

A KEY TO THE CYANOPHYCEAE

This key is a revision of that given in the 1962 key to the genera of British Seaweeds.

Only the British marine species, as listed by Parke and Dixon in the 1968 Check List of British Marine Algae (2nd. revision) are included. Drouet and Daily gave a revised classification of the coccoid forms (1956) and of the Oscillatoriaceae (1968); both involved considerable reductions in the number of species. The four coccoid genera of Drouet and Daily are included in the key, their names being enclosed in square brackets. Drouet's revision of the Oscillatoriaceae does not lend itself to this treatment.

The cyanophyceae are extremely plastic in morphology and, while the traditional names can often be more or less easily allocated to the plants as they are found in nature, it is far from certain whether the various 'genera' are truly distinct.

Cyanophyceae

- 1. Plants non-filamentous, cells solitary or assembled in large or small colonies, or with poorly defined filaments which are, at least partially packed closely together to form an encrusting growth on solid surfaces.....2
- Plants distinctly filamentous; filaments branched (Fig.1) or unbranched. Trichomes with or without mucilage sheath (Figs. 1,8,9.) either free or in gelatinous colonies, occasionally forming calcareous masses with more or less fibrous texture.....17
- 2. No differentiation between base and apex of cells. Cells solitary or in colonies, never filamentous. Reproduction by vegetative division10
- Plants attached to substratum; Cells solitary or colonial showing polarity, particularly in solitary cells. Thalli encrusting, one cell thick, or if more, then composed of irregular, upright filaments. Sometimes with filaments penetrating the substratum. Reproduction by endospores and exospores. [Entophysalis].....3

3. Thallus more or less obviously composed of rows of cells.....4.
Thallus not composed of rows of cells; Cells solitary or in groups,
one end attached to substratum.....9
4. Filaments of thallus at least partially endolithic on shell or
calcareous rock (Fig.1b.) Livella
Non-endolithic.....5
5. Forming flat encrustation.....6
Forming colonies essentially hemispherical, single or confluent.....8
6. Vertical filaments closely packed; short, arising from branched creeping
filaments, which may alone be present. Pleurocapsa
Vertical filaments arising from non-filamentous basal stratum.....7
7. Forming extensive dark, hard crust. Cells in rows with distinct individual
lamellate sheaths (cf. Gleocapsa) Entophysalis
Forming extensive gelatinous crust; cells small and embedded in mucilage
but without individual sheaths. Chlorogloia
8. Small hemispherical colonies of few cells arranged in radial rows.
Usually epiphytic on Cyanophyceae and other filamentous algae;
also on rock. (Fig.2.) Xenococcus
Larger colonies, confluent when older; epiphytic on Laminaria and other
algae and on rock. Mucilage production by spores in mature plants,
tends to separate them and to obscure filamentous form. Hydrococcus (= Oncobyrsa)
9. Cells solitary or, usually, in groups; attached by the lower, more pointed
end; sometimes with a small stalk. Endospores may be present, sometimes
in swollen cells. Epiphytic on various algae. (Fig. 3.) Dermocarpa
Solitary or in colonies; exospores may be present; uncertain whether
this genus really occurs in sea (Fig.4.) Chaenoesiphon
10. Cells solitary or in mucilaginous masses, never regularly arranged in
flat sheets.....11
Cells in flat plate-like colonies, dividing in two planes perpendicular
to the substratum and to each other to produce regular rows of cells
Agmenellum.....12

11. ~~Cells elipsoid or elongated, except just after division.~~ Division always perpendicular to long axis of cell. Solitary or colonial. [Coccochloris]...13
 Cells more or less spherical; elipsoid only at the time of division.
 Dividing in any of three planes. Colonial. [Anacystis].....15

12. Cells spherical or elipsoid just before division. Dividing in two planes at right angles, both perpendicular to the plane of the colony and so producing a flat sheet with the cells regularly arranged in rows. (Fig. 5.)

Merismopedia

Cells elongated, arranged with long axis perpendicular to plane of colony, dividing to give a flat sheet with the cells arranged in rows.

Microcrocis (= Holopedia)

13. Cells single or in two's or four's; not united in mucilaginous masses
 Usually on or with other blue green algae. Synechococcus
 Cells in mucilaginous masses.....14

14. Cells elongated, dividing transversely, embedded in mucilage.
 Mucilage sheaths persist so that the sheaths of the parent cells remain round and daughter cells and their individual sheaths, giving a lamellate appearance. Gleotheca
 Cells elongated, dividing transversely in mucilaginous masses but without persistent individual sheaths so that mucilage has a homogenous appearance Aphanothece

15. Cells not elongated; dividing in three planes. A new mucilage sheath forms around each cell after division within the persistent previous sheaths giving a lamellate appearance. Groups of 2 - 8 cells of this kind united in larger mucilaginous masses (Fig. 6) Gleocapsa
 Cells not arranged in small groups within strongly lamellate sheaths.....16

16. Cells spherical dividing in three planes, single or in pairs in a mucilaginous mass (Fig.7.) Occasionally with pairs or small groups of cells within the sheath of parent cells Aphanocapsa
Cells spherical or ovoid; more or less tightly packed in microscopic colonies with a usually lamellate outer envelope. Colonies epiphytic single or several united in common mucilage. Microcystis
17. All cells of trichomes similar.....18
Cells of more than one kind in trichome.....26
18. Trichomes in mucilage sheaths. Sheath closed at ends, more than one trichome in each. Filaments usually branched.....19
Trichomes naked or one trichome only in each sheath. Sheaths open at ends.....21
19. Sheaths thick walled with numerous trichomes closely packed in each (Fig. 9.) Forming strata on mud, (often with Lynxbya; Filaments seldom branched. Microcoleus
A few trichomes only in each sheath (seldom more than 3).....20
20. Sheaths thick and mucilaginous, filaments branched; trichomes with cells shorter than broad, tapered at the ends, the end cell usually enlarged into a cap (calyptra) (Fig.10). Forming sheets usually epiphytic on algae. Hydrocoleum
Sheaths firm, often laminate; trichomes tapered, without calyptras; filaments usually with false branching (Fig.17.); sometimes partially calcified, occasionally forming large calcareous masses Schizothrix
21. Trichomes in sheaths; filaments with occasional false branching, united into pointed tufts usually upright and up to 2-3 cm. high or prostrate. Synplaca
Trichomes naked or in sheaths; not united into tufts.....22
22. Sheaths colourless and delicate; filaments interwoven into sheets which are often strong enough to withstand handling. Filaments never spirally coiled Phormidium
Filaments not interwoven into sheets.....23

23. Sheaths present.....24
Sheaths absent. (Note: this observation requires care; motile filaments often move out of their sheaths in collected samples).....25
24. Filaments unbranched (Fig. 8), attached to surfaces or free; sometimes in sheets. Often showing gliding motion and capable of moving out of sheath. Diameter of trichome varies from 1 μ to 50 μ or more. Lyngbya
Filaments showing frequent false branching (Fig. 1a.) Without heterocysts.
Sheaths thin. Plectonema
25. Trichomes wound in a spiral of uniform diameter. (Fig.12). Divisions between cells hard to distinguish, even under high magnification, or absent. Motion of trichomes screw like. Spirulina
Trichomes straight or irregularly curved but not of spiral form; free usually showing active gliding motion Oscillatoria
26. Trichomes uniseriate with cell divisions mainly transverse.
Filaments unbranched or with false branching.....27
Trichomes uniseriate, occasionally of two rows of cells, with both transverse and longitudinal divisions; with profuse true branching.
Some branches attenuated and hair-like, others with terminal heterocysts. (Fig.13). Endolithic in calcareous rock or endozooic in shell. Hastigocoleus
27. Trichomes attenuated and hair-like at the tips.....28
Trichomes not, or only slightly, tapered at the ends.....33
28. Heterocysts absent; forming a soft encrustation on rocks or algae.
Trichomes, tapering at the tips, arising from a basal layer of closely packed rounded cells. Amphithrix
Heterocysts present.....29
29. Filaments united in microscopic mucilaginous colonies,.....30
Filaments not united in a general mucilaginous envelope.....32

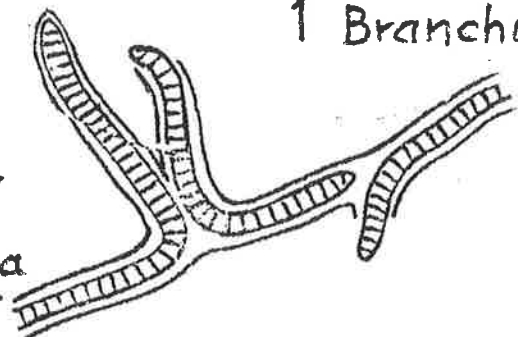
30. Heterocysts intercalary. Trichomes attenuated at the tips; filaments with profuse false and true branching, radially arranged in outer part of thallus. In black or brown mucilaginous colonies, which are at first solid and later hollow. Epilithic or epiphytic Brachytrichia
Heterocysts basal.....31
31. Forming flat encrustations on rock or on algae. Filaments unbranched, each with a single basal heterocyst, uniformly arranged perpendicular to the substratum. Sublittoral or in pools Isactis
Forming firm hemispherical colonies or irregular cushion-like masses on mud, rock or other algae. Filaments arranged radially with false branching, each branch with a basal heterocyst, well separated from the parent trichome. (Fig. 14). Trichomes taper distally to a hair. Rivularia
32. One trichome in each sheath; filaments unbranched or occasionally with false branching; never appearing dichotomous. Heterocysts basal or or intercalary. (Fig. 15). Epiphytic or endophytic in Demalion. Calothrix
2-6 trichomes or at least their bases, in each sheath. False branching appearing in dichotomous. Dicothrix
33. Trichomes unbranched; all similar, without distinction into erect and basal forms.....34
Trichomes with false branching or unbranched; thallus with distinct basal and erect portions.....36
34. Trichomes much twisted; in a mucilaginous mass with a distinct outer envelope. Heterocysts intercalary or sometimes terminal. (Fig.16). Nostoc
Trichomes free or in an indefinite mucilaginous mass, with no distinct outer envelope.....35
35. Filaments free, with sheaths. Cells shorter than broad; numerous intercalary heterocysts. (Fig.17) Nodularia
Filaments free or in mucilaginous masses with indefinite limits. Cells of trichomes longer than broad, heterocysts intercalary. Anabaena

36. Filaments unbranched; one trichome in each sheath. Cells larger towards base, with basal heterocysts. (Distinguished from Calothrix by trichomes not being attenuated into hairs) Fremyella (= Microchaete)
- Filaments branched, false branches borne singly, sheaths delicate.

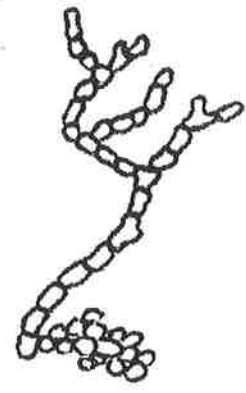
Tolypothrix

1 Branching

a. false
Plectonema

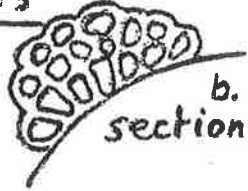


b. true
Hyella



2 Xenococcus

a. surface



b. section

3

Dermocarpa



a. colonies on
Laurencia

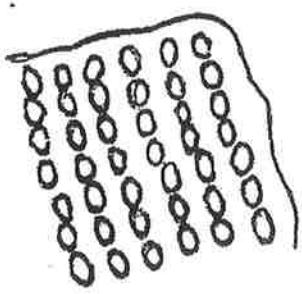


exospores

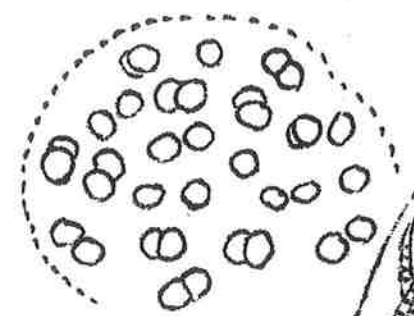


b. section
endospores

4 Chamaesiphon

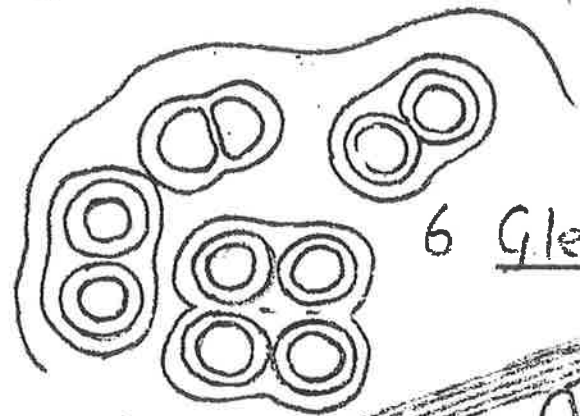


5 Merismopedia



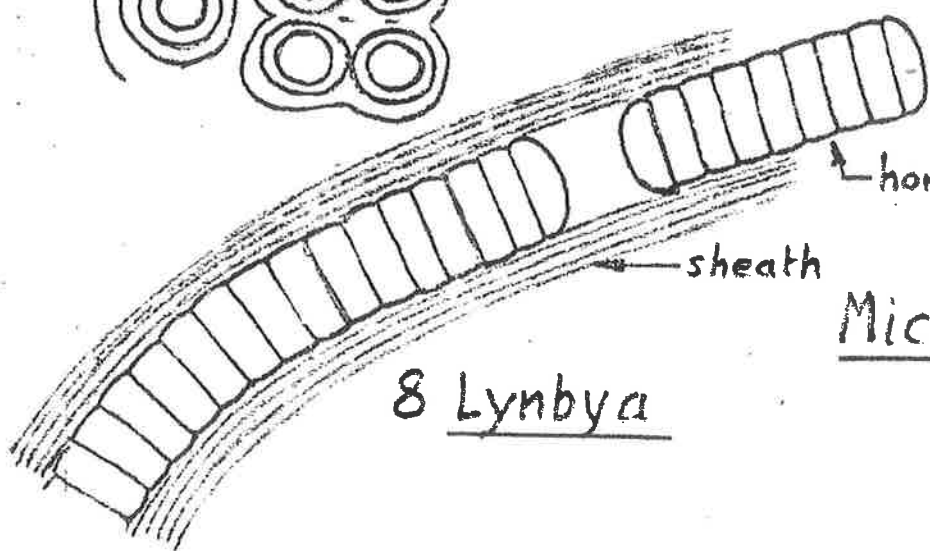
7 Aphanocapsa

6 Gleocapsa



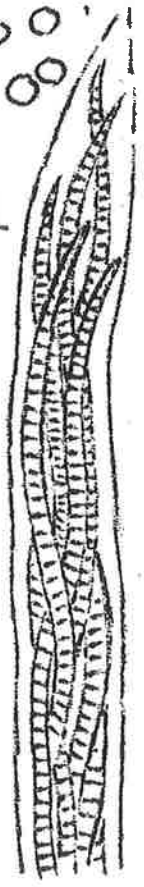
9 Microcoleus

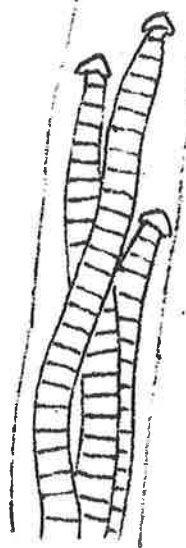
8 Lynbya



hormogone

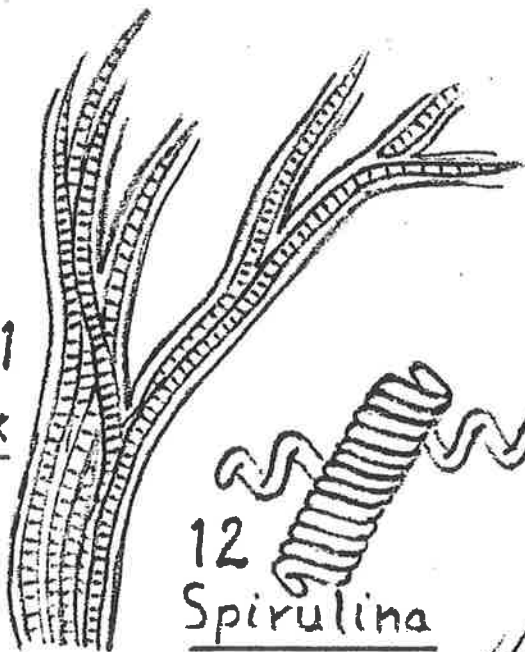
sheath





10 Hydrocoleum

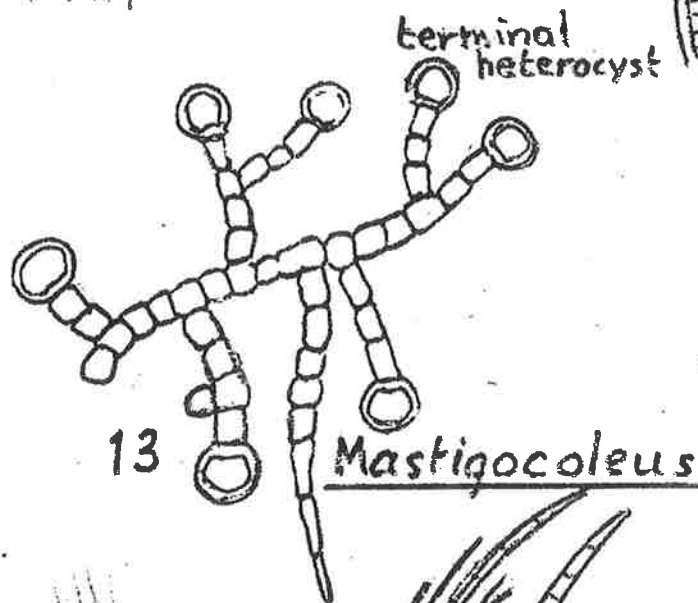
calyptra



11 Schizothrix



12 Spirulina



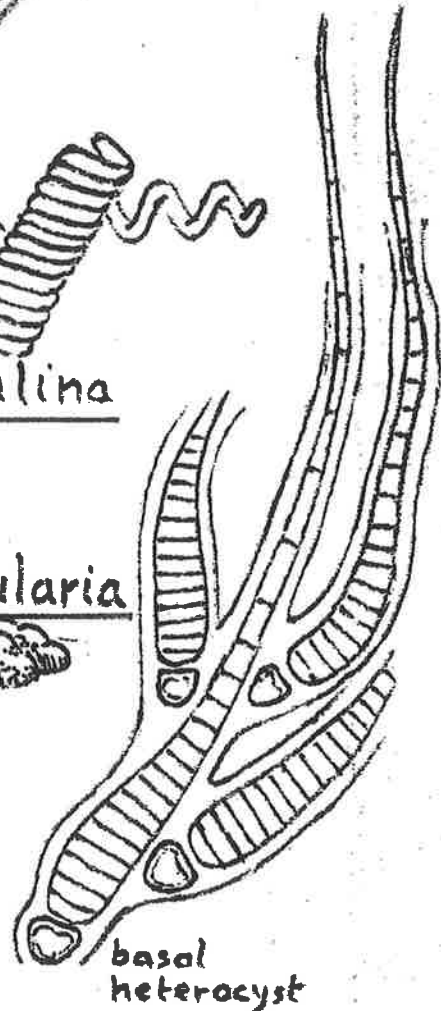
terminal heterocyst

13 Mastigocoleus

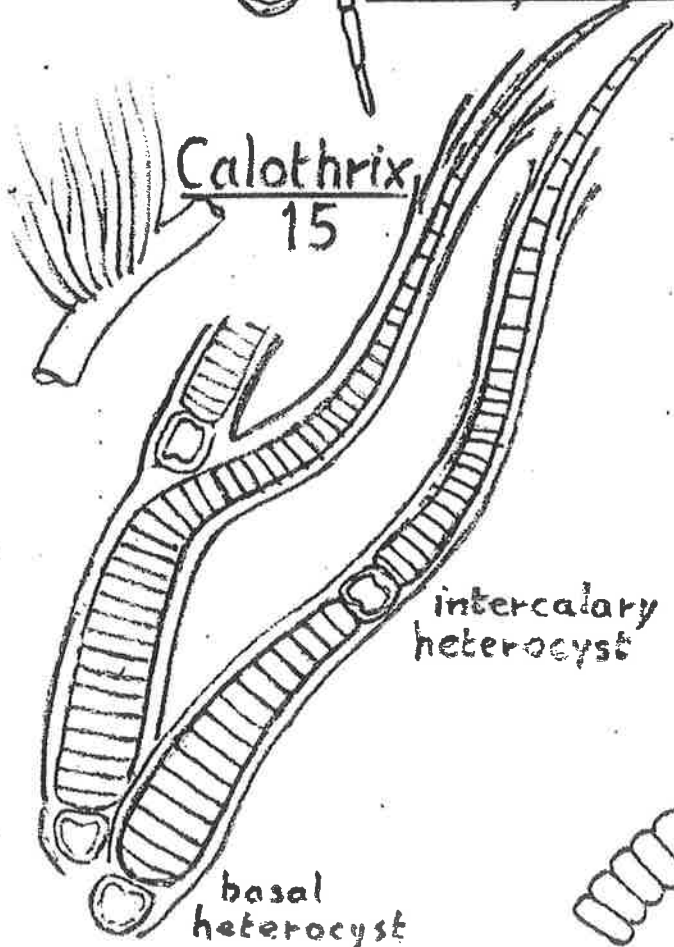


14 Rivularia

colonies



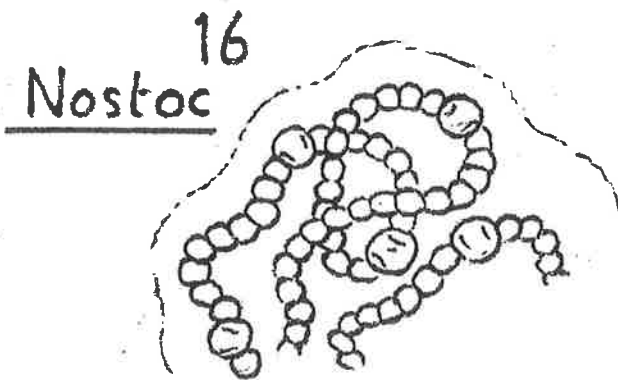
basal heterocyst



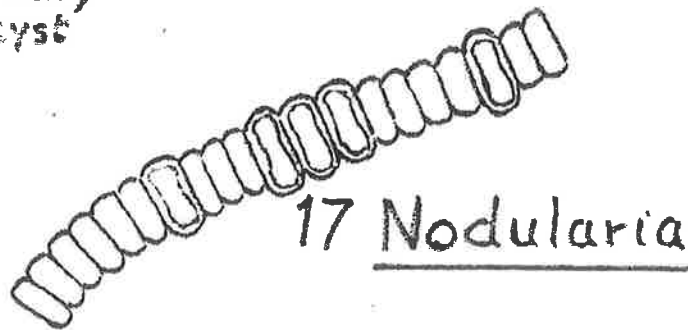
15 Calothrix

intercalary heterocyst

basal heterocyst



16 Nostoc



17 Nodularia