

# A Thorough Quantitative Review of Infectious Diseases of Concern for Peccary Conservation

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## Abstract

Infectious diseases are becoming more prevalent and widespread over the world, posing a threat to biodiversity. Several vanishing episodes of small populations of white-lipped peccaries have been documented in the Amazon region in recent decades. These population catastrophes are still poorly understood, but current evidence shows that infectious illnesses may have had a role. We conducted a rigorous quantitative literature analysis on infectious illnesses affecting suiform species in the Amazon region, assessing current knowledge and identifying peccary health problems. We discovered that data on the health of free-roaming peccaries in the Amazon region is limited, geographically unequal, and primarily cross-sectional. To solve the logistical issue of working in this field, we advocate collaborating with local populations and employing different participatory sampling approaches. Furthermore, we underline the significance of conducting studies with a greater geographical scope and multidisciplinary approaches, particularly in places where white-lipped peccaries had previously disappeared.

**Keywords:** Infectious diseases • Peccary conservation • Geographically unequal

## Introduction

Infectious diseases have emerged and are anticipated to continue to originate and spread globally in recent decades, owing mostly to the intensification of anthropogenic activities such as agriculture, urbanisation, and species movement, as well as environmental degradation and climate change. The growing contacts between wildlife, domestic animals, and humans have aided in the spread of infectious diseases around the world. Although infectious diseases were formerly thought to be natural processes impacting wildlife, it is now obvious that manmade activities have accelerated this process, making it a threat to biodiversity. Many of these infections can impact vulnerable wild hosts, causing their populations to decline. Peccaries are important species in the Amazon environment, helping to maintain and regenerate forests and animal habitats through seed dispersal [1].

They are considered ecosystem engineers because of their significance in the dynamics of the abiotic and biotic environment, and they are one of the main sources of animal protein in Latin American rural civilizations. However, periodic disappearances of small populations of white-lipped peccaries (*Tayassu pecari*; WLP) have been documented in the Amazon region since the 1980s. These disappearances were followed by a complete recovery of the original population after more than a decade or even nearly three decades. This phenomenon has been occurring in extraordinarily vast non-fragmented stretches of millions of hectares in the Amazon, affecting ecological cycles and even food security in indigenous and campesino populations; nevertheless, it is still little understood. Although hunting and habitat destruction have been the most studied threats, the species' huge populations and ecology imply that illnesses may play a role in its dynamics. Furthermore, despite the fact that white-lipped peccaries coexist with collared peccaries (*Pecari tajacu*; CP) in

the Amazon region, no drop in CP populations has been detected [2].

We conducted an English-language search in the online databases Scopus and Pubmed, with dates ranging. We selected keywords linked to the host species (peccaries, swine, and pigs), the political units of the Amazon region's countries (Brazil, Peru, Colombia, Venezuela, Ecuador, Bolivia, Suriname, Guyana, and French Guyana), and pathogen or disease-related phrases. Given the scarcity of disease-related literature in the Amazon, we ran an extra search in English using Google Scholar. Using the same prior search terms combined or as separate phrases, we were able to locate studies published in journals not indexed in the Journal Citation Reports (JCR), academic theses, dissertations, and congress presentations or summaries. We also did further searches in Google Scholar in Spanish and Portuguese because non-English-language studies on biodiversity and conservation subjects in South America are plentiful. Supporting information contains the search algorithms. We examined each entry received through the various searches based on the title, abstract, and contents of the document in order to determine the research topic, correct location in the Amazon region, and correct host species for inclusion in our database. To prevent providing duplicate data, we also eliminated general review papers from the database [3].

We analysed each study's content and used it to create a database by documenting the following general information: species reported, sample size, location, year of study, year of publication, pathogens studied, laboratory and diagnostic procedures, findings, and any extra notes that were required. We further classed the selected literature as 'Conservation Medicine' if it looked at the influence of infection or disease on wildlife populations, 'Zoonosis' if it looked at the transmission or affection of infections to humans, and 'Production' if it looked at the impact of diseases on cattle. When a thesis or a congress presentation was later published as an article, only the information from the research article was considered [4].

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## Description

Although WLP disappearances have been observed in various Amazonian regions of Brazil, Peru, Ecuador, Bolivia, French Guyana, Guyana, and Colombia most infectious disease research have been conducted in only two of these locations, Brazil and Peru. This unequal and unbalanced localization of studies provides an imperfect representation of the Amazon region and hinders knowledge on disease variability in peccary distribution. In some areas, investigations found unique infections in all three suiform species, providing preliminary information on diseases at the interface of these species

in the Amazon. This knowledge simplifies sample processes and logistics in areas where sampling wildlife is difficult or where WLPs have vanished. The majority of the studies were cross-sectional surveys, providing a picture of a single point in time and not providing enough information on the causes, consequences, and dangers in a disease-population link. To better understand the impact of infectious diseases on WLP populations, cohort, case-control, and longitudinal studies may be more appropriate. Furthermore, we analysed a significant number of studies that did not give information on the sample period, making the linkage of the results with a specific event or demographic conditions difficult [5].

Prior authorizations from ethical committees from institutional participants, as well as collection authorizations from each related public sector, are required for any research studies that involve biological collections. For example, in Brazil, the Instituto Chico Mendes de Conservação da Biodiversidade of the Ministry of the Environment is responsible for wildlife biological collection authorizations, and in Peru, the Servicio Nacional Forestal y de Fauna Silvestre of the Ministry of Agriculture and the Servicio Nacional de Areas Naturales Protegidas of the Ministry of the Environment. Furthermore, conducting complete and holistic studies under the One Health framework typically necessitates the integration of additional interfaces (people, domestic animals, and or the environment), each of which will require authorisation from public sectors.

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## Conclusion

To these must be added permits for the export of biological samples when necessary, as well as parallel importation authorizations by the receptor government, which includes compliance with the requirements of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity

authorizations by national Animal Health Departments, and finally the specific requirements of the Convention on Biological Diversity. We contend that export permits could be avoided by increasing the availability of acceptable technologies at comparable costs in neighbouring nations. Obtaining prior authorizations is a time-consuming, cost-effective, and labor-intensive process.

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None.

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## Conflict of Interest

None.

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