TABLE 1.1 Summary of Some Algal Divisions and Their More Significant Characteristics

Division	*Common Name*	*Pigments and Plastid Organization in Photosynthetic Species*	*Storage Product*	*Cell Wall*[a]	*Flagellar Number and Insertion*[b]	*Habitat*[c]
Cyanophyta	Blue-green algae	Chlorophyll *a*; c-phycocyanin, allophycocyanin, c-phycoerythrin; β-carotene and several xanthophylls	Cyanophycin granules (arginine and aspartic acid); polyglucose (glycogenlike)	α- and ϵ-diamino-pimelic acid, glucoseamine, alanine, etc.	Absent	fw, bw, sw, t
Prochlorophyta		Chlorophyll *a*,*b*; seven carentoids, of which β-carotene and zeaxanthin are major[d]	Starchlike	Peptidoglycan	Absent	sw
Chlorophyta	Green algae	Chlorophyll *a*,*b*; α-, β-, and γ-carotenes and several xanthophylls; 2–5 thylakoids/stack[e]	Starch (amylose and amylopectin) (oil in some)	Cellulose in many (β-1,4-glucopyranoside), hydroxy-proline glucosides; xylans and mannans; or wall absent; calcified in some[f]	1,2–8 many equal, apical	fw, bw, sw, t
Charophyta	Stoneworts	Chlorophyll *a*,*b*; α-, β-, and γ-carotenes and several xanthophylls; thylakoids variably associated	Starch (amylose and amylopectin)	Cellulose (β-1,4-glucopyranoside); some calcified	2, equal, subapical	fw, bw

Euglenophyta	Euglenoids	Chlorophyll *a,b*; β-carotene and several xanthophylls; 2–6 thylakoids/stack, sometimes many	Paramylon (β-1,3-glucopyranoside), oil	Absent	1–3 (—7) apical, subapical	fw, bw, sw, t
Phaeophyta	Brown algae	Chlorophyll *a,c*; β-carotene and fucoxanthin and several other xanthophylls; 2–6 thylakoids/stack	Laminaran (β-1,3-glucopyranoside, predominantly); mannitol	Cellulose, alginic acid, and sulfated mucopolysaccharides (fucoidan)	2, unequal[g] lateral	fw (very rare), bw, sw
Chrysophyta	Golden and yellow-green algae (including diatoms)	Chlorophyll *a,c* (*c* lacking in some); α-, β-, and ε-carotene and several xanthophylls, including fucoxanthin in Chrysophyceae, Bacillariophyceae, and Prymnesiophyceae; 3 thylakoids/stack	Chrysolaminaran (β-1,3-glucopyranoside, predominantly); oil	Cellulose, silica, calcium carbonate, mucilaginous substances and some chitin; or wall absent	1–2, unequal or equal apical	fw, bw, sw, t
Pyrrhophyta	Dinoflagellates	Chlorophyll *a,c*; β-carotene and several xanthophylls; 3 thylakoids/stack	Starch, α-1,4-glucan (oil in some)	Cellulose or absent; mucilaginous substances	2, one trailing, one girdling	fw, bw, sw

TABLE 1.1 (cont.)

Division	*Common Name*	*Pigments and Plastid Organization in Photosynthetic Species*	*Storage Product*	*Cell Wall*[a]	*Flagellar Number and Insertion*[b]	*Habitat*[c]
Cryptophyta	Crypto-monads	Chlorophyll *a,c*; α-, β-, and ϵ-carotene; distinctive xanthophylls (alloxanthin, crocoxanthin, monadoxanthin); phycobilins; 2 thylakoids/stack	Starch, α-1,4-glucan	Absent	2, unequal subapical	fw, bw, sw
Rhodophyta	Red algae	Chlorophyll *a* (*d* in some Florideo-phyceae); R- and C-phycocyanin, allophycocyanin; R- and B-phyco-erythrin. α- and β-carotene and several xanthophylls; thylakoids single, not associated	Floridean starch (amylopectin-like)	Cellulose,[h] xylans, several sulfated poly-saccharides (galactans) calcification in some; alginate in corallinaceae	Absent	fw (some), bw, sw (most)

[a] In terms of cell wall chemistry, the vegetative cells have received most attention. Spores, akinetes, dormant zygotes, and other resting stages have not been studied, but it is clear that their walls may contain other substances (e.g., waxes and other nonsaponifiable polymers and phenolic substances). See also Parker (1970), Mackie and Preston (1974), Darley (1974), and Hellebust (1974).

[b] In motile cells, when these are produced.

[c] fw, freshwater; bw, brackish water; sw, marine; t, terrestrial (soil, rocks, etc.).

[d] Withers et al. (1978).

[e] Based on Gibbs (1970) and Dodge (1973).

[f] Others are wall-less or have xylans, mannans, other glucans, some silica, or protein. Also, nearly all skeletal polysaccharides (cellulose, xylans, mannans) are accompanied by one or more mucilaginous substances (e.g., arabinogalactans and sulfated mucopolysaccharides).

[g] Except the uniflagellate sperms of Dictyotales.

[h] Lacking in some Bangiales, which have mannans and/or [illegible] wall component.