

## **Assessing the conservation status of habitat 6210(\*) Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Italy**

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### **Abstract.**

One of the main goals of the protection and management of Natura 2000 habitat types is the assessment of their conservation status. While some countries have already tested procedures to assess conservation status, many others, including Italy, still lack standard measures at the national level. The aim of our study was to address this lack of a national standard in Italy for habitat 6210(\*) by adapting procedures used in other member states to the Italian context. The dry grasslands of habitat 6210(\*), determined by human activities, display very high species richness but are, at the same time, seriously threatened by current climatic trends and land-use changes. Although the conservation of this habitat is a priority, there is no policy regarding the conservation of such grasslands. On the basis of the parameters included in the Habitats Directive, we selected the indicators most suited to the assessment of conservation status. These indicators were inferred from floristic and vegetation data collected in 2010 and 2011. As structure parameters, we selected non-graminoid vs graminoid cover and shrub cover; as floristic and vegetation parameters, we selected the occurrence and abundance of characteristic and abundant species, of species of conservation or biogeographic interest, and of weeds or invasive species. We identified three types of indicators, which represent a tool for conservation strategies aimed at grasslands included in habitat 6210(\*).

**Key words:** grasslands, Natura 2000, monitoring, management, indicators

### **Introduction**

The evaluation of the habitat's conservation status has been defined by the Habitats Directive (92/43/EEC, hereafter HD). Some EU member states have already proposed and tested procedures to assess the conservation status of their habitats (e.g. Austria, France, UK, Spain), while many others, including Italy, lack standardized measures that can be used on a national scale. This paper presents part of a PhD project<sup>1</sup> that was designed to assess the conservation status of habitat 6210(\*) and that addresses the need for a standardized and validated approach (de Bello et al. 2010). For

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<sup>1</sup> This project is part of the activities carried out under an agreement between the Region of Molise and Italian Botanical Society (SBI) for Management Plans of 10 Natura 2000 sites in Molise.

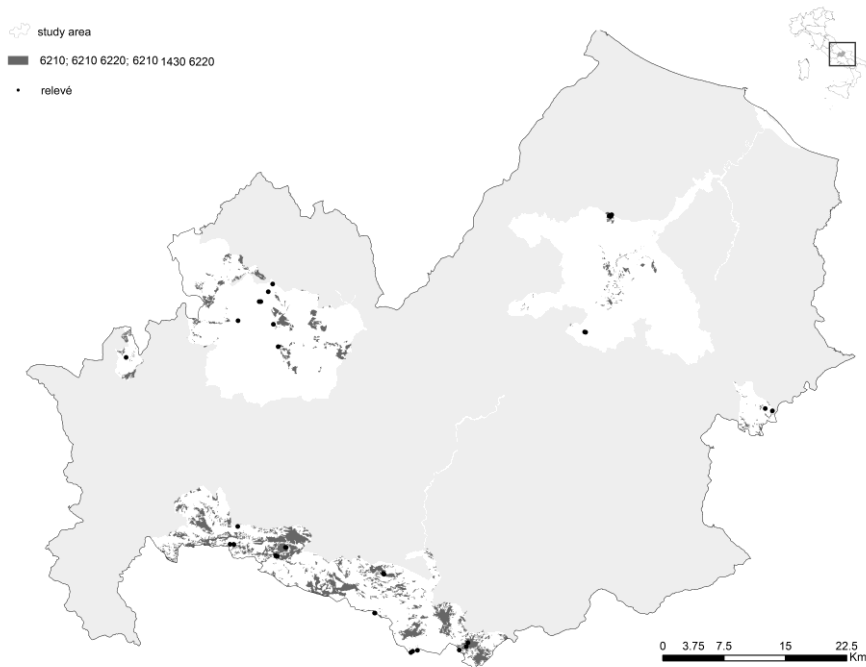
this purpose, we adapted procedures and indicators already being used in other member states to Italy (JNCC 2004, Yera Posa & Martorell 2009, Bundesamt für Naturschutz 2011).

Secondary succession grasslands are considered as important habitat type owing to their high species diversity. However, this habitat is currently being threatened by climatic factors and changes in land use (Gibson 2009). Although the conservation of this habitat is a priority for the scientific community (EDGG 2011, Fundatia ADEPT 2011, EGF 2011), no standardized measures exist for this purpose. Such measures should be aimed at grasslands that can sustain themselves and require minimal management. Indeed, it is more difficult to preserve grasslands that have begun to evolve into more advanced stages of vegetation (JNCC 2004). Dry grasslands referred to habitat 6210(\*) Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) are determined by human activities. The management practices that affect biodiversity in grasslands are above all livestock grazing and mowing (de Bello et al. 2007). The main aspects of these practices are the intensity of the activities (Bakker et al. 2006), their timing, their seasonality (Díaz et al. 2007) and local environmental conditions (Klimek et al. 2007). Another important factor, about which little is known, is the type and size of the grazing animals (e.g. sheep, goats, cattle, horses) (Bakker et al. 2006, Díaz et al. 2007). Indeed, Italy has witnessed changes in the type of grazing animals, particularly from sheep to cattle, fact that have led to changes in biodiversity, like in southern Italy (Fascetti *in verbis*).

After the II World War, land use in European rural areas changed considerably, with grasslands being affected most (Falcucci et al. 2007, de Bello et al. 2010). Moreover, the cessation of traditional management, due to both rural abandonment and agricultural intensification, determined the loss and fragmentation of habitats, which is considered to be one of the main causes of the decrease in biodiversity (de Bello et al. 2007).

## **Materials and methods**

The study area (Fig. 1) comprises ten Natura 2000 sites in the Molise region (central Italy). We focused on semi-natural grasslands, which represent one of the most common habitats in this region. More than 16% of the area is covered by habitat 6210(\*) (EEA 2011).



**Figure. 1** The study area

The parameters suggested by the HD to assess conservation status (EC 2007) can be used in various ways, depending on the purposes of the monitoring being conducted and the most accessible type of information. We selected indicators that could easily be collected during the field work. We also assessed human-induced threats according to the IUCN (2011) nomenclature. In order to test the conservation indicators in 2010 and 2011, we performed a floristic and vegetation survey by means of 37 phytosociological relevés, which we used to identify the habitat. We also identified the threats for each site.

### Results and Discussion

The surveyed grasslands, which we recognized as *Phleo ambigu-Bromion erecti* Biondi & Blasi ex Biondi et al. 1995, seem to be poorer in species than in the reference community, probably owing to the marly-arenaceous substrate that may reduce floristic diversity, as Biondi et al. (1985) also suggested. Below, we present the selected parameters, the information yielded by them and the methodology used to assess them.

We identified three types of indicators: (i) structure indicators; (ii) floristic and vegetation indicators; (iii) threats to the habitat posed by human activities. As structure parameters, we selected the relative cover of non-graminoids vs graminoids per relevé, which is a useful indicator of the naturalness of the grasslands (JNCC 2004, Pueyo et al. 2006, de Bello et al. 2010). We also selected shrub cover per relevé, which sheds light on the evolution of the vegetation stages (JNCC 2004). As floristic and vegetation parameters, “characteristic species composition” of the grasslands, assessed by the presence and cover of characteristic and abundant species (Braun-Blanquet 1931), was compared with that of a reference community, which is one of the most important floristic indicator methods available (de Bello et al. 2010); the presence and cover of weeds or invasive species indicates the fragility of the community or the presence of disturbance; lastly, the presence and cover of species of conservation or biogeographic interest and their population dynamics is indicative of the peculiarity of the site (JNCC 2004).

In the surveyed area, non-graminoid species are more abundant in the highlands, particularly in the Matese mountains, where sheep grazing is still practised, whereas graminoid species are more common in the lowlands, which are managed above all by mowing and cattle or horse grazing. The spread of *Brachypodium rupestre* (Host) Roem. & Schult. may reduce species richness, as observed by Catorci et al. (2011). Eleven relevés contained orchid species, which help to identify the conservation priority of the habitat (*Aceras anthropophorum*, *Anacamptis pyramidalis*, *Ophrys apifera*, *O. lutea*, *O. fuciflora*, *Orchis morio*, *O. pauciflora*, *O. sambucina*, *O. tridentata*, *Serapias vomeracea*); we also recorded three of the 35 species of conservation or biogeographic interest (*Himantoglossum adriaticum*, *Hypericum hircinum*, *Stipa austroitalica*).

As regards the threats, the main causes of biodiversity loss in the grasslands are land use changes, which could be assessed by diachronic remote sensing data. In particular, the abandonment and changes in the type of pastures, as assessed by the cover of clonal or spiny species of no pastoral interest, point to deviation from the reference community (Catorci et al. 2011). Indeed, abandoned pastures (i.e. those dominated by tall species) usually host a lower number of plant species (de Bello et al. 2010). The threat parameter data have not been analyzed yet.

## Conclusions

We identified three types of indicators, which represent a tool for conservation strategies aimed at grasslands included in habitat 6210(\*): (a)

Structure indicators: (i) non-graminoid vs graminoid cover ratio and (ii) shrub cover per relevé; (b) Floristic and vegetation indicators: (i) “characteristic species composition”, (ii) presence and cover of weeds or invasive species and (iii) presence and cover of species of conservation or biogeographic interest and their population dynamics. We are also planning to test the conservation status of the grasslands according to the following threats indicators: (i) changes in land use, as detected by means of diachronic remote sensing data and (ii) cover of clonal or spiny species of no pastoral interest.

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