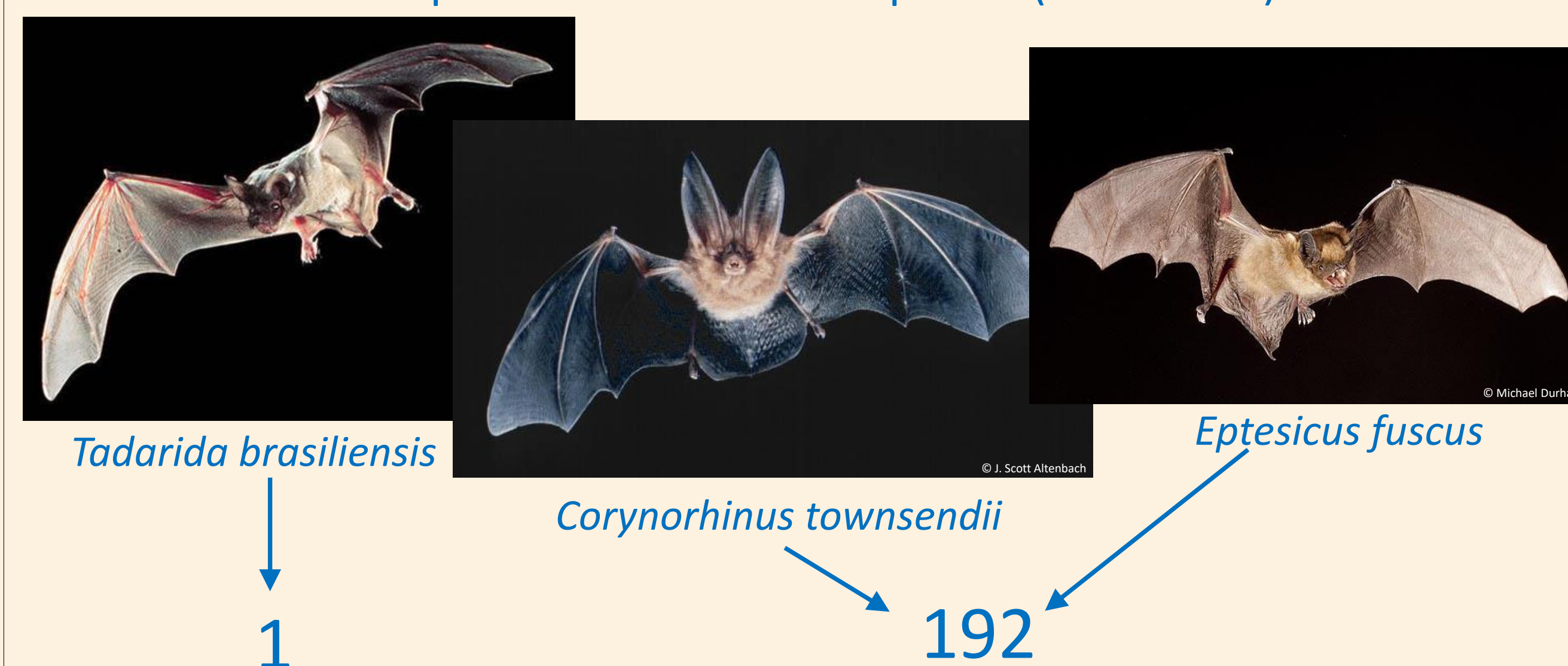


# How Rare? Limits of Detection of a Genetic Assay for Species Identification from Guano



## Methods

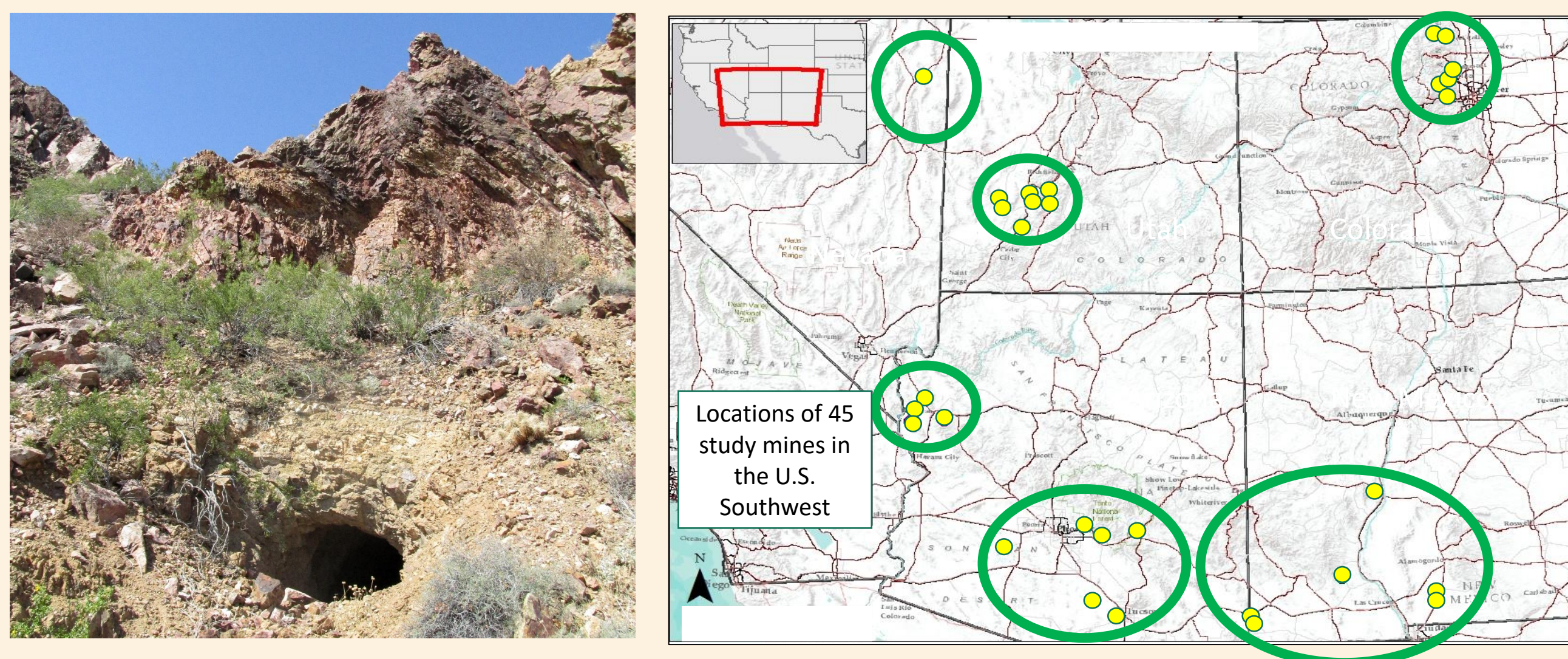
1. Mock community: Controlled lab study to assess ability to detect a “rare” bat in a pooled sample. Equivalent of 1 fecal pellet of a “rare” species combined with 192 pellets of “common” species (96 of each).



Ten replicates of each species combination, for a total of 30 tests.

2. Degraded samples: Single DNA extractions from two guano fertilizers of unknown age, source, or species composition.

3. Large-scale application: Roost survey via a single pooled guano sample collected from each of 45 mines in 5 states in the U.S. southwest



## Results

- Regardless of which species of “rare” bat (at 1:192) was used, we always detected it.
- In guano fertilizer, we identified species from both bat suborders and with varying diets (hence fecal types).



*Chaerephon plicatus*  
*Eonycteris spelaea*  
*Rousettus leschenaultia*

Yangochiroptera  
Yinpterochiroptera  
Yinpterochiroptera

Insectivore  
Nectarivore  
Frugivore

*Myotis velifer*  
*Tadarida brasiliensis*

Yangochiroptera  
Yangochiroptera

Insectivore  
Insectivore

## Introduction

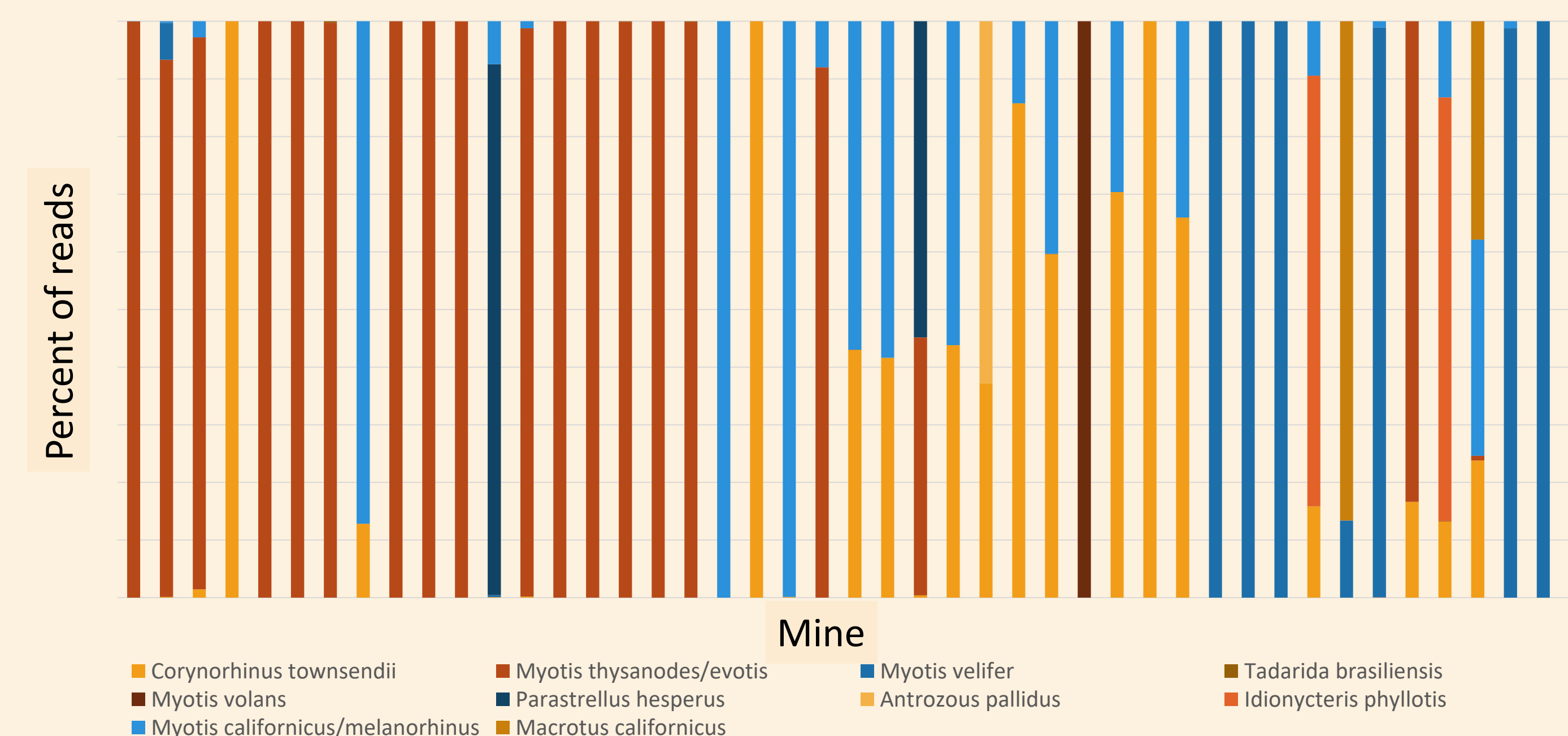
Species from Feces is a DNA mini-barcode assay that uses next-generation amplicon sequencing to identify all the bat species that contributed to a pooled guano sample (Walker *et al.* 2016). A pooled sample consists of about 200 fecal pellets collected from a roost. We wished to determine the capability of the assay in:

1. Detecting a rare bat
2. Detecting bat species in degraded guano of unknown age
3. Large-scale application across a landscape

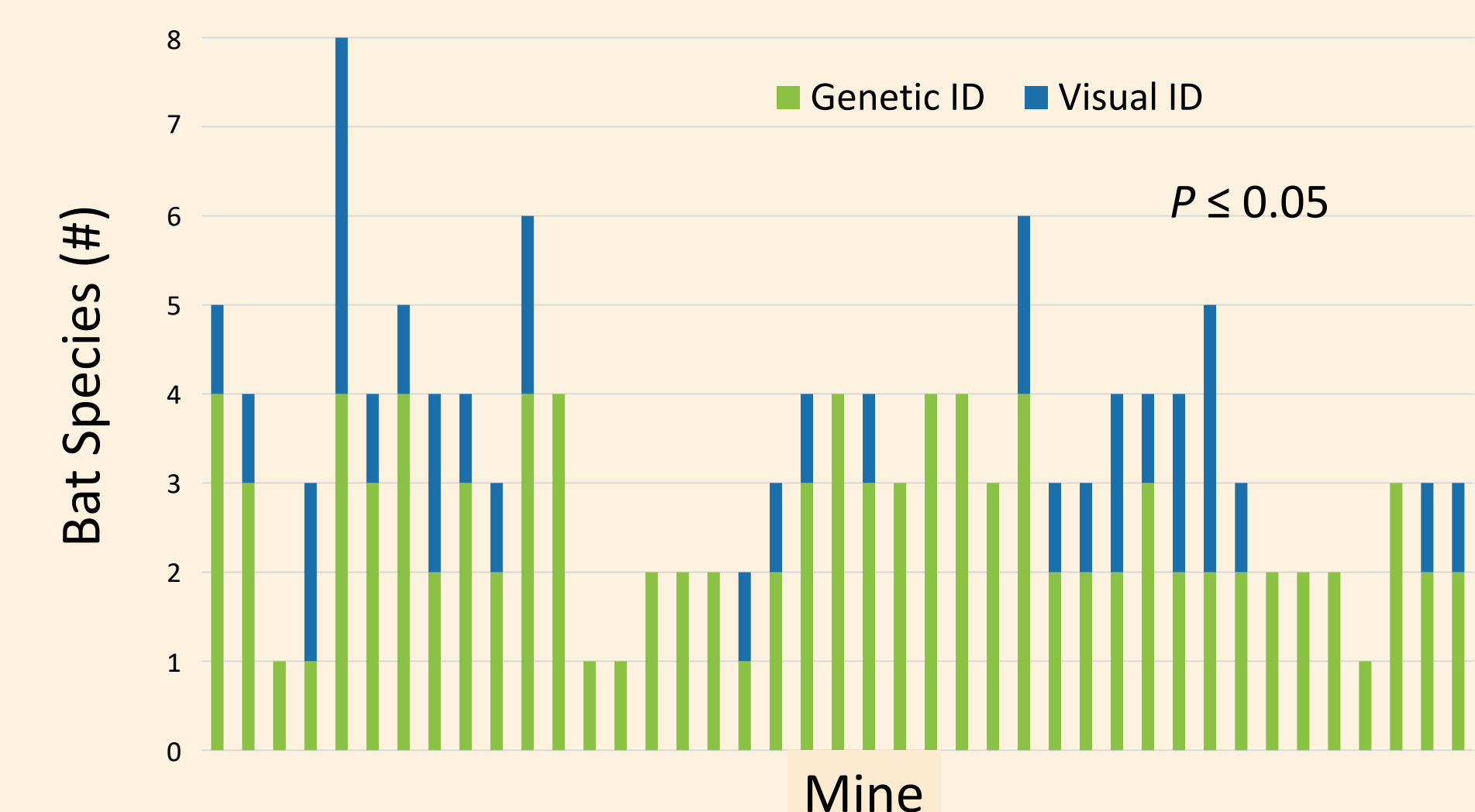


3. Roost survey:

a) Between 1 and 4 bat species were detected at each mine.



b) Bat species were genetically identified in 100% of mines, and visually identified in 58% of mines.



## Discussion

1. Our mock community experiment illustrated that even if a single fecal pellet in a pooled guano sample (typically ~200) is from a different species than the others, it will be detected by the Species from Feces assay.
2. The assay was sensitive with degraded DNA (guano fertilizer of unknown age).
3. Guano sampling for genetic identification of species was an effective means to survey roosts across a landscape, and provided more species information at lower cost than visual surveys.

## Acknowledgements

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**References:** Walker, F.M., C.H.D. Williamson, D.E. Sanchez, C.J. Sobek, & C.L. Chambers. 2016. Species from Feces: Order-wide identification of Chiroptera from guano and other non-invasive genetic samples. *PLoS ONE* 11(9): e0162342.

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