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

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Morgantown (WV), US
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Figure: Charley Harper

INTRO

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

Figures:
Gabriel Colorado

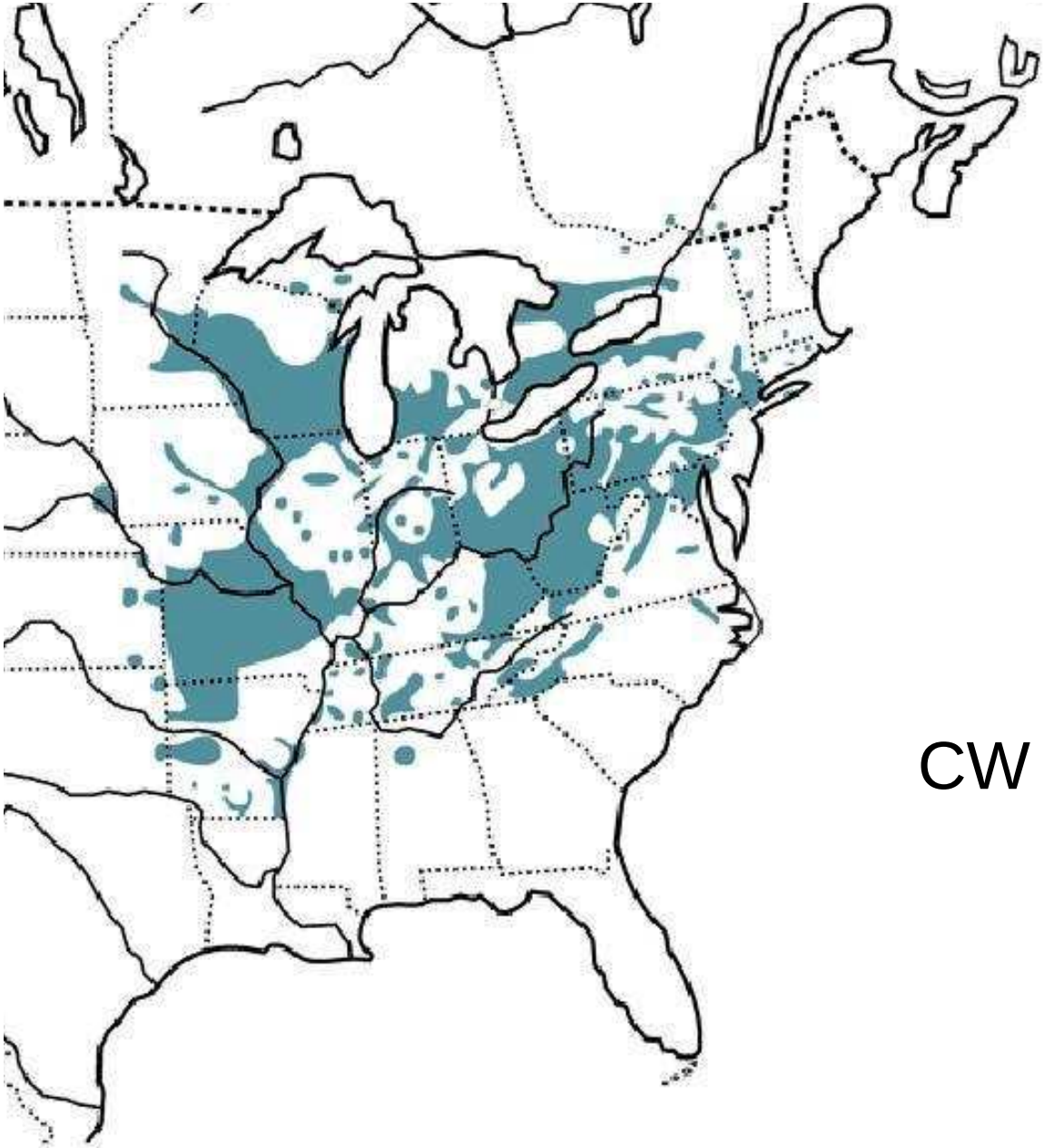


Figure: Hammel, 2000

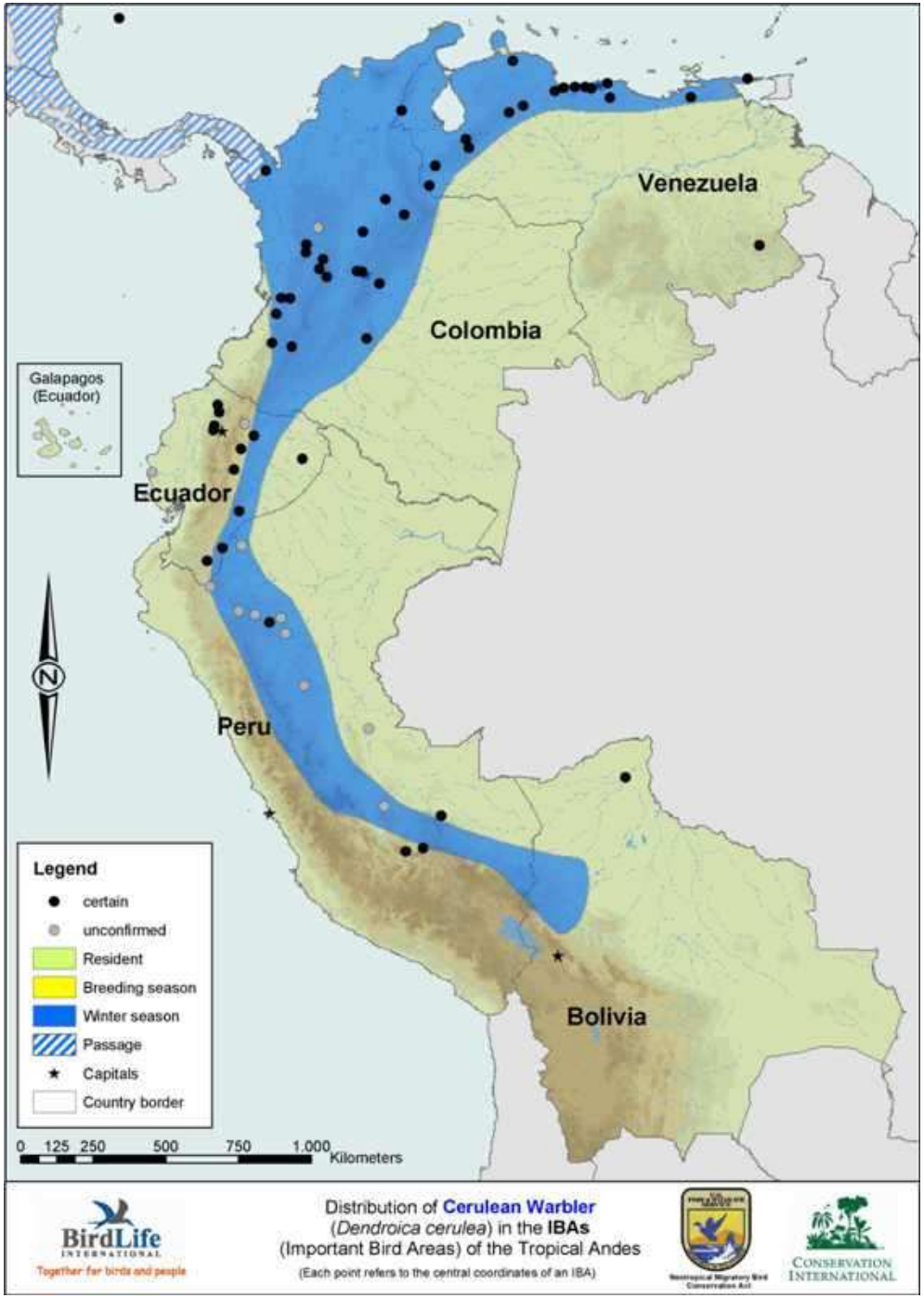
***Dendroica cerulea* foraging**

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

INTRO

- 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)

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 (5º47'N, 75º47'W).
- 1.500 m.

Figure: Microsoft Encarta 2007

Dendroica cerulea foraging

STUDY AREA

Coffee-Shade

Rubiaceae

300 ha

Cardamom-Shade

Zingiberacea

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.

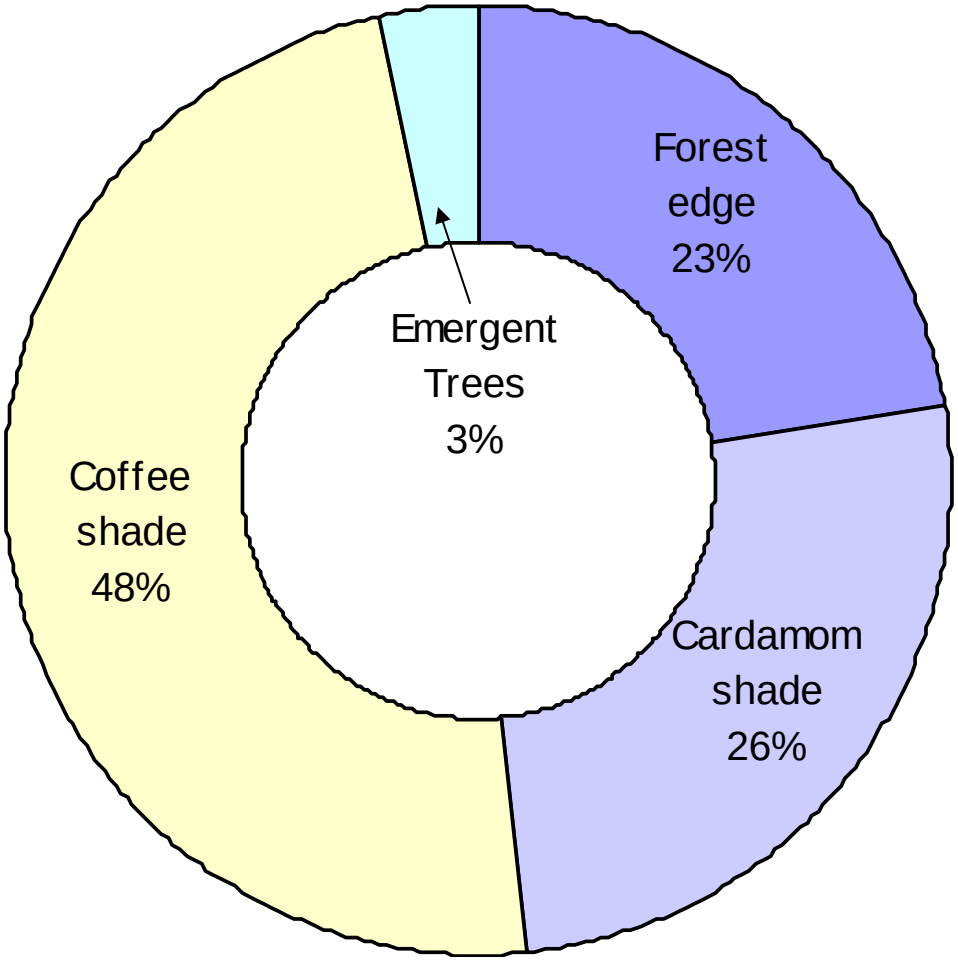
***Dendroica cerulea* foraging**

RESULTS

Habitat

- Only canopy trees in the shade plantations (*Inga* sp., *Albizia* sp.).

- Melastomataceae, Mangos (*M.indica*) and Urticaceae in edges (+ *Cordia* sp. plantation).



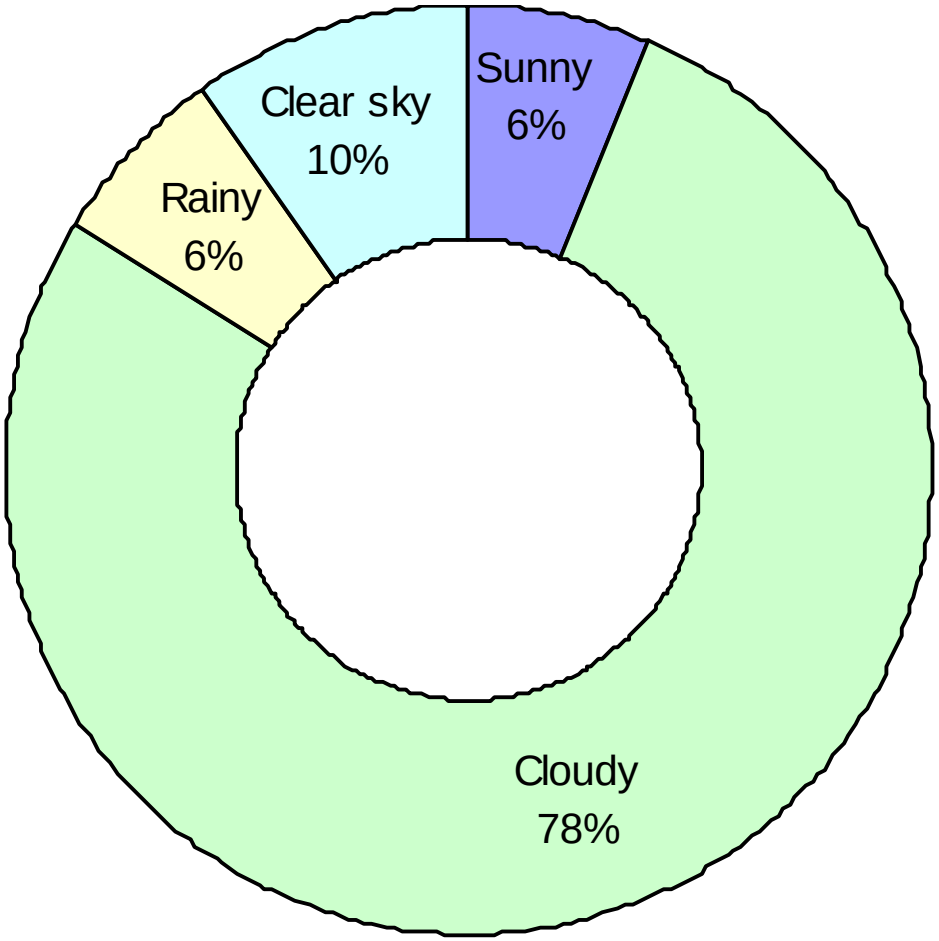
Dendroica cerulea foraging

RESULTS

Weather Conditions

- Overcast conditions

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

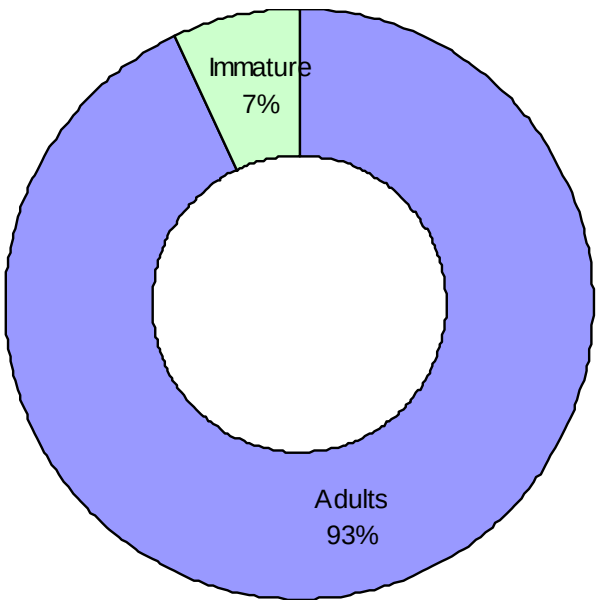


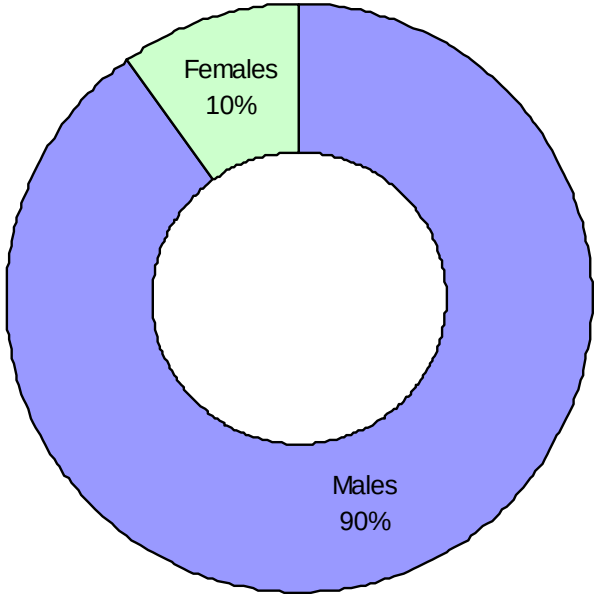
Dendroica cerulea foraging

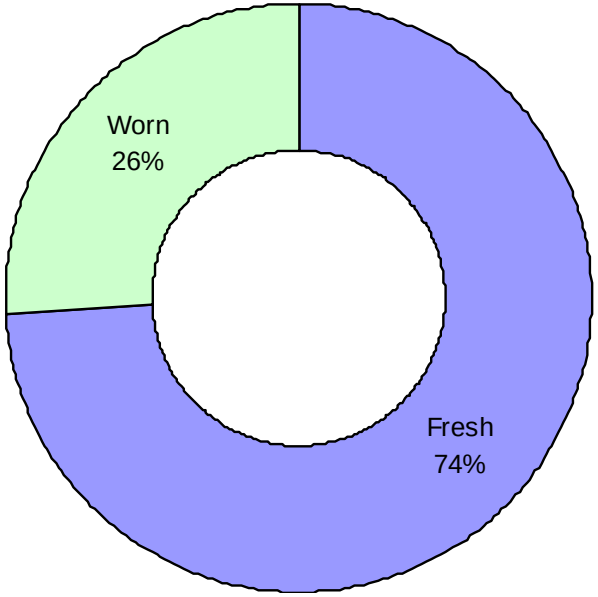
RESULTS

Sex – Age - Plumage

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





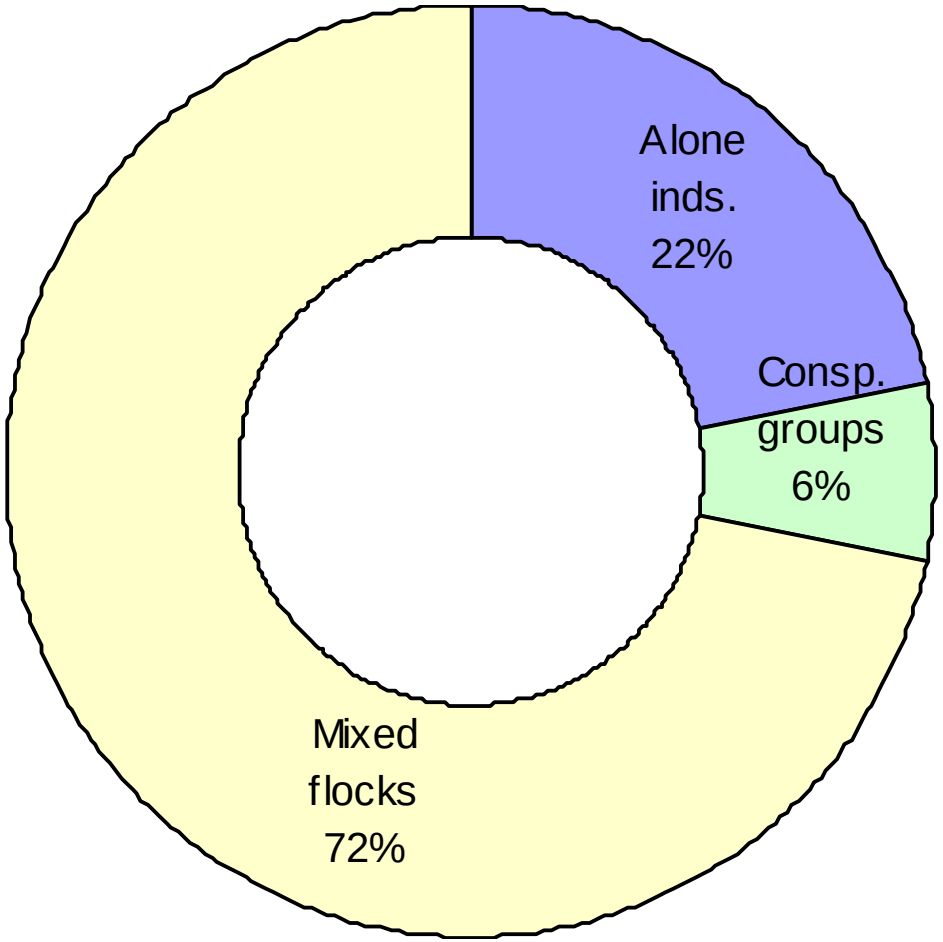


Dendroica cerulea **foraging**

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.



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.

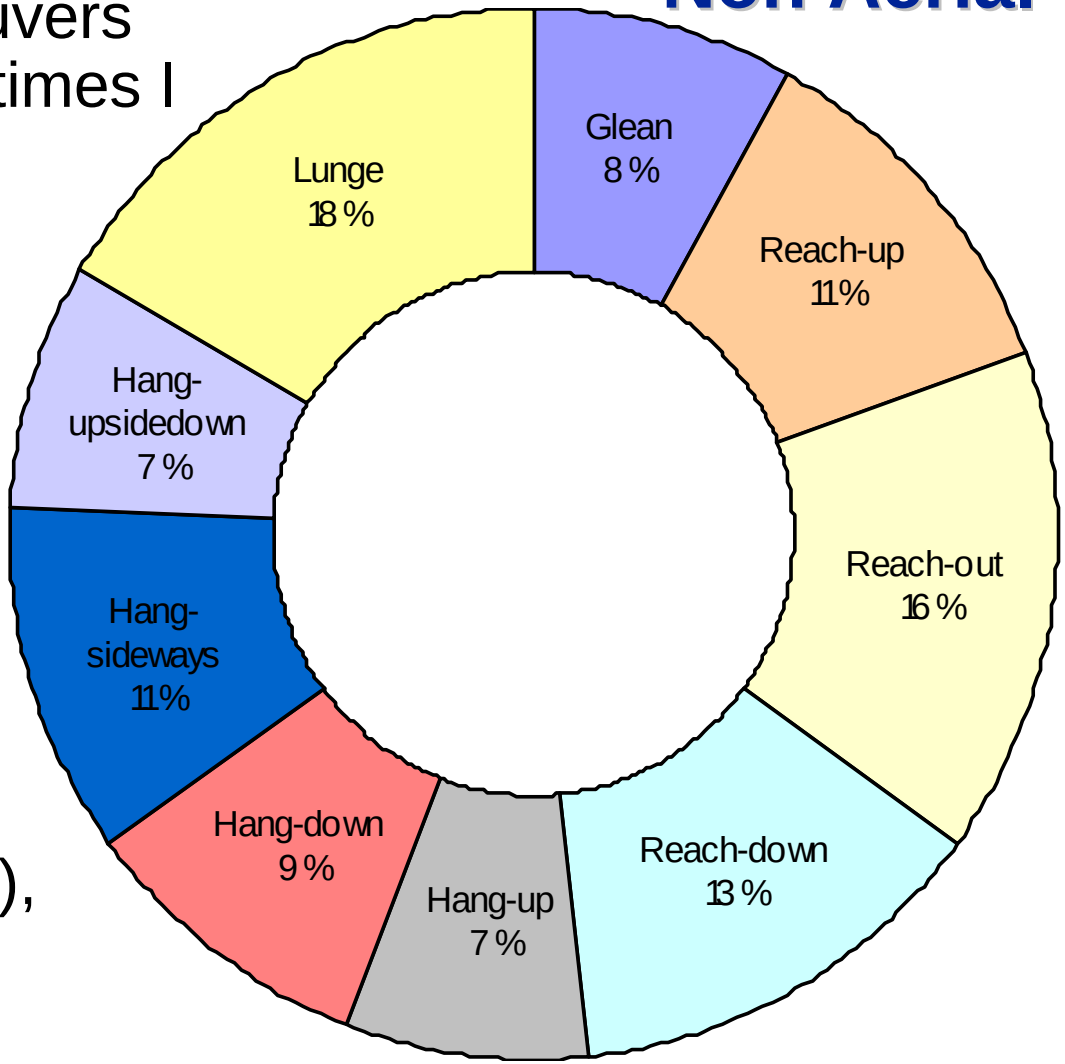
Dendroica cerulea foraging

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

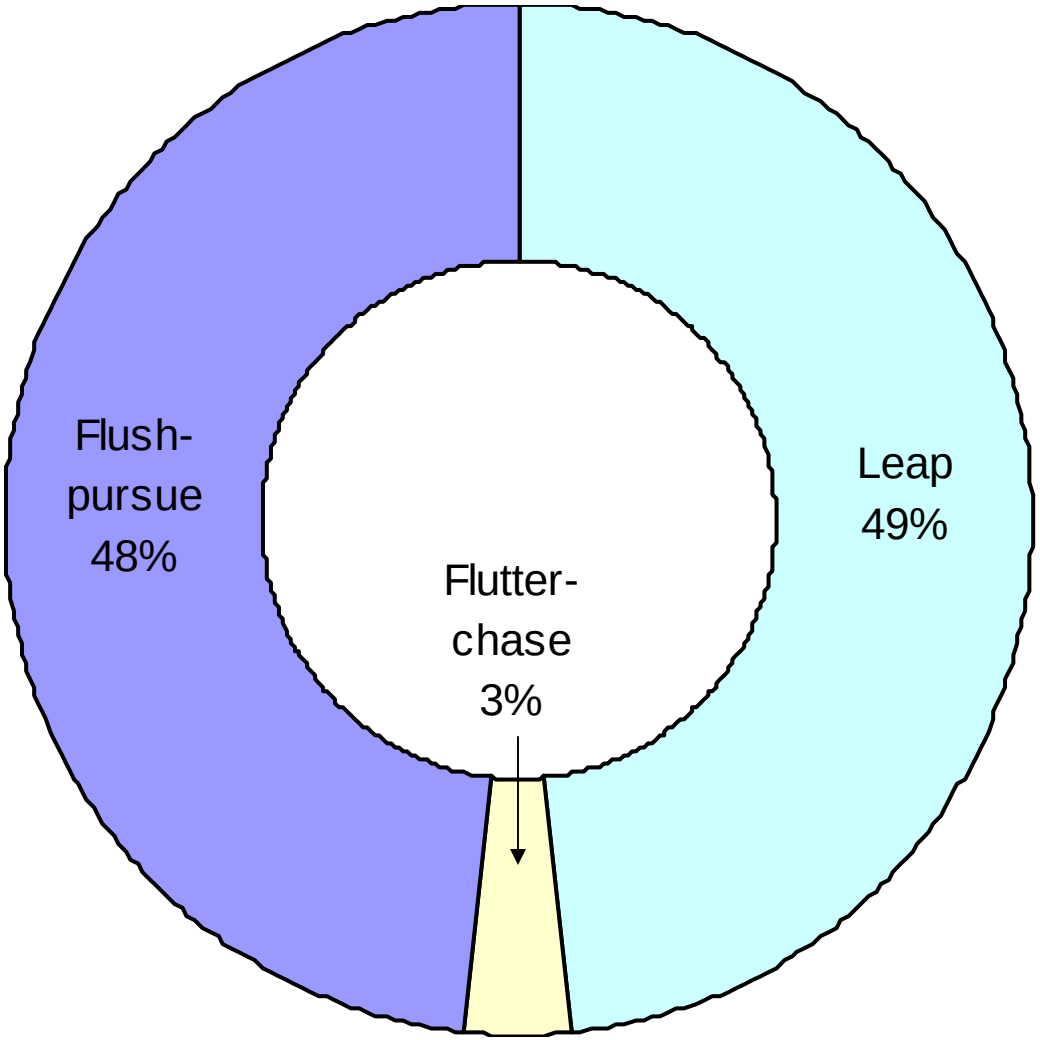
Attacking Maneuvers

Aerial

- $X^2 = 38{,}76$, $p < 0.01$, 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.



RESULTS
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.

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.

AKNOWLEDGMENTS

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