Working together to keep Nasties out of New Zealand

Tomatoes NZ Mini Conference

08 August 2024 | James Bertram | Rijk Zwaan

Agenda

- About me | Rijk Zwaan
- Breeding
  - Breeding Targets
  - Breeding for Resistance
  - Resistance Definitions
- ToBRFV
- Hygiene
- Diagnostics
- Seed Production
  - GSPP
  - Production locations
  - Quality
  - International Movement of Seed
- Hand over to NZGSTA

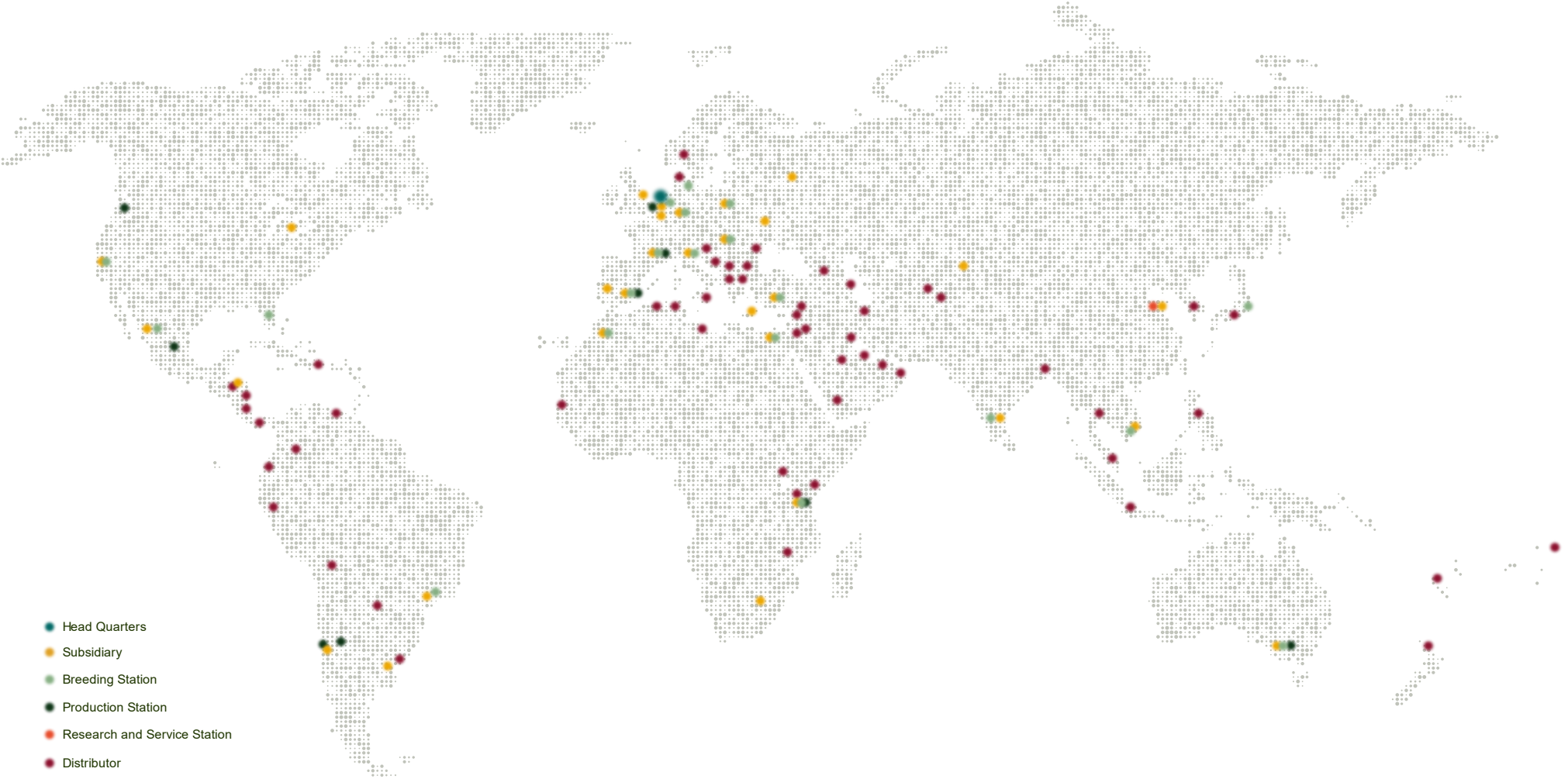
James Bertram

Client Manager | Crop Specialist
Rijk Zwaan

- Raised in Northland
- Massey University
- Auckland University
- Fruitfed Supplies
- Terranova Seeds NZ
- Rijk Zwaan – UK, AU, NZ

Rijk Zwaan at a **glance**

A family-owned Dutch vegetable and fruit breeding company.
We develop new varieties and sell the seeds worldwide.



31
Subsidiaries worldwide

100+
Serving >100 Countries

3,900
Employees around the globe

25+
Crops

1,500+
Commercial varieties

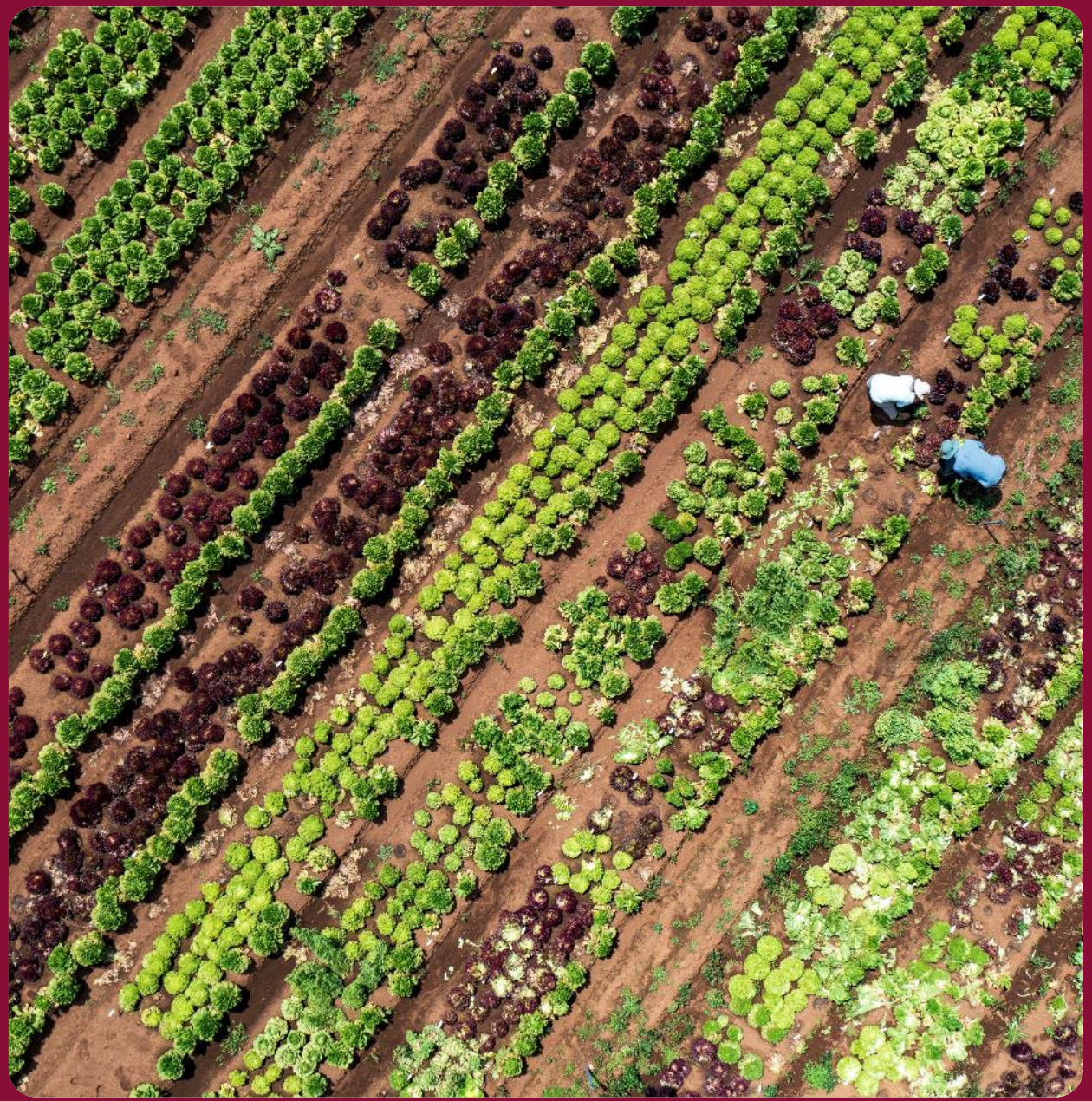
€600 (22/23)
million euros in turnover

30%
Turnover invested in R&D

40%
Of employees in R&D

Our **breeding** targets

- Best genetic resistances against plant diseases
- Agronomic performance
- Resilient and strong varieties
- Production Efficiencies
- Longer shelf life
- Inspirational and tasty fruit and vegetables



Breeding for **Resistance**

- Discovering genetic sources of resistance
- Validation of resistances
- Crossing new resistances into established breeding programs
- Validation of new cultivars
- It's an arms race…

Resistance definitions…
the detail

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.

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.

TL:DR

Translation for older ones among us…
TL:DR = ”Too Long: Didn’t Read”!

Resistance definitions… the cheat sheet

- **Susceptibility**
  - "It's gonna get it"
- **Immunity**
  - "It's never gonna get it"
- **Resistance**
  - "there's a chance it's not gonna get it"
    - **Intermediate resistance**
      - "maybe it ain't gonna get it…"
    - **High resistance**
      - "It's probably not gonna get it… but if you try hard enough then eventually it will"

Rugose Defense™

High resistance against ToBRFV

Healthy produce, peace of mind

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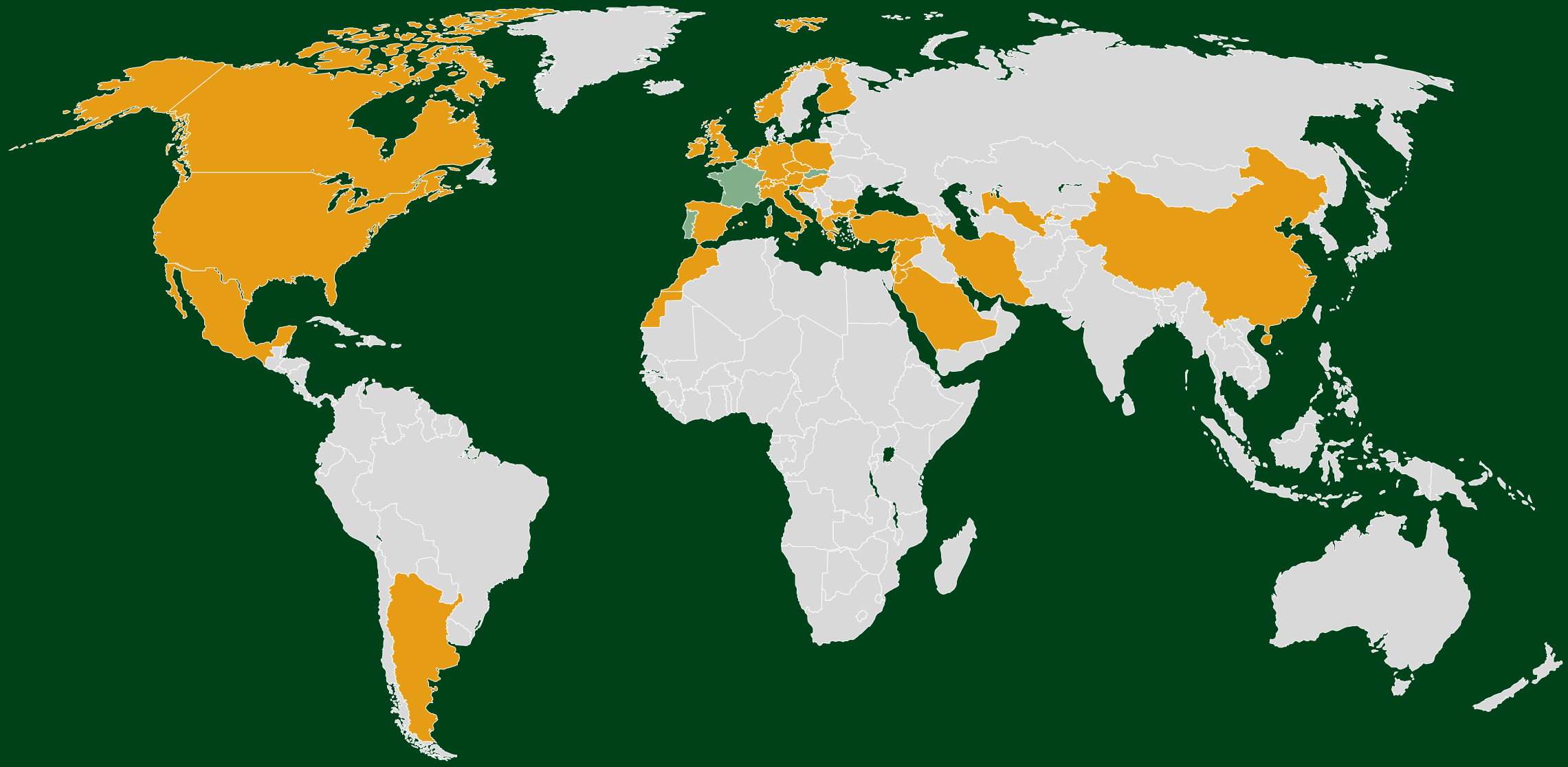
ToBRFV on a page

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

Distribution of ToBRFV



Validation

level of resistance

Lab test

- Leaf symptoms
- Virus titre

Adult plant test

- Leaf symptoms
- Virus titre
- Fruit symptoms

Validation of

varieties

- High resistance tested under virus pressure in practice
- Tested by leading growers for agronomical value

Hygiene & ToBRFV

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

Hygiene

- Holistic approach to resistance management
- Don’t just rely on varietal resistances
- Good cultivation and hygiene practices
- Appropriate interventions
- It’s an arms race…






Diagnostics

- Disease identification
- Emerging Threats
- Working with regulators

Seed Production

- GSPP
- Seed Production - General
- Quality Control
- Production Locations
- International Movement of Seed

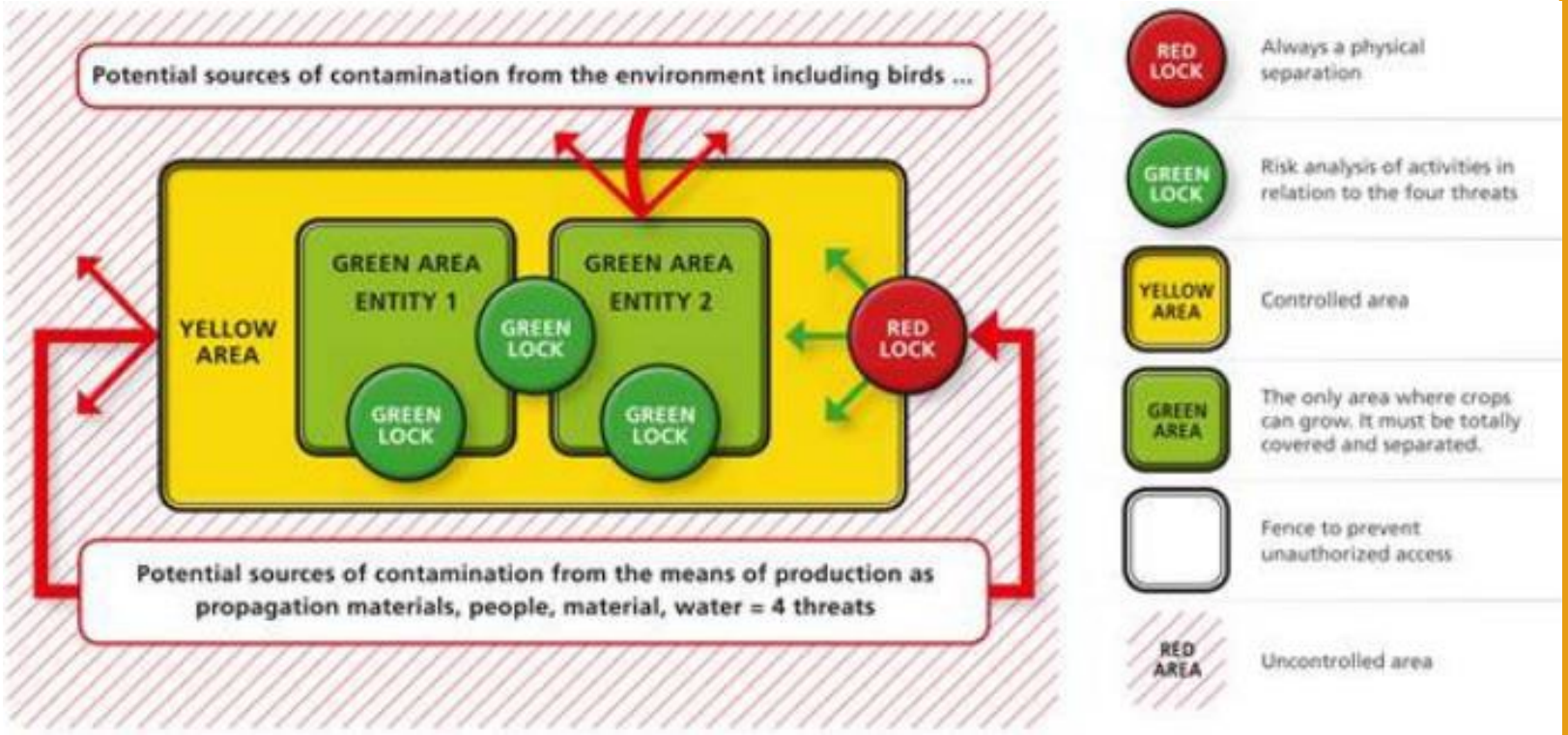
GSPP

- Process driven, frequent inspection, monitoring, & testing throughout the production chain
- Independently audited
- GSPP does not claim to prevent other diseases, however the hygiene protocols followed are incredibly strict!

GSPP

Good seed and plant practices

GSPP Good seeds and Plant Practices



Managing four key risks

1. Water
2. People
3. Materials
4. Starting material

- Primarily for preventing detecting Cmm in tomatoes
- Isolation of seed and plants from the environment
- Protected with walls
- Single controlled access

Seed Production - General

- Seed production locations
  - Rijk Zwaan own premises
  - or on contract base, under strict guidance
- Several countries:
  - Optimal climatical circumstances
  - Counter season

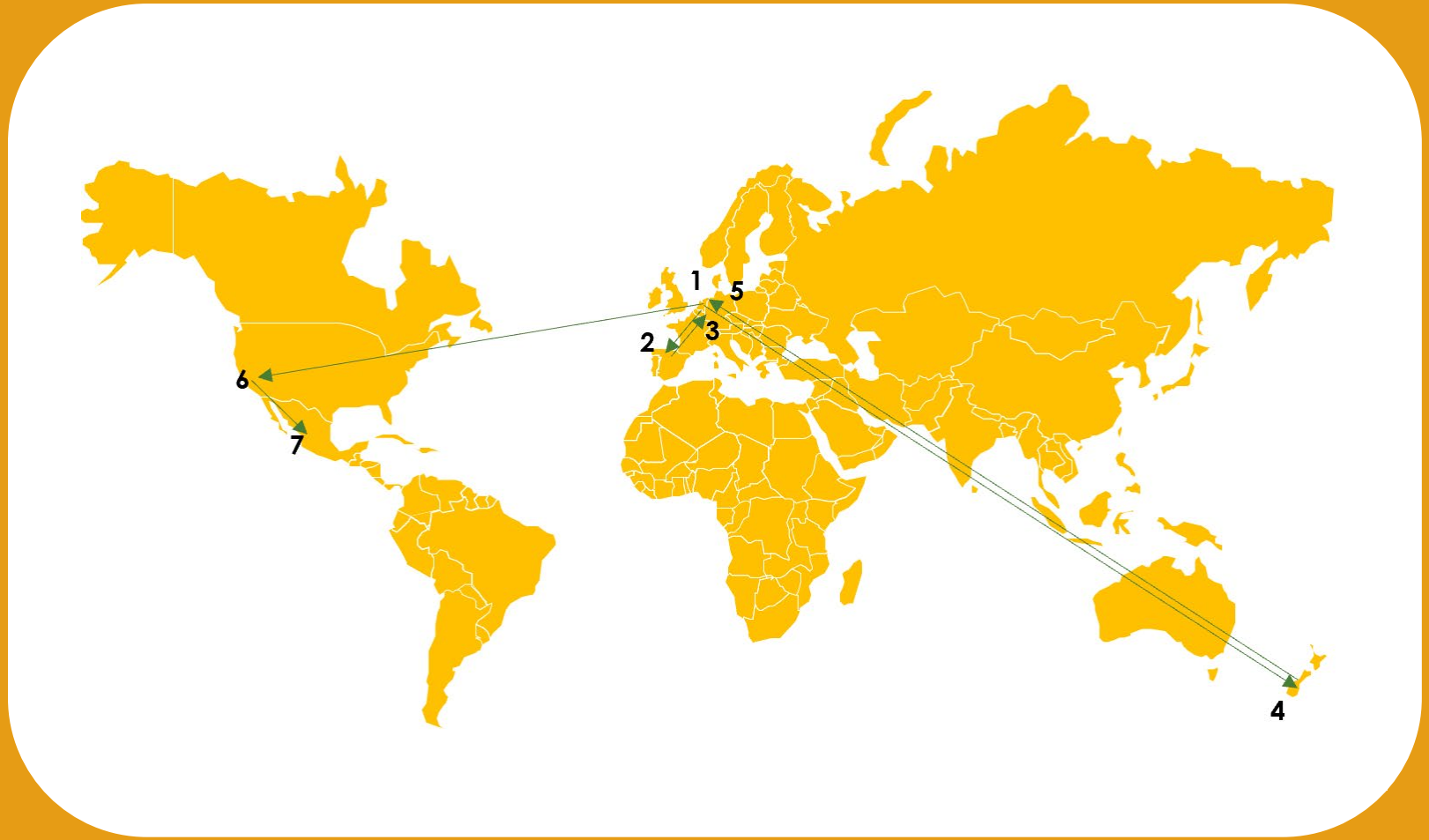
No matter the production location, **All** seeds produced for Rijk Zwaan are sent to Netherlands to manage quality

Quality Control

- Seed Health
- Germination
- Genetic Purity
- Seed purity
- Traceability

International Movement of Seed

- Seed production occurs in many countries
- Rijk Zwaan exports seeds from NL to more than 100 countries
- Re-export is the standard logistic model
- Shipments must comply with the phytosanitary requirements of the receiving countries
- Compliance is monitored / endorsed by sending country's NPPO
- Phytosanitary safeguards may be obtained either in country of production and / or in the country of processing
- Trade is facilitated by:
    - Consistent import requirements
    - Regulation of pests of real concern
    - Multiple options for phytosanitary compliance



"A complicated trade model"
Adapted from the ISF Training Manual for ISPM:38

Is the fence at the top of the cliff?

MPI
Import Health Standard
Seed Testing

Incursion
Response

Is the fence at the top of the cliff? It's all a matter of perspective…

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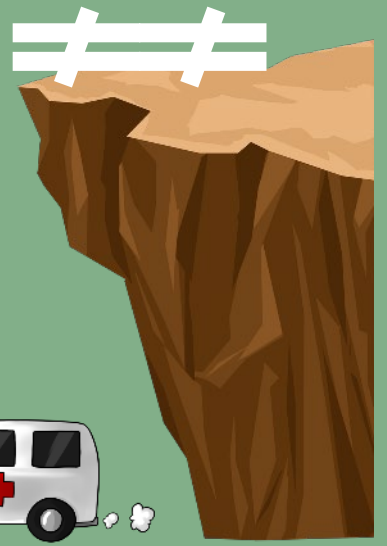
Rigorous Process
International Treaties
Regulatory Frameworks



MPI
Import Health Standard
Seed Testing

Incursion
Response

Commercial vs Non-Commercial

- Commercial:
  - Official channels
  - High levels of testing and compliance
- Non-Commercial:
  - Postal
  - Suitcase
- **NON-COMMERCIAL SEED IS POTENTIALLY THE SINGLE BIGGEST RISK FACTOR FOR ToBRFV ENTERING NEW ZEALAND**

Welcome to

Cressida Patrick
Biosecurity and Technical Manager
NZGSTA

RIJK ZWAAN

Thanks for your attention

www.rijkzwaan.com