



Eradication of New World Screwworm from Jamaica

The New World Screwworm (NWS) is an insect pest affecting warm-blooded animals and also humans. It causes widespread economic losses in livestock production as well as pain and suffering to animals and to those people unfortunate enough to become infected. Although it is endemic in Jamaica, the screwworm can be eradicated from the island using the well proven and successful Sterile Insect Technique. In collaboration with the Jamaican authorities, the Department of Technical Co-operation of the IAEA is planning to sponsor a Model Project to eradicate screwworm from Jamaica.

Impact of the disease

Apart from a few large commercial operations, most livestock owners in Jamaica are smallholder farmers who rear goats, pigs and sheep for the local market and for their own consumption. NWS infestation is high on such farms, especially among young animals. Livestock farmers, accustomed to living with NWS, monitor their animals carefully, treating them with insecticides and antibiotics when infection is suspected. Nevertheless, the impact of the disease is considerable, to the individual farmer as well as to the nation. For example:

- Animal productivity is lowered.
- Surveillance and treatment of the disease are labour intensive and costly.
- Residues from the chemicals used to treat NWS may persist in meat and milk.
- Hides and skins are damaged, reducing their value for leather.

Although NWS is only one of a number of problems associated with livestock production, freedom from NWS would improve livestock productivity and food self-sufficiency on the island. Eradication of this pest is feasible using the Sterile Insect Technique (SIT).



The New World Screwworm fly.

FAO

Sterile Insect Technique

Screwworms are eradicated through a form of biological control. Millions of sterile screwworm flies are raised in a production plant located in Tuxtla Gutierrez in the southern Mexican State of Chiapas. During the pupal stage of the fly's life cycle, the pupae are subjected to gamma radiation. The level of radiation is designed to leave the fly perfectly normal in all respects but one: it will be sexually sterile. Thus, when the artificially raised flies are released into the wild to mate with native fly populations, no offspring will result from the matings. These unsuccessful matings lead to the gradual reduction of native fly populations. With fewer fertile mates available in each succeeding generation, the fly, in essence, breeds itself out of existence.

"Eater of man"

The scientific name of New World Screwworm, *Cochliomyia hominivorax*, literally means "eater of man". The adult female fly lays her eggs in open wounds and, when the larvae emerge, they feed on the living tissue of the host animal. The wounds, which are known as myiasis, often become the site for secondary bacterial infection. If left untreated, animals infected with NWS eventually die.



S. FRECH/IAEA

P. CADOGAN/JAMAICA

Animal productivity would be greatly improved following eradication of NWS.

Model Project

The Department of Technical Co-operation, with technical support from the Joint FAO/IAEA Division, will provide assistance to the Ministry of Agriculture of the Government of Jamaica to eradicate NWS from the country. Other collaborating partners are the United States Department of Agriculture and the Mexican Ministry of Agriculture, Livestock and Rural Development. National agencies concerned with animal and human health, trade of livestock, quarantine measures, insect pest management etc. will also be involved in this three year project. Part of the local commitment to the campaign will be borne by the livestock farmers themselves who will be required to pay a small levy on each animal slaughtered. The money generated in this way will go towards supporting quarantine measures once eradication is complete. An important element of the Agency's commitment is the training of national personnel in SIT and related activities.

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The fly factory

Mass rearing and irradiation of NWS pupae will be undertaken at the NWS production plant in the southern Mexico state of Chiapas which is operated by the Mexico-United States Commission for the Eradication of Screwworm. This is the factory associated with the successful eradication of NWS from North America and many countries of Central America as well as in Libya.

- The production plant in Mexico will send about 20 million pupae to the dispersal centre in Jamaica every week.
- These pupae will be placed in environmental chambers under controlled temperature and humidity.
- Adult flies emerge over a period of 66 - 72 hours. They are attracted by light to a cold chamber where they will be chilled to immobility.
- When sufficient numbers of sterile flies have been collected, they will be placed into specially-designed dispersal containers, then transported to the airplanes and released over the Jamaican countryside as chilled adults.

Ground operations

For aerial release of sterile flies to be effective as quickly as possible, ground-based activities are equally important.

- Public information and education about the project.
- Inspection of all animals and treatment of all wounds with project-supplied larvacidal powder.
- Reporting of any cases of NWS infestation, collection of samples and restricting transport of wounded or infested animals.
- Surveillance and trapping to collect, identify and quantify NWS egg masses, fertile flies and sterile flies.
- Control and inspection of all animals entering Jamaica.



Map of Jamaica showing flight lanes for aerial release of sterile flies

Length....146 miles
Width at widest.... 51 miles
Total size.... 4,244 square miles

Air operations

Sterile flies will be released at a rate of 6,000 flies per linear nautical mile from an aircraft flying at 165 knots along pre-determined flight paths which ensure that, each week, the entire island is covered. This provides a coverage of 3,000 flies per square mile each week. Depending on feedback from monitoring teams, specific areas with high wild fly populations will be targeted with additional sterile flies.

Experience has shown that the regular, weekly release of 1,000 to 3,000 sterile flies per square mile can achieve eradication within 6 to 24 months, provided that re-infestation is prevented. Quarantine and inspection are essential, and the veterinary authorities in Jamaica are equipped to provide an effective service of diagnosis and treatment.

Eradication benefits

When eradication is complete, human and animal cases of screwworm infestation should disappear. There will be a reduction in the import cost of chemicals for treating NWS and the toxic burden on the environment will be alleviated. The risk of chemical residues in milk and meat will also be reduced. Livestock owners should notice a significant improvement in the productivity of their animals which will reach market weight more quickly and help to meet local demand and reduce the level of imports. Eradication of NWS from Jamaica will reduce the risk to neighbouring countries that are free of the fly and help to promote Jamaican exports. It is hoped that the whole region will eventually be free of New World Screwworm.



S. FRECH/IAEA

The leather industry on Jamaica will look forward to buying skins undamaged by NWS.



Quarantine, inspection, diagnosis and treatment will continue to be important even when the country is declared free of NWS.

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