



# A word from our main sponsor, Rijk Zwaan

Joe Beard & Paul Simmonds



# *Rugose Defense*

**High resistance  
against ToBRFV**

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## *ToBRFV recap*

- Tomato Brown Rugose Fruit Virus
- First found in Jordan in **2014**
- Related to other **Tobamo** viruses
- Highly **infectious**, easily transmittable
- Former resistance **ineffective**
- Virus **pressure differs** per client/region
- High costs for **hygiene** measures
- Up to **30%** production loss
- Supply chain **under pressure**





# *Resistances and definitions*

## **Susceptibility**

is the inability of a plant variety to restrict the growth and development of a specified pest.

## **Immunity**

is when a plant is not subject to attack or infection by a specified pest. There are no tomato varieties with immunity

**Resistance** is the ability of a plant variety to restrict the growth and development of a specified pest and/or the damage they cause when compared to susceptible plant varieties under similar environmental conditions and pest pressure.



# *Resistances and definitions*

**Intermediate resistant (IR)** plant varieties restrict the growth and/or development of ToBRFV to some extent. These varieties may, however, exhibit symptoms and/or damage under normal virus pressure.

**High resistant (HR)** plant varieties highly restrict the growth and development of the specified pest under normal pest pressure when compared to susceptible varieties. These plant varieties may, however, exhibit some symptoms or damage under heavy pest pressure.

## *Our solution*

Rijk Zwaan found new genetics with **high resistance** to ToBRFV.

Two genes originating from one wild tomato relative provides mechanisms of protection (used in both parents)

The sources of resistance are being crossed into all active breeding programs and segments worldwide.



# *Validation of level of resistance*

## **Lab test**

- Leaf symptoms
- Virus titre

## **Adult plant test**

- Leaf symptoms
- Virus titre
- Fruit symptoms



# Rootstocks

## Compatible

Our HR ToBRFV resistant tomato varieties are compatible with all commercially available rootstocks.

Competitors using a different source of resistance might have other results and communication

## Strong performance

The HR resistance of Rijk Zwaan is working in combination with all susceptible rootstock varieties.

Our trials have shown a strong performance of Suzuka RZ in combination with both susceptible as well as resistant tomato varieties.





# *Hygiene*

Strict hygiene measures and a clean start remain essential for a successful crop.

Rijk Zwaan considers HR varieties in combination with good hygiene to be the best solution for preventing losses caused by ToBRFV.





# *Introductions*

## High Tech

- Commercial varieties in; Cherry, Cocktail, Large Vine and Mini plum
- External trials with all other segments

## Mediterranean protected

- Commercial varieties in Cherry and Mini plum
- External trials with all other segments

*Contact your Rijk Zwaan contact for more information or go to:*

[www.rijkszwaan.com/rugose-defense](http://www.rijkszwaan.com/rugose-defense)





# *Validation of varieties*

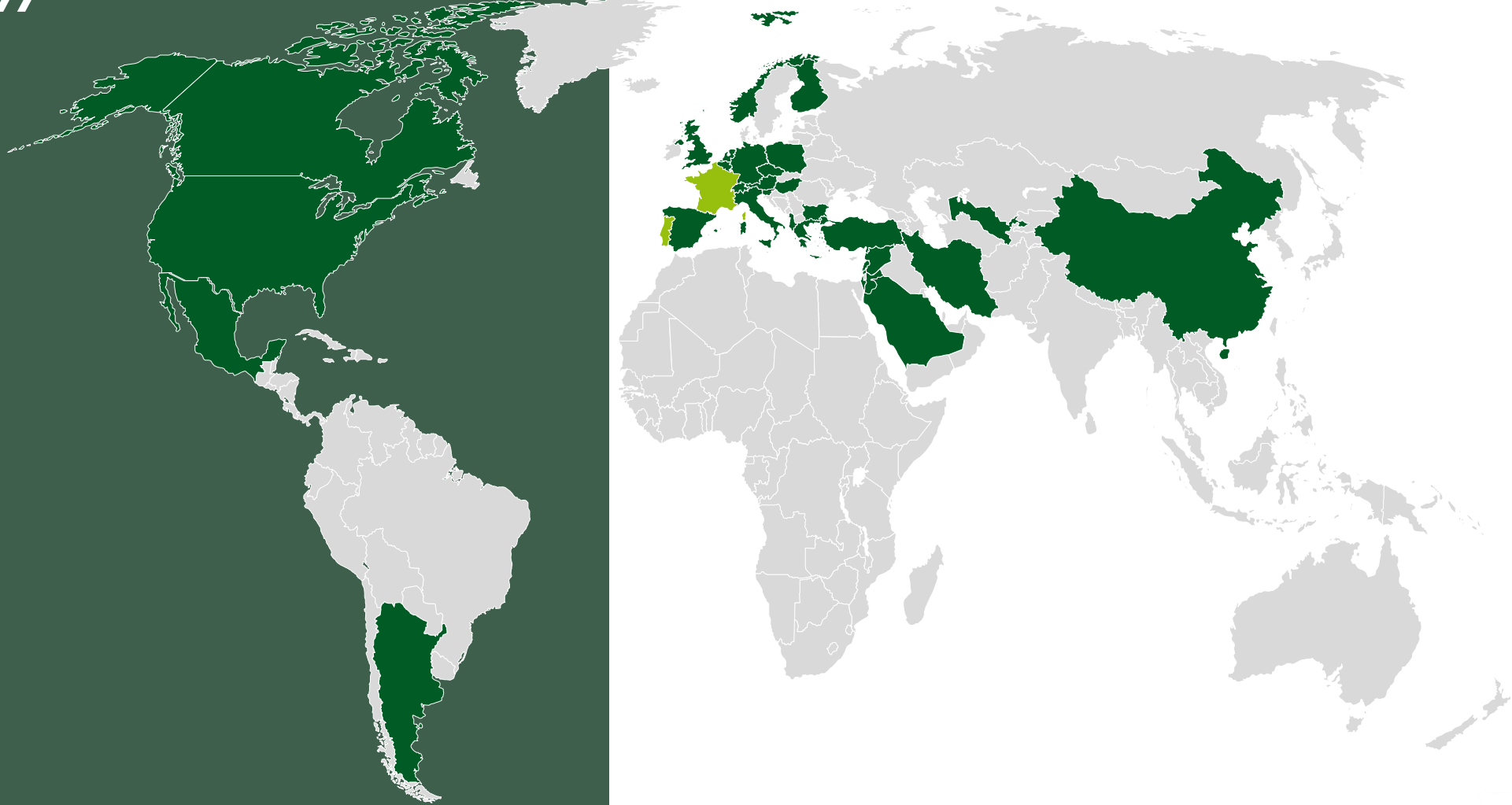
1. Adult plant test under virus pressure in practice
2. Compatible with all commercially available rootstocks
3. Tested by leading growers for agronomical value



# *An International Perspective*



# *Distribution*





# Commercial Crops

