

**WLF 419 Waterfowl and Wetlands Ecology and Management**  
**Lecture Waterfowl Evolution and Systematics**

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**History**

- **Key people**
  - **Early years**
    - **Delacour & Mayr**
    - **K. Lorenz**
    - **P. Johnsgard**
    - **F. McKinney**
  - **Recent**
    - **Johnson & Sorenson**
    - **Livezey**
    - **McCracken**
    - **Other-F. McKinney former students**
- **Characters and methods used**
  - **Early researchers**
    - **Behavior**
      - **Courtship**
        - **Orientations and sequence of displays**
          - **Males have characteristics repertoires and some displays are linked to others**
          - **E.g. Head-up-tail-up followed by steam**
      - **Copulation displays**
        - **Pre and post copulation displays**
          - **Species specific-show relationships**
            - **Marbled teal**
            - **White-backed duck**
    - **Ability to hybridize**

- **Morphology**
  - **Plumage-adults**
    - **Blue-wing patch on blue-winged ducks**
  - **Downy ducklings**
    - **Down patterning**
      - **Pattern weak or lacking in Anserini & Oxyurini**
      - **Strongly patterned in Anatini etc..**
  - **Trachea/bullae**
    - **Bullae**
      - **Absent in Geese and Swans**
      - **Highly developed in ducks-males only**
- **New advances in techniques**
  - **Two phylogenetic trees available for waterfowl**
    - **Morphological - Livezey**
    - **Molecular-Johnson & Sorenson**
- **Disagreements**
  - **Molecular and morphological trees agree on certain aspects but disagree on the placement of various taxa within a group as well as relationships between groups and tribes**
- **Oxyurini**
  - **Molecular – basal or ancestral group**
    - **Old lineage**
    - **More closely related to geese and swans than other ducks**
  - **Morphological-highly derived group**
    - **Recently evolved lineage**
    - **Primarily due to high specialization in diving**

- **Anatini**
  - **Blue-winged ducks**
    - **Morphology** – closely related to Mallards
    - **Molecular** – associated with silver teals
  - **Baikal teal**
    - **Basal and no closely related species (molecular)**
    - **Green-winged teals-morphological**
  - **Silver teal**
    - **Morphology** – Close to the green-winged teals
    - **Molecular** – Associated with Blue-winged ducks
  - **Speckled teal**
    - **Morphology** – Closely related to pintails
    - **Molecular** – close to the green-winged teals
  - **All dabblers—**
    - **Molecular data shows Anatini as a monophyletic group all under the genus *Anas* with a South American group consisting of Crested Duck, Brazilian Teal, Bronze-winged Duck, and Steamer Ducks**
    - **Morphological data shows Anatini as a paraphyletic group or unresolved phylogenetic group. Split tribe into *Anas* and *Mareca*. Steamers not included in Anaini.**
  
- **How solve these differences?**
  - **Check relationships using independent characters**
  - **Good source is behavior**
    - **A lot of information already available from previous research**

- **What else can we get my phylogenetic trees besides relationships?**
  - **Map characters on tree to show how a trait evolved over time**
  - **Map characters not used to build phylogenetic tree**
    - **Copulation displays**
      - **Functional Hypotheses**
        - **Species recognition**
        - **Pair bond reinforcement \*\***
        - **Important in obtaining repeated copulations**
        - **Ensure sperm retention**
        - **Signal Male Identity \*\***
        - **Signal to female successful copulation \*\***
  - **Courtship**
    - **In general, courtship on land leads to reduction in repertoire**
      - **E.g. Baikal teal and red-billed pintail**
    - **Predation factor**
      - **Trade-off between exaggeration of male displays and predation pressure**
- **Duckling distress calls**

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