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Genomic research at Lincoln University and MGI Tech will revolutionize New Zealand viticulture

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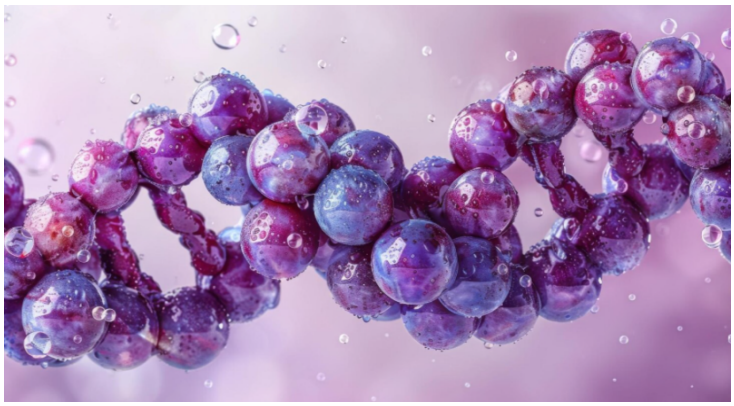

Aims to develop pest-resistant grapevine and hop varieties to reduce fungicide use in New Zealand's $2.1 billion wine export industry

MGI Tech Co., Ltd., a company developing tools and technologies for life sciences, has joined efforts withÂ Lincoln UniversityÂ inÂ CanterburyÂ to address sustainable challenges in viticulture through advanced sequencing technology. With genomics, the initiative aims to develop better grapevine and hop varieties that are tolerant to pests and diseases, reducing fungicide use across New Zealand's $2.1 billion wine export industry.Â Â Â

Viticulture Challenges inÂ New Zealand: Disease, Chemicals and Sustainability Pressure

Viticulture is a significant economic source of revenue forÂ New Zealand, ranking as the nation's sixth-largest export earner. However, like many primary sectors, it faces intensifying pressure to improve sustainability and reduce environmental impact. The country's vineyards are particularly vulnerable to fungal diseases, often requiring frequent and broad-spectrum spraying to maintain vine health and grape quality. Each year,Â New ZealandÂ farmers apply approximately 3,400 tonnes of pesticides. Alarmingly, under the US Environmental Protection Agency classification, 60% of fungicides and 72% of plant growth regulators used locally are considered potential carcinogens. This has placed the sector in the crosshairs of consumer and environmental scrutiny, particularly as climate change drives more volatile weather conditions that heighten disease risks.

New Pathways from Genomics

To address these challenges, a team ofÂ New ZealandÂ scientists have started a genomic study to reduce the wine sector's reliance on chemical sprays. By using advanced sequencing technology, researchers can now rapidly scan thousands of

grapevine samples to identify those with natural resistance to disease and environmental stress.

Associate ProfessorÂ Christopher Winefield, fromÂ Lincoln University'sÂ Department of Wine, Food & Molecular Biosciences, who first introduced genomics into his research to explore traits like fungal tolerance and soil health response, is now scaling the project significantly through MGI's high-throughput sequencing platform. This approach not only opens a pathway to breed more resilient grape varieties, it also enables real-time monitoring of vineyard conditions, laying the foundation for more targeted, sustainable and cost-effective vineyard management.

The genomics practices allow scientists to map the natural genetic diversity within thousands of grapevines, identifying those with inherent disease resistance. Early findings suggest that, with targeted intervention informed by this data, chemical spray use could be reduced by up to 80% in some vineyards.

Lincoln UniversityÂ researchers have installed theÂ MGI DNBSEQ-G400 genome sequencer, a next-generation sequencing platform enabling unprecedented scale and speed in genomics with economic cost. Traditionally, testing a few hundred grapevine samples per year was considered standard. Now, the lab can process over 50,000 annually â?? a one-hundredfold increase in volume. The MGI DNBSEQ-G400 platform can support real-time sequencing to detect pathogens like powdery mildew and mealybug. This enables precision agriculture approaches, where interventions are localised rather than applied uniformly. The genomic data is also helping scientists identify vines that are more resilient under water stress or nutrient limitations â?? a key consideration as climate volatility increases.

Beyond academia, the project has commercial ambitions.Â Winefield and his colleagues are forming a standalone venture to bring affordable genomic testing to the country's broader agriculture sector. The startup will serve viticulture, horticulture, and dairy farms, giving producers access to real-time insights previously confined to high-cost labs. This data-driven model would enable even small-scale producers to detect early signs of disease, make proactive crop management decisions, and cut down on unnecessary chemical inputs. The implications of the study extend well beyondÂ New Zealand. With international viticulture facing similar challenges, theÂ CanterburyÂ research could become a blueprint for sustainable production globally. According toÂ Winefield,Â New Zealand'sÂ unique microclimates and robust science infrastructure make it an ideal testbed.