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Doring, J; Collins, C; Frisch, M; Kauer, R 2019 Organic and Biodynamic Viticulture Affect Biodiversity and Properties of Vine and Wine: A Systematic Quantitative Review. American Journal of Enology and Viticulture 70: 221-242. 10.5344/ajev.2019.18047

Background and objective

Demand for organically grown crops has increased exponentially in the last few decades. Particularly in the wine sector, organic and biodynamic management systems are gaining more and more importance, with some of the most prestigious wineries converting to organic or biodynamic viticulture. The purpose of the study was to review evidence comparing effects of conventional, organic, and biodynamic viticulture on soil properties, biodiversity, vine growth and yield, disease incidence, grape composition, sensory characteristics, and wine quality. We focus here on organic vs. conventional and on biodiversity.

Search strategy and selection criteria

Literature searches of peer-reviewed published literature were conducted to find studies investigating organic and/or biodynamic viticulture. The following search terms were used in different combinations in the ISI-Web of Science and Pubmed Databases: organic/viticulture, biodynamic/viticulture, biodynamic/agriculture/grapes (last searched on 08/25/17). Only field trials that used replicates of management treatments with representative plots or studies that used a representative number of samples were included in the review in order to avoid bias in individual studies. Data from non-peer-reviewed sources such as conference proceedings, master theses or doctoral dissertations were also included into this study if they met the criteria mentioned above.

Data and analysis

Data were extracted manually from the different studies. If different forms of conventional viticulture were included in the studies, low input conventional plots were chosen for meta-analysis. The statistical method was not specified for biodiversity.

| Number of papers | Population | Intervention | Comparator | Outcome | Quality score |
|------------------|---|-----------------|----------------------|---|---------------|
| 24 | Field studies assessing the performance of organic in comparison to conventional viticulture systems. | Organic systems | Conventional systems | Metric: Biodiversity; Effect size: Not precisely defined. | 25 |

Results

- Biodiversity in most trophic levels was enhanced under organic viticulture. 17 out of 24 studies showed a clear increase in biodiversity under organic viticulture.
- The impact of a decrease in disturbance does not only depend on the general level of disturbance, but also on the taxon investigated and the type of disturbance measured.
- NULL
- NULL
- NULL

Factors influencing effect sizes

- Pest management strategies : NA
- Herbicide application : NA
- Addition of compost : NA
- Diversity of cover crops : NA

Conclusion

Biodiversity at different trophic levels was enhanced under organic and biodynamic viticulture compared to conventional management. However, the results are rated as uncertain, due to the lack of quantitative statistical analysis.