

### Reference 9

Paiola, A; Assandri, G; Brambilla, M; Zottini, M; Pedrini, P; Nascimbene, J 2020 Exploring the potential of vineyards for biodiversity conservation and delivery of biodiversity-mediated ecosystem services: A global-scale systematic review *SCIENCE OF THE TOTAL ENVIRONMENT*, 706, 135839. 10.1016/j.scitotenv.2019.135839

### Background and objective

Vineyards are experiencing strong expansion and management intensification worldwide, especially in areas with a Mediterranean climate, which are often characterized by a high conservation value. This is posing concerns about their environmental impact and it is fostering research on biodiversity patterns and ecosystem services in this agroecosystem. This systematic review, aims at providing a global and comprehensive overview of the current research on biodiversity and biodiversity-mediated ecosystem services in vineyards, considering the effects of landscape features and management practices. Here, results on the effects of landscape features at the farm level scale are reported.

### Search strategy and selection criteria

Authors carried out a systematic literature search on the Web of Science Core Collection database (last accessed on October 26, 2018), by entering the following search string: "*((VINEYARD\* OR VITICULTURE) AND (BIODIVERSITY OR DIVERSITY OR "SPECIES RICHNESS" OR "ECOSYSTEM SERVICE" OR RICHNESS OR CONSERVATION))*". No year or country limitations were used. The exclusion criteria were: 1) Pure agronomic studies (including those on the genetic diversity of *Vitis vinifera* or on microorganisms of primary agronomic matter); 2) Papers not in English; 3) Reviews; 4) Papers concerning only abandoned vineyards; 5) Studies carried out in greenhouses, as we focused on studies conducted in 'natural' conditions.

### Data and analysis

A standard vote-counting procedure was used. This methodology is useful to summarize very heterogeneous and often unbalanced data across studies. Authors separately considered species abundance and species richness (the two most commonly used biodiversity metrics in the literature) and counted significant positive, negative, and non-significant effects of each landscape variable for each taxon, accounting for the two different spatial scales (i.e. local and landscape).

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
218	Vineyards	1) Punctual and 2) linear structural elements in the surrounding agricultural landscape; 2) Linear structural elements in the farm	1) No landscape features in the surrounding agricultural landscape; 2) No landscape features in the farm	Metric: 1) Aves, Arthropoda and Plantae abundance; 2) Aves and Arthropoda and Plantae richness; 2) Arthropoda abundance; Effect size: Not applicable	62.5

### Results

- In vineyard landscapes, hedgerows and tree rows were found to have a positive influence on birds, arthropods and plants.
- The establishment and/or the maintenance of herbaceous field margins within vineyards strongly enhanced the abundance and richness of arthropods, birds and plants.
- A positive effect of dry-stone walls was found for birds, due to increased habitat heterogeneity and availability of potential breeding sites. Similarly, terraces were shown to host rich assemblages of xerothermophilic spiders.
- Isolated trees and isolated rural buildings provide nesting sites for birds within homogeneous vineyard landscapes. Isolated trees increased also the abundance of solitary wild bees in vineyards.

### Factors influencing effect sizes

- No factors influencing effect sizes to report

### Conclusion

The results of the studies are often contrasting and taxon- and scale-dependent, thus hindering conclusions at the global scale. However, habitat heterogeneity at the landscape and local scales is a key element for biodiversity. Reviewers' note: We labelled the results for grassed buffer strips as uncertain due to the lack of statistical testing.