Introduction

- Double-crested Cormorants and Anhingas are native Florida diving birds that mainly prey on small fish and have overlapping territories.
- They have developed distinct morphology and feeding strategies over 40 million years of separation.
  - Little is known about their ecological niche.
  - Long-term diet data sets provided by stable isotopes are needed.

Question/Hypothesis

- Are these birds occupying different trophic positions to avoid competition?
- Are they integrating different baseline food resources?
- H1: By using their unique feeding strategies, they are integrating distinct stable isotope ratios of carbon (δ¹³C) and nitrogen (δ¹⁵N).

Methodology

1. Collection of 10 adult Anhingas and 12 Double-crested Cormorants from pond locations.
2. Field sampling of tissues (plasma, red blood cells, stomach content) followed by preservation of tissues in 70% ethanol before being placed in a -80°C freezer.
3. Lipid extraction of tissues using an ultra-pure water rinse followed by a 2:1 chloroform:methanol solution soak.

Results

Figure 1: Google Maps view of pond locations in Charlotte (27°W, 81°N) and Lee (28°W, 81°N) County FL.

Figure 2: Results of elemental analysis for the tissues and stomach content of individual birds: bulk δ¹³C values (a), δ¹³C values for Anhingas (c) and Cormorants (d), and C:N ratios for Anhingas (e) and Cormorants (f). Bird tissue types include plasma, red blood cells (RBC), and stomach content.

Discussion

- Similar isotopic results for plasma and red blood cells within a single species displaying consistent dietary sources from a few days (3-5) to 1-month time scales.
- Differences in δ¹⁵N values between species lead to the trophic position of Double-crested Cormorants being on average 0.6-1.4 higher than Anhinga (assuming same N sources at base of local food web).
- Differences in δ¹³C data between species possibly show different baseline food resources of tilapia (main stomach content of Cormorants) and catfish (found only in Anhinga stomachs), based on the grazing habits of these fish.
- High C:N ratios of plasma, even after lipid extraction may be a possible indicator for N-poor composition of metabolites in the bloodstream of diving birds.

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References:


