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NEW RECORDS OF MYTILIDAE FROM THE
NORTHERN SOUTH WEST AFRICAN COAST

By

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Cape Town Kaapstad

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(With 5 figures)

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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:

	<i>Localities</i>
<i>Aulacomya magellanica</i> (Chemnitz)	Torra Bay; Möwe Bay; Rocky Point
<i>Choromytilus meridionalis</i> (Krauss)	Möwe Bay
<i>Gregariella simplicifilis</i> Barnard	Honolulu; Torra Bay; Möwe Bay; Rocky Point; 4-5 miles south of Kunene R. mouth
<i>Modiolus carvalhoi</i> Klappenbach	Möwe Bay; Rocky Point; 4-5 miles south of Kunene R. mouth
<i>Perna perna</i> (Linnaeus)	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
<i>Semimytilus algosus</i> (Gould)	Toscanini; 42 miles north of Unjab R. mouth; Möwe Bay; Rocky Point; Cape Frio; Angra Fria

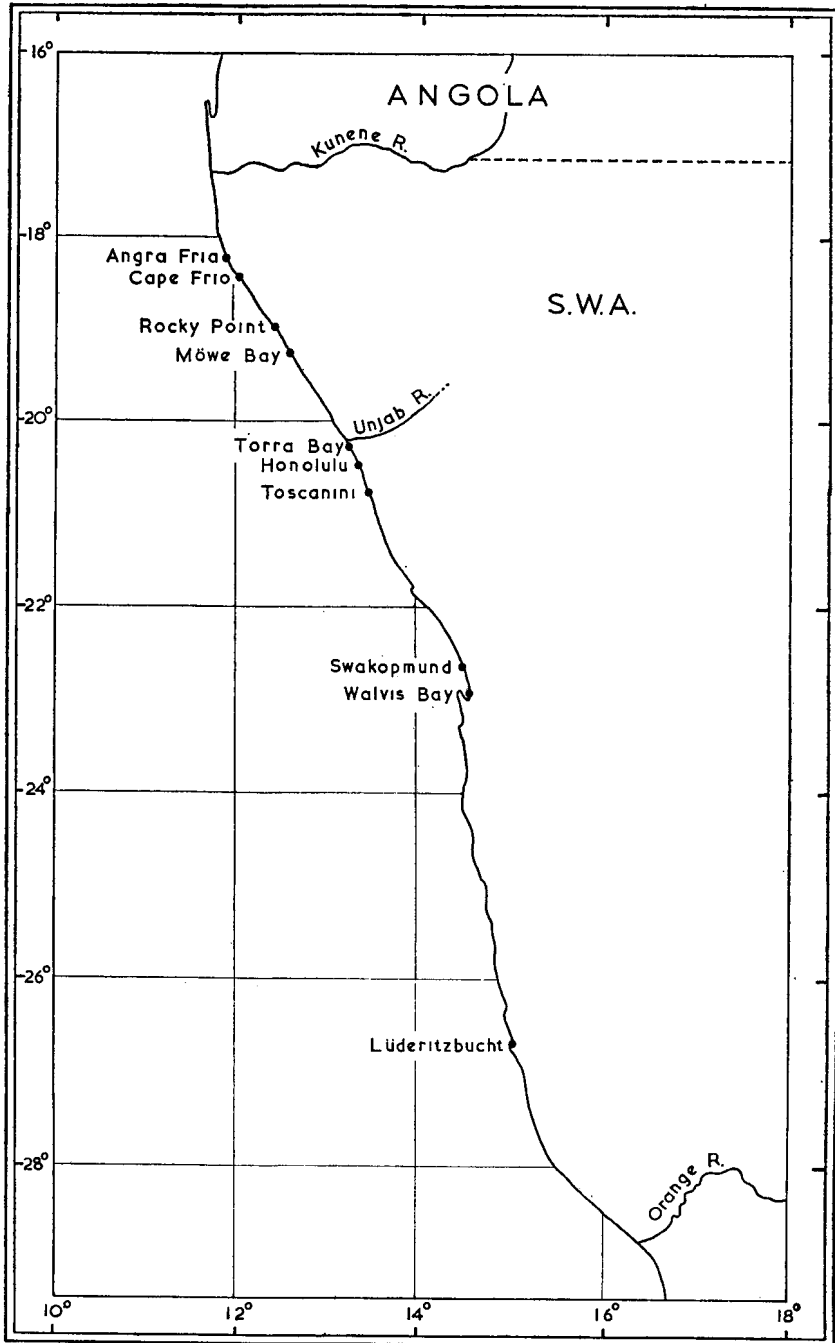


FIG. 1. Map of South West Africa showing localities where collections were made.

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 ($26^{\circ}38'S$, $15^{\circ}10'E$) 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 ($22^{\circ}59'S$, $14^{\circ}31'E$) 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*

<i>Catalogue No.</i>	<i>Size range (mm)</i>	<i>Locality</i>	<i>Date</i>
S.A.M. A31302	1.2–38.5	Rocky Point	13–16 June 1969
S.A.M. A31303, S.M. M256	1.0–12.4	Möwe Bay	30 May–3 June 1969
S.A.M. A31294, S.M. M253	1.0–22.8	Angra Fria	29 September 1968
S.A.M. A31301, S.M. M254	0.9–18.9	Cape Frio	29 September 1968
S.A.M. A31295, S.M. M255	0.9–14.9	Rocky Point	7 October 1968
S.A.M. A31300, S.M. M258	2.9–10.0	Toscanini	10 November 1968
S.A.M. A31296, S.M. M257	3.0–9.0	42 miles N. Unjab R.M.	8 November 1968

TABLE 1. Localities where collecting was carried out 1968/69

Toscanini	..	..	..	..	20°51'S, 13°25'E
Honolulu	..	..	..	..	20°36'S, 13°18'E
Torra Bay	..	..	..	..	20°18'S, 13°15'E
42 miles north of Unjab R. mouth					19°44'S, 12°54'E
Möwe Bay	..	..	..	..	19°20'S, 12°43'E
Rocky Point	..	..	..	..	18°59'S, 12°29'E
Cape Frio	..	..	..	..	18°26'S, 12°00'E
Angra Fria	..	..	..	..	18°17'S, 11°57'E
4-5 miles south of Kunene R. mouth					17°15'S, 11°45'E

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

Shell length (mm)	No. of hinge teeth	Mean no.	No. of specimens
1.0-4.0	16-23	18.9	10
4.1-5.0	11-22	15.9	10
5.1-6.0	9-20	14.3	10
6.1-7.0	3-16	8.3	12
7.1-8.0	3-10	6.3	14
8.1-9.0	2-13	5.9	8
9.1-10.0	0-7	3.6	7
10.1-12.0	0-5	1.0	7
12.1-38.5	0	0.0	8

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*.

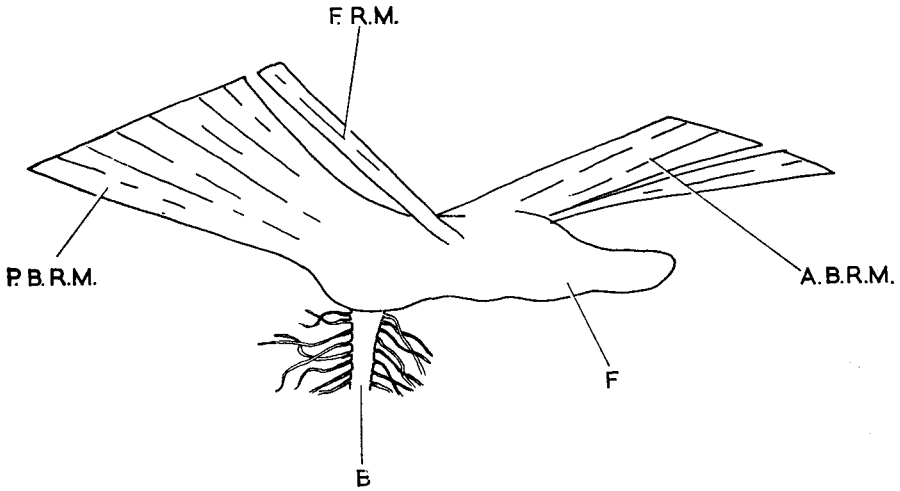


FIG. 2. Byssus musculature of a 2.0 mm *Semimytilus algosus*.

- 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

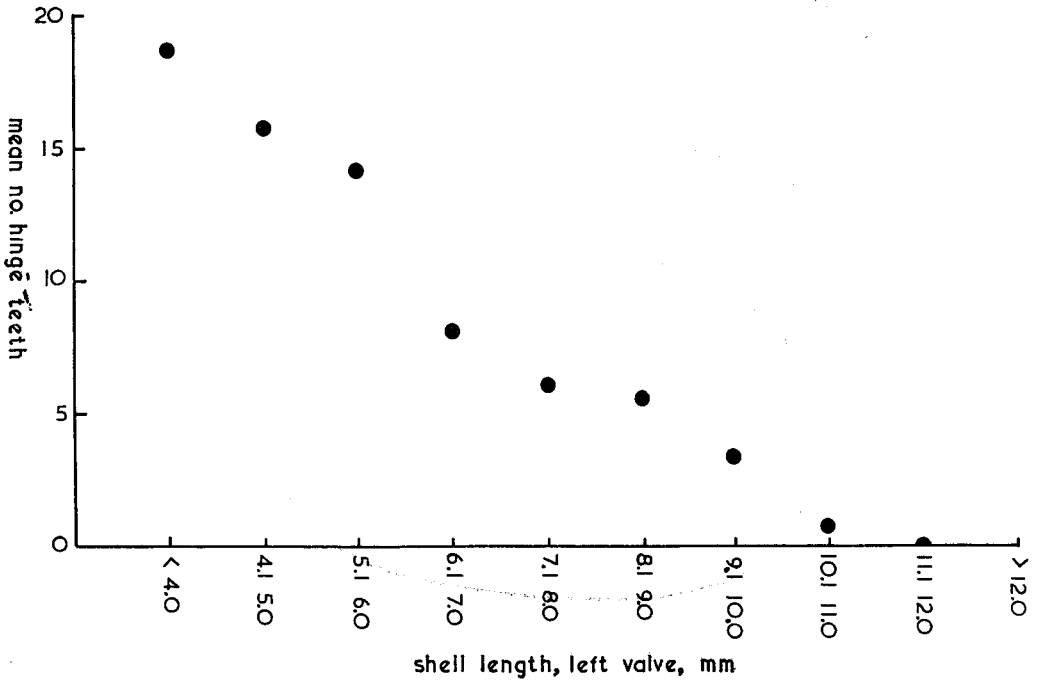


FIG. 3. Mean number of hinge teeth at different shell lengths in *Semimytilus algosus*.

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.

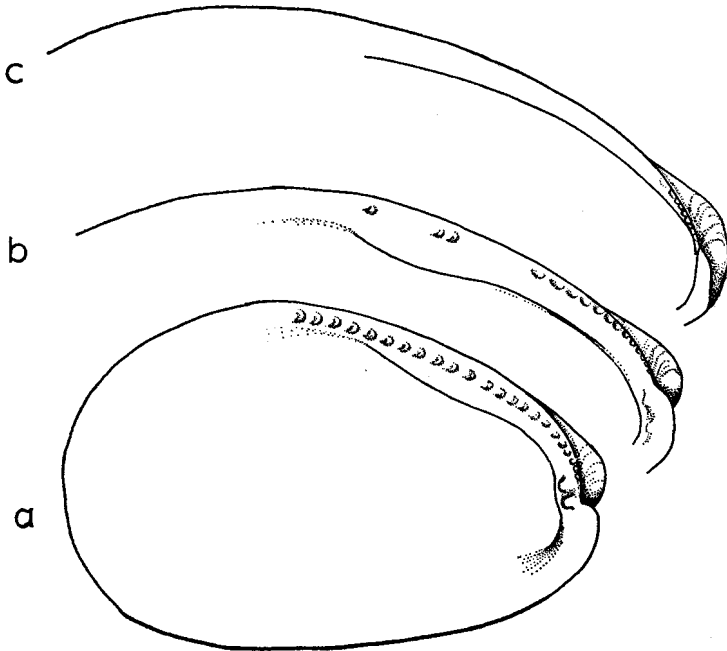


FIG. 4. Hinge line at different stages of development of *Semimytilus algosus*: a. 2.1 mm; b. 7.0 mm; c. 10.6 mm.

Modiolus carvalhoi Klappenbach, 1966

(Fig. 5)

Modiolus carvalhoi Klappenbach, 1966: 251, figs 1-5, 7, 8.*Material*

Catalogue No.	Size range (mm)	Locality	Date
S.A.M. A31306, S.M. M250	9.2-13.9	4-5 miles south of Kunene R. mouth	3-4 October 1968
S.A.M. A31299, S.M. M251	2.9-10.3	Rocky Point	13-15 June 1969
S.A.M. A31304, S.M. M252	3.0-19.3	Möwe Bay	30 May-3 June 1969

Description

Shell elongate, inflated. Dorsal margin shallowly convex, ending slightly behind umbo. Umbo subterminal. Lunule rather indistinct. Antero-dorsal angle about 50°, postero-dorsal angle broadly obtuse. Posterior margin smoothly rounded. Ventral margin straight. Anterior margin very short, convex, barely extending beyond umbo. Hinge without teeth. Inner surface nacreous, muscle scars and pallial line indistinct. Postero-dorsal region internally purplish. Shell externally covered by a thin, moderately shiny cuticle, light brown above to yellowish below; dorsal margin dark brown; a dark brown ray radiating from just behind umbo to posterior margin. Entire shell except antero-ventral region covered with a thick periostracum produced into numerous serrate hairs. A very slight carina from umbo to postero-ventral margin, becoming obsolete posteriorly. Sculpture consisting of irregular concentric growth lines. Ligament occupies about two-thirds dorsal margin. Byssus opening elongate and extremely narrow. Byssus threads moderately long, silky.

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

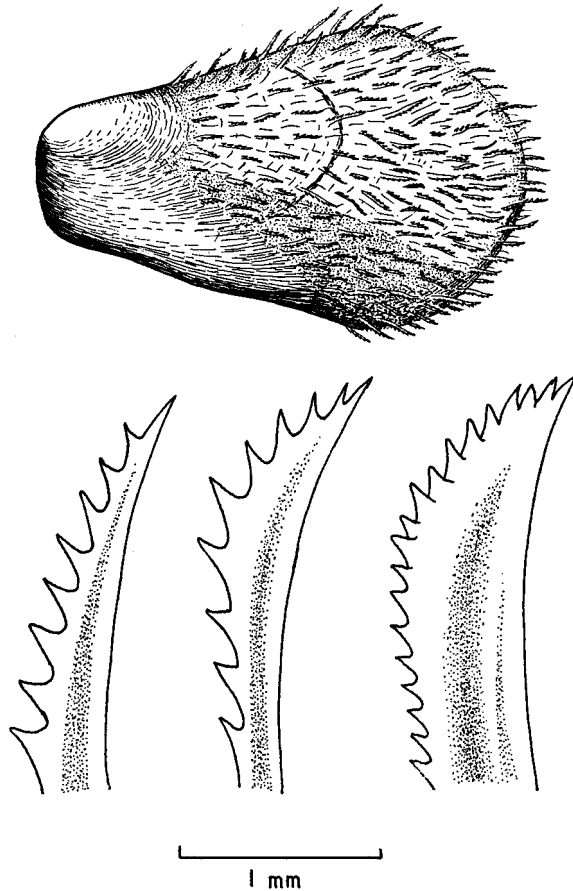


FIG. 5. *Modiolus carvalhoi*, with periostracal hairs further enlarged below.

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

Catalogue No.	Size range (mm)	Locality	Date
S.A.M. A31209	6.6	4-5 miles south of Kunene R. mouth	3, 4 October 1968
S.A.M. A31210, S.M. M259	4.3, 7.2	Honolulu	9 November 1968
S.A.M. A31297	3.6-6.8	Möwe Bay	31 May, 3 June 1969
S.A.M. A31298	7.0	Rocky Point	15 June 1969
S.A.M. A31305	9.7	Torra Bay	29 May 1969

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

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FISCHER, P.-H. 1948. Données sur la résistance et de la vitalité des mollusques. *J. Conch., Paris* **88**: 100-140.

FISCHER, P.-H., DUVAL, M. & RAFFY, A. 1933. Etudes sur les échanges respiratoires des littorines. *Archs Zool. exp. gén.* **74**: 627-634.

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THIELE, J. 1910. Mollusca: B. Polyplacophora, Gastropoda marina, Bivalvia. In Schultze, L. *Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Süd-Afrika*. **4**: 269-270. Jena: Fischer. *Denkschr. med.-naturw. Ges. Jena* **16**: 269-270.

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Example

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