

Functional groups and traits of plants in Mediterranean ultramafic shrublands (Sierra Bermeja, Spain)

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ABSTRACT

Plant functional traits (FTs) are important for understanding plant ecological strategies (e.g., drought avoidance), especially in the nutrient-poor soils of serpentine ecosystems (Díaz et al., 2016). In Mediterranean areas, such ecosystems are characterized by climatic factors (e.g., summer drought) that exert a filtering effect. In our study, we analysed 24 species with varying serpentine affinity, from strictly serpentine plants to generalist plants (Pérez Latorre et al., 2018) from two ultramafic shrublands in southern Spain, considering four FTs: plant height (H), leaf area (LA), specific leaf area (SLA), and stem specific density (SSD). We used principal component analysis to identify combinations of FTs and cluster analysis to define Functional Groups (FGs).

We defined eight FGs, which suggests that such Mediterranean serpentine shrublands are composed of species with wide-ranging of FTs. Indicator traits explained 67–72% of the variability based on four strategies: (1) lower H than in other Mediterranean ecosystems; (2) middling SSD; (3) low LA; and (4) low SLA due to thick and/or dense leaves, which contribute to long leaf survival, nutrient retention, and protection from desiccation and herbivory. Generalist plants had higher SLA than obligate serpentine plants, whereas the strictly serpentine plants showed more drought avoidance mechanisms than the generalists. The strictly serpentine plants in the serpentine shrublands studied could present greater resilience to climate change, particularly to severe drought, given the presence of their drought avoidance mechanisms compared with generalists, and the high number of FGs identified.

Studies of FT, and specially FG, may be very useful for the joint management of species in serpentine ecosystems.

KEYWORDS

ultramafic vegetation, functional traits, drought avoidance

REFERENCES [HEADING 1 STYLE]

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