

## A REVIEW OF CEPHALOPODS OCCURRING IN THE WATERS OF RIO DE JANEIRO STATE, BRAZIL WITH FIRST RECORD OF FOUR SPECIES

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(With 6 figures)

### RESUMO

#### Revisão dos Cefalópodes que Ocorrem no Estado do Rio de Janeiro, com Quatro Registros Novos

Quatro espécies de cefalópodes são registrados por primeira vez para o litoral do Rio de Janeiro, duas delas novas para o Brasil. *Pickfordiateuthis pulchella* Voss, 1953 e *Sepioteuthis sepioidea* (Blainville, 1823), espécies costeiras de grandes ovos, tiveram sua distribuição estendida do Caribe e Bahia, respectivamente até o Sudeste do Brasil. *Tremoctopus violaceus* Delle Chiaje, 1830 e *Thysanoteuthis rhombus* Troschel, 1853 são consideradas espécies circuntropicais. Incluindo os presentes registros a fauna de cefalópodos do Rio de Janeiro aumenta a 24 espécies, 20 gêneros e 9 famílias.

*Palavras-chave:* Cefalópodes, Brasil, Primeiros registros, Rio de Janeiro.

### ABSTRACT

Four cephalopod species are recorded for the first time in the State of Rio de Janeiro, two of them new for Brazil. *Pickfordiateuthis pulchella* Voss, 1953 and *Sepioteuthis sepioidea* (Blainville, 1823), shallow-water and large-egged species, had their distribution extended from Caribe and Bahia respectively to Southeastern Brazil. *Tremoctopus violaceus* Delle Chiaje, 1830 and *Thysanoteuthis rhombus* Troschel, 1853 are considered circuntropical species. Including the present records the number of reported cephalopod species for the State of Rio de Janeiro is of 24 included in 20 genera and 9 families.

*Key words:* Cephalopods, Brazil, New records, Rio de Janeiro.

### INTRODUCTION

The cephalopods fauna and its potential as a brazilian fishery resource are poorly known compared with other parts of the world

(Voss, 1973; Juanico, 1980). Palacios (1977) revised collections and reviewed the literature on Brazilian cephalopods listing 31 species. Haimovici (in Rios, 1985) added 7 more species of and stated that a substantial increase is expected if further studies are developed. In fact, the revision of the Cephalopoda collections of the Department of Zoology of the Universidade Federal do Rio de Janeiro (UFRJ), Museu Nacional do Rio de Janeiro (MNRJ), PESAGRO-RIO and field observations, yielded four new records for Rio de Janeiro, two of them new for Brazil:

Ordem Teuthoidea, Naef 1916

Sub-order Myopsida, Orbigny 1845

Family Loliginidae, Steenstrup 1861

*Sepioteuthis sepioidea* (Blainville, 1823)

Family Pickfordiateuthidae, Voss 1953

*Pickfordiateuthis pulchella* Voss, 1953

Sub-order Oegopsida, Orbigny 1845

Family Thysanoteuthidae, Kieferstein 1866

*Thysanoteuthis rhombus* Troschel, 1853

Order Octopoda, Leach 1818

Sub-order Incirrata, Grimpe 1916

Family Tremoctopodidae, Tryon 1879

*Tremoctopus violaceus* Delle Chiaje, 1830

A list of the material examined and a short description of each species follows:

*Pickfordiateuthis pulchella* Voss, 1953

One male, ML: 21.5mm and 2 females, ML: 15.0 and 16.1mm (FURG 0125); 2 males, ML: 20.0 and 14.5mm and one female, ML: 14.5mm (UFRJ 307): all specimens collected by Leo Soares, in Ilha de Jaguanum, Rio de Janeiro State (Fig. 1) in January 1958 and preserved in 10% formalin. No further information on collection depth, bottom type or fishing gear was available.

One male, ML: 14.5 and three specimens of undetermined sex, ML: 12.8, 10.1 and 9.3mm (MNRJ 5746), collected by Ronaldo Novelli, in surface waters in Ilha Grande, Rio de Janeiro State, on May 1979 and preserved in 10% formalin.

The morphometric indices of all species examined are presented at Table I. The mantle is cylindrical, with the largest diameter at the anterior fins insertion; the posterior end is funnel-shaped tapering to a blunt point. The fins are large, longer than wide, round and

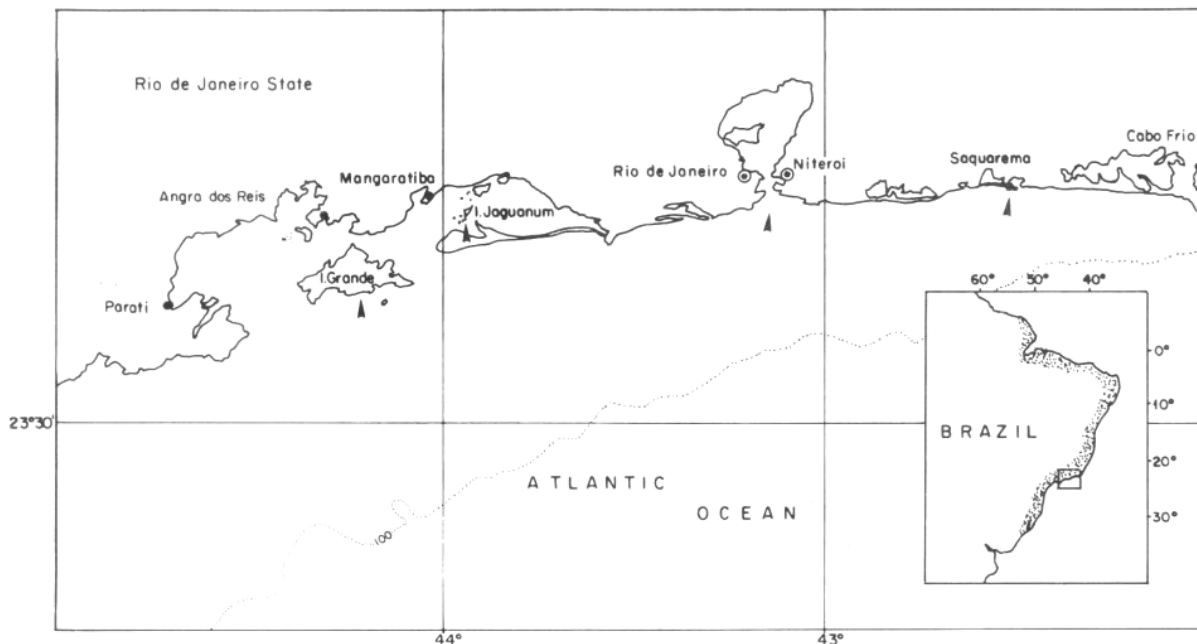


Fig. 1 - Map showing Rio de Janeiro State coastal region. The arrows indicate the localities where the species were collected.

TABLE I  
Morphometric indices of *Pickfordiateuthis pulchella* from Rio de Janeiro, Brazil

Sex	Ilha de Jaguanum					Ilha Grande	
	F	F	F	M	M	M	M
Mantle length (mm)	14.5	15.0	16.1	21.5	20.0	14.5	14.5
Mantle width index	42.7	50.0	38.5	41.8	45.0	42.7	42.0
Head width index	48.2	46.6	44.7	39.0	—	55.2	46.9
Fin length index	48.2	56.6	46.5	57.6	—	47.5	51.7
Fin width index	75.8	100.0	77.6	88.3	—	78.6	86.8
Arm length I index	17.9	20.0	21.7	23.2	22.5	24.1	18.6
Arm length II index	31.0	33.3	27.9	39.5	35.0	34.5	31.7
Arm length III index	34.5	40.0	32.9	41.8	43.5	37.9	36.5
Arm length IV index	26.2	36.6	24.8	32.5	35.0	34.5	32.4
Arm formula	3:2:4:1	3:4:2:1	3:2:4:1	3:2:4:1	3:2=4:1	3:2=4:1	3:4:2:1

attached dorso-laterally for about half of their length. The head is large and as wide as the mantle. The eyes are prominent and covered by a thin transparent membrane. There is visible pore (Fig. 2).

The arms are short and stout. Apparently the third pair (arm III) is the longest and arm I the shortest. The approximate arm order is III:IV:II:I. With exception of arms II, all the arms possess swimming membrane. The arm suckers have short pedicels and are in two rows. On the clubs, the suckers are in two

rows proximally and in four rows distally (Fig. 3f). The club suckers are bordered by a protective membrane.

The left ventral arm of the male is hectocotylized on its distal half. The dorsal row of suckers becomes indistinct; the suckers of the ventral row continue normally bordered by a large puffy swelling. Enlarged suckers were noted on the proximal portion of the right ventral arm as pointed out by Brackoniecki (1986) as a secondary male sexual modification (Fig. 3g).

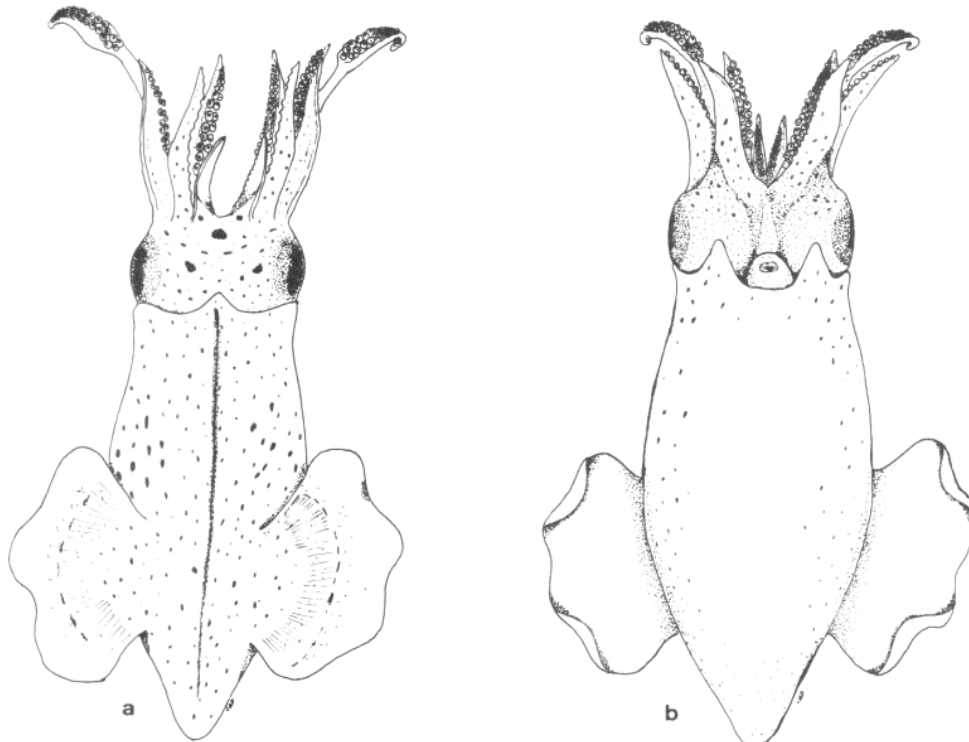


Fig. 2 - *Pickfordiateuthis pulchella*; a-b, male from Ilha de Jaguanum 21.5 mm mantle length; a, ventral view; b, dorsal view;

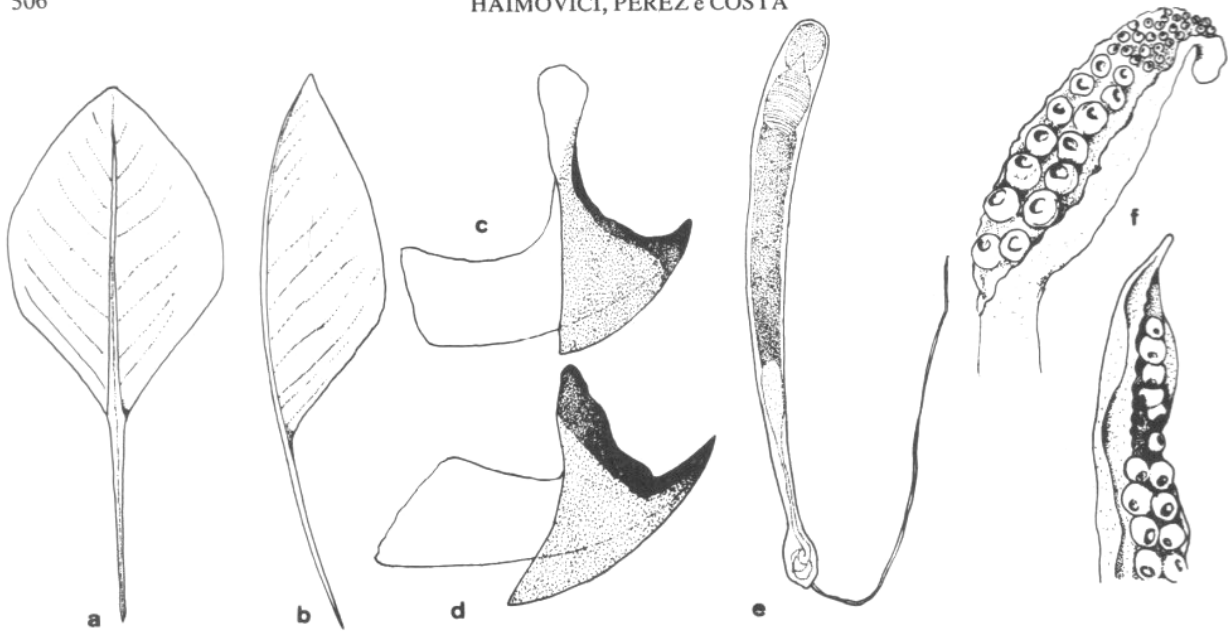


Fig. 3 - *Pickfordiateuthis puchella*; a-b, gladius; a, dorsal view; b, lateral view; c, ventral mandible; d, dorsal mandible; e, spermatophore; f, tentacular club; g, hectocotylus.

The spermatophores are elongated, the sperm mass comprises 2/3 of length of the spermatophore and is blunt, spiral-shaped at the posterior end. The cement body is elongated, sacular, connected with the ejaculatory apparatus by a slender neck. A long filament is attached to the anterior end (Fig. 3e).

The beaks show clear wings and lateral walls. In the upper beak, as well as the lower, there is a darker band bordering the inner edge from the rostrum to the wings. The lateral walls are unpigmented (Fig. 3c-d).

The gladius is well developed, the rachis is thin and the vane broad with strongly convex sides (Fig. 3a-b).

The formalin preserved specimens are a pale yellow colored with large brown chromatophores over the head and smaller ones scattered over the mantle (Fig. 2). Internally, a thin transparent membrane covering the visceral mass, bears large brown chromatophores.

On Table II, some length and index ranges of specimens from Rio de Janeiro are compared to specimens from the Florida Keys described by Voss (1953). The only observed difference is in the arms length, which are shorter in the Rio de Janeiro specimens. This could be an artifact of fixation or preservation (Andriquetto and Haimovici,

1988) or to geographic divergence but do not suggest differentiation at specific level.

#### *Tremoctopus violaceus* Delle Chiaje, 1830

One female, ML: 82,4 mm (FURG 0042), collected in Baia da Guanabara (Fig. 1), Rio de Janeiro state, on December, 1985 and preserved in 10% formalin. The specimen was deposited in PESAGRO-RIO (Rio de Janeiro State), and was kindly donated to the collection of the Department of Oceanography of Fundação Universidade do Rio Grande.

The mantle is muscular and wide tapering to a very blunt point. The head narrower than the mantle and bears laterally-directed eyes. There are two pairs of oval "aquiferous pores", one pair on the dorsal

TABLE II  
A comparison of some length and index range of *Pickfordiateuthis puchella* from Florida keys and Rio de Janeiro

	Rio de Janeiro (six specimens)	Florida Keys (four specimens)
Mantle length	14.0 - 21.5	13.2 - 22.0
Mantle width index	38.5 - 45.0	40.1 - 45.4
Head width index	39.0 - 48.2	43.2 - 46.6
Fin length index	46.5 - 57.6	50.0 - 52.4
Fin width index	75.8 - 100.0	80.2 - 96.4
Arm length I index	17.9 - 24.1	22.2 - 31.8
Arm length II index	27.9 - 39.5	38.6 - 45.9
Arm length III index	32.9 - 43.5	43.2 - 51.8
Arm length IV index	26.2 - 36.6	30.8 - 50.4

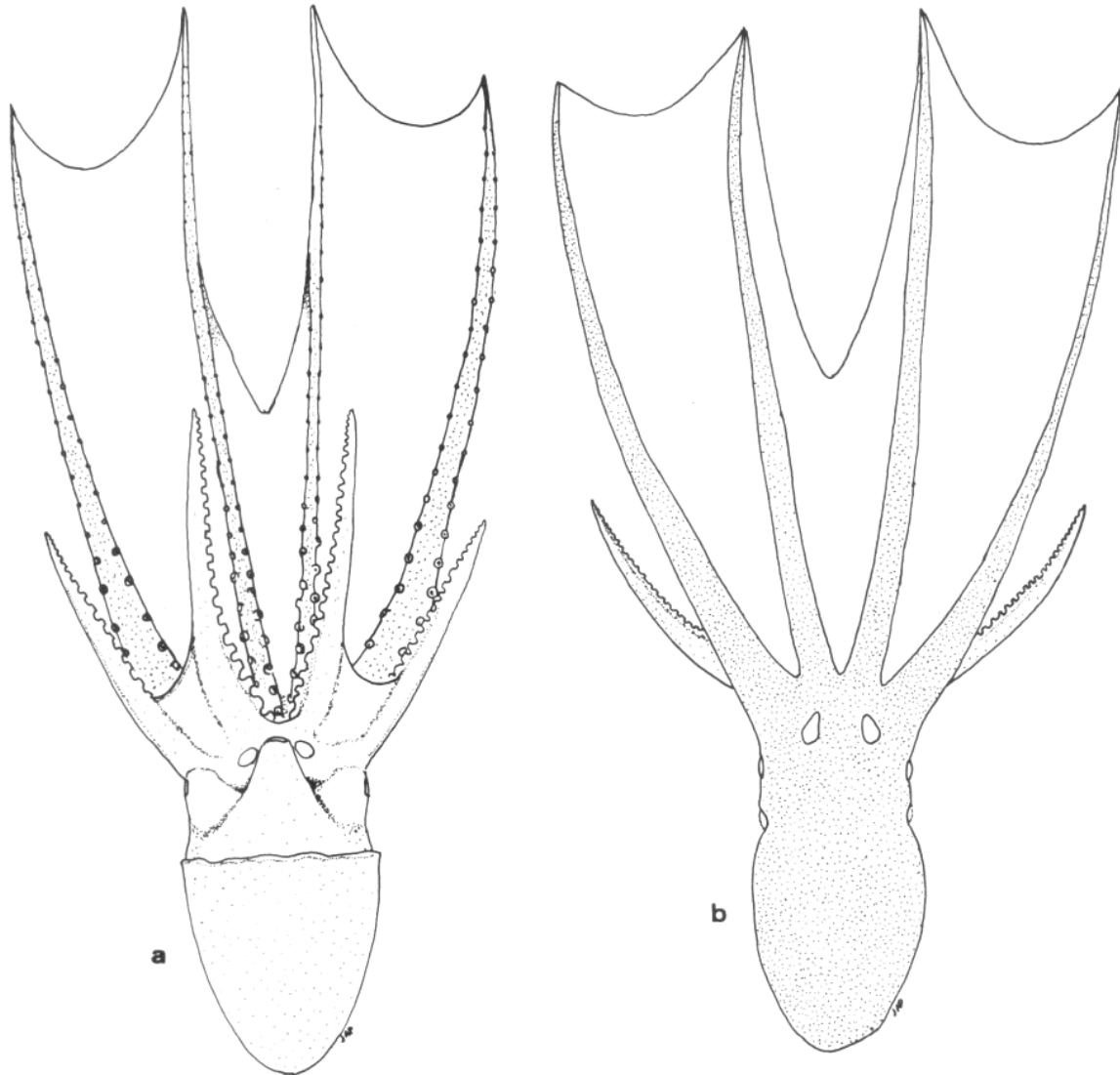


Fig. 4 - *Tremoctopus violaceus*; a-b, female from Baia da Guanabara, ML 82.4 mm; a, ventral view; b, dorsal view.

Surface of head between the eyes and another pair ventrally, adjacent to the funnel (Fig. 4).

The arms I are the longest with suckers decreasing in size toward the end of the arm becoming widely set apart in an alternating arrangement. The arms II are stout and flattened with no distinct suckers. Arms III are the shortest. The arm formula was I:II:IV:III. The web is well developed with formula B:A:D:C:E.

The formalin preserved specimen is dark bluish-purple on the dorsal surface and pale yellow on ventral surface.

*Sepioteuthis sepioidea* (Blainville, 1823)

One male, ML: 132 mm (MNRJ 3500), collected in Praia da Jurujuba, Baia da

Guanabara (Fig. 1), in 1940 and preserved in 10% formalin.

The mantle is broad and tapered to a blunt point posteriorly. The fins are elliptical-shaped occupying nearly the entire length of mantle (Fig. 5). A full description of this species can be found in Roper *et al.* (1984).

*Thysanoteuthis rhombus* Troschel, 1857

One specimen of undetermined sex identified from a photograph published in the Rio de Janeiro newspaper, "O Fluminense", in August 14th, 1986, page 6 (Fig. 6). The specimen was captured by fishermen in Praia de Itauna, Saquarema, State of Rio de Janeiro (Fig. 1).

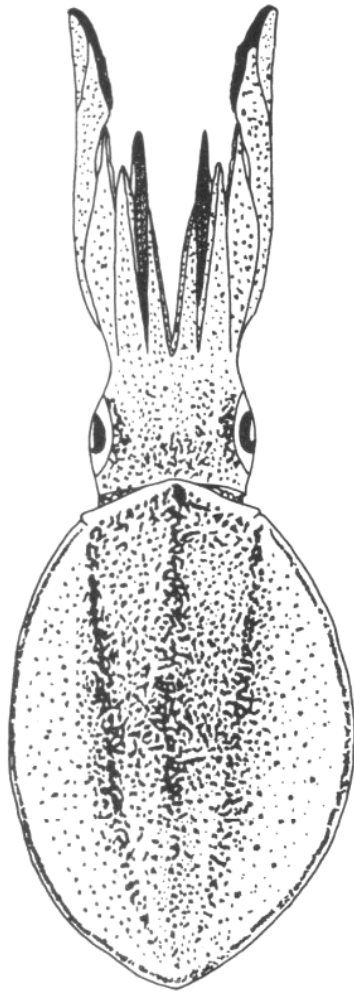


Fig. 5 - *Sepioteuthis sepioidea*, dorsal view.

The photograph clearly shows a thick muscular mantle, tapering to a blunt tip. The fins are rhombic, occupying the entire length of the mantle, a diagnostic character of this species. A full description of the species is found in Roper *et al.* (1984).

#### DISCUSSION

Including the present records, 24 species of cephalopods are registered for Rio de Janeiro comprising, in 20 genera and 9 families (Table III).

The family Pickfordiateuthidae was described by Voss (1953), who distinguished from the loliginid forms for showing an unlobed buccal membrane **without** suckers, lateral ununited round fins **and the presence** of only two rows of suckers **on the tentacular clubs** instead of the usual four. The family



Fig. 6 - *Thysanoteuthis rhombus*, photograph published in "O Fluminense", August 14th, 1986, page 6. Ventral view showing the rhombic fins occupying the entire length of the mantle.

includes a single genus and species *Pickfordiateuthis pulchella* Voss, 1953 from Southern Florida and Caribbean, although Brackoniecki (1986) pointed out the existence of at least one undescribed species from the Gulf of California.

The same distribution in the Atlantic is known for *Sepioteuthis sepioidea* (Blainville, 1823). Oliveira (1940) reported this species in Rio de Janeiro state and wrongly described it as *Sepia officinalis jurujubai*, this misidentification was already discussed by Voss (1973). *Sepioteuthis* was also reported from visual observation of living specimens for Bahia state (Haimovici in Rios, 1985). Both species are large-egged and live in shallow waters about marine grass covered flats and coral reefs. In view of these features and the absence of a planktonic larval stage Voss (1953) suggested that *Pickfordiateuthis*

TABLE III

List of the cephalopods of Rio de Janeiro, including local recorded species and species with its range of distribution in Western Atlantic, including Rio de Janeiro Coast

	Batimetric distribution	Habitat	Geographic distribution (Western Atlantic)
Family Sepiolidae Leach, 1817			
<i>Semiossia tenera</i> (Verrill, 1880)	60 - 160 m	Demersal, muddy and sandy bottoms	Gulf of Maine to Rio Grande do Sul
Family Loliginidae Steenstrup, 1861			
<i>Loligo sanpaulensis</i> Brackoniek, 1984	0 - 60 m	Neritic, semipelagic	Central Brazil to central Argentina
<i>Doryteuthis plei</i> (Blainville, 1823)	16 - 200 m	Neritic, semipelagic	35° N to Northern Argentina
<i>Lolliguncula brevis</i> (Blainville, 1823)	0 - 20 m	Neritic, shallow bays, estuaries	Bermuda to Patagonia
<i>Sepioteuthis sepioidea</i> (Blainville, 1923)	0 - 20 m	Coral reefs, grass flats	Cape Canaveral to Rio de Janeiro
Family Pickfordioteuthidae Voss, 1953			
<i>Pickfordioteuthis pulchella</i> Voss, 1953	0 - 20 m	Shallow waters, grass flats	Florida to Rio de Janeiro
Family Ommastrephidae Steenstrup, 1857			
<i>Illex argentinus</i> (Castellanos, 1968)	50 - 800 m	Epipelagic	Southern Argentina to Rio de Janeiro
<i>Ornitoteuthis antillarum</i> (Adam, 1957)	Oceanic	Epipelagic	Circumtropical
<i>Ommastrephes bartramii</i> (Lesueur, 1831)	Oceanic	Epipelagic	Subtropical and temperate waters
<i>Synmplectoteuthis luminosa</i> Sasaki, 1915	Oceanic	Epipelagic	Subtropical and temperate waters
<i>Hyaloteuthis pelagica</i> (Bosc, 1802)	Oceanic	Epipelagic	Warm waters, Atlantic and Pacific
Family Thysanoteuthidae Kieferstein, 1856			
<i>Thysanoteuthis rhombus</i> Troschel, 1856	Oceanic	Epipelagic	Circumtropical
Family Octopodidae Orbigny, 1845			
<i>Octopus defilippi</i> Veranyi, 1815	6 - 60 m	Benthic, sandy and muddy bottoms	Florida to Rio de Janeiro
<i>Octopus tehuelchus</i> Orbigny, 1834	up to 90 m	Benthic, muddy and rocky bottoms	Peninsula Valdes to Rio de Janeiro
<i>Octopus vulgaris</i> (Cuvier, 1797)	0 - 200 m	Benthic, rocks and coral reefs	Bermuda to Rio Grande do Sul
<i>Scaevargus unciarrhus</i> (Orbigny, 1840)	100 - 400 m	Benthic, sand and coralline bottoms	Florida to Santa Catarina
<i>Pteroctopus tetracirrhus</i> (DelleChiaje, 1830)	25 - 720 m	Benthic, muddy bottoms	North Carolina to Uruguay
<i>Enteroctopus</i> sp Robson, 1929	73m	Benthic, sand bottoms	One record.
<i>Eledone massyae</i> Voss, 1964	60 - 300 m	Benthic, sandy and muddy bottoms	Peninsula Valdes to Rio de Janeiro
<i>Eledone gaucha</i> Haimovici, 1988	60 - 300 m	Benthic, sandy and muddy bottoms	Rio Grande do Sul to Rio de Janeiro
<i>Pareledone turqueti</i> (Joubin, 1905)	540 - 4000 m	Benthic, mud	Antartida to Rio de Janeiro
<i>Pareledone charcoti</i> (Joubin, 1905)	0 - 1500 m	Benthic, sandy bottoms	Antartida to Rio de Janeiro
Family Argonautidae Tryon, 1879			
<i>Argonauta nodosa</i> Lightfoot, 1786	Oceanic	Epipelagic	Worldwide in warm waters
<i>Argonauta argo</i> Linnaeus, 1758	Oceanic	Epipelagic	Tropical and temperate waters
Family Tremoctopodidae Tryon, 1879			
<i>Tremoctopus violaceus</i> DelleChiaje, 1830	Oceanic	Epipelagic	Atlantic Ocean between 43°N-35°S

Sources: Palacio, 1977; Haimovici, in Rios, 1985; Haimovici and Andriquetto, 1986; Roper, Sweeney and Nauen, 1984; Warneke-Cramer, 1986; Costa, 1988.

*pulchella* should be a Florida Keys endemic species.

The new records may reflect a discontinuous distribution in the cephalopod fauna pattern but more probably are due to lack of information from the poorly known intermediate region. Tropical distributions from Caribbean to southern Brazil is also known for other large-egged cephalopod species such *Octopus joubini* and *Octopus briareus*. None of this species were found as far south as Rio Grande do Sul (Haimovici and Andriquetto, 1986).

*Tremoctopus violaceus* was reported by Adam (1937) from the northeastern region off Fortaleza. It was also identified from stomach contents of tunnids landed in São Paulo and larval stages were found in zooplankton samples from Rio Grande do Sul (Haimovici and Perez, unpublished). *Thysanoteuthis rhombus* was recently recorded from off Santa Catarina tuna fisheries (Ferreira, 1987) and one young specimen was caught with dipnet

off Rio Grande (Haimovici and Perez, in press).

Thomas (1977) stated that *Tremoctopus violaceus* is distributed on tropical waters in Atlantic Ocean and the Indo-Pacific, *Thysanoteuthis rhombus* is considered to be circumtropical species (Roper *et al.* 1984). We believe that both species regularly occur in Brazilian waters.

Some of the cephalopods of Rio de Janeiro are commercially fished. In 1986, 944 metric tons of squid and 365 metric tons of octopus were landed (Superintendencia de Desenvolvimento da Pesca, SUDEPE). The species composition of the landings is not specified, but a preliminary survey showed that the bulk of the landings was of *Octopus vulgaris*, *Eledone massyae*, *Loligo sanpaulensis* and *Doryteuthis plei*, (Costa and Haimovici, in press).

The coastal cephalopod fauna of Rio de Janeiro include both warm and temperate water species. Species of tropical origin

occupy the more diversified habitats in shallow regions including rocky and sandy bottoms, marine grass flats and estuarine zones. Colder water species are found on sand or mud in deeper waters further from the coast. Most epipelagic species recorded off Rio de Janeiro have worldwide tropical and temperate distributions (Table III). This fauna is typically transitional as stated by Palacio (1982) who, reviewing the distribution of the cephalopods and other groups, proposed a zoological province limited between Espírito Santo (Lat 20°) and Rio Grande do Sul (Lat. 34°S). This region is characterized by the seasonally fluctuating environment under the alternate influence of the warm Brazil current and the southern cold Malvinas (Falkland) current.

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