

The fly factory: cooperative use of atomic energy

Few would imagine that the natural beauty of the state of Chiapas is home to flies bred in a factory. These screw-worm flies originally infested tropical and sub-tropical areas in the southern United States, Mexico, Central America, two thirds of South America and the Caribbean islands.

In the thirties, Edward F. Knipling and Raymond C. Bushland discovered that the screw-worm fly could be sterilized at the larval stage, using atomic energy. This biological control technique proved successful because the female fly mates only once in its life, and if it is fertilized by a sterile male, the eggs it lays in the open wounds of warm-blooded animals never hatch.

This process led to the successful elimination of the parasite in the southern United States in 1961. Eradication was later carried out in the southeast, along the border with Mexico. Yet, since the screw-worm continued to damage animal health in both countries, cattle-ranchers on both sides of the border asked their respective governments for help in eliminating the plague. The Mexican-American Commission for the Eradication of Screw-Worms in Livestock was formed on August 28, 1972.

In the early years, sterile flies were bred and sent to Mexico from the plant in Mission, Texas. The commission's first objective was to eradicate the screw-worm in the north and west of Mexico, as far as the Tehuantepec isthmus. Mexican and American technicians worked jointly on the longer-term objective of creating a "sterile fly barrier" in the area.

The program's benefits gradually began to be noticed. In 1976, it became necessary to build a new plant for producing sterile flies in Chiapa de Corzo, Chiapas, with a weekly production of 550 million sterile flies for dispersion. Work included packing and sending insects to distribution centers where airplanes were used to disperse them over infested areas, so they would fertilize flies living in the wild.

Livestock was continuously inspected in "field operations." When an animal was found to be infested with

screw-worm larvae, the latter were collected and sent to the laboratory for diagnosis. This was used to determine the number of sterile flies which would have to be released over the areas where eradication was being carried out.

By 1984, the Mexican-American Commission for the Eradication of the Screw-Worm in Livestock had achieved the total disinfestation proposed in 1976. To maintain the "sterile fly barrier" and prevent the possibility of reinfestation in disease-free zones, the commission designed a means of controlling livestock movement: three fixed inspection and quarantine stations were established along the cattle routes of the Tehuantepec isthmus; other, temporary stations were set up in areas where infection continued to exist.

At the permanent stations, all animals passing through were subjected to a detailed examination and bathed in a



If you find a box of sterile flies, open it to protect the animals (propaganda for the eradication of the screw-worm).

larvicide solution. Any animal found to have the parasite or open wounds was kept in quarantine until cured.

Over the course of eight years of continuous work, the quarantine stations inspected 2,688,829 animals and quarantined 1,063, of which 175 were infested with the parasite. A total of 10,703 animals originating abroad were also inspected. New outbreaks in disinfested areas were thereby controlled, and by 1984 the goal of eradication proposed in the initial agreement had been achieved.

In 1986, a new agreement was signed that increased the responsibility of the Mexican-American Commission with an eradication program starting in the southeast of the Tehuantepec isthmus (Yucatan peninsula) and continuing to the neighboring Central American countries. That same year Guatemala signed an agreement with the Commission, with eradication work beginning in 1987. Belize did the same a year later, while in 1989 the Mexican-American Commission's program came into force.

The Mexican-American Commission declared Mexico free of screw-worm in livestock on February 25, 1991. This marked the culmination of nineteen years of intense work and coordination, involving a total investment of 413.5 million dollars and the creation of 1,905 field jobs of various kinds. This meant a savings of 82.6 million dollars for the Mexican cattle industry. Almost 251 billion sterile flies were released, as a result of 58,000 hours' flying time, protecting 77.5 million head of cattle on 491.75 million acres of protected land.

It is noteworthy that in late 1990, the Commission received an emergency request to eradicate an outbreak of screw-worm in livestock in Libya. Agreements for confronting this problem were signed with the United Nations Food and Agriculture Organization (FAO). The program was actively maintained in North Africa, with

Mexican and American staff, from December 1990 to October 1991. Direct flights from Tuxtla Gutiérrez to Tripoli carried over 1.3 billion sterile flies. In 1992, the screw-worm was declared fully eradicated in Libya, Belize and Guatemala.

The Mexican-American Commission for the Eradication of the Screw-Worm in Livestock used to be headquartered in Mexico City, but last August the Commission moved to the plant in Chiapa de Corzo. *Voices of Mexico* interviewed the Commission's Director, Carlos Bajatta, who discussed the organization's importance as well as the plant's usefulness, projected changes and future plans.

- What is the current state of the Commission's work?
- Disinfestation began in El Salvador in 1993. Although this country is now technically free of the parasite, surveillance work continues. Field and dispersion programs are being continued in western Honduras. In the case of Nicaragua, work was carried out in half of the western region; in July coverage began to extend to the entire country. Mexico continues to export sterile flies in preparation for the main objective: achieving a "biological barrier" extending to Panama. Eradication is therefore projected to begin in Costa Rica and Panama.
- How many sterile flies are being produced at the Chiapa de Corzo plant?
- At the moment, 210 million sterile flies are being produced every week, then dispersed in various areas in El Salvador, Honduras and Nicaragua. Land in Guatemala and Belize is no longer treated with sterile insects, since the plague has been eradicated. This is also the case in Mexico, with the exception—as a biological security measure—of the area where the plant is located.
- What is the most outstanding feature of the technology applied in the plant for producing sterile flies?
- First, the positive use of atomic energy, since when people talk about atomic energy the first thing that comes to mind is the atomic bomb or a nuclear plant disaster. Another important point is the biological control system, which prevents contamination and the overpopulation of a species, since it is a balanced, natural system that does not affect other species. On the contrary, it contributes to the health of other animals and man himself.
- Why did you decide to close your offices in Mexico City and transfer to the Chiapa de Corzo plant?
- Because the commission's activity has been reduced to the production of insects at the plant. Field work for Mexico has come to an end; the responsibility of checking for possible reinfestations has been handed over to the Ministry of Agriculture and Water Resources and the Mexico-United States Commission



A positive use of atomic energy.



A teamwork is needed to really eradicate a plague.

for the Prevention of Aphthous Fever and Other Exotic Diseases. In fact, the commission has only really reduced its geographic scope, since approximately 850 people are employed at the plant.

- How long will sterile flies continue to be produced at the Chiapa de Corzo plant?
- Until they build the one planned for Panama, to establish a “fly barrier” at the isthmus. The U.S. Department of Agriculture has already signed an agreement with the Panamanian government to build the plant, but work is not expected to begin for a couple of years.
- When the Panamanian plant is built, will Mexico no longer have a place in the project?
- Yes, and in a certain way we’re already looking at that, since the U.S. Department of Agriculture made the agreements directly with Panama. So when the Chiapa de Corzo plant closes, the Mexican-American Commission will probably cease to exist, or it will become a small organization for emergency cases, but not the large agency it is today.
- What will happen to the Mexican plant when the Panamanian one replaces it?

- Possibly the same as happened to the one in Mission, Texas, which is closed, but kept in perfect condition as a reserve.
- Instead of closing it, wouldn’t it be possible to use it for another scientific purpose, similar to the present one?
- I think it would be more practical and beneficial to put it to some use. And now is the time to think about what other program the installations could be adapted for.
- Could the Chiapa de Corzo plant be turned into a research center or school to study the possibility of eradicating other parasites with atomic energy? One example might be the six kinds of simuliids or flies that transmit oncocercosis, a disease which blinds millions of people in the Americas and throughout the world, including in Africa where 50 million suffer from the disease.
- That would be feasible, although the screw-worm fly is more similar to other kinds of insects, like Mediterranean fruit flies, which transmit parasites to fruit. In fact, there’s already a plant in Chiapas that produces those flies, where atomic energy is used for sterilization. But what you say about the oncocercosis-transmitting simuliids shouldn’t be ruled out. But first it would be necessary to study the sexual conduct of those six species, to see if atomic energy could be used to sterilize them.
- Would the Mexican-American Commission be interested in receiving technical-scientific proposals on how the Chiapa de Corzo plant could be used?
- I believe it would. I think both the American and the Mexican side would be open to scientific proposals and would be willing to take part in them by creating agreements for putting the plant to a new purpose. So we hope suggestions will start coming in....

The history of the Mexican-American Commission for the Eradication of the Screw-Worm in Livestock is further proof of the importance of teamwork, in which linguistic and cultural differences between nations are overcome. It serves as an example of how bilateral or multilateral initiatives can provide valuable benefits for society.

We hope this article will encourage the scientific community to seek positive new uses of atomic energy in the Chiapa de Corzo plant, to prevent it from becoming the mausoleum of a great fly factory in the service of humanity.

Suggestions may be sent to the following address:

Planta Productora de Moscas Estériles del Gusano Barrenador del Ganado, Km. 2 Carretera La Angostura, Chiapa de Corzo, Chiapas, Mexico.

Telephone numbers: (91-961) 414-23, 414-24, 414-25, 414-36 and 414-39 ✉

Dinorah Isaak
Staff Writer.