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THINK OUT OF THE BOX

Lifting Pressure on Dormancy and Canker Disease for Cherry Plant Health

Non-GMO, Non-Chemical, Non-Pesticides

A Cellular Regeneration Biotech with HQ in Singapore

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IN THIS ISSUE

WAKE UP "CALL"

Editor Dr. Jeff Lim

Fieldwork by ChongMing

THE NEED

In Chile, breaking the dormancy of cherry trees is essential due to the country's mild winters, which often result in insufficient chilling hours. Common methods include the use of hazardous hydrogen cyanamide (HC), which artificially "mimics" natural chilling but has very severe environmental and health implications. The oxidative stress induction pathway cannibalises the cellular budget that is necessary to sustain primary and secondary metabolisms **[ISSUE 1]** for plant health with zero compensation, thereby eliminating its role as a solution for sustainable (and safe) farming. Organic nitrates and horticulture oil are alternatives but not necessarily address the metabolic needs of cherries (beyond genetic disposition) with everything being equal. For this reason, an exceptional opportunity for sustainable solutions becomes available.

BREAKING DORMANCY & LIFTING CANKER DISEASE (C3)

Fieldwork by ChongMing

BARRIERS TO QUALITY

Climate Change:

Over the past five years, Chile has experienced significant climatic variations, primarily influenced by the El Niño Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), and the Antarctic Oscillation (AAO). These patterns have led to notable changes in temperature and precipitation across the country.

One of the most prominent trends has been a consistent decrease in precipitation. Chile has seen a reduction of approximately 26 mm per decade, translating to a 4% drop every ten years, which doubles to 8% when considering the last 40 years. This has resulted in 13 consecutive years of below-normal precipitation, with 2022 being another dry year. Temperature patterns have also shown variability, with higher temperatures during the southern summer months (November to February) and lower temperatures in areas with high elevations and closer to the Antarctic south.

These climatic variations have had substantial impacts on cherry farming in Chile. The reduction in precipitation has led to water scarcity, which is critical for cherry orchards that require consistent irrigation. Unpredictable weather patterns, including extreme winds, excessive rains, and hail, have also posed challenges. These conditions can cause i) fruit splitting, ii) flower loss, and iii) increased susceptibility to plant diseases, all of which negatively affect the *quality* and *yield* of cherries [WorldBank, WIPO].

THE OPPORTUNITY

Like any C3 plant, a cherry tree needs a "well-balanced diet" comprised CO2, water, macro, micro-nutrients and sunlight for photosynthesis. Under abiotic stress conditions **[ISSUE 1]**, the equilibrium for regular plant metabolism is tipped, in favour of gene expression (G) as natural defence. Process (G) is energy intensive. In the absence of constant supply of bio-available nutrients delivered via the root systems, in the presence of microbes and fungi, excessive energy depletion leads to growth stunt. Under heat stress conditions, stomata on the reverse side of the leaves will close when temperature exceeds 30 deg C, preventing photosynthesis, thereby forcing the tree to rely solely on cellular level metabolism for sustenance by drawing upon the existing cellular energy (CE) budget. With extended heat stress, the utility of conventional irrigation cannot compensate for rapid decline in metabolism, leading to remission.

SOLUTIONS & CONCLUSION

By incorporating bio-enzymes into existing regime, in the presence of bio-fertiliser, the rich cationic density that formed around the root system will be aborbed quickly. This enabled calcium channel to operate normally, building up and thickening cell walls, for stronger epithelial layer (showing up as higher brix value), leading to reduced cracking incidence and natural drought resistance.

By the same principle, a potent dose of bio-enzymes at 50 times dilution factor will speed up metabolim exponentially, expelling exudation through infected areas in the trunk, and drying up in just 7 days. In dormant tree including cherry, the key is to energise cellular division through exogenous triggering using bio-enzymes, meeting both primary and secondary metabolic needs. Chill hours are needed for breaking dormancy in cherry trees due to energy conservation. Bio-enzymes compensated for the need for extended chill hours, through zero oxidative stress pathway. A safe, highly effective natural solutions becomes available for breaking dormancy and treat canker disease sustainably.