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Data deluge: Opportunities, challenges, and lessons of big data in a multidisciplinary project

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Abstract

Grapevine powdery mildew resistance is a key target for grape breeders and grape growers worldwide. The driver of the USDA-NIFA-SCRI *Vitis*Gen3 project is completing the pipeline from germplasm identification to QTL to candidate gene characterization to new cultivars to vineyards to consumers. This is a common thread across such projects internationally. We will discuss how our objectives and approaches leverage big data to advance this initiative, starting with genomics and computer vision phenotyping for gene discovery and genetic improvement. To manage and maintain resistances for long-term sustainability, growers will be trained through our nation-wide extension and outreach plan. Ultimately, consumers drive adoption of new varieties, and our socioeconomic research using eye-tracking will be briefly described. Across this multi-disciplinary research effort, big data presents opportunities, challenges, and lessons.

Keywords: Disease resistance, Grape breeding, Genomics, Computer vision, Consumer behavior.