

Irradiating And Eradicating The Tsetse Fly Scourge



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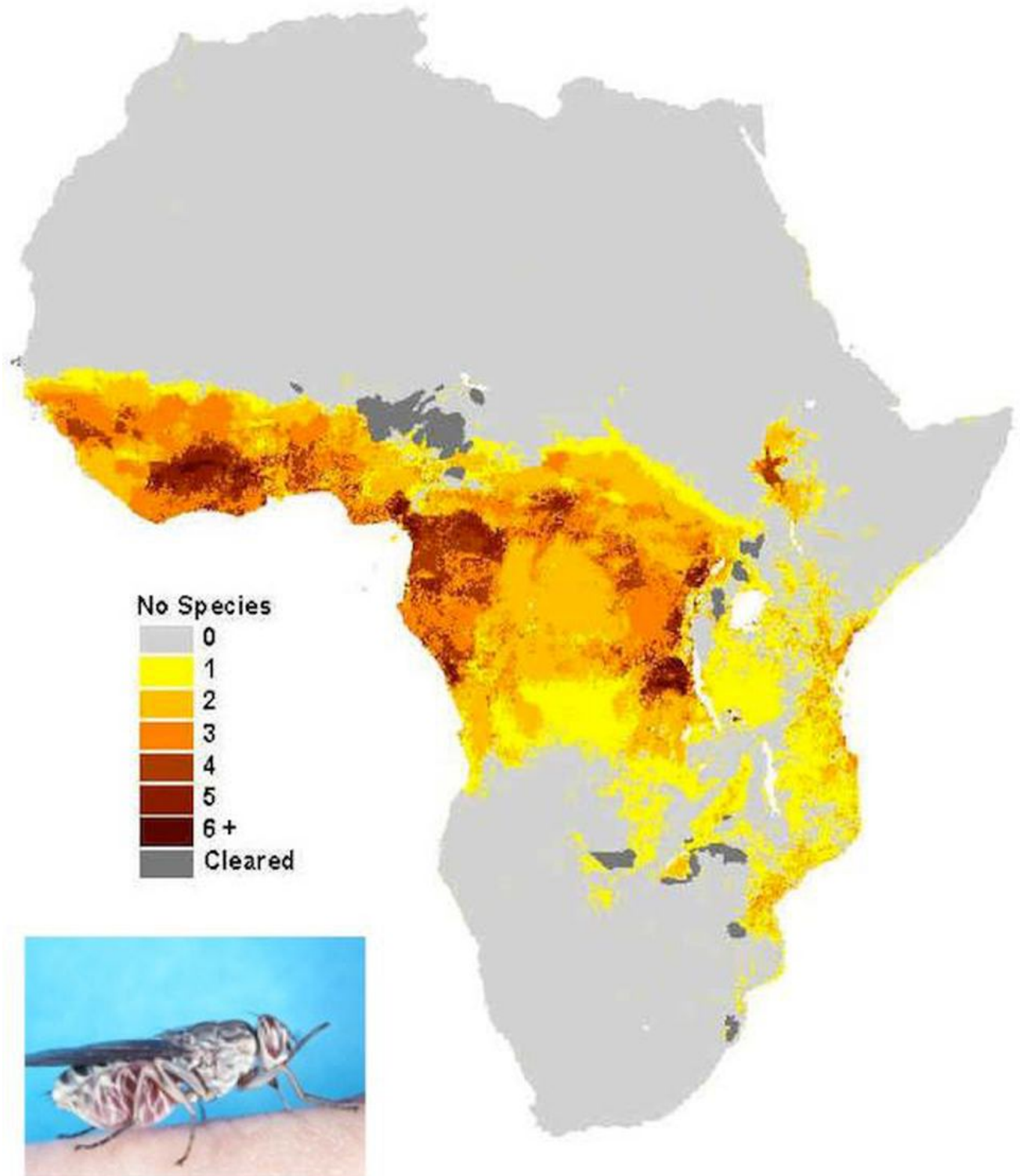
The Fear of radiation has come to the tsetse fly, but in this case it's warranted. The [International Atomic Energy Agency \(IAEA\)](#), partnering with the Senegalese government and the [United Nations FAO](#), used a radiation-based [Sterile Insect Technique \(SIT\)](#) to almost completely eradicate the tsetse fly scourge in the Niayes region of this West African nation.

The tsetse fly is a bloodsucking insect that kills more than three million livestock in sub-Saharan Africa every year with the [nagana](#) wasting disease, sickens and kills over 75,000 people with the [sleeping sickness](#), and destroys over \$4 billion each year in agriculture.

But that is about to change.

Senegal has 40,000 square miles plagued by this menace, but is only one of 38 countries infested with tsetse flies. Its Niayes region was selected for a SIT application because of its particular breed of cattle that produce more milk and meat than other cattle, but were being decimated by the tsetse fly. Infertility, weight loss, reduced meat and milk production, and fatigue so bad the cattle couldn't pull a plough or carry any weight, the people of this region were suffering without the help of their essential animals.

Geographic Distribution of All Species of the Tsetse Fly



The geographic distribution of the tsetse fly, a scourge that kills millions of livestock and thousands of people each year with its sleeping sickness, robbing over \$4 billion in agriculture in sub-Saharan Africa. But ionizing radiation used to sterilize males is poised to completely eradicate this plague. Source: FAO United Nations; CDC

Not to mention the direct effects on humans themselves. The *sleeping sickness* affects the central nervous system causing disorientation, personality changes, slurred speech, seizures, difficulty walking and talking, and finally death.

A member of the common housefly family, the tsetse fly is a strange beast. It's the only insect that bears live young and nurses them by lactation ([Britannica](#)). They have microbial symbioses with different microbes. In addition to the protozoan, *Trypanosoma brucei*, that causes the sleeping sickness, the tsetse fly has an unusual microbial symbiosis with the bacterium *Wolbachia* and has even exchanged and integrated DNA sequences with this pathogen to mutual benefit ([Science](#)). *Wolbachia* itself is a strange organism that is the most common reproductive parasite in the biosphere ([Wiki](#)), having mutually evolved with many insects. Some insect species cannot reproduce, or even survive, without being infected with this bacteria.

But after only four years of using radiation to sterilize male tsetse flies, this region of Senegal is basically free of this torment.

"I have not seen a single tsetse fly for a year now," said cattle farmer Oumar Sow ([IAEA](#)). "[Before,] we had to carefully select the time for milking."

Loulou Mendy, a pig farmer, says, "Now, we can even sleep out in the open."

SIT is a form of insect control that uses ionizing radiation to sterilize male flies. The radiation does not harm the flies in any other way. The males are mass-produced in special facilities, irradiated, and released in infested areas from the ground or by air. They mate with wild females, which then do not produce offspring, but also do not mate again.

Key to the success of these programs are research and development centers like [CIRDES](#), the 1st IAEA collaborating center for Africa in this area. CIRDES provides the SIT fly to Senegal for this program.

It was thought that decoding the tsetse fly genome would offer the best chance of eradicating this scourge ([NYTimes](#)), but the simpler, easier SIT radiation

technique has worked better than anyone could have imagined. The release of sterile male flies began in 2012, after a three-year period of pilot trials, training, preparation and testing.

Radiation is working for many infectious insects on almost every continent on Earth ([FAO/IAEA](#)). In addition to tsetse flies, SIT has been applied to hundreds of species of fruit flies, moths, mosquitoes and screwworm flies.

The outcome of this radiation technique is almost magic. Besides sleeping easy, the people in rural Niayes are looking forward to a 30% increase in their income this year.

I have been a scientist in the field of the earth and environmental sciences for 33 years, specializing in geologic disposal of nuclear waste, energy-related research, planetary surface processes, radiobiology and shielding for space colonies, subsurface transport and enviro... MORE

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