 2006

- Very dense, hygrophile scrub oligohalophile of the Corsican littoral overwhelmingly dominated by *Vitex agnus -castus*
- Characterized by a combination of: *Vitex agnus-castus*, *Rubus ulmifolius*, *Smilax aspera*
- Variations: *typicum* ; *viticetosum agni-casti* ; *rabetosum ulmifolii* ; *rhamnetosum alaterni*
- Syntaxa described from the Corsican coast ; could perhaps extend to communities with *Vitex agnus-castus* of the Maritime Alps



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Viticetalia agni-casti ord. nov. hoc loco
Rubo ulmifolii – Nerion oleandri O. Bolòs 1985

**5. *Erico scopariae – Nerietum oleandri* (Lavagne & Moutte 1971)
ass. nov. hoc loco.**

- Synonyme mediterranean riparian *Nerium oleander* and *Vitex agnus-castus* (Lavagne & Moutte 1971) - *Rubo-Nerietum oleandri tamaricetosum galligae* Loisel 1976
- Not very dense hygrophile oligohalophile scrubs, of small valleys with intermittent rivers of inland Provence (l'arrière-pays provençal)
- Characterized by a combination of: *Nerium oleander*, *Rubus ulmifolius*, *Tamarix gallica*, *Laurus nobilis* et *Myrtus communis*
- Syntaxon described from Provence, between Toulon and Estérel



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Viticetalia agni-casti ord. nov. hoc loco *Rubo sancti – Nerion oleandri* Brullo et al. 2004

All. Rubo sancti – Nerion oleandri Brullo & al., 2004

- Distribution in the Eastern Mediterranean
- This alliance can be regarded as an eastern vicariant of the *Rubo ulmifolii Nerion olendri* characterized by *Rubus sanctus*

- ✓ *Rubo sancti-Nerietum olendri* Brullo & Furnari 2004
- ✓ *Tamarici smyrniensis- Viticetum agni-casti* Géhu al. 1992
- ✓ *Nerio-Phoenicetum teophrasti* Brullo & al. 2004



Rubus sanctus



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**
Les 15 et 16 octobre 2012, à Saint-Mandé (94) France



Cl. *Nerio oleandri* – *Tamaricetea africanae* Braun-Blanq. & O. Bolòs 1958

PVF2

Ord. *Tamaricetalia africanae* Braun-Blanq. & O. Bolòs 1958

All. *Tamaricion africanae* Braun-Blanq. & O. Bolòs 1958

1. *Tamaricetum gallica* Braun-Blanq. & O. Bolòs 1958
2. *Solanum dulcamarae* – *Tamaricetum gallica* de Foucault 2008
3. *Inula crithmoidis* – *Tamaricetum africanae* Gamisans 1992
4. *Althaea officinalis* – *Tamaricetum africanae* Gamisans 1992

All. *Tamaricion boveano* – *canariensis* Izco et al. 1984

All. *Tamaricion niloticum* – *articulatae* all. nov. hoc loco

Ord. *Nerio Oleandri* – *Viticetalia agni-casti* ord. nov. hoc loco

All. *Rubo ulmifolii* – *Nerion oleandri* O. Bolòs 1985

1. *Rubo ulmifolii* – *Nerietum oleandri* O. Bolòs 1956
2. *Vinca majoris* – *Viticetum agni-casti* O. Bolòs 1956
3. *Nerio oleandri* – *Viticetum agni-casti* Paradis 2006
4. *Rubo ulmifolii* – *Viticetum agni-casti* Paradis 2006
5. *Erica scopariae* – *Nerietum oleandri* (Lavagne & Moutte 1971) ass. nov. hoc loco.

All. *Rubo sancti* – *Nerion oleandri* Brullo et al. 2004

All. *Imperato cylindrica-Eranthion ravennae* Br.-Bl. & O. Bolos 1958



Muséum
national
d'Histoire
naturelle

Colloque international : **Les prodromes des végétations d'Europe**

Les 15 et 16 octobre 2012, à Saint-Mandé (94) France

SFP
SOCIÉTÉ FRANÇAISE
DE PHYTOSOCIOLOGIE

Nerio Tamaricetea in North Africa





Thank you!