

How does vineyard management intensity affect ecosystem services and disservices – insights from a meta-analysis

Silvia Winter (1), Johann G. Zaller (2), Sophie Kratschmer (1), Bärbel Pachinger (1), Peter Strauss (3), Thomas Bauer (3), Daniel Paredes (4), José A. Gómez (4), Gema Guzmán (4), Blanca Landa (4), Annegret Nicolai (5), Françoise Burel (5), Daniel Cluzeau (5), Daniela Popescu (6), Claudiu-Ioan Bunea (6), Martin Potthoff (7), Muriel Guernion (5), and Péter Batáry (8)

(1) Institute of Integrative Nature Conservation Research, University of Natural Resources and Life Sciences Vienna, Vienna, Austria (silvia.winter@boku.ac.at), (2) Institute of Zoology, University of Natural Resources and Life Sciences Vienna, Vienna, Austria, (3) Institute for Land and Water Management Research, Austrian Federal Agency for Water Management, Petzenkirchen, Austria, (4) Institute for Sustainable Agriculture, CSIC, Cordoba, Spain, (5) University Rennes 1, UMR CNRS EcoBio, Paimpont, France, (6) University of Agriculture Science and Veterinary Medicine Cluj Napoca, Romania, (7) Georg-August-University, Centre of Biodiversity and Sustainable Land Use – Agriculture and the Environment, Göttingen, Germany, (8) Georg-August-University, Department of Crop Sciences, Göttingen, Germany

Viticultural agro-ecosystems provide a range of different ecosystem services which are affected by management decisions of winegrowers. At the global scale, vineyards are often high intensity agricultural systems with bare soil or inter-row vegetation consisting of only a few plant species. These systems primarily aim at optimizing wine production by reducing competition for water and nutrients between grapevines and weeds and by preventing the outbreak of pests and diseases. At the same time, this kind of management is often associated with ecosystem disservices such as high rates of soil erosion, degradation of soil structure and fertility, contamination of ground-water and decline of biodiversity. Recently, several initiatives across the world tried to overcome detrimental effects of that management style by creating biodiversity friendly vineyards. The consequences of establishing diverse cover crop mixes or tolerating spontaneous vegetation in vineyards for ecosystem services (including yield) overstretching local case studies has not been investigated yet.

This meta-analysis will provide an overview of all published studies comparing the effects of different vineyard management practices on a range of different ecosystem services like biodiversity, pest control, pollination, soil conservation and carbon sequestration. The aggregated effect size will point out which management measures can provide the best overall net sum of ecosystem services. This meta-analysis is part of the transdisciplinary BiodivERsA project VineDivers and will ultimately lead into management and policy recommendations for various stakeholder groups engaged in viticulture.