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Annotated Bibliography of Scientific Research on New World Screwworm (*Cochliomyia hominivorax*) Myiasis in Wildlife

Open-File Report 2026–1006

U.S. Department of the Interior
U.S. Geological Survey

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By Sarah Timbie, Shelby Weidenkopf, and Daniel A. Grear

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Abbreviations

NWS	New World screwworm
SIT	sterile insect technique

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By Sarah Timbie,[1] Shelby Weidenkopf,[2] and Daniel A. Grear[3]

Abstract

The New World screwworm (*Cochliomyia hominivorax*; NWS) is a parasitic blowfly that lays its eggs in open wounds of live, warm-blooded animals including livestock, wildlife, and potentially humans. The larvae consume living animal tissue, and if untreated, the infestation can lead to death. Although NWS was eradicated in the United States in 1966, it has been moving northward from its endemic range in South America during the past decade and could seriously threaten the health of U.S. wildlife populations, making detection, treatment, and surveillance of the disease far more difficult across this multi-sector disease system.

As the likelihood of NWS reintroduction to the United States increases, veterinarians, wildlife managers, and conservation specialists need to be informed and prepared to respond. The existing knowledge about NWS interactions with wildlife hosts is lacking, especially regarding North American species where the NWS has been eradicated for more than 50 years. To address this knowledge gap, we compiled an annotated bibliography that consolidates key information from the existing literature on NWS infestation in wild animals.

Introduction

The New World screwworm (screw worm; *Cochliomyia hominivorax*; NWS) is a parasitic blowfly that lays its eggs in open wounds of live, warm-blooded animals. The larvae consume living animal tissue, and if untreated, the infestation (called myiasis) can lead to weight loss, secondary infestations, and death (U.S. Department of Agriculture, 2025a).

NWS myiasis was first described in depth in 1858 by French scientist Charles Coquerel (Coquerel, 1858). Cushing and Patton (1933) later identified NWS as a distinct species (initially named *C. americana*) that used living tissue for the larval stage of its life cycle. *C. hominivorax* is endemic in many parts of the Caribbean and Central and South America but has been eradicated in different areas throughout the 20th century including the United States and Mexico, and certain Caribbean islands at different points in time (Spradbery, 1994).

NWS can infest any warm-blooded animal, including pets, wildlife, birds, and even people. Re-emergence of NWS in the United States could affect livestock and livestock trade and thus, the economy (U.S. Department of Agriculture, 2025a). NWS was present in the southwestern United States in the early 20th century but did not become a serious concern for the United States until the 1930s, when a shipment of infested animals to the southeastern United States prompted infestations across the southern United States (U.S. Department of Agriculture, undated). The cost to the livestock industry was massive owing to direct losses and treatment costs estimated at $100 million U.S. dollars per year of producer losses in the 1950s and 1960s (U.S. Department of Agriculture, 2025c). The U.S. Department of Agriculture developed multiple forms of educational materials to raise awareness and pharmaceutical options for livestock treatment, and scientists focused on novel methods to eliminate the threat.

Throughout the latter half of the 20th century, countries across North and South America worked together to eradicate NWS using the sterile insect technique (SIT) along with surveillance and treatment of livestock (U.S. Department of Agriculture, 2017). The SIT involves breeding and releasing sterile male NWS flies that cause females to produce inviable eggs when mated (Van der Vloedt and Klassen, 1991). This strategy relies on mass release of sterile males so that females are vastly more likely to mate with a sterile, rather than a fertile male. The SIT, along with surveillance and treatment in cattle, led to eradication of NWS from the southeastern United States in 1959 and from everywhere in the United States in 1966 (U.S. Department of Agriculture, 2017). In 2006, NWS was officially eradicated from

[1]University of Minnesota.

[2]Akima Systems Engineering, contractor to the U.S. Geological Survey.

[3]U.S. Geological Survey.

countries in the Americas north of the Darién Gap separating Panama and Colombia (World Organisation of Animal Health, 2019).

There have been sporadic detections of NWS and rare outbreaks north of the Darién Gap since 2006 (World Organisation of Animal Health, 2019) until 2024 when there was high-incidence of NWS detected in Panama, Costa Rica, and Nicaragua (Valdez-Espinoza and others 2025). In July 2025, Mexico's National Service of Agro-Alimentary Health, Safety, and Quality reported a case of NWS in a calf approximately 370 miles south of the United States/Mexico border, and on September 21 they reported a case in a calf approximately 70 miles south of the border (Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria, 2025; U.S. Department of Agriculture, 2025b). Recent studies of the potential distribution of NWS if it continues to spread northwards indicate high potential for spread from Central America to areas including Mexico's Pacific and Atlantic coasts, the Yucatan Peninsula, and parts of Texas and Florida (Valdez-Espinoza and others, 2025).

The issue of NWS is rapidly evolving, with growing concerns about its continued movement northward and detections less than 100 miles from the United States border. The most recent NWS detection in the United States was in 2016–17 in Florida Key deer (*Odocoileus virginianus clavium*; Parker and others 2020). Prior to the Key deer detection, the last reported detection in the United States occurred in 1966. The current understanding and awareness of the re-emergence of NWS is particularly limited in the context of wildlife health. To fill this gap, we compiled a summary of past documented cases of NWS in wildlife in the Americas to support those involved in managing wildlife health and natural resources. However, an additional challenge is that the scientific literature on NWS in wildlife is sparse, and some resources are not readily available in English. We intend this annotated summary to serve as a plain-language reference to help wildlife professionals, land managers, and policymakers quickly access key information. Although this document does not replace the need to consult original studies for a deeper understanding, we aim to provide a useful starting point for information to aid in decisions surrounding NWS management and response.

Purpose and Scope

We developed this annotated bibliography to collect and summarize scientific reports of NWS infestation in wildlife and serve as an accessible informational resource for wildlife managers, health officials, and administrators. Because of the limited literature available on the prevalence of NWS in wildlife, this annotated bibliography includes many articles that do not focus exclusively on NWS but mention some observation or report about NWS in wildlife. Thus, many of the articles may primarily address topics unrelated to NWS, but we aimed to provide as many pertinent references as possible. We also included a section entitled "Supporting Evidence for NWS Record" for each entry, which explains the basis for NWS-related evidence (for example, laboratory identification, personal communication).

Methods

We conducted a structured literature search using four databases: PubMed, Google Scholar (in English, Spanish, and Portuguese), SciELO, and the U.S. Department of Agriculture National Agricultural Library's search tool, SEARCH. We used two main sets of search terms: (1) "New world screwworm," "wildlife," and "myiasis," and (2) "*Cochliomyia hominivorax*," "wildlife," and "myiasis" for searches in Google Scholar, SEARCH, and PubMed. The search provided articles containing one or both of the sets of keywords in the title, abstract, or main body. Articles that only had the search terms in the references section were excluded. To ensure consideration of articles containing Spanish and Portuguese terms for NWS, we included the following additional sets of search terms: (1) "*Cochliomyia hominivorax*," "myiasis," and "animales silvestres," (2) "gusano barrenador," "myiasis," and "animales silvestres," and (3) "bicheira," "myiasis," and "animales silvestres."

We refined the initial results in five ways. First, we removed articles that focused solely on infestations in traditional livestock (cows, sheep, pigs, and so forth) rather than wildlife. Then, we removed articles that focused on case studies from outside of the Caribbean and North or South America. We also removed articles that focused on SIT or spatial, temporal, temperature, or seasonal analyses surrounding NWS fly ecology without any mention of wildlife hosts. Lastly, after reviewing the content of all the remaining pieces, we excluded articles that were not relevant to the topic of NWS infestation in wildlife or free-ranging animals. To be inclusive of infestation dynamics in free-ranging animals, we included articles that had information from feral domestic (for example, dogs, cats) and captive wild animals. After finding a set of relevant articles, we performed backward citation chaining to identify further relevant articles.

Previous reports (Carter and others, 2018, 2020) introduced a methodology for generating annotated bibliographies to facilitate the integration of recent, peer-reviewed science into resource management decisions. This report and other annotated bibliography reports (for example, Poor and others, 2021) build on that methodology and apply it to new species and topics. Therefore, relevant text from these reports is reproduced herein to frame the presentation. Each article or report was analyzed and summarized using the same structure, including information about the study's background, objectives, methods, location, findings, implications, topics, publication year, and supporting

evidence for NWS record (table 1). In the "Background," "Objectives," and "Methods"` summary sections of each entry, we provided an overview of the content as a whole. For the findings and implications, we highlighted only the information most relevant to NWS. The topics assigned for the articles included North America, Central America, South America, feral domestic animal, captive mammal, free-ranging mammal, captive bird, free-ranging bird, peridomestic, intraspecies aggression, and free-ranging wildlife.

Articles also varied by their strength of evidence for NWS infestation, ranging from anecdotal verbal reports to professional laboratory identifications. We provided a section in each summary describing the supporting evidence for each NWS record. To maintain a concise summary, we included only the most relevant information from each source. We recommend reading the full original documents for more in-depth information about each case.

Results and Discussion

We identified 25 articles that met our criteria for a report of NWS infestation in wildlife. These articles included reports of 19 species of free-ranging wild, captive wild, or free-ranging domestic species with laboratory detection of NWS infestations, 7 species with visual detections, and 11 species with secondary reports (table 2). Articles covered geographic areas throughout the NWS endemic range in Central and South America, as well as historical and recent outbreaks in North America. There were numerous additional species in these articles with anecdotal detections from personal communications where the identification method or species identification could not be determined. Many of the articles reported NWS detections as a supplementary finding for a study that was unrelated to NWS, and very few reported effort or sample size that would make estimating prevalence or incidence of NWS infestation possible. With the northward re-emergence of NWS and the threat it poses to the United States, the knowledge of wildlife effects and role in domestic animal outbreaks remains extremely limited.

Table 1. Description of categories in each summary of articles included in the "Article Summaries" section.

[NWS, New World screwworm (*Cochliomyia hominivorax*)]

Summary section	Description
Citation	Formal literature citation of the summarized article.
DOI	The digital object identifier that permanently identifies an article and links to its source on the internet.
Background	A short description of the background and motivation for the study or work being done.
Objectives	A short statement of the study objectives.
Methods	A brief description of how the information was collected.
Location	The country and locality (State, Province, or municipality) to which the information applies.
Findings	A short description of the findings of the study. The description was limited to findings relevant to NWS infestation in wild and free-ranging animals.
Implications	A brief description of the conclusions and interpretation of the findings as stated in the article.
Supporting Evidence of NWS Record	The source of evidence supporting the record of NWS infestation in wildlife, including anecdotal verbal reports, personal communication, visual identification of infected wounds, and laboratory morphological identification of NWS larvae.
Topics	The topics assigned for the articles included North America, South America, feral domestic animal, captive mammal, free-ranging mammal, captive bird, free-ranging bird, peridomestic, intraspecies aggression, and free-ranging wildlife.
Year (published)	The year the article was published.

Table 2. Wild and free-ranging animal species with records of New World screwworm (*Cochliomyia hominivorax*) infestation documented with laboratory confirmation, visual inspection, or secondary reports.

Species[1]	Scientific name	Class	Setting	Detection method	Number of articles with records of infestation
Key Deer[2]	*Odocoileus virginianus clavium*	Mammalia	Free-ranging	Laboratory	3
Common opossum	*Didelphis marsupialis*	Mammalia	Free-ranging	Laboratory, Secondary[3]	2
Feral cat	*Felis catus*	Mammalia	Free-ranging	Laboratory	2
Wild boar	*Sus scrofa*	Mammalia	Free-ranging	Laboratory	2
Mountain tapir	*Tapirus pinchaque*	Mammalia	Free-ranging	Laboratory	2
Racoon	*Procyon lotor*	Mammalia	Free-ranging	Laboratory, Secondary	2
Brazilian porcupine	*Coendou prehensilis*	Mammalia	Free-ranging	Laboratory	1
Fallow deer	*Dama dama*	Mammalia	Captive	Laboratory	1
Giant otter	*Pteronura brasiliensis*	Mammalia	Free-ranging	Laboratory	1
Gracile mouse opossum	*Gracilinanus* sp.	Mammalia	Free-ranging	Laboratory	1
Lesser grison	*Galictis cuja*	Mammalia	Free-ranging	Laboratory	1
Maned wolf	*Chrysocyon brachyurus*	Mammalia	Free-ranging, Captive	Laboratory	1
Spiny tree porcupine	*Coendou spinosus*	Mammalia	Free-ranging	Laboratory	1
Ocelot	*Leopardus pardalis*	Mammalia	Captive	Laboratory	1
Ostrich	*Struthio camelus*	Aves	Captive	Laboratory	1
Pampas deer	*Ozotoceros bezoarticus*	Mammalia	Captive	Laboratory	1
Western red deer	*Cervus elaphus*	Mammalia	Captive	Laboratory	1
Greater rhea	*Rhea americana*	Aves	Captive	Laboratory	1
White-eared opossum	*Didelphis albiventris*	Mammalia	Free-ranging	Laboratory	1
White-tailed deer	*Odocoileus virginianus*	Mammalia	Free-ranging	Visual, secondary	2
Baird's tapir	*Tapirus bairdii*	Mammalia	Free-ranging	Visual	1
Hippopotamus	*Hippopotamus amphibius*	Mammalia	Captive	Visual	1
Puma	*Puma concolor*	Mammalia	Free-ranging	Visual	1
Eastern cottontail rabbit	*Sylvilagus floridanus*	Mammalia	Free-ranging	Visual	1
Texas jackrabbit	*Lepus californicus texianus*	Mammalia	Free-ranging	Visual	1
Virginia opossum	*Didelphis virginiana*	Mammalia	Free-ranging	Visual, secondary	1
Colombian red howler	*Alouatta caraya*	Mammalia	Unknown	Secondary	2
Brown-throated sloth	*Bradypus variegatus*	Mammalia	Unknown	Secondary	1
Egret	*Egretta* sp.	Aves	Unknown	Secondary	1
Kinkajou	*Potos flavus*	Mammalia	Unknown	Secondary	1
New World Porcupine	*Coendou* sp.	Mammalia	Unknown	Secondary	1
Pronghorn	*Antilocapra americana*	Mammalia	Free-ranging	Secondary	1
Roadside Hawk	*Rupornis magnirostris*	Aves	Free-ranging	Secondary	1
White-faced saki	*Pithecia pithecia*	Mammalia	Free-ranging	Secondary	1
Three-toed sloth	*Bradypus* sp.	Mammalia	Unknown	Secondary	1
Two-toed sloth	*Choloepus* sp.	Mammalia	Unknown	Secondary	1

[1]Common and scientific name are recognized valid names from the Integrated Taxonomic Information System (www.itis.gov; retrieved February26, 2026). Names as reported are included in the article summaries.

[2]Records of New World screwworm infestation in key deer were from reports of the same 2016–17 outbreak.

[3]Secondary reports include personal communications, media reports, agency reports, and social media that did not present primary evidence of visual or laboratory confirmation. Review articles where the primary sources were available are not included in the count of articles.

Article Summaries

Central America and Mexico

Citation: Keatts, L., Guerra, L., Radachowsky, J., Rojas-Jiménez, J., Garcia-Anleu, R., Pérez-Flores, J., Walzer, C., and Montecino-Latorre, D., 2025, Illegal cattle trade brings New World Screwworm to wildlife and continues to destroy protected areas in Mesoamerica: EcoEvoRxiv, 22 p.

DOI: https://doi.org/10.32942/X2K05S

Background: New World screwworm is endemic in South America and affects animals and humans. NWS was eradicated from Central America north of the Darién Gap, Panama, in 2006, but recently has spread north through Central America into Mexico. This article details instances of NWS infestation in a multitude of wildlife species with varying captivity statuses.

Objectives: The authors sought to document and summarize the linkage between illegal cattle trading and the spread of NWS.

Methods: Monitoring of Baird's tapirs (*Tapirus bairdii*) with veterinary exams using camera traps and subsequent capture. Visual identification from camera traps in non-tapir species opportunistically photographed. A literature review of official and unofficial sources documenting NWS infestation in wild species of Central America.

Location: Central America and Mexico

Findings:

- Four Baird's tapirs (*T. bairdii*) and two Puma (*Puma concolor*) were detected with suspected NWS infestation from camera traps in Guatemala.
- Subsequent capture and veterinary treatment confirmed NWS in the four Baird's tapir.
- Cases of NWS infestation from online government surveillance reports included the following:
    - Panama: New world porcupine (*Coendou* sp.), sloth (unidentified taxa), kinkajou (*Potos flavus*), and deer (unidentified taxa). The captivity status of these animals is unknown.
    - Costa Rica: Brown-throated sloth (*Bradypus variegatus*).
    - Guatemala: Common opossum (*Didelphis marsupialis*).
    - Mexico: Roadside Hawk (*Rupornis magnirostris*).
- Cases of NWS infestation from non-official sources (social media, news articles) included the following:
    - Costa Rica: three-toed sloth (*Bradypus* sp.; species not identified), two-toed sloth (*Choloepus* sp.; species not identified), howler monkey (*Alouatta* sp.; species not identified), and New World porcupine (*Coendou* sp.; species not identified). Captivity status unknown.
    - Honduras: Egret (*Egretta* sp.; species not identified), captivity status unknown.
    - El Salvador: deer (no taxa reported), raccoon (*Procyon lotor*), and birds (no taxa reported). Captivity status unknown.
    - Guatemala: Free-ranging common opossum (*Didelphis marsupialis*)
    - Belize: howler monkey (*Alouatta* sp.; species not identified) of unknown captivity status.
    - Mexico: deer (*Capreolinae* sp.; species not identified), unknown captivity status.

Implications:

- Many species of wildlife are susceptible to NWS infestation.
- Article note: this is a non-peer reviewed pre-print.

Supporting Evidence for NWS record: Visual identification of larvae, literature review, personal communication, social media posts, health department reports, and radio broadcasts.

Topics: North America, Central America, free-ranging mammal, captive mammal

Year (published): 2025

South America

Citation: Almeida, M.A.O., Duarte, L.de.-F.C., Rocha, J.da.-S., Silva, M.S., Guimarães, J.E., and Ayres, M.C., 2008, Ocorrência de ectoparasitos em avestruzes (*Struthio camelus*) criadas no semi-árido baiano [Occurence of ectoparasites in ostriches (Struthio camelus) reared in semi-arid region of Bahia]: Revista Brasileira Parasitologia Veterinária, v. 17, no. 3, p. 155–157.

DOI: https://doi.org/10.1590/s1984-29612008000300007

Background: Ostrich (*Struthio camelus*) farming is a popular business in Brazil, but the presence of ectoparasites can damage the health of ostrich flocks and materials made from ostrich parts. This paper describes the results of a survey of ostrich farms to determine the economic impact of ectoparasites on ostrich farms, containing ostriches used as livestock.

Objectives: The authors sought to identify species of ectoparasites in ostrich flocks.

Methods: Random collection of feathers and collection of larvae from myiasis.

Location: Bahia, Brazil
Findings:

- NWS was detected in 1 flock out of 19 surveyed.
- One ostrich in the flock was infected with NWS larvae and infection was associated with wounds from pecking. The number of animals in each flock was not reported.

Implications:

- Animals that have higher levels of contact with other animals that carry NWS may be more likely to come into contact with NWS.
- Animals that engage in intraspecific aggression may have a higher potential to be infested with NWS.

Supporting Evidence for NWS record: Laboratory identification of collected NWS.
Topics: Captive bird, South America
Year (published): 2008

Citation: Altuna, M., Hickner P.V., Castro, G., Mirazo, S., Peréz de León, A.A., and Arp, A.P., 2021, New World screwworm (*Cochliomyia hominivorax*) myiasis in feral swine of Uruguay—One health and transboundary disease implications: Parasites & Vectors, v. 14, no. 26, p. 1–9.
DOI: https://doi.org/10.1186/s13071-020-04499-z
Background: Feral swine (wild boar; *Sus scrofa*) can carry many parasites and diseases that threaten animal and human health, which makes them a One Health concern. Myiasis from screwworm infestation in South America is also a One Health concern. Feral swine are a highly invasive pest in South America that live throughout the NWS endemic range, but there is little information about their relationship with each other.
Objectives: Researchers sought to determine the prevalence and geographic location of NWS infestation in feral swine in Uruguay.
Methods: Testing and identification of larvae collected from hunted feral swine with myiasis from northern Uruguay between May 2017 and April 2020.
Location: Northern Uruguay
Findings:

- 27 of 618 captured feral swine were infested with NWS larvae.
- NWS infestation was more common in large adult male feral swine than in any other type of swine.
- Most wounds that resulted in myiasis came from fighting between male feral swine.
- Some wounds that resulted in myiasis came from non-lethal bullet wounds.
- The prevalence of myiasis varied from month to month, but the number of harvested swine was consistent.
- Cases of myiasis were highest in the spring and lowest in the winter. The number of NWS cases in feral swine increased significantly with increasing average monthly high temperatures.
- Feral swine showed no sign of severe morbidity from myiasis.
- The number of NWS myiasis cases in feral swine was not correlated with monthly precipitation values.

Implications:

- Feral swine are competent hosts for NWS infestation.
- Feral swine could spread NWS across borders because of their high mobility. They have the potential to reintroduce NWS into areas where they have been previously eradicated and spread them into new areas entirely.
- Feral swine may be resilient to morbidity from NWS infestation.
- Wildlife surveillance of NWS in feral swine could be a useful addition to existing NWS control programs.
- Global warming and climate change could alter the seasonal prevalence of NWS infestations in feral swine.

Supporting Evidence for NWS record: Laboratory identification of larvae sampled from wounds of boar.
Topics: Intraspecies aggression, free-ranging mammal, South America
Year (published): 2021

Citation: Cansi, E., Bonorino, R., Mustafa, V.S., and Geudes, K.M.R., 2012, Multiple parasitism in wild maned wolf (*Chrysocyon brachyurus*, Mammalia: Canidae) in Central Brazil: Comparative Clinical Pathology, v. 21, p. 489–493.
DOI: https://doi.org/10.1007/s00580-012-1513-7
Background: Maned wolves (*Chrysocyon brachyurus*) are a near-threatened species that live in the Neotropical region of South America. Wild and captive maned wolves are susceptible to many parasites, but there are no prior published data documenting parasite co-infections in maned wolves. This paper describes the first detection of parasite co-infection in a wild maned wolf in Brazil.

Objectives: Identify parasites in a recently deceased maned wolf found in a section of fragmented Cerrado habitat near an urban area.

Methods: Laboratory identification of multiple parasites after necropsy.

Location: Brasilia, Brazil

Findings:

- The maned wolf was infested with NWS, ticks, a haemoparasite, and two nematodes.

Implications:

- Injured animals may be more susceptible to parasitism.
- Wild animals that live in areas surrounded by urban areas may be more susceptible to parasitism if there is a lack of wild hosts for parasites.

Supporting Evidence for NWS record: Post-mortem laboratory identification of NWS.

Topics: Peridomestic, free-ranging mammal, South America

Year (published): 2012

Citation: Cansi, E., 2011, Caracterização das miíases em animais nas cidades de Brasília (Distrito Federal) e Formosa (Goiás): Universidade de Brasília, Instituto de Biologia, Graduate Thesis, p. 42–64.

DOI: None, but can be accessed at https://repositorio.unb.br/handle/10482/8659 as of February 2026.

Background: Myiasis is a common problem with ectoparasites in domestic, exotic, and wild animals in captivity in Brazil. This thesis describes recorded cases of NWS myiasis in domestic and captive wild animals in 2009 and 2010 in Formosa and the Federal District of Brazil (chapters 3 and 7).

Objectives: The author sought to (1) quantify cases of myiasis and (2) identify factors that led to myiasis in infested animals.

Methods: Cases of myiasis were recorded in companion animals (dogs and cats), production animals (dairy and beef cattle), captive exotic animals, and wild animals in Formosa and the Federal District of Brazil in 2009 and 2010. For companion animals, veterinary clinics were asked to submit the larvae when treating cases of myiasis. In livestock, five cattle production farms were monitored for 1 year; these farms also included subsistence and recreational production of sheep, horses, pigs, donkeys, and poultry. For wild and exotic animals, the study was conducted at the Brasília Zoo and at a breeding facility for wild and exotic birds in the Federal District. In addition, free-living rodents and marsupials were captured using Sherman live traps. In all cases, larvae were collected, and the same identification procedures were performed in the laboratory.

Location: Brazil

Findings:

- The highest occurrence of NWS myiasis cases in companion animals was from March to May, during the rainy season. The number examined was not reported.
- There were 37 cases of NWS in pet dogs, most in adults, and it was more common in male purebred dogs.
- There was 1 case of NWS myiasis in a cat.
- There were 14 NWS cases in livestock, mostly from February to April. Most cases were in cattle bred for dairy purposes, mostly affecting the hind limbs in calves and females.
- In captive wild animals, 8 NWS cases were observed. The species infested included the following:
  - Western red deer (*Cervus elaphus*)
  - Maned wolf (*Chrysocyon brachyurus*)
  - Fallow deer (*Dama dama*)
  - Pampas deer (*Ozotoceros bezoarticus*)
  - Greater rhea (*Rhea american*)
- No findings of NWS in wild caught rodents and marsupials.
- One live maned wolf was captured with NWS myiasis in the Cerrado region of Brasília.

Implications:

- Introducing new species into Brazilian zoos can create new niches for NWS.
- Animals in zoos that have lower-quality sanitary management and behavioral practices may be at a higher risk of NWS infestation.

Supporting Evidence for NWS record: Laboratory identification of larvae and adult NWS

Topics: Captive mammal, captive bird, free-ranging mammal, free-ranging bird, South America

Year (published): 2011

Citation: Cepeda-Duque, J., Cano-González, L., Elejalde, G., Mantilla, J., Álvarez-Arellano, D., Gómez-Salazar, J., Rodríguez, V., Lizcano, D.J., Cortés-Vecino, J.A., Faccini-Martínez, A.A., Martins, T.F., Owens, J., Davis-Powell, J., Dadone, L., Galvis, C., Pukazhenthi, B.S., and Vélez, J., 2025, New World screwworm infestation in wild mountain tapirs, Central Andes Mountains, Colombia: Emerging Infectious Diseases, v. 31, no. 9, p. 1871–1874.

DOI: https://doi.org/10.3201/eid3109.250339

Background: NWS is an obligate parasite that depends on a living host for larval development. Although NWS has been eradicated from Central and North America, the screwworm is endemic to South America, meaning the threat of reintroduction to these locations is constant. The effect of NWS on threatened wildlife remains poorly understood.

Objectives: To document cases of NWS myiasis in wild mountain tapirs (*Tapirus pinchaque*).

Methods: Opportunistic collection of larvae while monitoring the health of free-ranging tapirs.

Location: Ucumari Regional Natural Park, Central Andes Mountains, Colombia

Findings:

- 2 NWS larvae were found in one adult female mountain tapir.
- 20 NWS larvae were found in one adult male mountain tapir.
- The NWS larvae were found in open wounds on the hind leg of both tapirs.
- A literature review found recorded infestations in other threatened neotropical mammals including giant armadillo (*Priodontes maximus*), maned wolf (*Chrysocyon brachyurus*), jaguar (*Panthera onca*), giant anteater (*Myrmecophaga tridactyla*), lowland tapir (South America tapir; *Tapirus terrestris*), and giant otter (*Pteronura brasiliensis*).

Implications:

- Threatened mammals in the Central Andes may include clouded tiger-cat (*Leopardus pardinoides*), little red brocket (*Mazama rufina*), northern pudu (*Pudu mephistophiles*), Andean bear (*Tremarctos ornatus*), mountain coati (*Nasua olivacea*), and Andean squirrel (*Sciurus pucheranii*) based on documented presence in study area and previous documentation of NWS infection.
- To mitigate risk to wildlife, the authors suggest implementing a biocontrol program similar to that done in North and Central America to eradicate NWS.
- Intraspecific aggression may contribute to the development of wounds in tapirs that can be infested by NWS.
- NWS infestation could be a concern for the health and status of animals with low reproductive rates and population sizes under conservation efforts.

Supporting Evidence for Wildlife Exposure: Laboratory identification, literature citations

Topics: Free-ranging mammal, South America, intraspecies aggression

Year (published): 2025

Citation: Costa-Júnior, L.M., Chaves, D.P., Brito, D.R.B., dos Santos, V.A.F., Costa-Júnior, H.N., and Barros, A.T.M., 2019, A review on the occurrence of *Cochliomyia hominivorax* (Diptera: Calliphoridae) in Brazil: Brazilian Journal of Veterinary Parasitology, v. 28, no. 4, p. 548–562.

DOI: https://doi.org/10.1590/S1984-29612019059

Background: NWS causes myiasis throughout the Americas. In Brazil, it is most commonly found in cattle, and especially in newborn calves. Even though NWS is present across Brazil, there is little information available about its distribution within the country and prevalence in different hosts.

Objectives: Researchers sought to (1) collect an organized record of papers describing the current and historical distribution of NWS in Brazil, and (2) review and summarize current and historical cases of immature and adult stages of NWS.

Methods: Literature review of technical and scientific publications (for example, case reports, field studies, and trapping studies) about NWS infestation in several hosts through internet database searches and collection of information from field professionals.

Location: Brazil

Findings:

- Researchers reviewed more than 200 articles ranging in publication date from 1875 to 2017.
- NWS was geographically distributed across Brazil, primarily in cattle.
- NWS was the most common reason reported for myiasis in domestic animals.
- Most articles focused on NWS infestation in people or cattle, but there were some records of other hosts.
- Domestic hosts other than cows and humans were dogs, cats, horses, buffalo, donkeys, rabbits, pigs, goats, and sheep.
- Records of wild and captive wild species included maned wolf (*Chrysocyon brachyurus*), hippopotamus (*Hippopotamus amphibius*), common opossum (*Didelphis marsupialis*), lesser grison (*Galictis cuja*), and ostrich (*Struthio camelus*).

- Researchers found a significant number of records of myiasis in small ruminants in Brazil without identification of the parasite.

Implications:

- NWS carries social and economic importance owing to its effect on human and animal health.
- There is little information about NWS myiasis in wildlife available in the literature, which is likely due to under-observation of the parasite.
- More studies are needed to focus specifically on NWS infestation in wildlife to establish its host and geographic distribution in Brazil.

Supporting Evidence for NWS record: Secondary references, no primary data.

Topics: South America, free-ranging mammal, free-ranging bird, captive mammal, captive bird

Year (published): 2019

Citation: de Souza, C.P., Verocai, G.G., and Ramadinha, R.H., 2010, Myiasis caused by the New World screwworm fly *Cochliomyia hominivorax* (Diptera: Calliphoridae) in cats from Brazil—Report of five cases: Journal of Feline Medicine and Surgery, v. 12, no. 2, p. 166–168.

DOI: https://doi.org/10.1016/j.jfms.2009.08.003

Background: NWS can have a big impact on animal and human health. NWS invades existing wounds and can cause serious damage to living tissues. Minor infestations are often easy to treat, but more invasive ones often lead to death. Ivermectin, pyrethrin, and pyrethroid sprays can be used to treat infestations in small animals.

Objectives: The authors sought to document cases of NWS infestation in three feral domestic cats (*Felis catus*) brought to a veterinary clinic in Brazil.

Methods: Laboratory identification of larvae removed from feral cats with serious wounds and myiasis.

Location: Rio de Janeiro, Brazil

Findings:

- The first feral cat had myiasis in its fractured left leg.
- The second feral cat had lesions with myiasis in its right front leg.
- The third feral cat had lesions and myiasis on the left side of its neck and face.
- All three of the feral cats were male and not neutered.

Implications:

- Use of nitenpyram could help with larval expulsion in small animals.

Supporting Evidence for NWS record: Laboratory identification.

Topics: South America, feral domestic mammal

Year (published): 2010

Citation: dos Santos Pinto, M., Florentino, B.F., Gonçalves, Y.B.C., Neto, J.A.B.C., de Souza Sapatera, N., Wingter, G.B., Leite, V.F. Nakamura, A.A., Rozza, D.B., Lucheis, S.B., and Bresciani, K.D.S., 2024, Parasitic fauna of wild boars (*Sus scrofa*) from the northwestern region of São Paulo state, Brazil: Parasitology Research, v. 123, p. 369.

DOI: https://doi.org/10.1007/s00436-024-08392-x

Background: Wild boar (*Sus scrofa*) is an invasive species in Brazil that causes economic and environmental damage. In addition, they have no natural predators to limit their numbers. Research into wild boar is limited, and this study investigated the types of parasites that occur in wild boar.

Objectives: To identify endoparasites and ectoparasites that occur in wild boar.

Methods: Laboratory identification of NWS samples collected from sections of harvested wild boar.

Location: São Paulo, Brazil

Findings:

- 3 of the 30 wild boar had NWS infestations.
- There was no significant difference in NWS infestation by sex of wild boar.

Implications:

- Wild boar can be infested by NWS.

Supporting Evidence for NWS record: Post-mortem laboratory identification

Topics: South America, free-ranging mammal

Year (published): 2024

Citation: Figueiredo, M., Santos, A.C.G., Guerra, R.M.S.N., 2010, Ectoparasites of wild animals in Maranhão: Pesquisa Veterinária Brasileira, v. 30, no. 11, p. 988–990.

DOI: https://doi.org/10.1590/S0100-736X2010001100013

Background: There are many programs and research initiatives in Brazil that work to preserve the area's biodiversity, and studying parasites in wild animals is an important part of conservation and preservation.

Objectives: The author sought to identify the ectoparasites of wild animals received by the Wildlife Screening Center (Centros de Triagem de Animais Silvestres) in São Luís, Maranhão, Brazil.

Methods: Examination of ectoparasites in animals seized by Forest Police officers, firefighters, and the general population from August 2006 to July 2008. Centros de Triagem de Animais Silvestres serves as a management and screening center for wild animals.

Location: Maranhão, Brazil

Findings:

- One of 2 lesser grisons (*Galictis cuja*) examined had NWS larvae in a skin lesion.
- The authors also examined 2 striated herons (*Butorides striata*), 24 white-faced whistling ducks (*Dendrocygna viduata*), 10 black-bellied whistling ducks (*Dendrocygna autumnalis*), 3 royal terns (*Thalasseus maximus*), 1 southern tamandua (*Tamandua tetradactyla*), 8 South American coatis (*Nasua nasua*), 3 crab-eating foxes (*Cerdocyon thous*), 1 green iguana (*Iguana iguana*), and 7 boa constrictors (*Boa constrictor*) and did not detect NWS infection.

Implications:

- NWS can infest lesser grisons.

Supporting Evidence for NWS record: Laboratory identification of NWS.

Topics: South America, free-ranging mammal

Year (published): 2010

Citation: Foerster, N., Soresini, G., Paiva, F., Silva, F.A.D., Leuchtenberger, C., and Mourão, G., 2022, First report of myiasis caused by Cochliomyia hominivorax in free-ranging giant otter (*Pteronura brasiliensis*): Brazilian Journal of Veterinary Parasitology, v. 31, no. 4, e009522.

DOI: https://doi.org/10.1590/S1984-29612022058

Background: Giant otters (*Pteronura brasiliensis*) commonly fight with other otters, which can result in wounds and scars, but infestation by ectoparasites is rare. Previous documentation of myiasis in river otters has existed, but information about NWS is limited. This report documents the presence of NWS in a free-ranging, wild giant otter.

Objectives: To document the cause of death and presence of disease in a dead giant otter.

Methods: Necropsy and laboratory classification of larvae found in myiasis of a dead giant otter.

Location: Mato Grosso do Sul, Brazil

Findings:

- Researchers identified the larvae collected from the giant otter as NWS.
- The larvae most likely infested a wound site in the otter that developed after an injury or altercation.

Implications:

- NWS myiasis may worsen animal health and make them more susceptible to death.
- NWS infestation could have concerning conservation implications if it can impact other forms of endangered wildlife.
- More research is needed on parasite-wildlife interactions to obtain a better idea of how often NWS infestation occurs and which endangered species could be most at risk.

Supporting Evidence for NWS record: Post-mortem laboratory identification of NWS.

Topics: South America, free-ranging mammal

Year (published): 2022

Citation: Lacey, L.A., and George, T.K., 1981, Myiasis in an Amazonian porcupine: Entomological News, v. 92, no. 2, p. 79-80

DOI: None but available at https://dn710108.ca.archive.org/0/items/biostor-77199/biostor-77199.pdf

Background: A moribund Brazilian porcupine (*Coendou prehensilis*; named Amazonian porcupine in the article) was found during a survey of animals in the Amazon National Park. The individual has severe myiasis in nasal tissue, one eye, and scalp.

Objectives: To document the cause of severe myiasis in the Brazilian porcupine.

Methods: Necropsy and laboratory classification of larvae found in the infestation.

Location: Amazon National Park, Tapajós, Brazil

Findings:

- The myiasis was so severe most of the rostrum was consumed, one eye was destroyed, myiasis in the scalp extended to the skull, and there was a strong smell of rotting meat.
- NWS larvae were abundant and larvae of a fly that usually develops in dead animals (*Sacrophaga* sp.) were also abundant.

Implications:

- NWS myiasis may lead to severe health outcomes and death when untreated.
- Other fly species that normally develop in dead animals may also be present where NWS infestation causes severe myiasis.

Supporting Evidence for NWS record: Post-mortem laboratory identification of NWS.

Topics: South America, free-ranging mammal

Year (published): 1981

Citation: Mendes-de-Almeida, F., Labarthe, N., Guerrero, J., Landau-Remy, G., Rodrigues, D.P., Borja, G.E.M., Pereira, M.J.S., 2007, *Cochliomyia hominivorax* myiasis in a colony of stray cats (*Felis catus* Linnaeus, 1758) in Rio de Janeiro, RJ: Veterinary Parasitology, v. 146, p. 376–378.

DOI: https://doi.org/10.1016/j.vetpar.2007.02.021

Background: Stray or feral domestic cats (*Felis catus*) are highly susceptible to a range of visible infestations and parasites, including fleas, lice, and scabies, but other, more hidden parasites are harder to observe (for example, ticks and fly larvae). NWS is known to oviposit in fresh wounds from accidents or fights (which are both common in feral domestic cats), and myiasis is commonly reported in livestock and dogs in the Americas, but there is no existing literature describing the burden of NWS in feral domestic cats.

Objectives: Researchers sought to identify the prevalence of NWS infestation in stray, feral domestic cats in Rio de Janeiro.

Methods: Surveillance of a colony of stray, feral domestic cats that were spayed and neutered and monitored by periodic capture and veterinary exam for 4 years for the presence of fly larvae.

Location: Rio de Janeiro, Brazil

Findings:

- 12.5 percent of the cat colony developed NWS infestation between 2001 and 2005.
- Only adult cats had NWS infestations.
- Infestation with NWS was more common in male cats.
- Infestation with NWS was found in the face, neck, tail, abdomen, foreleg, ear, and oral cavity of cats.
- Myiasis infestation in stray, feral domestic cats was associated with feline immunodeficiency virus infection.

Implications:

- Infestation with NWS could be encouraged by wounds in cats from fighting.
- Veterinary workers should warn customers about letting their pets interact with stray cats to reduce the chance of spreading NWS infestations.

Supporting Evidence for NWS record: Laboratory identification of NWS larvae after removal from wounds.

Topics: South America, feral domestic mammal, peridomestic

Year (published): 2007

Citation: Mantilla-Meluk, H., Mosquera-Guerra, F., Reyes Amaya, N.R., Sánchez-Alzate, L.J., Nova-León, L., Vargas-Arboleda, A.F., Valencia Zapata, D.C., Avella Castiblanco, G.C., Quintero, P., Bohórquez, J., Bejarano Rodríguez, V., Sanz, M., and Hernández Marín, S., 2025, One Health against the extinction of the mountain tapir (*Tapirus pinchaque*) in the Central Andes of Colombia: CABI One Health, v. 4, no. 1, p. 1–17.

DOI: https://doi.org/10.1079/cabionehealth.2025.0031

Background: The mountain tapir (*Tapirus pinchaque*) is an endangered species that lives in Colombia. The health of mountain tapirs is threatened by myiasis from NWS. Colombia has committed to using a One Health approach to protect tapirs from cattle screwworm flies through spatial analysis, mathematical modeling, and incorporating community participatory science for additional surveillance.

Objectives: The authors reviewed conservation management of zoonotic and epizootic diseases impacting mountain tapirs and evaluated the demographic impact that NWS-caused mortality could have on mountain tapir populations.

Methods: Participatory science network of scientists, community members, and natural resources managers documenting visual evidence of myiasis in mountain tapirs. Simulation modeling of population dynamics.

Location: Colombia

Findings:

- There were nine cases of myiasis in tapirs between 2021 and 2024, assumed to be NWS, with 8 out of 9 associated with confirmed mortality.
- Modeling shows that the combination of hunting, habitat loss, and myiasis will, in time, likely lead to the extinction of mountain tapirs.
- Habitat reduction and climate change have a major impact on increasing favorable conditions for NWS to threaten tapirs.
- Increasing temperatures in highland systems may drive cases of NWS infestation in tapirs in Colombia.

Implications:

- NWS infestation plays a significant role in wildlife health and can contribute to the threat of extinction for endangered species.

Supporting Evidence for NWS record: Visual identification

Topics: Free-ranging mammal, South America

Year (published): 2025

Citation: Pulgar, E., Quijada, J., Bethencourt, A., and Moissant de Román, E., 2009, Reporte de un caso de miasis por *Cochliomyia hominivorax* (Coquerel, 1858) (Diptera: Calliphoridae) en un cunaguaro (*Leopardus pardalis*, Linnaeus, 1758) en cautiverio tratado con Doramectina [Doramectin treatment of myiasis by *Cochliomyia hominivorax* in a captive ocelot (*Leopardus pardalis*)—A case report]: Entomotropica, v. 24 no. 3, p. 129–133.

DOI: None but can be accessed at https://www.researchgate.net/publication/277105430_Reporte_de_un_caso_de_miasis_por_Cochliomyia_hominivorax_Coquerel_1858_Diptera_Calliphoridae_en_un_cunaguaro_Leopardus_pardalis_Linnaeus_1758_en_cautiverio_tratado_con_Doramectina

Background: A captive ocelot (*Leopardus pardalis*) was observed with a wound and limp in its forelimb from an injury sustained in its enclosure. The wound was complicated by the myiasis.

Objectives: The authors described the case presentation and treatment of the myiasis.

Methods: Veterinarians at the zoo sedated and manually removed larvae of NWS from the wound. The ocelot was treated with a subcutaneous dose of doramectin.

Location: Venezuela

Findings:

- 35 NWS larvae were removed from the wound.
- There was no further infestation as the wound healed.

Implications:

- Doramectin may be an effective preventive treatment where sensitive species can be captured.

Supporting Evidence for NWS record: Laboratory identification

Topics: Captive mammal, South America

Year (published): 2009

Citation: Reis, F.S., Barros, M.C., Fraga, E.,daC., da Penha, T.A., Teixeira, W.C., dos Santos, A.C., and Guerra, R.M.S.N., 2008, Ectoparasitos de pequenos mamíferos silvestres de áreas adjacentes ao rio Itapecuru e área de preservação ambiental do Inhamum, Estado do Maranhão, Brasil [Ectoparasites of small wild mammals from the adjacent areas of Itapecuru River and Environmental Preservation Area of Inhamum, state of Maranhão, Brazil]: Revista Brasiliera De Parasitologia Veterinaria, v. 17, supp. 1, p. 69–74.

DOI: None but can be accessed at https://www.redalyc.org/pdf/3978/397841469014.pdf as of February 2026.

Background: Small mammals serve as hosts for a variety of ectoparasites and these ectoparasites can have direct impact on animal health, as well as serve as vectors for pathogens that can be transmitted among wild animals, domestic animals, and humans.

Objectives: To survey ectoparasites of small non-flying wild mammals in the Brazilian state of Maranhão and areas and environmental preserves adjacent to the Itapecuru River.

Methods: Capture of small mammals, visual inspection for ectoparasite, and collection of ectoparasite for laboratory identification.

Location: Maranhão State, Brazil

Findings:

- 36 small mammal species were collected and the most common and abundant ectoparasites were mites.
- NWS infestations were detected in a common opossum (*Didelphis marsupialis*) and a Gracile mouse opossum (*Gracilinanus* sp.) not identified to species.

Implications:

- Small mammals can host infestations of NWS.
- Parasitism by NWS was not as common as many other ectoparasites in the community of small mammals sampled in this study.

Supporting Evidence for NWS record: Laboratory identification of larvae

Topics: free-ranging mammal, South America

Year (published): 2008

Citation: Ramos, R.V., Mendes, T.M.F., Hoppe, E.L., Barros-Battesti, D.M., Ueta M.T., and Allegretti, S.M., 2024, Parasite infestations and infections of non-traditional pets and wild mammals: diagnosis and treatment: Brazilian Journal of Veterinary Parasitology, v. 33, no. 4, p. 1–9.

DOI: https://doi.org/10.1590/S1984-29612024074

Background: Mammals can serve as hosts for a range of parasites. Usually, parasites do not cause negative effects on health, but some of them can. Negative effects of parasites are more common when conditions in a larger environment or ecosystem also cause stress to the parasite hosts. The illegal trade of wild animals has a large, worldwide market and can have impacts on local biodiversity.

Objectives: Researchers sought to develop a deeper understanding of parasites that affect exotic animals kept as pets.

Methods: Collection and analysis of samples taken from wild and pet mammals seen at a local veterinary clinic in São Paolo, Brazil, between January 2017 and December 2019. Researchers performed necropsies on animals that died in the clinic or arrived deceased.

Location: São Paolo, Brazil

Findings:

- NWS infested 1 out of 15 examined wild white-eared opossum (*Didelphis albiventris*)
- NWS infested 1 out of 2 examined wild porcupine (orange-spined hairy dwarf porcupine [*Coendou spinosus*]; species name reported as *Sphiggurus villosus*).
- The infested opossum did not show physical damage other than infestation by NWS.
- The study also examined 23 free-ranging southern black-eared opossums (*D. aurita*), 3 free-ranging capybaras (*Hydrochoerus hydrochaeris*), 4 captive pet domestic ferrets (*Mustela putorius furo*), and 8 captive pet four-toed hedgehogs (*Atelerix albiventris*) and did not detect NWS.
- Most of the animals studied had parasites. Ectoparasites (ticks, mites, fleas, larvae) and helminths (nematodes, acanthocephalans) were the most common.

Implications:

- NWS may have contributed significantly to the death of the opossum, which is not common for other hosts with NWS.
- Introducing exotic animals as pets into new areas can increase the risk of parasite spread, which can harm local species.
- Exotic pets may pose a risk to the health of other more conventional pets.

Supporting Evidence for NWS record: Confirmed via post-mortem laboratory identification of NWS.

Topics: South America, captive mammal, free-ranging mammal

Year (published): 2024

Citation: Rossi Junior, J.L., Guião-Leite, F.L., Gioso, M.A., Falqueiro, L.M.D., and Fecchio, R.S., 2009, Oral myiasis in a captive hippopotamus: Journal of Veterinary Dentistry, v. 26, no. 3, p. 168–170.

DOI: https://doi.org/10.1177/089875640902600304

Background: Oral infections in animals can occur from dental diseases, abrasion, and injuries, but oral myiasis in zoo and wild animals is rare. Hippopotamuses (*Hippopotamus amphibius*) are common animals in zoos and can develop dental issues with age. They can also develop dental wounds from injuries after using their teeth in confrontations.

Objectives: The authors documented a case of myiasis in a captive hippopotamus.

Methods: Physical examination of a hippopotamus after traumatic injury.

Location: Brazil

Findings:

- The hippopotamus developed its injury after a traumatic fight with another male hippopotamus.
- 50 fly larvae causing myiasis were removed from the wound. The larvae were assumed to be NWS but not confirmed.

Implications:

- Animals that engage in intraspecific aggression may have a higher risk of developing myiasis from NWS.
- Animals that receive adequate preventive care and are kept clean may have a lower risk of developing myiasis.

Supporting Evidence for NWS record: Visual identification; researchers did not identify the species of larvae.

Topics: South America, captive mammal, intraspecies aggression

Year (published): 2009

Citation: Vié, J., and Richard-Hansen, C., 1997, Primate translocation in French Guiana—A preliminary report: Neotropical Primates, v. 5, no. 1, p. 1–3.

DOI: https://doi.org/10.62015/np.1997.v5.365

Background: A hydroelectric development project flooded a rainforest in French Guiana and stakeholders organized a wildlife translocation effort.

Objectives: To log local species; raise public awareness about conservation; and document the consequences of moving red howlers, golden-handed tamarins, and white-faced sakis to new locations in the rainforest.

Methods: Monitoring translocated animals through visual identification or radio collars.

Location: French Guiana

Findings:

- Two howler monkeys (Colombia red howlers; *Alouatta seniculus*) and one white-faced saki monkey (*Pithecia pithecia*) developed New World screwworm (NWS) infestation under their radio collars that contributed to their deaths.

Implications:

- Threatened species in areas with potential NWS that are monitored through the use of radio collars may be at higher risk of infestation.

Supporting Evidence for NWS record: Personal communication.

Topics: South America, free-ranging mammal

Year (published): 1997

United States

Citation: Bram, R., and George, J., 2000, Introduction of nonindigenous arthropod pests of animals: Journal of Medical Entomology, v. 37, no. 1, p. 1–8.

DOI: https://doi.org/10.1603/0022-2585-37.1.1

Background: There are many ways that nonindigenous insects can enter the United States and affect agriculture and animal health.

Objectives: To document instances of nonindigenous arthropod introductions to the United States.

Methods: A literature review of instances of nonindigenous arthropod introductions to the United States.

Location: United States

Findings:

- Before its eradication from Mexico in 1984, NWS entered the United States many times during the spring season, some of which can be attributed to wildlife crossing the Rio Grande while infested.
- NWS has been intercepted crossing into the United States in 1997 (larvae on dogs) and in 1998 (larvae on a horse and an angora goat).

Implications:

- There are sporadic records of NWS detection from larva infecting livestock and domestic animals entering the United States from NWS endemic areas.
- Wildlife migration was identified as a source of NWS introduction into the United States before eradication in Mexico, although no citations or evidence were presented to characterize this introduction route.

Supporting Evidence for NWS record: Literature review, citations to other articles, and no evidence cited.

Topics: North America, free-ranging wildlife

Year (published): 2000

Citation: Hennessey, M.J., Hsi, D.J., Davis, J.S., Delgado, A.H., Allen, H.A., Jandegian, C.M., Skoda, S.R., Guerena Watts, K., Gibbs, S.E.J., Powell, B., Welch, J.B., Phillips, P.L., Kitchen, D.L., Christy, G.S., and Bonilla, D.L., 2019, Use of a multiagency approach to eradicate New World screwworm flies from Big Pine Key, Florida, following an outbreak of screwworm infestation (September 2016–March 2017): Journal of the American Veterinary Medical Association, v. 255, no. 8, p. 908–914.

DOI: https://doi.org/10.2460/javma.255.8.908

Background: In September 2016, a Key deer (*Odocoileus virginianus clavium*) was confirmed to have an NWS infestation in Big Pine Key, Florida. Federal, State, and local government agencies worked together to respond to, and ultimately, eradicate the outbreak by early 2017.

Objectives: To document the outbreak timeline, epidemiology, and multi-agency response that led to successful elimination of NWS.

Methods: Visual surveillance for live or dead wild animals with subsequent capture, treatment, or euthanasia of severely infected animals. Captive animal inspection at an interdiction station along the single road into and out of the Florida Keys.

Location: Florida Keys and southern Florida, United States

Findings:

- There were 10 confirmed NWS infestations in Key deer and 125 presumptive cases associated with other sources of deer death.
- One wild raccoon was confirmed with an NWS infestation.
- 3 pet dogs, 2 pet cats, and 1 pet pig were confirmed with NWS infestation in the Florida Keys where NWS was documented.
- 1 NWS infestation was confirmed in a pet dog on the southern mainland of Florida.

Implications:

- An estimated 15 percent of the Key deer population died associated with NWS, and NWS myiasis may worsen animal health and make them more susceptible to death.
- Multiple agencies and multiple methods of NWS control were deployed to successfully eradicate NWS.

- The source of introduction into the Florida Keys and into the single mainland NWS case was unknown.

Supporting Evidence for NWS record: laboratory identification of NWS.

Topics: North America, free-ranging mammal, captive mammal

Year (published): 2022

Citation: Lindquist, A., 1937, Myiasis in wild animals in southwestern Texas: Journal of Economic Entomology, v. 30, no. 5, p. 735–740.

DOI: https://doi-org.proxy.library.emory.edu/10.1093/jee/30.5.735

Background: The species causing NWS myiasis was first characterized in 1933. Shortly after, animal health researchers sought to understand it better because it was harming their farm animals. In addition, the large number of adult NWS flies in the area suggested that wild animals might also be infested.

Objectives: The author worked to determine (1) the species of flies responsible for myiasis in wild animals in southwestern Texas, (2) what wild animals are infested by flies in southwestern Texas, (3) the original causes of wounds that become infested, (4) the level of incidence of myiasis, and (5) possible options for controlling cases of myiasis in wild animals.

Methods: Collection of wild animals in southwestern Texas with myiasis throughout 1934–36 and categorization of the type of screwworm with which they were infested. The capture methods and effort were not specified.

Location: Southwestern Texas, United States

Findings:

- Myiasis from NWS was found in Eastern cottontails (*Sylvilagus floridanus*; named as Texas cottontail rabbit), Texas jack rabbit (*Lepus californicus texianus*); Virginia opossum (*Didelphis virginiana*); and white-tailed deer (*Odocoileus virginianus*).
- 12 of 298 Texas cottontail rabbits were infested with NWS larvae.
- 14 of 16 Texas jack rabbits found in May 1936 (all with myiasis of some sort) were infested with NWS. 205 were killed in 1936, and 7 of those were infested with NWS.
- There was one "authentic" record and 2–3 "practically authentic" records of opossums infested with NWS. The criteria for authentic was not provided.
- The author observed four NWS infestations in white-tailed deer but had an additional 80 reports in deer from "ranch people and others."
- The author notes other people have found NWS myiasis in badgers, raccoons, coyotes, armadillos, mountain lions, wildcats, and foxes, but they are not "authentic records."
- Injuries/events that led to a good environment for NWS infestation included boils, accidental injuries, wounds from predators, gunshot wounds, wounds from fighting, wire cuts, ticks, navels at birth (for fawns), genital area during fawning (for deer), and pouches while carrying young (for opossums).
- Each animal had a different propensity for bringing NWS to maturity. The maximum number of larvae found on the animals was as follows: Texas cottontail rabbits serve as home for as many as 300 larvae; Texas jack rabbits could serve as home for as many as 1,000 larvae; opossums could support 400; and deer had as many as 3,000.

Implications:

- Preventive approaches may help control NWS infestation in wild animals.
- The authors suggested humans could reduce activities such as the use of barbed wire fences to reduce common injuries that may lead to infestation by NWS
- Animals that are found with infestation should be treated, and infested carcasses destroyed.

Supporting Evidence for NWS record: Personal communication and visual identification.

Topics: North America, free-ranging mammal

Year (published): 1937

Citation: Nichol, A.A., 1942, Gathering, transplanting, and care of young antelopes: The Journal of Wildlife Management, v. 6, no. 4, p. 281–286.

DOI: None but is available at https://www.jstor.org/stable/3795913

Background: Pronghorn (*Antilocapra americana*) fawns were gathered from grasslands in northern Arizona for translocation.

Objectives: To establish pronghorns within a recreation area in southern Arizona.

Methods: Pronghorn fawns were located visually and hand captured. They were transported to the release site and hand reared until release.

Location: Northern Arizona, United States

Findings:

- One out of 11 fawns died from an NWS infestation. No additional details about the age, location, or severity of the infestation were given.

Implications:

- Pronghorn fawns are susceptible to NWS infestation.

Supporting Evidence for NWS record: No evidence cited

Topics: North America, free-ranging mammal

Year (published): 1942

Citation: Parker, I.D., Lopez, R.R., Silvy, N.J., Pierce, B.L., Watts, K.G., Myers, E.P., Gibbs, S.E.J., Davis, D.S., Beaver, J.T., and Lund, A.A., 2020, Florida key deer abundance and recovery following New World screwworm infestation: Southeastern Naturalist, v. 19, no. 2, p. 179–191.

DOI: https://doi.org/10.1656/058.019.0201

Background: Florida Key deer (*Odocoileus virginianus clavium*) are a federally endangered species that live in the Florida Keys. They have a small population and have been impacted by many anthropogenic factors. In 2016, there was an outbreak of NWS in the Key deer in the Florida Keys.

Objectives: The authors sought to assess the impact of the 2016 NWS infestation on Key deer.

Methods: The authors tracked Key deer mortality using road surveys and radiotelemetry.

Location: Florida, United States

Findings:

- 135 Key deer died from NWS-related causes, either from direct death from infestation or euthanasia owing to infestation.
- The authors estimated that this was 10–20 percent of the population.
- Most Key deer deaths occurred in males because they had open wounds from the mating season.

Implications:

- NWS infestation caused instances of direct mortality for Key deer.
- Animals that engage in aggressive behaviors may be more susceptible to infestation by NWS.

Supporting Evidence for NWS record: Laboratory identification.

Topics: Free-ranging mammal, intraspecies aggression, North America

Year (published): 2020

Citation: Skoda, S.R., Phillips, P.L., and Welch, J.B., 2018, Screwworm (Diptera: Calliphoridae) in the United States—Response to and elimination of the 2016–2017 outbreak in Florida: Journal of Medical Entomology, v. 55, no. 4, p. 777–786.

DOI: https://doi.org/10.1093/jme/tjy049

Background: NWS is not native to Florida but was accidentally introduced to the area in the 1930s. The United States used the sterile insect technique in the 1950s to eradicate NWS from the country. The elimination of NWS in the United States is estimated to have saved more than a billion dollars for the livestock industry, and its return to the United States could bring significant economic damage. In 2016, NWS was reintroduced to the Florida Keys and severely damaged the health of the Key deer population (*Odocoileus virginianus clavium*).

Objectives: The authors sought to document their response to the 2016–17 NWS outbreak in Key deer in the Florida Keys.

Methods: The authors used a range of methods in their response, including NWS sampling with nets and liver traps; deoxyribonucleic acid (DNA) analysis of NWS larvae; and sterile NWS fly release.

Location: Florida, United States

Findings:

- 135 Key deer were euthanized owing to severe myiasis from NWS.
- More than 17,000 animals were inspected at an interdiction station for people leaving the Florida Keys.
- Nearly all cases of myiasis were in male deer who had been injured from bouts of interspecific aggression during mating season.
- Dead animals were placed in an uncontained area to decompose, adding an estimated 32,800 additional NWS into the nearby area.
- Pets, including five dogs, two cats, and two pigs, were also infested.

Implications:

- Disposing of carcasses with NWS without decontaminating them may lead to increased generation of NWS flies in the area.
- Local veterinarians may be important in the timely identification and reporting of new NWS outbreaks.

Supporting Evidence for NWS record: Laboratory identification.

Topics: North America, free-ranging mammal

Year (published): 2018

Citation: Teer, J.G., Thomas, J.W., and Walker, E.A., 1965, Ecology and management of white-tailed deer in the Llano Basin or Texas: Wildlife Monographs, no. 15, p. 3–62.

DOI: None but can be accessed at, https://www.jstor.org/stable/3830491

Background: The authors conducted a 9-year study of the population dynamics, ecology and game management of white-tailed deer (*O. virginianus*) in the Llano Basin of Central Texas.

Objectives: Establish population estimates, study fawn survival and mortality sources, and correlate the population dynamics with ecological and management factors.

Methods: Annual transects for individual counts, characterization of habitat and agriculture, behavioral observations, transects and searches for fawns

Location: Central Texas, United States

Findings:

- NWS screwworm infestations were observed in fawns every year with notably high fawn losses from myiasis in 1955 and 1957.
- Myiasis and starvation were noted as the most important sources of fawn mortality.

Implications:

- The authors attributed low population growth in 1955 and 1957 primarily to NWS infestation and mortality in fawns.
- The heavier infestations in 1955 and 1957 followed warm winters and the authors postulated that there was high overwinter survival of NWS in these years.
- Observation of NWS myiasis in live deer was most common around water sources.
- Visual identification of NWS myiasis was most apparent in live deer that had advanced infestations, likely re-infestation, and a dark exudate discoloring the infestation site.

Supporting Evidence for NWS record: Visual identification

Topics: North America, free-ranging mammal

Year (published): 1965

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Glossary

Infestation Parasitism by larvae of the New World screwworm fly is termed an infestation rather than an infection.

Myiasis The disease state caused by the New World screwworm characterized by the larvae living in and consuming live host tissue.

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