Plant diversity and functions in semi-natural grasslands under different management intensities

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6210* habitat (http://burrenprogramme.com/the-burren/habitats/)
Grazing management parameters affecting vegetation

- Technique (continuous grazing, rotational grazing)
- Duration (all year long, part of the year)
- Intensity (high, moderate, low)
- Animals (cattle, sheep, goats, horses)
Grazing effects on plants diversity

Overgrazing

- decrease in biomass
- spread of ruderal species (short-lived, small size, fast-growing)
  (Diaz et al. 2007; Kleijn et al. 2011)

Undergrazing

- spread of competitive species (fast-growing, big size)
- progression of woody species (Peco et al. 2012; Kleijn et al. 2011)

Moderate grazing

Several species occupy different available niches
(‘Land use-moderated conservation effectiveness hypothesis’, Kleijn et al. 2011)
Plant diversity and functions

Maintaining a high level of biodiversity is particularly important since it means diversification of resources to higher trophic levels (Kruess et al. 2002)
The effects of RDPs on plants species diversity in extensively managed grasslands have not been properly explored (Kleijn et al. 2011)
Aims of the study

Management regimes  Plant species diversity  Functions

- Identify management practices and rural development measures that maintain the degree of conservation
- Assess the relations between plant diversity, pastoral value and support to insect pollinators
- Define compositional, structural and functional indicators relating management practices, degree of conservation and functions
6210(*) habitat

Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)

In almost the entire European continent with greater extension in the Mediterranean biogeographical region (Calaciura et al. 2008)

Anacamptis pyramidalis  Dactylorhiza sambucina  Himantoglossum adriaticum  Orchis militaris

6210* habitat extension in Natura2000 sites throughout Europe (Calaciura et al. 2008)
We trust that international partners will support us in collecting data.
Collecting management data

- Grazing localities
- Animals
- Age of the animals
- Productive use
- Grazing period
- Grazing technique
- Technique to improve grazing
- PSR payments
Identifying abandoned areas

Aerial photographs (1988-89, 2008)
Random sampling points
Collecting floristic data

nested floristic samplings
0.1-1-9-16 m²
Collecting environmental data

Topography

- elevation
- slope
- aspect
- rockiness
- stoniness

Soil

- litter’s dept
- organic horizon’s depth
- CaCo$_3$ concentration

Management

- n° and types of dung piles
- trampling
- bite
- grazing animals
- watering points

CaCo$_3$ analysis by using 10% HCl

Animal bite
Degree of conservation of the habitat

- species richness
- species evenness
- typical species
- species of conservation interest

Valeriana tuberosa

Orchis ustulata

Linum bienne
Plant diversity and forage quality

ROGGERO, BAGELLA, FARINA, 2002 *Rivista di Agronomia* 36.2

$$VP = 0.2 \times \sum (CS_i \times IS_i)$$

**Species Abundance**

**Species Index of pabularity**

- 0. ungrazed and/or toxic plant
- 1. occasionally grazed
- 2. poor forage plant
- 3. good forage plant
- 4. very good forage plant
- 5. excellent forage plant

*Phleum pratense*
Plant traits and forage quality

- Plant height
- Life form
- Longevity
- Growth form
- Onset of flowering
- Spinescence
- Seed mass
- Specific leaf area
- Leaf dry-matter content
- Leaf N and P concentration
Flower traits and support to pollinators

Floral traits and their diversity drive pollinator visitation

Felix Fornoff, Alexandra-Maria Klein, Florian Hartig, Gita Benadi, Christine Venjakob, H. Martin Schaefer and Anne Ebeling

Ophrys apifera

- Flower height
- Floral unit area
- Flower symmetry
- Blossom UV and visible light reflectance

Multispectral pictures (visible light, UV)
We trust that international partners will support us in collecting management and floristic data to extend the analysis to other European regions.

Thank you for your attention

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