

## **New records and notes on marine benthic algae of American Samoa- Chlorophyta & Phaeophyta<sup>1</sup>**

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**Abstract** — A total of 43 species are added to the previously known flora of the benthic marine algae of American Samoa (8 Phaeophyta, 35 Chlorophyta), raising the known flora to 230 species. More new additions to the flora can be anticipated when Rhodophyta and Cyanophyta collected during recent surveys, and older unworked collections, are examined. Most of the additions reported here have a widespread Indo-Pacific distribution. *Sporocladopsis erythraea* Nasr (Chlorophyceae, Chaetophorales) was found epiphytic on the base of *Sargassum anapense* Setchell *et* Gardner, the first record outside its type locality (Red Sea).

**American Samoa / benthic marine algae / Chlorophyta / new records / Phaeophyta / *Sporocladopsis erythraea***

**Résumé** — **Nouvelles signalisations et notes sur des algues marines benthiques des îles Samoa américaines – Chlorophyta & Phaeophyta.** 43 espèces au total sont ajoutées à la flore précédemment connue des algues marines des îles Samoa américaines (8 Phaeophyta, 35 Chlorophyta), augmentant le nombre d'espèces connues jusqu'à 230. Beaucoup de ces nouvelles additions à la flore pouvaient être prévisibles à l'examen des Rhodophyta et Cyanophyta récoltées récemment et des anciennes collections non exploitées. La plupart de ces nouvelles espèces signalées ici ont une large répartition indo-pacifique. *Sporocladopsis erythraea* Nasr (Chlorophyceae, Chaetophorales) a été trouvée en épiphyte sur la base de *Sargassum anapense* Setchell *et* Gardner, et pour la première fois en dehors de sa localité type (Mer Rouge). (Traduit par la Rédaction).

**Algues marines benthiques / Samoa américaines / Chlorophyta / nouvelles signalisations / Phaeophyta / *Sporocladopsis erythraea***

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1. We are pleased to dedicate this paper in honour of Izzie Abbott's 85<sup>th</sup> birthday. For both of us Izzie has been a great friend, mentor and role model in our studies of tropical Pacific benthic marine algae. We know of nobody else who has the enthusiasm and such an in-depth knowledge of these challenging algae, and we look forward to working with her over the coming years as we continue to learn about these fascinating algae.

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## INTRODUCTION

Much of our knowledge on the marine algal flora of American Samoa (14°S, 168-171°W) is credited to William Albert Setchell, who published a fairly comprehensive flora of the islands in 1924. Setchell employed the assistance of many able collectors from abroad and locally, and the collections were mostly from the intertidal to the shallow subtidal zone, with deeper collections possible through dredging. Setchell compiled 100 species, including 13 Cyanophyta, 47 Rhodophyta, 11 Phaeophyta and 29 Chlorophyta, from about 15 sites, primarily on Tutuila and Aunu'u islands. The inner Pago Pago Harbour received much of Setchell's attention and over 60 species were found, with four new to science (Setchell, 1924; summarised in Skelton, 2003a).

Known collectors since Setchell are listed in Table 1. Specimens collected by them are scattered in many herbaria but the majority are housed at BISH and UC. A compilation of all known algae from the Samoa Archipelago (including American Samoa) was made by the authors (Skelton & South, 1999), and remains a foundation for modern treatment of algae from Samoa. Littler & Littler (2003) published an illustrated guide to common seaweeds of the South Pacific in which 33 species were attributed to American Samoa, the majority of which are new records, including 3 Phaeophyta and 6 Chlorophyta.

In 2002, the authors participated in invasive species surveys carried out by the Pacific Biological Survey of the Bishop Museum (Coles *et al.*, 2003). This was followed by an invitation by the Department of Marine & Wildlife Resources (DMWR), Government of American Samoa to do further algal surveys of the Manu'a Group and other sites that were not surveyed during the invasive species initiative (Coles *et al.*, 2003 and Skelton, 2003b). Some of the findings include new additions to Setchell's list, of which the Chlorophyta and Phaeophyta are reported herein.

Table 1. Chronology of known algal collectors of American Samoa.

<i>Collector</i>	<i>Date</i>	<i>Herbarium</i>
W.A. Setchell	1920	UC; BISH
A.L. Treadwell	1920	UC; BISH
F.A. Potts	1920	UC; BISH
ITASCA Expedition	1935	UC
H. Wray	1938	BISH
L.B. Loring	1958	BISH
R. Tsuda	1963	BISH
R. Buggeln	1964	BISH
Ah Sue	1964	BISH
C.H. Lamoureux	1965	BISH
J. Randall	1971; 1974	BISH
M.S. Doty	1975	BISH
M.D. Hoyle	1975	BISH
D. Littler & M. Littler	1990	US
P. Gabrielson	1998	Personal
P. Vroom	2000	BISH
P.A. Skelton	2002; 2003	SUVA; BISH*

\* Specimens to be deposited pending completion of analysis.

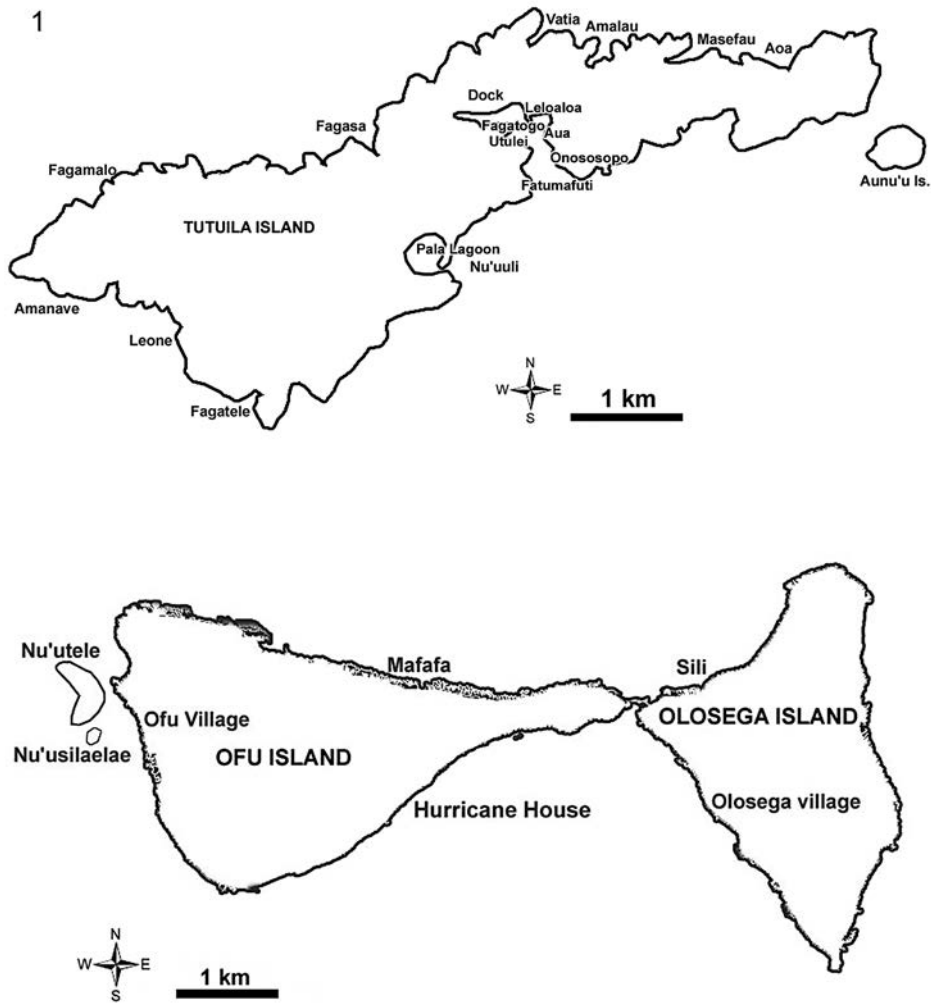


Fig. 1. Map of Tutuila Island (above); Ofu and Olosega (below) showing the collecting sites. (Maps courtesy of the Department of Marine and Wildlife Resources, Government of American Samoa).

## MATERIALS AND METHODS

26 sites were surveyed (see Fig. 1, Table 2). Collections were made by snorkelling, wading, intertidal sampling, and scuba-diving. All specimens were preserved in 4% formalin/seawater solution for 2 days, and were shipped to Australia for further analysis. The collecting sites and details are given in Table 2.

Specimens were pressed on herbarium sheets or mounted on slides. Slide specimens were stained with aniline blue and mounted in a 30% karo solution.

Table 2. Collecting sites (see Fig. 1). TI – Tutuila Island; OF – Ofu Island; OL – Olosega Island; AU – Aunu'u Island.

Station No.	Date Collected	Locality	GPS	
			Lat.	Long.
1	16-Oct-02	Amalau (TI)	14°15.160'	170°39.527'
2	16-Oct-02	Vatia (TI)	14°14.79'	170°40.10'
3	13-Oct-02	Utulei (TI)	14°17.02'	170°40.67'
4	15-Oct-02	Dock 1 (TI)	14°16.59'	170°41.26'
5	17-Oct-02	Onososopo (TI)	14°17.18'	170°39.89'
6	14-Oct-02	Fagatele Bay (TI)	14°21.96'	170°45.85'
7	16-Oct-02	Fagasa (TI)	14°17.01'	170°43.36'
8	16-Oct-02	Leone (TI)		
9	17-Oct-02	Leloaloe (TI)	14°16.22'	170°40.61'
10	17-Oct-02	Aua (TI)	14°16.70'	170°40.16'
11	24-Sep-03	Mafafa (OF)	S14°10.045'	W169°38.502'
12	22-Sep-03	Sili (OL)	S14°10.032'	W169°37.553'
13	16-Sep-03	Fagatogo (TI)	S14°16.618'	W170°40.827'
14	10-Sep-03	Fatumafuti (TI)	S14°17.645'	W170°40.496'
15	12-Sep-03	Aoa Bay (TI)		
16	11-Sep-03	Nu'u'uli (TI)	S14°19.215'	W170°41.812'
17	17-Sep-03	Aunu'u Is. (AU)	S14°16.994'	W170°33.665'
18	10-Sep-03	Fagaalu (TI)	S14°17.389'	W170°40.549'
19	12-Sep-03	Masefau (TI)		
20	13-Sep-03	Amanave (TI)	S14°19.544'	W170°49.849'
21	16-Sep-03	Nu'usilaclae Is. (OF)	S14°10.281'	W169°41.057'
22	13-Sep-03	Fagamalo (TI)	S14°17.903'	W170°48.612'
23	20-Sep-03	Olosega (OL)	S14°11.023'	W169°37.162'
24	20-Sep-03	Hurricane House (OF)	S14°10.665'	W169°39.255'
25	18-Sep-03	Nu'utele Is. (OF)	S14°10.167'	W169°41.015'
26	23-Sep-03	Ofu (OF)	S14°09.819'	W169°40.860'

Slide preparations were examined using a Nikon<sup>®</sup> SMZ645 dissecting microscope and an Olympus<sup>®</sup> CX31 compound microscope. Images were taken using a Nikon Coolpix<sup>®</sup> 990 digital camera and arranged in plates using Adobe Photoshop<sup>®</sup> 6.0 software.

The specimens are assigned the author's field numbers (AS), pending their deposit in the Phycological Herbarium of the South Pacific Regional Herbarium (SUVA-A). Duplicates will be deposited at BISH and at the Department of Marine and Wildlife Resources, Government of American Samoa.

## RESULTS

The classification follows Silva *et al.* (1996). Our surveys yielded 35 Chlorophyta and 8 Phaeophyta species as new additions to Setchell's list and are reported below (see Table 3).

## Phaeophyta

### Phaeophyceae

#### Dictyotales: Dictyotaceae

***Dictyopteris repens*** (Okamura) Børgesen 1924: 265, fig. 13. Basionym: *Haliseris repens* Okamura 1916: 8, fig. 3, pl. I: figs 7-18 (type locality: Chuuk Islands, Caroline Islands). (Figs 2-3).

This common alga is often found epiphytic on larger algae. *Dictyopteris delicatula* Lamouroux, another common epiphytic alga, is morphologically similar to *D. repens*. The two can be differentiated by a submarginal rib in *D. delicatula* whereas the margins of *D. repens* remain distromatic. Furthermore, the distribution of *D. delicatula* appears to halt in Fiji with no reports of its presence in Samoa.

**Voucher specimens:** Tutuila Island: Vatia Bay, *S. Coles, P. Reath, V. Bonito, P. Skelton & L. Basch* 16.x.2002 (AS 28); Utulei, *S. Coles, P. Reath, V. Bonito, P. Skelton & L. Basch* 13.x.2002 (AS 55); Fagatele Bay, *S. Coles, P. Reath, V. Bonito, P. Skelton & L. Basch* 14.x.2002 (AS 129, AS 139); Fagasa, *P.A. Skelton* 16.x.2002 (AS 207); Fagaalu, *P.A. Skelton* 10.ix.2003 (AS 458). Olosega Island: Sili Village, *P.A. Skelton & E. Henry* 22.ix.2003 (AS 386). Ofu Island: Nu'usilaelae Islet, *P.A. Skelton* 24.ix.2003 (AS 494); Aoa Bay, *P.A. Skelton* 12.ix.2003 (AS 510).

**Other record:** Fagatele Bay, *Birkeland et al.* 1987 (BISH).

***Dictyota bartayresiana*** Lamouroux 1809a: 43 (type locality: probably Haiti *vide* De Clerck, 1999).

This conspicuous brown alga is frequently seen in the intertidal or shallow subtidal zones. Due to the exposed nature of the fringing reefs of American Samoa *D. bartayresiana* does not reach the great sizes (i.e. 10-20 cm wide) as seen in neighbouring Samoa (Skelton pers. obs.). The majority of specimens collected are of small stature (*ca* thallus 2 mm wide, 2 cm tall).

**Voucher specimens:** Tutuila Island: Fagasa Bay, *P.A. Skelton* 16.x.2002 (AS 208); Utulei, *S. Coles, P. Reath, V. Bonito & P. Skelton* 13.x.2002 (AS 246).

***Dictyota friabilis*** Setchell 1926: 91-92, pl. 13: figs 4-7; pl. 20: fig. 1 (type locality: Tafaa Point, Tahiti).

This appears to be the only truly epiphytic *Dictyota* species in American Samoa. It tends to grow in the same plane as the host, but occasional erect unattached fronds have also been collected. The specimens at hand agree with the concept of this species as prescribed by Setchell (1926) for French Polynesian plants.

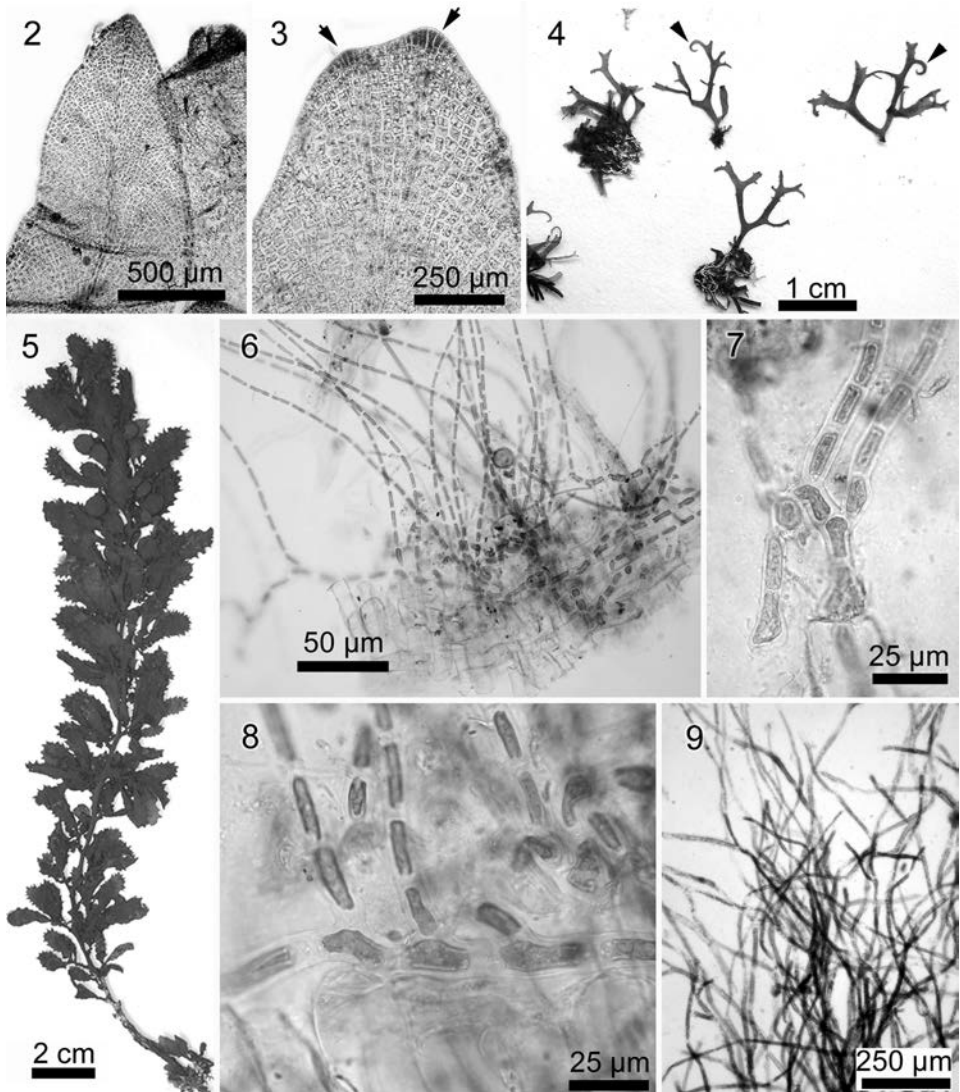
**Voucher specimens:** Tutuila Island: Utulei, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 13.x.2002 (AS 33, AS 118); Fagatele Bay *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 14.x.2002 (AS 126); Fagasa, *P.A. Skelton* 16.x.2002 (AS 189).

**Other records:** Tutuila Island: Fagasa Bay, *Birkeland et al.* 1985 (BISH); Fagatele Bay, *Birkeland et al.* 1987 (BISH). Pala Lagoon, *M.S. Doty* 4.v.1975 (BISH 556690).

***Dictyota hamifera*** Setchell 1926: 92 (type locality: French Polynesia). (Fig. 4)

This very distinctive *Dictyota* species has tendrils that function as hooking devices for attachment purposes. A single collection was made from Nu'utele Islet near the exposed channel.

**Voucher specimens:** Ofu Island: Nu'utele Islet, *P.A. Skelton* 19.ix.2003 (AS 607).



Figs 2-9. Figs 2-3. *Dictyopteris repens* (fig. 2) thallus showing the faint mid-rib; (fig. 3) the growing cells (arrows) and the beginning of the sub-opposite branching. Fig. 4. *Dictyota hamifera* pressed specimens showing the tendrils (arrows). Fig. 5. *Sargassum* sp. pressed specimen. Figs 6-8. *Sporocladopsis erythraea* (fig. 6) habit; (figs 7 & 8) showing the prostrate system and the basal part of erect thalli. Fig. 9. *Derbesia marina* habit of the sporophyte stage.

***Dictyota* sp.**

This epilithic *Dictyota* is characterised by its iridescent greenish-blue colour, growing subtidally in fairly strong current. It forms a turf community with other algae, but stands out by the iridescent blades. Only infertile material was collected and appears to be quite distinct from the other epiphytic *Dictyota* species (*D. friabilis*). Determination would be possible following the collection of reproductive specimens.

**Voucher specimens:** Ofu Island: Hurricane House, *P.A. Skelton* 20.ix.2003 (AS 590).

***Lobophora variegata*** (Lamouroux) Womersley *ex* Oliveira 1977: 217. Basionym: *Dictyota variegata* Lamouroux 1809a: 40 (type locality: Antilles, West Indies). Nomenclatural synonyms: *Zonaria variegata* (Lamouroux) C. Agardh 1817: XX. *Pocockiella variegata* (Lamouroux) Papenfuss 1943: 463-468, figs 1-15.

This very common and widespread alga grows close to the substratum often forming fan-shaped blades that may overlap. There does not seem to be a preferred substratum for this alga, as specimens have been collected from base of *Sargassum*, rock, rubble, bases of living corals, concrete blocks, buoys and other discarded objects.

**Voucher specimens:** Tutuila Island: Amalau, *P.A. Skelton* 16.x.2002 (AS 13); Utulei, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 13.x.2002 (AS 117); Fagatele Bay, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 14.x.2002 (AS 127); Aua, *P.A. Skelton* 12.x.2002 (AS 310); Nu'uuli, *P.A. Skelton* 11.ix.2003 (AS 424); Fagaalu, *P.A. Skelton* 10.ix.2003 (AS 450). Ofu Island: Nu'utele Islet, *P.A. Skelton* 19.ix.2003 (AS 581).

***Padina boryana*** Thivy *in* W.R. Taylor 1966: 355-356, fig. 2 (type locality: Tonga).

This alga is closely related to *P. australis* Hauck, both having mostly distromatic blades. The arrangement of the sporangia and hair bands is currently perceived as an important distinguishing feature. Furthermore, the *Vaughaniella* (mat-like filamentous phase) is known in *P. boryana* but not yet recorded for *P. australis*. American Samoan specimens were mostly depauperate and growing in tide-pools in the intertidal zone.

**Voucher specimens:** Tutuila Island: Fagatogo, *P.A. Skelton* 16.ix.2003 (AS 392).

**Fucales: Sargassaceae**

***Sargassum cf. cristaefolium*** C. Agardh 1820: 13 (type locality: unknown). (Fig. 5)

This entity should probably be attributed to the widely distributed *Sargassum cristaefolium* C. Agardh. Littler & Littler (2003) illustrated *Sargassum tenerrimum* J. Agardh from American Samoa (Table 3), which appears to be different from our plants by their straight, lance-shaped blades, compared to slightly curled blades.

**Voucher specimens:** Ofu Island: Nu'utele Islet, *P.A. Skelton* 19.ix.2003 (AS 596).

## Chlorophyta

### Chlorophyceae

#### Chaetophorales: Chroolepidaceae

***Sporocladopsis erythraea*** Nasr 1944: 33 (type locality: Red Sea). (Figs 6-8)

This rarity was collected only from Amalau, epiphytic on the base of *Sargassum anapense* Setchell. Currently only two species are known for the genus, with the second species – *Sporocladopsis novae-zelandiae* Chapman recorded from New Zealand and New South Wales, Australia (Millar & Kraft, 1994).

**Voucher specimens:** Tutuila Island: Amalau, P.A. Skelton 16.x.2002 (AS 5).

#### Cladophorales: Cladophoraceae

***Rhizoclonium africanum*** Kützing 1853: 21, pl. 67 (2) (type locality: Senegambia [Senegal or Gambia], Africa). Taxonomic synonym: *Rhizoclonium samoense* Setchell 1924: 177, fig. 42.

This common alga was found mainly in the high intertidal zone. We examined Setchell's material (*R. samoense* UC 233513!) and agree with Womersley & Bailey (1970) who merged *R. samoense* with *R. africanum*.

**Voucher specimens:** Tutuila Island: Main Dock, Pago Pago Harbour, P.A. Skelton 15.x.2002 (AS 59); Fagatele Bay, S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch 14.x.2002 (AS 151); Aua, P.A. Skelton 12.x.2002 (AS 287, AS 313).

#### Siphonocladaceae

***Boergesenia forbesii*** (Harvey) J. Feldmann 1938: 1503-1504. Basionym: *Valonia forbesii* Harvey 1860: 333 (syntype localities: Ryukyu-retto, Japan; Sri Lanka). Nomenclatural Synonym: *Pseudovalonia forbesii* (Harvey) Iyengar 1938: 191-194, figs 1-4.

This clavate shaped green alga is found in the shallow intertidal, usually in coarse sand. In exposed sites, the plants are usually depauperate and barely visible. Some of the materials collected were fertile.

**Voucher specimens:** Ofu Island: Mafafa, P.A. Skelton 24.ix.2003 (AS 316); Ofu Village, P.A. Skelton 19.ix.2003 (AS 612). Tutuila Island: Amanave, P.A. Skelton 13.ix.2003 (AS 483).

**Other records:** Tutuila Island: Amanave (Amanave) Village, R.T. Tsuda 4.ix.1963 (BISH 508914); Tula, R. T. Tsuda 26.viii.1963 (BISH 508913); Avasi Bay, Anon. ND. (BISH 511839).

***Boodlea montagnei*** (Harvey ex J. Gray) Egerod 1952: 332, footnote. Basionym: *Microdictyon montagnei* Harvey ex J. Gray 1866: 69 (type locality: Tonga). Taxonomic synonym: *Boodlea paradoxa* Reinbold 1905: 148-149.

A common component of the intertidal flora, forming delicate spongy cushions, often of a light green colour when exposed. Filaments anastomosing frequently resulting in a three-dimensional network; anastomosing by small septate cells issued from the apex of primary branch with crenulated ends on contact with secondary branch. The placement of this entity under *Boodlea* rather than *Microdictyon* follows the treatment of Egerod in Papenfuss & Egerod (1957) and Abbott & Huisman (2004).

**Voucher specimens:** Tutuila Island: Utulei Point, P.A. Skelton 13.x.2002 (AS 42; AS 102); Fagatele Bay, P.A. Skelton 14.x.2002 (AS 148); Fagaalu, P.A. Skelton 10.ix.2003 (AS 460).



***Cladophoropsis carolinensis*** Trono 1971: 48, pl. 3, figs 1-5 (type locality: Utwa Village, Kosrae Is. Caroline Islands).

This alga represented by a few specimens is found mainly in the high intertidal. It forms dark fleecy mats on rocks or other substrata.

**Voucher specimens:** Tutuila Island: Fagatele Bay, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 14.x.2002 (AS 155); Leone, *P.A. Skelton* 19.x.2002 (AS 230); Aua, *P.A. Skelton* 12.x.2002 (AS 286). Ofu Island: Nu'utele Islet, *P.A. Skelton* 19.x.2003 (AS 602).

***Cladophoropsis herpestica*** (Montagne) Howe 1914: 31. Basionym: *Conferva herpestica* Montagne 1842: 15 (type locality: Bay of Islands, New Zealand).

Specimens were collected from the intertidal and is tentatively placed in this species because of its larger filament diameter (> 200 µm) compared to *C. carolinensis* (< 200 µm diam.).

**Voucher specimens:** Tutuila Island: Leloalua, *P.A. Skelton* 17.x.2002 (AS 81).

***Dictyosphaeria cavernosa*** (Forsskål) Børgesen 1932: 2. Basionym: *Ulva cavernosa* Forsskål 1775: 187 (syntype localities: Gomfodae [Al-Qunfudhah], Saudi Arabia; Mokha, Yemen).

This rarely collected intertidal alga is less abundant than *Dictyosphaeria versluysii* Weber-van Bosse, and is distinguished by its hollow thallus.

**Voucher specimens:** Tutuila Island: Onososopo, *P.A. Skelton* 12.x.2002 (AS 67). Ofu Island: Nu'utele Islet, *P.A. Skelton* 19.ix.2003 (AS 571).

***Phyllocladion anastomosans*** (Harvey) Kraft *et Wynne* 1996: 131, figs 16-25. Basionym: *Cladophora anastomosans* Harvey 1859: pl. Cl (type locality: Fremantle, Western Australia).

This fairly common but delicate alga is found in most habitats except exposed places. It has a cylindrical siphonous stalk bearing a leaf-shaped meshwork in the upper fronds with plants reaching a few centimetres in height. The placement of *Phyllocladion* under the family Siphonocladaceae follows the results of Leliaert *et al.* (2003).

**Voucher specimens:** Ofu Island: Hurricane House, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 593); Ofu Village, *P.A. Skelton* 19.ix.2003 (AS 616).

### Valoniaceae

***Valonia aegagropila*** C. Agardh 1823 [1822-1823]: 429-430 (type locality: Nenezia, Italy).

The recognition of this Mediterranean species from the tropics needs further study. The material recognised here as belonging to this species is clumpy in appearance with cells or vesicles arising in a disorderly direction, compared to arising sub-terminally as in *V. fastigiata*. This disorderly and depauperate presentation may be attributed to the habitat, being exposed and with a strong current flow.

**Voucher specimens:** Tutuila Island: Vatia Bay, *P.A. Skelton* 16.x.2002 (AS 26); Leone, *P.A. Skelton* 19.x.2002 (AS 233).

***Valonia macrophysa*** Kützing 1843: 307 (type locality: Lessina, Croatia). Only a few delicate specimens were collected from the subtidal. The cells are slightly bigger than *V. aegagropila* (5-7 mm compared to 2-5 mm).

**Voucher specimens:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 326).

**Bryopsidales: Caulerpaceae**

***Caulerpa cupressoides*** (Vahl) C. Agardh 1817: XXIII. Basionym: *Fucus cupressoides* Vahl 1802: 38 (type locality: St Croix, Virgin Islands). (Fig. 10)

This species was common on Ofu and Islands, but absent from Tutuila and Aunu'u Islands. Populations occur on coarse sand, rock and rubble substrata in the high intertidal zone and tide pools, with moderate to fast water flow. The plants have a spreading stolon and erect thalli to 5 cm tall, attached by fine root-like rhizoids. The erect thallus forms small bushy and sometimes twisted branches bearing dentate ramuli. The ramuli are arranged either distichously or trigonously. Three growth forms (f. *disticha* Weber-van Bosse; f. *plumarioides* Børgesen; f. *lycopodium* Weber-van Bosse) were observed from the American Samoa populations, appearing to be environmentally induced.

**Voucher specimens:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 318; AS 321; AS 322; AS 338). Olosega Island: Olosega Village, *P.A. Skelton & E. Henry* 20 ix. 2003 (AS 546). Tutuila Island: Amanave, *P.A. Skelton* 13.ix.2003 (AS 481; AS 529);

***Caulerpa racemosa* var. *peltata*** (Lamouroux) Eubank in Stephenson 1944: 349.

This variety is recognised as having both compressed and sub-globose racemes on an individual plant.

**Voucher specimens:** Tutuila Island: Utulei, *P.A. Skelton* 13.x.2002 (AS 39). Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 317). Olosega Island: Olosega Village, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 551).

***Caulerpa racemosa* var. *turbinata*** (J. Agardh) Eubank 1946: 420-421, figs 2o-q. Basionym: *Caulerpa clavifera* var. *turbinata* J. Agardh 1837: 173 (type locality: near Tor, Sinai Peninsula, Egypt). Nomenclatural synonym: *Caulerpa racemosa* f. *turbinata* (J. Agardh) Weber-van Bosse 1898: 370-371, pl. XXXI: fig. 8). Taxonomic synonyms: *Fucus chemnitzia* Esper 1800 [1797-1800]: 167-168, pl. LXXXVIII: figs 1, 4-6. *Caulerpa chemnitzia* (Esper) Lamouroux 1809b: 332. *Ahnfeldtia chemnitzia* (Esper) Trevisan 1849: 141. *Chauvinia chemnitzia* (Esper) Kützing 1849: 499. *Caulerpa racemosa* var. *chemnitzia* (Esper) Weber-van Bosse 1898: 370-373.

This variety of *C. racemosa* is distinguished by the turban-shaped racemes. Found growing on a rock in the shallow intertidal.

**Voucher specimen:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 325).

***Caulerpa serrulata*** (Forsskål) J. Agardh 1837: 174. Basionym: *Fucus serrulatus* Forsskål 1775: 189 (type locality: Mokha, Yemen). Taxonomic synonym: *Caulerpa freycinetii* C. Agardh 1823 [1822-1823]: 446.

Common in the intertidal or in tide pools, less common subtidally. Occurs on most substrata (sand, rubble, rock, and discarded materials) in moderate to fast current flow. The abundance of this alga, especially near the harbour where plant sizes are relatively tall (5 cm), may indicate that it has recently been introduced, as suggested by Skelton (2003a). However, a sizeable population of diminutive plants (2 mm) was found on Ofu-Olosega islands, suggesting that it is native but has been overlooked.

**Voucher specimens:** Tutuila Island: Utulei, *P.A. Skelton* 13.x.2002 (AS 31; AS 101; 107); Fagatele Bay, *S. Coles, P. Reath, V. Bonito & P.A. Skelton* 14.x.2002 (AS 168); Fagasa, *P.A. Skelton, S. Coles, P. Reath, V. Bonito & L. Basch* 16.x.2002

(AS 196); Onosopopo, *P.A. Skelton, S. Coles, P. Reath, V. Bonito & L. Basch* 17.x.2002 (AS 260). Fagatogo, *P.A. Skelton* 16.ix.2003 (AS 501). Olosega Island: Olosega Village, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 552); Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 323); Ofu Village, *P.A. Skelton* 19.ix.2003 (AS 611).

**Other record:** Swains Atoll, *Anon.* ND (BISH 542705).

***Caulerpa taxifolia*** (Vahl) C. Agardh 1817: XXII. Basionym: *Fucus taxifolius* Vahl 1802: 36 (type locality: St Croix, Virgin Islands).

This rarely encountered alga in Samoa is represented by a few specimens, quite a contrast to a genetically varied but morphologically alike form that has an invasive status in the Mediterranean and parts of Australia. It grows in close association with other *Caulerpa* species in shallow intertidal places, usually on coarse sandy substratum.

**Voucher specimens:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 336). Olosega Island: Olosega Village, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 547).

***Caulerpa verticillata*** J. Agardh 1847: 6 (type locality: probably West Indies). (Fig. 11)

The species has only been found from one site (Pala Lagoon) near the largest remaining mangroves. It was found epiphytic on *Halimeda opuntia* (Linnaeus) Lamouroux, as well as growing on rock and decaying logs in the shallow intertidal.

**Voucher specimens:** Tutuila Island: Pala Lagoon, Nu'uuli, *P.A. Skelton* 11.ix.2003 (AS 425).

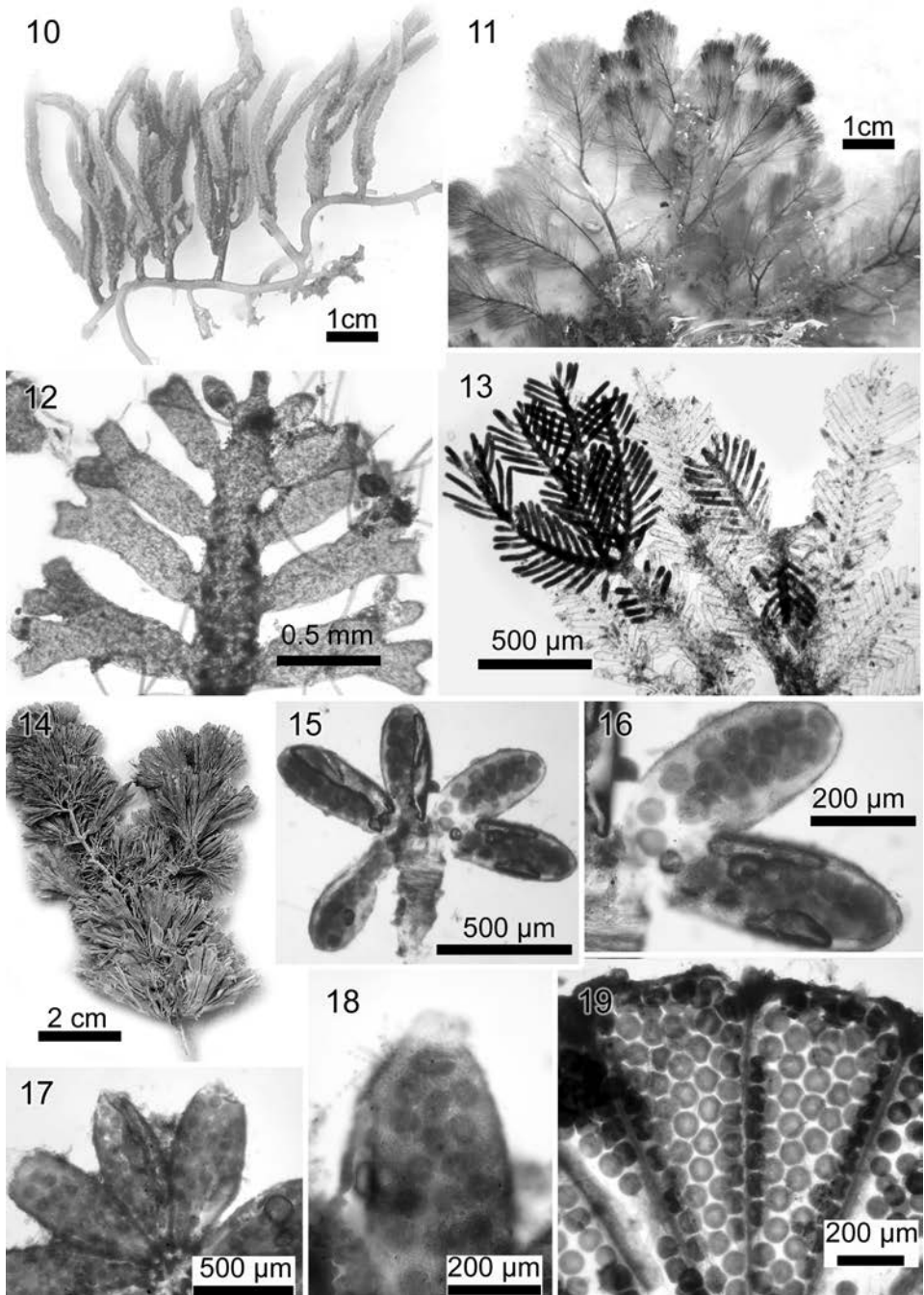
***Caulerpa webbiana*** Montagne 1837: 354 (type locality: Arrecife, Isla Lanzarote, Islas Canarias). (Fig. 12)

The specimens are all small (to 1 cm tall), and heavily epiphytised by foraminifera. Found in the shallow intertidal, in tide pools and on large carbonate structures. Plants form a green fuzz in the coarse sand, barely visible during collection. The ramuli are arranged either distichously (f. *distichous* Weber-van Bosse – fig. 12) or whorled (f. *pickeringii* (Harvey *et* Bailey) Eubank). The ramuli are forked with two distinctive mucronate tips at the apex. The form *pickeringii* is still recognized as a distinct species by some (Littler & Littler, 2003), whereas we follow Kraft (2000) and South & Skelton (2003a; 2003b) in treating it as a form of *C. webbiana*.

**Voucher specimens:** Ofu Island: Amanave, *P.A. Skelton* 13.ix.2003 (AS 525).

***Caulerpella ambigua*** (Okamura) Prud'homme *et* Lokhorst 1992: 114. Basionym: *Caulerpa ambigua* Okamura 1897: 4, pl. I: figs 3-12 (type locality: Ogasawara-gunto [Bonin Islands] Japan). Taxonomic synonyms: *Caulerpa vickersiae* Børgesen 1911: 129-132, fig. 2. *Caulerpa biloba* Kemperman *et* Stegenga 1983: 271, figs 1-7. (Fig. 13)

A common component of turf algal communities in the shallow subtidal reefs, growing on rocks and large carbonate structures. Plants are small, to 5 mm tall, and have a weakly defined stolon. Attachment is by short branched rhizoids with the erect fronds branching dichotomously to trichotomously. The ramuli are distichous, occasionally whorled, and lacking constrictions at the base, with rounded apices. The ramuli pattern is variable, commonly in a series of longest pairs at the bottom giving rise to a few short pairs, then reverting back to long pairs and so forth, and frequently some sections are devoid of ramuli.



**Voucher specimens:** Tutuila Island: Fagatele Bay, *S. Coles*, *P. Reath*, *V. Bonito* & *P.A. Skelton* 14.x.2002 (AS 157).

### Codiaceae

***Codium* cf. *mamillosum*** Harvey 1855: 565 (type locality: Swan River, Western Australia). Nomenclatural synonym: *Lamarckia mamillosa* (Harvey) Kuntze 1891: 900.

A single specimen was collected from Utulei Point, near the mouth of Pago Pago Harbour. The spherical shape is reminiscent of *C. mamillosum*, which has been recorded from Fiji (South & Skelton 2003a) and other nearby Pacific Island countries. The specimen is small (1 cm diam.), and is tentatively placed under this species.

**Voucher specimens:** Tutuila Island: Utulei, *S. Cole*, *P. Reath*, *V. Bonito*, *P. Skelton* & *L. Basch* 13.x.2002 (AS 178)

### Derbesiaceae

***Derbesia marina*** (Lyngbye) Solier 1846: 453. Basionym: *Vaucheria marina* Lyngbye 1819: 79, pl. 22A (sporophyte) (type locality: K̄vivig, Str̄ømø, Faeroes). Taxonomic synonyms: *Gastridium ovale* Lyngbye 1819: 72, pl. 18B (gametophyte). *Halicystis ovalis* (Lyngbye) Areschoug 1850: 447. (fig. 9)

This fairly common alga is found from intertidal to subtidal sites. Two very contrasting morphological stages are reported, the spherical *Halicystis* or the gametophytic stage and the filamentous *Derbesia* sporophytic stage. The latter stage was the only stage found at American Samoa. The cylindrical filaments (40-62.5 µm diam.) are irregularly and sparsely branched, with a double septum at the base of some branches, and are found entangled with other algae.

**Voucher specimens:** Tutuila Island: Fagatele Bay, *S. Cole*, *P. Reath*, *V. Bonito*, *P. Skelton* & *L. Basch* 13.x.2002 (AS 131).

### Halimedaceae

***Halimeda gracilis*** Harvey ex J. Agardh 1887: 82 (type locality: Sri Lanka).

Common in the upper subtidal (ca 5 m depth) in moderate water flow. The segments are reminiscent of *Halimeda opuntia* (Linnaeus) Lamouroux but are larger and less profusely branching in more than one plane.

**Voucher specimens:** Tutuila Island: Vatia Bay, *S. Cole*, *P. Reath*, *V. Bonito*, *P. Skelton* & *L. Basch* 16.x.2002 (AS 20); Leloaloea, *S. Cole*, *P. Reath*, *V. Bonito*, *P. Skelton* & *L. Basch* 17.x.2002 (AS 85); Aoa Bay, *P.A. Skelton* 12.ix.2003 (AS 354);

←  
Figs 10-19. Fig. 10. *Caulerpa cupressoides* habit of a pressed specimen. Fig. 11. *Caulerpa verticillata* habit of a wet specimen. Fig. 12. *Caulerpa webbiana* f. *disticha* habit of a slide-preserved specimen. Fig. 13. *Caulerpella ambigua* habit. Fig. 14. *Tydemanian expeditionis* habit of pressed specimen. Figs 15 & 16. *Parvocaulis clavata* (fig. 15) habit showing 5 rays; (fig. 16) close up of two rays showing the spherical to sub-spherical gametangia. Figs 17 & 18. *Parvocaulis exigua* (fig. 17) part of the habit showing fused rays confining to the base; (fig. 18) close up of a ray with young gametangia and a slightly protruding apex. Fig. 19. *Parvocaulis parvula* part of the habit showing fused rays bearing spherical gametangia.

Fatumafuti, *P.A. Skelton* 10.ix.2003 (AS 398); Fagaalu, *P.A. Skelton* 10.ix.2003 (AS 468). Ofu Island: Hurricane House, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 563).

**Other records:** Vatia Bay, *Randall & Devaney* 1974 (BISH).

***Halimeda macroloba*** Decaisne 1841: 118 (type locality: Red Sea).

Another common mid-to-high intertidal alga, characterised by its large, round to reniform segments.

**Voucher specimens:** Tutuila Island: Masefau Bay, *P.A. Skelton* 12.ix.2003 (AS 633).

***Halimeda cf. macrophysa*** Askenasy 1888: 14, pl. IV: figs 1-4 (type locality: Matuku Island, Fiji).

**Voucher specimens:** Tutuila Island: Fagaalu, *P.A. Skelton* 10.ix.2003 (AS 472).

***Halimeda minima*** (Taylor) Colinvaux 1968: 32, figs 5, 6. Basionym: *Halimeda opuntia f. minima* Taylor 1950: 82, pl. 39, fig. 2. (type locality: Bikini Lagoon, Bikini Atoll, Marshall Islands).

**Voucher specimens:** Tutuila Island: Fagasa, *P.A. Skelton, S. Coles, P. Reath, V. Bonito & L. Basch* 16.x.2002 (AS 187).

#### Udoteaceae

***Rhipidosiphon javensis*** Montagne 1842: 14-15 (type locality: Leiden Island [Nyamuk-besar], near Jakarta, Java, Indonesia). Nomenclatural synonym: *Udotea javensis* (Montagne) A. Gepp *et* E. Gepp 1904: 363-364, pl. 467: figs 1-4.

Common alga in tide-pools, intertidal and shallow subtidal.

**Voucher specimens:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 331); Hurricane House, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 592); Nu'utele Islet, *P.A. Skelton* 19.ix.2003 (AS 615).

***Tydemanina expeditionis*** Weber-van Bosse 1901: 139-140 (syntype localities: various in Indonesia). Taxonomic synonyms: *Tydemanina gardineri* A. Gepp *et* E. Gepp 1911: 67-68, 141, pl. XVIII: fig. 155. *Tydemanina mabahithae* Nasr 1944: 40-41. (Fig. 14)

One of the few algae that is common in some sites, especially on Ofu and Olosega islands but rare in others (e.g. Tutuila and Aunu'u islands). It is found from the subtidal to the lower intertidal, usually on the side of large bommies. Of the two forms known – flabellate versus verticillate, only the flabellate form has been collected.

**Voucher specimens:** Olosega Island: Sili Village, *P.A. Skelton & E. Henry* 22.ix.2003 (AS 376). Ofu Island: Hurricane House, *P.A. Skelton & E. Henry* 20.ix.2003 (AS 560).

#### Dasycladales: Dasycladaceae

***Neomeris van-bosseae*** Howe 1909: 80-82, pl. 1: figs 4, 6; pl. 5: figs 17-19 (*van bosseae*).

This common intertidal and tide-pool alga is distinguished from *N. annulata* by the lack of annular rings around the lower thallus.

**Voucher specimens:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 324). Tutuila Island: Amanave, *P.A. Skelton* 13.ix.2003 (AS 480).

**Polyphysaceae**

***Parvocaulis clavata*** (Yamada) Berger *et al.* 2003: 559, figs 13, 27. Basionym: *Acetabularia clavata* Yamada 1934: 57, figs 24-25. Nomenclatural synonym: *Polyphysa clavata* (Yamada) Schnetter *et Bula-Meyer* 1982: 41, pl. 7, figs 1, b. (Figs 15-16)

*Parvocaulis clavata* is similar to *P. exigua* (Solms-Laubach) Berger *et al.* (2003) but can be separated by the rounded ray tips (versus mamillate tips in *P. exigua*). Moreover, the rays are arranged in a single plane (Abbott & Huisman 2004).

**Voucher specimen:** Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 320b).

***Parvocaulis exigua*** (Solms-Laubach) Berger *et al.* 2003: 559, figs 14, 28. Basionym: *Acetabularia exigua* Solms-Laubach 1895: 28-29, pl. 2: figs 1, 4 (syntype localities: Indonesia: Macassar, Celebes and Sikka, Flores). Nomenclatural synonym: *Polyphysa exigua* (Solms-Laubach) Wynne 1995: 333, fig. 88. Taxonomic synonym: *Acetabularia tsengiana* Egerod 1952: 414, fig. 231. (Figs 17-18)

*Parvocaulis exigua* is common in the shallow intertidal and in tide-pools, but is rarely collected due to its small size. It grows on rubble and other carbonate structures usually in fairly calm to moderate water flow. It is often found growing with *Parvocaulis parvula* and *P. clavata* – two similar looking species. It can be separated from the other two species by the unattached oblong rays with mamillate tips. Abbott & Huisman (2004) observed the rays to be arranged in more than one plane, as opposed to the single plane in *P. clavata*.

**Voucher specimens:** Tutuila Island: Utulei, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 13.x.2002 (AS 38); Amanave, *P.A. Skelton* 13.ix.2003 (AS 484).

***Parvocaulis parvula*** (Solms-Laubach) Berger *et al.* 2003: 559, figs 11, 25. Basionym: *Acetabularia parvula* Solms-Laubach 1895: 29, pl. 2: figs 3, 5 (syntype localities: 'Tropical India'; Celebes, Indonesia). Nomenclatural synonym: *Polyphysa parvula* (Solms-Laubach) Schnetter *et Bula Meyer* 1982: 42. (Fig. 19)

Closely associated with *P. exigua* and *P. clavata*, this alga can be separated by its fused obovoid rays and the non-mamillate tips.

**Voucher specimens:** Tutuila Island: Utulei, *S. Cole, P. Reath, V. Bonito, P. Skelton & L. Basch* 13.x.2002 (AS 115); Amanave, *P.A. Skelton* 13.ix.2003 (AS 482). Ofu Island: Mafafa, *P.A. Skelton* 24.ix.2003 (AS 320a).

**DISCUSSION**

With the additions reported here, the latest compilation of marine benthic algal species reported from American Samoa is 230, comprising 133 Rhodophyta, 23 Phaeophyta and 74 Chlorophyta. The examination of Rhodophyta and Cyanophyta collections made during our surveys, as well as those made by previous collectors (scattered in various herbaria), will result in a further increase in algal diversity for the American Samoa flora.

Table 3. Chlorophyta and Phaeophyta so far known from American Samoa. Bold records are new additions to the flora; \* represents unconfirmed records.

PHAEOPHYTA	Reference
<i>Asteronema breviarticulatum</i> (J. Agardh) Ouriques et Bouzon	Setchell 1924; Skelton 2003a
<i>Chnoospora minima</i> (K. Hering) Papenfuss	Setchell 1924; Littler & Littler 2003; Skelton 2003a (as <i>C. implexa</i> )
<b><i>Dictyopteris repens</i> (Okamura) Børgesen</b>	Birkeland <i>et al.</i> 1987; Skelton 2003a.
* <i>Dictyota adnata</i> Zanardini	Littler & Littler 2003
<b><i>Dictyota bartayresiana</i> Lamouroux</b>	Skelton 2003a
<b><i>Dictyota friabilis</i> Setchell</b>	Birkeland <i>et al.</i> 1987; Skelton 2003a
<b><i>Dictyota hamifera</i> Setchell</b>	Skelton 2003a
<i>Dictyota lata</i> Lamouroux	Setchell 1924
<b><i>Dictyota</i> sp.</b>	Skelton 2003a
<i>Ectocarpus van-bosseae</i> Setchell <i>et</i> Gardner	Setchell 1924
<i>Feldmannia indica</i> (Sonder) Womersley <i>et</i> Bailey	Setchell 1924; Skelton 2003a
<i>Hapalospongidion pangoense</i> (Setchell) P.C. Silva	Setchell 1924
<b><i>Lobophora variegata</i> (Lamouroux) Womersley <i>ex</i> Oliveira</b>	Skelton 2003a
<b><i>Padina boryana</i> Thivy</b>	Skelton 2003a
<i>Ralfsia expansa</i> (J. Agardh) J. Agardh	Littler & Littler 2003
<i>Sargassum anapense</i> Setchell <i>et</i> Gardner	Setchell 1924; Skelton 2003a
<i>Sargassum fonanonense</i> Setchell <i>et</i> Gardner	Setchell 1924
<b><i>Sargassum</i> sp.</b>	Skelton 2003a
* <i>Sargassum tenerrimum</i> J. Agardh	Littler & Littler 2003
<i>Sphacelaria ceylanica</i> Sauvageau	Setchell 1924
<i>Sphacelaria cornuta</i> Sauvageau	Setchell 1924
<i>Sphacelaria tribuloides</i> Meneghini	Birkeland <i>et al.</i> 1987
<i>Turbinaria ornata</i> (Turner) J. Agardh	Setchell 1924; Skelton 2003a
CHLOROPHYTA	
<i>Anadyomene</i> sp.	Littler & Littler 2003
<b><i>Boergesenia forbesii</i> (Harvey) J. Feldmann</b>	Skelton 2003a
<b><i>Boodlea montagnei</i> (Harvey <i>ex</i> J. Gray) Egerod</b>	Skelton 2003a
<i>Boodlea vanbosseae</i> Reinbold	Setchell 1924; Littler & Littler 2003; Skelton 2003a
<i>Bryopsis pennata</i> J.V. Lamouroux	Littler & Littler 2003; Skelton 2003a
<i>Bryopsis pennata</i> var. <i>secunda</i> (Harvey) Collins <i>et</i> Hervey	Setchell 1924
* <i>Bryopsis plumosa</i> (Hudson) C. Agardh	Sea Engineering & AECOS 1991
<i>Bryopsis pottsii</i> Setchell	Setchell 1924
<b><i>Caulerpa cupressoides</i> (Vahl) C. Agardh</b>	Skelton 2003a
<b><i>Caulerpa cupressoides</i> f. <i>disticha</i> Weber-van Bosse</b>	Skelton 2003a
<b><i>Caulerpa cupressoides</i> f. <i>plumarioides</i> Børgesen</b>	Skelton 2003a
<b><i>Caulerpa cupressoides</i> v. <i>lycopodium</i> Weber-van Bosse</b>	Skelton 2003a
<i>Caulerpa peltata</i> Lamouroux	Setchell 1924; Skelton 2003a
<i>Caulerpa racemosa</i> (Forsskal) J. Agardh	Setchell 1924; Skelton 2003a
<b><i>Caulerpa racemosa</i> v. <i>peltata</i> (Lamouroux) Eubank</b>	BISH 542706; Skelton 2003a
<b><i>Caulerpa racemosa</i> v. <i>turbinata</i> (J. Agardh) Eubank</b>	Skelton 2003a
<b><i>Caulerpa serrulata</i> (Forsskål) J. Agardh</b>	Skelton 2003a
* <i>Caulerpa sertularioides</i> (Gmelin) Howe	Sea Engineering & AECOS 1991
<b><i>Caulerpa taxifolia</i> (Vahl) C. Agardh</b>	Skelton 2003a
<b><i>Caulerpa verticillata</i> J. Agardh</b>	Skelton 2003a
<b><i>Caulerpa webbiana</i> Montagne</b>	Skelton 2003a
<b><i>Caulerpa webbiana</i> f. <i>disticha</i> Weber-van Bosse</b>	Skelton 2003a
<b><i>Caulerpa webbiana</i> f. <i>pickeringii</i> (Harvey <i>et</i> Bailey) Eubank</b>	Skelton 2003a
<b><i>Caulerpella ambigua</i> (Okamura) Prud'homme <i>et</i> Lokhorst</b>	Skelton 2003a



CHLOROPHYTA	Reference
<i>Chaetomorpha antennina</i> (Bory de Saint Vincent) Kützing	Setchell 1924; Skelton 2003a
<i>Chaetomorpha restricta</i> (Suhr) Kützing	Setchell 1924
<i>Chlorodesmis fastigiata</i> (C. Agardh) Ducker	Setchell 1924; Birkeland <i>et al.</i> 1987; Skelton 2003a
<i>Cladophora glomerata</i> (Linnaeus) Kützing	Setchell 1924
<i>Cladophora pinniger</i> Setchell	Setchell 1924
<i>Cladophora</i> sp.	Skelton 2003a
<b><i>Cladophoropsis carolinensis</i> Trono</b>	Skelton 2003a
<b><i>Cladophoropsis herpestica</i> (Montagne) Howe</b>	Skelton 2003a
<i>Cladophoropsis infestans</i> Setchell	Setchell 1924
<i>Cladophoropsis limicola</i> Setchell	Setchell 1924; Skelton 2003a
<i>Codium bulbopilum</i> Setchell	Setchell 1924; Skelton 2003a
<b><i>Codium</i> cf. <i>mamillosum</i> Harvey</b>	Skelton 2003a
<b><i>Derbesia marina</i> (Lyngbye) Solier</b>	Skelton 2003a
<b><i>Dictyosphaeria cavernosa</i> (Forsskål) Børgesen</b>	Skelton 2003a
<i>Dictyosphaeria versluisii</i> Weber-van Bosse	Setchell 1924; Skelton 2003a
<i>Halimeda bikinensis</i> W.R. Taylor	Littler & Littler 2003
<i>Halimeda</i> cf. <i>discoidea</i> Decaisne	Birkeland <i>et al.</i> 1987; Littler & Littler 2003
<i>Halimeda gigas</i> W.R. Taylor	Littler & Littler 2003
<b><i>Halimeda gracilis</i> Harvey ex J. Agardh</b>	Randall & Devaney 1974; Skelton 2003a
<i>Halimeda incrassata</i> (Ellis) Lamouroux	Setchell 1924; Skelton 2003
<b><i>Halimeda macroloba</i> Decaisne</b>	Setchell 1924; Littler & Littler 2003; Skelton 2003a
<b>*<i>Halimeda</i> cf. <i>macrophysa</i> Askenasy</b>	Skelton 2003a
<b><i>Halimeda minima</i> (Taylor) Colinvaux</b>	Skelton 2003a
<i>Halimeda opuntia</i> (Linnaeus) Lamouroux	Setchell 1924; Birkeland <i>et al.</i> 1987; Skelton 2003a
<i>Microdictyon</i> sp.	Skelton 2003a
<i>Microdictyon umbilicatum</i> (Velley) Zanardini	Setchell 1924
<i>Neomeris annulata</i> Dickie	Setchell 1924; Birkeland <i>et al.</i> 1987; Skelton 2003a
<i>Neomeris dumetosa</i> J.V. Lamouroux	Littler & Littler 2003
<b><i>Neomeris van-bosseae</i> Howe</b>	Skelton 2003a
<i>Ostreobium quekettii</i> Bornet <i>et</i> Flahault	Setchell 1924
<b><i>Parvocaulis clavata</i> (Yamada) Berger <i>et al.</i></b>	Skelton 2003a
<b><i>Parvocaulis exigua</i> Berger <i>et al.</i></b>	Skelton 2003a
<b><i>Parvocaulis parvula</i> (Solms-Laubach) Berger <i>et al.</i></b>	Skelton 2003a
<b><i>Phyllocladon anastomosans</i> (Harvey) Kraft <i>et</i> Wynne</b>	Skelton 2003a
<b><i>Rhipidosiphon javensis</i> Montagne</b>	Skelton 2003a
<b><i>Rhizoclonium africanum</i> Kützing</b>	Skelton 2003a; (incl. <i>R. samoense</i> Setchell 1924).
<i>Rhizoclonium hieroglyphicum</i> (C. Agardh) Kützing	Setchell 1924
<i>Rhizoclonium riparium</i> var. <i>implexum</i> (Dillwyn) Rosenvinge	Setchell 1924
<b><i>Sporocladopsis erythraea</i> Nasr</b>	Skelton 2003a
<b><i>Tydemania expeditionis</i> Weber-van Bosse</b>	Skelton 2003a
<i>Ulva clathrata</i> (Roth) C. Agardh	Setchell 1924; Skelton 2003a
<b>*<i>Ulva compressa</i> Linnaeus</b>	Skelton 2003a
<i>Ulva flexuosa</i> Wulfen	Setchell 1924
<i>Ulva intestinalis</i> Linnaeus	Setchell 1924; Skelton 2003a
<i>Ulva prolifera</i> O.F. Müller	Setchell 1924
<b>*<i>Ulva</i> sp.</b>	Skelton 2003a
<b><i>Valonia aegagropila</i> C. Agardh</b>	Skelton 2003a
<i>Valonia fastigiata</i> Harvey ex J. Agardh	Setchell 1924; Birkeland <i>et al.</i> 1987; Skelton 2003a
<b><i>Valonia macrophysa</i> Kützing</b>	Skelton 2003a
<i>Ventricaria ventricosa</i> (J. Agardh) Olsen <i>et</i> J. West	Setchell 1924; Birkeland <i>et al.</i> 1987; Skelton 2003a

Table 4. Comparison of Chlorophyta and Phaeophyta flora of American Samoa and selected Pacific Islands.

	<i>Fiji</i>	<i>French Polynesia</i>	<i>Hawaii</i>	<i>American Samoa</i>
Chlorophyta	136	96	107	74
Phaeophyta	46	42	62	23

References: Fiji – South & Skelton 2003a; French Polynesia – Payri & N’Yeurt 1997; Hawaii – Abbott & Huisman 2004; American Samoa – this study.

Eight Phaeophyta are reported here as new records from our surveys, with an additional three species - *Dictyota adnata* Zanardini, *Sargassum tenerrimum* J. Agardh and *Ralfsia expansa* (J. Agardh) J. Agardh, illustrated by Littler & Littler (2003). Setchell (1924) listed 11 Phaeophyta with four new species. One of Setchell’s new species, *Ectocarpus van-bosseae* Setchell et Gardner, appears to conform to the generic description of *Hincksia*.

35 new records of Chlorophyta were found from our surveys, complemented with four illustrated by Littler & Littler (2003).

The majority of the new records of Chlorophyta and Phaeophyta have an Indo-Pacific distribution, with the exception of *Sporocladopsis erythraea* previously only recorded from its type locality, the Red Sea (Nasr, 1944). Its presence as an epiphyte on the endemic *Sargassum anapense* suggests that it is part of the native flora and not introduced. This list also includes about seven species that need to be examined to confirm their presence (see Table 3).

In comparison to other Pacific Island floras – especially French Polynesia (Payri & N’Yeurt, 1997), Fiji (South & Skelton, 2003a) and Hawaii (Abbott & Huisman, 2004), the flora is comparable relative to the small land-mass of the islands and limited habitats (Table 4). Increasing intensity in collecting efforts in American Samoa will yield more species, although the total diversity will not be as high as that seen in the Hawaiian flora. The Fijian flora also has a high diversity of Chlorophyta and Phaeophyta but much of its marine environment remains unexplored and thus the total algal diversity will be much higher. The French Polynesian flora has a very high diversity and this may be attributed to the high collecting intensity in some localities, and the varied habitats of the islands.

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