



BIOO 470: Ornithology

Dr. Ethan Linck
Office: 305 Lewis Hall

Introduction

- ▶ Ethan Linck (“Ethan”, “Dr. Linck”, “Professor”, whatever)
- ▶ BA Biology, Reed College; PhD Biology University of Washington
- ▶ Postdocs at UNM, UWy; 4th year at MSU

Introduction

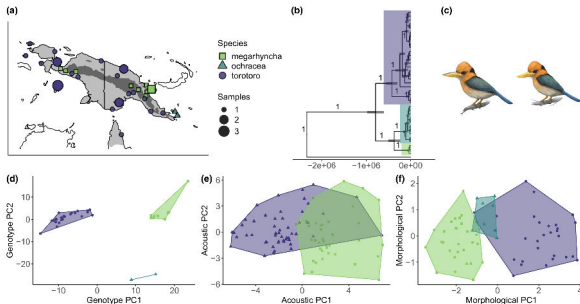
- ▶ Ethan Linck (“Ethan”, “Dr. Linck”, “Professor”, whatever)
- ▶ BA Biology, Reed College; PhD Biology University of Washington
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(Me at 26 in PNG + Eastern Crested Berrypecker, *Paramythia montium*)

Introduction

- ▶ Research: Evolutionary history, adaptation, and distribution of birds (and sometimes insects and mammals)
- ▶ Elective Member, American Ornithological Society
- ▶ Recreational birder; 2nd time teaching BIOO470



(Linck et al. 2020, *J. Evol. Biol.*)

Introduction

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Columbiformes [Columbidae](#)

New Britain Bronzewing

Henicophaps foersteri

 [Vulnerable](#)



Identification

POWERED BY IGBL

A little-known species from lowland and foothill forest. Long bill and colorful iridescence in the wing. Underparts and face white, rufous from the crown to the upper back and sides of the chest. Rare and secretive. Feeds on the ground and lands on a perch when flushed, bobbing its head. The only ground-feeding dove species of this size and color. Vocalizations undocumented but apparently an upslurred "pip-yia" and deep, flat "hoop-hoop" notes.

No audio available.
[Submit yours](#)

(*Henicophaps foersteri*)

Course Logistics

- ▶ Syllabus and slides on course website (will change); grades and announcements on Canvas
- ▶ Grading: 400 points total: 3 x 50-point lecture exams, 3 x 50-point lab exams, 6 x 10-point lab quizzes (lowest dropped), 25 points from participation, 25-point eBird assignment

BIOB470: Ornithology

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BIOB470: Ornithology

Course: BIOC 470 (3 Credits: 2 Lecture, 1 Lab)

Prerequisite: BIOC310

Lecture Time & Place: MW 10:00 - 10:50 AM, 1147 Wilson Hall.

Lab Time & Place: R 3:05 - 4:55 PM, 012 Lewis Hall.

Instructor: Dr. Ethan Linck (ethan.linck@montana.edu; 406-994-2024)

Office Hours: 1:00 PM - 2:30 M/W, Lewis 305

Catalog Description

Evolution, functional biology, distribution, and classification of birds. Montana species recognition is developed through laboratory use of a representative skin collection.

Overview

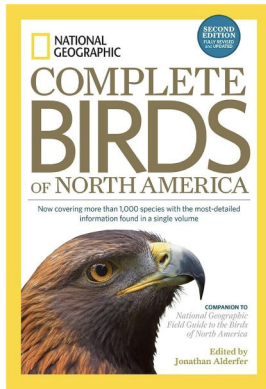
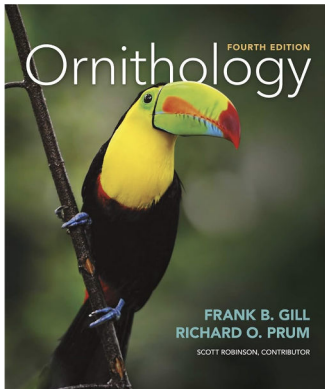
Birds are among the most familiar groups of organisms. This course covers the evolution, functional biology, distribution, and classification of birds. Lecture topics will include an overview of avian diversity and taxonomy, characteristic adaptations, life history, and reproduction. Labs will focus on morphological features and visual and aural identification of common Montana species.

Course Organization and Format

Monday and Wednesday class periods will consist of 50-minute lectures. Thursday labs will involve

Resources

- ▶ *Ornithology*, Gill & Prum: on-demand at bookstore
- ▶ Any field guide (*National Geographic Complete Birds* at bookstore)



<https://join.iclicker.com/SSVI>

Ornithology

Go to

join.iClicker.com
SSVI



Where should you look for **course material** to study from?

- a) The course website
- b) Canvas
- c) The textbook
- d) The course website *and* the textbook

Resources

- ▶ Slides posted after each class. Latin names are links!
- ▶ Work cited and found in concluding references when possible

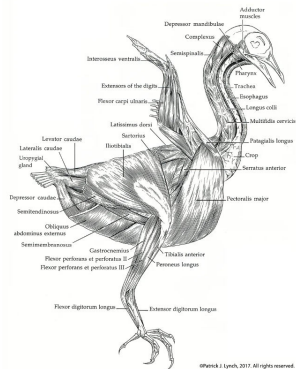
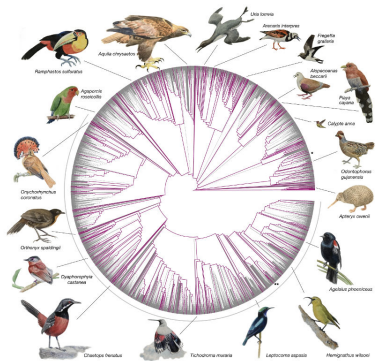


(*Mellisuga helenae*)

<https://macaulaylibrary.org/asset/89854171>

Topics

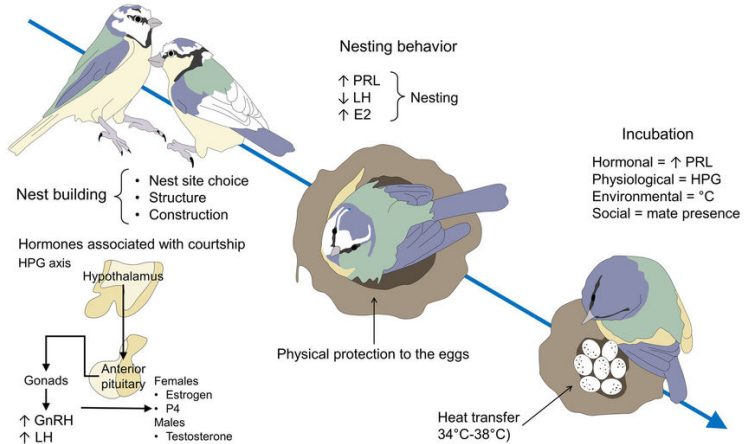
- ▶ Evolution
- ▶ Anatomy



(Stiller et al. 2024; Proctor & Lynch 1993)

Topics

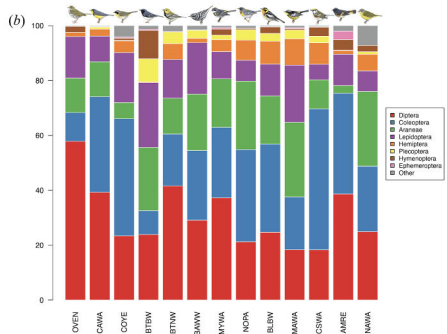
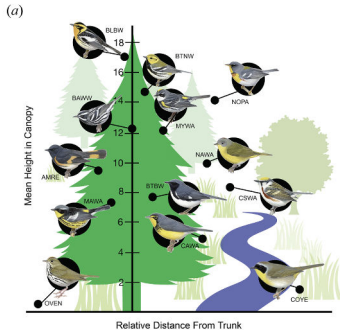
- ▶ Physiology
- ▶ Life-history Strategies



(Mota-Rojas et al. 2023)

Topics

- Ecology
- Conservation
- Scientific Method



(Miller et al. 2025)

Tips for Success

- ▶ Lectures follow the textbook!
- ▶ You are responsible for all material in readings and lectures



(*Balaeniceps rex*)

Tips for Success

- ▶ Tests will emphasize lectures
- ▶ Occasional material from primary literature



(*Nyctibius griseus*)

Facts

- ▶ Terminology and Nomenclature
- ▶ Montana species identification
- ▶ Physics of flight
- ▶ Anatomy



(*Aythya valisineria*)

Concepts & Theory

- ▶ Evolution of birds (phylogenetics)
- ▶ Choice of mating system
- ▶ Level of parental investment



(*Nucifraga columbiana*)

Why are birds awesome?

- ▶ Bee Hummingbird: Cuban endemic; smallest bird in the world, 5 cm long, 1.8 g (a penny weighs 2.5 g)



(*Mellisuga helenae*)

Why are birds awesome?

- ▶ Common Ostrich: largest bird, 90 - 130kg, (~50,000 or 72,000X a Bee Hummingbird) 1.7 - 2.7m tall. Run at speeds of 43 mph for short bursts, sustained speeds of ~30 mph



(*Struthio camelus*)

Why are birds awesome?

- ▶ Peregrine Falcon: fastest flying bird, hits ~200 mph in “stoops”, pulling out results in 27gs force (F-16 built to easily withstand 9gs)



(*Falco peregrinus*)

Why are birds awesome?

- ▶ Bar-headed Goose: migrates over the Himalayans at $>33,000$ ft, $\sim 4,000$ ft higher than Mt. Everest.



(*Anser indicus*)

Why are birds important?

1. **Scientific Importance**

- A. Evolution
- B. Ecology
- C. Physiology and Neurobiology

2. **Economic Importance**

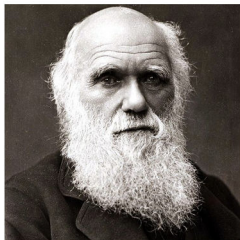
- A. Ecosystem Services
- B. Recreation

3. **Cultural Importance**

- A. Mascots
- B. Mythology
- C. National Emblems

Importance to Evolutionary Biology

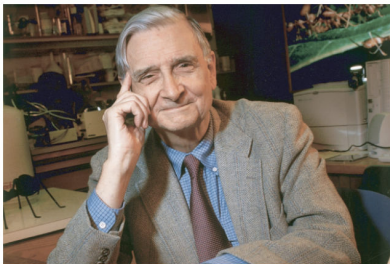
- ▶ Evolution by natural selection
- ▶ Allopatric speciation: Speciation in geographic isolation
- ▶ Biological species concept: Species are reproductively isolated



(Mayr, Darwin, Peter & Rosemary Grant)

Importance to Ecology

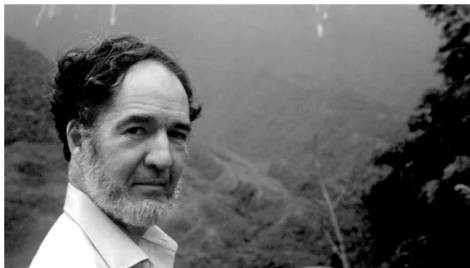
- ▶ Quantitative Ecology: Mathematical models for ecology
- ▶ Island Biogeography: Species composition comes from immigration and extinction



(MacArthur, Wilson)

Importance to Ecology

- ▶ Niche Theory: Sum of conditions a species needs to survive and reproduce
- ▶ Community Assembly: What species are where and why?



(Grinnell, Diamond)

Importance to Physiology and Neurobiology

- Ethology: study of behavioral processes



(Tinbergen, Lorenz)

Importance to Physiology and Neurobiology

- Polygyny threshold hypothesis: When is it favorable for a female to enter into a polygynous relationship?



(Orans, Emlen)

Importance to Physiology and Neurobiology

- ▶ Zebra finch model system



(*Taeniopygia guttata castanotis*)

Importance to Ecosystem Services

- ▶ Nutrient cycling
- ▶ Seed dispersal
- ▶ Meat provision
- ▶ Pest control



Importance to Ecosystem Services

- ▶ Pollination
- ▶ Scavenging
- ▶ Ecotourism



Cultural Importance

- ▶ Birds are common emblems for teams and countries; fixtures in mythologies across the world



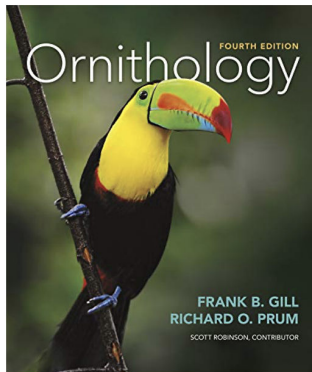
BOZEMAN
HAWKS



(Bozeman High School, The Crane Wife, Mexico, USA)

Assignments for Monday (9/31)

- ▶ Read Chapter 1



References

- ▶ Title Slide Species: *Oreotrochilus estella*, *Spinus notatus*, *Diglossa cyanea*, *Turdus fuscater*
- ▶ Linck, E., Freeman, B. G., & Dumbacher, J. P. (2020). Speciation and gene flow across an elevational gradient in New Guinea kingfishers. *Journal of Evolutionary Biology*, 33(11), 1643-1652.
- ▶ Gill, F. B., Prum, R. O., & Robinson, S. K. (2019). *Ornithology* (4th ed.). W. H. Freeman.
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- ▶ Proctor, N. S., & Lynch, P. J. (1993). *Manual of ornithology: Avian Structure & Function*. Yale University Press.

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- ▶ Mota-Rojas, D., Marcet-Rius, M., Domínguez-Oliva, A., Buenhombre, J., Daza-Cardona, E. A., Lezama-García, K., . . . & Bienboire-Frosini, C. (2023). Parental behavior and newborn attachment in birds: life history traits and endocrine responses. *Frontiers in Psychology*, 14, 1183554.
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