

Inventory of the Echinodermata collection from the Universidade Federal de Alagoas

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Abstract: Collections and inventories provide important and essential information for understanding the composition and distribution of biodiversity. This contribution presents an inventory of the species held in the Echinodermata collection in the Setor de Comunidades Bentônicas (LABMAR/ICBS), Universidade Federal de Alagoas. The collections were made over a period of more than 20 years, at several localities of coastal Alagoas. This collection now includes 16,201 catalogued individual specimens, with 50 species in the five extant classes Crinoidea, Asteroidea, Ophiuroidea, Echinoidea and Holothuroidea, based on 640 records; the class Ophiuroidea is best represented. The results of this inventory contribute significantly to knowledge of marine benthic diversity from the state of Alagoas, and the information presented here expands the data for Echinodermata from the northeastern coast of Brazil.

Keywords: biodiversity, echinoderm, taxonomy, benthic macroinvertebrate, Brazil.

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Resumo: As coleções e inventários fornecem importantes e essenciais informações para entender a composição e distribuição da biodiversidade. Esta contribuição apresenta um inventário da coleção de Echinodermata pertencente ao Setor de Comunidades Bentônicas (LABMAR/ICBS), da Universidade Federal de Alagoas. As coletas foram realizadas ao longo de mais de vinte anos em diversas localidades da costa de Alagoas. A coleção conta com 16.201 exemplares tombados e 50 espécies distribuídas entre as cinco classes viventes Crinoidea, Asteroidea, Ophiuroidea, Echinoidea e Holothuroidea, com base em 640 registros, sendo a classe Ophiuroidea a melhor representada. O resultado deste inventário vem contribuir significativamente para o conhecimento da diversidade bentônica marinha do Estado de Alagoas ampliando as informações sobre a fauna do filo Echinodermata para a costa nordeste do Brasil.

Palavras-chave: biodiversidade, equinoderma, taxonomia, macroinvertebrados bentônicos, Brasil.

Introduction

Zoological catalogues and collections on regional scales are important to understand the composition and distribution of national and global faunas (Mikkelsen & Cracraft 2001). Such data is the principal source of information on biodiversity distribution, providing knowledge of areas yet unexplored, and also reveals local extinctions and reductions in species distributions (Nogueira et al. 2009). Zoological scientific collections are important records of Brazilian biodiversity, because the increasing occupation and intensity of human impacts often result in species extinction (Zaher & Young 2003).

In Brazil, knowledge of zoological collections is still sparse, especially for the North and Northeast regions. For example, information on collections of Echinodermata is mostly limited to the Southeast region, in institutions such as the Museu Nacional of the Universidade Federal do Rio de Janeiro, the Museu de Zoologia of the Universidade de São Paulo and the Museu de Zoologia of the Universidade de Campinas (Amaral & Jablonski 2005, Ventura et al. 2009). In the Brazilian Northeast, other specific collections with Brazilian specimens of Echinodermata have been established more recently in universities in the states of Bahia (Manso et al. 2008), Paraíba (Gondim et al. 2008), Pernambuco (Lima & Fernandes 2009), and Sergipe (Oliveira et al. 2010).

The first reference to the phylum Echinodermata for the Brazilian coast was based on notes published by Verrill (1868), when this group was still called Radiata, based on samples collected in the Abrolhos area off southern Bahia. Later, Rathbun (1879) surveyed the distribution of species of Echinodermata. The species and distribution of Echinodermata according to salinity in Guanabara Bay, state of Rio de Janeiro (RJ) were characterized by Krau (1950). The first catalogue of echinoderms from the Brazilian coast was made available by Brito (1962). Several studies and remarks about the fauna of Echinodermata along the Brazilian coast have been contributed, especially by Tommasi (1985, 1999). The diversity of Echinodermata from the west coast of the Atlantic Ocean was described by Hendler et al. (1995), who provided taxonomic and ecological information, with some citations for the Brazilian coast. Castro et al. (1999) observed the occurrence of Echinodermata at different depths in Ilha Grande Bay (RJ). Netto et al. (2005) published new records from studies on the São Paulo coast. Xavier (2010) reviewed the literature and listed species of Echinodermata from the Santa Catarina coast.

On the Brazilian northeastern coast, Lima-Verde (1969) studied the Echinodermata from shallow waters from the mouth of the Parnaíba River in Piauí state, to the mouth of the São Francisco River in Alagoas state. Albuquerque (1986) investigated the fauna of Ophiuroidea from the northern and northeastern continental shelf. Echinodermata from the coast of Bahia were characterized for several reef and soft bottom substrates (Alves & Cerqueira 2000, Magalhães et al. 2005, Manso et al. 2008). The diversity of echinoderms from the Ceará coast was characterized by Martins & Queiroz (2006). In the intertidal zone of Cabo Branco, Paraíba state, the echinoderm fauna was analyzed according to habitat (Gondim et al. 2008). New records of Ophiuroidea were reported from shallow waters on the coast of Maceió, Alagoas (Lima et al. 2011).

Most of the catalogues of Echinodermata include mainly representatives of class Ophiuroidea, and some of these publications included descriptions of new species and records (Tommasi 1970, 1999, Tommasi & Abreu 1974). Other studies were based on specimens obtained from oceanographic research cruises that dredged along different parts on the Brazilian coast, and included descriptions, notes, ecological and biogeographical aspects of Ophiuroidea (Monteiro 1987, Manso 1989, Absalão & Manso 1990, Manso 1991,

Borges et al. 2002, Borges & Amaral 2006, Ventura et al. 2007, Borges et al. 2011).

This contribution presents a catalogue and information on the collection of material of the phylum Echinodermata, held by the Setor de Comunidades Bentônicas (LABMAR/ICBS), Universidade Federal de Alagoas.

Material and Methods

The present inventory is based on specimens from the intertidal zone and shallow waters, including coral reefs, sandstone reefs, beaches, soft bottoms, and the phytal, which is abundant along the coast of Alagoas (Correia & Sovierzoski 2009, Correia 2011).

The specimens were collected from different sites on the coast of Alagoas (8° 55' S and 36° 10' W; 10° 30' S and 36° 23' W), including the following localities, from north to south: Maragogi - Galés (9° 01' 07" S and 35° 12' 13" W); São Miguel dos Milagres - Porto da Rua (9° 15' 11" S and 35° 20' 31" W); Passo de Camaragibe - Camaragibe River bar (9° 18' 47" S and 35° 24' 54" W); Paripueira - Natural Pool (9° 28' 25" S and 35° 32' 40" W); Maceió - Ipioca (9° 29' 55" S and 35° 33' 50" W), Ponta do Prego (9° 31' 48" S and 35° 35' 30" W), Ponta do Meirim (9° 32' 37" S and 35° 36' 52" W), Sereia (9° 34' 04" S and 35° 38' 46" W), Riacho Doce (9° 34' 55" S and 35° 39' 25" W), Guaxuma (9° 35' 33" S and 35° 39' 54" W), Jatiúca (9° 39' 12" S and 35° 41' 46" W), Ponta Verde (9° 39' 57" S and 35° 41' 32" W), Piscina dos Amores (9° 40' 39" S and 35° 42' 10" W), Pajuçara (9° 41' 06" S and 35° 43' 22" W), Sobral sewel outfall (9° 40' 45" S and 35° 45' 00" W); Marechal Deodoro - channel of the Manguaba lagoon (9° 43' 13" S and 35° 48' 23" W), Saco da Pedra (9° 44' 26" S and 35° 48' 59" W) and Francês (9° 46' 03" S and 35° 50' 13" W); Barra de São Miguel - São Miguel River bar (9° 50' 10" S and 35° 53' 05" W); Jequiá da Praia - Lagoa Azeda (9° 58' 04" S and 35° 58' 32" W); Coruripe - Pontal do Coruripe (10° 07' 32" S and 36° 10' 32" W); and Piaçabuçu - Pontal do Peba (10° 21' 25" S and 36° 17' 40" W) (Figure 1).

The samples were transported to the Setor de Comunidades Bentônicas, where they were sorted, anesthetized with 10% MgCl₂, and then fixed with 4% formaldehyde for 24 to 48 hours. The specimens were conserved in 70% ethanol and assigned a catalogue number. The material was identified with specialized bibliography to the lowest possible taxonomic category, based on Clark & Downey (1992), Tommasi (1969, 1999), Hendler et al. (1995) and Pawson et al. (2010), and when necessary was sent to a specialist for confirmation of the identification. All remarks on the species of Echinodermata in this collection were entered in a database, available from the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Results

The catalogue lists 16,201 individuals in the five extant classes Crinoidea, Asteroidea, Ophiuroidea, Echinoidea, and Holothuroidea. To date, the collection includes 640 records representing 50 species. The class Ophiuroidea is best represented, followed by the class Holothuroidea. Classes Asteroidea and Echinoidea include fewer families, with different numbers of genera and species. Only one family and a single species of the class Crinoidea are represented.

Most of the Echinodermata species were collected from reef ecosystems. The reefs provide different substrata composed by algae, corals, and sponges, and of these, macroalgae harbored most individuals of Ophiuroidea and Holothuroidea. Specimens of classes Asteroidea, Echinoidea, and Crinoidea were recorded on coral and



Figure 1. Map showing the sites on the coast of Alagoas state, northeastern Brazil, represented in the Echinodermata collection (UFAL/ECH).

sandstone reefs, and some species of Asteroidea and Echinoidea were also found on soft bottoms.

The class Ophiuroidea is the most abundant taxon recorded for the Alagoas coast, with 14,837 individuals, in seven families and 19 species (Table 1).

Class Ophiuroidea

Order Ophiurida Müller & Troschel, 1840

Family Ophiolepididae Ljungman, 1867

Genus *Ophiolepis* Müller & Troschel, 1840

Ophiolepis impressa Lütken, 1859: one record. Brazil, Alagoas, Paripueira - Natural Pool UFAL/ECH 0620.

Ophiolepis paucispina (Say, 1825): six records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0478; Ponta Verde reef UFAL/ECH 0147, 0172, 0249, 0411, 0533.

Table 1. Species of class Ophiuroidea catalogued in the Echinodermata collection of the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Taxa	Nº ind.	Records	Substrate
Family Ophiolopidae			
<i>Ophiolopis impressa</i>	1	1	Coral reef
<i>Ophiolopis paucispina</i>	9	6	Coral reef, algae
Family Ophiidermatidae			
<i>Ophiiderma appressa</i>	21	15	Coral reef, sandstone reef, algae
<i>Ophiiderma cinerea</i>	10	9	Coral reef, sandstone reef, algae
Family Ophiocomidae			
<i>Ophiocoma echinata</i>	7	4	Coral reef, sandstone reef
<i>Ophiocoma wendti</i>	1	1	Coral reef
<i>Ophiocomella ophiactoides</i>	263	37	Coral reef, algae, coral and hydrocoral
Family Ophionereidae			
<i>Ophionereis reticulata</i>	22	16	Coral reef, sandstone reef
<i>Ophionereis squamulosa</i>	1	1	Coral reef
Family Ophiactidae			
<i>Ophiactis brasiliensis</i>	125	10	Coral reef, sandstone reef, algae, coral
<i>Ophiactis lymani</i>	118	25	Coral reef, sandstone reef, algae, sponge, coral, polychaetes and fouling
<i>Ophiactis quinqueradia</i>	5	4	Sponge
<i>Ophiactis savignyi</i>	7.033	129	Coral reef, sandstone reef, algae, sponge, coral and soft bottom
Family Amphipuridae			
<i>Amphipholis januarii</i>	7	5	Coral reef, soft bottom, algae
<i>Amphipholis squamata</i>	7.084	96	Coral reef, sandstone reef, algae, sponge, coral and fouling
<i>Amphiura kinbergi</i>	1	1	Fouling
<i>Ophiocnida loveni</i>	2	1	Coral reef
<i>Ophiocnida scabriuscula</i>	4	4	Coral reef
Family Ophiotrichidae			
<i>Ophiotrich (Ophiotrich) angulata</i>	123	60	Coral reef, sandstone reef, algae, sponge, coral and fouling
Total	14.837	425	

Family Ophiidermatidae Ljungman, 1867

Genus *Ophiiderma* Müller & Troschel, 1840

Ophiiderma appressa (Say, 1825): 15 records. Brazil, Alagoas, Maceió - Ipioca reef UFAL/ECH 0541; Ponta do Prego reef UFAL/ECH 0537, 0549; Ponta do Meirim reef UFAL/ECH 0517, 0526, 0527; Sereia reef UFAL/ECH 0470, 0535; Jatiúca reef UFAL/ECH 0511; Ponta Verde reef UFAL/ECH 0210, 0376, 0412; Pajuçara reef UFAL/ECH 0025. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0331; Francês reef UFAL/ECH 0387 (Figure 2a).

Ophiiderma cinerea Müller & Troschel, 1842: nine records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0546; Ponta do Meirim reef UFAL/ECH 0528; Sereia reef UFAL/ECH 0497; Riacho Doce reef UFAL/ECH 0560; Ponta Verde reef UFAL/ECH 0016, 0127, 0133, 0587. Marechal Deodoro - Francês reef UFAL/ECH 0615.

Family Ophiocomidae Ljungman, 1867

Genus *Ophiocoma* L. Agassiz, 1835

Ophiocoma echinata (Lamarck, 1816): four records. Brazil, Alagoas, Maceió - Riacho Doce reef UFAL/ECH 0389; Jatiúca reef UFAL/ECH 0624. Marechal Deodoro - Francês reef UFAL/ECH 0228. São Miguel dos Milagres - Porto da Rua reef UFAL/ECH 0175 (Figure 2b).

Ophiocoma wendti Müller & Troschel, 1842: one record. Brazil, Alagoas, Marechal Deodoro - Francês reef UFAL/ECH 0623.

Genus *Ophiocomella* A.H. Clark, 1939

Ophiocomella ophiactoides (H. L. Clark, 1901): 37 records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0529; Ponta Verde reef UFAL/ECH 0064, 0066, 0067, 0087, 0091, 0110, 0120, 0150, 0160, 0166, 0186, 0197, 0201, 0213, 0225, 0241, 0244, 0248, 0259, 0262, 0265, 0287, 0303, 0329, 0367, 0370, 0374, 0408, 0409, 0442, 0465, 0553, 0593. Maragogi - Galés reef UFAL/ECH 0107, 0109. Marechal Deodoro - Francês reef UFAL/ECH 0614.

Family Ophionereidae Ljungman, 1867

Genus *Ophionereis* Lütken, 1856

Ophionereis reticulata (Say, 1825): 16 records. Brazil, Alagoas, Maceió - Ipioca reef UFAL/ECH 0542; Ponta do Prego reef UFAL/ECH 0547; Ponta do Meirim reef UFAL/ECH 0516; Sereia reef UFAL/ECH 0534, 0563; Riacho Doce reef UFAL/ECH 0390; Jatiúca reef UFAL/ECH 0291, 0636; Ponta Verde reef UFAL/ECH 0142, 0157, 0267; Pajuçara reef UFAL/ECH 0381. Maragogi - Galés reef UFAL/ECH 0105. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0334, 0480; Francês reef UFAL/ECH 0475 (Figure 2c).

Ophionereis squamulosa Koehler, 1914: 1 record. Brazil, Alagoas, Maceió - Jatiúca reef UFAL/ECH 0625.

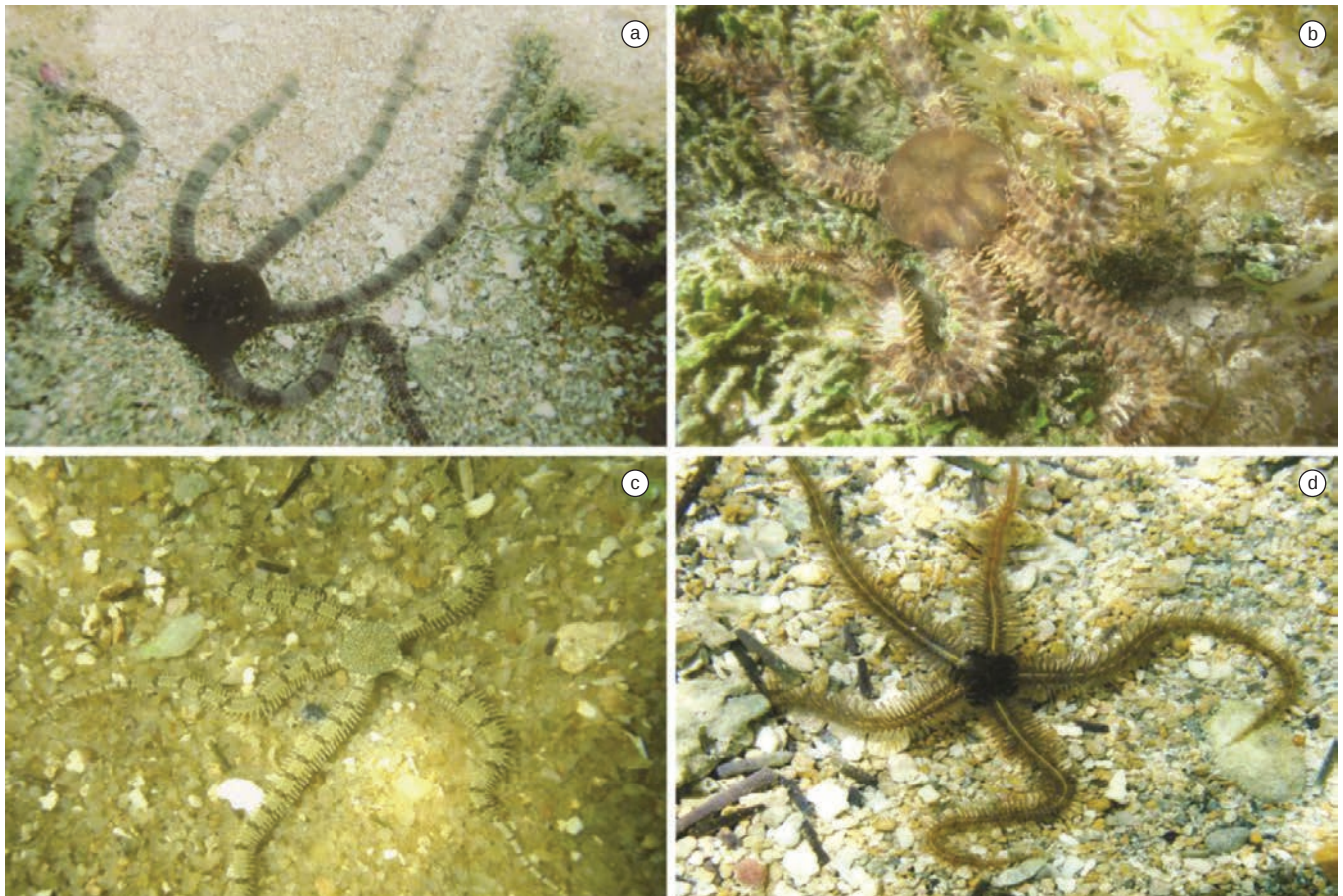


Figure 2. Species of class Ophiuroidea from the Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH): a) *Ophioderma appressa*, b) *Ophiocoma echinata*, c) *Ophionereis reticulata* and d) *Ophiothrix angulata*.

Family Ophiactidae Matsumoto, 1915

Genus *Ophiactis* Lütken, 1856

Ophiactis brasiliensis Manso, 1988: 10 records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0519; Ponta Verde reef UFAL/ECH 0037, 0068; Piscina dos Amores reef UFAL/ECH 0485; Pajuçara reef UFAL/ECH 0380, 0559, 0626. Maragogi - Galés reef UFAL/ECH 0108. Marechal Deodoro - Francês reef UFAL/ECH 0072, 0639.

Ophiactis lymani Ljungman, 1872: 25 records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0518; Ponta Verde reef UFAL/ECH 0089, 0102, 0118, 0164, 0270, 0301, 0325, 0372, 0403, 0404, 0460, 0461, 0552, 0603. Sobral sewel outfall UFAL/ECH 0114, 0585. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0231. Maragogi - Galés reef UFAL/ECH 0106. Marechal Deodoro - Francês reef UFAL/ECH 0343, 0638; Saco da Pedra reef UFAL/ECH 0277, 0305, 0337, 0355.

Ophiactis quinqueradia Ljungman, 1872: four records. Brazil, Alagoas, Maceió - Ponta Verde reef UFAL/ECH 0136, 0255. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0338. Paripueira - Natural Pool UFAL/ECH 0622.

Ophiactis savignyi (Müller & Troschel, 1842): 129 records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0554, 0557, 0564; Sereia reef UFAL/ECH 0489, 0617, 0631; Riacho Doce reef UFAL/ECH 0447; Garça Torta reef UFAL/ECH 0055; Jatiúca reef UFAL/ECH 0309, 0349, 0430, 0443, 0628; Ponta Verde reef UFAL/ECH 0009, 0013, 0036, 0048, 0058, 0060, 0062, 0065, 0070, 0077, 0079, 0081, 0083, 0085, 0088, 0097, 0099, 0101, 0112, 0113, 0117, 0122, 0128, 0134,

0135, 0138, 0143, 0145, 0148, 0158, 0161, 0163, 0180, 0182, 0184, 0193, 0195, 0198, 0205, 0208, 0211, 0220, 0223, 0239, 0242, 0245, 0256, 0257, 0260, 0263, 0269, 0271, 0285, 0298, 0300, 0321, 0322, 0324, 0327, 0365, 0368, 0371, 0398, 0401, 0402, 0436, 0437, 0438, 0457, 0458, 0459, 0543, 0554, 0581, 0592, 0596, 0604, 0606; Piscina dos Amores reef UFAL/ECH 0486; Pajuçara reef UFAL/ECH 0352, 0382, 0627; Sobral sewel outfall UFAL/ECH 0187, 0413, 0424, 0583, 0584, 0599, 0608, 0634. Maragogi - Galés reef UFAL/ECH 0044, 0168. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0278, 0306, 0308, 0332, 0339, 0354, 0385, 0449, 0450, 0530; Francês reef UFAL/ECH 0023, 0075, 0227, 0272, 0292, 0304, 0342, 0345, 0377, 0616, 0640. Paripueira - Natural pool UFAL/ECH 0358. Passo de Camaragibe - Camaragibe River bar UFAL/ECH 0582. São Miguel dos Milagres - Porto da Rua reef UFAL/ECH 0177.

Family Amphiphiuridae Ljungman, 1867

Genus *Amphipholis* Ljungman, 1866

Amphipholis januarii Ljungman, 1866: five records. Brazil, Alagoas, Maceió - Jatiúca reef UFAL/ECH 0429; Ponta Verde UFAL/ECH 0200, 0247. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0230. Paripueira - Cabeço UFAL/ECH 0618.

Amphipholis squamata (Delle Chiaje, 1828): 96 records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0550; Ponta do Meirim reef UFAL/ECH 0520, 0558; Sereia reef UFAL/ECH 0490, 0629; Riacho Doce reef UFAL/ECH 0104; Jatiúca reef UFAL/ECH 0347, 0513; Pajuçara reef UFAL/ECH 0032, 0076; Ponta Verde reef UFAL/ECH 0008, 0014, 0059,

0061, 0063, 0069, 0071, 0078, 0080, 0082, 0084, 0086, 0090, 0098, 0100, 0103, 0115, 0116, 0119, 0144, 0146, 0149, 0159, 0162, 0165, 0173, 0181, 0183, 0185, 0194, 0196, 0199, 0206, 0209, 0212, 0221, 0222, 0224, 0240, 0243, 0246, 0258, 0261, 0264, 0284, 0286, 0297, 0299, 0302, 0323, 0326, 0328, 0366, 0369, 0373, 0405, 0406, 0407, 0439, 0440, 0441, 0462, 0463, 0464, 0501, 0512, 0555, 0556, 0580, 0590, 0595, 0597, 0602, 0605; Sobral sewel outfall UFAL/ECH 0414, 0423, 0427, 0598, 0607, 0635. Maragogi - Galés reef UFAL/ECH 0169. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0336, 0357; Francês reef UFAL/ECH 0341, 0637. Paripueira - Natural Pool UFAL/ECH 0619.

Genus *Amphiura* Forbes, 1843

Amphiura kinbergi Ljungman, 1872: one record. Brazil, Alagoas, Maceió - Sobral sewel outfall UFAL/ECH 0576.

Genus *Ophiocnida* Lyman, 1865

Ophiocnida loveni (Ljungman, 1867): one record. Brazil, Alagoas, Maceió - Jatiúca reef UFAL/ECH 0275.

Ophiocnida scabriuscula (Lütken, 1859): four records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0514; Jatiúca reef UFAL/ECH 0252; Ponta Verde reef UFAL/ECH 0215, 0266.

Family Ophiotrichidae Ljungman, 1867

Genus *Ophiotrix* Müller & Troschel, 1840

Ophiotrix angulata (Say, 1825): 60 records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0538, 0551; Sereia reef UFAL/ECH 0471, 0496, 0532, 0562, 0632; Riacho Doce reef UFAL/ECH 0561; Garça Torta reef UFAL/ECH 0052; Guaxuma reef UFAL/ECH 0499; Jatiúca reef UFAL/ECH 0167, 0251, 0276, 0426; Ponta Verde reef UFAL/ECH 0001, 0002, 0017, 0035,

0188, 0207, 0214, 0226, 0288, 0320, 0330, 0375, 0410, 0466, 0600, 0601; Piscina dos Amores reef UFAL/ECH 0421; Pajuçara reef UFAL/ECH 0420, 0508; Sobral sewel outfall UFAL/ECH 0056, 0425, 0467. Barra de São Miguel - Barra de São Miguel reef UFAL/ECH 0033. Coruripe - Pontal de Coruripe reef UFAL/ECH 0525. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0229. Marechal Deodoro - Manguaba lagoon channel UFAL/ECH 0004; Saco da Pedra reef UFAL/ECH 0279, 0307, 0333, 0335, 0353, 0356, 0384, 0388, 0448, 0481; Francês reef UFAL/ECH 0024, 0074, 0268, 0340, 0378, 0386, 0419, 0633. Paripueira - Natural Pool UFAL/ECH 0621. São Miguel dos Milagres - Porto da Rua reef UFAL/ECH 0178 (Figure 2d).

The class Holothuroidea has 1,214 individuals recorded, distributed in eight families and 14 species. *Synaptula hydriformis* is the most abundant species (Table 2).

Class Holothuroidea

Order Dendrochiroidea Grube, 1840

Family Psolidae Perrier, 1902

Genus *Lissothuria* Verrill, 1867

Lissothuria braziliensis (Théel, 1886): one record. Brazil, Alagoas, Maceió - Ipioca reef UFAL/ECH 0575.

Family Phyllophoridae Oestergren, 1907

Genus *Phyllophorus* Grube, 1840

Phyllophorus (Urodemella) occidentalis Ludwig, 1875: six records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0539; Riacho Doce reef UFAL/ECH 0394, 0507; Ponta Verde reef UFAL/ECH 0311; Pajuçara reef UFAL/ECH 0020, 0043.

Table 2. Species of class Holothuroidea catalogued in the Echinodermata collection of the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Taxa	Ind.	Records	Substrate
Family Psolidae			
<i>Lissothuria braziliensis</i>	1	1	Coral reef
Family Phyllophoridae			
<i>Phyllophorus (Urodemella) occidentalis</i>	16	6	Coral reef
<i>Stolus cognatus</i>	6	4	Coral reef
Family Sclerodactylidae			
<i>Pseudothyone belli</i>	1	1	Algae
Family Cucumariidae			
<i>Aslia pygmaea</i>	2	2	Coral reef and algae
<i>Duasmodyctyla seguroensis</i>	16	8	Coral reef
<i>Ocnus braziliensis</i>	62	20	Coral reef, sandstone reef
<i>Ocnus suspectus</i>	4	4	Coral reef, sandstone reef
Family Holothuriidae			
<i>Holothuria (Halodeima) grisea</i>	27	15	Coral reef, sandstone reef
<i>Holothuria (Platyperona) parvula</i>	2	2	Coral reef
<i>Holothuria (Thymiosycia) arenicola</i>	2	1	Coral reef, sandstone reef
Family Stichopodidae			
<i>Isostichopus badionotus</i>	2	2	Sandstone reef
Family Synaptidae			
<i>Synaptula hydriformis</i>	968	40	Algae
Family Chiridotidae			
<i>Chiridota rotifera</i>	105	35	Coral reef, algae
Total	1,214	141	

Genus *Stolus* Selenka, 1867

Stolus cognatus (Lampert, 1885): four records: Brazil, Alagoas, Maceió - Riacho Doce reef UFAL/ECH 0393, 0612; Jatiúca reef UFAL/ECH 0250, 0274 (Figure 3a).

Family Sclerodactylidae Panning, 1949

Genus *Pseudothyone* Panning, 1949

Pseudothyone belli (Ludwig, 1887): one record: Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0589.

Family Cucumariidae Ludwig, 1894

Genus *Aslia* Rowe, 1970

Aslia pygmaea (Théel, 1886a): two records. Brazil, Alagoas, Maceió - Sereia reef UFAL/ECH 0609, 0630.

Genus *Duasmodyctyla* Ayres, 1854

Duasmodyctyla seguroensis (Deichmann, 1930): eight records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0446; Riacho Doce reef UFAL/ECH 0392, 0418, 0422, 0613; Jatiúca reef UFAL/ECH 0273; Ponta Verde reef UFAL/ECH 0040, 0232.

Genus *Ocnus* Forbes, 1841

Ocnus braziliensis (Verrill, 1868): 20 records. Brazil, Alagoas, Maceió - Sereia reef UFAL/ECH 0494, 0536; Riacho Doce reef UFAL/ECH 0141, 0415, 0504; Garça Torta reef UFAL/ECH 0050; Jatiúca reef UFAL/ECH 0510; Ponta Verde reef UFAL/ECH 0022, 0039, 0053, 0121, 0126, 0395; Pajuçara reef UFAL/ECH 0012, 0029, 0042, 0045, 0046. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0383. Passo de Camaragibe - Camaragibe river bar UFAL/ECH 0350 (Figure 3b).

Ocnus suspectus (Ludwig, 1874): four records. Brazil, Alagoas, Maceió - Sereia reef UFAL/ECH 0495; Riacho Doce reef UFAL/ECH 0506, 0611; Ponta Verde reef UFAL/ECH 0586.

Order Aspichirota Grube, 1840

Family Holothuriidae Ludwig, 1894

Genus *Holothuria* Linnaeus, 1767

Holothuria (Halodeima) grisea Selenka, 1867: 15 records. Brazil, Alagoas, Maceió - Sereia reef UFAL/ECH 0469, 0493; Riacho Doce reef UFAL/ECH 0391, 0505; Garça Torta reef UFAL/ECH 0049; Jatiúca reef UFAL/ECH 0348; Ponta Verde reef UFAL/ECH 0038, 0041, 0140; Pajuçara reef UFAL/ECH 0011, 0018, 0019, 0021, 0359. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0479 (Figure 3c).

Holothuria (Platyperona) parvula (Selenka, 1867): two records. Brazil, Alagoas, Maceió - Riacho Doce reef UFAL/ECH 0610; Ponta Verde reef UFAL/ECH 0487.

Holothuria (Thymiosycia) arenicola Semper, 1868; one record. Brazil, Alagoas, Marechal Deodoro - Francês reef UFAL/ECH 0474.

Family Stichopodidae Haeckel, 1896

Genus *Isostichopus* Deichmann, 1958

Isostichopus badiotus (Selenka, 1867): two records. Brazil, Alagoas, Marechal Deodoro - Francês reef UFAL/ECH 0344, 0531.

Order Apodida Brandt, 1835

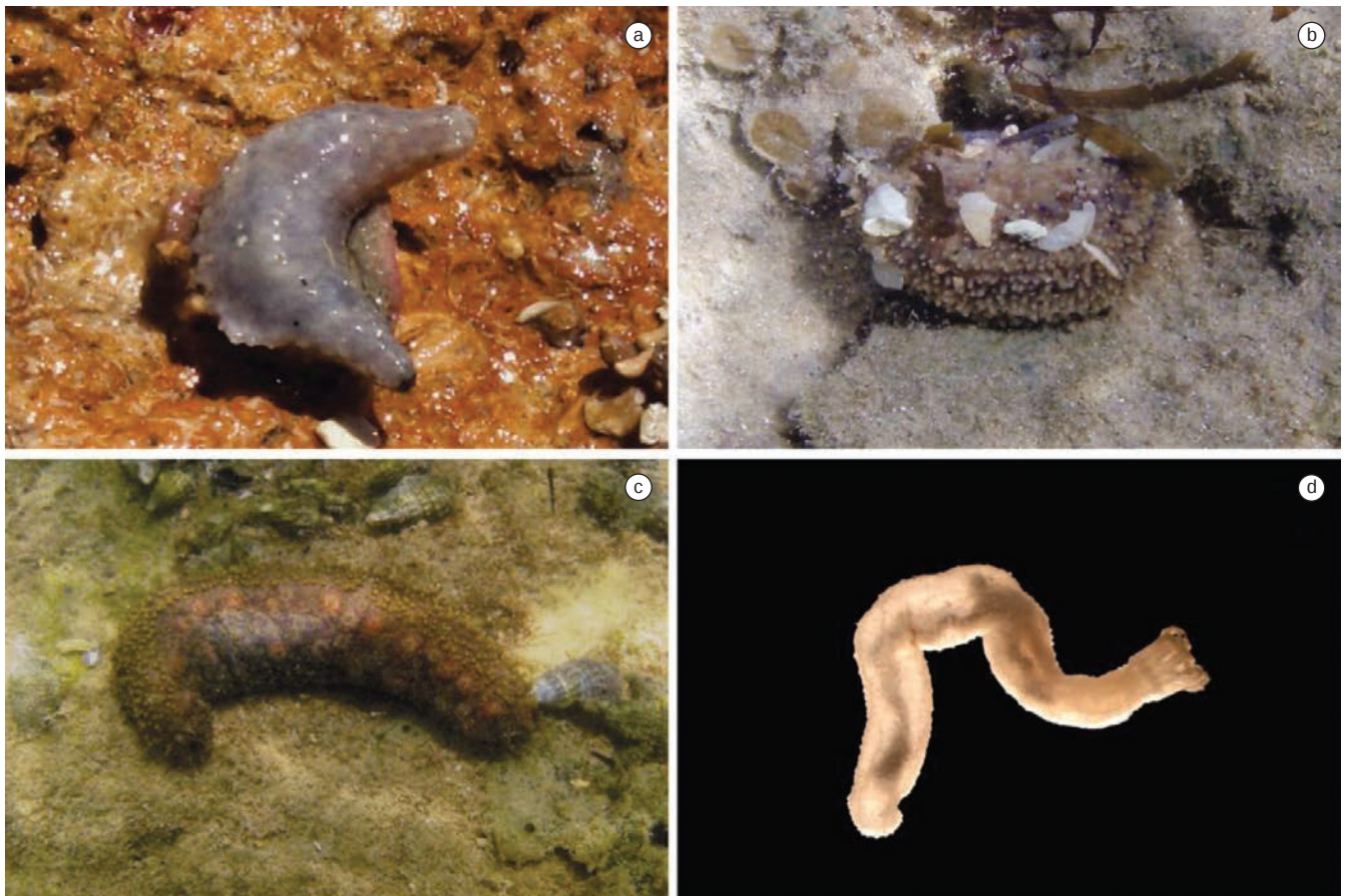


Figure 3. Species of class Holothuroidea from the Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH): a) *Stolus cognatus*, b) *Ocnus braziliensis*, c) *Holothuria grisea* and d) *Synaptula hydriformis*.

Family Synaptidae Burmeister, 1837

Genus *Synaptula* Oersted, 1849

Synaptula hydriformis (Lesueur, 1824): 40 records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0545; Riacho Doce reef UFAL/ECH 0073; Ponta Verde reef UFAL/ECH 0006, 0015, 0057, 0094, 0111, 0132, 0155, 0174, 0179, 0191, 0203, 0204, 0217, 0218, 0236, 0237, 0253, 0254, 0281, 0282, 0294, 0295, 0296, 0317, 0318, 0362, 0363, 0396, 0399, 0416, 0433, 0434, 0455, 0456, 0500, 0588, 0591, 0594 (Figure 3d).

Family Chiridotidae Oestergren, 1898

Genus *Chiridota* Eschscholtz, 1829

Chiridota rotifera (Pourtalès, 1851): 35 records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0477; Garça Torta reef UFAL/ECH 0051; Ponta Verde reef UFAL/ECH 0007, 0095, 0154, 0156, 0171, 0176, 0189, 0190, 0192, 0202, 0216, 0219, 0234, 0235, 0238, 0280, 0283, 0293, 0315, 0316, 0319, 0361, 0364, 0397, 0400, 0417, 0431, 0432, 0435, 0454, 0476, 0502, 0503.

The class Echinoidea is represented by 97 individuals, including five families and eight species. The most abundant Echinoidea species are *Echinometra lucunter*, *Eucidaris tribuloides* and *Lytechinus variegatus* (Table 3).

Class Echinoidea

Order Cidaroida Claus, 1880

Family Cidaridae Gray, 1825

Genus *Eucidaris* Pomel, 1883

Eucidaris tribuloides (Lamarck, 1816): five records. Brazil, Alagoas, Maceió - Guaxuma reef UFAL/ECH 0498; Ponta Verde UFAL/ECH 0026. Barra de São Miguel - Barra de São Miguel reef UFAL/ECH 0030. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0568, 0570 (Figure 4a).

Ordem Diadematoidea Duncan, 1889

Family Diadematidae Gray, 1855

Genus *Diadema* Gray, 1825

Diadema antillarum Philippi, 1845: one record. Brazil, Alagoas, Barra de São Miguel - Barra de São Miguel reef UFAL/ECH 0034 (Figure 4b).

Order Echinoida Claus, 1876

Family Echinometridae Gray, 1825

Genus *Echinometra* Gray, 1825

Echinometra lucunter (Linnaeus, 1758): 10 records. Brazil, Alagoas, Maceió - Sereia reef UFAL/ECH 0491; Ponta Verde reef UFAL/ECH 0123, 0137, 0151, 0170, 0312, 0451; Piscina dos Amores reef UFAL/ECH 0290, 0484. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0310 (Figure 4c).

Family Toxopneustidae Troschel, 1872

Genus *Lytechinus* A. Agassiz, 1863

Lytechinus variegatus (Lamarck, 1816): 13 records. Brazil, Alagoas, Maceió - Jatiúca reef UFAL/ECH 0129; Ponta Verde reef UFAL/ECH 0027, 0139, 0152, 0153, 0233, 0313, 0314, 0360, 0452; Piscina dos Amores reef UFAL/ECH 0289. Barra de São Miguel - Barra de São Miguel reef UFAL/ECH 0031. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0569 (Figure 4d).

Genus *Tripneustes* L. Agassiz, 1841b

Tripneustes ventricosus (Lamarck, 1816): seven records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0548; Sereia reef UFAL/ECH 0468, 0488, 0567; Jatiúca reef UFAL/ECH 0346, 0428, 0482 (Figure 4e).

Order Clypeasteroidea L. Agassiz, 1835

Family Mellitidae Stefanini, 1912

Genus *Encope* L. Agassiz, 1840

Encope emarginata (Leske, 1778): two records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0444. Marechal Deodoro - Francês reef UFAL/ECH 0473 (Figure 4f).

Genus *Leodia* Gray, 1851a

Leodia sexiesperforata (Leske, 1778): one record. Brazil, Alagoas, Marechal Deodoro - Francês reef UFAL/ECH 0565.

Genus *Mellita* L. Agassiz, 1841a

Mellita quinquesperforata (Leske, 1778): two records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0515. Coruripe - Lagoa do Pau UFAL/ECH 0524.

The class Asteroidea is represented by 46 individuals, including five families and eight species. *Luidia senegalensis* and *Linckia guildingi* are the most abundant species (Table 4).

Class Asteroidea

Table 3. Species of class Echinoidea catalogued in the Echinodermata collection of the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Taxa	Ind.	Records	Substrate
Family Cidaridae			
<i>Eucidaris tribuloides</i>	33	5	Coral reef, sandstone reef
Family Diadematidae			
<i>Diadema antillarum</i>	1	1	Coral reef, sandstone reef
Family Echinometridae			
<i>Echinometra lucunter</i>	10	10	Coral reef, sandstone reef
Family Toxopneustidae			
<i>Lytechinus variegatus</i>	36	13	Coral reef, algae, mud
<i>Tripneustes ventricosus</i>	7	7	Coral reef, sandstone reef
Family Mellitidae			
<i>Encope emarginata</i>	6	2	Coral reef, soft bottom
<i>Leodia sexiesperforata</i>	1	1	Coral reef, soft bottom
<i>Mellita quinquesperforata</i>	3	2	Coral reef, soft bottom
Total	97	41	



Figure 4. Species of class Echinoidea from the Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH): a) *Eucidaris tribuloides*, b) *Diadema antillarum*, c) *Echinometra lucunter*, d) *Lytechinus variegatus*, e) *Tripneustes ventricosus* and f) *Encope emarginata*.

Order Paxillosida Perrier, 1884

Family Luidiidae Sladen, 1889

Genus *Luidia* Forbes, 1839

Luidia senegalensis (Lamarck, 1816): three records. Brazil, Alagoas, Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0572, 0573, 0578.

Luidia alternata (Say, 1825): one record. Brazil, Alagoas, Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0577.

Family Astropectinidae Gray, 1840

Genus *Astropecten* Gray, 1840

Astropecten brasiliensis Müller & Troschel, 1842: one record. Brazil, Alagoas, Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0571.

Order Valvatida Perrier, 1884

Family Oreasteridae Fisher, 1911

Genus *Oreaster* Müller & Troschel, 1842

Oreaster reticulatus (Linnaeus, 1758): one record. Brazil, Alagoas, Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0566.

Family Ophidiasteridae Verrill, 1870

Genus *Linckia* Nardo, 1834

Linckia guildingi Gray, 1840: 12 records. Brazil, Alagoas, Maceió - Ponta do Prego reef UFAL/ECH 0445, 0523; Sereia reef UFAL/ECH 0492; Jatiúca reef UFAL/ECH 0130, 0509; Ponta Verde reef UFAL/ECH 0028, 0124, 0131; Piscina dos Amores reef UFAL/ECH 0125, 0522; Pajuçara reef UFAL/ECH 0010; Paripueira - Natural Pool UFAL/ECH 0047 (Figure 5a).

Genus *Narcissia* Gray, 1840

Narcissia trigonaria Sladen, 1889: one record. Brazil, Alagoas, Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0579.

Order Spinulosida Perrier, 1884

Family Echinasteridae Verril, 1870

Genus *Echinaster* Müller & Troschel, 1840

Echinaster brasiliensis Müller & Troschel, 1842: three records. Brazil Alagoas, Maceió - Ponta Verde reef UFAL/ECH 0093, 0096. Jequiá da Praia - Lagoa Azeda reef UFAL/ECH 0574.

Echinaster echinophorus (Lamarck, 1816): four records. Brazil, Alagoas, Maceió - Jatiúca reef UFAL/ECH 0483; Ponta Verde reef UFAL/ECH 0092, 0453. Piaçabuçu - Pontal do Peba reef UFAL/ECH 0054 (Figure 5b).

The class Crinoidea is represented by only seven individuals in this collection, all *Tropiometra carinata* (Table 5).

Class Crinoidea

Order Isocrinida Sieverts-Doreck, 1952

Table 4. Species of class Asteroidea catalogued in the Echinodermata collection of the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Taxa	Ind.	Records	Substrate
Family Luidiidae			
<i>Luidia senegalensis</i>	16	3	Soft bottom
<i>Luidia alternata</i>	1	1	Soft bottom
Family Astropectinidae			
<i>Astropecten brasiliensis</i>	1	1	Soft bottom
Family Oreasteridae			
<i>Oreaster reticulatus</i>	1	1	Soft bottom
Family Ophidiasteridae			
<i>Linckia guildingi</i>	13	12	Recife de coral, sandstone reef
<i>Narcissia trigonaria</i>	2	1	soft bottom
Family Echinasteridae			
<i>Echinaster brasiliensis</i>	8	3	Coral reef, sandstone reef, soft bottom
<i>Echinaster echinophorus</i>	4	4	Coral reef, sandstone reef
Total	46	26	

Table 5. Species of class Crinoidea catalogued in the Echinodermata collection of the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Taxa	Ind.	Records	Substrate
Family Tropiometridae			
<i>Tropiometra carinata</i>	7	7	Coral reef, sandstone reef
Total	7	7	



Figure 5. Species of class Asteroidea from the Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH): a) *Linckia guildingi* and b) *Echinaster echinophorus*.



Figure 6. *Tropiometra carinata*, representative of the class Crinoidea in the Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas (UFAL/ECH).

Family Tropiometridae A.H. Clark, 1908

Genus *Tropiometra* A.H. Clark, 1907

Tropiometra carinata (Lamarck, 1816): seven records. Brazil, Alagoas, Maceió - Ponta do Meirim reef UFAL/ECH 0521; Guaxuma reef UFAL/ECH 0540; Pajuçara reef UFAL/ECH 0003, 0005. Marechal Deodoro - Saco da Pedra reef UFAL/ECH 0351; Francês reef UFAL/ECH 0379, 0472 (Figure 6).

Discussion

In this collection, the class Ophiuroidea is the most abundant with 19 taxa, including *Ophiactis savignyi* and *Amphipholis squamata* with the most records. According to Borges et al. (2011), the ophiuroids are the most diverse and frequently abundant group among the echinoderms, living associated with several types of substrata including sand, algae, mud and rubble, or associated with biological substrata such as corals, sponges and polychaete tubes. Numerical and taxa abundance of the class Ophiuroidea was also observed in the echinoderm fauna associated with several types of substrata from the Bahia coast (Magalhães et al. 2005, Borges & Amaral 2006, Manso et al. 2008).

Holothuroidea is the second best-represented class in abundance and taxonomic richness. This group was considered the least studied class in the South Atlantic (Hadel et al. 1999). *Holothuria grisea* is very common, and was reported as the most frequent and numerous holothuroid on the Brazilian coast (Tommasi, 1969, 1999). The most numerous species of this class in the collection is *S. hydriformis*, principally from phytal communities. According to Clark (1908), this species is viviparous and occurs in association with several species of macroalgae.

Several species in the present collection, including the sea cucumber *Isostichopus badiotus*, the sea urchin *Eucidaris tribuloides*, and the sea stars *Echinaster brasiliensis*, *Luidia senegalensis*, *Echinaster echinophorus* and *Narcissia trigonaria*, are considered endangered in some localities on the southeastern Brazilian coast (Hadel et al. 1999, Ventura et al. 2009).

Other catalogues report more specimens and taxa of the classes Echinoidea and Asteroidea than the classes Ophiuroidea and Holothuroidea (Alves & Cerqueira 2000, Lima & Fernandes 2009, Oliveira et al. 2010, Xavier 2010). However, the dominance of these groups is associated with the types of substrates where these species can be found (Gondim et al. 2008). Substrates composed of algae,

marine grasses, sponges, and other sessile organisms also contribute to increasing the abundance and richness of the echinoderm fauna (Hendler et al. 1995). The variety of types of substrates where the specimens were collected contributed to increasing the abundance and richness of the species listed in this catalogue, mainly of the classes Ophiuroidea and Holothuroidea.

Conclusion

This inventory of the phylum Echinodermata collection in the Setor de Comunidades Bentônicas, Universidade Federal de Alagoas, illustrates the diversity of this group in the benthic fauna on the coast of Alagoas. The present catalogue contains 50 species, with 640 records and 16,201 individuals, including 19 species of Ophiuroidea, 14 Holothuroidea, 8 Echinoidea, 8 Asteroidea, and one Crinoidea. This collection is an important reference tool for current and future studies of the marine biodiversity of the phylum Echinodermata from the state of Alagoas and the Brazilian northeastern coast.

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