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Is wild boar rooting a form of damage or an effect? Combined impacts of wild boar rooting and water erosion on soil properties

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INTRODUCTION & AIM

- The feeding behavior of wild boar (*Sus scrofa*) includes rooting, or removing of the soil while searching for roots and insects, potentially impacting soil productivity, biodiversity, ecosystem composition, and water dynamics in the areas affected.
- Conflicts related to this behaviour are common in its distribution range, and the public's perceptions have a high influence on the evaluation of the effects.
- Our aim was to better understand the relation between wild boar rooting and erosion in a grassland with a steep slope, as well as its influence on soil characteristics and water retention potential.
- We hypothesize that wild boar causes differences in soil properties at different scales in eroded and sedimented sections of slopes.

MATERIALS AND METHODS

- The study was carried out at the Jane Goodall Tanösvény, in Vöröskővár, Budapest, Hungary. Soil samples were collected from wild boar rootings at the top (19 samples) and bottom (12 samples) sections of the slope (Fig. 1).
- We selected wild boar rootings of 20-50 cm depth, with ring (i.e., excavated soil accumulated around the rooting) of 15-25 cm high, and sampled the soil at 0-10 cm depth (Fig. 2,3), combining 5 subsamples for the analyses.

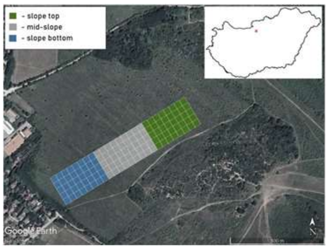

Fig. 1. Study area in Vöröskővár, Budapest, Hungary.

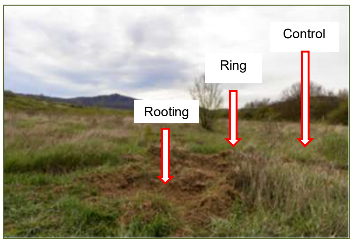

Fig. 2. Types of soil samples.

- To compare with local soil conditions, samples were also taken from control areas, located at 1-2 m distance from the ring. Fig. 2. shows the types of samples, and Fig. 3. shows the difference in elevation.
- Samples composition (phosphorus, Total Organic Carbon (TOC), pH and clay content) were analyzed with a near-infrared (NIR) soil scanner (Agrocares Ltd) .

- The analysis was carried out using the SoilCares mobile app (wavelength 1300-2600 nm), and included pH, soil organic matter (SOM), total nitrogen (N), total phosphorus (P), free potassium (K), cation exchange capacity (CEC), and clay. The most important findings are summarized and briefly explained in the Results section.

Fig. 3. Wild boar rooting, showing selected excavation depth and ring height.

RESULTS & DISCUSSION

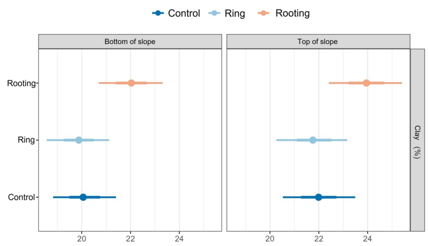

Fig. 4. Clay (%) content in rooting, ring and control, on top and bottom sections of the area.

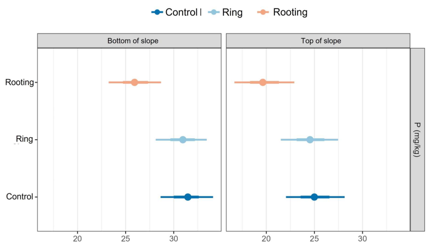

Fig. 5. Phosphorus content in rooting, ring and control, on top and bottom sections of the area.

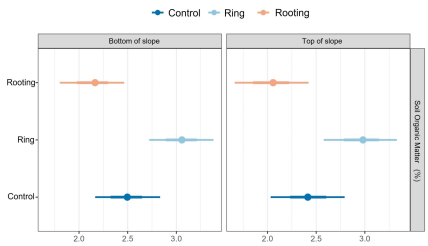

Fig. 6. SOM (%) content in rooting, ring and control, on top and bottom sections of the area.

The pH values measured at the top of the slope are slightly higher than those at the bottom, leading to a very small but detectable difference when comparing the ring and pairs of samples from inside the rooting. At the same slope section there are no differences in the pH of rooting, ring and control.

There is no noticeable difference in clay content between either rooting parts or slope parts (Fig. 4).

The differences in phosphorus values between the top and bottom of the slope are more pronounced than between the rooting parts (Fig. 5). The values are higher at the bottom of a slope.

For SOM the values measured inside the rooting are lower than the control and ring at both the bottom and top of the slope, but the boundaries of the 95% intervals are very close to each other, slightly overlapping (Fig. 6).

The combined effect of wild boar rooting and erosion is very diverse: none of them have any effect on clay content or pH; at the bottom of the slope, erosion increases the Phosphorus content, and rooting decreases it; although the SOM content is less in the rooting, it accumulates in the ring.

CONCLUSION

Based on erosion gradient, the pH changed (increasing at the top of the slope, as expected), but the organic matter remained unaffected by this parameter. From a soil point of view, there is no justification for an exclusively wild boar-focused management solutions, since there are no discernible patterns that override the impact of the broader landscape structure, considering the effects of erosion, namely the slope and particle movement along its gradient.

FUTURE WORK / FUNDING

We are investigating the long-term effects of rooting, erosion, and vegetation composition on the soil, aiming to a more nuanced approach to the landscape management efforts. This research was supported by the National Research, Development and Innovation Office in Hungary within the framework of the National Laboratory for Health Security programme (RRF-2.3.1-21-2022-00006).