THE CONNECTION BETWEEN ENVIRONMENTAL PREDICTORS AND REGENERATION CAPACITY OF SANDY HABITATS IN HUNGARY

Edina Csákvári[1,2], Ákos Bede-Fazekas[1], Ferenc Horváth[1], Zsolt Molnár[1], Melinda Halassy[1]

[1]Centre for Ecological Research, Institute of Ecology and Botany, [2]csakvari.edina@ecolres.hu
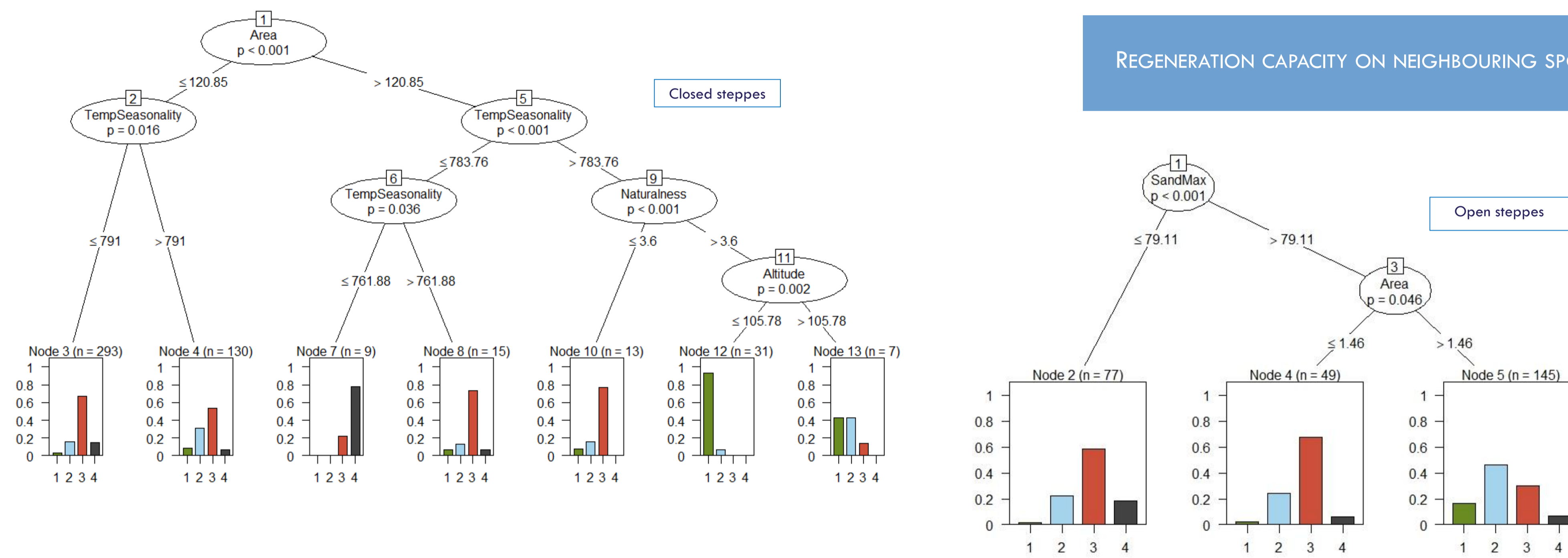
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INTRODUCTION

- One of the most diverse and species rich plant communities in Europe are temperate grasslands with a high number of endemic, rare and endangered species.
- Grasslands are threatened due to the intensification of agricultural practices, the abandonment of traditional grazing and the use of non-native species in forest management.
- Protecting, maintaining and successfully restoring dry grasslands is a key objective of the European conservation policy.
- Understanding the factors that influence the regeneration capacity – an indicator of healthy ecosystems and their services – can facilitate the preservation as well as restoration of these habitats.
- Our aim was to evaluate the regeneration capacity of sandy habitats and to identify the key environmental predictors that determine it.

MATERIALS AND METHODS

- We investigated the regeneration capacity of Pannonian sandy habitats at national scale, which are integrated in the EU Natura 2000 network: *open sand steppes*, *closed sand steppes*, *poplar-juniper sand dune forests and thickets*.
- We used the Hungarian Vegetation Mapping database (MÉTA) that includes local estimates of regeneration capacity of semi-natural habitats based on expert judgments. A four level scale was used for each regeneration capacity type: *good*, *moderate*, *low*, *impossible*.
- Three different kinds of location are included in the MÉTA database at the quadrat level: *spot*, *neighbouring spots*, *old-fields*.
- We included three groups of environmental predictors that possibly influence the regeneration capacity of sandy habitats:
  - proxies for naturalness (MÉTA): area, habitat naturalness, Natural Capital Index
  - landscape composition (CLC): land uses within landscape
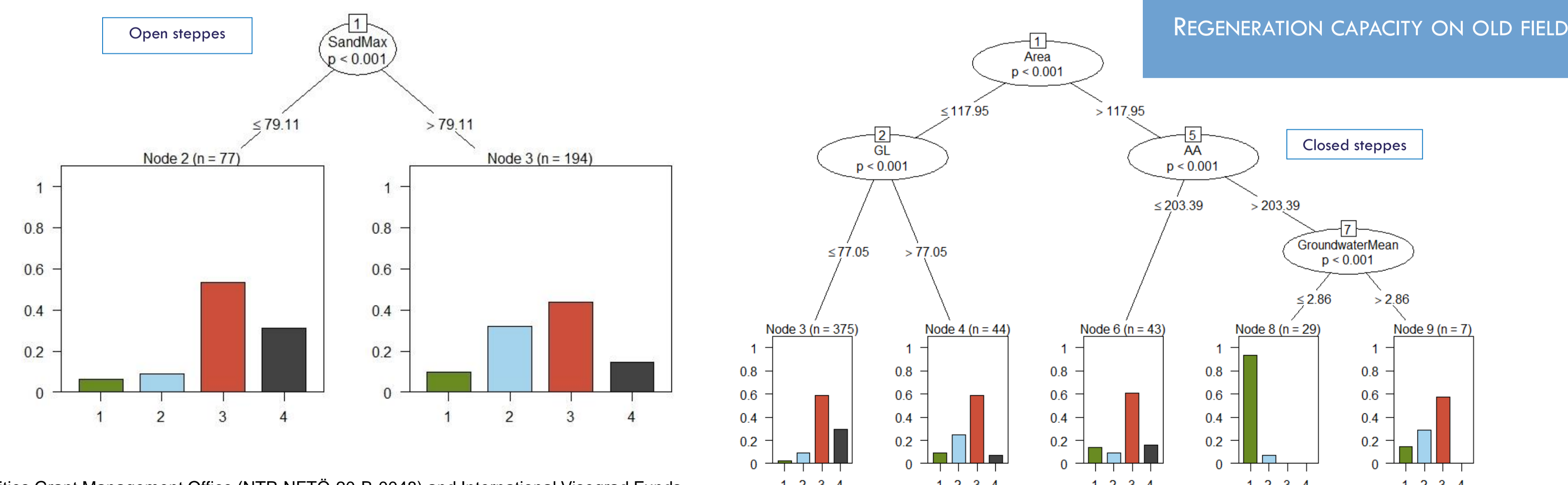 - abiotic factors: sand content, groundwater, altitude, seasonality of precipitation and temperature

RESULTS AND DISCUSSION

- Using the decision tree method, the local regeneration of sandy habitats is primarily determined by *habitat naturalness*, supposedly providing a sufficient source of propagules. Higher *temperature seasonality* is the second most important factor. In the case of poplar-juniper stands the *seasonality of precipitation* is the most important predictor.
- Regeneration of sandy habitats is also possible on neighbouring areas and in abandoned fields. The regeneration is primarily affected by the *sand content* of the soil. Larger total local habitat *area* promotes regeneration too. The presence of artificial surfaces hinders regeneration, but agricultural areas represent a potential for regeneration after abandonment.
- We suggest strong protection of still existing natural or semi-natural remnants in the first place, especially in the case of habitats with lower regeneration capacity. While it is possible to rely on spontaneous regeneration in the case of better regenerating habitats, active restoration is required in other cases.

REGENERATION CAPACITY ON NEIGHBOURING SPOT

REGENERATION CAPACITY ON SPOT
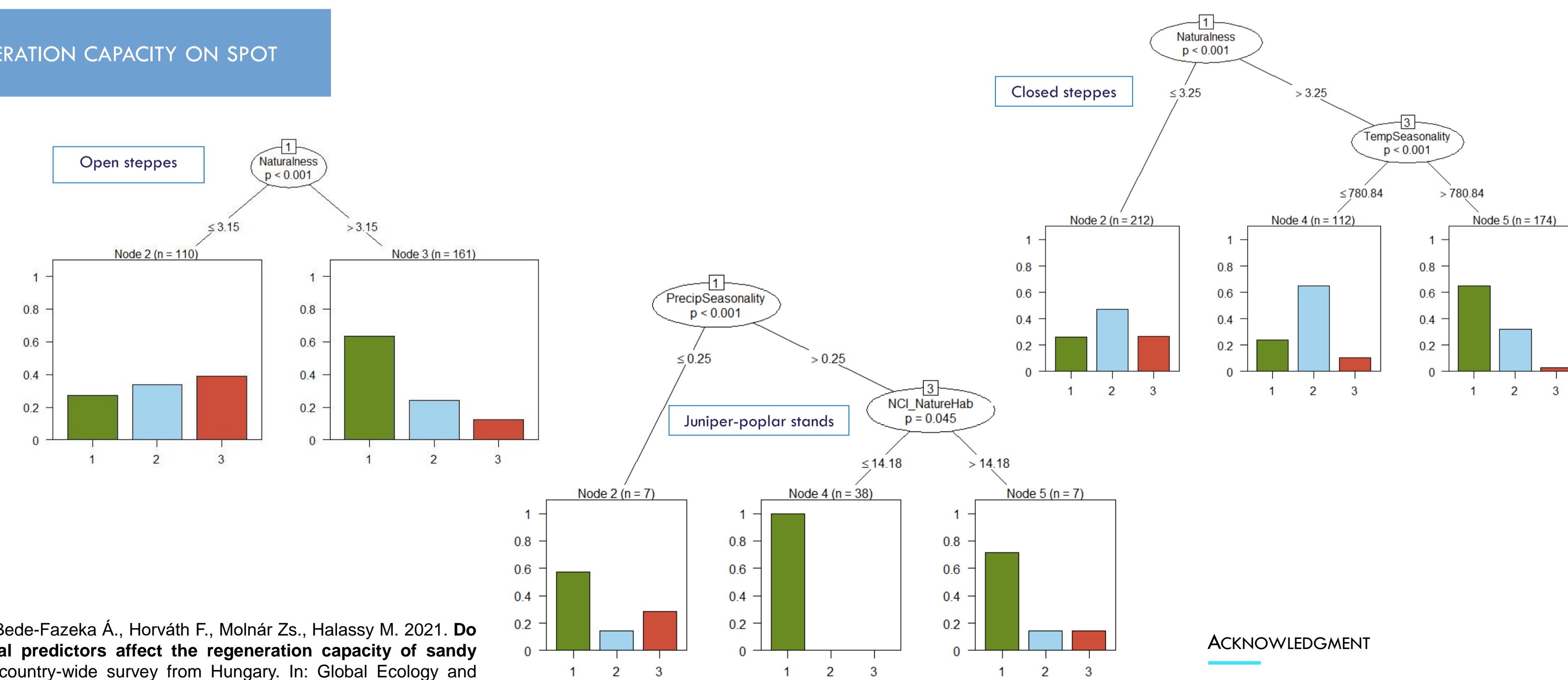
REGENERATION CAPACITY ON OLD FIELD

REFERENCES

Csákvári E., Bede-Fazeka Á., Horváth F., Molnár Zs., Halassy M. 2021. **Do environmental predictors affect the regeneration capacity of sandy habitats?** A country-wide survey from Hungary. In: Global Ecology and Conservation 27(4):e01547. https://doi.org/10.1016/j.gecco.2021.e01547