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How environmental microbiomes contribute to grape berry colonization within a context of agroecological practices

Ripe grape berries are the primary source of fermentative microorganisms involved in the process by which grape must becomes wine; they also host the pathogens that reduce crop yield and quality. Wine quality is therefore intricately linked to the microbiological status of the grape berries. While there are many sources of colonization, the environmental factors likely to have an impact on the microbiome establishment of ripening grape berries have not been thoroughly studied.

By combining a multiscale experimental approach (plant, field, landscape) with taxonomic and functional analyses of the berry microbiome, the goal of this thesis is to assess how environmental microbiomes contribute to grape berry colonization. More specifically, the role played by arthropods (pollinating or herbivorous insects) as vectors in the assembly of microbial communities in berries will be studied. The project will also attempt to determine the impact of field management methods, landscape diversity and winery proximity on microbiome establishment in grape berries.

This work will enable us to identify the potential sources and reservoirs of microorganisms of interest, from the plant to the landscape, and the environmental factors likely to impact this community.

Within a context of agroecological transition, this thesis project should make it possible to identify effective winegrowing practices and levers for manipulating the fraction of the berry microorganisms that play a key functional role in the natural regulation of pathogens and the winemaking process.