

h9 Rapidly evolving fish < infraclass Teleostei of the class Osteichthyes >

If the doctrine of Evolution had not existed, Paleontologists must have invented it. —Huxley, 1880.¹

The formerly formally recognized class Osteichthyes (bony fishes)² is not a monophyletic group and has the status of a vernacular unless John Mulley and Peter Holland in 2004 are right in placing all in a clade defined by a putative ancestor with 12 pairs of chromosomes as distinct from sharks and lamprey (**Figure h9.1**). Osteichthyes include Sarcopterygii (lobe-finned fishes and terrestrial vertebrates—so us) and Actinopterygii (“ray-finned” fishes) of which there are 20,000 living species (as many as *all* other living vertebrate species combined). Their fins are webs of skin supported by bony or horny spines. Most actinopterygians are with complex skeletons of true bone (sturgeons and paddlefishes are exceptions with skeletons, away from the head, of cartilage and gristle).³

Teleostii (advanced bony fishes) (**Table h9.1**), a division of the class Actinopterygii, are characterized by a fully movable upper jaw (of maxilla and premaxilla) which is protruded to expose their biting edges when the mouth opens. The teleost tail (caudal fin) typically has upper and lower halves about equal.⁴ This *homocercal* tail is retained in primitive form by the living Acipenseriformes (and not, Pere Ahlberch and Brian D. Metscher have determined, by *Polypterus*, whose fin morphology they find derived). In early teleosts, the homocercal tail is found in *Cheirolepis* and, in bony fishes immediately ancestral to the teleosts, it is well exemplified by the tail of *Lepisosteus* (and not *Amia*, whose median fin morphology is more derived).⁵

Teleosts are the dominant aquatic vertebrates today (and we sister land lubbers eat millions of them which should hardly surprise as fish eat fish). Teleosts are in every aquatic habitat from the abyssal depths of the ocean to freshwater streams and ponds, in coastal mud flats (**Footnote h9.1**), and even on dry land in nocturnal peregrinations. “Catfish terrify dogs in Florida,” is the headline. By the end of the Cretaceous, teleosts had achieved their watery ascendancy in stream, lake, and sea. What in descendants are swim bladders, were then, in most of the freshwater varieties, functioning lungs. Other than the teleosts, lines of bony fish that remained aquatic have dwindled almost to extinction since the end of the Cretaceous.

Typical of sharks (class Chondrichthyes) is a *heterocercal* tail. In it, the dorsal lobe is often larger than the ventral lobe, and the tip of the vertebral column turns upward and extends into the dorsal lobe of the tail fin. In Teleosts, such a tail is retained in sturgeons and is the ancestral condition seen in many fossil primitive bony fishes. □

Table h9.1 Teleostii (advanced bony fishes)

Orders:

- Acipenseriformes (sturgeons) retain the primitive heterocercal tail.
- Amiiformes (bowfins)
- Anguilliformes (eels, electric eels)
- Atheriniformes (silversides)
- Aulopiformes (greeneyes, sabertooths, lancetfishes)
- Batrachoidiformes (toadfish)
- Clupeiformes (herrings, anchovies)
- Cypriniformes (carps)
- Elopiformes (tarpons, ladyfish, bonefish)
- Gadiformes (cod-like fishes)
- Gasterosteiformes (sickle-backs, seahorses, pipefishes)
- Gobiesociformes (skilletfishes)
- Lepisosteoriformes (gars)
- Lophiiformes (anglerfish)
- Perciformes (perch-like fishes) is the most diverse order (includes cichlids).
- Scorpaeniformes (scorpionfish)
- Siluriformes (catfishes)

Figure h9.1

