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The Grapevine Genomics Encyclopedia: an innovative portal to integrate knowledge, resources and services for the grape scientific community and industry

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Online tools and databases are key to exploit the potential offered by genomic advances to both research and industry. In plants, the final goal of these resources is to contribute towards crop improvement, which, whether achieved through selective breeding or biotechnological strategies, is largely dependent on the cumulative knowledge of a plant species' genome (and pangenome) and its containing genes. Acquiring this knowledge is specially challenging in grapevine (*Vitis vinifera* L.), one of the oldest fruit crops grown worldwide. Well-established research communities studying model organisms have created and maintained, through public and private funds, a diverse range of online tools and databases serving as repositories of genomes and gene function data. The lack of such resources for the non-model, but economically important *Vitis vinifera* species has driven the need for a standardized collection of assets within the grapevine community. Within the INTEGRAPPE COST Action CA17111, several resources destined to maximise genomics and phenotyping data have been established, using standardized and F.A.I.R. protocols. Among these efforts, the Action has (1) included the first grape gene reference catalogue, where genes are ascribed to functional data, including their accession identifiers from different genome-annotation versions, (2) enlisted all reference genome sequence assemblies and their functional gene annotations, and (3) created guidelines for the correct generation, upload and treatment of diverse omics data. Despite these advances, there is much space for innovation. The CIG will centralize the resources in a single database, with open access to the public but also offering customized services for the research community and industry, thus giving economic value to this platform. In order to assist the scientific community and grape/wine companies in designing next-generation cultivars that will adapt to new climate conditions, this database will combine omics, phenotypes and climate data to generate predictions. The CIG aims to implement innovative technologies such as deep learning and modelization methods to provide a service to the companies in order for them to adapt their production, being aware of the impact of climate transition. These tools will also allow growers to assess the level of sustainability of their vineyard. During the CIG grant period the CIG Team will gather in Working Group Meetings to decide on the best procedures to implement the GRAPEDIA database and will customize the web portal through the activity of Training Schools conducted in the form of jamborees and hackathons to work towards the same goal. Short-Term Scientific Missions will also be promoted to accomplish deliverables, where students and researchers will be nurtured by laboratories that have expertise in biological database construction. The structure of the database will consist of modules to manage and visualize omics and phenotypic data and will allow the implementation of new modules after the grant period ends to serve as a social data-driven platform for the grapevine community in which scientists, breeders, producers, and consumers will be able to exchange information.