TROPHIC FOOD WEB DYNAMICS ACROSS A MANGROVE/UPLAND ECOTONE

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Florida Mangrove Ecotone

Mixed Mangroves

Saltmarsh

Upland Forest

Natural habitat connectivity
Most Florida Mangrove Habitat Connectivity
**Armases cinereum** (Family: Sesarmidae)

MANGROVE, SALTMARSH, UPLAND FOREST

- Wide-ranging
- Highly abundant in Florida
- See ↑ abundance and ↑ size in upland forest habitat

**WHY?**

- 2ND CONSUMERS

From Odum 1970
Goal: Investigate feeding patterns of *Armases cinereum* across a mangrove/upland forest ecotone

- 2 Laboratory Feeding Experiments
- Stable Isotope Analysis
Mangrove Herbivory: Preference for Mangrove Species and Level of Decomposition

- **3 Choices Simultaneously:** ½ leaf of each *Laguncularia racemosa, Avicennia germinans, Rhizophora mangle*
- **1 level of decomposition per trial:** Fresh, Senescent, Partially Decomposed

**RESULTS:**

![Graph showing average consumption by Armases for each mangrove species by trial type.](https://via.placeholder.com/150)

- N=45 crabs per trial
- Letters and • indicate significant trials at α = 0.05
## Multi-Choice Experiment: Preference for Common Mangrove/Upland Ecotone Prey

- Choice between 5 plant food items and 1 animal prey common at study site, UTBRP

<table>
<thead>
<tr>
<th>Common cricket</th>
<th>Iva</th>
<th>Borrichia</th>
<th>Grass</th>
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<tbody>
<tr>
<td><em>(Gryllus spp.)</em></td>
<td><em>(Iva frutescens)</em></td>
<td><em>(Borrichia frutescens)</em></td>
<td><em>(Stenotaphrum secundatum)</em></td>
</tr>
</tbody>
</table>

- **Fern**
  - *(Nephrolepis biserrata)*

- **Black Mangrove**
  - Partially-Decomposed
  - *(Avicennia germinans)*
Results:

Manly-Chesson Alpha Values for Plant Prey Items Consumed by Armases in Multiple-Choice Feeding Assay

Rank by Electivity Index:
1. Cricket*
2. Iva
3. Black Mangrove
4. Borrichia
5. Fern
6. Grass

Proportion of Initial Mass Consumed
Exploring Feeding via Stable Isotope Analysis

• Goal: Confirm the laboratory-observed selectivity behavior with stable-isotope analysis

• Analysis of observed $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ ratios using simmr (R software package)

Potential sources selected based on previous experiments, literature, and direct observation of *Armases cinereum* in the field. Some potential sources omitted due to mixing model restrictions.
Simmr Mixing Model Results

- Animal prey preference in lab and greatest proportion in diet of crabs at ecotone
- Contributions from both upland and mangrove detritus
- Iva and Detrital Avicennia both <15% of diet

Likely a very abbreviated snapshot of a highly generalist omnivore
Conclusions

1. *Armases* shows preferences for partially-decomposed Black Mangrove leaves when provided mangrove leaves.

2. *Armases* displayed strong selectivity for animal prey, yet among plant foods consumed we observed preference for Iva and Black Mangrove.

3. Stable isotope analysis revealed small % diet contribution of Iva and Black Mangrove.
   - Possibly due to overlapping signatures, contamination by leaf-boring insects, or Nitrogen contamination by locally-applied fertilizers.

Ongoing Work:
- Does the presence of adjacent upland forest influence the trophic position of *Armases cinereum* in Tampa Bay?
- Does presence of upland forest influence reproductive output, size, and gender ratios of *Armases cinereum* populations?
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