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REVIEW ARTICLE

The new world screwworm, *Cochliomyia hominivorax* (Coquerel): the return of an old plague to North America, its economic and health impact

El gusano barrenador del nuevo mundo, *Cochliomyia hominivorax* (Coquerel): el regreso de una vieja plaga a Norteamérica y su impacto económico y sanitario

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ABSTRACT

Cochliomyia hominivorax, the New World Screwworm, is an obligate parasite of warm-blooded animals that causes severe myiasis and economic losses. Although eradicated from the United States and Mexico, recent detections in Mexico, the Unted States, South America, and the Caribbean show a persistent risk of reinfestation. Illegal cattle importation amplifies this threat. This work summarizes the economic and medical relevance of *C. hominivorax* and describes the strategies used for its control, emphasizing its continued threat to countries previously considered free of this parasite.

KEYWORDS

Cattle, disease resurgence, zoonotic parasite, myiasis, Sterile Insect Technique.

RESUMEN

Cochliomyia hominivorax (Coquerel) (Diptera), la mosca barrenadora del ganado, es un parásito obligado de animales de sangre caliente que causa miasis grave y pérdidas económicas. Aunque erradicado de Estados Unidos y México, detecciones recientes en México, Estados Unidos, Sudamérica y el Caribe, muestran un riesgo persistente de reinfestación. La importación ilegal de ganado agrava esta amenaza. Este artículo resume su relevancia económica y médica de *C. hominivorax*, ademas, describe las estrategias para su control, destacando la continua amenaza que representa para países que anteriormente se consideraban libres de este parásito.

PALABRAS CLAVE

Ganado, resurgencia de enfermedades, parásito zoonótico, miasis, técnica del insecto estéril.

Introducción

Cochliomyia hominivorax (Coquerel) (Diptera), commonly known as the New World Screwworm (nws), is a fly species belonging to the family Calliphoridae (Costa-Júnior et al., 2019). *Cochliomyia hominivorax* can be distinguished by its size—two to three times larger than the common house fly—its metallic coloration, which ranges from black and blue, to dark green, and the presence of three dorsal stripes on the thorax (Sykes et al., 2021; Welch, 2016). The genus *Cochliomyia* includes other species such as *C. aldrichi* (Del Ponte), *C. macellaria* (Fabricius), and *C. minima* (Shannon & Del Ponte). Although *C. minima* is morphologically similar to *C. hominivorax*, they can be differentiated by the length of the central abdominal stripe, which is shorter in *C. hominivorax* (Sykes et al., 2021).

In its larval phase, *C. hominivorax* is an obligate parasite of homeothermic vertebrates and feeds on living tissue (E Souza et al., 2022), unlike other fly species—such as *C. macellaria*—that feed on decomposing tissue. Because infestations (myasis) occur in living hosts, *C. hominivorax* is considered a species of major relevance to both human and animal health. Infestations occur primarily in livestock (e.g., cows, swine), although accidental cases have also been reported in birds, wildlife, and humans (Costa-Júnior et al., 2019).

Only a few other fly species feeds on living tissue and cause myiasis, such as the Old World Screwworm [*Chrysomya bezziana* (Villeneuve)]. These species differ in their geographical distribution (Welch, 2016) and in the pigmentation of their tracheal trunks. *Chrysomya bezziana* occurs mainly in tropical regions, including southeast Asia, Africa, and the Middle East, and may also be present on some Pacific islands (World Organisation for Animal Health [woah], 2019). Other myiasis-causing species, such as the tumbu fly [*Cordylobia anthropophaga* (Blanchard)] and the spotted flesh fly [*Wohlfahrtia magnifica* (Schiner)], are not present in the Americas (Sykes et al., 2021). As a causative agent of myasis, *C. hominivorax* poses a serious threat to livestock—specially cattle—and to human health. Economic losses associated with this species have reached billions of dollars annually in the United States and South America. The United States Department of Agriculture (usda) estimates annual losses of usd $10-20 billion, including usd $1.4 billion per year in Texas alone (usda, 2025a). The main objective of this study is to conduct a comprehensive assessment of the impacts of *C. hominivorax* on human and animal health, and of the economic losses in the livestock sector, with emphasis on the current outbreak in Mexico, and the need for coordinated scientific strategies and sustained surveillance to protect animal health and agricultural economies in the Americas.

Distribution

Cochliomyia hominivorax is endemic to the Western Hemisphere and occurs in tropical, subtropical, and temperate zones. It was introduced to the Americas by the end of the 20th century (Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria [senasica], 2024a). Historically, its distribution extended from parts of the Caribbean and the southern United States to Mexico (particularly in southern states such as Chiapas and Tabasco), and throughout Central and South America, except for Chile and southern Argentina (Tietjen et al., 2022). *Cochliomyia hominivorax* has been present in the southwestern United States since the 1840s; however, it did not emerge as a major threat in the Southeast until the 1930s, when infested animals from the Southwest inadvertently spread the pest. In response, the usda and southeastern states launched the Screwworm Educational Program in 1935 to inform producers about prevention strategies (usda, 2025b). Later, with the implementation of sterile fly releases and international collaboration, the United States declared *C. hominivorax* eradicated in 1966. Due to the risk of reintroduction, eradication efforts expanded into Mexico and South America, with Mexico reporting its last nws outbreak in 1993 (usda, 2025b). In affected countries, *C. hominivorax* has caused severe losses in livestock, companion animals, wildlife, and, under certain conditions, human populations (Costa-Júnior et al., 2019).

In 2023, the usda reported a marked increase in detections *C. hominivorax* at the Panama border, rising from an average of 25 annual cases to more than 6,500 within one year (usda, 2025c). On November 22, 2024, the usda and the Animal and Plant Health Inspection Service confirmed a positive detection in Chiapas, Mexico (usda, 2024). Outbreaks have since been reported in Costa Rica, Nicaragua, Honduras, Guatemala, and

Mexico (USDA, 2024). Because of the ongoing expansion toward northern borders, tracking and controlling *C. hominivorax* may become increasingly difficult if timely preventive actions are not implemented.

Life cycle

The complete life cycle of *C. hominivorax* lasts approximately 21 days under favorable environmental conditions (Figure 1), although unfavorable factors may extend it up to three months (Comision México-Americana para la Erradicacion del Gusano Barrenador del Ganado, 2008). Adult females typically lay 250-300 eggs (Guillen Mosco, 2024) in open wounds, body orifices, or mucous membranes such as the navel, nostrils, mouth, ears, orbital eyes, vulva, and perineum. Eggs hatch within 12-24 hours, and the larvae begin feeding on healthy tissue and wound exudates (Akhoundi et al., 2023). Using their anterior mouth hooks, they burrow into the flesh and maintain the wound open while breathing through the posterior spiracles (Tietjen et al., 2022).

Larval development includes three instars that feed exclusively on fresh flesh and fluids. After the third instar, the larvae enter a pupae stage characterized by a hardened protective cuticle that is burrowed into the soil. After metamorphosis, adult flies enter the mating stage, females oviposit in open wounds, with eggs hatching shortly after.

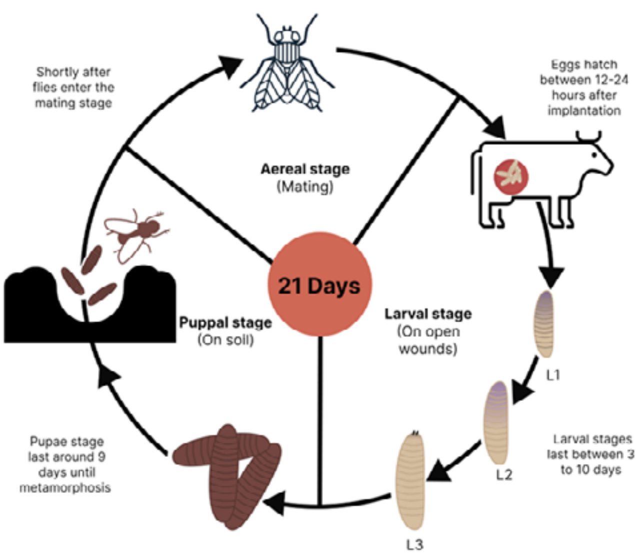

Figure 1. Life cycle of *Cochliomyia hominivorax*.

The larval stages last between 3 to 10 days and can grow up to 17 mm in length before pupation. Larvae are identified by their pigmented tracheal trunks, extending from the twelfth segment to the tenth or ninth, especially visible in the third instar (Center for Food Security & Public Health [CFSPH], n.d.; Sykes et al., 2021). After completing their feeding period, larvae drop to the ground, burrow into the soil, and form a hardened pupal case with a brownish-red coloration (Guillen Mosco, 2024). Metamorphosis is completed after approximately 9 days (Barros & Bricarello, 2020). The duration of the entire cycle varies widely with temperature: it may be completed in less than three weeks in warm climates or extend to 2-3 months under cooler conditions (CFSPH, n.d.).

Following metamorphosis, adult flies are relatively harmless, feeding on nectar and decomposing organic matter. Due to their short lifespan, adults mate soon after emergence, and females quickly resume oviposition, completing the cycle (USDA, 2025a).

Morphological and molecular identification

The main morphological characteristic used for the identification of *C. hominivorax* is the presence of pigmented tracheal trunks, which are the most prominent in third-instar larvae. This pigmentation extends from the twelfth to the tenth or ninth body segment (CFSPH, n.d.; Sykes et al., 2021).

Due to the similarity of *C. hominivorax* with other related species, taxonomical identification has been challenging; therefore, genetic identification has become a viable alternative (Toledo Perdomo & Skoda, 2020). Understanding population genetics is essential for effective pest management and control; additionally, it helps predict dispersal and colonization patterns plus supports the development of geographically targeted treatments (E Souza et al., 2022; Lyra et al., 2009). However, depending on the technical approach used, contrasting evidence has been emerged regarding population variability and the genetic structure of *C. hominivorax*. For example, mitochondrial DNA analysis using PCR-RFLP of the complete cytochrome oxidase c subunits 1 and 2 sequences—amplified with primers C1-J-2195 and L2-N-3014—and of the complete control region and partial 12S RNA sequences—amplified with primers TM-N-193 and SR-J-14233—revealed low variability within mainland hominivorax population (Lyra et al., 2009). However, high differentiation was detected between Caribbean and mainland populations, suggesting a restriction in gene flow among island populations and indicating that they represent independent evolutionary units (Lyra et al., 2009). Similar patterns of genetic separation among Caribbean lineages were observed in analyses based on 150 bp single nucleotide polymorphisms (SNPs); however, unlike previous reports, geographic population structuring was also detected within South America (Tietjen et al., 2022).

Economic losses

Before eradication, *C. hominivorax* caused substantial economic losses to producers. This included animal mortality, reduced livestock production, decreased availability of draft animals and manure, additional cost for animal inspection and handling, and increased expenses for insecticides, veterinary care, and medications (Welch, 2016).

In the United States, the Federal Government and nonprofits organizations funded several activities aimed at controlling *C. hominivorax*, such as:

- Public Education
- Research on improved treatments
- Surveillance
- Sterile Insect Technique (SIT) program expenditures

In 1941, during early eradication efforts, in the United States suffered annual losses estimated at USD $5-10 million. Over the following three years, the Federal Government, the State of Florida, and other states contributed more than USD $978,000 to the program. In the same year, the USDA spent USD $60,000 in the development of an effective insecticide targeting *C. hominivorax* (USDA, 2025a).

Before the eradication in 1959, producers in the southeastern United States were experiencing severe economic losses, estimated at USD $10-20 million annually (USDA, 2025a). This eradication was achieved through a sustained SIT program, which required a substantial investment of USD $10 million from the Federal Government and the State of Florida. Meanwhile, producers in the southwestern United States faced even higher losses, with annual estimates ranging from USD $50 to $100 million (Texas Animal Health Commission, 2024).

The success of the Southeast eradication campaign prompted the launch of a Southwest program in 1962, financed by the Federal Government, the Southwest states, and the Southwest Animal Health Research Foundation. This USD $32 million initiative concluded in 1966 and established a NWS barrier along the U.S.-Mexico (Novy, 1991).

A 1976 economic analysis revealed that 1.49 million cattle and 332,600 sheep and goats in Texas were infested with *C. hominivorax*. That same year, Texas ranchers spent USD $132.1 million annually on eradication efforts, and the overall economic impact was estimated at USD $283-375 million. The challenge of containing *C. hominivorax* at the border, along with ongoing outbreak threats, led to the creation of the joint Mexico-U.S. Screwworm Eradication Commission (Thomas, 1978). Its mission was to confine *C. hominivorax* to Mexico's southern border, a goal successfully achieved in 1986 (USDA National Agricultural Library, 1987). These eradication efforts cost Mexico USD $134 million in 1984, and the full program totaled USD $790 million (SENASICA, 2024a).

The annual cost of controlling NWS myiasis in domestic animals in endemic regions was considerable, ranging from USD $4.82 to $10.71 per animal. This estimate can help affected nations assess the total economic impact on their livestock sectors (Rawlins, 1985).

In 2005, the economic impact of *C. hominivorax* in South America was estimated at USD $3.5 billion annually. Eradication efforts remain extremely costly and labor-intensive, requiring coordinated action among governments and producers. The United States and Mexico, in particular, have undertaken joint binational efforts to eradicate this pest (USDA, 2025a).

Since 2024 and through February 2025, the presence of *C. hominivorax* has been reported in southern Mexico, leading to significant economic losses for individuals engaged in cattle exports from Mexico to the United States. Because beef demand remains constant and the influx of cattle from Central America into Mexico continues, the risk of disease dissemination toward the central and northern Mexico—and consequently southern U.S. regions—remains high. According to the National Agricultural Council

(Consejo Nacional Agropecuario [CNA]), since the suspension of livestock exports, losses are estimated at USD $11.4 million per day (CNA, 2025).

The principal livestock checkpoint for cattle entering southern Mexico from Central America is the Federal Inspection and Checkpoints (PVIF) located at "Dos Bocas" in Catazajá, Chiapas, where a mandatory inspection is conducted. Each animal undergoes a visual examination (SENASICA, 2024b), ivermectin treatment, and an insecticide spray bath. However, many trailers transport cattle for more than 12 hours, which causes severe animal stress, often resulting in mortality, economic losses, and increased potential for infestation. Additionally, various ranchers in the region have reported cases of wounds infected with *C. hominivorax*, which they attribute to livestock collection centers operating nearby (Martín-Pérez, 2025).

Eradication by sterile fly technique

The significant economic impacts previously described led to the implementation of eradication programs, most notably the SIT. Developed in the 1950s by Edward F. Knipling and Raymond C. Bushland of the U.S. Department of Agriculture, this technique takes advantage of the fact that *C. hominivorax* females are monogamous while males are polygamous. Sexual sterility is induced by exposing pupae to X-rays or gamma radiation (Bushland & Hopkins, 1953), which damages the chromosomes in sperm cells. These breaks result in sticky chromosome ends that tend to rejoin incorrectly, forming dicentric chromosomes with two spindle fiber attachment sites (Bushland & Hopkins, 1953). During cell division, these abnormal chromosomes are pulled toward opposite poles; if they do not break, the cell cannot divide and dies. If breakage occurs at a new site, one daughter cell receives a chromosomal deficiency while the other receives a duplication (Knipling, 1979). Additional chromosome fragments lacking spindle fiber attachment points are excluded from daughter nuclei, leading to cells missing essential genetic information. Ultimately, these chromosomal abnormalities cause embryo death when irradiated males fertilize wild females (Muller, 1950). Releasing sufficient numbers of sterile males over several generations, reduces the reproductive success of the wild population eradication is achieved. A release ratio of at least 10 sterile males per wild female is required to achieve population suppression (Knipling, 1955).

Because no chemical can be applied safely without posing hazards to workers or non-target species, radiation from radioisotopes such as Cesium-137 and Cobalt-60 is used instead. Radiation doses must be carefully calibrated to ensure that male longevity, dispersal, and mating competitiveness are not significantly compromised (Knipling, 1979).

In 1954, SIT was successfully applied on the 176-square-mile island of Curaçao, off the coast of Venezuela (Baumhover, 1966). USDA scientists eradicated *C. hominivorax* from the island in fewer than six months (Baumhover et al., 1955). The success in Curaçao prompted increasing pressure from the Florida Livestock Board between 1955 and 1957 to apply SIT to eradicate NWS in the southeastern United States.

During the 1960s, SIT was employed to suppress NWS populations in the United States. As the eradication program expanded into the southwestern region, the USDA recognized the needed of international cooperation. In 1962, Mexico granted permission to release sterile flies in infested areas of Tamaulipas, Nuevo Leon, and Coahuila, marking the beginning of the Northern Program. The success of the eradication in the United States emphasized the need for a coordinated international approach, leading the U.S. Congress to amend the 1947 Act to support broader cooperation. On July 27, 1966, Congress authorized NWS eradication activities in Mexico (Wyss, 2006). The Northern Program eventually expanded to cover one-third of Mexico. Despite progress, repeated reinfestation of the United States underscored the need for an even larger-scale campaign.

On August 28, 1972, Mexico and the United States signed a cooperative agreement to eradicate NWS from the region north and west of the Isthmus of Tehuantepec, establishing the Mexico-United States Commission for the Eradication of Screwworms (SW Commission). The Commission expanded activities using sterile flies produced in Mission, Texas (Vargas-Terán, 1991). In 1976, a new sterile fly production plant was established in Chiapa de Corzo, Chiapas, Mexico (Wyss, 2006). The coordinated efforts resulted in the final report of NWS in the United States on August 30, 1982.

The devaluation of the Mexican peso led to the first amendment of the SW Commission Agreement in September 1983, permitting both governments to voluntarily increase financial support. A second amendment in April 1986 authorized an expansion of the program to all of Mexico and collaboration with additional countries. The United States provided 80 % of program funding, while Mexico contributed 20 % proportional to estimated losses caused by NWS (USDA National Agricultural Library, 1992). This amendment also enabled cooperation with Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama—all of which were declared NWS-free between 1994 and 2000 (Wyss, 2006).

In 1991, SIT successfully halted a severe outbreak in northern Africa. The same approach has also used to eradicate the Mediterranean fruit fly in Mexico and California, the melon fly in Okinawa, and the tsetse fly in Africa (USDA National Agricultural Library, 1992).

In Mexico, the program implemented inspections and treatment of animals moving north from infested zones into NWS-free regions. Continued releases of sterile flies gradually eradicated NWS in areas increasingly distant from the U.S. border. By the end of 1984, all regions north of the Isthmus of Tehuantepec were declared free of *C. hominivorax* (Wyss, 2006). A sterile fly barrier zone and quarantine system in southern Mexico have maintained this status, despite two isolated outbreaks in 1985. *Cochliomyia hominivorax* was eradicated from the southern United States, Mexico, and the entirety of Central America and Panama through a sustained program that began in 1957 and concluded in 2004 with eradication from Panama (Scott et al., 2020).

Today, Puerto Rico, the United States, and most of Mexico remain free of *C. hominivorax*, but the risk of reintroduction through animal movement persists. Recently, Panama, Costa Rica, Nicaragua, and Honduras have reported new cases, raising concerns about further northward spread. Additionally, travel-associated cases are occasionally detected in individuals returning to the United States from endemic areas, posing an ongoing risk.

Mexico reinfestation

Mexico has been free of *C. hominivorax* since 1991. However, cattle trade from Guatemala into Mexico led to a new infestation in a bull infected with *C. hominivorax*, detected on November 21, 2024, in Catazajá, Chiapas, located 224.8 km from the Guatemalan border (USDA, 2024a). On November 26, 2024, the United States suspended cattle imports from Mexico following the detection of *C. hominivorax* (Owens, 2024). During this period, several preventive measures were implemented, including a permanent inspection point at the "Dos Bocas" customs facility in Catazajá, Chiapas. This process required livestock to be unloaded for wound treatment, tick-killing baths, and the administration of ivermectin. Additionally, two Federal Verification and Inspection Points located in Huixtla and Trinitaria, Chiapas, played a key role in preventing the spread of NWS from Central America (SENASICA, 2024b). On November 30, 2024, SENASICA initiated the release of sterile *C. hominivorax* flies in the area where the infection was identified (*BM Editores*, 2024). However, on December 10, 2024, another case of infection was confirmed in Ciudad Hidalgo, Chiapas, near the Guatemala border (Coello, 2024).

In January and February 2025, several *C. hominivorax* infections in cattle were reported in ranches near the "Dos Bocas" customs post in Catazajá, Chiapas, Mexico. However, these reports come primarily from local newspapers and ranchers. The cause of this reinfestation was attributed to a loss of control by the National System of Individual Cattle Identification (Sistema Nacional de Identificación Individual del Ganado), the agency responsible for regulating cattle ear tags in Mexico. Ear tags can be illegally acquired to smuggle unregistered cattle lacking health documents or transit permits into the country (Asmann & Dittmar, 2022). This situation has allowed the continued entry of illegal cattle from the southern border, creating an entry and dissemination gateway (Cruz-González, et al., 2025). SENASICA has reported several cases of myiasis across several Mexican states, including Campeche, Chiapas, Quintana Roo, Yucatan, and Veracruz (SENASICA, 2025).

Human myiasis by *C. hominivorax* in Latin America

From an economic perspective, cattle are the most affected species by *C. hominivorax* infestations. However, human infestations remain a persistent concern and deserve attention. Several South American countries have reported numerous cases. For example, Venezuela documented 241 cases over seven years (1999-2006). Patients ranging from newborns to 91-years-old, with most cases occurring in children aged

0-6. Two elderly patients died due to massive infestations (Coronado & Kowalski, 2009). One case involved a 75-year-old woman with a history of prostration and an ulcerative lesion on her left gluteus; clinical examination confirmed *C. hominivorax* (Moissant de Román et al., 2004). This pathogen poses a significant risk for patients with chronic wounds such as decubitus ulcers, impetigo, gangrene, and cancer. In 2017, a 70-year-old man with severe myiasis associated with squamous cell carcinoma had a cavitary tumor perforated by 160 maggots, illustrating the severity of such infestations (Tortolero Low et al., 2017).

In 2008, infestations began to increase in Rio de Janeiro, where 22 cases were documented over 12 months. These cases affected both men and women, with 54.6 % being recurrences and 36.4 % being first-time infestations (Batista-da-Silva et al., 2011). As in other regions, the primary risk factor was the presence of open wounds. Many patients worked in construction, farming, or domestic labor, which increased exposure to the flies responsible for myiasis.

Recently, new reports of myiasis caused by *C. hominivorax* have emerged (SENASICA, 2025). In Haiti, a 26-year-old man with a persistent wound on the back of his head had 12 maggots removed during examination (Theppote et al., 2020). In Argentina, four cases were reported in individuals aged 54 to 86. Contributing factors included advanced age, diabetes, psoriasis, cancer, and surgical wounds, even though all patients were of relatively good socioeconomic status (Menghi et al., 2020).

Although *C. hominivorax* was eradicated in Mexico in 1991, the risk of reinfection persists due its presence in the Caribbean, Central America, and South American. In 2019, a 68-year-old Argentine man living in Mexico City contracted an infestation during travel to Argentina. Diagnosis occurred in Mexico City, where the patient presented with a 13-year history of a verrucous lesion in the infraclavicular region. A skin graft from the ipsilateral thigh was used, and the patient recovered well (Luengo Fernández et al., 2019).

Despite being primarily associated with the Americas, *C. hominivorax* has also been reported in Europa. In 2002, an 84-year-old man in France had a perforating nasal lesion containing maggots at the base of the fistula (Couppié et al., 2005). More recently, in 2023, a French patient reported constant noise and tickling in the left ear; clinical examination revealed maggots later identified as *C. hominivorax* via morphological and molecular techniques. The patient recovered within three months with no relapse (Akhoundi et al., 2023). Neither patient had traveled to countries with high *C. hominivorax* prevalence.

Cochliomyia hominivorax was accidentally introduced into Libya in 1988, with additional cases reported in Algeria in 1997 (Couppié et al., 2005). Although unlikely to establish outside the Americas, misidentification remains a concern. Molecular characterization, as used in the recent French case, can minimize such errors. Nevertheless, the possibility of this species appearing outside the Americas should not be dismissed.

In the past year, numerous cases of *C. hominivorax* myiasis have been reported in South America, with Costa Rica reporting the highest number—38 cases in 2024, including two fatalities. Older adults, particularly those over 65, were the most affected group (Ministerio de Salud, Costa Rica, 2024). Panama and Nicaragua reported two cases each in 2004. In Panama, the first case involved a 94-year-old woman in Chiriquí, a province bordering Costa Rica. The second involved a minor living 270 km from Panama City; both patients recovered at home (Forbes, 2024). In Nicaragua, both cases involved head myiasis, were diagnosed early, and had favorable outcomes following maggot removal (Swissinfo, 2025). These cases in Costa Rica and neighboring countries underscore the ongoing challenges in controlling *C. hominivorax*.

***Cochliomyia hominivorax* and wildlife**

Although the best-documented cases of animal infestation by *C. hominivorax* involve cattle, it is important to highlight the threat posed to other animal species and to recognize that the scarcity of reports on myiasis in wild mammals does not imply the absence of *C. hominivorax* in these habitats.

Myiasis cases have been reported in domesticated animals such as dogs, cats, goat, sheep, horses, donkeys, buffalo, and pigs (Costa-Júnior et al., 2019), as well as in multiple wildlife animals in the Americas—including feral swine (Altuna et al., 2021); felids such as the ocelot [*Leopardus pardalis* (L.)] (Pulgar et al., 2009) and jaguar [*Panthera onca* (L.)] (May-Junior et al., 2021); a giant otter (*Pteronura brasiliensis* Zimmerman) (Foerster et al., 2022); and a wild maned wolf [*Chrysocyon brachyurus* (Illiger)] (Cansi et al., 2011). Because the home ranges of many wildlife species may extend over hundreds of hectares, myiasis by *C. hominivorax* in wildlife has the potential to become a transboundary disease (Altuna et al., 2021).

Cochliomyia hominivorax also poses a threat to wildlife conservation, as infestations have been reported in captive animals such as hippopotamus [*Hippopotamus amphibius* (L.)] and lesser grison [*Galictis cuja* (Molina)] (Costa-Júnior et al., 2019). In 2016, infestations were detected in Key deer [*Odocoileus virginianus clavium* (Barbour & Allen)] from the National Key Deer Refuge in Big Pine Key, Florida (Scholl et al., 2019). However, due to the limited studies on wildlife populations, it is difficult to assess the true extent and impact of *C. hominivorax*. It is evident, nonetheless, that myiasis threatens endangered species by impairing their hunting behavior, compromising territorial defense, and even causing mortality in vulnerable populations (May-Junior et al., 2021).

Environmental factors such as temperature have also been associated with the presence of *C. hominivorax* infestations in wildlife (Altuna et al., 2021). With rising temperatures caused by global warming, the threat that *C. hominivorax* poses to wild animal populations is expected to increase.

Treatment

Diphenylamine was the first chemical fly-repellent agent used for the prevention and treatment of NWS infestations in livestock (Melvin & Bushland, 1938). Although it is not a potent fly repellent and does not completely prevent oviposition on wounds, it effectively kills NWS larvae that hatch from deposited eggs before they can cause tissue damage. Studies have shown that diphenylamine is significantly more effective than pine tar oil, bone oil, and other substances commonly used for NWS prevention (Melvin et al., 1939). This compound not only protects wounds from infestation but also eliminates young larvae—up to three days old—that may already be present. However, it should not be relied upon to eliminate larvae older than three days.

In 1983, the Australian Bureau of Animal Health carried out a study to determine the efficacy of chemicals used in northern Australia for eliminating *C. hominivorax* in cattle (Spradbery et al., 1983). Of the 13 acaricides/insecticides evaluated, the eight organophosphorus compounds (bromophos, chlorfenvinphos, chlorpyrifos, coumaphos, crotoxyphos, chlorfenvinphos, dioxathion, and phosmet) caused a high mortality rate (> 67 %) in laboratory tests and were more effective *in vivo* studies than the amidines (armitraz, chloromethiuron, clenpirin, and cymiazole) and the carbamate (promacv). The authors concluded that the use of organophosphorus compounds for thick control also reduced NWS fly populations (Spradbery et al., 1983). The use of ivermectin for treating wounds caused by *Chrysomya bezziana* was shown to be effective in a 1987 study; doses of 200 μg/kg and 280 μg/kg administered on day 1 provided protection for 11 and 17 days, respectively (Perkins, 1987).

Currently, these compounds are widely used to treat *C. hominivorax* infestations. WOAH recommends the application of organophosphorus and pyrethroid insecticides to wounds to eliminate larvae and protect against reinfestation (WOAH, 2019). Preventive measures include spraying or dipping susceptible livestock with organophosphorus compounds, as well as the use of avermectins—a group of drugs derived from *Streptomyces avermitilis*, including ivermectin, abamectin, moxidectin, selamectin, and doramectin (El-Saber Batiha et al., 2020). Doramectin, in particular, is used for both treatment and prevention (CFSPH, n.d.; WOAH, 2019).

Conclusions

The eradication of *C. hominivorax* from the United States and Mexico represents a major achievement in both animal and human health, preventing substantial economic losses. The successful implementation of the SIT underscores the importance of international cooperation and the value of scientific innovation in addressing significant agricultural and economic challenges.

However, the recent resurgence of NWS in southern Mexico and Central America poses a renewed threat to the region. A limited campaign using sterile flies was implemented as an attempt to control the pest, but this approach has proven insufficient, as new reports continue to emerge from southern Mexico—including Catazajá, Chiapas, and Balancán, Tabasco—and even farther north. With temperatures expected to rise in the upcoming spring and summer seasons, concerns grow regarding whether *C. hominivorax* can be contained before reaching the United States.

There is, therefore, an urgent need for sustained vigilance, robust surveillance systems, and continued international collaboration to prevent the re-establishment of this parasite. Past experiences highlight the critical importance of proactive measures and rapid response strategies to protect animal and human health as well as agricultural productivity. While *C. hominivorax* is currently the primary concern, future disease outbreaks—such as the foot-and-mouth disease—could arise if cattle movement and health are not properly monitored and controlled.

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