

Diatoms

Taxonomy

- 175 fossil and living genera

Division or Phylum Chrysophyta:

(contain golden brown plastids (chlorophyll a,c and carotenoids B-carotene and a-xanthophyll, sometimes referred to as fucoxanthin) and single nucleus; include silicoflagellates, sometime referred to as *Xanthophyta*)

Phylum or Class Bacillariophyceae :

(isolated cells or colonies; housed in porous, opaline frustule)

Two main orders:

1. *Centrales* (radial symmetry) (commonly marine)
2. *Pennalles* (bilaterally symmetrical) (commonly FW)

General Biology

- Cell encompassed in opaline bivalved frustule.
- larger valve = epitheca, smaller valve = hypotheca, overlap = girdle, raphe = longitudinal valve slit
- Binary fission produces smaller offspring in diatom populations. Each valve of the split frustule acts as an epitheca, and a new hypotheca inserted into the epitheca. smaller valve in split frustule, until sexual reproduction. Rate of reproduction is often once every 18-36 hours)
- mostly marine (~75%), fresh water and other habitats (~25%)
- live in photic zone
- benthic and planktonic (planktonic forms may contain abundant oils and fatty acids, as well as long setae, may secrete mucilage)
- used for diatomite (absorbant, filtrate, filler, abrasive, insulative)
- Form a vegetative stage (resting spore) that lacks flagellum
- Similar to dinoflagellates in size, ranging from 1 mm to 1000 mm. Average size range 10-100 mm

Taphonomy:

- Original frustule composition = opal A
- Opal A is unstable, transforms to opal CT (cristobalite) over 50°C (frustrules destroyed unless protected in lithology)

Biostratigraphy:

- DSDP and ODP projects produced fine zonation and linked zonation to magnetostratigraphy.
- Oldest diatoms are early Jurassic, although similar Cambrian plates have been discovered.
- However the first ABUNDANT well preserved forms appear in the Campanian.
- First freshwater forms appeared in Paleocene, but did not diversify until Oligocene.

At K/T boundary:

- 23% Diatom generic extinction. (resting spores enhanced survival??)
 - 92% Planktonic foraminiferan extinction
 - 73% Coccolithophorid generic extinction
 - 85% Radiolarian generic extinction