

# NRCPD-OUAVM Joint Research Report

Date: 2024.5.27  
Project no: 2023-joint-19

## 1. Principal investigator

Name: Consuelo Almazán

Position: Adjunct Professor

Affiliation: Immunology and Vaccines Laboratory (LINVALS), College of Natural Sciences, Autonomous University of Queretaro. Queretaro, Mexico.

## 2. Project title:

Detection and surveillance of *Haemaphysalis longicornis* (Neuman, 1901) in Mexico

## 3. Collaborating research group members at NRCPD

Name: Rika Umemiya-Shirafuji

Position: Associate Professor

## 4. Research period (in mm/dd/yyyy, and total number of years)

01/04/2023 -31/03/2024: one year

## 5. Purposes and objectives

Since the first report on 2017 in New Jersey, US, the Asian tick *Haemaphysalis longicornis* has been detected in at least 18 states from North America. This tick is exotic in Mexico. However, in 2019 it was detected on a horse that was entering the country. The horse was originally from Texas, US, and the tick was detected during the inspection point of Coahuila, in the border of US-Mexico. Due to this finding, special attention to inspection of imported live animals is being paid in all ports of entry to the country. Because of the rapid distribution and range extension of *H. longicornis* towards the US southern states, and the free crossing of wild animals that may be carrying the tick, the risk of entrance and establishment of longhorned tick in the country is very high. Furthermore, predicting models performed by Raghavan et al. (2019), have shown that areas from southeastern US to central and southern Mexico are environmentally suitable for development and future distribution of *H. longicornis*. Finally, because climate change affects the distribution of ticks, it is very likely that *H. longicornis* will continue migrating to the south. Early detection of ticks is critical to prevent their establishment and to implement control measures against these parasites and the diseases they transmit. For this early detection, surveillance studies are required. Therefore, **the objective of this project is to establish methods of rapid detection and surveillance of *H. longicornis* tick by morphological and molecular identification** following training and collaboration with researchers at the National Research Center for Protozoan Diseases (NRCPD) in Obihiro, Japan.

## 6. Outline of research process

### *Tick collection and Identification*

A preliminary collection of ticks attached to wild animals and domestic animals, in collaboration with wildlife and livestock associations as well as animal health authorities working at the inspection points in Northern Mexico has been performed. In addition, a collection of questing ticks from three geographical points in three states from Northern Mexico (Tamaulipas, Nuevo Leon, and Coahuila) by using the tick dragging method has been performed. Collected ticks were preserved in 30 % ethanol and transported to the Laboratory of Immunology and Vaccines (LINVAS), University of Queretaro (UAQ), for identification.

Morphological identification of ticks has been performed according to established guides (Barker & Walker, 2014). In addition, ticks images from different developmental stages obtained from a colony maintained at the Tick-BioBank from the NRCPD, in Obihiro University, Japan (Umemiya-Shirafuji *et al.* 2022) were used.

### *Genetic studies*

Because none of the identified ticks corresponded to *Haemaphysalis* spp., genetic studies have not been performed. However, tick collection and surveillance will continue, and if *Haemaphysalis* ticks are detected, molecular identification and sequencing of 10S rDNA, 12S rDNA, and CoxI genes.

## 7. Outline of research achievements

- A collection of ticks on domestic and wild animals and in the environment has been performed. Ticks have been morphologically identified and are kept at the LINVAS for future studies.

- On February 2024, I visited the National Research Center for Protozoan Diseases (NRCPD) in Obihiro, Japan, where I took a training on identification and manipulation of *H. longicornis* ticks at the Tick-BioBank under Dr Rika Umemiya-Shirafuji. A series of images of ticks were obtained and these images are used as reference for morphological identification of ticks collected in Mexico.

-The images are included in a document to be used for Veterinarians and other professionals involved in animal health and tick control to prevent incursions and infestations of *H. longicornis* in Mexico.

## 8. Publication of research achievements

A manuscript written in Spanish is under review. The main objective of this manuscript is to contribute with information on *H. longicornis* biology, life cycle, and provide useful identification for morphological identification of this tick that is not available in Mexico. The published document will be used for Veterinarians and other professionals involved on animal health and tick control in the country. The title of the manuscript is: **The Asian tick *Haemaphysalis longicornis* (Neuman, 1901): Actions to prevent its incursion and establishment in Mexico**, authors: Almazán C, Umemiya-Shirafuji R, Rosario-Cruz R, Cortés García B, Mosqueda J.