

# **Cerulean Warbler (*Dendroica cerulea*) foraging behavior in the Western Andes of Colombia**

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Figure: Charley Harper



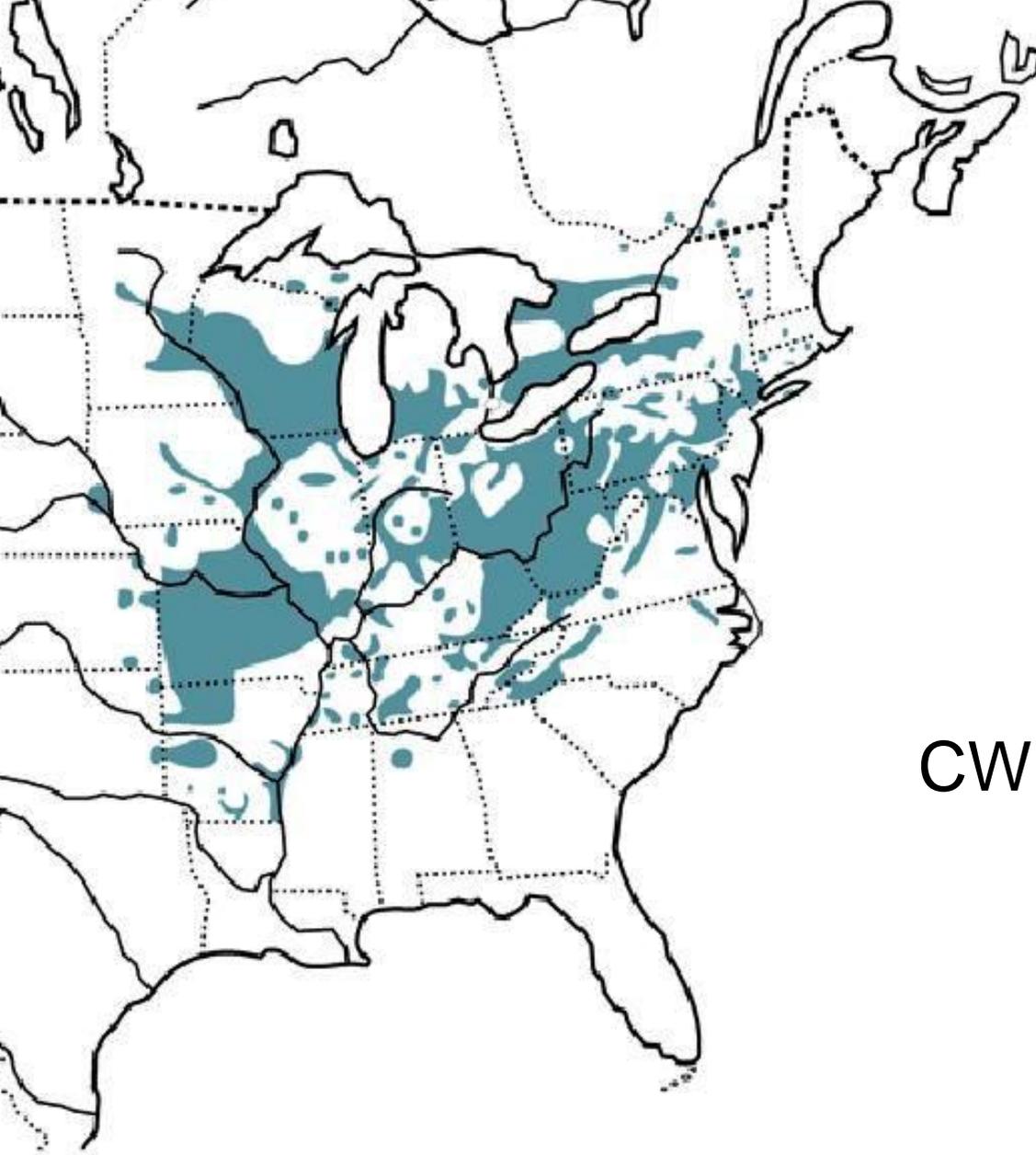
*Dendroica cerulea* foraging  
**INTRO**

The Cerulean Warbler (CW hereafter) is a small, sexually dimorphic, Neartic-Neotropical migrant Parulidae songbird.



Figures:  
Gabriel Colorado

*Dendroica cerulea* foraging  
**INTRO**



CW inhabits mature and older deciduous forests in eastern USA.

# *Dendroica cerulea* foraging **INTRO**

CW visits native and old growth woodlands, as well as agroecosystems and forest edges in its wintering grounds in Colombia, Venezuela, Ecuador, Peru and Bolivia.

September to April

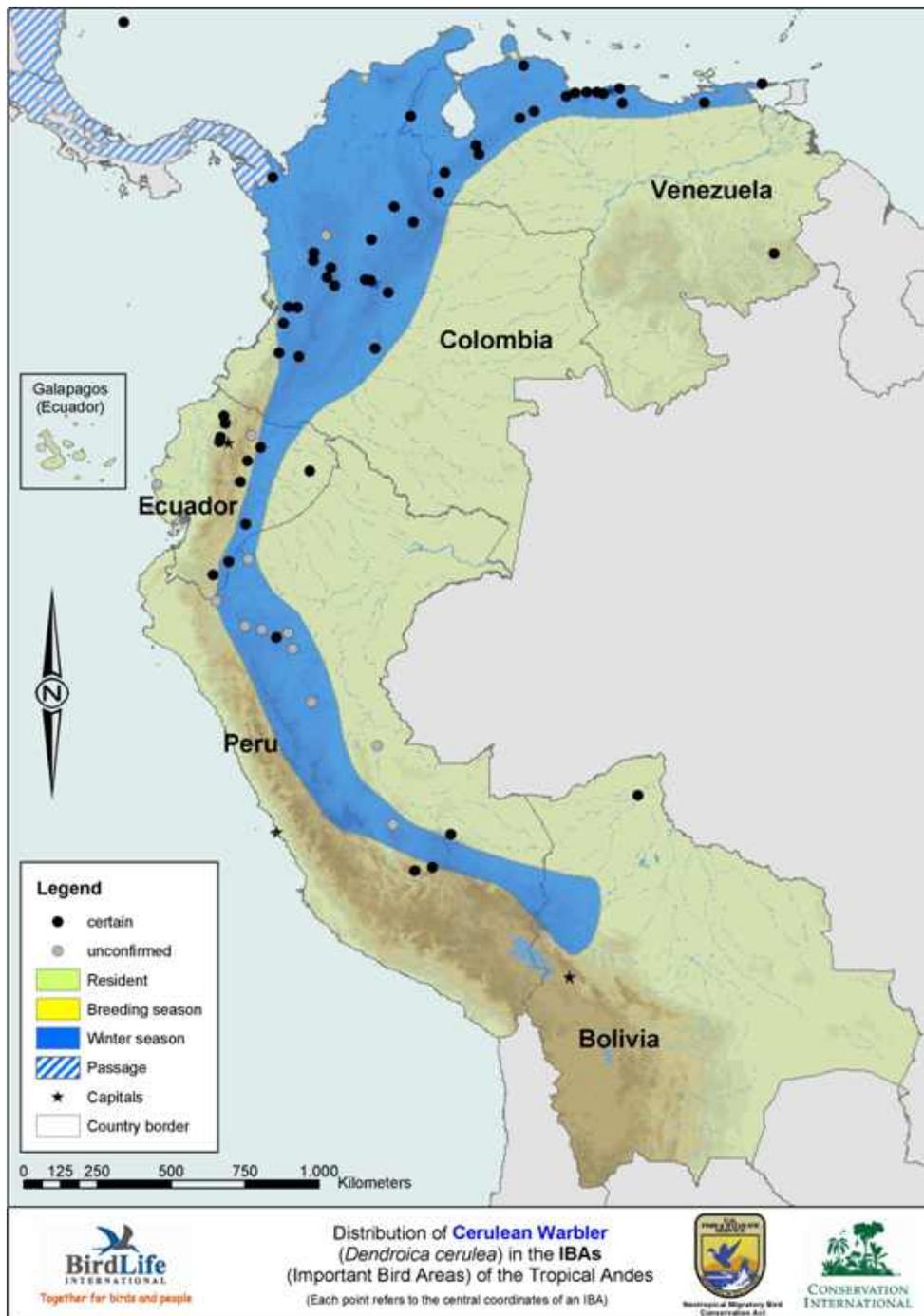


Figure: BirdLife International, 2006



- Vulnerable (IUCN).
- Conservation Concern (USWFS).
- Big gap on detailed behavioral and ecological information of CW in the Neotropics.

*A sense of urgency attends the study of species of concern, like the Cerulean Warbler*

(Hammel *et al.*, 2004)



*Dendroica cerulea* foraging  
**OBJETIVE**

Detailed non-systematic investigation about the foraging ecology and behavior in a shaded plantation ecosystem in the Western Andes of Colombia during the 2005-2006 non-breeding season.



## *Dendroica cerulea* foraging **STUDY AREA**

- Jericó municipality, Antioquia state.
- E slope of Western Andes ( $5^{\circ}47'N$ ,  $75^{\circ}47'W$ ).
- 1.500 m.



*Dendroica cerulea* foraging  
**STUDY AREA**



**Coffee-Shade**  
**Rubiaceae**

**300 ha**  
**Cardamom-Shade**  
**Zingiberaceae**



Figures: Diego Calderón-F.



## *Dendroica cerulea* foraging **METHODS**

- October 2005 to March 2006.
- Non-systematic roving of the main and all adjacent trails.
- When CW individual(s) observed:
  - Age – sex - plumage condition – rings
  - date – hour - weather condition - habitat
- Focal-animal sampling methods (Altman, 1974):
  - Alone, in pairs, or being part of a mixed-flock - elevation - species composition and speed of mixed flocks - visited/used plants - behavior among individuals - food searching behavior - foraging maneuvers - food handling techniques (Remsen & Robinson, 1990).
- Chi-square tests (Fowler & Cohen 1996).



*Dendroica cerulea* foraging  
**RESULTS**

- 190 hours = 31 CW observations.

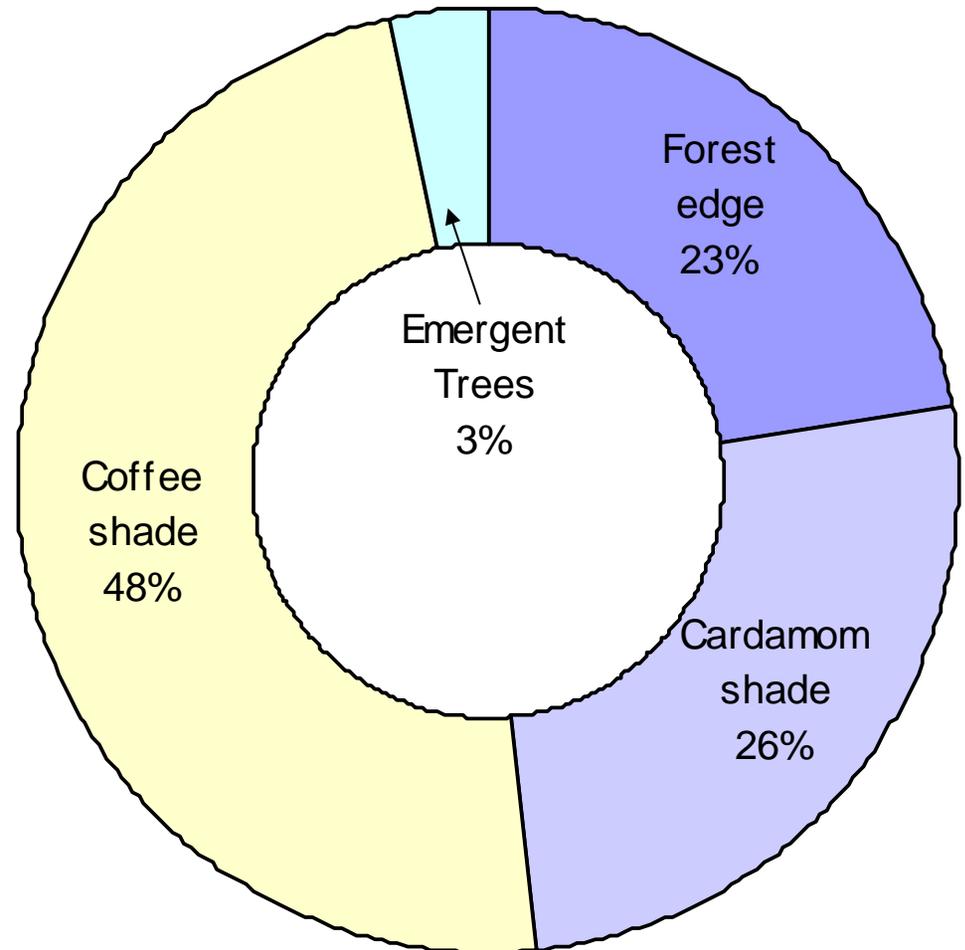


Figures: Diego Calderón-F.



# *Dendroica cerulea* foraging **RESULTS** **Habitat**

- Only canopy trees in the shade plantations (*Inga* sp., *Albizia* sp.).
- Melastomataceae, Mangos (*M.indica*) and Urticaceae in edges (+ *Cordia* sp. plantation).

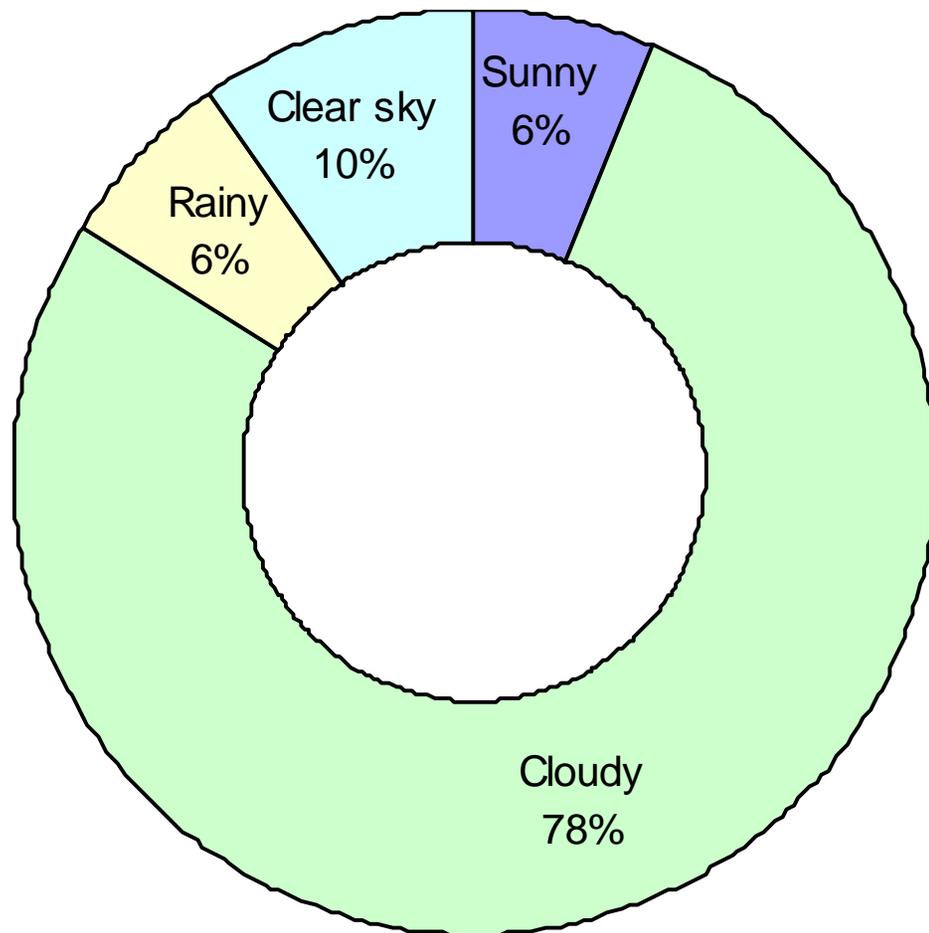




*Dendroica cerulea* foraging  
**RESULTS**  
**Weather Conditions**

- Overcast conditions

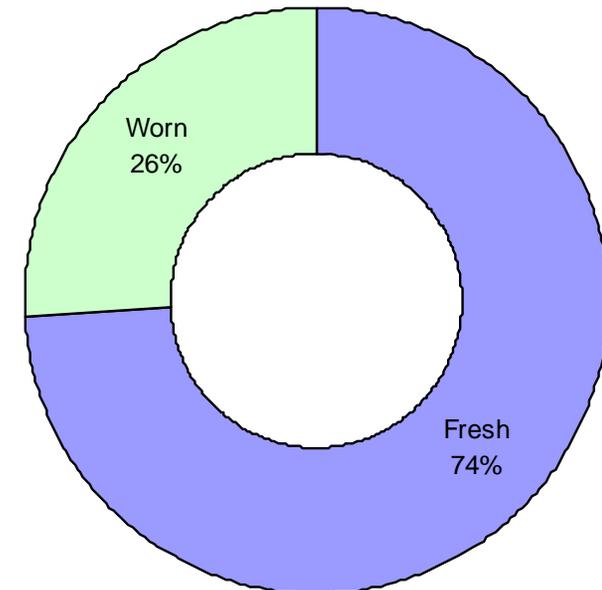
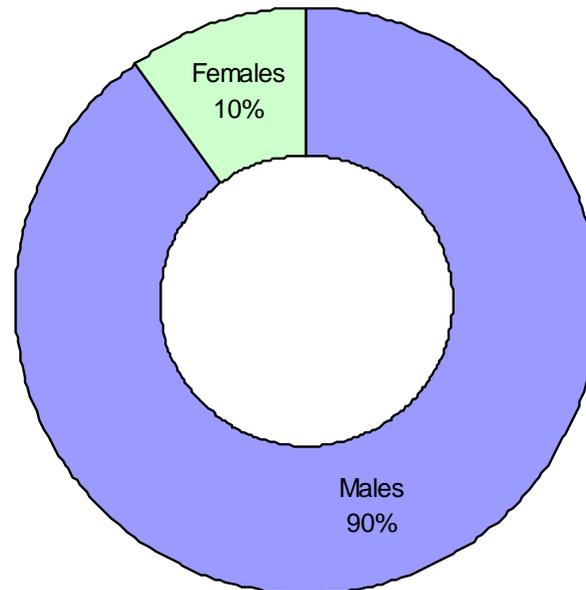
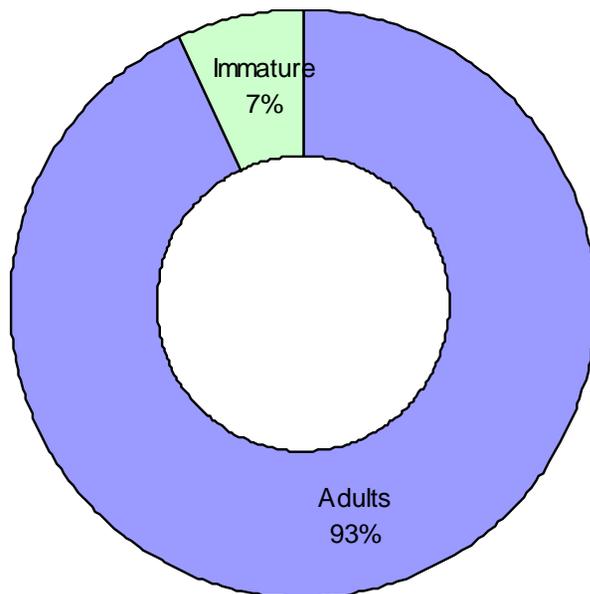
$X^2 = 45.51, p < 0.01, 3df$





*Dendroica cerulea* foraging  
**RESULTS**  
**Sex – Age - Plumage**

- Adult individuals, males, and birds in fresh plumage individuals were more commonly observed.

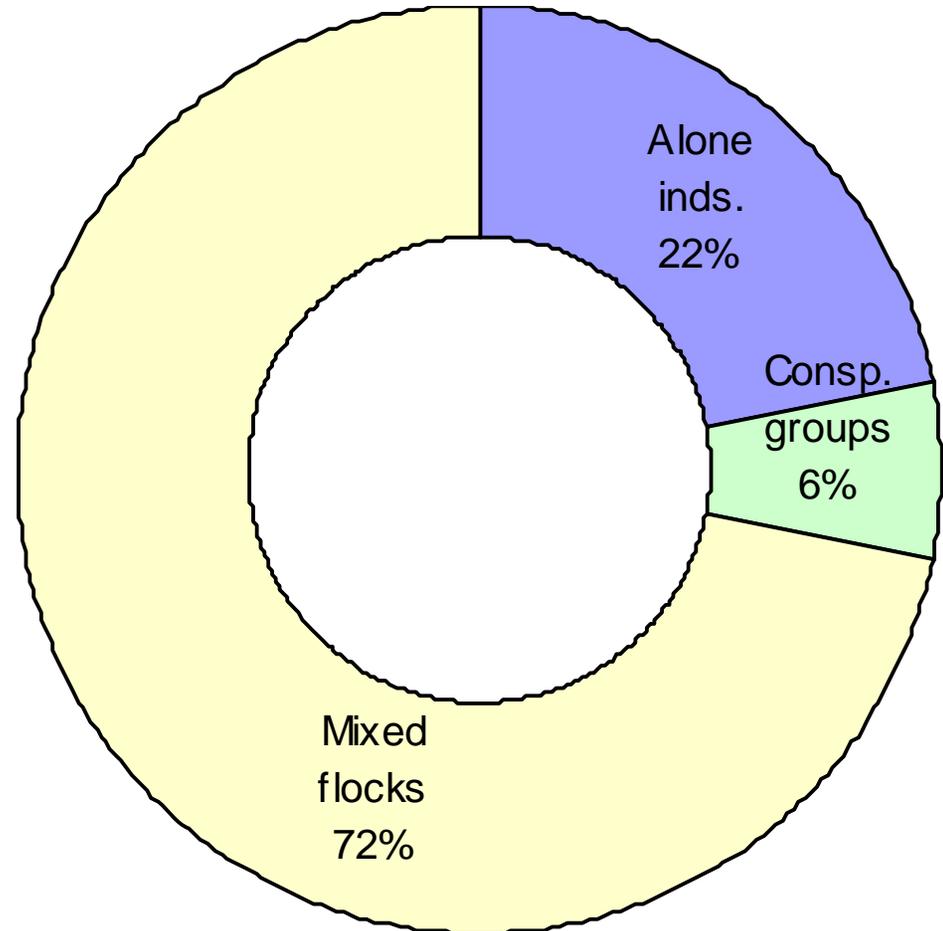




# *Dendroica cerulea* foraging **RESULTS**

## **Composition**

- Conspecific groups: one obs. (two 2 adult males).
- Mixed groups:  
 $X^2 = 22.56, p < 0.01, 2df$
- 37 spp. joined mixed groups (10 migrants).
- A flock with up to 26 spp., contained 7 CW inds. (6 males), 1 hour foraging in coffee-shade & cloudy sky.





## *Dendroica cerulea* foraging **RESULTS**

### **Foraging Behavior**

- CW is an indefatigable bird!
- CW constantly flies between trees and rarely stops while foraging (only for bill sweeping - 0,5 times per minute).
- CW forages at 7,81 m over the ground, and 1,42 m/min.
- CW rapidly moves making small hops along thin twigs and looking in all directions, searching all surfaces, for food.
- CW scans the back of leaves of *Cordia* sp. and *Inga* sp. trees carefully.
- CW twists *Cordia* sp. leaves taking them by the tip with the bill in search of insects.



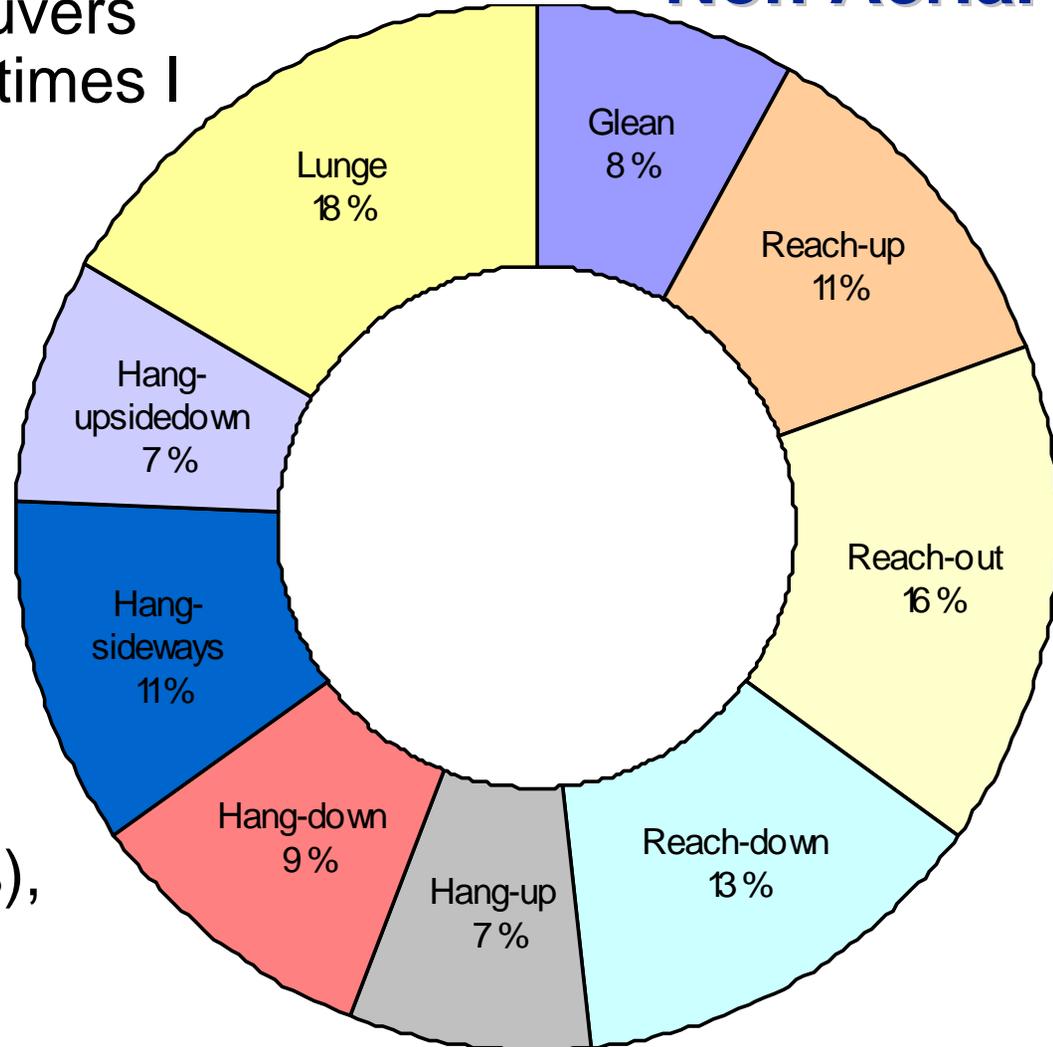
Figure: Diego Calderón-F.



*Dendroica cerulea* foraging  
**RESULTS**  
**Attacking Maneuvers**  
**Non Aerial**

- Lunge and Reach maneuvers were performed almost all times I observed a CW ind.

- No subsurface maneuvers (Probe, Gape, Chisel, Pull, among others), were observed.





*Dendroica cerulea* foraging

## RESULTS

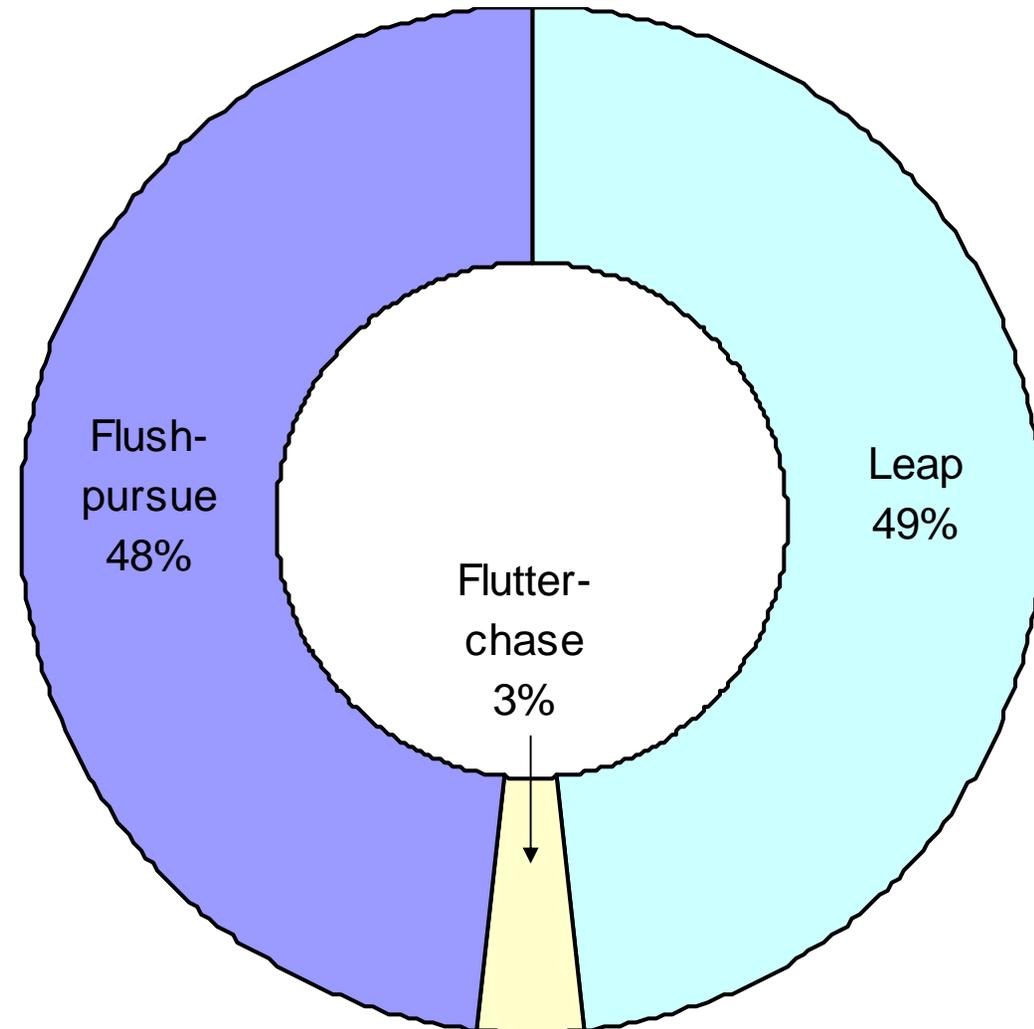
### Attacking Maneuvers

### Aerial

- $\chi^2 = 38,76$ ,  $p < 0.01$ , 6df

- Screen and Sally were never observed.

- A few Flutter-chases made by adult males in *Cordia* sp. trees resulted in ca.1 m vertically free falls.





## **Food Handling Techniques**

- Reliable prey identification was possible only twice (6,9% of observations) = green caterpillars (2,5 cm long).
- **Snap**
- In all remaining observations (93,1%), apparently small insects were taken - **Gulp**.
- No other food-handling technique, as Shake, Jab, Clasp, Drink, among many others, was recorded
- In one occasion, an adult male CW picked at some spider webs from the back of leaves of a *Cordia* tree; no prey observed.



*Dendroica cerulea* foraging  
**FINAL CONSIDERATIONS**

- CW is an **Active Forager** (Remsen & Robinson, 1990).
- Difficult to obtain **reliable prey data** (high foraging speed + small prey sizes).
- Agricultural landscapes are **very important for the CW in winter** (broken canopies).
- **Cardamom-** and **Coffee-Shade** cultivated areas in W Andes of Colombia play an important role for CW winter.
- More **basic studies are needed** in order to develop effective **conservation** efforts for this sp.



*Dendroica cerulea* foraging  
**ACKNOWLEDGMENTS**

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