Demographics of a Mexican Free-tailed Bat Colony in Northern Oklahoma

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DEPARTMENT OF BIOLOGY

Background

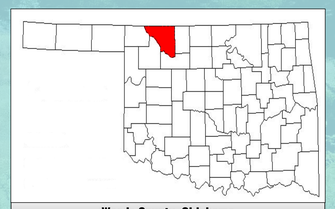
- **Mexican Free-tailed Bats (*Tadarida brasiliensis mexicana*) form large maternity colonies from spring to fall in southern Great Plains and southwestern United States** (Davis et al. 1962)
- **Northern Oklahoma is home to northernmost maternity colonies in Great Plains** (Caire et al. 2014)
- **Sex ratios can vary greatly between "maternity" colonies** (Constantine 1967)
- **Patterns of emergence during outflight can be impacted by class (sex, age, reproductive status)** (Lee and McCracken 2001)

Mexican Free-tailed Bat during processing

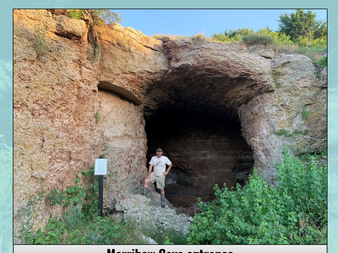
Hundreds of bats circling inside Merrihew Cave

Study Site

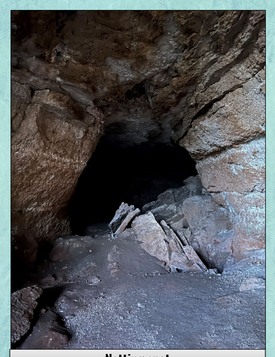
- **Merrihew Cave in Woods County, Oklahoma**
- **Merrihew Cave had an average population of 66,708 *T. brasiliensis mexicana* during the summers of 2010-2011, with >100,000 bats some sampling periods** (Ganow et al. 2015)



Woods County, Oklahoma



Merrihew Cave entrance



Netting spot

View of entrance from netting spot

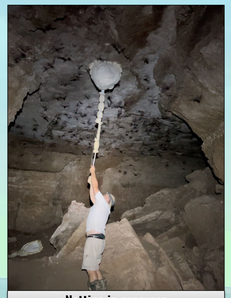
Objectives

- **Determine sex ratio in Merrihew Cave**
- **Collect data on age and reproductive status**
- **Determine if there are any patterns in the emergence of different classes of bats during the outflight**

Methods

- **3 nights of sampling thus far: June 24, August 13, September 23 in 2022**
- **We captured bats in handheld modified hoop nets**
- **Bats were placed into labeled buckets corresponding to sampling period**
- **Sampling began with the start of outflights, with sampling periods lasting 3-11 minutes long depending on density**
- **Data were taken on sex, age (volant young or adult), and reproductive status**

Setup just before the outflight



Netting in progress

Data collection

Results

- **<u>June 24</u>**
  461 bats captured, 90.2% adult females and 9.8% adult males. No flying young present. 87.5% of females were pregnant, 10.3% lactating, and 2.2% non-reproductive (Fig. 1)
- **<u>August 13</u>**
  419 bats captured, 90.8% adult females and 9.2% adult males. 67.8% were adults and 32.2% were juveniles. 71.3% of females were post-lactating, 21.3% lactating, and 7.4% non-reproductive (Fig. 2)**. Most juveniles present in middle of outflight** (Fig. 3)
- **<u>September 23</u>**
  425 bats captured, 87.99% adult female and 12.01% adult male. 90.12% were adults and 9.88% juveniles. Juveniles and adult males left early in the outflight (Fig 4)**. Difficulties distinguishing adults and juveniles. No reproductive females**

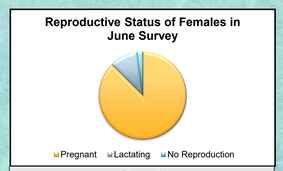


Figure 1

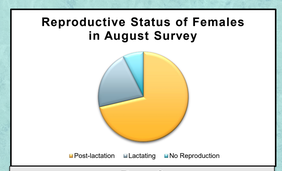


Figure 2

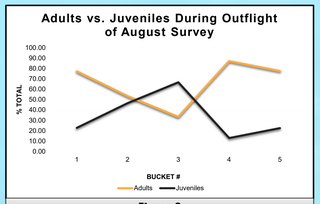


Figure 3

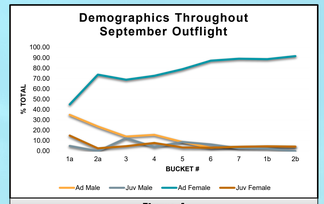


Figure 4

Discussion

- **Data demonstrate that Merrihew Cave has a high proportion of females, especially when compared to "maternity" colonies farther south and west, as some colonies have nearly 2.15(M):1(F) sex ratios** (Geluso and Geluso 2004)**. We speculate this might reflect greater insect availability in the Great Plains compared to more arid regions.**
- **August sampling demonstrated that juveniles emerged in middle of outflight, well after sunset. This is consistent with literature that show juveniles leave later due to poor flying ability and lower energetic demands** (Hughes et al. 1995, Kunz and Stern 1995)**.**
- **September sampling showed juveniles and adult males leaving early and adult females increasing throughout outflight. This could be due to lower energetic demands from female adults that are no longer reproductive, whereas juveniles begin foraging for themselves. Bats left the cave later into the evening overall too during this month. However, it is hard to draw conclusions from these data as it was difficult to distinguish adults and juveniles this late in the year.**
- **Additional samples will be collected next summer, but with multiple surveys each month to better elucidate emergence patterns. Further studies could include return times to show how long each class forages each night.**

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