

Lecture: Avian Taxonomy

Class Business

The Twitter Handle Worksheet is now overdue! Make sure you fill it out, and bring it to class! The Course Guidelines Form is WAY overdue; if you haven't handed it in, you aren't earning points no matter what you do.

Reading for this lecture

Required. Gill: Chapter 1, and online at www.whfreeman.com/gill3e

1. Taxonomic organization

A) BASICS OF TAXONOMY - A taxonomy is an ordered (formal) system of classifying and naming organisms. A **taxonomy** is not necessarily a **phylogeny** (= a hypothesis about the pattern of evolution that produced the groups of organisms being named), but in practice in modern biology, all taxonomies are hypotheses about evolutionary history and relatedness.

i) Organisms are arranged in a hierarchical fashion with nested taxonomic levels. The basic levels are:

Kingdom, Phylum, Class, Order, Family, Genus, Species (in this hierarchy, organisms are increasingly closely related as you get closer to the species level. Are all individuals in a species equally closely related?) In addition, some taxonomists use intermediary levels, such as subfamilies, subgenera, superspecies, etc.

ii) In addition to their common names all birds also have scientific ("Latin") names. These are given as a **binomial**, with the genus name first (and capitalized) and the species name second (not capitalized). E.g., the scientific name for Canada Goose is *Branta canadensis*. Subspecies names are given as a **trinomial**, with the third part identifying the subspecies. E.g., the subspecies of Canada Goose that occurs in the Aleutian islands (and which is endangered) is called *Branta canadensis leucopareia*. Why do we bother to do this?

iii) Birds are classified in the Kingdom Animalia, the Phylum Chordata, and the Class Aves. Within the Aves, the first major subdivision splits the birds into two superorders, the **Palaeognathae** (ratites and tinamous) and the **Neognathae** (all other modern birds).

B) WHAT YOU SHOULD LEARN

- i) There is variation in the ways that birds are grouped by different experts (there is also a lot that is consistent across taxonomies) and taxonomies do differ – a taxonomy is a hypothesis! You should be aware that there is variation, and all taxonomies CHANGE over time.
- ii) During this lecture, I will simply provide an overview of the groups of birds in the world above the level of Orders.
- iii) Over the course of the semester I expect you to select an Order of birds to summarize the available information on, according to the Ordinal Summary Guidelines posted on the class website. You will pick an Order from those named on the website of our textbook (whfreeman.com/Gill3e). Your job will be to summarize in an orderly and useful fashion the following information: the name of your group (both common and scientific); how both the name and membership of the group has differed over time and analysis (for example, the Superorder Paleognathae either contains 5 orders, including the Struthioniformes = Ostriches, or, according to some authorities a single order, the Struthioniformes, with 5 families, including the Struthionidae =Ostriches), approximately how many species are in the order, and major characteristics of each group (e.g., where found, what type of bird, major defining anatomical and/or behavioral characteristics).

2. Superorder Palaeognathae

A) FEATURES

- i) The Palaeognathae consists of a relatively small number of species and includes all ratites, plus the tinamous.
- ii) The group dates back a long way and it has been suggested that they have a lot of “primitive” traits; this is misleading, since all living bird groups have been evolving for a long time, and it is not at all clear that Paleognathes are more like the ancestor of all birds than any other kind of bird.

- iii) Members of this group all have a distinctive arrangement of bones in their palates, and this arrangement is not found in other birds. This is a key trait that unites the group.
- iv) Most of the birds in this group (all of the ratites) are also flightless and have a number of anatomical features that are associated with flightlessness (e.g., reduced keel on the sternum, reduced wing bones). Tinamous can fly, but are very terrestrial.
- v) In this group **males** provide parental care, and the mating systems are often relatively unusual (e.g., polygynandry/promiscuity).
- vi) Exact details of taxonomy and relationships between subgroups are controversial, but the ratites are generally considered to be monophyletic, with tinamous their closest relatives (i.e., their “**sister**” **group**). (in which case the name ends in “-idea” instead of “-iformes”).

3. Superorder Neognathae

A) FEATURES

- i) This group includes all other modern birds.
- ii) The group is united, and distinguished from the paleognathous birds by a different arrangement of bones in the palate.
- iii) The neognathous birds are subdivided into approximately 24 orders.
- iv) Some authorities divide the Superorder into two “infraclasses”: the **Galloanserae** (containing the Galliformes and Anseriformes) and the **Neoaves** (all other modern orders).