Cephalopod Biodiversity, Ecology and Evolution
Payne, A. I. L., Lipiński, M. R., Clarke, M. R. and M. A. C. Roeleveld (Eds). *S. Afr. J. mar. Sci. 20: 1–16 1998*

THE STATUS AND IMPORTANCE OF CEPHALOPOD SYSTEMATICS IN SOUTHERN AFRICA

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A checklist of southern African cephalopods published in 1974 listed 94 species for the region 20–45°S, 10–40°E. Just 23 years later the number of known species has doubled to an estimated 195, represented in the South African Museum collection by 4 252 accessioned lots (15 434 specimens, excluding many paralarvae). In 1995, cephalopods constituted the sixth most valuable fisheries resource worldwide (after shrimps and tunas). Only one subspecies, *Loligo vulgaris reynaudii*, is targeted in South Africa at present, but it is important commercially because of the high prices it commands internationally. A number of other species constitute alternate resources of potential commercial interest, including at least 12 sepiids, 7 loliginids, 6 ommastrephids and 9 octopods. Cephalopods are also important in the trophic relations of marine fish, birds and mammals. Knowledge of the southern African cephalopod fauna is important not only for regional biodiversity studies but also from a wider perspective. The region is strategically placed between the Atlantic, Indian and Southern oceans and the faunal composition is complex. The southern African cephalopods include about 20–30% of the known world cephalopod species. Resolution of taxonomic problems in the southern African context goes a long way towards global resolution, particularly among the oceanic species. The size and complexity of the South African Museum's cephalopod collection prompted the holding of a systematics workshop to produce a guide to southern African cephalopods. This paper provided a basis for that Biodiversity Workshop. A provisional checklist for the region is provided, species constituting a potential resource for either artisanal or larger fisheries are identified and unresolved problems in the systematics (including an undescribed genus and at least 12, but probably more than 20, new species) are indicated.

The status of cephalopod systematics worldwide is decades behind that of other major marine taxa. The group is very attractive to taxonomists, but difficulties in obtaining adequate funding and material have resulted in a low level of understanding. The group is difficult to study at all stages because, apart from the common inshore *Sepia, Loligo* and *Octopus* species, cephalopods are difficult to catch, relatively sparse, and must therefore be collected *ad hoc*. Museum cephalopod collections are consequently few and constitute valuable sources of information.

Understanding of cephalopod ecology is also poor owing to the paucity of taxonomists and ecologists attracted to the group (Clarke 1996a). Even the giant squid, *Architeuthis,* largest of all invertebrates, is poorly known and the number of *Architeuthis* species worldwide is still unresolved.

Most cephalopod specimens are collected as by-catch in surveys targeting other taxa. Once caught, cephalopods must be fixed carefully, because lack of care with fixation can result in large distortions and, in decapods, loss of sucker rings, which drastically reduces the value of the specimens for systematics. Preservation and storage is also a problem because many cephalopods attain a large size. Managers of wet collections containing large specimens face the recurring problem of finding large containers with good seals at an affordable price. Once preserved, many cephalopods become stiff and working with them is not easy, sometimes becoming a wrestling match with eight arms and two tentacles while trying to examine organs in the mantle cavity.

Just 20 years ago there were 50 times as many researchers working on marine fish as on cephalopods. This was a reflection of the relative economic importance of the two groups, but decline in fish stocks, increase in the total value of cephalopod fisheries and the realization of the importance of cephalopods in the diets of fish, birds and marine mammals are now changing attitudes toward cephalopod studies (Clarke 1996a).

In the last published checklist of southern African cephalopods, 94 species were listed for the area 20–45°S, 10–40°E (Roeleveld 1974). In this paper the area is extended to the border between Angola and Namibia, at about 17°S. The slightly more northern limit to the area is a natural boundary for many species, marking the approximate position where the Benguela Current moves offshore (Shannon 1985). To the south the region extends to about the subtropical convergence, which varies in location with the seasons but generally lies farther north in winter. Off the east coast of southern Africa the boundary at 17°S is an arbitrary one, because tropical species extend southwards in the Moçambique and Agulhas currents to a variable extent.

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Manuscript received: September 1997

As cephalopods were, in 1994, the sixth most valuable fisheries resource worldwide (after redfish, shrimps, cods, tunas and crabs; F.A.O. 1996), the identification of potential resource species may lead to the establishment of new fisheries, which could contribute towards job creation and upliftment in impoverished regions such as the Eastern Cape, KwaZulu-Natal and Moçambique.

The world's commercial cephalopod catch consists largely of species of the families Sepiidae, Loliginidae, Ommastrephidae and Octopodidae, which together contributed 2 776 233 tons, or about 2.5% of the total world catch of marine animals in 1994 (F.A.O. 1997). The most important by mass are the ommastrephids; now that *Todarodes pacificus* has recovered from earlier overfishing it is, as before, by far the most important target species for cephalopod fisheries (504 408 tons in 1994; F.A.O. 1997).

Cephalopods are becoming increasingly important resources in the Indian Ocean. In India, for example, cephalopods are much sought for the export trade, and their fishery production is showing a spectacular growth rate (Narasimham *et al.* 1993). In South Africa only one subspecies, *Loligo vulgaris reynaudii*, is targeted at present. Colloquially known as "white gold", it has been as high as the third most important local marine species commercially because of the high prices it commands internationally (Chief Director Sea Fisheries, unpublished data).

The purpose of this paper is, first, to emphasize the importance of systematics studies as the basis for fisheries and other biological research, and, second, to highlight cephalopod resources, in view of declining finfish stocks. Southern Africa has been slow to recognize the value of cephalopod stocks, which are highly prized farther east. The annotated checklist also provided a baseline for a Biodiversity Workshop in September 1997, as part of the international cephalopod meeting under the auspices of the Cephalopod International Advisory Council (CIAC). This workshop enlisted the help of many of the world's cephalopod systematists to produce a guide to the Cephalopoda of southern Africa.

MATERIAL AND METHODS

The annotated checklist includes species in the South African Museum collection or recorded in the literature for the area 17–45°S, 10–40°E. Genera, subgenera, species and subspecies are listed alphabetically within families. Species known only from beaks in stomachs of highly mobile predators (e.g. *Moroteuthis knipovitchi* and *Kondakovia longimana,* recorded by Clarke 1980) have not been included in the checklist because the locality of predator feeding is unknown and the animals may have been eaten before the predator entered the southern African region. Known taxonomic problems, new taxa and potential resource species are indicated. For the latter, the maximum size is also provided. In the interests of brevity, many oceanic species, not of economic importance nor particularly problematic systematically, have not been annotated. This lack of consistency is due to the length limitation imposed by publication in a symposium volume. Full details and updated systematic treatment of all species will be provided in the results of the aforementioned CIAC '97 workshop.

Abbreviations, symbols and definitions used throughout are given in the tabulation below.

coll.	Collection
det.	Determined (identified)
exotic	Derived from waters other than the southern African region as defined in text
ML	Mantle length (dorsal), in mm
SAM	South African Museum
SAM*, SAM-A*, SAM-S*	Catalogue numbers in the SAM cephalopod collection
sta.	Station
M, F, juv.	Male, female, juvenile
I, II, III	Maturity stages: immature, maturing, mature (as defined by Roeleveld and Liltved 1985)
†	See Tillier and Boucher-Rodoni (1993) and Lu *et al*. (1995) regarding author and date of first publication of species name
‡	Cranchiid species assigned letters or numbers relate to a study of N. A. Voss that is currently in preparation
§	*Bull. mar. Sci.* **49**(1–2) has the date 1991 on its title page. It was actually published on 29 January 1992, so giving the date 1992 to taxonomic description of species

ANNOTATED SPECIES LIST OF CEPHALOPODA IN SOUTHERN AFRICA (17–45°S, 10–40°E)

CLASS CEPHALOPODA

Subclass Nautiloidea

Family Nautilidae
Nautilus pompilius Linnaeus, 1758
Drift shells only.

Subclass Coleoidea

ORDER SEPIOIDEA
Family Spirulidae
Spirula spirula (Linnaeus, 1758)

Family Sepiidae

Sepia aculeata Van Hasselt in Férussac & d'Orbigny, 1835†

Unverified record from Moçambique, specimens donated by fishing industry. Fished commercially in India (Narasimham *et al.* 1993). Also of commercial value in China, Indonesia and Thailand (Chotiyaputta 1993, Khromov *et al.* 1998).

Sepia acuminata Smith, 1916

Common off KwaZulu-Natal and Moçambique (Roeleveld unpublished); of potential commercial value (Khromov *et al.* 1998).

Sepia adami Roeleveld, 1972

Sepia angulata Roeleveld, 1972

Described from shells only; undescribed soft parts in SAM collection.

Sepia australis Quoy & Gaimard, 1832

The most common sepiid off the west coast of South Africa and Namibia (Roeleveld 1972, Sánchez and Villanueva 1989, 1991). Not currently exploited commercially but important in the Benguela foodweb (Lipiński *et al.* 1991). *Sepia elegans*, only slightly larger (max. *ML* 90 mm compared with 83 mm for *S. australis*), is exploited in the Mediterranean (Mangold and Boletzky 1987).

Sepia bertheloti d'Orbigny, 1835†

One shell only, collected between Gonubie and Park Rynie; doubtful record. The species is fished commercially off the Canary Islands (Roper *et al*. 1984).

Sepia burnupi Hoyle, 1904

Sepia confusa Smith, 1916

Fairly common in south-western Indian Ocean (Roeleveld unpublished).

Sepia dubia Adam & Rees, 1966

One of a group of small-bodied species (the 'Hemisepius' group) showing a mosaic of characters that should be reassessed.

Sepia elegans Blainville, 1827

Adam (1952) has discussed the publication dates of d'Orbigny (1826, 1835) as author of this species; see also Tillier and Boucher-Rodoni (1993). Recorded from Namibia (21°10′S, 13°20′E, 180–200 m) and the Agulhas Bank (37°12′S, 22°30′E, 110 m, Filippova *et al.* 1995); the latter position is apparently incorrect, because it lies well south of the Agulhas Bank in about 4 000 m. The South African Museum collection has only exotic specimens. *S. elegans* is taken as by-catch in Mediterranean and West African trawl fisheries (Roper *et al.* 1984).

Sepia faurei Roeleveld, 1972

One of the 'Hemisepius' species group.

Sepia hieronis (Robson, 1924)

Second most abundant sepiid off South Africa's west coast (Augustyn *et al.* 1995). East Coast (Moçambican) specimens show some morphological differences (Roeleveld 1972) that should be reassessed.

Sepia incerta Smith, 1916

Sepia insignis Smith, 1916

A poorly known species; an undescribed male, and additional female, juvenile and shells in the South African Museum collection.

Sepia ivanovi Khromov, 1982

Sepia joubini Massy, 1927

Sepia ?n. sp.

One of the 'Hemisepius' species group. SAM–S1504, one female from 29°40′S, 14°58′E, 330 m.

Sepia orbignyana Férussac, 1826

Enters northern Namibian waters at the extreme southern end of its range. Exploited by western Mediterranean and Saharan-West-African trawl fisheries (Roper *et al*. 1984).

Sepia papillata Quoy & Gaimard, 1832

Large body size (max. *ML* 140 mm), common around South Africa's Western Cape (Khromov *et al*. 1998) and a potential food resource. Two described shell forms (Roeleveld 1972) should be reassessed.

Sepia prashadi Winckworth, 1936

Fished commercially in India (Narasimham *et al*. 1993) and in the Red Sea (Roper *et al*. 1984).

Sepia pulchra Roeleveld & Liltved,1985

One of the 'Hemisepius' species group.

Sepia robsoni (Massy, 1927)

One of the 'Hemisepius' species group, an insufficiently described species (Khromov *et al*. 1998); additional undescribed material in the South African Museum collection.

Sepia simoniana Thiele, 1920

Second most abundant sepiid off South Africa's

south coast (Augustyn *et al*. 1995). Large body size (max. *ML* 190 mm), potentially a commercial species (Khromov *et al*. 1998).

Sepia tuberculata Lamarck, 1798
Common in intertidal rock pools, of potential commercial value because of accessibility (Roeleveld unpublished). Medium sized (max. *ML* 82 mm).

Sepia typica (Steenstrup, 1875)
One of the 'Hemisepius' species group and type species of the genus *Hemisepius* Steenstrup, 1875, currently synonymized with *Sepia* Linnaeus, 1758.

Sepia vermiculata Quoy & Gaimard, 1832
The only sepiid found in southern African estuaries (Roeleveld 1972), large bodied (max. *ML* 287 mm) and probably the most important species of *Sepia* of potential commercial interest. Previously a subspecies of *S. officinalis*; closely related species *S. hierredda* (max. *ML* 450 mm) and *S. officinalis* (*sensu stricto*, max. *ML* 300 mm) exploited in the north-eastern Atlantic, Mediterranean and off West Africa (Bakhayokho and Maigret 1980, Roper and Sweeney 1981, Roper *et al*. 1984, Mangold and Boletzky 1987). *S. officinalis* (*sensu lato*, including *S. officinalis*, *S. hierredda* and *S. vermiculata*) is a highly appreciated food item, particularly in Japan, Korea, Italy and Spain; aquaculture also appears promising (Roper *et al*. 1984).

Sepia zanzibarica Pfeffer, 1884
Commercial species in Gulf of Aden, max. *ML* 250 mm (Khromov *et al*. 1998).

Sepiella cyanea Robson, 1924
Common off KwaZulu-Natal and Moçambique (Roeleveld unpublished); possibly of commercial value, as by-catch in prawn fishery; max. *ML* 80 mm (Adam and Rees 1966).

Sepiella inermis (Van Hasselt in Férussac & d'Orbigny, 1835)†
Fished commercially in India and Thailand (Silas *et al*. 1985d, Chotiyaputta 1993, Narasimham *et al*. 1993); also a subject of experimental aquaculture in Thailand (Chotiyaputta 1993); max. *ML* 124 mm.

Sepiella ornata (Rang, 1837)
Enters Namibian waters at the southern end of its range (Khromov *et al*. 1998). The SAM coll. has only exotic specimens from Muanda, Congo.

Family Sepiolidae
Euprymna stenodactyla (Grant, 1833)

Euprymna sp.
Another species, not *E. stenodactyla*.

Heteroteuthis hawaiiensis dagamensis Robson, 1924
Validity of subspecies doubtful.

Heteroteuthis n.sp.

Inioteuthis capensis Voss, 1962 ? = *Rondeletiola minor* (Naef, 1912)
Synonymy requires resolution.

Inioteuthis japonica Verrill, 1881
Identified by Massy (1927); questionable.

Neorossia ?*caroli* (Joubin, 1902)
Mercer *in litt*. 9/2/1972.

Rossia enigmatica Robson, 1924 ? = *Rossia mastigophora* Chun, 1915.

Rossia n.sp. Lipiński (Sea Fisheries, Cape Town, pers. comm.)

Sepiola sp.

Stoloteuthis leucoptera (Verrill, 1878)

Family Idiosepiidae
Idiosepius biserialis Voss, 1962

Idiosepius macrocheir Voss, 1962

Idiosepius sp.
Some specimens in the South African Museum collection show a mosaic of characters identifying *I. biserialis* and *I. macrocheir.*

ORDER TEUTHOIDEA
Family Loliginidae
A number of different classifications have been proposed for the Loliginidae (Natsukari 1984, Brakoniecki 1986, Nesis 1987, Alexeyev 1992, Okutani 1995, Anderson 1996, Vecchione *et al*. 1998). Until consensus is reached, the genus *Loligo* has been retained for all relevant *Doryteuthis* and *Photololigo* species.

Loligo chinensis Gray, 1849
Enters Moçambican waters at the western end of its range. An important fisheries species throughout the Indo-west-Pacific, though mainly east of the Andaman Islands (Roper *et a*l. 1984, Nesis 1987, Chotiyaputta 1993). Max. *ML* 430 mm (Chotiyaputta 1993).

Loligo duvaucelii d'Orbigny, 1835†

Common inshore north of the Kei River, but not apparently exploited in southern Africa at present. A common Indo-west-Pacific species (Adam 1954), fished commercially throughout its range, from Taiwan south to the Philippines and Banda Sea and west to the Persian Gulf, Red Sea and East Africa (Roper *et al*. 1984, Nateewathana 1992, Chotiyaputta 1993, Narasimham *et al*. 1993). In India there has been a steady increase in production in recent years, as a result of the rising demand in the export trade (Meiyappan *et al*. 1993). Max. *ML* 320 mm (Chotiyaputta 1993). In the Gulf of Aden and Arabian Sea, *L. duvaucelii* is represented by two morphologically distinct forms (Nesis 1987). The collection of seven species of *Photololigo* in Moçambique waters suggests that specimens of *Loligo duvaucelii* in the South African Museum collection may be misidentified and should be re-examined.

Loligo edulis Hoyle, 1885

Large loliginid commercially exploited in the West Pacific (Okutani 1995); the major commercial squid in Hong Kong. Also fished in Japan, the Philippines, probably Indonesia (Roper *et al*. 1984), Thailand (Chotiyaputta 1993) and Malaysia (Ashirin *et al*. 1995), and is of potential commercial interest in North-West Australia (Wadley 1993). Max. *ML* 450 mm (Nesis 1987). *L. edulis* has polymorphic populations (Segawa *et al*. 1993); two morphs of *L. edulis*, distinguishable by size at sexual maturity, occur off northern Australia (Yeatman and Benzie 1993). This was the most common loliginid caught during the Moçambique survey of F.R.S. *Algoa* in 1984, and it is clearly an important potential resource (Roeleveld unpublished).

Loligo pickfordae (Adam, 1954)

A small bodied, poorly known species, max. *ML* 110 (?140) mm (Nesis 1987). Moçambique specimens show character states overlapping with those of *L. duvaucelii*.

Loligo robsoni (Alexeyev, 1992)

Three specimens (two males, one female, *ML* 80–158 mm) from Moçambique were tentatively identified as *L. robsoni*.

Loligo sibogae (Adam, 1954)

Fished commercially in India (Nair and Omana 1985, Silas 1985, Silas *et al*. 1985a, c, Narasimham *et al*. 1993), Thailand (Nateewathana 1992) and taken as by-catch off Taiwan (Roper *et al*. 1984). Max. *ML* 205 mm (Silas *et al*. 1985b). Synonymized with *L. singhalensis* by some authors (Korzun and Alekseev 1991, Okutani 1995).

Loligo singhalensis Ortmann, 1891

Subject of significant fisheries (Nesis 1987), fished commercially off Hong Kong (Voss and Williamson 1971), Philippines (Roper *et al*. 1984), India (Silas 1985, Silas *et al*. 1985c, Narasimham *et al*. 1993). Max. *ML* 500 mm (Roper *et al*. 1984, Nesis 1987). Korzun and Alekseev (1991) consider *Loligo singhalensis* (non Ortmann, 1891) *sensu* Adam (1954) to be *L. edulis* Hoyle, 1885 and *L. singhalensis* (non Ortmann, 1891) *sensu* Voss (1963) to be *L. chinensis* Gray, 1849. *L. edulis* has very distinctive intestinal light organs, each opening into the mantle cavity by a short duct (Sasaki 1929); *L. chinensis* differs from both *L. edulis* and *L. singhalensis* Ortmann in having arm suckers with sharp rather than blunt teeth and a gladius that is widest in the middle rather than in the anterior third (Korzun and Alekseev 1991). Systematics of the whole *Photololigo* species group in the western Indian Ocean is problematic, complicated by both sexual dimorphism and ontogenetic variation.

Loligo vulgaris reynaudii d'Orbigny, 1839–1841†

Established as a subspecies of the North Atlantic *Loligo vulgaris* (*sensu stricto*) on the basis of morphological and electrophoretic evidence (Augustyn and Grant 1988); now the subject of extensive biological and fisheries investigations (e.g. Augustyn 1989, Sauer 1993, Augustyn *et al*. 1994, Lipiński 1994, Smale *et al*. 1995). This subspecies is the basis of the only commercial fishery for cephalopods in southern Africa. It is also one of the most valuable South African fisheries, currently earning more than R100 million (US$23 million in 1997) in exports (Augustyn 1996).

Lolliguncula mercatoris Adam, 1941

Common inshore, the juveniles are very difficult to distinguish from early stages of *Loligo vulgaris reynaudii* and consequently complicate studies of early life history of the latter. Max. *ML* 48 mm, mature specimens are easily distinguished from *L.v. reynaudii* by their small size.

Sepioteuthis lessoniana Férussac in Lesson, 1831†

Indo-west-Pacific from Hawaii, Japan, Australia and New Zealand to the Red Sea, Saya de Malha Bank (Adam 1939, Nesis 1993a) and Moçambique (Nesis 1987); a large squid, max. *ML* 365 mm (Adam 1939). Fished commercially in India (Silas et al. 1985b, Narasimham *et al*. 1993), Thailand (Chotiyaputta 1993) and throughout south-east Asia (Roper *et al*. 1984); also a subject of experimental aquaculture in Thailand (Chotiyaputta 1993). Like *Loligo edulis*, this species has polymorphic populations (Segawa *et al*. 1993).

Family Gonatidae
Gonatus antarcticus Lönnberg, 1899
A single record from southern Africa. In the Falkland Islands, *G. antarcticus* is a major component in the diet of three species of penguin (Thompson 1994).

Family Enoploteuthidae
Abralia (*Abralia*) *steindachneri* Weindl, 1912
An Indian Ocean species, two records off Moçambique.

Abralia (*Asteroteuthis*) *veranyi* (Rüppell, 1844)
A tropical/subtropical Atlantic species. A single record (three specimens) of unknown locality present in the South African Museum collection.

Abralia (*Heterabralia*) *andamanica* Goodrich, 1896
Has only been recorded twice off southern Africa.

Abralia (*Pygmabralia*) ?*redfieldi* Voss, 1955
A single juvenile, *ML* 16 mm, collected during F.R.S. *Africana* Cruise 060.

Abraliopsis (*Abraliopsis*) *pfefferi* Joubin, 1896
Type species of *Abraliopsis*, reduced to a subspecies of *A. hoylei* (Pfeffer, 1884) by Nesis (1987: 179), but considered a separate species by Tsuchiya and Okutani (1988: 129). Specimens in SAM coll. from both the Atlantic and Indian oceans may help to resolve this taxonomic problem.

Abraliopsis (*Micrabralia*) *lineata* (Goodrich, 1896)
A poorly known species, redescribed by Tsuchiya *et al.* (1991) from the Arabian Sea. Two unpublished records from southern Africa (SAM coll.).

Abraliopsis (*Micrabralia*) *gilchristi* (Robson, 1924)
Small body size, one of the most common oceanic species around southern Africa.

Abraliopsis (*Pfefferiteuthis*) *atlantica* Nesis, 1982
Only exotic specimens in SAM coll.

Enoploteuthis sp.
A single specimen from Moçambique.

Family Ancistrocheiridae
Ancistrocheirus lesueurii (d'Orbigny, 1835)†
Thelidioteuthis alessandrini is a synonym. Undescribed mature males with hectocotyli present in SAM coll. This species is believed to have some fishery potential because of its large size (Roper *et al.* 1984); max. *ML* 405 mm (SAM coll., two females ex sperm whales).

Family Pyroteuthidae
Pyroteuthis margaritifera (Rüppell, 1844)

Pterygioteuthis gemmata Chun, 1908

Pterygioteuthis giardi Fischer, 1896

Family Octopoteuthidae
Octopoteuthis indica (Naef, 1923)
Named by Naef (1923: 336, as *Octopodoteuthis indica*) for Chun's (1910: 144, Pl. 17, Figs 3, 4, 9) larger paralarva from *Valdivia* sta.102, 34°31′S, 26°00′E; known only from the holotype.

Octopoteuthis rugosa Clarke, 1980
Attains a large size: max. *ML* 230 mm (Clarke 1980).

Octopoteuthis sicula Rüppell, 1844
Max. *ML* 150 mm (Okutani 1995).

Octopoteuthis megaptera (Verrill, 1885)
Reported from Namibia by Nesis (1991§) and Villanueva and Sánchez (1993). Max. *ML* 200 mm (Okutani 1995).

Taningia danae Joubin, 1931
A large squid, max. *ML* 1.6 m (Roper and Vecchione 1993), important in the diet of sperm whales (Clarke 1967) and believed to have some fishery potential (Roper *et al.* 1984).

Family Onychoteuthidae
Onychoteuthis banksii (Leach, 1817)
A species complex that requires taxonomic resolution (Young 1972).

Onykia carribœa LeSueur, 1821
Probably a complex of species (Voss, in Roeleveld 1975), representing juvenile stages of *Moroteuthis* spp. (Tsuchiya and Okutani 1991§).

Moroteuthis loennbergii Ishikawa & Wakiya, 1914
A single female, *ML* 228 mm, was collected during F.R.S. *Africana* Cruise 060.

Moroteuthis robsoni Adam, 1962
Fairly common in bottom trawls made deeper than about 500 m on the continental slope. Heavily preyed upon by sperm whales, believed to have some fishery potential, max. *ML* 750 mm (Okutani and Hasegawa 1979).

Onychoteuthidae, new genus and species
A total of 14 specimens from 484 to 972 m off the

South-Western Cape (F.R.S. *Africana* Cruise 060), plus one from 31°14′S, 15°35′E, 796 m (hake biomass survey, January 1990).

Family Lepidoteuthidae

Systematic problems concerning the Lepidoteuthidae and Pholidoteuthidae have been discussed by Roper and Lu (1989) and Nesis and Nikitina (1990).

Lepidoteuthis grimaldii Joubin, 1895

One female without tentacles, *ML* 380 mm, and remains of two specimens, from stomachs of three sperm whales taken off Durban (SAM–S650, S673, S2596). Attains a large size: max. *ML* 970 mm; adults known only from stomachs of predators (Clarke 1966).

Family Pholidoteuthidae

Pholidoteuthis boschmai Adam, 1950

? = *Tetronychoteuthis dussumieri* (*sensu* Pfeffer 1900, 1912, non d'Orbigny, 1839; see Roper and Lu 1989, Nesis and Nikitina 1990). One mature male (*ML* 307 mm, SAM–S2435) from the stomach of B*athyraja smithi* caught off the West Coast in 849 m. Fragmentary remains of skin and gladius were recorded by Robson (1926, as *Tetronychoteuthis* sp.) in an otter trawl from S.S. *Pickle* sta. 347, 31°58′S, 16°00′E, 1 229 m. Voss (1967) recorded a juvenile, *ML* 25 mm (as *Tetronychoteuthis dussumieri*), from the stomach of *Alepisaurus ferox* collected a little east (at 31°44′S, 44°35′E) of the southern African region as defined here. Several good specimens from sperm whales (Clarke 1980) taken off Donkergat.

Family Chtenopterygidae

Chtenopteryx sicula (Vérany, 1851)

Largest specimen in SAM coll. has *ML* 95 mm (SAM–S2015). A juvenile, *ML* 13 mm (SAM–A29711), collected with *Tetronychoteuthis dussumieri* (above) a little east of the southern African region (Voss 1967) was re-identified as *Chtenopteryx sepioloides* Rancurel, 1970 (M.A. Salcedo-Vargas, México D.F., Mexico, pers. comm.).

Family Batoteuthidae

?Batoteuthis skolops Young & Roper, 1968

Two questionable records (paralarva, SAM–S450, and tentacles, SAM–S3373).

Family Brachioteuthidae

Brachioteuthis picta Chun, 1910

Brachioteuthis riisei (Steenstrup, 1882)

Brachioteuthis n. sp. (Lipiński, pers. comm.)

Family Lycoteuthidae

Lycoteuthis lorigera (Steenstrup 1875)

Senior synonym of *Lycoteuthis diadema* (see Villanueva and Sánchez 1993); the SAM coll. includes at least 31 males. Important in the diet of sharks, bony fish and smaller cetaceans (Roeleveld *et al*. 1992).

Family Histioteuthidae

Histioteuthis atlantica (Hoyle, 1885)

Histioteuthis bonnellii bonnellii (Férussac, 1834)†

This and the next subspecies may not be clearly separable (Voss *et al*. 1992). Numerous specimens in SAM coll., identified only to species, may help separate the two subspecies. The largest histioteuthid, max. *ML* 330 mm (Morales 1962); important in the diet of sperm whales (Clarke 1966).

Histioteuthis bonnellii corpuscula Clarke, 1980

Max. *ML* 83 mm (Clarke 1980), 90 mm (Nesis 1987).

Histioteuthis celetaria pacifica (G. Voss, 1962)

All SAM holdings are from Moçambique.

Histioteuthis corona corona Voss & Voss, 1962

Histioteuthis hoylei (Goodrich, 1896)

Voss (1967) described two females SAM–A29698, A29750, as *Histioteuthis dofleini*) from the extreme eastern end of the region.

Histioteuthis macrohista N. Voss, 1969

Well represented in SAM coll., primarily from South Africa's west and south coasts.

Histioteuthis meleagroteuthis (Chun, 1910)

Histioteuthis miranda (Berry, 1918)

One of the largest histioteuthids, max. *ML* 264 mm (SAM–S183, Clarke 1986), common on the lower continental slope (Roeleveld *et al*. 1992) and important in the diet of sperm whales (Clarke 1980).

Histioteuthis reversa (Verrill, 1880)

Family Bathyteuthidae

Bathyteuthis abyssicola Hoyle, 1885

Bathyteuthis bacidifera Roper, 1968

An equatorial Indo-Pacific species (Roper 1969); a single female (SAM–S1998, *ML* 34 mm) was caught at 34°53′S, 18°10'E in the eastern South Atlantic.

Family Neoteuthidae
?*Neoteuthis* sp.

One doubtful record (head and tentacle only; SAM coll.) from F.R.S. *Africana* Cruise 060. Possibly more than one *Neoteuthis* species but broadly spaced captures and small number of specimens make species definitions extremely difficult (Roper 1992).

Family Architeuthidae
Architeuthis dux Steenstrup, 1857

Examination of 12 specimens from southern Africa and about 30 from the North Atlantic has given no indication that more than one species was involved (Roeleveld unpublished). Max. *ML* in southern African waters 1.85 m (SAM–S2486; mature female).

Family Ommastrephidae
Eucleoteuthis luminosa (Sasaki, 1915)

Two records, from the south-western Indian Ocean (SAM–S13) and the eastern South Atlantic (SAM –S1145).

Illex coindetii (Vérany, 1839)†

Enters northern Namibian waters at the extreme southern end of its range; a single record (SAM –S258, 1 juvenile) off Namibia between Cape Frio and Hollam's Bird Island. Exploited in the western Mediterranean, off West Africa and Spain (Roper *et al*. 1984).

Nototodarus hawaiiensis (Berry, 1912)

N. philippinensis and *N. nipponicus* are probably synonyms. Common in bottom trawls over the continental slope in 211–620 m off Moçambique and KwaZulu-Natal north of Durban (SAM coll.). By-catch in shrimp trawls and a potential resource in Australia, Hawaii, South Africa and Moçambique (Wadley 1993, Parry 1996, Roeleveld unpublished), max. *ML* 309 mm (Okutani and Kuroiwa 1985). By-catch of *Todarodes pacificus* jig fishery in Japan (Okutani and Uemura 1973), believed to have a high fishery potential in the Philippines because of its abundance and the consistency of the muscle, which makes it fit for human consumption (Roper *et al*. 1984).

Ommastrephes bartramii (LeSueur, 1821)

A widely distributed oceanic squid, common beyond the continental shelf all round southern Africa. A potential resource, caught with jiggers and dipnets at night in surface temperatures of 17.5–26.5°C off KwaZulu-Natal; max. *ML* 860 mm (Nesis 1987). The most important target in the Japanese jig fishery since the depletion of *Todarodes pacificus* (Okutani 1977). Still underexploited, the stock was recently estimated at 380 000 tons (Clarke 1996b).

Ornithoteuthis volatilis (Sasaki, 1915)

A relatively rare and little-known species (Wormuth 1976). SAM coll. has specimens from stomachs of *Thunnus albacares*, *Alepisaurus ferox* and a sperm whale, as well as trawl-caught specimens.

Sthenoteuthis oualaniensis (Lesson, 1830)

Common beyond the continental shelf off KwaZulu-Natal in surface temperatures of 22.3–27.1°C, extending south in the Agulhas Current to 35°S off Port Elizabeth. Overlaps with *Ommastrephes bartramii* south of Madagascar and off KwaZulu-Natal. Probably also common off Moçambique; a potential resource, max. *ML* 390 mm (excluding the giant Arabian Sea form, which reaches 650 mm *ML*; Nigmatullin *et al*. 1983, Nesis 1993b). Biomass estimates for *S. oualaniensis* (including the "early-maturing form", below, and the giant Arabian Sea form) are about 2 million tons in the Indian Ocean (Zuev *et al*. 1985, cited by Nesis 1993b) and 8–11 million tons throughout its Indo-Pacific range (Nigmatullin 1990, cited by Nesis 1993b). Fished commercially in Okinawa and Taiwan (Okutani and Tung 1978) and a potential resource off Hawaii (Parry 1996).

Sthenoteuthis pteropus (Steenstrup, 1855)

Enters Namibian waters at the south-eastern limit of its distribution range (Nesis 1991§, Zuev and Nikolsky 1993). An important resource in the tropical Atlantic (Zuev *et al*. 1985), but probably not sufficiently common in southern African waters to support a fishery. Max. *ML* 650 mm (Nesis 1993b). The SAM coll. has only exotic specimens.

Sthenoteuthis n.sp. Roeleveld (in prep.)

The "early-maturing form" of *Sthenoteuthis oualaniensis* (Nesis 1977).

Todarodes angolensis Adam, 1962

Fairly common off the West Coast over the continental slope at about 300–700 m (Roeleveld *et al*. 1992). By-catch of hake and horse-mackerel fisheries over the Namibian continental shelf (Bianchi *et al*. 1993, Nigmatullin *et al*. 1994); a potential resource, max. *ML* 410 mm (Villanueva 1992). Related species *T. pacificus* was, until depleted, the single most important species, constituting up to 80% of Japan's total cephalopod catch (Okutani 1977); *T. sagittatus* is the subject of directed fisheries in Iceland, Norway and the Mediterranean (F.A.O. 1997).

Todarodes filippovae Adam, 1975

Associated with Antarctic Intermediate Water, recorded at about 700–1 000 m off South Africa's

south-western Cape and in the stomachs of sperm whales feeding at about 1 000 m off Durban (Roeleveld 1989, Clarke and Roeleveld 1998). Also occasionally enters the southern part of the region when the subtropical convergence moves north of 45°S. Important in the diet of sperm whales, believed to have some fishery potential in subantarctic region and Australia (Okutani 1977; Dunning 1982, cited by Roper *et al*. 1984); max. *ML* 560 mm (Nesis 1987).

Todaropsis eblanae (Ball, 1841)
Taken as by-catch in hake trawl fishery (González *et al*. 1996). Occasional by-catch of Russian fisheries near the Namibian continental slope (Nigmatullin *et al*. 1994); also in the western Mediterranean and on the Sahara Banks (Roper *et al*. 1984). An object of minor fisheries in the North-East Atlantic (Nesis 1987). A potential resource, max. *ML* 283 mm (Roeleveld unpublished).

Family Thysanoteuthidae
Thysanoteuthis rhombus Troschel, 1857

Family Chiroteuthidae
Identified by Salcedo-Vargas in 1996.

Asperoteuthis acanthoderma (Lu, 1977)

Chiroteuthis (*Chiroteuthis*) *joubini* Voss, 1967

Chiroteuthis (*Chiroteuthis*) ?*spoeli* Salcedo-Vargas, 1996

Chiroteuthis (*Chiroteuthis*) *veranii veranii* (Férussac, 1835)†

Chiroteuthis (*Chirothauma*) *capensis* Voss, 1967

Chiroteuthis (*Chirothauma*) *picteti* ?*somaliensis* Salcedo-Vargas, 1996

Grimalditeuthis bonplandi (Vérany, 1837)
Placed in the Chiroteuthidae by Young (1991§: 181).

Planctoteuthis cf. *planctonica* (Pfeffer, 1912)

Family Mastigoteuthidae
Identified by Salcedo-Vargas in 1996.

Idioteuthis hjorti Chun, 1913

Idioteuthis inermis Rancurel, 1972

Idioteuthis ?*magna* Joubin, 1913

Idioteuthis sp. A, cf. *danae*

Idioteuthis sp. B

Mastigoteuthis atlantica Joubin, 1933

Mastigoteuthis grimaldii (Joubin, 1895)

Mastigoteuthis n. sp. Salcedo-Vargas (pers. comm.)

Family Joubiniteuthidae
Joubiniteuthis portieri (Joubin, 1912)

Family Cycloteuthidae
Cycloteuthis akimushkini Filippova, 1968
Recorded only from sperm whale stomach (Clarke 1980).

Cycloteuthis sirventi Joubin, 1919

Discoteuthis discus Young and Roper, 1969

Discoteuthis laciniosa Young and Roper, 1969

Family Cranchiidae
Bathothauma sp.

Cranchia scabra Leach, 1817

Galiteuthis sp. D‡

Galiteuthis sp. F‡

Helicocranchia ?sp. O‡

Helicocranchia sp. (N. A. Voss, University of Miami, pers. comm.)

Leachia cyclura Lesueur, 1821

Leachia sp. 7‡ plus 1–2 more species (N. A. Voss, pers. comm.)

Leachia ?n. sp. (SAM–S766)

Liguriella sp.

Liocranchia reinhardtii (Steenstrup, 1856)

Liocranchia valdiviae Chun, 1906

Megalocranchia maxima Pfeffer, 1884

Phasmatopsis cymoctypus
Possibly distinct from *Megalocranchia* sp. A‡ (N. A. Voss, pers. comm. to M. R. Clarke).

Sandalops ?sp. A‡

Taonius sp. C‡ (= *Taonius* sp. B of Roeleveld *et al*. 1992)

Taonius sp. F‡ (= *Taonius* sp. A of Roeleveld *et al*. 1992)

Teuthowenia pellucida (Chun, 1910)

ORDER VAMPYROMORPHA
Family Vampyroteuthidae
Vampyroteuthis infernalis Chun, 1903

ORDER OCTOPODA

CIRRATA

The cirrate octopods are badly in need of revision; partially resolved by Voss (1988a, b), Voss and Pearcy (1990) and in progress (F. G. Hochberg, Santa Barbara Museum of Natural History, California, USA; S. O'Shea, National Institute of Water and Atmospheric Research, Wellington, N.Z., pers. comm.).

Family Stauroteuthidae
Chunioteuthis cf. *ebersbachii* Grimpe, 1916
One specimen (SAM–S221), det. O'Shea (in prep.) from KwaZulu-Natal in 900 m. *C. ebersbachii* and *C. gilchristi*, status uncertain, are apparently known only from the respective holotypes (Voss 1988b: 296).

Chunioteuthis gilchristi (Robson, 1924)
Described (as *Cirrhoteuthis gilchristi*) from 2 569 m off Cape Town. Status uncertain (Voss 1988b), near *Grimpoteuthis* (O'Shea, pers. comm.). One specimen (SAM–2732), labelled *Cirroteuthis gilchristi*, det. O'Shea (in prep.) as *Opisthoteuthis* sp.; two more specimens (SAM–2728, 2731) to be re-examined.

Family Opisthoteuthidae
Grimpoteuthis spp. A, B
Six specimens collected off Cape Town (Robson 1924, as *Cirroteuthis* spp. A and B), transferred to *Grimpoteuthis* spp. (Robson 1932).

Opisthoteuthis agassizii Verrill, 1883

Opisthoteuthis medusoides Thiele, 1915

Opisthoteuthis vossi Sánchez & Guerra, 1989

Opisthoteuthis sp.
Off the West Coast in 903 m (SAM–S1954), det. O'Shea (pers. comm.)

INCIRRATA

Family Bolitaenidae
Eledonella pygmaea Verrill, 1884

Japetella diaphana Hoyle, 1885

Family Amphitretidae
Amphitretus pelagicus Hoyle, 1885

Family Vitreledonellidae
Vitreledonella richardi Joubin, 1918

Family Octopodidae
Aphrodoctopus schultzei (Hoyle, 1910)

Bathypolypus valdiviae (Thiele, 1915)
Common on the continental slope at 700 m (Roeleveld *et al*. 1992).

Benthoctopus berryi Robson, 1924
Known only from the holotype.

Benthoctopus n. spp. A, B, C (O'Shea, pers. comm.).

Cistopus indicus (Rapp, in Férussac & d'Orbigny, 1835)†
Recorded from Moçambique by Martens (1879). A primary commercial octopod in most Asian markets, max. *ML* 180 mm (Roper *et al*. 1984). Not represented in SAM coll.

Eledone thysanophora Voss, 1962

Graneledone n. sp. (O'Shea, pers. comm.)

Octopus sp. cf. *aegina*
Det. M. D. Norman (University of Melbourne, pers. comm.).

Octopus n.sp. cf. *arborescens*
Det. Norman (pers. comm.).

Octopus argus Krauss, 1848
Frequently synonymized with *O. horridus* (Norman, pers. comm.).

Octopus cyanea Gray, 1849
Collected off Durban (M. J. Smale, Port Elizabeth Museum, pers. comm.). Probably the most important reef-dwelling *Octopus*, taken throughout the Indo-west-Pacific in local and subsistence fisheries (Roper *et al*. 1984); max. *ML* 160 mm (Norman and Sweeney 1997). Only exotic specimens in SAM coll.

Octopus defilippi Verany, 1851
Only "macrotritopus" paralarvae are known from southern African waters.

Octopus fontanianus var. *africanus* (Robson, 1929)
Separated (as *Joubinia fontaniana* var. *africana*)

from the south-eastern Pacific *Octopus fontanianus* for Massy's (1925) female specimen from KwaZulu-Natal.

Octopus magnificus Villanueva, Sánchez & Roeleveld, 1992§

A large octopus taken incidental to hake trawls and rock lobster traps; max. *ML* 362 mm, but fully mature females not yet found (Villanueva *et al*. 1991§). A potential resource.

Octopus ornatus Gould, 1852

Octopus sp. cf. *vulgaris*

Common in the inter- and subtidal regions, max. *ML* 213 mm (Smale *et a*l. 1993), a resource. *O. vulgaris* Cuvier, 1797, previously a cosmopolitan catch-all species, now restricted to the Mediterranean and north-eastern Atlantic; neotype to be designated (K. M. Mangold, Laboratoire Arago, France, pers. comm.). The southern African species needs a new name.

Pareledone carlgreni Thore, 1945

Should probably be removed to the genus *Aphrodoctopus* (Roper, in Lu and Stranks 1994: 239).

Pareledone nigra (Hoyle, 1910)

Should probably be removed to the genus *Aphrodoctopus* (Roper, in Lu and Stranks 1994: 239).

Scaeurgus unicirrhus (delle Chiaie in Férussac & d'Orbigny, 1839–1841)†

Velodona togata capensis Robson, 1924

Common off KwaZulu-Natal and Moçambique (SAM coll.), by-catch in prawn trawls, max. *ML* 160 mm (Smale *et al*. 1993), a potential resource. The subspecies *V. togata capensis* seems to be based on immature specimens and should be re-evaluated.

Family Alloposidae
Haliphron atlanticus Steenstrup, 1861

Family Tremoctopodidae
Tremoctopus violaceus violaceus delle Chiaie in Férussac & d'Orbigny, 1835†

Tremoctopus violaceus gracilis (Souleyet in Eydoux & Souleyet, 1852)†

Family Ocythoidae
Ocythoe tuberculata Rafinesque, 1814

Family Argonautidae
Argonauta argo Linnaeus, 1758

Argonauta hians Solander, 1786

Argonauta nodosa Solander, 1786

EXOTICS IN THE SOUTH AFRICAN MUSEUM COLLECTION

The South African Museum collection also has comparative material of the non-southern African species listed below:

Nautilus scrobiculatus Solander, 1786	Locality unknown
Sepia gibba Ehrenberg, 1831	Jeddah, Saudi Arabia
Sepia hierredda Rang, 1837	Cabo Negro, Angola
Sepia officinalis Linnaeus, 1758	Banyuls-sur-Mer; Madeira
Rossia macrosoma d'Orbigny, 1839–1842 in Férussac & d'Orbigny, 1834–1848†	Bay of Naples
Sepiola aurantiaca Jatta, 1896	Madeira
Sepiola sp.	Plymouth; Banyuls-sur-Mer
Idiosepius thailandicus Chotiyaputta, Okutani & Chaitiamvong, 1991	Ban Don Bay, Surat-Tani, Gulf of Thailand
Alloteuthis africana Adam,1950	Gabon
Alloteuthis sp.	Banyuls-sur-Mer
Loligo gahi d'Orbigny, 1835	Falkland Islands; Lima, Peru
Loligo forbesi Steenstrup, 1856	Carmarthen Bay
Loligo opalescens Berry, 1911	U.S.A.
Gonatus phoebetriae Imber, 1978	Marion Island (holotype, beaks only)
Abralia (Enigmoteuthis) sp. ?	Gulf of Aden, ex *Etmopterus pusillus*
Moroteuthis ingens (Smith, 1881)	Kerguelen Island

SAM collection (*continued*)

Kondakovia longimana Filippova, 1972	South-West Atlantic
Chtenopteryx sepioloides Rancurel, 1970	South of Madagascar
Psychroteuthis glacialis Thiele, 1920	Weddell Sea
Illex argentinus (Castellanos, 1960)	Mar Del Plata; Falkland Islands; 45°S off Argentina
Illex illecebrosus (Lesueur, 1821)	Portugal Cove, Newfoundland
Martialia hyadesi Rochebrune & Mabille, 1889†	47°30′S, 60°22′W; Falkland Islands
Nototodarus gouldi (McCoy, 1888)	Off Melbourne, Australia
Todarodes pacificus (Steenstrup, 1880)	Japan Sea; Tokyo fish market
Todarodes sagittatus (Lamarck, 1798)†	Tyrrhenian Sea, Mediterranean
Megalocranchia ?sp. C‡	20°12′S, 56°53′E, Indian Ocean, near Mauritius
Grimpoteuthis sp.	Angola Basin, 4 660 m, (SAM–S765) det. O'Shea
Octopus ?*membranaceus* Quoy & Gaimard, 1832†	Tokyo fish market
Tremoctopus gelatus Thomas, 1977	31°S, 44°E, south of Madagascar

DISCUSSION

Cephalopod systematics in southern Africa has benefitted from collection programmes and surveys of the Sea Fisheries' vessels F.R.S. *Africana* and *Algoa*, notably *Africana* Cruise 060 in 1988 (Roeleveld *et al*. 1992) and the exploratory survey off Moçambique in 1994.

The South African Museum cephalopod collection has been growing actively for more than 30 years and currently holds 4 252 catalogued lots (15 434 specimens), in addition to many uncatalogued para-larvae. There are numerous known systematics problems and undescribed taxa in the region, including a new genus in the family Onychoteuthidae and at least 12, but probably more than 20, new species; in addition, the southern African Octopoda probably includes more un-named species than named ones (Norman, pers. comm.). Genera including probable or possible new species include *Sepia* (*Hemisepius*), *Heteroteuthis*, *Rossia*, *Brachioteuthis*, *Sthenoteuthis*, *Mastigoteuthis*, *Galiteuthis* (2 new species), *Helicocranchia*, *Leachia* (2 new species), *Sandalops*, *Taonius* (2 new species), *Grimpoteuthis* (2 new species?), *Benthoctopus* (3 new species), *Graneledone* and *Octopus* (many new species).

The southern African cephalopod fauna includes at least 12 sepiid, 7 loliginid, 6 ommastrephid and 9 octopod species of actual or potential commercial interest. Some of these species are easily accessible and available to artisanal fisheries and for mariculture, while others require large capital outlay for industrial fisheries development. Species accessible from shore and small boats and readily available for artisanal fisheries are *Sepia tuberculata*, *S. vermiculata*, *Loligo duvaucelii*, *L. vulgaris reynaudii*, *Octopus cyanea*, *O.* cf. *vulgaris* and *Eledone thysanophora*. Species accessible with larger ships offshore include *Sepia acuminata*, *S. australis*, *S. hieronis*, *S. papillata*, *S. simoniana*, *S. zanzibarica*, *Sepiella cyanea*, *Rossia enigmatica*, *Loligo chinensis*, *L. edulis*, *L. sibogae*, *L. singhalensis*, *Sepioteuthis lessoniana*, *Lycoteuthis lorigera*, *Nototodarus hawaiiensis*, *Ommastrephes bartramii*, *Sthenoteuthis oualaniensis*, *Todarodes angolensis*, *Todaropsis eblanae*, *Bathypolypus valdiviae*, *O. magnificus* and *Velodona togata capensis*.

The Indian Ocean fauna is very poorly known in general and continues to produce new range extensions for species known from farther east. These include a number of species important in fisheries elsewhere, such as *Loligo edulis*, *L. chinensis*, *L. duvaucelii*, *Ommastrephes bartramii*, *Sthenoteuthis oualaniensis*, *Octopus cyanea* and *O.* cf. *vulgaris*.

Estimated numbers of known living species of cephalopods vary from fewer than 650 (Nesis 1987) to more than 1 000 (Rathjen and Voss 1987). The 195 species reported here for southern Africa therefore constitute about 20–30% of the world cephalopod species, and resolution of southern African cephalopod systematics would contribute substantially to resolution at a global level.

Because of the oceanographic complexity of the southern African region, the cephalopod fauna includes southern African endemics (e.g. several species of *Sepia* and *Octopus*, *Todarodes angolensis*, *Bathypolypus valdiviae* and *Benthoctopus berryi*), circum-Subantarctic species associated with Antarctic Intermediate Water (e.g. *Todarodes filippovae*, *Histioteuthis macrohista* and *Teuthowenia pellucida*), circumglobal southern tropical/subtropical species (e.g. *Abraliopsis gilchristi*), tropical Indo-Pacific species (e.g. *Histioteuthis miranda*, *Nototodarus hawaiiensis* and *Argonauta nodosa*) and cosmopolitan tropical/subtropical species, e.g. *Chtenopteryx sicula*, *Histioteuthis meleagroteuthis* and *Cranchia scabra* (Roeleveld et

al. 1992).

The need for an identification guide to southern African cephalopods has become increasingly apparent; the CIAC '97 biodiversity workshop, hosted jointly by the South African Museum and the Sea Fisheries, aims to produce such a guide. Cephalopod systematists from all over the world were enlisted to work on the accumulated specimens and data in the Museum. The Expert Centre for Taxonomic Identification (University of Amsterdam & UNESCO) have agreed to publish the resultant guide as a CD ROM disc. Further efforts will also be made to produce a printed copy, for use in the field and by persons who do not have ready access to electronic media.

The proposed guide to southern African cephalopods will deal not only with the systematics and distribution, but will also identify species of actual or potential commercial importance, and will provide a tool for fisheries officers, environmental managers and conservationists. As short-lived animals with a lifespan of about one year or less, cephalopods are particularly vulnerable to overfishing.

ACKNOWLEDGEMENTS

I thank Drs L. J. V. Compagno (South African Museum, Cape Town), for taxonomic advice, and M. R. Lipiński, for an updated list of cephalopod types in the Natural History Museum, London. Thanks also to Prof. R. E. Young (University of Hawaii) and Dr D. N. Khromov (Russian-American Firm ICF/EKO, Moscow) for comments on the manuscript. Special thanks to Drs M. A. Salcedo-Vargas, N. A. Voss and M. D. Norman and Mr S. O'Shea for provisional identifications and unpublished information on chiroteuthids and mastigoteuthids, cranchiids, incirrate and cirrate octopods respectively.

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