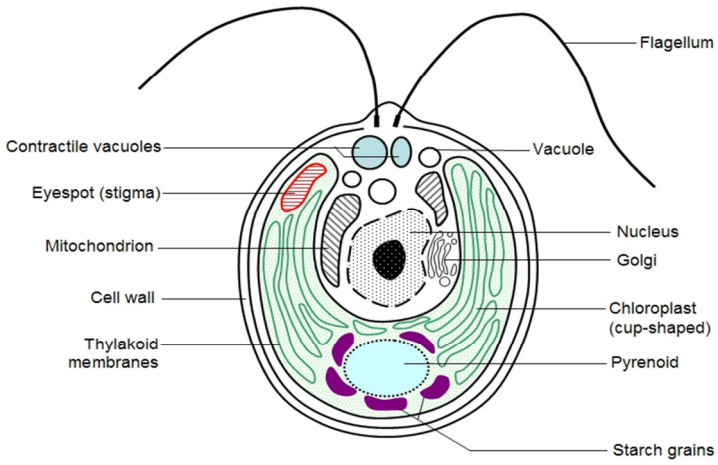
CHARACTERISTICS OF ALGAE

- They are filamentous, thread like and photosynthetic.
- They could be unicellular as in *Chlamydomonas sp.*
- They are of various colours ranging from green, blue-green, red, brown or golden.
- They are the eukaryotic-with distinct nucleus.
- They could be heterotrophs, photoautotrophic except the prokaryotic cyanobacteria (blue-green algae in a symbiotic relations).
- Some are flagellated while others are not.
- They are aquatic either fresh water or as marine phytoplanktons.
- Algae form the bases of aquatic food webs that support enormous abundance and diversity of life.
- All algae posses' chlorophyll, the primary pigments that trap wavelengths of light to which chlorophyll is not as sensitive.
- These pigments include other forms of chlorophyll (green) carotenoids (yellow/orange), xantophylls (brown) and Phycobilins (red or blue varieties).
- Asexual reproduction is by zoospores while sexual is by production of gametes.

Chlamydomonas



REPRODUCTION IN ALGAE

Reproduction in algae is of three main kinds: vegetative, asexual and sexual.

1. Vegetative Reproduction: The parent cell divides into two or more fragments that grow into new organisms. it occurs by fission, fragmentation, budding, propagation, hormogonia, protonema, tubers, etc.
    - Akinetes: thick walled non-motile bodies filled with concentrated food, modified vegetative cell.
    - Hormogonia: segments of filaments.
    - Protonema: a thread-like chain of cells, the beginning stage of some species of algae.
2. Asexual Reproduction: it takes place by the formation of various types of sporangia. The spore escape from the parent plant, undergo germination and give rise to new plants. All kinds of spores, with the exception of zoospores are non motile. The common types of asexual spores found in algae, include zoospores, aplanospores, autospores, hypnospores, exospores, endospores, carpospores, monospores, tetraspores and paraspores.
    - Zoospores: flagellated, asexual reproductive bodies often with an eyespot.
    - Synzoospore: multinucleate, multiflagellate zoospore or compound zoospore.
    - Aplanospore: non-motile thick walled zoospore formed by cleavage of protoplast within a cell.
    - Hypnospore: thick walled aplanospore.
    - Autospores: thick walled spores formed by cell division

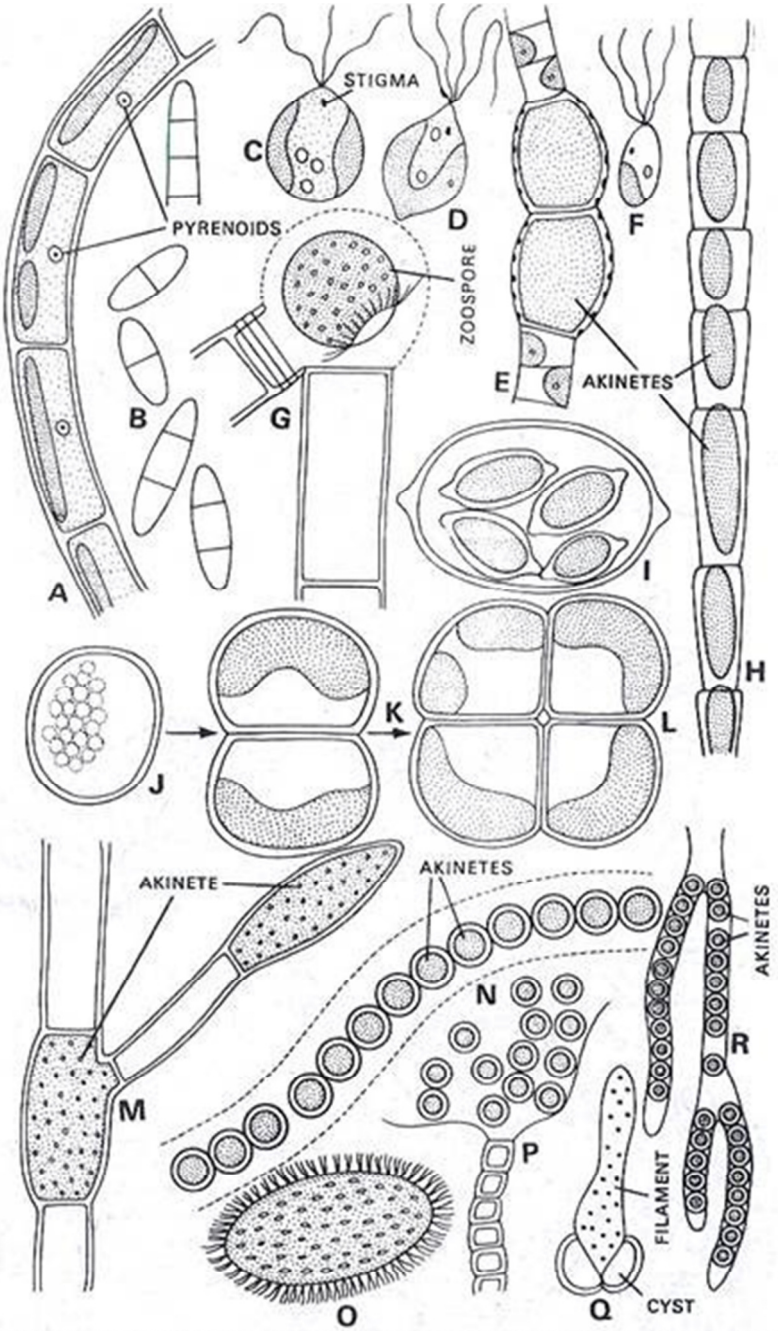


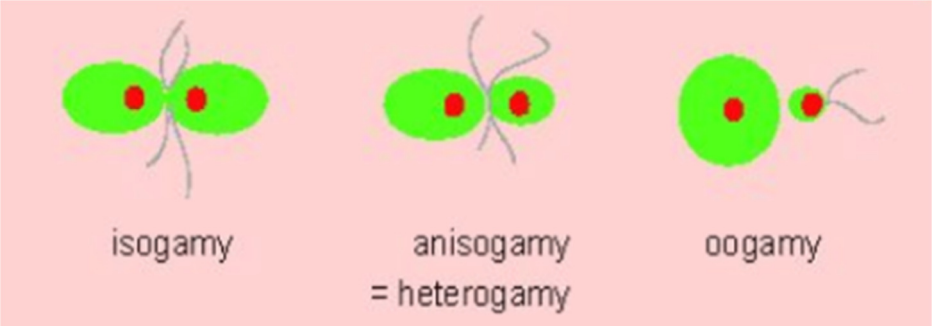
Fig. 3.7. Reproduction. Vegetative and Asexual. A filament of *Hormidium*; B, fragments of same; C, D and F, zoospores (swarmers) of *Ulothrix*; E, akinetes of *Ulothrix idiospora*; G, zoospore of *Oedogonium* sp.; I, autospores of *Oocystis lacustris*; H, akinetes of *Oedogonium*; J-L, cell division *in Pleurococcus* sp.; M, akinetes of *Pithophora*; N, akinetes of *Ulothrix oscillarina*; O, synzoospore of *Vaucheria*; P, palmella stage in *Ulothrix*; Q, germination of cyst in *Vaucheria*; R, akinetes of *Botrydium*.

3. Sexual Reproduction: it is also known as gametic reproduction, since it involves the fusion between haploid gametes to form a diploid zygote.

   Based on the form, size and behaviour of the fusing gametes, three major kinds of sexual reproduction can be recognised among algae, namely isogamy, anisogamy or heterogamy and oogamy.

   - Isogamy: equal-sized, motile gametes.
   - Anisogamy or heterogamy: motile gametes, almost equal-sized.
   - Oogamy: small motile male gamete, large non-motile female gamete

     Isogamy is the most primitive type and oogamy is the most advanced type.



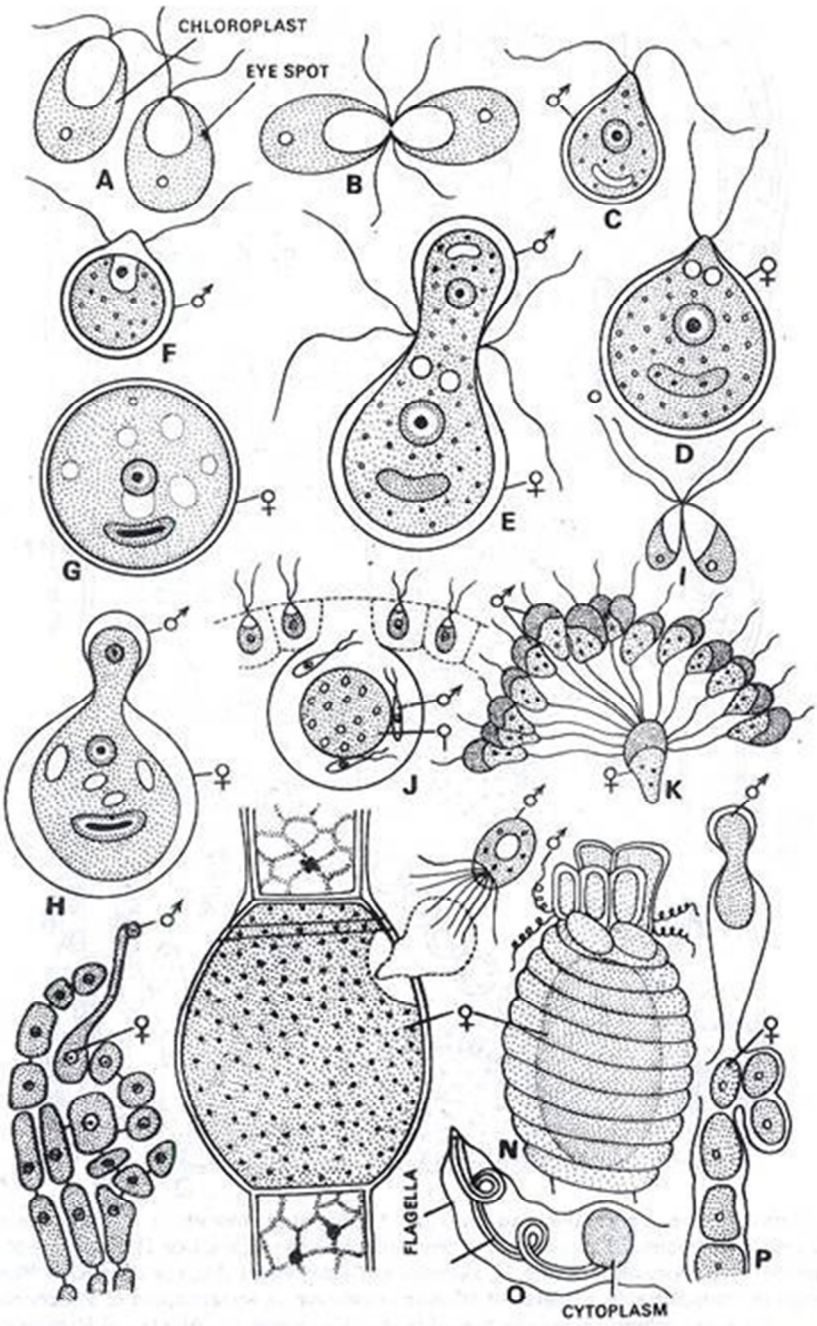


Fig. 3.8. Reproduction. Sexual. A, two gametes of same size (isogametes); B, fusion of same (isogamy); C and D, two gametes of different size (male and female); E, fusion of same (anisogantny); F and G, male and female gametes; H, fusion of same (oogamy); I, anisogamy in *Enteromorpha inteslinalis*; J. oogamy in *Volvox*; K, clump formation in *Ectocarpus*, large female is surrounded by male gametes; L, oogamy in *Oedogonium*; M, advanced oogamy in *Polysiphonia*; N, oogamy, in *Chara*; O, antherozoid of *Chara*; P, oogamy in *Batrachospermum*.