

SCIENTIFIC RESULTS OF THE "BAEPENDI" AND "VEGA" CRUISE TO THE TRINDADE ISLAND

(Resultados científicos do cruzeiro do "Baependi" e do "Vega" à Ilha da Trindade).

MARINE ALGAE

Aylthon B. Joly

Department of Botany, Univ. of S. Paulo, Brazil

The present report is based upon a number of marine algae collected during an official expedition to the islands of Trindade and Martim Vaz, off the Brazilian coast, (20° 30' Lat. S and 29° Long. W) and at some points off the coast of the State of Espirito Santo, Brazil.

The material collected by several dredgings, is unfortunately very poor; it consists mainly of fragments or parts of plants, as represented in the collection submitted to identification. In many instances it was possible to recognise only the genus and not the species, and in this respect the list is very incomplete. It will be necessary to regard this account as a preliminary information on a few marine algae growing at the Islands and by no means a flora or a comprehensive list of species. The author has good reasons to believe that this brief list represents merely a touch in the subject. Further and extensive collections are a real need.

The author was not able to locate a single reference in the phycological bibliography regarding the Islands, though an exhaustive search was done. Cleve (1900) report a few Diatoms collected "near Trindade". A preliminary note on the algae of the Islands appeared 2 years ago; that note dealt especially with some Chlorophyceae. (See Joly, 1950). Oliveira (1951), in a previous note, gives a complete list of all the dredgings stations and mentions also seven genera of algae present in the Islands.

The identification of the material was done at the University of Michigan, under the direction and with the help of Prof. Wm. R. Taylor, to whom the author wishes to express his best thanks. To Mr. W. Besnard, director of the former "Instituto Paulista de Oceanografia" (now Instituto Oceanográfico of the University of S. Paulo), the author is indebted for the collection and preservation of the algae and also for the permission to use this material in the present report. I am also indebted to Dr. Lejeune P. H. de Oliveira of the Instituto Oswaldo Cruz (Rio de Janeiro) for the loan of part of the material studied.

SYSTEMATIC LIST

MYXOPHYCEAE*

Lyngbya majuscula Gomont

Very abundant in the material, found tangled among other algae. This was the only member of the Myxophyceae present in the collections. Dredged off Trindade between 30 to 50 m.

CHLOROPHYCEAE

Palmophyllum sp.

One large piece of a plant which I think belongs to the old genus named above. The lack of good descriptions, possibly because of the apparent rarity of the material, prevented the identification of this plant. This genus was reported previously only from very deep water in the Adriatic and Mediterranean seas. Kützing's figures of *P. flabellatum* Kützing (see Kützing 1845, t. 32 fig. V, 1 and 2), are somewhat different of our plant at least with regard to the "zonation" of the thallus. Dredged at "Banco" Victoria off Espirito Santo coast.

Cladophora sp.

Numerous pieces of branches, possibly belonging to a *Cladophora* with very elongated cells, were found among the material, tangled with filaments of a *Ceramium* and *Lyngbya*. Dredged off Trindade, between 30 and 50 m.

Anadyomene stellata (Wulfen) C. Agardh

This beautiful plant is abundant in the collection; several exceedingly large pieces of the frond were secured. Dredged off S. João da Barra and at "Banco" Jaseur at 57 m. Regarding the distribution of this species and that of *Dictyosphaeria cavernosa* I want to call the attention to the following: — Fritsch (1945) gives one map, taken from Svedelius (1924), showing the geographical distribution among others of the two above named plants (*Dictyosphaeria cavernosa* under the synonym *D. favulosa*). In this map *A. stellata* is referred to the Northeastern part of Brazil (Svedelius, l. c., p. 15-16).

Apparently the previously known reference to the occurrence of this species in Brazil is that of Martius (1833, p. 23) when he wrote: "In oris Brasiliae collectam communicavit optimus Mertens" giving no specific locality. Martens (1870 p. 302) simply quoted Martius. But Lützelburg (1922-1923, vol. 2 p. 230) reporting the algae collected by him and identified by O. C. Schmidt, who published later a complete account (see Schmidt 1924), clearly establishes the place of occurrence of this species in the bay of Angra dos Reis. (Lat. 23° S) Schmidt in his paper (l. c. p. 88) gives

(*) — Dr. Francis Drouet of the Chicago Natural History Museum, kindly identified the material of this group.

in addition to this locality another place, near the capital of the state of Parahyba, north of Pernambuco. It is a difficult task to find where Svedelius picked up the reference when he stated that *Anadyomene stellata* is: ". . . also known from the Atlantic coast of South America as far south as Pernambuco . . ." (see Svedelius 1924 p. 15). Unfortunately Fritsch (1945, map 1) did not include either the additional information on the distribution of *Anadyomene stellata* or the new record established by Taylor (1930 p. 629) for *Dictyosphaeria cavernosa* (under *D. favulosa*) in the South Atlantic.

Microdictyon sp.

Several frond fragments were found. The material approaches the sectio *Macrodictyon* of Setchell by its structure. The lack of complete plants prevented the identification. Dredged at "Banco" Jaseur off Espirito Santo coast at 57m.

Chamædoris peniculum (Solander) O. Kuntze

Since the material found in the collection is very incomplete, being represented by four basal stipes it is with reserve that I give the name above to the plants dredged off Trindade, between 30 and 50 m. The species has been reported several times on the Brazilian coast.

Dictyosphaeria cavernosa (Forsskaal) Börgesen

Few well developed clumps of this interesting plant were secured. In a previous report (see July l. c.) it appeared under the well known synonym *D. favulosa* (C. Agardh) Decaisne. Dredged off Trindade between 30 and 50 m. Reported previously by Taylor (1930) and Williams & Blomquist (1941).

Neomeris annulata Dickie

Very few plants of this species were found. This is the first report from the Brazilian coast and the South Atlantic, thus increasing in several degrees the latitude of the known area of distribution of this plant. Dredged between 30 and 50 m. off Trindade.

Dasycladus vermicularis (Scopoli) Krasser

Reported previously once in the Brazilian coast. Very few plants were found on the material dredged at Praia dos Portugueses, Trindade, between 12 and 18 m.

Avrainvillea nigricans Decaisne

Three well developed plants and a few fragments of the basal part of the stipe. This is the first record without question of this species and genus from the Brazilian coast. The previous references (see Gepp, 1911 p. 23, 27 and Börgesen, 1913 p. 85) were somewhat doubtful. (See also Taylor 1931 p. 292). Dredged off Trindade between 30 and 50 m.

Rhipilia sp.

Two small plants, possibly of the above named genus were dredged off Trindade between 30 and 50 m.

Penicillus capitatus Lamarck

Abundant in the material as represented by several plants well developed and with the characteristic habitus. This plant was misidentified in a previous note, as *P. Lamourouxii* Decaisne (see July, 1950). Dredged from 30 to 50 m. off Trindade. This is the third report of the genus and species in the Brazilian coast. (cf. Williams & Blomquist, 1947 and Oliveira, 1951). The distribution area of the genus has increased about 12 degrees in its southern range since the appearance of Williams & Blomquist's paper quoted above.

Penicillus sp.

Few, small plants perhaps belonging to a new species were found dredged off Trindade between 30 and 50 m.

Udotea cyathiformis Decaisne

Two small plants of the well known species named above were present in the collection. One dredged at Praia dos Portugueses, Trindade between 12 and 18 m. and the other off S. João da Barra on the coast of Espirito Santo at 20 m.

Udotea flabellum (Ellis et Solander) Howe

Few but characteristic plants agreeing very well with the description and excellent figures given by the Gepps (1911 p. 131 - 133 Pl. 3 figs. 26-28) were secured. Dredged off Trindade between 30 and 50 m. This is the second time that the plant is reported in Brazil. The previous report was from a region far to the north than the present one (see July, 1950 as reference).

Udotea sp.

A small *Udotea* was present among the material dredged at Praia dos Portugueses. The plant is composed of dichotomous filaments, held together side by side forming a monostromatic blade of about 2 cm high. The filaments are evenly constricted just above each dichotomy and there are no papillae or lateral appendages arising from the filaments. The stipe is very short and it passes evenly into the frond; it is covered with downward growing filaments which arise from the lowermost part of the frond. The frond is very delicate and apparently it splits lengthwise in two, three or more (?) parts as the plant grows older. The plant falls naturally in the first of the groups in which the Gepps divided the genus *Udotea* (see Gepp & Gepp 1911 p. 106 *et seq.*) by its monostromatic blade and the absence of papillae or lateral appendages on the frond filaments. However it is possible that this plant might be a young form of any of the two species listed above. I was unable to find any reference concerning the young stages or the deve-

lopment of the flabellum as the plant grows older, on the known species of *Udotea*. The material being so scarce I preferred not to name it.

Halimeda discoidea Decaisne

Fragments of two (?) plants and several unjointed pieces were secured. Nodal structure quite characteristic. This plant appeared as *H. Opuntia* (Linnæus) Lamouroux in a previous note. (see July 1. c.). Dredged from 30 to 50 m off Trindade. This is the second report of this species in Brazil. (see Williams & Blomquist, 1947).

Codium isthmocladum Vickers?

The material approaches the species named above. The measurements of the utricles were not quite within the range of the species. Very abundant on the collection. Perhaps some young specimens found are also ascribed to this species. Dredged from 22 m at 20 miles off S. João da Barra on the coast of Espirito Santo. This is the second report of this species in Brazil, (cf. Williams & Blomquist 1947 p. 390) thus increasing in several degrees the latitude in the Southern range of the species.

Codium bursa (Linnaeus) C. Agardh?

The material ascribed to this species is doubtless the same as understood by Schmidt (1923) but the discontinuous distribution arised by this record is a subject which must be dealt with care. All the previous records on this species are from the Northern Hemisphere, especially from the Mediterranean region. This is the first record from the South Atlantic. When received, the plants still had the very characteristic ball habitus, but soon after I started the sampling they desintegrated in the strong formalin solution. Dredged at 22 m and at about 20 miles off S. João da Barra on the coast of Espirito Santo. Abundant in the collection.

Caulerpa verticillata J. Agardh

Several pieces of this very characteristic plant were found. This is the first good record of the species from the Brazilian coast. It is impossible to trace Howe's reference to this species as being found in Brazil. (cf. Howe 1920 p. 608). Weber van Bosse (1898) in her monograph of the genus does not refer to this species as being found in the Brazilian coast. Dredged off Trindade, between 30 and 50 m.

Caulerpa prolifera (Forsskaal) Lamouroux

One piece of the "rhizome" with few erect "leaves" and some fragments were secured. Dredged off Trindade, between 30 and 50 m.

Caulerpa crassifolia (C. Agardh) J. Agardh f. **mexicana** (Sonder) J. Agardh.

Several pieces of the variety named above were found. Dredged off Trindade, between 30 and 50 m and at Praia das Tartarugas on the island.

Caulerpa racemosa (Forsskaal) Weber van Bosse var. **occidentalis** (J. Agardh) Börgesen

Few fragments present on the collection ; the material agrees with the var. *occidentalis* of this polymorphic species. Dredged off Trindade between 30 and 50 m.

PHAEOPHYCEAE

Colpomenia sinuosa (Roth) Derbès et Solier

One plant secured off Trindade, between 30 and 50 m.

Pocockiella variegata (Lamouroux) Papenfuss

Several plants were found at "Banco" Jaseur (57 m) and at "Banco" Victoria off Espirito Santo coast.

Zonaria flava (Clem.) C. Agardh

This is the third report of this species on the Brazilian coast. (cf. Martens 1870 p. 303) Few torn plants were secured by dredging off S. João da Barra at 22 m on the coast of Espirito Santo.

Zonaria zonalis (Lamouroux) Howe

Very abundant in the material. Several well developed plants were secured off S. João da Barra at 20 m on the coast of Espirito Santo.

Padina sp.

Few young plants of a *Padina* were secured. Dredged off Trindade, between 30 and 50 m.

Padina sanctæ crucis Börgesen

Dredged off Trindade between 12 and 18 m and at Praia dos Portugueses. Several tetrasporic and few sterile plants found in the collection. Reported twice on the Brazilian coast.

Dictyota cervicornis Kützing

Few plants secured off Trindade and at Praia dos Portugueses on the island. Dredged between 30 and 50 m.

Dictyota dentata Lamouroux

Very abundant in the material. Dredged off Trindade between 30 and 50 m and at Enseada dos Portugueses, on the island.

Dictyopteris delicatula Lamouroux

Several portions of this characteristic species and few plants were secured off Trindade, by dredgings between 30 and 50 m and at Praia dos Portugueses on the island.

Dictyopteris plagiogramma (Montagne) Vickers

Few torn plants were found in the collection. The plant is a common one on the Brazilian coast. Dredged off Trindade between 30 and 50 m.

Sargassum hystrix J. Agardh var. **spinulosum** (Kützing) Grunow

A small piece found at "Banco" Jaseur, dredged from 57 m. This is the first record of the species and variety from the Brazilian coast.

RHODOPHYCEAE

Liagora ceranoides Lamouroux?

One piece of a male plant. Dredged at Praia dos Portugueses, Trindade between 12 and 18 m.

Galaxaura oblongata (Ellis et Solander) Lamouroux

Two plants found off Trindade between 30 and 50 m.

Asparagopsis taxiformes (Delile) Collins et Hervey

One part of a plant found at Trindade. Dredged between 30 and 50 m.

Amphiroa ephedraea Lamarck?

It is with certain reluctance that I give the name above to one piece of a sterile plant found at 20 miles off S. João da Barra (22 m) on the coast of Espirito Santo. The plant is an inhabitant of the Indo-Pacific seas. The present record needs new ample collections to be confirmed. The material seems to me to agree very well with the description and figure given by Weber van Bosse (1904 p. 96-97 and pl. 14 fig. 13) but the impossibility of comparison with authentic material and the unexpected discontinuity of distribution arising by this record prevented a conclusive identification.

Corallina cubensis (Montagne) Kützing emend. Börgesen

Few plants of this delicate species were secured from dredgings off Trindade, between 30 and 50 m.

The collection also included abundant material of the crustose Corallinaceae. This collection is at the disposal of any phycologist interested on the group. It was impossible to the writer, in the start of his study of marine algae, to undertake the difficult task of naming those very interesting plants.

Jania adhærens Lamouroux

Several sterile plants of this delicate species were found growing on stones or epiphytically upon other algae and frequently on the basal parts of old plants of *Dictyota dentata*. The plants seem to agree very well with the figures and description given by Börgesen (1917 p. 195-197).

Halymenia sp.

One well developed plant present in the collection. Perhaps this species will prove to be new, but further collections are necessary. Dredged at "Banco" S. Thomé between 39 and 46 m off the coast of Espirito Santo.

Gracilaria cornea J. Agardh

Few plants of this very characteristic *Gracilaria* were secured from dredgings off Trindade, between 30 and 50 m.

Chrysiomenia sp.

One plant perhaps belonging to the genus named above was found. Dredged off Trindade, between 30 and 50 m.

Champia sp.

One sterile branch and few very young specimens of a plant belonging to the genus *Champia*, possibly *C. parvula* (C. Agardh) Harvey were found among the material. Dredged off Praia dos Portugueses, Trindade, between 12 and 18 m.

Griffithsia sp.

One small sterile branch with several globose cells of a plant belonging to the genus *Griffithsia* was found. It has many resemblances with *G. monilis* Harvey*, but the scarcity of the material made it impossible to have a complete identification. Dredged at 20 miles off S. João da Barra in 22 m, on the coast of Espirito Santo.

Ceramium sp.

Several pieces of a tetrasporic *Ceramium* were found tangled with other algae. Dredged off Trindade between 30 and 50 m and at Enseada dos Portugueses.

Chondria sp.

Small pieces of a plant possibly of the above named genus were secured from dredgings at Praia dos Portugueses, Trindade between 12 and 18 m.

From the preceding list, though incomplete, it is possible nevertheless, to call attention to one remarkable evidence which is in accordance with the observations of other phycologists. It is evident that the "Greens", especially the Siphonaceous group predominates upon the deep water flora, as it is the case on the Caribbean region.

Another typical tropical character is evident from the list of the "Browns": nine from the eleven species listed are from the Dictyotaceæ, besides the presence on the collection of the two tropical genera: *Sargassum* and *Colpomenia*.

(*) — Collins & Hervey (1917 p. 135) reported this species for Bermuda, though the plant is an inhabitant of Australia. It will be of great interest if this record from the South Atlantic is confirmed.

The "Reds" are unfortunately very poorly defined in the present list to permit any judgement. Few, but typical tropical genera are present : *Galaxaura*, *Liagora*, *Halymenia*, and *Amphiroa*.

RESUMO

O presente trabalho descreve com certos detalhes uma coleção de algas marinhas de profundidade coletadas nas proximidades das ilhas da Trindade e Martim Vaz, e em certos pontos afastados da costa do Espírito Santo. Esta lista no entanto está longe de representar uma flora da região, que o autor considera como muito mais rica do que o evidenciado pela presente lista. Novas e extensivas coleções tanto de profundidade como mais próximas à superfície, sem dúvida trarão informações valiosas para a ficologia

BIBLIOGRAPHY

- BÖRGESEN, F.
1913. The Marine Algae of the Danish West Indies Part I. Chlorophyceæ. Dansk Bot. Arkiv 1,4 : 1-158.
1917. The Marine Algae of the Danish West Indies Part. III. Rhodophyceæ 3. Dansk. Bot. Arkiv 3,1c : 145-240.
- CLEVE, P. T.
1900. Plankton from the Southern Atlantic and the Southern Indian Ocean. Öfv. K. Vet.-Akad. Forhandl. 57,8 : 919-938.
- COLLINS, F. S. & HERVEY, A. B.
1917. The algae of Bermuda. Proc. Amer. Acad. Arts & Science 53 : 1-195. (incl. pl. 1-6).
- FRITSCH, F. S.
1945. The structure and reproduction of the Algae II : I-XII+1-939+2 Maps. Cambridge.
- GEPP, A. & E. S.
1911. The Codiaceæ of the Siboga Expedition including a Monograph of Flabellariæ and Udoteæ. Siboga-Expeditie. Monograph LXII of "Uitkomsten of Zoologisch, Botanisch, Oceanographisch en Geologische Gebied verzameld in Nederlandsch Oost-Indie 1899-1900 aan boord H. M. Siboga onder commando van Luitenant ter zee 1.º kl. G. F. Tydeman uitgegeven door Max Weber". Leiden.
- JOLY, A. B.
1950. Resultados científicos do cruzeiro do "Bæpendi" e do "Vega" à ilha da Trindade. Nota preliminar sobre algumas Algas. Bol. Inst. Paulista Ocean. 1,2 : 73-75.
- KÜTZING, F. T.
1845-1849. Tabulæ Phycologicæ oder Abbildungen der Tange. 20 vols. Nordhausen.
- LÜTZELBURG, P. VON
1922-1923. Estudo botânico do Nordeste. Inspetoria Fed. Obras Contra as Seccas. Publ. n.º 57 Ser. I, A 3 vols., Rio de Janeiro, Brasil. (Algae : 2 : 10-11 ; 3 : 229-231. ident. by O. C. Schmidt)
- MARTENS, G. VON
1870. Conspectus algarum Brasiliæ Hactenus detectarum. Vidensk. Medd. f. d. Naturh. Foren. i Kjöbenhavn 2 : 297-314.
- MARTIUS, K. F. P. VON, ESCHWEILER, F. G. & NEES VON ESENBECK, C. G.
1833. Flora Brasiliensis seu enumeratio plantarum in Brasilia . . . 1,1 : I-IV + 1-390. (Algae : 1-50) Svo. Stuttgart & Tübingen.
- OLIVEIRA, L. P. H. DE
1951. Nota prévia sobre a fauna e flora marinha bentônica da ilha da Trindade. Mem. Inst. Oswaldo Cruz 49 : 443-456.

- SCHMIDT, O. C.
1923. Beiträge zur Kenntnis der Gattung *Codium* Stackh. Bib. Bot. 91 : 1-68.
1924. Meeresalgen der Sammlung von Lützelburg aus Brasilien. Hedwigia 65 : 85-100.
- SVEDELIUS, N.
1924. On the Discontinuous Geographical Distribution of some Tropical and Sub-tropical Marine Algae. Arkiv f. Bot. 19,3 : 1-70.
- TAYLOR, WM. R.
1930. Algae collected by the Hassler, Albatross, and Schmitt Expeditions. I. Marine algae from Brazil. Amer. Jour. Bot. 17 : 627-634.
1931. A synopsis of the marine algae of Brazil. Rev. Algol. 5,3-4 : 279-313.
- WEBER VAN BOSSE, A.
1898. Monographie des Caulerpes. Ann. Jard. Bot. Buitenzorg 15,2 : 243-401. Pl. 20-34.
1904. Corallineæ veræ of the Malay Archipelago. Siboga-Expeditie. Monograph LXI of "Uitkomsten of Zoologisch, Botanisch, Oceanographisch en Geologisch Gebied verzameld in Nederlandsch Oost-Indie 1899-1900 aan boord H. M. Siboga onder commando van Luitenant ter zee 1.º kl. G. F. Tydeman uitgegeven door Max Weber". Leiden.
- WILLIAMS, L. G. & BLUMQUIST, H. L.
1947. A collection of marine algae from Brazil. Bull. Torrey Bot. Club 74 : 383-397.