# Intra-tropical Migration in a Neotropical Songbird: the Purple Martin (*Progne subis)*

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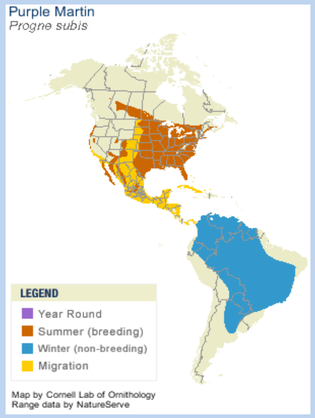
## Background





- Breeding Bird Survey 1966-2010: Martin populations declining at a rate of 0.5% per year
- Cause of declines is not known!

## Objectives and Methodology

(1) Spatial and Temporal Patterns of ITM:
**Where**, **When** and **How Far** do they move?
- Used data from geolocator tracking of 144 Martins for 6 years (2007-2012)

(2) **Who** is a migrant: predict ITM from age/ sex/ distance from breeding site/arrival date/ year parameters
- Binary Logistic Regression Analysis

(3) **What** causes ITM: rainy weather / agricultural insecticides limit insect flight, are Martins migrating in search of food?
- Paired t-tests of temperature, rainfall and percent agricultural land-cover between initial and subsequent winter sites

Image: Bird Lab at York

## Intra-tropical Migration (ITM)

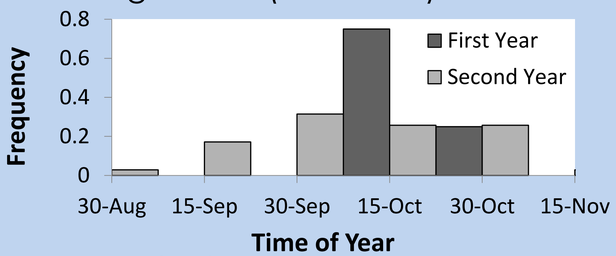
- Geolocator tracking reveals Purple Martins migrate in the tropics!
- **Intra-tropical Migration (ITM):** travelling >100km between winter "roost" sites
- The pattern/cause of these long-distance movements in a **neotropical migrant**(spends part of its life in the tropics) has not been investigated to date

Image: Bird Lab at York

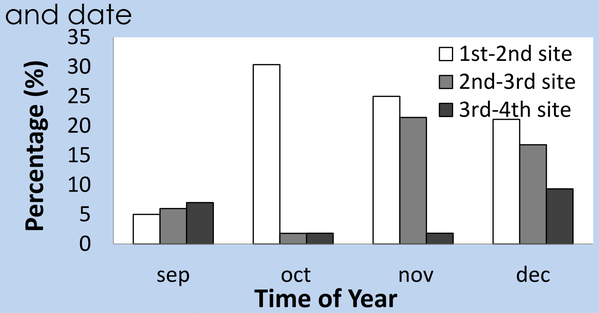
## Results

### Who is a Migrant?

- 60% of purple martins
- Late arrivals to wintering ground
- Younger birds (First Years)

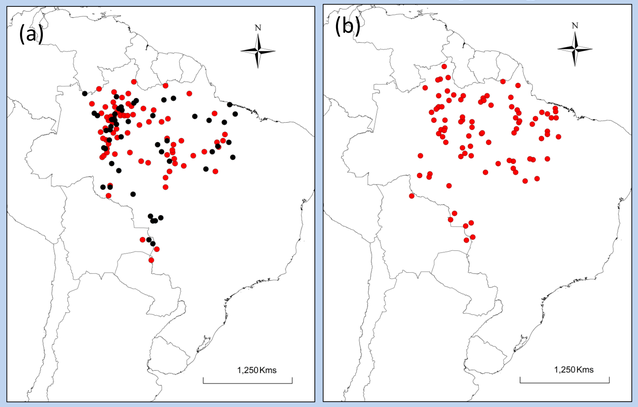



Frequency of arrival to first winter site by age and date




Percentage of intra-tropical migrants moving between winter sites per month

### ITM: When and Where do they migrate?

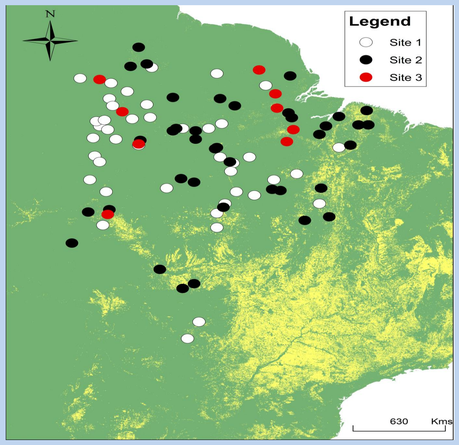



(a) First winter roost sites of **intra-tropical migrants** (n=88) and **non-migrants** (n=56) (b) Additional winter sites of **intra-tropical migrants**

- **Where** do they Move: East, away from core wintering grounds
- **When :** Oct-Dec, movements are not synchronous
- **How far:** Mean distance 813km ±167SE

### What Causes ITM

- No weather differences between initial and subsequent sites




First (n=39), second (n=39) and third (n=9) winter roost sites for ITM>500km. Yellow shading represents intensive agricultural lands, green shading represents non-agricultural vegetation.

## Conclusion and Implications for Conservation

- First to describe a long-distance ITM system in a neotropical migrant
- No conclusive evidence that food limitation due to weather/agriculture causes ITM
- Geographically broad, time-dependent cue
- Plausible explanation of results:

Insects peak late Aug → Early bird gets the worm → Late arrivals head east in search of food → Expect to see forest but it's gone!

- **Purple Martin populations are declining:** do birds suffer from going to agricultural landscapes?
- Energetic/Long-term costs of ITM?
- Conservation efforts should focus on patches of habitat in addition to core wintering areas