



PLANTASTIC DISCOVERIES



Plants
for the Future
European Union



30% OFF



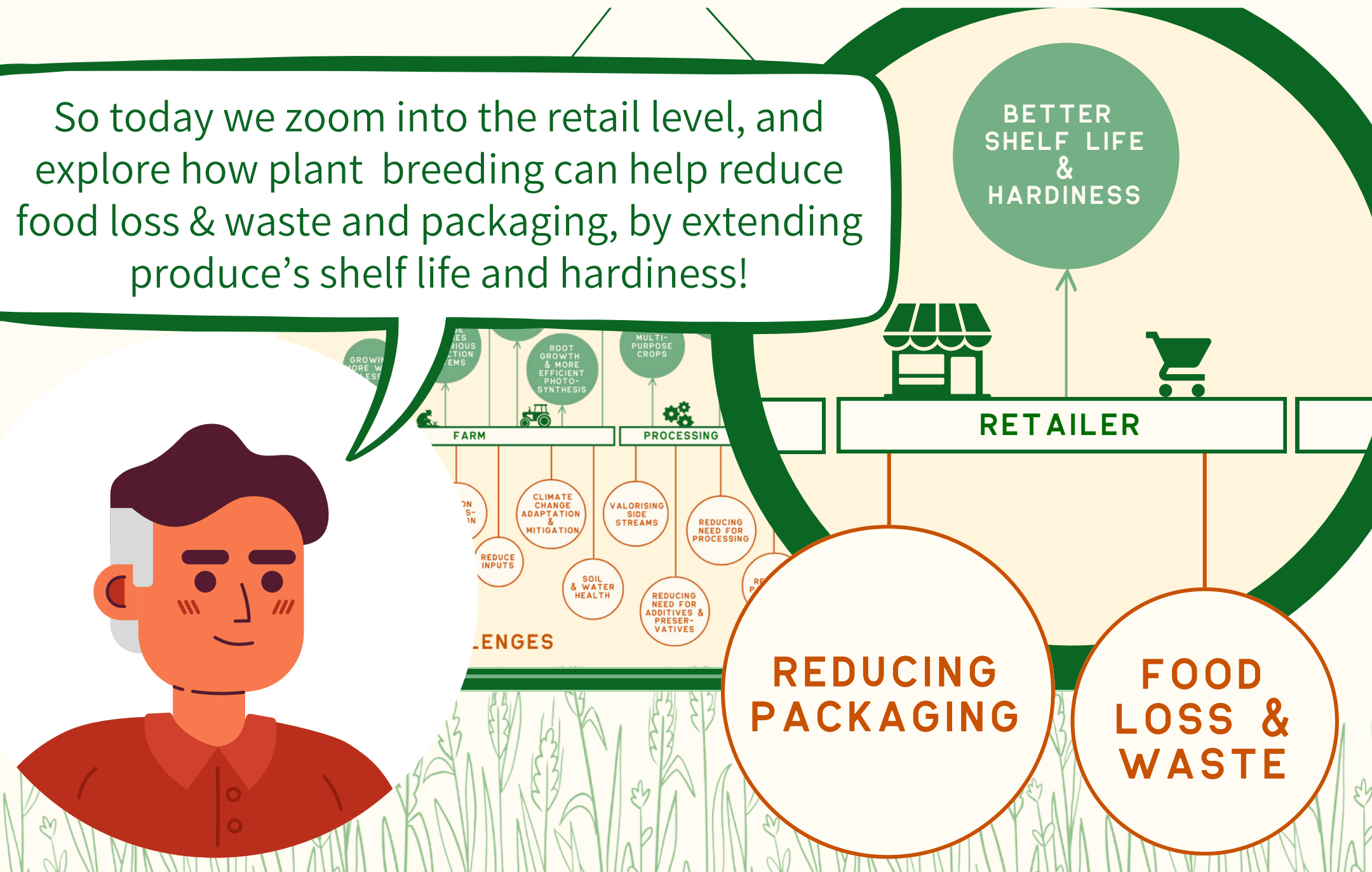
HOW CAN PLANT BREEDING HELP FOOD RETAILERS?



PLANT
BREEDING
SERIES

THE ISSUE

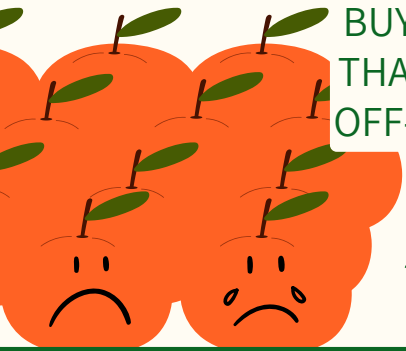
The retail sector faces significant sustainability challenges, particularly regarding food and packaging waste. In 2022, approximately 1.05 billion tonnes of food waste were generated globally, with 12% originating from retail operations. Concurrently, plastic packaging usage in retail aims to preserve product freshness but contributes substantially to environmental pollution.



FOOD LOSS & WASTE AT RETAIL LEVEL

There is a lot of edible food that is disposed of at retail level.
What are some of the main causes?

WHO'S GONNA
BUY US NOW
THAT WE ARE
OFF-SEASON?



Overstocking and Overordering: Retailers often overstock products to ensure shelves appear full and to avoid stockouts, which can lead to excess inventory that expires before being sold.

Strict Aesthetic Standards: Due to consumer preferences, retailers can enforce rigorous cosmetic criteria for fruits and vegetables, rejecting produce that is misshapen or has minor blemishes, even if it is safe to consume.

TODAY'S BEAUTY
STANDARDS ARE
OUT OF HAND

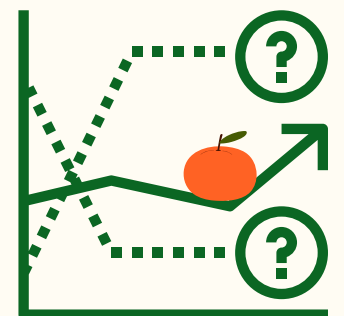


I'M AFFRAID
I SHELF NOT
MAKE IT...




Short shelf life: Fresh produce has limited shelf life, and retailers often discard items that are close to expiration or have passed their “best before” dates. Moreover, consumers tend to avoid purchasing items that are close to expiration.

Inefficient Inventory Management: Poor forecasting, lack of real-time data, and inadequate inventory tracking systems can lead to overordering and spoilage.



PACKAGING

Packaging can extend the shelf life of produce by protecting it from physical damage, contamination, and spoilage. Modified atmosphere packaging (MAP) and vacuum sealing slow decay by controlling oxygen and moisture levels. Moreover, offering smaller, pre-packaged portions aligns with consumer preferences and can reduce food waste by allowing consumers to purchase quantities that match their needs.



While packaging helps reduce food loss & waste, it often contributes to plastic waste, which has big environmental consequences as well. However, in many instances, the environmental footprint of packaging is smaller than the emissions from the food waste it helps prevent.

This balance explains why certain foods are packaged in specific proportions—not as an overuse of plastic, but as a strategy to match consumer needs and prevent waste. **But both excessive food waste and overuse of packaging are problematic, and finding an equilibrium is essential.**

HOW CAN PLANT BREEDING HELP?

Plant breeding is a powerful tool that can significantly contribute to reducing food loss & waste and minimising the need for excessive packaging at the retail level.

By developing varieties of fruits, vegetables, and other produce with increased shelf life and improved hardiness, plant breeding addresses key factors that lead to spoilage and waste.

SHELF LIFE: REFERS TO HOW LONG THE PRODUCE STAYS FRESH AND EDIBLE AFTER HARVEST! SHELF LIFE FOCUSES ON BIOLOGICAL PROCESSES, SUCH AS RIPENING OR DECAY.

HARDINESS: REFERS TO THE PHYSICAL DURABILITY OF PRODUCE, MAKING IT BETTER ABLE TO WITHSTAND THE STRESSES OF HARVESTING, TRANSPORTATION AND HANDLING. HARDINESS FOCUSES ON PHYSICAL DURABILITY, LIKE RESISTANCE TO DAMAGE DURING HANDLING.

But first let's clarify something quickly!

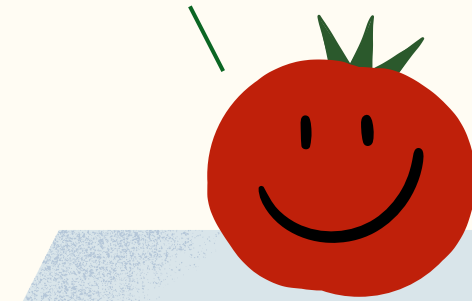


EXTENDED SHELF LIFE

Plant breeders focus on developing varieties that stay fresh longer after harvest, reducing the likelihood of spoilage before reaching consumers.

This is achieved through:

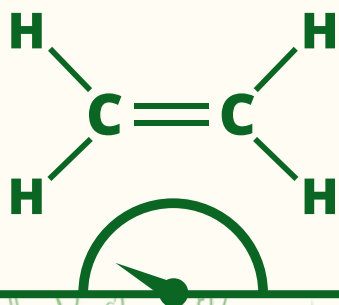
I WILL STAY HERE AS
LONG AS THE SHELF
CAN HOLD ME



Delayed ripening: Slowing down the natural aging process of fruits and vegetables.



Resistance to decay: Reducing susceptibility to fungal, bacterial, or microbial spoilage.



Reduced ethylene sensitivity: Ethylene is a hormone that triggers ripening; reducing sensitivity to it can delay spoilage.

ENHANCING HARDINESS

Hardiness can be improved through plant breeding as well:

Thicker or stronger skin: Produce with tougher skin is less prone to bruising, cracking, or damage during handling.

Resistance to mechanical stress: Varieties that can endure impacts, pressure, or abrasion without damage.

This can help reduce packaging, by making produce more resistant without needing plastic protection!



SOME EXAMPLES

TOMATOES

Mediterranean Long Shelf Life (LSL) tomatoes are a group of varieties bred specifically for improved durability and extended shelf life. Unlike typical tomatoes, which have a shelf life of only 3 to 5 days at room temperature, LSL tomatoes can last several weeks to a few months under optimal storage conditions. This is achieved through conventional breeding methods that focus on traits like thicker skins, reduced moisture content, and resistance to cracking and bruising, all of which help the fruit maintain its firm texture and quality for a much longer period.

These tomatoes are ideal for long-distance transportation and extended retail display, as they can withstand the rigours of handling and display without deteriorating as quickly as typical tomatoes. In contrast, typical tomatoes, which are more vulnerable to bruising, cracking, and moisture loss, require faster turnover at retail to avoid spoilage. With LSL tomatoes, retailers benefit from reduced food waste, as these varieties remain fresh and intact for a much longer time.



POTATO

Extended shelf life potatoes are a group of varieties bred to enhance storage capabilities and reduce sprouting. Developed through conventional breeding methods, these potatoes possess traits such as thicker skins, lower moisture content, and increased resilience to bruising, allowing them to last longer in storage compared to typical potatoes. Notable examples include Kennebec, Katahdin, German Butterball, and Elba, all of which are known for their long dormancy periods and resistance to dehydration and spoilage.



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LETTUCE

Fresh lettuce has a short shelf life of just 5-10 days which is why it is so frequently wasted. Pre-shredded lettuce has an even shorter shelf life of 3-5 days. The speed at which lettuce degrades contributes to a significant issue: 40% of bagged lettuce is wasted annually.

GreenVenus Lettuce, a NGT variety, is designed to resist russet spotting and stay fresh for up to seven days after being cut. Through NGTs, specific genes responsible for browning have been targeted, enhancing the lettuce's shelf life without introducing foreign DNA.





**And there are many more
examples of varieties developed to
improve shelf life and hardiness!**



**Do you know of any?
LET US KNOW!**