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The genus *Polysiphonia* (Rhodophyta, Ceramiales) from Santa Catalina Island, California I. Oligosiphonia

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Illustrations, descriptions and taxonomic notes are provided for eight tetrasiphonous species of *Polysiphonia* occurring on Santa Catalina Island, California: *P. flaccidissima* HOLLENB., *P. scopulorum* var. *villum* (J. AG.) HOLLENB., *P. decussata* HOLLENB., *P. pacifica* var. *delicatula* HOLLENB., *P. eastwoodae* S. & G., *P. acuminata* GARDN., *P. savatieri* HAR., and *P. simplex* HOLLENB. Comparisons are made with descriptions for these species elsewhere in the Pacific Ocean.

Key Index Words: *Ceramiales*; *Oligosiphonia*; *Pacific Ocean*; Polysiphonia; *Rhodophyta*; *Santa Catalina Is.*

The genus *Polysiphonia* GREVILLE, a widely distributed and ecologically diverse group, is often one of the least understood taxa in ecological accounts and regional floras (TAYLOR 1960, KAPRAUN 1977; WOMERSLEY 1979). The species occurring on the California coast, however, are relatively well delimited in the monographic treatments by HOLLENBERG (1942a, 1942b, 1944, 1961, 1968b) which stressed the significant diagnostic morphological features. But even here, specific determinations can be difficult, especially in the warm temperate and tropical waters of the Southern California Channel Islands, with diminutive specimens which achive reproductive maturity without attaining the habit and vegetative features characteristic of the species. The present study, utilizing collections primarily from Santa Catalina Island, was initiated to consider some of the special problems encountered with the minute, turf-forming tetrasiphonous *Polysiphonia* species, and to provide additional data for the continuing biogeographic investigations of the Southern California Islands (NEUSHUL *et al.* 1967, MURRAY *et al.* 1980, MURRAY and LITTLER 1981).

Specimens were obtained by the authors during March and September, 1980, from a range of habitats near Avalon and Twin Harbors, and the vicinity of the University of Southern California Catalina Marine Science Center (CMSC). Additional specimens were examined to provide a better appreciation of morphological variation reported for some taxa. Collections are designated as follows: DFK for D. F. KAPRAUN, DNY for David N. YOUNG, GJH for George J. HOLLENBERG, EYD for E. Yale DAWSON. Voucher specimens and microscopic slides for this study are deposited in the following herbaria: UNC-Wilmington (WNC), Allan Hancock Foundation (AHFH), and the Smithsonian Museum (US).

Loans of type specimens and historically significant collections were provided by Dr.

J. NORRIS (US). Additionally, we are grateful to Valerie ANDERSON (AHFH) for technical assistance and the Institute for Coastal and Marine Studies (USC) for providing facilities at CMSC.

Key to the Tetrasiphonous Species of *Polysiphonia*

1. Branches arising in axils of trichoblasts *P. flaccidissima*
1. Branches replacing trichoblasts 2
2. Rhizoids in open connection with pericentral cells 3
2. Rhizoids cut off from pericentral cells 5
3. Scar cells absent in decumbent axes; erect filaments arising endogenously in unilateral fashion at intervals of 2-4 segments from prostrate axes *Polysiphonia scopulorum* var. *villum*
3. Scar cells common in decumbent axes; erect filaments arising radially from both prostrate and erect axes 4
4. Trichoblast or scar cell separated from preceding branch by 1 or 2 naked segments; lateral branches decussate; main axes more than 150 μm diam *P. decussata*
4. Trichoblasts or scar cells absent or exceedingly rare; lateral branches alternate; main axes less than 100 μm diam *P. pacifica* var. *delicatula*
5. Segments in main axes 2-3 diam long *P. acuminata*
5. Segments in main axes 1 diam or less long 6
6. Plants 2-3 cm tall; prominent main axes more than 250 μm diam; adventitious branchlets developing from scar cells in older branches
6. Plants less than 2 cm tall, matted or bushlike, lacking a prominent main axis; filaments less than 250 μm diam; adventitious branchlets absent 7
7. Plants mostly epiphytic; bushlike from a distinct basal tuft of rhizoids; main axes to 150 μm diam *P. savatieri*
7. Plants mostly saxicolous; erect filaments from a distinct basal tuft of creeping branches; main axes to 250 μm diam *P. simplex*

Polysiphonia acuminata GARDN.

(Figs 1-6)

P. acuminata GARDNER 1927: 100, HOLLENBERG 1942b: 782, SMITH 1944: 360, ABBOTT and HOLLENBERG 1976: 684, fig. 630.

Thallus erect, 2-3 cm tall, coarse with primary branches arising alternately from the distinct main axis; segments in the main axis 250-400 μm diam, to 1 diam long; branches replacing trichoblasts in development; trichoblasts developing in spiral sequence on each segment not bearing a branch; in older parts adventitious branchlets of limited growth developing from scar cells; pericentral cells 4, uncorticated, or less commonly, with rhizoidal cortication near the base; rhizoids cut off from the end of pericentral cells.

Cystocarps not observed in this study. For a description see ABBOTT and HOLLENBERG (1976: 684).

Spermatangial branches cylindrical, 30-50 ×120-150 μm, with subtending trichoblast, sterile tips absent or consisting of 1-2 small cells.

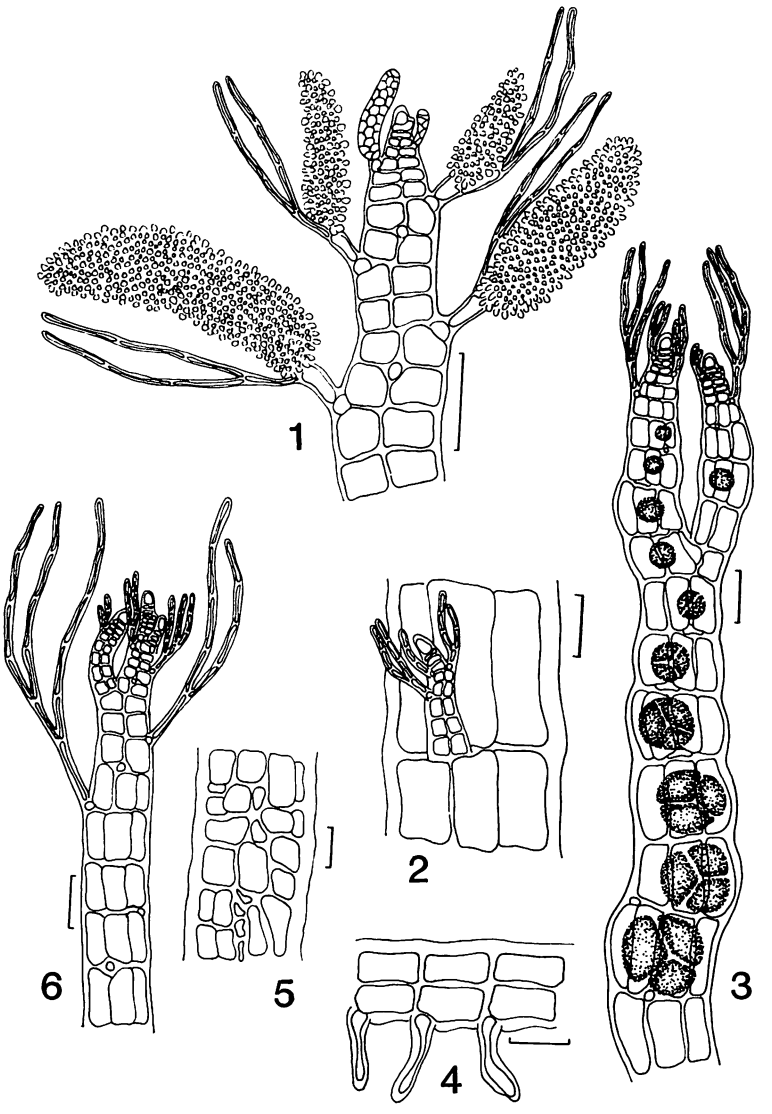
Tetrasporangia 50-70 μm diam, spirally arranged in long series in the branch tips.

Type-Locality White's Point near San Pedro, Los Angeles County, California.

Distribution: Monterey to La Jolla on the California coast, and from Catalina Island.

Selected Specimens Studied: SANTA CATALINA IS: Cherry Cove, DFK, 10 March 1980, WNC 15162; Cherry Cove, DNY 1004, tetrasporic, 5 Sept. 1980, WNC 15161; north side of island GJH 838, male, 15 April 1935, US 2273, US 2274, US2275. LOS ANGELES CO: (Isotype) White's Point near San Pedro, N.L. GARDNER 1968, June 1908, US 2838.

Remarks: This species with its characteristically robust and distinct main axes beset with clearly alternate branches is comparatively distinct, even in the diminutive form



Figs 1-6. *Polysiphonia acuminata*. Fig. 1. Spermatangial branches. Fig. 2. Adventitious branchlet. Fig. 3. Branch apex with tetrasporangia. Fig. 4. Rhizoids cut off from pericentral cells. Fig. 5. Rhizoidal cortication of older filament. Fig. 6. Vegetative branch apex. Figs 1-3, 6. Scale=50 μm. Figs 4-5. Scale=100 μm.

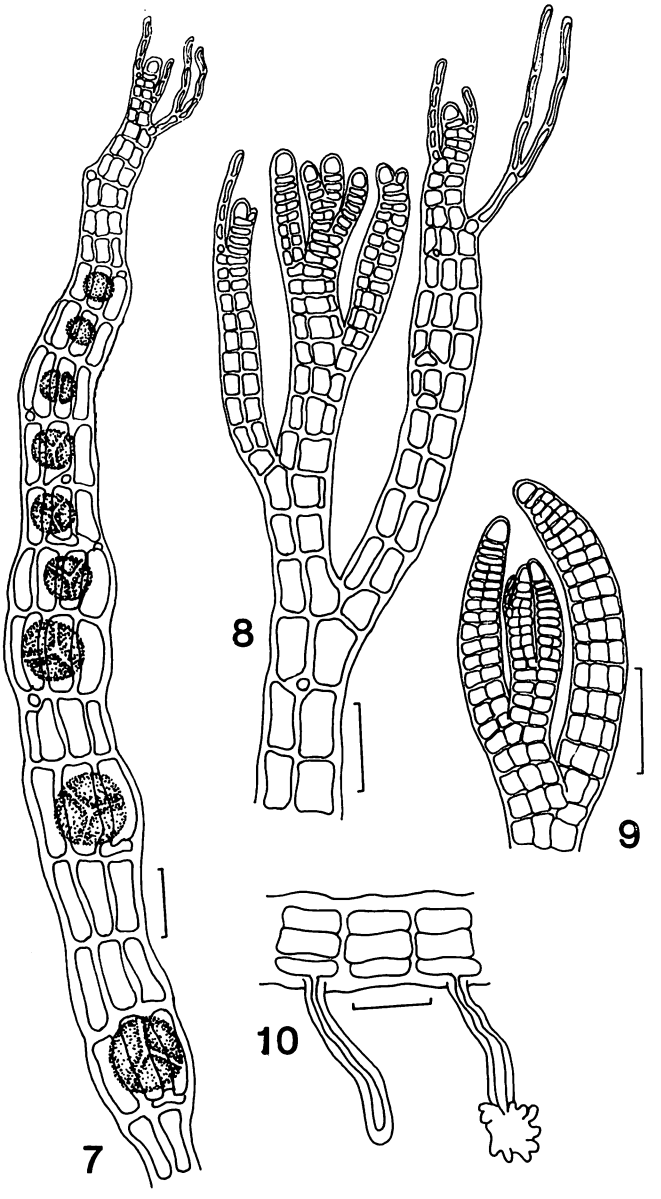
most often encountered in this study.

Polysiphonia decussata HOLLENB.

(Figs 7-10)

P. decussata HOLLENBERG 1942b: 780, fig. 6, 1961: 351, pl. 2, fig. 1, ABBOTT and HOLLENBERG 1976: 686, fig. 633.

Thallus entangled, giving rise to erect filaments to 0.5 cm tall; prostrate axes attached by numerous rhizoids which remain in open connection with pericental cells; erect filaments 150-200 μm diam, the segments to 1 diam long; pericentral cells 4, uncorticated; branches replacing trichoblasts in development; trichoblasts or scar cells separated from preceding branch by 1 or 2 naked segments; branches appearing disti-



Figs 7-10. *Polysiphonia decussata*. Fig. 7. Branch apex with tetrasporangia. Figs 8-9. Decussate branch development. Fig. 10. Rhizoids in open connection with pericentral cells. Figs 7-9. Scale=50 μm. Fig. 10. Scale=100 μm.

chous, but developing decussately in relation to trichoblasts.

Sexual reproductive structures not seen in this study. For descriptions see HOLLENBERG (1942b: 780).

Tetrasporangia 40-56 μm diam, in spiral series in branch tips.

Type-Locality: Topanga Canyon, Los Angeles County, California.

Distribution: Southern California to Isla Guadalupe, Baja California, and the Galápagos Islands.

Selected Specimens Studied: SANTA CATALINA IS: Catalina Harbor, DFK, tetrasporic, 10 March 1980, WNC 15163. ORANGE CO: Laguna Beach, GJH 1114,

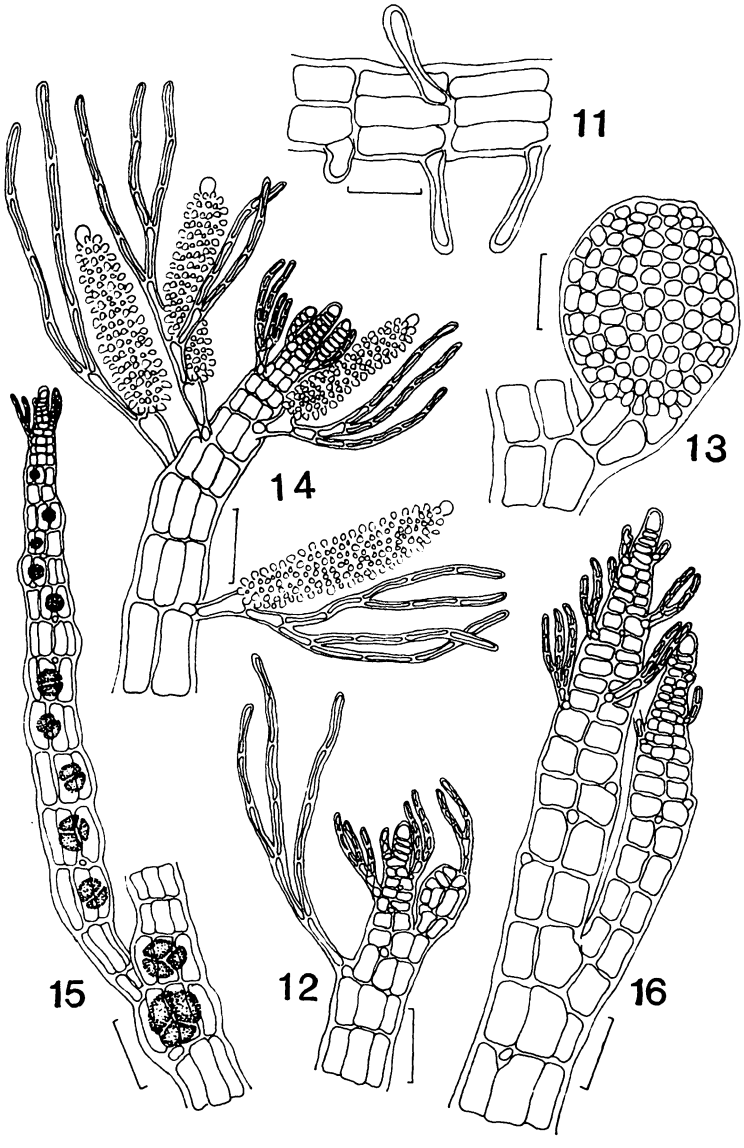
tetrasporic, 10 Nov. 1935, US 1086, US 1087. LOS ANGELES CO: (Holotype) Topanga Canyon, GJH 2649, 4 June 1939, US 1174, US 1175. MEXICO: Punta Santa Rosalia, Baja California, EYD 2846, 10 Oct. 1946, AHFH 72792; Guadalupe Island, EYD 8588, 20-1 Dec. 1949, AHFH 70550; Punta Santa Rosalia, Baja California, EYD 2886, 10 Oct. 1946, AHFH 72759.

Polysiphonia eastwoodae SETCHELL and GARDNER

(Figs 11-16)

P. eastwoodae SETCHELL and GARDNER 1830: 161, DAWSON 1954b: 160, KAPRAUN *et al.* 1983: 881-898, figs 25-29.

P. snyderae KYLIN 1941: 35, pl. 12, fig. 34,



Figs 11-16. *Polysiphonia eastwoodae*. Fig. 11. Rhizoids cut off from pericentral cells. Fig. 12. Carpogonial branch. Fig. 13. Mature pericarp. Fig. 14. Spermatangial branches. Fig. 15. Tetrasporania in spiral sequence. Fig. 16. Branch development in apex. Figs 11-13, 15. Scale=100 μm. Figs 14, 16. Scale=50 μm.

HOLLENBERG 1942a: 784, fig. 9, DAWSON 1944: 330, 1951: 56, 1954b: 160.

P. mollis sensu HOLLENBERG 1961: 359, pl. 4, fig. 2 [non *P. mollis* J.D. HOOKER and HARVEY 1847: 397], DAWSON 1957: 8, 1966: 29, DAWSON *et al.* 1960: 72, pl. 41, figs 7-8, MEÑEZ 1964: 213, fig. 3A-G, ABBOTT and HOLLENBERG 1976: 688, fig. 636, HOLLENBERG and NORRIS 1977: 9, fig. 5B, KAPRAUN and BOWDEN 1978: 201, figs 25-27.

?P. tongatensis sensu SEGI 1951: 207 (in part) [non *P. togatensis* HARVEY in KUETZING 1864: 14].

Thallus 2-3 cm tall from a discoid base; erect filaments subdichotomously branched, replacing trichoblasts in development; older branches becoming decumbent and attached to the substratum by rhizoids cut off from proximal end of pericentral cells; pericentral cells 4, uncorticated; segments 1(-2) diam long, to 200 μm diam; trichoblasts deciduous, leaving conspicuous scar cells.

Cystocarps ovoid, 300-350 μm diam.

Spermatangial branches 40-50×90-110 μm, with subtending trichoblasts; mostly with sterile tip cells.

Tetrasporangia 50-60 μm diam, in spiral series in distended upper branchlets.

Type-Locality: Guadalupe Is., Pacific Mexico.

Distribution: Widely reported from temperate and tropical waters of the Pacific Ocean.

Selected Specimens Studied: SANTA CATALINA IS: Chalk Cove, DNY, cystocarpic, 12 Oct. 1979, WNC 15156; Big Fisherman's Cove, DNY 1011, tetrasporic, 5 Sept. 1980, WNC 15154; Fourth of July Cove, DNY 1005, cystocarpic, male, tetrasporic, 5 Sept. 1980, WNC 15155. MEXICO: (Isotype) Guadalupe Is., Baja California del Norte, H.L. MASON coll. 55, April 1955, det. SETCHELL and GARDNER, US 2818; MILLER's Landing, Baja California, EYD 2936, 11 Oct 1946, AHFH 72780.

Remarks: WOMERSLEY (1979) critically examined the type material of *Polysiphonia mollis* J.D. HOOKER et HARVEY and determined that "almost certainly" branches develop in the axils of trichoblasts, in contrast to the concept of this taxon which was developed by HOLLENBERG (1961 1968a). Our specimens clearly showed branches replacing trichoblasts in development, and so are referred to *P. eastwoodae* which seems to be the available epithet for this distinct entity.

Polysiphonia flaccidissima HOLLENB.

(Figs 17-22)

P. flaccidissima HOLLENBERG 1942b: 783, fig. 8, 1961: 351, pl. 2, fig. 2, 1968a: 63, figs 2A, 11, DAWSON *et al.* 1964: 88, pl. 78, fig. B, BRAUNER 1975: 128, figs 2-4, ABBOTT and HOLLENBERG 1976: 688, figs 634-635, SCHNEIDER 1976: 140, HOLLENBERG and NORRIS 1977: 4, fig. 2E, KAPRAUN 1979: 107, figs 8-9, KAPRAUN and NORRIS 1982: 231, fig. 110.

Thallus minute; erect filaments to 1.5 cm tall from an extensive creeping system; prostrate axes to 80 μm diam, attached by numerous rhizoids cut off from pericentral cells; erect and prostrate axes with radial development of branch primordia; branches developing in the axils of trichoblasts, mostly at intervals of 6 segments; pericentral cells 4, uncorticated; trichoblasts simple or with 1 dichotomy, soon deciduous, leaving conspicuous scar cells.

Cystocarps on a slender pedicel, subspherical, 200-250 μm diam, cortical cells isodiametric.

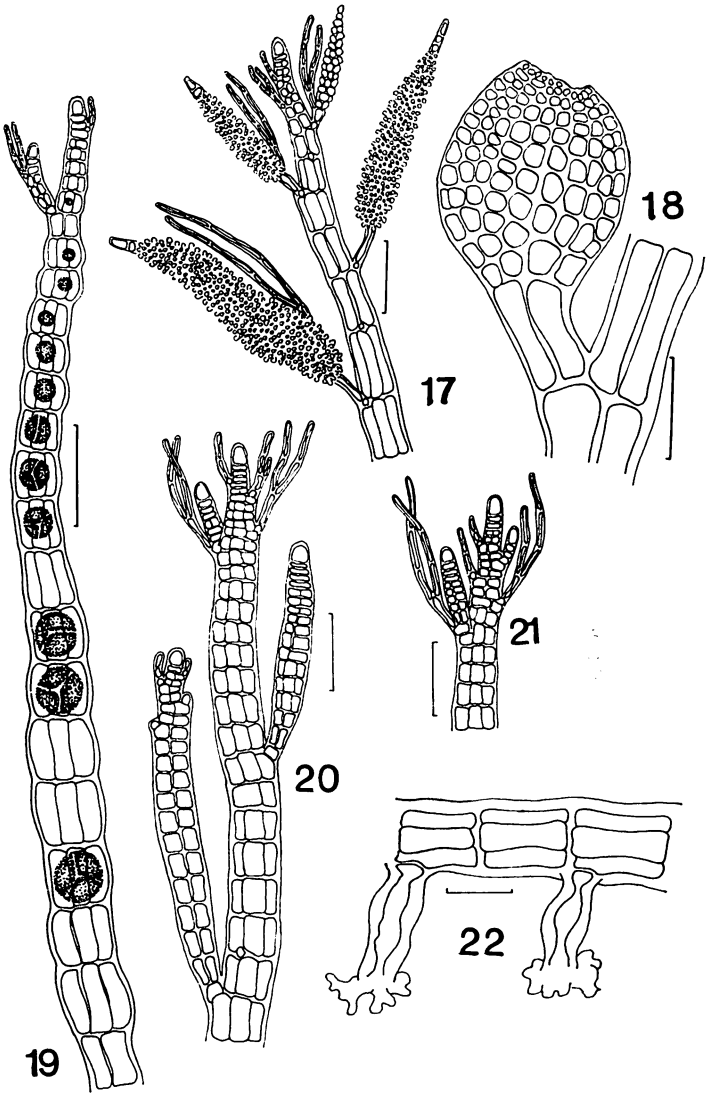
Spermatangial branches lanceolate, 30-40× 150-180 μm, mostly with a tip of 1-3 sterile cells, arising as a primary fork of a trichoblast.

Tetrasporangia 40-60 μm diam, spirally arranged in long series in swollen terminal branch tips.

Type-Locality: Laguna Beach, California.

Distribution: Pacific coast from Southern California to Peru; tropical central Pacific Ocean; warm temperate and tropical western Atlantic Ocean.

Selected Specimens Studied: SANTA



Figs 17-22. *Polysiphonia flaccidissima*. Fig. 17. Spermatangial branches. Fig. 18. Cystocarp. Fig. 19. Tetrasporangia. Figs 20-21. Branches arising in axils of trichoblasts. Fig. 22. Rhizoids cut off from pericentral cells. Figs 17-18, 20-21. Scale=50 μm. Figs 19, 22. Scale=100 μm.

CATALINA IS: Bird Rock, R. SETZER 9612, 20 March 1977; Isthmus, Twin Harbors, GJH 767, 15 April 1935, US 2243. MEXICO: Isla Concha, Baja California, coll. W. WILLIAMS, 4 May 1946, det. GJH, US 2410, US 2411; Socorro Is., Revillagigedo Archipelago, coll. EYD, tetrasporic, cystocarpic, male, 16 April 1955, det. GJH, US 2423.

Remarks: WOMERSLEY (1979: 479) expressed the opinion that no satisfactory differences exist between *P. flaccidissima* and *P. sertularioides* (GRAT.) J. AG. from Australia and the Mediterranean. Although these two taxa are closely related and possibly conspecific, consistent morphological distinctions do exist. In *P. flaccidissima* cystocarps are supported by a long pedicel and spermatangial branches are lanceolate,

ending in 1-3 sterile tip cells. In contrast, *P. sertularioides* cystocarps are short stalked and spermatangial branches cylindirical, without sterile apical cells. *Polysiphonia havanensis* MONT., which is intermediate in respect to these features, has been considered distinct primarily on the basis of its different rhizoid development (HOLLENBERG 1942b : 784 KAPRAUN 1977 : 316). However, a current investigation of *P. havanensis* from the tropical western Atlantic has shown this character to be highly variable in this species and of doubtful taxonomic value (KAPRAUN, unpublished data).

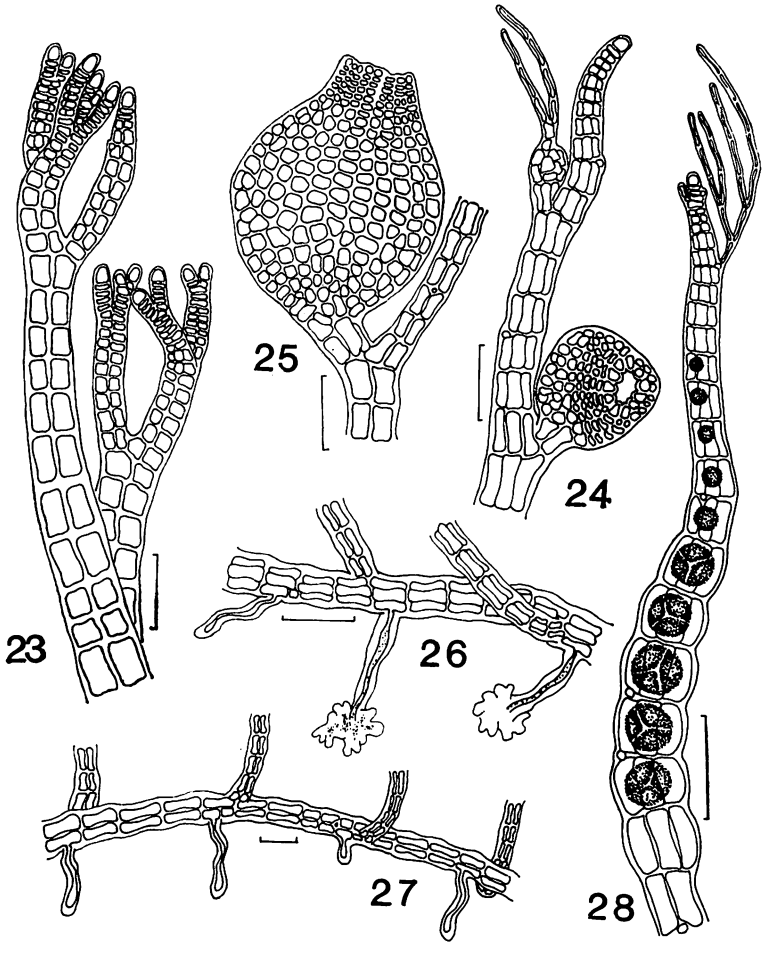
For the present it seems best to retain the familiar epithet *P. flaccidissima* for California specimens until the variabitity of the morphological features in other populations can be determined and used to support more definitive taxonomic conclusions.

Polysiphonia pacifica var. *delicatula* HOLLENB.

(Figs 23-28)

P. pacifica var. *delicatula* HOLLENBERG 1942b : 778, 1961 : 362, SMITH 1944 : 360, ABBOTT and HOLLENBERG 1976 : 690, HOLLENBERG NORRIS and 1977 : 10, fig. 6B.

Thallus dark red; erect filaments to 1 cm



Figs 23-28. *Polysiphonia pacifica* var. *delicatula*. Fig. 23. Apex showing alternate branching patterns. Figs. 24-25. Immature and mature cystocarps. Figs 26-27. Rhizoids in open connection with pericentral cells in decumbent axes. Fig. 28. Tetrasporagia. Figs 23-24. Scale=50 μm. Figs 25-28. Scale=100 μm.

tall from an extensive creeping system; prostrate axes 80–120 μm diam, attached by numerous rhizoids which remain in open connection with pericentral cells; erect filaments to 100 μm diam, the segments 1–3 diam long; branching primarily alternate, with branch apices somewhat forcipate; trichoblasts absent.

Cystocarps briefly pedicellate, urceolate, 250–350 μm diam; cortical cells isodiametric.

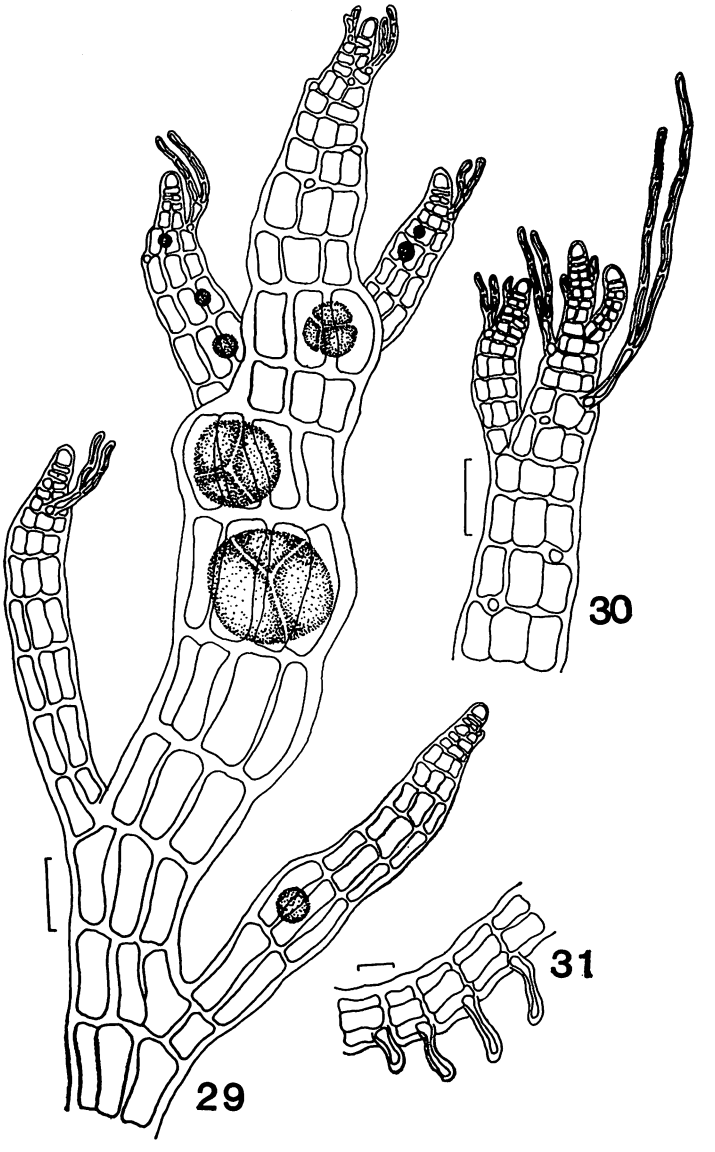
Spermatangial branches not seen in this study. For a description see HOLLENBERG (1942b: 777).

Tetrasporangia 60–70 μm, in long straight series in upper branchlets.

Type-Locality: Monterey, California.

Distribution: Mendocino County south to Baja California, the Gulf of California, and the Galápagos Islands.

Selected Specimens Studied: SANTA CATALINA IS: Catalina Harbor, DFK, cystocarpic, 19 March 1980, WNC 15168; Big Fisherman's Cove, DFK, 13 March 1980, WNC 15167; Big Fisherman's Cove, GJH



4037, tetrasporic, 1 April 1970, US 2535; Big Fisherman's Cove, DNY 1009, cystocarpic, 5 Sept 1980, WNC 15166. MONTEREY CO: (The Type) Monterey, GJH 2888, 20 July 1939, US 61226. MEXICO: Bahia de los Angeles, Baja California, EYD 1351, 11 April 1946, AHFH 54149; Punta Santa Rosalia, Baja California, EYD 2827, 9 Oct. 1946, AHFH 72763.

Polysiphonia savatieri HAR.

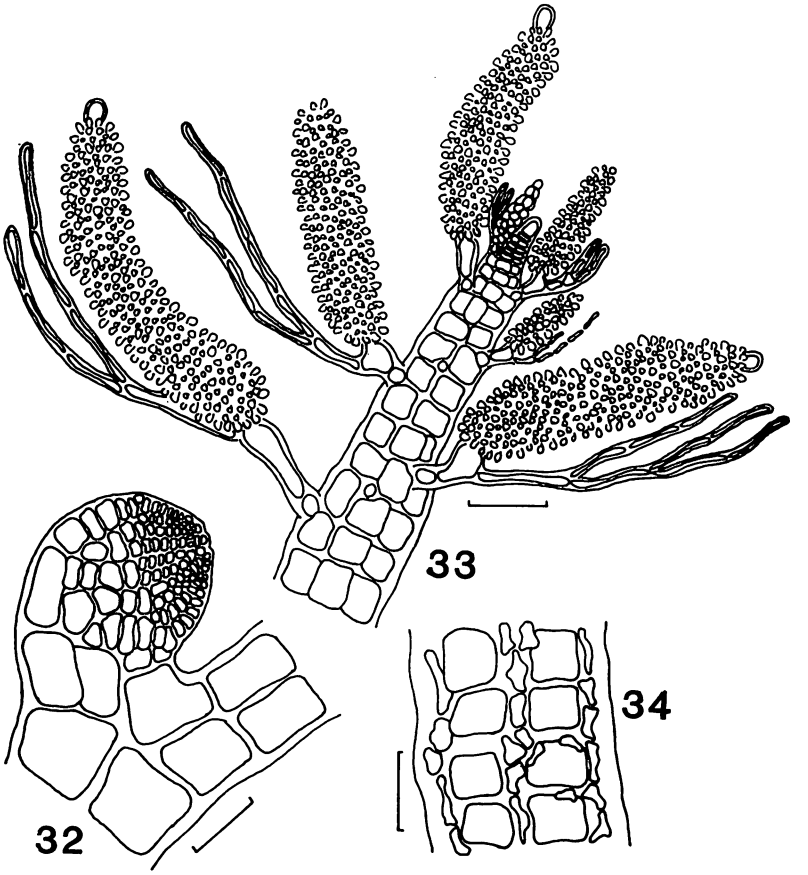
(Figs 29-34)

P. savatieri HARIOT 1891: 226, SEGI 1951: 202, figs 10A-H, DAWSON 1954b: 160, HOLLENBERG 1961: 363, pl. 7, fig. 4, 1968a: 77, figs 37, 38, ABBOTT and HOLLENBERG 1976: 692, fig. 639, HOLLENBERG and NORRIS 1977: 781, fig. 21.

P. minutissima HOLLENBERG 1942b: 781, fig. 21.

Thallus epiphytic, erect to 0.8 cm from a tuft of rhizoids; erect branches subdichotomous, spreading, giving a bushlike habit; branches replacing trichoblasts in development; main axes to 150 μm diam, segments mostly less than 1 diam long; pericentral cells 4, uncorticated, or less commonly, with rhizoidal cortication near the base; rhizoids cut off from the end of pericentral cells.

Cystocarps globular-urceolate, nearly sessile, 220-250 μm diam; cortical cells isodiametric.



Figs 29-34. *Polysiphonia savatieri*. Fig. 29. Tetrasporangia in spiral sequence. Fig. 30. Branch apex. Fig. 31. Rhizoids cut off from pericentral cells. Fig. 32. Immature cystocarp. Fig. 33. Spermatangial branches. Note variation in sterile apical cell and subtending trichoblasts. Fig. 34. Rhizoidal cortication of older filament. Figs 29-30, 32-33. Scale=50 μm. Figs 31, 34. Scale=100 μm.

Spermatangial branches 40-50×180-200 μm, with or without subtending trichoblast, with or without sterile apex.

Tetrasporangia 70-80 μm diam, protuberant, in short spiral series in branch tips.

Type-Locality: Yokosuka, Japan.

Distribution: Monterey to Baja California, including the Channel Islands, and the Gulf of California. Widely distributed in the central and western tropical Pacific Ocean, Japan.

Selected Specimens Studied: SANTA CATALINA IS: Bird Rock, DFK, tetrasporic, 10 March 1980, WNC 15158; Big Fisherman's Cove, DNY, male and cystocarpic, 5 Sept. 1980, WNC 15157; Bird Rock, coll. N. Nicholson, tetrasporic, 25 March 1970, det. GJH 4027, US 2599; south side of island, GJH 838, 15 April 1935, US 2596.

Remarks: Male gametophytes observed in this study showed greater morphological variation in the spermatangial branches than had previously been reported (HOLLENBERG 1961, HOLLENBERG and NORRIS 1977). In other species, presence or absence of trichoblasts subtending spermatangia, and presence or absence of sterile tip cells have been reported as subject to variation (KAPRAUN 1979, KAPRAUN and NORRIS 1982). Also, this taxon is generally described as completely uncorticated (ABBOTT and HOLLENBERG 1976), but several of our specimens showed some basal cortication.

***Polysiphonia scopulorum* var. *villum* (J. AG.) HOLLENB.**

(Figs 35-40)

P. scopulorum var. *villum* (J. AGARDH) HOLLENBERG 1968a: 81, fig. 7A, BRAUNER 1975: 130, ABBOTT and HOLLENBERG 1976: 692, fig. 640, HOLLENBERG and NORRIS 1977: 233, fig. 111.

P. villum J. AGARDH, 1863: 941.

Lophosiphonia villum (J. AGARDH) SETCHELL and GARDNER 1903: 329, HOLLENBERG 1942a: 535, DAWSON 1944: 332, pl. 48, figs 1-6, 1951: 53, 1954b: 161, 1963: 421, pl. 169(44), figs 1-3, Taylor 1945: 304.

Thallus minute; extensive creeping system giving rise to erect filaments to 0.5 cm tall; erect filaments arising endogenously in unilateral fashion, at regular intervals of 2-4 segments; filaments with conspicuous trichoblasts, dichotomously branched up to the fourth order; branches replacing trichoblasts in development; pericentral cells 4, uncorticated; rhizoids in open connection with pericentral cells.

Cystocarps ovoid, 140-160 μm diam; cortical cells isodimetric, angular.

Spermatangial branches not observed in this study. For a description see HOLLENBERG (1968a: 79).

Tetrasporangia swollen in long series, 40-50 μm diam.

Type-Locality: "Ad littus Americae tropica," probably on the Pacific coast of Mexico.

Distribution: Southern British Columbia to Costa Rica. Widely distributed in warm temperate and tropical Pacific and Atlantic Oceans.

Selected Specimens Studied: SANTA CATALINA IS: Avalon Harbor, DFK, cystocarpic, 12 March 1980, WNC 15164; Bird Rock, DFK, tetrasporic, 10 March 1980, WNC 15165; Santa Catalina Harbor, GJH 4026.5, 27 March 1970, US 2615.

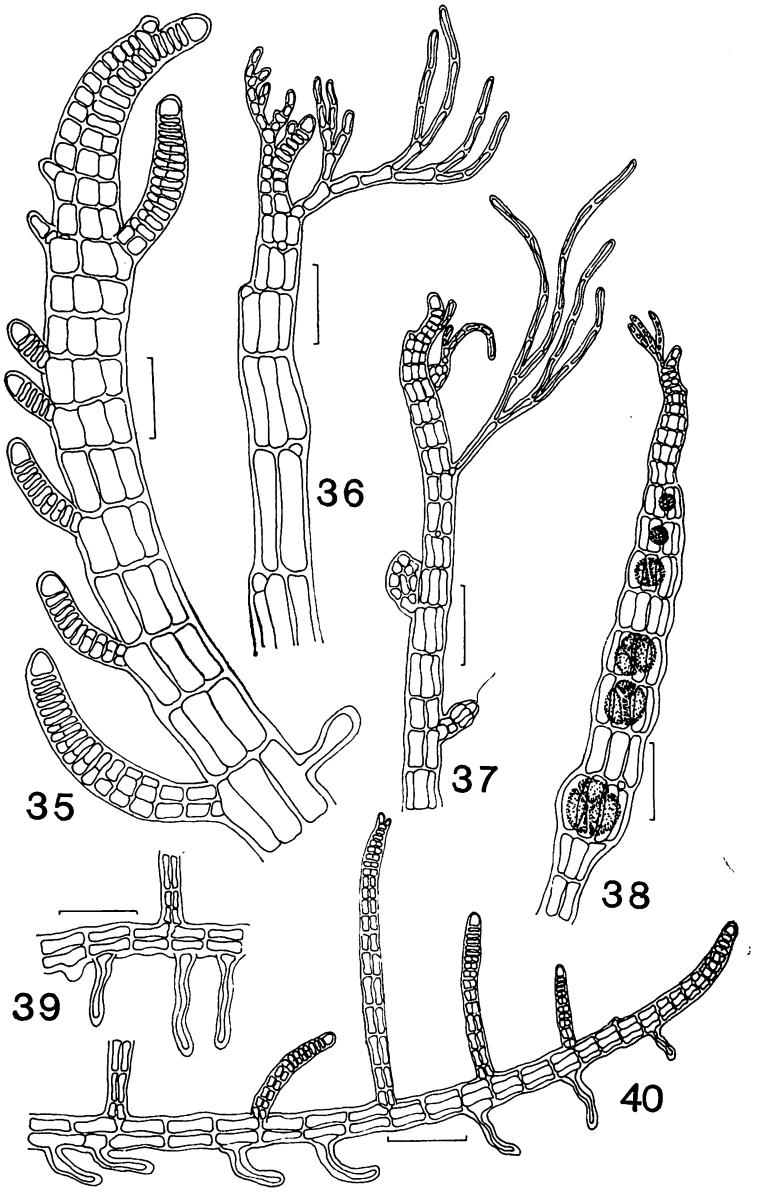
***Polysiphonia simplex* HOLLENB.**

(Figs 41-44)

P. simplex HOLLENBERG 1942b: 782, fig. 18, 1961: 364, pl. 5, fig. 1, DAWSON 1944: 331, 1951: 53, 1954a: 6, 1954b: 160, 1966: 29, ABBOTT and HOLLENBERG 1976: 694, fig. 641, HOLLENBERG and NORRIS 1977: 14, fig. 9.

P. ferulacea sensu SEGI 1951: 209, fig. 14, in part [non *P. ferulacea* SUHR in J.G. AGARDH 1863: 980].

Thallus forming creeping, entangled mats on rocks; erect filaments 2-3 cm tall; main axes 150-250 μm diam; segments less than 1 diam long; pericentral cells 4, uncorticated; rhizoids cut off form the proximal end of pericentral cells; branches replacing tricho-



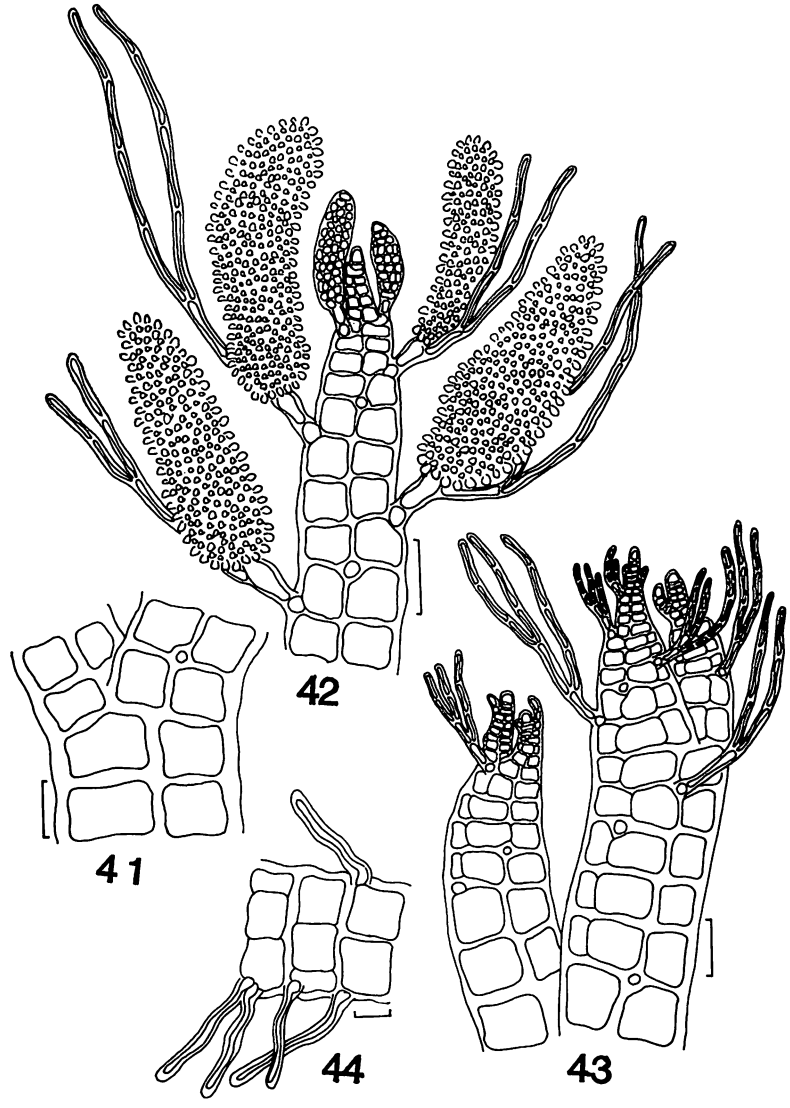
Figs 35-40. *Polysiphonia scopulorum* var. *villum*. Fig. 35. Erect filaments arising endogenously in unilateral fashion from prostrate axis. Fig. 36. Apex of erect filament. Fig. 37. Developing carpogonial branch and cystocarp. Fig. 38. Tetrasporangia. Figs 39-40. Rhizoids in open connection with pericentral cells. Figs 35-36. Scale=50 μm. Figs 37-40. Scale=100 μm.

blasts in development; trichoblasts with 1-2 dichotomies, soon deciduous, leaving conspicuous scar cells.

Cystocarps not observed in this study. For a description see HOLLENBERG and NORRIS (1977 : 15).

Spermatangial branches 40-50×175-200 μm with subtending trichoblasts, lacking sterile tip cells.

Tetrasporangia not observed in this study. For a description see HOLLENBERG and NORRIS (1977 : 15).



Figs 41-44. *Polysiphonia simplex*. Fig. 41. Characteristic dimensions of mature pericentral cells. Fig. 42. Spermatangial branches. Fig. 43. Branch apex development. Fig. 44. Rhizoids cut off from pericentral cells. Figs 41-43. Scale=50 μm. Fig. 44. Scale=100 μm.

Type-Locality: Laguna Beach, California.

Distribution: Southern California to southern Mexico, and from Costa Rica.

Selected Specimens Studied: SANTA CATALINA IS: Bird Rock, DNY 1014, 5 Sept 1980, WNC 15159; Bird Rock, DFK, male, 10 March 1980, WNC 15160. ORANGE CO: Languna Beach, GJH, 13 Feb. 1966, US 2640. SAN DIEGO CO: Neptune Place, La Jolla, EYD 15608, 1 Dec. 1956, AHFH 63111; La Jolla, T. A & A. Stephenson JA35, Nov.-Dec., 1947, AHFH 18979. MEXICO: Isla Venado, off Mazatlan, Sinaloa, EYD 10926, 8 June 1952, AHFH 72791; Punta Santa Rosalia, Baja California, EYD 2887, 10 Oct. 1946, AHFH 72781.

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ヤング, D.N., カプラウン, D.F.: カリフォルニア州サンターカタリナ島のイトグサ属

北米カリフォルニア州南部の小島，サンターカタリナ島に産するイトグサ属の tetrasiphonous の8種，すなわち，*P. flaccidissima* HOLLENB., *P. scopulorum* var. *villum* (J. AG.) HOLLENB,, *P. decussata* HOLLENB., *P. pacifica* var. *delicatula* HALLENB., *P. eastwoodae* S. & G., *P. acuminata* GARDN., *P. savatieri* HAR., および *P. simplex* HOLLENB. について図と記載と分類学的考察を行った。太平洋の他の場所のものとの比較がこの8種の記載の中で行なわれている。