

Assessing Genetic Diversity in Northern Yellow Bats Killed at Wind Energy Facilities

JACK JOYCE TEXAS CHRISTIAN UNIVERSITY DEPARTMENTAL HONORS IN BIOLOGY





Wind Energy Facilities and Bat Mortality

- Wind energy growing rapidly
- Linked to increasing bat fatalities
- Persistence of bat populations
- TX #1 in installed wind farms
- Little known about anthropogenic impact
- Conservation of great human concern



Weaver et al., Understanding Wind Energy Impacts, 2019 Weaver et al., Estimating Bat Fatality, 2020 Weaver et al., Ultrasonic Acoustic Deterrents, 2020

Northern Yellow Bat (Lasiurus intermedius)



Two sub-species

- L. i. floridanus
- ▶ L. i. intermedius



▶ Range

Southern Yellow Bats (Lasiurus ega) present?

Previous Studies

- Collaborations with Texas State University
- mtDNA sequencing & microsatellite genotyping characterized genetic diversity and estimated effective population size
 - Lasiurus ega, Lasiurus intermedius
 - Hidalgo and Starr Counties
- 8,000/ yr killed in Starr County (all species)
- Northern Yellow Bat 2nd most affected species



Chipps et al., 2020a and 2020b

Current Project

- Expand on existing research from Rio Grande Valley
- 18 wing tissue samples, Willacy County, TX, 2015
- Willacy County population never been studied
- Amplify/ sequence COI locus of mitochondrial genome
- Compare results to Hidalgo and Starr Counties



Methods

- DNA extracted following ammonium acetate/ isopropanol precipitation method detailed in Korstian et al. (2013)
- DNA amplified by PCR at 550 bp region of COI gene of mitochondria
- Sequenced using ABI Dye Terminator Cycle Sequencing
- Sequences analyzed on ABI 3130 Genetic Analyzer
- Compare sequences to Genbank Voucher Sequences to obtain species ID
- Unique sequence haplotypes detected using GenAlEx



Anticipated Results

Table 2 Characterization of mitochondrial diversity for each Lasiurus taxon examined				
Taxon	n	Н	h	π
L. ega	112	2	0.018	0.00003
L. i. floridanus	50	6	0.588	0.00225
L. i. intermedius	203	7	0.542	0.00177

Results from Willacy County will be compared to these results

Chipps et al., 2020

Discussion

- More knowledge is needed about population structure and diversity to assess impacts
- Jurisdictional issues prevent informed decision making
- US Fish & Wildlife Service: No laws in place to protect bats
- Continued mitigation studies to improve predictability of bat fatality
- Paves the way for collaboration amongst TX scientists, TPWD, and wind energy companies



Arnett et al., 2016

References

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