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Original Paper

Myxomycetes of the Atlantic Rainforest: species on the ground litter from Pedra Talhada Biological Reserve (Alagoas, Brazil)

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Abstract

The Brazilian Atlantic Rainforest is considered one of the world biodiversity hotspots, with high levels of endemism. Studies on the myxobiota of Atlantic Rainforest have been carried out mainly in the Northeast region of Brazil but the ground litter microhabitat has only been included in a few of these studies. This study aimed to record the composition and diversity of the myxobiota of the ground litter of Pedra Talhada Biological Reserve and to expanding the knowledge about the microbiota of Atlantic Rainforest. Samples of ground litter were collected at the end of the dry season and the beginning of the rainy season and 1,080 moist chambers were mounted. The identification of the specimens obtained were based on a morphological examination. Were obtained 86 specimens, identified, and registered in the UFP herbarium. Plasmodia and/or sporocarps were recorded in 23.7% of the moist chambers. The inventory resulted in 13 new records for Alagoas raising the number of known species in the state to 61. *Perichaena longipes* and *Stemonitopsis gracilis* are registered for the first time in Northeast Brazil and in the Atlantic Rainforest, *Macbrideola spinosispora* is the first record for Brazil and *Licea* sp. is likely a new taxon. A key to identify the species occurring in Alagoas is presented, as well as, distribution and comments of the species in Brazil.

Key words: Amoebozoa, chorology, microhabitat, Myxogastria, tropical rainforest.

Resumo

A Floresta Atlântica brasileira é considerada um dos hotspots de biodiversidade mundial, com altos níveis de endemismo. Estudos sobre a mixobiota de Floresta Atlântica têm sido realizados principalmente na região Nordeste do Brasil, mas o folhedo de solo foi incluído em poucos desses estudos. O objetivo desse trabalho foi registrar a composição e diversidade da mixobiota do folhedo de solo da Reserva Biológica de Pedra Talhada e expandir o conhecimento sobre a microbiota da Floresta Atlântica. Amostras do folhedo de solo foram coletadas no final da estação seca e início da estação chuvosa e 1.080 câmaras úmidas foram montadas. A identificação e descrição dos espécimes obtidos foram baseadas em análise morfológica. Foram obtidos 86 espécimes, identificados e registrados no Herbário UFP. Plasmódios e/ou esporocarpos foram registrados em 23,7% das câmaras úmidas. O inventário resultou em 13 novos registros para Alagoas, aumentando para 61 o número de espécies conhecidas para o estado. *Perichaena longipes* e S*temonitopsis gracilis* são registrados pela primeira vez no Nordeste e na Floresta Atlântica. *Macbrideola spinosispora* é o primeiro registro para o Brasil e *Licea* sp. provavelmente é um novo táxon. Uma chave de identificação para as espécies ocorrentes em Alagoas é apresentada, bem como, comentários e distribuição das espécies no Brasil.

Palavras-chave: Amoebozoa, corologia, micro habitat, Myxogastria, floresta tropical.

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Introduction

Myxomycetes (Amoebozoa, Myxomycota) are part of the diverse group of organisms that inhabit the ground litter of natural and anthropized environments (Rojas & Stephenson 2013). In the phase of active metabolism, when myxomycetes are in the form of mixoflagellates, myxoamoeba or plasmodia and move over the different elements of the ground litter, they interact with the other occupants of the microhabitat, release products of the metabolism to the substrate, and act mainly as predators of bacteria, yeasts and other microorganisms, on which they feed. Close to the sporulation phase, the plasmodia usually move towards the most superficial and illuminated layer of the ground litter and the sporocarps attach to any of the elements present there, so that the presence of the species becomes more easily perceived.

With about 1,000 species and worldwide distribution, myxomycetes have been the object of studies as components of the microbiota of different terrestrial ecosystems in the two hemispheres, colonizing different microhabitats, especially fallen dead trunks, bark of living trees, ground litter, and aerial litter (Rojas & Stephenson 2017). In tropical humid forests, litter consists predominantly of parts that detach from the plants and are retained in the foliage and branches (aerial litter) or fall to the ground (ground litter or litter fall). This microhabitat, formed by sticks, pieces of bark, fruits, floral parts, and mainly leaves in addition to animal excrement and remains, allows the development of a rich microbiota. The abundance, composition and diversity of decomposing microorganisms present in the litter and their predators, including myxomycetes, play an important role in nutrient flow, contributing to soil fertility and growth of forest plants (Walker *et al*. 2019).

The Brazilian Atlantic Rainforest is a tropical forest still considered one of the world biodiversity hotspots, with high levels of endemism despite intense exploitation and consequent fragmentation that has led to a loss of more than 90% of the original area (Tabarelli *et al*. 2005; Araújo *et al*. 2015). The remnants of the original forest are distributed from the state of Rio Grande do Norte to Rio Grande do Sul, of which about 10% are in the Northeast of the country, and present different phytophysiognomies due to climatic and geographic variations (Tabarelli *et al*. 2006). Studies on the myxobiota of Atlantic Rainforest and associated ecosystems have been carried out in different phytophysiognomies and microhabitats. They have explored Conservation Units, mainly in the Northeastern region of the country, with records for species in Open Ombrophilous Forest and Seasonal Semideciduous Forest (Cavalcanti *et al.* 2006; Bezerra *et al*. 2007, 2008; Tenório *et al*. 2009), Seasonal Semideciduous Forest and montane humid forest in Open Ombrophilous Forest (Silva & Cavalcanti 2012; Costa *et al*. 2014), Dense Ombrophilous Forest (Xavier de Lima & Cavalcanti 2015), sandbanks (Bezerra *et al*. 2011), and mangroves (Agra *et al*. 2015; Cavalcanti *et al*. 2016; Barbosa & Cavalcanti 2020). Among the microhabitats explored, ground litter has been included in a few studies, such as that carried out by Coelho & Cavalcanti (2010) who registered 30 species distributed in ten families from moist chamber cultures and field collections in two lowland dense rainforest Conservation Units.

Aiming to expand the knowledge about the microbiota of the Atlantic Rainforest, this work presents the first records of the composition and diversity of the myxobiota of the ground litter of Pedra Talhada Biological Reserve, a fragment of Ombrophilous Submontane Rainforest located in the Northeast of Brazil, and provides new references of myxomycetes for the state of Alagoas, for the Northeast region, and for the country.

Material and Methods

Study area

Currently, there are 51 Conservation Units located in the state of Alagoas, Northeastern Brazil, and 24 are located in the Atlantic Rainforest domain (Moura 2006), within the area of the Pernambuco Endemism Center, including the Pedra Talhada Biological Reserve (PTBR) (Fig. 1a-c). Created in 1989, the PTBR is located in the municipalities of Quebrangulo (AL) and Lagoa do Ouro (PE), 90 km away from the coast (09°14'45.5"S, 36°25'14.06"W), and comprises an area of 4,469 ha with altitudes varying from 459 to 883 m (Tscharner *et al*. 2015).

The local climate is tropical with dry summer (As of Köppen's, Alvares *et al*. 2013), with average annual temperature of 25 °C (Guimarães *et al*. 2014). Higher precipitation occurs between May and July, with more than 250 mm per month, and the drier season covers the months from October to February, with less than 50 mm per month. The PTBR is a fragment of Ombrophilous Submontane

Forest, considered "brejo de altitude", that is, an island of humid forest (Atlantic Rainforest enclave) surrounded by xerophytic vegetation (Caatinga), with a local climate that remains more humid in relation to the neighboring areas due orographic rains (Nusbaumer *et al*. 2015a).

In the tree layer stand up Camboatã-de-leite (*Thyrsodium spruceanum* Benth., Anacardiaceae), Camboatã (*Cupania impressinervia* Acev.- Rodr., Sapindaceae) and Uruçuca (*Vochysia dardanoi* M.C. Vianna & Fontella, Vochysiaceae). Other plants found in the area are Sucupira (*Bowdichia virgilioides* Kunth, Fabaceae), Sapucarana (*Eschweilera alvimii* Mori, Lecythidaceae), and Palmito-juçara (*Euterpe edulis* Martius, Arecaceae), which are among the Brazilian species threatened with extinction (Nusbaumer *et al*. 2015a).

The most common macrofungi found in the PTBR are the basidiomycetes *Chlorophyllum molybdites* (G.Mey.) Massee *ex* P.Syd., *Leucocoprinus fragilissimus* (Berk. & M.A.Curtis) Pat., *Tetrapyrgos nigripes* (Schwein.) E.Horak (Agaricaceae), *Auricularia fuscosuccinea* (Mont.) Henn. (Auriculariaceae), *Ganoderma australes* (Fr.) Pat. (Ganodermataceae), *Marasmius haematocephalus* (Mont.) Fr. (Marasmiaceae), and *Pycnoporus sanguineus* (L.) Murrill (Polyporaceae); among the ascomycetes, the family Xylariaceae stands out with 16 species of *Xylaria* (Nusbaumer *et al*. 2015b; Santos *et al*. 2020). Only two species of myxomycetes, *Ceratiomyxa fruticulosa* (O.F. Müll.) T. Macbr. (Ceratiomyxaceae) and *Stemonitis* cf. *fusca* Roth (Stemonitaceae), both lignicolous, are included in the inventory of fungi and lichens of the PTBR carried out by Nusbaumer *et al*. (2015b). Parentes & Cavalcanti (2022) recently registered the presence of *Hemitrichia leiocarpa* (Cooke) Lister at the PTBR. The occurrence of this species in Brazil was hitherto based on a single record made five decades ago in Pernambuco, 225 km away from the PTBR.

Ground litter collection and moist chamber cultures

In 2019, two excursions to the PTBR were carried out at the end of the dry season (May, 35.2 mm) and in the beginning of the rainy season (July, 152.6 mm), lasting six days each, to explore the ground litter. The areas were defined based in the PTBR Management Plan as Primitive Forest and Recuperation Forest. Samples of the ground litter were collected randomly obtained in duplicates, packed in plastic bags and naturally dried in the laboratory.

One thousand and eighty (1,080) moist chambers were prepared for the culture of myxomycetes. Samples were placed in 9 cm diameter Petri dishes lined with filter paper;

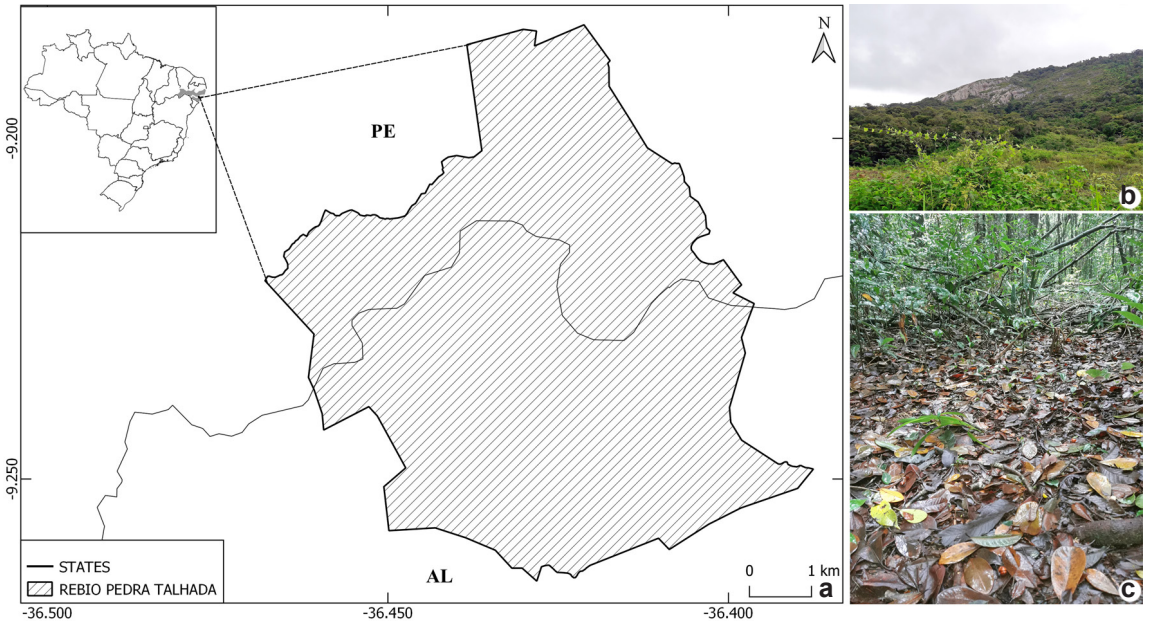

Figure 1 – a. Location of the Pedra Talhada Biological Reserve (PTBR), Northeast Brazil. b. General view. c. Inland of the forest and ground litter.

distilled water (pH 7) was added until the ground litter was soaked. After 24h, the excess water was removed and the pH was checked. Cultures were kept at room temperature (22–25 °C) under diffuse light and once a week observed under a stereomicroscope for a period of four consecutive months; when necessary, distilled water was added in order to maintain a moist environment within the culture. The newly formed sporocarps were removed from the moist chamber together with the fragment of the substrate on which they were fixed and placed in a semi-open Petri dish, facilitating their gradual drying at room conditions. The percentual yield was obtained by the ratio between the number of moist chambers in which plasmodia and/or sporocarps were observed and the total number of moist chambers prepared (1,080).

Preparation and analysis of specimens, identification and descriptions

Macroscopic morphological characteristics of specimens were observed under a stereomicroscope and microscopic characteristics were observed under an optical microscope at different magnifications. The method of Stephenson *et al*. (1993) was used for the mounting of slides and specimens were identified using keys, illustrations and descriptions by Lister (1925), Martin & Alexopoulos (1969), Farr (1976), Lado & Pando (1997), and Poulain *et al*. (2011). Data from the Eumycetozoan Project (<http://slimemold.uark.edu/>) was consulted to check nomenclature and images, the online databases <https://eumycetozoa.com/data/index.php> to check authors and synonyms (Lado 2005–2021). Color notations in parenthesis are from Methuen Handbook of colour (Kornerup & Wanscher 1978). After identification, specimens were placed in standardized cardboard boxes for deposit at the UFP herbarium of the Federal University of Pernambuco; species that sporulated in the same culture at different times constituted separate exsiccates. Species recorded on the ground litter from Pedra Talhada Biological Reserve were described. The distribution of species in Brazil was based on Maia *et al*. (2015), Flora do Brasil 2020 (continuously updated) and herbarium catalogues from Meise Botanic Garden (<https://www.botanicalcollections.be>), Real Jardín Botánico (<http://www.rjb.csic.es/jardinbotanico/jardin/index.php>) and UFP. Official acronyms were adopted to cite Brazilian states and the Federal District in the distribution of species according to IBGE (2021).

Results

A total of 257 moist chambers (23.7%) were positive for myxomycetes from 1,080 mounted, 65.7% of them remained in plasmodial phase and 34.2% formed sporocarps. In the moist chambers, the substrate varied from acid (pH 4.1) to close to neutral (pH 6.9), however the largest number of specimens and species was observed in the pH 5–5.9 range. The species of Cribrariaceae and Trichiaceae tended to sporulate at a pH closer to neutral while Didymiaceae and Physaraceae tended to sporulate on a more acidic substrate (Tab. 1).

Twenty-one species belonging to 18 genera, eight families and five of the six orders of the Myxomycetes class were recorded (Tab. 1). The genera *Clastoderma*, *Craterium*, *Diachea*, *Diderma*, *Lamproderma* and *Macbrideola* are reported for the first time in Alagoas. Except for *Stemonitis fusca* Roth, the other species are new records for the PTBR (Tab. 1). *Perichaena longipes* L.M. Walker, Leontyev & S.L. Stephenson and *Stemonitopsis gracilis* (G. Lister) Nann.-Bremek. are reported for the first time for the Northeast and the Atlantic Rainforest. *Macbrideola spinosispora* L.M. Walker, G. Moreno & S.L. Stephenson is cited for the first time for Brazil and represents the second record in South America (Tab. 1).

Commented list of species

1. *Arcyria cinerea* (Bull.) Pers., Syn. meth. fung. (Göttingen) 1: 184 (1801).

Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'00.7''S, 36°25'38.03''W, in moist chamber with ground litter, 5.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87589), (UFP 87575); 17.VII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87576); 12.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87584); 15.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87591), (UFP 87557); 16.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87552), (UFP 87586), (UFP 87585), (UFP 87583), (UFP 87559); 23.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87564).

Cosmopolitan species distributed in all regions of Brazil [Martin & Alexopoulos 1969; Maia *et al*. 2015; Flora do Brasil 2020 (continuously updated)]. In Alagoas, it has been recorded in the Atlantic Rainforest and Caatinga (Cavalcanti 2002; Bezerra *et al*. 2014). Forty-two specimens of the species were obtained, sporulating in moist chamber cultivation with pH 4.4–6.4 (Tab. 1).

The species occurs in North (AC, AM, PA, RO, RR), Northeast (AL, BA, CE, PB, PE, PI, RN, SE), Midwest (DF, GO), Southeast (RJ, SP) and South (PR, RS, SC).

Table 1 – Myxomycetes recorded on the ground litter in a pH range from Pedra Talhada Biological Reserve, Pernambuco Endemism Center (Quebrangulo, Alagoas, Northeast Brazil).

Orders / Families	Species	Specimens	pH
Echinosteliales			
Echinosteliaceae	*Echinostelium minutum* de Bary	1	5.0
Clastodermataceae*	*Clastoderma debaryanum* A.Blytt*	1	5.2
Liceales			
Cribrariaceae	*Cribraria microcarpa* (Schrad.) Pers.	5	5.0–6.3
	Cribraria violacea Rex	1	6.3
Liceaceae	*Licea* sp.	1	5.8
Physarales			
Didymiaceae	*Diachea leucopodia* (Bull.) Rostaf.*	1	5.5
	Diderma chondrioderma (de Bary & Rostaf.) Kuntze*	1	4.9
	Didymium verrucisporum A.L. Welden*	4	5.2–5.7
Physaraceae	*Craterium leucocephalum* (Pers. ex J.F. Gmel.) Ditmar*	1	5.0
	Physarum cinereum (Batsch) Pers.	5	4.6–5.9
	Physarum viride (Bull.) Pers	2	4.8
Stemonitales			
Stemonitaceae	*Comatricha tenerrima* (M.A. Curtis) G. Lister*	1	5.1
	Lamproderma scintillans (Berk. & Broome) Morgan*	1	4.9
	Macbrideola spinosispora L.M. Walker, G. Moreno & S.L. Stephenson***+	1	5.1
	Stemonitopsis gracilis (G. Lister) Nann-Bremek.**+	1	5.2
	Stemonitis fusca Roth	1	5.3
Trichiales			
Trichiaceae	*Arcyria cinerea* (Bull.) Pers.	42	4.4–6.4
	Metatrichia vesparia (Batsch) Nann-Bremek. ex G.W.Martin & Alexop.	6	4.8–5.6
	Perichaena chrysosperma (Curr.) Lister*	1	6.3
	Perichaena depressa Lib.*	3	5.8–6.1
	Perichaena longipes L.M. Walker, Leontyev & S.L. Stephenson **+	6	5.0–5.4
Total	**21**	**86**	

New records: * = Alagoas; ** = Brazil Northeast; *** = Brazil; + = Atlantic Forest.

2. *Clastoderma debaryanum* A. Blytt, Bot. Zeitung (Berlin) 38: 343 (1880).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°14'52.4''S, 36°25'12.06''W, in moist chamber with ground litter, 29.IX.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87533).

First reference of the family and genus for Alagoas. *Clastoderma debaryanum* is the most widely distributed among the four species of the genus listed by Lado (2005–2021). In Brazil, it has records in the North, Northeast, Southeast, South and Midwest region, in areas of Atlantic Rainforest, including sandbanks and mangroves, Caatinga, Cerrado, and Amazon (Coelho 2019; Maia *et al*. 2015). The only specimen obtained, consisted of three sporocarps sporulating in moist chamber with pH 5.2 (Tab. 1).

The species occurs in North (RR), Northeast (BA, PB, PE, PI, RN), Southeast (SP) and South (SC).

3. *Comatricha tenerrima* (M.A. Curtis) G. Lister, in Lister, Guide Brit. Mycetozoa, ed. 4, 39 (1919).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'26.3''S, 36°24'45.09''W, in moist chamber with ground litter, 11.IX.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87535).

First reference for Alagoas. In Brazil, *Comatricha tenerrima* is recorded in the Amazon, Atlantic Rainforest, Cerrado, and Pampa (Coelho 2019; Maia *et al*. 2015). The only specimen obtained, consisted of four sporocarps sporulating in moist chamber culture with pH 5.1 (Tab. 1).

The species occurs in North (RR), Northeast (MA, PB, PE, RN), Midwest (MT), Southeast (MG, SP) and South (PR, RS).

4. *Craterium leucocephalum* (Pers. ex J.F. Gmel.) Ditmar, in Sturm, Deutschl. Fl., Abt. 3, Die Pilze Deutschlands 1 (1): 21 (1813).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'22.8''S, 36°24'47.08''W, in moist chamber with ground litter, 1.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 86373).

First reference of the genus for Alagoas. Cosmopolitan species distributed in all regions and biomes of Brazil except for the Pantanal (Martin & Alexopoulos 1969; Maia *et al.* 2015; Xavier de Lima & Cavalcanti 2017). One specimen was obtained, consisting of five sporocarps sporulating in moist chamber culture with pH 5 (Tab. 1).

The species occurs in North (AM, RR), Northeast (AL, BA, CE, PB, PE, PE, RN, SE), Midwest (DF), Southeast (RJ, SP) and South (PR, RS, SC).

5. *Cribraria microcarpa* (Schrad.) Pers., Syn. meth. fung. 1: 190 (1801).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'24.7''S, 36°25'08.7''W, in moist chamber with ground litter, 1.VII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87532), (UFP 87529); 15.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87531); 19.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87532); 29.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87533).

Cosmopolitan species distributed in all regions of Brazil, with no records only for the Pantanal (Martin & Alexopoulos 1969; Maia *et al*. 2015; Xavier de Lima & Cavalcanti 2017). The five specimens obtained sporulated in moist chambers with pH 5–6.3 (Tab. 1).

The species occurs in North (RR), Northeast (AL, BA, MA, PB, PE, PI, RN, SE), Midwest (DF, GO), Southeast (SP) and South (PR, RS).

6. *Cribraria violacea* Rex, Proc. Acad. Nat. Sci. Philadelphia 43: 393 (1891).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'25.1''S, 36°25'08.4''W, in moist chamber with ground litter, 28.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 86365).

Cosmopolitan species distributed in almost all regions of Brazil, with no records only for the Pantanal (Martin & Alexopoulos 1969; Maia *et al*. 2015; Xavier de Lima & Cavalcanti 2017). One specimen was obtained, consisting of three sporocarps sporulated in moist chamber cultivation with pH 6.3 (Tab. 1).

The species occurs in North (RR), Northeast (AL, BA, MA, PB, PE, PI, RN, SE), Midwest (DF), Southeast (SP) and South (RS, SC).

7. *Diachea leucopodia* (Bull.) Rostaf., Sluzowce monogr. 190 (1874).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'22.8''S, 36°24'47.8''W, in moist chamber with ground litter, 26.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87536).

First reference of genus to Alagoas. Cosmopolitan species distributed in the Amazon, Atlantic Rainforest and Cerrado (Martin & Alexopoulos 1969; Maia *et al*. 2015). One specimen was obtained, consisting of four sporocarps sporulated in moist chamber cultivation with pH 5.5 (Tab. 1).

The species occurs in North (RR), Northeast (AL, BA, PE, PI, RN), Midwest (DF, GO), Southeast (MG, RJ, SP) and South (PR, RS, SC).

8. *Diderma chondrioderma* (de Bary & Rostaf.) Kuntze, Revis. gen. pl. 3 (3): 465 (1898).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'27.6''S, 36°24'43.5''W, in moist chamber with ground litter, 23.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 86362).

First reference of the genus to Alagoas. *Diderma chondrioderma* was hitherto registered only as corticicolous in Atlantic Rainforest in Pernambuco [Cavalcanti 2002; Maia *et al*. 2015; Flora do Brasil 2020 (continuously updated)]. In the ground litter of the PTBR, one specimen was obtained, sporulated in moist chamber cultivation with pH 4.9 (Tab. 1).

The species occurs in Northeast (AL, PE).

9. *Didymium verrucisporum* A.L. Welden, Mycologia 46 (1): 98 (1954).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'29.1''S, 36°25'50.0''W, in moist chamber with ground litter, 26.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87542), (UFP 87543), (UFP 87541); 27.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87544).

First reference to Alagoas, Bahia, Mato Grosso, Paraná and São Paulo states based on herbarium catalogues from Meise Botanic Garden (BR5020054758509; BR5020054765576), Real Jardín Botánico (RJB 4691) and UFP (71799). Distributed in almost all regions of Brazil, with no records only for the Pantanal and the Amazon (Maia *et al*. 2015; Xavier de Lima & Cavalcanti 2017). Four specimens were obtained in moist chambers with pH 5.2–5.7 (Tab. 1).

The species occurs in Northeast (AL, BA, PB, PE), Midwest (MT), Southeast (SP) and South (PR).

10. *Echinostelium minutum* de Bary, in Rostafinski, Sluzowce monogr. 215 (1874).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'00.2''S, 36°25'38.04''W, in moist chamber with ground litter, 26.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87534).

Cosmopolitan species distributed in almost all regions of Brazil, not recorded only for the Pantanal (Martin & Alexopoulos 1969; Maia *et al*. 2015; Xavier de Lima & Cavalcanti 2017; Coelho 2019). In Alagoas, it is registered in Atlantic Rainforest (Cavalcanti 2002). One specimen was obtained, consisting of four sporocarps sporulated in moist chamber cultivation with pH 5 (Tab. 1).

The species occurs in North (RR), Northeast (AL, BA, MA, PE, RN), Southeast (SP) and South (RS).

11. *Lamproderma scintillans* (Berk. & Broome) Morgan, J. Cincinnati Soc. Nat.Hist. 16 (4): 131 (1894).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'00.2''S, 36°25'38.03''W, in moist chamber with ground litter, 25.XI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87537).

First reference of the genus for Alagoas. Cosmopolitan species widely distributed in Brazil, with no records only in the Midwest region (Martin & Alexopoulos 1969; Maia *et al*. 2015). One specimen was obtained, consisting of five sporocarps, in moist chamber cultivation with pH 4.9 (Tab. 1).

The species occurs in North (RR), Northeast (PE), Southeast (SP) and South (PR and RS).

12. *Licea* sp.

Sporocarps sessile, densely grouped, but not overlapping, acuminate, laterally flattened, 0.5 mm long × 0.2 mm high, reddish brown (8D6), dehiscence by a preformed fissure, marked by transverse lines that open forming three to four plates, with thin and transparent margins by transmitted light. Peridium double, inner layer papillose, outer layer cartilaginous with deposits of refuse matter. Capillitium absent. Columella absent. Spore-mass golden yellow (5B7). Spores subglobose, grayish yellow (4B6) by transmitted light, uniformly and minutely spinulose, uniformly thick-walled, 10–11 µm diameter.
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'33.0''S, 36°25'12.04''W, in moist chamber with ground litter, 28.VI.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87538), (UFP duplicate 87549).

Only one specimen was obtained in moist chamber culture with pH 5.8 (Tab. 1). The specimen is similar to *Licea capacia* Oltra & G. Moreno, differing from it by the grouping of sporocarps and the double peridium bearing papillae.

13. *Macbrideola spinosispora* L.M. Walker, G. Moreno & S.L. Stephenson, Bol. Soc. Micol. Madrid 38: 64 (2014).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'22.8''S, 36°24'47.08''W, in moist chamber with ground litter on decomposing fruit, 1.VII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87547; UFP duplicate 87548).

First record of the species for the country and first record of the genus for Alagoas. One specimen was obtained, consisting of 12 sporocarps, sporulated in moist chamber culture with pH 5.1 (Tab. 1). Except for the slightly larger spore size, the morphology of the sporocarp obtained corresponds to the description of the type material collected in Costa Rica on dead leaves (Walker *et al*. 2014). The description and photos of sporophore structures of the specimen obtained in the PTBR were sent to Gabriel Moreno, one of the authors of the species, who confirmed the identification.

14. *Metatrichia vesparia* (Batsch) Nann.-Bremek. ex G.W. Martin & Alexop., Myxomycetes 143 (1969).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°14'50.1''S, 36°25'13.09''W,

in moist chamber with ground litter, 6.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87528); 2.IX.2019, *LH Cavalcanti & JMS Parentes* (UFP 87528); 16.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 86364), (UFP 87525); 28.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87526); 22.XI.2019, *LH Cavalcanti & JMS Parentes* (UFP 87527).

Cosmopolitan species distributed in all regions and vegetation domains of Brazil (Martin & Alexopoulos 1969; Maia *et al*. 2015). In Alagoas, it is registered in Atlantic Rainforest (Cavalcanti 2002; Maia *et al*. 2015). Six specimens were obtained in moist chamber culture with pH 4.8–5.6 (Tab. 1).

The species occurs in North (AM, RO, RR), Northeast (AL, BA, PB, PE, PI, RN, SE), Midweast (DF, GO, MS), Southeast (RJ, SP) and South (PR, RS, SC).

15. *Perichaena chrysosperma* (Curr.) Lister, Monogr. mycetozoa, ed. 1, 196 (1894).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'25.1''S, 36°25'08.04''W, in moist chamber with ground litter, 5.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87517).

First reference for Alagoas. Cosmopolitan species distributed in almost all regions, with no records only for the Pantanal (Martin & Alexopoulos 1969; Maia *et al*. 2015; Coelho 2019). One specimen was obtained, consisting of five sporocarps sporulated in moist chamber cultivation with pH 6.3 (Tab. 1).

The species occurs in North (RR), Northeast (BA, PB, PE, RN), Southeast (RJ, SP) and South (RS, SC).

16. *Perichaena depressa* Lib., Pl. crypt. Arduenna 378 (1837).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'24.7''S, 36°25'08.07''W, in moist chamber with ground litter, 2.IX.2019, *LH Cavalcanti & JMS Parentes* (UFP 87515), (UFP 87514); 17.IX.2019, *LH Cavalcanti & JMS Parentes* (UFP 86375).

First reference for Alagoas. Cosmopolitan species, distributed in all regions and vegetation domains of Brazil [Martin & Alexopoulos 1969; Maia *et al*. 2015; Coelho 2019; Flora do Brasil 2020 (continuously updated)]. Three specimens were obtained, sporulated in moist chamber cultivation with pH 5.8–6.1 (Tab. 1).

The species occurs in North (RR), Northeast (BA, CE, PB, PE, PI, RN, SE), Midwest (DF, MS), Southeast (RJ, SP) and South (RS, SC).

17. *Perichaena longipes* L.M. Walker, Leontyev & S.L. Stephenson, Mycologia 107 (5): 1015 (2015).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°14'58.0''S, 36°25'39.06''W, in moist chamber with ground litter, 26.VI.2019, *LH Cavalcanti & JMS Parentes* (UFP 87520); 1.VII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87522), (UFP 87523); 15.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87516), (UFP 87521); 19.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87518); 5.IX.2019, *LH Cavalcanti & JMS Parentes* (UFP 87519).

First record for the Northeast region. Described by Walker *et al*. (2015) based on material collected in Costa Rica and northern Brazil (RR). The seven specimens sporulated in moist chambers with pH 5–5.4 (Tab. 1), and meet the description of the species except for the total height of the sporocarp and the diameter of capillitial filaments, which is larger.

The species occurs in North (RR: UFRR 30961; UARK 54507).

18. *Physarum cinereum* (Batsch) Pers., Neues Mag. Bot. 1: 89 (1794).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'29.1''S, 36°25'53.06''W, in moist chamber with ground litter, 27.VII.2019, *LH Cavalcanti & JMS Parentes* (UFP 86363); 12.VIII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87545); 13.IX.2019, *LH Cavalcanti & JMS Parentes* (UFP 87540); 26.XI.2019, *LH Cavalcanti & JMS Parentes* (UFP 87539); 10.XII.2019, *LH Cavalcanti & JMS Parentes* (UFP 87546).

Cosmopolitan species distributed in all regions of Brazil, with no records only for the Pantanal and Pampa (Martin & Alexopoulos 1969; Maia *et al*. 2015; Coelho 2019; Velloso *et al.* 2020). In Alagoas, there are records of the species as lignicolous, foliicolous, and floricolous (Cavalcanti 2002). Five specimens were obtained sporulated in moist chamber culture with pH 4.6–5.9 (Tab. 1).

The species occurs in North (AM, RR), Northeast (AL, BA, PE, SE), Midwest (DF, GO), Southeast (MG, SP) and South (PR, SC).

19. *Physarum viride* (Bull.) Pers., Ann. Bot. (Usteri) 15: 6 (1795).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°15'29.4''S, 36°25'50.01''W, in moist chamber with ground litter, 29.X.2019, *LH Cavalcanti & JMS Parentes* (UFP 87550); 20.XI.2019, *LH Cavalcanti & JMS Parentes* (UFP 87551).

Cosmopolitan species, distributed in all regions and vegetation domains of Brazil (Martin & Alexopoulos 1969; Maia *et al*. 2015; Coelho

2019). In Alagoas, it is registered as lignicolous in Atlantic Rainforest (Cavalcanti *et al*. 2006; Xavier de Lima & Cavalcanti 2017). Two specimens were obtained, sporulated in moist chamber culture with pH 4.8 (Tab. 1).

The species occurs in North (AM, RR), Northeast (AL, BA, PE, PI, RN, SE), Midwest (DF, GO, MS), Southeast (RJ, SP) and South (PR, SC).

20. *Stemonitis fusca* Roth, Bot. Mag. (Römer & Usteri) 1(2): 26 (1787).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°14'42.6''S, 36°25'13.05''W, in moist chamber with ground litter, 19.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 86380).

Cosmopolitan species, distributed in all regions and of Brazil, with no records only for the Pantanal (Martin & Alexopoulos 1969; Maia *et al*. 2015; Xavier de Lima & Cavalcanti 2017). In Alagoas, it is registered in Atlantic Rainforest, including the PTBR, as lignicolous (Cavalcanti *et al*. 2006; Nusbaumer *et al*. 2015b). One specimen was obtained, consisting of about 10 sporocarps sporulated in moist chamber culture with pH 5.3 (Tab. 1).

The species occurs in North (AM, PA, RR), Northeast (AL, BA, MA, PB, PE, PI, RN, SE), Midwest (DF, GO, MS, MT), Southeast (ES, RJ, SP) and South (PR, RS, SC).

21. *Stemonitopsis gracilis* (G. Lister) Nann.-Bremek., Nederlandse Myxomyceten (Zutphen) 210 (1975).
Material examined: Quebrangulo, Pedra Talhada Biological Reserve, 09°14'58.5''S, 36°25'39.06''W, in moist chamber with ground litter, 19.VIII.2019, *LH Cavalcanti* & *JMS Parentes* (UFP 87595).

In Brazil, *S. gracilis* had only one record in the Pampa biome (Xavier de Lima & Cavalcanti 2017) and this is the first record of *S. gracilis* for the Northeast region of Brazil and for Atlantic Rainforest. Only one specimen was obtained in moist chamber culture with ground litter, with pH 5.2 (Tab. 1).

The species occurs in South (RS).

The results of this study increase to 27 the number of genera and 61 the number of species of myxomycetes known to Alagoas, occurring in areas of Atlantic Rainforest and Caatinga, in different microhabitats. Taxa can be distinguished by the key below, based on Bezerra *et al.* (2014) and Parentes & Cavalcanti (2022) with insertion of the new records.

Key to species of Myxomycetes known for Alagoas

1. Peridium present, persistent or evanescent; spores not adhered individually to the sporophore of branches columns; sporophore an aethalium, pseudoaethalium, plasmodiocarp or sporangium.....2
1'. Peridium absent; spores adhered individually to the sporophore of branches columns; sporophores with branched columns .....*Ceratiomyxa fruticulosa* (O.F. Mull.) T. Macbr.
2. Sporangium or plasmodiocarp 7
2'. Pseudoaethalium or aethalium 3
3. Aethalium.....4
3'. Pseudoaetallium .....*Tubifera microsperma* (Berk. & M.A. Curtis) G.W. Martin
4. Lime absent, capillitium absent, pseudocapillitium present 5
4'. Lime present in the capillitium and peridium .....*Fuligo septica* (L.) F.H. Wigg.
5. Aethalium subglobose; peridium thick; pseudocapillitium irregular, simple or branched 6
5'. Aethalium pulvinate; peridium thin, membranous; pseudocapillitium membranous, formed by perforated plates or filaments.....*Reticularia jurana* Meyl.
6. Pseudocapillitium 10–25 µm diameter; spores 6–7.5 µm diameter; cortex without chambered vesicles.....*Lycogala epidendrum* (L.) Fr.
6'. Pseudocapillitium 2–10 µm diameter; spores (4–)4.5–5.5(–6) µm diameter; cortex with chambered vesicles..... *Lycogala exiguum* Morgan
7. Spore-mass clear (whitish, yellowish, reddish, cinnamon to rusty or olive to greenish tint 42
7'. Spore-mass dark (blackish brown or purplish brown to black).....8
8. Lime present 23

8’. Lime absent 9
9. Sporocarp stalked; capillitium present 12
9’. Sporocarp sessile; capillitium absent 10
10. Spores uniformly thin-walled, pale yellow to golden yellow, up to 12 µm diamete 11
10’. Spores thick-walled, with a thinner and clearer area, yellow orange, 11–14.5 × 12–16(–17) µm diameter ..... *Licea succulenticola* Mosquera, Lado, Estrada & Beltrán-Tej.
11. Peridium by a longitudinal apical dehiscence, opening in two plates of equal size; spores pale yellow, globose to ovoid, minutely, densely and regularly warted, 9–12 µm diameter ..... *Licea biforis* Morgan
11’. Peridium dehiscence by a long horizontal line and two transversal lines on each side, opening in three or four plates; spores bright gold yellow, subglobose, spiny, 10–11 µm diameter. Very aggregated sporocarps ..... *Licea* sp.
12. Sporotheca cylindrical 17
12’. Sporotheca globose, ovoid, fusiform, or sub-cylindrical 13
13. Peridium persisting as a collar after the upper portion has broken away 16
13’. Peridium entirely evanescent 14
14. Capillitium emerging from the entire length of the columella 15
14’. Capillitium emerging from the apex of the columella .... *Lamproderma scintillans* (Berk. & Broome) Morgan
15. Sporocarp 1–1.5 mm; sporotheca globose to subglobose; spores 10–11 µm diameter ..... *Comatricha laxa* Rostaf.
15’. Sporocarp 1.5–3 mm; sporotheca ovoid to fusiform; spores 7–8 µm diameter ..... *Comatricha tenerrima* (M.A. Curtis) G. Lister
16. Spores violaceous gray, minutely warted, sometimes with groups of darker warts; stalk of uniform color .... *Collaria arcyrionema* (Rostaf.) Nann.-Bremek. *ex* Lado
16’. Spores pale violet, markedly and uniformly spiny; stalk base reddish orange to yellowish orange .... *Macbrideola spinosispora* L.M. Walker, G. Moreno & S.L. Stephenson
17. Capillitium with a complete or fragmented surface net 18
17’. Capillitium without a surface net..... *Stemonaria longa* (Peck) Nann.-Bremek., R. Sharma & Y. Yamam
18. Stalk and columella hollow, capillitum with a complete or nearly complete surface net 21
18’. Stalk and columella fibrous and solid at the base, hollow at the top; capillitium with a fragmented surface net 19
19. Peridium evanescent 20
19’. Peridium often persistent, gray–lilac, shiny silver ..... *Stemonitopsis typhina* (F.H. Wigg.) Nann.-Bremek
20. Spores 10–11.5 µm diameter, warted .... *Stemonitopsis subcaespitosa* (Peck) Nann.-Bremek.
20’. Spores 6–8 µm diameter, almost smooth .... *Stemonitopsis gracilis* (G. Lister) Nann-Bremek.
21. Spores asperulate 22

21’. Spores spinulose-reticulate ..... *Stemonitis fusca* Roth
22. Sporocarp rusty brown; meshes capillitium mostly < 25 µm .... *Stemonitis axifera* (Bull.) T. Macbr.
22’. Sporocarp purplish brown to almost black; meshes capillitium mostly > 25 µm..... ..... *Stemonitis splendens* Rostaf.
23. Lime present in capillitium 27
23’. Lime absent in capillitium..... 24
24. Peridium with lime granules; stalk, when present, non–calcareous..... 25
24’. Peridium without lime granules; stalk and columella calcareous .... *Diachea leucopodia* (Bull.) Rostaf.
25. Lime present in peridium as stellate crystals 26
25’. Lime present in peridium as amorphous granules..... ..... *Diderma chondrioderma* (De Bary & Rostaf.) Kuntze
26. Columella absent; spores 10–12 µm diameter; plasmodiocarp..... ..... *Didymium* aff. *dubium* Rostaf.
26’. Columella present; spores 8–9 µm diameter; stalked sporangium..... ..... *Didymium verrucisporum* A.L. Welden
27. Sessile sporocarp or plasmodiocarp 40
27’. Stalked sporocarp 28
28. Capillitium essentially homogeneous..... 29
28’. Capillitium composed of two distinct mixed systems..... ..... *Physarella oblonga* (Berk. & M.A. Curtis) Morgan
29. Sporocarp dehiscence circumscissile by a preformed fissure.. ..... *Craterium leucocephalum* (Pers. *ex* J.F. Gmel.) Ditmar
29’. Sporocarp with other forms of dehiscence 30
30. Capillitium a net of thin hyaline tubules; lime present only in the nodes..... 31
30’. Capillitium a net of lime-filled tubules; connecting hyaline tubules few or absent ..... *Badhamia melanospora* Speg.
31. Sporotheca compressed or flat..... 32
31’. Sporotheca globose, subglobose or lenticular 33
32. Sporotheca fan-shaped, compressed-reniform to lobed; spores purplish brown, warted, 10–12.5 µm diameter ..... *Physarum compressum* Alb. & Schwein.
32’. Sporotheca discoid; spores pale violet brown, spinulose, with prominent groups of spinules, 8–10 µm diameter ..... *Physarum pezizoideum* (Jungh.) Pavill. & Lagarde
33. Lime absent in the stalk 35
33’. Lime present in the stalk..... 34
34. Sporotheca yellow to opaque orange; columella small, conical .... *Physarum melleum* (Berk. & Broome) Massee
34’. Sporotheca gray to brownish gray; columella absent, pseudocolumella globose ..... *Physarum stellatum* (Massee) G.W. Martin
35. True columella absent..... 36

35’. True columella present, reaching about 80% of the height of the sporotheca ..... *Physarum penetrate* Rex
36. Sporotheca white or gray 37
36’. Sporotheca yellow ..... *Physarum viride* (Bull.) Pers
37. Sporotheca globose 38
37’. Sporotheca multilobate and compound-contorted ..... *Physarum nicaraguenses* Macbr.
38. Stalk in light yellow or olive tints; spores < 10 µm diameter 39
38’. Stalk reddish brown merging with the base of the sporotheca; spores > 10 µm diameter ..... *Physarum pusillum* (Berk. & M.A. Curtis) G. Lister
39. Capillitium consisting of long and thin filaments arising from the base of the sporangium; lime nodules fusiform ..... *Physarum album* (Bull.) Chevall.
39’. Dense capillitium with white, small, rounded, aggregate lime nodules forming a ball in the center of the sporotheca ..... *Physarum nucleatum* Rex
40. Peridium simple 41
40’. Peridium triple, yellow to brown; dehiscence lobate ..... *Physarum bogoriense* Racib.
41. Peridium thin, densely coated with lime ..... *Physarum cinereum* (Batsch) Pers.
41’. Peridium usually densely coated with thick lime globules, rarely almost without lime ..... *Physarum vernum* Sommerf.
42. Dictydine granules present; capillitium absent 56
42’. Dictydine granules absent; capillitium present 43
43. Columella absent; capillitium filaments ornate 46
43’. Columella present; capillitium filaments smooth 44
44. Spores yellow to hyaline, wrinkled 45
44’. Spores grayish, warted ..... *Clastoderma debaryanum* A. Blytt
45. Sporocarp in yellowish tints; columella well developed, up to 24 µm ..... *Echinostelium arboreum* H.W. Keller & T.E. Brooks
45’. Sporocarp white to pink; columella short, up to 15 µm ..... *Echinostelium minutum* de Bary
46. Capillitial threads without spiral bands 50
46’. Capillitial threads with spiral bands 47
47. Stalked sporangium 48
47’. Reticulate plasmodiocarp ..... *Hemitrichia serpula* (Scop.) Rostaf. *ex* Lister
48. Capillitium and spores yellow, orange, or red 49
48’. Capillitium and almost hyaline spores ..... *Hemitrichia leiocarpa* (Cooke) Lister
49. Peridium membranous, dehiscence irregular; capillitium and spores yellow ..... *Hemitrichia calyculata* (Speg.) M.L. Farr

49’. Peridium cartilaginous, dehiscence circumscissile; capillitium and spores orange-red ....*Metatrichia vesparia* (Batsch) Nann.-Bremek. *ex* G.W. Martin & Alexop.
50. Sporocarp plasmodiocarp or sporangium; stalk, when present, not filled with cysts; capillitial threads not branched 53
50’. Sporocarp stalked sporangium; stalk filled with cysts; capillitial threads branched and anastomosed 51
51. Capillitium attached to the edge of the calyculus 52
51’. Capillitium detached from calyculus, attached to the top of the stalk .....*Arcyria magna* Rex
52. Sporotheca red, fading to brownish red; capillitium ornamented with teeth, rings or half rings.....*Arcyria denudata* (L.) Wettst.
52’. Sporotheca pale gray; capillitium ornamented with spines and warts, the basal filaments smooth or nearly so .....*Arcyria cinerea* (Bull.) Pers.
53. Sporangium sessile or stalked, capillitium ornamented with constrictions, warts, spines, and/or coral-like projections..... 54
53’. Plasmodiocarp; capillitium ornate with long spines of up to 4 µm and warts ....*Perichaena chrysosperma* (Curr.) Lister
54. Sporangium sessile; capillitium with constrictions; spores warted..... 55
54’. Sporangium stalked; capillitium with papillae and coral–like projections; spores nearly smooth ....*Perichaena longipes* L.M. Walker, Leontyev & S.L. Stephenson
55. Sporotheca subglobose; capillitium scarce..... .....*Perichaena corticalis* (Batsch) Rostaf.
55’. Sporotheca flattened; capillitium abundant ....*Perichaena depressa* Lib.
56. Peridium persistent as a network..... 57
56’. Peridium persistent as thick, longitudinal filaments interconnected with thin, horizontal filaments .....*Cribraria cancellata* (Batsch) Nann.- Bremek.
57. Sporotheca in yellowish or brownish tints 58
57’. Sporotheca dark violet with a metallic sheen ....*Cribraria violacea* Rex
58. Nodules of the peridial network with numerous dictydine granules..... 59
58’. Nodules of the peridial network flattened, rarely with dictydine granules, rounded mesh from the base to the apex....*Cribraria confusa* Nann.- Bremek. & Y. Yamam.
59. Calyculus usually present 60
59’. Calyculus absent or reduced to a small stellate collar; stalk very long, about 6/8 of the total height of the sporocarp ..... *Cribraria microcarpa* (Schrad.) Pers.
60. Peridial network with angular nodules, connected by 5–8 filaments, with projections adhered to the filaments.....*Cribraria intricata* Schrad.
60’. Peridial network with prominent, small, round and dark nodules, connected by 3–6 very thin filaments .....*Cribraria tenella* Schrad

Discussion

The Brazilian Northeast region has the largest number of records of myxomycetes in the country, among which those of Physarales (85), Trichiales (39) and Liceales (37) stand out, followed by Stemonitales (35), Echinosteliales (4) and Ceratiomyxales (3) [Maia *et al*. 2015; Flora do Brasil 2020 (continuously updated)]. However, only 48 species have a known occurrence in the myxobiota of Alagoas, 11 of these occur in the

Caatinga (shrubland and dry forest), and 39 in the Atlantic Rainforest, recorded in fragments of Open Ombrophilous Forest and Seasonal Semideciduous Forest, located in municipalities of São José da Lage, Ibateguara, Marechal Deodoro, and Quebrangulo (Cavalcanti *et al*. 1985, 2006; Bezerra *et al*. 2014; Nusbaumer *et al*. 2015b; Parentes & Cavalcanti 2022). Regarding the myxobiota of the PTBR, only *Ceratiomyxa fruticulosa* and *Stemonitis* cf. *fusca* were included in the list of fungi and lichen species presented by Nusbaumer *et al*. (2015b) and the occurrence of *H. leiocarpa* was recently reported by Parentes & Cavalcanti (2022). When the records of Nusbaumer *et al*. (2015b) are added to the results of this work, all orders recognized by Poulain *et al*. (2011) for the class Myxomycetes are present in the myxobiota of PTBR. The representativeness of families is also significant, with the presence of 69% of the families recognized by Leontyev *et al*. (2019). The occurrence of *Stemonitis fusca* was confirmed and the new records increased the number of species known to the myxobiota of PTBR from two to 22, and of those known to Alagoas from 48 to 61.

Perichaena longipes had known occurrence restricted to Costa Rica, Panama, and Brazil (Walker *et al*. 2015). In the three countries, the specimens were found in humid tropical forests, always associated with aerial or ground litter. This species is morphologically similar to *P. pedata* (Lister & G. Lister) G. Lister & E. Jahn, but it is distinguished by a much longer stalk, clearer peridium, and unique capillitial ornamentation (Walker *et al*. 2015).

In Brazil, *Stemonitopsis gracilis* had only one record in the Pampean region of Rio Grande do Sul, collected on decaying trunk in a riparian forest (Xavier de Lima & Cavalcanti 2017). The specimen sporulated on the ground litter of the PTBR has characteristics similar to those of *Stemonitopsis brachypus* (Meyl.) Y. Yamam. and *S. gracilis*, differing from the first in the total height and diameter of the spores, being closer to the second one, from which it differs only by the smaller spore size. The scarcity of sporocarps precluded a more detailed analysis to confirm the species.

Until 2019, *Macbrideola spinosispora* had known occurrence only from the typical locality in Costa Rica, where it sporulates on ground litter in an environment of lowland rainforest (Walker *et al*. 2014). The second record of *M. spinosispora* was recently made in the region of Cusco, Peru, in a forest located at 2,300–3,500 m of elevation (Treviño-Zevallos & Lado 2020), significantly expanding the knowledge about its area of distribution and confirming the putative preference for ground litter of humid forests. This work provides the second record of the species for South America, also in ground litter in a humid forest, likewise in Costa Rica and Peru. The presence of the species in the PTBR shows that, in addition to the preference for ground litter of a humid forest with mixed vegetation, *M. spinosispora* occurs from low and submontane altitudes (290–410 m), as in the PTBR (459–883 m), up to altitudes above 2,000 m, as in Peru.

In the present study, moist chambers had a low yield and, in most of them, the plasmodia did not sporulate, as often reported by researchers who use this technique, posing further difficulty to access the richness of the local myxobiota (Ko Ko *et al*. 2009). Several biotic and abiotic factors may contribute to the low percent yield in moist chamber cultures. They may include the level of decomposition of the components, chemical composition, and acidity of the ground litter, competitive interactions with other organisms that swarm the ground litter such as insect larvae, fungi and nematodes. The results for PTBR are similar to those obtained in studies using the moist chamber with ground litter in tropical forests such as Kuhn *et al*. (2013) who obtained 29% of positive moist chambers and Dagamac *et al*. (2014) that only 321 of the 1,200 prepared moist chambers were positive for myxomycetes, which corresponds to 26.8% of the total, a value close to that observed for the PTBR.

One of the specimens obtained in the present study was morphologically similar to *Licea* species, although the color of the peridium and the spore mass also resemble those of the genus *Perichaena*. The characteristics presented by the only available specimen do not fit the species described so far for the two genera because, although the sporocarps resemble those of *Licea capacia* Oltra & G. Moreno, they are densely grouped and the peridium is double and papillose. The most striking morphological characteristic of *L. capacia*, also observed in the analyzed specimen, is the shape of the sporocarps and the preformed dehiscence line, opening in four plates (Moreno & Oltra 2014). Molecular analysis of the specimen could confirm whether the present specimen is a variation of *L. capacia* or a new taxon, but the material available is very scarce.

Among the species identified in the present study, *A. cinerea*, *P. cinereum*, *P. viride* and *S. fusca* are common in ground litter and other microhabitats (Bezerra *et al*. 2014). Some of the species obtained in this study are typically found in the ground litter, such as *C. leucocephalum* and *L. scintillans*, which have records as foliicolous in Atlantic Rainforest and Cerrado (Cavalcanti *et al*. 2015), as well as recently described species such as *P. longipes* and *M. spinosispora*, which are only registered in ground and aerial litter (Walker *et al*. 2014; Treviño-Zevallos & Lado 2020). The type material of *D. verrucisporum* was collected on dead leaves in the Panama Canal Zone, as well as in other countries such as Mexico (López & García 1996), confirming the species preference for ground litter. On the other hand, species that are commonly found in other microhabitats were registered in the ground litter of the PTBR as *C. debaryanum* often found on bark of living trees and on decomposing trunks, *C. microcarpa* commonly registered as corticolous and lignicolous, and *C. violacea*, observed as lignicolous and fimicolous in Atlantic Rainforest and Cerrado (Cavalcanti 2002; Cavalcanti & Mobin 2004; Bezerra *et al*. 2008; Bezerra *et al*. 2014).

Just over half (59%) of the species that developed in the moist chambers with ground litter from the PTBR belong to the orders Echinosteliales, Physarales, and Stemonitales, as also observed by Dagamac *et al*. (2012, 2014) for the Philippines. However, although only 41% have clear spores, 67% of the specimens belong to Trichiales, with a predominance of *A. cinerea*, often included among the most abundant species of the myxobiota of ground litter in different vegetation types from different countries (Dagamac *et al*. 2014; Macabago *et al*. 2017; Nguyen *et al*. 2019).

The inventory carried out at the PTBR brought new records to the state of Alagoas, the Northeastern region, and the country, contributing to fill some of the existing gaps in the knowledge of the myxobiota of ground litter and of the Atlantic Rainforest.

Despite being in the process of degradation, the remained fragments of the Brazilian Atlantic Rainforest offer favorable microhabitats for the development of myxomycetes, including species rarely collected and potentially threatened by habitat loss according with IUCN criteria, such as *H. leiocarpa.*

The present study showed that the ground litter of the PTBR provides resources necessary for the development of a rich myxobiota, considering the number of genera and species registered. Similar studies will bring more support to the existing knowledge and may contribute to actions aimed at the conservation of remnants of the Brazilian Atlantic Rainforest.

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