

Introduction to Biology. Lecture 32

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1 Where we are

- Origin of seed plants

2 Jurassic park

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



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Where we are

Origin of seed plants



Life cycle of land plants

- Sporic life cycle with interleaving generations
- Diploid stage grow directly on the haploid stage and even parasitizes on it (e.g., in mosses)
- Originates from the life cycle of algae: diploid stage was an adaptation to the distribution of spores
- Eventually, diploid stage begin to dominate the life cycle



The conflict between size and reproduction

- Competition for the light resulted in growing up; growing up resulted in *secondary thickening*—trees appeared
- Seed plants started as trees, and these trees were diploid stage
- Haploid stage still existed and probably was a minute *prothallium*
- This is a conflict: diploid stage cannot adapt better because free haploid stage was too cranky, and birth control is impossible
- Decision: take haploid stage on the diploid stage and grow it inside

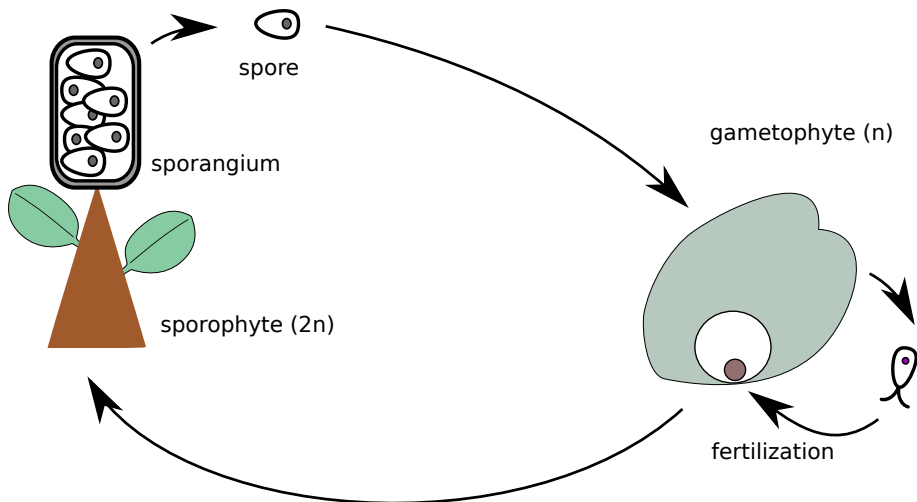


The seed

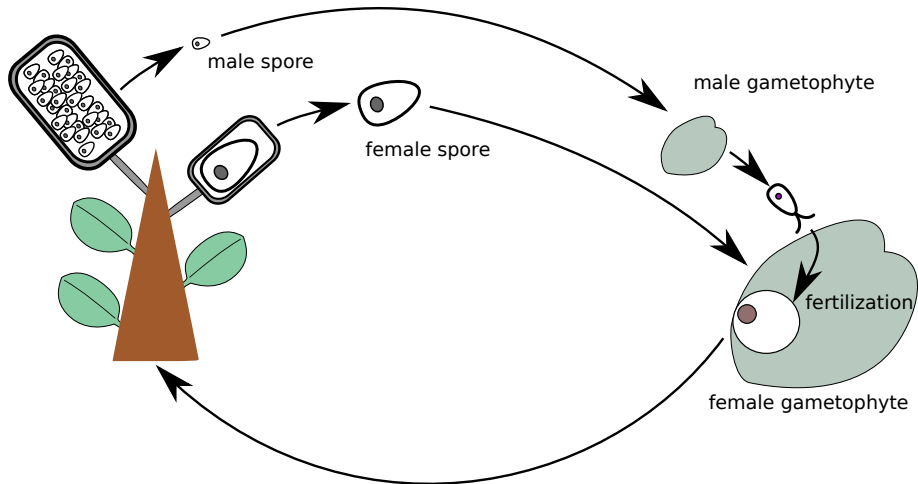
- Seed is the chimeric organ of three parts: mother diploid tissue (seed coat), daughter diploid (embryo) and female haploid stage (endosperm)
- Main problems: need for pollination, extremely slow growth (two years in pine tree, up to five years in cycads)



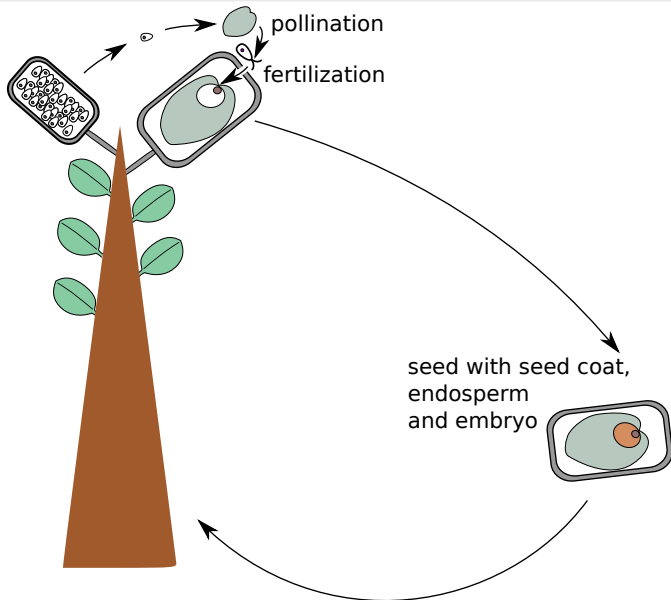
Origin of seed I



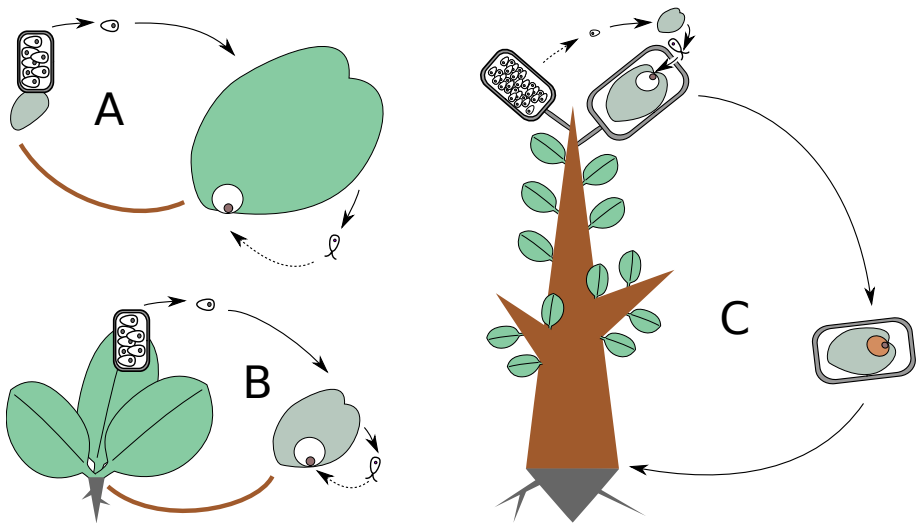
Origin of seed II



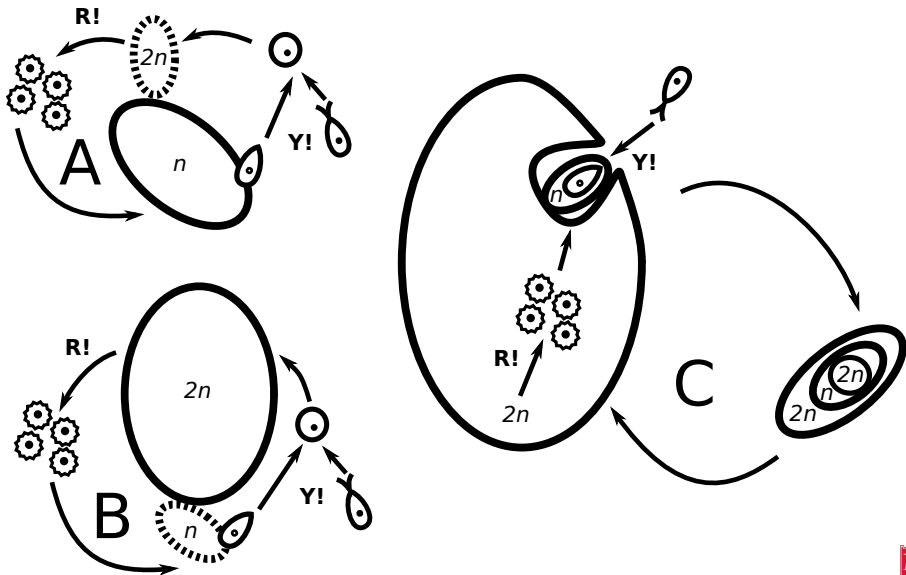
Origin of seed III



Three phyla of plants I



Three phyla of plants II



Jurassic park

From Triassic to Cretaceous



From Triassic to Cretaceous

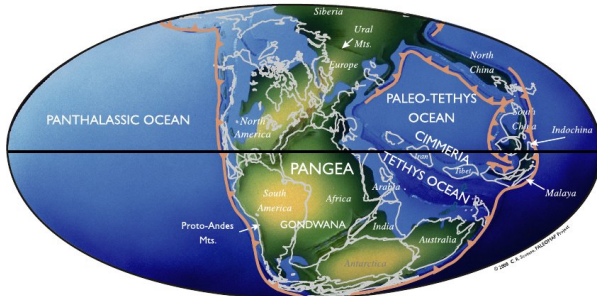
Mesozoic era:

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



Triassic period

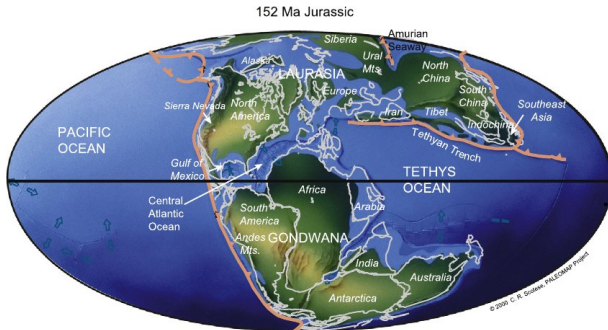
237 Ma Triassic



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

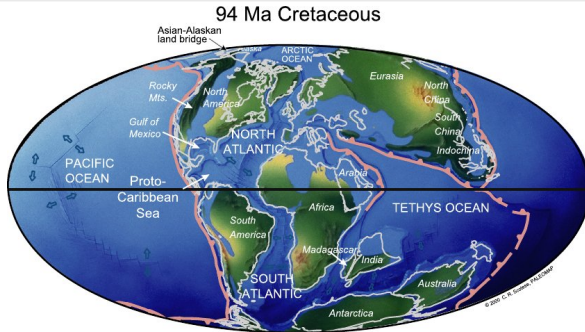


Jurassic period



- 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



Jurassic park

Jurassic and Cretaceous flora and fauna

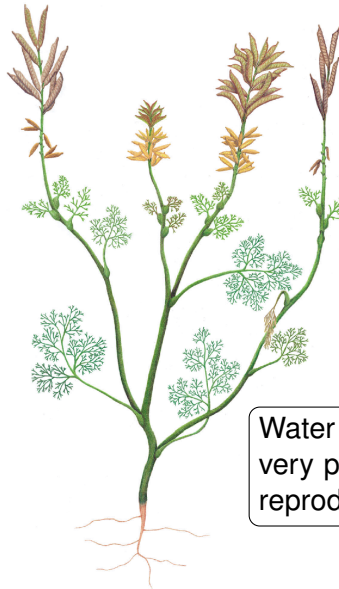


Terrestrial flora

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



Archaeofructus (discovered in 2002, Yixian)



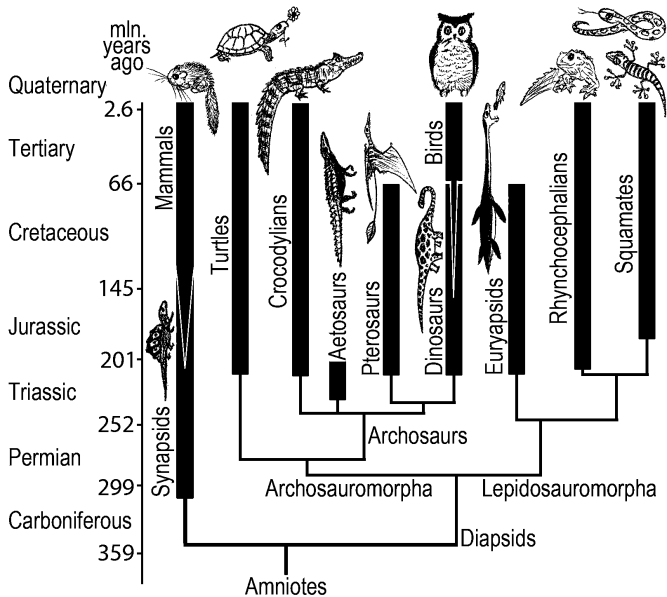
Water plant with
very primitive
reproductive organs

Terrestrial fauna

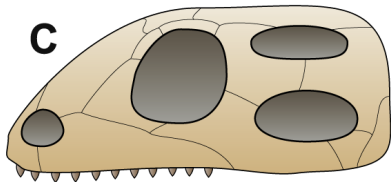
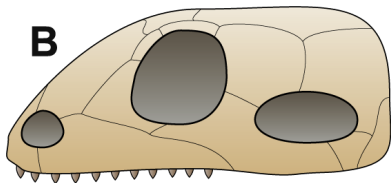
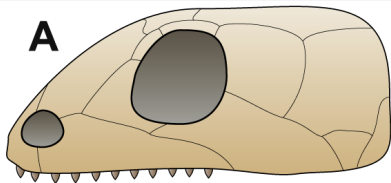
- Amphibia
- Reptilia
 - Synapsida: ancestors of **mammals**, e.g., pelycosaurs
 - Anapsida: **turtles** and many extinct lineages like pareiasaurs from Permian, now frequently united with diapsids
 - Diapsida: the most diverse reptilian group
- Aves (departed from Diapsida)
- Mammalia (in transition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



Reptiles, mammals and birds



Subdivisions of reptiles



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



For Further Reading



Seed.

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



Reptiles.

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

