



Food and Agriculture
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International
Plant Protection
Convention



Department
for Environment
Food & Rural Affairs

Area-wide Management of Plant Pests Using the Sterile Insect Technique (SIT)

Rui Cardoso Pereira

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Outline

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2. Area-wide Integrated Pest Management (AW-IPM)
3. Sterile Insect Technique (SIT)
 - Concept
 - Strategic options
 - Examples
4. Set of International Standards for Phytosanitary Measures (ISPMs) for Fruit Flies



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Bactrocera dorsalis

1. Introduction



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Plant Pests Problems

- Reduce production yields and the quality of the fruits
- Increase the production costs
- Affects the environment
- Cause problems to international trade

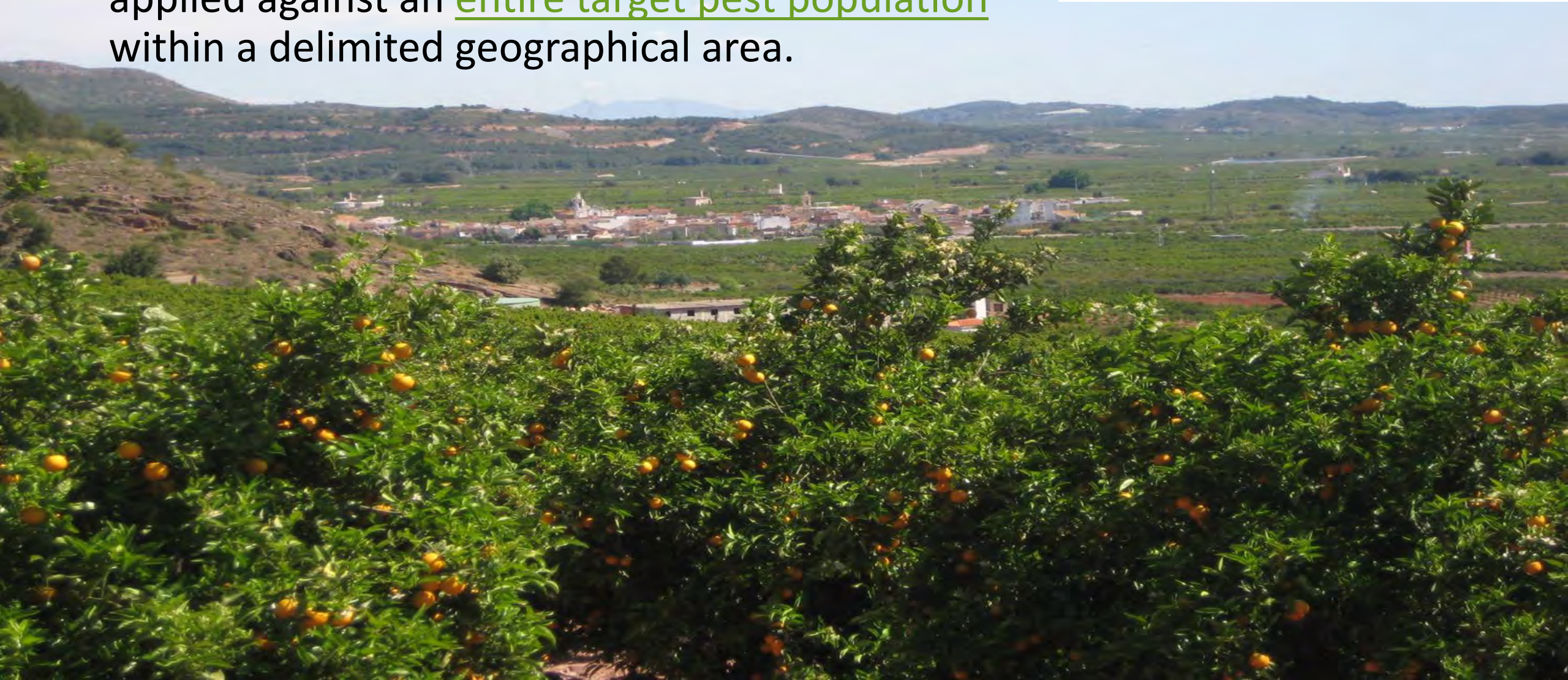


2. Area-Wide Concept

Area-wide is an integrated pest management (IPM) applied against an entire target pest population within a delimited geographical area.



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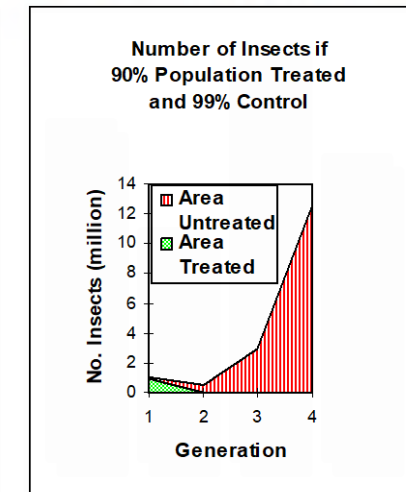
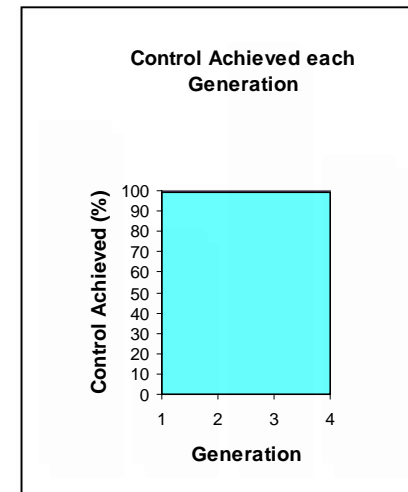
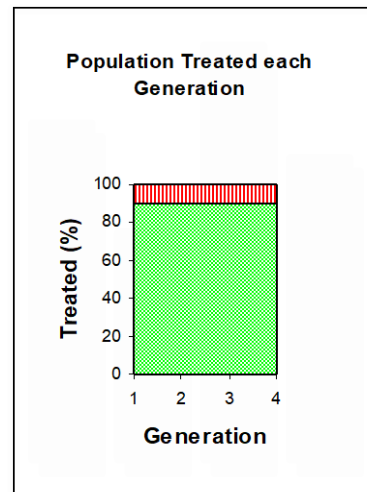




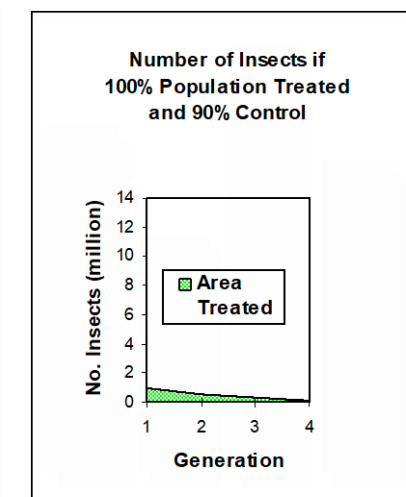
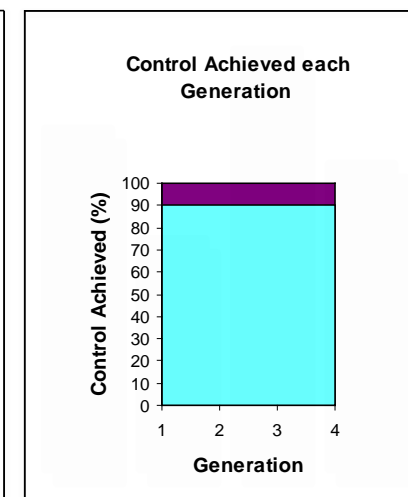
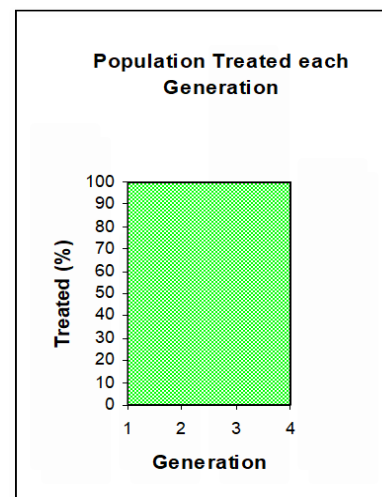
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2. Area-Wide IPM

Top: 10% of the population is untreated, and in four generations it produces a large number of individuals, while the 90% of the population that is treated declines.



Bottom: Entire pest population in the agroecosystem is suppressed uniformly, and its numbers decline from generation to generation.



Adapted from
Knippling (1972)





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2. Area-Wide IPM Requirements

- Treatment of entire target pest population
- Coordination among all stakeholders
- Long-term commitment and multiyear planning
- Centralized organization dedicated exclusively to its implementation





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3. Sterile Insect Technique (SIT)

Plant pests

- Fruit flies
- Moths



Pests of medical and veterinary importance

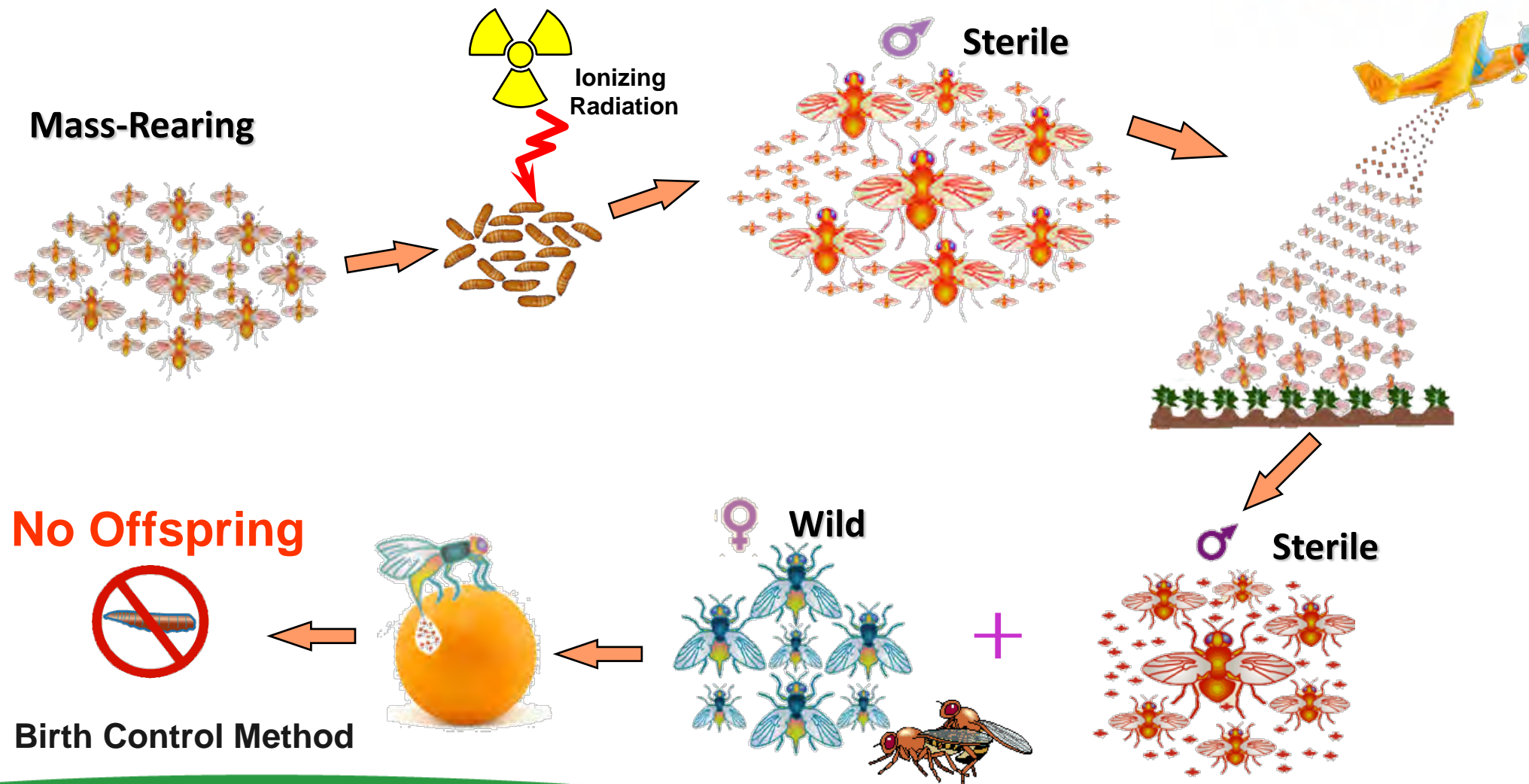
- Mosquitoes
- Screwworm
- Tsetse flies





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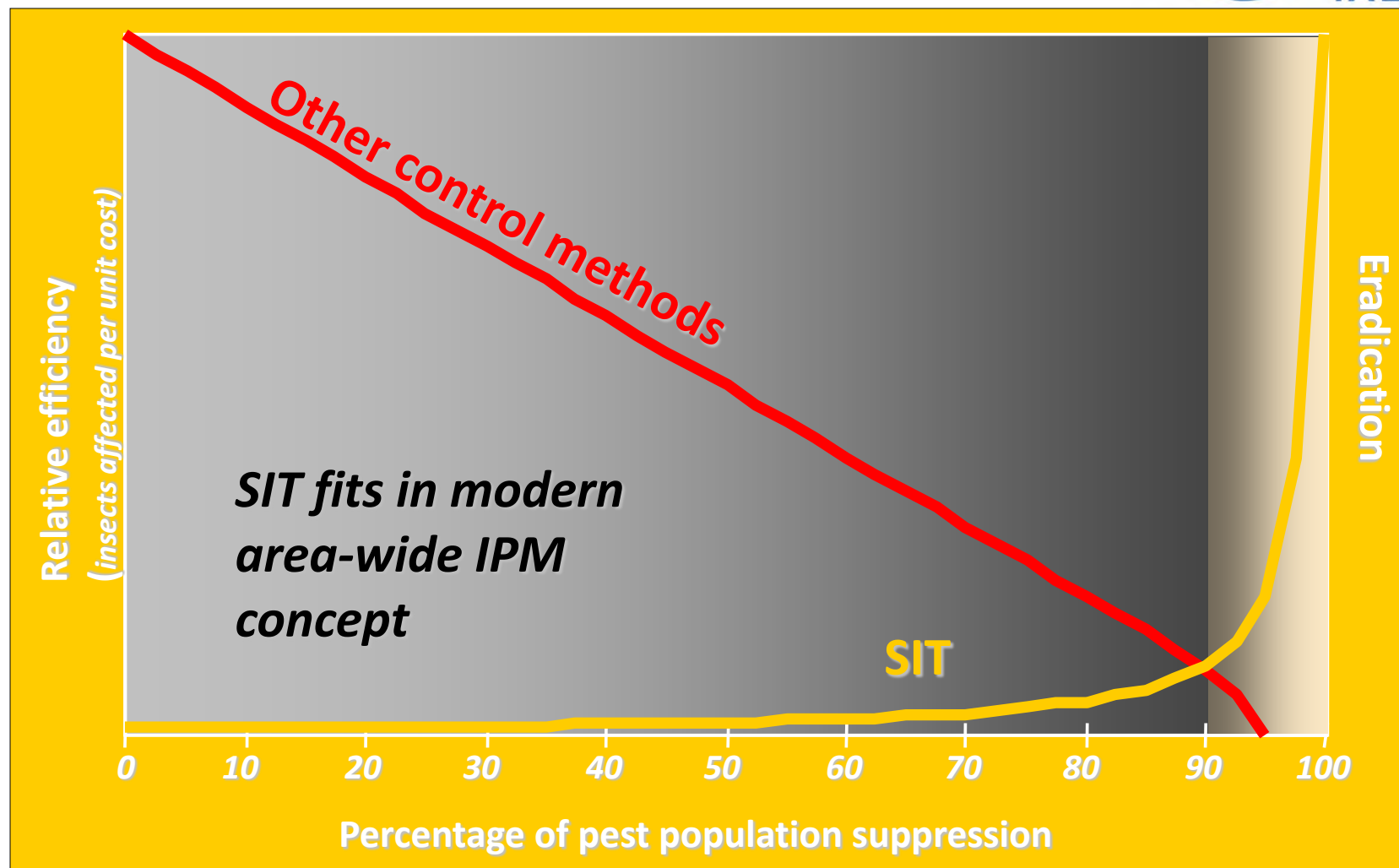
3. Sterile Insect Technique (SIT)





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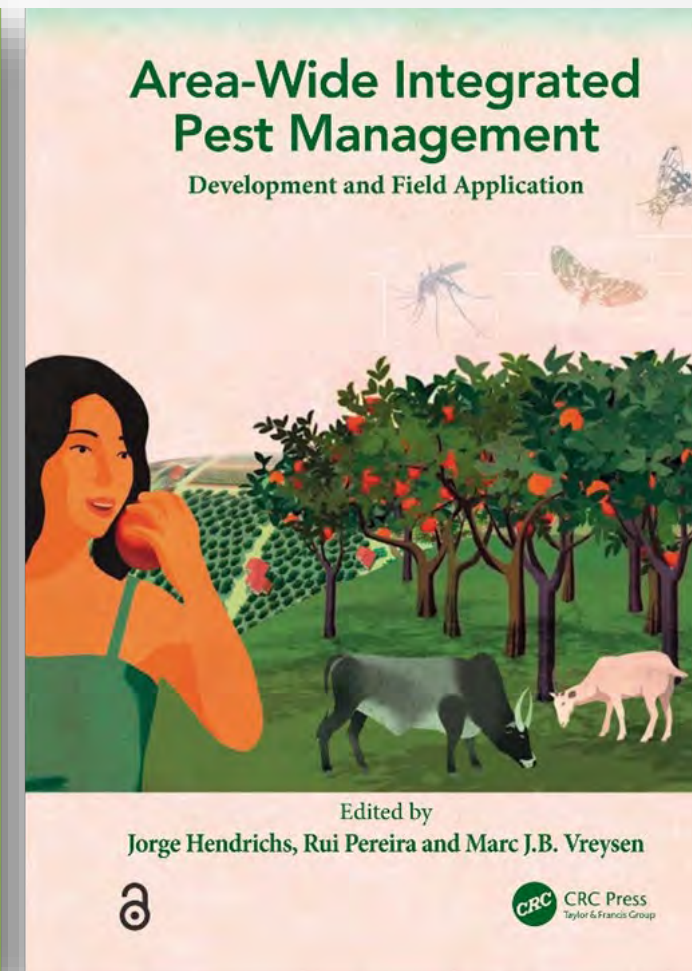
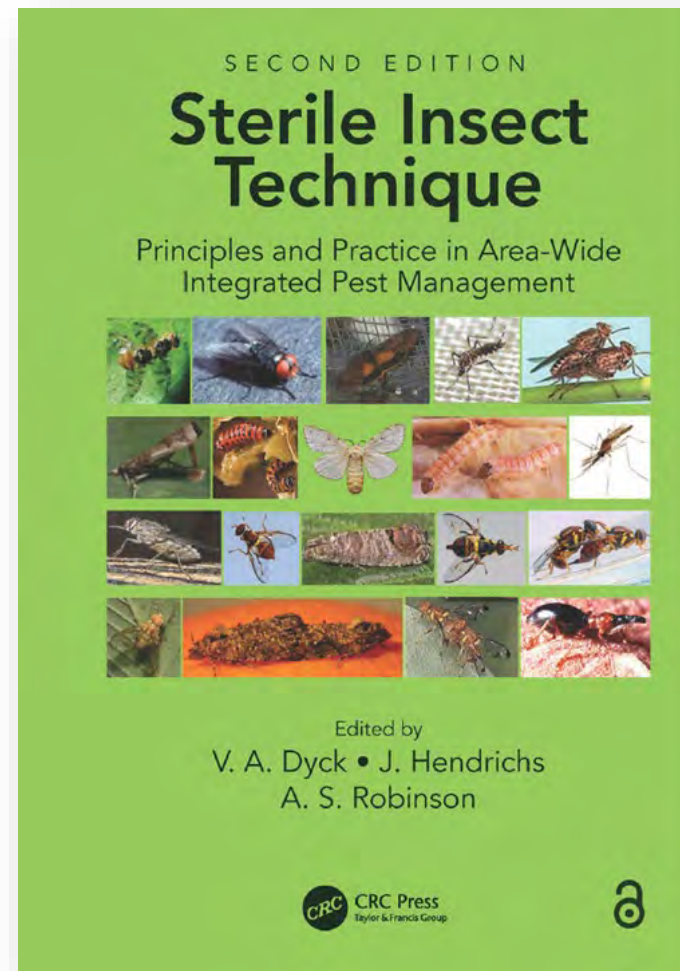


3. SIT & AW-IPM publications (2021)



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- Books with more than 1000 pages each published in 2021 and freely available on digital format
- <https://doi.org/10.1201/9781003035572> (SIT)
- <https://doi.org/10.1201/9781003169239> (AW-IPM)





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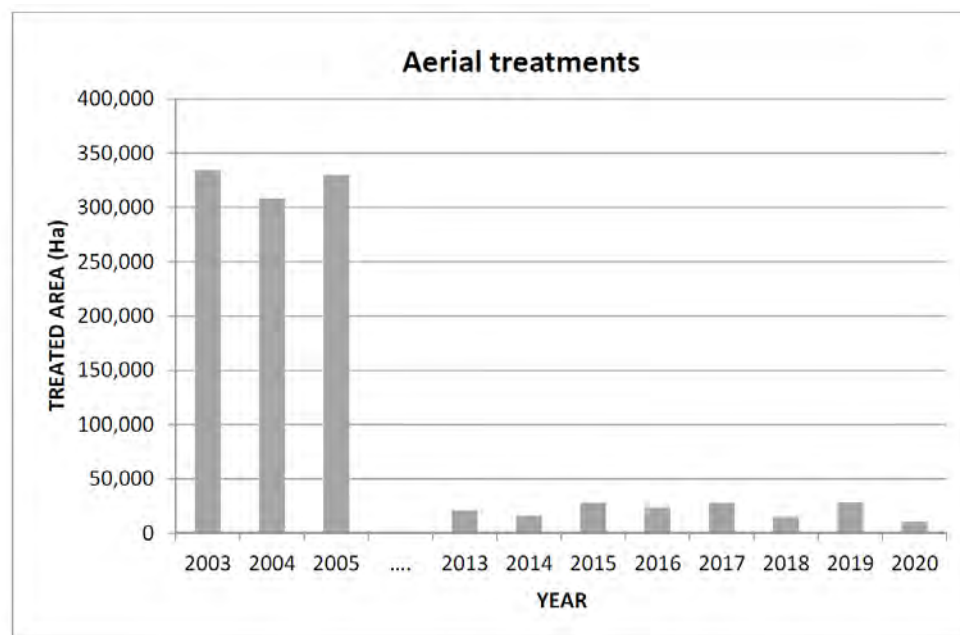
3. SIT Strategic Options

- **Suppression:** To reduce insecticide use and crop losses, and to develop low pest prevalence areas
- **Containment:** To avoid the spread of invasive pests
- **Prevention:** To avoid establishment of invasive pests
- **Eradication:** To establish pest free areas to facilitate international trade and address outbreaks of invasive pests



3. Examples: SIT Suppression

Mediterranean fruit fly Suppression in Valencia, Spain



Area treated with insecticide bait sprays (Pla et al., 2021).

False Codling Moth in Citrusdal, South Africa



Rearing of the false codling moth *Thaumatotibia leucotreta*.



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3. Examples: SIT Containment

Mediterranean fruit fly in Mexico-Guatemala



State-of-the-art Mediterranean fruit fly mass-rearing and irradiation facility with the capacity of producing **one billion** sterile males per week, Chiapas, Mexico.





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3. Examples: SIT Prevention

Mediterranean fruit fly Preventive Release Programme in California and Florida



Mediterranean fruit fly preventive releases in Chile and Argentina



Argentina and Chile are piloting the implementation of a preventive SIT approach in their pest free areas.





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3. Examples: SIT Eradication

Cactus Moth in Isla Mujeres and Isla Contoy, Mexico (2009)



Pink Bollworm in Mexico and USA (2018)



Included planting transgenic cotton, using insect pheromones to disrupt mating, releasing sterile insects to prevent reproduction, and extensive survey.

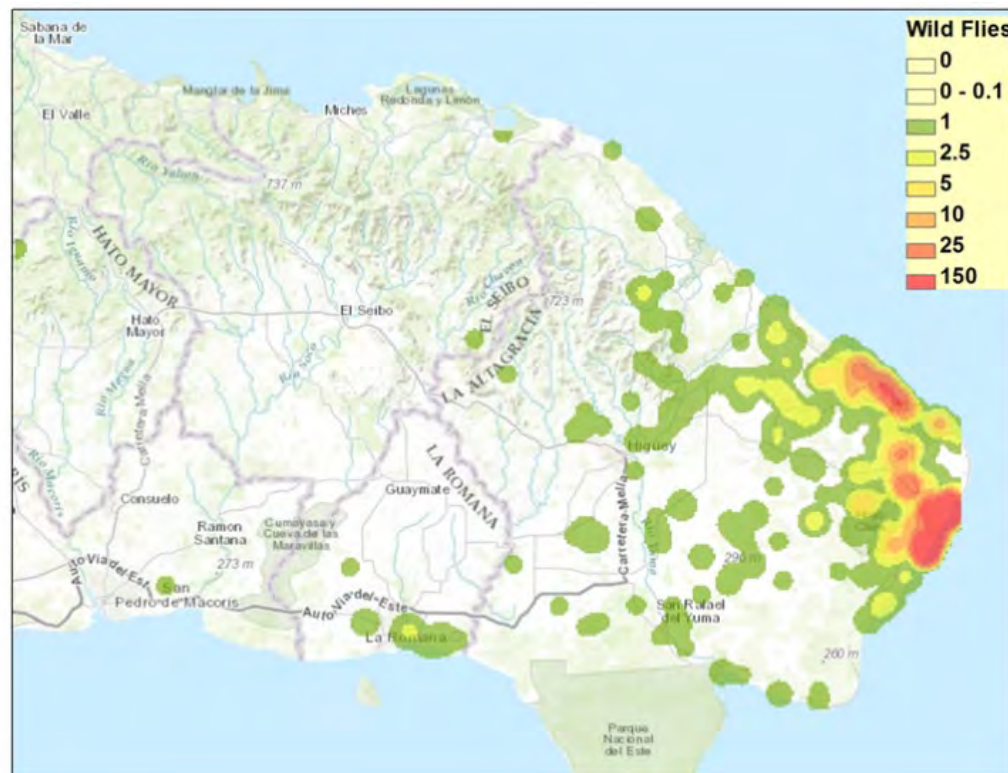




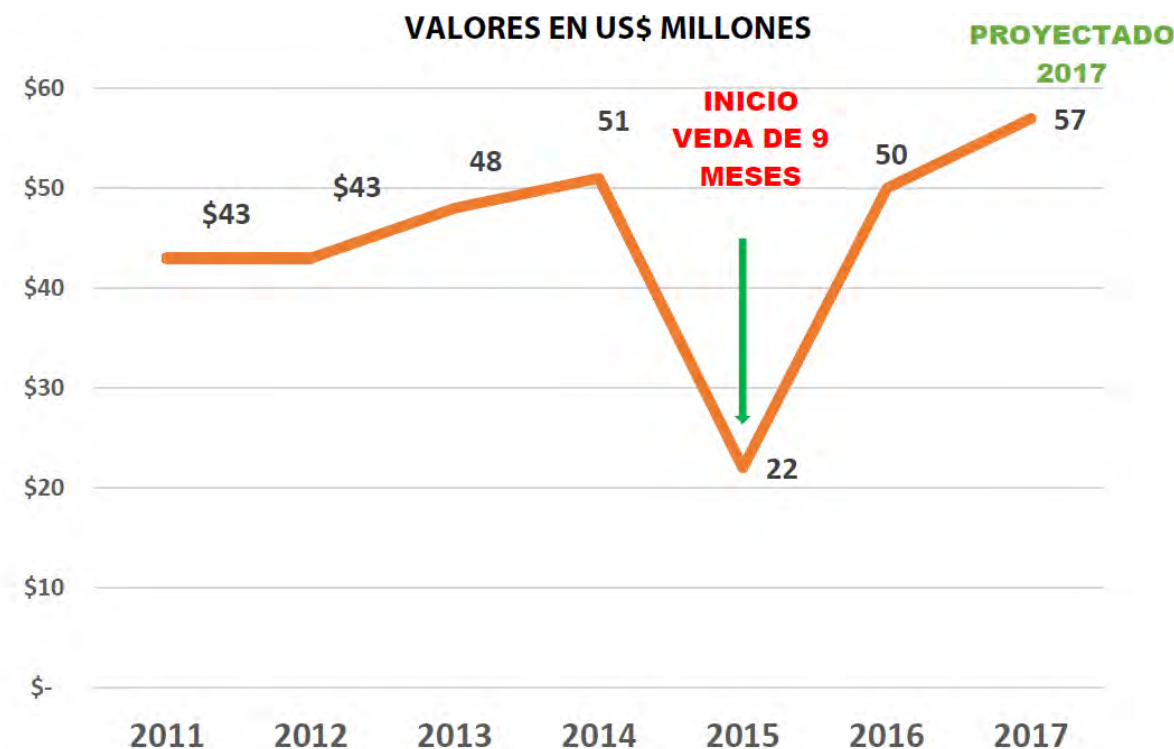
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3. Examples: SIT Eradication

Dominican Republic



Invasion of Mediterranean fruit fly in 2000 Km² (1st detection in March 2015, last detection Jan. 2017). 4000 million sterile flies released between Oct. 2015-May 2017.



Dominican Republic Fruit Exports.



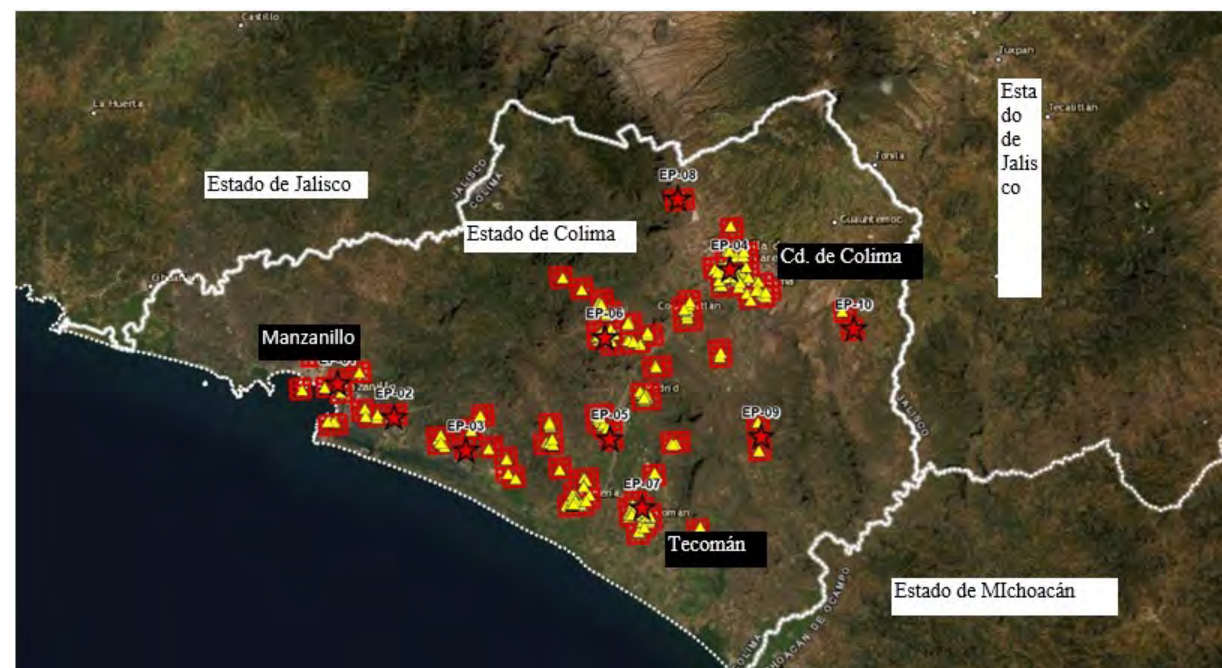


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3. Examples: SIT Eradication

Colima, Mexico

- Outbreak of Mediterranean fruit fly in April 2021
- 4436 traps deployed for pest delimitation purposes
- Extensive suppression and eradication activities, including release of 1170 million of sterile flies
- Official declaration of eradication by the Mexican Government on 2 Aug. 2022

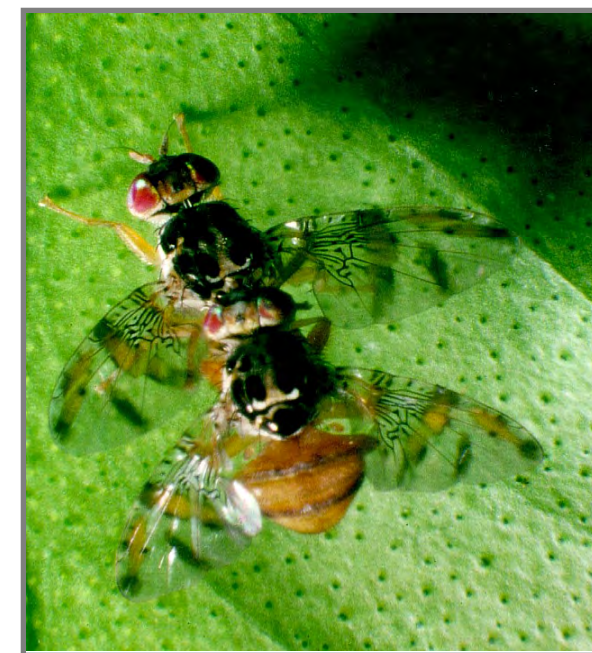




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4. Set of ISPMs for fruit flies

- ISPM 26: Establishment of pest free areas for fruit flies (Tephritidae)
- ISPM 35: Systems approach for pest risk management of fruit flies (Tephritidae)
- ISPM 37: Determination of host status of fruit to fruit flies (Tephritidae)
- [Fruit Fly Standards can Help Gain Market Access | IAEA](#)





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Thank You

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