

# OXITEC

HEALTHY PEOPLE HEALTHY ENVIRONMENT

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*RIDL olive fly for improved olive crop  
yield and quality*



# Background

- Private UK company
  - 40 staff
  - Subsidiaries in Brazil and Malaysia
  - Support from international institutions
- Products for both vector control and agriculture
- Collaboration examples
  - Institut Pasteur
  - Malaysian Ministry of Health
  - USDA
  - Moscamed Brasil
  - SIPPE China



# Sterile Insect Technique, general principle

## How it works

- Rear millions of insects
- Sterilise with irradiation
- Release over wide area
- Sterile males mate with wild females: progeny don't survive
- Pest population declines



New World screwworm eradicated from USA and Central America with SIT



Medfly rearing facility in El Piño, Guatemala



# Sterile insect techniques

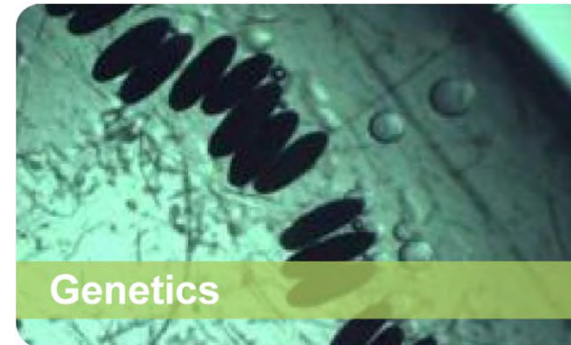


## ❖ Benefits

- environmentally friendly
- males actively seek females
- proven approach
- long history

## ❖ Drawbacks

- high capital expenditure
- bio-safety
- mixed sex release
- damaging to fitness
- species limited



## ❖ Benefits

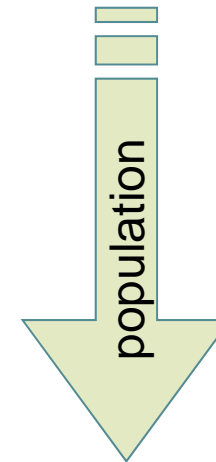
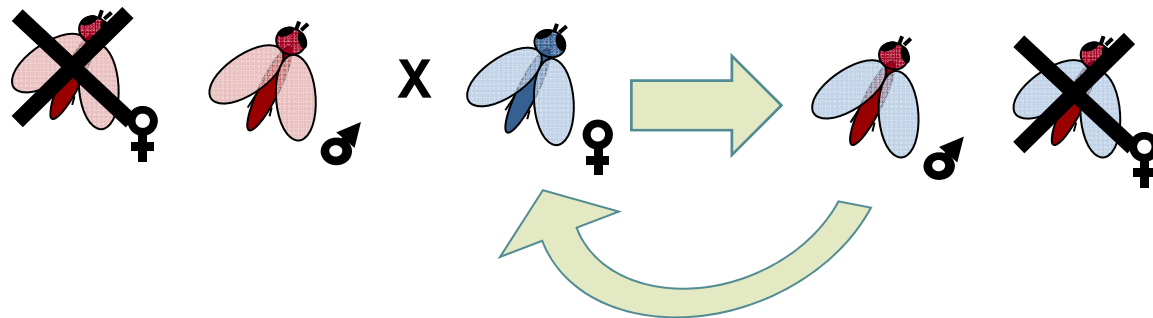
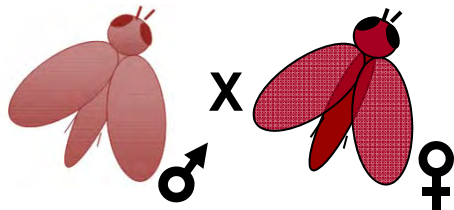
- environmentally friendly
- males actively seek females
- low capital
- applicable to local area control
- many species
- minimal fitness penalty
- male-only release
- 'built-in' monitoring
- 'built-in' biosecurity



# RIDL SIT application

- All RIDL females die
- Males are released in the wild
- RIDL males mate with the wild females
- All daughters die
- The pest population declines

Mass Rearing



# Benefits of RIDL

A cost effective control for a wide range of insect pests

- species specific - utilises the mating propensity of the pest itself to control the population
- benefits of radiation-based SIT plus many advantages of fitter insects and male-only release.
- IP protection - RIDL technology is patented
- simple rearing - artificial diet, established mass production rearing systems
- ease of monitoring
- bio-containment - no establishment of the released insects





## Olive Fly; *Bactrocera oleae*

- ❑ The olive fruit fly is the most destructive pest of olive fruit, causing considerable crop damage in the Mediterranean region and in California.
- ❑ Despite significant spending on insecticides the olive fly causes a reduction in crop yield and quality.
- ❑ Some of the insecticides used are being phased out and olive fly is developing resistance to even relatively new insecticides.
- ❑ Alternative methods have not been effective in suppressing high infestations of olive fly.



# Olive fly strain OX3097D

Strain OX3097D was selected among other olive fly insertions because of:

- 100% female lethality even with one copy of the transgene
- Good male to female ratio under normal rearing
- Excellent fluorescence
- Good laboratory rearing characteristics



OX3097D

WT

Red Filter



OX3097D

WT

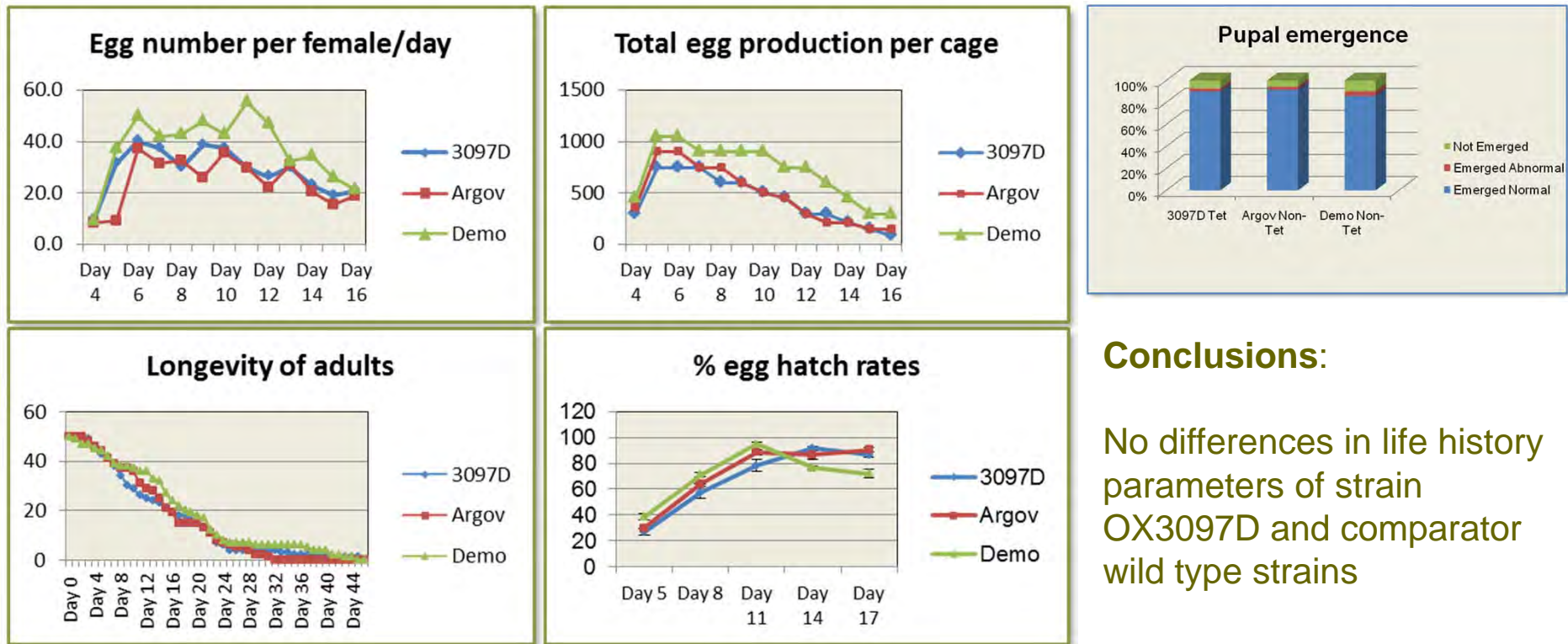
Bright Field





# Life history parameters at high density (1 fly/10cm<sup>3</sup>)

Strain OX3097D was further tested in the laboratory for rearing/life history parameters against two different wild type background strains



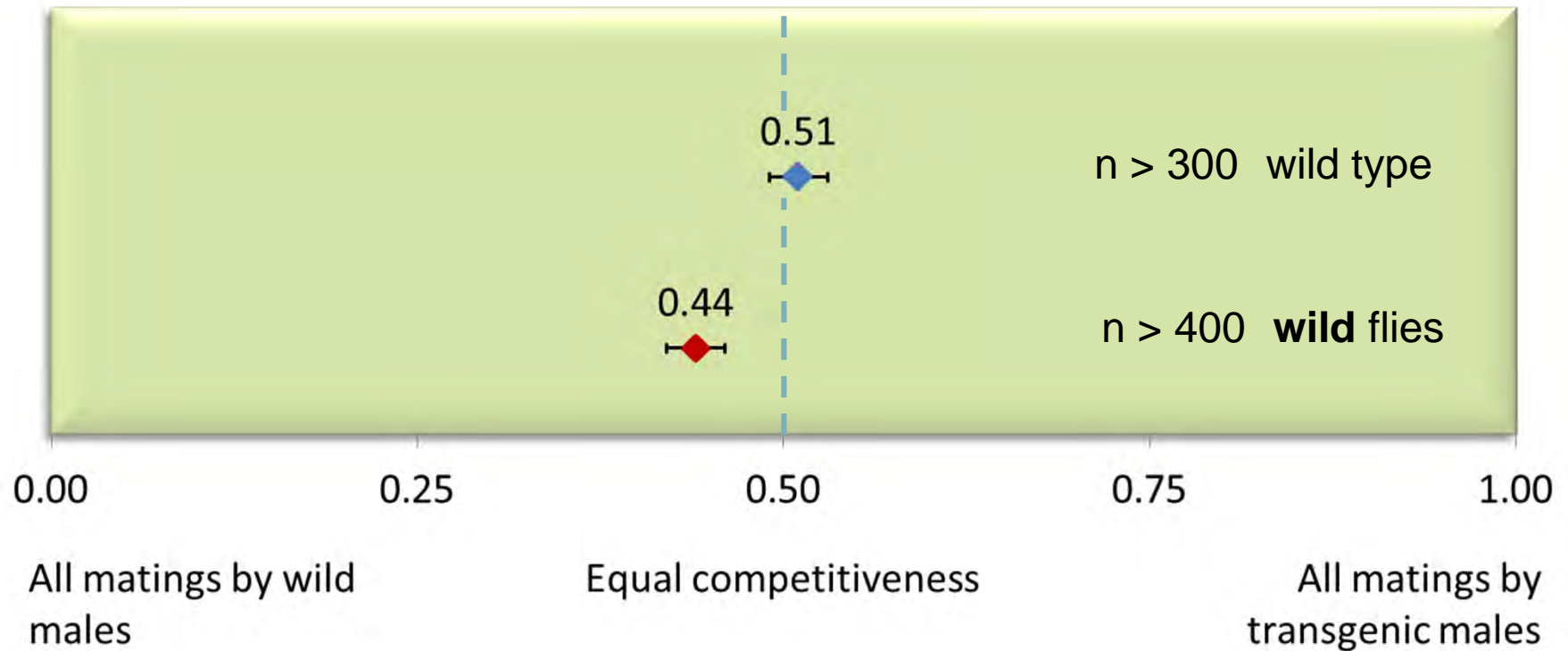
## Conclusions:

No differences in life history parameters of strain OX3097D and comparator wild type strains



# Relative sterility index (RSI) for strain OX3097D

RSI is the major index for measuring sexual competitiveness

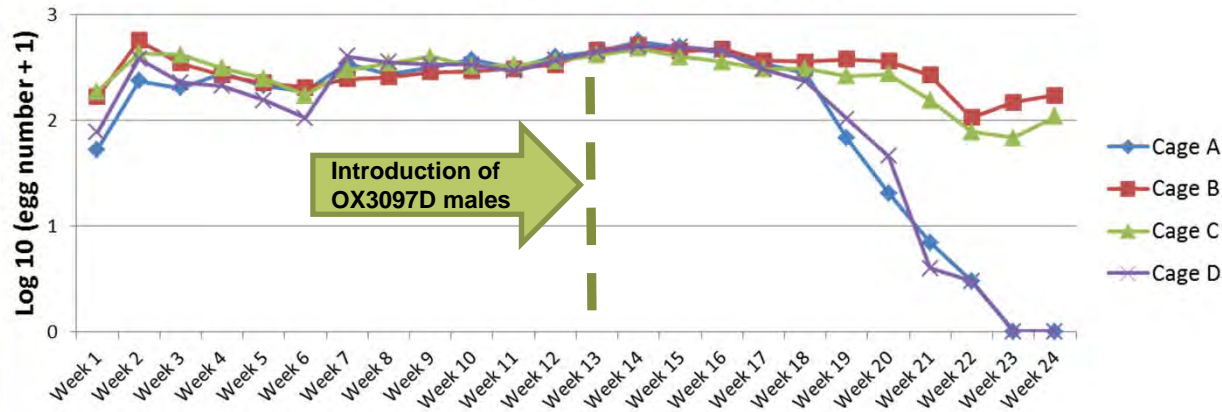


According to FAO/IAEA/USDA quality control tests, the minimum accepted value for RSI for fruit flies is 0.2

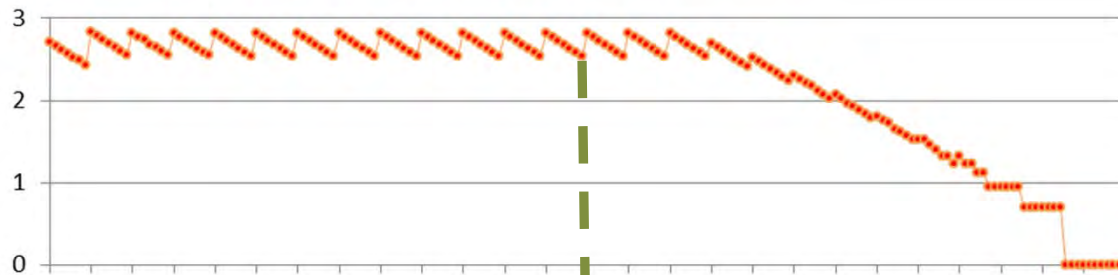


# Caged suppression trial-Olive fly

### Average Weekly Egg Count



### Simulated Egg Count








## Oxitec's RIDL technology

- Cost effective and efficient way of suppressing olive fly populations
- Potential to increase olive crop productivity and quality
- Offers considerable environmental benefits
- Can be used as part of an area wide management programme
- Can be part of integrated pest management (IPM) programs



# Agricultural portfolio

Target	Crop	Estimated value of crop production (ex farm)	Uncontrolled losses	Controlled losses
 <b>Diamondback moth</b>	Brassicas	\$9.7Bn	30%	5%
 <b>Medfly/ Mexfly</b>	Citrus/pome/ stone fruit	\$4Bn	50-70%	Up to 20%
 <b>Olive fly</b>	Olive	\$9Bn	80-100%	15%
 <b>Pink bollworm</b>	Cotton	\$37Bn	Up to 80%	5%
 <b><i>Tuta absoluta</i></b>	Tomato	\$30Bn	Up to 100%	10%

