Introduction to Biology. Lecture 31

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Outline

1. Questions and answers
   - Exam 4
2. Where we are
   - Life cycles
   - From Carboniferous to Permian
3. How plants got their seeds
   - Origin of seed plants

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Questions and answers

Exam 4

Results of Exam 4: statistic summary

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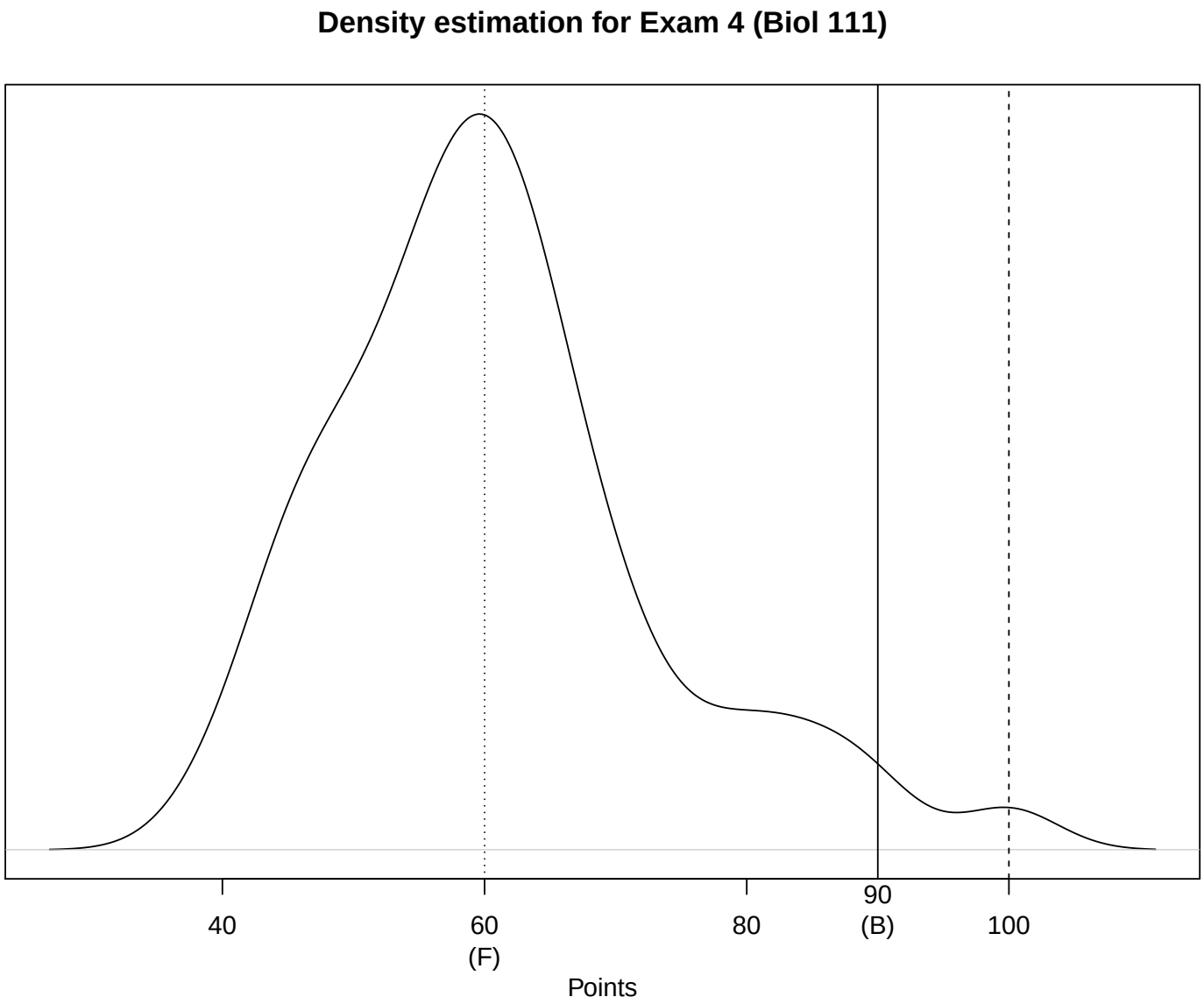
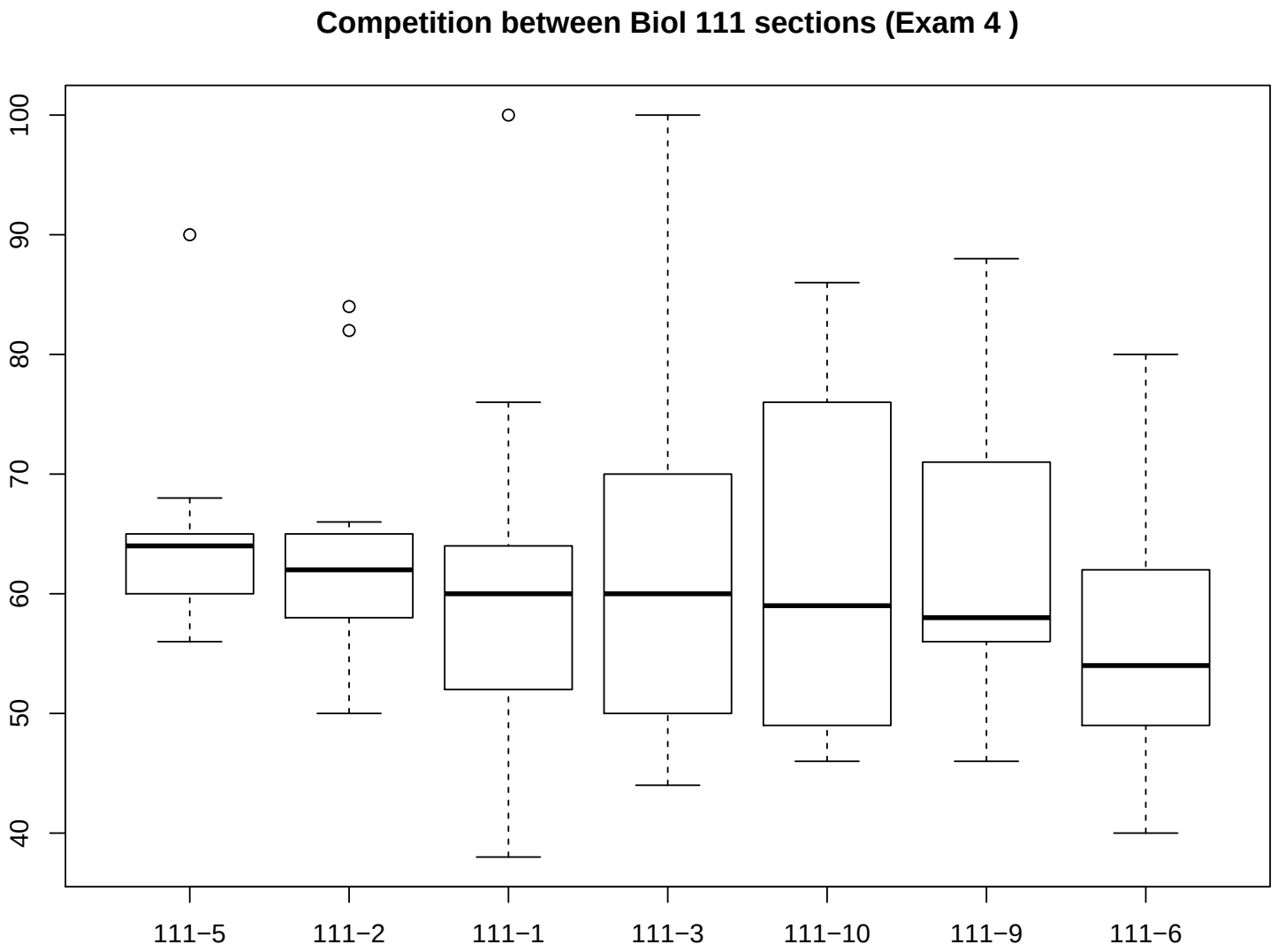
Summary:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
  38.00   52.00   60.00   60.94   66.00  100.00      12
Grades:
   F    D    C    B  max
< 60 < 70 < 80 < 90  100
```

Results of Exam 4: the curve



Results of Exam 4: sections



Results of Exam 4: two questions

A. Roughly speaking, you have 23 father's and 23 mother's chromosomes. In the each of your *gametes*, there are _ chromosomes:

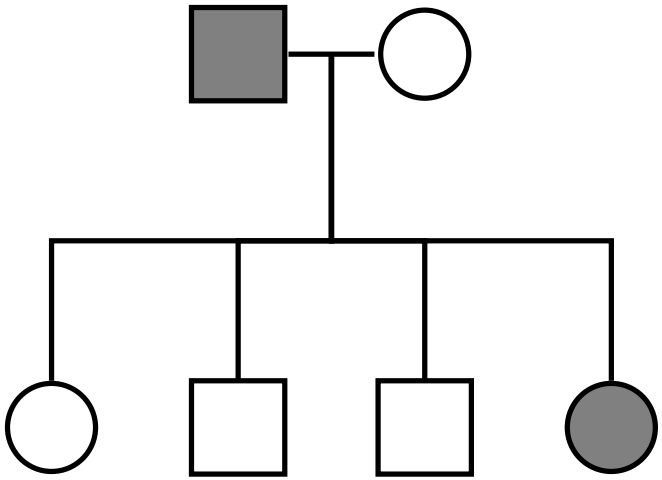
   A. 23 are from your father, 23—from mother
   B. 11 mother's and 12 father's
   C. **From 1 to 23 are father's and from 23 to 1 are mother's**

B. In meiosis, X-shaped chromosomes:

   A. Never split
   B. Split in anaphase I
   C. **Split in anaphase II**

Results of Exam 4: second pedigree

44. Is the disease from the pedigree chart below:

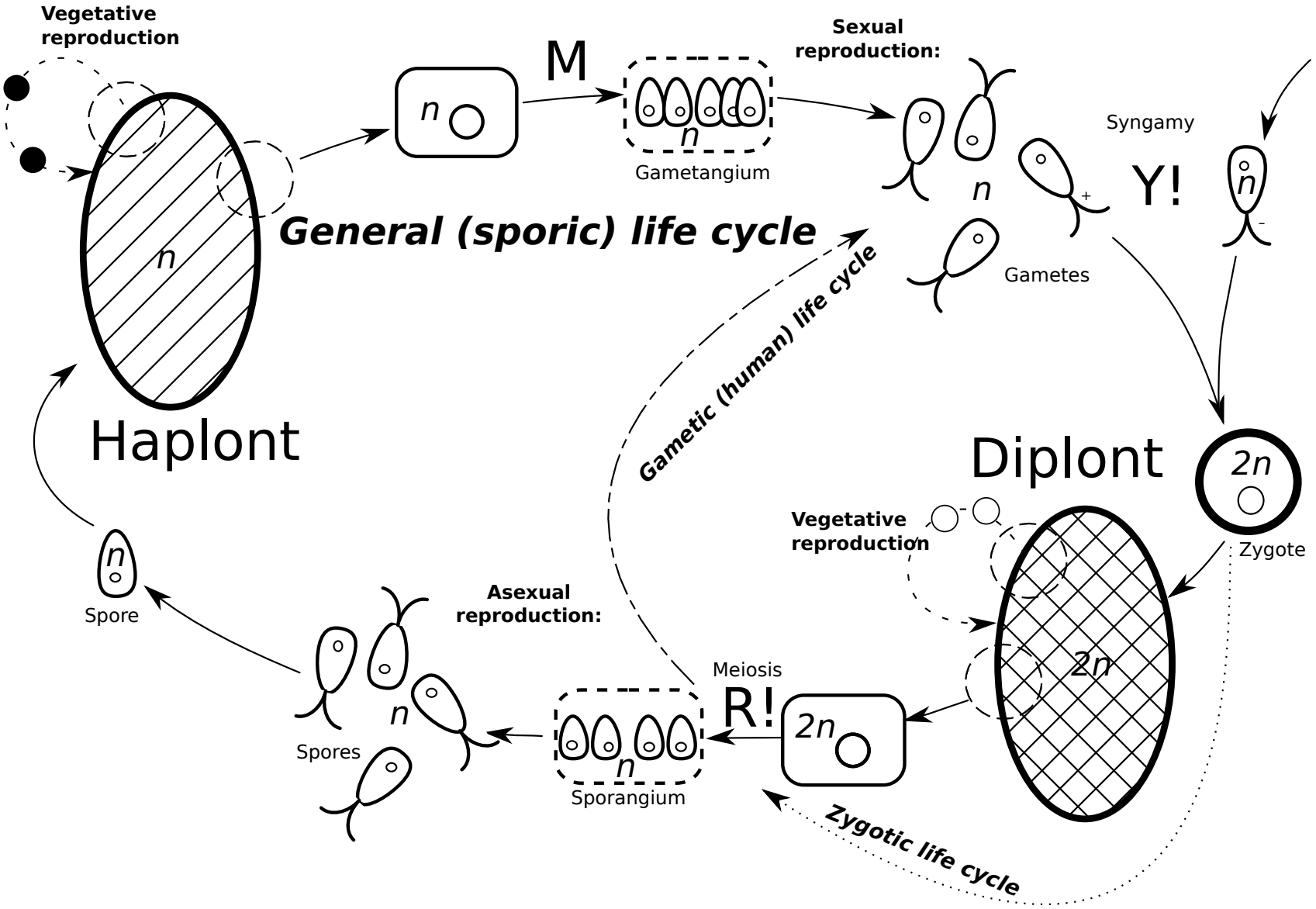


A. Dominant
B. Recessive
C. **I need more information**

Where we are

Life cycles

Life cycle of multicellular organism

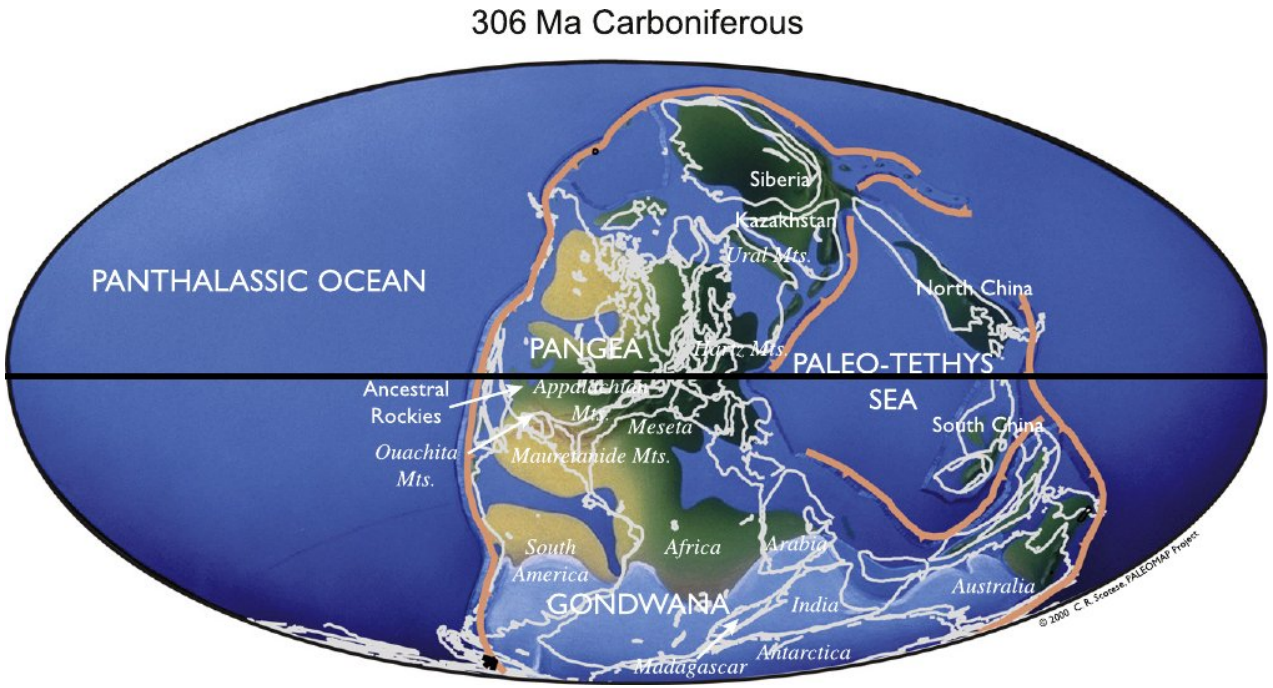


Where we are
From Carboniferous to Permian

From Carboniferous to Permian

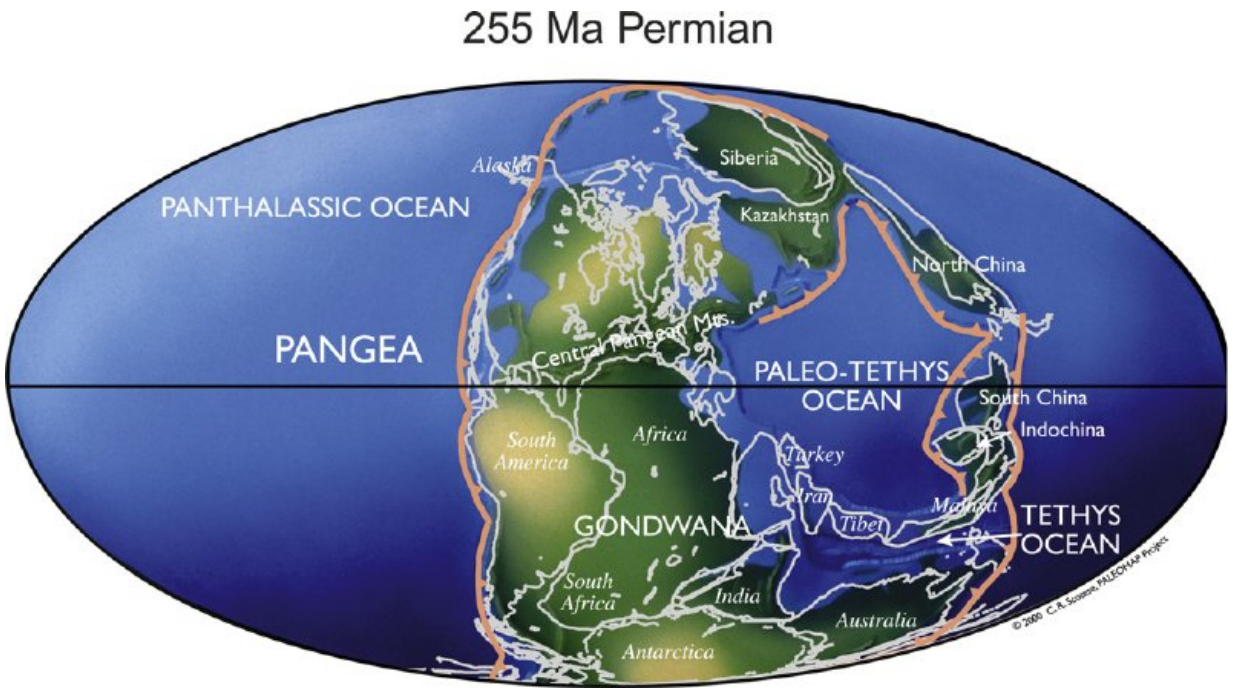
- Devonian period: 419 Mya
- Carboniferous period: 358 Mya
- Permian period: 299–252 Mya

Carboniferous period



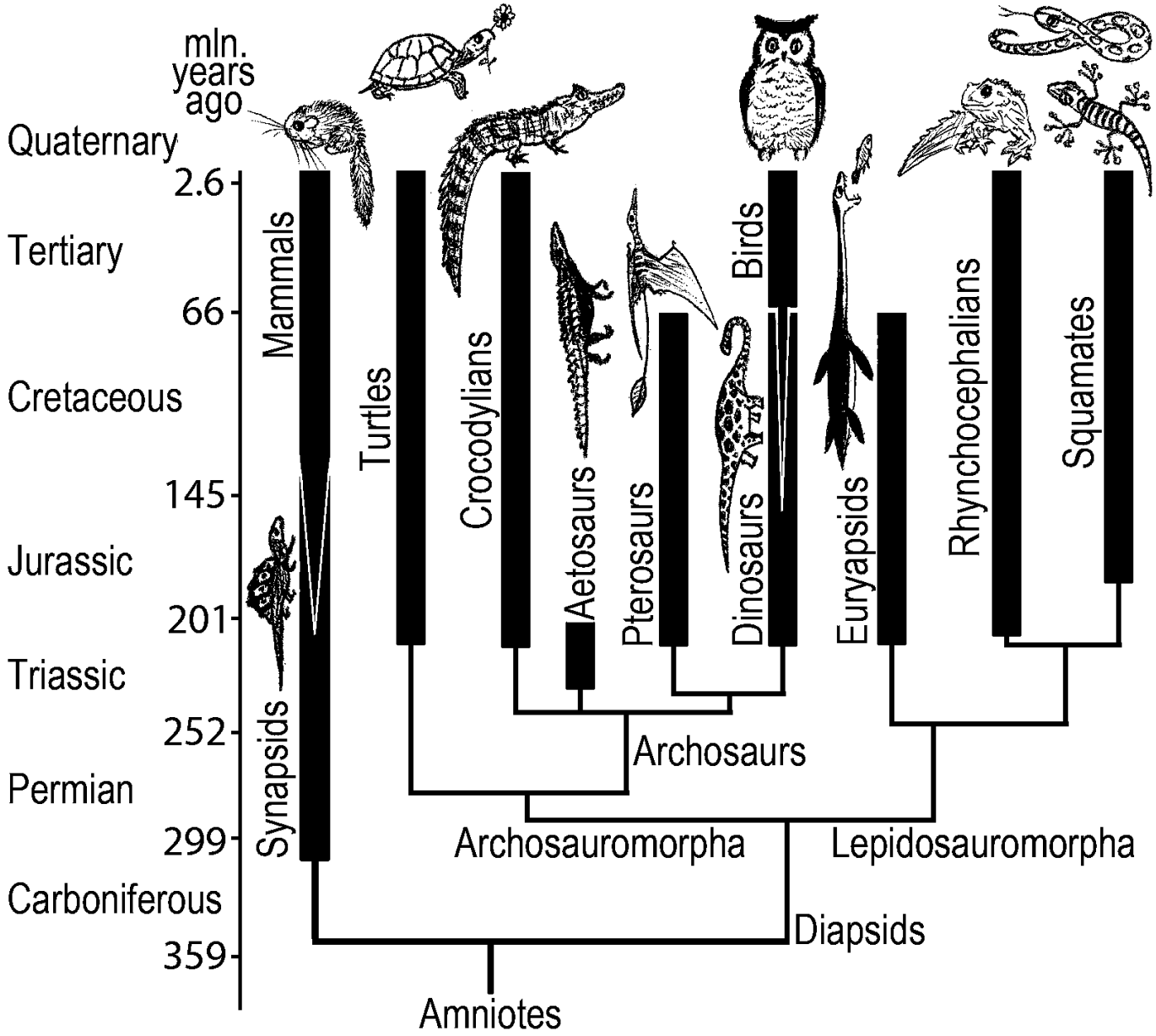
- Hot, wet tropical climate in Europe and North America (Laurasia), dry arctic forests in Siberia (Angarida)
- Pteridophyte and primitive seed plants forests dominated tropics, insects started to fly
- Reptiles appeared

Permian period



- Last period of Paleozoic era, ended with a mass extinction in the sea and also on land
- Pangea formed, with a giant central desert
- Primitive synapsid reptiles dominated the land

Following the movie: reptiles, mammals and birds



How plants got their seeds

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 is the parasite of 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*
- Diploid stage followed the *K*-strategy (slow and smart) whereas haploid prothallium followed the *r*-strategy (random explosions)
- This is a conflict: diploid stage cannot adapt better because free haploid stage was too cranky, it became a hindrance on the way of evolution
- Decision: take haploid stage on the diploid stage and grow it inside

For Further Reading

Reptiles.

`http://en.wikipedia.org/wiki/Reptile`

Permian.

`http://en.wikipedia.org/wiki/Permian`