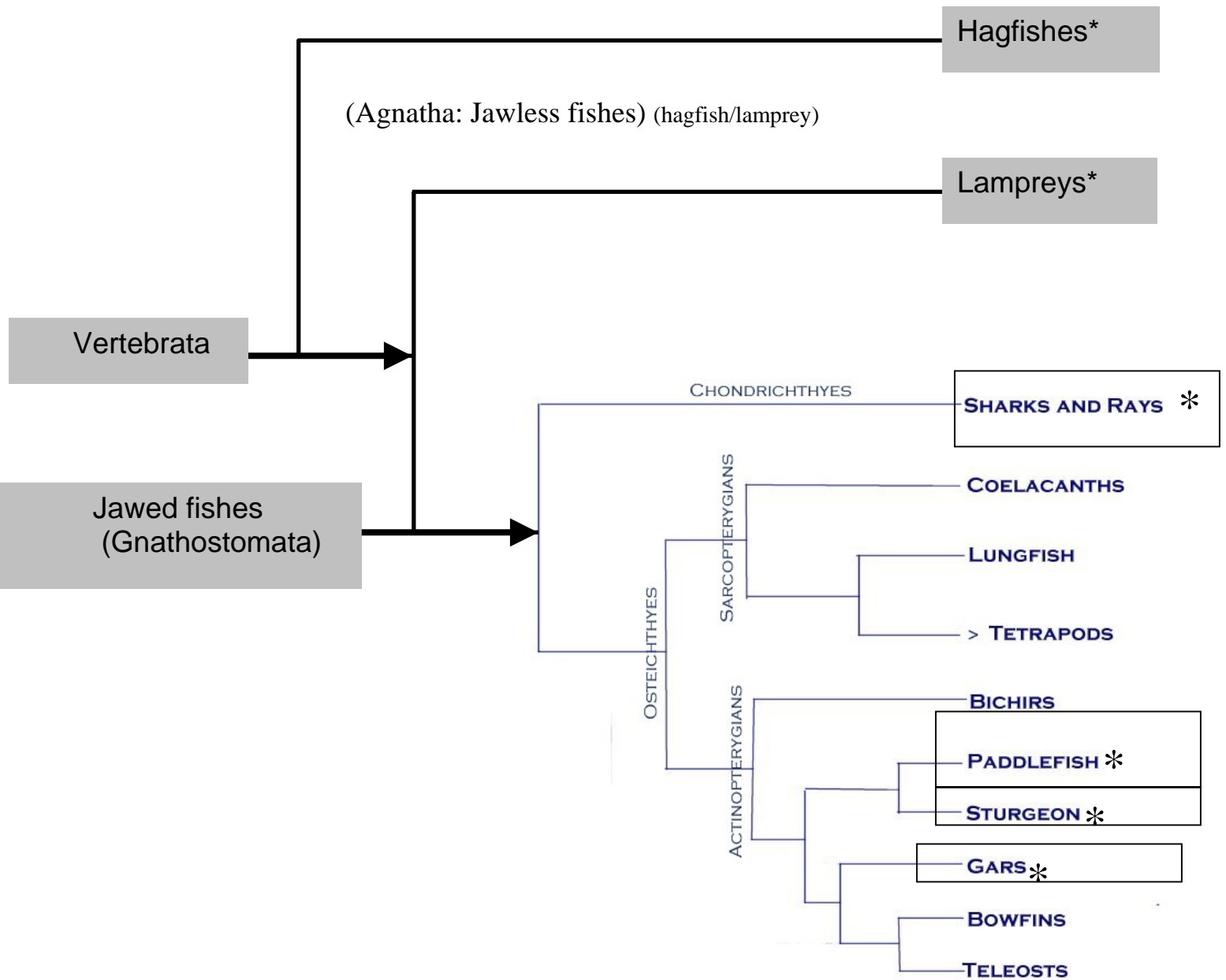


Ichthyology Spring 2009
 Lab Three: Agnatha through Lepisosteidae
 (asterisked groups are those that we will cover in lab today)



Today we begin with the taxonomy, phylogeny, and identification of fishes. You will be responsible for the following:

- Being able to identify the fish species presented in lab, without the use of a key (unless otherwise noted)
- Knowing the characteristics of the individual species and higher groups of fishes from lab handouts, keys, and pictures/illustrations from the Fishes of MT CD. **As indicated in bold**
- Being able to identify the characteristics and functions of different morphological traits among the species examined in the lab
- Correct spelling of common name (0.5 point off for each spelling error). **Correct Latin name: 0.5 point added for correct Latin genus species or family name. Occasional other group names to know will be highlighted in bold**
- Knowing whether a species is native or introduced to Montana, and if native, to which major drainage of Montana i.e., Mississippi, Columbian, Saskatchewan
- Anything else presented in the lab handouts and in associated chapters in book on each group (distinct taxonomic features and life history)

Note: the numbers below correlate to specific specimens in jars or out on the tables.

I. Superclass **Agnatha (jawless fishes)**

Class Myxini

Order Myxiniiformes (**hagfishes**)

Entirely marine in distribution; in chap 14, note feeding mode and commercial fishery on them

3.1 On the demonstration specimen identify:

- barbels around mouth
- gill openings and slime gland pores along side of body (adaptation for life in burrows?)
- single median nostril used for water intake to gills
- Also notice that, unlike lampreys, hagfishes do not have eyes or an oral disc.

Class Cephalaspidomorpha

Order Petromyzontiformes (**lampreys**)

Family Petromyzontidae

Petromyzon marinus (sea lamprey)

Freshwater or anadromous, parasitic and free-living forms; not found in Montana. Undergo distinctive metamorphosis; see specimens **3.2** of larval ammocoetes. Adult specimen of sea lamprey ('aquatic vampires').

3.3 Identify:

- gill slits

- single median nostril
- oral disc (most distinctive feature)
- teeth on oral disc and tongue
- dorsal fin
- eyes (note: when preserved the eyes of lampreys often become opaque and difficult to see and distinguish from surrounding skin)
- On dissected specimen **3.4**, note these gills compared to teleost fishes with gill arches and filaments

Class **Chondrichthyes** (cartilaginous fishes)

Subclass Elasmobranchii

Order Squaliformes (one of the eight orders of sharks)

Have distinctive placoid, sandpaper-like scales; various reproductive modes including egg laying by release of leathery eggs (see specimen **3.5** in box)—some species bear live young, which develop in the uterus—see specimen **3.6**

3.6 Identify:

- gill slits (compare to teleost like perch or trout re: respiratory structure)
 - spiracle (water entry pore)
 - nostrils
 - heterocercal caudal fin.
 - The skin has a rough texture, from the presence of placoid scales.
 - Note presence of modified pelvic fin in some specimens
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Class **Osteichthyes (bony fishes)**

Subclass Actinopterygii (ray-finned fishes)

Order Acipenseriformes

(Paddlefish and sturgeon have mostly cartilaginous skeletons with a notochord (ie not a typical backbone or spine).

Family **Acipenseridae (sturgeons)**

Acipenser transmontanus (**white sturgeon**)

Scaphirhynchus platyrhynchus (**shovelnose sturgeon**)

Scaphirhynchus albus (**pallid sturgeon**)

These three sturgeon are identified by their caudal peduncle and by the position of the barbels under the snout. Note the sturdy scutes along the side of the body. See specimens **3.7** or **3.8** under a microscope to locate barbels, protrusible mouth without teeth, and distinctive scales (handle carefully!). Specimen **3.9** is a 2-day old shovelnose sturgeon. Sturgeons are one of the largest freshwater fishes, are highly sought after commercially (eggs=caviar) and are one of the most endangered fish families due to overharvest and blocking of their long distance migrations by dams.

Acipenser transmontanus - **white sturgeon**

- native
- In Montana, limited to Kootenai River of the Columbia River basin
- Note stout caudal peduncle (compared to shovelnose and pallids) & presence of spiracle near eye.
- No preserved specimen available.
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Scaphirhynchus platyrhynchus - **shovelnose sturgeon**

- native
- Widely distributed in lower Missouri and lower Yellowstone rivers
- Note long, slender caudal peduncle. Barbels about half way between snout and mouth, all of near equal length.

Scaphirhynchus albus - **pallid sturgeon (3.9A)**

- native
- lower Missouri and lower Yellowstone rivers drainage, now rare
- Note long, slender caudal peduncle. Barbels about 1/3rd between snout and mouth, outer ones typically >2X length of inner ones. (see Keys)

Family **Polyodontidae (paddlefish)**

Polyodon spathula (paddlefish)

Specimen **3.10**:

- native
- lower Missouri and lower Yellowstone rivers (also a Chinese paddlefish in Yangtze River)
- Unique elongated flattened snout or paddle. Paddle is thought to function as a rudder to hold position while feeding with mouth open in fast current; also has many electroreceptors for detecting weak electric fields generated by prey
- many slender, long, closely spaced gill rakers--planktivore
- spiracle present; elongated operculum; note unique eye position.
- modified ganoid scales on dorsal lobe of heterocercal ('shark-like') caudal fin

Infraclass Neopterygii (gars and bowfin)

Order Lepisosteiformes

Family **Lepisosteidae (gars)**

***Lepisosteus platostomus* (shortnose gar)**

***Lepisosteus platostomus* – shortnose gar**

- specimen **3.11**
- native
- lower Missouri River below Fort Peck dam
- abbreviated heterocercal caudal fin
- have hard, *nonoverlapping* ganoid scales; tubular, elongated snout with many small teeth; torpedo-like shape for ambushing prey. Large swimbladders can be used for air breathing at very low oxygen levels
- For comparison, check out specimen **3.12**, a spotted gar from lower Mississippi drainage, with a much more elongated snout, shows teeth structure well.