

# Experience in the management of litter meadows that had been abandoned for several years in Salzburg (Austria)

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## Introduction

Litter meadows contain a great number of endangered plant species and are very important for the conservation of biodiversity in the cultural landscape of Central Europe. They are endangered because the traditional management, comprising a single cut in the autumn has ceased in many cases. Abandonment has resulted in the land becoming fallow. Subsequent succession and even reforestation have led to a considerable loss of area and a drop in quality of the former litter meadows. In 2002, the group for the protection of biotopes HALM (Heimisches Arten- und Lebensraum-Management), which is a sub-organisation of the Österreichische Naturschutzjugend – Landesgruppe Salzburg (Austrian Nature Conservation Youth Group – Salzburg Division), has begun to manage three litter meadows (total area approximately 1.5 ha).



## Management carried out by HALM

Combating shrub invasion, removing litter layers in spring and restoring old systems of drainage ditches were the first tasks that were carried out manually. Most summers (end of June – July) between 2002 and 2005, the common reed and the large sedges were mown with motor-scythes to fight their dominance. In most cases the litter was removed in spring. In autumn 2004 litter meadow No 1 was treated with a chain-cutter combined with a roller to eliminate uneven patches and to enable further management to be carried out using machines (EICHBERGER & ARMING 2005).

## Material and methods

A detailed monitoring programme was only carried out on meadow No 1. The flowering stems of the two indicator species *Iris sibirica* and *Gladiolus palustris* were counted. Along a transect of 10m five permanent plots (1m x 1m) were marked durably with iron bars. Every year (2002-2005), the following parameters were examined on each plot: number of culms of common reed (*Phragmites australis* (Cav.) Trin. ex Steud.); height; number of leaves and diameter near the ground of every reed culm; cover of herb and moss layer, as well as litter layer. Finally, the vegetation was documented by a relevé following the method of Braun-Blanquet, but a percentage scale was used to estimate the cover of the plants. All the statistical analyses of the samples were carried out using an SPSS program.

## Results

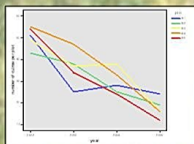


Fig. 3: Absolute number of reed culms counted on the permanent plots B1 – B5 in the years 2002 – 2005

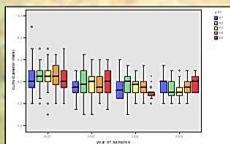


Fig. 4: Box plot diagrams showing the culm diameters of the reed culms on the permanent plots B1 – B5 in the years 2002 – 2005

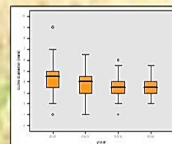


Fig. 5: Box plot diagrams showing the culm diameters of the reed culms in the years 2002 – 2005; for the box plot of one year the single criteria of the permanent plots B1 – B5 were used respectively

## Discussion

Initial results show an increase in the numbers of plant species that characterise litter meadows (e.g. *Gladiolus palustris*, *Iris sibirica*, *Molinia caerulea*). Since HALM has resumed management, a significant increase in the number of flowering stems of *Iris sibirica* (fig. 1) and *Gladiolus palustris* (fig. 2) has taken place. This can be interpreted as a result of better light conditions due to regular mowing. The decrease in the number of flowering stems of *Iris sibirica* in 2005 (fig. 1), still remaining on a high level, may be due to weather conditions or other autecological reactions. The decline in the number of reed culms in the years 2002 – 2005 is evident on every single permanent plot (see fig. 3). A decline has been found every year on most single plots. The average diameter of the reed culms decreased from 4.5mm in 2002 to 3.5mm in 2005 (which means a loss of 22.22%). This together with the decline in the number of reed culms (as well as the average height of the culms not shown here), the decrease of the phytomass of *Phragmites australis* is more than evident (see fig. 4 and 5). These results lead to the theory, that mowing common reed in summer and regularly removing litter cause a loss in the vitality of the reed. Therefore, other typical plant species of litter meadows can spread and are less suppressed by the competition of the reed. The results of the monitoring programme indicate that it is possible to restore the vegetation and the structure of typical litter meadows even when a meadow has lain fallow for more than ten years, and the natural succession to reforestation has already started. The goal is to complement continuous management of these litter meadows to conserve this biotope-type together with its wealth of species.

## Study area and situation

All three litter meadows are situated south of the city of Salzburg (Austria), in the landscape immediately north of mount Untersberg. Once there were extensive areas of litter meadows and moorland, of which today only small remnants are left. The traditional management of these meadows had been abandoned for several years. The (former) occurrence of *Gladiolus palustris*, which is threatened by extinction in the Federal Province of Salzburg (WITTMANN et al. 1996), had a decisive influence on the selection of the project areas.

Due to the results of WITTMANN (1989) it is relatively well known, how long the litter meadows had lain fallow. Table 1 shows the number of the meadow (referring to NOWOTNY et al. 2005, with more a detailed description), the traditional name of the owner's farm ("Hofname"), the approximate area, the year when management was resumed and the period of fallowness.

No	name of the owner's farm	area	management resumed in	period of fallowness
1	Althammerbauer	3750 m <sup>2</sup>	2002	approx. 20 years
2	Prähäuserbauer	6000 m <sup>2</sup>	2001	more than 10 years
3	Martinbauer	4400 m <sup>2</sup>	2002	only sporadic management in the last 20 years

Tab. 1: The litter meadows managed by HALM

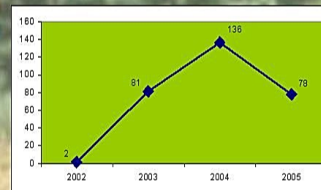


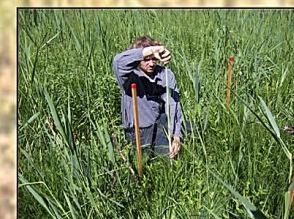
Fig. 1: Number of flowering stems of *Iris sibirica* L. in the years 2002 – 2005

*Iris sibirica* was documented on meadow No 1 in 1995 for the first time. At the end of the 1990s no flowering stems could be found. Since HALM has resumed management, the number of flowering stems has increased as shown in fig. 1.



Fig. 2: Number of flowering plants of *Gladiolus palustris* L. in the years 2000 – 2005

WITTMANN (1989) found approximately 150 flowering individuals of *Gladiolus palustris* on meadow No 1. Since 2000 the flowering plants of this species have been counted every year. When HALM began managing the meadow again in 2002, a significant increase could be seen (cf. fig. 2). Since 2004, *Gladiolus palustris* as well as *Iris sibirica* have shown a tendency to spread to new sites on the meadow, where these species have previously never been documented.



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**Photographs**  
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