New national and regional Annex I Habitat records: from #26 to #36

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Abstract

New Italian data on the distribution of the Annex I Habitats 1510*, 2130*, 2250*, 3180*, 3260, 5230*, 6410, 7140, 7220*, 9320 are reported in this contribution. Specifically, 14 new occurrences in Natura 2000 sites are presented and 20 new cells are added in the EEA 10 km × 10 km reference grid. The new data refer to the Italian administrative regions of Abruzzo, Apulia, Friuli Venezia Giulia, Liguria, Marche, Molise, Sardinia, Sicily, Tuscany and Umbria.

Keywords

1510*, 2130*, 2250*, 3180*, 3260, 5230*, 6410, 7140, 7220*, 9320, conservation, vegetation, 92/43/EEC Directive
Introduction

We are halfway through the 5th (2019-2024) six-year periodical Habitat reporting. The section might be beneficial in representing a collaborative and scientifically validated tool for collecting updated distribution data on the habitats. To date, 36 are the contributions for 90 new cells of EEA 10 km x 10 km Reference grid and 48 new occurrences in Natura 2000 Sites. This is the sixth 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 Geographic Information System (QGIS.org 2020) for mapping purposes.

Table 1. Synthetic overview of the newly reported data.

| Hab ID | Hab name | Cell ID | Country | BR | N2000 Site | Authors |
|--------|----------|---------|---------|----|------------|---------|
| 1510*  | Mediterranean salt steppes (Limonietalia) | 10kmE427N197, 10kmE428N197, 10kmE429N194, 10kmE426N201 | Italy | MED | - | Bagella S., Caria M.C., Farris E., Rivieccio G., |
| 2130*  | Fixed coastal dunes with herbaceous vegetation (grey dunes) | 10kmE465N217, 10kmE467N215, 10kmE474N210, 10kmE480N210, 10kmE477N210, 10kmE478N210 | Italy | CONT | IT720215 | Casavecchia S., de Francesco M.C., Pirone G., Stanisci A., Tozzi E.P. |
| 2250*  | Coastal dunes with Juniperus spp. | 10kmE492N202 | Italy | MED | - | Mantino F., Forte L., Tomasselli V. |
| 3180*  | Turloughs | 10kmE456N217, 10kmE456N222 | Italy | CONT | IT530019, IT530028 | Bonini F., Landucci F., Gigante D. |
| 3180*  | Turloughs | 10kmE459N253 | Italy | CONT | IT3340006, IT3341002 | Castello M., Poldini L. |
| 3260   | Water courses of plain to montane levels with the Ranunculo fluitantis and Callitricho-Batrachion vegetation | 10kmE443N224 | Italy | MED | - | Fiaschi T., Fanfarillo E., Angiolini C. |
| 5230*  | Arborescent matatorial with Laurus nobilis | 10kmE472N167 | Italy | MED | - | Bazan G., Gianguzzi L. |
| 6410   | Molinia meadows on calcareous, peaty or clayey-silt laden soils (Molinion caeruleae) | 10kmE413N233 | Italy | ALP | IT1314610 | Dagnino D., Mariotti M., Turcato C. |
| 7140   | Transition mires and quaking bogs | 10KmE458N219 | Italy | CONT | IT5210007 | Prazesouskaya S., Gigante D., Maneli F., Aleffi M., Poponessi S., Venanzoni R. |
| 7220*  | Petrifying springs with tufa formation (Cratoneurion) | 10kmE455N222 | Italy | CONT | IT5330020 | Poponessi S., Gigante D. |
| 9320   | Olea and Ceratonia forests | 10kmE459N161 | Italy | MED | ITA040009 | Bazan G., Gianguzzi L. |
Figure 1. Distribution in Italy of the Habitat 1510*: 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 1. Distribution in Italy of the Habitat 1510*: 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 1510*.

| Cell ID       | 10km E427N197 | 20km E427N197 | 30km E427N197 | 40km E427N197 | 50km E427N197 | 60km E427N197 | 70km E427N197 |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Latitude      | 40.917386     | 40.917307     | 40.915888     | 40.916768     | 40.916602     | 40.916661     | 40.916641     |
| Longitude     | 9.503935      | 9.503807      | 9.504323      | 9.503725      | 9.503964      | 9.503844      | 9.503911      |
| Date          | 6/26/2020     | 6/26/2020     | 7/2/2020      | 8/5/2020      | 8/5/2020      | 8/5/2020      | 8/5/2020      |
| Area (m²)     | 2             | 2             | 2             | 2             | 2             | 2             | 2             |
| Altitude (m a.s.l.) | 1           | 1             | 0             | 0             | 0             | 0             | 0             |
| Cover (%)     | 98            | 95            | 95            | 95            | 70            | 100           | 90            |
| Average vegetation height (cm) | 30           | 30            | 30            | 30            | 30            | 30            | 30            |

Charact. and diff. Taxa of Limonium nartoonense-glomerati and subass limonietosum virgati

^Limonium virgatum (Willd.) Fourn. 5 5 3 1 1 1 1 7
^Limonium nartoonense Mill. - - - 3 3 4 4 4
Frankenia laevis L. subsp. laevis - - - - - - -

Other species

Thrinopyrum anceum (L.) Á.Löve 3 2 2 + 1 2 2 7
Halimone portulacoides (L.) Aellen - - - - 2 1 1 4
Salicornia fruticosa (L.) L. - - - - - - -
Parapholis incerta (L.) Hubbard 2 2 1 1 - - - 4
Salicornia perennis Willd. subsp. perennis 1 + 1 + - - - -
Phleum pratense L. subsp. pratense 1 - - - - - - -
Trigonella smalii Coulot & Rabaute    - - - - - - -

^ Reference plant species of the Habitat 1510*, from Biondi et al. (2009).

Campobasso, Marina di Santa Cristina port, 1 m a.s.l., Coordinates: 41.94625 N, 15.07366 E (Tab. 3, Rel. 5); 3 m a.s.l., Coordinates: 41.95455 N, 15.07424 E (Tab. 3, Rel. 6). Published relevés: Italy, Puglia, Foggia, Foce Varano, 1 m a.s.l., Coordinates: 41.9192861 N, 15.511717 E [Tab. 1 in Biondi et al. (2007), Rel. 5]; 3 m a.s.l., Coordinates: 41.9200556 N, 15.794875 E [Tab. 1 in Biondi et al. (2007), Rel. 3]; Italy, Puglia, Foggia, Istmo di Lesina, 3 m a.s.l., Coordinates: 41.9098611 N, 15.569406 E [Tab. 1 in Biondi et al. (2007), Rel. 5].

Cells ID in the EEA reference grid: #27a: 10kmE465N217 (Tab. 3, Rel. 1 to 3); 10kmE467N215 (Tab. 3, Rel. 4). #27b: 10kmE474N210 (Tab. 3, Rel. 5 and 6); from Tab. 1 in Biondi et al. (2007); 10kmE480N210 (Rel 2 and 3); 10kmE477N210 (Rel 4); 10kmE478N210 (Rel. 5) (Fig. 2).

Natura 2000 Site Code: #27a: IT7120215 “Torre del Cer­rano” (Tab. 3, Rel. 1 to 3); currently not included in any Natura 2000 Site (Tab. 3, Rel. 4). #27b: IT7282216 “Foce Biferno-Litorale di Campomarino” (Tab. 3, Rel. 5 and 6); IT9110001 “Isola di Lago di Varano” [Tab. 1 in Biondi et al. (2007), Rels 2 and 3]; IT9110037 “Laghi di Lesina e Varano” [Tab. 1 in Biondi et al. (2007), Rel. 3]; IT9110015 “Duna di Lago di Lesina e Foce Del Fortore” [Tab. 1 in Biondi et al. (2007), Rels 4 and 5].

Phytosociological table: Tab. 3 (unpublished relevés); taxonomic nomenclature according to Pignatti et al. (2017-2019); published relevés: Tab. 1 (Rel 2 to 5) in Biondi et al. (2007).

Notes: The plant species cover follows Braun-Blanquet’s abundance-dominance scale. We propose to include in this habitat also the Adriatic grey dunes with grass communities with Verbascum nivum subsp. gargaricum and Euphorbia terracina (referable to Corine Biotopes 16.228 “Dune Malcomnia annual-herb communities”).

#28. Annex I Habitat: 2250* Coastal dunes with Juniperus spp. (Mantino F, Forte L, Tomaselli V)

EUNIS Classification system: N1B (formerly: B1.6) Mediterranean and Black Sea coastal dune scrub (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: Asparago acutifolii-Juniperetum macrocarpae (Molnieri & R. Molinier 1955) O. de Bolos 1962, Juniperion turbinatae Rivas-Martinez (1975) 1987, Pistacio-Rhamnetalia alaterni Rivas-Martinez 1975, Quercetea ilicis Br.-Bl. in Br.-Bl., Roussine & Nègre 1952 (Biondi et al. 2014).

Geographic information: Italy, Apulia, Costa Ripagno, Polignano a Mare (Bari), 7 m a.s.l. Coordinates: 41.032367 N, 17.154936 E [Tab. 4, Rel. 2].

Cells ID in the EEA reference grid: 10kmE492N202 (Fig. 3).

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

Phytosociological table: Tab. 4; taxonomic nomenclature according to Bartolucci et al. (2018) and Galasso et al. (2018), and later updates.

Notes: This priority habitat is present on sandy stabilized dunes and it is distributed in Apulia Region along the Adriatic and Jonian coasts (Brullo et al. 2001, Forte 2001, Forte et al. 2002, Biondi et al. 2006, Tomaselli et al. 2010, Perrino et al. 2013, Medagli et al. 2015, Veronica et al. 2017, Eionet 2019). The recorded community is located in the recently established Regional Natural Park “Costa Ripagno”, between Mola di Bari and Polignano a Mare,
Figure 2. Distribution in Italy of the Habitat 2130*: 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 3. Habitat 2130*.

| Relevé number | 1  | 2  | 3  | 4  | 5  | 6  |
|---------------|----|----|----|----|----|----|
| Cell ID       | 10km | 10km | 10km | 10km | 10km | 10km |
| Latitude      | E46SN217 | E46SN217 | E46SN217 | E467N215 | E474N210 | E474N210 |
| Longitude     | 42.59306 | 42.59104 | 42.58943 | 42.39233 | 41.94625 | 41.94595 |
| Date          | 5/31/2021 | 5/31/2021 | 5/31/2021 | 6/3/2021 | 6/10/2021 | 6/10/2021 |
| Area (m²)     | 4  | 4  | 4  | 4  | 4  | 4  |
| Slope (°)     | 0  | 0  | 0  | 0  | 0  | 0  |
| Altitude (m a.s.l.) | 0  | 1  | 1  | 2  | 1  | 3  |
| Vegetation Cover (%) | 65  | 50  | 50  | 70  | 60  | 80  |
| Sea distance (m) | 30  | 45  | 60  | 75  | 80  | 65  |
| Diagnostic species | ^Phleum arenarium L. subsp. caesium H.Scholz | .  | .  | 3  | 2  | 3  | 4  |
|                 | ^Festuca fasciculata Forssk. | .  | .  | 1  | +  | .  | 2  |
|                 | ^Cerasium semidecandrum L. | +  | .  | .  | .  | .  | 1  |
| Charact. and diff. taxa of Verbasco garganici-Euphorbietum terracinae | *Euphorbia terracina L. | 1  | 1  | 2  | 2  | 1  | 1  |
|                 | *Verbacum niveum subsp. garganicum (Ten.) Murb | 2  | 2  | 1  | 1  | 2  | 2  |
|                 | *Sixalix atopurpurea (L.) Greuter et Burdet | .  | .  | .  | .  | 1  | 2  |
| Other species  | Silene colorata Poir. | 1  | 1  | 2  | 1  | 1  | .  | 5  |
| Lotus cytisoides L. | 1  | 1  | 2  | .  | 1  | 3  | 5  |
| Elymus farctus (Viv.) Runemark ex Melderis | .  | .  | 1  | 1  | 1  | .  | 3  |
| Medicago marina L. | 1  | .  | .  | 1  | 2  | .  | 3  |
| Oenothera stucchi Soldano | .  | .  | 3  | .  | 3  | .  | 3  |
| Rostraria litorea (All.) Holub | 2  | 1  | 1  | .  | .  | .  | 3  |
| Anisantha madritensis (L.) Nevski | +  | .  | .  | .  | .  | .  | 2  |
| Lagurus ovatus L. | +  | .  | .  | .  | .  | .  | 1  |
| Avena barbata Pott ex Link | .  | .  | .  | .  | 1  | 1  | 2  |
| Chenchrus incertus M.A.Curtis | 2  | .  | 1  | .  | .  | .  | 2  |
| Erodium lacinatum (Cav.) Willd. | +  | .  | .  | +  | .  | .  | 2  |
| Ambrosia palustriaca DC. | 1  | .  | .  | .  | .  | .  | 1  |
| Artemisia campestris L. | .  | .  | .  | .  | .  | .  | 1  |
| Bartsia trixago L. | .  | .  | .  | .  | 1  | .  | 1  |
| Catapodium rigidum (L.) C.E.Hubb. | .  | .  | .  | .  | .  | .  | 1  |
| Corynephorus articulatus (Desf.) P.Beauv. | .  | .  | .  | .  | 1  | .  | 1  |
| Dittrichia viscosa (L.) Greuter | .  | .  | .  | 1  | .  | .  | 1  |
Table 3. Continuation.

| Relevé number | 1          | 2          | 3          | 4          | 5          | 6          |
|---------------|------------|------------|------------|------------|------------|------------|
|               | 10km       | 10km       | 10km       | 10km       | 10km       | 10km       |
| Cell ID       | E46SN217   | E46SN217   | E46SN217   | E467N215   | E474N210   | E474N210   |
| Latitude      | 42.59306   | 42.59104   | 42.58943   | 42.39233   | 41.94625   | 41.94595   |
| Longitude     | 14.08217   | 14.0839    | 14.08512   | 14.34526   | 15.07366   | 15.07424   |
| Date          | 5/31/2021  | 5/31/2021  | 5/31/2021  | 6/3/2021   | 6/10/2021  | 6/10/2021  |
| Area (m²)     | 4          | 4          | 4          | 4          | 4          | 4          |
| Slope (°)     | 0          | 0          | 0          | 0          | 0          | 0          |
| Altitude (m a.s.l.) | 0     | 1          | 1          | 2          | 1          | 3          |
| Vegetation Cover (%) | 65     | 50         | 50         | 70         | 60         | 80         |
| Sea distance (m) | 30     | 45         | 60         | 75         | 80         | 65         |
| Presences     | Echinophora spinosa L. | .          | .          | .          | r          | .          | 1          |
|               | Erigeron sumatrensis Retz. | .          | .          | .          | +          | .          | 1          |
|               | Hypochaeris achyrophorus L. | .          | .          | .          | .          | 1          | 1          |
|               | Medicago littoralis Rohde ex Loisel. | .          | .          | .          | .          | 1          | 1          |
|               | Ononis variegata L. | .          | 1          | .          | .          | .          | 1          |
|               | Parapholis incurva (L.) C.E.Hubb. | .          | .          | .          | .          | .          | 1          |
|               | Salsola kali L. | .          | .          | .          | +          | .          | 1          |
|               | Sporobolus virginicus (L.) Kunth | 1         | .          | .          | .          | .          | 1          |

^ Reference plant species of the Habitat 2130*, from Biondi et al. (2009).
* New proposed reference species

Figure 3. Distribution in Italy of the Habitat 2250*: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).

and it is placed in an isolated site along the calcarenitic coast, on sandy-silt deposits derived from the erosion of the rocks, as described in Biondi et al. (2006).

The phytocoenosis, dominated by tall plants of Juniperus macrocarpa Sm. and referable to Asparago acutifolii-Juniperetum macrocarpae (Molinier et R. Molinier 1955) O. de Bolós 1962, extends for only 9000 m² and presents a mature aspect with a poor floristic composition. The landscape matrix surrounding the site is characterised by cultivated fields, Opuntia ficus-indica (L.) Mill. stands and scattered sclerophyllous maquis of Pistacio-Rhamnetalia alaterni Rivas-Martinez 1975, while along the coast there is the presence of small patches belonging to the Arthrocaulon macrostachyum (Moric.) Piirainen & G. Kadereit community.

Until the establishment of the Regional Park, the principal threats to which the site was exposed have been tourism, fire and agricultural practices. The diachronic analysis of orthophotos from 2005 to 2015 highlights the reduction of the community due to fire and plowing; moreover, the possibility to reach the coast by car increased the pressure due to tourism exploitation.
Table 4. Habitat 2250*.

| Relevé number | 1        | 2        |
|---------------|----------|----------|
| Cell ID       | 10kmE492N202 | 10kmE492N202 |
| Latitude      | 41.032425 | 41.032367 |
| Longitude     | 17.15591  | 17.154936 |
| Date          | 9/22/2021 | 11/12/2021 |
| Area (m²)     | 100       | 100       |
| Altitude (m a.s.l.) | 7         | 7         |
| Cover (%)     | 100       | 100       |
| Average vegetation height (m) | 4.5       | 4.5       |

**Diff. of Asparagus acutifolii-Juniperetum macrocarpae**

^Juniperus macrocarpa Sm.

| Presence | 5 | 5 | 2 |

**Charact. of Juniperion turbinatae**

^Juniperus turbinata Guss.

| Presence | + | + | 2 |

**Charact. of Pistacia lentisci-Rhamnetalia alaterni and Quercetea ilicis**

| Presence | 1 | 1 | 2 |
|---|---|---|---|
| Pistacia lentiscus L. | + | | |
| Rubia peregrina L. | + | | |
| Asparagus acutifolius L. | + | | |
| Phillyrea latifolia L. | + | | |
| Stachys major (L.) Bartolucci & Peruzzi | + | + | 1 |
| Olea europaea L. | + | | |
| Rubia peregrina | 1 | 1 | 2 |
| Asparagus acutifolius | 1 | 1 | 2 |
| Phillyrea latifolia | 1 | 1 | 2 |
| Stachys major (L.) Bartolucci & Peruzzi | 1 | 1 | 2 |
| Olea europaea | 1 | 1 | 2 |

**Other species**

| Presence | 1 | 1 | 2 |
|---|---|---|---|
| Pinus halepensis Mill. | + | | |
| Carpobrotus edulis (L.) N.E. Br. | + | | |
| Puncratum maritimum L. | + | | |
| Oloptum miliaceum (L.) Röser & H.R. Hamasha | + | | |
| Arisarum vulgare O. Targ.Tozz. | + | | |
| Pinus halepensis | + | + | 2 |
| Carpobrotus edulis | + | + | 2 |
| Puncratum maritimum | + | + | 2 |
| Oloptum miliaceum | + | + | 2 |
| Arisarum vulgare | + | + | 2 |
| Other species | + | + | 2 |

^ Reference plant species of the Habitat 2250*, from Biondi et al. (2009).

The high distance from other Adriatic coastal juniper communities, distributed on Gargano and Salento, confers to this formation a relict character.

In a recent study on the conservation status of Italian coastal dune habitats (Prisco et al. 2020), the overall assessment of 2250* results Unfavorable-Bad for all the considered criteria (range, area, structure and function, future prospects).

#29. Annex I Habitat: 3180* Turloughs (Bonini F, Landucci F, Gigante D)

**EUNIS Classification system**: C1.6 Temporary lakes, ponds and pools (narrower), C1.67 Turlough and lake-bottom meadows (narrower)

**Biogeographical Region**: #29a: Mediterranean; #29b: Continental.

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

**Phytosociological reference**: #29a: Ranunculo acri-Caricetum hirtae Biondi & Ballelli 1995, Potentillion anserinae Tüxen 1947, Potentillo-Polygonetalia avicularis Tüxen 1947, Molinio-Arrhenatheretea Tüxen 1937; #29b: Deschampsio-Caricetum distantis Pedrotti 1978 and Hordeo-Ranunculetum velutini Pedrotti 1978, Ranunculion velutini Pedrotti 1978, Trifolio-Hordeetalia Horvatić 1963, Molinio-Arrhenatheretea Tüxen 1937; the syntaxonomic frame is in accordance with Mucina et al. (2016).

**Geographic information**: #29a: Italy, Umbria, Perugia, Sant’Anatolia di Narco, Laghetti di Gavelli, 1,122 m a.s.l., Coordinates: 42.681726 N, 12.908217 E; #29b: Italy, Marche, Macerata, Sefro, Piani di Monte Lago, 925 m a.s.l., Coordinates: 43.108911 N, 12.975154E (upper plain); 892 m a.s.l., 43.120255 N, 12.968448 E (lower plain).

**Cells ID in the EEA reference grid**: #29a: 10kmE456N217; #29b: 10kmE456N222 (Fig. 5).

**Natura 2000 Site Code**: #29a: SCI IT5210068 “Laghetto e piano di Gavelli (Monte Coscerno)”; #29b: SCI IT5330019

Figure 4. Habitat 2250* in the Regional Natural Park "Costa Ripagnola" (Apulia).
“Piani di Montelago”, included in the SPA IT5330028 “Valle Scurosa, Piano di Montelago e Gola di Pioraco”.

**Phytosociological table:** #29a Tab. 8 in Biondi and Ballelli (1995); #29b Tab. 1 in Pedrotti (1978).

**Notes:** Although this habitat’s inclusion in Annex I was originally based on Irish reports only (European Commission 2013), its occurrence is nowadays acknowledged in Ireland, United Kingdom, Germany, Estonia, Slovenia, and Croatia, in several Biogeographic Regions (Atlantic, Continental, Boreal, Alpine, and Mediterranean), according to the latest Annex I habitats Reporting cycle (Eionet 2013-18). This priority habitat has been mentioned for the first time in Italy by Landucci in the assessment of the habitat “C1.6a Temperate temporary water body”, in Janssen et al. (2016), and first reported by Gigante et al. (2019b) at Castel S. Maria plain in central Italy. Then, Castello et al. (2021) reported it at Lake Doberdò in North-East Italy. The two sites here reported are characterized by long-standing flooding in winter, with partial emergence of the bottom sediment in summer (Pedrotti 1978, Biondi and Ballelli 1995). As a consequence, the vegetation is strongly affected by the water gradient and the level of the water table, giving rise to a complex of vegetation types typically including phytocoenoses from several alliances: *Magnocaricion gracilis* Géhu 1961, *Ranunculion velutini* Pedrotti 1978, *Potentillion anserinae* Tx. 1947, among the others. In particular, the alliance *Ranunculion velutini* Pedrotti 1976 seems particularly related to the ecological conditions of temporary flooding affecting this complex Annex I habitat type in Central Italy, however in other areas it can include variously composed mosaics of vegetation types (see the following Habitat Record #30). Both the areas have been investigated in recent years by the authors (unpublished data), confirming the occurrence of the mentioned plant communities; the coordinates of the reference points, missing in the original papers (Pedrotti 1978, Biondi and Ballelli 1995), have been registered in the field in areas representative of the habitat variability. Other similar sites occurring along the many Apenninic karstic highlands are certainly to be referred to this priority habitat type, including for instance the plain of Castel S. Maria and the temporary lake close to Grutti, both in the Province of Perugia, in central Italy, at present under investigation by the authors.

#30. Annex I Habitat: 3180* Turloughs (Castello M, Poldini L)

**EUNIS Classification system:** C1.6 Temporary lakes, ponds and pools (narrower), C1.67 Turlough and lake-bottom meadows (narrower)

**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:** this habitat includes a complex of vegetation types, the most significant of which belong to: *Fontinalion antipyreticae* W. Koch 1936, *Leptodictyeta riparii* Philippi 1956, *Plathytypidion Fontinalis* Philippi 1956; *Bidentetea Tüxen et al. ex von Rochow 1951; Isoëto-Nanojuncetea Br.-Bl. & Tüxen in Br.-Bl. et al. 1952; Eleocharito palustris-Sagittarion sagittifoliae Passarge 1964, *Oenanthera aquatica* Hejný ex Balátová-Tuláčková et al. 1993, *Phragmito-Magnocaricetea* Klika in

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**Figure 5.** Distribution in Italy of the Habitat 3180*: in black the new cells.
Klika & Novák 1941; Potentillion anserinae Tüxen 1947, Potentillo-Polygonetalia avicularis Tüxen 1947, Arrhenatherion elatioris Luquet 1926 (hygrophilous and oligo-mesotrophic coenoses), Arrhenatheretalia elatioris Tüxen 1931, Molinia-Arrhenatheretea Tüxen 1937; the syntaxonomic frame is in accordance with Mucina et al. (2016).

**Geographic information**: Italy, Friuli Venezia Giulia, Gorizia, Lago di Doberdò (Lake Doberdò), 4.5 m a.s.l., Coordinates: 45.831078 N, 13.562322 E [Tabs S1, S7, S10 (Rel. 2 to 24), S11, S12 (Rel. 1) in Supplementary material 1 in Castello et al. (2021)].

**Cell ID in the EEA reference grid**: 10kmE459N253 (Fig. 5).

**Nature 2000 Site Code**: SAC IT3340006 “Carso Triestino e Goriziano”, SPA IT3341002 “Aree Carsiche della Venezia Giulia”.

**Phytosociological table**: Tabs S1, S7, S10 (Rel. 2 to 24), S11, S12 (Rel. 1) in Supplementary material 1 in Castello et al. (2021).

**Notes**: This priority habitat, modelled on the temporary lakes of Ireland called “turloughs” and currently reported from other States of the EU (Eionet 2013–2018), corresponds to a geomorphological unit (Bunce et al. 2013) in which the seasonal transitions between water and terrestrial conditions result in strongly variable mosaics of communities. The occurrence of the habitat 3180” from the Italian Karst at Lake Doberdò is discussed by Castello et al. (2021). Lake Doberdò is a typical disappearing lake being the result of the emersion of the groundwater: its water regime is strongly variable, with water level fluctuations that can be higher than 6 m at seasonal high water. A phytosociological survey carried out in 2015–2018 provided the full picture of the wide range of plant communities correlated with the variable environmental conditions due to the hydrological regime of the lake and traditional agricultural land-use. Limited areas of permanent open water allow the presence of aquatic communities of Lemnetea O. Bolós & Masclans 1955 and Potamogetonetae Klika in Klika & Novák 1941, but this habitat type is characterized by communities associated with large oscillations of water level dependent on fluctuations of groundwater. The exposed muddy water margins are colonized by pioneer communities of Bidentetalia, Isoetano-Nanajuncetalia and Eleocharito palustris-Sagittario sagittifoliae. Most of the lake bottom is covered by marsh communities dominated by reed and sedge beds of Phragmition communis Koch 1926, Magnocaricion elatae Koch 1926 and Magnocaricion gracilis Géhu 1961. The peculiar hydrological regime of the site is well expressed by the stands of Cincidotus fontinaloides and Fontinalis antipyretica, the Potentillion anserinae wet meadows covering the lake shores, and a periodically flooded meadow corresponding to Leucojo aestivi-Poetum pratensis Tasinazzo ex Castello, Poldini & Altobelli 2021, an association considered as a hygrophilous, oligo-mesotrophic waterside expression of Arrhenatherion meadows tending towards the communities of Molinion caeruleae Koch 1926 and showing considerable affinities with the periodically-flooded meadows of Trifolio-Hordeetalia Horvatić 1963.

#31. Annex I Habitat: 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-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 Neubäusl 1959, Callitricho hamulatae-Ranunculetalia aquatilis Passarge ex Theurillat in Theurillat et al. 2015, Potamogetonetalia Klika in Klika et Novák 1941 (Lastrucci et al. 2010; Mereu et al. 2010; Mucina et al. 2016). Geographic information: Italy, Tuscany, Siena, Asciano, 169 m a.s.l., Coordinates: 43.278535 N, 11.384239 E (Tab. 5, Rel. 1); 172 m a.s.l., Coordinates: 43.278025 N, 11.383466 E (Tab. 5, Rel. 2); Italy, Tuscany, Siena, Castelnuovo Berardenga, 185 m a.s.l., Coordinates: 43.303939 N, 11.414234 E (Tab. 5, Rel. 3); 185 m a.s.l., Coordinates: 43.303783 N, 11.414386 E (Tab. 5, Rel. 4).

**Cell ID in the EEA reference grid**: 10kmE443N224 (Fig. 6).

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

**Phytosociological table**: Tab. 5; taxonomic nomenclature according to Bartolucci et al. (2018) for vascular plants and Aleffi et al. (2020) for mosses.

**Notes**: The interpretation of the communities dominated by Potamogeton species can be critical, since in lentic waters these species are also diagnostic of the habitat 3150 “Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation” according to Biondi et al. (2009). However, in particular ecological conditions like running water with seasonal water fluctuations as in the study sites, the attribution of these communities to the habitat 3260 appears appropriate. The habitat was detected in the central stretch of the Arbia river, where it is well represented. The new occurrences are located not far from the SACs “Monti del Chianti” and “Crete di Camposodo e Crete di Leonina”. The presence of this habitat was already known for nearby cells. These new records allow to deepen the knowledge of Habitat 3260 in central-southern Tuscany.

#32. Annex I Habitat: 5230* Arborescent matorral with Laurus nobilis (Gianguzzi L., Bazan G)

**EUNIS Classification system**: T22 (formerly: G2.2) Mainland laurel-philous forest (Chytry 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).
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Phytosociological reference: Acantho mollis-Lauretum nobilis Gianguzzi, D’Amico & Romano 2010, Asparago acutifolii-Laurion nobilis Gianguzzi, Cuttonaro, Cusimano & Romano 2010, Quercetalia ilicis Br.-Bl. ex Molinier 1934, Quercetea ilicis Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Gianguzzi et al. 2016).

Geographic information: Italy, Sicilia, S. Fratello, left bank of Vallone Mascarino, 440 m a.s.l., Coordinates: 38.029877 N, 14.584034 E (Tab. 6, Rel. 1); Italy, Sicilia, Santa Margherita Belice, Contrada Senia, 345 m a.s.l., Coordinates: 37.674376 N, 13.010698 E (Tab. 6, Rel. 4).

Cell ID in the EEA reference grid: 10kmE443N224 (Tab. 6, Rel. 1); 10kmE443N224 (Tab. 6, Rel. 2); 10kmE443N224 (Tab. 6, Rel. 3); 10kmE443N224 (Tab. 6, Rel. 4) (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 forest formations of *Laurus nobilis* in Sicily have fragmentary and spotted distribution, denoting an evident relictual character (Marino et al. 2014; Romano et al. 2021). From the phytosociological point of view, they are ascribed to *Acantho mollis-Lauretum nobilis*, an association previously referred to the *Arbuto-Laurion nobilis* alliance (Gianguzzi et al. 2010), described by Rivas-Martínez et al. (2001) for the Iberian Peninsula and ascribed to *Pistacio-Rhamnetalia alaterni*. In a more recent study, the same vegetation was re-proposed by Gianguzzi et al. (2016) as a censosis of the order *Quercetalia ilicis* and for this reason referred to a new alliance, with Tyrrenhian gravitation, described as *Asparago acutifolii-Laurion nobilis* Gianguzzi, Cuttonaro, Cusimano & Romano 2016. The first of the new stations, reported in this work, is located on the Tyrrhenian side of the Nebrodi Mountains, between 430–450 m a.s.l., where it covers about 2000 m$^2$. It is localized in the bioclimatic belt of the sub-humid thermo-Mediterranean area, colonizing a cool and shady slope, linked to hydromorphic clayey soils, on a detrital matrix of carbonatic nature (Fig. 8). It is a residual station, which must be added to the other interesting wet sites recently reported for the Nebrodi Mountains (De Castro et al. 2008, 2015; Gianguzzi et al. 2017; Troia et al. 2017) and for other reliefs of the central-western part of Sicily (Caldarella et al. 2009, 2013, 2021; Caruso et al. 2012; Gianguzzi et al. 2009, 2013; De Castro et al. 2008, 2015). The second station is located near Santa Margherita Belice (SW-Sicily), where there are several nuclei, the largest of which is more than 1.5 hectares (Fig. 9). In this area, characterized by calcarenitic substrates, the laurel has a high potential by building dense phytocoenoses in the valleys and gorges as well as creating hedges and borders between the fields that define agricultural landscapes with high diffuse naturalness that are the result of the long interaction between human history and nature of this area of Sicily (Bazan et al. 2019, 2020).

![Figure 8](image8.png)

**Figure 8.** Habitat 5230*: relict aspects of *Laurus nobilis* formation near Vallone Mascarino (S. Fratello, NE Sicily, Italy).

![Figure 7](image7.png)

**Figure 7.** Distribution in Italy of the Habitat 5230*: in black the new cell, in grey the cells officially reported in the 4th Habitat report ex-Art. 17 (period 2013-2018; Eionet 2019).
#33. Annex I Habitat: 6410 Molinia meadows on calcareous, peaty or clayey-siltladen soils (Molinion caeruleae) (Dagnino D, Mariotti M, Turcato C)

**EUNIS Classification system:** R27 Temperate and boreal moist or wet oligotrophic grassland (Chytrý et al. 2020).

**Biogeographical Region:** Alpine

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

**Phytosociological reference:** Molinion caeruleae Koch 1926, Molinitalia caeruleae Koch 1926, Molinio-Arrhenatheretea Tüxen 1937 (Biondi & Blasi 2015)

**Geographic information:** Italy, Liguria, Imperia, Rio Banea, between 1610 and 1630 m a.s.l., Coordinates: 44.098970 N, 7.728850 E (Tab. 7, Rel. 1); 44.099039 N, 7.729067 E (Tab. 7, Rel. 2).

**Cells ID in the EEA reference grid:** 10kmE413N233 (Fig. 10).

**Natura 2000 Site Code:** SAC IT1314610 "M. Saccarello – M. Frontè"

**Phytosociological table:** Tab. 7; taxonomic nomenclature according to Bartolucci et al. (2018) and later updates and Aleffi et al. (2020).

**Notes:** The finding occurs during the activities of the Interreg ALCOTRA CoBiodiv and GeBiodiv projects.

### Table 6. Habitat 5230*.

| Relevé number | 1 | 2 | 3 | 4 |
|---------------|---|---|---|---|
| Cell ID       | 10kmE472N167 | 10kmE458N162 | 10kmE458N162 | 10kmE458N162 |
| Latitude      | 38.029877    | 37.673176    | 37.673751    | 37.674376    |
| Longitude     | 14.584034    | 13.018921    | 13.012809    | 13.010698    |
| Date          | 2/25/2010    | 10/23/2021   | 10/23/2021   | 10/23/2021   |
| Area (m²)     | 100          | 100          | 100          | 100          |
| Altitude (m a.s.l.) | 483       | 310          | 315          | 245          |
| Exposition    | NW NW        | NW           | NE           | NE           |
| Slope (°)     | 5            | 25           | 40           | 10           |
| Cover (%)     | 100          | 100          | 100          | 100          |
| Average vegetation height (m) | 8 | 6 | 10 | 8 |

**Charact. and diff. of Acantho mollis-Lauretum nobilis**

| ^Laurus nobilis L. | 5 | 5 | 5 | 5 |
| ^Hedera helix L.  | 5 | 3 | 4 | 4 |
| Acanthus mollis L. | 3 | 2 | 3 | 3 |

**Charact. of Pistacio-Rhamnetalia and Quercetea ilicis**

| ^Smilax aspera L. | 2 | + | 2 | 1 |
| ^Asparagus acutifolius L. | + | 1 | 1 | 1 |
| Arisaum vulgare Targ. –Tox. | 2 | . | + | + |
| Rubia peregrina L. | . | + | 1 | + |
| Oxyris albus L. | . | . | 1 | + |
| Carex disticha Desf. | . | . | + | + |
| ^Ruscus aculeatus L. | 1 | . | . | . |
| Olea europaea L. var. sylvestris (Mill.) Lehr. | . | 1 | . | . |
| Rhamnus alaternus L. | . | 1 | . | . |
| ^Quercus virgiliana Ten. | . | . | 1 | . |
| Euphorbias characias L. | . | . | + | 1 |

**Trasgressives of Salici-Populetea**

| ^Ulmus minor Mill. | 3 | 1 | 1 | . |
| ^Ficus carica L. var. caprificus (Risso) Tischurc & Ravasini | . | + | 1 | 1 |
| ^Arum italicum Mill. | 1 | 1 | . | . |

**Trasg. of Rhamno-Prunetea**

| Rubus gr. ulmifolius Schott | 3 | 1 | + | 1 |
| Rosa sempervirens L. | 2 | + | . | 2 |
| Rhus cortaria L. | 1 | 1 | . | 2 |
| Solanum dulcamara L. | 1 | . | + | 2 |
| Clematis vitalba L. | 1 | . | . | 1 |
| Carex pendula Huds. | 1 | . | . | 1 |
| Populus nigra L. | . | . | 1 | 1 |

**Other species**

| Ailanthus altissima (Mill.) Swingle | . | 1 | 1 | 2 |
| Arundo donax L. | . | + | 1 | 1 |
| Paritaria judaica L. | . | . | + | 2 |
| Eucorynus europaeus L. | 1 | . | . | 1 |
| Peridium aquilinum (L.) Kuhn. | 1 | . | . | 1 |
| Symphytum tuberosum L. | . | 1 | . | 1 |
| Helleborus viridis subsp. boconeoi (Ten.) Peruzzi | 2 | . | . | 1 |
| Phytolacca americana L. | . | + | . | 1 |
| Sambucus eversi L. | . | . | + | 1 |
| Picris echioides L. | . | . | + | 1 |

^ Reference plant species of the Habitat 5230*, from Biondi et al. (2009).
#34. Annex I Habitat: 7140 Transition mires and quaking bogs (Praeleskouskaya S, Gigante D, Maneli F, Aleffi M, Poponessi S, Venanzoni R)

**EUNIS Classification system:** Q25 Non-calcareous quaking mire (Chytrý et al. 2020).

**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:** Caricion nigrae Koch 1926 em. Klika 1934 nom. mut. propos., Caricetalia nigrae Koch 1926 nom. mut. propos., Scheuchzerio palustris-Caricetea nigrae nom. mut. propos. ex Steiner 1992 (Biondi et al. 2014).

**Geographic information:** Italy, Umbria, Perugia, Pian Piccolo (Castelluccio di Norcia), 1332 m a.s.l., coordinates in Tab. 8 (Rels 1 to 8), and Pian Grande (Castelluccio di Norcia), 1274 m a.s.l., coordinates 42.783461 N, 13.200544 E (Tab. 8, Rels 9 and 10).

**Cell ID in the EEA reference grid:** 10KmE458N219 (Fig. 11)

**Natura 2000 Site Code:** IT5210071 “Monti Sibillini (versante umbro)”.

**Phytosociological table:** Tab. 8; taxonomic nomenclature according to Pignatti et al. (2017–2019) and Aleffi et al. (2020).

**Notes:** Two residual monospecific populations of Sphagnum, probably relict of the late glacial period (Brugia-paglia 2007), are found in wet karst sink-hole environment, in the Sibillini Mountains (Central Italy) at an altitudinal range from 1274 m a.s.l. on Pian Grande, to 1332 m a.s.l. on Pian Piccolo (Aleffi and Cortini Pedrotti 1998). Here, they represent the southern limit of the peat bog vegetation of the continental and boreo-alpine European vegetation, and therefore have a great value from a biogeographical point of view. Since this Habitat is located outside its optimum range, it shows a strong impoverishment of the floristic composition and a loss in characteristic/diagnostic species: in fact, it is represented here by small and fragmented plant communities, allowing only a weak formal syntaxonomic classification.

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**Figure 9.** Habitat 5230*: Laurus nobilis formation at Contrada Dragonara (Santa Margherita Belice, SW Sicily, Italy).

**Figure 10.** Distribution in Italy of the Habitat 6410: 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 7. Habitat 6410.

| Relevé number | 1 | 2 |
|---------------|---|---|
| Cell ID       | 10kmE413N233 | 10kmE413N233 |
| Latitude      | 44.098970 | 44.099039 |
| Longitude     | 7.728850 | 7.729067 |
| Date          | 8/7/2020 | 8/7/2020 |
| Area (m²)     | 16 | 16 |
| Altitude (m a.s.l.) | 1621 | 1615 |
| Exposition    | NE | NE |
| Slope (%)     | 22 | 19 |
| Cover Total (%) | 100 | 100 |
| Cover arboreal layer (%) | 0 | 0 |
| Cover shrubby layer (%) | 0 | 0 |
| Cover herbaceous layer (%) | 100 | 100 |
| Cover bryophytic layer (%) | 50 | 50 |

| Molinion caeruleae, Molinetalia caeruleae, Molinoio-Arrhenatheretea |
|---------------------------------------------------------------|
| ^Molinia caerulea (L.) Moench                                 |
| ^Potentilla erecta (L.) Raeusch.                             |
| Geum rivale L.                                               |
| ^Succisa pratensis Moench                                    |
| Caltha palustris L.                                          |
| ^Crepis palustris (L.) Moench                                |
| Lathyrus pratensis L. subsp. pratensis                       |
| ^Deschampsia cespitosa (L.) P. Beauv. subsp. cespitosa        |
| Briza media L.                                               |
| ^Plagiommion elatum (Bruch & Schimp.) T.J.Kop.               |
| ^Plagiommion rostratum (Schrad.) T.J.Kop.                    |
| Calliergonella cuspidata (Hedw.) Loeske                      |
| ^Climacium dendroides (Hedw.) E.Weber & D.Mohr               |

Other species

| Carex paniculata L. subsp. paniculata                      |
|------------------------------------------------------------|
| Agrostis stolonifera L. subsp. stolonifera                 |
| Vicia cracca L.                                            |
| Alchemilla connivens Buser                                 |
| Equisetum arvense L.                                       |
| Epilobium palustre L.                                      |
| Mentha longifolia (L.) L.                                  |
| ^Blysmus compressus (L.) Panz. ex Link                      |
| ^Viola palustris L.                                         |
| ^Swertia perennis L.                                       |
| Carex lepidocarpa Tausch subsp. lepidocarpa                |

^ Reference plant species of the Habitat 6410, from Biondi et al. (2009).

Figure 11. Distribution in Italy of the Habitat 7140: 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 8. Habitat 7140.

| Relevé number | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|---------------|----|----|----|----|----|----|----|----|----|----|
| Cell ID       | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km |
| Latitude      | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 |
| Longitude     | 42.771444 | 42.771444 | 42.771248 | 42.769612 | 42.769768 | 42.769612 | 42.769612 | 42.769612 | 42.769768 | 42.783461 |
| Date          | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 |
| Area (m²)     | 1.2 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Altitude (m a.s.l.) | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1274 |
| Cover (%)     | 100 | 100 | 90 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |
| Presence      | + 7  | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 |

**Diagnostic species**

^Sphagnum subsecundum Nees ex Sturm

| Cell ID | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km | 10Km |
|---------|------|------|------|------|------|------|------|------|------|------|
| Latitude | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 | E458N219 |
| Longitude | 42.771444 | 42.771444 | 42.771248 | 42.769612 | 42.769768 | 42.769612 | 42.769612 | 42.769612 | 42.769768 | 42.783461 |
| Date | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 | Jul-20 |
| Area (m²) | 1.2 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Altitude (m a.s.l.) | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1332 | 1274 |
| Cover (%) | 100 | 100 | 90 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |
| Presence | + 7  | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 | + 5 |

^Reference plant species of the Habitat 7140, from Biondi et al. (2009).
Ten original relevés (Tab. 8) were made according to Braun-Blanquet’s (1979) method and the Handbook for monitoring species and habitats of community interest in Italy (Angelini et al. 2016). Relevés 1–8 (Tab. 8), located on Pian Piccolo, can be attributed to vegetation of the Caricion nigrae alliance and interpreted as an assemblage of Aulacomium palustre and Sphagnum subsecundum (according to Biondi et al. 2009), while the relevés 9-10 (Tab. 8), located on Pian Grande, can be attributed to the Caricetum gracilis, within which the carpet of Sphagnum platyphyllum develops (Pedrotti et al. 2004; Venanzoni and Gigante 2007; Aleffi et al. 2016). The bog, in the most flooded core areas, is also characterized by species of Magnocaricetalia elatae, while in the drier external areas is characterized by species of Nardo-Callunetea. The environmental conditions, in which such vegetation develops, involve not only meteoric waters, but also those of groundwater and surface flow, as in minerotrophic fens; moreover, for macroclimatic reasons (i.e. reduction of rainfall), high levels of water stress are reached during the summer period, in which Sphagnum dries completely (Aleffi et al. 2016). The critical issues for this Habitat are mainly attributable to the anthropogenic influence (mowing, grazing and transit of livestock).

#35. Annex I Habitat: 7220* Petrifying springs with tufa formation (Cratoneurion) (Poponessi S, Gigante D)

**EUNIS Classification system:** C2.121 Petrifying springs with tufa or travertine formations

**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:** Cratoneurion commutati Koch 1928, Montio-Cardaminetalia Pawlowski et al. 1928, Montio-Cardaminetea Br.-Bl. et Tx. ex Klika et Hadac 1944; the syntaxonomic frame is in accordance with Mucina et al. (2016).

**Geographic information:** Italy, Marche, Macerata, Fiuminata, W side of Mount Finiglia, 749 m a.s.l., Coordinates: 43.127817 N, 12.885968 E (Tab. 9, Rel. 1 to 5).

**Cell ID in the EEA reference grid:** 10kmE455N222 (Fig. 12).

**Nature 2000 Site Code:** SAC IT5330020 "Monte Pennino-Scurosa".

**Phytosociological table:** Tab. 9; taxonomic nomenclature for vascular species in accordance with Portale della Flora d’Italia (2021), for bryophytes with Aleffi et al. (2020).

**Notes:** the 7220* stand reported here covers an area of about 50 m² and is located in a cool and shady gully, below a tree layer dominated by Ostrya carpinifolia Scop. (Fig. 13). Water is permanently dripping also in summer (Fig. 14).

#36. 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).

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**Figure 12.** Distribution in Italy of the Habitat 7220*: 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 13.** Overview of the habitat 7220* in the reported stand (Fiuminata, MC); the dominance of *Palustriella commutata* is evident.

| Relevé number | 1 | 2 | 3 | 4 | 5 |
|---------------|---|---|---|---|---|
| Cell ID       | 10kmE455N222 | 10kmE455N222 | 10kmE455N222 | 10kmE455N222 | 10kmE455N222 |
| Latitude      | 43.127817    | 43.127817    | 43.127817    | 43.127817    | 43.127817    |
| Longitude     | 12.885968    | 12.885968    | 12.885968    | 12.885968    | 12.885968    |
| Date          | 7/21/2021    | 7/21/2021    | 7/21/2021    | 7/21/2021    | 7/21/2021    |
| Area (cm²)    | 20x20        | 20x20        | 20x20        | 20x20        | 20x20        |
| Altitude (m a.s.l.) | 749 | 749 | 749 | 749 | 749 |
| Exposition (°) | 15 | 15 | 20 | 30 | 15 |
| Slope (°)     | 70 | 80 | 90 | 85 | 70 |
| Cover moss layer (%) | 95 | 95 | 85 | 85 | 90 |
| Cover herb layer (%) | 95 | 95 | 0.1 | 1 | 0.1 |
| Calcareous concretion (%) | 20 | 30 | 5 | 15 | 15 |

**Typical species of Cratoneuron commutati, Montio-Cardaminetalia, Montio-Cardamineta**

- *Palustriella commutata* (Hedw.) Ochyra
- *Pellia epiphylla* (L.) Corda subsp. *epiphylla*

**Other bryophyte species**

- *Eucladium verticillatum* (With.) Bruch & Schimp.
- *Aneura pinguis* (L.) Dumort.
- *Other vascular species*
  - *Fraxinus ornus* L. subsp. *ornus* (*plantulae*)
  - *Lonicera caprifolium* L.
  - *Teucrium chamaedrys* L. subsp. *chamaedrys*
  - *Brachypodium sylvaticum* (Huds.) P. Beauv. subsp. *sylvaticum*.

**Other plant species**

- *Calcareous concretion* %
- *Typical species of* *Cratoneuron commutati, Montio-Cardaminetalia, Montio-Cardamineta* ^
- *Other bryophyte species* ^
- *Other vascular species* ^

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**Phytosociological reference:** *Chamaeropo humilis-Oleetum sylvestris* Gianguzzi et Bazan 2019, *acanthetosum mollis* Gianguzzi et Bazan 2019, *Oleo sylvestris-Ceratonion siliquae* Br.-Bl. ex Guinouet et Drouineau 1944, *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Martinez 1975, *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015).

**Geographic information:** Italy, Sicilia, Sciacca, Monte S. Calogero, 230 m a.s.L., Coordinates: 37.524238 N, 13.131250 E (Tab. 10, Rel. 1) and 37.523987 N, 13.130899 E (Tab.10, Rel. 2).

**Cell ID in the EEA reference grid:** 10kmE459N161 (Fig. 15).

**Natura 2000 Site Code:** SAC ITA040009 “Monte San Calogero (Sciacca)”.

**Phytosociological table:** Tab. 10; taxonomic nomenclature according to Bartolucci et al. (2018).

**Notes:** The forest communities in *Olea europaea* L. var. *sylvestris* (Mill.) Lehr. in Sicily and in the Mediterranean area in recent years have been the subject of phytosociological studies (Gianguzzi and Bazan 2019, 2020), which dealt with the syntaxonomic characterization of these cenoses and their respective distribution. In particular, the wild olive forests of Sicily have been attributed to three distinct associations and referred to two distinct alliances of the *Quercetea ilicis* class. In fact, two of them (Ruto chalepensis-Oleetum sylvestris Gianguzzi & Bazan 2019 and *Chamaeropo humilis-Oleetum sylvestris* Gianguzzi & Bazan 2019) denote a thermophilous character (infr- and thermomediterranean bioclimatic belts) and has been ascribed to the *Oleo-Ceratonion* alliance (order *Pistacio lentisci-Rhamnetalia alaterni*, both linked to basophilous substrates; the third association (*Calicotomo infestae-Oleetum sylvestris* Gianguzzi & Bazan 2019), more mesophilous (*mesoomediterranean bioclimatic belt*), is instead ascribed to *Erico-Quercion ilicis* alliance (order *Quercetalia ilicis*), typical of acidophilous substrates (metamorphites, quartzarenites, etc.). This led to a subsequent update of the distribution of the habitat 9320 in Sicily (Gianguzzi et al. 2020; Rivieccio et al. 2020; Bazan et al. 2021), in the same way as other scrub formations reported for the western part of Sicily and the small islands (e.g., Caldarella et al. 2011; Gianguzzi et al. 2011, 2012, 2014a, 2014b, 2015, 2018; Gianguzzi and La Mantia 2009;
La Rosa et al. 2021; Romano et al. 2006; etc.), leading to an implementation of the 4th Italian Report of Habitats. The reported station is located along the coastal belt of the southern Sicily, falling within the Natural Reserve of Monte San Calogero (Monte Kronio) and the SAC ITA040009 “Monte San Calogero (Sciacca)” (Fig. 16), on carbonate substrates located in the dry thermo-Mediterranean bioclimatic belt (Bazan et al. 2015).

**Figure 14.** Detail of the habitat 7220* in the reported stand (Fiuminata, MC); dripping water occurs also in summer.

![Image of habitat 7220* in Fiuminata, MC]

**Figure 15.** 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; Eionet 2019), in white (black outline) the cells later reported by Gianguzzi et al. (2020) and Bazan et al. (2021).
Table 10. Habitat 9320.

| Cell ID          | 10kmE459N161 | 10kmE459N161 |
|------------------|--------------|--------------|
| Latitude         | 37.524238    | 37.523987    |
| Longitude        | 13.131250    | 13.130899    |
| Date             | 4/28/2021    | 4/28/2021    |
| Area (m²)        | 150          | 150          |
| Altitude (m a.s.l.) | 220        | 230          |
| Exposition       | SE           | SE           |
| Slope (°)        | 30           | 40           |
| Cover (%)        | 100          | 95           |
| Average vegetation height (m) | 6       | 6.5          |

^Olea europaea L. var. sylvestris (Mill.) Lehr.

Charact. and diff. of Chamaeropo humilis-Oleetum sylvestris acanthetosum mollidis

| Cell ID          | 10kmE459N161 | 10kmE459N161 |
|------------------|--------------|--------------|
| Latitude         | 37.524238    | 37.523987    |
| Longitude        | 13.131250    | 13.130899    |
| Date             | 4/28/2021    | 4/28/2021    |
| Area (m²)        | 150          | 150          |
| Altitude (m a.s.l.) | 220        | 230          |
| Exposition       | SE           | SE           |
| Slope (°)        | 30           | 40           |
| Cover (%)        | 100          | 95           |
| Average vegetation height (m) | 6       | 6.5          |

^Olea europaea L. var. sylvestris (Mill.) Lehr.

Charact. and diff. of Ruta chalepensis-Oleetum sylvestris oleetosum sylvestris

Ruta chalepensis L.

| Presences |
|-----------|
| 1         |

^Pistacia terebinthus L. subsp. terebinthus

| Presences |
|-----------|
| 1         |

Charact. of Pistacio lentisci-Rhamnetalia alaterni and Oleo sylvestris-Ceratonion siliquae

Euphorbia dendroides L.

| Presences |
|-----------|
| 2         |

Teucrium fruticans L. subsp. fruticans

| Presences |
|-----------|
| 2         |

^Stachys major (L.) Bartolucci & Peruzzi

| Presences |
|-----------|
| 2         |

^Asparagus albus L.

| Presences |
|-----------|
| 2         |

Pistacia lentiscus L.

| Presences |
|-----------|
| 2         |

Charact. of Quercetea ilicis

Arisorum vulgare O.Targ.Tozz. subsp. vulgare

| Presences |
|-----------|
| 3         |

Rubia peregrina L.

| Presences |
|-----------|
| 2         |

Allium subhirsutum L. subsp. subhirsutum

| Presences |
|-----------|
| 2         |

Oxalis alba L.

| Presences |
|-----------|
| 1         |

Ampelodesmos mauritanicus (Poir.) T.Durand & Schinz

| Presences |
|-----------|
| +         |

Calicostome infesta (C.Presl) Guss. subsp. infesta

| Presences |
|-----------|
| 1         |

Other species

Arum italicum Mill. subsp. italicum

| Presences |
|-----------|
| 2         |

Hyparrhenia hirta (L.) Stapf subsp. hirta

| Presences |
|-----------|
| 1         |

Phagnalon saxatile (L.) Cass.

| Presences |
|-----------|
| 1         |

Oxalis pes-caprae L.

| Presences |
|-----------|
| +         |

Brachypodium distachyon (L.) P. Beauv.

| Presences |
|-----------|
| +         |

Asphodelus ramosus L. subsp. ramosus

| Presences |
|-----------|
| +         |

Micromeria graeca (L.) Rchb. subsp. graeca

| Presences |
|-----------|
| +         |

Charybdis maritima (L.) Speta

| Presences |
|-----------|
| +         |

Andropogon distachyos L.

| Presences |
|-----------|
| +         |

Bituminaria bituminosa (L.) E.H.Stirt.

| Presences |
|-----------|
| 1         |

Petrosedum sediforme (Jacq.) Grulich

| Presences |
|-----------|
| +         |

Capparis spinosa L.

| Presences |
|-----------|
| +         |

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

Figure 16. Habitat 9320, Olea europaea L. var. sylvestris formation at Monte San Calogero (Sciacca, SW-Sicily, Italy).
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