# Rootstocks for delivery of salt-tolerant grafted tomatoes

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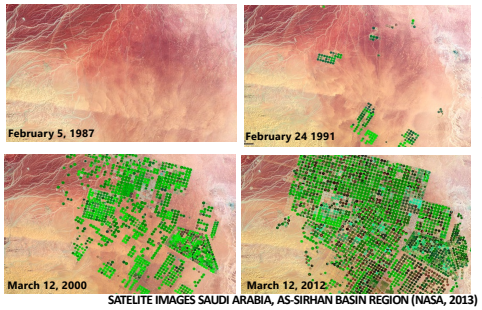
## Fresh water depletion over the past three decades




SATELITE IMAGES SAUDI ARABIA, AS-SIRHAN BASIN REGION (NASA, 2013)

The series of false-color images show the evolution of agricultural operations in the Wadi As-Sirhan Basin, Saudi Arabia. Because rainfall in this area is just 100 to 200 millimeters per year, water here is a non-renewable resource. Although no one knows how much water is beneath the desert, hydrologists estimate **it will only be economical to pump water for about 50 years.**

Therefore, **there is a need for crops that have greater salinity tolerance to unlock brackish water for irrigation.**

## My research

*S. donuanum* (Gbif.org,2018) | *S. pimpinellifolium* (Alchetron, 2018) | *S. cheesmaniae* (Magic garden seeds, 2021)

It is known that:

- **Wild tomatoes** have a high genetic diversity compared to commercial tomatoes, and a remarkable tolerance to abiotic and biotic stress, but they lack the vigor and yield of commercial lines.
- **Grafting** is used to control soil-borne diseases and to overcome abiotic stress conditions such as salinity

## Aim

**To develop F1 hybrid rootstocks to be used for grafting, combining vigor with salinity tolerance by crossing highly salt tolerant wild Solanum species with robust commercial varieties.**

**References**

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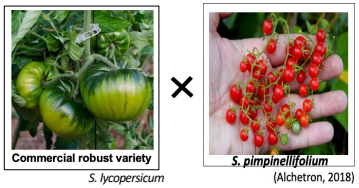
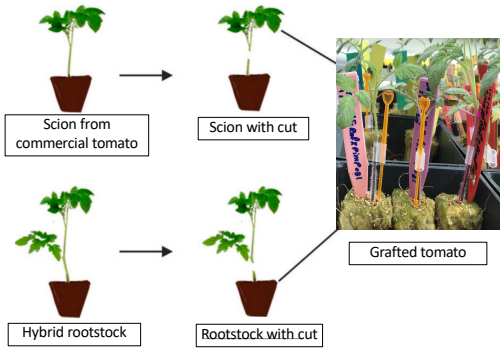
## Methodology

**1** Generate hybrids to be used as rootstocks by crossing commercial tomato varieties with wild salt tolerant tomatoes




*S. lycopersicum* (Alchetron, 2018)

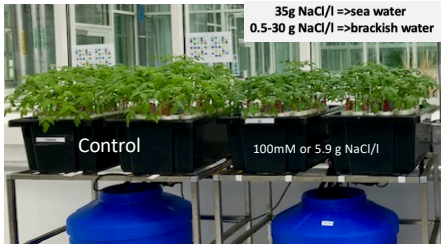
**2** Graft the commercial tomato scion on to the hybrid rootstock




*S. Lycopersicum* x *S. Pimpinellifolium*

(American Society for Horticultural Science. Singh.,2017)

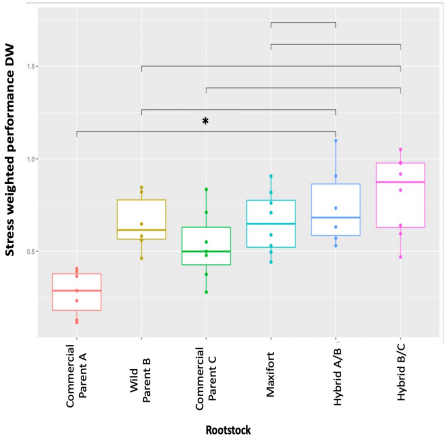
**3** Screen for salinity tolerance and identify the best performing salt tolerant rootstock to compare to the commercial hybrid rootstock Maxifort




Measurements:

- Shoot biomass
- $Na^+$ and $K^+$ accumulation in shoot and root
- Stomatal conductance

$$\text{Salinity tolerance index} = \frac{Dry\ weight\ Salt}{\sqrt{Dry\ weight\ Control}}$$




In the boxplot:

Rootstocks with higher values are better performers under control conditions and are more salt tolerant than are the ones with smaller values.

In this experiment one F1 hybrid rootstock performed better than the parental lines and than Maxifort (DeRuiter), which is one of the most commercially important F1 hybrid tomato rootstock developed by crossing a *S. lycopersicum* with a wild tomato (*S. habrochaites*).

We use Maxifort as control for our experiments.