LANDSCAPE METRICS AS FUNCTIONAL TRAITS IN PLANTS:
PERSPECTIVES FROM A GLACIER FORELAND

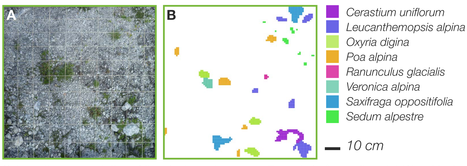
Patch-level functional traits

Spatial patterns of vegetation arise from an interplay of functional traits, environmental characteristics and chance. The retreat of glaciers offers exposed substrates which are colonised by plants forming distinct patchy patterns. **The aim of this study was to unravel whether patch-level landscape metrics of plants can be treated as functional traits.**

METHODS

We sampled 46 plots, each 1×1m, distributed along a restricted range of terrain age and topsoil texture on the foreland of the Nardis glacier, in the South-Eastern Alps, Italy.

Nine quantitative functional traits were selected for 16 of the plant species present, and seven landscape metrics were measured to describe the spatial arrangement of the species' patches on the study plots, at a resolution of 1x1 cm.

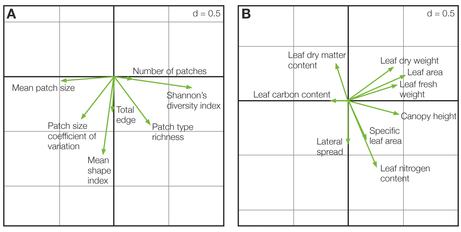


Schematic representation of the plant species survey. To each $1m^2$ sampling plot (A) a virtual 1 cm-grid is superimposed to produce the final species-patch map (B).

We studied the relationships among plant traits and landscape metrics.

RESULTS

Diversity in patch types and size both decrease whilst patch size increases with increasing canopy height, leaf size and weight. More compact patch shapes are correlated with an increased capacity for the conservation of nutrients in leaves.

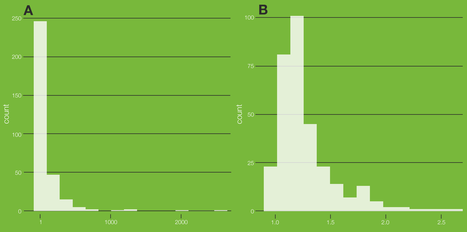


First two axes of ordination diagrams displaying the (A) landscape metric scores and (B) plant trait scores. The values of d give the grid size.

CONCLUSION

We conclude that patch-level **landscape metrics of plants can be treated as species specific functional traits**. We recommend that existing databases of functional traits should incorporate this type of data.

Distribution of species-specific landscape trait values, in particular patch size, might be rather skewed, so the mean might not be the best summarising statistical indicator.



Frequency distribution of patch size [cm^2] (A) and patch shape (B) for *Saxifraga bryoides*. Patch shape = 1 when the patch is a square and increases with its shape irregularity.

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IMAGE CREDITS

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