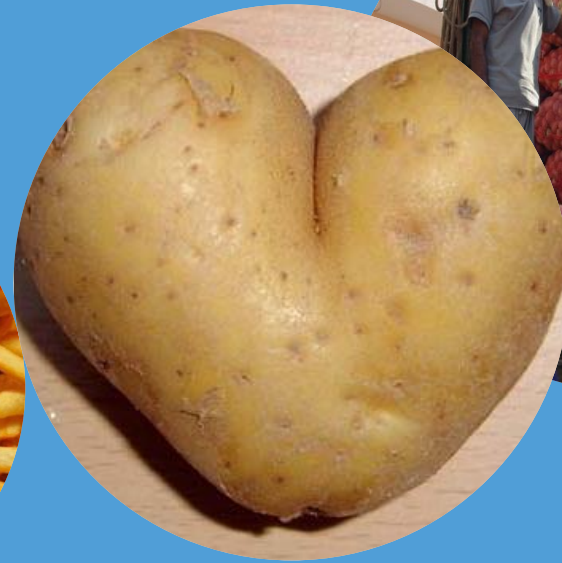


# Innovative propagation methods in potato production

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1. Microtuber production through:  
Temporary Immersion System (TIS)
  2. True potato seed production through  
Diploid Hybrid Breeding
- 



Microtuber production through:

Temporary Immersion System (TIS) in the  
ProPhyTIS Bio-reactor

**Not mini-tuber production in the open, but:  
micro-tuber production, in sterile conditions**

# Conventional mini-tuber: cutting, vitro plantlets in solid medium, aeroponics,



# Micro-tuber production: cutting, plantlets in TIS, microtubers



# TIS system advantages

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- Sterile conditions throughout, minimal contamination
- Automated media exchange, potential for full automation
- Enriched CO<sub>2</sub> environment, rapid growth, larger tubers
- Smaller lab size: more tubers/m<sup>2</sup>
- Shorter growth cycle than mini-tubers 5 cycles/yr instead of
- Reduction of production cost
- Mass production allows reduction of number of field cycles



# Results in the field



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# Potato hybrid breeding

Potato Seeds: Diploid F1 hybrid breeding, production of homogenous TPS

**Not tetraploid TPS (CIP system), not conventional tetraploid new clonal variety (breeding companies) but F1 from selected male and female inbred lines**

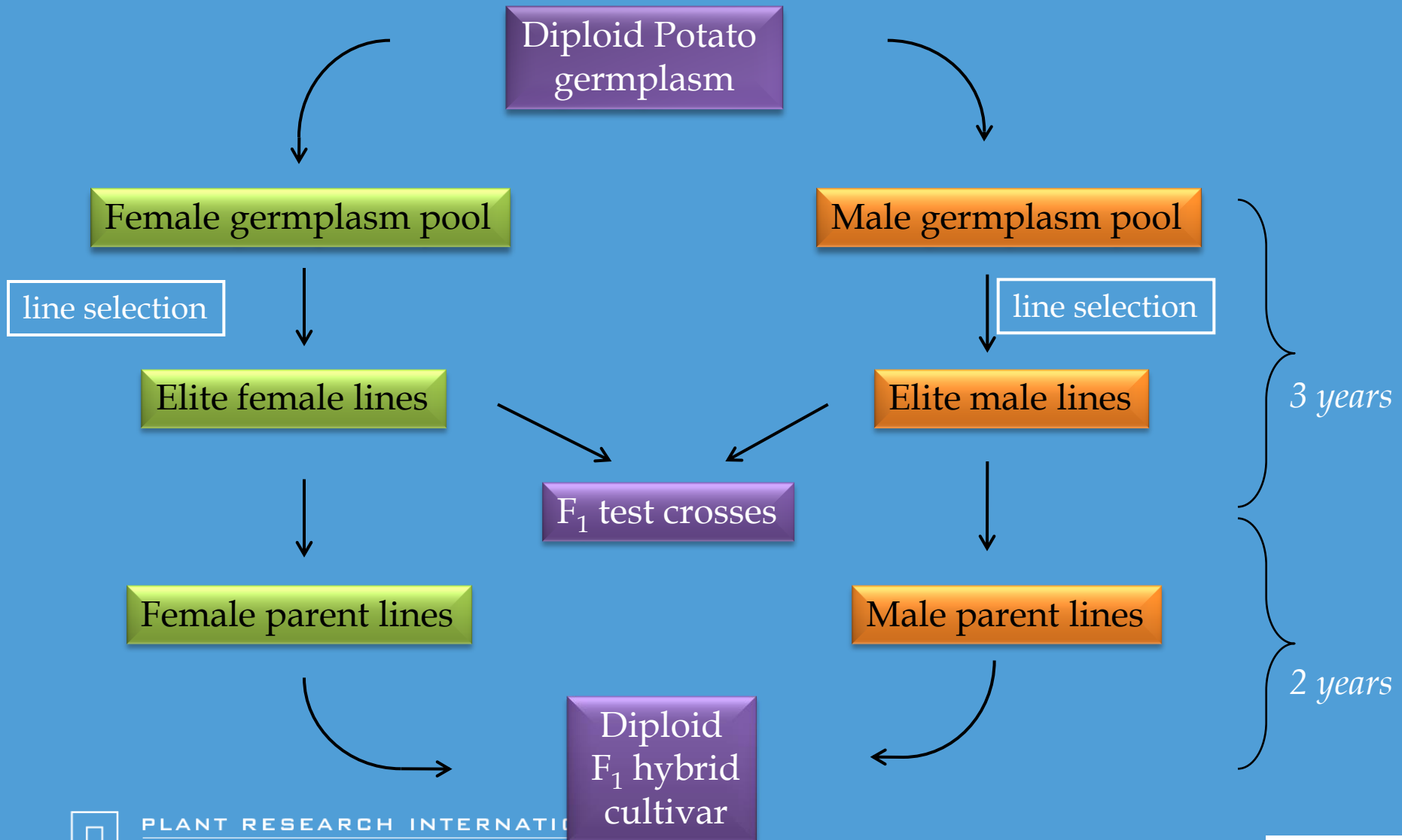


# Comments

- Tetraploid True Potato Seed
  - Cheap method, low tech, for low-input systems
  - Heterogenous products not for all markets
  - Lower yield potential than selecting the best clone (variety)
  - Healthy material, not contaminated
- Tetraploid new variety multiplied clonally (seed potatoes)
  - High tech (marker assisted breeding)
  - Lengthy process 11 years after cross
  - Slow bulking once variety is created (4 years)
  - Contaminated with diseases



# Diploid F<sub>1</sub> hybrid breeding pathway

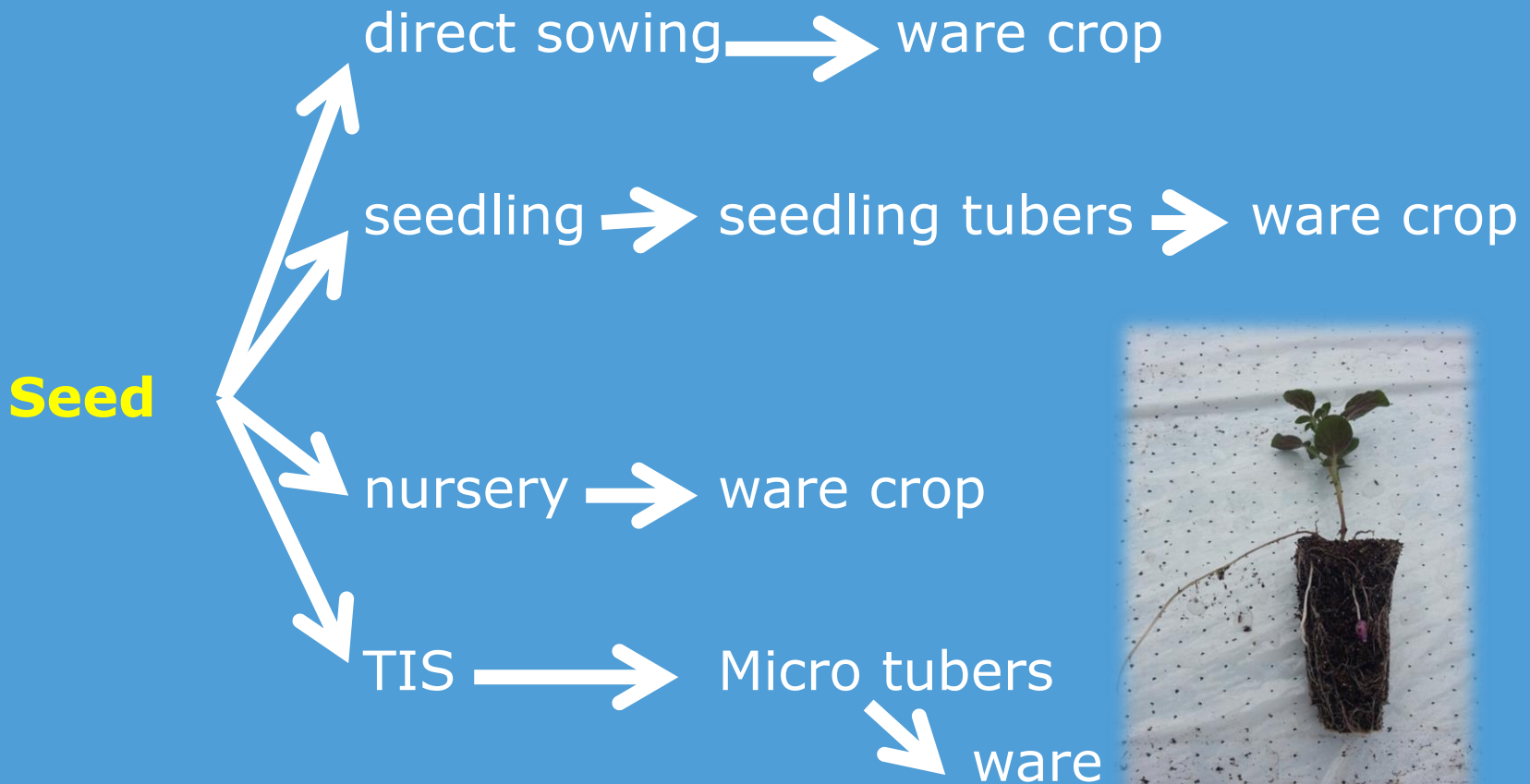


# F1 hybrid seeds, advantages

- Rapid creation of a new F1 variety (5 yrs)
- Rapid combination of various traits
- Vaster introduction of new varieties (Russet Burbank is 140 years old)
- Seed is devoid of diseases
- Rapid bulking compared to seed potatoes
- Ease of distributing (200 g seeds as many individuals as 25 t seed tubers)



# Deployment of f1 hybrid seed



# Options to explore in Chinese potato production systems

- Conventional varieties through **mini-tubers** and seed potato programme
- Conventional varieties through **micro-tubers** and shortened seed potato programme
- F1 **hybrid seed** from inbred male and female parent lines: 1) direct seeding, 2) seedlings from nursery 3) seedlings tubers replacing mini-tubers, 4) seedlings to TIS, 5 other?
- Tetraploid **TPS** from selected parents



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# Thank you

# 謝謝

