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Kitaibela vitifolia

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Kitaibela vitifolia

How soil water availability affects the functional diversity in grazed and abandoned pastures

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Though the interplay of grazing intensity and the availability of resources is a key driver in grassland composition, very few studies focused on changes of functional traits after abandonment along stress gradients. Since the range of functions provided by a community largely depends on the diversity of functional traits, a useful approach for investigating ecosystem processes is the analysis of functional diversity, which proved to be widely applicable to grazing systems. Through a comparative approach, we aimed to assess the context dependent effects of long-term grazing cessation on functional composition and diversity in sub-Mediterranean grasslands. We hypothesized that, after long-term abandonment, variability of stress intensity due to different soil water regimes drives the trait-based recovery processes, also influencing the patterns of functional diversity. On a calcareous mountain ridge of central Italy, we collected data on species cover and traits, site characteristics, soil and vegetation structure in 0.5 x 0.5 m plots located in grazed pastures and in grasslands abandoned since the early 1970s. We analysed patterns of species, traits and functional diversity (*FD*, Rao's quadratic entropy) in relation to environmental variables and management type. We found that soil water availability on a fine scale determines *FD* and direction of trait response after grazing cessation. In plots with bare soil and lower water availability values, species and trait composition were less affected by abandonment. Instead, we observed a shift from strategies devoted to grazing resistance to those devoted to competition for light after grazing cessation at intermediate water availability. Grazing cessation decreased the overall *FD*, however in both the harsher and more productive conditions grazed and abandoned systems did not show significant differences. Instead, in intermediate conditions we documented significant differences in *FD* of many trait states, especially those related to resource acquisition and space occupation. Thus, our results indicate that the level of soil water resources determines the net effect of disturbance on the *FD* of grassland communities.