



New national and regional Annex I Habitat records: from #37 to #44

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Abstract

In this contribution, Italian new data concerning the distribution of the Annex I Habitats 3150, 3170*, 3260, 4090, 91L0, 91M0, 9340 are reported. In detail, 20 new occurrences in Natura 2000 sites are presented and 30 new cells are added in the EEA 10 km × 10 km reference grid. The new data refer to the Italian administrative regions of Campania, Lazio, Sardinia, Sicily, Tuscany, and Umbria.

Keywords

3150, 3170*, 3260, 4090, 91L0, 91M0, 9340, conservation, vegetation, 92/43/EEC Directive

Introduction

This is the seventh standardized contribution reporting records of new occurrences of Annex I Habitats in Europe. Based on 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 will be archived in the national database “VegItaly”, managed by the Italian Society of Vegetation Science (Gigante et al. 2012; Landucci et al. 2012). The parameter such as range (surface area) is one of the criteria used to assess habitat conservation status. In this perspective, implementing the

knowledge of habitat occurrence with new habitat records might be beneficial to evaluate their conservation status more accurately.

Habitat 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. A synthetic overview of the newly recorded occurrences is provided in Table 1. The maps have been created by using the open source QGIS Geographic Information System (QGIS.org 2020).

Table 1. Synthetic overview of the newly reported data (CONT = Continental, MED = Mediterranean).

Hab ID	Hab name	Cell ID	Country	BR	N2000 Site	Authors
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation	10kmE455N224	Italy	CONT	IT5210014	Bonini F., Ferri V.
3170*	Mediterranean Temporary Ponds	10kmE421N186	Italy	MED	-	Rivieccio G., Bagella S., Caria MC.
3170*	Mediterranean Temporary Ponds	10kmE479N157, 10kmE476N158, 10kmE457N162, 10kmE468N164, 10kmE475N157, 10kmE468N165, 10kmE467N165, 10kmE479N168, 10kmE476N167, 10kmE470N157, 10kmE476N154, 10kmE472N163; 10kmE463N162; 10kmE462N162; 10kmE462N163, 10kmE459N162, 10kmE459N166	Italy	MED	ITA030010, ITA030005, ITA020016, ITA050012, ITA020020, ITA020004, ITA020028, ITA060003	Tavilla G., Cambria S., Sciandrello S., Minissale P., Giusso del Galdo G.
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	10kmE441N225	Italy	MED	-	Fiaschi T., Fanfarillo E., Angiolini C.
4090	Endemic oro-Mediterranean heaths with gorse	10kmE475N172, 10kmE474N173, 10kmE468N166, 10kmE467N166, 10kmE461N168, 10kmE450N152	Italy	MED	ITA030030, ITA030029, ITA020017, ITA020050, ITA020003, ITA020006, ITA010020, ITA010030	Gianguzzi L., Ilardi V., Bazan G.
91L0	Illyrian oak-hornbeam forests (<i>Erythronio-Carpinion</i>)	10kmE459N207	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
91M0	Pannonian-Balkan turkey oak-sessile oak forests	10kmE459N206	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
9340	<i>Quercus ilex</i> and <i>Quercus rotundifolia</i> forests	10kmE468N197, 10kmE469N198	Italy	MED	IT8030021, IT8030036, IT8030037	Stinca A., Mei G., Esposito A.

#37. Annex I Habitat: 3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation (Bonini F, Ferri V)

EUNIS Classification system: C1.3 - Permanent eutrophic lakes, ponds and pools

Biogeographical Region: Continental

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

Phytosociological reference: *Potametum natantis* Hild 1959, *Nymphaeion albae* Oberd. 1957, *Potamogetonetalia* Koch 1926, *Potamogetonetea* Klika in Klika et Novák 1941 (Mucina et al. 2016).

Geographic information: Italy, Umbria, Perugia, Gualdo Tadino, Valsorda, 1008 m a.s.l., Coordinates: 43.259999 N, 12.815047 E (Tab. 2, Rel. 1); 1007 m a.s.l., Coordinates: 43.260040 N, 12.815042 E (Tab. 2, Rel. 2); 1007 m a.s.l., Coordinates: 43.260049 N, 12.815021 E (Tab. 2, Rel. 3).

Cells ID in the EEA reference grid: 10kmE455N224 (Fig. 1).

Natura 2000 Site Code: SAC IT5210014 “Monti Maggio - Nero (sommità)”.

Phytosociological table: Tab. 2; vascular taxa nomenclature according to “Portale della Flora d’Italia” (2021); algal taxa identification and nomenclature according to Bellingier and Sigeo (2010).

Notes: The *Potamogeton natans*-dominated vegetation reported here refers to a little karst lake (Fig. 2) located in the SAC IT5210014 “Monti Maggio - Nero (sommità)”. Relevés show an evident and characteristic floristic pooriness. Algal taxa at the genus level have been included in the survey too.

Nowadays the lake covers an area of about 310 m², surrounded by an outer belt with *Eleocharis palustris* vegetation about 5 m wide. Diachronic satellite images observed through the Google Earth software (2022) show a progressive reduction of the lake surface over the last 20 years.

The finding occurred during the activities of the Life Integrated project LIFE19 IPE/IT/000015 “LIFE IMAGINE Umbria - Integrated Management and Grant Investments for the N2000 Network in Umbria”.



Figure 1. Distribution in Italy of the Habitat 3150: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019).

Table 2. Habitat 3150.

Relevé number	1	2	3	
Cell ID	10kmE455N224	10kmE455N224	10kmE455N224	
Latitude	43.259999	43.260040	43.260049	
Longitude	12.815047	12.815042	12.815021	
Date	5/23/2022	5/23/2022	5/23/2022	
Area (m ²)	1	1	1	
Altitude (m a.s.l.)	1008	1007	1007	
Aspect (°)	-	-	-	
Slope (°)	0	0	0	
Water column height (cm)	40	31	34	
Emergent herb layer Cover (%)	80	90	60	Presences
Submerged layer Cover (%)	30	10	10	
Total Cover (%)	100	100	70	
<i>Potametum natantis</i> , <i>Nymphaeion albae</i> , <i>Potamogetonetalia</i> , <i>Potamogetonetea</i> ^ <i>Potamogeton natans</i> L.				
Other species				
<i>Oedogonium</i> sp.	2	2	2	3
<i>Draparnaldia</i> sp.	1	.	r	2
<i>Spirogyra</i> sp.	+	.	+	2
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	.	.	1	1

^ Reference plant species of the Habitat 3150, from Biondi et al. (2009).

#38. Annex I Habitat: 3170* Mediterranean Temporary Ponds (Rivieccio G, Bagella S, Caria MC)

EUNIS Classification system: C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation

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: *Isoëtium* Br.-Bl. 1935, *Isoëtetalia* Br.-Bl. 1935, *Isoëto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (Mucina et al. 2016).

Geographic information: Italy, Sardinia, Oristano, Usellus, Altopiano S.Chiara, Paule Quaddu, 434 m a.s.l., Coordinates: 39.833047 N, 8.800797 E (Tab. 3, Rel. 1) and 435 m a.s.l., Coordinates: 39.833450 N, 8.801269 E (Tab. 3, Rel. 2).

Cell ID in the EEA reference grid: 10kmE421N186 (Fig. 3).

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



Figure 2. Aspect of the Habitat 3150 in the reported stand (Valsorda, Gualdo Tadino, Perugia, Italy).



Figure 3. Distribution in Italy of the Habitat 3170*: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Bazan et al. 2021; Gigante et al. 2019a).

Phytosociological table: Tab. 3; taxonomic nomenclature according to “Portale della Flora d’Italia” (2021).

Notes: Paule Quaddu is in a silvo-pastoral area, and its conservation depends on traditional land use (Bagella et al. 2016; Fois et al. 2021). The uncontrolled action of wild boars, particularly in the outer belt, could adversely affect typical habitat species mainly when associated with

ongoing climate change (Bagella and Caria 2013; Bolpagni et al. 2019; Caria et al. 2021). Because Paule Quaddu has great floristic richness and is home to many species of conservation concern, it should be monitored despite being, like many sites in habitat 3170*, outside the Natura 2000 network (Bagella et al. 2013).

Table 3. Habitat 3170* .

Relevé number	1	2	
Cell ID	10kmE421N186	10kmE421N186	
Latitude	39.833047	39.833450	
Longitude	8.800797	8.801269	
Date	5/28/2014	5/28/2014	
Area (m ²)	1	1	Presences
Altitude (m a.s.l.)	434	435	
Cover (%)	90	90	
Charact. and diff. of <i>Isoëtion</i>, <i>Isoëtetalia</i>, <i>Isoëto-Nanojuncetea</i>			
^ <i>Isoëtes histrix</i> Bory	3	2	2
^ <i>Agrostis pourretii</i> Willd.	2	1	2
^ <i>Cicendia filiformis</i> (L.) Delarbre	1	+	2
^ <i>Lythrum hyssopifolia</i> L.	+	+	2
^ <i>Juncus pygmaeus</i> Rich. ex Thuill.	1	2	2
^ <i>Juncus bufonius</i> L.	1	+	2
<i>Centaurium maritimum</i> (L.) Fritsch	+	.	1
<i>Solenopsis laurentia</i> (L.) C. Presl	+	.	1
<i>Briza minor</i> L.	.	r	1
<i>Eryngium pusillum</i> L.	+	.	1
Other species			
<i>Bellis annua</i> L.	+	+	2
<i>Bromus hordeaceus</i> L.	1	+	2
<i>Chamaemelum fuscatum</i> (Brot.) Vasc.	1	1	2
<i>Cynosurus polybracteatus</i> Poir.	1	+	2
<i>Eudianthe laeta</i> (Aiton) Fenzl	1	+	2
<i>Hordeum geniculatum</i> All.	+	+	2
<i>Linum usitatissimum</i> L. subsp. <i>angustifolium</i> (Huds.) Thell.	+	+	2
<i>Lotus parviflorus</i> Desf.	+	+	2
<i>Lysimachia foemina</i> (Mill.) U. Manns & Anderb.	+	+	2
<i>Trifolium subterraneum</i> L.	1	+	2
<i>Anacamptis longicornu</i> (Poir.) R.M. Bateman, Pridgeon & M.W. Chase	r	.	1
<i>Asphodelus ramosus</i> L.	+	.	1
<i>Ballardia viscosa</i> (L.) Fisch. & C.A. Mey.	.	+	1
<i>Carex divisa</i> Huds.	.	+	1
<i>Carex flacca</i> Schreb.	+	.	1
<i>Filago germanica</i> (L.) Huds.	.	+	1
<i>Macrobriza maxima</i> (L.) Tzvelev	+	.	1
<i>Oenanthe pimpinelloides</i> L.	.	+	1
<i>Plantago lanceolata</i> L.	+	.	1
<i>Trifolium campestre</i> Schreb.	.	+	1
^ Reference plant species of the Habitat 3170*, from Biondi et al. (2009).			

#39. Annex I Habitat: 3170* Mediterranean Temporary Ponds (Tavilla G, Cambria S, Sciandrello S, Minissale P, Giusso del Galdo G)

EUNIS Classification system: C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation

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: Relevés and tables mentioned in this paragraph refer to Brullo and Marcenò (1974), and Brullo et al. (2022): *Isoëtetum durieui* Br.-Bl. 1936 (Tab. A2), *Lythro hyssopifoliae-Elatinatum macropodae* Brullo, Sciandrello, Tavilla & Minissale 2022 (Tab. A6); *Buillardio vaillantii-Elatinatum campylospermae* Brullo, Sciandrello, Minissale, Cambria, Iardi & Giusso 2022 (Tab. A7), *Isoëtion* Br.-Bl. 1936; *Isoëto velatae-Crasuletum vaillantii* Poiron & Barbero 1965 (Tab. A9), *Ranunculo laterifloro-Antinorietum insularis* Brullo, Grillo

& Terrasi 1976 (Tab. A10), *Myosuro minimi-Ranunculetum lateriflori* Raimondo 1980 (Tab. A11), *Ranunculo lateriflori-Callitrichetum brutiae* Brullo & Minissale 1998 (Tab. A13), *Callitricho brutiae-Crassuletum vaillantii* Brullo, Scelsi, Siracusa & Tomaselli 1998 (Tab. A14), *Preslion cervinae* Br.-Bl. ex Moor 1937; *Isoëtetalia* Br.-Bl. 1936; *Plantagini intermediae-Cyperetum fusci* Sciandrello, D’Agostino & Minissale 2013 (Tab. A24), *Nanocyperion flavescens* Koch 1926; *Heliotropio supini-Heleochloetum schoenoidis* Rivas Goday 1956 (Tab. A26), *Glino lotoidis-Verbenetum supinae* Rivas Goday 1964 (Tab. A27), *Coronopo squamati-Corrigioletum litoralis* Brullo & C. Brullo 2022 (Tab. A30), *Verbenion supinae* Slavnic 1951, *Nanocyperetalia* Klika 1935, *Isoëto-Nanojuncetea* Br.-Bl. & R. Tx. ex Westhoff, Dijk & Passchier 1946 (Brullo et al. 2022). **Geographic information:** Italy, Sicily, Fiumedinisi (Me), Gole Santissima, 679 m a.s.l., Coordinates: 38.070343 N, 15.380235 E [Tab. A24 (Rels 18 to 29) in Brullo et al. (2022)]; Italy, Sicily, Fiumedinisi (Me), Torrente Vacco, 500 m a.s.l., Coordinates: 38.057154 N, 15.354371 E [Tab. A24 (Rels 9 to 17) in Brullo et al. (2022)]; Italy, Sicily, Ar-

gimusco (Bosco di Malabotta), Coordinates: unknown [Tab. A30 in Brullo et al. (2022)]; Italy, Sicily, Bosco Pisano (Buccheri), Coordinates: unknown [Tab. A14 in Brullo et al. (2022)]; Italy, Sicily, Hyblean plateau, Monte Lauro, Coordinates: unknown [Tab. A10 and Tab. A13 in Brullo et al. (2022)], Italy, Sicily, Carlentini, Cozzo Fico, 364 m a.s.l., Coordinates: 37.235751 N, 15.002701 E [Tab. A9 (Rels 6 to 8) in Brullo et al. (2022)]; Italy, Sicily, Madonie massif, Coordinates: unknown [Tab. A11 in Brullo et al. (2022)], Italy, Sicily, Castelvetrano, Castello della Pietra, 135 m a.s.l., Coordinates: 37.666873 N, 12.892273 E [Tab. A7 (Rels 9 to 11) in Brullo et al. (2022)], Italy, Sicily, Syracuse, Coordinates: unknown [Tab. A6 (Rels 10 to 20) in Brullo et al. (2022)], Italy, Sicily, Petralia Soprana, Pollicino Margio, 1270 m a.s.l., Coordinates: 37.823477 N, 14.127076 E [Tab. A2 (Rels 1 to 2) in Brullo et al. (2022)], Italy, Sicily, Caltanissetta, Lago Disueri, 160 m a.s.l., Coordinates: 37.192295 N, 14.295359 E [Tab. A27 (Rels 28 to 34) in Brullo et al. (2022)]; Italy, Sicily, Castronovo di Sicilia, Lago Fanaco, 690 m a.s.l., Coordinates: 37.661405 N, 13.554113 E [Tab. A26 (Rels 5 to 7) in Brullo et al. (2022)]; Italy, Sicily, Castronovo di Sicilia, Lago Pian del Leone, 836 m a.s.l., Coordinates: 37.667570 N, 13.475648 E [Tab. A26 (Rel. 14) in Brullo et al. (2022)]; Italy, Sicily, Palermo, Lago Prizzi, 655 m a.s.l., Coordinates: 37.730444 N, 13.405263 E [Tab. A26 (Rels 11 to 13) in Brullo et al. (2022)]; Italy, Sicily, Regalbuto, Lago Pozzillo, 370 m a.s.l., Coordinates: 37.652906 N, 14.594773 E, 37.652906 N [Tab. A26 (Rel. 2) in Brullo et al. (2022)]; Italy, Sicily, Agrigento, Lago Arancio, 180 m a.s.l., Coordinates: 37.633536 N, 13.067903 E, 37.633536 N [Tab. A27 (Rels 1 to 9) in Brullo et al. (2022)]; Italy, Sicily, Palermo, Lago Poma, 190 m a.s.l., Coordinates: 37.985357 N, 13.101472 E, 37.985357 N [Tab. 1 (Rel. 24) in Brullo and Marcenò (1974)]; Italy, Sicily, Rosolini, Cava Grande, 240 m a.s.l., Coordinates: 36.838528 N, 14.901330 E, 36.838528 N [Tab. A6 (Rels 21 to 25) in Brullo et al. (2022)].

Cell ID in the EEA reference grid: 10kmE479N157 [Tab. A6 (Rels 10 to 20) in Brullo et al. (2022)], 10kmE476N158 [Tab. A9 (Rels 6 to 8) in Brullo et al. (2022)], 10kmE457N162 [Tab. A7 (Rels 9 to 11) in Brullo et al. (2022)], 10kmE468N164 [Tab. A2 (Rels 1 to 2) in Brullo et al. (2022)], 10kmE475N157 [Tab. A10, A134 and A14 in Brullo et al. (2022) in Brullo et al. (2022)], 10kmE468N165 [Tab. A11 (Rels 3 to 7) in Brullo et al. (2022)], 10kmE467N165 [Tab. A11 (Rels 1 to 2 and Rel. 8) in Brullo et al. (2022)], 10kmE479N168 [Tab. A24 (Rels 9 to 29) in Brullo et al. (2022)], 10kmE476N167 [Tab. A30 (Rels 1 to 5) in Brullo et al. (2022)], 10kmE470N157 [Tab. A27 (Rels 28 to 34) in Brullo et al. (2022)], 10kmE476N154 [Tab. A6 (Rels 21 to 25) in Brullo et al. (2022)], 10kmE472N163 [Tab. A26 (Rel. 2) in Brullo et al. (2022)]; 10kmE463N162 [Tab. A26 (Rels 5 to 7) in Brullo et al. (2022)]; 10kmE462N162 [Tab. A26 (Rel. 14) in Brullo et al. (2022)]; 10kmE462N163 [Tab. A26 (Rels 11 to 13) in Brullo et al. (2022)], 10kmE459N162 [Tab. A27 (Rels 1 to 9) in Brullo et al. (2022)], 10kmE459N166 [Tab. 1 (Rel. 24) in Brullo and Marcenò (1974)] (Fig. 3).

Nature 2000 Site Code: Relevés and tables mentioned in this paragraph refer to Brullo et al. (2022): SAC ITA030010 “Fiume Fiumedinisi, Monte Suderi” (Tab. A24, Rels 9 to 29); SAC ITA030005 “Bosco di Malabotta” (Tab. A30); SAC ITA020016 “Monte Quacella, Monte dei Cervi, Pizzo Carbonara, Monte Ferro, Pizzo Otiero” (Tab. A11, Rels 1 to 2); SPA ITA050012 “Torre Manfria, Biviere e Pianda di Gela” (Tab. A27, Rels 28 to 34); SAC ITA020020 “Querceti sempreverdi di Geraci Siculo e Castelbuono” (Tab. A11, Rels 3 to 7); SAC ITA020004 “Monte S. Salvatore, Monte Catarineci, Vallone Mandarinini, ambienti umidi” (Tab. A11, Rel. 8); SAC ITA020028 “Serra del Leone e Monte Stagnataro” (Tab. A26, Rels 5 to 7); SAC ITA060003 “Lago di Pozzillo” (Tab. A26, Rel. 2).

Phytosociological table: Tabs A2, A6, A7, A9, A10, A11, A13, A14, A24, A26, A27, A30 in Brullo et al. (2022) and Tab. 1 in Brullo and Marcenò (1974); taxonomic nomenclature according to Bartolucci et al. (2018).

Notes: This habitat, characterized by plant communities belonging to class, occurs from the coastal belt to the high mountains of the northern ranges (up to 1600 m a.s.l.) in Sicily. These findings are in accordance with the syntaxonomical revision carried out by Brullo et al. (2022).

#40. Annex I Habitat: 3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation (Fiaschi T, Fanfarillo E, Angiolini C)

EUNIS Classification system: C2.3 Permanent non-tidal, smooth-flowing watercourses.

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: *Batrachion fluitantis* Neuhäusl 1959, *Potametalia pectinati* Koch 1926, *Potamogetonetea* Klika in Klika et Novák 1941 (Lastrucci et al. 2010; Mereu et al. 2010; Mucina et al. 2016).

Geographic information: Italy, Tuscany, Siena, Colle di Val d'Elsa, 120 m a.s.l., Coordinates: 43.420509 N, 11.132562 E (Tab. 4, Rel. 1); 119 m a.s.l., Coordinates: 43.420773 N, 11.132174 E (Tab. 4, Rel. 2); 118 m a.s.l., Coordinates: 43.422548 N, 11.130689 E (Tab. 4, Rel. 3); 118 m a.s.l., Coordinates: 43.423415 N, 11.129922 E (Tab. 4, Rel. 4).

Cell ID in the EEA reference grid: 10kmE441N225 (Fig. 4). **Nature 2000 Site Code:** currently not included in any Natura 2000 Site.

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

Notes: The habitat has been identified in the early-middle stretch of the Elsa River, running through the town of Colle di Val d'Elsa. It is located within the ANPIL (natural areas of local interest) "Parco Fluviale dell'Alta Val d'Elsa" and not far from the SAC IT5190003 "Montagnola



Figure 4. Distribution in Italy of the Habitat 3260: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cells later reported (Rivieccio et al. 2020, 2021).

Table 4. Habitat 3260.

Relevé number	1	2	3	4	
Cell ID	10kmE441N225	10kmE441N225	10kmE441N225	10kmE441N225	
Latitude	43.420509	43.420773	43.422548	43.423415	
Longitude	11.132562	11.132174	11.130689	11.129922	
Date	6/20/2021	6/20/2021	6/20/2021	6/20/2021	
Area (m ²)	1	1	1	1	
Altitude (m a.s.l.)	120	119	118	118	
Cover (%)	80	95	70	70	Presences
Aspect (°)	-	-	-	-	
Slope (°)	0	0	0	0	
Charact. and diff. of <i>Batrachion fluitantis</i>, <i>Callitricho hamulatae</i>-<i>Ranunculetalia aquatilis</i> and <i>Potamogetonetea</i>					
^ <i>Potamogeton natans</i> L.					
^ <i>Myriophyllum spicatum</i> L.					
^ <i>Potamogeton nodosus</i> Poir.					
Other species					
<i>Schoenoplectus lacustris</i> (L.) Palla					
<i>Agrostis stolonifera</i> L. subsp. <i>stolonifera</i>					
<i>Mentha aquatica</i> L. subsp. <i>aquatica</i>					
<i>Alisma plantago-aquatica</i> L.					
^ <i>Helosciadium nodiflorum</i> (L.) W.D.J.Koch subsp. <i>nodiflorum</i>					
^ <i>Veronica anagallis-aquatica</i> L. subsp. <i>anagallis-aquatica</i>					
	4	5	.	3	3
	1	.	2	.	2
	.	.	4	.	1
	1	2	.	.	2
	.	.	.	1	1
	.	.	.	2	1
	.	.	.	1	1
	.	+	.	.	1
	.	.	+	.	1

^ Reference plant species of the Habitat 3260, from Biondi et al. (2009).

Senese". The presence of this habitat was already known for some nearby cells and in other parts of the Elsa River itself. These data allow to increase the knowledge on distribution of Habitat 3260 in central Tuscany, which was recently detected in nearby areas (Rivieccio et al. 2021). It must be noted that the Habitat 3260 shares a lot of species with the Habitat 3150 ("Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation" – Biondi et al. 2009), and that in many cases the attribution to one habitat or the other has to be based on the physical conditions of the sites (running vs still waters).

#41. Annex I Habitat: 4090 Endemic oro-Mediterranean heaths with gorse (Gianguzzi L, Ilardi V, Bazan G)

EUNIS Classification system: S74 (formerly: F7.4) Central Mediterranean Mountain hedgehog-heath (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: *Genistetum tyrrhenae* (Brullo, Di Martino & Marcenò 1977) Brullo in Brullo & Furnari 1994 [Tab. S2 in Gianguzzi et al. (2015)]; *Calicotomo villosae-Genistenion tyrrhenae* Gianguzzi, Cusimano, Ilardi & Romano 2015; *Calicotomo villosae-Genistion tyrrhenae* Biondi 1997; *Cisto salvifolii-Genistetum madoniensis* Marino, Guarino & Bazan 2012 [Tab. S3 in Gianguzzi et al. (2015)]; *Genisto aristatae-Calicotomenion infestae* Gianguzzi, Cusimano, Ilardi & Romano 2015; *Lavanduleta lia stoehadis* Br.-Bl. in Br.-Bl., Molinier & Wagner 1940 em. Rivas-Martínez 1968; *Cisto-Lavanduletea* Br.-Bl. in Br.-Bl., Molinier & Wagner 1940. *Genistetum gasparrinii* Gianguzzi, Cusimano, Ilardi & Romano 2015 [Tab. S6 in Gianguzzi et al. (2015)]; *Genisto aspalathoidis-Rosmarinetum officinalis* Gianguzzi 1999 [Tab. 7 in Gianguzzi (1999)]; *Cisto eriocephali-Ericion multiflorae* Biondi 1997; *Rosmarinetalia officinalis* Br.-Bl. ex Molinier 1934; *Rosmarinetea officinalis* Rivas-Martínez, Fernandez-González, Loidi, Lousã & Penas 2001 (Gianguzzi et al. 2015).

Geographic information: Relevés and tables mentioned in this paragraph refer to Gianguzzi et al. (2015) and for Pantelleria Island to Gianguzzi (1999): Italy, Sicily, Lipari Island (Aeolian Archipelago) (Fig. 5), C.da Quattropiani, between 180 and 319 m a.s.l., Coordinates: 38.512899 N, 14.914244 E (Tab. S2, Rel. 1); 38.513378 N, 14.914181 E (Tab. S2, Rel. 2); 38.514858 N, 14.914774 E (Tab. S2, Rel. 3); 38.517116 N, 14.915913 E (Tab. S2, Rel. 4); Italy, Sicily, Salina Island (Aeolian Archipelago), 90 m a.s.l., Santa Marina Salina, 38.568655 N, 14.869475 E (Tab. S2, Rel. 5); Italy, Sicily, Pollina, between 530 and 560 m a.s.l.,

Coordinates: 37.993555 N, 14.151966 E (Tab. S3, Rel. 1); 37.993666 N, 14.151249 E (Tab. S3, Rel. 2); 37.993622 N, 14.150214 E (Tab. S3, Rel. 6); Italy, Sicily, Collesano (Fig. 6), Case Pedale, between 570 and 590 m a.s.l., Coordinates: 37.939561 N, 13.947916 E (Tab. S3, Rel. 3); 37.938414 N, 13.945270 E (Tab. S3, Rel. 4); 37.938850 N, 13.944209 E (Tab. S3, Res. 5); Italy, Sicily, Cefalù, Bivio Sellitta, between 590 and 610 m a.s.l., Coordinates: 37.979154 N, 13.975927 E (Tab. S3, Rel. 7); 37.978902 N, 13.977135 E (Tab. S3, Rel. 8); 37.978974 N, 13.977439 E (Tab. S3, Rel. 9); Italy, Sicily, S. Mauro Castelverde, between 720 and 790 m a.s.l., Coordinates: 37.934358 N, 14.158271 E (Tab. S3, Rel. 10); 37.935162 N, 14.158668 E (Tab. S3, Rel. 11); 37.935522 N, 14.158818 E (Tab. S3, Rel. 12); 37.934103 N, 14.157938 E (Tab. S3, Rel. 13); 37.933881 N, 14.157778 E (Tab. S3, Rel. 14); Italy, Sicily, Palermo, Mt. Gallo, Pizzo Vuturo between 100 and 500 m a.s.l., Coordinates: 36.736045 N, 12.004186 E (Tab. S6, Rel. 1); 36.736366 N, 12.025052 E (Tab. S6, Rel. 2); 36.736623 N, 12.025380 E (Tab. S6, Rel. 3); 36.737031 N, 12.025665 E (Tab. S6, Rel. 4); 36.739889 N, 12.017726 E (Tab. S6, Rel. 5); 36.740353 N, 12.019139 E (Tab. S6, Rel. 6); 36.740981 N, 12.020209 E (Tab. S6, Rel. 7); 36.741543 N, 12.022514 E (Tab. S6, Rel. 8); 36.747172 N, 12.026668 E (Tab. S6, Rel. 12); Italy, Sicily, Palermo, Mt. Gallo, Pizzo Vuturo between 60 and 70 m a.s.l., 36.741812 N, 12.023235 E (Tab. S6, Rel. 9); 36.742043 N, 12.024112 E (Tab. S6, Rel. 10); Italy, Sicily, Palermo, Mt. Gallo (Fig. 7), Pizzo Sella 350 m a.s.l., 36.746551 N, 12.027147 E (Tab. S6, Rel. 11); Italy, Sicily, Pantelleria Island (Fig. 8), Dietro Isola, 36.736045



Figure 5. *Genistetum tyrrhenae* (Lipari Island).

N, 12,004186 E (Tab. 7, Rel. 1); Italy, Sicily, Pantelleria Island, Punta Zineddi, 36.736366 N, 12.025052 E (Tab. 7, Rel. 2); Italy, Sicily, Pantelleria Island, Punta del Banco, 36.736623 N, 12.025380 E (Tab. 7, Rel. 3); 36.737031 N, 12.025665 E (Tab. 7, Rel. 4); 36.739889 N, 12.017726 E (Tab. 7, Rel. 5); 36.740353 N, 12.019139 E (Tab. 7, Rel. 6);

36.740981 N, 12.020209 E (Tab. 7, Rel. 7); 36.741543 N, 12.022514 E (Tab. 7, Rel. 8); 36.741812 N, 12.023235 E (Tab. 7, Rel. 9); 36.742043 N, 12.024112 E (Tab. 7, Rel. 10); Italy, Sicily, Pantelleria Island, Cuddia Attalora, 36.746551 N, 12.027147 E (Tab. 7, Rel. 11); 36.747172 N, 12.026668 E (Tab. 7, Rel. 12).



Figure 6. Aspect of the *Genista madoniensis* vegetation (Collesano, Bosco Pedale).

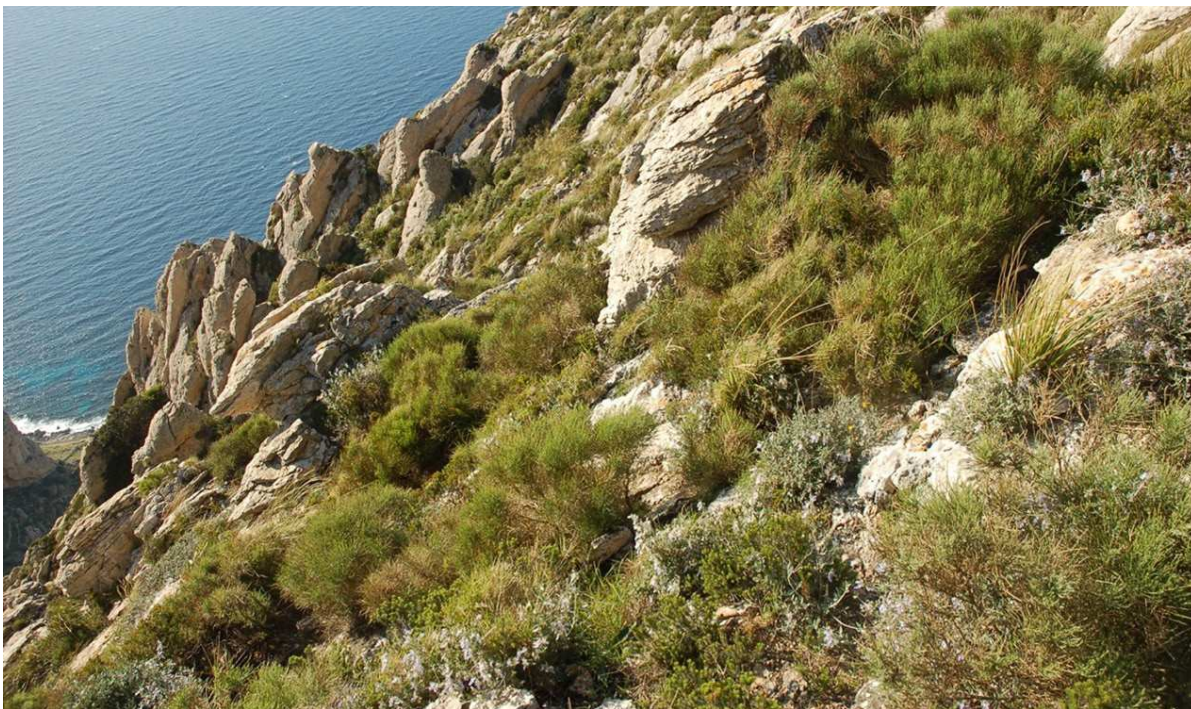


Figure 7. Garrigue with *Genista gasparrini* (M. Gallo, Palermo).

Cell ID in the EEA reference grid: 10kmE475N172 [Tab. S2, Rels 1 to 4 in Gianguzzi et al. (2015)]; 10kmE474N173 [Tab. S2, Rel. 5 in Gianguzzi et al. (2015)]; 10kmE468N166 [Tab. S3, Rels 1 and 2, Rel. 6, Rels 10 to 14 in Gianguzzi et al. (2015)]; 10kmE467N166 [Tab. S3, Rels 3 to 9 in Gianguzzi et al. (2015)]; 10kmE461N168 [Tab. S6, Rels 1 to

12 in Gianguzzi et al. (2015)]; 10kmE450N152 [Tab. 7, Rels 1 to 12 in Gianguzzi (1999)] (Fig. 9).

Natura 2000 Site Code: SAC ITA030030 “Isola di Lipari” [Tab. S2, Rels 1 to 4 in Gianguzzi et al. (2015)]; SAC ITA030029 “Isola di Salina (Stagno di Lingua)” [Tab. S2, Rel. 5 in Gianguzzi et al. (2015)]; SAC ITA020017



Figure 8. Habitat with *Genista aspalathoides* (Pantelleria Island).



Figure 9. Distribution in Italy of the Habitat 4090: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013–2018; Eionet 2019), in white (black outline) the cell later reported (Gigante et al. 2019a).

“Complesso Pizzo Dipilo e Querceti su calcare” and SPA ITA020050 “Parco delle Madonie” [Tab. S3, Rels 3 to 5 in Gianguzzi et al. (2015)]; SAC ITA020003 “Boschi di San Mauro Castelverde” [Tab. S3, Rels 10 to 14 in Gianguzzi et al. (2015)]; SAC ITA020006 “Capo Gallo” [Tab. S6, Rels 1 to 12 in Gianguzzi et al. (2015)]; SAC ITA010020 “Isola di Pantelleria - Area Costiera, Falesie e Bagno dell'Acqua” [Tab. 7, Rel. 1 and Rels 5 to 12 in Gianguzzi (1999)]; SPA ITA010030 “Isola di Pantelleria e area marina circostante” [Tab. 7, Rels 1 to 12 in Gianguzzi (1999)].

Notes: The garrigues with *Genista* sp. pl. of the *Cisto-Lavanduletea* and *Rosmarinetea officinalis* classes of the southern territories of the Italian-Tyrrhenian Province, have been reviewed in a recent phytosociological contribution (Gianguzzi et al. 2015). The study led to the syntaxonomic characterization of several coenoses and to the redefinition of some new other sintaxa. In Sicily these garrigues are dominated by the following endemic and subendemic taxa: *Genista tyrrhena* subsp. *tyrrhena* (Aeolian Archipelago), *G. gasparrini* (Mount Gallo at Palermo), *G. madoniensis* (Madonie Mts.), *G. aristata* (Madonie and Nebrodi Mts.), *G. cupanii* (Madonie Mts.), *G. demarcoi* (Pizzo di Pilo at Isnello), *G. aristata* (Madonie Mts, Nebrodi Mts. and southern Calabria) and *G. aspalathoides* (Pantelleria Island and coasts of Tunisia and Algeria). In particular, the *Genista* sp. pl. garrigues of Sicily have been attributed to seven associations and two subassociations, referring to three distinct suballiances of the aforementioned vegetation classes *Cisto-Lavanduletea* (acidophilous communities on volcanic substrata and quartzarenites) and *Rosmarinetea officinalis* (basiphilous communities on calcareous and calcareous-dolomite substrates).

The *Genista* sp. pl. communities have a secondary origin due to grazing activities and fire and despite the long-term exploitation they maintain a high biodiversity level and represent elements of a sustainable use of traditional and historical agricultural landscapes (Marino et al. 2012; Bazan et al. 2020a, 2020b; Castrorao Barba et al. 2021). The high conservation interest of these communities with regards to the peculiarity of their floristic composition, with the presence of rare or endemic species, made them worthy of inclusion in the habitat 4090. This led to a subsequent update of the distribution of the habitat 4090 in Sicily, in the same way as other formations reported for the western part of Sicily and the small islands (e.g., De Castro et al. 2008, 2015; Gianguzzi and Bazan 2020; Gianguzzi and La Mantia 2009; Gianguzzi et al. 2013, 2014a, 2014b, 2015, 2016, 2017, etc.).

#42. Annex I Habitat: 91LO Illyrian oak-hornbeam forests (*Erythronio-Carpinion*) (Fanfarillo E, Fiaschi T, Angiolini C)

EUNIS Classification system: included in T1E - *Carpinus* and *Quercus* mesic deciduous 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: *Carpino betuli-Coryletum avellanae* Ballelli, Biondi & Pedrotti 1982, *Pulmonario apenninae-Carpinion betuli* Biondi, Casavecchia, Pinzi, Allegrezza & Baldoni ex Biondi, Casavecchia, Pinzi, Allegrezza & Baldoni in Biondi, Allegrezza, Casavecchia, Galdenzi, Gigante & Pesaresi 2013, *Erythronio-Carpinion* (Horvat 1958) Marinček in Wallnöfer et al. 1993, *Fagetalia sylvaticae* Pawłowski 1928, *Carpino-Fagetalia sylvaticae* Jakucs ex Passarge 1968 (Ballelli et al. 1980; Biondi et al. 2014; Mucina et al. 2016).

Geographic information: Italy, Lazio, Frosinone, Fumone, 563 m a.s.l., Coordinates: 41.744147 N, 13.252099 E (Tab. 5, Rel. 1); 562 m a.s.l., Coordinates: 41.744062 N, 13.251308 E (Tab. 5, Rel. 2); Italy, Lazio, Frosinone, Alatri, 450 m a.s.l., Coordinates: 41.7342281 N, 13.299273 E (Tab. 5, Rel. 3); 493 m a.s.l., Coordinates: 41.758622 N, 13.342764 E (Tab. 5, Rel. 4); Italy, Lazio, Frosinone, Fumone, 586 m a.s.l., Coordinates: 41.743762 N, 13.253897 E (Tab. 5, Rel. 5); Italy, Lazio, Frosinone, Alatri, 446 m a.s.l., Coordinates: 41.735465 N, 13.302729 E (Tab. 5, Rel. 6).

Cell ID in the EEA reference grid: 10kmE459N207 (Fig. 10).
Nature 2000 Site Code: currently not included in any Natura 2000 Site.

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

Notes: In the area of the records, these woods are often fragments located in High Nature Value agricultural areas that are very rich in patches of other well-preserved natural vegetation types, like *Carpinion orientalis* Horvat 1958 forests (Fanfarillo et al. 2017a, 2017b). Relevés 1, 2, and 5 are included in the Canterno Lake Natural Reserve.

#43. Annex I Habitat: 91MO Pannonian-Balkan turkey oak-sessile oak forests (Fanfarillo E, Fiaschi T, Angiolini C)

EUNIS Classification system: T19512 - Southern Italic *Quercus frainetto* 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: *Mespilo germanicae-Quercetum frainetto* Biondi, Gigante, Pignattelli & Venanzoni 2001, *Ptilostemo stricti-Quercenion cerridis* Bonin & Gamsans 1977, *Crataego laevigatae-Quercenion cerridis* Arrigoni 1997, *Quercetalia pubescenti-petraeae* Klika 1933, *Quercetalia pubescentis* Doing-Kraft ex Scamoni et Passarge 1959 (Biondi et al. 2001; Biondi et al. 2014; Mucina et al. 2016).

Geographic information: Italy, Lazio, Frosinone, Alatri, 216 m a.s.l., Coordinates: 41.660184 N, 13.322857 E (Tab. 6, Rel. 1).



Figure 10. Distribution in Italy of the Habitat 91L0: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).

Table 5. Habitat 91L0.

Relevé number	1	2	3	4	5	6	
Cell ID	10km	10km	10km	10km	10km	10km	
Latitude	E459N207	E459N207	E459N207	E459N207	E459N207	E459N207	
Longitude	41.744147	41.744062	41.734281	41.758622	41.743762	41.735465	
Date	13.252099	13.251308	13.299273	13.342764	13.253897	13.302729	
Area (m ²)	8/11/2018	8/11/2018	7/29/2018	6/1/2017	4/14/2016	4/17/2022	
Altitude (m a.s.l.)	150	150	70	200	200	70	
Cover (%)	563	562	450	493	586	446	
Aspect (°)	95	95	90	90	90	90	
Slope (°)	340	335	-	0	45	-	
	15	10	0	30	30	0	Presences
Charact. and diff. taxa of <i>Carpino betuli-Coryletum avellanae</i>							
^ <i>Carpinus betulus</i> L.	5	5	5	3	5	1	6
^ <i>Corylus avellana</i> L.	+	.	1	2	+	4	5
^ <i>Asperula taurina</i> L. subsp. <i>taurina</i>	.	.	1	.	.	2	2
<i>Cardamine bulbifera</i> (L.) Crantz	.	.	.	.	.	1	1
^ <i>Corydalis cava</i> (L.) Schweigg. & Körte subsp. <i>cava</i>	.	.	.	.	.	2	1
^ <i>Galanthus nivalis</i> L.	.	.	.	.	.	1	1
Charact. and diff. taxa of <i>Pulmonario apenninae-Carpinion betuli, Erytronio-Carpinion, Fagetalia sylvaticae, and Carpino-Fagetia sylvaticae</i>							
^ <i>Acer campestre</i> L.	2	2	1	1	1	2	6
<i>Hedera helix</i> L. subsp. <i>helix</i>	2	3	1	1	2	1	6
<i>Rosa arvensis</i> Huds.	+	+	r	+	+	.	5
^ <i>Crataegus laevigata</i> (Poir.) DC.	+	+	+	.	1	.	4
^ <i>Lonicera caprifolium</i> L.	r	.	1	2	1	+	5
<i>Euonymus europaeus</i> L.	+	+	.	.	+	1	4
^ <i>Prunus avium</i> (L.) L.	+	r	.	r	1	.	4
<i>Viola reichenbachiana</i> Jord. ex Boreau	1	1	1	.	3	.	4
<i>Cyclamen hederifolium</i> Aiton subsp. <i>hederifolium</i>	1	1	.	+	.	.	3
<i>Daphne laureola</i> L.	+	.	.	r	+	.	3
^ <i>Euphorbia amygdaloides</i> L.	r	r	.	.	1	.	3
<i>Helleborus foetidus</i> L. subsp. <i>foetidus</i>	.	+	.	+	1	.	3
<i>Mercurialis perennis</i> L.	.	+	.	.	1	3	3
<i>Brachypodium sylvaticum</i> (Huds.) P.Beauv. subsp. <i>sylvaticum</i>	.	.	1	.	1	.	2
<i>Melica uniflora</i> Retz.	.	+	.	1	.	.	2
<i>Pulmonaria vallisarvae</i> A.Kern. subsp. <i>apennina</i> (Cristof. & Puppi)	.	.	1	.	.	1	2
L.Cecchi & Selvi	.	.	.	.	.	.	.
^ <i>Adoxa moschatellina</i> L. subsp. <i>moschatellina</i>	.	.	.	.	.	1	1
<i>Alliaria petiolata</i> (M.Bieb.) Cavara & Grande	.	.	.	.	1	.	1
<i>Allium pendulinum</i> Ten.	.	.	.	.	3	.	1
<i>Campanula trachelium</i> L. subsp. <i>trachelium</i>	.	.	.	1	.	.	1
<i>Doronicum columnae</i> Ten.	r	.	.	.	.	.	1

Relevé number	1	2	3	4	5	6	
Cell ID	10km	10km	10km	10km	10km	10km	
	E459N207	E459N207	E459N207	E459N207	E459N207	E459N207	
Latitude	41.744147	41.744062	41.734281	41.758622	41.743762	41.735465	
Longitude	13.252099	13.251308	13.299273	13.342764	13.253897	13.302729	
Date	8/11/2018	8/11/2018	7/29/2018	6/1/2017	4/14/2016	4/17/2022	
Area (m ²)	150	150	70	200	200	70	
Altitude (m a.s.l.)	563	562	450	493	586	446	
Cover (%)	95	95	90	90	90	90	
Aspect (°)	340	335	-	0	45	-	
Slope (°)	15	10	0	30	30	0	Presences
<i>Euonymus latifolius</i> (L.) Mill.	.	.	.	2	.	.	1
<i>Euphorbia dulcis</i> L.	.	.	.	r	.	.	1
<i>Ficaria verna</i> Huds.	.	.	.	.	.	1	1
<i>Lathyrus vernus</i> (L.) Bernh.	.	1	.	.	.	.	1
<i>Luzula forsteri</i> (Sm.) DC.	.	.	.	.	+	.	1
<i>Populus tremula</i> L.	.	.	.	+	.	.	1
<i>Ranunculus lanuginosus</i> L.	.	.	.	.	.	2	1
<i>Symphytum bulbosum</i> K.F.Schimp.	.	.	.	.	.	3	1
Other species							
<i>Ruscus aculeatus</i> L.	+	+	r	+	1	+	6
<i>Cornus sanguinea</i> L. subsp. <i>hungarica</i> (Kárpáti) Soó	+	r	2	1	+	.	5
<i>Quercus pubescens</i> Willd. subsp. <i>pubescens</i>	r	+	+	1	r	.	5
^ <i>Ligustrum vulgare</i> L.	.	+	1	+	+	.	4
^ <i>Acer opalus</i> Mill. subsp. <i>obtusatum</i> (Waldst. & Kit. ex Willd.)	r	.	.	1	1	.	3
Gams							
^ <i>Anemone apennina</i> L.	.	.	.	1	3	3	3
^ <i>Cornus mas</i> L.	+	+	+	.	.	.	3
^ <i>Crataegus monogyna</i> Jacq.	.	.	+	+	1	.	3
<i>Geum urbanum</i> L.	.	+	+	.	.	+	3
<i>Scutellaria columnae</i> All. subsp. <i>columnae</i>	2	1	+	.	.	.	3
<i>Viola alba</i> Besser subsp. <i>dehnhardtii</i> (Ten.) W.Becker	.	+	+	+	.	.	3
<i>Ajuga reptans</i> L.	+	.	.	.	1	.	2
<i>Chaerophyllum temulum</i> L.	1	.	.	+	.	.	2
<i>Clematis vitalba</i> L.	r	.	.	.	+	.	2
<i>Cyclamen repandum</i> Sm. subsp. <i>repandum</i>	.	.	.	.	2	+	2
^ <i>Fraxinus ornus</i> L. subsp. <i>ornus</i>	.	.	.	1	+	.	2
^ <i>Lathyrus venetus</i> (Mill.) Wohlf.	.	.	.	1	1	.	2
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	r	.	.	.	+	.	2
<i>Rubus ulmifolius</i> Schott	.	.	.	.	+	+	2
<i>Veronica hederifolia</i> L.	.	.	.	.	+	1	2
<i>Arisarum proboscideum</i> (L.) Savi	.	.	.	.	+	.	1
<i>Atropa bella-donna</i> L.	.	.	+	.	.	.	1
<i>Anisantha</i> sp.	.	.	.	.	.	+	1
<i>Digitalis micrantha</i> Roth ex Schweigg.	+	.	.	.	.	.	1
<i>Fragaria vesca</i> L. subsp. <i>vesca</i>	.	.	.	1	.	.	1
<i>Lamium maculatum</i> L.	.	.	.	.	.	1	1
<i>Lilium bulbiferum</i> L. subsp. <i>croceum</i> (Chaix) Jan	.	.	.	.	1	.	1
<i>Poa sylvicola</i> Guss.	.	.	.	.	.	2	1
<i>Robinia pseudoacacia</i> L.	.	.	.	.	.	1	1
<i>Rubus hirtus</i> Waldst. & Kit. group	+	.	.	.	.	.	1
<i>Sambucus nigra</i> L.	.	.	.	.	.	2	1
<i>Stellaria neglecta</i> Weihe subsp. <i>neglecta</i>	.	.	.	.	.	1	1
^ <i>Sorbus torminalis</i> (L.) Crantz	.	.	.	+	.	.	1
<i>Thalictrum aquilegifolium</i> L. subsp. <i>aquilegifolium</i>	.	.	.	.	.	+	1
<i>Urtica dioica</i> L.	.	.	.	.	.	1	1

^ Reference plant species of the Habitat 91L0, from Biondi et al. (2009).

Cell ID in the EEA reference grid: 10kmE459N206 (Fig. 11).

Nature 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 14 relevés of Table 1 in Copiz et al. (2006), attributed to *Mespilo germanicae-Quercetum frainetto quercetosum roboris*, fall into the same cell of our relevé and are classifiable as well in the habitat 91M0.

#44. Annex I Habitat: 9340 *Quercus ilex* and *Quercus rotundifolia* forests (Stinca A, Mei G, Esposito A)

EUNIS Classification system: G2.12 - *Quercus ilex* woodland.

Biogeographical Region: Mediterranean

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



Figure 11. Distribution in Italy of the Habitat 91M0: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).

Table 6. Habitat 91M0.

Relevé number	1
Cell ID	10kmE459N206
Latitude	41.660184
Longitude	13.322857
Date	4/16/2016
Area (m ²)	300
Altitude (m a.s.l.)	216
Cover (%)	90
Aspect (°)	180
Slope (°)	5
Charact. and diff. taxa of <i>Mespilo germanicae-Quercetum frainetto</i>	
^ <i>Quercus frainetto</i> Ten.	5
^ <i>Mespilus germanica</i> L.	1
<i>Ptilostemo stricti-Quercenion cerridis, Crataego laevigatae-Quercion cerridis, Quercetalia pubescenti-petraeae, Quercetea pubescentis</i>	
<i>Ruscus aculeatus</i> L.	3
^ <i>Aegonychon purpureoeruleum</i> (L.) Holub	2
<i>Crataegus laevigata</i> (Poir.) DC.	2
^ <i>Fraxinus ornus</i> L. subsp. <i>ornus</i>	2
<i>Crataegus monogyna</i> Jacq.	1
<i>Dioscorea communis</i> (L.) Caddick & Wilkin	1
^ <i>Quercus cerris</i> L.	1
<i>Arum italicum</i> Mill. subsp. <i>italicum</i>	+
<i>Brachypodium sylvaticum</i> (Huds.) P.Beauv. subsp. <i>sylvaticum</i>	+
^ <i>Luzula forsteri</i> (Sm.) DC.	+
<i>Quercus pubescens</i> Willd. subsp. <i>pubescens</i>	+
Other species	
<i>Hedera helix</i> L. subsp. <i>helix</i>	3
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	3
^ <i>Euonymus europaeus</i> L.	2
^ <i>Ligustrum vulgare</i> L.	2
<i>Lonicera caprifolium</i> L.	2
<i>Rosa sempervirens</i> L.	2
<i>Rubus ulmifolius</i> Schott	2
<i>Asparagus acutifolius</i> L.	1
<i>Prunus</i> sp.	1
<i>Cyclamen repandum</i> Sm. subsp. <i>repandum</i>	+
^ <i>Glechoma hirsuta</i> Waldst. & Kit.	+
<i>Laurus nobilis</i> L.	+
<i>Ligustrum lucidum</i> W.T.Aiton	+
^ <i>Vicia cassubica</i> L.	+

^ Reference plant species of the Habitat 91M0, from Biondi et al. (2009).

Phytosociological reference: *Fraxino orni-Quercenion ilicis* Bacchetta, Bagella, Biondi, Farris, Filigheddu & Mossa ex Bacchetta, Bagella, Biondi, Farris, Filigheddu & Mossa in Biondi et al. 2013; *Fraxino orni-Quercenion ilicis* Biondi, Casavecchia & Gigante ex Biondi, Casavecchia & Gigante In Biondi, Allegrezza, Casavecchia, Galdenzi, Gigante & Pesaresi 2013; *Quercetalia ilicis* Br.-Bl. ex Molinier 1934; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine & Nègre 1952 (Biondi and Blasi 2015).

Geographic information: Italy, Campania, Naples, Portici, Royal Park, 82 m a.s.l. Coordinates: 40.812577 N, 14.346724 E (Tab. 7, Rel. 1); Italy, Campania, Naples, Torre del Greco, loc. Camaldoli della Torre, 174 m a.s.l.

Coordinates: 40.781888 N, 14.405559 E (Tab. 7, Rel. 2); Italy, Campania, Naples, Ercolano, loc. Riserva Tirone, 555 m a.s.l. Coordinates: 40.817056 N, 14.401818 E (Tab. 7, Rel. 3); Italy, Campania, Naples, Ottaviano, between Ottaviano and Cognoli d'Ottaviano, 822 m a.s.l. Coordinates: 40.833439 N, 14.448057 E (Tab. 7, Rel. 4).

Cell ID in the EEA reference grid: 10kmE468N197 (Tab. 7, Rels 1 to 3); 10kmE469N198 (Tab. 7, Rel. 4) (Fig. 12).

Nature 2000 Site Code: SAC IT8030021 “Monte Somma”; SAC IT8030036 “Vesuvio”; SPA IT8030037 “Vesuvio e Monte Somma”.

Phytosociological table: Tab. 7; taxonomic nomenclature according to Bartolucci et al. (2018).



Figure 12. Distribution in Italy of the Habitat 9340: in black the new cells, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).

Table 7. Habitat 9340.

Relevé number	1	2	3	4	
Cell ID	10kmE468N197	10kmE469N197	10kmE469N197	10kmE469N198	
Latitude	40.812577	40.781888	40.817056	40.833439	
Longitude	14.346724	14.405559	14.401818	14.448057	
Date	5/19/2015	8/29/2007	9/8/2007	9/6/2007	
Area (m ²)	100	300	350	200	
Altitude (m a.s.l.)	82	174	555	822	
Aspect	SW	W	W	ESE	
Slope (°)	2	45	5	40	
Tree layer height (m)	20	7	18	7	
Shrub layer height (m)	1.5	3	2	2	
Herb layer height (m)	0.2	0.2	0.2	0.2	
Total cover (%)	90	100	90	90	
Tree layer cover (%)	75	90	75	85	
Shrub layer cover (%)	30	15	20	30	
Herb layer cover (%)	20	5	5	5	
Charact. and diff. taxa of <i>Fraxino orni-Quercenion ilicis</i>					
[^] <i>Drymochloa drymeja</i> (Mert. & W.D.J.Koch) Holub subsp. <i>exaltata</i> (C.Presl) Foggi & Signorini	2	+	.	.	2
[^] <i>Fraxinus ornus</i> L. subsp. <i>ornus</i>	2	2	.	.	2
<i>Dioscorea communis</i> (L.) Caddick & Wilkin	1	.	.	.	1
<i>Emerus major</i> Mill. subsp. <i>emeroides</i> (Boiss. & Spruner) Soldano & FConti	.	2	.	.	1

Relevé number	1	2	3	4	
Cell ID	10kmE468N197	10kmE469N197	10kmE469N197	10kmE469N198	
Latitude	40.812577	40.781888	40.817056	40.833439	
Longitude	14.346724	14.405559	14.401818	14.448057	
Date	5/19/2015	8/29/2007	9/8/2007	9/6/2007	
Area (m ²)	100	300	350	200	
Altitude (m a.s.l.)	82	174	555	822	
Aspect	SW	W	W	ESE	
Slope (°)	2	45	5	40	
Tree layer height (m)	20	7	18	7	
Shrub layer height (m)	1.5	3	2	2	
Herb layer height (m)	0.2	0.2	0.2	0.2	
Total cover (%)	90	100	90	90	
Tree layer cover (%)	75	90	75	85	
Shrub layer cover (%)	30	15	20	30	
Herb layer cover (%)	20	5	5	5	Presences
Charact. and diff. taxa of <i>Fraxino ornii-Quercion ilicis</i>, <i>Quercetalia ilicis</i>, <i>Quercetea ilicis</i>					
^ <i>Quercus ilex</i> L. subsp. <i>ilex</i>	5	5	5	5	4
<i>Asplenium onopteris</i> L.	1	+	1	+	4
^ <i>Rubia peregrina</i> L.	1	+	.	+	3
<i>Ruscus aculeatus</i> L.	2	1	.	.	2
^ <i>Smilax aspera</i> L.	+	+	.	.	2
<i>Asparagus acutifolius</i> L.	.	+	.	.	1
^ <i>Arbutus unedo</i> L.	.	+	.	.	1
^ <i>Phillyrea latifolia</i> L.	+	.	.	.	1
<i>Pinus pinaster</i> Aiton subsp. <i>pinaster</i>	.	.	1	.	1
^ <i>Viburnum tinus</i> L. subsp. <i>tinus</i>	+	.	.	.	1
^ <i>Laurus nobilis</i> L.	1	.	.	.	1
Other species					
<i>Hedera helix</i> L. subsp. <i>helix</i>	2	+	+	.	3
<i>Robinia pseudoacacia</i> L.	.	.	+	+	2
<i>Rubus ulmifolius</i> Schott	.	.	1	2	2
<i>Sorbus domestica</i> L.	.	+	+	.	2
<i>Castanea sativa</i> Mill.	.	.	.	+	1
<i>Catapodium rigidum</i> (L.) C.E.Hubb. subsp. <i>rigidum</i>	.	+	.	.	1
<i>Cephalanthera longifolia</i> (L.) Fritsch	.	.	+	.	1
<i>Clematis vitalba</i> L.	.	.	.	+	1
<i>Cytisus villosus</i> Pourr.	.	+	.	.	1
<i>Epilobium</i> sp.	.	.	.	+	1
<i>Geum urbanum</i> L.	.	.	.	+	1
<i>Hieracium racemosum</i> Waldst. & Kit. ex Willd. subsp. <i>crintum</i> (Sm.)	.	.	.	+	1
Rouy	.	.	.	.
<i>Mycelis muralis</i> (L.) Dumort. subsp. <i>muralis</i>	.	.	.	+	1
<i>Orobancha hederarum</i> Vaucher ex Duby	1	.	.	.	1
<i>Orobancha</i> sp.	.	+	.	.	1
<i>Polypodium cambricum</i> L.	.	+	.	.	1
<i>Pseudoturritis turrita</i> (L.) Al-Shehbaz	.	.	.	+	1
<i>Quercus pubescens</i> Willd. subsp. <i>pubescens</i>	.	+	.	.	1

^ Reference plant species of the Habitat 9340, from Biondi et al. (2009).

Notes: The relevés describe the holm-oak forests that occur in the volcanic area of the Somma-Vesuvio complex. Like most other natural habitats which are located in the area around the Bay of Naples, todate this forest habitat is mainly threatened by the effects of various human activities, such as wildfires (Stinca et al. 2020) and invasions of alien species (Stinca et al. 2015), but also by extreme natural events linked to climate change (Teobaldelli et al. 2020).

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