

# Micronucleus assay, a suitable tool to evaluate genotoxicity in wild bats

Jesusa Paz Castillo<sup>1</sup>; Natalia Sandoval-Herrera<sup>2,3</sup>; Kenneth Welch<sup>2,3</sup>  
 1University of Toronto Scarborough, ON, Canada 2Department of Ecology and Evolutionary Biology, University of Toronto, ON, Canada 3Department of Biological Sciences, University of Toronto Scarborough, ON, Canada

## BACKGROUND



Bats provide important ecosystem services, such as pollinators, seed dispersers, and pest control agents. [1] Given their ecological role as insect predators, insectivorous bats are particularly vulnerable to pesticides. [2]



Micronuclei are a good biomarker of genotoxicity. It is an easy, low-cost, and field-ready method that could be used to monitor wild animals chronically exposed to genotoxic substances. [3]

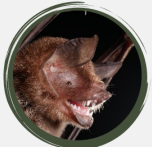
## OBJECTIVE



To evaluate the suitability of the Micronucleus (MN) assay as a biomarker of genotoxicity in insectivorous bats exposed to different levels of agricultural intensity.

## METHODS & DESIGN

### STUDY SPECIES



- Insectivorous bat [4]
- Distribution: South America, Central America, and Caribbean coast [4]
- Roost in mines and caves [4]

Parnell's mustached bat  
*Pteronotus mexicanus*



STEP 1

Draw blood from the radial artery of the bat



STEP 2

Make a blood smear and stain using HemaColor Rapid staining kit



STEP 3

Examine the erythrocytes for any formation of MN under a light microscope at 1000x magnification

## RESULTS



Bats roosting in caves surrounded by high intensive agricultural lands showed the highest number of MN



Bats roosting in caves surrounded by low intensive agricultural lands presented relatively low MN count compared to the caves surrounded by commercial crops

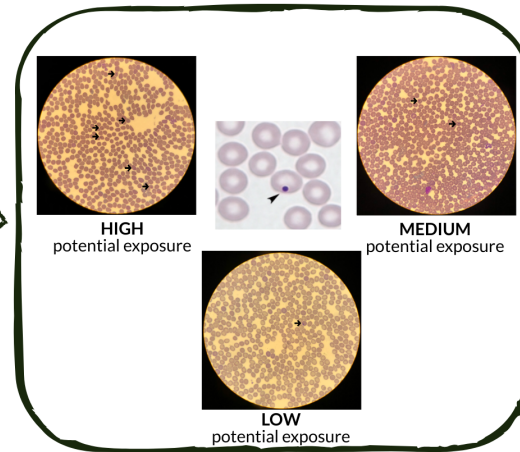


Figure 2. Pictomicrographs of the erythrocytes of *P. mexicanus* under a light microscope at a magnification of 1000x.

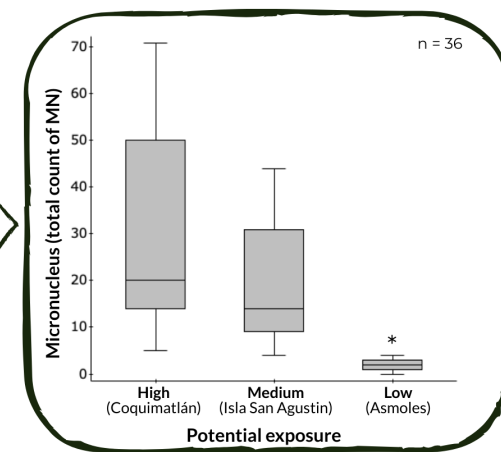


Figure 3. Total count of micronucleus detected in bats roosted from three different cave sites located in Colima, Southern Mexico.  $Z = 11.3$ ;  $p = 0.003$



### STUDY SITE

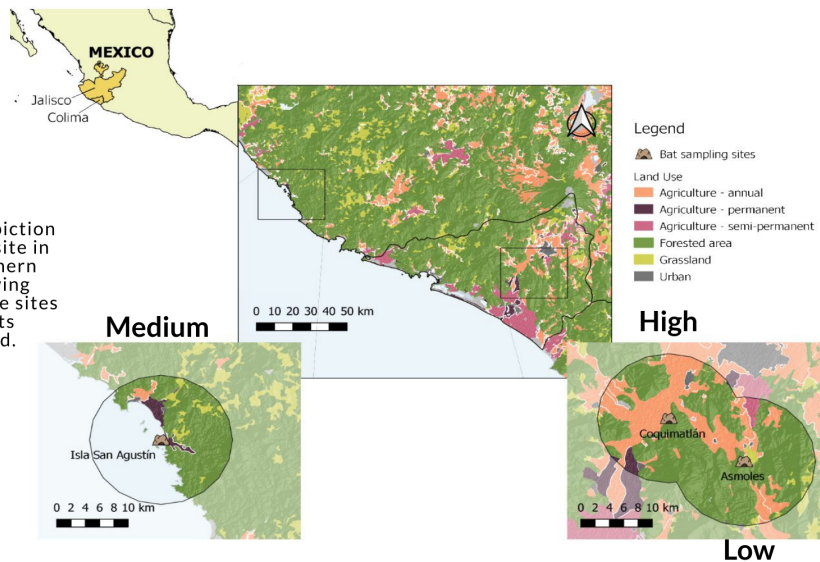


Figure 1. Depiction of the study site in Colima, Southern Mexico, showing the three cave sites where the bats were captured.



Arthropods can bioaccumulate agricultural contaminants such as pesticides. [2,5] Exposure to such genotoxic substance can induce damage to genetic material and result in micronucleus formation. [6] Hence, insectivorous bats roosting in caves and foraging in the surrounded crop lands that have intensive pesticide application contain the highest number of MN.

## CONCLUSIONS



Micronucleus assay is a reliable and **field-ready** test for evaluating variation of genotoxic damage in wild bats.

Therefore, it can be used in analysis and monitoring of ecotoxicological sensitivity in **wild populations**.

### References

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### Acknowledgements

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