NEW RECORDS OF MYTILIDAE FROM THE NORTHERN SOUTH WEST AFRICAN COAST

By

BRIAN KENSLEY and MARY-LOUISE PENRITH

Cape Town      Kaapstad
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BRIAN KENSLEY

&

MARY-LOUISE PENRITH

South African Museum, Cape Town

(With 5 figures)

[MS. received 31 July 1969]

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INTRODUCTION

During expeditions of the State Museum, Windhoek, accompanied on two occasions by staff members of the South African Museum, to the northern coast of South West Africa in 1968 and 1969, material was collected which indicated an interesting mytilid fauna. Prior to these expeditions, the intertidal fauna of the South West African coast north of Swakopmund (22°40'S, 14°34'E) was completely unknown. Collecting was carried out at several localities (table 1 and figure 1). The following species of Mytilidae were collected:

Localities

\[ \begin{align*}
\text{Aulacomya magellanica (Chemnitz)} & \quad \text{Torra Bay; Möwe Bay; Rocky Point} \\
\text{Choromytilus meridionalis (Krauss)} & \quad \text{Möwe Bay} \\
\text{Gregariella simplicifilis} \quad \text{Barnard} & \quad \text{Honolulu; Torra Bay; Möwe Bay; Rocky Point; 4-5 miles south of Kunene R. mouth} \\
\text{Modiolus carvalhoi} \quad \text{Klappenbach} & \quad \text{Möwe Bay; Rocky Point; 4-5 miles south of Kunene R. mouth} \\
\text{Perna perna (Linnaeus)} & \quad \text{Toscanini; Honolulu; Torra Bay; 42 miles north of Unjab R. mouth; Möwe Bay; Rocky Point; Angra Fria; 4-5 miles south of Kunene R. mouth} \\
\text{Semimytilus algosus (Gould)} & \quad \text{Toscanini; 42 miles north of Unjab R. mouth; Möwe Bay; Rocky Point; Cape Frio; Angra Fria}
\end{align*} \]

Fig. 1. Map of South West Africa showing localities where collections were made.
The distribution of the common species of Mytilidae on the South West African coast indicates a difference in fauna between the southern and northern areas. The common Mytilidae of the southern South West African coast at least as far north as Lüderitzbucht (26°38'S, 15°10'E) are the same as those of the western Cape coast, i.e. Choromytilus meridionalis and Aulacomya magellanica (Penrith & Kensley, in press). These are replaced from the region of Walvis Bay (22°59'S, 14°31'E) northwards by Perna perna. There is some overlap. Choromytilus meridionalis has been recorded from Walvis Bay (Lamy, 1931, see Barnard, 1964), and a single small specimen (8.3 mm) was collected from a kelp holdfast at Möwe Bay in June 1969. Aulacomya magellanica was found in very small numbers as far north as Rocky Point; the specimens were very small (6.1–27.8 mm), the average size reached on the southern coast being over 60 mm. Barnard (1964) recorded Perna perna as occurring rarely at Lüderitzbucht. Perna perna is abundant from Swakopmund northwards, and reaches a large size, specimens of over 100 mm being common.

The occurrence on the northern South West African coast of the three species of Mytilidae discussed below is but one indication of the extremely interesting nature of the fauna of that area. Two of them are otherwise known only from the Pacific coast of South America, and one was recently described from the southern Cape Province to Natal.

**Notes on Species**

*Semimytilus algosus* (Gould, 1850)

(Figs 2, 3, 4)

Mytilus algosus Gould, 1850: 344.

Semimytilus algosus: Soot-Ryen, 1955: 25, pl. 4, fig. 17, text-figs 8, 9, 14, 15, 16 (synonymy); 1959: 25.

**Material**

<table>
<thead>
<tr>
<th>Catalogue No.</th>
<th>Size range (mm)</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.A.M. A31302</td>
<td>1.2–38.5</td>
<td>Rocky Point</td>
<td>13–16 June 1969</td>
</tr>
<tr>
<td>S.A.M. A31303</td>
<td>1.0–12.4</td>
<td>Möwe Bay</td>
<td>30 May–3 June 1969</td>
</tr>
<tr>
<td>S.A.M. A31294</td>
<td>1.0–22.8</td>
<td>Angra Fria</td>
<td>29 September 1968</td>
</tr>
<tr>
<td>S.A.M. A31301</td>
<td>0.9–18.9</td>
<td>Cape Frio</td>
<td>29 September 1968</td>
</tr>
<tr>
<td>S.A.M. A31295</td>
<td>0.9–14.9</td>
<td>Rocky Point</td>
<td>7 October 1968</td>
</tr>
<tr>
<td>S.A.M. A31300</td>
<td>2.9–10.0</td>
<td>Toscanini</td>
<td>10 November 1968</td>
</tr>
<tr>
<td>S.A.M. A31296</td>
<td>3.0–9.0</td>
<td>42 miles N.</td>
<td>8 November 1968</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unjab R.M.</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 1. Localities where collecting was carried out 1968/69

<table>
<thead>
<tr>
<th>Location</th>
<th>Latitude/Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toscanini</td>
<td>20°51'8, 13°25'E</td>
</tr>
<tr>
<td>Honolulu</td>
<td>20°36'S, 13°18'E</td>
</tr>
<tr>
<td>Torra Bay</td>
<td>20°18'8, 13°15'E</td>
</tr>
<tr>
<td>42 miles north of</td>
<td>19°44'8, 12°54'E</td>
</tr>
<tr>
<td>Unjab R. mouth</td>
<td></td>
</tr>
<tr>
<td>Mőwe Bay</td>
<td>19°20'8, 12°43'E</td>
</tr>
<tr>
<td>Rocky Point</td>
<td>18°59'S, 12°29'E</td>
</tr>
<tr>
<td>Cape Frio</td>
<td>18°26'S, 12°00'E</td>
</tr>
<tr>
<td>Angra Fria</td>
<td>18°17'S, 11°57'E</td>
</tr>
<tr>
<td>4-5 miles south of</td>
<td>17°15'S, 11°45'E</td>
</tr>
<tr>
<td>Kunene R. mouth</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2. Decrease in number of hinge teeth with increase in length of *Semimytilus algosus*

<table>
<thead>
<tr>
<th>Shell length (mm)</th>
<th>No. of hinge teeth</th>
<th>Mean no.</th>
<th>No. of specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1·0-4·0</td>
<td>16-23</td>
<td>18·9</td>
<td>10</td>
</tr>
<tr>
<td>4·1-5·0</td>
<td>11-22</td>
<td>15·9</td>
<td>10</td>
</tr>
<tr>
<td>5·1-6·0</td>
<td>9-20</td>
<td>14·3</td>
<td>10</td>
</tr>
<tr>
<td>6·1-7·0</td>
<td>3-16</td>
<td>8·3</td>
<td>12</td>
</tr>
<tr>
<td>7·1-8·0</td>
<td>3-10</td>
<td>6·3</td>
<td>14</td>
</tr>
<tr>
<td>8·1-9·0</td>
<td>2-13</td>
<td>5·9</td>
<td>8</td>
</tr>
<tr>
<td>9·1-10·0</td>
<td>0-7</td>
<td>3·6</td>
<td>7</td>
</tr>
<tr>
<td>10·1-12·0</td>
<td>0-5</td>
<td>1·0</td>
<td>7</td>
</tr>
<tr>
<td>12·1-38·5</td>
<td>0</td>
<td>0·0</td>
<td>8</td>
</tr>
</tbody>
</table>

Remarks

Barnard (1964) mentioned specimens of Mytilidae in the collection of the South African Museum collected by the University of Cape Town at Cape Cross (21°45'S, 13°37'E) in South West Africa that fitted the definition of the monospecific genus *Semimytilus* by Soot-Ryen (1955). These specimens were later identified by Dr. Soot-Ryen as *Semimytilus algosus* (Mr. P. A. Hulley, personal communication), known from the Pacific coast of South America (Ecuador; Chile; Juan Fernandez Islands) (Soot-Ryen, 1955). In South West Africa this species appears to be confined to the northern part of the coast, the southernmost record being Swakopmund (South African Museum); it is common at most localities between Swakopmund and Angra Fria. Small specimens are abundant amongst coralline algae and kelp holdfasts, and the byssus threads of large *Perna perna*.

The numerous small specimens collected show slight variation in shell shape and marginal crenulation. However, all the specimens examined, from the very smallest, show the division of the anterior byssus retractor muscle into two parts (fig. 2), a feature characteristic of *Semimytilus*. All the specimens showing this feature have therefore been assigned to *Semimytilus algosus*. 
FIG. 2. Byssus musculature of a 2.0 mm *Semimytilus algosus*.

A.B.R.M. - Anterior Byssus Retractor Muscle
B. - Byssus
F. - Foot
F.R.M. - Foot Retractor Muscle
P.B.R.M. - Posterior Byssus Retractor Muscle

FIG. 3. Mean number of hinge teeth at different shell lengths in *Semimytilus algosus*.
Soot-Ryen (1959) showed that *Semimytilus algosus* does vary somewhat in shape with growth. Barnard (1964) stated that *Semimytilus* lacks hinge teeth, although this character is not included in the original diagnosis of the genus by Soot-Ryen (1955), and there are also no teeth on the anterior margin (Soot-Ryen, 1955). In the present samples, small specimens were found to have 1–3 teeth on the anterior margin up to a shell length of about 3.5 mm; no anterior teeth were found in any specimens from 4.0 mm upwards. Furthermore, small specimens were found to have teeth behind the ligament along the hinge line, but specimens of 12 mm or more had no teeth along the hinge. It was noted that in general the smallest specimens had the most teeth. Measurements and tooth counts were made on a number of specimens of different sizes, and they are shown in table 2 and figure 3. Although there was considerable individual variation, some specimens retaining numerous teeth at a much greater size than others, there was a strongly-marked tendency to reduce the number of teeth with size. This reduction is apparently caused by the teeth being progressively overlain with nacre during growth. The hinge line at different stages is illustrated in figure 4.

![Figure 4: Hinge line at different stages of development of *Semimytilus algosus*: a. 2.1 mm; b. 7.0 mm; c. 10.6 mm.](image-url)
Modiolus carvalhoi Klappenbach, 1966

(Fig. 5)

Modiolus carvalhoi Klappenbach, 1966: 251, figs 1–5, 7, 8.

Material

<table>
<thead>
<tr>
<th>Catalogue No.</th>
<th>Size range (mm)</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.A.M. A31299, S.M. M251</td>
<td>2.9–10.3</td>
<td>Rocky Point</td>
<td>13–15 June 1969</td>
</tr>
<tr>
<td>S.A.M. A31304, S.M. M252</td>
<td>3.0–19.3</td>
<td>Möwe Bay</td>
<td>30 May–3 June 1969</td>
</tr>
</tbody>
</table>

Description


Remarks

The South West African specimens agree well with descriptions and figures of both Modiolus carvalhoi, from Brazil, and Modiolus capax (Conrad, 1837), from the Pacific coast of South America. Both these species are distinguished from the other species of Modiolus by the serrate periostracal hairs. The periostracal hairs of the South West African specimens appear somewhat broader, with broader processes, than those figured for Pacific specimens of Modiolus capax by Soot-Ryen (1955). The hairs of Modiolus carvalhoi from Brazil are also broader, in general, but those of the South West African specimens do not resemble Klappenbach’s (1966) figures for that species very closely either. In his description of Modiolus capax, Soot-Ryen (1955) stated the breadth of the periostracal hairs to be a variable feature, and this certainly seems to be the case in Modiolus carvalhoi from Brazil (Klappenbach, 1966, figures 3–5) and in the South West African specimens (fig. 5b).

Modiolus carvalhoi is further distinguished from Modiolus capax by the position of the umbones and by its smaller size. In both these characters the
South West African specimens resemble *Modiolus carvalhoi*, and they are therefore assigned to that species. However, *Modiolus capax* and *Modiolus carvalhoi* are so similar, and the South West African specimens could so easily be assigned to either, that the placing of the South West African specimens presented some difficulty. The fact that *Modiolus carvalhoi* is geographically nearer to South West Africa than *Modiolus capax* has perhaps had undue influence on our decision. However, two intertidal species otherwise known only from the western American coast have been recorded from South West Africa. One of these is the species discussed above, *Semimytilus algosus*; the other is a brachiopod *Discinisca tenuis* (Sowerby), found in large numbers on the South West African coast from Lüderitzbucht to the Kunene river mouth, and otherwise known only from the coasts of Chile and Peru (Dr. H. M. Muir-Wood, *in litt.*).

On the South West African coast *Modiolus carvalhoi* is strongly cryptic, and occurs intertidally in the bases of algal clumps and in kelp holdfasts.
Gregariella simplicifilis Barnard, 1964

Barnard (1964) gave this name to the common species of *Gregariella* in South African waters in order to clear up the considerable confusion which had previously surrounded its identity (see Barnard, 1964: 402 for synonymy).

**Material**

<table>
<thead>
<tr>
<th>Catalogue No.</th>
<th>Size range (mm)</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.A.M. A31209</td>
<td>6·6</td>
<td>4–5 miles south of Kunene R. mouth</td>
<td>3, 4 October 1968</td>
</tr>
<tr>
<td>S.A.M. A31210, S.M. M259</td>
<td>4·3, 7·2</td>
<td>Honolulu</td>
<td>9 November 1968</td>
</tr>
<tr>
<td>S.A.M. A31297</td>
<td>3·6–6·8</td>
<td>Mőwe Bay</td>
<td>31 May, 3 June 1969</td>
</tr>
<tr>
<td>S.A.M. A31298</td>
<td>7·0</td>
<td>Rocky Point</td>
<td>15 June 1969</td>
</tr>
<tr>
<td>S.A.M. A31305</td>
<td>9·7</td>
<td>Torra Bay</td>
<td>29 May 1969</td>
</tr>
</tbody>
</table>

**Remarks**

Barnard (1964) gave the distribution of this species as St. James, Cape Peninsula (34°07′S, 18°28′E) to Amanzimtoti, Natal (30°04′S, 30°52′E). It has not been recorded from the South African coast west of the Cape Peninsula. The South West African specimens are identical with the South African specimens in the South African Museum collection. The apparent absence of this species from the coast between the Cape Peninsula and the northern South West African coast may be due to the low water temperatures caused by the Benguela upwelling system in that area. However, as this species is strongly cryptic, occurring in the bases of algal clumps, its absence from the cold-water area may be only apparent.

**DISCUSSION**

The replacement of *Aulacomya magellanica* and *Choromytilus meridionalis*, the common mytilids of the southern part of the west coast of southern Africa, by *Perna perna* is almost certainly related to inshore water temperatures. The west coast of southern Africa is subject to the influence of the cold Benguela upwelling system, and Lüderitzbucht is situated within the area of maximal effect of this system (Hart & Currie, 1960; Stander, 1964). The distribution of *Perna perna*, a widely distributed species which also gradually replaces *Aulacomya magellanica* and *Choromytilus meridionalis* in the warmer waters east of Cape Point, is evidently interrupted by the low temperatures which prevail along the west coast. *Aulacomya magellanica* is a species found in southern cool temperate seas (South America, the Falkland Islands, Kerguelen Island), and *Choromytilus meridionalis* is apparently endemic to the South African region; both these species are common on the west coast between Lüderitzbucht and Cape Point. North of Lüderitzbucht inshore temperatures rise (Stander, 1964), and the cold-water fauna is gradually replaced by a tropical one.
One of the six species of mytilids recorded from the northern coast of South West Africa, *Semimytilus algosus*, is otherwise known only from the northern South American Pacific coast. Conditions on the two coasts are parallel in that a cold current or upwelling system flows along both, causing temperate conditions to extend well into tropical latitudes. It is nevertheless surprising to find representatives of the same species so widely separated yet apparently undifferentiated in any way.

**Summary**

Six species of Mytilidae are recorded from the northern coast of South West Africa.

**Acknowledgements**

We are grateful to the South West African Administration and in particular Mr. C. G. Coetzee, Director of the State Museum, Windhoek, for making the expeditions possible, and to the directors of the Sarusas Development Company for assistance and accommodation at Möwe Bay. We are also indebted to Mr. Coetzee for collecting much of the material. We wish to thank Mr. P. A. Hulley, of the South African Museum, for information regarding *Semimytilus algosus*, and Dr. T. Soot-Ryen, of Norway, for commenting on the manuscript.

We are grateful to the Council for Scientific and Industrial Research for a grant towards the expenses of the 1969 expedition.

The Trustees of the South African Museum are grateful to the Council for Scientific and Industrial Research for a grant to publish this paper.

**References**


INSTRUCTIONS TO AUTHORS

Based on

CONFERENCE OF BIOLOGICAL EDITORS, COMMITTEE ON FORM AND STYLE. 1960. 

MANUSCRIPT

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(1) Heading, consisting of informative but brief title, name(s) of author(s), address(es) of
author(s), number of illustrations (plates, figures, enumerated maps and tables) in the article.
(2) Contents. (3) The main text, divided into principal divisions with major headings; sub-
headings to be used sparingly and enumeration of headings to be avoided. (4) Summary.
(5) Acknowledgements. (6) References, as below. (7) Key to lettering of figures. (8) Explanations
to plates.

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all photographs.

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within each name, with suffixes a, b, etc. to the year for more than one paper by the
same author in that year.
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For journal articles give title of article, title of journal in italics (abbreviated according to
the World list of scientific periodicals. 4th ed. London: Butterworths, 1963), series in
parentheses, volume number, part number (only if independently paged) in parentheses,
pagination.

Examples (note capitalization and punctuation)
88: 100–140.
KOEHN, A. J. 1964. Ecological notes on Conus (Mollusca: Gastropoda) in the Trincomalee
KOEHN, A. J. 1960. Spawning behaviour, egg masses and larval development in Conus from
Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Süd-

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by the International Trust for Zoological Nomenclature (particularly articles 22 and 51).
The Harvard system of reference to be used in the synonymy lists, with the full references
incorporated in the list at the end of the article, and not given in contracted form in the
synonymy list.

Example
Scalaqia coronata Lamarck, 1816: pl. 451, figs 5 a, b; Liste: 11. Turton, 1932: 80.