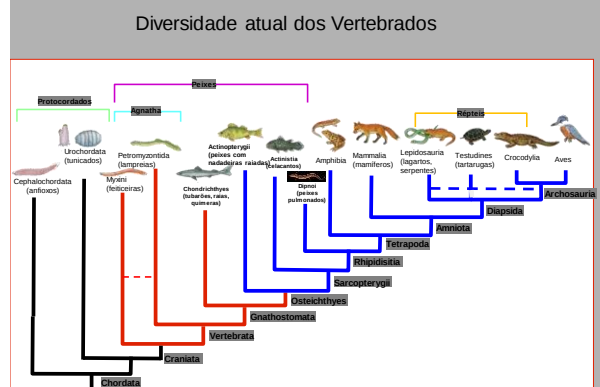
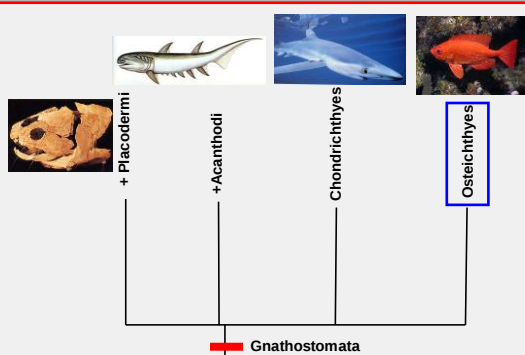


- Introdução aos Osteichthyes

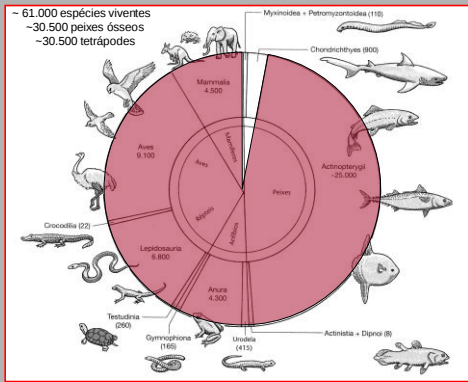
- **Actinopterygii**

Objetivos desta aula

- Caracterizar os Osteichthyes
- Caracterizar os Actinopterygii
- Apresentar a diversidade de Actinopterygii recentes

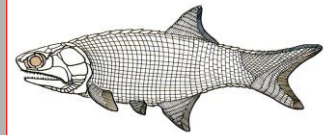


Diversidade atual dos Osteichthyes = todos os Gnathostomata exceto Chondrichthyes

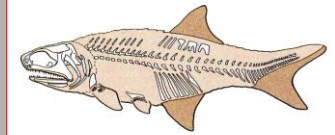


Osteichthyes: caracteres

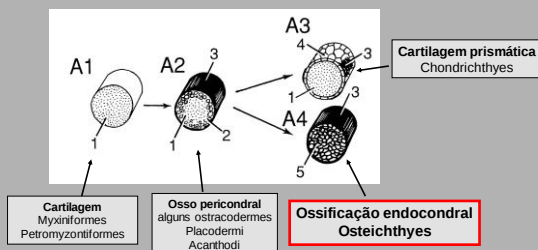
Esqueleto dérmico



1 - Endoesqueleto
ossificação endocondral
(substituição da cartilagem por osso durante o desenvolvimento)

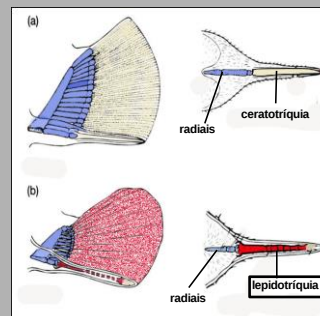


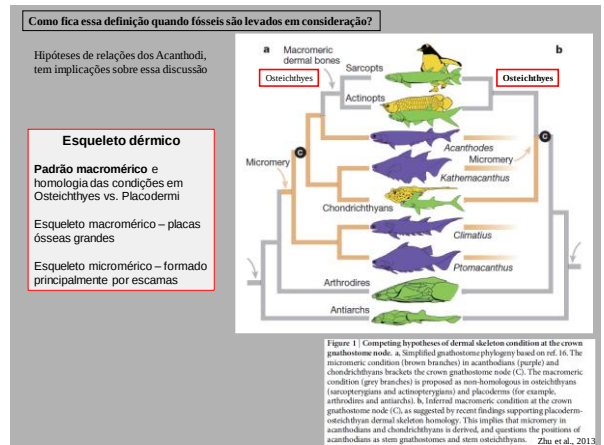
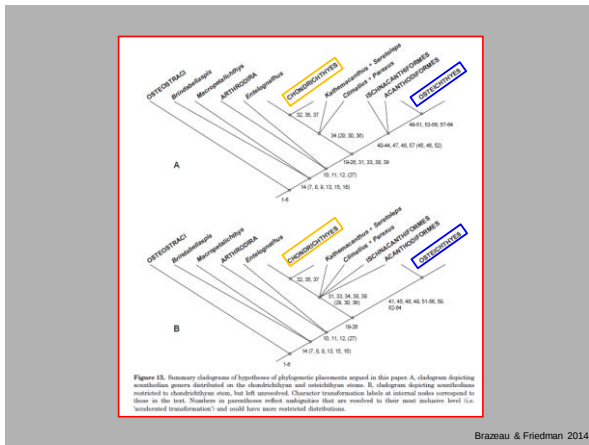
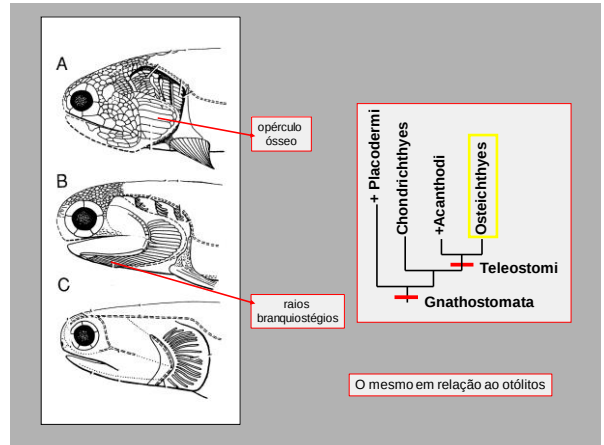
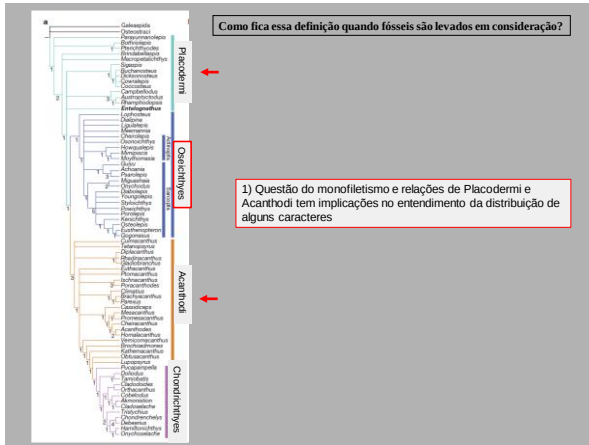
Osteichthyes: caracteres

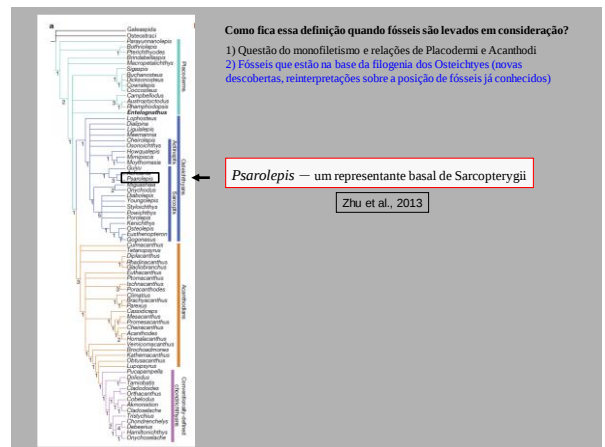
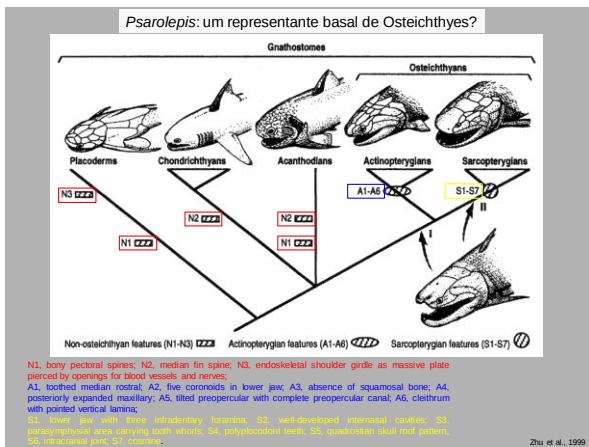
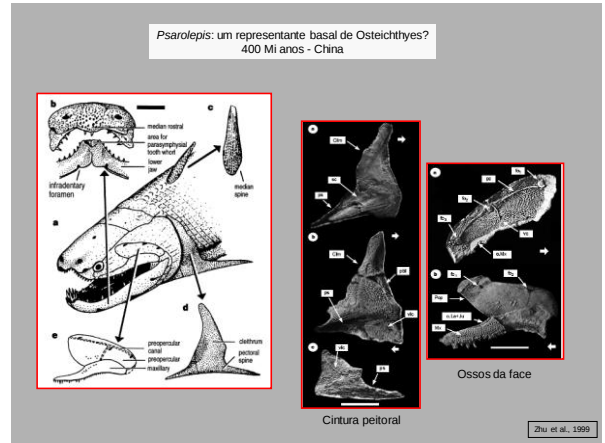
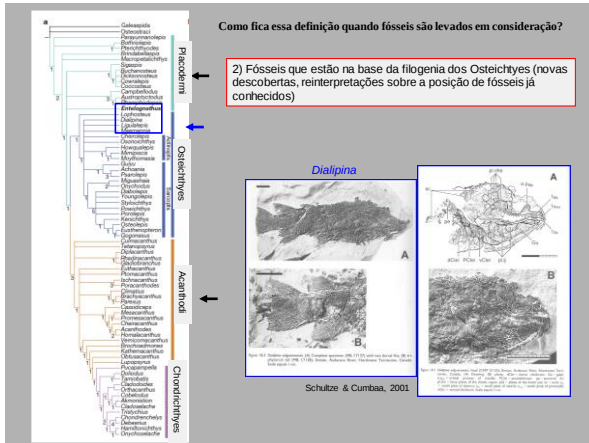


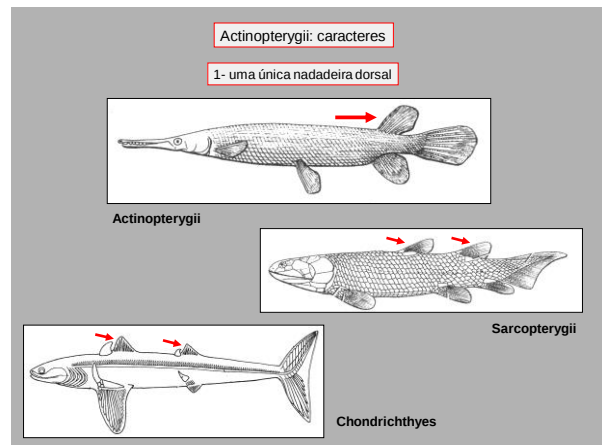
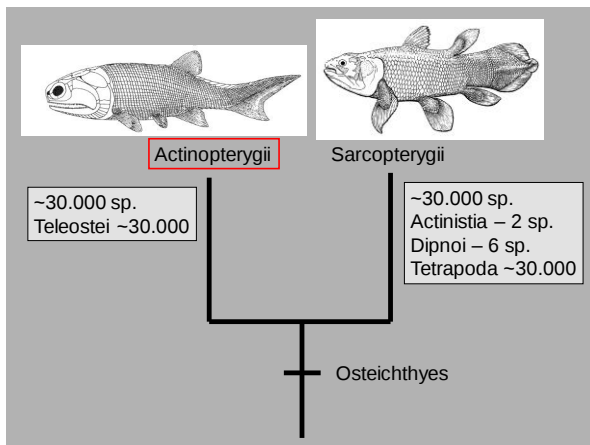
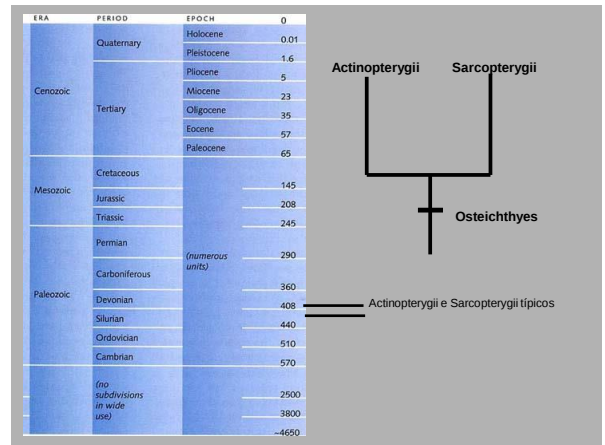
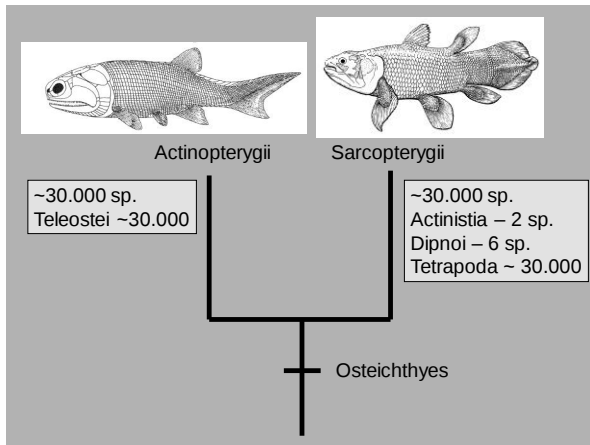
Osteichthyes: caracteres

2 - Raios das nadadeiras sustentados por ossos dérmicos chamados lepidotríquia



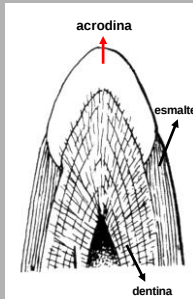






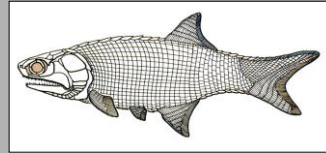
Actinopterygii: caracteres

2- acrodina nos dentes



Acrodina: enameloide derivado da ectoderme e crista neural

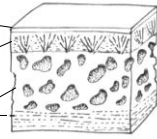
Esqueleto dérmico: características gerais



esmalte ou enameloide

dentina

osso dérmico



Esmalte: origem monotípica (ectoderme)

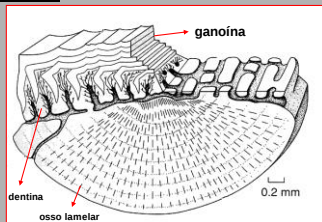
Enameloide: origem dupla (ectoderme e crista neural)

Actinopterygii: caracteres

3- Escamas ganóides

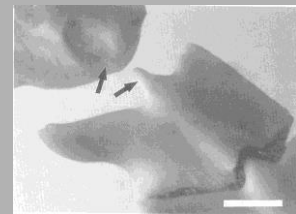


Ganoína: esmalte derivado da ectoderme com padrão de deposição lamelar



Actinopterygii: caracteres

4- processo anterodorsal nas escamas



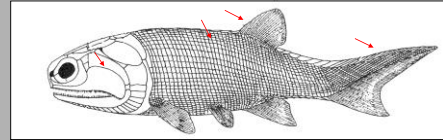
Actinopterygii: origem e evolução

Cheirolepis 380 milhões de anos; 25 cm; água doce; predadores

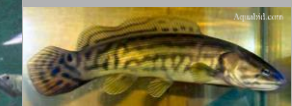


Actinopterygii: origem e evolução

Moithomasia - Devoniano, pequeno porte, amplamente distribuídos em mares rasos, formando cardumes



Actinopterygii recentes



Actinopterygii recentes

- 1  — Polypteriformes (Cladistia) - 12 sp.
- 2  — Acipenseriformes (Chondrostei) - 28 sp.
- 3  — Lepisosteiformes (Gynghimodi) - 7 sp.
- 4  — Amiiformes (Halecomorphi) - 1 sp.
- 5  — Teleostei ~ 30.000 sp.

Polypteriformes (= Cladistia)

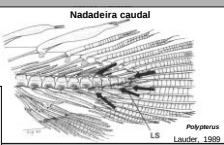
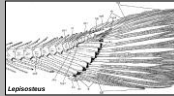
- 12 espécies, água doce
- África tropical





Polypteriformes (= Cladistia)

- 12 espécies, água doce
- África tropical



Acipenseriformes (= Chondrostei)

- 28 espécies, água doce ou anádromos
- Hemisfério Norte
- esturjões e peixes espátula

esturjões





Acipenser sturio Linnaeus (Acipenseridae)

Acipenseriformes (= Chondrostei)

esturjões



Fêmea - 4m - 180 kg ovos



Huso dauricus
Tamanho máximo - 8 m - 1300 kg

Acipenseriformes (= Chondrostei)



esturjões



Acipenseriformes (= Chondrostei)



Peixes-espátula

Peixe-espátula americano – *Polyodon spathula*Peixe-espátula chinês - *Psephurus gladius*
Tamanho máximo: 4 m

Acipenseriformes (= Chondrostei)

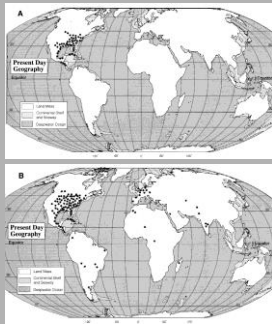
Peixes-espátula



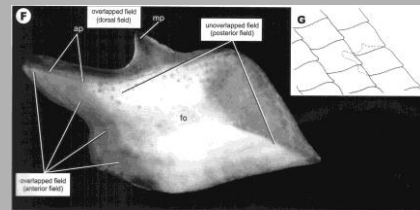
Lepisosteiformes (Gynghimodi)

- 7 espécies, água doce ou salobra
- América do Norte, Central e Cuba

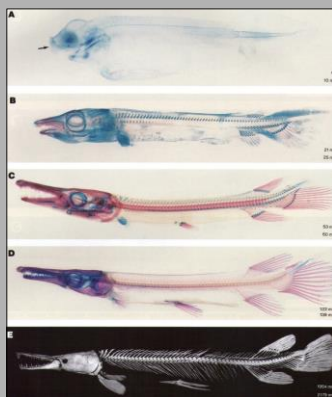
Lepisosteiformes (Gynglimodi)



Lepisosteiformes (Gynglimodi)



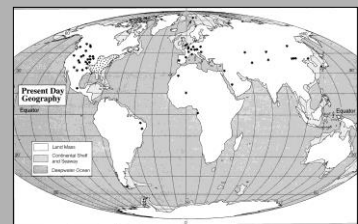
Lepisosteiformes (Gynglimodi)



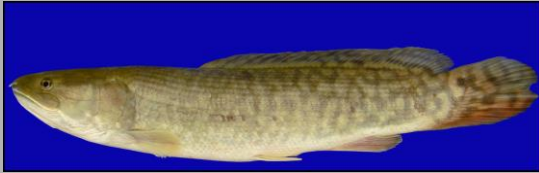
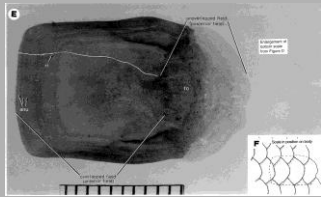
Atractosteus spatula

Amiiformes (Halecomorphi)

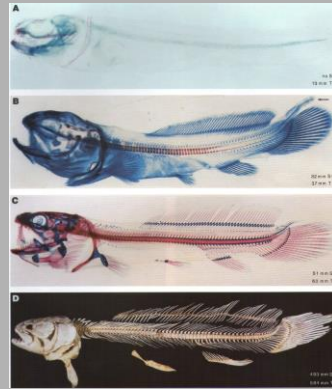
- 1 espécie, água doce
- Leste da América do Norte



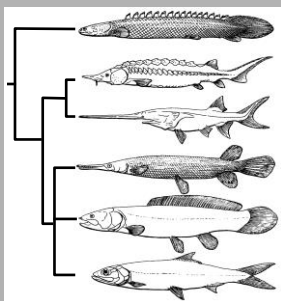
Amiiformes (Halecomorphi)



Amiiformes (Halecomorphi)



Actinopterygii



Polypteriformes (Cladistia) – 12 sp.

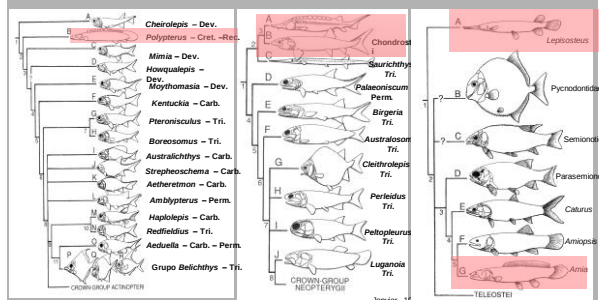
Acipenseriformes (Chondrostei) – 28 sp.

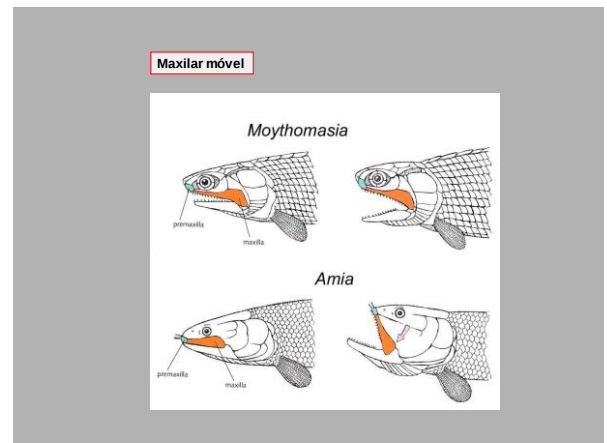
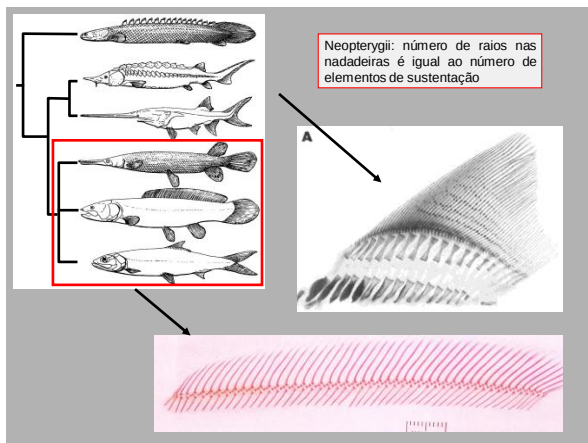
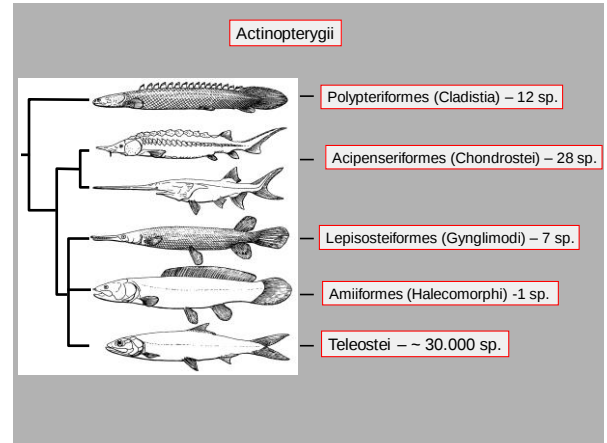
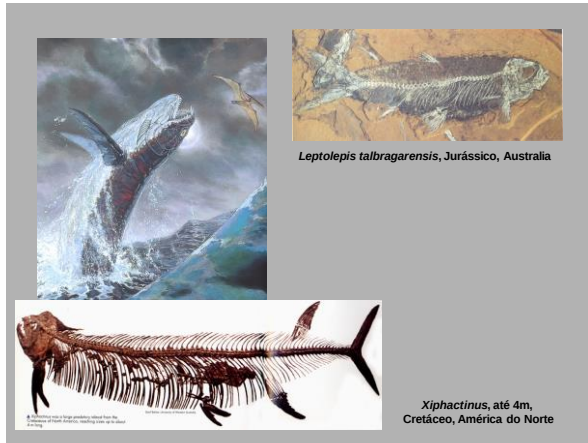
Lepisosteiformes (Gynghimodi) – 7 sp.

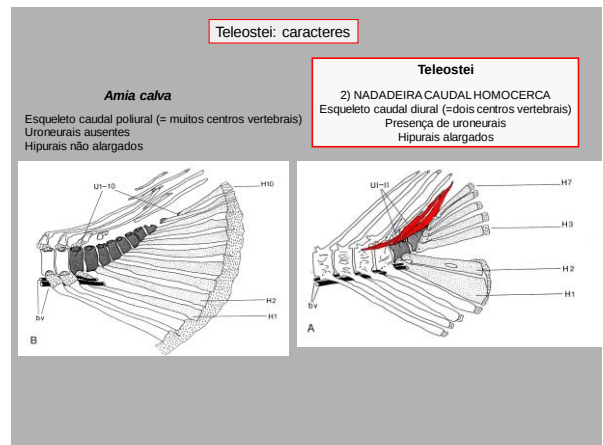
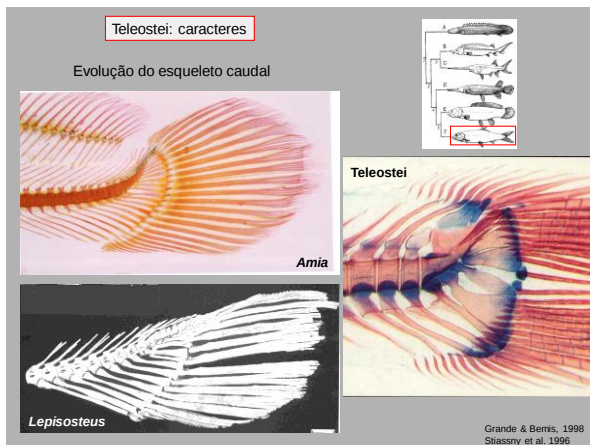
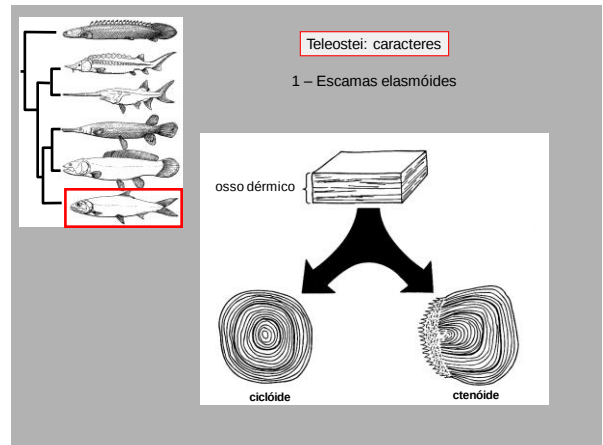
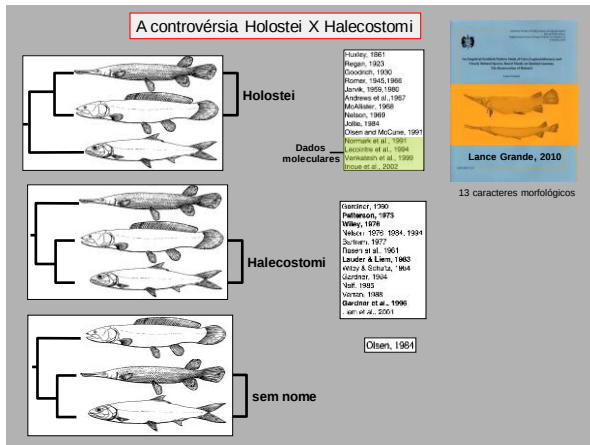
Amiiformes (Halecomorphi) -1 sp.

Teleostei – ~ 30.000 sp.

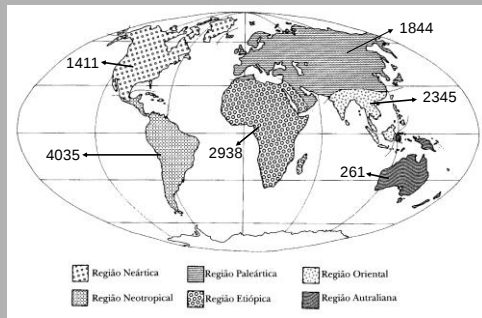
Actinopterygii fósseis e recentes



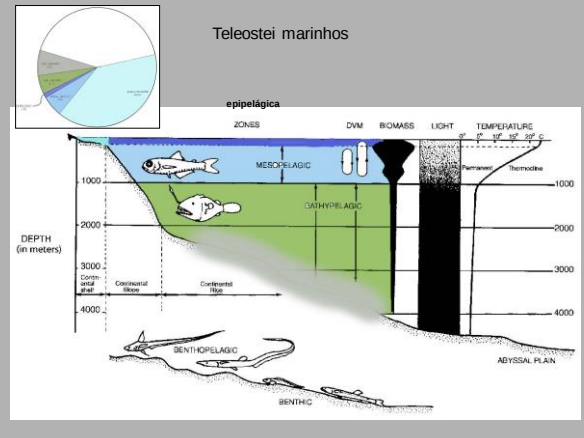




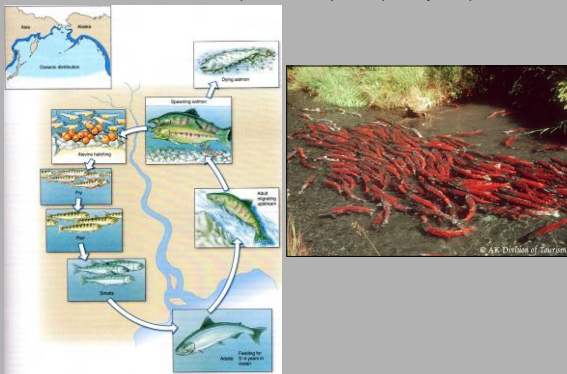
Teleostei de água doce



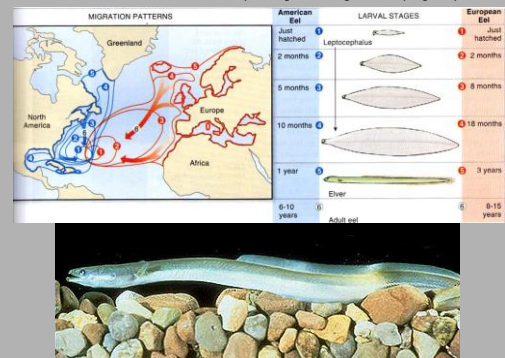
Teleostei marinhos



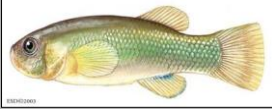
Teleostei diádromos

Anádromos: Exemplo: Salmão do pacífico (*Oncorhynchus*)

Teleostei diádromos

Catádromos: Exemplo: enguias de água doce (*Anguilla*)

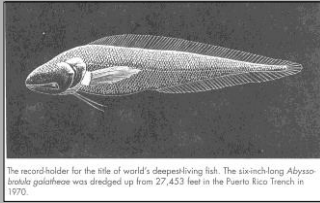
Diversidade de ambientes: altitude



Orestias
Cyprinodontiformes: Cyprinodontidae
Lago Titicaca - 3812 m



Yunnanilus
Cypriniformes: Balitoridae
Tibet - 5200 m



The record-holder for the title of world's deepest-living fish. The six-inch-long *Abyssobrotula galathea* was dredged up from 27,453 feet in the Puerto Rico Trench in 1970.

Abyssobrotula galathea Nielsen, 1977
Ophidiiformes: Ophidiidae
8370 m

Diversidade de ambientes: temperatura



Cyprinodon macularius Baird & Girard 1853
Cyprinodontiformes: Cyprinodontidae
Rios do Vale da Morte, California - 45°C



Trematomus bernacchii Boulenger, 1902
Perciformes: Nototheniidae
Antártica - -2°C

Diversidade de ambientes: peixes de profundidade



Caulophryne petygica
Natural History Museum



Eurypharynx pelicanoides
<http://www.academicromances.com>



Anoplogaster cornuta
Sören Zanker



Maurolicus muelleri
Wen-Sung Chung/University of Queensland

Diversidade de ambientes



Peixes subterrâneos
Mundo 94 sp.
Brasil: 19 sp.

Stygichthys typhlops Brittan & Böhlke, 1965
Characiformes: Characidae



Pimelodella kronei (Miranda Ribeiro, 1907)
Siluriformes: Heptapteridae

Diversidade morfológica: tamanho



Pirarucu
Arapaima gigas
2,5 m



Paedocypris progenetica
~9 mm

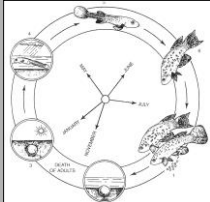
Diversidade biológica - Ciclo de vida



Antônio Vilar
Aquam Fmsterrae
www.casaciencias.org

Polyprion americanus
Cherne-poveiro
~ 70 anos

Nematolebias whitei (Myers, 1942)
Cyprinodontiformes: Rivulidae
1 ano



Diversidade biológica – ciclo de vida



Peixe natural em ambiente próximo ao rio. Rio de São João, BA, ambiente do *Leptothorax* (stet). Sempre há competição e *Desmoulleus* (stet).



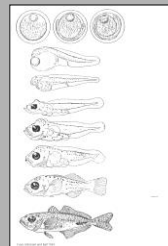
Modelo larval da *Apistogramma* (stet) após ser criado para construção de ovos, resultando no complexo desenvolvimento dos três espécies de peixes.

Costa, 2002
Helfman et al., 1998

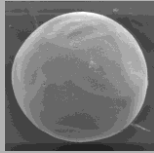
Diversidade biológica dos Teleostei: reprodução e desenvolvimento

Maioria dos Teleostei:

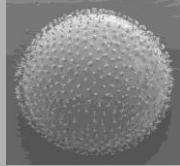
- Dióicos
- Fecundação externa
- Desenvolvimento externos dos ovos e embriões
- Sem cuidado parental
- Fase larval



Ovos de Teleostei



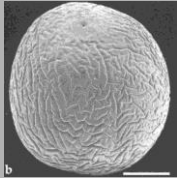
Salminus
(Characidae)



Simpsonichthys suzardi
(Favari & Toledo-Piza 2007) Rivulidae



Parapsaerichthys ocellatus
Britz et al. 1999 (Belontiidae)



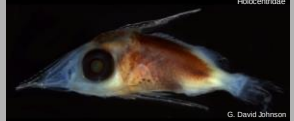
Malpulutta kreibsi
Britz, 2001 (Ophichthidae)

Larvas de Teleostei



Chaetodon affinis

Peter Kornhuber



Holocentridae

G. David Johnson



Lampromus

Credit: J. Milner



Scomber scombrus

Claude Bourles and Gerard Dumas

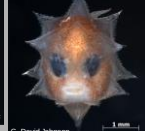


Eurypharynx pelagicus

G. David Johnson



Mola mola



Ogcocephalus



Credit: reynolds

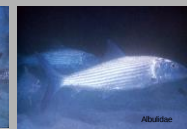


HEF U/W Production

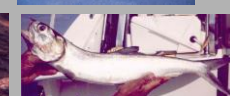
ELOPOMORPHA - 857 sp. (26 agua doce) (Brasil ~ 100sp)



Mola mola



Albulidae



Diversidade biológica - Reprodução



Torquigener albomaculosus
Pufferfish 'crop circles' - Life Story: Episode 5 preview - BBC One

Diversidade Biológica: Determinação sexual

The Native Fish Conservancy



Kryptolebias marmoratus
Cyprinodontiformes: Rivulidae

autofecundação



Poecilia formosa
Cyprinodontiformes: Poeciliidae

partenogenética



Perciformes: Serranidae
Reversão sexual
23 famílias

Perciformes: Pomacentridae



Synbranchiformes:
Synbranchidae

Diversidade Biológica: eletricidade nos Teleostei

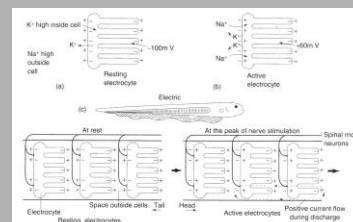
Descarga elétrica forte



Poraquê (*Eupomotis electricus*)



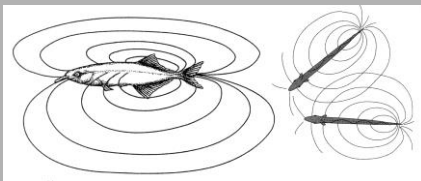
Malapterurus electricus



eletrocitos

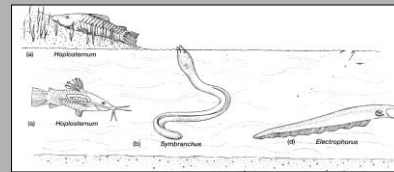
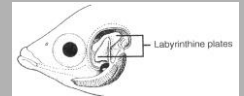
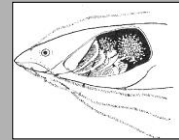
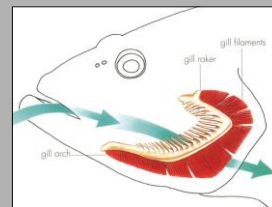
Diversidade Biológica: eletricidade nos Teleostei

Descarga eléctrica fraca



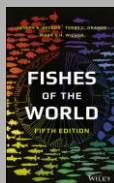
campo elétrico

Respiração

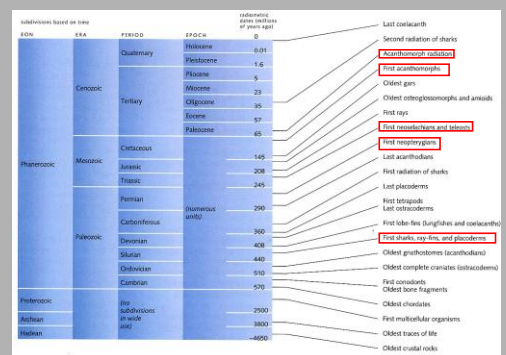


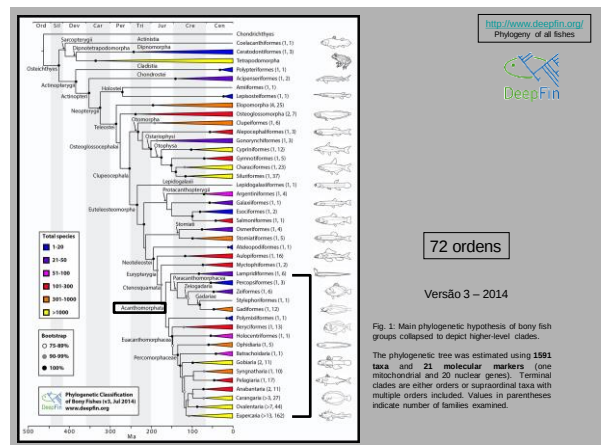
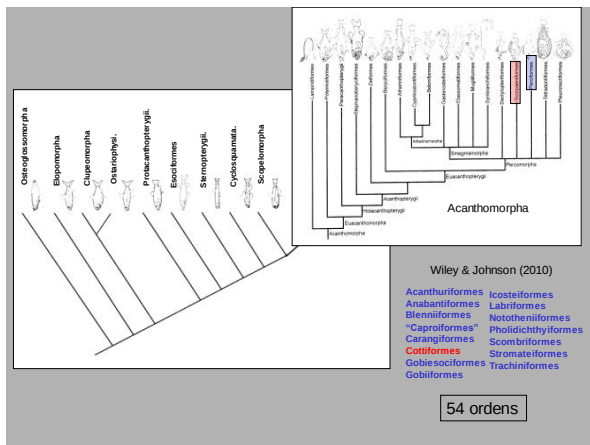
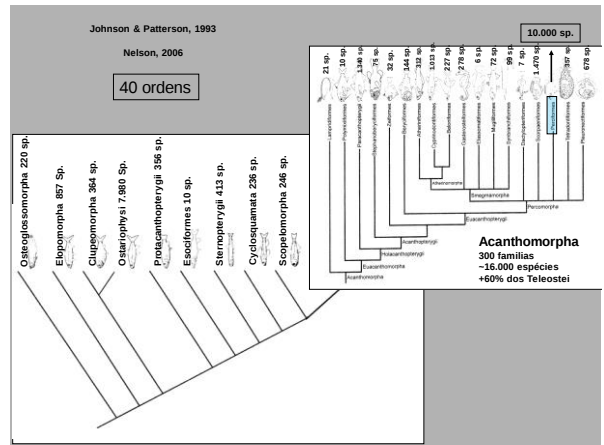
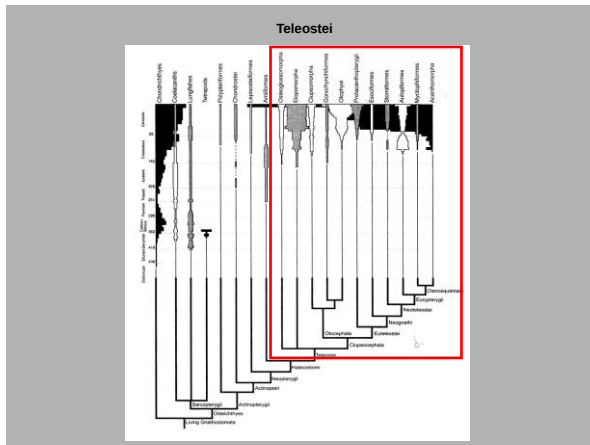
DIVERSIDADE ATUAL DE TELEOSTEI

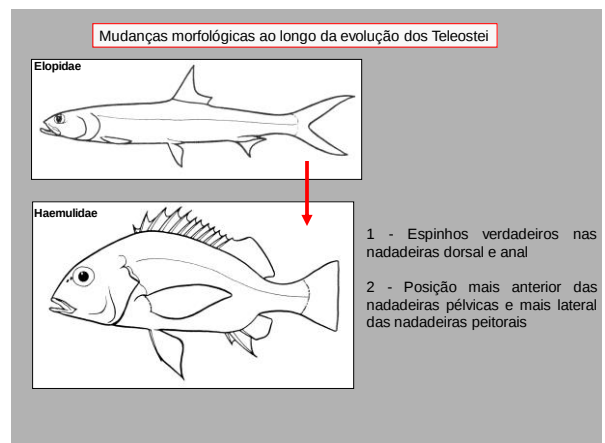
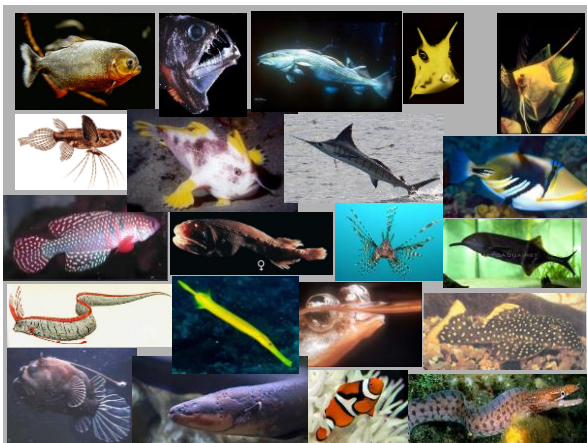
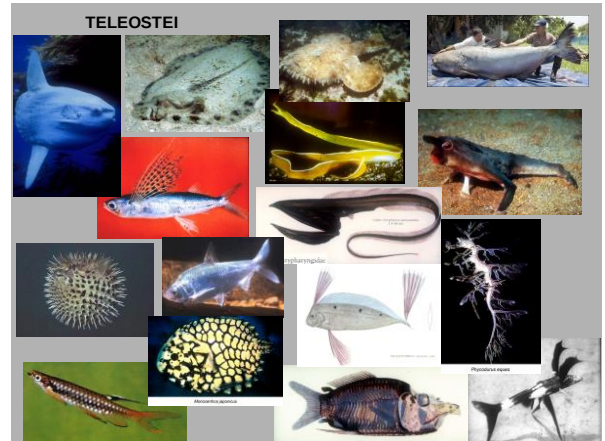
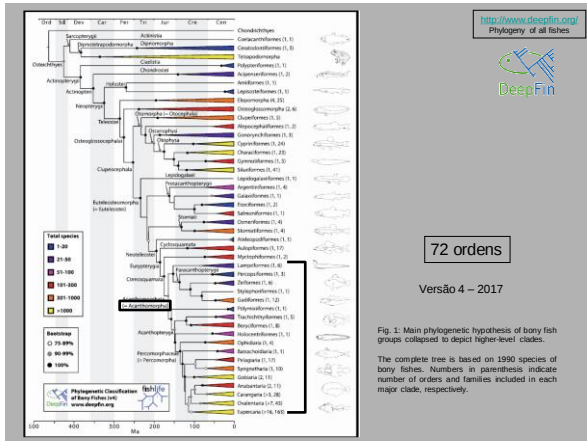
Nelson (1976)	Nelson (1984)	Nelson (1994)	Nelson (2006)
18.007 espécies	20.812 espécies	24.618 espécies	26.840 espécies 40 ordens
415 famílias	409 famílias	482 famílias	448 famílias



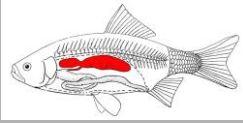
Nelson et al. (2016)
29.585 espécies
63 ordens
469 famílias







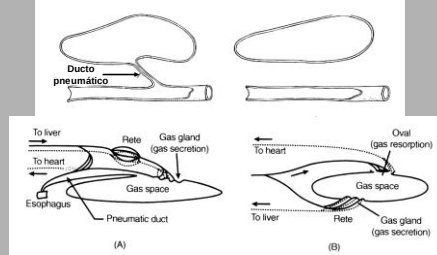
Mudanças morfológicas ao longo da evolução dos Teleostei



3- Bexiga natatória

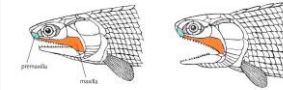
Fisóstomo

Fisoclisto

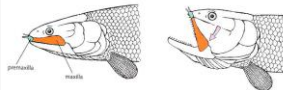


Mudanças morfológicas ao longo da evolução dos Teleostei

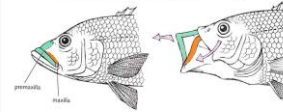
Moythomasia



Amia



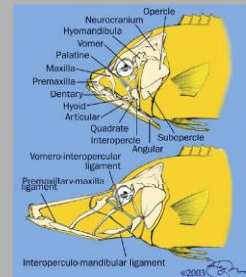
Teleostei derivado (Cichlidae)



4- Maxilas

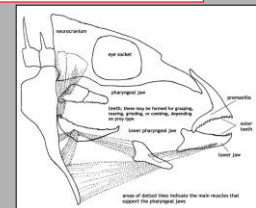
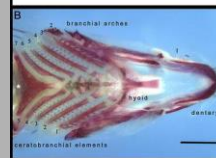
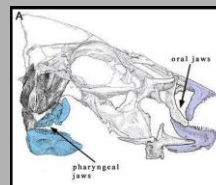
Maxilas protráteis

(alimentação por sucção)



Mudanças morfológicas ao longo da evolução dos Teleostei

5- Arcos branquiais: maxilas faríngeas



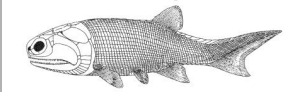
Diário Oficial da União
Lista nacional das espécies de peixes ameaçadas de extinção

2004

Chondrichthyes: 15 sp.
Actinopterygii: 144 sp.

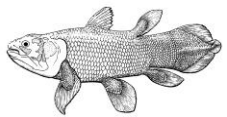
2014

Myxiniiformes: 1 sp.
Chondrichthyes: 53 sp.
Actinopterygii: 353 sp.



Actinopterygii

~30.000 sp.
Teleostei ~30.000



Sarcopterygii

~30.000 sp.
Actinistia – 2 sp.
Dipnoi – 6 sp.
Tetrapoda ~ 30.000

Osteichthyes