AUSTRALIAN ANEMONES FINAL REPORT

accompanied by

ATTRIBUTION DATABASE OF AUSTRALIAN ANEMONES (on CD rom)

Prepared for the Department of Environment and Heritage, Heritage Division

by

Museum of Tropical Queensland (Queensland Museum)

21 May 2004

Compiled by
Dr. Jacqueline K. Wolstenholme and Dr. Carden C. Wallace

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EXECUTIVE SUMMARY

- This ***Final Report*** accompanies the ***"Attribution Database of Australian Anemones"*** on CD rom. The two works complete the project ***"Literature Review and Attribution of Australian Anemones"*** contracted to the Museum of Tropical Queensland. An Interim Report was submitted in February 2004.

- The report summarises findings from an investigation of specimen holdings of Australian anemones at seven major state museums in Australia. The findings are presented fully as line data in the accompanying attribution database for the Heritage section of the Department of Environment and Heritage.

- Sea anemones are marine animals related to corals and jellyfish. They occur in most habitats from intertidal to deep sea and have the potential to be used for recognition of Australian marine bio-regions. Their economic value includes biomedical potential, toxic properties, symbiotic relationships and the iconography of tropical coral reefs

- A *Checklist and Bibliography of Australian Anthozoa*, developed by Museum of Tropical Queensland for the Australian Biological Information Facility (ABIF), documented the published occurrence of 84 valid species of anemones from 19 families in Australian waters.

- Our Interim Report singled out 23 of those 84 species for priority documentation as part of the present contract. Dr J. Wolstenholme targeted these and all other identified specimens from Australian waters in visits to the seven museums.

- This report includes descriptive profiles of the 23 prioritised species, in a format adaptable to web-page presentation, including brief description and picture, notes on behaviour and ecology and published references.

- This report notes that specimens and accompanying data for the 23 prioritised Australian anemone species and 38 of the 84 known species are held within the museums visited.

- The report records that specimens and data for 26 additional species not formally recorded from Australian waters were located within the museums, bringing the tally of known Australian anemone species to 110. The list of Australian anemones is expanded to include this information.

- This report records that the Attribution Database includes 730 specimens with 427 specimens confidently identified to species and 4 tentatively identified to species, with the remainder dentified only to genus, family or class.

- This report also updates the following components of the Interim Report: background, species descriptions in web-page format, species list, classification and bibliography.

CONTENTS

1. Background

- In 2002 our laboratory (Museum of Tropical Queensland) developed a database of the species and classification of anemones recorded from Australia (see Attachment 1) as a component of a *Checklist and Bibliography of Australian Anthozoa*, compiled for The Australian Biological Resources Study (ABRS) and available online as a component of the Australian Biological Information Facility (ABIF).

- This database indicated that 84 valid species of anemones are known from 19 families: the strongest records are in the families Actiniidae and Stichodactylidae, which include common seashore anemones and the large and colourful tropical coral reef anemones that are hosts to anemone fish and other symbionts. While these two habitats are the most accessible and the anemones frequently recorded, there are numerous other habitats, depths and behaviour patterns represented by the other anemones on the list.

- On behalf of Department of Environment and Heritage (DEH), our laboratory was contracted to select a representative range of Australian anemone species from a variety of habitat categories and to collate data from museum collections around Australia on the distribution patterns of those species.

- The literature documenting Australian sea anemones (Phylum Cnidaria, Class Anthozoa; Order Actiniaria) ranges from formal scientific publications and theses to guidebooks and popular texts such as dive magazines.

- In preparation for this databasing exercise, we consulted the literature to develop a prioritised list of species from a variety of habitat types and distribution ranges. We then developed redescriptions of the selected species, which are presented in final form this report.

- This exercise has benefited substantially from access to the ***Hexacorals Database*** of the ***Census of Marine Life***, prepared by Dr Daphne Fautin, which we acknowledge.

- Additionally, we acknowledge the research scientists, curators and/or collection managers at the major Australian museums caring for natural history collections, for their support in facilitating access to the specimens and data in their care.

- Databasing of the specimen records followed the format available from each museum and is presented for DEH on a separate CD rom accompanying this report.

2. Species of anemone formally recorded from Australia

Table 1 Species formally recorded from Australia, with author name and date of publication
This list is based on the *Checklist and Bibliography of Australian Anthozoa* prepared for ABRS. [note: brackets around author and date indicate that some change to the name, usually through synonymy in the genus category, has occurred since the original description]

Actineria dendrophora Haddon & Shackleton, 1893
Actinia australiensis Carlgren, 1950
Actinia tenebrosa Farquhar, 1898
Actiniogeton spenceri (Haddon & Duerden, 1896)
Actinodendron alcyonoideum Quoy & Gaimard, 1833
Actinodendron glomeratum Haddon, 1898
Actinodendron plumosum Haddon, 1898
Actinothoe carlgreni (Haddon & Duerden, 1896)
Actinothoe glandulosa Carlgren, 1954
Actinothoe milmani (Haddon & Shackleton, 1893)
Actinothoe plebeia (Haddon, 1898)
Alicia rhadina Haddon & Shackleton, 1893
Anemonactis clavus (Quoy & Gaimard, 1833)
Anemonia sulcata Pennant, 1777
Anthopleura aureoradiata (Stuckey, 1909)
Anthopleura dixoniana (Haddon & Shackleton, 1893)
Anthopleura inconspicua (Hutton, 1878)
Anthopleura nigrescens (Verrill, 1928)
Anthothoe albocincta (Hutton, 1878)
Anthothoe australiae (Haddon & Duerden, 1896)
Anthothoe australiensis Carlgren, 1950
Anthothoe similis (Haddon & Duerden, 1896)
Aulactinia veratra (Drayton in Dana, 1846)
Boloceroides mcmurrichi (Kwietniewski, 1898)
Bunodactis maculosa Carlgren, 1954
Bunodactis rubrofusca Carlgren, 1924
Bunodeopsis australis Haddon, 1898
Calliactis marmorata Studer, 1879
Calliactis polypus (Forskål, 1775)
Charisella elongata Carlgren, 1949
Cricophorus nutrix (Stuckey, 1909)
Cryptodendrum adhaesivum Klunzinger, 1877
Dofleinia armata Wassilieff, 1908
Edwardsia vivipara Carlgren, 1950
Edwardsianthus gilbertensis Carlgren, 1931
Edwardsianthus pudica (Klunzinger, 1877)
Entacmaea quadricolor (Ruppell & Leuckart, 1828)
Epiactis australiensis Carlgren, 1950
Epiactis thompsoni Coughtrey, 1875
Epiphellia anneae Carlgren, 1950
Epiphellia browni (Wilsmore, 1911)
Epiphellia capitata (Wilsmore, 1911)
Epiphellia elongata Carlgren, 1950
Halianthella kerguelensis (Studer, 1879)
Heteractis aurora (Quoy & Gaimard, 1833)
Heteractis crispa (Hemprich & Ehrenberg in Ehrenberg, 1834)
Heteractis magnifica (Quoy & Gaimard, 1833)
Heteractis malu (Haddon & Shackleton, 1893)
Heteranthus verruculatus Klunzinger, 1877
Heterodactyla hemprichi Ehrenberg, 1834
Heterodactyla hypnoides Saville-Kent, 1893
Hormathianthus tuberculatus Carlgren, 1943
Isactinia carlgreni Lager, 1911
Isactinia olivacea Hutton, 1878
Isanemonia australis Carlgren, 1950
Isophellia stella Cutress, 1971
Macrodactyla aspera (Haddon & Shackleton, 1893)
Macrodactyla doreensis (Quoy & Gaimard, 1833)
Megalactis griffithsi Saville-Kent, 1893
Minyas torpedo Bell, 1886
Oulactis mcmurrichi (Lager, 1911)
Oulactis muscosa (Drayton in Dana, 1846)
Paraphellia hunti Haddon & Shackleton, 1893
Paraphellia lineata Haddon & Shackleton, 1893
Peachia hilli Wilsmore, 1911
Phlyctenactis tuberculosa (Quoy & Gaimard, 1833)
Phlyctenanthus australis Carlgren, 1949
Phymanthus muscosus Haddon & Shackleton, 1893
Sagartiomorphe carlgreni Kwietniewski, 1898
Sicyonis erythrocephala (Pax, 1922)
Stichodactyla duerdeni (Carlgren, 1900)
Stichodactyla gigantea (Forskål, 1775)
Stichodactyla haddoni (Saville-Kent, 1893)
Stichodactyla mertensii Brandt, 1835
Stichodactyla tapetum (Hemprich & Ehrenberg in Ehrenberg, 18
Stylobates loisetteae Fautin, 1987
Telactinia citrina (Haddon & Shackleton, 1893)
Telmatactis australiensis Carlgren, 1950
Telmatactis devisi (Haddon & Shackleton, 1893)
Telmatactis insignis Carlgren, 1950
Telmatactis sipunculoides (Haddon & Shackleton, 1893)
Telmatactis stephensoni Carlgren, 1950
Telmatactis vermiformis (Haddon, 1898)
Triactis producta Klunzinger, 1877

3. Prioritised species for detailed review

Twenty three species were chosen as priorities for the attribution database, based on the existence of more than one known record* and provision of a spread of distribution and habitat categories (Table 2). These are shown organised by geographic distribution, depth and habit in Table 3. (*We included two exceptions to this, based on indications that further records will be available).

Table 2 Species of Australian anemones given priority for the attribution database.

1. *Actinia tenebrosa*
2. *Actinothoe glandulosa*
3. *Anthothoe albocincta*
4. *Aulactinia veratra*
5. *Boloceroides mcmurrichi*
6. *Bunodactis maculosa*
7. *Cryptodendrum adhaesivum*
8. *Dofleinia armata*
9. *Edwardsia vivipara*
10. *Entacmaea quadricolor*
11. *Epiactis australiensis*
12. *Heteractis magnifica*
13. *Heterodactyla hemprichii*
14. *Isanemonia australis*
15. *Isophellia stella*
16. *Macrodactyla doreensis*
17. *Oulactis muscosa*
18. *Phlyctenactis tuberculosa*
19. *Phlyctenanthus australis*
20. *Sicyonis erythrocephala*
21. *Stichodactyla haddoni*
22. *Stylobates loisetteae*
23. *Triactis producta*

Table 3 Distribution classes of prioritised anemone species.

Zone	Distribution	Deep Sea	Subtidal	Intertidal	"Nektonic"
Tropical and Sub-Tropical	Australia only	*Stylobates loisetteae*			
	Broad		*Macrodactyla doreensis* *Triactis producta* *Heteractis magnifica* *Stichodactyla haddoni* *Cryptodendrum adhaesivum* *Entacmaea quadricolor* *Heterodactyla hemprichii*		*Boloceroides mcmurrichi*
Temperate	Australia only		*Edwardsia vivipara* *Bunodactis maculosa* * *Epiactis australiensis* *Isanemonia australis* *Actinothoe glandulosa* *	*Aulactinia veratra*	
	Broad	*Sicyonis erythrocephala*	*Phlyctenanthus australis* *Dofleinia armata*	*Actinia tenebrosa* *Oulactis muscosa* *Anthothoe albocincta*	*Phlyctenactis tuberculosa*

* indicates species known from only one record and/or locality

4. Revised list of species of Australian anemones

This table (Table 4) presents the revised list of species of Australian anemones, following inspection of collections in the Australian museums. The column labelled 'Priority Species' highlights the priority species examined in this report. The column labelled 'New/Unpublished Record' highlights species that were recorded from museum collections but are not reported in the literature as species occurring in Australia, and are therefore additional to the 84 records presented in the interim report. The column labelled 'Not in Museum Collections' highlights species that are recorded in the literature with an Australian distribution, but were not recorded from the museum collections.

Table 4

Species	Priority Species (+)	Non-priority Species present (+)/absent (A) Museum Collections	New/Unpublished Record
1. ***Actinauge granulata* Carlgren, 1928**			+
2. ***Actinauge verrilli* McMurrich, 1893**			+
3. *Actineria dendrophora* Haddon & Shackleton, 1893		A	
4. ***Actinernus elongatus* (Hertwig, 1882)**			+
5. *Actinia australiensis* Carlgren, 1950		A	
6. ***Actinia australis***			+
7. *Actinia tenebrosa* Farquhar, 1898	+		
8. *Actiniogeton spenceri* (Haddon & Duerden, 1896)		A	
9. *Actinodendron alcyonoideum* Quoy & Gaimard, 1833		A	
10. *Actinodendron glomeratum* Haddon, 1898		A	
11. *Actinodendron plumosum* Haddon, 1898		+	
12. *Actinothoe carlgreni* (Haddon & Duerden, 1896)		A	
13. *Actinothoe glandulosa* Carlgren, 1954	+		
14. *Actinothoe milmani* (Haddon & Shackleton, 1893)		A	
15. *Actinothoe plebeia* (Haddon, 1898)		A	
16. *Alicia rhadina* Haddon & Shackleton, 1893		A	
17. ***Amphianthus capensis* Carlgren, 1928**			+
18. *Anemonactis clavus* (Quoy & Gaimard, 1833)		A	
19. *Anemonia sulcata* Pennant, 1777		A	
20. *Anthopleura aureoradiata* (Stuckey, 1909)		A	
21. *Anthopleura dixoniana* (Haddon and Shackleton, 1893)		+	
22. ***Anthopleura handi* Dunn, 1978**			+
23. *Anthopleura inconspicua* (Hutton, 1878)		A	
24. *Anthopleura nigrescens* (Verrill, 1928)		A	
25. *Anthothoe albocincta* (Hutton, 1878)	+		
26. *Anthothoe australiae* (Haddon & Duerden, 1896)		A	
27. *Anthothoe australiensis* Carlgren, 1950		A	
28. *Anthothoe similis* (Haddon & Duerden, 1896)		A	
29. ***Artemidactis victrix* Stephenson, 1918**			+
30. ***Aulactinia sulcata* (Clubb, 1902)**			+
31. *Aulactinia veratra* (Drayton in Dana, 1846)	+		

32. *Boloceroides mcmurrichi* (Kwietniewski, 1898)	+		
33. *Bunodactis maculosa* Carlgren, 1954	+		
34. *Bunodactis rubrofusca* Carlgren, 1924		A	
35. *Bunodeopsis australis* Haddon, 1898		A	
36. *Calliactis algoaensis* Carlgren, 1938			+
37. *Calliactis marmorata* Studer, 1879		A	
38. *Calliactis parasitica* (Couch, 1844)			+
39. *Calliactis polypus* (Forskal, 1775)		+	
40. *Capnea georgiana* (Carlgren, 1927)			+
41. *Charisella elongata* Carlgren, 1949		A	
42. *Cricophorus nutrix* (Stuckey, 1909)		+	
43. *Crytodendrum adhaesivum* Klunzinger, 1877	+		
44. *Dofleinia armata* Wassilieff, 1908	+		
45. *Edwardsia meridionalis* Williams, 1981			+
46. *Edwardsia vivipara* Carlgren, 1950	+		
47. *Edwardsianthus gilbertensis* Carlgren, 1931		A	
48. *Edwardsianthus pudica* (Klunzinger, 1877)		A	
49. *Entacmaea quadricolor* (Ruppell and Leuckart, 1828)	+		
50. *Epiactis adeliana* Carlgren and Stephenson, 1929			+
51. *Epiactis australiensis* Carlgren, 1950	+		
52. *Epiactis georgiana* Carlgren, 1927			+
53. *Epiactis thompsoni* (Coughtrey, 1875)		+	
54. *Epiphellia anneae* Carlgren, 1950		A	
55. *Epiphellia browni* (Wilsmore, 1911)		A	
56. *Epiphellia capitata* (Wilsmore, 1911)		A	
57. *Epiphellia elongata* Carlgren, 1950		A	
58. *Glyphoperidium bursa* Roule, 1909			+
59. *Gyractis excavata* Boveri, 1893			+
60. *Halianthella kerguelensis* (Studer, 1879)		+	
61. *Heteractis aurora* (Quoy and Gaimard, 1833)		+	
62. *Heteractis crispa* (Hemprich and Ehrenberg in Ehrenberg, 1834)		+	
63. *Heteractis magnifica* (Quoy and Gaimard, 1833)	+		
64. *Heteractis malu* (Haddon and Shackleton, 1893)		+	
65. *Heteranthus verruculatus* Klunzinger, 1877		A	
66. *Heterodactyla hemprichii* Ehrenberg, 1834	+		
67. *Heterodactyla hypnoides* Saville-Kent, 1893		A	
68. *Hormathia lacunifera* (Stephenson, 1918)			+
69. *Hormathianthus tuberculatus* Carlgren, 1943		A	
70. *Hormosoma scotti* Stephenson, 1918			+
71. *Isactinia carlgreni* Lager, 1911		A	
72. *Isactinia olivacea* (Hutton, 1878)		+	
73. Isanemonia australis Carlgren, 1950	+		
74. *Isophellia stella* Cutress, 1971	+		
75. *Macrodactyla aspera* (Haddon & Shackleton, 1893)		A	
76. *Macrodactyla doreensis* (Quoy and Gaimard, 1833)	+		
77. *Macrodactyla stephensoni*			+
78. *Megalactis griffithsi* Saville-Kent, 1893		A	
79. *Minyas torpedo* Bell, 1886		A	

80. *Oulactis mcmurrichi* (Lager, 1911)		A	
81. *Oulactis muscosa* (Drayton in Dana, 1846)	+		
82. ***Paractis papaver* (Drayton in Dana, 1846)**			+
83. ***Parantheopsis cruentata* (Couthouy in Dana, 1846)**			+
84. *Paraphellia hunti* Haddon & Shackleton, 1893		A	
85. *Paraphellia lineata* Haddon & Shackleton, 1893		A	
86. *Peachia hilli* Wilsmore, 1911		+	
87. *Phlyctenactis tuberculosa* (Quoy and Gaimard, 1833)	+		
88. *Phlyctenactis australis* Carlgren, 1949	+		
89. *Phymanthus muscosus* Haddon & Shackleton, 1893		A	
90. ***Rhodactis bryoides* Haddon and Shackleton, 1893**			+
91. ***Saccactis mcmurrichi* Lager, 1911**			+
92. *Sagartiomorphe carlgreni* Kwietniewski, 1898		A	
93. *Sicyonis erythrocephala* (Pax, 1922)	+		
94. *Stichodactyla duerdeni* (Carlgren, 1900)		A	
95. *Stichodactyla gigantea* (Forskal, 1775)		+	
96. *Stichodactyla haddoni* (Saville-Kent, 1893)	+		
97. *Stichodactyla mertensii* Brandt, 1835		+	
98. *Stichodactyla tapetum* (Hemprich and Ehrenberg in Ehrenberg, 1834)		+	
99. ***Stomphia selaginella* (Stephenson, 1918)**			+
100. *Stylobates loisetteae* Fautin, 1987	+		
101. *Telactinia citrina* (Haddon & Shackleton, 1893)		A	
102. *Telmatactis australiensis* Carlgren, 1950		+	
103. *Telmatactis devisi* (Haddon & Shackleton, 1893)		A	
104. *Telmatactis insignis* Carlgren, 1950		A	
105. *Telmatactis sipunculoides* (Haddon & Shackleton, 1893)		A	
106. *Telmatactis stephensoni* Carlgren, 1950		A	
107. *Telmatactis vermiformis* (Haddon, 1898)		A	
108. *Triactis producta* Klunzinger, 1877	+		
109. ***Urticina felina* (Linnaeus, 1761)**			+
110. ***Urticinopsis crassa* Carlgren, 1938**			+

5. Explanation of headings and terms used in attribution database

This database lists all specimens of anemones in the museum collections which were identified below the level of Order Actiniaria (i.e. anemone) and were collected from Australia or an Australian Territory/Region. All information that was available, either on the museum database or on specimen labels, is given for each anemone listed. Blank cells indicate that no information was available for that anemone species for that field.

Additional information, which was not provided on the museum databases or specimen labels, is taken from "Hexacorallians of the World: Sea anemones, corals and their allies" website which is referred to as the "Hexacoral" website in the table and in the following explanatory notes of the database. The address for the Hexacoral website is http://hercules.kgs.ku.edu/hexacoral/anemone2/index.cfm. Question marks ('?') are only used in the attribution database if they were used on the museum databases or museum labels.

Column	Comment
Family	This column is used for primary sort of entire table.
Valid species name	• This column is used for secondary sort of entire table • This column gives the name and authority currently used for the anemone listed – updated from the next two columns (i.e. Genus and Species) where necessary based on information provided on the Hexacoral website.
Genus	This is the name of the genus listed on the museum database or specimen label for this anemone.
Species	This is the species epithet listed on the museum database or specimen label for this anemone.
Authority	This is the authority for the species listed in the previous column (Species), and is based on information provided on the Hexacoral website.
Museum	This column indicates the museum which housed each anemone listed. Abbreviations are as follows MTQ: Museum of Tropical Queensland, Townsville; QM: Queensland Museum, Brisbane; AM: Australian Museum, Sydney; MV: Museum Victoria, Melbourne; SAM: South Australian Museum, Adelaide; WAM: Western Australian Museum, Perth; MAGNT: Museum and Art Gallery of the Northern Territory, Darwin.
Registration No.	This column gives the registration number of the anemone specimen in the relevant museum collections.
Type	This column indicates if the anemone is a type specimen, and the kind of type if this information was available.
Locality 1	This column lists the broad region in which the anemone was collected i.e. Australia, Antarctica, Indian Ocean, Norfolk Island, Tasman Sea.
Locality 2	This column lists the next regional level in which the anemone was collected e.g. Australian State, Coral Sea. A blank cell indicates that no further locality information was available for this anemone.
Locality 3-5	This column lists the next regional level in which the anemone was collected. A blank cell indicates that no further locality information was available for this anemone.
Latitude and Longitude	This column lists the latitude and longitude co-ordinates, when provided on the museum databases or specimen labels. Co-

	ordinates for specimens collected by trawling techniques are usually listed as a range i.e. 'from' and 'to'. Co-ordinates are listed in one of two formats: • Most co-ordinates are listed with degrees as whole numbers and minutes with a decimal fraction, when available. Direction (south or east) are also listed with co-ordinates in this format. • Some co-ordinates are listed with the latitude and the longitude each as a single positive or negative number. Direction is not listed with co-ordinates in this format.
Day, Month and Year of Collection	These columns indicate the day, month and year the anemone was collected. Blank cells indicate that information was not available on museum database or specimen label.
Depth	Depths are given in metres, unless otherwise indicated. Depths for specimens collected by trawling techniques are often given as the range over which the trawl was done.
Substrate/Habitat	All available information describing the substrate and/or habitat on which the anemone was attached is listed in this column.
Collectors	Collectors for each anemone are listed in this column.
Identification by	This column lists the person who identified the anemone as listed in the columns labelled as Genus and/or Species (or Family if no further identification is listed). This column is important for assessing the level of confidence that may be attributed to the identification. In particular, identification of specimens by D. Fautin (Dunn) and other authors in the reference list are considered to be most reliable.
Identification Date	This column indicates the dates that specimens were identified.
No. Specimens	This column indicates the number of specimens in the jar. Due to short visits that I had at each museum, this column is incomplete.
Photo Index	This column indicates whether the museum holds a photo of the anemone, and whether the photo is linked to the specimen record.
Photographed by J. Wolstenholme	This column indicates the specimens that I photographed, during my visit to each museum. Copies of these photos were given to the host museum and are provided on a CD with the final report for this project.
Colour &/or appearance	This column lists details about the colour or other features describing the appearance of the anemone.
Collection method	This column lists information, when available, about methods used in the collection of the specimen.
Specimen No.	This column lists a code unique to each specimen, used to sort specimens prior to being registered (and given a unique registration number).
Station Code	This column lists codes used to identify the location at which the anemone was collected.
Site Visit ID and Region ID	This column lists further information about the site and region in which it was sampled, for specimens from the Museum of Tropical Queensland and the Queensland Museum.
JW Comment	This column comprises notes that I made while examining the anemones and completing the database. Asterisks (*) highlight a relevant note in this column.
Extra information on database/label	This column includes information that was not relevant to any other headings in this table.

Reference	This column notes published references which refer to the corresponding anemones.

6. Descriptions of prioritised species

Descriptions of the 23 prioritised species follow, in a format adaptable to web-page presentation. Please note the illustrations accompanying these descriptions are for the purpose of this report only as copyright permission has not been sought. Sources and photographers are acknowledged. New photographs will be obtained for subsequent descriptions of these species.

Family: Edwardsiidae Andres, 1881

Genus: Edwardsia *de Quatrefages, 1842*

Edwardsia vivipara Carlgren, 1950

Burrowing Anemone
This is the only true burrowing sea anemone recorded in Australia. This species and others in this genus have a bulb-like structure at the base of the column called a physa which aids in burrowing and is used to anchor the anemone in soft substrates. Anemones of this genus are found on sandy or muddy shores of low energy locations with only the tentacles showing as a star on the sediment surface. No common names are known for this species. Other species in this genus are known as kinds of "burrowing anemones".

Photo Source: N. Holmes, Plate 17.5 in Shepherd and Thomas1982

Synonymy
Edwardsia vivipara Carlgren, 1950

Type Location
Edwardsia vivipara: Outer Harbour near Port Adelaide, South Australia

Museums Holding Type Material
Edwardsia vivipara: Syntypes: Museum of Zoology, Lund University

Summary of Species Description
This and other species of the family Edwardsiidae show greater differentiation in the body of the anemone compared with species of other families. These regions of the column are differentiated into the capitulum (a thin-walled region at the base of the tentacles) and the scapus (a thick-walled region which comprises most of the column). The upper region of the scapus is differentiated into the scapulus, while the base of the column comprises a bulbous burrowing structure called the physa. In *E. vivipara*, the physa is well developed. Nemathybomes, nematocyst laden spheroidal invaginations in the mesogloea, which only occur in the genera *Edwardsia* and *Isoedwardsia*, are scattered over the scapus. There are about 12 tentacles.

The retractor muscles of the microcnemes are diffuse and the outer lamellar part of the mesentery is attached to the retractor near its outer edge. The parietal muscles are triangular in outline in the uppermost part of the cnidoglandular tract and extend longitudinally down the column. Cnidom are basitrichs and microbasic *p*-mastigophores, while holotrichs and rarely spirocysts are recorded from the embryos but not adults of this species. There are no traces of nemathybomes in the embryos.

Recorded length of introverted individuals is up to 6 cm in length and 0.4 cm diameter. The colour of the scapus of specimens preserved in formalin is ochre. The endoderm is provided with numerous zooxanthellae.

Remarks
This species is viviparous, with specimens examined by Carlgren (1950) containing egg-shaped and more cylindrical embryos at various stages of development.

Habitat
Intertidal zone in sand flats.

Known Distribution
Outer Harbour near Port Adelaide, Gulf St Vincent, South Australia.

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Family: Actiniidae Rafinesque, 1815

Genus: Stylobates *Dall, 1903*

***Stylobates loisetteae* Fautin, 1987**

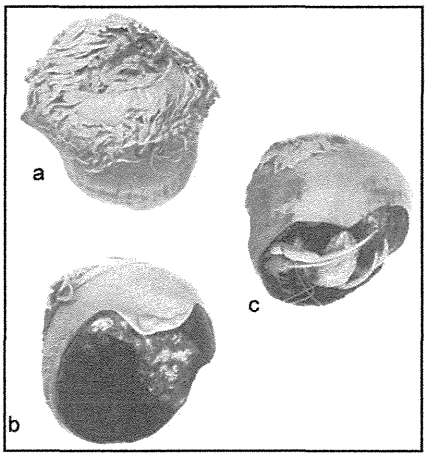

Image Source: Figs 1 and 2 in Fautin, 1987

Shell-Forming Anemone
This is a deep sea species which forms a life long symbiotic relationship with a species of hermit crab. This curious relationship is possible because of the anemone's ability to secrete a chitonous shell, so that the anemone grows with the crab, unlike the more familiar shallow-water hermit crabs which must find new shells as they continue to grow. The ability of the anemone to secrete the chitonous shell is probably fundamental to the crab's survival, as well as an important factor in enabling the crabs to grow to a large size because shells (particularly large shells) are rare in deep sea habitats. The paucity of shells may be because large molluscs are rare in deeper habitats but perhaps more imortantly because calcium carbonate dissoves more easily with depth. It is likely that the anemone's survival is also dependent on its relationship with the crab. The name* Stylobates *is roughly translated as "a walker on stilts". No common names are known to have previously been used for any species of this genus.

Synonymy
Stylobates loisetteae Fautin, 1987

Type Location
Stylobates loisetteae: NW of Port Hedland, Western Australia, Australia

Museums Holding Type Material
Stylobates loisetteae: Holotype: Western Australian Museum
Stylobates loisetteae: Paratypes: Australian Museum; California Academy of Sciences; Western Australian Museum

Summary of Species Description
The appearance of this species is greatly influenced by the carcinoecium. Carcinoecium is a term coined by Carlgren (1928a and b in Dunn et al 1980) to describe the shell secreted by the pedal disc of the anemone, over the apical gastropod shell to which the associated crab is originally attached. It can vary from a thin coating over a gastropod shell to a massive trochoid structure. The base of the anemone is completely adherent to the carcinoecium, covering the entire shell except for a small area at the beginning of the last whorl.

The column is smooth. Tentacles are exposed on the oral disc, around a central mouth that is typically agape in the preserved specimens. Marginal tentacles are thin and pointed. The longest tentacles are up to 20mm, becoming progressively shorter marginally. Number of tentacles range from 160 to 200 in a medium to large specimens.

Ectodermal musculature is longitudinal in tentacles and radial in the oral disc. Mesenteries are thin, with at least the first two cycles complete and five or six cycles present in average sized individuals. Retractor muscles are moderately well developed and diffuse. Parietobasilar muscles are poorly developed. Mesenteries of the two highest orders are gametogenic. Sexes are presumed separate because only females have been recorded. The actinopharynx has shallow ribs, with two symmetrical siphonoglyphs. Cnidom are spirocysts, basitrichs, and microbasic *p*-mastigophores.

The largest recorded diameter of an individual anemone of this species is 75mm. The column ranges is colourless to pink or yellow in colour.

Remarks
Each of the two previously described species of this genus is associated with a different species of *Parapagurus*. It is presumed therefore that the crab associated with *Stylobates loisetteae* is a third and undescribed species of *Parapagurus*. The two other species of *Stylobates* have been recorded from single locations, one species in Hawaii and the other in Tanzania.

Habitat
Deep water habitats from 300-500m with muddy, soft-sediment bottoms.

Known Distribution
North-west shelf of Western Australia.

References
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Family: Actiniidae Rafinesque, 1815

Genus: Actinia *Linnaeus, 1758*

Actinia tenebrosa Farquhar, 1898

Waratah Anemone; Cherry Anemone
This is the most conspicuous anemone on the temperate Australian coast, being dark red in colour and relatively common on intertidal rocky shores. The waratah anemone is often found found in aggregations because this species reproduces by brooding larvae and releasing fully developed young which often settle close to the parent anemone.

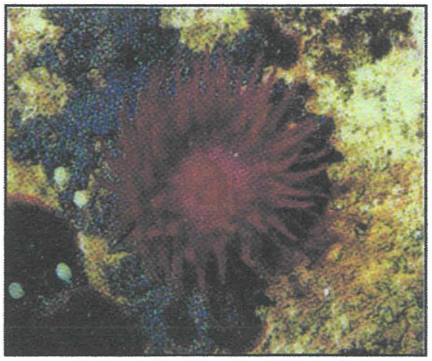

Image Source: p. 126 in Edgar, 1997

Synonymy
Actinia tenebrosa Farquhar, 1898

Type Location
Actinia tenebrosa: Neighbourhood of Wellington, New Zealand

Museums Holding Type Material
Actinia tenebrosa: Syntypes: Canterbury Museum

Summary of Species Description
The pedal disc adheres strongly to the substrate and is wider than the column. The column is smooth. The ectoderm of the pedal disc and column are similar, with the appearance of the mesogloea being more fibrous in the column. The mouth is set on a prominent peristome. The oral disc and the tentacles can be completely covered when the anemone is contracted. The tentacles are a blunt conical shape and separated from the column by a deep fosse, rising to a well developed collar under the bases of the outer tentacles. Marginal spherules (24) are developed on this collar. The tentacles are arranged in three cycles, crowded around the outer edge of the oral disc and numerous (150-200 or more).

The ectodermal muscles are strong, with the processes of the mesogloea on which they are borne being long and straight with no or only slight branching. The mesogloea is about one-third as thick as the ectoderm, while the endoderm is very thick, almost filling the cavity. The endodermal musculature is only very slightly developed. There are two pairs of directive mesenteries. The normal number of mesenteries appears to be 48 pairs arranged in three cycles although the number of mesenteries is variable due to larger specimens having a weakly developed fourth cycle. Musculature on all mesenteries is very weak. This species has separate sexes and is asexually viviparous. Young specimens with up to two cycles of tentacles may be found in the coelenteron. Gonads are best developed on the weaker mesenteries, but are present on all but the directive mesenteries. The stomadaeum is not commonly everted, is strongly folder and has two siphonoglyphs. Cnidom are basitrichs, atrichs, micro *p*-mastigophors and spirocysts.

The maximum recorded dimensions of this species are height of the column 30-40 mm, diameter of the disc 40 mm and length of the tentacles 15 mm. The colour of the column is reddish-brown varying to brownish-black. The marginal spherules are white or blue and seem to be generally hidden within the fosse. The tentacles and oral disc are a deep pink or red.

Remarks
Although this species is probably the best-known and most widespread of the Australian anemones, it is surprisingly poorly represented in Australian museum collections. This species is also probably the most extensively studies species of Australian anemones, particularly with respect to reproductive biology and dispersal and connectivity within and between populations (see listed references). Local populations of this species have been shown to be maintained by predominantly asexually generated recruitment, while widely dispersed larvae may be an important source of initial colonists. Although levels of gene flow among established local populations are low, clear division into northern and southern groups, consistent with the predicted offshore movement of the eastern Australian current close to the border between Victoria and New South Wales are evident. This species has also been reported to be an opportunistic predator, found to feed on moths and foraminifera when these prey were temporarily abundant after being trapped in intertidal rock pools (Ayre 1984)

Habitat
Usually abundant on rocks, under ledges or other shaded positions and sometimes in open pools, occurs in the higher intertidal zone usually from about 0.5m above the low tide level.

Known Distribution
Along the Australian coastline and offshore islands south of the Tropic of Capricorn and around most of New Zealand and offshore islands

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Family: Actiniidae Rafinesque, 1815

Genus: Bunodactis *Verrill, 1899*

Bunodactis maculosa Carlgren, 1954

Spotted Anemone
Available information is limited to the original description of this species. The name spotted anemone is a direct translation of the latin meaning of maculosa, although no information is available for the colour or other details of the appearance of this species when alive. No common names are known to have been previously used for this species.

Synonymy
Bunodactis maculosa Carlgren, 1954

Type Location
Bunodactis maculosa: Mangles Bay, Cape Peron, Western Australia, Australia

Museums Holding Type Material
Bunodactis maculosa: Syntypes: Western Australian Museum

Summary of Species Description
The pedal disc is broad and larger in diameter than the oral disc. The body wall is mostly smooth, with verrucae present at the upper part of the column. The fosse is fairly deep and circumscribed by the sphincter. Tentacles are short, with the inner tentacles longer than the outer tentacles. Length of inner tentacles is 4mm. There are approximately 50 tentacles.

The retractor muscles are well developed and have branched folds. The parietobasilar muscles form a distinct fold on the mesenteries. The number of mesenteries at the base of the anemone is the same as the number of tentacles. Twelve pairs of mesenteries are perfect, of which two pairs are directives. The mesenteries of the third cycle are short and lack distinct retractors and filaments. The mesenteries of the two first cycles are fertile, and individuals are hermaphroditic. The actinopharynx is folded and there are two distinct siphonoglyphs. The cnidom are basitrichs, microbasic *p*-mastigophores and *p*-mastigophores.

The greatest dimensions of the largest specimen are 11mm in diameter and 7mm in height.

Remarks
This species was tentatively assigned to the genus *Bunodactis* when originally described (Carlgren 1954) and this designation has since been confirmed by Fautin (2003). The genus *Bunodactis* has a complex history. There are 74 species listed within this genus (Fautin 2003). Of these species only 11 (including *B. maculosa*) are thought to be valid species while the taxonomic status of 18 species are unresolved. The remaining species have been reclassified within one of 9 other genera (Fautin 2003).

Habitat
Found under stones, no further habitat records recorded for this species.

Known Distribution
Cape Peron, Western Australia

Reference
Carlgren O (1954) Actiniaria and Zoantharia from South and West Australia with comments upon some Actiniaria from New Zealand. Arkiv för Zoologi 6: 571-595.
England KW (1987) Certain Actiniaria (Cnidaria, Anthozoa) from the Red Sea and tropical Indo-Pacific Ocean. Bulletin of the British Museum Natural History (Zoology) 53: 205-292.
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Griffith JK, Fromont J (1998) A catalogue of recent Cnidaria type specimens in the Western Australian Museum of Natural Science, Perth. Records of the Western Australian Museum 19: 223-239.

Family: Actiniidae Rafinesque, 1815

Genus: Aulactinia *Verrill, 1864*

Aulactinia veratra (Drayton in Dana, 1846)

Green Snakelocks Anemone; Long-Tentacled Anemone
***This anemone ranges in colour from brilliant green to dark bottle green and has smooth tentacles, about 4 cm in length. This anemone tends to be found in dense aggregations, in water filled crevices or rock pools near the low-tide level. It is frequently found all round the temperate Australian coasts, often co-occurring in rock pools with* Oulactis muscosa.**

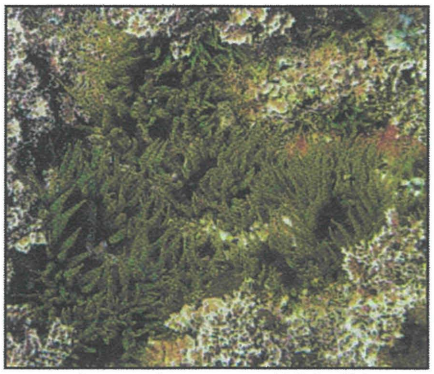

Image Source: p. 127 in Edgar, 1997

Synonymy
Actinia veratra Drayton in Dana, 1846
Cribrina verruculata Lager, 1911

Type Location
Actinia veratra: Wollongong, New South Wales, Australia
Cribrina verruculata: Freemantle and Rottnest Island, Western Australia, Australia

Museums Holding Type Material
Actinia veratra: Holotype: United States National Museum (Smithsonian Institution)? (to be confirmed)
Cribrina verruculata: Syntypes: Museum für Naturkunde der Humboldt Universität

Summary of Species Description
The pedal disc is circular, broad, well developed and approximately equal to that of the column in diameter. Adhesive areas run in longitudinal rows down the entire length of the column. These areas have verrucae as well as other suckers. There are no spherules or pseudospherules at the margin. There is a strong endodermal sphincter muscle, circumscribed to circumscribed-diffuse, generally palmate, on the marginal side of a distinct fosse. The oral disc is flat with a central mouth. Tentacles are restricted to the marginal half of the oral disc and are conical, blunt-tipped and regularly arranged. Central tentacles are erect and marginal tentacles droop over the edge. Tentacles are fairly short (5-12 mm in preserved specimens) and of similar length within an individual. Tentacles are relatively numerous, with the maximum recorded number being 152.

The longitudinal muscles are ectodermal. Retractor muscles are diffuse and parietobasilar muscles are wide with a short free flap. There is a maximum of five mesenterial cycles, with the first three cycles being complete and the remaining two cycles being rudimentary and confined to the proximal end. There are two pairs of directives. The stronger mesenteries other than the directives are fertile. Sexes are presumed separate, because only individuals containing female gonads have been recorded. The actinopharynx is ribbed, rose coloured in one specimen and cream in

others. The directive mesenteries are attached to two distinct, symmetrical siphonoglyphs. The cnidom are spirocysts, basitrichs, microbasic p-mastigophores and holotrichs.

The pedal disc is up to 35 mm diameter and the height of the column is 8-15 mm is to 20 mm. Individuals are typically green, less commonly brown or reddish brown in color, with the adhesive areas being lighter coloured stripes. The tentacles are the same colour as the rest of the anemone. There are no zooxanthellae.

Remarks
This species was originally assigned to the genus *Actinia* when described by Drayton in Dana (1846) but has commonly been referred to as *Cnidopus verater* since being reassigned by Carlgren (1950 a, b). Carlgren inexplicably changed the species name to *verater* in these publications but Ottaway (1975) and Edmands and Fautin (1991) resolve that the original name should not be superceded. In a review of the taxonomic and nomenclatural status of this species, Edmands and Fautin (1991) also demonstrate that the appropriate generic placement of this species is in the genus *Aulactinia*. The corrected name for this species is therefore *Aulactinia veratra*.

Note that the Family classification of this species of Actiniidae is tentative. No family level classification is given on the Hexacoral databse or in Edmands and Fautin (1991). The family classification is therefore tentatively assigned, on the basis of that by Ottaway (1975) for *Cnidopus veratra*.

Aulactinia veratra may be confused with *Isactinia olivacea* and possibly *Isanemonia australis*. The two latter species have smooth columns, with *I. olivacea* also having adhesive verrucae in longitudinal rows.

Habitat
Found in the intertidal zone. May be locally abundant on rocky shores, often co-occurring with *Oulactis muscosa*. It occurs in areas of moderate wave energy, particularly in rock pools, crevices and the undersides of ledges.

Known Distribution
Temperate Australian coast and north and south islands of New Zealand.

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Family: Actiniidae Rafinesque, 1815

Genus: Epiactis *Verrill, 1869*

Epiactis australiensis Carlgren, 1950

Brooding Anemone
This species is very similar to and may not be distinct from another species of this genus,* Epiactis thompsoni*. The only major difference between these species is the presence of blister-like stinging vesicles between and at the base of the tentacles in* E. australiensis *and the apparent absence of these structures in* E. thompsoni*. No common names are known to have been previously used for this species. Other species of this genus are usually called brooding anemones. This species is also likely to be a brooding anemone, although its means of reproduction is not known.

Synonymy
Epiactis australiensis Carlgren, 1950

Type Location
Epiactis australiensis: Marine Rocks, South Australia, Australia

Museums Holding Type Material
Epiactis australiensis: Syntypes: Museum of Zoology, Lund University

Summary of Species Description
The pedal disc is well developed, the body is cylindrical and the column is smooth. At the outer margin of the oral disc there is a row of small pseudospherules, with pores which communicate with all exocoels and endocoels. Pseudospherules are small vesicles between the outer tentacles which contain few or no stinging cells. The pores of the pseudospherules are formed by invaginations of the ectoderm. The fosse is extraordinarily deep. The sphincter circumscribes and is situated near the middle of the fosse. The tentacles are conical. In a preserved specimen measured by Carlgren (1950) in which the tentacles were contracted, inner tentacles were 6mm long. There were about 60 tentacles in the largest specimens examined by Carlgren (1950).

The longitudinal muscles of the tentacles are ectodermal. The retractor muscles form a thick band in the middle of the mesenteries. The parietobasilar muscles are strong and show a distinct fold on the mesenteries. There are two pairs of directives and almost all mesenteries are perfect. The number of mesenteries at the base is 66 in the largest specimen examined by Carlgren (1950). The largest specimen examined by Carlgren was sterile. There are two well developed siphonoglyphs. The cnidom are basitrichs and microbasic *p*-mastigophores.

The recorded size of the largest preserved specimen is 22mm diameter and 32mm in height (Carlgren 1954). Colour of live individuals is brown red, bright red or dark green or pale pink.

Remarks
Further research is necessary to confirm the status of this species. In the original description of this species, Coughtrey (1875) notes that *Epiactis australiensis* may

actually belong to *E. thompsoni*, a previously described species of this genus, tentatively designating *E. australiensis* as a new species pending further work. Both species have been recorded from southern Australian locations, while *E. thomsoni* is also recorded from New Zealand. The primary difference between these species is the presence of pseudospherules in *E. australiensis* and the apparent absence of these structures in *E. thomsoni*.

Habitat
Found on or under rocks from the intertidal zone to a depth of 30m on sandy bottoms.

Known Distribution
Eyre Peninsula in South Australia to Victoria and northern Tasmania.

References
Carlgren O (1950) Actinaria and Zoantharia from South Australia. Kungl. Fysiografiska Sallskapets I Lund 20: 121-135.
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Family: Actiniidae Rafinesque, 1815

Genus: Isanemonia *Carlgren, 1950*

Isanemonia australis Carlgren, 1950

Image Source: p. 302 in Erhardt and Baensch,2000

Australian wax anemone
This is the only species described for this genus. The genus is named for its affinities with the large genus* Anemonia*, with the primary difference between the two genera being the number of mesenteries relative to the number of tentacles and marginal spherules (specialised vesicles around the outer edge of the anemone which often contain stinging cells). The relative proportion of these structures in* Isanemonia *are similar, while species of* Anemonia *have considerably more mesenteries than tentacles and marginal spherules. Further research is also necessary to resolve possible affinities between* Isanemonia *and the genera* Isactinia *and* Aulactinia*. No common names are known to have previously been used for this species.

Synonymy
Isanemonia australis Carlgren, 1950

Type Location
Isanemonia australis: Port Willunga, South Australia, Australia

Museums Holding Type Material
Isanemonia australis: Syntypes: Museum of Zoology, Lund University

Summary of Species Description
The pedal disc is broad and well developed. The body is cylindrical and the column is smooth. There is a row of small perforated pseudospherules at the margin. The margin is distinct and both the upper and lower margins have slight vertical ridges. The fosse is broad and the sphincter is very elongated and diffuse. The tentacles are conical, long and recorded counts for an individual range from 96 to 116.

The retractor muscles are band like, the parietobasilar muscles are very strong and form a distinct fold on the mesenteries. At least 24 pairs of mesenteries are perfect, and all or almost all are fertile. The number of mesenteries at the base of the body is about the same as the number of tentacles, although there were never more tentacles than mesenteries in the specimens examined by Carlgren (1950, 1954). The number of mesenteries ranged from 98 to 130. There are two pairs of directives and two well developed siphonoglyphs. The cnidom are spirocysts, atrichs, basitrichs and microbasic *p*-mastigophors.

The pedal disc is up to about 5 cm in diameter in live animals. The colour of the column is dark green, brown or red and tentacles are light green or pink with a few faint, white markings.

Remarks
In New Zealand, anemones of this species from deep rock pools may have been incorrectly identified as *Isactinia olivacea* (Parry 1951). *Isanemonia australis* may also have been confused with *Aulactinia veratra* (Edmands and Fautin 1991; Ottaway 1975)

Habitat
This species occurs in the lower intertidal region and subtidally to a depth of about 10m in protected places, such as crevices and on the underside of rocks.

Known Distribution
Several locations in south-west Western Australia and Gulf of St Vincent and Eyre Peninsual, South Australia

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Family: Actiniidae Rafinesque, 1815

Genus: Macrodactyla *Haddon, 1898*

Macrodactyla doreensis (Quoy & Gaimard, 1833)

Image Source: p. 243 in Fosså and Nilsen, 1998

Corkscrew Tentacle Sea Anemone
The tentacles are a distinctive feature of this species, being long, sinuous and relatively few in number. They are evenly tapered to a point, sometimes assuming a corkscrew shape. This species sometimes becomes the symbiotic partner for anemone fishes, although it is in a different family to the other host anemone species. This genus contains only the one species and has the most restricted distribution of any host anemone, occurring in a narrow longitudinal band from southern Japan to Papua New Guinea and the Great Barrier Reef. Many other names are also known for this species, including long tentacle anemone, corkscrew anemone, sebae anemone, sand anemone, red base anemone, long tentacle red based anemone, purple anemone, purple long tentacle anemone.

Synonymy
Actinia doreensis deBlainville, 1830
Condylactis gelam Haddon & Shackleton, 1893

Type Location
Actinia doreensis: Manokwari, Irian Jaya, Indonesia (as Port Dorey, New Guinea)
Condylactis gelam: Torres Strait

Museums Holding Type Material
Actinia doreensis: There is no type specimen of this species in Quoy and Gaimard's collection at the Muséum National d'Histoire Naturelle (Fautin 1981).
Condylactis gelam: Syntypes: Museum of Zoology, Lund University

Summary of Species Description
The base is circular in outline and adheres to the substrate. The column is typically equal to or slightly greater than the basal diameter and smaller than the oral disc. The lower portion of the column is of uniform diameter and about equal to the pedal disc. The upper portion of the column is broadly flared in large specimens and only somewhat expanded in small specimens. Non-adherent verrucae are present in longitudinal rows down the length of the column, are round to ovoid in shape and are largest at the centre of the column where they are up to 5mm diameter. The oral disc is widely flared. Tentacles are relatively few in number but very long (to 175mm), sinuous and evenly tapered to a point. The tentacles may shrivel when disturbed, are adhesive and may adhere to a person's hand and break from the anemone.

The base ranges in diameter from 5-10 cm diameter. The oral disc is up to 50 cm diameter but is usually smaller and typically 10-20 cm diameter. The base is the

same colour as the lower column, which is dull orange to brilliant red. The central transitional part of the column is typically creamy green and the upper portion of the column, the oral disc and the tentacles are grey-brown or brownish-violet with white verrucae in longitudinal rows down the walls of the column. These rows may also extend onto the oral disc and tentacles as radial white lines. This species is zooxanthellate.

Remarks
The host anemone fish *Amphiprion chrysogaster*, *A. clarkii*. *A. perioderaion* and *A. polymnus* may be found in *M. doreensis*, although this species is commonly seen without fish. Experiments demonstrate that *M. doreensis* can serve as an alternative host for the saddled cleaner shrimp, *Periclimenes holthuisi*, which is usually found on living on *Stichodactyla haddoni*.

Habitat
Lives in mud, sand or gravel substrates, in pockets on coral platforms or in sediment bordering coral reefs. Generally to depths no deeper than five metres, but is reported from depths to 15 metres. Individuals lie at the surface of the sediment with the column buried in the sediment and can retract completely into the sediment.

Known Distribution
Central Indo-Pacific in a narrow north-south band, from Japan south to the Philippines, Papua New Guinea, the Great Barrier Reef and Moreton Bay

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Family: Actiniidae Rafinesque, 1815

Genus: Oulactis *Milne-Edwards & Haime, 1851*

Oulactis muscosa (Drayton in Dana, 1846)

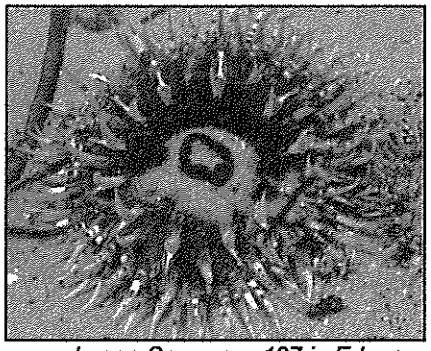

Image Source: p. 127 in Edgar, 1997

Speckled Anemone
This species can be recognised by its colouration and especially by its habit of collecting and attaching bits of gravel or shell or coarse sand to and between its tentacles. This unusual habit can obscure the distinctive speckled colouration of this species. Alternating between the outer tentacles are a series of short, fringed marginal spherules that are usually obscured by sand grains. This species is a common inhabitant in rock pools, second in abundance to* Actinia tenebrosa*. It attaches to rocky substrate under several centimetres of sand, so that only the tentacles and oral disc appear on the surface. It is found in south-east Australia from southern Queensland to Spencer Gulf, South Australia, Tasmania and New Zealand. The status of a similar species,* Oulactis macmurrichi*, is uncertain. This latter species is found from Perth in Western Australia to Coffin Bay in South Australia and differs only in that it has a darker colouration. No other common names are known to have been used for this species.

Synonymy
Metridium muscosum Drayton in Dana, 1846
Oulactis plicatus Hutton, 1878

Type Location
Metridium muscosum: Wollongong, Illawarra, New South Wales, Australia
Oulactis plicatus: Dunedin, New Zealand

Museums Holding Type Material
Metridium muscosum: Holotype: United States National Museum (Smithsonian Institution)? (to be confirmed)
Oulactis plicatus: There is probably no type specimen for this species.

Summary of Species Description

The basal disc of this species is firmly fixed to the substratum. The column surface has vertical rows of adhesive verrucae, which become more numerous in the upper part of the column and the lower part of the column is smooth. The largest verrucae are in the middle of the column, and the smallest in the uppermost part of the column where they are closely arranged, set on outgrowths and well developed over the endocoels. Marginal spherules are present running out from the endocoels and sometimes, at least partly, from the exocoels so that two annuli of spherules are present. The fosse is shallow, the sphincter distinctly diffuse and set close to the tentacles. The oral disc is wide. The sphincter varies from weak and diffuse to moderately strong and circumscript. Tentacles are short, conical, and up to 96 in number.

The longitudinal muscles of the tentacles are ectodermal. The retractor muscles are diffuse and the parietobasilar muscles are well developed. There are 48 pairs of mesenteries. All mesenteries, except the directives, are fertile. The actinopharynx is longitudinally sulcated and has two symmetrical siphonoglyphs. Cnidom are basitrichs, atrichs, spirocysts, holotrichs and micro-basic *p*-mastigophors.

Anemones of this species may be up to 100 mm in height and 50 mm in diameter. The body of live animals is dark brown, with the lower part of the column and the uppermost verrucae white. The oral disc is dark brown and the actinopharynx moss-green. Tentacles are transparent to pale brown, and brownish-red at their base. Zooxanthellae are abundant in the tentacles, oral disc and upper column.

Habitat
Mid to low intertidal zone, adhering to rock surfaces in crevices.

Known Distribution
South Australia to 100 miles north of the Queensland border and Tasmania in Australia, and Dunedin and Cook Strait in New Zealand.

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Family: Actiniidae Rafinesque, 1815

Genus: Phlyctenactis *Stuckey, 1909*

Phlyctenactis tuberculosa (Quoy & Gaimard, 1833)

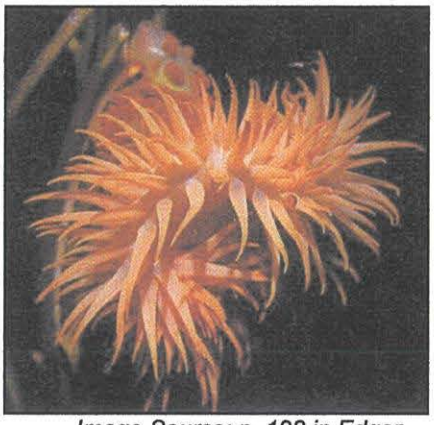

Image Source: p. 128 in Edgar, 1997

Buoyant Swimming Anemone; Wandering Anemone
Unlike many other sea anemones, **Phylyctenactis tuberculosa** ***is not a regular feature of rocky beaches because it does not attach to the substrate. Rather, this species drifts in the current, crawls along the bottom or swims with tentacles performing lashing movements and is usually found in subtidal habitats to a depth of 30m. It is sometimes seen attached loosely to seagrasses or algae. The buoyant swimming anemone is easily recognised by the numerous bladder-like vesicles bulging from the column surface, between the tentacles. When the tentacles are contracted during the day, only the vesicles are visible so that the anemone looks like a ball of baked beans.***

Synonymy
Actinia tuberculosa Quoy & Gaimard, 1833
Phlyctenactis retifera Stuckey, 1909

Type Location
Actinia tuberculosa: Bass Strait, Tasmania, Australia
Phlyctenactis retifera: Cloudy Bay, Cook Strait, New Zealand

Museums Holding Type Material
Actinia tuberculosa: Type: Muséum National d'Histoire Naturelle? (to be confirmed)
Phlyctenactis retifera: unknown

Summary of Species Description
This species has a broad but not well developed pedal disc which is rarely attached to seaweed, often unattached, but never inflated. The column is straight and cylindrical. The whole column is covered with large, oval simple vesicles which are crowded and in irregular rows. There are no marginal spherules and fosse is well developed. The oral disc is flat. The sphincter is broad and diffuse .Tentacles are numerous (6 cycles) and quite short compared with the size of the anemone (25 mm) and blunt.

The longitudinal muscles of the tentacles and radial muscles of the oral disc are mesogloeal. The retractor muscles are diffuse, parietobasilar muscles are well-developed and the basilar muscles are distinct. Mesenteries are numerous and hexamerously arranged with directive mesenteries. There are at least 24 perfect pairs. The mesenteries at the base are more numerous than those at the margin e.g. 390 at the base but only 280-290 tentacles. Primary and secondary mesenteries may be sterile. There are two broad siphonoglyphs. Cnidom are spirocysts, basitrichs and microbasic *p*-mastigophors.

This species may attain lengths of 150 mm or more in height and 125 mm diameter. Vesicles are up to 25 mm long and 13 mm in width. The colour of the pedal disc is orange, the column brown with vesicles are a darker or lighter shade or sometimes a blue-grey. The oral disc is yellow and the tentacles are straw coloured or grey or brown.

Remarks
Although not a particularly abundant species, it is well represented in museum collections presumably because of its size, unusual appearance and tendency to be washed up on beaches. It is also a very distinct species and therefore easily identified and so is more likely to be sorted within museum collections.

Habitat
This species is usually found in quiet sheltered pools on rocky coasts, particularly amongst seaweed, to a depth of 30 metres. This species has often been found washed up on beaches.

Known Distribution
Temperate Australia from Perth to Byron Bay, also recorded from the north and south islands of New Zealand.

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Family: Actiniidae Rafinesque, 1815

Genus: Phlyctenanthus *Carlgren, 1949*

Phlyctenanthus australis Carlgren, 1949

Southern Anemone
This species is found in the southern hemisphere, having been recorded from southeastern coasts and islands of South America as well as south-eastern Australia in New South Wales and Victoria. It has a superficial resemblance to* P. tuberculosa*, with both species having numerous bubble-like vesicles on the surface of the column. Unlike* P. tuberculosa*, the southern anemone remains permanently attached to the bottom and is usually found on exposed, rocky headlands at the lower limits of the intertidal zone.

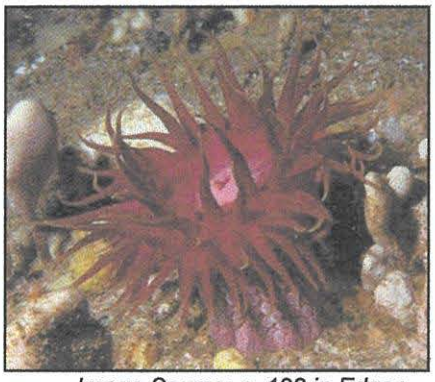

Image Source: p. 128 in Edgar, 1997

Synonymy
Phlyctenanthus australis Carlgren, 1949

Type Location
Phlyctenanthus australis: Sydney, New South Wales, Australia

Museums Holding Type Material
Phlyctenanthus australis: Syntypes: Museum of Natural History, University of Copenhagen; Museum of Zoology, Lund University

Summary of Species Description
The pedal disc is well developed. The column is cylindrical with large, simple and fairly crowded vesicles. The vesicles are often longitudinally furrowed in a contracted state. The smallest vesicles occur in the proximal part of the body and the largest below the margin where they are thinly set and form an annulus, giving this species a characteristic appearance. There are no marginal spherules and the fosse is deep and well developed. The sphincter is strong and circumscribed. Tentacles are short and up to 96 in number.

Longitudinal muscles of the tentacles and radial muscles of the oral disc are ectodermal. The longitudinal muscles are strong. The numerous muscle folds of the retractor muscles are highly branched. The retractors of the stronger mesenteries are diffuse, band-like and those of the weaker mesenteries are more restricted. Parietobasilar and basilar muscles are strong, with the parietobasilar muscles forming a distinct fold on the surface of the mesenteries. There are two pairs of directive mesenteries and a total of 48 pairs of mesenteries, all perfect and fertile apart from the directives. There is the same number of mesenteries proximally and distally. There are two broad siphonoglyphs. Cnidom are spirocysts, basitrichs and microbasic *p*-mastigophors.
Length and breadth dimensions are about 100 mm. The column is reddish brown, vesicles are bluish, tentacles reddish brown with white transversal bands.

Habitat
Subtidal to about 15 metres on moderate to high energy coasts.

Known Distribution
Eastern Great Australian Bight to New South Wales, near Sydney.

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Family: Actiniidae Rafinesque, 1815

Genus: Dofleinia *Wassilieff, 1908*

Dofleinia armata Wassilieff, 1908

Image Source: p. 48 in Coleman, 1977

Armed Anemone; Striped Anemone
This species is one of the largest and certainly the most dangerous Australian anemone. The body of anemones of this species extend up to 200 mm diameter, with their tentacles extending up to 500 mm in length. The tentacles can be striped or plain, with a scale-like surface structure, usually terminating in a slightly swollen tip. The tentacles writhe and coil, often curling into balls which obscure the mouth. Contact with this species produces extremely painful wounds which may take one to several months to heal. This species is most prevalent in tropical locations and is found on soft sediments among mangroves as well as on sheltered reef slopes.

Synonymy
Dofleinia armata Wassilieff, 1908

Type Location
Dofleinia armata: Sagami Bay near Misaki, Japan

Museums Holding Type Material
Dofleinia armata: Holotype: Zoologische Staatssammlung München

Summary of Species Description
This species has a broad base and a smooth column. The oral disc is flat and broad. The tentacles are hexamerously arranged, plump, not numerous and very large. The inner tentacles are at least twice as large as the outer tentacles. Papillae along the surfaces of the tentacles, which are easily visible to the naked eye, contain strong batteries of very large basitrichs. Weaker papillae, also containing nematocysts, are present on the oral disc. The sphincter is diffuse and weak.

The longitudinal muscles of the tentacles are ectodermal. The retractor muscles are diffuse. Mesenteries are hexamerously arranged, and probably are all fertile apart from the directive mesenteries. There are two broad siphonoglyphs which are prolonged aborally. The cnidom are spirocysts, basitrichs and microbasic *p*-mastigophors.

Anemones of this species are up to 200 mm diameter and the tentacles to 500 mm in length.The oral disc is mostly obscured by the large tentacles. The tentacles have brown with cream strips along their length.

Remarks
This genus and species is very distinct, although their relationship to other anemones is not clear. The papillose disc and tentacles are a distinct feature.

Habitat
Intertidal to a depth of 20metres, in muddy or fine silt sediments.

Known Distribution
Tropical Australia, south to Perth in Western Australia.

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Family: Actinostolidae Carlgren, 1932

Genus: Sicyonis *Hertwig, 1882*

Sicyonis erythrocephala (Pax, 1922)

Deep Sea Anemone
Most species from this family occur in deep or very deep waters at high latitudes. This species has been widely recorded in southern latitudes, around Antarctica and as far north as 42^{0}S. Only one other species has been tentatively recorded from the southern hemisphere for this genus. Further unpublished records for this genus, possibly a new species, have also been sampled in the deep waters beyond the continental shelf of the Great Barrier Reef. As deep sea locations are surveyed, particularly in tropical locations, it is likely that further records for this genus and other deep sea anemones will be discovered.

Synonymy
Cymbactis erythrocephala Pax, 1922
Sicyonis aurora Carlgren & Stephenson, 1929
Sicyonis antarctica Carlgren, 1939

Type Location
Cymbactis erythrocephala: Locality of syntypes to be confirmed
Sicyonis aurora: Maria Island, Tasmania, Australia
Sicyonis antarctica: Antactica

Museums Holding Type Material
Cymbactis erythrocephala: Syntypes: Museum National d'Histoire Naturelle
Sicyonis aurora: unknown
Sicyonis antarctica: Syntypes: Royal Scottish Museum

Summary of Species Description
The base may be retracted so the lowermost column is contracted beneath and around the flat or concave pedal disc. The column is cylindrical, sometimes with circumferential constriction giving specimens an hourglass shape, or tapering slightly toward basal end. The body wall is smooth except for shallow, irregular furrows. The oral disc is somewhat wider than the column when expanded and radially furrowed along mesenterial insertions. In many specimens examined by Fautin (1984), the margin is contracted, hiding the oral disc and most tentacles although the outermost tentacles are generally visible because the oral disc cannot be completely involuted. Tentacles cover much of the disc in well defined cycles and are stout, rugose with longitudinal and circumferential grooves (probably due to contraction), bluntly digitiform and a terminal pore may be conspicuous. These features are especially obvious in inner tentacles which are larger (to 15 mm long and 4-5 mm basal diameter) than marginal ones (rarely more than 3-5 mm long and 1-2 mm basal diameter). The circular tentacle muscles are endodermal and the mesogleal longitudinal musculature is lacking at the tip but otherwise is typically equally developed all round. Of three animals examined by Fautin (1984), one had 96 tentacles, another had 48 tentacles and 90 mesenteries at the proximal end and the third specimen had 87 tentacles and 188 mesenteries at the base.

Retractor muscles are diffuse with intermediate length lamellae, most of which have short side branches. Parietobasilar muscles are strong but developed only at the proximal end. The parietobasilar muscles lack a free flap. The mesenteries are hexamerally arrayed. Mesenteries of the first two orders are complete and sterile, those of the third order are also sterile with some attached to the actinopharynx. All mesenteries have filaments. Oral, but no marginal stomata are evident. The highest cycle mesenteries are fertile, lack filaments and are only in the proximal half to two thirds. If there are five cycles, fourth-order mesenteries may be sterile and have filaments or be fertile and lack filaments. As many as six cycles have been recorded, with up to three fertile. Animals are dioecious and ova of preserved specimens are bright yellow and larger than 1 mm diameter. The actinopharynx is deeply sulcate, and up to half the column length. There are two deep, symmetrical siphonoglyphs, attached to two pairs of directive mesenteries. The siphonoglyphs are usually about the same length as the actinopharynx. The cnidom are spirocysts, basitrichs and microbasic p-mastigophores.

The base is typically 30-50 mm diameter. The column is mostly 50-60 mm long and nearly 10 mm across. A few of the specimens examined by Fautin (1984) retained a brownish or reddish brown ectoderm, most only in shallow wrinkles near the pedal end. In the absence of the ectoderm, the column is white to pinkish in colour. The oral disc is the same colour as the tentacles, which is pink to tan.

Habitat
Deep water habitats from 261 to 3867m, with strong currents.

Known Distribution
Probably all around Antarctica, ranging as far north as 42^0S.

References
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Family: Aliciidae Duerden, 1897

Genus: Triactis *Klunzinger, 1877*

Triactis producta Klunzinger, 1877

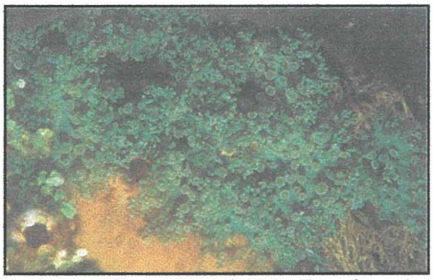

Image Source: p. 246 in Fosså and Nilsen, 1998

Boxer Crab Anemone; Crab Anemone; Pom Pom Anemone
The boxer crab anemone is so named because it is sometimes found living on the claws of crabs of the genus* Lybia*, which uses the anemones and their powerful stinging cells for defense. In fact these crabs are totally dependent on the anemones for their survival, although the anemones are also able to attach to the substrate and live independently of the crabs. In Hawaii, crabs of this genus have been seen to remove the anemones from the substrate and attach them to their claws.

Synonymy
Triactis producta Klunzinger, 1877
Viatrix cincta Haddon & Shackleton, 1893
Phyllodiscus indicus Stephenson, 1922

Type Location
Triactis producta: Red Sea
Viatrix cincta: Torres Strait
Phyllodiscus indicus: unknown

Museums Holding Type Material
Type: Museum für Naturkunde, Berlin? (to be confirmed)
Viatrix cincta: unknown
Phyllodiscus indicus: unknown

Summary of Species Description
The pedal disc is well developed. The column is smooth, and has a capitulum and deep fosse. The upper margin branches into several branching pedicels, which each terminate in small mastigophoral spherules. The oral disc is small, with a central mouth on top of a cone. There is no distinct sphincter. There are up to 60 tentacles which are hexamerously arranged and have a very large number of nematocysts in their distal parts. The tentacles are long, slender, have blunt tips and their surface is granular due to the small groups of nematocysts.

Longitudinal muscles of the tentacles and the radial muscles of oral disc are ectodermal. The retractor muscles are weak and the parietobasilar muscles are very weak. Mesenteries are hexamerously arranged in three cycles. There are six pairs of mesenteries in the first cycle, all of which are fertile. Remaining cycles comprise several imperfect pairs. There are two pairs of directive mesenteries. The species is dioecious and viviparous. There are two distinct siphonoglyphs. The cnidom are spirocysts, basitrichs, microbasic *p*-mastigophors, and microbasic and macrobasic amastigophors.

Height and diameter of anemones of this species is to 15 mm. The column is translucent pale brown with darker spots on its lower part which grade to continuous beneath the peduncles. The capitulum is dark brown with pale translucent vertical lines. The tentacles are translucent, the oral disc is pale brown and the mouth is orange-brown. The peduncles and fosse have an iridescent blue-green sheen. Zooxanthellae are present in the endoderm of the column, disc, peduncles and spherules.

Remarks
Species of the host crab, *Lybia edmondsoni*, have never been found without the anemone attached to its claws, although the anemone is often found living separately from the crab. The crab uses the anemones, with one on each claw, as a defensive weapon and in capture of prey.

Habitat
Shallow reefs, on living and dead scleractinian coral and on the claws of the xanthid crab, *Lybia edmondsoni.*

Known Distribution
Recorded from widely spaced Indo-Pacific localities in the tropics, including the Torres Strait and Great Barrier Reef in Australia, the Red Sea, Maldives, Singapore, Guam and Hawaii.

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Family: Boloceroididae Carlgren, 1924

Genus: Boloceroides *Carlgren, 1899*

Boloceroides mcmurrichi (Kwietniewski, 1898)

Swimming Anemone
This species swims by coordinated paddling of its tentacles. The base is weakly adherent and individuals may be seen loosely attached to the substrate or blades of seagrass. They are small and delicate, with a short, thin walled column which is translucent. In comparison to the small body size, the tentacles are numerous and long, being up to three times the length of the column. The swimming anemone can reproduce by both sexual and asexual means, with individuals propogating asexually by budding new individuals from the tentacles.

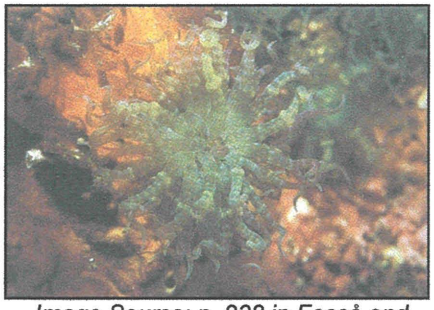

Image Source: p. 238 in Fosså and Nilsen, 1998

Synonymy
Bolocera mcmurrichi Kwietniewski, 1898
Boloceroides hermaphroditica Carlgren, 1900
Nectothela lilae Verrill, 1928

Type Location
Bolocera mcmurrichi: Ambon, Indonesia
Boloceroides hermaphroditica: Zanzibar, East Africa
Nectothela lilae: Oahu, Hawaiian Islands

Museums Holding Type Material
Bolocera mcmurrichi: Syntype: Museum of Zoology, Lund University
Boloceroides hermaphroditica: Syntypes: Museum of Zoology, Lund University; Phyletisches Museum
Nectothela lilae: Holotype: American Museum of Natural History; Paratypes: Bishop Museum

Summary of Species Description
The column is low, smooth and the upper margin of the column is tentaculate. There is a definite base and limbus. There is no sphincter. Inner tentacles are very long (up to five times the height of the column) and the outer tentacles are considerably shorter. The tentacles also have sphincters, at which point they develop a whorl of small tentacles and detach from the adult and grow to form new individuals. Shorter tentacles among the longer tentacles are probably regenerating tentacles.

Longitudinal muscles are smooth. There are no basilar muscles. Retractor muscles and parietobasilar muscles are weak and diffuse. Mesenteries are irregularly arranged in up to four cycles at the centre of the column, with further cycles at the margin. Mesenteries of the first cycle are perfect, while mesenteries of higher order cycles are imperfect. Those of the first and second cycles are fertile and those of the third and fourth cycles and the directives are sterile. There are more mesenteries distally than there are proximally. There are no true siphonoglyphs. Cnidom are spirocysts, basitrichs, microbasic *p*-mastigophors and microbasic amastigophors.

The dimensions are height of 3 mm,diameter of the pedal disc is 8 mm and diameter and diameter of the whole anemone including tentacles is 25 mm. Reported colours of anemones of this species are light brown, with violet-whitish rings on their tentacles, or a uniform translucent pale green.

Remarks
This species is able to detach itself from the substrate and swim by movement of its tentacles. Autotomized tentacles of this species have been shown to develop mouths, columns, and crowns of six tentacles at the wounded ends in three weeks.

Habitat
Subtidal to at least 10 metres, attached to the vertical substrates or in caves amongst stones or dead coral. When found detached, it is often amongst drift algae.

Known Distribution
Shark Bay in Western Australia and several other Pacific locations including Japan, Hong Kong, Indonesia and Hawaii.

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Family: Isophelliidae Stephenson, 1935

Genus: Isophellia *Carlgren, 1900*

Isophellia stella Cutress, 1971

Poorly Known Anemone
This is a poorly known species which has not been documented in the literature, other than its original description. No common names are known to have previously been used in this genus.

Synonymy
Isophellia stella Cutress, 1971

Type Location
Isophellia stella: Off Middle Brighton, Port Phillip Bay, Victoria, Australia

Museums Holding Type Material
Isophellia stella: Holotype: Museum of Victoria
Isophellia stella: Paratypes: Museum of Victoria

Summary of Species Description
The appearance of this species is only known from the original description. These specimens were attached to tough white fibrous material, probably polychaete tubes. The column is constricted just above the pedal disc. The capitulum is thin-walled. The scapus is thick-walled and bears prominent tenaculi in its distal half. The tentacles are thin, evenly tapered and acute. The inner tentacles are up to 6 mm in length and are at least twice the length of the outer tentacles. There are 80 tentacles on each anemone examined, although considering the number of mesenteries it is likely that the number of tentacles in mature individuals would be 96.

The radial muscles of the oral disc and longitudinal muscles of the tentacles are ectodermal. Twenty-four pairs of mesenteries extend from the pedal disc to the oral disc, with those of the first and many of the second cycle fertile. Specimens sectioned are male. The actinopharynx is longitudinally corrugated. There are two prominent siphonoglyphs. The cnidom are spirocysts, microbasic b-mastigophores and microbasic p-mastigophores.

Specimens are preserved. Contracted specimens have total lengths of 10 x 5 mm and expanded specimens have a total lengths of 20 x 7 mm. Specimens of this species do not contain zooxanthellae.

Remarks

Habitat
Unknown

Known Distribution
Port Phillip Bay, Victoria, Australia

References

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Family: Sagartiidae Gosse, 1858

Genus: Actinothoe *Fischer, 1889*

Actinothoe glandulosa Carlgren, 1954

False Burrowing Anemone
Like most other anemones, this species does not possess the burrowing structure of the small group of athenarian anemones, such as Edwardsia vivipara. Therefore, although it tends to bury its column in the substrate, it is not a true burrowing anemone. This species has only been recorded from temperate reefs near Perth in Western Australia, where it occurs in clusters of several individuals. Animals of this species are small and white in colour. Little else is known about this species.

Image Source: p. 129 in Edgar, 1997

Synonymy
Actinothoe glandulosa Carlgren, 1954

Type Location
Actinothoe glandulosa: Cape Peron, Western Australia, Australia

Museums Holding Type Material
Actinothoe glandulosa: Syntypes: Museum of Zoology, Lund University; Western Australian Museum

Summary of Species Description
The pedal disc is well developed but not as broad as the oral disc. The column is smooth and probably without cinclides. The margin is distinct. The sphincter is fairly strong, mesogloeal, and reticular forming a coarse mesh-like network. The outer tentacles are very short while the inner tentacles are considerably longer and about the same length as the column when preserved. The tentacles are delicate and about 70 in number.

The longitudinal muscles of the tentacles are ectodermal. The retractors are band-like, weak, their folds usually low, branched in the upper part and not branched at all or only a little in the lower part. There are ten pairs of perfect mesenteries, all of which were sterile. There is one pair of directives and one siphonoglyph. The region of the ciliated tract is broad. The cnidom are basitrichs, microbasic *p*-mastigophores, *p*-mastigophores and microbasic amastigophors.

These anemones are always small in size, around 13mm diameter and white in colour.

Remarks

Habitat
Found in sublittoral habitats from 0-12 metres, often in clusters of several individuals.

Known Distribution
Temperate Western Australian reefs.

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Family: Sagartiidae Gosse, 1858

Genus: Anthothoe *Carlgren, 1938*

Anthothoe albocincta (Hutton, 1878)

Striped Anemone; White-Striped Anemone
The most distinctive feature of this anemone is the longitudinal stripes on the column. The stripes are usually white and orange or dark green. The tentacles and oral disc are the same combination of contrasting colours, with tentacles white and the oral disc orange or dark green. This species is common in south-eastern Australian locations, at the lower limits of the intertidal zone under rock ledges and on jetty pylons.

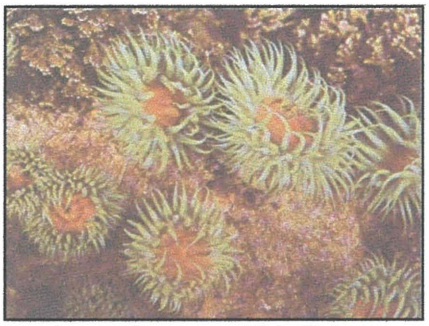

Image Source: p. 52 in Coleman, 1977

Synonymy
Gregoria albocinta Hutton, 1878

Type Location
Gregoria albocinta: Dunedin, New Zealand

Museums Holding Type Material
Gregoria albocinta: There is probably no type specimen for this species.

Summary of Species Description
The pedal disc is broad, and the column is low and smooth. The sphincter is strong and occupies almost the whole mesogloea, diminishing in breadth downwards. The tentacles are conical and very numerous (about 200). The inner tentacles are of moderate length and the outer tentacles are substantially shorter.

The retractors are band-like, strong and form high folds. The parieto-basilar muscles are very weak and form a straight lamella. There are two directive and many perfect pairs of mesenteries. In the largest specimen: at least 22 perfect pairs of mesenteries. The mesenteries of at least the first cycle are sterile. The actinopharynx is strongly ridged. There are two symmetrically set siphonoglyphs. Cnidom are microbasic amastigophors, basitrichs and microbasic *p*-mastigophors.

Dimensions are at least 8 mm in height, diameter of the pedal disc 15 mm and diameter of the column 12 mm. The column has longitudinal white and dark brown alternating stripes and the upper part of the column is orange. Tentacles are white and unmarked. The oral disc is orange with white stripes around the mouth.

Habitat
Under rocks in the lower intertidal zone.

Known Distribution
Ceduna in South Australia to New South Wales and Tasmania, also recorded from the north and south islands of New Zealand.

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Family: Stichodactylidae Andres, 1883

Genus: Heteractis *Milne Edwards, 1857*

Heteractis magnifica (Quoy & Gaimard, 1833)

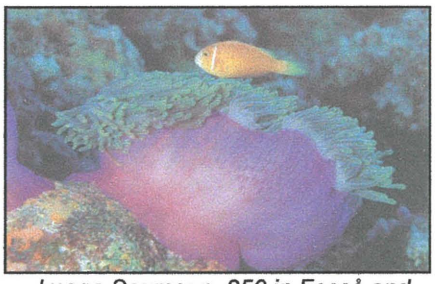

Image Source: p. 250 in Fosså and Nilsen, 1998

Magnificent Anemone; Ritteri Anemone
This is one of the most conspicuous and frequently photographed species of anemone and is host to several species of anemone fish. Individuals are large and commonly found living on prominent coral or rocky outcrops, exposed to currents. It is probably also the most common species of anemone in the anemone trade, being found in most import shipments. This species can be seen with the oral disc fully extended, with undulating folds moving in the current, or be partly or almost completely retracted, so that the column wall is obvious and only a few tentacles are visible.

Synonymy
Actinia magnifica Quoy & Gaimard, 1833
Helianthopsis ritteri Kwietniewski, 1898
Helianthopsis mabrucki Carlgren, 1900

Type Location
Actinia magnifica: Vanikoro, Santa Cruz Islands, Solomon Islands
Helianthopsis ritteri: Ambon Harbour, Ambon, Indonesia
Helianthopsis mabrucki: Zanzibar, East Aftrica

Museums Holding Type Material
Actinia magnifica: Type: Muséum National d'Histoire Naturelle? (to be confirmed)
Helianthopsis ritteri: Syntype: Phyletisches Museum
Helianthopsis mabrucki: Syntypes: Zoologisches Museum, Hamburg

Summary of Species Description
The column is gently flared. The outer margin of the column has longitudinal rows of verrucae that extend down the length of the column. This species is capable of almost complete contraction so that only a tuft of tentacles is visible in the centre. The oral disc is flat to gently undulating, and densely covered with finger-like tentacles. Tentacles approach the mouth to within 20-30mm. The shape of the tentacles is unique within this genus, hardly tapering and being blunt or slightly swollen at tips. The tentacles are up to 75 mm long and some bifurcate or have side branches.

The diameter across the oral disc is up to 1m and commonly 300-500mm. The column is uniform in colour, often blue, green, red, white or chestnut brown. The lower portion of tentacles are the same colour as the oral disc (usually a shade of brown), and the terminal portion is yellow, green or white. The central oral disc is yellow, brown or green, often raised so that the mouth sits on a cone. Verrucae are the same colour as the column or slightly lighter or darker. *Heteractis magnifica* is the symbiotic host to 12 species of anemone fish of the genus *Amphiprion*.

Remarks
This species can be solitary or clonal. In central Indo-Pacific locations, individuals are solitary and large or several smaller animals of identical colouration may cluster together, resembling one larger animal. In other locations, e.g. Maldives, Malaysia, French Polynesia, tens or hundreds of identically coloured individuals form extensive beds, presumably constituting one clone.

Habitat
Fully exposed, prominent positions on reefs, attached to a solid object such as a coral boulder. The exposed habitat of this species is unique.

Known Distribution
Broad Indo-Pacific distribution from East Africa to French Polynesia, and Australia to the Ryukyu Islands

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Family: Stichodactylidae Andres, 1883

Genus: Stichodactyla *Brandt, 1835*

Stichodactyla haddoni (Saville-Kent, 1893)

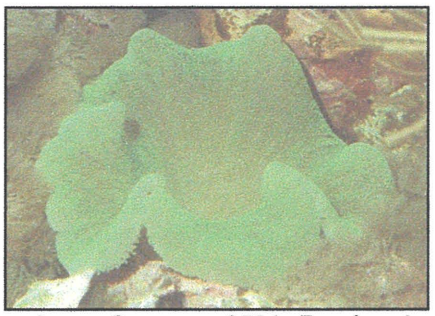

Image Source: p. 256 in Fosså and Nilsen, 1998

Haddon's Sea Anemone; Carpet Anemone, Saddle Anemone, Glass Pearl Anemone
This anemone is host to several species of symbiotic anemone fish. It has a large undulating oral disc with short and evenly sized tentacles over the surface of the oral disc, giving the anemone a carpet-like appearance. The tentacles and oral disc surface may be the same colour throughout, or pigmentation in tentacles may vary in colour giving the anemone a variegated colour pattern. This variegated pattern is very distinctive of this species. This species lives mostly on sandy bottoms or among coral rubble on reef flats and can withrdraw rapidly and completely into the substrate, leaving its symbiotic fish to hover over the resulting depression.

Synonymy
Discosoma haddoni Saville-Kent, 1893

Type Location
Discosoma haddoni: Northern Great Barrier Reef

Museums Holding Type Material
Discosoma haddoni: Type: The Natural History Museum (London)? (to be confirmed)

Summary of Species Description
The column is sturdy. There are small, non-adhesive verrucae on the uppermost part of the column. The oral disc folds in deep waves. The oral disc is densely covered with numerous radial rows of short digitiform tentacles to within 10-20 mm of the mouth. Tentacles are up to 5 mm in length. The tentacles are bluntly pointed to slightly bulbous. Exocoelic tentacles are very robust, alternating with less robust endocoelic tentacles. Exocoelic tentacles may be up to twice as long as endocoelic tentacles and point outward. The tentacles are sticky to touch and may stick to a person's hand.

Cnidom are spirulae, spirocysts and Penicilli A.

Oral disc diameter is commonly 500 mm and rarely to 800 mm. The oral disc is usually yellow to tan in colour. Tentacles ends can be green, yellow, grey, or rarely pink which can give the anemone a variegated appearance. Exocoelic tentacles are usually white. Verrucae are the same colour as the column or light red to purple. Zooxanthellae are abundantly present in the endoderm of the tentacles, oral disc and mesenterial filaments in the distal part of the body. This anemone is host to six species of anemone fish.

Remarks

This anemone can pull rapidly and completely into the sand when disturbed, leaving its symbiotic fish to hover over the resulting depression.

Habitat
Sand dwelling below about 5m, with a preference for unconsolidated sediments in marine-dominated, shallow, low-wave-energy areas such as the slopes of islands in a lagoon.

Known Distribution
Indo-Pacific ranging from the Red Sea and Mozambique to Japan and Fiji, including north-western and eastern coasts of Australia.

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Family: Thalassianthidae Milne Edwards, 1857

Genus: Heterodactyla *Ehrenberg, 1834*

Heterodactyla hemprichii Ehrenberg, 1834

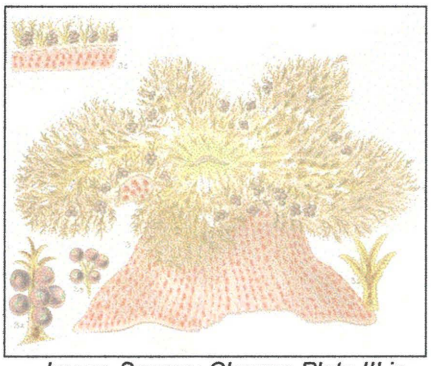

Image Source: Chromo Plate III in Saville-Kent, 1893

Hemprich's Anemone
This species resembles anemones of the genus Stichodactyla. As in this genus, the tentacles over much of the oral disc are short but differ in that they are multi-branched so that they look like a person's hand. In addition, longer and thicker tentacles containing globular nematophors are scattered towards the edge of the margin of the oral disc. Unlike species of the genus Stichodactyla, this species does not host symbiotic anemone fish. This species is named after the German-Russian naturalist, Hemprich. No common names have previously been used for this or the other species of this genus.

Synonymy
Heterodactyla hemprichii Ehrenberg, 1834

Type Location
Heterodactyla hemprichii: Near Sharm el Sheik, Red Sea

Museums Holding Type Material
Heterodactyla hemprichii: Type: Museum für Naturkunde, Berlin? (to be confirmed)

Summary of Species Description
The pedal disc is well-developed. The column is vase-shaped, with verrucae on the upper part of the column. The oral disc is quite strongly folded. The sphincter is very weak and restricted to circumscribed. There are two types of tentacles, i.e. endocoelic and exocoelic tentacles. Endocoelic tentacles are short, branched at their tips, with these branches resembling fingers on a hand. They are radially arranged with globular nematophores budding from the sides like bunches of grapes. The nematophores contain numerous bastrich nematocysts. Exocoelic tentacles are orally-aborally flattened and branched at the edge of the oral disc.

The longitudinal muscles of the tentacles and radial muscles of the oral disc are ectodermal. Thre retractores are well developed, diffuse and band-like. The parietobasilar muscles are weak, and the basilar muscles are well developed. There are numerous pairs of mesenteries, with at least three cycles perfect and two pairs of directives. There are more mesenteries distally than proximally. All stronger mesenteries, except the directives, are fertile. There are two well developed siphonoglyphs. Cnidom are spirocysts, basitrichs and microbasic *p*-mastigophors.

The diameter of the oral disc is to 300 mm diameter. Anemones are white, brown or green. Tentacles are green to greenish brown and the nematophores are violet or blue. Unlike many other species of the family Thalassianthidae, this species of anemone does not host anemone fish.

Habitat
This species is uncommon, often attached to and beneath branching corals.

Known Distribution
Tropical Queensland coast in Australia, and other Indo-Pacific locations including the Red Sea and Indonesia.

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Family: Thalassianthidae Milne Edwards, 1857

Genus: Cryptodendrum *Klunzinger, 1877*

Cryptodendrum adhaesivum Klunzinger, 1877

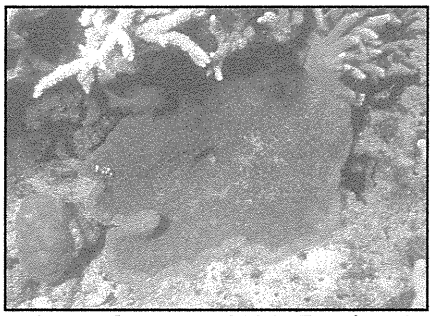

Image Source: p. 263 in Fosså and Nilsen, 1998

Adhesive Anemone; Sticky Anemone; Pizza Anemone, Nobbly Rim Anemone
The tentacles of this species are extremely sticky, as highlighted by the taxonomic and common names of this species. The tentacles are extremely short and of two forms, densely covering the oral disc. At the centre of the oral disc, the tentacles have a narrow stalk with five or more short branches, resembling a miniature glove. Those near the edge of the oral disc are simple elongate bulbs, while at the extreme margin is a ring of tentacles like the central tentacles but with fewer branches. Tentacles of the two forms are usually different colours. This species extends from deep rock holes into which it can rapidly and completely withdraw. It is host to one species of symbiotic anemone fish.

Synonymy
Cryptodendrum adhaesivum Klunzinger, 1877
Stoichactis digitata Doumenc, 1973

Type Location
Cryptodendrum adhaesivum: Koseir, Red Sea
Stoichactis digitata: French Polynesia (to be confirmed)

Museums Holding Type Material
Cryptodendrum adhaesivum: Syntypes: Museum für Naturkunde der Humboldt Universität; Naturhistoriska Riksmuseet
Stoichactis digitata: Syntypes: Museum National d'Histoire Naturelle

Summary of Species Description
The base is adherent, generally broader than the column, but considerably narrower than the oral disc and usually irregular in outline. The column is contractile, and gradually widens from the base to the oral disc or flares abruptly near the margin of the oral disc. Verrucae are developed on the upper column. There are no marginal spherules. The oral disc is not lobed and is flat when expanded, undulate when contracted. The sphincter is weak and circumscribed. The oral disc is entirely covered with tentacles, except around the mouth, giving it a furry appearance. Tentacles are very sticky, extremely short (to 5 mm in length), dense and of two forms. Tentacles in the centre of the oral disc have a narrow stalk with five or more short finger-like branches at their tip. Tentacles near the edge of the oral disc are simple elongate bulbs about 1 mm in diameter. At the extreme margin of the oral disc, there is a ring of tentacles like the central ones, but with fewer branches.

The longitudinal muscles of the tentacles and radial muscles of the oral disc are ectodermal and circular muscles are endodermal. Retractors are diffuse, well developed and band-like. The parietobasilar muscles are weak and the basilar

muscles are distinct. Mesenteries are numerous, with at least three perfect cycles developed. There are more mesenteries at the margin than at the base. At least all the stronger mesenteries, except the directives, are fertile. Some weaker mesenteries may also be fertile. There are usually two well-developed and symmetrical siphonoglyphs. Cnidom are spirocysts, basitrichs, microbasic *p*-mastigophores.

The oral disc is to 300 mm diameter, when expanded. This species may be extremely colourful. Tentacles of the two forms are usually different colours and the stalk and tips of tentacles may also differ in colour. Colour combinations include yellow and pink, blue and grey, green and brown. Occasionally tentacles of another colour occur in patches amid those of the predominant colour. The mouth area can also be brightly coloured, e.g. fuchsia, yellow, green or white. There are endodermal zooxanthellae. This anemone is host to one species of anemone fish, *Amphiprion clarkii*, although it is rarely occupied.

Remarks
Tentacles of other species of anemone (e.g. *Stichodactyla haddoni*) may adhere to a person's hand when touched, and pull off the anemone. In *Cryptodendrum adhaesivum*, the tentacles are extremely sticky but when touched, they remain attached to the anemone.

Habitat
Deep rocky holes, into which it can rapidly and completely withdraw, on patch reefs in protected and exposed habitats, to depths of at least 15 metres.

Known Distribution
Australia at Low Isles and Moreton Bay, and other Indo-Pacific locations including the Red Sea, Maldives, Thailand, southern Japan, Melanesia, Micronesia and Polynesia.

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Family: Thalassianthidae Milne Edwards, 1857

Genus: Entacmaea *Ehrenberg, 1834*

Entacmaea quadricolor (Leuckart in Rüppell & Leuckart, 1828)

Bubble Tip Anemone; Bulb-Tentacle Anemone, Maroon Anemone, Rose Anemone

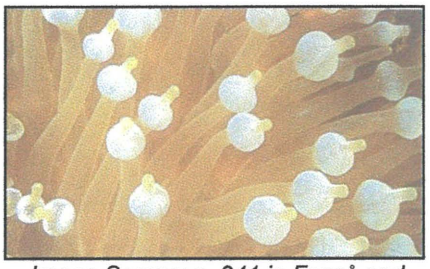

Image Source: p. 241 in Fosså and Nilsen, 1998

This species is easily recognised by the bubble-like bulbs at the tips of most tentacles. Despite the distinct appearance of this species, it also shows substantial variablity, as indicated by the extensive list of species which have been synonymised as* E. quadricolor*. Factors contributing to this variability are thought to be its ability to reproduce by both asexual and sexual means and its ability to live as solitary individuals or in aggregated clusters. This is the most abundant and widespread anemone which hosts anemone fish, providing homes for several species of the symbionts. There is often an equatorial band around the tentacle bulbs, which has been suggested to be related to the presence of the symbiotic fish.

Synonymy

Actinia quadricolor Leuckart in Rüppell and Leuckart 1828
Actinia vas Quoy & Gaimard, 1833
Actinia erythrosoma Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia adhaerens Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia helianthus Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia ehrenbergii Brandt, 1835
Crambactis arabica Haeckel, 1876
Anemonia kwoiam Haddon & Shackleton, 1893
Condylactis ramsayi Haddon & Shackleton, 1893
Condylactis gelam Haddon & Shackleton, 1893
Gyrostoma hertwigi Kwietniewski, 1898
Gyrostoma stuhlmanni Carlgren, 1900
Gyrostoma sulcatum Lager, 1911
Gyrostoma haddoni Lager, 1911
Antheopsis carlgreni Lager, 1911

Type Location

Actinia quadricolor: Near Suez, Red Sea
Actinia vas: Santa Cruz Islands, Solomon Islands
Actinia erythrosoma: Torres Strait
Actinia adhaerens: Red Sea
Actinia helianthus: Red Sea
Actinia ehrenbergii: unknown
Crambactis arabica: Red Sea
Anemonia kwoiam: unknown
Condylactis ramsayi: unknown
Condylactis gelam: Torres Strait
Gyrostoma hertwigi: Torres Strait (to be confirmed)
Gyrostoma stuhlmanni: Zanzibar, East Africa

Gyrostoma sulcatum: Surf Point, Shark Bay, Western Australia, Australia
Gyrostoma haddoni: Fremantle, Rottnest Island, Green Island, Western Australia, Australia
Antheopsis carlgreni: Shark Bay, Western Australia, Australia

Museums Holding Type Material
Actinia quadricolor: Holotype: Senckenberg Museum
Actinia vas: Type: Muséum National d'Histoire Naturelle? (to be confirmed)
Actinia erythrosoma: Lectotypes: Museum für Naturkunde der Humboldt Universität; Naturhistoriska Riksmuseet
Actinia adhaerens: Syntypes: Museum für Naturkunde der Humboldt Universität; Naturhistoriska Riksmuseet
Actinia helianthus: Holotype: Museum für Naturkunde der Humboldt Universität
Actinia ehrenbergii: unknown
Crambactis arabica: Syntype: Phyletisches Museum
Anemonia kwoiam: Syntype: University Museum of Zoology, Cambridge
Condylactis ramsayi: Syntype: University Museum of Zoology, Cambridge
Condylactis gelam: Syntypes: Museum of Zoology, Lund University
Gyrostoma hertwigi: Syntypes: Naturhistoriska Riksmuseet; Phyletisches Museum
Gyrostoma stuhlmanni: Syntypes: Zoologisches Museum, Hamburg
Gyrostoma sulcatum: Syntypes: Museum für Naturkunde der Humboldt Universität; Naturhistoriska Riksmuseet, Western Australian Museum; Zoologisches Museum, Hamburg
Gyrostoma haddoni: Syntypes: Museum für Naturkunde der Humboldt Universität; Zoologisches Museum, Hamburg
Antheopsis carlgreni: Syntypes: Museum für Naturkunde der Humboldt Universität; Zoologisches Museum, Hamburg

Summary of Species Description
Anemones of this species occur as clusters of small individuals, apparently produced by asexual propogation, or larger solitary individuals. The pedal disc is well developed but small. The column is low, gradually flares from the pedal disc and does not have verrucae. The margin is well defined. The fosse is always distinct and usually deep. The sphincter is diffuse, and sometimes very weak. The tentacles are simple, with each having a bulb, usually at or near the end of the tentacle. Tentacles are long, to 100 mm.

The longitudinal muscles are ectodermal. The retractors are diffuse and often band-like. All stronger mesenteries are fertile. The siphonoglyphs are variable in number as are the directives, which may be absent. The mesenteries are numerous, and many are perfect. The number of tentacles is more numerous than the number of mesenteries at the base of the anemone. Cnidom are basitrichs, spirocysts, heterotrichs, microbasic *p*-mastigophores and microbasic amastigophores.

The diameter of the oral disc of small individuals is 50-100 mm. The diameter of large, solitary individuals is to 400 mm. The oral disc and tentacles are brown or sometimes reddish or greenish, tips of tentacles are red, or rarely blue, and the equator of the bulb has a white band. The bulb seems to be related to the presence of fish. Tentacles lacking a bulb have a white ring where the equator would form. *Entacmaea quadricolor* is host to the largest number (13) of species of anemone fish.

Remarks
Type specimens for *Gyrostoma sulcatum* are at the Western Australian Museum. The smooth column is unique among symbiotic anemones, as are the bulbed tentacles. *Entacmaea quadricolor* is the only species of anemone that has been

shown to benefit from its association with anemonefishes, by preventing predation by butterflyfishes and other predators.

Habitat
This species is frequently locally abundant within its distribution range. The small clonal clusters of individuals occur in shallow water, e.g. on tops of reefs, in crevices or along coral branches, while the large, solitary polyps are in deep water e.g. on reef slopes, with their bases anchored in deep holes.

Known Distribution
This species is geographically widespread, occurring around the tropical Australian coast and across the Indo-Pacific from the east African coast, Red Sea, Arabian Gulf, to Japan, Micronesia and Melanesia.

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8. Museums Visited

The following museums were visited by Dr Jackie Wolstenholme, research officer on the project, to compile the data in the attribution database.

Museum and Visiting Dates	Contact Person (Position)	Address
Australian Museum	Dr Penny Berents (Head of Division, Invertebrate Zoology)	6 College Street, Sydney, 2010
Museum of Victoria	Dr Tim O'Hara (Senior Curator, Marine Invertebrates)	GPO Box 666E Melbourne, 3001
South Australian Museum	Mr Thierry Laperousaz (Collection Manager, Marine Invertebrates)	South Terrace, Adelaide
West Australian Museum	Dr Jane Fromont (Curator, Marine Invertebrates)	Perth Cultural Centre Perth 6000
Museum and Art Gallery of the Northern Territory	Dr Phil Alderslade (Senior Curator, Coelenterates)	Museum and Art Gallery of the Northern Territory Darwin
Queensland Museum 13 – 19 April	Mr Stephen Cook (Section Manager, Biodiversity)	P.O. Box 330 South Brisbane 4101 Queensland
Museum of Tropical Queensland	Dr. Peter Arnold (Senior Curator, Tropical Natural History)	78-102 Flinders St. Townsville 4812

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Attachment 10.1

Classificatory arrangement of Australian anemones from Platypus database

(Australian Biological Resources Study, ABIF web-based facility)

Platypus Checklist Output
Database: Anthozoa
Generation Date: February 19, 2004 11:27 AM

ACTINIARIA

ENDOCOELANTHEAE Carlgren, 1925

ACTINIIDAE Gosse, 1858
Actinia Linnaeus, 1758
australiensis Carlgren, 1950
Actinia australiensis Carlgren, 1950
tenebrosa Farquhar, 1898
Actinia tenebrosa Farquhar, 1898
Actiniogeton Carlgren, 1938
spenceri (Haddon & Duerden, 1896)
Actinioides spenceri Haddon & Duerden, 1986
Anemonia Risso, 1826
sulcata Pennant, 1777
Anemonia sulcata Pennant, 1777
Actinia cereus Ellis & Solander, 1786
Anemonia vagans Risso, 1826
Anthopleura Duchassaing & Michelotti, 1860
aureoradiata (Stuckey, 1909)
Bunodes aureoradiata Stuckey, 1909
dixoniana (Haddon & Shackleton, 1893)
Actinioides dixoniana Haddon & Shackleton, 1893
Actinioides papuensis Haddon, 1898
inconspicua Hutton, 1878
Anthopleura inconspicua Hutton, 1878
nigrescens (Verrill, 1928)
Tealiopsis nigrescens Verrill, 1928
Anthopleura pacifica Uchida, 1938
Anthopleura handi Dunn, 1978
Aulactinia Verrill, 1864
veratra (Drayton in Dana, 1846)
Actinia veratra Drayton in Dana, 1846
Cribrina verruculata Lager, 1911
Bunodactis Verrill, 1899
maculosa Carlgren, 1954
Bunodactis maculosa Carlgren, 1954
rubrofusca Carlgren, 1924
Bunodactis rubrofusca Carlgren, 1924
Dofleinia Wassilieff, 1908
armata Wassilieff, 1908

Dofleinia armata Wassilieff, 1908
Epiactis Verrill, 1869
australiensis Carlgren, 1950
Epiactis australiensis Carlgren, 1950
thompsoni Coughtrey, 1875
Actinia thompsoni Coughtrey, 1875
Epiactis adeliana Carlgren and Stephenson, 1929
Epiactis georgiana Carlgren, 1927
Glyphoperidium bursa Roule, 1909
Isactinia Carlgren, 1900
carlgreni Lager, 1911
Isactinia carlgreni Lager, 1911
olivacea Hutton, 1878
Anthea olivacea Hutton, 1878
Isanemonia Carlgren, 1950
australis Carlgren, 1950
Isanemonia australis Carlgren, 1950
Macrodactyla Haddon, 1898
aspera (Haddon & Shackleton, 1893)
Condylactis aspera Haddon & Shackleton, 1893
doreensis (Quoy & Gaimard, 1833)
Actinia doreensis deBlainville, 1830
Condylactis gelam Haddon & Shackleton, 1893
Macrodactyla stephensoni (?possibly not a valid species – no authorship)
Oulactis Milne-Edwards & Haime, 1851
mcmurrichi (Lager, 1911)
Saccactis australis Lager, 1911
Saccactis mcmurrichi Lager, 1911
Saccactis musculosa Lager, 1911
Saccactis coliumensis Riemann-Zurneck & Gallardo, 1990
muscosa (Drayton in Dana, 1846)
Metridium muscosum Dayton in Dana, 1846
Oulactis plicatus Hutton, 1878
Parantheopsis cruentata (Couthay in Dana, 1846)
Phlyctenactis Stuckey, 1909
tuberculosa (Quoy & Gaimard, 1833)
Actinia tuberculosa Quoy & Gaimard, 1833
Phlyctenactis retifera Stuckey, 1909
Phlyctenanthus Carlgren, 1949
australis Carlgren, 1949
Phlyctenanthus australis Carlgren, 1949
Stylobates Dall, 1903
loisetteae Fautin, 1987
Stylobates loisetteae Fautin, 1987
Telactinia England, 1987
citrina (Haddon & Shackleton, 1893)
Anemonia citrina Haddon & Shackleton, 1893
Urticina felina (Linnaeus, 1761)
Urticinopsis crassa Carlgren, 1938

ACTINODENDRONIDAE Haddon, 1898
Actinodendron de Blainville, 1830
alcyonoideum Quoy & Gaimard, 1833
Actinodendron alcyonoideum Quoy & Gaimard, 1833
glomeratum Haddon, 1898

Actinodendron glomeratum Haddon, 1898
plumosum Haddon, 1898
Actinodendron plumosum Haddon, 1898
Megalactis Ehrenberg, 1834
griffithsi Saville-Kent, 1893
Megalactis griffithsi Saville-Kent, 1893

ACTINERNIDAE
Actinernis elongatus (Hertwig, 1882)

ACTINOSTOLIDAE Carlgren, 1932
Hormosoma scotti Stephenson, 1918
Sicyonis Hertwig, 1882
erythrocephala (Pax, 1922)
Cymbactis erythrocephala Pax, 1922
Sicyonis aurora Carlgren & Stephenson, 1929
Sicyonis antarctica Carlgren, 1939
Stomphia selaginella (Stephenson, 1918)

ALICIIDAE Duerden, 1895
Alicia Johnson, 1861
rhadina Haddon & Shackleton, 1893
Alicia rhadina Haddon & Shackleton, 1893
Triactis Klunzinger, 1877
producta Klunzinger, 1877
Triactis producta Klunzinger, 1877
Viatrix cincta Haddon & Shackleton, 1893
Phyllodiscus indicus Stephenson, 1922

BOLOCEROIDIDAE Carlgren, 1924
Boloceroides Carlgren, 1899
mcmurrichi (Kwietniewski, 1898)
Bolocera mcmurrichi Kwietniewski, 1898
Boloceroides hermaphroditica Carlgren, 1900
Nectothela lilae Verrill, 1928
Bunodeopsis Andres, 1881
australis Haddon, 1898
Bunodeopsis australis Haddon, 1898

CONDYLANTHIDAE Stephenson, 1922
Charisella Carlgren, 1949
elongata Carlgren, 1949
Charisella elongata Carlgren, 1949

DISCOSOMATIDAE
Rhodactis bryoides Haddon and Shackleton, 1893

EDWARDSIIDAE Andres, 1881
Edwardsia de Quatrefages, 1842
vivipara Carlgren, 1950
Edwardsia vivipara Carlgren, 1950
Edwardsia meridianalis Williams, 1981
Edwardsianthus England, 1987
gilbertensis Carlgren, 1931
Edwardsia gilbertensis Carlgren, 1931
pudica (Klunzinger, 1877)

Edwardsia pudica Klunzinger, 1877
Edwardsia adenensis Faurot, 1895
Edwardsia rakaiyae Bourne, 1916
Edwardsia bocki Carlgren, 1931

HALCAMPIDAE Andres, 1883
Halianthella Kwietniewski, 1895
kerguelensis (Studer, 1879)
Edwardsia kerguelensis Studer, 1879
Marsupifer valdiviae Carlgren, 1901
Rhytidactis antarctica Pax, 1922
Dimyactis duplicata Pax, 1922

HALOCLAVIDAE Verrill, 1899
Anemonactis Andres, 1881
clavus (Quoy & Gaimard, 1833)
Actinia clavus Quoy & Gaimard, 1833
Peachia Gosse, 1855
hilli Wilsmore, 1911
Peachia hilli Wilsmore, 1911

HORMATHIIDAE Carlgren, 1932
Actinauge granulata Cargren, 1928
Actinauge verrilli McMurrich, 1893
Amphthianthus capensis Carlgren, 1928
Calliactis Verrill, 1869
marmorata Studer, 1879
Calliactis marmorata Studer, 1879
polypus (Forskal, 1775)
Priapus polypus Forskal, 1775
Actinia decorata Couthoy in Dana, 1846
Adamsia miriam Haddon & Shackleton, 1892
Calliactis armillatas Verrill, 1928
Cricophorus Carlgren, 1924
nutrix (Stuckey, 1909)
Sagartia nutrix Stuckey, 1909
Hormathianthus Carlgren, 1943
tuberculatus Carlgren, 1943
Hormathianthus tuberculatus Carlgren, 1943
Paraphellia Haddon, 1889
hunti Haddon & Shackleton, 1893
Paraphellia hunti Haddon & Shackleton, 1893
lineata Haddon & Shackleton, 1893
Paraphellia lineata Haddon & Shackleton, 1893

ISOPHELLIIDAE Stephenson, 1935
Epiphellia Carlgren, 1949
anneae Carlgren, 1950
Epiphellia anneae Carlgren, 1950
browni (Wilsmore, 1911)
Phellia browni Wilsmore, 1911
capitata (Wilsmore, 1911)
Phellia capitata Wilsmore, 1911
elongata Carlgren, 1950
Epiphellia elongata Carlgren, 1950

Isophellia Carlgren, 1900
stella Cutress, 1971
Isophellia stella Cutress, 1971
Telmatactis Gravier, 1916
australiensis Carlgren, 1950
Telmatactis australiensis Carlgren, 1950
devisi (Haddon & Shackleton, 1893)
Phellia devisi Haddon & Shackleton, 1893
insignis Carlgren, 1950
Telmatactis insignis Carlgren, 1950
sipunculoides (Haddon & Shackleton, 1893)
Phellia sipunculoides Haddon & Shackleton, 1893
stephensoni Carlgren, 1950
Telmatactis stephensoni Carlgren, 1950
vermiformis (Haddon, 1898)
Phellia vermiformis Haddon, 1898

MINYADIDAE Milne Edwards, 1857
Minyas Cuvier, 1817
torpedo Bell, 1886
Minyas torpedo Bell, 1886

PHYMANTHIDAE Andres, 1883
Heteranthus Klunzinger, 1877
verruculatus Klunzinger, 1877
Heteranthus verruculatus Klunzinger, 1877
Phymanthus Milne Edwards & Haime, 1871
muscosus Haddon & Shackleton, 1893
Phymanthus muscosus Haddon & Shackleton, 1893

SAGARTIIDAE Gosse, 1858
Actinothoe Fischer, 1889
carlgreni (Haddon & Duerden, 1896)
Sagartia carlgreni Haddon & Duerden, 1896
glandulosa Carlgren, 1954
Actinothoe glandulosa Carlgren, 1954
milmani (Haddon & Shackleton, 1893)
Thoe milmani Haddon & Shackleton, 1893
plebeia (Haddon, 1898)
Sagartia plebeia Haddon, 1898
Anthothoe Carlgren, 1938
albocincta (Hutton, 1878)
Gregoria albocinta Hutton, 1878
australiae (Haddon & Duerden, 1896)
Mitactis australiae Haddon & Duerden, 1896
australiensis Carlgren, 1950
Anthothoe australiensis Carlgren, 1950
similis (Haddon & Duerden, 1896)
Mitactis similis Haddon & Duerden, 1896
Artemidactis victrix Stephenson, 1918

SAGARTIOMORPHIDAE Carlgren, 1934
Sagartiomorphe Kwietniewski, 1898
carlgreni Kwietniewski, 1898
Sagartiomorphe carlgreni Kwietniewski, 1898

STICHODACTYLIDAE Andres, 1883
Heteractis Milne Edwards, 1857
aurora (Quoy & Gaimard, 1833)
Actinia aurora Quoy & Gaimard, 1833
Bunodes koseirensis Klunzinger, 1877
Phymanthus simplex Haddon & Shackleton, 1893
Antheopsis koseirensis Krempf, 1905
crispa (Hemprich & Ehrenberg in Ehrenberg, 1834)
Actinia crispa Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia paumotensis Couthouy in Dana, 1846
Discosoma macrodactylum Haddon & Shackleton, 1893
Radianthus kukenthali Kwietniewski, 1896
Discosoma tuberculata Kwietniewski, 1898
Radianthus lobatus Kwietniewski, 1898
magnifica (Quoy & Gaimard, 1833)
Actinia magnifica Quoy & Gaimard, 1833
Helianthopsis ritteri Kwietniewski, 1898
Helianthopsis mabrucki Carlgren, 1900
malu (Haddon & Shackleton, 1893)
Discosoma malu Haddon & Shackleton, 1893
Stichodactis papillosa Kwietniewski, 1898
Antheopsis concinnata Lager, 1911
Stichodactis glandulosa Lager, 1911
Stichodactis kwietniewskii Lager, 1911
Macranthea cookei Verrill, 1928
Stichodactyla Brandt, 1835
duerdeni Carlgren, 1900
Homostichanthus duerdeni Carlgren, 1900
gigantea (Forskål, 1775)
Priapus giganteus Forskål, 1775
Actinia parvitentaculata Quoy & Gaimard, 1833
Actinia amethystina Quoy & Gaimard, 1833
Discosoma kenti Haddon & Shackleton, 1893
Stoichactis intermedia Lager, 1911
haddoni (Saville-Kent, 1893)
Discosoma haddoni Saville-Kent, 1893
mertensii Brandt, 1835
Stichodactyla mertensii Brandt, 1835
tapetum (Hemprich & Ehrenber in Ehrenbe, 1834)
Actinia tapetum Hemprich & Ehrenberg in Ehrenberg, 1834
Homactis rupicola Verrill, 1870
Discosoma ambonensis Kwietniewski, 1898
Stoichactis australis Lager, 1911
Stoichactis laevis Lager, 1911

THALASSIANTHIDAE Milne Edwards, 1857
Actineria de Blainville, 1834
dendrophora Haddon & Shackleton, 1893
Actineria dendrophora Haddon & Shackleton, 1893
Cryptodendrum Klunzinger, 1877
adhaesivum Klunzinger, 1877
Cryptodendrum adhaesivum Klunzinger, 1877
Stoichactis digitata Doumenc, 1973
Entacmaea Ehrenberg, 1834

quadricolor (Ruppell & Leuckar, 1828)
Actinia quadricolour Leuckart in Ruppell & Euckart, 1828
Actinia vas Quoy & Gaimard, 1833
Actinia erythrosoma Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia adhaerens Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia helianthus Hemprich & Ehrenberg in Ehrenberg, 1834
Actinia ehrenbergii Brandt, 1835
Crambactis arabica Haeckel, 1876
Condylactis ramsayi Haddon & Shackleton, 1893
Anemonia kwoiam Haddon & Shackleton, 1893
Condylactis gelam Haddon & Shackleton, 1893
Gyrostoma hertwigi Kwietniewski, 1896
Gyrostoma stuhlmanni Carlgren, 1900
Antheopsis carlgreni Lager, 1911
Gyrostoma sulcatum Lager, 1911
Gyrostoma haddoni Lager, 1911

Heterodactyla Ehrenberg, 1834
hemprichii Ehrenberg, 1834
Heterodactyla hemprichii Ehrenberg, 1834
hypnoides Saville-Kent, 1893
Heterodactyla hypnoides Saville-Kent, 1893

NO FAMILY CLASSIFICATION AVAILABLE:

Aulactinia sulcata (Clubb, 1909)
Calliactis algoaensis Carlgren, 1938
Calliactis parasitica (Couch, 1844)
Capnea georgiana (Carlgren, 1927)
Gyractis excavata Boveri, 1893
Hormatia lacunifera (Stephenson, 1918) (?may not be a valid species)
Paractis papaver (Drayton in Dana, 1846)
Saccactis mcmurrichi Lager, 1911

Attachment 10.2

Overseas museums holding Australian specimens

In the course of this study, we have found numerous examples of Australian specimens stored in overseas museums. Where published, these records will contribute to the database. The following is a list of museums known to hold types or mentioned material of anemones from Australian locations.

- American Museum of Natural History (New York, U.S.A.)
- Bernice P. Bishop Museum (Hawaii, U.S.A.)
- California Academy of Sciences, (Los Angeles, U.S.A.)
- Museum für Naturkunde der Humboldt Universität (Berlin, Germany)
- Muséum National d'Histoire Naturelle (Paris, France)
- Museum of Natural History, University of Copenhagen (Denmark)
- Museum of Zoology, Lund University (Lund, Sweden)
- Naturhistoriska Riksmuseet (Stockholm, Sweden)
- Phyletisches Museum (Jena, Germany)
- Royal Scottish Museum (Edinburgh, Scotland)
- Senckenberg Museum (Ffrankfurt am Main, Germany)
- The Natural History Museum (London, U.K.)
- United States National Museum (Smithsonian Institution) Natural History Museum (Washington DC, U.S.A.
- University Museum of Zoology, Cambridge (Cambridge, U.K.)
- Zoologisches Museum, Hamburg (Hambeurg, Germany)
- Zoologische Staatssammlung München (Munich, Germany))

Attachment 10.3 Attribution Database of Australian Anemones.