



Small-scale traditional management of highly species-rich grasslands in the Carpathians



Dániel Babai^{a,*}, Zsolt Molnár^b

^a Centre for the Humanities, Hungarian Academy of Sciences, Országház u. 30., 1014 Budapest, Hungary

^b Centre for Ecology, Hungarian Academy of Sciences, Alkotmány u. 2-4., 2063 Vácrátót, Hungary

ARTICLE INFO

Article history:

Received 9 January 2013
Received in revised form 21 August 2013
Accepted 23 August 2013
Available online 20 September 2013

Keywords:

Conservation management
Hay meadow
Ecosystem service
Natura 2000
Small-scale farming
Traditional ecological knowledge

ABSTRACT

Abandonment or change of traditional (pre-modern) management systems threaten semi-natural grasslands worldwide. Understanding existing traditional grassland management could greatly help to improve our ability to preserve biodiversity in traditionally managed farmlands. We studied the management of species-rich man-made grasslands (ca. 32–52 vascular plant species on 16 m²) and the related traditional ecological knowledge in Gyimes (Romania), where more than 40,000 hectares of meadows and pastures are still managed traditionally. Methods of ecological anthropology e.g. participatory field work, semi-structured interviews (33 interviewees), and free listings were used. Csángós (people living in these valleys of the Carpathians) distinguish hay meadows based on manuring: nearby and distant hay meadows. Pastures are classified into pastures near settlements, mountain pastures, and pastures for sheep. Traditional management of meadows includes mowing, cleaning, mowing-date rotation of tracts, amelioration with hayseed and *Onobrychis viciifolia* seeds, manuring, manual thinning of unwanted plants, suppression of mosses, and small-scale drainage. We argue that the mowing-date rotation system found in Gyimes is a unique land-use practice that could greatly enhance biodiversity together with hayseed scattering. Treatment of pastures is more simple: sectional cleaning of shrubs/trees, and burning and corralling against *Nardus*. The goal of Csángós is not to protect biodiversity, but to keep their grasslands in good condition for a long run, and thus ascertain the availability of hay in the needed quantity and quality. We argue that subsidy systems should encourage the maintenance of this and similar systems, support the still existing local traditional communities and also in protected areas management systems should build on the experiences of these small-scale traditional farmers.

© 2013 Elsevier B.V. All rights reserved.

1. Introduction

Abandonment or drastic change of traditional management systems threaten habitats worldwide (Middleton, 2013). Grasslands, especially European semi-natural mountain grasslands developed in formerly forested areas many centuries ago and characterized by high vascular plant diversity at present (Merunková et al., 2012; Poschlod et al., 1998) are among the most threatened habitats. These grasslands have an important role for maintaining the livestock sector, which is dominant in the economy of mountain communities, since it is the branch of agriculture that can provide goods in marketable quality and quantity (dairy products, meat) in mountain environments (Glaser and Thornton, 2011; Meilieur, 1986).

Species richness of European grasslands depends significantly on their prehistoric origin (Hájková et al., 2011; Pärtel et al., 2007), the unique combination of local abiotic factors (Merunková et al., 2012), and the regional species pool (Merunková et al., 2012; Poschlod et al., 1998). However, it has also been shown that traditional land-use systems are important in maintaining species richness in grasslands (Aavik et al., 2008; Matějková et al., 2003; Poschlod et al., 1998; Prince et al., 2012). Despite this, detailed studies on the effects of traditional management of species-rich grasslands on diversity are scarce. Poschlod and WallisDeVries (2002) found, for instance, that historical land use of calcareous grasslands in Germany, such as medium- and long-term movement of grazing animals could be vital for the maintenance of the landscape and local diversity. Glaser and Thornton (2011) studied a Swiss alpine farming system, where, in spite of the ongoing erosion of traditional ecological knowledge and practices, they still could find evidence for the importance of ecological knowledge of local farmers and the vital role of local social structures in the resilience of small-scale mountain farming. Dahlström et al. (2013) compared the effectiveness of a living Romanian traditional

* Corresponding author. Tel.: +36 20 462 35 84; fax: +36 1 375 97 64.
E-mail addresses: babai.daniel@gmail.com (D. Babai),
molnar.zsolt@okologia.mta.hu (Z. Molnár).

meadow-management system with the grassland management conducted by Swedish nature conservation.

European traditional extensive land-use systems that can ensure the maintenance of semi-natural grasslands have changed significantly during the last century (Baur et al., 2006; Glasenapp and Thornton, 2011; Poschlod and WallisDeVries, 2002; Poschlod et al., 1998). Traditional land use has undergone a transformation, or even ceased to exist, especially in the mountain regions. Extensive land use yields little profit while it is labor-intensive. As a consequence, farming is becoming more intensive on highly productive and/or more conveniently located semi-natural grasslands (Niedrist et al., 2009), while unfavorable areas are abandoned (MacDonald et al., 2000). Intensification leads to the homogenization of the landscape and the disappearance of microhabitats after while (Tasser and Tappeiner, 2002). Abandonment can result in rapid encroachment of shrubs and forests below the timberline (MacDonald et al., 2000; Tasser and Tappeiner, 2002). These processes have resulted in a drastic decrease in the area of semi-natural grasslands not only in mountains, but also in general (up to 70–90%, Cousins and Eriksson, 2001; Dahlström et al., 2013; Glasenapp and Thornton, 2011; Poschlod et al., 1998; Vassilev et al., 2011), and have led to a significant decline in species diversity (Glasenapp and Thornton, 2011; Merunková et al., 2012; Pavlík et al., 2011).

Intensification and abandonment in Western Europe took place decades ago (Glasenapp and Thornton, 2011; MacDonald et al., 2000; Meilieur, 1986). However, species rich grasslands are widespread in East-Central Europe (e.g. in the Carpathians) even today, and are often still managed extensively, though abandonment has started several decades ago in many parts of the region (Cremene et al., 2005; Dahlström et al., 2013). In the Gyimes part of the Eastern Carpathians, abandonment became a major factor only in the last five years. The process is driven by economic and demographic changes occurring at local and regional change, but it is also fostered by some agri-environmental subsidy schemes, their extreme bureaucracy and the strict regulations on dairy production implemented by the European Union.

More and more scientists (e.g. Fischer et al., 2012; Mascia et al., 2003; de Snoo et al., 2013; Whiteman and Cooper, 2000) argue that for maintaining biodiversity, social and psychological factors are sometimes more important than ecological ones. Hence, research on knowledge systems, behavior, motivation and ecological embeddedness of human communities that still maintain traditional landscape patterns and extensive species-rich semi-natural grassland areas is particularly important.

We have to document the traditional ecological knowledge used by local farmers to manage species-rich grasslands before this knowledge forever disappears (cf. Berkes et al., 2000; Molnár et al., 2008). Traditional ecological knowledge is a combination of elements of theoretical knowledge, practical experience, and beliefs (Berkes, 1999). In Europe, we define traditional ecological knowledge as knowledge based upon decades of personal experience with the surrounding living landscape, acquired through hands-on management of the landscape, and containing centuries-old, communally stored ecological experiences that are mostly independent of western science and connected to rituals of social life (Molnár et al., 2008). As this communal knowledge is severely eroding today, recovering its ecologically relevant elements is of utmost importance. Traditional ecological knowledge could help understand e.g. the various links between the social and ecological systems in order to develop more efficient and context placed conservation policies for traditional rural landscapes.

In this paper, traditional ecological knowledge related to the use of species-rich, extensively managed grasslands of a local mountain community is introduced. We document what type of meadows and pastures local people distinguish, how they manage

their meadows and pastures, and how they maintain and improve hay and pasture quality. The paper concludes with implications for nature conservation management by stressing the need of application of traditional ecological knowledge in management planning and execution, and the support of communities that still use traditional management systems.

2. Materials and methods

2.1. Study area

Gyimes is an ethnographically well-defined area situated in the Eastern Carpathians, Romania. The study area (60 km², valley of the Hidedgség stream, a tributary of Tatros, 46°37' N, 25°57' E) has an altitudinal range from 800 m up to 1500 m a.s.l. The mountains are composed primarily of acidic sandstone with some limestone. The climate is montane-boreal. The mean annual temperature ranges from 4 to 6 °C, and the amount of annual precipitation from 700 to 1200 mm (Nechita, 2003).

The area was an extensively used property of the neighboring Csík Basin and the border area of the Hungarian Kingdom from the 11th century. The first settlers arrived in Gyimes in the middle of the 18th century (Hofer, 2009), after which the number of inhabitants rapidly increased, and today approaches 15 thousands (Ilyés, 2007). Parallel to the growth of the population, the extent of forests was rapidly reduced by the creation of pastures and hay meadows, and reached a quasi-equilibrium by the middle of the 19th century (Babai, 2013). The result is a more or less stable mosaic of forests and dominating grasslands since the mid 19th century (Electronic Appendix, Photo 1). There is more than 16,000 hectare man-made grassland in the region (average 2.8 ha grassland/household in the studied village, Gyimesközéplök) (Sólyom et al., 2011). Total area of arable fields was ca. 8% in the 1960s, but decreased below 3% by 2010 (Sólyom et al., 2011).

The study area falls within the coniferous forest zone (*Hieracio rotundati-Piceetum*). Beech stands (*Symphyto cordati-Fagetum*) occur only scattered. The clear-cuts are dominated by *Senecioni sylvatici-Epilobietum angustifolii*, and *Fragario-Rubetum*. The grasslands are mountain pastures and meadows (*Arrhenatheretum elatioris* incl. *festucetosum rubrae*, *Festuco rubrae-Agrostietum capillaris*, *Anthoxantho-Agrostietum capillaris*, *Violo declinatae-Nardetum*). There is an increasing area of undergrazed pastures and some unmowed meadows in Gyimes as animal stocks are declining. On these pastures, *Betula pendula*, *Populus tremula*, *P. abies*, *Juniperus communis* (*J. nana* in the mountains), and *Rosa canina* agg. create patchy and dense thickets within a few years. Meadows are managed traditionally by 1593 out of the 2452 households (65%) in the studied village (Gyimesközéplök), who receive agri-environmental subsidies. Families still use more than 6900 hectares man-made grassland in this village. A significant portion of the area is part of the Natura 2000 network. Natura 2000 habitats related to our study are species-rich *Nardus* grasslands on siliceous substrates in mountain areas (6230), hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430), mountain hay meadows (6520), and alkaline fens (7230).

The flora is rich with 618 vascular plant species in the valley (Babai, 2013). The most species-rich grasslands are the mountain hay meadows (52 vascular plant species on 16 m² on average), followed by meadows near the settlements (32 species), alkali fens (29 species) and pastures (42 species) (Babai, 2013). One of the most species-rich grasslands ever documented in Europe is 15 km from our study area (Gyimes-passage, 82 vascular plant species on 16 m²) (Babai, 2013). In managed, temperate grasslands, the maxima in smaller spatial grains was 89 vascular plant species in 1 m² in Argentina, and 105 vascular plant species in 16 m² in the Czech Republic (Wilson et al., 2012). Scientific names of plant

Download English Version:

<https://daneshyari.com/en/article/8488015>

Download Persian Version:

<https://daneshyari.com/article/8488015>

[Daneshyari.com](https://daneshyari.com)