# INTEGRATING TAXONOMIC, FUNCTIONAL AND PHYLOGENETIC DIVERSITY TO ASSESS PLANT DIVERSITY PATTERNS IN ITALIAN AGRICULTURAL LANDSCAPES

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Agricultural landscapes are complex mosaics of ecosystems, including croplands, forests, grasslands, shrublands, and wetlands. These habitats support diverse plant communities, each contributing uniquely to overall biodiversity and ecosystem services. However, the roles of different community types in supporting functional and evolutionary diversity remain underexplored (Cadotte et al., 2011). This study aims to identify conservation priorities by integrating taxonomic, functional, and phylogenetic dimensions of plant diversity across agricultural landscapes.

We surveyed 47 circular study areas (1 km radius) distributed across Italy in different biogeographical and management contexts. A total of 235 plots (25 m² each) were surveyed within the five main ecosystem types. Taxonomic diversity was assessed using α- and β-diversity metrics, Indicator Species Analysis (INSPAN) and PERMANOVA to assess floristic composition. Preliminary results show that grasslands support the highest α-diversity, while wetlands have the highest contribution to β-diversity, indicating unique species assemblages. Each ecosystem type also supports specific indicator species, s including *Papaver rhoeas* L. in arable land, *Acer campestre* L. in woodlands, *Dactylis glomerata* L. in grasslands, *Prunus spinosa* L. in shrublands and *Phragmites australis* (Cav.) Trin. ex Steud. in wetlands.

The analysis of taxonomic diversity highlights wetlands as key ecosystems for the conservation of plant biodiversity in Italian agricultural landscapes, due to their distinct floristic composition. However, all ecosystem types contribute significantly to the conservation of specific plant species and communities. Maintaining a balanced mix of natural, semi-natural, and human-modified habitats is therefore essential.

Ongoing analyses of functional traits and phylogenetic diversity will provide additional insights into community assembly processes and ecosystem resilience. By integrating these dimensions, we aim to better understand plant community responses to land use change and guide evidence-based conservation in agricultural contexts. This approach emphasises landscape heterogeneity as a key driver of biodiversity and ecological stability (Gámez-Virués et al., 2015).

1) Cadotte M. W., Carscadden K., Mirotchnick N., 2011. Beyond species: functional diversity and the maintenance of ecological processes and services. *Journal of applied ecology*, *48*(5), 1079-1087.

2) Gámez-Virués S., Perović D. J., Gossner M. M., Börschig C., Blüthgen N., De Jong H., ... & Westphal C., 2015. Landscape simplification filters species traits and drives biotic homogenization. *Nature communications*, *6*(1), 8568.