



# New national and regional Annex I Habitat records: from #21 to #25

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Subject editor: Daniela Gigante ♦ Received 8 June 2021 ♦ Accepted 28 June 2021 ♦ Published 12 July 2021

## Abstract

New Italian data on the distribution of the Annex I Habitats 3170\*, 6110\*, 91E0\*, 9320, 9330 are reported in this contribution. Specifically, one new occurrence in Natura 2000 sites is presented and six new cells are added in the European Environment Agency 10 km × 10 km reference grid. The new data refer to the Italian administrative regions of Sardinia, Sicily and Umbria.

## Keywords

3170\*, 6110\*, 91E0\*, 9320, 9330, 92/43/EEC Directive, conservation, EEA, vegetation

## Introduction

This is the fifth contribution reporting records of new occurrences of Annex I Habitats in Europe. By comparing the results of the 4th Report ex-Art. 17 of Annex I Habitat Monitoring in Europe (Eionet 2019), these cell occurrences are newly recorded for Italy. The related phytosociological relevés of each contribution are reported and archived in the Italian database "VegItaly" (Gigante et al. 2012; Landucci et al. 2012).

## Habitats records

Following the standard format of Gigante et al. (2019a), all species data, site data and descriptions of the new habitat records are hereafter provided. We report a synthetic overview in Tab. 1. We used the open source QGIS Geo-

graphic Information System (QGIS.org 2020) for mapping purposes.

**#21. Annex I Habitat: 3170\* Mediterranean temporary ponds (Caria M.C., Riviuccio G., Bagella S.)**

**EUNIS Classification system:** Q52 (formerly: C3.4) Small-helophyte bed (Chytrý et al. 2020).

**Biogeographical Region:** Mediterranean

**National Habitat Checklist of reference:** Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE (Biondi et al. 2009).

**Phytosociological reference:** *Isoetion* Br.-Bl. 1936, *Isoetalia* Br.-Bl. 1936, *Isoeto-Nanojuncetea* Br.-Bl. et Tüxen ex Westhoff, Dijk et Passchier (Biondi and Blasi 2015).

**Table 1.** Synthetic overview of the newly reported data.

Hab ID	Hab name	Cell ID	Country	BR	N2000 Site	Authors
3170*	Mediterranean temporary ponds	10kmE421N184	Italy	MED	-	Caria M.C., Riviaccio G., Bagella S.
6110*	Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>	10kmE454N218	Italy	MED	-	Bonini F.
91E0*	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	10kmE425N196	Italy	MED	-	Calvia G., Bonari G., Bacchetta G.
9320	<i>Olea</i> and <i>Ceratonia</i> forests	10kmE455N161, 10kmE468N160	Italy	MED	ITA010005, ITA010031	Gianguzzi L., Bazan G.
9330	<i>Quercus suber</i> forests	10kmE459N160	Italy	MED	-	Bazan G., Gianguzzi L.

**Geographic information:** Italy, Sardinia, Alta Marmilla, Mogoro, 127 m a.s.l. Coordinates: 39.650513 N, 8.774201 E (Tab. 2, Rel. 1); 39.650929 N, 8.774303 E (Tab. 2, Rel. 2); 39.650833 N, 8.774213 E (Tab. 2, Rel. 3); 39.652295 N, 8.774368 E (Tab. 2, Rel. 4).

**Cell ID in the EEA reference grid:** 10kmE421N184 (Fig. 1).  
**Nature 2000 Site Code:** currently not included in any Natura 2000 Site.

**Phytosociological table:** Tab. 2; taxonomic nomenclature according to Bartolucci et al. (2018).

**Notes:** The habitat is located in the outer belt of Mediterranean temporary ponds and waterlogged soils in patchwork with the vegetation dominated by *Pistacia lentiscus* and *Myrtus communis* (Bagella et al. 2009) inside a private biological farm. As already reported in Riviaccio et al.

(2020), the area is rich in wetlands, whose persistence is favored by traditional farming practices (Bagella et al. 2016).

**#22. Annex I Habitat:** 6110\* Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albi* (Bonini F.)

**EUNIS Classification system:** R13 (formerly: E1.1) Cryptogam- and annual-dominated vegetation on calcareous and ultramafic rock outcrops (Chytrý et al. 2020).

**Biogeographical Region:** Mediterranean

**National Habitat Checklist of reference:** Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE (Biondi et al. 2009).



**Figure 1.** Distribution in Italy of the Habitat 3170\*: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018), in white (black outline) the cells later reported for Sardinia region (Gigante et al. 2019a).

**Table 2.** Habitat 3170\*.

Relevé number	1	2	3	4	
Cell ID	10kmE421N184	10kmE421N184	10kmE421N184	10kmE421N184	
Latitude	39.650513	39.650929	39.650833	39.652295	
Longitude	8.774201	8.774303	8.774213	8.774368	
Date	3/4/2021	3/4/2021	3/4/2021	5/12/2021	
Area (m <sup>2</sup> )	1	1	1	1	
Altitude (m a.s.l.)	127	127	127	127	
Cover (%)	75	80	70	50	
Average vegetation height (m)	0.15	0.15	0.15	0.2	
Water depth (cm)	0	0	0	0	Presences
<b>Charact. and diff. taxa <i>Isoetion</i>, <i>Isoetetalia</i>, <i>Isoeto-Nanojuncetea</i></b>					
<sup>^</sup> <i>Isoetes histrix</i> Bory	1	1	2	1	4
<i>Isoetes gymnocarpa</i> (Gennari) A.Braun	1	1	1	1	4
<sup>^</sup> <i>Agrostis pourretii</i> Willd.	1	2	2	3	4
<i>Romulea requienii</i> Parl.	1	2	2	r	4
<i>Lythrum hyssopifolia</i> L.	.	+	.	+	2
<sup>^</sup> <i>Juncus bufonius</i> L.	.	.	.	1	1
<sup>^</sup> <i>Juncus capitatus</i> Weigel	.	.	.	+	1
<sup>^</sup> <i>Juncus pygmaeus</i> Rich. ex Thuill.	.	.	.	r	1
<i>Solenopsis laurentia</i> (L.) C.Presl	.	.	.	2	1
<i>Centaureum maritimum</i> (L.) Fritsch	.	.	.	r	1
<i>Isoetes tiguliana</i> Gennari	.	.	.	+	1
<i>Isolepis cernua</i> (Vahl) Roem. & Schult.	.	.	.	r	1
<i>Juncus tingitanus</i> Maire & Weiller	.	.	.	2	1
<i>Lotus hispidus</i> DC.	.	.	.	r	1
<b>Other species</b>					
<i>Lysimachia foemina</i> (Mill.) U.Manns & Anderb.	1	1	2	r	4
<i>Romulea ligustica</i> Parl.	2	2	2	.	3
<i>Asphodelus ramosus</i> L. subsp. <i>ramosus</i>	3	2	2	.	3
<i>Cynosurus polybracteatus</i> Poir.	+	+	.	1	2
<i>Cynodon dactylon</i> (L.) Pers.	.	.	+	+	2
<i>Chamaemelum fuscatum</i> (Brot.) Vasc.	1	1	.	.	2
<i>Carex divisa</i> Huds.	+	+	.	.	2
<i>Romulea ramiflora</i> Ten. subsp. <i>ramiflora</i>	.	.	r	+	2
<i>Logfia gallica</i> (L.) Cosson & Germ.	.	+	+	.	2
<i>Phalaris coerulescens</i> Desf.	1	.	.	3	2
<i>Galactites tomentosus</i> Moench	+	.	.	.	1
<i>Gaudinia fragilis</i> (L.) P.Beauv.	.	.	.	+	1
<i>Euphorbia exigua</i> L. subsp. <i>exigua</i>	.	.	.	r	1
<i>Filago germanica</i> (L.) Huds.	+	.	.	.	1
<i>Lolium rigidum</i> Gaudin subsp. <i>rigidum</i>	.	.	.	r	1
<i>Carex flacca</i> Schreb. subsp. <i>erythrostachys</i> (Hoppe) Holub	.	.	.	r	1
<i>Linum usitatissimum</i> L. subsp. <i>angustifolium</i> (Huds.) Thell.	.	1	.	.	1
<i>Lotus conimbricensis</i> Brot.	.	+	.	.	1
<i>Taeniatherum caput-medusae</i> (L.) Nevski	.	.	.	r	1
<i>Aira caryophyllea</i> L.	.	.	.	+	1
<i>Macrobriza maxima</i> (L.) Tzvelev	.	.	.	+	1
<i>Ranunculus paludosus</i> Poir.	.	.	+	.	1
<i>Allium</i> sp.	.	2	.	.	1

<sup>^</sup> Reference plant species of the Habitat 3170\*, from Biondi et al. (2009).

**Phytosociological reference:** *Sedum album*-dominated community, *Alyso alyssoidis*-*Sedion* Oberd. et T. Müller in T. Müller 1961, *Alyso-Sedetalia* Moravec 1967, *Sedo-Scleranthetea* Br.-Bl. 1955 (Mucina et al. 2016).

**Geographic information:** Italy, Umbria, Perugia, Spoleto, Colle Sant'Elia, 419 m a.s.l., Coordinates: 42.733544 N, 12.742532 E (Tab. 3, Rel. 1); 418 m a.s.l., Coordinates: 42.733744 N, 12.742815 E (Tab. 3, Rel. 2); 421 m a.s.l., Coordinates: 42.733384 N, 12.742358 E (Tab. 3, Rel. 3).

**Cells ID in the EEA reference grid:** 10kmE454N218 (Fig. 2).

**Natura 2000 Site Code:** currently not included in any Natura 2000 Site.

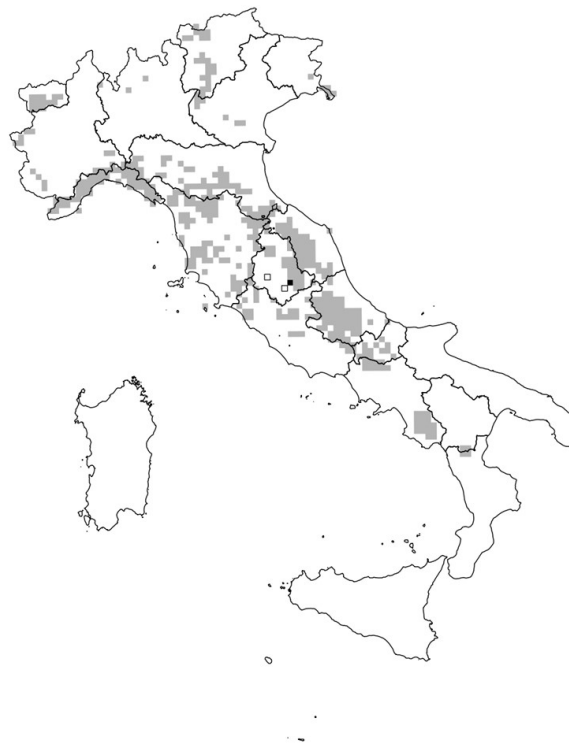
**Phytosociological table:** Tab. 3; taxonomic nomenclature according to Portale della Flora d'Italia (2020).

**Notes:** The vegetation of *Alyso-Sedion albi* for central Italy is little reported in the phytosociological literature and no *Sedum album*-dominated coenosis has been framed yet (Venanzoni & Gigante 1999; Di Pietro et al. 2006). The recorded community (Fig. 3) occurs on carbonate rocky outcrops below the “Rocca Alborno” fortress, near the border of the Natura 2000 SAC IT5210064 “Montelucodi Spoleto”, but outside. The Habitat spreads on the carbonatic rocks over an area of about 600 sqm. In several points it is invaded by the alien invasive *Ailanthus altissima* (Mill.) Swingle. The present finding occurred during

**Table 3.** Habitat 6110\*.

Relevé number	1	2	3	
Cell ID	10kmE454N218	10kmE454N218	10kmE454N218	
Latitude	42.733544	42.733744	42.733384	
Longitude	12.742532	12.742815	12.742358	
Date	5/7/2021	5/7/2021	5/7/2021	
Area (m <sup>2</sup> )	1	1	1	
Altitude (m a.s.l.)	419	418	421	
Exposition (°)	120	170	165	
Slope (°)	54	80	46	
Cover (%)	65	45	80	
Rockiness (%)	29	53	16	
Stoniness (%)	1	0	1	
Moss cover (%)	2	1	1	
Bare soil (%)	3	1	2	
<b>Charact. and diff. taxa</b> <i>Alyso alyssoidis-Sedion, Alyso-Sedetalia, Sedo-Scleranthea</i>				<b>Presences</b>
^ <i>Sedum album</i> L.	4	3	4	3
<i>Petrorhagia saxifraga</i> (L.) Link subsp. <i>saxifraga</i>	+	+	r	3
^ <i>Petrosedum rupestre</i> (L.) P.V.Heath	.	1	2	2
^ <i>Sedum sexangulare</i> L.	1	.	.	1
<i>Sedum dasyphyllum</i> L.	.	1	.	1
<b>Other species</b>				
<i>Lactuca viminea</i> (L.) J.Presl & C.Presl	1	r	1	3
<i>Geranium molle</i> L.	r	r	.	2
<i>Medicago minima</i> (L.) L.	+	.	+	2
<i>Micromeria graeca</i> (L.) Benth. ex Rchb. subsp. <i>tenuifolia</i> (Ten.) Nyman	+	1	.	2
<i>Anisantha diandra</i> (Roth) Tutin ex Tzvelev	.	.	1	1
<i>Artemisia alba</i> Turra	.	.	+	1
<i>Convolvulus cantabrica</i> L.	.	.	+	1
<i>Clinopodium nepeta</i> (L.) Kuntze	.	.	r	1
<i>Euphorbia helioscopia</i> L. subsp. <i>helioscopia</i>	.	.	r	1
<i>Reichardia picroides</i> (L.) Roth	.	.	r	1
<i>Sonchus asper</i> (L.) Hill	.	.	r	1

^ Reference plant species of the Habitat 6110\*, from Biondi et al. (2009).



**Figure 2.** Distribution in Italy of the Habitat 6110\*: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018), in white (black outline) the cells later reported for Umbria region (Gigante et al. 2019b).





**Figure 3.** Habitat 6110\* at Colle Sant'Elia (Spoleto, Perugia, Italy).

the surveys carried out with the financial contribution of the Life Integrated project “LIFE IMAGINE Umbria - Integrated Management and Grant Investments for the N2000 Network in Umbria”.

**#23. Annex I Habitat: 91E0\*** Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (Calvia G., Bonari G., Bacchetta G.)

**EUNIS 2020 classification system:** T14 (formerly: G1.3) Mediterranean and Macaronesian riparian forests (Chytrý et al. 2020).

**Biogeographical Region:** Mediterranean.

**National Habitat Checklist of reference:** Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE (Biondi et al. 2009).

**Phytosociological reference:** *Osmundo regalis-Alnetum glutinosae* Camarda 1995; *Osmundo-Alnion glutinosae* (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975; *Populetales albae* Br.-Bl. ex Tchou 1948; *Salici purpureae-Populetea nigrae* (Rivas-Mart. et Cantó ex Rivas-Mart. et al. 1991) Rivas-Mart. et Cantó 2002 (Biondi and Blasi 2015).

**Geographic information:** Italy, Sardinia, Berchidda, Rio Salomone, between 195 and 203 m a.s.l., Coordinates: 40.750385 N, 9.209475 E (Tab. 4, Rel. 1); 40.750466

N 9.209482 E (Tab. 4, Rel. 2); 40.750872 N, 9.210716 E (Tab. 4, Rel. 3); 40.750850 N, 9.210757 E (Tab. 4, Rel. 4); 40.750852 N, 9.210802 E (Tab. 4, Rel. 5); 40.751022 N, 9.210905 E (Tab. 4, Rel. 6); 40.751436 N, 9.211736 E (Tab. 4, Rel. 7); 40.751473 N, 9.211695 E (Tab. 4, Rel. 8); 40.751177 N, 9.211229 E (Tab. 4, Rel. 9).

**Cell ID in the EEA reference grid:** 10kmE425N196 (Fig. 4). **Natura 2000 Site Code:** currently not included in any Natura 2000 Site.

**Phytosociological table:** Tab. 4; taxonomic nomenclature according to Bartolucci et al. (2018).

**Notes:** This priority habitat occurs scattered in the island of Sardinia (Bacchetta et al. 2009) and is often represented by the association *Osmundo regalis-Alnetum glutinosae* Camarda 1995. This is a typical association represented by edapho-hygrophilous meso-woods (10–20 m high) growing along oligotrophic rivers and streams, from the sea level up to 800 m of elevation. They are calcifuge formations linked to moist sandy to gravelly soils in the Mediterranean Oceanic Pluviseasonal bioclimate, with thermotypes ranging from the thermo-Mediterranean to the meso-Mediterranean and ombrotypes from lower subhumid to lower humid (Angius and Bacchetta 2009). It is classified within the W-Mediterranean alliance *Osmundo-Alnion glutinosae* (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975 and the Tyrrhenian sub-alliance *Hyperico hircini-Alnion glutinosae* Dierschke 1975 (Angius and Bacchetta 2009; Landi and Angiolini 2010). At the site here reported (Fig. 5), the trees of *Alnus glutinosa* are only occasionally dominant due to relatively recent wildfires and extreme rain events. For this reason, *Osmunda regalis* L. is often dominant, forming a dense undergrowth along streambanks and islets.

**#24. Annex I Habitat: 9320** *Olea* and *Ceratonia* forests (Gianguzzi L., Bazan G.)

**EUNIS Classification system:** T24 (formerly: G2.4) *Olea europaea-Ceratonia siliqua* forest (Chytrý et al. 2020).

**Biogeographical Region:** Mediterranean

**National Habitat Checklist of reference:** Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE (Biondi et al. 2009).

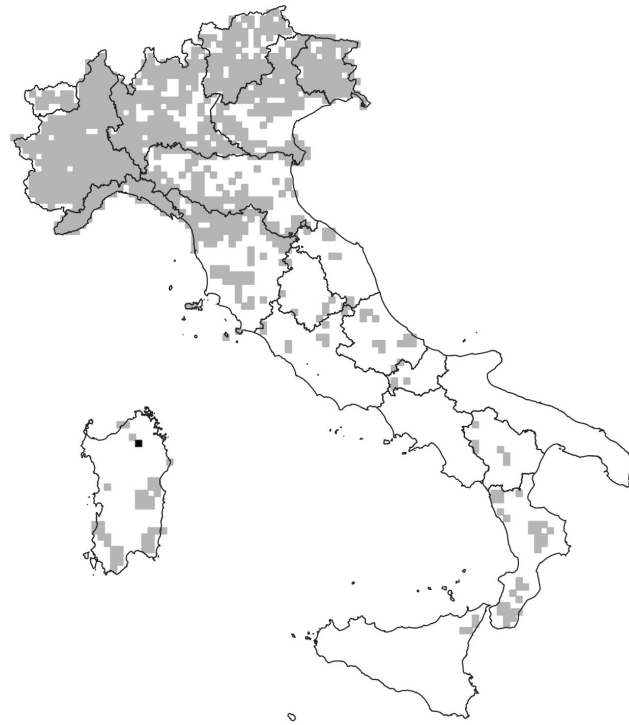
**Phytosociological reference:** *Chamaeropo humilis-Oleetum sylvestris* Gianguzzi et Bazan 2019 *acanthetosum mollis* Gianguzzi et Bazan 2019 (Tab. 2, Rel. 1); *Ruto chalepensis-Oleetum sylvestris* Gianguzzi et Bazan 2019 *oleetosum sylvestris* Gianguzzi et Bazan 2019 (Tab. 2, Rel. 2); *Oleo sylvestris-Ceratonion siliquae* Br.-Bl. ex Guinochet et Drouineau 1944; *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Martínez 1975; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015).

**Geographic information:** Italy, Sicilia, Mazara del Vallo, Gorgi Tondi, 30 m a.s.l., Coordinates: 37.613763 N, 12.648103 E (Tab. 5, Rel. 1); Italy, Sicilia, Caltanissetta, Gulfi, 433 m a.s.l., Coordinates: 37.475271 N, 14.099069 E (Tab. 5, Rel. 2)

Table 4. Habitat 91E0\*.

Relevé number	1	2	3	4	5	6	7	8	9	Presences
Cell ID	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	10kmE425N196	
Latitude	40.750385	40.750466	40.750872	40.750850	40.750852	40.751022	40.751436	40.751473	40.751177	
Longitude	9.209475	9.209482	9.210716	9.210757	9.210802	9.210905	9.211736	9.211695	9.211229	
Date	8/18/2019	8/18/2019	8/18/2019	8/18/2019	8/18/2019	8/18/2019	8/18/2019	8/18/2019	8/18/2019	
Area (m <sup>2</sup> )	25	16	16	16	25	25	20	16	9	
Altitude (m a.s.l.)	196	196	200	200	200	200	201	201	201	
Canopy cover (%)	100	100	100	100	90	100	95	85	85	
Slope (°)	7	10								
Exposition	W	W								
Substrate	Granite	Granite	Granite	Granite	Granite	Granite	Granite	Granite	Granite	
Rockiness (%)	10	20								
Vegetation average height (m)	5.5	4.5	3	4	5	4.5	4	3.5	2	
Stoniness (%)	15	15	50	25	50	40	35	25	35	
Number of species	12	10	8	16	10	8	8	11	9	
<b>Diagnostic ass. <i>Osmundo regalis-Alnetum glutinosae</i></b>										
	2	2	3	3	3	3	2	2	1	9
<i>^Alnus glutinosa</i> (L.) Gaertn.					+	+				
<i>Smilax aspera</i> L.	1	2		1		+			1	7
<i>^Carex microcarpa</i> Bertol. ex Moris	1			+			1			3
<i>Rhamnus alaternus</i> L.	1	1								2
<i>Cyperus badius</i> Desf.								1	+	2
<i>Hypericum hircinum</i> L. subsp. <i>hircinum</i>			+							1
<b>Character. subass. <i>salicetosum atrocineriae</i></b>										
<i>^Salix atrocineria</i> Brot.	+	2		2	2	1	3		1	7
<b>Character. <i>Osmundo-Almion</i></b>										
<i>^Osmunda regalis</i> L.	4	5	5	3	5	4	4	2	4	9
<i>Erica terminalis</i> Salisb.			1	+		1	2	1		5
<i>Fraxinus ornus</i> L.	2	1		1						3
<i>Spiranthes aestivalis</i> (Poir.) Rich.	+									1
<b>Character. <i>Salici purpureae-Populetea nigrae</i></b>										
<i>^Salix purpurea</i> L.				2		3	1	4	1	5
<i>Vitis vinifera</i> L. subsp. <i>sylvestris</i> (Gmelin) Hegi				1	+	2	+	1		5
<b>Character. <i>Quercetea ilicis</i></b>										
<i>Arbutus unedo</i> L.	2	1								2
<i>Erica arborea</i> L.	1	+								2
<i>Pistacia lentiscus</i> L.		2								1
<b>Other species</b>										
<i>Typha angustifolia</i> L.			+	+	1				1	4
<i>Rubus ulmifolius</i> Schott	+	+		+				+		4
<i>Lythrum salicaria</i> L.			1	+				+		3
<i>Mentha aquatica</i> L.				+	+			1		3
<i>Scirpoides holoschoenus</i> (L.) Soják				1				+	2	3
<i>Gratiola officinalis</i> L.			+		+		+			3
<i>Mentha pulegium</i> L.					+					2
<i>Elymus repens</i> (L.) Gould				+					+	2
<i>Carex panormitana</i> Guss.			+		+					2
<i>Ditrichia viscosa</i> (L.) Greuter	+									1
<i>Ludwigia palustris</i> (L.) Elliott	+									1
<i>^Cladium mariscus</i> (L.) Pohl.				+						1
<i>Juncus acutius</i> L.								+		1

^ Reference plant species of the Habitat 91E0\*, from Biondi et al. (2009).



**Figure 4.** Distribution in Italy of the Habitat 91E0\*: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).



**Figure 5.** Habitat 91E0\* along Rio Salomone river (Berchidda, Sassari, Italy).

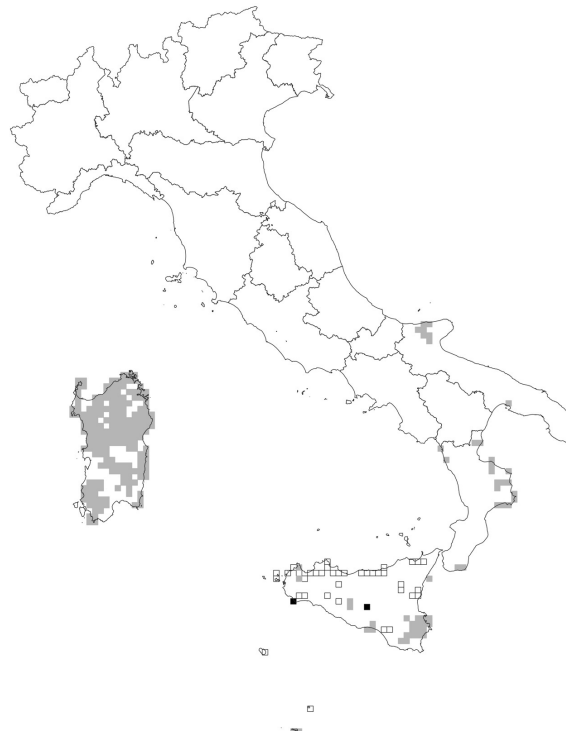


**Table 5.** Habitat 9320.

Relevé number	1	2	
Cell ID	10kmE455N161	10kmE468N160	
Latitude	37.613763	37.613763	
Longitude	12.648103	12.648103	
Date	3/13/2021	3/13/2021	
Area (m <sup>2</sup> )	100	150	
Altitude (m a.s.l.)	30	433	
Exposition	SE	SE	
Slope (°)	6	15	
Cover (%)	90	100	
Average vegetation height (m)	4	4	Presences
<b>Dominant species</b>	5	5	2
^ <i>Olea europaea</i> L. var. <i>sylvestris</i> (Mill.) Lehr.			
<b>Charact. and diff. of <i>Chamaeropo humilis</i>-<i>Oleetum sylvestris acanthosum mollidis</i></b>			
<i>Acanthus mollis</i> L. subsp. <i>mollis</i>	2	.	1
^ <i>Chamaerops humilis</i> L.	2	.	1
<b>Charact. and diff. of <i>Ruto chalepensis</i>-<i>Oleetum sylvestris oleetosum sylvestris</i></b>			
^ <i>Pistacia terebinthus</i> L. subsp. <i>terebinthus</i>	.	3	1
<i>Ruta chalepensis</i> L.	.	1	1
<b>Charact. of <i>Pistacio lentisci</i>-<i>Rhamnetalia alaterni</i> and <i>Oleo sylvestris</i>-<i>Ceratonion siliquae</i></b>			
<i>Pistacia lentiscus</i> L.	3	.	1
<i>Teucrium fruticans</i> L. subsp. <i>fruticans</i>	2	.	1
<i>Clematis cirrhosa</i> L.	1	.	1
^ <i>Stachys major</i> (L.) Bartolucci & Peruzzi	1	.	1
<i>Artemisia arborescens</i> (Vaill.) L.	+	1	2
<i>Rhamnus lycioides</i> subsp. <i>oleoides</i> (L.) Jahand. & Maire	+	.	1
<i>Quercus calliprinos</i> Webb	+	.	1
^ <i>Asparagus albus</i> L.	+	.	1
<b>Charact. of <i>Quercetea ilicis</i></b>			
^ <i>Asparagus acutifolius</i> L.	1	2	2
<i>Ampelodesmos mauritanicus</i> (Poir.) T.Durand & Schinz	1	+	2
<i>Rubia peregrina</i> L.	1	.	1
<i>Hedera helix</i> L. subsp. <i>helix</i>	1	.	1
^ <i>Lonicera implexa</i> Aiton	1	.	1
<i>Smilax aspera</i> L.	+	.	1
<i>Euphorbia characias</i> L.	.	2	1
^ <i>Rhamnus alaternus</i> L.	.	2	1
<i>Arisarum vulgare</i> O.Targ.Tozz. subsp. <i>vulgare</i>	.	1	1
<i>Quercus virgiliana</i> Ten.	.	+	1
<b>Other species</b>			
<i>Capparis spinosa</i> L.	1	.	1
<i>Oloptum miliaceum</i> (L.) Röser & H.R.Hamasha	1	.	1
<i>Parietaria judaica</i> L.	1	.	1
<i>Brachypodium retusum</i> (Pers.) P.Beauv.	+	.	1
<i>Daucus carota</i> L. subsp. <i>carota</i>	+	.	1
<i>Ferula communis</i> L. subsp. <i>communis</i>	+	.	1
<i>Foeniculum vulgare</i> Mill. subsp. <i>vulgare</i>	+	.	1
<i>Bituminaria bituminosa</i> (L.) E.H.Stirt.	+	.	1
<i>Avena barbata</i> Pott ex Link	+	.	1
<i>Salvia rosmarinus</i> Schleid.	+	.	1
<i>Dittrichia viscosa</i> (L.) Greuter	+	.	1
<i>Thymus spinulosus</i> Ten.	+	.	1
<i>Diplotaxis tenuifolia</i> (L.) Dc.	+	.	1
<i>Dactylis glomerata</i> subsp. <i>hispanica</i> (Roth) Nyman	.	2	1
<i>Hypparrhenia hirta</i> (L.) Stapf subsp. <i>hirta</i>	.	2	1
<i>Capparis sicula</i> Veill.	.	2	1
<i>Sedum dasyphyllum</i> L.	.	1	1
<i>Crataegus monogyna</i> Jacq.	.	1	1
<i>Arundo plinii</i> Turra	.	1	1
<i>Asphodelus ramosus</i> L.	.	+	1
<i>Mandragora autumnalis</i> Bertol.	.	+	1

^ Reference plant species of the Habitat 9320, from Biondi et al. (2009).





**Figure 6.** Distribution in Italy of the Habitat 9320: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018), in white (black outline) the cells later reported for Sicily region (Gianguzzi et al. 2020).

**Cell ID in the EEA reference grid:** 10kmE455N161 (Tab. 5, Rel. 1); 10kmE468N160 (Tab. 5, Rel. 2) (Fig. 6).

**Natura 2000 Site Code:** The stand of Rel. 1 is included in the SAC ITA010005 “Laghetti di Preola e Gorgi Tondi e Sciare di Mazara” and SPA ITA010031 “Laghetti di Preola e Gorgi Tondi, Sciare di Mazara e Pantano Leone”; the stand of Rel. 2 is currently not included in any Natura 2000 Site.

**Phytosociological table:** Tab. 5; taxonomic nomenclature according to Bartolucci et al. (2018).

**Notes:** The phytosociological interpretation of *Olea europaea* L. var. *sylvestris* (Mill.) Lehr. communities by Gianguzzi and Bazan (2019, 2020) has allowed a correct interpretation and an update of distribution of the Habitat 9320 in Sicily (Gianguzzi et al. 2020). In the Region, botanical and phytosociological research have indeed provided new insights into the status and distribution of habitat and species for the implementation of the 4th Italian Report of Habitats (e.g., Troia et al. 2012; De Castro et al. 2015; Gianguzzi et al. 2013, 2014a, 2014b, 2015, 2016).

Recent surveys have provided two new records of 9320 habitat in Sicily referred to *Chamaeropo humilis-Oleatum sylvestris acanthetosum mollis* and *Ruto chalepensis-Oleatum sylvestris oleetosum sylvestris*. The second phytocoenosis represents the first record of a wild olive formation growing on gypsum substrates. Its location outside Natura 2000 network should receive special attention.

**#25. Annex I Habitat: 9330 *Quercus suber* forests (Bazan G., Gianguzzi L.)**

**EUNIS Classification system:** T21 (formerly: G2.1) Mediterranean evergreen *Quercus* forest (Chytrý et al. 2020).

**Biogeographical Region:** Mediterranean

**National Habitat Checklist of reference:** Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE (Biondi et al. 2009).

**Phytosociological reference:** *Genisto aristatae-Quercetum suberis* Brullo 1984 *pistacietosum lentisci* Brullo, Gianguzzi, La Mantia et Siracusa 2008; *Erico arboreae-Quercion ilicis* Brullo, Di Martino et Marcenò 1977; *Quercetalia ilicis* Br.-Bl. ex Molinier 1934; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015).

**Geographic information:** Italy, Sicilia, Sciacca, Sovareto, 50 m a.s.l., Coordinates: 37.500410 N, 13.121535 E (Tab. 6, Rel. 1); Coordinates: 37.500605 N, 13.121616 E (Tab. 6, Rel. 2).

**Cell ID in the EEA reference grid:** 10kmE459N160 (Fig. 7).

**Natura 2000 Site Code:** currently not included in any Natura 2000 Site.

**Phytosociological table:** Tab. 6; taxonomic nomenclature according to Bartolucci et al. (2018).

**Notes:** The Habitat identified is a remnant linear strip of cork oak vegetation, located in xeric conditions of the coastal area of south-west Sicily. The phytocoenosis has been assigned to *Genisto aristatae-Quercetum suberis pistacietosum lentisci*, which is differentiated from the sub-

**Table 6.** Habitat 9330.

Relevé number	1	2	
Cell ID	10kmE459N160	10kmE459N160	
Latitude	37.500.410	37.475.271	
Longitude	13.121.535	14.099.069	
Date	3/13/2021	3/13/2021	
Area (m <sup>2</sup> )	150	150	
Altitude (m a.s.l.)	50	51	
Exposition	S	S	
Slope (°)	1	1	
Cover (%)	100	100	
Average vegetation height (m)	6	4	Presences
<b>Charact. taxa of <i>Genisto aristatae-Quercetum suberis pistacietosum lentisci</i></b>			
<i>Quercus suber</i> L.	4	3	2
<i>Pistacia lentiscus</i> L.	2	2	2
<i>Olea europaea</i> L. var. <i>sylvestris</i> (Mill.) Lehr.	1	2	2
<i>Teucrium fruticans</i> L. subsp. <i>fruticans</i>	+	1	2
<b>Charact. <i>Erico-Quercion ilicis</i></b>			
<i>Myrtus communis</i> L.	.	1	1
<b>Charact. <i>Quercetalia ilicis</i> and <i>Quercetea ilicis</i></b>			
<i>Rubia peregrina</i> L.	1	1	2
<i>Smilax aspera</i> L.	1	1	2
<i>Asparagus acutifolius</i> L.	+	+	2
<b>Other species</b>			
<i>Rubus ulmifolius</i> Schott	1	1	2
<i>Reichardia picroides</i> (L.) Roth	+	+	2
<i>Oloptum miliaceum</i> (L.) Röser & H.R.Hamasha	+	+	2
<i>Ceratonia siliqua</i> L.	2	.	1
<i>Cistus salvifolius</i> L.	.	1	1
<i>Spartium junceum</i> L.	.	1	1
<i>Hyparrhenia hirta</i> (L.) Stapf subsp. <i>hirta</i>	.	+	1
^ Reference plant species of the Habitat 9330, from Biondi et al. (2009).			

**Figure 7.** Distribution in Italy of the Habitat 9330: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).



**Figure 8.** Habitat 9330, relict aspects of *Quercus suber* formation in Contrada Sovareto (Sicacca, SW-Sicily, Italy).

association typicum by the absence of *Genista aristata* (Marino et al. 2012) and the frequency of thermophilous species (Brullo et al. 2008).

It is the last vestiges of a *Quercus suber* forest (Fig. 8) that historically covered this area (Stieler 1880) which is named in Sicilian dialect Suvarito (meaning the cork oak forest). Nowadays, the formation is within a large tourist resort which, indirectly, has contributed protecting it. However, the community should receive special attention as it is located outside the Natura 2000 network sites.

## Bibliography

- Angius R, Bacchetta G (2009) Boschi e boscaglie ripariali del Sulcis-Iglesiente (Sardegna sud-occidentale, Italia). *Braun-Blanquetia* 45: 1–63.
- Bacchetta G, Bagella S, Biondi E, Farris E, Filigheddu R, Mossa L (2009) Vegetazione forestale e serie di vegetazione della Sardegna (con rappresentazione cartografica alla scala 1:350.000). *Fitosociologia* 46: 3–82.
- Bagella S, Caria MC, Farris E, Filigheddu R (2009) Phytosociological analysis in Sardinian Mediterranean temporary wet habitats. *Fitosociologia* 46(1): 11–26.
- Bagella S, Caria MC, Farris E, Rossetti I, Filigheddu R (2016) Traditional land uses enhanced plant biodiversity in a Mediterranean agro-silvo-pastoral system. *Plant Biosystems* 150(2): 201–207. <https://doi.org/10.1080/11263504.2014.943319>
- Bartolucci F, Peruzzi L, Galasso G, Albano A, Alessandrini A, Ardenghi NMG, et al. (2018) An updated checklist of the vascular flora native to Italy. *Plant Biosystems* 152(2): 179–303. <https://doi.org/10.1080/11263504.2017.1419996>
- Biondi E, Blasi C, Burrascano S, Casavecchia S, Copiz R, Del Vico E, et al. (2009) Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE. Società Botanica Italiana. Ministero dell'Ambiente e della tutela del territorio e del mare, D.P.N. Available online at <http://vnr.unipg.it/habitat/> [accessed on 2021, Jun 4].
- Brullo S, Gianguzzi L, La Mantia A, Siracusa G (2008) La classe *Quercetea ilicis* in Sicilia. *Bollettino dell'Accademia Gioenia di Scienze Naturali* 41(369): 1–24.
- Chytrý M, Tichý L, Hennekens SM, Knollová I, Janssen JA, Rodwell JS, et al. (2020) EUNIS Habitat Classification: Expert system, characteristic species combinations and distribution maps of European habitats. *Applied Vegetation Science* 23: 648–675. <https://doi/10.1111/avsc.12510>
- De Castro O, Colombo P, Gianguzzi L, Perrone R (2015) Flower and fruit structure of the endangered species *Petagnaea gussonei* (Sprenghel) Rauschert (*Saniculoideae*, *Apiaceae*) and implications for its reproductive biology. *Plant Biosystems* 149(6): 1042–1051. <https://doi.org/10.1080/11263504.2015.1014007>
- Di Pietro R, Burrascano S, Blasi C (2006) Sulla presenza dell'*Alyssa-Sedion* sui Monti Prenestini (Subappennino Laziale). *Allionia* 40: 39–50.
- Eionet (2019) Eionet Central Data Repository. <https://cdr.eionet.europa.eu/it/eu/art17/envxuwp6g/> [accessed on 2021, May 20]
- Gigante D, Allegranza M, Angiolini C, Bagella S, Caria MC, Ferretti G, et al. (2019a). New national and regional Annex I Habitat records: #1–#8. *Plant Sociology* 56(1): 31–40. <https://doi.org/10.3897/pls2020572/05>



- Gigante D, Bagella S, Bonini F, Caria MC, Gabellini A, Gennai M, et al. (2019b) New national and regional Annex I Habitat records: #9–#12. *Plant Sociology* 56(2): 129–134. <https://www.doi.org/10.7338/pls2019562/09>
- Gigante D, Acosta ATR, Agrillo E, Attorre F, Cambria VM, Casavecchia S, et al. (2012) VegItaly: Technical features, crucial issues and some solutions. *Plant Sociology* 49(2): 71–79. <http://www.doi.org/10.7338/pls2012492/05>
- Gianguzzi L, Bagella S, Bazan G, Caria MC, Cerabolini BEL, Dalla Vecchia A, Riviaccio G, Bolpagni R (2020) New national and regional Annex I Habitat records: from #13 to #15. *Plant Sociology* 57(1): 65–74. <https://doi.org/10.3897/pls2020571/07>
- Gianguzzi L, Bazan G (2019) The *Olea europaea* L. var. *sylvestris* (Mill.) Lehr. forests in the Mediterranean area. *Plant Sociology* 56(2): 3–34. <https://doi.org/10.7338/pls2016531/02>
- Gianguzzi L, Bazan G (2020) A phytosociological analysis of the *Olea europaea* L. var. *sylvestris* (Mill.) Lehr. forests in Sicily. *Plant Biosystems* 154(5): 705–725. <https://doi.org/10.1080/11263504.2019.1681532>
- Gianguzzi L, Cusimano D, Cuttonaro P, Gianguzzi G, Romano S. (2014a) Distribution, ecology and conservation survey on the *Celtis tournefortii* subsp. *aetnensis* (Celtidaceae: Cannabaceae) populations in Sicily. *Webbia* 69(2): 325–334. <https://doi.org/10.1080/00837792.2013.853364>
- Gianguzzi L, Cusimano D, Ilardi V, Romano S. (2013) Distribution, ecology, vegetation and conservation survey on the relictual population of *Carex panormitana* Guss. (Cyperaceae) in Sicily (Italy). *Webbia* 68(2): 159–175. <https://doi.org/10.1080/00837792.2013.853364>
- Gianguzzi L, Cusimano D, Romano S. (2014b) Phytosociological characterization of the *Celtis tournefortii* subsp. *aetnensis* microwoods in Sicily. *Plant Sociology* 51(2): 17–28. <https://doi.org/10.7338/pls2014512/02>
- Gianguzzi L, Cuttonaro P, Cusimano D, Romano S (2016) Contribution to the phytosociological characterization of the forest vegetation of the Sicani Mountains (inland of the North-Western Sicily). *Plant Sociology* 53(1): 5–43. <https://doi.org/10.7338/pls2016531/02>
- Gianguzzi L, Papini F, Cusimano D (2015) Phytosociological survey vegetation map of Sicily (Mediterranean region). *Journal of Maps* 12(5): 845–851. <https://doi.org/10.1080/17445647.2015.1094969>
- Landi M, Angiolini C (2010) *Osmundo–Alnion* woods in Tuscany (Italy): A phytogeographical analysis from a west European perspective. *Plant Biosystems* 144: 93–110. <https://doi.org/10.1080/11263500903361036>
- Landucci F, Acosta ATR, Agrillo E, Attorre F, Biondi E, Cambria VM, et al. (2012) VegItaly: The Italian collaborative project for a national vegetation database. *Plant Biosystems* 146(4): 756–763. <https://doi.org/10.1080/11263504.2012.740093>
- Marino P, Guarino R, Bazan G (2012) The Sicilian taxa of *Genista* sect. *Voglera* and their phytosociological framework. *Flora Mediterranea* 22: 169–190. <https://doi.org/10.7320/FlMedit22.169>
- Mucina L, Bültmann H, Dierßen K, Theurillat JP, Raus T, Čarni A, et al. (2016) Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. *Applied Vegetation Science* 19 (Suppl. 1): 3–264. <https://www.doi.org/10.1111/avsc.12257>
- Portale della Flora d'Italia (2020) Available at <http://dryades.units.it/flor-italy> [accessed on 2021, May 25]
- Riviaccio G, Bagella S, Bazan G, Bonini F, Caria MC, Dagnino D, Mariotti M, Turcato C, Gianguzzi L (2020) New national and regional Annex I Habitat records: from #16 to #20. *Plant Sociology* 57(2): 133–144. <https://doi.org/10.3897/pls2020572/05>
- Stieler K (1880) Italy from the Alps to Mount Etna. D. Appleton & Company.
- Troia A, Bazan G, Schicchi R (2012) Micromorphological approach to the systematics of Mediterranean *Isoetes* species (*Isoëtaceae*, *Lycopodiophyta*): analysis of the megaspore surface. *Grana* 51(1): 35–43. <https://doi.org/10.1080/00173134.2011.637131>
- Venanzoni R, Gigante D (1999) Contributo allo studio dei pascoli sommitali del Monte Tezio (Perugia, Italia). *Fitosociologia* 36(1): 157–174.