Life in suspension

1. Density

Sea water density: 1.021-1.028 g/cm^3

Maximum freshwater density: 1 g/cm^3 (at 4°C)

Carbohydrates: about 1.5 g/cm^3

Protein: about 1.3 g/cm^3

Lightest lipid: 0.86 g/cm^3

Silica: 2.6 g/ cm^3

Calcite (Ca CO_3): 2.72 g/cm^3

Freshwater diatoms: 1.02-1.25 g/cm^3

Marine diatom: 1.112 g/cm^3

***Microcystis aeroginosa:* 0.99-1.00 g/cm^3**

***Chlorella vulgaris:* 1.09 g/cm^3**

THE TENDENCY: P`>P

(Oscillatoria erythraea, Botryococcus braunii)

2.Water movements

3. Sizes and Shapes

4. Physiological regulation of cell density (Fat reserves, Gas vacuoles, control of ionic composition)

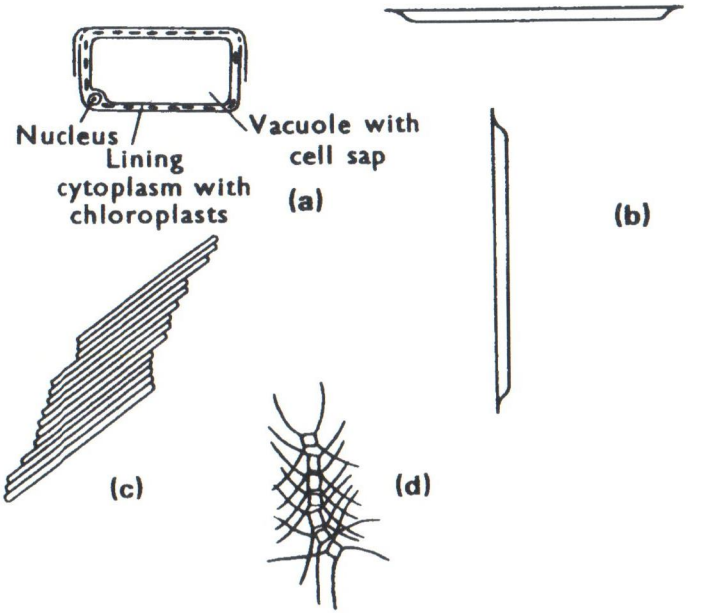


Fig. 3.1 (**a**) Bladder-like cell with large vacuole (*Coscinodiscus*) (**b**) Needle-like cell (*Rhizosolenia – floating position (upper) and sinking position* (**c**) Raft-like cell mass (*Bacillaria*) (**d**) Associated group of cells with spiny outgrowths (*Chaetoceros*).

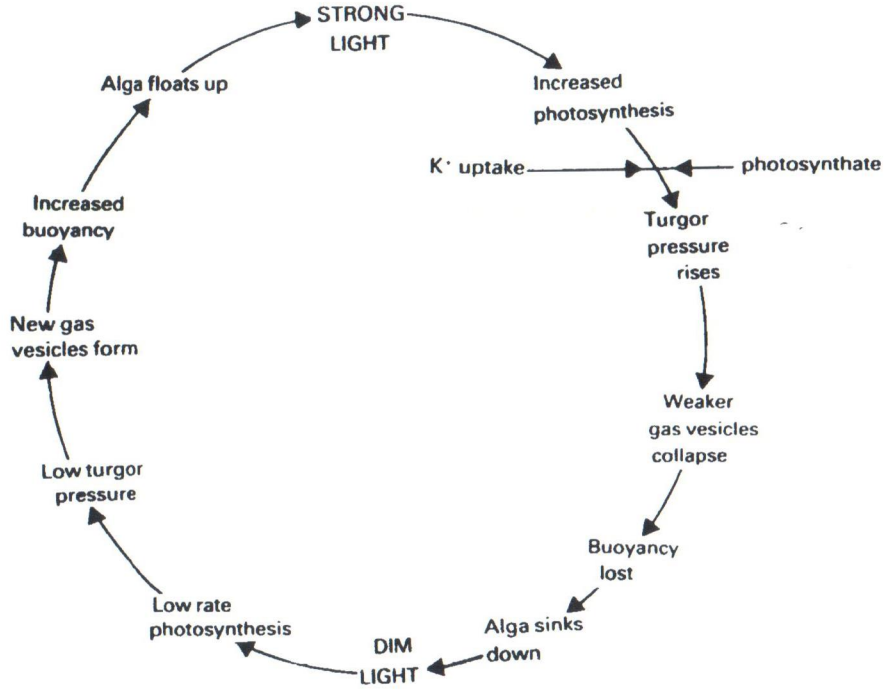
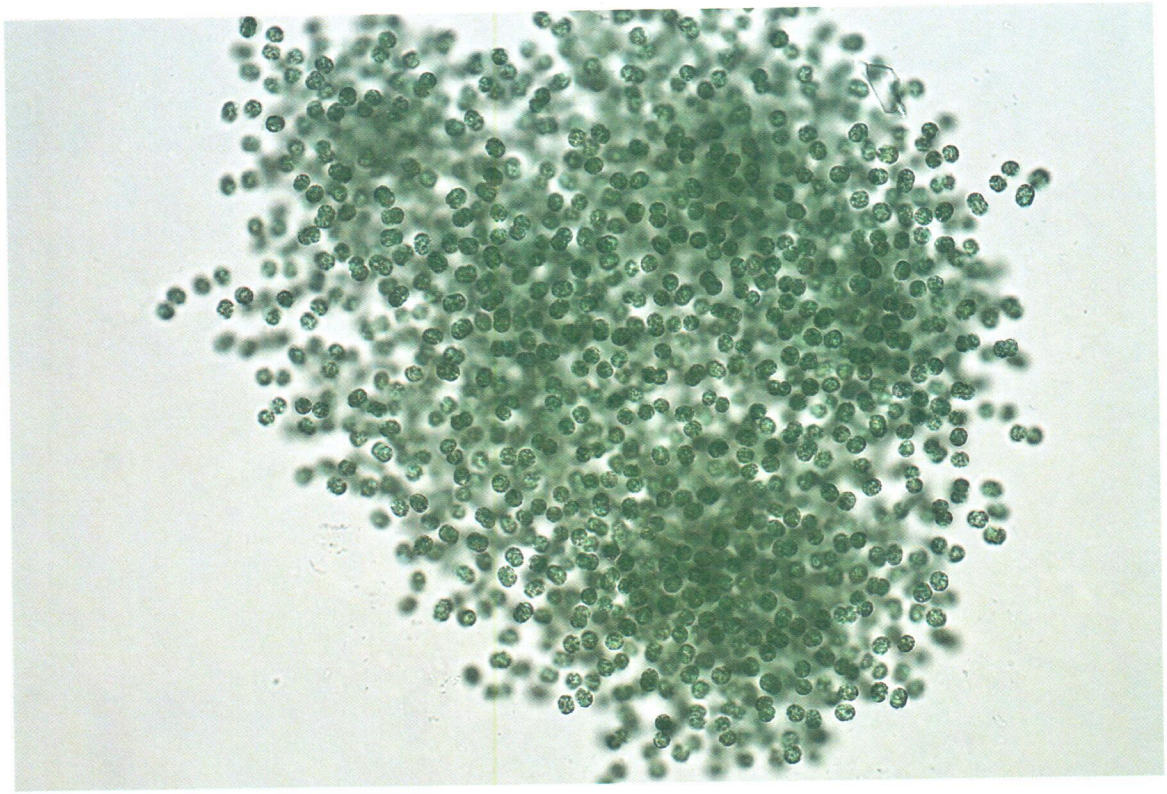
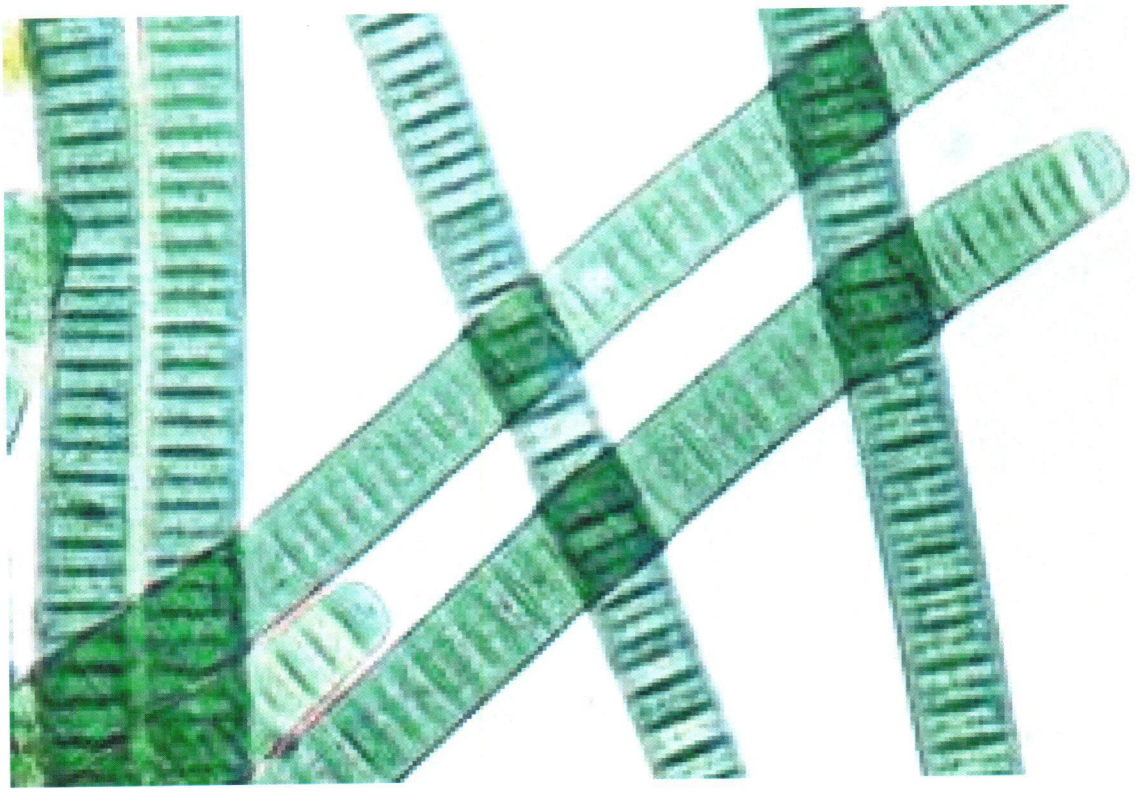
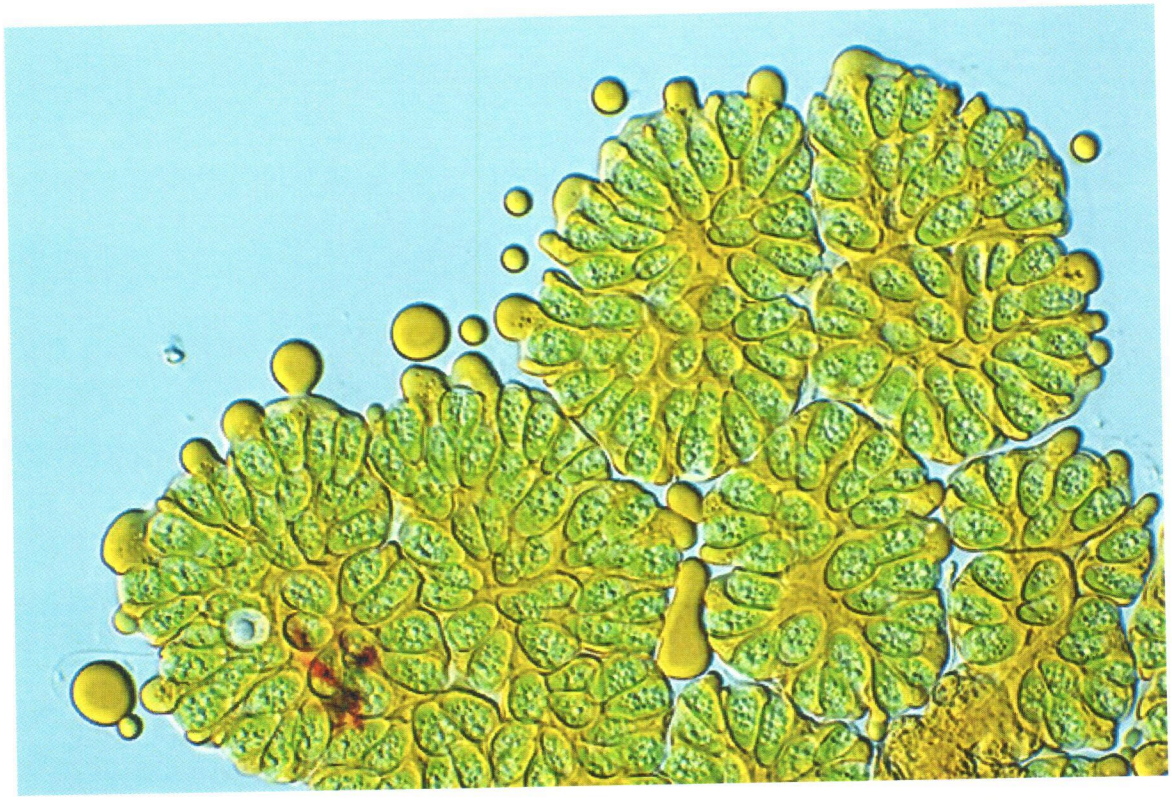


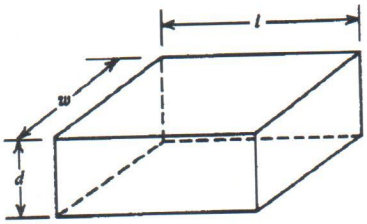
Fig. 3.2 Diagram showing the sequence of buoyancy regulation in planktonic blue-greens (after Reynolds and Walsby, 1975, *Biol. Rev.*, **50**, 437–81)[78].





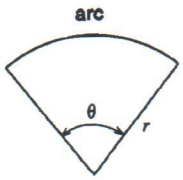


GEOMETRIC FORMULAS FOR BASINS OF VARIOUS SHAPES ($\pi = 3.1416$)



Rectangular basin

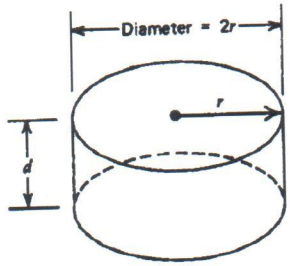
Surface area = $w \times l$
Circumference = $2w + 2l$
Volume = $w \times l \times d$



Arc of a circle
θ degrees

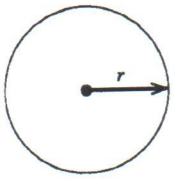
Surface area = $\frac{\pi \times r^2 \times \theta}{360}$

Length of arc = $\frac{\pi \times r \times \theta}{180}$



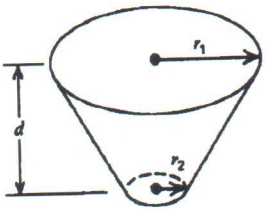
Circular basin

Surface area = $\pi \times r^2$
Circumference = $2 \times \pi \times r$
Volume = $\pi \times r^2 \times d$



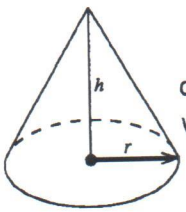
Sphere

Surface area = $4 \times \pi \times r^2$
Volume = $\frac{4}{3} \times \pi \times r^3$



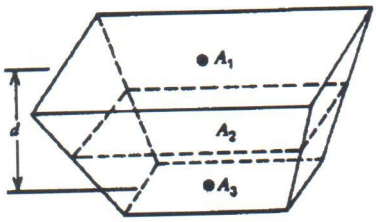
Conical basin

Area$_1$ = $\pi \times r_1^2$
Volume = $\frac{d}{3} \times (A_1 + A_2 + \sqrt{A_1 \times A_2})$
Area$_2$ = $\pi \times r_2^2$



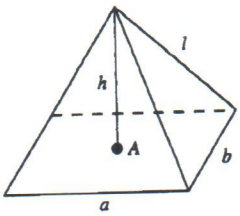
Cone

Curved surface area = $\pi \times r \times \sqrt{r^2 + h^2}$
Volume = $\frac{\pi}{3} \times r^2 + h$



Prismoidal basin

Volume = $\frac{d}{6} \times (A_1 + 4A_2 + A_3)$
where A_1 = surface area
A_2 = area of midsection
A_3 = bottom area
d = depth



Pyramid

Volume = $\frac{a \times b \times h}{3}$

Area of side = $\frac{a \times l}{2}$
= $\frac{b \times l}{2}$

Area of base = $a \times b$