Predicting the distribution and succession changes of grassland vegetation in the selected model region of the Devínska Kobyla Mt. in GIS

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Introduction
The model region of the Devínska Kobyla Mt. is situated near the Bratislava, Slovakia, between the Morava and Danube rivers, where the Carpathian Mountains meet with the Pannonian Basin (Fig. 1). This unique geographical position resulted in the extraordinary physical-geographical conditions, such as topography and climate, with specific, rare and rich species steppe flora and fauna. The protected area of the National Nature Reserve (NNR), of 114.38 ha, is part of the NATURA 2000 network and is classified as an Important Plant Area. Since the mid-20th century this area was gradually loosing its economic importance. The present state of vegetation in the Devínska Kobyla NNR is conditioned predominantly by succession (Hegedüšová 2009).

Prediction of the vegetation
Using the two algorithms for the calculation of a three-dimensional potential model for the maintenance of xero-thermophilous vegetation we received two very similar results.

> The differences are especially in the central and southeastern parts of the reservation. This is crucial for the selection of more appropriate model.
> Model B describes the slow succession areas mapped by field research. These are sites, where abiotic characteristics of the country in the mutual coincidence form the ideal conditions for the development of the xero-thermophilous communities. Therefore the Model B was found to be more suitable for prediction of vegetation.

Dynamics of vegetation changes over the period 1949 - 2003

> The evaluation of the secondary succession is based on the chronological sequence of aerial photographs. The first period of seventeen years falls within the years 1949 – 1966. The second period is between the years 1966 – 1985 (nineteen years). The last third period (nineteen years) determines the difference between the images from the years 1985 - 2003.
> The succession was the slowest in the first reporting period. Non-forest vegetation largely follows the edges of the forests. The area retains the character of the period before the fragmentation of grassland.
> The most significant change is visible in the central part of the reservation during the years 1966 – 1985 (nineteen years). The third period brought the fragmentation of the former wood-steppe communities. The change of the shrub and forest vegetation is uniform across the whole ridge, but not as significant as in the xero-thermophilous vegetation. Succession areas are incoherent.
> We suppose that process of the succession will be slower under uncontrolled management. The areas, in which the xero-thermophilous communities have preserved to the present, have a high potential for long-term preservation in terms of the abiotic characteristics.

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