

Precision breeding for indoor strawberry: The AI revolution with Heritable, CIV, and Paul J. Mastronardi

Heritable Agriculture, Paul J. Mastronardi, and CIV (Consorzio Italiano Vivaisti), are proud to announce that they have partnered to develop an advanced strawberry improvement program for greenhouse and tabletop varieties. This partnership represents a trifecta of expertise and capabilities essential for a successful breeding program, marrying the genetics and germplasm knowledge of CIV, the AI-driven breeding models and machine learning expertise of Heritable Agriculture, and the production assets, distribution network, and leadership in indoor strawberry production of Paul J. Mastronardi.

By uniting germplasm, AI expertise, and advanced growing capabilities, this collaboration forges a synergy that surpasses what any single entity could accomplish alone.

Addressing Challenges in Greenhouse Crop Breeding

Traditional breeding programs take several years and millions of dollars to bring new cultivars to the market. Current strawberry breeding emphasizes field-growth and targets a limited number of traits. This results in inadequate control over essential characteristics such as taste, disease resistance, and productivity, which are key factors for successful greenhouse operations.



"We are already working with North America's largest retailers to bring these innovations to their customers." Paul J. Mastronardi said, "Greenhouse and tabletop environments vary widely, requiring tailored genetics and distinct growing protocols to optimize performance and meet market demands. We expect to bring novel varieties to the market that will deliver a premium quality experience for the consumer and retailer, while ensuring crop economics that will see farms thrive for generations."

Innovative Breeding: Faster, More Precise, and AI-Powered

The partnership will use Heritable's AI-driven predictive breeding technology to:

- Predict crop performance through simulations, before strawberries are planted.
- Optimize traits that are important in greenhouse environments, such as taste, disease resistance, and yield.

- Develop varieties that streamline growth and management practices for indoor growers.
- Reduce breeding timelines, bringing superior varieties to market faster.



Tim Beissinger (Heritable CTO) and Joel Smith (Sr. Computational Biologist) discuss the latest in AI implementation for breeding. (Photo credit, Yunus Emre Cakir)

Heritable's AI-driven breeding program optimizes both grower and consumer traits simultaneously, and their breeding simulations and predictions drastically reduce breeding cycle timelines. By partnering with Paul J. Mastronardi for operational and market leadership, and CIV for their worldclass germplasm, Heritable is set to transform the strawberry market.

"Our approach empowers greenhouse and tabletop growers to break free from traditional breeding limitations," said Dr. Brad Zamft, CEO of Heritable Agriculture. "Partnering with Paul J. Mastronardi and CIV allows us to push the boundaries of what's possible for greenhouse crop optimization."

Heritable Agriculture's multi-omic, AI-driven predictive models generalize across species, environments, and traits, making the approach highly adaptable to any operation. The technology extends to crops such as tomatoes, spinach, and peppers, offering an opportunity for growers looking to diversify and innovate.

Ultimately, it begins with superior genetics

With over 40 years of experience in the R&D of new varieties, CIV has established itself as a leader in strawberry cultivation, leveraging a wealth of expertise and a strong presence across Europe and North America. Through continuous research and a robust international network, the company remains at the forefront of varietal innovation.

"A partnership of this scale provides a unique opportunity for CIV to drive and speed-up our traditional breeding process at the service of all value chain players" said Federico Stanzani, CIV's Managing Director. "This collaboration is a confirmation of CIV's continuous commitment to delivering cutting-edge solutions and achieving the highest quality standards to swiftly meet the market demands."



Andrea Colpo, CIV Assistant breeder, assesses new cultivar selections

Through its renowned breeding program, CIV brings specialized expertise and a rich germplasm collection to the partnership, with the ultimate goal of developing the perfect strawberry—one that seamlessly combines exceptional flavor with outstanding productivity. By blending tradition with innovation and prioritizing sustainability.

Prof. Bruno Mezzetti (Marche Polytechnic University) emphasizes the complexity of modern strawberry breeding, driven by global competition and advanced technologies. *"The recent synergy between Heritable, the Italian Consortium CIV, and Paul J. Mastronardi represents a significant challenge to demonstrate the role that Artificial Intelligence (AI) can play in improving the breeding capabilities of an organization like CIV and the market sustainability of a company like Paul J. Mastronardi,"* said Prof. Mezzetti. *"The involvement of an Italian company in such an ambitious program should serve as an impetus to showcase the potential of our enterprises by facilitating access to new technologies."*

"This is a paradigm shift for the greenhouse sector", said Paul J. Mastronardi, *"our work with Heritable Agriculture and CIV not only reimagines how we breed strawberries but also sets the stage for a new era of greenhouse crop innovation."*

About Heritable Agriculture

Born at X, Alphabet's moonshot factory, and founded by molecular and computational biologists with extensive experience in plant genetics, Heritable Agriculture develops AI-driven crop breeding solutions. The company uses its proprietary AI-driven models to lower the costs and accelerate the time to market for expansive opportunities in the agriculture sector, in this case for indoor agriculture.

About Paul J. Mastronardi

Paul J. Mastronardi is a third-generation greenhouse grower and distributor in the North American market. He was recognized as a Top 10 Under 40 honoree by *Greenhouse Canada* in 2017 and as a Top 40 Under 40 honoree by *Produce Business* in 2024. Paul also serves on multiple boards across various industries and brings extensive experience in developing businesses.

About CIV

Founded in 1983 through the collaboration of three key leaders in the fruit sector—Salvi, Mazzoni, and Tagliani—CIV has been a benchmark in varietal innovation for over 40 years. Committed to developing unique, resilient, and sustainable varieties, we leverage advanced research and continuous collaboration with industry leaders to deliver new fruit varieties that combine exceptional flavor, high disease resistance, and a reduced environmental footprint. Our mission is to create cutting-edge varieties that meet the growing market demand for quality and sustainability.