The Sterile Insect Technique and how it contributes to climate-smart agriculture

Online Panel Discussion
Contribution of Nuclear Applications to Food Security in a Changing Climate
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A world that is hungry

- Current world population of 7.9 billion
- About 690 million people globally are undernourished
- Food security is affected by insect pests

Arthropod pests
- Crop
- Livestock
- Human health
Insect Pest Management (IPM)

• For the first 70 year of the 20th century control was largely based on chemical insecticides

• The global insecticide market is estimated at between $ 60-80 billion.
The Sterile Insect Technique (SIT)

- Type of birth control for insects.
- Ingenious idea that has been around since the 1950s and has been implemented in both developing and developed countries.
- It has been successful in controlling a number of key insect pests, including fruit flies; tsetse fly; screwworm; moths and mosquitoes.

Locations of field sites implementing the SIT against mosquitoes
The Sterile Insect Technique (SIT)

Production of large numbers

Male sterilization with ionizing radiation

Sterile male with wild female mating

Release of sterile males

No offspring

SIT is a environmental friendly technique

- Reduces the use of insecticides
- Targets the pest species, and not other beneficial insects.
- Used together with other control methods such as biological control and or bait stations and traps.

- When used as a part of an area wide integrated pest management program it is highly successful, is a clean technique and can be used to suppress, eradicate, contain or prevent the establishment of pests.
**SIT: Advantages - limitations**

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<tr>
<th>Advantages</th>
<th>Limitations</th>
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<tr>
<td>Friendly to the environment</td>
<td>Not stand-alone</td>
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<td>Species specific</td>
<td>Prior suppression required</td>
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<td>No risk of resistance</td>
<td>Delayed effect (no kill)</td>
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<td>Reduced use of insecticides</td>
<td>Not for all insects</td>
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<td>No reproduction: released insects cannot become established</td>
<td>Immigration of gravid females (AW strategies)</td>
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<td>Aerial dispersal: civil unrest, mountainous, forests….</td>
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Climate change and IPM

• Climate change is going to impact the distribution of pest species, increasing the survival and establishment of invasive pests in previously inhospitable regions.

• SIT can eradicate, contain or prevent the establishment of invasive populations without leaving an ecological footprint.

Yan et al, 2017
Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture, Insect Pest Control Sub-programme

• Research activities, service delivery, supplying of biological materials and providing guidance and expert support for technical cooperation projects.
• The Insect Pest Control Laboratory carries out applied research and methods development and improvement, helping Member States adapt and integrate SIT and area-wide integrated pest management programmes.

https://www.iaea.org/topics/insect-pest-control
Thank you