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Convention

Demonstrating Feasibility of the Sterile Insect Technique (SIT) in the Control of the Codling Moth, *Cydia pomonella*

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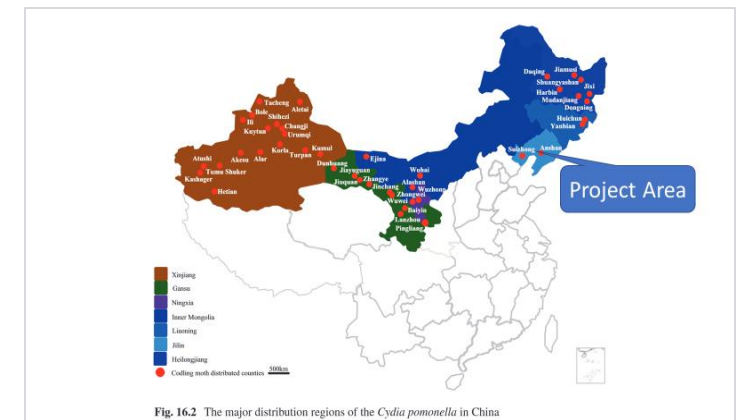


Background

- Codling moth is one of the most destructive apple pests worldwide because its larvae destroy the commercial value of the fruit
- It was first reported in north-western China in 1957 and has been spreading to north-eastern China recently (Wan et al., 2017)
- Not only causes serious damage to fruit production in China, but also impacts exports and inflicts economic loss estimated at US \$605 million per year (Zhu, 2010)
- The Sterile Insect Technique (SIT) to control codling moth has been well developed and shown its success on the codling moth operational programmes in Canada and in New Zealand at pilot level
- Through an IAEA technical cooperation (TC) project, China requested support from the Joint FAO/IAEA Centre on SIT technology transfer for codling moth control



Photo: Yang Xueqin

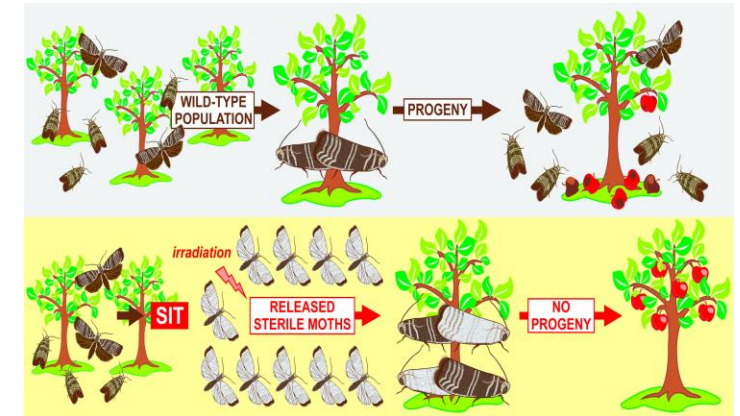


Wan et al, 2017

Scope

Transfer the Sterile Insect Technique (SIT) to China for codling moth control

- Establish codling moth mass-rearing and sterilization technology
- Optimize the packing, holding, and release strategy for sterile codling moth
- Adopt and implement an Integrated Pest Management (IPM)-SIT based approach for sustainable control of the codling moth
- As a spin-off of this project in the future, it could also provide technical support to other lepidopteran pests of economic significance



Marec et al, 2019



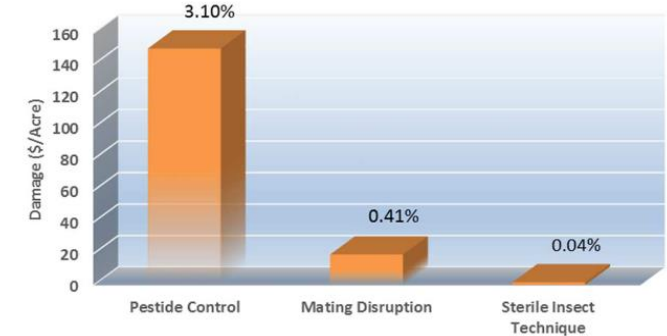
Photo: <https://www.fast-growing-trees.com>

Relevance to the IPPC

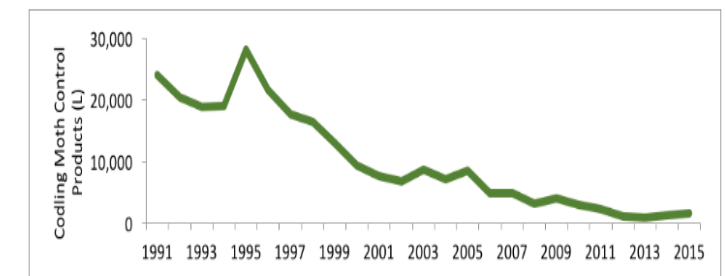
- Promote sustainable fruit production and enhance food security through the suppression of the codling moth for better production
- Reduce the pesticide used for controlling codling moth to protect human health and biodiversity for better environment
- Facilitate trade development for better life



CODLING MOTH INJURY LEVELS



Since 1991, the amount of pesticide used against codling moth in the program area has been reduced by 96%.

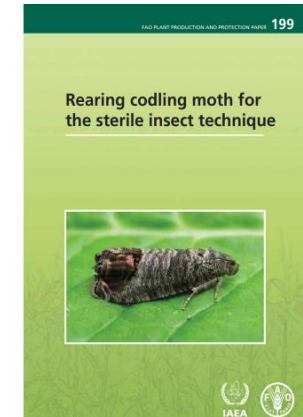


The Okanagan-Kootenay Sterile Insect Release Program (SIR)
<https://www.oksir.org/>



Main expected outputs

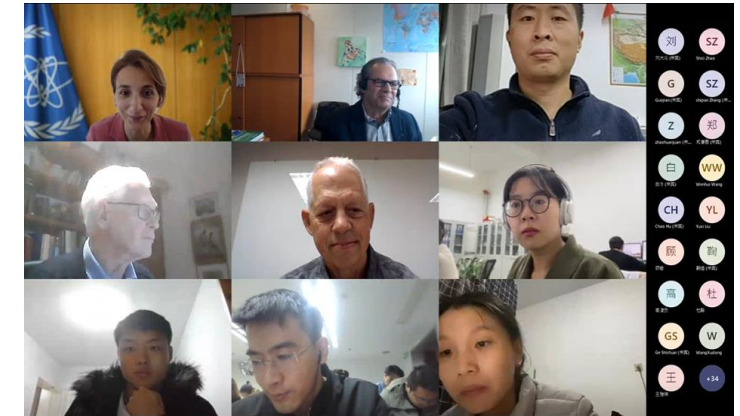
- Facility for codling moth SIT established
 - Mass-rearing and sterilization
 - Packing, emerging, holding, and release
- Guidelines and protocols for codling moth SIT developed/adapted
 - Mass-rearing and sterilization
 - Packing, holding and release
 - Quality assessment of codling moth pre- and post-irradiation
 - Monitoring and suppression measures
- Staff trained on area-wide (AW) SIT application
- AW-SIT for codling moth validated in the field at pilot scale





Success and challenges

- Virtual training on codling moth AW-SIT to 54 trainees
- Economic feasibility assessment on the use of SIT to control codling moth in progress
- Laboratory colony of codling moth established for further studies on mass-rearing and sterilization
- Sterility study on X-ray irradiation of *Cydia pomonella* completed (Zhang et al., 2023)
- Provision of specific materials and equipment to support codling moth artificial rearing
- Covid-19 delayed Human Resource development activities in 2022, including fellowships, scientific visits and expert missions.
- Technology transfer from Canada OKSIR programme to China under the framework of IAEA-TC project.
- From pilot validation move to large scale programme in the future



Bulletin of
Entomological
Research

Article contents

Abstract
Footnotes
References

Sterility of *Cydia pomonella* by X ray irradiation as an alternative to gamma radiation for the sterile insect technique

Published online by Cambridge University Press: 08 August 2022

Jing-Han Zhang, Na Li, Hui-Yuan Zhao, Ya-Qi Wang, Xue-Qing Yang and Kong-Ming Wu

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Abstract

The codling moth *Cydia pomonella* is a major pest of global significance impacting pome fruits and walnuts. It threatens the apple industry in the Loess Plateau and Bohai Bay in China. Sterile insect technique (SIT) could overcome the limitations set by environmentally compatible area-wide integrated pest management (AW-IPM) approaches such as mating disruption and attract-kill that are difficult to suppress in a high-density pest population, as well as the development of insecticide resistance. In this study, we investigated the effects of X-ray irradiation (0.05–2.00



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Thank you

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