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PGRs PESTS

Lifting Pressure on Infection at Farms and Orchards

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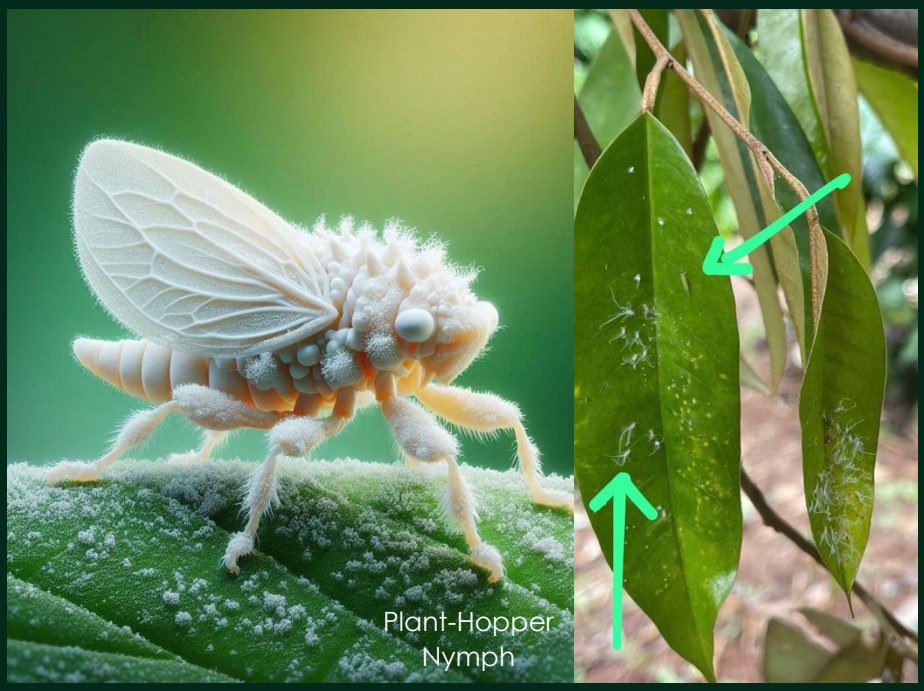

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COMPLEX SUGAR AS CURE

Editor Dr. Jeff Lim

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ECONOMICS OF ORCHARD

Demand for fruits is led by growing awareness in health conscious consumers, including organic and sustainably grown varieties, has increased. This trend is particularly strong in developed countries and growing in emerging markets. Despite being the second largest producer by capacity such as for citrus production, Brazil remains the top producer per capita for year ending 2022. This is seconded by China, with USA in the third spot.

With Asia taking the leadership role in agricultural valued at USD 2.3 trillion, Europe coming in second at USD 450 billion, with South America and Africa in a tie at USD 300 billion, the economic impact due to agricultural production is therefore very significant. In this issue, we look into the risk factors for job security linked to PGRs, extending beyond climate change.

FUNDAMENTAL SOLUTIONS

Fieldwork by ChongMing

PGRs & MODERN MEDICINE

Plant Growth Regulators (PGRs) play a significant role in orchard farming by influencing various physiological processes in plants. An overview of their role and the potential long-term impacts as follows:

- **Growth Regulation**: PGRs are used to control the growth of plants, including promoting or inhibiting stem elongation, leaf expansion, and root growth. This helps in managing the size and shape of trees, making them easier to harvest and maintain.
- **Fruit Development**: PGRs can enhance fruit set, improve fruit size, and regulate the timing of fruit ripening. This is particularly useful in synchronizing harvest times and improving the marketability of the produce.

Comparison to Modern Medicine

The widespread application of PGRs in orchard farming can be likened to modern medicine that focuses on addressing symptoms rather than curing the underlying issues. Here is how:

- **Symptom Management**: Just as modern medicine often treats symptoms to provide immediate relief, PGRs are used to manage the visible aspects of plant growth and productivity. They can temporarily enhance growth, improve fruit quality, and increase resistance to stress.
- **Underlying Issues:** However, like treating symptoms without addressing the root cause, the persistent use of PGRs does not solve underlying soil health or plant nutrition issues. Over time, this can lead to more significant problems.

Long-term Impact of PGRs

- **Oxidative Stress**: Continuous use of PGRs can lead to oxidative stress in plants. This stress results from an imbalance between the production of reactive oxygen species (ROS) and disrupts the plant's ability to perform cellular repair. Over time, oxidative stress can damage cellular structures and impair plant functions.
- **Degradation of Plant Health**: By the third year of persistent PGR use, significant degradation in plant health can set in. Symptoms may include reduced vigor, poor fruit quality, and increased susceptibility to diseases and pests.
- **Orchard Demise**: If the use of PGRs continues without addressing the underlying issues, the orchard may face severe decline by the fifth year. This can result in reduced yields, increased maintenance costs, and ultimately, the need to replace the orchard. One classical example of such demise is the declining economy of the citrus industry in the USA, compounded by agro-chemicals overdose with everything being equal.

PGRs & JOB LOSS RISK FACTORS

Extended use of Plant Growth Regulators (PGRs) can have significant economic and social implications, particularly in the context of orchard farming. Here's how the potential failure of orchards due to prolonged PGR use can put millions of jobs at risk:

Impact on Jobs in Orchard Farming

- **Direct Employment**: Orchard farming directly employs millions of people worldwide, including farmers, laborers, and managers. The failure of orchards due to prolonged PGRs use can lead to job losses in these roles. For example, in California alone, the agricultural sector employs over 400,000 people.
- **Supply Chain Jobs**: The agricultural supply chain includes jobs in transportation, packaging, processing, and distribution. Orchard failure can disrupt this supply chain, leading to job losses in these sectors as well. For instance, the fruit and nut processing industry is a significant employer in regions like California and Spain.
- **Supporting Industries**: Industries that provide inputs to orchard farming, such as suppliers of fertilizers, pesticides, and farming equipment, can also be affected. Reduced demand for these products due to orchard failures can lead to job losses in these supporting industries.

Economic Ripple Effect

- **Local Economies**: Many rural communities depend heavily on orchard farming for their economic well-being. Orchard failures can lead to reduced income for these communities, affecting local businesses and services. This can result in a broader economic downturn in these areas.
- **Export Markets**: Countries that rely on exporting orchard products can face significant economic challenges if their orchards fail. This can lead to reduced export revenues, affecting national economies and potentially leading to job losses in other sectors.

Long-term Consequences

- **Loss of Expertise**: The failure of orchards can lead to a loss of agricultural expertise and knowledge. Experienced farmers and workers may leave the industry, making it harder to rebuild and recover in the future.
- **Investment and Innovation**: Persistent orchard failures can deter investment in the agricultural sector. This can slow down innovation and the adoption of new technologies, further impacting productivity and job creation.

SOLVING THE PLANT METABOLISM CHALLENGE

The case study inset represents a ready solution to lift the current state of the broader citrus industry in the USA out of severe distress. As discussed in **[ISSUE 1]** and shown by example in **[ISSUE 2]** on influencing feeding insects behaviour, the solution to all farms and ochards regardless of regime lies in speeding up plant metabolism by shorting the nutrient cycling pathway in the soil for a healthy soil microbiome, delivering enhanced performance through foliar application, with clear evidence in this **[SPECIAL ISSUE]** and **[ISSUE 3]** showing how metabolising *like a bat* in flight solves fundamental metabolic dysfunctions using functional bio-molecules. Bats are natural host to pathogens yet remain uninfected owing to its outstanding circulation at approximately 5 times that of a running man.

Likewise, by the same analogy, a plant experiencing metabolic disorder is akeen to a diabetic patient showing clear insulin resistance, and along with these symptoms, a whole suite of diseases in the tow in a vicious cycle evident by endless dialysis and prescription that does not address the root cause.

At the same time, by raising complex carbohyrates synthesis during cultivation and post harvest, natural food preservation can be achieved in this **[SPECIAL ISSUE]**. By the same set of solutions, a healthy metabolism act as ANTI-FROST agent, solving chill/frost challenges in plants in **[ISSUE 4]**. Clearly, the solution of modern AG does not reside in the use agrochemicals, including PGRs. Rather plant health is directly dependent on nurturing a healthy crop by supplying bioavailable nutrients that supports sustenance by reducing oxidative stress.

By extension, the same solution is also applicable to a wide variety of C3, C4 and CAM plants.

CONCLUSION

The whole of AG is on the precipice of change, led by sustainable solutions that propels the entire sector in a forward motion, moving sectorial and economic indicators, matching back to human as the first priority. Biology is simply common sense. So is human health.