Final Technical Report

Project Title: Monitoring Statewide Grapevine Cold Hardiness Evaluations for Developing the Michigan Grapevine Cold Hardiness Model

Grants Given (GG) Number: 22*1565

Project Period: December 2021 – April 2022 (Year 1 of 5-year project)

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Problem Statement and Objectives:

The Michigan wine industry's growth has significantly contributed to the state's economy. However, challenges such as cold hardiness impact grapevine survival and fruit quality. This report covers the first year of a five-year project that aims to monitor grapevine bud cold hardiness and develop the Michigan Grapevine Cold Hardiness Model (MGCHM). The objectives for this initial year included collecting environmental data, such as growing degree days (GDD), temperature, light intensity, low-temperature exotherm (LTE), and differential thermal analysis (DTA) data, and working towards the development of Cold Hardiness Algorithms and the MGCHM.

Methods and Procedures:

The first year focused on data collection and early-stage model development. Environmental data encompassing GDD, temperature, light intensity, LTE, and DTA data were collected from selected grapevine cultivars across multiple sites. While the MGCHM and Cold Hardiness Algorithms were not fully developed during this year, the foundational data and analysis were initiated.

Results and Achievements:

The first year laid the groundwork for future accomplishments:

Environmental Data Collection: Significant progress was made in collecting essential environmental data, forming a comprehensive dataset for analysis.

Model Development Initiation: While the MGCHM and Cold Hardiness Algorithms were not fully developed, the project began the process of building these predictive tools based on the collected data.

Stakeholder Engagement: Collaborative efforts with industry partners and stakeholders began, ensuring the project's alignment with industry needs.

Challenges and Adjustments:

The project encountered certain challenges and made corresponding adjustments:

Model Development Timeline: The intricate nature of the MGCHM and Cold Hardiness Algorithms necessitated a timeline extending beyond initial projections. This adjustment was essential to guarantee the utmost accuracy and relevance of these pivotal tools, which will be diligently developed upon the project's completion.

Environmental Data Variability: Variability in environmental data collection was addressed by refining data collection protocols and ensuring data accuracy.

Lessons Learned and Recommendations:

The first year provided valuable insights and recommendations for the remainder of the project:

Continuous Adaptation: The project reinforced the importance of adaptability, as project timelines and outcomes can be influenced by various factors.

Stakeholder Involvement: Early and consistent stakeholder engagement enhances project relevance and ensures alignment with industry needs.

Data Quality Emphasis: High-quality data collection is crucial for robust models and accurate predictions.

Future Directions and Sustainability:

The subsequent years of the project will involve further data collection, detailed model development, algorithm refinement, and stakeholder engagement. The sustainability of the project lies in continued collaboration, ongoing data analysis, iterative model improvement, and educational initiatives.

Abstract Statement:

The first year of the Monitoring Statewide Grapevine Cold Hardiness Evaluations project marked the initiation of a five-year effort to develop the Michigan Grapevine Cold Hardiness Model (MGCHM). Environmental data collection, early-stage model development, and stakeholder engagement were the focal points, reflecting the project's commitment to addressing cold hardiness challenges in the Michigan wine industry. While the MGCHM and Cold Hardiness Algorithms were not finalized, the project's significance lies in its foundational work. Through comprehensive data collection involving growing degree days, temperature, light intensity, low-temperature exotherm, and differential thermal analysis, the project initiated the journey towards the creation of these predictive tools. As the project progresses, its emphasis on environmental data, early-stage model building, and stakeholder engagement will contribute to the industry's growth, sustainability, and knowledge exchange, reinforcing its commitment to addressing the challenges of cold hardiness in Michigan's wine industry.