

## Sandy grasslands regeneration results of the conservation management on the Homoktövis Conservation Area in Budapest (2009-2021)

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In Budapest, despite the density of the population, precious plant communities still remain in a lot of, mostly isolated fragments of habitats which, are outstanding in the diversity of species and are rare inhabitants of endemic species. On the examined territory, since 2006 long term reconstructions of the habitats have been ongoing which strive for the decrease of the invasive woody species on the territory and the insurance of the habitat of the sandy lawn, as well as the long term conservation of the fragments of the lawn and the creation of the natural sandy lawn. This activity is conducted by the volunteers of the MME and with the help of the students of educational institutions in parallel requesting for the permits of the Municipality of the Capital. During these interventions, the shoots were mechanically beat down and they were wiped dried as well. Besides these interventions, it was fundamental to preserve the sensitive, rare or legally protected species and to increase their volume as much as possible.

The area of Budapest came into existence on a surface of big variability regarding its natural geography, where the absolutely differing habitat types could exist within relatively small distances. In the following periods investigations appeared in growing numbers about the survey of the wildlife (Bajor, 2009), which came to the same opinion: the old-world wildlife of the present capital due to its geographical conditions possesses a species richness and is singular in many respects. But to the accurate realisation of the present interventions, it is of crucial importance the knowledge of the original wildlife and its change on the base of old surveys.

The professional lectures were published at first in Latin, but later also in Hungarian, or they were updated (Gönczy, 1864). In this period, the initially monopolistic Linnaeus' approach dominated, but in the course of the research works in the Budapest area the common investigations of the species and their surrounding more and more prevailed. Next appeared a work, which accentuated the unique character of the landscape's flora (Borbás, 1871, 1879). But since the early 1990s an increasing number draw attention

to the constriction and degradation of the natural wildlife in the Budapest area (Pénzes, 1942; Péntes and Csizy, 1956). At the end of the XX century the localized investigation of the remained fragments became characteristic, because the big, coherent areas practically ceased to exist (Rakonczay, 1992; Simon, 1994; Tardy, 1996; Seregélyes et al., 1996-1997; Pintér, 2008; Babulka and Turcsányi, 1987).

The once rich grass vegetation at Budapest and in its surroundings dwindled drastically and survived only in small patches and fragments. The importance of the area, which constitutes the topic of this paper, is great, but above this they are crucial, because here it allows to trace back the influence of the environmental treatment on the vegetation.

In order to preserve the grass fragments for a long time, conservation works are since 2006 going on in the buckthorn's Újpest habitat. We perform this activity by the help of the voluntaries of the Hungarian Ornithological and Nature Conservation Society's Budapest Group and of the students of the educational institutes, besides the procurement of the official permissions.

The planning of the treatments and interventions were conducted from the existing areas of seeds gradually towards their outside, taking into special account that not too much surface should be open at the same time during an intervention in order to prevent the fast expansion of the invasive species and species of the weeds. The effects of the interventions on the vegetation were conducted on 7 sample areas, on 10-10 quadrats by examining the coenological entries, therefore we were able to provide the effects of the reconstruction of the habitats 14 years retrospectively. During the past years, due to the systematic planning on the fragments of the habitats, 9 hectares of new surface could be opened. Due to this, more than 40% of the entire protected area could become an area of lawn. To better understand the changes, we demonstrated them on a map and we compared with the soil science data of this surface.

In the course of the interventions beyond the mechanical beating down of sprouts we employed also chemical parching. Thank to the systematic

planning, we could open an area of about 5 ha in the last seven years. Through this about 40% of the entire protected and treated area became again sand grassland. In the first period this value was only about the half of the present, i. e. only 20% of the habitat was free of woody invasive plants.

In the open grassland areas species composition is nearly identical in every relevé, the common dominant species were *Festuca vaginata*, *Stipa borysthenica* and *Peucedanum arenarium*. *Fumana procumbens* was dominating in area I, but in area II its cover values decreased. In area II cover values of *Festuca pseudovaginata* increased significantly beside *Festuca vaginata*, what is characteristic and dominant species for sandy grasslands. During the examined period the dominance relationships of the two *Festuca* species changed – the earlier the area was treated, *Festuca pseudovaginata* has become even less dominant, however it reached a relatively high coverage in Area.

Nowadays the issue of habitat reconstructions is becoming more significant, an increasingly large growing scale of researches deals with the active restoration of valuable habitats (Török et al., 2009; Vida et al., 2008). However, the restoration of natural and semi-natural habitats in urban environment is almost unknown in Hungary (Kézdy and Tóth, 2012). In order to accelerate the process, over-sowing with seed-mixture is being used in many cases (Török

et al., 2009), since it is easier to achieve results, however it may not lead to success. With regard to the study site, overseeding was not seemed appropriate because fragments of the original plant communities were existing as a propagulum source (Pintér, 2008).

Changes in the vegetation in the examined area were clearly observable during a 12 – year – long period, species of the sandy grassland has become dominant, which can generally be regarded as positive from the nature conservation point of view (Borhidi, 2003). As it has been confirmed by several authors (Kemény et al., 2001), the open sandy vegetation is more tolerant to degradation in well-formed grassland.

In the central part of the area where there has always been natural, open sandy lawn, the dominant species of grass is *Festuca vaginata*. However, in the areas of killed shrubs, the dominant species of *Festuca* was the *Festuca pseudovaginata* and a new species: *Festuca tomanii* (Bajor et al., 2016; Penksza, 2019; Penksza et al., 2019a, b, 2020). It was especially outstanding that for the science a new species of *Festuca* has been revealed which scientific description is under progress. The work has been supported by OTKA K-125423.

**Keywords:** phytosociology, *Festuca vaginata*, *Festuca pseudovaginata*, sandy grassland

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