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Syntaxonomic synopsis of the forest and tall scrub vegetation of Northern Algeria

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Abstract. This paper presents the first syntaxonomic conspectus of the forest and scrub communities of Northern Algeria. The communities belong mainly to the zonal classes such as the *Quercetea ilicis*, *Quercetea pubescentis* and *Junipero-Pinetetea sylvestris* (new to Algeria). The *Cytisetea scopario-striati* and *Nerio-Tamaricetea* are considered intrazonal within the Mediterranean zone, while the *Crataego-Prunetea* considered intrazonal within the Temperate zone. The azonal vegetation is represented by four classes: *Alno glutinosae-Populetea albae*, *Salicetea purpureae*, *Alnetea glutinosae*, and *Franguletea* (the latter being recognised in Algeria for the first time). We attempted to include all known syntaxa as featured in both regular and grey literature; many of those still await effective publication or formal validation. The paper also presents formal descriptions (and/or validations) of one new order, 12 new alliances, and 15 new associations.

Keywords: Algeria, forest vegetation, scrub vegetation, phytosociology, syntaxonomy.

[es] Sinopsis sintaxonómica de los bosques y matorrales de alta talla de la vegetación del norte de Argelia

Resumen. Este trabajo presenta el primer esquema sintaxonómico de las comunidades forestales y de matorrales de alta talla del norte de Argelia. Las comunidades pertenecen principalmente a las clases zonales *Quercetea ilicis*, *Quercetea pubescentis* y *Junipero-Pinetetea sylvestris* (nuevas en Argelia). *Cytisetea scopario-striati* y *Nerio-Tamaricetea* se consideran intrazonales dentro de la zona mediterránea, y *Crataego-Prunetea* intrazonal dentro de la zona templada. La vegetación azonal está representada por cuatro clases: *Alno glutinosae-Populetea albae*, *Salicetea purpureae*, *Alnetea glutinosae* y *Franguletea* (esta última se reconoce en Argelia por primera vez). Intentamos incluir toda la sintaxis conocida en publicaciones válidas e inéditas; por ello, muchos nombres todavía esperan una publicación efectiva o una validación formal. El documento también presenta descripciones formales (y / o validaciones) de un nuevo orden, 12 nuevas alianzas y 15 nuevas asociaciones.

Palabras clave: Argelia; vegetación forestal; vegetación arbustiva; fitosociología; sintaxonomía.

Introduction

Algerian forests cover about 4.11 million of hectares that represents only 1.76% for the entire national territory, and 16.4% for its northern regions (Djema & Messaoudène, 2009). These forests are limited to humid, subhumid and semi-arid bioclimatic zones, and are mostly distributed in the mountainous regions of

Tellian and Saharan Atlas in Northern Algeria. The elevational span of the forest occurrence is broad and covering all belts between the thermomediterranean and the oromediterranean altitudes (*sensu* Quézel & Médail, 2003a).

Phytosociological studies in Algeria date back to the 1950s. The syntaxonomy of forest (and tall scrub) vegetation types, such as forest, scrub and macchia, was earlier studied by for-

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eign researchers (e.g. Quézel, 1956; Zaffran, 1960; Nègre, 1964). Although these authors have described many syntaxonomic units, the general syntaxonomic framework as used in North Africa, and in Algeria in particular, relies heavily on studies of the Western Mediterranean vegetation (e.g. Loisel, 1971; Barbero *et al.*, 1974, 1981; Barbero & Quézel, 1975; Rivas-Martínez, 1975; Rivas-Martínez & Rivas Goday, 1975; Quézel & Barbero, 1981, 1986, 1989; Rivas-Martínez *et al.*, 1986, 1999, 2001, 2002, 2011; de Foucault *et al.*, 2012).

Despite the obvious important ecological services and conservation value, the focused attention, the forest and scrub vegetation of Algeria has been receiving only since the 80th of the past century, especially by researchers using the Braun-Blanquet (1964) approach. These studies accumulated valuable phytosociological data on almost all forest vegetation types, such as sclerophyllous evergreen forests, deciduous broadleaved forests, coniferous forests, and riparian forests (Guinochet, 1980; Zeraia, 1981; Abdessemed, 1981; Dahmani, 1984, 1997; Bensettiti, 1985, 1995; Toubal, 1986; Aimé *et al.*, 1986; Khelifi, 1987, 2008; Sadki, 1988; Hadjadj-Aoul, 1988, 1995; Wojterski, 1988; Quézel & Barbero, 1989; Géhu *et al.*, 1992, 1994a, 1994b; Meddour, 1993, 1994a, 1994b, 1998, 1999, 2002, 2010; Yahi, 1995, 2007; Géhu & Sadki, 1996; Bensettiti & Lacoste, 1999; Hadjadj-Aoul & Loisel, 1999; Laribi, 2000; Gharzouli, 1989, 2007; Dahmani-Megrerouche & Loisel, 2003; Laribi *et al.*, 2008; Meddour *et al.*, 2010; Siab-Farsi *et al.*, 2014).

The first syntaxonomic synopsis of the forest and scrub plant communities of Algeria presented 6 classes, 8 orders, 22 alliances and 70 associations and/or rank-less plant communities (Meddour & Géhu, 1998). A synthesis of the forest communities by Djebaïli (1994) listed only 20 associations, belonging to 2 classes, 2 orders and 5 alliances. Later, Dahmani-Megrerouche *et al.* (2014) summarised the syntaxonomy of forest vegetation in Algeria into merely 2 classes, 3 orders, 10 alliances and 28 associations.

In this paper, we present a synopsis of the Northern Algerian forest and scrub syntaxa described according to the Braun-Blanquet approach. The aim of this conspectus is formulation of a backbone of syntaxonomic system of this vegetation that would serve syntaxonomic and nomenclatural revisions in future. We also

summarise the major source of the phytosociological data to assist such revisions.

Material and methods

We conducted a detailed bibliographic research on published studies (about 50 published papers and 40 unpublished theses) describing Algerian forest vegetation.

In this synopsis, we list all forest and scrub-dominated vegetation types (syntaxa) described by Braun-Blanquet approach in Algeria in the course of the past 60 years (1956–2016). Only the syntaxa documented by phytosociological relevés are considered here.

Intentionally, we are not covering number of published subassociations and suballiances since their syntaxonomic value still should be clarified. At this stage, we refrain from nomenclatural and syntaxonomic revision of the association (and subassociations). This critical revision will be attempted elsewhere. We provide (presumably) correct name for each syntaxon, synonyms as known from the Algerian literature, lists of author(s) who have studied the given syntaxon in Algeria, and all other related references that include pertinent phytosociological relevés. We refer to Meddour (2010) for the synecological descriptions, distribution, and diagnostic species lists for each association. The concepts and nomenclature of the classes and most of the follows Mucina *et al.* (2016) and we applied the naming rules of the ICPN (Weber *et al.*, 2000) to other high-rank syntaxa not covered by the European vegetation system (Mucina *et al.*, 2016). In synonymy of some associations we also cite the article of the ICPN, according to which the synonym is deemed invalid or illegitimate. Some syntaxonomic and nomenclatural concepts of the orders and alliances, as currently used in Algerian phytosociological literature, are however still subject to future revisions.

Results

We list 129 associations (including 15 rank-less plant communities) classified into 10 classes, 12 orders (1 new), and 34 alliances (12 new). Two orders and 18 alliances (marked with an asterisk) are endemic to North Africa.

SYNTAXONOMIC SURVEY OF CLASSES

The classification of the classes within the zonal-intrazonal-azonal system follows Mucina *et al.* (2016).

Zonal mediterranean woodlands and scrub

Quercetea ilicis Braun-Blanquet ex A. de Bolòs & O. de Bolòs in A. Bolòs y Vayreda 1950

Zonal submediterranean woodlands and scrub

Junipero-Pinetea sylvestris Rivas-Martínez 1965 *nom. invers. propos.*

Quercetea pubescentis Doing-Kraft ex Scamoni & Passarge 1959

Intrazonal Mediterranean woodlands and scrub

Cytisetea scopario-striati Rivas-Martínez 1974
Nerio-Tamaricetea Braun-Blanquet & O. de Bolòs 1958

Intrazonal Temperate woodlands and scrub

Crataego-Prunetea Tüxen 1962 *nom. conserv. propos.*

Azonal temperate woodlands and scrub

Alno glutinosae-Populetea albae P. Fukarek & Fabijanić 1968

Salicetea purpureae Moor 1958

Alnetea glutinosae Braun-Blanquet & Tüxen ex Westhoff, Dijk & Passchier 1946

Franguletea Doing ex Westhoff in Westhoff & Den Held 1969

ANNOTATED SYNTAXONOMIC SYSTEM

Quercetea ilicis Braun-Blanquet ex A. de Bolòs & O. de Bolòs in A. Bolòs y Vayreda 1950

Thermo-mesomediterranean pine and oak forests and associated macchia of the Mediterranean

- *Pistacio lentisci-Rhamnetea alaterni* Julve 1992 (phantom)
- *Pistacio lentisci-Rhamnetea alaterni* Julve 1993 (syntax. syn.)

Syntaxonomic and nomenclatural notes: De Foucault (1993) have 'described' a series of 'Les synusies arborescentes' under the following names:

'*Pino halepensis-Quercetea ilicis* (Br.-Bl. 1947) de Fouc. et Julve 1991'

'*Quercetalia rotundifolio-ilicis* de Fouc. et Julve 1991'

'*Quercetea rotundifoliae-Cedretum atlanticae* all. nov.'

'*Quercetea rotundifoliae-Cedretum atlanticae* (Barbero *et al.* 1981) nov.'

'*Aceri monspessulani-Cedretum atlanticae* (Br.-Bl. et Maire 1924) nov.'

'*Aceri granatense-Abietetum maroccanae* (Barbero *et al.*) nov.'

'*Quercion rotundifolio-suberis* (Barbero *et al.* 1981) all. nov.'

'*Pino halepensis-Tetraclinetalia articulatae* ord. nov. prov.'

'*Tetraclinion articulatae* all. nov.'

Since all are synusial units of vegetation of vascular plants, and these are not subject to the ICPN (Definition I, art. 3d), and therefore not considered here either as candidates for valid names or synonyms.

Quercetalia ilicis Braun-Blanquet ex Molinier 1934

Evergreen and semi-deciduous thermo-to supramediterranean oak and relict laurel forests of the Central and Western Mediterranean

- *Quercetalia atlanticae* Bensettiti & Lacombe 1999 *nom. inval.* (Art. 8)

Oleo sylvestris-Quercion rotundifoliae

Barbero, Quézel & Rivas-Martínez in Rivas-Martínez, Costa & Izco 1986 *nom. invers. propos.*

Thermo-mediterranean evergreen oak forests on deep soils in subhumid and humid regions of the Iberian Peninsula and North Africa

Typus: Myrto communis-Quercetum suberis Barbero, Benabid, Quézel & Rivas-Martínez in Barbero, Quézel & Rivas-Martínez 1981 (Barbero *et al.*, 1981: 319, Table 3, rel. 2)

- *Oleo sylvestris-Quercion rotundifolio-suberis* Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 5)

• '*Quercetea rotundifoliae-Oleion sylvestris*' Barbero, Quézel & Rivas-Martínez in Rivas-Martínez, Costa & Izco 1986 (orig. form)

- *non Quercion suberis* Loisel 1971

Myrto communis-Quercetum suberis Barbero, Benabid, Quézel & Rivas-Martínez in Barbero, Quézel & Rivas-Martínez 1981

Nomenclatural and syntaxonomic notes: Barbero *et al.* (1981), similarly as with many other new associations in their paper, have placed an asterisk next to the number of a relevé in the header of the table. (In case of the *Myrto-Quercetum suberis*, the relevé 2 in Tab. 3 in Barbero *et al.*, 1981 carry an asterisk.) This symbol has been used in cases to designate ‘type’ relevé of a new syntaxon in francophone phytosociological literature in the past and therefore we suggest recognising it as an acceptable indication of the type relevé, rendering the new syntaxa validly published.

Lit.: Zeraia (1981), Toubal (1986), Wojterski (1988), Toubal & Toubal (1996b), Meddour (2002).

Smilaco mauritanicae-Quercetum rotundifoliae Barbero, Quézel & Rivas-Martínez 1981

• ‘*Smilaci mauritanicae-Quercetum rotundifoliae*’ Barbero, Quézel & Rivas-Martínez 1981 (orig. form)

Lit.: Zeraia (1981), Wojterski (1988).

Pistacio terebinthi-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)

• *Pistacio terebinthi-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)

Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Dahmani-Megrerouche & Loisel (2003).

Pistacio lentisci-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)

• *Pistacio lentisci-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)

Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Brakchi (1998), Dahmani-Megrerouche & Loisel (2003), Lemouissi (2014)

Cytiso triflori-Quercetum suberis Braun-Blanquet 1953

• ‘*Cytiseto-Quercetum suberis*’ Braun-Blanquet 1953 (orig. form)

• *Cytiso villosi-Quercetum suberis* Braun-Blanquet 1953 *corr.* Serra, Loddo & Bacchetta 2002 (*corr. illeg.*)

• *Cytisovillosi-Quercetum suberis* Braun-Blanquet 1953 *nom. mut. propos.*

Nomenclatural note: In the original diagnosis, *Cytisus triflorus* is the only *Cytisus* species listed. Serra *et al.* (2002) have changed the name using *Cytisus villosus* as the eponymous. However, this ‘correction’ has not been explicitly performed in accordance with the ICPN.

Lit.: Quézel (1956), Zeraia (1981), Dahmani (1984), Toubal (1986), Khelifi (1987), Sadki (1988), Wojterski (1988, 1990), Salamani (1990), Khelifi & Sadki (1995), Toubal & Toubal (1996b), Meddour (2002, 2010), Iboukassene (2008), Meddour *et al.* (2010). Figure 2B.

Festuco triflorae-Quercetum suberis Meddour 2010 *nom. inval.* (Art. 1)

Lit.: Meddour (2010).

Pistacio lentisci-Quercetum suberis Khelifi & Sadki 1995 *nom. inval.* (Art. 5)

• *Pistacio lentisci-Quercetum suberis* Khelifi 1987 *nom. inval.* (Art. 1)

• ‘Forêt de chêne liège à lentisque’ (Debazac, 1959)

Lit.: Debazac (1959), Toubal (1986), Khelifi (1987), Khelifi & Sadki (1995), Meddour (1994a, 2002).

Telino linifoliae-Quercetum suberis Zeraia 1981 *nom. inval.* (Art. 1)

Syntaxonomic note: This association, recognized in Morocco (Maâmora forest), has been linked to the ‘*Quercus-Oleion sylvestris*’ (Barbero *et al.*, 1981; Benabid & Fennane, 1994; Benabid, 2000; Fennane, 2003; Aafi, 2007). It is reminiscent of the xero-thermophilous cork-oak forest on siliceous substrates of Provence (*Quercus suberis-Genistetum linifoliae* Loisel 1971), and formerly classified in Algeria as part of the *Quercion suberis* (Loisel, 1976).

Lit.: Zeraia (1981).

Genisto numidicae-Quercetum suberis Toubal 1998

• *Erico scopariae-Quercetum suberis* Khelifi 1987 *nom. inval.* (Art. 1)

Lit.: Khelifi (1987), Khelifi & Sadki (1995), Toubal (1998).

Lonicero implexae-Quercion cocciferae* all. nova hoc loco

Thermo-mediterranean kermes oak and forests on deep soils in subhumid regions of Western Algeria

Holotypus (hoc loco): Lonicero implexae-Quercetum cocciferae Nègre 1964 (Nègre, 1964: 30, Table 7)

Diagnostic taxa: *Lonicera implexa*, *Osyris quadripartita*, *Phillyrea latifolia*, *Prasium majus*, *Quercus coccifera*

Syntaxonomic note: This new is based on the concept of invalidly published suballiance *Oleo sylvestris-Quercenion cocciferae* Hadjadj-Aoul & Loisel 2010 *nom. inval.* (Art. 5).

***Lonicero implexae-Quercetum cocciferae* Nègre 1964**

Lit.: Nègre (1964), Baumgartner (1966), Wojterski (1988, 1990), Hadjadj-Aoul & Loisel (1999), Rebbas *et al.* (2011).

***Phillyreo latifoliae-Quercetum cocciferae* Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988**

• '*Prasio-Oleetum*' O. de Bolòs in O. de Bolòs & Molinier 1969 (phantom; in Guinochet 1980)

Lit.: Guinochet (1980), Hadjadj-Aoul (1988, 1993), Hadjadj (1991), Meddour (2002).

***Oleo sylvestris-Tetraclinetum articulatae* Hadjadj-Aoul & Loisel 1999**

• *non Oleo salicifoliae-Tetraclinetum articulatae* Fennane 1988 *nom. inval.* (Art. 5)
Lit.: Hadjadj-Aoul & Loisel (1999).

***Rusco hypophylli-Tetraclinetum articulatae* Hadjadj-Aoul & Loisel 1999**

Lit.: Hadjadj-Aoul & Loisel (1999).

***Osyrido quadripartitae-Quercetum cocciferae* Hadjadj-Aoul & Loisel 1999**

Lit.: Hadjadj-Aoul & Loisel (1999).

***Junipero oxycedri-Quercetum cocciferae* Hadjadj-Aoul & Loisel 1999 *nom. illeg.* (Art. 31)**

• *non Junipero oxycedri-Quercetum cocciferae* (Braun-Blanquet 1924) de Foucault & Julve 1991

• *non Junipero oxycedri-Quercetum cocciferae* Sánchez García, Sánchez Gullón, Linares Perea & Galán de Mera 2014

Lit.: Hadjadj-Aoul & Loisel (1999).

***Tamo communis-Quercetum cocciferae* Hadjadj-Aoul & Loisel 1999**

Lit.: Hadjadj-Aoul & Loisel (1999).

***Tetraclino articulatae-Phillyreetum latifoliae* Hadjadj-Aoul & Loisel 1999**

Lit.: Hadjadj-Aoul & Loisel (1999), Medjahdi (2010).

Balansaeo glaberrimae-Quercion rotundifoliae* Barbero, Quézel & Rivas-Martínez ex Rivas-Martínez *et al.* 2011

Meso-supramediterranean evergreen oak forests on deep soils, calcareous and decarbonated soils of North Africa

• *Balansaeo glaberrimae-Quercion rotundifoliae* Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 5)

***Balansaeo glaberrimae-Quercetum rotundifoliae* Barbero, Quézel & Rivas-Martínez 1981**

• *Lino numidici-Teucrietum kabylici* Gharzouli 1989 *nom. inval.* (Art. 1)

Lit.: Gharzouli (1989), Dahmani-Megrerouche (1996a, 1996b, 1997), Dahmani-Megrerouche & Loisel (2003), Meddour (2010), Meddour *et al.* (2010). Figure 1A.

***Phlomido bovei-Quercetum rotundifoliae* Zeraia in Meddour 2002 *nom. inval.* (Art. 2b)**

• *Phlomido bovei-Quercetum rotundifoliae* Zeraia 1981 *nom. inval.* (Art. 1)
Lit.: Zeraia (1981), Meddour (1994a, 2002). Figure 2A.

***Cytiso villosi-Quercetum rotundifoliae* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)**

• *Cytiso triflori-Quercetum rotundifoliae* Meddour 1994 *nom. inval.* (Art. 1)

• *Cytiso-Quercetum* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)

Lit.: Wojterski (1988), Meddour (1994a, 2002, 2010), Dahmani-Megrerouche (1996a, 1996b, 1997), Dahmani-Megrerouche & Loisel (2003), Meddour *et al.* (2010), Lemouissi (2014).

***Festuco triflorae-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)**

• *Festuco triflorae-Quercetum rotundifoliae* Dahmani 1984 *nom. inval.* (Art. 1)

Lit.: Dahmani (1984, 1994), Dahmani-Megrerouche (1996a, 1996b, 1997).

Ptilostemona riphaei-Quercetum rotundifoliae

Meddour 2010 *nom. inval.* (Art. 1)

Lit.: Meddour (2010).

Pinetalia halepensis Biondi, Blasi, Galdenzi, Pesaresi & Vagge in Biondi, Allegrezza, Casavecchia, Galdenzi, Gasparri, Pesaresi, Vagge & Blasi 2014
Thermo-mesomediterranean pine forests of the Central and Eastern Mediterranean

Pistacio lentisci-Pinion halepensis Biondi, Blasi, Galdenzi, Pesaresi & Vagge in Biondi, Allegrezza, Casavecchia, Galdenzi, Gasparri, Pesaresi, Vagge & Blasi 2014

Thermo-mesomediterranean pine forests of the Central and Eastern Mediterranean

Genisto quadriflorae-Pinetum halepensis
ass. nova hoc loco

Holotypus (hoc loco): Benabdelli (1996: Tab. 14, rel. 3)

• *Calicotomo spinosae-Pinetum halepensis* Brakchi 1998 *nom. inval.* (Art. 1)

• ‘Matorral élevé à *Pinus halepensis*’ (Rebbas *et al.*, 2011: 280, Table VI)

Lit.: Benabdelli (1996: Tab. 4, rels. 1, 2, 3 & 5), Brakchi (1998), Rebbas *et al.* (2011), Lemouissi (2014).

Arisaro vulgaris-Pinetum halepensis Brakchi 1998 *nom. inval.* (Art. 1)

Lit.: Brakchi (1998).

Erico arboreae-Pinetum halepensis Brakchi 1998 *nom. inval.* (Art. 1)

• *non Erico arboreae-Pinetum halepensis* De Marco & Caneva 1984

Lit.: Brakchi (1998), Rebbas *et al.* (2011).

Pistacio lentisci-Rhamnetalia alaterni Rivas-Martínez 1975

Thermo-mesomediterranean low-grown matorral, macchia and garrigue of the Mediterranean Basin

Syntaxonomic note 1: As Benabid & Fennane (1994), Benabid (2000) and Fennane (2003) pointed out, the boundaries between the alliances within the *Pistacio lentisci-Rhamnetalia alaterni* in North Africa are not clear. Already in 1980, Guinochet proposed that “a close examination reveals that the associations described in this have very similar floristic compositions, of-

ten differing only in the absence or presence, or even merely dominance, of one or a few, some among forty species”. Clearly, a syntaxonomic revision of the *Pistacio lentisci-Rhamnetalia alaterni* in North Africa is long overdue.

Syntaxonomic note 2 (L. Mucina): The scrub communities traditionally classified within the *Quercetea ilicis* have been considered to constitute a in its own right by Julve (1993) who coined the *Pistacio lentisci-Rhamnetea alaterni*. This deed has not been followed by many (e.g. Theurillat *et al.*, 1995; several issues of the French Prodrome, e.g. de Foucault *et al.*, 2012; it has not been recognised notably in Bardat *et al.*, 2004), but appears to possess some merit especially in the light of the current recognition of scrub classes such as *Crataego-Prunetea* (separated from *Quercus-Fagetea*), *Rosopendulinae-Pinetea mugo* vs *Vaccinio-Piceetea*, *Rhododendro hirsuti-Ericetea carnea* vs *Erico-Pinetea*, *Salicetea purpureae* vs *Alno-Populetea*, and *Franguletea* vs *Ahnetea glutinosae*. Recognition of the importance of vegetation structure (especially complexity of vertical layering and physiognomy) in delimitation of the higher ranks of the Braun-Blanquet syntaxonomy is not a new phenomenon (see Westhoff, 1967). I am of the opinion, that the vegetation structure (as an additional criterium) should be consequently pursued also in classification of woodland and scrub vegetation of the Mediterranean.

Asparago albi-Rhamnion oleoidis Rivas Goday ex Rivas-Martínez 1975

Ibero-Maghrebian thermomediterranean sclerophyllous maquis and mantle scrub of semi-arid to subhumid regions

Syntaxonomic note: Maghrebian phytosociologists used the name *Oleo-Ceratonion siliquae* Braun-Blanquet ex Guinochet & Drouineau 1944 to accommodate sclerophyllous scrub of the relevant ecological space (semi-arid to subhumid, thermomediterranean, coastal-close habitats). The latter is however, limited (see also Rivas-Martínez *et al.*, 2011) to the northwestern Spanish Valenciano-Catalonian coasts as well as the coast of the Balearic Island, and further to the coastal seaboard of the Ligurian and Tyrrhenian Sea (incl. Corsica, Sardinia, northern coasts of Italy, and the entire western coasts of Apennine Peninsula). The *Oleo-Ceratonion* is, in south of Spain and further south in North Africa, replaced by the *Asparago albi-Rhamnion oleoidis*.



Figure 1. Forest communities of Algeria. A: *Balansaeo glaberrimae-Quercetum rotundifoliae*, Tizi Tirkabine, Tizi n’Kouilal Pass, Djurdjura Mt; B: *Plagio maghrebini-Quercetum canariensis*, Yakouren, Béni Ghobri forest. Both photos: R. Meddour.

- ‘*Oleo-Ceratonion siliquae*’ (*sensu auct. maghrebianum*)
- *non Oleo-Ceratonion siliquae* Braun-Blanquet ex Guinochet & Drouineau 1944

Smilaco asperae-Pistacietum lentisci
(Nègre 1964) *nom. nov. hoc loco*

- ‘Association à *Pistacia lentiscus* et *Olea europaea*’ Nègre 1964 *nom. illeg.* (Art. 31)
- *Oleo sylvestris-Pistacietum lentisci* Nègre 1964 *corr. sensu auct. (corr. superfl.)*
- ‘Groupement à *Olea europaea* et *Pistacia lentiscus*’ (Toubal, 1986)
- *Oleo oleastri-Pistacietum lentisci* Sadki 1988 *nom. inval.* (Art. 1)
- *non Oleo sylvestris-Pistacietum lentisci* Braun-Blanquet & Molinier 1951
Lit.: Nègre (1964), De Bélair *et al.* (1984), Toubal (1986), De Bélair & Bencheikh-Lehocine (1987), Sadki (1988, 1995), Wojterski (1988, 1990), Khelifi & Sadki (1995), Toubal & Toubal (1996b), Meddour (2002).

Phillyreo latifoliae-Pistacietum lentisci
Benabid 1982 *nom. inval.* (Art. 5)

- *Phillyreo angustifoliae-Pistacietum lentisci* Siab-Farsi, Khelifi & Kadid 2014 *nom. inval.* (Art. 5)
- *Phillyreo angustifoliae-Pistacietum lentisci* Khelifi 2008 *nom. inval.* (Art. 1)
Lit.: Khelifi (2008), Siab-Farsi *et al.* (2014).

Ephedro fragilis-Pistacietum lentisci
Géhu, Kaabèche & Gharzouli ex Géhu & Sadki 1996

- *Ephedro fragilis-Pistacietum lentisci* Géhu & Sadki 1996 (phantom)
- ‘*Ephedro fragilis-Lentiscetum*’ Géhu, Kaabèche & Gharzouli 1992 *nom. inval.* (orig. form) (Art. 2b)
- ‘Faciès à *Ephedra fragilis* de l’*Oleo-Pistacietum lentisci*’ (Wojterski, 1988)
- *non Ephedro fragilis-Pistacietum lentisci* Biondi, Brugiapaglia, Farris, Filigheddu & Secchi 2004 *nom. illeg.* (Art. 31)
Nomenclatural note: Géhu & Sadki (1996, not 1995; see Note on the *Ephedro fragilis-Junieretum turbinatae*) validated the association by selecting the holotype.

Lit.: Wojterski (1988), Géhu *et al.* (1992), Géhu & Sadki (1996), Siab-Farsi *et al.* (2014).

Bupleuro fruticosi-Euphorbietum dendroidis Géhu, Kaabèche & Gharzouli 1992 *nom. inval.* (Art. 5)

- ‘Maquis à *Euphorbia dendroides*’ (Géhu *et al.*, 1994a)
- *Chamaeropo humilis-Euphorbietum dendroidis* Toubal & Toubal 1996 *nom. inval.* (Art. 5)
- ‘Groupement à *Euphorbia dendroides*’ (Kaabèche *et al.*, 1998)
Lit.: Géhu *et al.* (1992, 1994a), Toubal & Toubal (1996a), Kaabèche *et al.* (1998), Rebbas *et al.* (2011)

Ampelodesmo mauritanicae-Chamaeropetum humilis J. Braun-Blanquet, Font Quer, G. Braun-Blanquet, Frey, Jansen & Moor 1936

- *Pistacio lentisci-Chamaeropetum humilis* Brullo & Marcenò 1985 (syntax. syn.)
- *Ampelodesmo mauritanicae-Chamaeropetum humilis* Quézel, Barbero, Benabid & Rivas-Martínez 1992 *nom. illeg.* (Art. 31)
- *Chamaeropetum humilis* Toubal 1998 (syntax. syn.)
Nomenclatural and syntaxonomic notes: Toubal’s (1998), ‘*Chamaeropetum humilii*’ was validly described (albeit the name deserves orthographic correction) from Algeria, and it is syntaxonomically identical with the *Ampelodesmo-Chamaeropetum* (Braun-Blanquet *et al.*, 1936). The association *Pistacio lentisci-Chamaeropetum humilis* Brullo & Marcenò 1985 (Brullo & Marcenò, 1985; Brullo *et al.*, 2008) most probably belongs to the same association as well. Géhu & Sadki (1996: 354-355) have included validly described *Chamaeropodo humilis-Artemisietum arborescentis* Géhu & Sadki 1996 into the *Oleo-Ceratonion*. This classification is not correct since this ‘pré-maquis subnitrophile’ apparently belongs to the *Pegano-Salsoletea*.
Lit.: Toubal (1998), Mesli (2001), Amara (2014).

Chamaeropo humilis-Asparagetum altissimi Guinochet 1980 *nom. inval.* (Art. 5)

Nomenclatural note: Once the name of this association is validated, it would be the prime candidate for *nomen inversum* since *Chamaerops humilis* has high cover values that *Asparagus altissimus* in all 3 relevés in the table in the original publication (Guinochet, 1980: Tab. 7).

Lit.: Guinochet (1980).

Quercetum coccifero-rotundifoliae Hadjadj-Aoul & Loisel 1999

Lit.: Hadjadj-Aoul & Loisel (1999), Mesli (2001).

Tetraclini articulatae-Lavanduletum dentatae Dahmani 1984 *nom. inval.* (Art. 1)

- *non Lavandulo dentatae-Tetraclinetum articulatae* Fennane 1982 *nom. inval.* (Art. 1)

- *non Lavandulo dentatae-Tetraclinetum articulatae* Fennane 1988 *nom. inval.* (Art. 5)

Lit.: Dahmani (1984), Hadjadj-Aoul (1988).

Calicotomo intermediae-Tetraclinetum articulatae Barbero, Quézel & Rivas-Martínez 1981

Lit.: Hadjadj-Aoul (1988), Hadjadj (1991), Hadjadj-Aoul & Loisel (1999), Medjahdi (2010), Amara (2014).

Ampelodesmo mauritanicae-Tetraclinetum articulatae Hadjadj-Aoul & Loisel 1999

- ‘Groupement à *Tetraclinis articulata* et *Ampelodesma mauritanicum*’ (Miara, 2011)

- ‘G3:*Tetraclinis articulata-Ampelodesma mauritanicum*’ (Benabdellah, 2011)

Lit.: Hadjadj-Aoul & Loisel (1999), Benabdellah (2011), Miara (2011), Miara *et al.* (2012).

Genisto quadriflorae-Tetraclinetum articulatae Hadjadj-Aoul & Loisel 1999

Lit.: Hadjadj-Aoul & Loisel (1999).

Comm. ‘**Groupements à *Myrtus communis***’ (Nègre, 1964)

- ‘sous-groupement à *Myrtus communis*, la myrtaie’ (Chevassut, 1956)

Lit.: Chevassut (1956), Nègre (1964), Toubal (1986).

Tetraclini articulatae-Pistacion atlanticae Rivas-Martínez, Costa & Izco 1986*

Thermo-mesomediterranean sclerophyllous scrub of arid and semi-arid continental regions of the Maghreb

Syntaxonomic note: Fennane (1988) suggested that this was only of very dubious value since it had been originally created to accommodate mainly *Tetraclinis* associations. Hadjadj-Aoul & Loisel (1999) as well as Meddour (2010) have cited it for Algeria.

Rosmarino tournefortii-Tetraclinetum articulatae Nègre 1964 *nom. invers. et nom. mut. propos.*

- ‘*Callitrieto-Rosmarinetum tournefortii*’ Nègre 1964 (orig. form)

- *Rosmarino tournefortii-Tetraclinetum articulatae* Fennane 1987 *nom. inval.* (Art. 1)

- *Rosmarino tournefortii-Tetraclinetum articulatae* Fennane 1988 *nom. inval.* (Art. 5)

Nomenclatural note: In the original name of this association (Nègre, 1964) the suffix *-etum* should be assigned to the species of higher stratum (*Tetraclinis articulata*, syn. *Callitris quadrivalvis*). Therefore we suggest inverting the original name as well as mutating the inverted name since the concept of the genus *Callitris* has not been in use in North Africa for more than past 20 years. Molecular phylogenetic work (e.g. Gadek *et al.*, 2000; Yang *et al.*, 2012) confirmed that *Callitris* and *Tetraclinis* belong to different clades and hence should be considered different at the genus level. Fennane’s (1987, 1988) *Rosmarino tournefortii-Tetraclinetum articulatae* is syntaxonomically identical, yet invalidly published. However, validation of this name would create a later homonym.

Lit.: Nègre (1964), Hadjadj-Aoul (1988), Medjahdi (2010). Figure 2C.

Rhuo pentaphyllae-Tetraclinetum articulatae Hadjadj-Aoul 1999

- ‘*Rhus pentaphyllae-Tetraclinetum articulatae*’ Hadjadj-Aoul 1988 *nom. inval.* (Art. 1)

- ‘*Rhus pentaphyllae-Tetraclinetum articulatae*’ Hadjadj 1991 *nom. inval.* (Art. 5)

- ‘Groupement à *Tetraclinis articulata* et *Rhus pentaphylla*’ (Alcaraz, 1991)

Lit.: Hadjadj-Aoul (1988), Hadjadj (1991), Alcaraz (1991), Hadjadj-Aoul & Loisel (1999).

Rhamno oleoidis-Tetraclinietum articulatae
Hadjadj-Aoul & Loisel 1999
Lit.: Hadjadj-Aoul & Loisel (1999).

Junipero turbinatae-Quercetum cocci-ferae Hadjadj-Aoul & Loisel 1999
Lit.: Hadjadj-Aoul & Loisel (1999).

Calicotomo intermediae-Oleetum sylvestris
Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988
Lit.: Amara (2014).

Junipero oxycedri-Rhamnion atlanticae
Quézel & Barbero 1986*
Meso-supramediterranean sclerophyllous scrub of subhumid regions of the Maghreb

Junipero turbinatae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
• *Junipero turbinatae-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Kadi-Hanifi (1998), Dahmani-Megrerouche & Loisel (2003).

Comm. 'Groupement à *Quercus rotundifolia* et *Juniperus oxycedrus* subsp. *rufescens*' (Miara *et al.*, 2012)
Lit.: Miara (2011), Miara *et al.* (2012)..

Juniperion turbinatae Rivas-Martínez 1975 corr. 1987
Thermomediterranean tall juniper scrub on coastal dune systems of the semi-arid to sub-humid Western Mediterranean seaboard
• *Juniperion lyciae* Rivas-Mart. 1975 (orig. name)

Ephedro fragilis-Juniperetum macrocarpae
Bartolo, Brullo & Marcenò 1982
• *Ephedro fragilis-Juniperetum macrocarpae* Géhu & Géhu-Franck 1986 *nom. illeg.* (Art. 31)
Nomenclatural and syntaxonomic notes: The *Ephedro fragilis-Juniperetum macrocarpae* J.M. Géhu & J. Géhu-Franck 1986 (see Géhu & Géhu-Franck, 1986; Géhu *et al.*, 1994a), described from Tunisia, is ap-

parently syntaxonomically identical with the *Ephedro fragilis-Juniperetum macrocarpae* Bartolo, Brullo & Marcenò 1982 (described from Sicily; Brullo *et al.*, 2008) and therefore nomenclaturally should be considered a later homonym.
Lit.: Aimé *et al.* (1983), Géhu *et al.* (1992, 1994a), Khelifi *et al.* (2014).

Ephedro fragilis-Juniperetum turbinatae
Géhu & Sadki 1996
• *Ephedro fragilis-Juniperetum turbinatae* (Zaffran 1960) Géhu & Sadki 1996 (phantom)
Nomenclatural note: The name was effectively not published in 1995, but in March 1996 as indicated clearly on the last page of the Volume XV of *Document phytosociologiques N.S.* (see Géhu & Sadki, 1996).
Lit.: Zaffran (1960), Wojterski (1988), Géhu & Sadki (1996), Siab-Farsi *et al.* (2014).

Rhamno rotundifoliae-Juniperetum turbinatae Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988
Lit.: Medjahdi (2010).

Clematidi cirrhosae-Juniperetum lyciae
Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 2b)
Nomenclatural note: The association was described by Barbero *et al.* (1981: 369-370) invalidly since only synoptic table has been presented.
Lit.: Meziani (1984).

Ericion arboreae (Rivas-Martínez ex Rivas-Martínez, Costa & Izco 1986) Rivas-Martínez 1987
Mesomediterranean neutrophilous to acidophilous mesic maquis and mantle in the sub-humid to humid regions of the Western Mediterranean

Simethi bicoloris-Ericetum arboreae Nègre 1964
Lit.: Nègre (1964).

Erico arboreae-Myrtetum communis Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988
• 'Groupement à *Pistacia lentiscus* et *Erica arborea*' (Sadki, 1988)
Lit.: Sadki (1988), Hadjadj (1991), Khelifi & Sadki (1995), Hadjadj-Aoul & Loisel (1999), Meddour (2010), Medjahdi (2010).



Figure 2. Forest communities of Algeria. A: *Phlomis bovei-Quercetum rotundifoliae*, Mzarir, southern slope of Djurdjura Mt; B: *Cytisus villosus-Quercetum suberis*, Mizrana forest, Kabylia coast; C: *Rosmarino tournefortii-Tetraclinium articulatae*, Sahel of Tipaza. All photos: R. Meddour.

Erico arboreae-Arbutetum unedonis
Molinier 1937
• ‘*Erico arboreae-Arbutetum unedo*’ Mesli
2001 *nom. inval.* (Art. 1)
Lit.: Mesli (2001).

Erico arboreae-Tetraclinium articulatae
Hadjadj-Aoul 1988 *nom. inval.* (Art. 1)
Lit.: Hadjadj-Aoul (1988).

Erico arboreae-Quercetum cocciferae
Quézel, Barbero, Benabid & Rivas-Martínez
1992
Lit.: Medjahdi (2010).

Phillyreo latifoliae-Quercetum cocciferae
Quézel, Barbero, Benabid, Loisel & Rivas-
Martínez 1988

- ‘*Prasio-Oleetum* O. de Bolòs in O. de Bolòs & Molinier 1969’ (phantom; in Guinochet, 1980)
Lit.: Guinochet (1980), Hadjadj-Aoul (1988, 1993), Hadjadj (1991), Meddour (2002).

Genisto ulicinae-Quercetum cocciferae
Djaaboub 2008 *nom. inval.* (Art. 1)
Lit.: Djaaboub (2008).

Periplocion angustifoliae Rivas-Martínez 1975
Infra-thermomediterranean relict low semideciduous sclerophyllous scrub of the coastal arid and semi-arid regions of the south-eastern Spain, Sicily and the western North Africa

- *Periploco angustifoliae-Tetraclinidion articulatae* Rivas-Martínez in Rivas-Martínez *et al.* 2011 (syntax. syn.)

Syntaxonomic note: This alliance, originally recognised in south-eastern Spain (Rivas-Martínez, 1975; Rivas-Martínez *et al.*, 1986) has not been adopted in Morocco (see Barbero *et al.*, 1981; Benabid & Fennane, 1994; Benabid, 2000), despite the ‘*Periploco laevigatae-Tetraclinidion articulatae* Benabid 1982’ from calcareous substrates of the thermomediterranean belt, does occur in Morocco in the coastal Eastern Rif (Barbero *et al.*, 1982), yet it has not been linked to this unit (Quézel & Barbero, 1986). In Orania (Western Algeria), this very rare vegetation occurs only in few sites between Oran and Ghazouet (Medjahdi, 2010), and could possibly also be found as far as Ghomara in Morocco (see Barbero *et al.*, 1981) and around the Alboron Sea (Meddour, 2010).

Periploco angustifoliae-Tetraclinidion articulatae Benabid ex Rivas-Martínez *et al.* 2011

- *Periploco laevigatae-Tetraclinidion articulatae* Benabid 1982 *nom. inval.* (Art. 1)

- *Periploco laevigatae-Tetraclinidion articulatae* Benabid 1985 *nom. inval.* (Art. 5)

Nomenclatural note: This association has been selected by Rivas-Martínez *et al.* (2011) as the holotype of the *Periploco angustifoliae-Tetraclinidion articulatae*.

Lit.: Medjahdi (2010).

Euphorbio bivonae-Rhoetum tripartitae
Siab-Farsi, Khelifi & Kadid 2014 *nom. inval.* (Art. 5)

- ‘*Euphorbio bivonae-Rhusetum tripartitae*’ Khelifi 2008 *nom. inval.* (Art. 1)
Lit.: Khelifi (2008), Siab-Farsi *et al.* (2014).

Comm. ‘**Brousse à *Periploca laevigata* et *Ziziphus lotus***’ (Géhu *et al.*, 1994a)
Lit.: Géhu *et al.* (1994a).

Genisto tricuspadatae-Calicotomion spinosi
Dahmani-Megrerouche & Loisel *all. nova hoc loco**

Thermo- and mesomediterranean low maquis on acidic or decarbonated soils in subhumid and humid regions of Central Algeria

Holotypus (hoc loco): Calicotomo spinosae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below).

Diagnostic taxa: *Ampelodesmos mauritanicus*, *Calicotome spinosa*, *Cistus creticus* subsp. *creticus*, *Genista tricuspadata*

- *Genisto tricuspadatae-Calicotomion spinosi* Dahmani 1984 *nom. inval.* (Art. 1)

- *Genisto tricuspadatae-Calicotomion spinosi* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Arts. 5 & 8)

Syntaxonomic note: This vegetation of central Algerian distribution includes matorrals and coppice of green oak, whose extension is alarming due to the frequency of fires. The degradation of green oak or cork oak forest, at thermomediterranean and mesomediterranean belts, in subhumid or even humid bioclimate, resulted in plant communities dominated physiognomically by *Calicotome spinosa*, *Ampelodesmos mauritanica*, *Genista tricuspadata* subsp. *tricuspadata*, which are characteristic species (Dahmani, 1997). These are not typical tall-scrub formations, but as was mentioned by Quézel *et al.* (1988; see also Meddour, 2010) about some Moroccan vegetation: “complex and heterogeneous vegetation structures, mainly integrating heavily anthropized degradation stages (‘dematorralsation’ process), in which the chamaephytes linked to the *Cisto-Lavanduletea* or *Rosmarinetea* can play an important physiognomic role and whose interpretation is not easy”.

Calicotomo spinosae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel *ass. nova hoc loco*

Holotypus (hoc loco): Dahmani-Megrerouche & Loisel (2003: Table 6, rel. 3)

- *Calicotomo spinosae-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
- *Calicotomo spinosae-Quercetum rotundifoliae* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
- ‘Groupement à *Quercus rotundifolia* et *Genista tricuspidata*’ (Miara, 2011)
Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Mesli (2001), Dahmani-Megrerouche & Loisel (2003), Boulaacheb (2009), Meddour (2010), Miara (2011), Miara *et al.* (2012), Lemouissi (2014).

Cisto salviifolii-Quercetum rotundifoliae
Dahmani-Megrerouche & Loisel *ass.nova hoc loco*

Holotypus (hoc loco): Dahmani-Megrerouche & Loisel (2003: Table 8, rel. 8)

- *Cisto salviifolii-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
- *Cisto salviifolii-Quercetum rotundifoliae* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Brakchi (1998), Dahmani-Megrerouche & Loisel (2003), Meddour *et al.* (2010), Miara *et al.* (2012).

Arbuto unedoni-Quercetum rotundifoliae
Miara, Hadjadj-Aoul & Ait Hammou 2012

- ‘Groupement à *Quercus rotundifolia* et *Arbutus unedo*’ (Miara, 2011)
Lit.: Miara (2011), Miara *et al.* (2012).

Pistacio lentisci-Calicotometum spinosae
Boussouf 2004 *nom. inval.* (Art. 1)
Lit.: Boussouf (2004).

Calicotomo intermediae-Quercion cocciferae
Dahmani-Megrerouche & Loisel *all. nova hoc loco**

Thermo- and mesomediterranean scrub on calcareous soils in semi-arid or subhumid regions of Western Algeria

Holotypus (hoc loco): *Calicotomo intermediae-Quercetum rotundifoliae* Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)

Diagnostic taxa: *Calicotome infesta* subsp. *intermedia*, *Quercus coccifera*, *Quercus ilex* subsp. *ballota*, *Chamaerops humilis*

- *Calicotomo intermediae-Quercion cocciferae* Dahmani 1984 *nom. inval.* (Art. 1)
- *Calicotomo intermediae-Quercion cocciferae* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Arts. 5 & 8)

Calicotomo intermediae-Quercetum rotundifoliae
Dahmani-Megrerouche & Loisel *ass. nova hoc loco*

Holotypus (hoc loco): Dahmani-Megrerouche & Loisel (2003: Table 9, rel. 4)

- *Calicotomo intermediae-Quercetum rotundifoliae* Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
- *Calicotomo intermediae-Quercetum rotundifoliae* Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997), Kadi-Hanifi (1998), Dahmani-Megrerouche & Loisel (2003).

Ampelodesmo mauritanicae-Quercetum cocciferae
Kadik 2005 *nom. inval.* (Art. 1)
Lit.: Kadik (2005).

Loto dorycnium-Quercion rotundifoliae
Djebaïli *all. nova hoc loco**

Tall-scrub ‘pre-forest’ green-oak and pine vegetation of the Saharan Atlas

Holotypus (hoc loco): *Loto dorycnium-Pinetum halepensis* Djebaïli in Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)

Nomenclature note: The concept of this was originally conceived by Prof. Djebaïli (1935-1994), a grand personality of Algerian biology who tragically deceased. (https://fr.wikipedia.org/wiki/Salah_Djebaïli). As a token of our appreciation, we suggest that this alliance should be described under his name.

Diagnostic species: *Asparagus acutifolius*, *Ephedra altissima*, *Lotus dorycnium* (syn. *Dorycnium suffruticosum*, *D. pentaphyllum*), *Phillyrea media*, *Pinus halepensis*, *Pistacia terebinthus*, *Quercus ilex* subsp. *ballota*

- ‘Alliance à *Pinus halepensis* et *Quercus ilex*’ Djebaïli 1978 *nom. inval.* (Art. 1)
- ‘Alliance à *Pinus halepensis* et *Quercus ilex*’ Djebaïli 1984 *nom. inval.* (Art. 8)
- ‘Alliance à *Pinus halepensis* et *Quercus ilex*’ Djebaïli 1990 *nom. inval.* (Art. 8)
- ‘*Pino halepensis-Quercion rotundifoliae* Djebaïli 1978’ *corr.* Meddour 2010 *nom. inval.* (Art. 1; *invalid nomen corrigendum*)

Syntaxonomic note: Kaabèche (1995) has shown, by using numerical analyses, that the ‘*Pinus halepensis* plant community’ of the Saharan Atlas (Kadik, 1983), the ‘*Pinus halepensis* and *Quercus ilex* community’ and the ‘*Pinus halepensis* and *Juniperus phoenicea* community’ of Ksour Mountains (both by Bouzenoune, 1984), and the ‘forest plant communities’ of the Ouled Nail Mountains (Kaabèche, 1990), have close floristic affinities with vegetation described by Djebaïli (1978). Undoubtedly, they should belong to the *Pistacio-Rhamnalia*. Yet, the syntaxonomic classification of these units (one association with several subassociations or a new alliance with several associations), remained unclear. Although Kaabèche (1995) accepted the idea of vegetation ‘with *Pinus halepensis* and *Quercus ilex*’, the concept remained poorly defined due to the choice of characteristics and differentials species of matorrals. It appears, however, that coining of a new name (alliance) to accommodate the ‘pre-forest’ (scrub) green-oak and pine formations of the Saharan Atlas is justified and supported by the notion of ‘continental facies of the Saharan Atlas’ for the pine-dominated vegetation as described by Maire (1926). Other characteristic species are *Genista pseudopilosa*, *Pistacia lentiscus*, *Thymelaea nitida*, etc. The same name was previously proposed by Celles (1975, in Kaabèche, 1995) for the Saharan Atlas as well.

Loto dorycnium-Pinetum halepensis Djebaïli *ass. nova hoc loco*

Neotypus (hoc loco): Djebaïli (1984: Table 1, rel. 195)

Syntaxonomic note: This association (where *Argyrobium linneanum* is significantly present) appears to have close floristic affinities with the *Argyrobium linneani-Pinetum halepensis* Achhal 1986 (see Quézel & Barbero, 1986; Fennane, 2003) described from the Central High Atlas, but belonging to the *Tetraclini-Pistacium atlanticae*.

- *Dorycnio suffruticosi-Phillyreum mediae* Djebaïli 1978 *nom. inval.* (Art. 1)
 - *Dorycnio suffruticosi-Phillyreum mediae* Djebaïli 1990 *nom. inval.* (Art. 2b)
- Lit.: Djebaïli (1978, 1984, 1990), Meddour (2010), Chermat (2014).

Coronillo valentinae-Quercetum Guinochet ex Meddour *ass. nova hoc loco*

Holotypus (hoc loco): Guinochet (1980: Table 8, rel. 1)

- ‘*Quercus-Coronilletum valentinae*’ Guinochet 1980 *nom. inval.* (Art. 5)
 - *Coronillo valentinae-Quercetum rotundifoliae* Guinochet 1980 *nom. inval.* (Meddour 2002; Art. 2b)
- Lit.: Guinochet (1980), Meddour (1994a, 2002).

Cytisetea scopario-striati Rivas-Martínez 1974
Mediterranean and (sub)atlantic temperate broomy scrub (retamal, piornal, escobonal) seral to forests on acidic substrates

Cytisetalia scopario-striati Rivas-Martínez 1974
Western and Central Mediterranean thermo- to supramediterranean and submediterranean broomy cytisoid scrub

• *Retametalia sphaerocarpace* Rivas Goday 1980 (syntax.syn.)

Retamion monospermae Rivas-Martínez & Cantò in Rivas-Martínez, Fernández-González, Loidi, Lousã & Penas 2002
Lusitano-Andalusian and Tingitanian seral broomy scrub on deep littoral soils and palaeodune regosols.

Ononido variegatae-Retametum monospermae Pignatti 1952

Lit.: Géhu *et al.* (1998).

Retametum monospermae (Thomas 1969) Géhu, Kaabèche et Gharzouli 1992

- ‘Groupement à *Retama bovei*’ (Thomas, 1969)
- *Retametum monospermae* Thomas 1968 (phantom; see Géhu *et al.* 1992)
- *Retametum bovei* Thomas 1968 (phantom; see Géhu *et al.*, 1994a)
- *Pycnocomo rutifoliae-Retametum bovei* Khelifi, Siab-Farsi & Kadid 2014 *nom. illeg.* (Art. 31)
- *Pycnocomo rutifolii-Retametum monospermae* Pérez Chiscano 1982 *nom. inval.* (Art. 5)

Nomenclatural note: This community was, for the first time, described by Thomas (1969) as ‘groupement à *Retama bovei*’. Géhu *et al.* (1992, see also 1994a) later suggested two association names (*Retametum monospermae* and *Retametum bovei*, resp.), and attributed erroneously to Thomas (1968). Creation

of a *nomen novum* for the 'groupement à *Retama bovei*' by Géhu *et al.* (1992) is a possibility and therefore we suggest that the correct name should read '*Retametum monospermae* (Thomas 1969) Géhu *et al.* 1992'. Although Géhu *et al.* (1992) have not explicitly assigned the nomenclatural type, only one element (relevé) is available for typification in their paper, hence this relevé becomes automatically the holotype.

- *non Centaureo sphaerocephalae-Retametum monospermae* Tregubov 1963 Lit.: Thomas (1969), Géhu *et al.* (1992, 1994a), Khelifi (2008), Khelifi *et al.* (2014).

SUBMEDITERRANEAN WOODLANDS AND SCRUB

Junipero-Pinetea sylvestris Rivas-Martínez 1965 *nom. invers. propos.*

Relict oromediterranean and submediterranean orotemperate dry pine forests, juniper woods and related scrub of the Mediterranean

- *Ephedro majoris-Juniperetea phoeniceae* Quézel & Barbero 1981 *nom. inval.* (Art. 8)

Nomenclatural note: A list of character species is given for the *Ephedro-Juniperetea* by Quézel & Barbero (1981: 1141), however the holotype was not designated (two invalidly published orders were described in the same paper; see below).

Ephedro majoris-Juniperetalia phoeniceae Quézel & Barbero ex Mucina & Meddour *ordo nov. hoc loco**

Maghrebian montane-mediterranean and lower oromediterranean juniper scrub and woodlands in semi-arid and arid regions

Holotypus (hoc loco): Ephedro nebrodensis-Juniperion phoeniceae Quézel & Barbero in Asensi, Díez-Garretas & Quézel 2007 (Asensi *et al.*, 2007: Phytocoenologia 37: 599-623).

- *Thymo hirti-Juniperetalia phoeniceae* El Hamrouni 1978 *nom. inval.* (Art. 8)

- *Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero 1981 *nom. inval.* (Art. 8)

Nomenclatural note: A list of character species is given by Quézel & Barbero (1981: 1141), however no alliance was described in this paper, hence the names remains invalid.

- *Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero (1981) 1986 *nom. inval.* (Art. 8)

Nomenclatural note: Since the *Ephedro majoris-Juniperetea phoeniceae* Quézel & Barbero 1981 has been invalidly described at time when Quézel & Barbero (1986: 106) attempted down-ranking of this to the level, the name '*Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero (1981) 1986' remains invalid.

- *Ephedro-Juniperetalia* Quézel & Barbero ex Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988 *nom. inval.* (Art. 5)

Nomenclatural note: This name was supposedly validated by Quézel *et al.* (1988: 100), however since these authors chosen the *Juniperothuriferae-Quercion rotundifoliae* Quézel & Barbero 1980' as the type (*holotypus*), the name remains invalidly published (contrary to what Asensi *et al.*, 2007 would claim). There is no publication by Quézel & Barbero (1980) cited in Quézel *et al.* (1988) that would contain validly described of this name. Therefore, the name *Ephedro-Juniperetalia* remains invalidly published.

Ephedro nebrodensis-Juniperion phoeniceae Quézel & Barbero in Asensi, Díez-Garretas & Quézel 2007*

Thermo- and mesomediterranean juniper scrub of arid and semi-arid regions of the Maghreb, forming mantle of the *Tetraclini-Pistacion*

Nomenclatural note: Asensi *et al.* (2007: 607) selected the *Coronillo ramosissimae-Juniperetum turbinatae* Quézel & Barbero in Asensi, Díez-Garretas & Quézel 2007 as the holotype of the *Ephedro nebrodensis-Juniperion phoeniceae*. This association was validly described by Asensi *et al.* (2007: 608). These authors have used *Ephedra nebrodensis* Tineo as one of the eponymous species. *Ephedra nebrodensis* Tineo is considered a synonym of *E. major* subsp. *villarsii*; see www.emplantbase.org). Keeping the epitheton '*majoris*' would have been more appropriate.

- *Ephedro majoris-Juniperion phoeniceae* Quézel & Barbero (1981) 1986 *nom. inval.* (Art. 8)

Nomenclatural note: Since the *Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero 1981 has been invalidly described at time when Quézel & Barbero (1986) attempted the down-ranking of this to the level, the name '*Ephedro majoris-Juniperion phoeniceae* Quézel & Barbero (1981) 1986' remains invalid.

- *Ephedro majoris-Juniperion phoeniceae* Quézel & Barbero in Quézel & Médal 2003 *nom. inval.* (Art. 8)

Comm. ‘**Groupement à *Fraxinus xanthoxylloides* et *Juniperus phoenicea***’ (Abdessemed, 1981)

Taxonomic note: *Fraxinus xanthoxylloides* (G. Don) Wall. ex A. DC. was erroneously identified; the correct name is *Fraxinus dimorpha* Coss. & Durieu — an Algerian-Moroccan endemic species.

Lit.: Abdessemed (1981).

Junipero thuriferae-Quercion rotundifoliae

Quézel & Barbero ex Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988*
Montane-mediterranean and supramediterranean mixed juniper-oak woodlands in semi-arid, cold, subhumid temperate regions of the Maghreb, forming mantle of the *Quercus-Cedretalia atlanticae*

Nomenclatural note: Quézel *et al.* (1988: *Ecol. Medit.* 14 (1/2): 77–122) have chosen the *Buxo balearicae-Quercetum rotundifoliae* Barbero, Quézel & Rivas-Martínez 1981 as the holotype of the *Junipero thuriferae-Quercion rotundifoliae*, and hence correctly validated the name.

- *Junipero thuriferae-Quercion rotundifoliae* Quézel & Barbero (1981) 1986 *nom. inval.* (Art. 8)

Nomenclatural note: Since the *Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero 1981 has been invalidly described at time when Quézel & Barbero (1986) attempted downranking of this to the level, the name ‘*Ephedro majoris-Juniperion phoeniceae* Quézel & Barbero (1981) 1986’ remains invalid.

- *Junipero africanae-Quercion rotundifoliae* Quézel & Barbero ex Quézel, Barbero, Benabid, Loisel & Rivas-Martínez 1988 *corr.* Barbero, Lebreton & Quézel 1994 (phantom)
Nomenclatural note: This is a phantom name since there was no formal correction performed by Barbero *et al.* (1994). Merely, on page 31, these authors cited ‘*Junipero thuriferae (africanae)-Quercion rotundifoliae*’—obviously referring to the fact that the African subspecies of *J. thurifera* is called *J. thurifera* subsp. *africana*.

- ‘*Junipero thuriferae (africanae)-Quercion rotundifoliae* Quézel & Barbero 1986’ (*corr. superfl.*)

Nomenclatural note: This name (used by Barbero *et al.*, 1994; see above) is a result of superfluous addition of subspecific epitheton and hence it is illegitimate, equally as is illegitimate the name of this in Quézel & Barbero (1986).

Junipero thuriferae-Quercetum rotundifoliae
Quézel & Barbero 1981

- ‘Groupement à *Juniperus thurifera*’ (Abdessemed, 1981)

- *non Junipero thuriferae-Quercetum rotundifoliae* Rivas-Martínez 1982 *nom. inval.* (Art. 2b)

- *non Junipero thuriferae-Quercetum rotundifoliae* Rivas-Martínez 1987 *nom. illeg.* (Art. 31)

Syntaxonomic note: According to Dahmani (1994), ‘groupement à *Juniperus thurifera*’ (Abdessemed, 1981) is similar to the *Junipero thuriferae-Quercetum rotundifoliae* Quézel & Barbero 1981, described in Morocco. We share this opinion.

Lit.: Abdessemed (1981), Dahmani (1994).

Comm. ‘**Groupement à *Fraxinus xanthoxylloides* et *Quercus rotundifolia***’ (Abdessemed, 1981)

- ‘Groupement à *Quercus ilex* et *Fraxinus dimorpha*’ (Beghami, 2013)

Lit.: Abdessemed (1981), Beghami (2013).

Lonicero kabylicae-Juniperion hemisphaericae
Quézel & Barbero 1989*

Montane-mediterranean to oromediterranean (spanning elevations 1500 and 2200 m) low juniper scrub on limestone and dolomite, in cold and perhumid Djurdjura and Babors Mts (Tellian Atlas)

Cynosuro balansae-Juniperetum hemisphaericae Quézel & Barbero 1989

- ‘Groupement à *Juniperus communis* var. *hemisphaerica*’ (Wojterski, 1988)

Lit.: Wojterski (1988), Quézel & Barbero (1989), Meddour (2001, 2010), Meddour *et al.* (2010).

Daphno oleoidis-Juniperetum sabiniae
Quézel & Barbero 1989

Lit.: Quézel & Barbero (1989), Meddour *et al.* (2010).

Buxo sempervirentis-Cerastietum gibraltari
Gharzouli 1989 *nom. inval.* (Art. 1)

Lit.: Gharzouli (1989), Meddour & Géhu (1998).

Quercetea pubescentis Doing-Kraft ex Scamoni & Passarge 1959

Oak, mixed deciduous and conifer open forests in warmer habitats in the cool-temperate nemoral zone of Central and Southern Europe and in the supramediterranean belt of the Mediterranean, Asia Minor and Middle East

Quercu-Cedretalia atlanticae Barbero, Quézel & Rivas-Martínez ex Quézel & Barbero 1989*

Oak forests of the warm-temperate regions in the nemoral zone of Central and Southern Europe and relic supramediterranean fir-pine and oak forests of the Mediterranean
Holotypus: *Paeonio atlanticae-Cedrion atlanticae* Barbero, Quézel & Rivas-Martínez ex Quézel & Barbero 1989 (assigned by Quézel & Barbero, 1989: 99)

Syntaxonomic note: This Maghrebian unites at present almost all forest formations of deciduous oaks (*Quercus faginea*, *Q. canariensis*, *Q. pyrenaica*, *Q. afares*, etc.), Atlas cedar (*Cedrus atlantica*) and endemic Maghrebian firs (*Abies maroccana*, *Abies numidica*) occurring in humid and perhumid (or even subhumid) and cold bioclimates typical of the supramediterranean and montane-mediterranean belts (Barbero *et al.*, 1974, 1981; Barbero & Quézel, 1975; Benabid, 1982, 1984). Soils, at least in dense, well-preserved stands, are deep, brown forest soils (Barbero & Quézel, 1975). In Algeria, one of the main centers of distribution of this order, the communities of this are found in the highest Tellian Massifs and the Aurès-Bélezma Mts (Géhu *et al.*, 1998; Meddour & Géhu, 1998).

• *Quercu-Cedretalia atlanticae* Barbero, Loisel & Quézel 1974 *nom. inval.* (Art. 8)

Nomenclatural note: The description of this in Barbero *et al.* (1974) is not sufficient since, besides the listed of diagnostic species, no has been clearly classified within the *Quercu-Cedretalia atlanticae*. Although Barbero & Quézel (1975) did assign one association (association à *Abies numidica* et *Asperula odorata* Quézel 1956) in this order, the name of the remained invalidly published. The validation was done later by Quézel & Barbero (1989).

Paeonio atlanticae-Cedrion atlanticae Barbero, Quézel & Rivas-Martínez ex Quézel & Barbero 1989*

This includes majority of the hilltop forest plant communities (zeen oak, cedar and *Abies numidica* stands) in the Kabylia sector (Djurdjura, Akfadou and Babors), and in the Tellian Atlas of Algeria

• *Paeonio atlanticae-Cedrion atlanticae* Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 5)

Senecioni perralderiani-Cedretum atlanticae Quézel & Barbero 1989

Lit.: Quézel & Barbero (1989), Yahi (1995, 2007), Gharzouli (2007), Meddour *et al.* (2010). Figure 3B.

Bunio alpini-Cedretum atlanticae Meddour 1994

• *Bunio atlantici-Cedretum atlanticae* Meddour 1994 *nom. mut. propos.*
Lit.: Meddour (1994a, 1994b, 2002), Yahi *et al.* (1999), Yahi (2007). Figure 3C.

Balansaeo glaberrimae-Cedretum atlanticae Barbero, Quézel & Rivas-Martínez 1981

• *Conopodio glaberrimi-Cedretum atlanticae* Barbero, Quézel & Rivas-Martínez 1981 *corr.* Meddour 2010 (*corr. illeg.*)

Syntaxonomic note: In the protologue, this association is classified into the *Balansaeo-Quercion*. However, the relevé table of this association, suggests that the mesic elements (of the *Quercetea pubescentis*, incl. *Quercu-Cedretalia*) are more prominent than those of the *Quercetea ilicis*.
Lit.: Dahmani-Megrerouche (1996a, 1996b, 1997).

Cerastio atlantici-Cedretum atlanticae Yahi in Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)

• *Cerastio atlantici-Cedretum atlanticae* Yahi 1995 *nom. inval.* (Art. 1)
Lit.: Yahi (1995), Yahi *et al.* (1999), Yahi & Médiouni (2000), Yahi (2007).

Senecioni gallerandiani-Cedretum atlanticae Yahi in Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)

- *Senecioni gallerandiani-Cedretum atlanticae* Yahi 1995 *nom. inval.* (Art. 1)
Lit.: Yahi (1995), Yahi *et al.* (1999), Yahi & Mediouni (2000).

Biscutello raphanifoliae-Cedretum atlanticae Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)

- *Biscutello raphanifoliae-Stachyetum algeriensis* Gharzouli 1989 *nom. inval.* (Art. 1)
Lit.: Gharzouli (1989), Yahi *et al.* (1999).

Saturejo baborensis-Cedretum atlanticae Gharzouli 2007 *nom. inval.* (Art. 1)
In the header of the relevé table in Gharzouli (1997), this name was used.
Lit.: Gharzouli (2007).

Sorbo ariae-Cedretum atlanticae Gharzouli 2007 *nom. inval.* (Art. 1)
Lit.: Gharzouli (2007).

Cedro atlanticae-Aceretum monspesulani Azira-Atroune 2001 *nom. inval.* (Art. 1)
Lit.: Azira-Atroune (2001).

Sileno atlanticae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Lit.: Meddour (2010).

Physospermo verticillati-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Lit.: Meddour (2010).

Potentillo micranthae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Lit.: Meddour (2010). Figure 3A.

Junipero hemisphaericae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Lit.: Meddour (2010).

Lamio garganici-Cedrion atlanticae
Abdessemed *all. nova hoc loco**

Cedar forests of the Saharan Atlas (Aurès, Belezma and Hodna Mts) in subhumid (locally semi-arid) and pronounced continental bioclimate

Holotypus (hoc loco): Ranunculo aurasiaci-Cedretum atlanticae Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)
Diagnostic taxa: *Carum montanum*, *Cedrus atlantica*, *Cephalanthera longifolia*, *Lamium garganicum* subsp. *garganicum*, *Ranunculus aurasiacus*

- *Lamio numidici-Cedrion atlanticae* Abdessemed in Wojterski 1988 *nom. inval.* (Art. 8)
- *Lamio numidici-Cedrion atlanticae* Abdessemed in Dahmani-Megrerouche 1996 *nom. inval.* (Art. 8)
- *Lamio numidici-Cedrion atlanticae* Abdessemed 1981 *nom. inval.* (Art. 1)
- *Lamio numidici-Cedrion atlanticae* Abdessemed 1984 *nom. inval.* (Art. 8)
- *Lamio numidici-Cedrion atlanticae* Abdessemed in Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 8)
- *non Viola munbyanae-Cedrion atlantici* Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 5)
- *non Viola munbyanae-Cedrion atlantici* Barbero, Quézel & Rivas-Martínez ex Quézel & Barbero 1989

Ranunculo aurasiaci-Cedretum atlanticae ass. nova hoc loco

Holotypus (hoc loco): Abdessemed in Wojterski (1988: Tab. 52, rel. 1)

- *Viola munbyanae-Juniperetum communis* Abdessemed 1981 *nom. inval.* (Art. 1)
- *Viola munbyanae-Juniperetum hemisphaericae* Abdessemed 1981 *corr. auct., nom. inval.* (Art. 1; invalid *nom. corr.*)

Nomenclatural note: Correction of this name (replacement of ‘*communis*’ by ‘*hemisphaericae*’) is not admissible because there are two taxa listed in the original diagnosis (in unpublished thesis of Abdessemed, 1981), namely *J. communis* var. *hemisphaerica* and *J. communis* subsp. *eu-communis* and the author used explicitly ‘*communis*’ as the eponymous species. If effectively published, the name *Viola munbyanae-Juniperetum communis* cannot be used since none of the eponymous species is a species of the dominant layer. This is a forest community, dominated by *Cedrus atlantica*.

- *Viola munbyanae-Cedretum atlanticae* (Abdessemed 1981) Meddour & Géhu 1998 *nom. inval.* (Art. 1; invalid *nom. nov.*)
Lit.: Abdessemed (1981), Abdessemed in Wojterski (1988), Meddour & Géhu (1998).



Figure 3. Forest communities of Algeria. A: *Potentillo micranthae-Cedretum atlanticae*, Djebel Taouialt, Djurdjura Mt; B: *Senecioni perralderiani-Cedretum atlanticae*, Tigounatine forest, Djurdjura; C: *Bunio atlantici-Cedretum atlanticae*, Chr ea, Tellian Atlas. All photos: R. Meddour.

Berberido hispanicae-Cedretum atlanticae

Benabid 1994 *nom. inval.* (Art. 2b)

- *Cedro atlanticae-Berberidetum hispanicae* Abdessemed 1981 *nom. inval.* (Art. 1).
 - *Berberido hispanicae-Cedretum atlanticae* Benabid 1992 *nom. inval.* (Art. 1)
- Lit.: Abdessemed (1981).

Ranunculo spicati-Cedretum atlanticae

Abdessemed in Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)

- *Cedro atlanticae-Ranunculetum spicati* Abdessemed 1981 *nom. inval.* (Art. 1)
- Lit.: Abdessemed (1981, 1984), Dahmani-Megrerouche (1996a, 1996b, 1997).

Cedro atlanticae-Quercetum rotundifoliae

Abdessemed 1984 *nom. inval.* (Art. 2b)

- *Cedro atlanticae-Quercetum rotundifoliae* Abdessemed 1981 *nom. inval.* (Art. 1)
- Lit.: Abdessemed (1981, 1984), Dahmani-Megrerouche (1996a, 1996b, 1997).

Aceri monspessulani-Smyrniatum olusatri

Abdessemed 1981 *nom. inval.* (Art. 1)

- *Aceri monspessulani-Cedretum atlanticae* (Abdessemed 1981) Meddour & Géhu 1998 *nom. inval.* (Art. 1; invalid *nom. nov.*)
- Nomenclatural note: If effectively published, the name should read: *Smyrnio olusatri-Cedretum atlanticae*.

Lit.: Abdessemed (1981), Meddour & Géhu (1998).

Lonicero etruscae-Ilicetum aquifolii Abdessemed 1981 *nom. inval.* (Art. 1)

- *Ilici aquifolii-Cedretum atlanticae* (Abdessemed 1981) Meddour & Géhu 1998 *nom. inval.* (Art. 1; invalid *nom. nov.*)
- 'Association à *Ilex aquifolium*' Abdessemed 1981 *nom. inval.* (Art. 1)

Nomenclatural note: If effectively published, the name *Lonicero etruscae-Ilicetum aquifolii* cannot be used since none of the eponymous species is a species of the dominant layer. This is a forest community, dominated by *Cedrus atlantica*.

Lit.: Abdessemed (1981), Meddour & Géhu (1998).

Abietion maroccano-numidicae Mucina & Meddour *all. nova hoc loco**

Relict Maghrebian fir forests on dolomitic substrates

Holotypus (hoc loco): *Asperulo odoratae-Abietetum numidicae* Quézel 1956 (Quézel, 1956)

Diagnostic taxa: *Abies maroccana*, *A. numidica*, *Acer opalus* s.l., *Calamintha grandiflora* subsp. *baborensis*, *Doronicum plantagineum* subsp. *atlanticum*, *Ilex aquifolium*, *Myosotis macrocalycina*, *Paeonia mascula* subsp. *atlantica*. *Senecio perralderianus* s.l., *Taxus baccata*

- *non Paeonio broteroi-Abietion pinsapo* Rivas-Martínez 1982 *nom. inval.* (Art. 8)
- *non Paeonio broteroi-Abietion pinsapo* (Rivas-Martínez 1987) Rivas-Martínez, Fernández-González, Loidi, Lousã & Penas 2002

• *incl. Abietenion maroccanae* Barbero, Quézel & Rivas-Martínez 1981 (as suballiance)

Syntaxonomic note: Besides the type association, this also could also contain the *Taxus baccata*-dominated forests (e.g. Meddour & Laribi, 1999; Gharzouli, 2007).

Asperulo odoratae-Abietetum numidicae

Quézel 1956

- 'Association à *Abies numidica* et *Asperula odorata*' Quézel 1956 (orig. form)
- *Asperulo odoratae-Adenocarpetum complicati* Gharzouli 1989 *nom. inval.* (Art. 1)
- '*Adenocarpetum complicati-Abietetum numidicae*' Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)
- '*Asperulo odoratae (Galio odoratae)-Abietetum numidicae*' Quézel 1956 *corr.* Gharzouli 2007 *nom. inval.* (Art. 1; invalid *nom. corr.*)

Lit.: Quézel (1956), Barbero & Quézel (1975), Wojterski (1988), Gharzouli (1989, 2007), Kolai (1991), Yahi (1995, 2007), Yahi *et al.* (1999)

Buxo sempervirentis-Abietetum numidicae

Yahi, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)

- *Buxo sempervirentis-Abietetum numidicae* Meddour & Géhu 1998 *nom. inval.* (Art. 2b)
- Lit.: Meddour & Géhu (1998), Yahi *et al.* (1999).

Plagio maghrebini-Quercion canariensis all. nova hoc loco*

Algerian-Tunisian deciduous oak and mixed forests of cold, humid (subhumid) regions on brown forest soils in supramediterranean belt

Holotypus (hoc loco): *Plagio maghrebini-Quercetum canariensis* Laribi in Meddour *ex* Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (*hoc loco*; see below)

Diagnostic taxa (* endemic to North Africa): *Alliaria petiolata*, *Cytisus villosus*, *Doronicum plantagineum* subsp. *atlanticum**, *Drymochloa drymeja*, *Galium tunetanum*, *Hedera algeriensis**, *Hyacinthoides aristidis**, *Lathyrus niger*, *Laurus nobilis*, *Melica minuta*, *Myosotis latifolia*, *Plagius maghrebinius**, *Prunella vulgaris*, *Prunus avium*, *Pulicaria odora*, *Quercus afares**, *Q. canariensis*, *Scutellaria columnae*, *Teucrium kabylicum**

Syntaxonomic note: This new replaces the Iberian *Quercion fagineae* and the *Aceri granatensis-Quercion fagineae* in North African mountains. In Algeria, these forests are found in the Tellian Massif along the East Algerian coast. They are distinguished from the Iberian alliances by presence of number of endemic taxa (see above).

- *Scutellarion columnae* Aimé, Bonin, Chaabane, Loisel & Saoudi 1986 *nom. inval.* (Art. 8)

Nomenclatural and syntaxonomic notes: The Tunisian *Ilici aquifolio-Quercetum fagineae* Aimé *et al.* 1986 *nom. inval.* (Art. 5) and the *Moehringio pentandrae-Quercetum fagineae* Aimé, Bonin, Chaabane, Loisel & Saoudi 1986 *nom. inval.* (Art. 5) should also belong to this (see Aimé *et al.*, 1986), and therefore the invalidly described *Scutellarion columnae* Aimé, Bonin, Chaabane, Loisel & Saoudi 1986 should be synonymised with the *Plagio-Quercion canariensis*.

- ‘*Scutellarion columnae-Quercion fagineae*’ (Aimé, Bonin, Chaabane, Loisel & Saoudi 1986) Meddour 2010 *nom. inval.* (Art. 8; invalid *nom. nov.*)

- *non Aceri granatensis-Quercion fagineae* (Rivas Goday, Rigual & Rivas-Martínez in Rivas Goday, Borja, Esteve, Galiano, Rigual & Rivas-Martínez, 1960) Rivas-Martínez 1987

- *non Quercion fagineae* Braun-Blanquet, P. Silva & Rozeira 1956

- *non Quercion broteroi* Braun-Blanquet, P. Silva & Rozeira 1956 corr. Rivas-Martínez 1972 (*corr. illeg.*)

Nomenclatural note: The correction of the original name *Quercion fagineae* to *Quercion broteroi* is not legitimate (based on art. 43, as claimed by Rivas-Martínez *et al.*, 2011) because *Q. broteroi* is often understood as a subspecies of *Q. faginea* (see www.emplantbase.org).

- *non Quercion fagineo-suberis* (Braun-Blanquet, P. Silva & Rozeira 1956) Rivas-Martínez 1975 *nom. illeg.* (Art. 29)

Plagio maghrebini-Quercetum canariensis

Laribi in Meddour *ass. nova hoc loco*

Holotypus hoc loco: Laribi *et al.* (2008: Tab. 3, rel. 5)

Nomenclatural notes: The name-giving species are *Q. canariensis* and *Plagius maghrebinius* Vogt & Greuter (formerly *Chrysanthemum fontanesii nom. inval.*; see Euro+Med PlantBase). Although the effectively (yet invalidly) published name *Chrysanthemo fontanesii-Quercetum canariensis* Laribi, Derridj & Acherar 2008 was published earlier than the invalid name *Plagio maghrebini-Quercetum canariensis* Laribi in Meddour 2010, the former name cannot be used for validation because it was derived from an invalid taxon name (ICPN art. 2c).

- *Chrysanthemo fontanesii-Quercetum canariensis* Laribi 2000 *nom. inval.* (Art. 1)

- *Chrysanthemo fontanesii-Quercetum canariensis* Laribi, Derridj & Acherar 2008 *nom. inval.* (Arts. 2b, 2c & 5)

- *Plagio maghrebini-Quercetum canariensis* Laribi 2000 corr. Meddour 2010 *nom. inval.* (Art. 1; invalid *nom. corr.*)

- *Plagio maghrebini-Quercetum canariensis* Laribi in Meddour 2010 *nom. inval.* (Arts. 5 & 8)

Lit.: Laribi (2000), Laribi *et al.* (2008), Meddour (2010), Meddour *et al.* (2010). Figure 2B.

Viburno tini-Quercetum canariensis

ass. nova hoc loco

Holotypus (hoc loco): Meddour (2002: Tab. 7, rel. 6)

- *Phillyreo mediae-Quercetum fagineae* Aimé, Bonin, Chaabane, Loisel & Saoudi 1986 *nom. inval.* (Art. 5)

- *Viburno tini-Quercetum canariensis* Meddour 2002 *nom. inval.* (Art. 5).

- *non Viburno tini-Quercetum fagineae* Torres & Cano in Cano, Pinto, Valle, Torres, García-Fuentes, Salazar, Melendo & Mendes 2002

Lit.: Aimé *et al.* (1986), Hadjadj-Aoul (1988), Meddour (2002).

Epimedio perralderiani-Quercetum fagineae Quézel 1956

Lit.: Quézel (1956), Aimé *et al.* (1986), Wojterski (1988), Gharzouli (2007).

Rubo incanescens-Quercetum fagineae Quézel 1956

Lit.: Quézel (1956), Aimé *et al.* (1986), Meddour (1993, 2010), Laribi (2000), Gharzouli (2007), Laribi *et al.* (2008), Meddour *et al.* (2010).

Lysimachio cousiniana-Quercetum fagineae Quézel 1956

Lit.: Quézel (1956), Zeraia (1981), Aimé *et al.* (1986), Khelifi (1987), Khelifi & Sadki (1995).

Cynosuro peltierii-Quercetum afaredis
Laribi in Laribi, Derridj & Acherar 2008
nom. inval. (Arts. 2b & 5)

• *Cynosuro peltierii-Quercetum afaredis*
Laribi 2000 *nom. inval.* (Art. 1)
Lit.: Laribi (2000), Laribi *et al.* (2008),
Meddour *et al.* (2010).

Quercetum balloto-broteroi *ass. nova*
hoc loco

Holotypus (hoc loco): Alcaraz (1989:
Tab. 1, rel. 11)

Taxonomic note: *Quercus faginea* subsp.
tlemcenensis (A.DC.) Maire & Weiller ex
Greuter & al. is *Q. faginea* subsp. *broteroi*
(Cout.) A.Camus according to Euro+Med
PlantBase.

- ‘Groupement à *Quercus faginea*’ (Abdessemed, 1981)
- ‘Groupement à *Quercus rotundifolia* et *Quercus faginea* subsp. *tlemcenensis*’ (Dahmani, 1984)
- ‘Groupements mixtes à *Quercus ilex* et *Quercus faginea* subsp. *tlemcenensis*’ (Alcaraz, 1989)
- ‘Groupement à *Quercus suber* et *Quercus faginea* subsp. *baetica*’ (Miara, 2011)
- ‘G1: *Quercus rotundifolia-Quercus faginea* ssp. *tlemcenensis*’ (Benabdellah, 2011)
Lit.: Abdessemed (1981), Dahmani (1984, 1994), Hadjadj-Aoul (1988), Alcaraz (1989), Benabdellah (2011), Miara (2011), Miara *et al.* (2012).

Lauro nobilis-Celtidetum australis Ben-
settiti & Lacoste 1999 *nom. inval.* (Art.
2b)

• ‘Groupement à *Celtis australis*’ (Mon-
jauze, 1958)
Lit.: Monjauze (1958), Bensettiti (1995),
Bensettiti & Lacoste (1999).

Aceri monspessulani-Ulmetum procerae
Meddour 1999

Lit.: Meddour (1999, 2010), Meddour *et al.* (2010).

Scrophulario laevigatae-Acerion obtusati
*all. nova hoc loco**

Submediterranean xero-thermophilous broad-
leaved scree and ravine maple forests of the
Maghreb

Diagnostic taxa: *Acer obtusatum*, *Cystopteris fragilis*, *Ilex aquifolium*, *Lonicera etrusca*, *Polystichum setiferum*, *Primula acaulis* subsp. *atlantica*, *Ruscus aculeatus*, *Scrophularia laevigata*

Holotypus (hoc loco): *Scrophulario laevigatae-Aceretum obtusati* Wojterski ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)

• *Drabo muralis-Acerion obtusati* Azira-
Atroune 2001 *nom. inval.* (Art. 1)

Syntaxonomic note: The Maghrebian scree forests have been, until today, considered as belonging alliances, characterised either by *Quercus canariensis* or by *Cedrus atlantica*. They are, as all scree forest further north (in Europe), distinct through their ecology (nutrient-rich soils subject to downslope erosion) and occurrence in water-rich sheltered habitats (steep slopes of gorges). Floristically they mediate between the mesic-habitat vegetation of *Quercus canariensis* and alluvial forests. Typically, maples (*Acer*) and limes (*Tilia*; missing in North Africa) occur as dominants in these scree forests. The best-known scree is the western-central European *Tilio-Acerion* Klika 1955. There are several analogous scree alliances in the submediterranean Southern Europe (see Mucina *et al.*, 2016), including the *Fraxino excelsioris-Acerion pseudoplatani* P. Fukarek 1969 and *Ostryo carpinifoliae-Tilion platyphylli* (Košir, Čarni & Di Pietro 2008) Čarni in Willner, Solomeshch, Čarni, Bergmeier, Ermakov & Mucina 2016 (both Balkan Peninsula), and *Tilio pseudorubrae-Ostryion carpinifoliae* S. Brullo, Scelsi & Spampinato 2001 (southern Apennine Peninsula). The position of the Maghrebian *Scrophulario laevigatae-Acerion obtusati* remains contentious. Three options are worth testing, using large-scale syntaxonomic revision: (1) placement of the *Scrophulario laevigatae-Acerion obtusati* within the *Aceretalia pseudoplatani*

(belonging to the *Carpino-Fagetea*), or (2) description of a new Maghrebian accommodating the new alliance, and finally (3) placement of the *Scrophulario laevigatae-Acerion obtusati* within the broadly conceived *Quercu-Cedretalia atlanticae*. Since the known scree forests of the Maghreb have been so far classified within the latter, until proven otherwise, we shall follow this option.

Scrophulario laevigatae-Aceretum obtusati Wojterski *ass. nova hoc loco Holotypus (hoc loco)*: Wojterski (1988: 100, Table 32, rel. 1)

- *Scrophulario laevigatae-Aceretum obtusati* Wojterski 1988 *nom. inval.* (Art. 5)
- ‘Erablière à *Acer obtusatum*’ (Meddour & Laribi, 1999)
Lit.: Wojterski (1988), Meddour (1994a, 2002), Meddour & Géhu (1998), Meddour & Laribi (1999).

Prunetum avii Toubal 1998 *nom. inval.* (Art. 1).

- ‘Groupement à *Prunus avium*’ (Wojterski, 1988)
- ‘Groupement à *Prunus avium*’ (Bensettiti, 1995)
Lit.: Wojterski (1988), Bensettiti (1995), Toubal (1998).

Cystopterido fragilis-Aceretum obtusati Azira-Atroune 2001 *nom. inval.* (Art. 1)

- Lit.: Azira-Atroune (2001).

Cotyledoni brevifoliae-Aceretum obtusati Azira-Atroune 2001 *nom. inval.* (Art. 1)

- Lit.: Azira-Atroune (2001).

Linario rubrifoliae-Aceretum campestris Azira-Atroune 2001 *nom. inval.* (Art. 1)

- Lit.: Azira-Atroune (2001).

Crataego-Prunetea Tüxen 1962 *nom. conserv. propos.*

Scrub and mantle vegetation seral or marginal to broad-leaved forests in the nemoral zone and the submediterranean regions of Europe
Syntaxonomic note: Aymonin (1963) could have been the one who identified for the

first time in Algeria (and in North Africa) plant communities for resembling this class. Although not directly addressing the class, he had noticed a “spiny formation, very closed, of secondary origin, appearing in coppice at *Rosaceae* (*Crataegus*, *Prunus*), with *Rhamnus alaternus*, *Viburnum tinus*, *Lonicera implexa* and *Rubus*” in the Chercellois area (Eastern Algeria). This observation was later confirmed by Wojterski (1988), Meddour (1994) and Géhu *et al.* (1994). For Quézel & Médail (2003a; see also Meddour, 2010), the vegetation belonging to this in the Maghreb is still rather poorly known.

- *Rhamno catharticae-Prunetea spinosae* Rivas Goday & Borja ex Tüxen 1961 *nom. inval.* (Art. 3b)
- *Rhamno-Prunetea* Rivas Goday et Borja Carbonell ex Tüxen 1962 *nom. inval.* (Art. 3b)
Nomenclatural note: Mucina *et al.* (2016: 45) suggested (informally) conservation of the *Crataego-Prunetea* Tüxen 1962 against less often used (validly published) *Sambucetea* Doing 1962.

Pyro spinosae-Rubetalia ulmifolii Biondi, Blasi & Casavecchia in Biondi, Allegrezza, Casavecchia, Galdenzi, Gasparri, Pesaresi, Vagge & Blasi 2014

Spiny bramble scrub on nutrient-rich soils of the winter-mild Atlantic seaboard, the Mediterranean, the Macaronesian Archipelago and the Azores

Pruno spinosae-Rubion ulmifolii O. de Bolòs 1954

Spiny bramble scrub of the winter-mild Atlantic seaboard and the Western Mediterranean of Europe and North Africa

Tamo communis-Crataegetum monogynae Meddour 1998 *nom. inval.* (Art. 1)

- Lit.: Meddour (1994a, 1998, 2002).

Comm. ‘**Haie à *Crataegus monogyna***’ (Wojterski, 1988)

- Lit.: Wojterski (1988, 1990), Meddour (2002).

Comm. ‘**Groupement à *Rubus ulmifolius***’ (Wojterski, 1988)

- ‘Fruticée à *Rubus ulmifolius*’ (Meddour & Laribi, 1999)

- Lit.: Wojterski (1988, 1990), Géhu *et al.* (1994a), Meddour & Laribi (1999).

AZONAL FORESTS AND SCRUB

Alno glutinosae-Populetea albae P. Fukarek & Fabijanić 1968

Riparian gallery forests of the Eurosiberian and Mediterranean Regions

Populetalia albae Braun-Blanquet ex Tchou 1949

Mediterranean and submediterranean riparian gallery forests

Clematido cirrhosae-Populion albae

Bensettiti & Lacoste *all. nova hoc loco**

Thermomediterranean deciduous alluvial willow-poplar forests along in summer often dry rivers of the Maghreb

Holotypus (hoc loco): Irido foetidissimae-Populetea albae Nègre 1964 (Nègre 1964: 13-14)

Diagnostic species: *Aristolochia semper-virens*, *Arundo donax* (natura-lised in the Western Mediterranean), *Clematis cirrhosa*, *Iris foetidissima*, *Populus alba*

Nomenclatural note: Bensettiti & Lacoste (1999) called this informally *Populion albae* “méditerranéen”.

• *Clematido cirrhosae-Populion albae* Bensettiti & Lacoste 1999 *nom. inval.* (Art. 5)

• *non Populion albae* Braun-Blanquet 1930 (phantom)

• *non Populion albae* Braun-Blanquet 1931 *nom. inval.* (Art. 8)

• *non Populion albae* Tüxen 1931 *nom. inval.* (Art. 8)

• *non Populion albae* de Bannes-Puygiron 1933 *nom. inval.* (Art. 8)

• *non Populion albae* Szafer in Soó 1941 *nom. inval.* (Art. 8)

• *non Populion albae* Braun-Blanquet & Tüxen 1943 *nom. inval.* (Art. 8)

• *non Populion albae* Braun-Blanquet 1948 *nom. inval.* (Art. 8)

• *non Populion albae* Braun-Blanquet ex Tchou 1949

• *non Saponario officinalis-Populion albae* (Braun-Blanquet 1931) Bensettiti & Lacoste 1999 *nom. inval.* (Art. 8)

Nomenclatural note: Bensettiti & Lacoste's (1999) '*Populion albae* "septentrional" = *Saponario-Populion*' is *de facto* a *nomen novum* introduced for the *Populion albae*

Braun-Blanquet 1931 *nom. inval.*, and therefore invalid as well.

Irido foetidissimae-Populetea albae

Nègre 1964

• 'Groupement à *Populus alba*' (Rebbas *et al.*, 2011)

• *non Irido foetidissimae-Populetea albae* (Braun-Blanquet ex Tchou 1948) O. de Bolòs 1962 *nom. inval.* (Art. 1; *invalid nom. nov.*)

Nomenclatural note: De Bolòs (1962) attempted renaming the Tchou's association, however cited wrong year (1948); the effective year of publication of the '*Populetea albae*', that was subject of renaming, is 1949. However, even if this technicality would not be an acceptable, the name *Irido foetidissimae-Populetea albae* has been already taken (Nègre 1964), hence the de Bolòs' (1962) name would become a later homonym (Art. 31).

• *non Populetea albae* von Soó 1927 *nom. inval.* (Art. 2b)

• *non Populetea albae* de Soó 1929 *nom. inval.* (Art. 2b)

• *non Irido foetidissimae-Populetea albae* Braun-Blanquet ex Tchou 1947 (phantom)

• *non Irido foetidissimae-Populetea albae* Braun-Blanquet ex Tchou 1948 (phantom)

• *non Populetea albae* Braun-Blanquet ex Tchou 1949

Lit.: Nègre (1964), Bensettiti (1985, 1992, 1995), Wojterski (1988), Wojterski & Bensettiti (1988), Bensettiti & Lacoste (1999), Kaabèche *et al.* (1995), Rebbas *et al.* (2011).

Salici pedicellatae-Fraxinion angustifoliae

*all. nova hoc loco**

Maghrebian high-elevation (meso- to supra-mediterranean) riparian ash-dominated forests

Holotypus (hoc loco): Equiseto maximi-Fraxinetum angustifoliae Bensettiti & Lacoste ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)

Diagnostic species: *Alliaria petiolata*, *Apium nodiflorum*, *Celtis australis*, *Clinopodium vulgare*, *Fraxinus angustifolia*, *Ilex aquifolium*, *Lamium flexuosum*, *Polystichum setiferum*, *Prunus avium*, *Salix pedicellata*

Nomenclatural note: The description of this new is not an upranking of the sub *Salici pedicellatae-Fraxinion angustifoliae* Bensettiti & Lacoste 1999 since this sub was not validly described (Art. 5).

- *non Lauro nobilis-Fraxinion angustifoliae* I. Kárpáti & V. Kárpáti 1961
- *non Fraxinion angustifoliae* Pedrotti 1970 *nom. inval.* (Art. 3b)
- *non Fraxinion angustifoliae* Pedrotti ex Biondi & Casavecchia in Biondi, Casavecchia & Pesaresi 2010 *nom. inval.* (Art. 5)
- *non Carici remotae-Fraxinion oxycarpae* Pedrotti ex Pedrotti, Biondi, Allegrezza & Casavecchia in Biondi, Allegrezza, Casavecchia, Galdenzi, Gasparri, Pesaresi, Vagge & Blasi 2014
- *non Lauro nobilis-Ulmion minoris* Biondi, Casavecchia, Gasparri & Pesaresi in Biondi, Allegrezza, Casavecchia, Galdenzi, Gasparri, Pesaresi, Vagge & Blasi 2014

Equiseto maximi-Fraxinetum angustifoliae
Bensettiti & Lacoste *ass. nova hoc loco*

- *Equiseto maximi-Fraxinetum angustifoliae* Bensettiti & Lacoste 1999 *nom. inval.* (Art. 5)
- *Holotypus (hoc loco)*: Bensettiti & Barbero (2009: Table 4, rel. 1)
- Nomenclatural note: Because the original (invalid) description of the association (Bensettiti & Lacoste, 1999) contains only a synthetic (constancy) table, a neotype had to be selected.
- '*Carici-Fraxinetum*' (*sensu auct. maghrebianum*)
- *non Carici-Fraxinetum excelsioris* Koch ex Faber 1936
- *non Carici-Fraxinetum angustifoliae* Pedrotti 1970
- *non Carici-Fraxinetum angustifoliae* Jovanović & Tomić 1979
- *non Carici-Fraxinetum angustifoliae* Piccoli & Gerdol 1984
- *non Carici-Fraxinetum oxycarpae* Pedrotti 1970 *corr.* 1992 (*corr. superfl.*)

Nomenclatural note: The correction of the name *Carici-Fraxinetum angustifoliae* Pedrotti 1990 by Pedrotti (1992) is superfluous since *Fraxinus oxycarpa* Willd. is considered basionym of *Fraxinus angustifolia* subsp. *oxycarpa* (Willd.) Franco & Rocha Afonso (see Euro+Med PlantBase) and hence either misiden-

tification or taxonomic homonymy do not apply.

Lit.: Wojterski & Bensettiti in Wojterski (1988), Wojterski & Bensettiti (1988), Bensettiti (1995), Bensettiti & Lacoste (1999), Bensettiti & Barbero (2009).

Salici pedicellatae-Populetum nigrae
Bensettiti & Lacoste 1999 *nom. inval.* (Arts. 2b & 5)

Lit.: Bensettiti & Lacoste (1999).

Comm. '**Groupement à *Ulmus campestris* et *Fraxinus angustifolia***' (Bensettiti, 1985)

Lit.: Bensettiti (1985, 1992, 1995), Wojterski & Bensettiti in Wojterski (1988), Kaabèche *et al.* (1995).

Comm. '**Groupement à *Salix alba* et *Fraxinus angustifolia***' (Géhu *et al.*, 1994)
Lit.: Géhu *et al.* (1994a).

Comm. '**Galleries forestières à orme (*Ulmus campestris* var. *suberosa*)**' (Wojterski, 1988)

Lit.: Wojterski (1988).

Osmundo-Alnion glutinosae (Braun-Blanquet, P. Silva & Rozeira 1956) Dierschke & Rivas-Martínez in Dierschke 1975
Alder and willow riparian forests of the Western Mediterranean

Scrophulario tenuipedis-Alnetum glutinosae Meddour & Laribi 1999

Lit.: Meddour & Laribi (1999), Laribi (2000), Meddour *et al.* (2010).

Lamio flexuosi-Alnetum glutinosae O. de Bolòs 1954 *nom. invers. propos.*

• *Lamio flexuosi-Alnetum glutinosae* Bensettiti & Lacoste 1999 *nom. inval.* (Art. 2b)

Lit.: Bensettiti (1995), Bensettiti & Lacoste (1999), Bensettiti & Barbero (2009), Belouahem-Abed (2012).

Salicetea purpureae Moor 1958

Willow and tamarisk scrub and low open forests of riparian habitats in the temperate to arctic zones of Europe

Salicetalia pupureae Tüxen 1937

Willow scrub and low open forests of riparian habitats in the temperate to arctic zones of Europe

Salicion triandrae Müller & Görs 1958
Willow scrub on loamy-sandy sedimentary river banks in the lowland to submontane belts of the nemoral zone of Europe

Comm. 'Groupement à *Salix purpurea*' (Kaabèche *et al.*, 1995)
Lit.: Kaabèche *et al.* (1995), Géhu *et al.* (1998).

Salicion albae Soó 1951
Willow and poplar low open forests of lowland to submontane river alluvia in the nemoral zone of Europe and at high altitudes of the Mediterranean

Comm. 'Groupement à *Salix alba*' (Kaabèche *et al.*, 1995)
Lit.: Kaabèche *et al.* (1995), Géhu *et al.* (1998).

Alnetea glutinosae Braun-Blanquet & Tüxen ex Westhoff, Dijk & Passchier 1946
European and North African mesotrophic regularly flooded alder carr and birch wooded mires
• *Alnetea glutinosae* Braun-Blanquet & Tüxen 1943 (Art. 2b)

Alnetalia glutinosae Tüxen 1937
European and North African mesotrophic regularly flooded alder carr

Campanulo alatae-Alnion glutinosae
*all. nova hoc loco**
North African mesotrophic regularly flooded alder carr

Holotypus (hoc loco): Viti viniferae-Alnetum glutinosae Meddour, Meddour-Sahar, Zeraia & Mucina 2017 (see below)

Diagnostic taxa: *Alnus glutinosa*, *Allium triquetrum*, *Apium nodiflorum*, *Arum italicum*, *Campanula alata*, *Carex pendula*, *C. remota*, *Laurus nobilis*, *Ruscus hypophyllum*, *Vitis vinifera* subsp. *sylvestris*

• *non Alnion glutinosae* Malcuit 1929
Syntaxonomic note: The description of this is not an up-ranking of the sub-alliance *Campanulo alatae-Alnenion glutinosae* Bensettiti & Lacoste 1999 because the latter syntaxon was

published invalidly (Arts. 5 & 8). This North African comprises remarkable southern outliers of wooded mires experiencing several months of waterlogging under summer-hot, humid Mediterranean climate (Bensettiti, 1992; Bensettiti & Lacoste, 1999). The '*Carici remotae-Alnetum glutinosae*' Debazac 1959, described from Tunisia (Debazac, 1959: 77), might belong here as well.

Viti viniferae-Alnetum glutinosae
ass. nova hoc loco

Holotypus (hoc loco): Géhu *et al.* (1994: Table 1, rel. 7)

• *Ruscus hypophylli-Alnetum glutinosae* Géhu, Kaabèche & Gharzouli 1994 *nom. inval.* (Art. 3f)

Nomenclatural note: Géhu *et al.* (1994b) chose an unfortunate name for this association listing *Ruscus hypoglossum* (occurring in only one of seven relevés) as an eponymous species. Since this species is not found in the holotype (Table 1, rel. 2) assigned by Géhu *et al.* (1994b), the association name is deemed invalid.

• *Rubo caesii-Alnetum glutinosae* Bensettiti 1995 *nom. inval.* (Art. 1)

• *Rubo caesii-Alnetum glutinosae* Bensettiti & Lacoste 1999 *nom. inval.* (Arts. 2b & 5)

• *Rubo caesii-Alnetum glutinosae* Bensettiti in Meddour & Laribi 1999 *nom. inval.* (Arts. 2b & 5)

• *non Carici pendulae-Alnetum glutinosae* Braun-Blanquet 1967

• *non Lauro nobilis-Alnetum glutinosae* Brullo & Guarino 1998

Lit.: Bensettiti (1992, 1995), Géhu *et al.* (1994a, b), Bensettiti & Lacoste (1999), Belouahem-Abed *et al.* (2011).

Franguletea Doing ex Westhoff in Westhoff & Den Held 1969

Willow carr of Western Europe, Fennoscandia, the subatlantic regions of Central Europe and North Africa

Salicetalia auritae Doing 1962

Willow carr of Western Europe, Fennoscandia, the subatlantic regions of Central Europe and North Africa

Tamo communis-Salicion atrocineræe
de Foucault & Julve ex Mucina & Meddour *all. nova hoc loco*

Willow carr of Atlantic coastal regions of southwestern France, Iberian Peninsula and North Africa

Holotypus (hoc loco): Tamo communis-Salicetum acuminatæe de Foucault 1995 (de Foucault, 1995: 61, Tab. 17)

Diagnostic taxa: *Arum italicum*, *Dioscorea communis*, *Laurus nobilis*, *Ruscus hypophyllum*, *Salix cinerea* subsp. *oleifolia* (= *S. atrocineræe*)

• *Tamo communis-Salicion atrocineræe* de Foucault & Julve 2001 *nom. inval.* (Art. 5)

Nomenclatural note: De Foucault & Julve (2001) classified three, all validly described, associations in this alliance, namely: *Tamo communis-Salicetum acuminatæe* de Foucault 1995, *Viti viniferæe-Salicetum acuminatæe* Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & Valdes 1980, *Clematidi campanulifloræe-Rubetum ulmifolii* Peinado & Velasco in Peinado, Moreno & Velasco 1983 (this association actually belongs to the *Pruno-Rubion ulmifolii*). De Foucault & Julve (2001) have, however, failed to designate the holotype and therefore we validate the here.

• *non Salicion cineræe* T. Müller & Görs ex Passarge 1961

Syntaxonomic and nomenclatural notes: The *Tamo communis-Salicion atrocineræe* is a warm-temperate (South European-North African) geographic analogon of the European boreo-temperate *Salicion cineræe*, and it differs from the latter by its diagnostic taxa (see above).

Rusco hypophylli-Salicetum atrocineræe
Géhu, Kaabèche & Gharzouli 1994

Syntaxonomic note: This is, so far, the only association of the willow carrs described from North Africa, exemplifying a unique occurrence of this habitat and vegetation type outside of Eurasia. In the region where this association was described there is the only site of *Frangula alnus* in Algeria (Belouahem-Abed *et al.*, 2011). This species is also found across the Algerian border in

Tunisian Kroumiria (Nègre, 1952; Debazac, 1959; Timbal, 1970).

Lit.: Géhu *et al.* (1994b, 1998).

Nerio-Tamaricetea Braun-Blanquet & O. de Bolòs 1958

Circummediterranean and Macaronesian riparian scrub

Tamaricetalia africanæ Braun-Blanquet & O. de Bolòs 1958

Circummediterranean and Macaronesian riparian scrub

• *Nerio oleandri-Viticetalia agni-casti* de Foucault, Bensettiti, Noble & Paradis 2012 (syntax. syn.)

Tamaricion africanæ Braun-Blanquet & O. de Bolòs 1958

Infra- to supramediterranean tamarisk riparian scrub in temporarily flooded freshwater habitats of the Western Mediterranean

Nerio oleandri-Tamaricetum africanæ

Kaabèche, Gharzouli & Géhu ex Mucina & Meddour *ass. nova hoc loco*
Holotypus (hoc loco): Kaabèche *et al.* (1995: table 11, rel. 2)

• *Nerio oleandri-Tamaricetum africanæ* Kaabèche, Gharzouli & Géhu 1995 *nom. inval.* (Art. 5)

• ‘Groupement à *Nerium oleander* et *Tamarix africana*’ (Toubal, 1986)

Lit.: Toubal (1986), Géhu *et al.* (1994a, 1998), Kaabèche *et al.* (1995), de Foucault *et al.* (2012).

Comm. ‘Groupement à *Tamarix africana*’ (Wojterski & Bensettiti in Wojterski, 1988)

Lit.: Wojterski & Bensettiti in Wojterski (1988), Bensettiti (1995), Géhu *et al.* (1994a, 1998).

Tamaricion boveano-canariensis Izco, Fernández-González & Molina 1984

Infra- to supramediterranean tamarisk riparian scrub in temporarily flooded brackish habitats of the Western Mediterranean and Macaronesia

Comm. ‘Groupement à *Tamarix boveana*’ (Dubuis & Simonneau, 1954)

Lit.: Dubuis & Simonneau (1954), De Foucault *et al.* (2012).

Rubo ulmifolii-Nerion oleandri O. de Bolòs 1985

Thermo- to supramediterranean oleander riparian scrub of the Western Mediterranean.

Rubus ulmifolii-Nerietum oleandri O. de Bolòs 1956

Lit.: Sadki (1988), Khelifi & Sadki (1995), Géhu *et al.* (1998), de Foucault *et al.* (2012).

Lavatero olbiae-Rubetum ulmifolii Farris, Secchi & Filigheddu 2007

• *Lavatero olbiae-Rubetum ulmifolii* Rebbas 2002 *nom. inval.* (Art. 1)

• ‘Groupement à *Lavatera olbia* et *Rubus ulmifolius*’ (Rebbas *et al.*, 2011).

Lit.: Rebbas (2002), Rebbas *et al.* (2011).

Outlook

In Algeria, the most variable forest and scrub is the *Quercetea ilicis*, a flagship syntaxonomic unit of the Mediterranean vegetation as it comprises 65 associations (nearly 51 % of the entire count). This is also well represented in the neighbouring Morocco (Quézel & Barbero, 1986; Fennane, 2003) and Tunisia. The syntaxonomic contents of this class, and especially of the *Pistacio lentisci-Rhamnetalia alaterni* remains a matter of concern. The syntaxonomic status of many alliances of this is well-defined in the Iberian Peninsula, France and Italy (Rivas-Martínez *et al.*, 2001, 2002; Bardat *et al.*, 2004; Costa *et al.*, 2012; Biondi *et al.*, 2014; see also Mucina *et al.*, 2016). However, as highlighted by Benabid & Fennane (1994) and Fennane (2003), the delimitation of the alliances within this (9 alliances in case of our synopsis) is not clear and a critical revision of these concepts in North Africa is urgently needed.

The oak and cedar forests of the *Quercetea pubescentis*, incl. the iconic cedar forests of the Atlas classified in the *Querco-Cedretalia atlanticae*, appears as the second most important as it includes 35 associations (27% of the count). The oak and cedar forests are of high patrimonial significance and deserve protection.

Finally, the *Junipero-Pineteta sylvestris* (represented by a North African endemic — the *Ephedro majoris-Juniperetalia phoeniceae*), is the third zonal forest/scrub found in Algeria. The 6 associations (or plant communities) of this are representatives of this Mediterranean montane vegetation as known from the Iberian Peninsula (*Juniperetalia hemisphaericae*; Rivas-Martínez *et al.*, 1999) and the Eastern Mediterranean (Brullo

et al., 2001; see also Mucina *et al.*, 2016 for the formal description of the new *Berberido creticae-Juniperetalia excelsae*). The high-altitude juniper-dominated scrub and open woodlands have been considered ‘presteppic forest type’ (e.g. Jørgensen, 2009), hence definitely different from the mediterranean, prevalently low-altitude oak forest (woodland) and scrub of the *Quercetea ilicis*. The peculiarity of this vegetation (and its distinctness from other forest vegetation types of North Africa) has been recognised by Quézel & Barbero (1981), who described a class in its own right (*Ephedro majoris-Juniperetalia phoeniceae* Quézel & Barbero 1981) to accommodate this vegetation concept.

Besides these zonal units, the azonal forest vegetation limited to alluvial riverine habitats (oueds) supports notable 8 associations of riparian forest classified within the mediterranean *Populetales albae* (*Alno glutinosae-Populetea albae*). These forests are of national significance due to important ecological services they render in the Algerian valley-dominated landscapes, hydrology, and biodiversity (see also Quézel & Médail, 2003b).

Our synopsis is poised to become an important tool fostering intensification of surveying of vegetation (and biodiversity, in general) resources in Algeria. In comparison with neighbouring Morocco, where the checklist of the forest and scrub vegetation includes 2 classes, 5 orders, 13 alliances, and 124 associations (Fennane, 2003), our synopsis demonstrates a higher level of completeness.

It is regrettable that the number of phytosociological studies in Algeria has decreased in the last years. This is a worrying trend that has to be reversed if the variability of the Algerian vegetation is to be revealed and understood in order to secure sustainable use and protection of this valuable national resource.

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Appendix 1: List of new syntaxa described (or validated) in this paper as well as associations awaiting effective publication or validation.

New Order

Ephedro majoris-Juniperetalia phoeniceae Quézel & Barbero ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017

New Alliances

Abietion maroccano-numidicae Mucina & Meddour in Meddour, Meddour-Sahar, Zeraia & Mucina 2017

Calicotomo intermediae-Quercion cocciferae Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017

Campanulo alatae-Alnion glutinosae Meddour, Meddour-Sahar, Zeraia & Mucina 2017

Clematido cirrhosae-Populion albae Bensettiti & Lacoste ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017

Genisto tricuspidatae-Calicotomion spinosi Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Lamio garganici-Cedrion atlanticae Abdessemed in Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Lonicero implexae-Quercion cocciferae Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Loto dorycnium-Quercion rotundifoliae Djebaïli in Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Plagio maghrebini-Quercion canariensis Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Salici pedicellatae-Fraxinon angustifoliae Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Scrophulario laevigatae-Acerion obtusati Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Tamo communis-Salicion atrocineriae de Foucault & Julve ex Mucina & Meddour in Meddour, Meddour-Sahar, Zeraia & Mucina 2017

New Associations

Calicotomo intermediae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Calicotomo spinosae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Cisto salviifolii-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Coronillo valentinae-Quercetum Guinochet ex Meddour in Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Equiseto maximi-Fraxinetum angustifoliae Bensettiti & Lacoste ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Genisto quadriflorae-Pinetum halepensis Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Loto dorycnium-Pinetum halepensis Djebaïli, Meddour & Mucina in Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Nerio oleandri-Tamaricetum africanae Kaabèche, Gharzouli & Géhu ex ex Mucina & Meddour in Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Plagio maghrebini-Quercetum canariensis Laribi in Meddour ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Quercetum balloto-broteroi Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Ranunculo aurasiaci-Cedretum atlanticae Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Scrophulario laevigatae-Aceretum obtusati Wojterski ex Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Smilaco asperae-Pistacietum lentisci (Nègre 1964) Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Viburno tini-Quercetum canariensis Meddour, Meddour-Sahar, Zeraia & Mucina 2017
Viti viniferae-Alnetum glutinosae Meddour, Meddour-Sahar, Zeraia & Mucina 2017

Associations awaiting effective publication

Aceri monspessulani-Smyrnetum olusatri Abdessemed 1981 *nom. inval.* (Art. 1)
Ampelodesmo mauritanicae-Quercetum cocciferae Kadik 2005 *nom. inval.* (Art. 1)
Arisaro vulgaris-Pinetum halepensis Brakchi 1998 *nom. inval.* (Art. 1)
Berberido hispanicae-Cedretum atlanticae Benabid 1994 *nom. inval.* (Art. 1)
Buxo sempervirentis-Cerastietum gibraltari Gharzouli 1989 *nom. inval.* (Art. 1)
Cedro atlanticae-Aceretum monspessulani Azira-Atroune 2001 *nom. inval.* (Art. 1)
Cotyledoni brevifoliae-Aceretum obtusati Azira-Atroune 2001 *nom. inval.* (Art. 1)
Cystopterido fragilis-Aceretum obtusati Azira-Atroune 2001 *nom. inval.* (Art. 1)
Erico arboreae-Pinetum halepensis Brakchi 1998 *nom. inval.* (Art. 1)
Erico arboreae-Tetraclinetum articulatae Hadjadj-Aoul 1988 *nom. inval.* (Art. 1)
Festuco triflorae-Quercetum suberis Meddour 2010 *nom. inval.* (Art. 1)
Genisto ulicinae-Quercetum cocciferae Djaboub 2008 *nom. inval.* (Art. 1)
Junipero hemisphaericae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Linario rubrifoliae-Aceretum campestris Azira-Atroune 2001 *nom. inval.* (Art. 1)
Lonicero etruscae-Ilicetum aquifolii Abdessemed 1981 *nom. inval.* (Art. 1)
Physospermo verticillati-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)

- Pistacio lentisci-Calicotometum spinosae* Boussouf 2004 *nom. inval.* (Art. 1)
Potentillo micranthae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Prunetum avii Toubal 1998 *nom. inval.* (Art. 1)
Ptilostemone riphaei-Quercetum rotundifoliae Meddour 2010 *nom. inval.* (Art. 1)
Saturejo baborensis-Cedretum atlanticae Gharzouli 2007 *nom. inval.* (Art. 1)
Sileno atlanticae-Cedretum atlanticae Meddour 2010 *nom. inval.* (Art. 1)
Sorbo arianae-Cedretum atlanticae Gharzouli 2007 *nom. inval.* (Art. 1)
Tamo communis-Crataegium monogynae Meddour 1998 *nom. inval.* (Art. 1)
Telino linifoliae-Quercetum suberis Zeraia 1981 *nom. inval.* (Art. 1)
Tetraclini articulatae-Lavanduletum dentatae Dahmani 1984 *nom. inval.* (Art. 1)

Associations awaiting validation

- Biscutello raphanifoliae-Cedretum atlanticae* Yahy, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)
Bupleuro fruticosi-Euphorbietum dendroidis Géhu, Kaabèche & Gharzouli 1992 *nom. inval.* (Art. 5)
Buxo sempervirentis-Abietetum numidicae Yahy, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)
Cedro atlanticae-Quercetum rotundifoliae Abdessemed 1984 *nom. inval.* (Art. 2b)
Cerastio atlantici-Cedretum atlanticae Yahy in Yahy, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)
Chamaeropo humilis-Asparagium altissimi Guinochet 1980 *nom. inval.* (Art. 5)
Clematidi cirrhosae-Juniperetum lyciae Barbero, Quézel & Rivas-Martínez 1981 *nom. inval.* (Art. 2b)
Cynosuro peltierii-Quercetum afaredis Laribi in Laribi, Derridj & Acherar 2008 *nom. inval.* (Arts. 2b & 5)
Cytiso villosi-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Euphorbio bivonae-Rhoetum tripartitae Siab-Farsi, Khelifi & Kadid 2014 *nom. inval.* (Art. 5)
Festuco triflorae-Quercetum rotundifoliae Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
Junipero turbinatae-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Lauro nobilis-Celtidetum australis Bensettiti & Lacoste 1999 *nom. inval.* (Art. 2b)
Phillyreo latifoliae-Pistacietum lentisci Benabid 1982 *nom. inval.* (Art. 5)
Phlomidio bovei-Quercetum rotundifoliae Zeraia in Meddour 2002 *nom. inval.* (Art. 2b)
Pistacio lentisci-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Pistacio lentisci-Quercetum suberis Khelifi & Sadki 1985 *nom. inval.* (Art. 5)
Pistacio terebinthi-Quercetum rotundifoliae Dahmani-Megrerouche & Loisel 2003 *nom. inval.* (Art. 5)
Ranunculo spicati-Cedretum atlanticae Abdessemed in Dahmani-Megrerouche 1996 *nom. inval.* (Art. 2b)
Salici pedicellatae-Populetum nigrae Bensettiti & Lacoste 1999 *nom. inval.* (Arts. 2b & 5)
Senecioni gallerandiani-Cedretum atlanticae Yahy in Yahy, Médiouni & Géhu 1999 *nom. inval.* (Art. 2b)

Awaiting new name

- Junipero oxycedri-Quercetum cocciferae* Hadjadj-Aoul & Loisel 1999 *nom. illeg.* (Art. 31)