

Background: Species-rich *Nardus stricta* grasslands are a priority habitat for conservation in Europe. They typically occur on siliceous substrates and less frequently are found on calcareous bedrock.

Aims: The present paper aimed to identify the environmental factors (i.e. bedrock type, topographic, and climatic factors) that are related with community diversity and to assess if differences in plant diversity between *N. stricta* communities on calcareous and siliceous bedrock occur. We hypothesised that *Nardus* grasslands on calcareous bedrock hosted a higher vascular plant diversity than those on siliceous bedrock.

Methods: Based on 579 vegetation surveys carried out in the south-western Alps, we assessed vascular plant diversity (species richness, Shannon diversity, and Pielou's equitability index) of species-rich *Nardus* grasslands and compared it between *N. stricta* communities on calcareous and siliceous bedrock.

Results: Elevation was identified as the main factor related to species composition, while species diversity was mostly related to mean annual precipitation and bedrock type. Species richness, Shannon diversity, and Pielou's equitability index were higher within the communities on calcareous rather than on siliceous bedrock and a total of 89 and 34 indicator species were detected, respectively.

Conclusions: Based on our results, we suggest to protect primarily, as a habitat of priority interest, *N. stricta* grasslands on calcareous substrates for the higher vascular plant diversity hosted.

