

Shiv Tiwari, Ph.D
CEO, GreenVenus LLC
1910 5th St, Davis, CA 95616
Phone: 415-385-4678
Email: stiwari@greenvenus.com

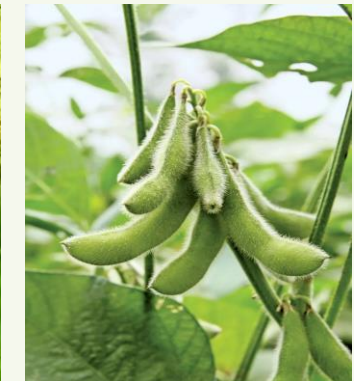


The Market Leader in Rapid Trait Development

Critical Needs in Today's Ag-Industry

- ❖ **Rapid Adaptation to Climate Change and Accelerated Market Entry:** Addressing the need for quick responses to shifting environmental conditions and market demands.
- ❖ **Reducing Food Waste and Greenhouse Gas Emissions:** Tackling inefficiencies and environmental impacts within the food supply chain.
- ❖ **Balancing Nutrition and Yield in Breeding Practices:** Shifting the focus from past breeding priorities that emphasized yield at the expense of nutritional quality.
- ❖ **Mitigating Food Allergies:** Developing solutions to reduce allergenicity in commonly consumed foods.
- ❖ **Diversifying Crop Reliance:** Expanding the food chain beyond a limited number of staple crops to improve resilience and sustainability.

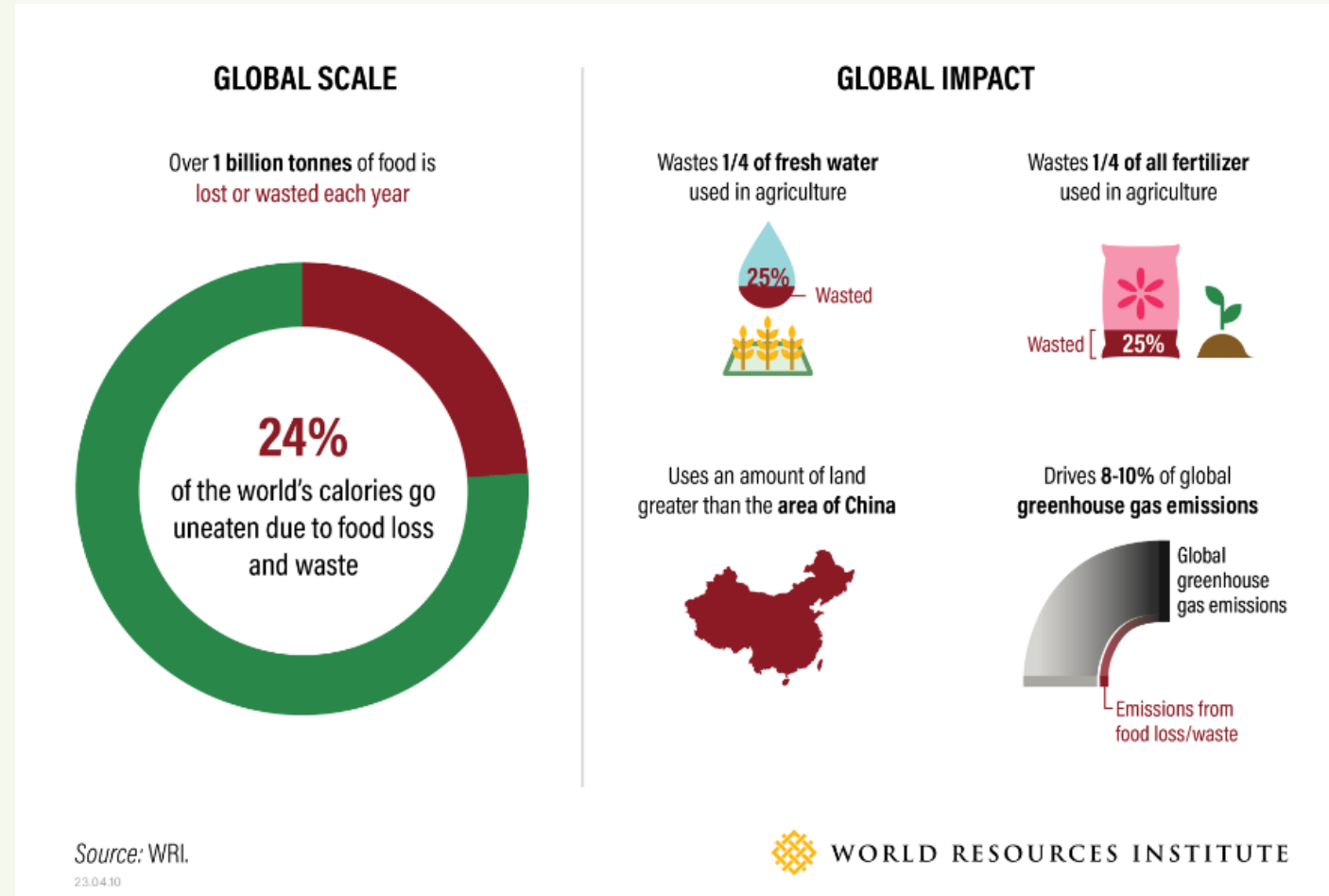
Top 4 crops feeding the world



Food Waste Causes Loss of \$940B to World Economy Each Year

Highlights

- ❖ Globally, **24% of food is wasted**, while 1 in 10 people remain malnourished. In the **U.S., 40% of food is wasted, costing \$218 billion** annually—about 1.3% of GDP.
- ❖ U.S. aims to cut food waste by 50% by 2030. A 20-50% global reduction in consumer food waste could save \$120-300 billion annually.
- ❖ Short shelflife also reduces nutritional value, impacting consumer health and product quality.



Food Waste Results in 8-10% of Human-Caused Greenhouse Gas Emissions

Roughly 40% of Avocado alone is wasted throughout the supply chain, amounting to ~ USD \$2B in loss each year.

Browning causes the loss of visual appeal and nutritional value



Spoilage due to short storage life



Spoilage of stored raisins



Controlled Environment Agriculture Failure

- ❖ High energy costs and **lack of appropriate genetics** are a few leading causes of failure in indoor industries—loss of several billion dollars of investment
- ❖ The failure list includes Fifth Season, Plantise, Glowfarms, Agricoool, AppHarvest, Aerofarms, Bowery Farms, Infarm, and Kalera industries.

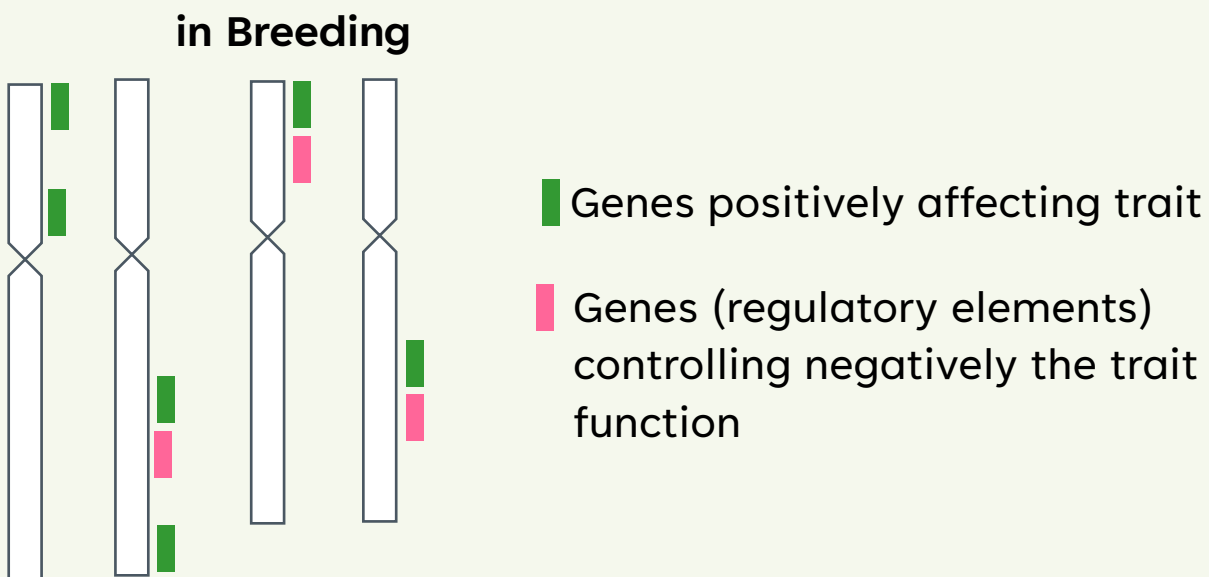


Major Breeding Challenges

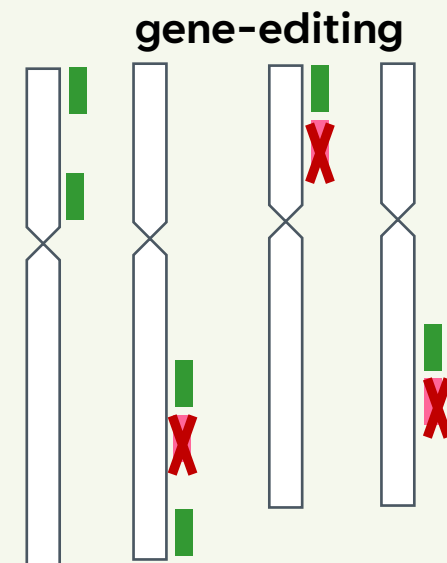
Complex traits such as yield, disease resistance, and flavor are controlled by multiple QTLs distributed across various chromosomes. Additionally, these QTLs often contain genes that influence traits in opposing ways, making it challenging for breeders to separate beneficial and detrimental genes within a single QTL.

Separating positive and negative elements (genes, regulatory regions) in a QTL is a major breeding challenge.

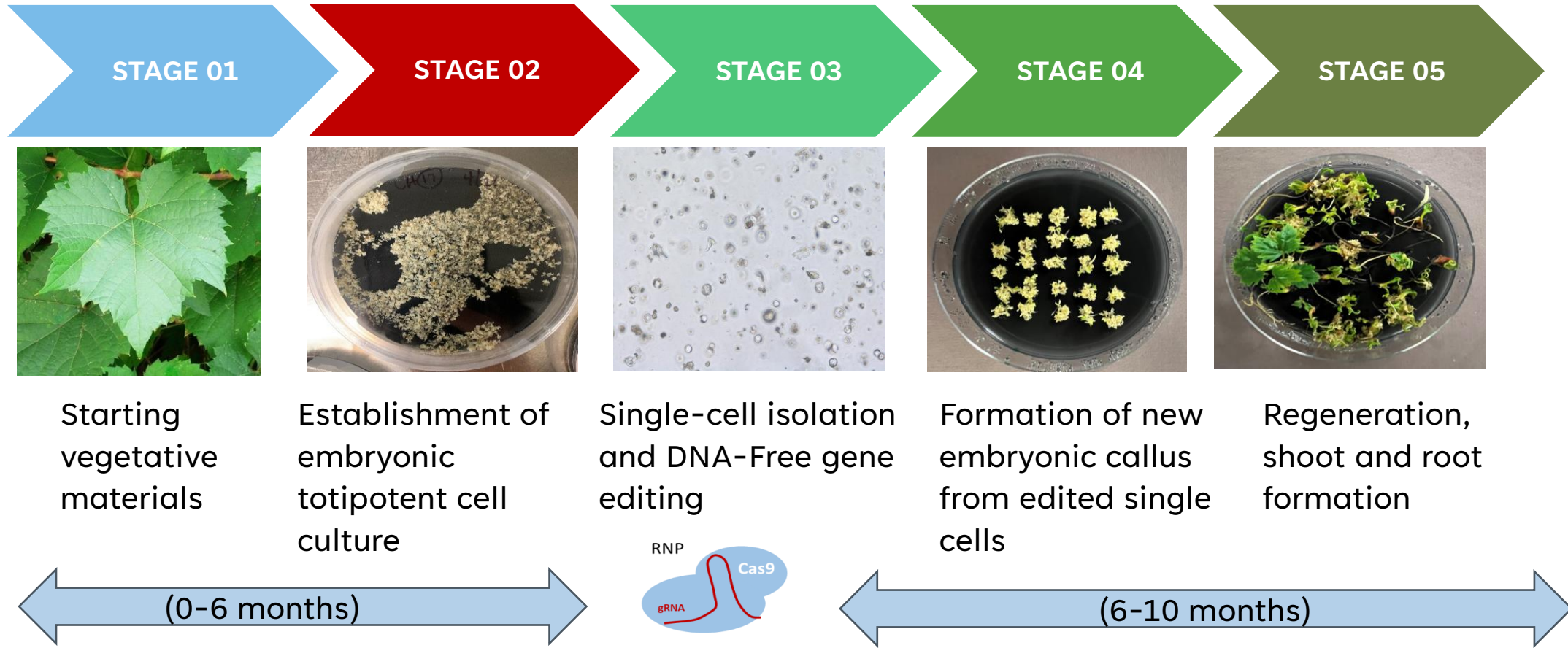
Both positive and negatively influencing genes (regulatory elements) can exist in a QTL. Separating them is a critical challenge



Targeted elimination of negatively affecting genes (regulatory elements) in a QTL via



GreenVenus PrimaVera Gene Editing Platform Enable Rapid Trait Development and Market Entry



Our Priority and Focus Crops

- ❖ **Climate adaptation:** Fast-track product development and market launch
- ❖ **Reducing food waste and improved postharvest life:** Short shelf-life and browning in crops like lettuce and avocados cause 30-40% wastage, resulting in financial losses and adverse environmental effects.
- ❖ **Toxic ingredients as preservatives:** Adding sulfites to inhibit oxidation during winemaking has numerous adverse effects on consumers and significantly impacts wine's sensory characteristics.
- ❖ **Undesirable flavors and digestibility challenges in plant protein sources:** Inherent flavors in bean-derived products and their poor digestibility present challenges in the meat-analog market.

Focus Crops and Traits



**Fresh Section:
Lettuce, Tomato,
Leafy Green,
Strawberry**

Non-browning, Shelf-Life,
Crisp, Flavor



**Premium wine and
Improved Storage Life**

Sulfite-Free, Improved Nutritional
and Sensory Value, and Storage Life



**Avocado
Genetics**

Non-Browning, Flavor,
Nutrition



**Next-gen Beans and
Lentils**

Smell-Free, High Protein, Digestibility,
and Allergen-Free

Non-browning Lettuce & Avocado with Improved Postharvest Life

Our Non-browning lettuce with better sensory properties, > ten days improved shelf life, entered commercial sale in 2024

Control



GV varieties



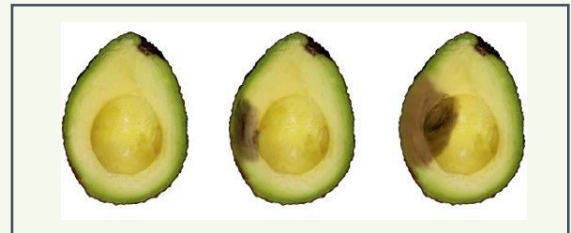
The PPO-edited avocado fruits are expected to resist flesh blackening. They are expected to be enriched with polyphenols, which may improve their nutritional and sensory properties. They are also likely to resist bruising and pulp spot-like challenges.



PPO-induced Pulp Spots



PPO-induced oxidative browning



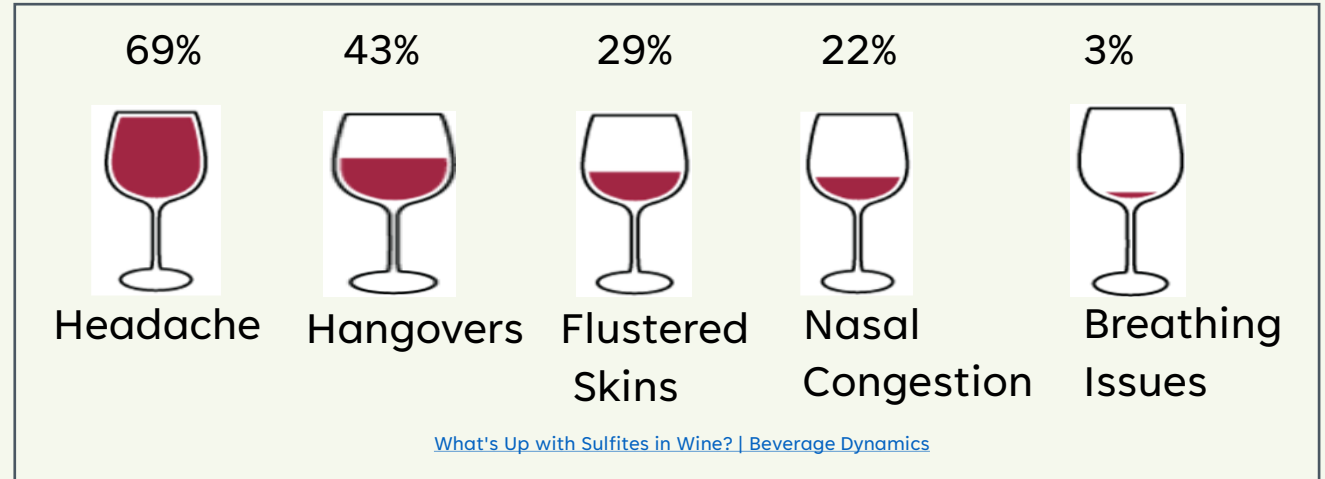
PPO-induced bruise damage

Opportunity

- ❖ A \$75B addressable market with >50% gross margin
- ❖ Opportunity to improve tasting attributes such as polyphenolic contents (contribute to taste, aroma, and antioxidant properties) by eliminating PPO enzymes
- ❖ Opportunity for organic wine
- ❖ Opportunity to dramatically improve shelf and shipping stability to grow customer base.

<https://www.prnewswire.com/news-releases/greenvenus-gene-edited-grapes-offer-premium-quality-sustainable-winemaking-301901964.html>

75% of Wine Drinkers have Experienced Adverse Reactions to Sulfite Preservatives and Histamines



PPO-ko Lines with Reduced Oxidation Entered Research Trials in 2024



Indoor growers suffer from high costs partly due to a lack of suitable germplasm that thrives in artificial environments.

<https://www.prnewswire.com/news-releases/greenvenus-introduces-fast-growing-lettuce-varieties-for-indoor-farming-302241028.html>

Indoor lines, at 20 day grown hydroponically



High-yielding field varieties



Lentils and Beans for Adaptability in Different Market Segments

- ❖ The current challenges are **poor digestibility, low solubility, allergenicity, and undesirable smells** that prevent use as an additive in different food and feeds.
- ❖ Our goal is to **substitute a significant portion of meat and dairy alternatives** for both human and animal feeds.

Revenue in the **Milk Substitutes Market** amounts to **US\$25.23bn** in 2024. The market is expected to grow annually by **8.46% (CAGR 2024-2029)**.

<https://www.statista.com/outlook/cmo/food/dairy-products-eggs/milk-substitutes/worldwide>



Revenue in the **Meat Substitutes Market** amounts to **US\$10.33bn** in 2024. The market is expected to grow annually by **8.55% (CAGR 2024-2029)**.

<https://www.statista.com/outlook/cmo/food/meat/meat-substitutes/worldwide>



The global plant-based **Pet Food Market** is valued at **US\$26bn** and is projected to grow to **US\$57bn by 2032**.

<https://www.kerry.com/products/animal-applications/pet-food-nutrition/plant-based-pet-food-trends.html>



Thank You