

British Columbia Wine Grape Council Research Priorities for the Federal Canadian Agricultural Partnership (C.A.P.) 2023 – 2028.

The main headers below represent priority themes for the BC wine and grape industry. Project topics are listed below each theme and can support research in both viticulture and enology that are relevant to the theme.

Climate Change Impacts and Mitigation Strategies

a) Research related to extreme heat and plant stress:

- Impact on biological controls such as biofungicides and beneficial insects
- Using bio-stimulants to help protect and recover from heat stress
- Aromatic impacts on wine from dehydration and early season frost
- Rootstock research – looking for increased drought tolerance
- Nutrient uptake, size of root-zone
- Tolerance to soil borne pests and alkalinity
- Mycorrhizae and Trichoderma sp.
- Syrah decline management
- Use of ground cover and sprinkler irrigation for vineyard cooling with the goal of protecting vine/soil health and obtaining yield/quality targets. Reduce **berry softening**.

b) Biovigilance strategies to develop resilience to extreme weather - IPM

c) Using of organic and sustainable amendments for as a tool for enhancing resilience to climate change and enhancing yield stability.

Continuation of Cold damage resistance and hardiness improvement

a) Influences of vine health and management practices on hardiness and impacts (virus, crown gall, crop load etc.)

b) Plant protection techniques (physical and chemical).

c) Suppression of ice nucleating bacteria for frost reduction (*Pseudomonas syringae*)

d) Measurement of stored carbohydrate (simple sugars and oligosaccharides) reserves in woody tissue. Potential cryoprotectant effect.

Biovigilance:

a) Support monitoring, modelling, and education for new emerging pests and potential new threats not yet present in BC vineyards.

Smoke taint prevention and mitigation:

a) Smoke-taint mitigation - post-harvest processing and post-fermentation

b) Smoke-taint prevention and risk factors (in vineyard).

Smoke taint detection:

- a) Smoke taint detection-improvements to existing analysis procedures
- b) Benchmarking concentrations of smoke marker compounds in the Okanagan
- c) Development of a rapid, field-usable risk assessment tool.

Smoke-taint research:

- a) Consumer smoke taint identification studies/trials. Identification of sensory threshold(s) for different segments of consumers. [This is a good idea; could also include studies on how varietal characteristics (or their loss) influence perception of taint].
- b) Basic plant biochemistry--how are smoke-derived phenols chemically trapped in-planta?
- c) Varietal susceptibility

Robotics and New Technologies for:

- a) Disease, pest and weed detection and management
- b) Multi and hyper spectral imaging for vineyard Codiagnosics (GIS)
- c) Estimating aromas and wine quality
- d) Sensory analysis of wines
- e) Continuation of GIS projects

Insect Pest management

- a) Leafhoppers, cutworm, mealybug and scale (bio-controls, organic control, soft chemical controls, and vegetation management). Cultural practices to enhance natural biological controls through vineyard ground cover, insectaries; greater understanding and use of native biological control agents
- b) Assessment of existing IPM practices, and development of more effective IPM practices for improved virus vector management (monitoring, chemical controls, biological control and secondary impacts).
- c) Investigate possible relationship between Volatile Organic Compounds emitted by grapevines and attraction of insect pests (leafhoppers, cutworms, etc.) for the potential of *attract and kill* application.
- d) Research on biodegradable vaccines that protect crops from pathogens including insect pests

Disease management

- a) Crown gall:
 - Developing primers and protocols to include crown gall (*Allorhizobium vitis*) in High Throughput Sequencing (HTS) diagnostics of grapevine viruses.
 - Investigate and potentially develop Crown Gall biocontrol options.
- b) A single diagnostic test for serious pathogens in plant material
- c) **Continuation of virus and disease research including:**



- Clean plant program (free of: virus, crown gall, and trunk and root pathogens)
 - Sustainable and organic controls
 - Application of molecular and genomics tools for diagnostics and forecasting
 - Disease impacts on wine quality (virus, powdery mildew, rots)
 - Virus diseases, especially leaf roll (economics, elimination planning)
 - Trunk diseases (prevention, cultural management)
 - Fungal diseases (risk modelling)
 - New and emerging diseases
- d) Evaluating biocontrol fungicides (such as Serenade opti - *Bacillus subtilis* and Serifel, *Bacillus amyloliquefaciens* MBI600) colonization, efficacy, resiliency under varying temperature and humidity conditions; alone and in common tank mixes, application timing and spray intervals
- e) Research on biodegradable vaccines that protect crops from virus and disease related pathogens
- Vegetation management**
- a) Herbicide alternatives (in-row cover cropping, cultivation, mulching, mowing), impacts on wine quality
 - b) Impacts on beneficials, soil fertility and soil microbial ecosystems
 - c) Impact of vegetation management on fungal diseases and sour rot
 - d) Impacts on microclimate and fruit quality
- Vine balance and canopy management**
- a) Effects on fruit maturation and compositional quality (timing and level of crop adjustment, leaf removal, shoot positioning, hedging, etc., with and without water stress)
- Soil Health, Ground Cover and Vine Nutrition**
- a) Carbon sequestration
 - b) Soil compaction and physical limitations
 - c) Biodiversity, generating diversity pockets or corridors, role of native species
 - d) Better mowing decisions for vineyard floors to maximize cover crop (native or seeded) root development, soil conditioning, and carbon sequestration
 - e) Nutrient diagnosis tools, leaf vs blade and timing of sampling, understanding types of petiole analysis including how best to manage fertilizer input. Plus, potential value of sap analysis and/or SPAD (Soil Plant Analysis Development) chlorophyll meter – To enhance understanding actual vine nutrient status including factors affecting nitrogen metabolism. and fine tune fertilizer practices.
 - f) Foliar vs fertigation vs soil application

- g) Organic sources of nutrients and their efficacy and management, nutrient management and ground cover interactions, synergies among nutrients and impact of balance nutrients on resilience of vineyards
 - h) Subsoil feeding as a tool for enhancing vineyards resilience
 - i) Greater understanding of vine nutrition including how to effectively balance long-term plant health while optimizing yield. This could include variable rate fertilizer application to increase intra-block uniformity.
 - j) Potential herbicide alternatives (under-vine cover crops, cultivation, mulching, mowing, non-glyphosate herbicide options). Impacts on soil health and wine quality.
- Enology**
- a) Organoleptic influence of nearby vegetation and atmosphere
 - b) Indigenous yeast isolation and characterization