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The LIFE project STIPA: Saving Transylvania's important pastoral agro-ecosystems (Romania)

STIPA is an EU-funded LIFE project directed at the conservation of the dry grasslands of Târnava Mare SCI (Natura 2000 Site of Community Importance), in southern Transylvania, Romania. This area of outstanding European biodiversity, particularly the dry and steppic grasslands, has been maintained by centuries of low-intensity pastoral and mixed farming, but is now increasingly threatened by overgrazing, abandonment and conversion to arable land. The project aims to improve the conservation status of two priority dry grassland habitats in Annex I of the EU Habitats Directive – 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with important orchid sites, and 6240* Sub-Pannonic steppic grasslands – which cover approximately 6000 ha (7%) of the SCI. Started in late 2010, this 3-year project is co-ordinated by the Romanian NGO Fundația ADEPT Transilvania and co-financed by Orange Romania.

Abstract

Das LIFE-Projekt STIPA: Schutz der bedeutenden Weide-Landschaften in Transsylvanien (Rumänien)

STIPA ist ein LIFE-Projekt mit Fokus auf den Trockenrasen des Târnava Mare-Gebietes (Natura 2000-Site of Community Importance, SCI) in Süd-Siebenbürgen, Rumänien. Dieses Gebiet ist durch eine außergewöhnlich hohe Biodiversität gekennzeichnet, die vor allem durch die Vielfalt an Trocken- und Steppenrasen bedingt ist. Diese haben durch jahrhundertelange extensive Weidenutzung überdauert, sind jedoch heute sowohl durch Überbeweidung, als auch durch Nutzungsaufgabe und Grünlandumbruch gefährdet. Das Projekt verbessert die Schutzsituation von zwei prioritären Trockenrasen-Lebensraumtypen: 6210* Halbnatürliche Trockenrasen und verbuschte Ausbildungen auf Kalkuntergrund (*Festuco-Brometalia*) mit wichtigen Orchideenvorkommen, und 6240* Subpannonische Steppenrasen. Diese machen ungefähr 6000 ha (7 %) des Natura 2000-Gebiets aus. STIPA wurde Ende 2010 mit einer Laufzeit von drei Jahren gestartet. Es wird mitfinanziert durch Orange Romania und durch die rumänische NGO Fundația ADEPT Transilvania koordiniert.

Zusammenfassung

Transylvania possesses some of Europe's most significant stands of High Nature Value (HNV) lowland grassland. These traditionally-managed, low-input farmland meadows and pastures retain an abundance and variety of wild plants, animals and semi-natural habitats that have disappeared from much of the rest of the continent (VEEN et al. 2009). The floristically rich dry grasslands, especially, are habitats of international conservation importance, and their survival in Romania is all the more important given the large-scale loss of this habitat elsewhere.

However, until recently farm grasslands have not been a conservation priority in Romania (AKERROYD & PAGE 2006, 2011; MOUNTFORD & AKEROYD 2009). This is despite a decline in the traditional management practices needed to maintain them, which has accelerated following Romania's EU accession in January 2007. Since then, pressure has increased for large-scale (often unsustainable) rural development, more intensive land use and the conversion of permanent grassland to arable land. Meanwhile, economic depression in rural areas has resulted in depopulation (DIMANCESCU 2004: 47), with an exodus of young people from farming communities, contraction of the existing pattern of small farms, and abandonment of traditionally managed farmland (NATIONAL STRATEGY PLAN FOR RURAL DEVELOPMENT 2007–2013). HNV grasslands thus face substantial threats (RÁKOSY & KOVÁCS 2001, CREMENE et al. 2005, JONES 2009, JONES et al. 2010).

Extensive HNV dry grasslands occur in the dissected plateau of the Târnava Mare SCI (Fig. 3), an area of rolling, well-wooded hills and often deep valleys to the south of the old town of Sighișoara (AKERROYD 2006, AKEROYD & PAGE 2011).

1 Introduction



Fig. 1: Târnave Mare SCI landscapes: species-rich dry grassland above Viscri (left), and mosaic landscape of dry and mesic grassland, arable land, woodland and scrub near Daia (right).

The plateau lies in a region of continental climate, with high summer temperatures, and natural floristic richness. The uneven topography, the hills rising to 700–800 m separated by steep valleys, produces considerable microclimatic differences between south- and north-facing slopes. The human history of the area (see below) has also diversified habitats by creating a mosaic landscape (Fig. 1). The dominant geology of marls, the lime-rich clay layers interspersed with thin bands of sand, limestone, volcanic ash and loess, tends to instability.

Widespread slumping on slopes has created both patches of unstable open ground and a hummocky topography, notably steep-sided hillocks (*movile* in Romanian) (Fig. 2). These characteristic landscape features comprise a significant physical element of the dry grasslands, and the *movile* especially exhibit remarkable floristic diversity of xeric and mesic species, including woodland plants and montane floristic elements such as *Daphne cneorum* and *Sesleria heufleriana* (SCHNEIDER-BINDER 1971, 1975, 2008). The flora of the *movile* and other steep slopes includes four species on Annex II of the Habitats Directive – *Crambe tataria*, *Echium maculatum* (*E. russicum*), *Iris aphylla* and, on more mesic *movile* slopes, *Adenophora liliifolia* – and more than 20 other species Red-listed in Romania, including *Adonis vernalis*, *Cephalaria radiata*, *Prunus tenella*, *Salvia nutans* and *S. transylvanica*. More recent discoveries in the SCI include the nationally rare *Hyacinthella leucophaea* and *Polycnemum majus* var. *mediterranea* Beck (JONES et al. 2010).

In the 12–13th centuries, German immigrants from Flanders and Luxembourg (known in Romania as *Sași* or ‘Saxons’) settled here, establishing regularly laid out villages, with fortified churches to deter invading Cumans, Tartars and Turks. They have farmed the land here for over 800 years, but in recent decades most Saxon farming communities have emigrated in Germany. Their legacy to us

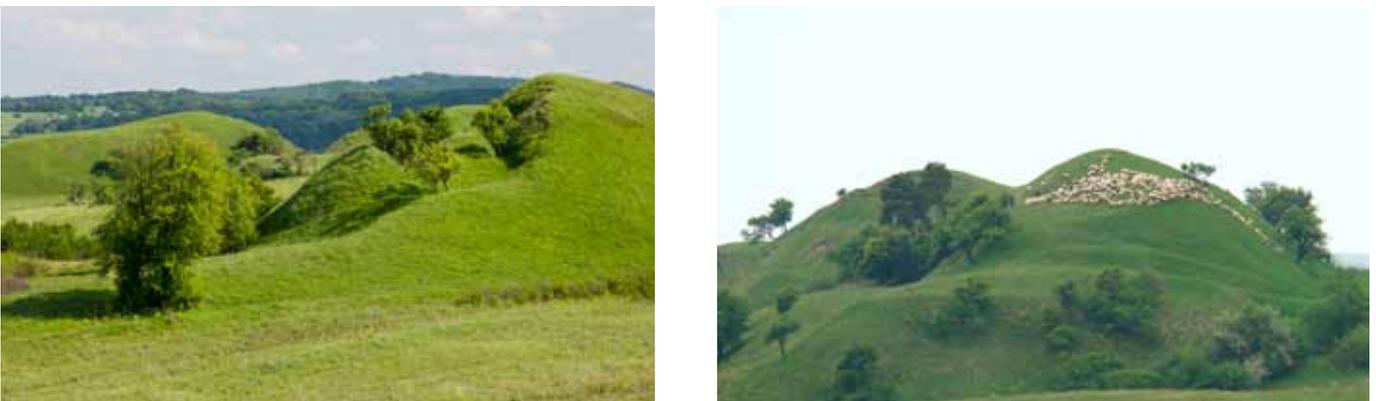


Fig. 2: Two views of part of a group of slumping hummocks or *movile* near Saschiz. The flock of sheep (right) indicates both the scale of this landscape and also how it is too often overgrazed.

today is one of Europe's last major regions of historic countryside, an almost 18th-century European agricultural landscape developed on the pattern of medieval settlement (AKERROYD 2006, AKEROYD & PAGE 2006, 2011). The mosaic of woodland, scrub, hay-meadow, pasture and small arable plots, maintained over centuries of low-intensity pastoral and mixed farming, is today an area of outstanding European biodiversity. However, the grasslands in particular face increasing threats from overgrazing, abandonment, improvement and conversion to intensive arable farming. Pastoralism, which has maintained this landscape for so long, is also changing, with a move away from cattle (and buffalo) to excessive numbers of sheep.

Fundația ADEPT Transilvania (www.fundatia-adept.org) was established in 2004 in order to address the uncertain future of these important grasslands. This Romanian conservation NGO is working with local people in a multi-disciplinary, landscape-scale initiative towards practical solutions to complex, interlinked problems of biodiversity conservation and rural community development (AKERROYD & PAGE 2011). Fundația ADEPT's central mission is to encourage continued good management by farmers, through practical advice and economic incentives, in order to maintain the links between traditional management and high-biodiversity habitats, as opposed to the simple application of conventional remedial measures for conservation. Only thus can such a large-scale landscape be maintained. Grasslands lie right at the heart of the rural economy, not only providing ecological 'goods and services' and a gene-bank of legumes and other forage plants, but also yielding meat, milk, traditional cheeses, honey, herbs, and dye and medicinal plants.

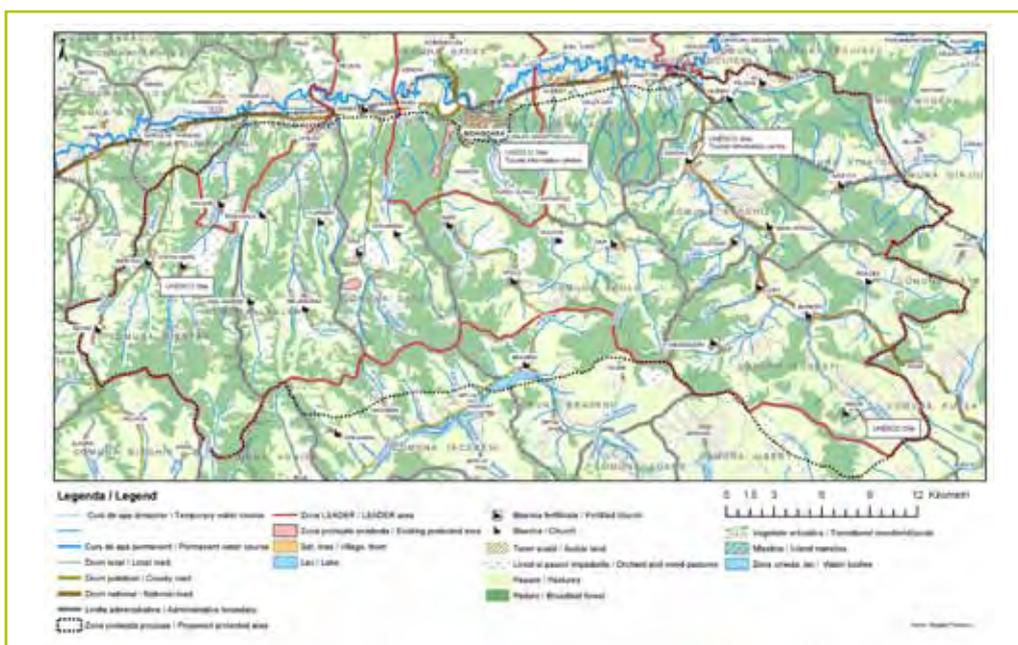


Fig. 3:
Map of Târnave Mare SCI,
showing the scattered villages
and the mixture of grassland and
woodland.

Among Fundația ADEPT's current activities is STIPA (Saving Transylvania's Important Pastoral Agro-ecosystems), an EU-funded LIFE+ project focusing on dry and steppic grasslands within Târnave Mare Natura 2000 Site of Community Importance (SCI) (Fig. 3). This project aims to improve the conservation status of two priority dry grassland habitats listed in Annex I of the EU Habitats Directive – 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with important orchid sites, and 6240* Sub-Pannonic steppic grasslands – which together cover c. 6,000 ha (7%) of the 85,374 ha SCI. Started in late 2010, this 3-year project is co-ordinated by Fundația ADEPT and co-financed by Orange Romania, with a total budget of €350,000.

An estimated 1000 ha of these habitats in the SCI are at present poorly managed through neglect and the decline of the traditional rural economy. Easily accessible sites have become overgrazed, while less accessible sites have been abandoned, with subsequent spread of thorny scrub dominated by *Crataegus monogyna* and *Prunus spinosa*. These effects should be readily reversible by the application of traditional management following initial restoration measures. STIPA is designed to provide the technical assistance to farmers needed for the continuation or re-establishment of such grassland management to bring dry grassland habitats under appropriate long-term maintenance regimes.

2 Methodology

Fundația ADEPT has carried out large-scale mapping of all habitats and species of interest in Târnava Mare SCI, creating a database of their presence and absence in land parcels, with an estimate of cover or populations. The STIPA database will provide precise maps of the two priority dry grassland habitats (6210* and 6240*), precisely identifying their locations using information derived from Digital Elevation Models, which is then verified in the field.

Assessment of conservation status based on the field visits to all sites will lead to a conservation plan for the area, with targeted conservation plans for specific sites, and monitored by detecting changes in habitat structural characteristics and species composition in large scale (hectares) and small scale (meters) in order to detect trends after restoration action. Evaluation of the large-scale data will be based on a rapid assessment of the area, representativity and conservation status. The methodology for small scale monitoring is sampling of permanent plots: permanent quadrat 4 x 4 m are being established at each monitoring site, the corners marked by iron sticks buried in the soil, and relocated by GPS and metal detector.

Conservation remedial measures have included the purchase for STIPA of a low-impact motorized mower capable of cutting overgrown grassland and clearing low scrub. This innovative machine, designed and built by the German manufacturer Martin Brielmaier (www.brielmaier.com), who has also loaned the project two similar machines, has a low centre of gravity and large plastic-spiked roller wheels. Not only does this design ensure the mower does not compact or disturb the soil, but also its stability facilitates safe and efficient use on steep slopes. Originally we had planned to supplement the Brielmaier machines with small walk-behind mowers (similar to the Allen scythes used by some farmers in the area). However, tests showed that at many dry grassland sites on steep slopes it would be dangerous to use these smaller mowers and they are insufficiently robust, and less efficient in terms of area mowed per hour, and fuel use. Instead the project employs chain-saws and heavy-duty metal-bladed strimmers, able to cope with small trees and other tough woody growth.

Another practical measure, bureaucratic rather than field-based, has been to assist farmers to enter EU schemes for agri-environment measures. Working with policy-makers, ADEPT has also contributed to the design of national and regional agri-environment measures, and to more general policy in the National Rural Development Programme, through collaboration with the Romanian Ministry of Agriculture & Rural Development at technical and policy level, and via membership of the National Monitoring Committee for Rural Development.

Land that has been invaded by scrub is not eligible for agri-environment payments. The inclusion of over 35,000 ha of permanent grassland in agri-environment agreements in the Târnava Mare area has had a significant impact in scrub clearance in grassland habitats across the SCI, including priority habitats 6210* and 6240*.

To increase local understanding and support for the conservation of these dry grasslands, Fundația ADEPT staff carry out farm visits and hold Town Hall and open meetings on a regular basis, keeping in close touch with mayors, town hall staff, farmer associations and local communities. They also present agri-environment modules in workshops for farmers, which include the demonstration of equipment and methods for control of invasion of grassland by scrub.

Fundația ADEPT is also raising awareness in local schools (with school nature classes and summer field trips) and also among the farming and wider rural community, of the importance of grassland biodiversity and general conservation. This is assisted by a newsletter, and illustrated leaflets on the ecology of dry grasslands and species of flowering plants and Lepidoptera that can be regarded as dry grassland (6210* and 6240*) indicators. These focus on more widespread and easily identifiable indicator species, and avoid the inclusion of rarer species, to make them more helpful for farmers and other non-professional users.

These elements will be brought together in a Conservation Plan for the area. Five of the potentially most threatened and floristically rich or significant areas are to be established as micro-reserves (LAGUNA, 2001), each with a simple, practical management agreement between Fundația ADEPT, the Town Hall and (where appropriate) private landowners. The first two of these sites have been identified and are described below.

3
Results and discussion

3.1 Mapping and assessment of conservation status of the two habitats

Sites of south or south-western aspect and with a slope of >15% were pre-selected by GIS mapping, followed up from May to September 2011 and 2012 by extensive field visits and validation of the vegetation present at the sites (Fig. 4). Detailed GIS mapping was used to identify 5,979 surfaces of correct aspect and inclination as potential target habitats. Of these, elimination and consolidation of surfaces led to a reduction of target surfaces to 752.

Having checked all these surfaces, we found that prediction by the GIS mapping (focusing on S- and SW-facing sites with >20° slope) was 90% correct when assessed in the field – a positive result for a process that could also be extended to other LIFE+ large-scale mapping projects. This saves a lot of field work time in this kind of landscape-scale project.

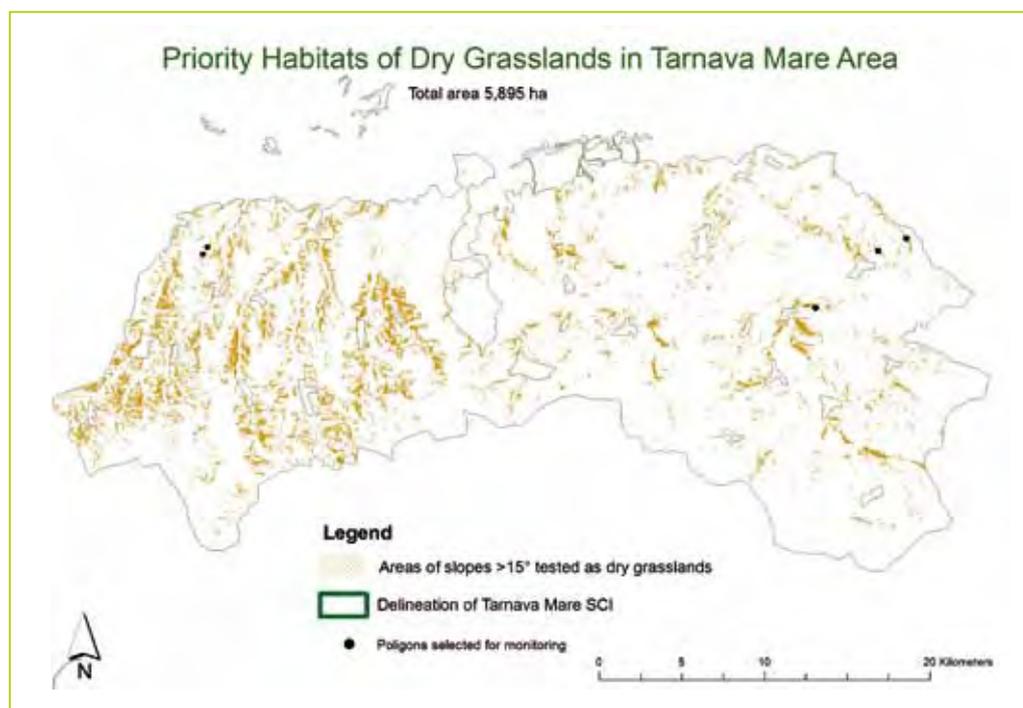


Fig. 4: Distribution in Tarnava Mare SCI of priority habitats 6210* and 6240* based on aspect and inclination, and confirmed by field visits; also the 5 established monitoring sites with permanent quadrates.

3.2 Concrete conservation measures on the identified surfaces

The Brielmaier mower (Fig. 5) has demonstrated its suitability and effectiveness for restoration and scrub control, and has provoked considerable interest from farmers and Town Halls. The farmers appreciate the fact that this mower is much less destructive of grass condition than rotary mowers. Nearly 200 ha of grassland has so far been cleared of invading scrub using these mowers, a process which has a demonstrative as well as direct restoration value. Landowners whose land has been cleaned have all agreed that they will keep their land in good order, using appropriate mowing and grazing to prevent future scrub invasion, for at least five years. This has the additional benefit of allowing them to enter agri-environment schemes.

Fig. 5: One of Fundația ADEPT’s Brielmaier mowing machine in action (left) cutting hay-meadow and (right) clearing thistles and other ruderal vegetation on the edge of a proposed micro-reserve at Apold. Note *movila* in the background.



However, the high price (€ 25,000 for each mower) is a problem. This requires special funding and sharing of these machines within the community. A way forward is that grassland falls partly under public ownership and therefore is under the control of the Town Halls, where Fundația ADEPT enjoys good relations with mayors and other officials.

One technique that requires further investigation is the use of controlled burning as part of restoration measures for dry grassland. Official approval of burning in Romania, especially in Natura 2000 sites or areas under agri-environment agreements, is fraught with problems of both legality and scientific approval, but we hope to carry out controlled burning on an experimental basis and to employ burning in future management if test results are positive. Some small trials have already been carried out (Prof. L. Rákósy, pers. comm. 2012) and do appear to provide a useful management tool. If controlled burning is not permitted – and widespread, uncontrolled illegal burning in late winter is indeed a problem in Târnava Mare SCI – we shall continue habitat restoration using other methods.

3.3 Establishing incentives for farmers

The main incentive for the continued good management of these grasslands is the High Nature Value Grassland agri-environment measures:

- 214/1 which stipulates mowing of meadows at least once per year but not before 1 July, and stocking rates on pasture of 0.7–1.1 Livestock Unit per hectare (to prevent both under- and over-grazing), and
- 214/2, the same conditions as 214/1, but which offers higher payment for the additional condition of no use of machinery.

The high uptake of these incentives in the Tarnava Mare SCI, noted above, has already made a considerable impact on the landscape. Although much land remains in poor condition (Fig. 6), in general scrub is being cleared, as farmers realize that their progress to improving scrub-invaded pastures will be checked by government officials. A problem is that woody material is left in piles that locally impede mowing and grazing and are likely to lead to local nutrient accumulation. Some limited burning may be an answer to this problem.

ADEPT is providing active assistance to farmers to access these measures. This has proved a simple but effective procedure to preserve good conservation status of the grasslands, and to gain the trust of the farmers. The number of farmers participating in the High Nature Value grassland agri-environment scheme in communes where ADEPT's farm advisory services have been operating is seven times higher than in neighbouring communes: 2,097 farmers (69% of eligible farmers, those receiving SAPS direct payments) on 35,421 ha (74% of land eligible for direct payments) are receiving a total of €4,959,060 per year (average €2,364 per farmer per year) on 5-year contracts. This is a considerably higher uptake than the national average (30%) in Romania, and represents a significant injection of money to the rural economy. The attraction of these grants is that this money is spent locally: large-scale capital investment grants tend to be spent on outside contracts that bring much less local benefit.

Fig. 6:
Poorly managed dry grassland near Archita, a site which Fundația ADEPT is bringing back into favourable conservation status as part of the STIPA project.



3.4 Contact and consultation with the farmers and landowners

Community actions to engender local support are an essential element of this project. In the period June 2011-Feb 2012 alone, we carried out 17 schools nature classes and six field excursions, based on agreements with nine schools. We held 10 village meetings including 358 farmers, local authorities and other interested parties. We demonstrated the innovative mowing equipment to 264 farmers during 43 farm visits.

We are keeping the local community informed with a 6-monthly dedicated newsletter, STIPA. ADEPT has also published colour-illustrated leaflets in Romanian (Fig. 7), and (for the benefit of tourists and other visitors) English on the ecology of dry grasslands (AKERROYD & BĂDĂRĂU 2012a) and species of flowering plants (AKERROYD & BĂDĂRĂU 2012b) and Lepidoptera (RÁKOSY 2012) that can be regarded as dry grassland (6210* and 6240*) indicators. These focus on the more common indicator and easily identifiable indicator species, and avoid the inclusion of rarer species, to make them more helpful for farmers and other non-professional users.

Fig. 7: Fundația ADEPT's Illustrated leaflets in Romanian and English aimed at farmers, other local people and visitors from Romania and other countries, on dry grassland and species of flowering plants and Lepidoptera that indicate the presence of priority habitats 6210* and 6240*.



3.5 Conservation action plan

We are developing the conservation action plan very much in consultation with the local farmers and Town Halls, based on the contact at these meetings. The conservation action plan will also draw on the results of assessments of conservation status, and on the large scale and small-scale monitoring. Management proposals will rely to a large extent on the financial incentives offered by the High Nature Value agri-environment scheme, to compensate farmers for control of livestock stocking rates, and the frequency and timing of mowing.

The conservation action plan will include specific protection, as micro-reserves for which we will make simple agreements with farmers, to protect hotspots of special importance. We have already identified three of these sites, on *movile* where both of the priority dry grassland habitats are found in close proximity, near Apold, Saschiz and Bunești. Many plants on these three groups of *movile*, especially on the driest slopes (AKERROYD & PAGE 2011), are among the rarest and most threatened in Romania, including more than 20 that are Red-listed. These and others are rare throughout Europe, and four (*Crambe tataria*, *Echium russicum*, *Iris aphylla* and, on more mesic slopes, *Adenophora lilifolia*, are listed on Annex II of the EU Habitats Directive as in need of special protection. Several other plants are endemic, i.e. not found outside Romania and one, *Pulsatilla pratensis*, is probably a distinct endemic subspecies. This and many other plants on the *movile* are not only rare but also of great beauty: for example *Adonis vernalis*, *Daphne cneorum*, *Orchis tridentata*, *Prunus tenella*, *Salvia nutans* and *S. transylvanica*. Several of the plants are medicinal herbs. Their assemblages are unique, the flora a curious mix of woodland, steppic and Mediterranean, even mountain, plants – each *movila* is a miniature botanic garden and a microcosm of the Transylvanian flora and vegetation.

3.6 Monitoring

For monitoring the results of conservation measures, we are carrying out annual large-scale inspections of all the identified blocks of the two habitats. This may not always yield hard scientific data, but is nevertheless valuable in assessing overall project impact on conservation status. This will involve on-site discussion with farmers and landowners.

In parallel, detailed monitoring will be carried out at the five established sites (Fig. 4). These sites were selected because they were invaded by scrub and suitable for restoration by clearance and removal of the invasive species. At each of these sites, we have set up a 4 x 4 m monitoring quadrat in a permanent plot, in which relevés were recorded before clearance and will be recorded each year. Within the quadrat, species lists are also being recorded in a grid of eight 0.5 x 0.5 m quadrats. We will thus monitor the response small-scale species diversity, as it responds to the removal of scrub cover.

4 Conclusions

The challenge for conservation in farmed landscapes such as Târnava Mare SCI, which lie outside the envelope of a conventional protected area network such as National or Nature Parks, is considerable, and conservation measures are liable to be distrusted by local people, who may fear they will have no benefit. All too often, environmental conservation is perceived as “a hindrance to economic prosperity, apparently disenfranchising the poor by denying them the right to improve their livelihoods” (GITHIRU, 2007). The biodiversity of the Saxon Villages area can be protected in the long term only if we can demonstrate that biodiversity conservation is of value to local people and linked directly to the regeneration of a depressed rural economy. Maintenance of HNV meadows and pastures must be seen to yield tangible benefits to farmers and farming communities, whether in the form of agri-environment incentive payments or of improved commercial incomes. Biodiversity conservation in the Saxon Villages will only succeed in the longer term within the framework of a stable rural society and economy.

This large-scale conservation project has integrated ecological studies and conservation measures for dry grassland with support for the local farming communities and their present and future livelihoods. The key to protecting this landscape is to work at multiple levels – from mapping based on ecological and floristic knowledge, through practical conservation interventions such as scrub clearance, to educational activities with local people and feeding into agricultural and rural development policy at regional and national level.

Dry grassland conservation is just part of the process required to protect the internationally important biodiversity and unique cultural landscape of the Saxon Villages. As well as contributing to the survival of the species-rich dry grassland landscapes of southern Transylvania, we hope that the methods and results of the STIPA project will serve as a useful model for future grassland conservation initiatives elsewhere in the Carpathian region and Europe.

Looking to the future, Fundația ADEPT is working with the Romanian Ministry of Agriculture and Rural Development (MARD), and the European Commission (DG Agriculture & Rural Development) to design and monitor a range of agri-environment measures for the next CAP period (2013–2019). These will be aimed at small-scale farmers, and include a simplified payments scheme for small farm holdings, improved criteria for eligibility of land (much permanent pasture is currently not eligible for direct payments or agri-environment payments but still yields ecosystem services), and funding for locally-based farm advisory services such as that piloted by the ADEPT project.

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