

## E1.3a Mediterranean closely grazed dry grassland

### Summary

These are heavily-grazed pastures of the Mediterranean basin, mostly on silt and clay soils in the lowlands, dominated by rosette plants and small grasses tolerant of intensive herbivory and trampling. The soils are dry in summer which helps exclude nitrophilous plants that might be encouraged by dunging, but refreshed by autumn rains, the herbage remains green and productive through the winter, providing valuable forage. Companion plants vary widely across the large range. Though threatened by abandonment of traditional management and more locally by afforestation, urbanisation and pollution, there has been little reduction in extent, but a more substantial loss in quality in some regions.

### Synthesis

The habitat type is assessed as Least Concern at the EU28 and EU28+ levels since, although a decline in quantity and quality has been reported, it is not declining fast enough as to qualify for a threatened category. The quantitative trend shows a slight decrease in the last 50 years (3% on average), indicating that in spite of the general tendency to abandon the traditional grazing activities, still the actual decline for this habitat type is not so severe, although the reduction is expected to be far more serious in the next future. The values of EOO and AOO largely exceed the thresholds for higher levels of threat. Only few countries reported about the qualitative decline, with average values not qualifying for any threatened category. Further research is needed on the quality trends, especially for Spain, accounting for the largest area.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

### Sub-habitat types that may require further examination

No sub-habitats have been distinguished for further analysis.

### Habitat Type

#### Code and name

E1.3a Mediterranean closely grazed dry grassland



Close-up view of an aspect of the habitat from the alliance *Romulion*, N-E Greece. (Photo: K. Vidakis).



An early summer view of a *Poa bulbosa*-dominated dry grassland, Mt. Petano, Central Italy. (Photo: Daniela Gigante).

## Habitat description

These grasslands consist of heavily grazed pastures, mostly by sheep. They are usually found on fine clay/silt soils and on flat areas, often at low elevations, which are intensively grazed and trampled by livestock. Due to grazing, their soils are often eutrophic, although they contain low abundance of nitrophilous plant species, probably due to the xerothermic conditions of these areas and to the effect of soil compaction by trampling. These anthropogenic grasslands are dry in early summer, but with the first autumn rains sprout and grow rapidly, remaining green and fertile during the winter. The dominating species, usually hemicryptophytes and chamaephytes such as *Poa bulbosa* and clovers, are characterized by grazing-tolerant mechanisms (e.g. rosettes) and low height. Such grasslands are found mostly in the Mediterranean and sub-Mediterranean zone of the western and central Mediterranean basin, including N-W Africa; their eastern distribution limit lies within the Balkan Peninsula. Depending on the environmental conditions and the geographic location, these grasslands include:

(a) Communities on acidic soils that tend to create uniform turfs with grasses and legumes adapted to grazing (e.g. *Poa bulbosa*, *Aira caryophyllea*, *Trifolium subterraneum*, *Trifolium nigrescens*). In Portugal these grasslands, among others, serve as very important food resources for wild rabbit populations and consequently for the diet of several important birds of prey, such as *Aquila adalberti*.

(b) Communities on clay soils of the western Mediterranean dominated by low hemicryptophytes and therophytes adapted to very intensive grazing, such as species with rosettes. The most common species of these grasslands are *Plantago serraria* and *Trifolium subterraneum*, while some of the diagnostic species are *Paronychia echinulata*, *Erodium primulaceum* and *Biscutella baetica*.

(c) Mesophilous grasslands of southern Italy which are usually the result of forest degradation. The most common species of these grasslands are *Bellis perennis*, *Barbarea bracteosa*, *Trifolium repens*, *Poa bulbosa*, *Plantago cupanii* and several others, some of which are endemic to Sicily.

(d) Communities of the southern Balkan Peninsula on fine clay soils (sometimes also in humid salty soils) around intensively grazed areas. In these early spring communities typical species develop from February to the end of March gradually drying out until summer, and only some C4 (drought-resistant species) plants can be found afterwards (e.g. *Achnatherum bromoides*). The most common species of these grasslands are *Romulea* spp., *Hedypnois rhagadioloides*, *Hypochoeris cretensis*.

Indicators of good quality:

- Presence of traditional grazing regime without signs of abandonment
- Absence of indication of significant, crevice-like, erosion
- Absence (or very low cover) of nitrophilous species
- No signs of secondary succession (e.g. encroachment of chamaephytes or shrub species)

Characteristic species:

Flora: Vascular plants: *Achillea coarctata*, *Acinos alpinus*, *Aira caryophyllea*, *Allium guttatum*, *Alyssum desertorum*, *Anthemis arvensis* subsp. *spacelata*, *Astragalus cymbaearpos*, *Astragalus echinatus*, *Astragalus incanus*, *Astragalus macrorhizus*, *Astragalus pelecinus*, *Astragalus scorpioides*, *Astragalus sesameus*, *Astragalus stella*, *Barbarea bracteosa*, *Bellis annua*, *Bellis perennis*, *Biscutella baetica*, *Carex caryophyllea*, *Convolvulus lineatus*, *Crepis zacintha*, *Erodium botrys*, *Erodium cavanillesii*, *Erodium primulaceum*, *Festuca trichophylla* subsp. *trichophylla*, *Galium murale*, *Gynandrisis sisyrrinchium*, *Hedypnois rhagadioloides*, *Herniaria glabra* var. *glaberrima*, *Herniaria glabra* var. *glabra*, *Hordeum murinum* subsp. *leporinum*, *Hypochoeris cretensis*, *Hypochoeris radicata* subsp. *platylepis*, *Lagurus ovatus*, *Linaria simplex*, *Lolium perenne*, *Lotus angustissimus*, *Lotus corniculatus*, *Lupinus micranthus*, *Medicago intertexta*, *Merendera filifolia*, *Moenchia erecta*, *Myosotis ramosissima*, *Onobrychis humilis*, *Ophrys*

*incubacea, Ornithogalum collinum, Parentucellia latifolia, Paronychia argentea, Plantago albicans, Plantago coronopus, Plantago cupanii, Plantago lagopus, Plantago lanceolata, Plantago loeflingii, Plantago serraria, Poa bulbosa, Poa trivialis, Potentilla calabra, Ranunculus bullatus, Ranunculus paludosus, Ranunculus pseudomillefoliatus, Romulea bulbocodium, Romulea linaresii subsp. graeca, Romulea ramiflora, Scorpiurus vermiculatus, Scorzonera villosiformis, Taraxacum obovatum, Teucrium capitatum, Thymus spinulosus, Trifolium bocconeii, Trifolium bivonae, Trifolium cherleri, Trifolium gemellum, Trifolium glomeratum, Trifolium micranthum, Trifolium nigrescens, Trifolium pallidum, Trifolium pratense subsp. semipurpureum, Trifolium repens, Trifolium scabrum, Trifolium subterraneum, Trifolium suffocatum, Trifolium tomentosum, Trigonella gladiata, Urospermum picroides, Vulpia sicula.*

### **Classification**

This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

E1.31 West Mediterranean xeric grassland

E1.32 Southwestern Mediterranean perennial pastures

E1.33 East Mediterranean xeric grassland

EurovegCheckList:

*Plantaginion serrariae* Galán de Mera et al. 2000

*Plantaginion cupanii* S. Brullo et Grillo 1978

*Poo bulbosae-Astragalion sesamei* Rivas Goday et Ladero 1970

*Romulion* Oberd. 1954

*Trifolio subterranei-Periballion minutae* Rivas Goday 1964.

Annex I:

6220 \*Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea

Emerald:

E1.3 Mediterranean xeric grassland

MAES-2:

Terrestrial - Grasslands

IUCN:

4.4 Temperate grassland

### **Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?**

Yes

Regions

Mediterranean

Justification

These closely grazed dry grasslands are typical of the Mediterranean region, where they find optimal climatic conditions for their development. They concur in shaping a cultural landscape linked to the traditional land use of these areas, now increasingly at risk of disappearance due to different economic

priorities and changing customs of the local populations.

## Geographic occurrence and trends

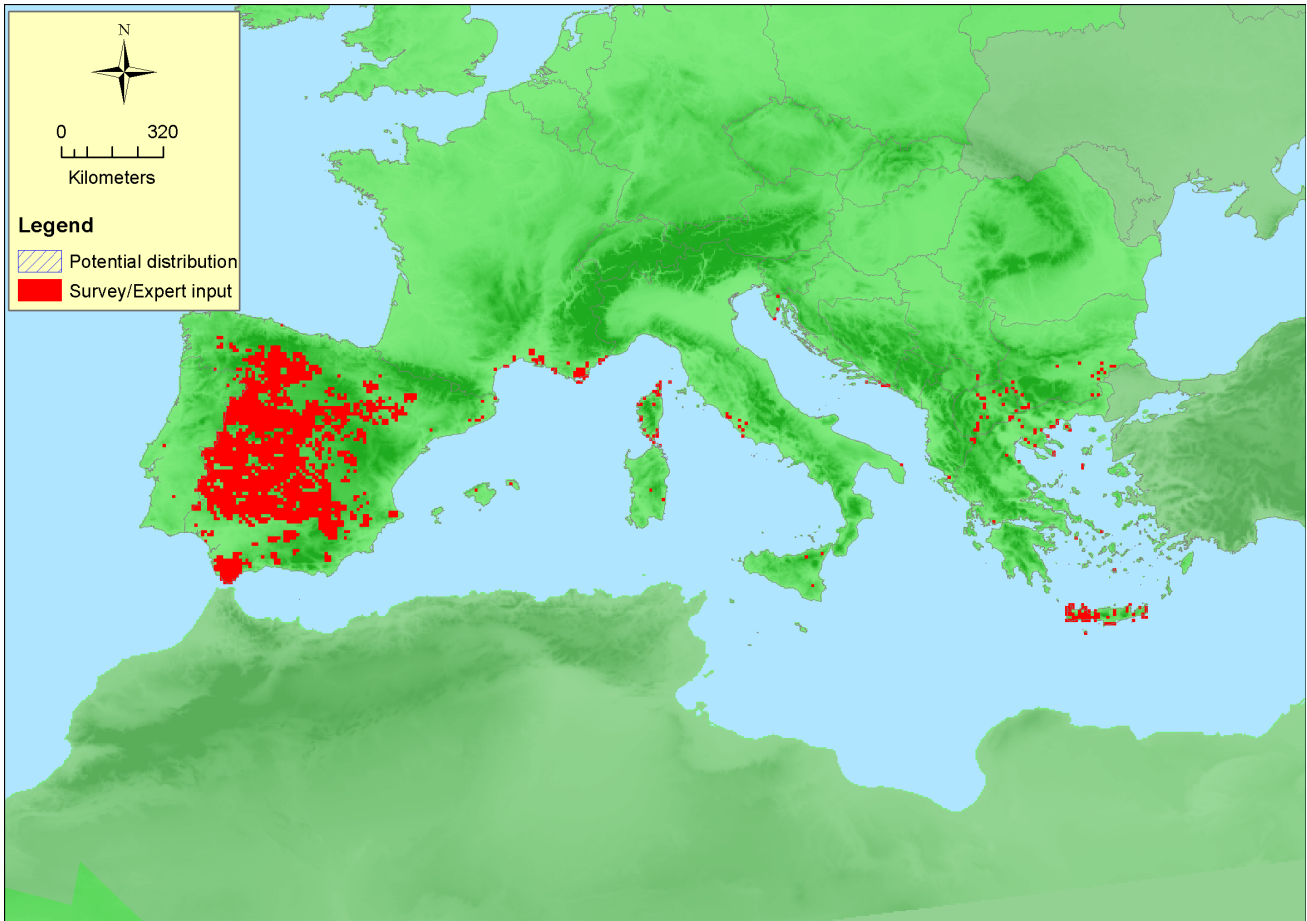
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Bulgaria</i>	Present	Unknown Km <sup>2</sup>	Decreasing	Decreasing
<i>Croatia</i>	Uncertain	Unknown Km <sup>2</sup>	Unknown	Unknown
<i>Greece</i>	Greece (mainland and other islands): Present	115 Km <sup>2</sup>	Unknown	Unknown
<i>Italy</i>	Italy mainland: Present Sardinia: Present Sicily: Present	477 Km <sup>2</sup>	Stable	Decreasing
<i>Malta</i>	Uncertain	Unknown Km <sup>2</sup>	Unknown	Unknown
<i>Portugal</i>	Portugal mainland: Present	98 Km <sup>2</sup>	Decreasing	Unknown
<i>Spain</i>	Spain mainland: Present	6.7 Km <sup>2</sup>	Decreasing	Unknown

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Albania</i>	Uncertain	Unknown Km <sup>2</sup>	Unknown	Unknown
<i>Bosnia and Herzegovina</i>	Present	5 Km <sup>2</sup>	Decreasing	Decreasing
<i>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	10 Km <sup>2</sup>	Stable	Stable
<i>Kosovo</i>	Uncertain	Unknown Km <sup>2</sup>	Unknown	Unknown
<i>Montenegro</i>	Uncertain	Unknown Km <sup>2</sup>	Unknown	Unknown

## Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
<i>EU 28</i>	2504350 Km <sup>2</sup>	2027	7,388 Km <sup>2</sup>	
<i>EU 28+</i>	2714950 Km <sup>2</sup>	2055	7,403 Km <sup>2</sup>	

## Distribution map



The map is incomplete, depending on availability of data in EVA database, but rather complete for Spain. Data sources: EVA, NAT.

### How much of the current distribution of the habitat type lies within the EU 28?

Since data from Croatia, Malta and part of the Balkan Peninsula are still missing, more than 99% of the known European distribution area of this habitat type lies inside the EU 28 territory. With quantitative data from Albania, Montenegro and Kosovo perhaps the rate of presence out of EU28 might increase; however, this habitat type is mostly represented in Spain and Mediterranean Italy. No data are available to quantify the distribution area of this habitat outside of Europe (in northwestern Africa).

### Trends in quantity

The quantitative trend of this habitat type is of a slight decrease (3% on average, based on the weighted average of data and trends provided by Spain, Portugal, Italy and Bosnia and Herzegovina), with significant local tendencies to a reduction only in Portugal and Bosnia and Herzegovina (about 50% in both countries in the last 50 years). The areas in these countries are rather small, consequently their relatively strong reduction does not affect the average trend in quantity, however it indicates that this habitat is seriously threatened at the national level. Spain and Italy account for the largest areas, with 6,698 and 477 km<sup>2</sup> respectively. A stable situation has been reported in Italy, while a slight decrease (2%) have been reported in Spain.

- Average current trend in quantity (extent)  
 EU 28: Decreasing  
 EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?  
 No  
*Justification*

The geographical range of the habitat (EEO) is very wide and the observed decline in extent is moderate.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?

No

*Justification*

The geographical range of the habitat (EEO) is very wide.

## **Trends in quality**

Reported information on qualitative declines is only available for Italy, Bulgaria and Bosnia-Herzegovina (from moderate to severe). On average, it affects an extent of 20% of the total area of the habitat with a severity of about 55%. It should be noted that data from Spain could not be used for the quality assessment, since no qualitative indications were given by the experts, although they reported a general decrease. Being the Spanish area by far the largest for this habitat type, more detailed information is needed to proceed with a more complete qualitative assessment.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

## **Pressures and threats**

---

The main pressures to this habitat type are the following: the abandonment of traditional management of pastoral systems and the related lack of grazing, also due to a drastic reduction in the number of livestock in rural areas in the last decades; the consequent biocenotic evolution and succession, and the transformation into arable land with agriculture intensification. At the local level, urbanization, reforestation and pollution can have an impact on the quantitative and qualitative decline of this habitat type. Fire can be another important factor, both because of high frequency as well as for its suppression. According to the territorial experts, some major effects of the indicated pressures include area loss, changes in the species composition and ruderalisation, changes in the local ecological conditions, overgrowing by shrubs and woody species, degradation and loss of genuine specific composition. Indeed, this habitat type is strongly linked to human management and traditional grazing activities (especially by sheep and cattle) and the major threat is the abandonment of these practices. On the other side, for some areas (e.g. FYRO Macedonia) it is also indicated that due to global climate change, the surface of this habitat might increase and expand from the south to the central parts of the country. A similar scenario can occur in other Mediterranean countries.

## **List of pressures and threats**

### **Agriculture**

Modification of cultivation practices

Agricultural intensification

Grazing

Abandonment of pastoral systems, lack of grazing

### **Sylviculture, forestry**

Forest planting on open ground (native trees)

Artificial planting on open ground (non-native trees)

### **Natural biotic and abiotic processes (without catastrophes)**

Biocenotic evolution, succession

Species composition change (succession)

## Geological events, natural catastrophes

Fire (natural)

## Conservation and management

---

The general deep transformation and loss of the traditional grazed landscapes is affecting most of the seminatural dry grasslands all over central and southern Europe, including this habitat type. Promotion, and in many cases reintroduction, of the traditional pastoral systems with intensive grazing are the most effective ways (and probably the only ones) for the conservation of these complex systems and their landscape. A controlled use of fire can also represent an effective way to maintain this habitat type. The establishment of protected areas, supported by an active protection of habitats and landscapes, might enhance the conservation of this habitat type, based on proper protocols for a correct management.

### List of conservation and management needs

#### Measures related to agriculture and open habitats

Other agriculture-related measures  
Maintaining grasslands and other open habitats

#### Measures related to spatial planning

Establish protected areas/sites  
Legal protection of habitats and species  
Manage landscape features

### Conservation status

Annex I:

6220\*: CON U1, MED U1, ALP unknown

### When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

Being a semi-natural habitat almost completely dependant on correct management, the typical character and functionality can only be recovered once the traditional intensive grazing activity is re-established. The floristic composition should include plant species well adapted to grazing, depending on the proximity of a seed source, although a basic role in the colonization is provided by the grazing animals who act as vectors for the dissemination.

### Effort required

10 years
Through intervention

## Red List Assessment

---

### Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-3.2 %	Unknown %	Unknown %	Unknown %
EU 28+	-3.2 %	Unknown %	Unknown %	Unknown %

The trend in the last 50 years shows a reduction of about 3%, resulting in the category of Least Concern under Criterion A. The trend reported for this habitat type in the countries of occurrence is of slightly

decreasing or even stable in some of them, while a remarkable decrease has been observed only in Portugal and in Bosnia and Herzegovina, where it is only represented by small areas, whose conservation value appears consequently even higher. Spain accounts for the largest surface and for that country only a decrease of 2% is reported, indicating that in spite of the general tendency to an abandonment of the traditional grazing activities, the actual overall decline of this habitat type is not so large, although the reduction is expected to be more serious in the next future. No data is available to calculate the future and the historical decline of this habitat type.

### Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km <sup>2</sup>	Yes	Yes	no	>50	Yes	Yes	no	no
EU 28+	>50000 Km <sup>2</sup>	Yes	Yes	no	>50	Yes	Yes	no	no

The ongoing tendency to abandon the traditional grazing activities represents a threatening process likely to cause continuing declines in quantity and/or quality for this habitat type within the next 20 years. A future reduction in the spatial extent can be realistically predicted as a consequence of the dynamic processes of the vegetation, causing floristic and phytocoenotical changes affecting the biotic quality of the habitat. However the values of EOO and AOO largely exceed the indicated thresholds and as a consequence the assessment of this habitat type results in the category of Least Concern.

### Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	20 %	55 %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	20 %	55 %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%
EU 28+	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%

Only few countries reported about the qualitative decline: Italy, Bulgaria, Bosnia-Herzegovina (from moderate to severe). Based on the provided trends for extent and severity of degradation, a qualitative decline affects an extent of 20% of the total area with a degree of severity of 55% on average. It should be noted that for Spain no qualitative trends are available, so data from this country could not be included in the calculation of the parameters, but the expert's opinions have reported on a general decline in the area. The Spanish area being by far the largest for this habitat type, more detailed information is needed to proceed with a more complete qualitative assessment. Based on the available data, the application of Criterion C/D1 brings to assess this habitat type as Least Concern.



## Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	Unknown
EU 28+	Unknown

There is no quantitative analysis available that estimates the probability of collapse of this habitat type.

## Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	LC	DD	DD	DD	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

## Confidence in the assessment

Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

## Assessors

Gigante, D.

## Contributors

Type description: G. Fotiadis & M. Vrahnakis

Territorial data: E. Agrillo, F. Attorre, J. Capelo, L. Casella, D. Espírito-Santo, D. Gigante, G. Giusso Del Galdo, C. Gussev, J. Loidi, C. Marcenò, V. Matevski, Đ. Milanović, S. Sciandrello, D. Viciani

Working Group Grasslands: I. Biurrun, J. Dengler, D. Gigante, Z. Molnar, D. Paternoster, J. Rodwell, J. Schaminée, R. Tzonev

## Reviewers

M. García Criado

## Date of assessment

27/10/2015

## Date of review

11/01/2016

## References

---

Apostolova, I., Dengler, J., Di Pietro, R., Gavilán, R.G., Tsiripidis, I. 2014. Dry grasslands of southern Europe: syntaxonomy, management and conservation. *Hacquetia* 13/1: 5-18.

Bacchetta, G, Brullo, S., Giusso, Del Galdo, G., Guarino, R. 2005. Indagine fitosociologica sulle praterie a *Brachypodium retusum* (Pers.) Beauv. della Sardegna. *Parlatorea*, 7: 27-38.

Bagella, S, Caria, M.C., Farris, E., Rossetti, F., Filigheddu, R. 2014. Traditional land uses enhanced plant biodiversity in a Mediterranean agro-silvo-pastoral system. *Plant Biosystems*. doi: 10.1080/11263504.2014.943319

- Bagella, S., Filigheddu, R., Caria, M.C., Girlanda, M., Roggero, P.P. 2014. Contrasting land uses in Mediterranean agro-silvo-pastoral systems generated patchy diversity patterns of vascular plants and below-ground microorganisms. *Comptes Rendus Biologies*. doi: 10.1016/j.crvi.2014.09.005
- Bagella, S., Salis, L., Marrosu, G.M., Rossetti, I., Fanni, S., Caria, M.C., Roggero, P.P. 2013. Effects of long-term management practices on grassland plant assemblages in Mediterranean cork oak silvo-pastoral systems. *Plant Ecology*, 214: 621-631.
- Biondi, E. and Bagella, S. 2005. Vegetazione e paesaggio vegetale dell'arcipelago di La Maddalena (Sardegna nord-orientale). *Fitosociologia*, 42(2) suppl.1: 1-99.
- Biondi, E., Ballelli, S., Allegranza, M., Taffetani, F., Francalancia, C. 1994. La vegetazione delle "fiumare" del versante ionico lucano calabro. *Fitosociologia*, 27: 51-66.
- Biondi, E., Blasi, C., Allegranza, M., Anzellotti, I., Azzella, M.M., Carli, E., Casavecchia, S., Copiz, R., Del Vico, E., Facioni, L., Galdenzi, D., Gasparri, R., Lasen, C., Pesaresi, S., Poldini, L., Sburlino, G., Taffetani, F., Vagge, I., Zitti, S., Zivkovic, L. 2014. Plant communities of Italy: The Vegetation Prodrome. *Plant Biosystems* 148(4): 728-814. doi: 10.1080/11263504.2014.948527
- Biondi, E., Blasi, C., Brugiapaglia, E., Fogu, M. C., Mossa, L. 1994. La vegetazione nitrofila della città di Cagliari (Sardegna). *Allionia*, 32: 303-323.
- Biondi, E., Blasi, C., Burrascano, S., Casavecchia, S., Copiz, R., Del Vico, E., Galdenzi, D., Gigante, D., Lasen, C., Spampinato, G., Venanzoni, R., Zivkovic, L. 2009. *Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE*. Società Botanica Italiana. Ministero dell'Ambiente e della tutela del territorio e del mare, D.P.N. <http://vnr.unipg.it/habitat/>
- Biondi, E., Burrascano, S., Casavecchia, S., Copiz, R., Del Vico, E., Galdenzi, D., Gigante, D., Lasen, C., Spampinato, G., Venanzoni, R., Zivkovic, L., Blasi, C. 2012. Diagnosis and syntaxonomic interpretation of Annex I Habitats (Dir. 92/43/ EEC) in Italy at the alliance level. *Plant Sociology*, 49(1): 5-37.
- Biondi, E., Filigheddu, R. and Farris, E. 2001. Il paesaggio vegetale della Nurra (Sardegna nord-occidentale). *Fitosociologia*, 38(2), suppl. 2: 3-105.
- Blasi, C. (Ed.), 2010. *La Vegetazione d'Italia*. Palombi & Partner S.r.l. Roma. ISBN: 978-88-6060-290-9
- Caballero, R., Fernández-González, F., Pérez Badia, R., Molle, G., Bagella, S., Dottavio, P., Papanastasis, V.A, Fotiadis, G., Sidiropoulou, A., Ipikoudis, I. 2009. Grazing systems and biodiversity in Mediterranean areas: Spain, Italy and Greece. *REVISTA PASTOS*, 39: 1-154.
- Čarni, A., Matevski, V., Šilc, U., Čušterevska, R. 2014. Early spring ephemeral therophytic non-nitrophilous grasslands as a habitat of various species of *Romulea* in the southern Balkans. *Acta Bot. Croat.* 73(1): 155-177.
- Costa, J.C., Neto, C., Aguiar, C., Capelo, J., Espírito Santo, M.D., Honrado, J., Pinto-Gome, C., Monteiro-Henriques, T., Sequeira, M., Lousã, M. 2012. Vascular plant communities in Portugal (Continental, Azores and Madeira). *Global Geobotany*, 2: 1-180.
- Farris, E., Filigheddu, R., Deiana, P., Farris, G.A., Garau, G. 2010. Short-term effects on sheep pastureland due to grazing abandonment in a Western Mediterranean island ecosystem: a multidisciplinary approach. *Journal for Nature Conservation*, 18(4): 258-267.
- Farris, E., Filigheddu, R.S. and Secchi, Z. 2007. Caratterizzazione fitosociologica dell'habitat prioritario 6220\*-"Percorsi substeppici di graminacee e piante annue dei Thero-Brachypodietea": caso di studio della Sardegna settentrionale. *Fitosociologia*, 44 (2-Suppl. 1): 271-278.
- Genovesi, P., Angelini, P., Bianchi, E., Dupré, E., Ercole, S., Giacanelli, V., Ronchi, F., Stoch, F. 2014. *Specie*

- e habitat di interesse comunitario in Italia: distribuzione, stato di conservazione e trend*. MATTM, ISPRA. 194 pp.
- ISPRA, 2009-2014. *Progetto Carta della Natura alla scala 1:50.000*.  
<http://www.isprambiente.gov.it/it/servizi-per-lambiente/sistema-carta-della-natura/carta-della-naturaalla-scala-1-50.000>
- MATTM, *3rd Italian national report 2014 - Report on Implementation Measures* (Article 17, Habitats Directive), 2007-2013. <http://cdr.eionet.europa.eu/it/eu/art17/envvupyjhw>;  
[ftp://ftp.dpn.minambiente.it/Natura2000/TrasmissioneCE\\_2014/](ftp://ftp.dpn.minambiente.it/Natura2000/TrasmissioneCE_2014/)
- Pisanu, S., Farris, E., Caria, M.C., Urbani, M., Filigheddu, R., Bagella, S. 2014. Vegetation and plant landscape of Asinara National Park (Italy). *Plant Sociology*, 51: 31-57.
- Ribeiro, S., Gonçalves, P. and Espírito-Santo, M.D. 2012. Land-use influence on Mediterranean perennial swards of *Poa bulbosa*: a case study in the International Tagus Region. *Lazaroa* 33: 51-64.
- Rivas Goday, S. and Rivas Martínez, S. 1963. *Estudio y clasificación de los pastizales españoles*. Ministerio de Agricultura. Madrid, pp. 269.
- Rivas-Martínez, S. Díaz T.E., Fernández-González, F., Izco, J., Loidi, J., Lousã, M., Penas, A. 2002. Vascular plant communities of Spain and Portugal. Addenda to the syntaxinomial checklist of 2001. *Itinera Geobotanica* 15(1-2): 5-922
- Rodwell, J.S., Schaminée, J.H.J., Mucina, L., Pignatti, S., Moss, D. 2002. *The diversity of European vegetation. An overview of phytosociological alliances and their relationship to EUNIS habitats*. Report EC-LNV 2002/054, Wageningen.
- San Miguel, A. 2008. *Management of Natura 2000 habitats. 6220 \*Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea*. European Commission.
- Šilić, Č. 1972/1973. Nova nalazišta nekih rijetkih i manje poznatih biljnih vrsta u flori Bosne i Hercegovine. *Glasnik Zemaljskog muzeja Bosne i Hercegovine u Sarajevu*, 11-12: 59-79.