

## KEYS TO THE GENERA OF MARINE ALGAE OF TAIWAN

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The following keys were prepared for the use of the students in the National Taiwan University for the identification of marine algae of Taiwan. The genera cited here are only those reported on Taiwan and its offshore islands, so that generic distinctions apply only to species of the local flora.

In constructing the keys an effort has been made to avoid using reproductive structures as far as possible. However, it should be mentioned that fragmentary material or juvenile plants are not always identifiable by these keys. In cases where species of a genus are of different shape, the genus appears more than once in the key. No attempts have been made to correct any possible changes of generic names of local species that were cited in Shen and Fan's (1950) and Chiang's (1960, 1962) papers upon which these keys were made.

## Chlorophycophyta (Green algae)

- |   |                       |
|---|-----------------------|
| 1. Thallus encrusted with lime, at least in part.....                       | 2                     |
| 1. Thallus not encrusted with lime.....                                     | 4                     |
| 2. Thallus conspicuously jointed.....                                       | <i>Halimeda</i>       |
| 2. Thallus not jointed.....   | 3                     |
| 3. Thallus brush-like.....  | <i>Chamaedoris</i>    |
| 3. Thallus umbrella-like.....   | <i>Acetabularia</i>   |
| 4. Thallus composed of one to many, spherical or clavate vesicles.....      | 5                     |
| 4. Thallus not composed of vesicles.....                                    | 7                     |
| 5. Thallus single, clavate.....   | <i>Boergesenia</i>    |
| 5. Thallus forming a mat of indefinite size.....                            | 6                     |
| 6. Daughter vesicles initiated inside the parent segments.....              | <i>Dictyosphaeria</i> |
| 6. Daughter vesicles growing out from the parent segments.....              | <i>Valonia</i>        |
| 7. Thallus reticulate.....  | 8                     |
| 7. Thallus not reticulate.....  | 11                    |
| 8. Anastomosing segments in the form of a small hapteroid cell.....         | 9                     |
| 8. Anastomosing segments not in the form of a small hapteroid cell.....     | 10                    |
| 9. Thallus spongy; segments united to each other in more than one plane.... | <i>Boodlea</i>        |
| 9. Thallus flat; segments united to each other in one plane.....            | <i>Struvea</i>        |
| 10. Meshes filled with small intercalary cells.....                         | <i>Anadyomene</i>     |
| 10. Meshes open.....  | <i>Microdictyon</i>   |
| 11. Thallus foliose or tubular.....   | 12                    |
| 11. Thallus filamentous.....  | 14                    |
| 12. Thallus foliose.....  | 13                    |
| 12. Thallus tubular or tubular in part.....                                 | <i>Enteromorpha</i>   |
| 13. Thallus composed of two layers of cells.....                            | <i>Ulva</i>           |
| 13. Thallus composed of one layer of cells.....                             | <i>Monostroma</i>     |
| 14. Filaments multicellular.....  | 15                    |
| 14. Filaments nonseptate, monosiphonous.....                                | 18                    |

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15. Filaments unbranched.....	<i>Chaetomorpha</i>
15. Filaments branched.....	16
16. Filaments free.....	<i>Cladophora</i>
16. Filaments entangled in a mass.....	17
17. Filaments without septations at the base of branching.....	<i>Cladophoropsis</i>
17. Filaments with septations at the base of branching.....	<i>Valoniopsis</i>
18. Thallus with a rhizoid-bearing prostrate part and a branched erect part.....	<i>Caulerpa</i>
18. Thallus erect or prostrate.....	19
19. Thallus spongy.....	<i>Codium</i>
19. Thallus not spongy.....	20
20. Branching dichotomous, constricted at intervals.....	<i>Chlorodesmis</i>
20. Branching pinnate or radial, not constricted at intervals.....	<i>Bryopsis</i>

#### Phaeophycophyta (Brown algae)

1. Thallus filamentous, branched.....	2
1. Thallus not filamentous.....	3
2. Filaments uniseriate.....	<i>Ectocarpus</i>
2. Filaments multiseriate.....	<i>Sphacelaria</i>
3. Thallus foliose.....	4
3. Thallus not foliose.....	13
4. Thallus flabellate or with a much branched blade.....	5
4. Thallus with a narrow unbranched blade.....	12
5. Thallus with midrib.....	<i>Neurocarpus</i>
5. Thallus without midrib.....	6
6. Thallus flabellate.....	7
6. Thallus dichotomous or pinnately branched.....	9
7. Two cortical cells corresponding to each medullary cell.....	<i>Zonaria</i>
7. One cortical cell corresponding to each medullary cell.....	8
8. Thallus with inrolled margins.....	<i>Padina</i>
8. Thallus without inrolled margins.....	<i>Homoeostrichus</i>
9. Growth originating from an apical cell.....	10
9. Growth originating from marginal rows of apical cells.....	<i>Spathoglossum</i>
10. Medullary and cortical layers composed of one layer of cells.....	<i>Dictyota</i>
10. Medullary and cortical layers not composed of one layer of cells.....	11
11. Cortical layers composed of two layers or partially of three layers of cells.....	<i>Pachydietyon</i>
11. Cortical layer composed of one layer of cells.....	<i>Dilophus</i>
12. Thallus altogether composed of cells.....	<i>Petalonia</i>
12. Thallus composed of a filamentous medulla and a cellular cortex.....	<i>Endarachne</i>
13. Thallus hollow.....	14
13. Thallus not hollow.....	17
14. Thallus cylindrical.....	15
14. Thallus saccate.....	16
15. Thallus simple, strongly constricted at intervals.....	<i>Scytosiphon</i>
15. Thallus branched, not constricted.....	<i>Rosenvingea</i>
16. Thallus reticulate.....	<i>Hydroclathrus</i>
16. Thallus not reticulate.....	<i>Colpomenia</i>

17. Thallus differentiated into stem, branches and leaf-like portions.....18  
 17. Thallus not differentiated into stem, branches and leaf-like portions.....19  
 18. "Leaf" flat.....*Sargassum*  
 18. "Leaf" peltate.....*Turbinaria*  
 19. Thallus altogether composed of cells.....*Chnoospora*  
 19. Thallus composed of filamentous medulla and cellular cortex.....*Ishige*

### Rhodophycophyta (Red algae)

1. Thallus free-living or epiphytic on other organisms.....2  
 1. Thallus growing within *Liagora orientalis*.....*Liagorophila*  
 2. Thallus calcified, at least in part.....3  
 2. Thallus uncalcified.....16  
 3. Thallus crustose.....4  
 3. Thallus not crustose.....8  
 4. Thallus with rhizoids.....5  
 4. Thallus without rhizoids.....6  
 5. Rhizoids unicellular.....*Mastophora*  
 5. Rhizoids multicellular.....*Peyssonelia*  
 6. Tetrasporic conceptacles with a single pore.....*Lithophyllum*  
 6. Tetrasporic conceptacles with several pores.....7  
 7. Hypothallium one or two cells in thickness.....*Melobesia*  
 7. Hypothallium many cells in thickness.....*Lithothamnion*  
 8. Medulla composed of long, intertwined filaments.....9  
 8. Medulla absent or, if present, composed of cells in transverse rows.....13  
 9. Cortex pseudoparenchymatous.....10  
 9. Cortex filamentous, loose.....12  
 10. Cortex thick, consisting of more than four layers of cells.....*Rhodopeltis*  
 10. Cortex thin, consisting of two to four layers of cells.....11  
 11. Thallus with dense whorls of short hairs.....*Actinotrichia*  
 11. Thallus smooth or hairy; hairs, if present, not in whorls.....*Galaxaura*  
 12. Carpogonial branches composed of 3 to 6 cells.....*Liagora*  
 12. Carpogonial branches composed of 6 to 10 cells.....*Liagoropsis*  
 13. Conceptacles scattered over the surface of intergeniculum.....*Amphiroa*  
 13. Conceptacles marginal or terminal.....14  
 14. Only one conceptacle on each intergeniculum.....15  
 14. More than one conceptacle on each intergeniculum.....*Cheilosporum*  
 15. Branching dichotomous.....*Jania*  
 15. Branching lateral.....*Corallina*  
 16. Thallus membranous, monostromatic or distromatic.....17  
 16. Thallus not membranous, or if membranous, polystromatic.....18  
 17. Thallus entire throught.....*Porphyra*  
 17. Thallus with reticulate portion.....*Martensia*  
 18. Thallus filamentous; filaments uniseriate.....19  
 18. Thallus not filamentous.....23  
 19. Thallus branched.....20  
 19. Thallus unbranched.....21  
 20. Tetrasporangia terminal.....*Plumaria*  
 20. Tetrasporangia lateral.....*Spermothamnion*

21. Spores formed singly.....	22
21. Spores formed more than one .....	<i>Bangia</i>
22. Spores formed from portions of parent cells.....	<i>Erythrotrichia</i>
22. Spores formed from whole parent cells.....	<i>Asterocytis</i>
23. A central axis readily observed in sections of mid-parts of the thallus.....	24
23. A central axis not observed in sections of mid-parts of the thallus.....	48
24. Thallus filamentous .....	25
24. Thallus not filamentous.....	30
25. Thallus corticated, at least in part.....	26
25. Thallus uncorticated .....	<i>Murrayella</i>
26. Branching dichotomous .....	27
26. Branching not dichotomous .....	28
27. Each node consisting of a whorl of teeth.....	<i>Centroceras</i>
27. Nodes without teeth .....	<i>Ceramium</i>
28. Thallus cylindrical.....	29
28. Thallus compressed.....	<i>Carpoblepharis</i>
29. Branchlets wholly uncorticated .....	<i>Wrangelia</i>
29. Branchlets corticated at the node.....	<i>Spyridia</i>
30. Thallus erect.....	31
30. Thallus prostrate .....	76
31. Thallus cylindrical or slightly compressed.....	32
31. Thallus not cylindrical or slightly compressed.....	39
32. Thallus covered with numerous short branchlets .....	33
32. Thallus not covered with short branchlets.....	35
33. Tips of branches usually with trichoblasts .....	34
33. Tips of branches without trichoblasts .....	<i>Hypnea</i>
34. Axial cell surrounded by 5 pericentral cells.....	<i>Acanthophora</i>
34. Axial cell surrounded by 6-8 pericentral cells .....	<i>Digenea</i>
35. Tips of branches usually with trichoblasts.....	36
35. Tips of branches without trichoblasts .....	37
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36. Apical cell emergent.....	<i>Chondria</i>
37. Branches usually fused to each other .....	<i>Caulacanthus</i>
37. Branches free.....	38
38. Thallus hollow, at least in old parts .....	<i>Gloiopeltis</i>
38. Thallus solid .....	<i>Asparagopsis</i>
39. Thallus flat, not hollow.....	40
39. Thallus ovate, or pyriform, hollow.....	<i>Acrocystis</i>
40. Thallus with branches arising from the midrib.....	41
40. Thallus without branches arising from the midrib.....	43
41. Thallus with inrolled tips .....	42
41. Thallus without inrolled tips.....	<i>Neurymenia</i>
42. Thallus corticated.....	<i>Vidalia</i>
42. Thallus uncorticated.....	<i>Amansia</i>
43. Thallus corticated .....	44
43. Thallus uncorticated, at least in young parts and branches.....	<i>Symphyocladia</i>
44. Thallus with inrolled tips.....	<i>Chondrococcus</i>
44. Thallus without inrolled tips .....	45
45. Axial filament surrounded by many rhizoidal filaments .....	<i>Phacelocarpus</i>

45. Axial filament not surrounded by rhizoidal filaments.....	46
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46. Tips of branches and branchlets not rounded.....	47
47. Tips of branchlets usually bifurcated.....	<i>Microcladia</i>
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48. Medullary tissue filamentous.....	49
48. Medullary tissue absent, or if present, parenchymatous.....	61
49. Thallus flat.....	50
49. Thallus cylindrical or slightly compressed.....	56
50. Thallus with many teeth arising from margin and surfaces.....	<i>Halymenia</i>
50. Thallus without teeth.....	51
51. Thallus with wart-like outgrowths.....	52
51. Thallus without wart-like outgrowths.....	53
52. Thallus crimson-red in color.....	<i>Meristotheca</i>
52. Thallus brownish-red and yellowish-green in color.....	<i>Sarcodia</i>
53. Thallus simple or dichotomous, cuneately broadened upwards.....	<i>Chondrus</i>
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54. Cystocarps bulging above the surface.....	<i>Gigartina</i>
54. Cystocarps not bulging above the surface.....	55
55. Medulla with stellate cells.....	<i>Grateloupia</i>
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56. Cells of epidermis 5-6-gonal in surface view.....	<i>Scinia</i>
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57. Cortex composed of laterally more or less compacted branching filaments.....	58
57. Cortex composed of free branching filaments.....	60
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58. Thallus cartilaginous.....	59
59. Thallus many times dichotomously branched.....	<i>Polyopos</i>
59. Thallus sparsely branched.....	<i>Carpopeltis</i> (in part)
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62. Cortex and medulla without rhizoidal filaments.....	64
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64. Medulla composed of elongated cells.....	70
65. Thallus cylindrical.....	66
65. Thallus compressed or flat.....	67
66. Thallus constricted at intervals.....	<i>Corallopsis</i>
66. Thallus not constricted.....	<i>Gracilaria</i> (in part)
67. Thallus flabellate; segments less than 2 mm. broad.....	<i>Gymnogongrus</i>
67. Thallus not flabellate; segments more than 3 mm. broad.....	68
68. Thallus procumbent, dorsiventral.....	<i>Weberella</i>
68. Thallus erect, not dorsiventral.....	69
69. Thallus with midrib.....	<i>Holmesia</i>
69. Thallus without midrib.....	<i>Gracilaria</i> (in part)

70. Thallus spongy ..... *Ceratodictyon*  
 70. Thallus not spongy ..... 71  
 71. Thallus often covered with many papillae ..... *Eucheuma*  
 71. Thallus not covered with papillae ..... 72  
 72. Midparts of the thallus flat, less than 1 mm. broad ..... *Gelidiopsis*  
 72. Midparts of the thallus cylindrical, about 1 mm. broad ..... 73  
 73. Thallus pinnately branched ..... *Gelidiella*  
 73. Thallus irregularly branched ..... *Wurdemannia*  
 74. Thallus with diaphragms ..... 75  
 74. Thallus without diaphragms ..... *Chrysiomenia*  
 75. Gland cells present ..... *Erythrocolon*  
 75. Gland cells absent ..... *Champia*  
 76. Thallus with membranous, leaf-like blades ..... *Lecvilella*  
 76. Thallus without leaf-like blades ..... 77  
 77. Thallus uncorticated ..... *Herposiphonia*  
 77. Thallus corticated, except ultimate branches ..... *Bostrychia*

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