

Introduction to Biology. Lecture 33

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1 Where we are?

2 Jurassic park

- From Triassic to Cretaceous
- Jurassic and Cretaceous flora and fauna



1 Where we are?

2 Jurassic park

- From Triassic to Cretaceous
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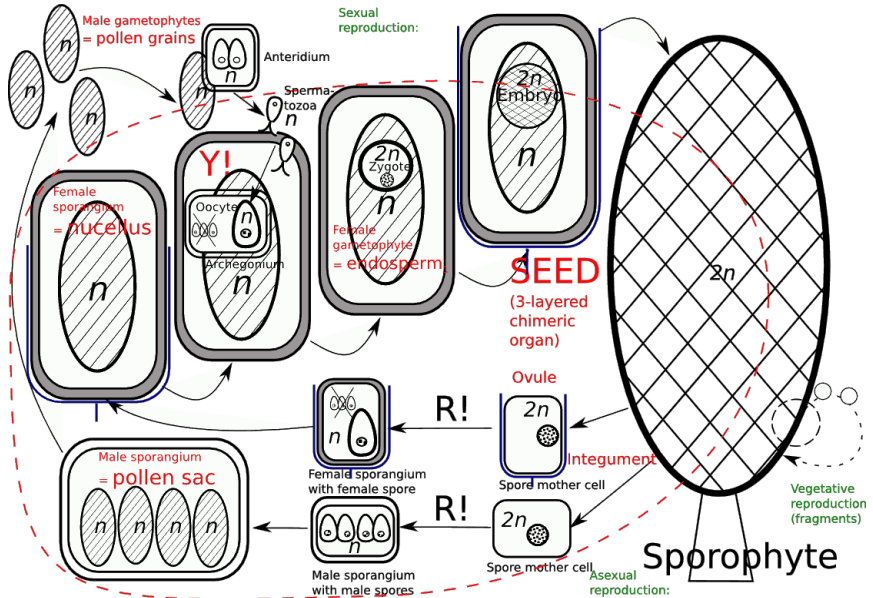


The seed

- Trees need a control over their reproduction, that was a reason to take haploid stage inside
- Seed = seed coat ($2n$) + endosperm (n) + embryo ($2n$)



Life cycle of seed plants (please do not faint)



Jurassic park

From Triassic to Cretaceous



From Triassic to Cretaceous

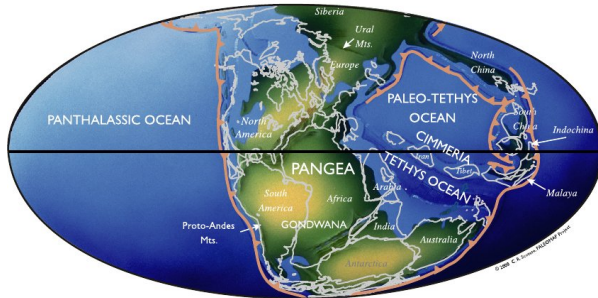
Mesozoic era:

- Triassic: starts 252 Mya
- Jurassic: starts 201 Mya
- Cretaceous: starts 145 Mya, ends 66 Mya



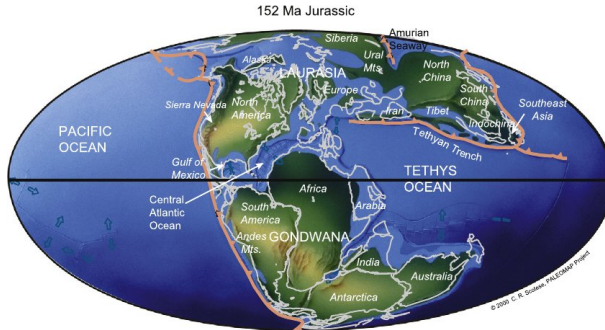
Triassic period

237 Ma Triassic



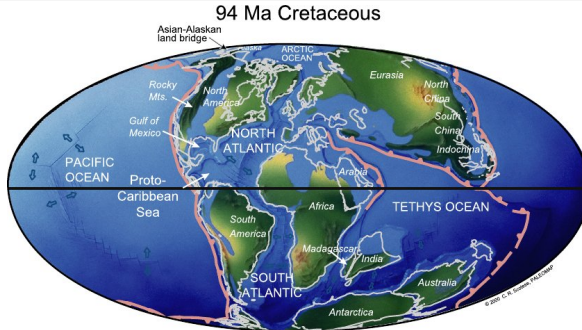
- Pangea broke (part of Africa adhered to North America)
- Climate becoming wetter
- Grasshopper-like insects radiated
- Synapsid reptiles declined, dinosaurs and pterosaurs appeared

Jurassic period



- Atlantic ocean and Rocky mountains appeared
- Peak of dinosaur diversity
- Birds appeared as a lineage of small flying dinosaurs
- In the sea, ammonites and primitive fish dominated

Cretaceous period



- High level of water (second high after Devonian), warm climate even on North and South poles, sea in North Dakota
- Flowering plants appeared and rapidly colonized all land
- Butterflies and flies appeared
- Terrestrial dinosaurs slowly declined and finally disappeared in the very end of period



Subdivisions of Cretaceous

System	Series	Stage
Paleogene	Paleocene	Danian
Cretaceous	Upper	Maastrichtian
		Campanian
		Santonian
		Coniacian
		Turonian
		Cenomanian
	Lower	Albian
		Aptian
		Barremian
		Hauterivian
		Valanginian
		Berriasian
Jurassic	Upper	Tithonian

- Hauterivian: first flowering plants (pollen)
- Barremian/Aptian: Famous Yixian formation (China)
- Maastrichtian: end of dinosaur age



Jurassic park

Jurassic and Cretaceous flora and fauna

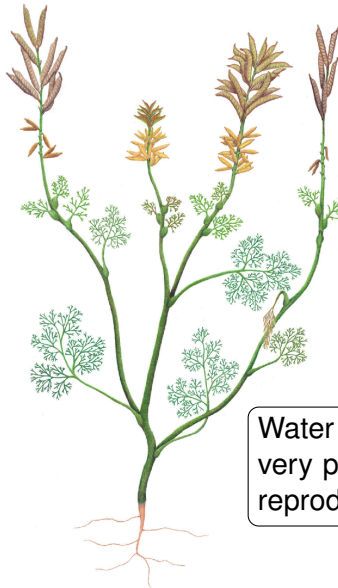


Terrestrial flora

- Spermatophyta
 - Non-angiosperm seed plants (“gymnosperms”)
 - Magnoliopsida (angiosperms, flowering plants)
- Pteridophyta



Archaeofructus (discovered in 2002, Yixian)



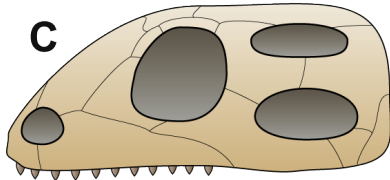
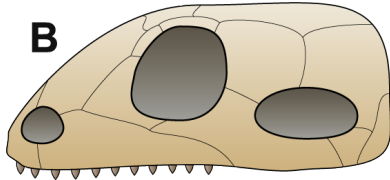
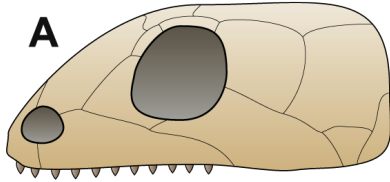
Water plant with
very primitive
reproductive organs

Terrestrial fauna

- Amphibia
- Reptilia
 - Synapsida: ancestors of mammals, e.g., pelycosaurs
 - Anapsida: turtles and many extinct lineages like pareiasaurs from Permian
 - Diapsida: the most diverse reptilian group
- Aves (departed from Diapsida)
- Mammalia (in transition from synapsid reptiles to core mammals)



Subdivisions of reptiles



- A Anapsid skull
- B Synapsid skull
- C Diapsid skull

Tricodont proto-mammal



Diapsid reptiles

- Ichthyosauria: marine, dolphin-like reptiles
- Sauropterygia: placodonts and plesiosaurs
- Lepidosauria: lizards, snakes and extinct mosasaurs
- Archosauromorpha: crocodiles, dinosaurs (including ancestors of birds)



Ichthyosaur



Ichthyosaurs were viviparous. Note also the vertical fin.



Placodont



Covered with skin plates, eat mollusks.



Plesiosaurs



Mosasaur



From North Dakota!

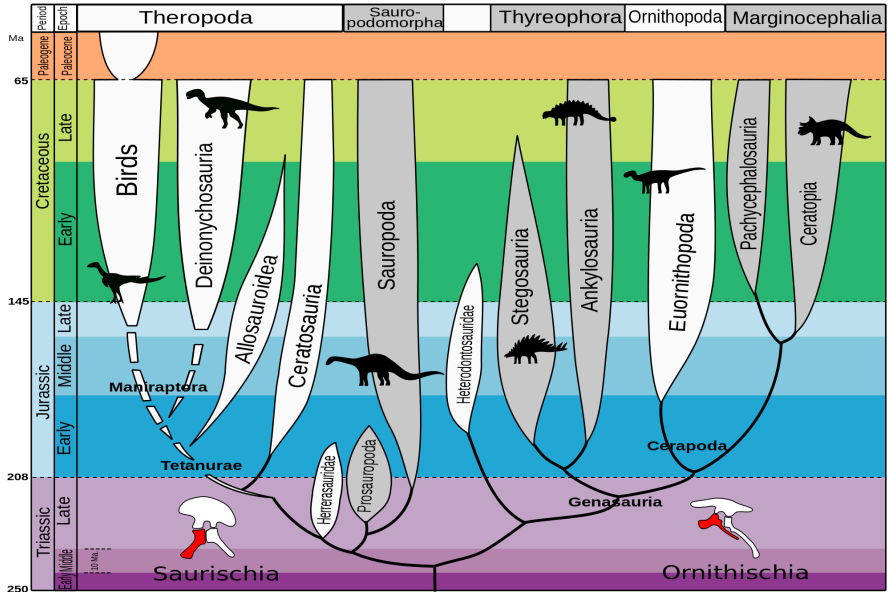


Archosauromorph reptiles

- Crocodylomorpha: advanced behavior, four-chambered heart
- Pterosauria: archosaur “bats”, some with fur-like cover. Note that skin membrane is not very effective wing.
- Dinosauria: bipedal archosaurs:
 - Ornithischia: “bird-hipped”, include ankylosaurs, stegosaurs, ornithomimids, ceratopsia
 - Saurischia: “lizard-hipped”:
 - A Theropoda: true bipedal, carnivorous or insectivorous, mostly feathered
 - B Sauropodomorpha: secondary quadrupedal, small heads, long necks, long tails; largest dinosaurs



Dinosaurs in time



Yutyrannus from China, newest reconstruction



feathered, warm-blood, social



Summary

- Jurassic period was a peak of dinosaur diversity



For Further Reading



[Walking with dinosaurs \(film\).](#)

http:

[//en.wikipedia.org/wiki/Walking_with_Dinosaurs](http://en.wikipedia.org/wiki/Walking_with_Dinosaurs)



[Reptiles.](#)

<http://en.wikipedia.org/wiki/Reptile>



[Dinosaurs.](#)

<http://en.wikipedia.org/wiki/Dinosaur>

