SALVERE – Semi natural grassland as a source of biodiversity improvement – a Central Europe Project

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Abstract

The 1992 Rio de Janeiro Convention on Biological diversity and the recent EU regulations promote the protection of biodiversity and demote the strong biodiversity decrease in Europe. To implement this aim, the availability of site-specific native seed and plant material is needed. In the case of grasslands, this requirement is not sufficiently met in Central Europe, where seed of herbaceous native ecotypes is seldom available in large amounts. Extensively managed semi-natural grassland (the most important type of High Nature Value Farmland - HNVF) can be regarded as a seed source useful to establish new HNV areas. Indeed, they are normally rich in species of native provenance and for this reason they can be harvested to obtain valuable propagation material. State of the art techniques to create forage meadows or to restore degraded areas using commercial seed mixtures are not comparable with the target of ecological restoration done with propagation material from semi-natural grassland. Therefore a large number of different harvesting methods and application techniques have been developed for exploitation and application of site-specific seed or plant material.

Key word: High nature value farmland, native seed and plant material, harvesting methods, biodiversity, restoration

General aims of the project

The Project SALVERE is implemented through the CENTRAL EUROPE Programme and co-financed by the European Regional Development Funds (European Territorial Cooperation). Till the end of the project period in December 2011, eight project partners from six countries work together. The general aim of the project is to stop the rapid decline of biodiversity and to contribute to protect biodiversity present in semi-natural grassland. The propagules of such potential donor sites can be used to restore new HNV Areas or species-rich grassland on former arable land, road embankments, ski slopes, areas of opencast mining and for compensation sites (Kirmer and Tischew, 2006; Krautzer and Hacker, 2006). Semi-natural grassland is the only existing source to provide ecological restoration of grassland with appropriate seed and plant material (Krautzer and Pötsch, 2009). Another important point is the quantification of the seed potential on donor sites, best practise methods for harvest and re-vegetation and the analysis of harvested seed material in terms of species composition and seed germination. Knowledge transfer into practice will be promoted via five workshops, one final conference, several field trips with interested stakeholders and other public relations events.

Material and Methods

In the summer 2009 the project partners implemented 17 trials with different target plant communities and continued studies on5 already existing trials, (Scotton 2010). Table 1 shows a list

of the implemented trials and the used methods.

Table 1: Number of implemented trials, involved plant communities and used methods to establish semi-natural grassland

target plant communities	
Arrhenatherion	8 partners (15 trials)
Bromion (Mesobromion)	4 partners (4 trials)
Molinion	2 partners (2 trials)
Deschampsion (Cnidion)	1 partner (1 trial)
used methods to establish semi-natural grasslands	
Green hay	8 partners
Dry hay	2 partners
On-site threshing	7 partners
Seed stripping	4 partners
Seed mixtures of local origin from seed propagation	3 partners

Material from available donor areas can be harvested for either direct use in restoration or for the further propagation of suitable material (Krautzer and Pötsch, 2009). Most of the different harvesting methods for site-specific restoration have been developed above all in the English and German speaking world in recent decades. The following harvesting methods for restoration were used for the introduction of target species and implementation of the demonstrations and experimental trials:

Green Hay (GH): A widespread method is the cutting of suitable donor sites at the time when most of the desired species are at an optimum stage of seed maturity. The ratio donor site to restoration site depends on biomass, seed content and plant community of the donor site and varies between 3:1 – 1:2.
Dry Hay (DH): Comparable to the green hay method but the material was dried on the donor site before harvesting. This method requires increased manipulation expenditure, whereby a large part of the diaspore material gets lost (ratio varies between 3:1 – 1:2).
On-site-threshing (OST): Threshing takes place with an appropriately adapted combine harvester at the optimum time of seed maturity. Through harvesting parts of several areas, a wide spectrum of species can be received at the right moment and stored for at least 1-3 years. The harvested pure seeds yield depends on seed content and the used technique and varies between 40 - 150 kg ha pure seeds. The application rate of on-site-threshing is between 1 - 5 g m^{-2}.
Seed stripping (SS): With the aid of a rotating brush, the mature seeds are brushed from the plants into a container and the harvested material can be reused either fresh or dry. The harvested yield of pure seeds varies between 20 – 80 kg ha and the applications rate is between 1 - 5 g m^{-2}.
Seed mixtures of local origin (S): Seeds for propagation were collected from suitable donor sites and cultivated for seed propagation. The recommended seed density is between 1 – 5 g m^{-2}. This method was used in combination with GH and OST.

Results and Discussion
The project SALVERE Project is still running and not all results are available. By now our results clearly show that harvesting of semi-natural grassland with different harvesting methods is an effective way to obtain regional seed mixtures for restoration. The composition of the harvested seed material varies depending on the harvesting method. On-site threshing and green hay are suitable harvesting methods and the material is rich in number and seeds of target species. The species richness of donor sites increases the restoration success of receptor sites (Kiehl *'et al.'*, 2009, Kirmer, 2010). Green hay is easier to harvest (with a tractor and self loading forage wagon), but in normal case just one cut is possible. The material from on-site threshing is bulk reduced and can be stored more easily after drying and it is possible to thresh a meadow in several parts to

harvest the early and the late maturing species. Harvesting of Arrhenatherion meadows in June enhances the transfer of grasses whereas harvesting in July promotes the herbaceous species.
In Europe ecological restoration made enormous progress in recent years (Krautzer and Wittmann, 2006). Twenty years ago, near-natural restoration was considered impossible. A large number of methods for winning, reproduction and use of this material have been developed. All over Europe there are numerous excellent examples of ecological restoration from wetlands to opencast mining areas up to high zones. The only available resource of seed- and plant material, which can fulfil the demands of nature conservation, regional aspects and site-specificity, is semi-natural grassland. To guarantee the regional availability of site-specific seed and plant material a register of potential donor sites should be developed. The donor site register will give information about site conditions, plant communities, exploitation methods and limitations. A draft for implementation in the single partner countries will be worked out within the SALVERE project. A potential problem in the use of site-specific native plant material for nature conservation improvement of existing grassland areas is given by the limitations of the national seed laws as an EU skeleton law. Until now, it is not permitted to bring threshed material for the restoration of grassland on the seed market. To solve this conflict between the nature conservation law and the seed law, the SALVERE team is working on a European guideline that is in context with the EU directive 2010/60 (EU 2010) that provides for certain derogations for marketing of fodder plant seed mixtures intended for use in the preservation of the natural environment. Summing up is to say that, restoration of semi natural grassland is an important way to enhance the biodiversity loos.

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