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FIRST RECORDS OF *Aseroe rubra* Labill. AND *Phallus indusiatus* Vent. FOR THE PAMPA BIOME, BRAZIL
PRIMEROS REGISTROS DE *Aseroe rubra* Labill. AND *Phallus indusiatus* Vent. PARA EL BIOMA PAMPA, BRASIL

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ABSTRACT

The order Phallales encompasses species commonly known as "stinkhorns" and "veils of the bride". Although recognized for their peculiar morphological traits, their representation in the mycobiota of Rio Grande do Sul state (Southern Brazil) is scarce, especially in the Pampa biome, which is one of the least studied in the country. The Pampa, located only in this Brazilian state, features predominantly grassland vegetation but faces challenges due to the expansion of monocultures and low representation in protected areas. The study focused on the collection of specimens, including *Phallus indusiatus* and *Aseroe rubra*, representing the first records for the biome. It utilized collection and identification methodologies, comparing morphological characteristics with specialized literature. The research resulted in the identification of these two species and the development of an identification key for the species of Phallales in the Pampa, as well as a checklist and a distribution map. The work highlights the biodiversity present in the region, as well as contributing to the conservation and appreciation of the Pampa biome, a natural and cultural heritage. The new recorded occurrences represent a significant advancement in the recognition of the region's fungal

richness. Overall, the study compiles data on seven species (five with previously known occurrences for the biome, and two cited for the first time) from five genera of Phallales, reflecting the urgent need for research due to threats to the local ecosystem.

Keywords: Clathraceae; geographical distribution; gasteroid fungi; Phallaceae; Phallales.

RESUMEN

El orden Phallales abarca especies comúnmente conocidas como "stinkhorns" y "veils of the bride". Aunque se les reconoce por sus peculiares rasgos morfológicos, su representación en la micobiodiversidad del estado de Rio Grande do Sul (Sur de Brasil) es escasa, especialmente en el bioma Pampa, que es uno de los menos estudiados del país. El Pampa, ubicado únicamente en este estado brasileño, presenta predominantemente vegetación de pastizales, pero enfrenta desafíos debido a la expansión de monocultivos y a la baja representación en áreas protegidas. El estudio se centró en la recolección de ejemplares, incluyendo *Phallus indusiatus* y *Aseroe rubra*, que representan los primeros registros para el bioma. Se utilizaron metodologías de recolección e identificación, comparando características morfológicas con la literatura especializada. La investigación resultó en la identificación de estas dos especies y en el desarrollo de una clave de identificación para las especies de Phallales en el Pampa, así como un listado y un mapa de distribución. El trabajo destaca la biodiversidad presente en la región, además de contribuir a la conservación y apreciación del bioma Pampa, un patrimonio natural y cultural. Las nuevas ocurrencias registradas representan un avance significativo en el reconocimiento de la riqueza fúngica de la región. En general, el estudio compila datos sobre siete especies (cinco con ocurrencia ya conocida para el bioma, y dos citadas por primera vez) de cinco géneros de Phallales, reflejando la necesidad urgente de investigación ante las amenazas al ecosistema local.

Palabras clave: Clathraceae; distribución geográfica; hongos gasteroides; Phallaceae; Phallales.

INTRODUCCIÓN

The order Phallales encompasses fungi with peculiar shapes, commonly known as stinkhorns, bridal veils, and witch's cages. They are primarily characterized by basidiomata that develop in early stages resembling eggs, expanding pseudostipes and/or receptacles upon maturity, although there are some where this expansion does not occur[(1)]. Currently, the order includes seven families: Clathraceae, Claustulaceae, Gastrosporiaceae, Lysuraceae, Phallaceae, Protophallaceae, and Trappeaceae[(2)].

Trierveiler-Pereira and Cabral[(3)] list 14 genera belonging to the order Phallales in Brazil, distributed across 43 species. In the Amazon biome, there are records of 13 species belonging to five genera; for the Caatinga, five genera containing six species are reported; in the Cerrado, only one species is cited. The Atlantic Forest biome exhibits the highest diversity, with 31 species grouped into 14 genera, while there are no records of fungi from the order Phallales in the Pantanal[(3)]. For the Pampa biome, to date, five species in four genera are reported[(4)(5)(6)(2)(7)(3)].

The mycobiota of the Pampa biome is one of the least studied in Brazil, with only 84 known species, while the Atlantic Forest, for example, presents over 3,000 species of fungi cataloged[(8)]. This fact may be related to the proximity of this biome to research centers specialized in mycological biodiversity.

The Pampa is restricted to the state of Rio Grande do Sul (RS) in the South of Brazil, occupying 63% of its territory (the other part is Atlantic Forest) and 2.07% of the national territory[(9)]. This biome is characterized by vegetation dominated by grasses, with scattered formations of shrubs and trees[(10)(9)]. It is a natural, genetic, and cultural heritage of both national and global importance, but the progressive introduction and expansion of monocultures and pastures with exotic species have led to the rapid manipulation and alteration of the natural landscapes of the Pampa. Regarding protected natural areas in Brazil, the Pampa is the biome with the least representation in the National System of Conservation Units (SNUC)[(11)].

Considering Brazil's territorial extent and existing gaps in knowledge, this study aims to contribute to the understanding of the diversity of fungi of the order Phallales in the Brazilian Pampa, as well as the distribution of the group across Brazil, including reports of new occurrences of Phallales species within the biome.

MATERIAL AND METHODS

The samples of *Phallus indusiatus* Vent. were collected in Cachoeira do Sul – RS in April 2022, while those of *Aseroe rubra* Labill. were collected in São Gabriel – RS and Pelotas – RS in August 2024, during the rainy season of autumn and winter, respectively, following the methodology proposed by Ribeiro *et al.*[1]. The material was collected and dehydrated for later identification, comparing it with specialized literature. We emphasize that these locations were not pre-selected as specific study areas; the collections occurred sporadically, without prior selection of the sites.

In this study, a search was also conducted for studies published until September 2024 that cite Phallales species in the Brazilian Pampa and their respective characteristics to construct an identification key, including the new ones collected in this work. A checklist of the data relating to the occurrence of these species in the biome was also created, as well as a distribution map. Coordinates were taken from the studies and, when missing, they were searched for by location name on Google Maps (https://www.google.com.br/maps) or in Species Link with the voucher number. The herbarium codes missing from the articles were found in Species Link (https://specieslink.net/search/). The color codes presented for the structures followed the work of Kornerup and Wanscher[12].

The nomenclature concept adopted for the basidiomata's forms followed Ribeiro and *et al.*[13]. The specimens were deposited in the herbarium of the Federal University of Rio Grande do Sul (ICN) and in the Bruno Edgar Irgang Herbarium (HBEI).

RESULTS AND DISCUSSION

After the analyses, two species were identified, belonging to two families: Clathraceae, represented by the species *Aseroe rubra* Labill., and Phallaceae, represented by the species *Phallus indusiatus* Vent. Both represent the first record for the Brazilian Pampa. In Brazil, *Phallus indusiatus* has a wide distribution[1], while *Aseroe rubra* has been recorded only in the southern part of the country, in two states: Paraná[14] and Rio Grande do Sul[15][16][6], making this the fourth record for the country. Complete descriptions, photos, and comments on the species are made available, as well as a checklist and a distribution map of Phallales from Brazilian Pampa.

Taxonomy

Clathraceae Chevall
Aseroe rubra Labill., Bull. Murith. Soc. Valais. Sci. Nat. 1: 145 (1800)
Mycobank nº: 622416

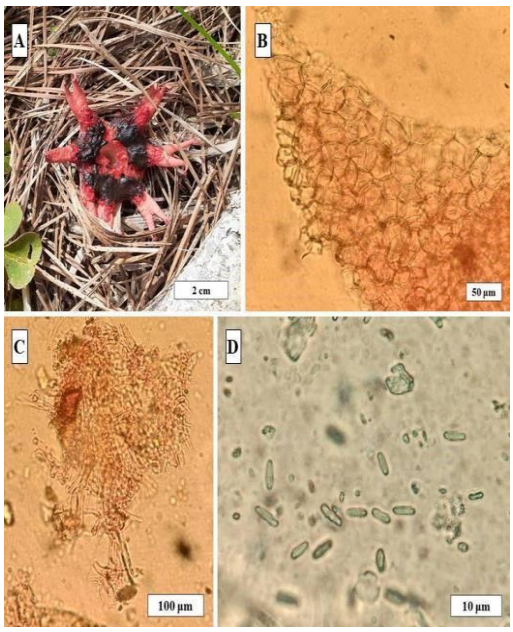

Figure 1. *Aseroe rubra.* ***A.*** *Expanded basidiomata.* ***B.*** *Hyphae of the receptacle.* ***C.*** *Volva hyphae.* ***D.*** *Basidiospores.*

Mature expanded basidiomata Arachnoid, red (9A7), 31 mm high. **Receptacle** disk-shaped in pseudostipe apex, red (9A7), composed of ten arms organized in pairs, 6-10 mm high, emerging from its outer edge with a fusion among themselves in the basal portion; the arms are more robust at the base and taper toward the terminal portion. **Pseudostipe** cylindrical, hollow, spongy, 17 mm high, pinkish white (9A2), lighter on base (9A1). **Volva** 25 × 21 mm, brownish grey (7C2). **Gleba** olive brown (4F6), mucilaginous, spread over the disk and the initial portion of the arms. **Basidiospores** 4.21–4.54 × 1.36–1.79 µm, subcylindrical to cylindrical, smooth, hyaline in 5% KOH. **Receptacle composed** of pseudoparenchymatous hyphae, hyaline, globose, subglobose to slightly elliptical shaped, thin walls (<1 µm). **Volva** composed of filamentous hyphae, 3.9–4.4 µm, straight, hyaline, thin walls (<1µm).

Note: Dring[17] proposed the synonymization of several species of *Aseroe* Labill. into *A. rubra*, identifying a high variability within the species, and accepted one more species in the genus: *Aseroe arachnoidea* E. Fischer, both having long arms, differentiating them by the number of tubes in the receptacle and the color of the basidiome (several tubes and a red basidiome in *A. rubra*, and a single tube and a typically white basidiome in *A. arachnoidea*). Based on molecular biology data, Trierveiler-Pereira *et al.*[18] transferred *A. arachnoidea* to *Lysurus*, as *Lysurus arachnoideus* (E. Fisch.) Trierv.-Per. & K. Hosaka, noting, among other characteristics, that the species does not have a fertile disk like *Aseroe* spp. The key presented in Ribeiro *et al.*[1] includes, in addition to the characters of Dring[17], the quantity and shape of the arms to differentiate the two species: more than 10 cylindrical arms in *A. rubra* and up to 10 non-cylindrical arms in *L. arachnoideus*, with both species forming the arachnoid shape. Trierveiler-Pereira *et al.*[6], who analyzed materials of *Aseroe rubra* collected in southern Brazil, mentioned that these specimens display a bright red color and a large number of long arms (up to 22). Although the number of arms of the collected specimen (five branching at the tips) is not particularly high, the other characteristics are typical of *A. rubra*.

Examined Material: BRAZIL. Rio Grande do Sul, São Gabriel, neighborhood Santa Brígida, 25/VII/2024, Mariane M. Kroth, HBEI 0190; Capão do Leão, neighborhood Jardim América, 27/VIII/2024, Bibiana L. Groff, HBEI 0191.

Phallaceae Corda
Phallus indusiatus Vent., Mém. Inst. Natl. Sci., Sci. Math. 1: 520, 1798
MycoBank nº: 245788

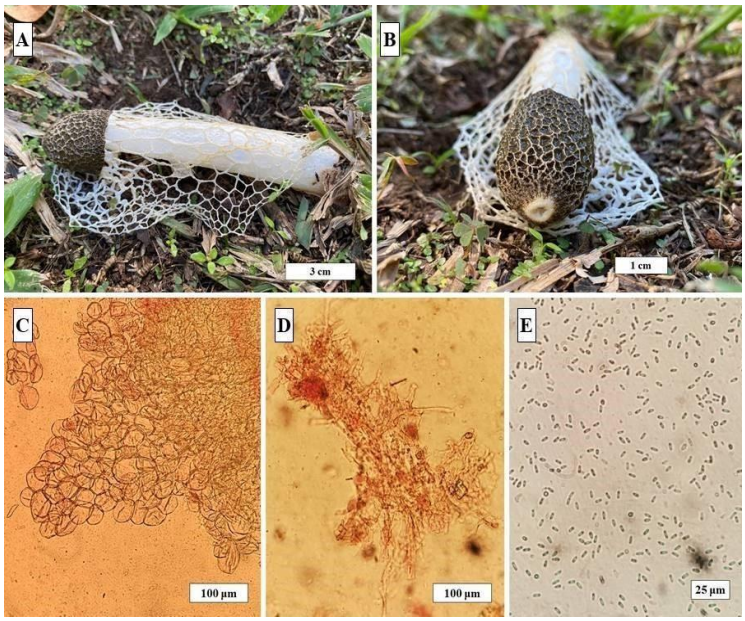

Figure 2. *Phallus indusiatus.* ***A-B.*** *Expanded basidiomata.* ***C.*** *Pseudoparenchymatous hyphae of the pseudostipe.* ***D.*** *Volva hyphae.* ***E.*** *Basidiospores.*

Mature expanded basidiomata Phalloid, 122 mm high. **Receptacle** campanulate, with an apical pore, reticulated surface. **Pseudostipe** cylindrical, spongy, 58 × 14.5 mm, white (1A1). **Indusium** extending to the ground, white (1A1) to yellowish white (1A2), 76 mm in length, attached to the apex of the pseudostipe. **Volva** hypogeous, white (1A1), with pinkish white pigments (10A2). **Gleba** olive brown (4F6), mucilaginous. **Basidiospores** 3.4–4.0 × 1.35–2.1µm, elongate, smooth, hyaline in 5% KOH. **Pseudostipe** pseudoparenchymatous, composed of ovoid, globose to

subglobose cells, hyaline. **Volva** composed of filamentous hyphae, straight, hyaline, thin walls (<1µm), with numerous clamp connections, crystal deposits in globose cells.

Note: The work of Cabral *et al.*[19] shed light on the complex of species of *Phallus indusiatus* sensu lato with the description of three new taxa: *Phallus denigricans* T.S.Cabral, B.D.B.Silva & Baseia, *P. purpurascens* T.S.Cabral, B.D.B.Silva & Baseia, and *P. squamulosus* T.S.Cabral, B.D.B.Silva & Baseia. *Phallus indusiatus* sensu stricto is characterized by its reticulated and campanulate receptacle, developed white indusium extending to the ground, and hypogeous volva with pink pigments and crystals[19]. The minimum height of the basidiospores of the specimen collected in Cachoeira do Sul shows a slight divergence of 0.2 µm when compared to the dimensions presented in the work of Cabral *et al.*[19]; however, given the congruent characteristics presented, the specimen can be identified as *Phallus indusiatus*. The ephemerality of the basidiomata of fungi in the order Phallales presents a challenge for the formal recording of species occurrences, associated with complete descriptions of the material; efforts to expand the known distribution of these taxa constitute important contributions to the assessment of the conservation status of the species.

Examined material: BRASIL. Rio Grande do Sul, Cachoeira do Sul, neighborhood Soares, 20/IV/2022, Natália Vargas, ICN 203692.

Identification key for the Phallales species cited for the Brazilian Pampa

1 Mature basidiome phalloid or lysuroid. 2
1’ Mature basidiome arachnoid or column clathroid. 5

2 Basidiome phalloid, membranous receptacle. 3
2’ Basidiome lysuroid, receptacle formed by free or connected arms. 4

3 Basidiome with indusium, reticulated receptacle, full straight margin. *Phallus indusiatus*
3’Basidiome without indusium, rugulose receptacle, campanulate, with slightly toothed margin...*Phallus campanulatus*

4 Arms united in the young basidiome, detaching at maturity; pseudostipe white to beige. *Lysurus cruciatus*
4’Arms united in clathrate aspect, during all stages of the basidiome; pseudostipe pastel red to pinkish. *Lysurus sphaerocephalus*

5 Basidiome arachnoid, red, tentacle-like arms. *Aseroe rubra*
5’Basidiome column clathroid, white, whitish yellow, light orange or orange, arms never in the form of tentacles ... 6

6 Whit glebifers, receptacle whitish yellow to light orange. *Blumenavia rhacodes*
6’ Without glebifers, receptacle orange to red. *Clathrus columnatus*

Checklist and distribution map of Phallales from Brazilian Pampa

The first Phallales species collected was *Lysurus sphaerocephalus* (Schltdl.) Hern. Caff., Urcelay, Hosaka & L.S. Domínguez in Parque Schöenwald, Viamão, 13 July 1965, for F.R. Schoenwald (ICN 3722) and in the same locality and same collector on 29 July 1965 (ICN3778) cited by Cortez *et al.*[4] and Trierveiler-Pereira et al.[6]. With the new collections presented in this study seven species in five genera had been recorded in Brazilian Pampa until September 2024. The checklist is presented in Table 1, and a map with distribution of these species in Fig. 3.

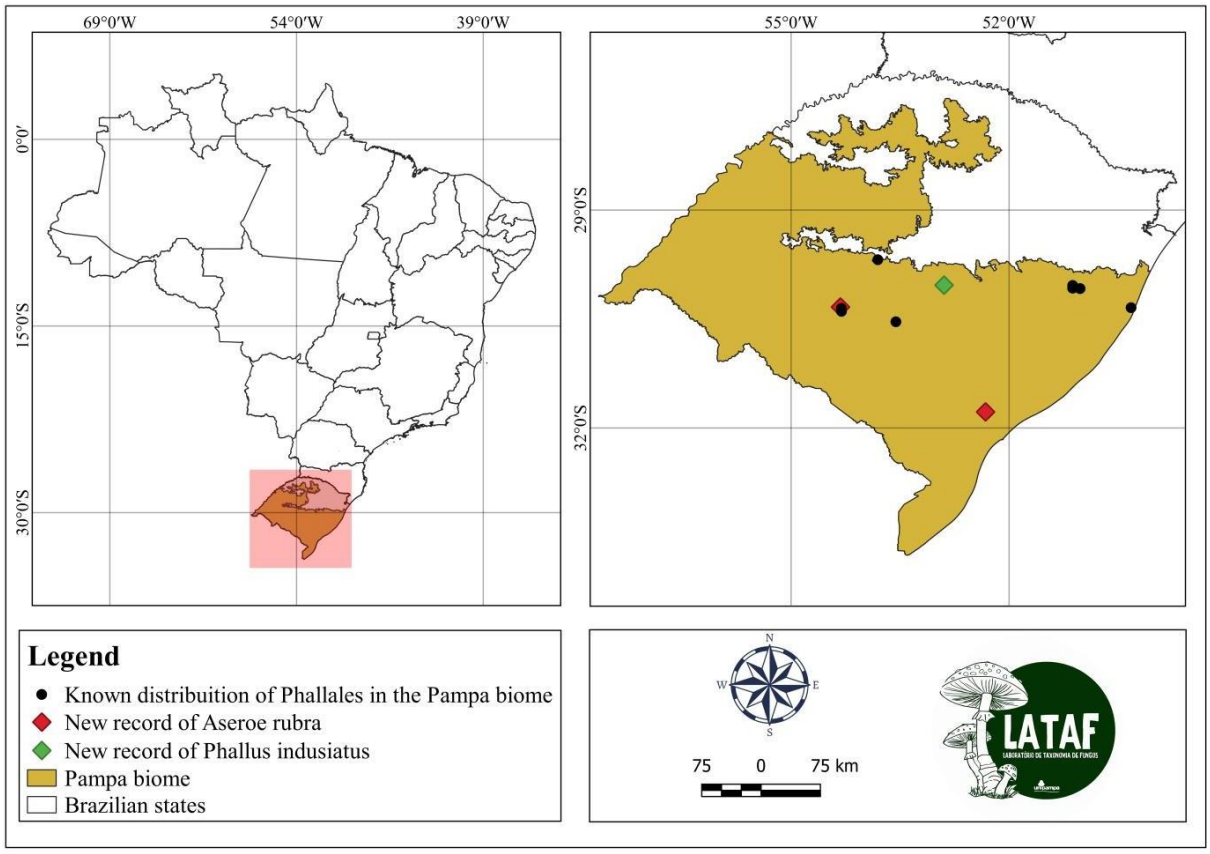

Figure 3. *Distribution map of Phallales species recorded to Brazilian Pampa.*

Species	Site in Pampa biome	Coordinates	Source
Aseroe rubra Labill.	Bairro Santa Brígida, São Gabriel (HBEI 0190)	30°19'44.94"S 54°27'58.76"W	Present study
	Bairro Jardim América, Capão do Leão (HBEI 0191)	31°45'33.61"S 52°25'11.67"W.	Present study
Blumenavia rhacodes Möller	Reserva Ecológica Sanga da Bica, São Gabriel (HBEI 047)	30°20'37''S 50°19'14''W	(7)
	Morro Santanta, Porto Alegre (ICN 176968)	30°02'14.2"S 51°07'26.8"W	(2, 6)
	Campus Vale UFRGS, Porto Alegre (ICN 177266 epitype, ICN 177267)	30°04'30.9"S 51°07'29.2"W	(2, 6)
Clathrus columnatus Bosc	Parque Municipal Pedra do Segredo, Caçapava do Sul	30°32'16.0"S 53°33'26.0"W	?
	Parque Estadual Itapuã, Viamão (Trierveiler-Pereira 257: ICN 176972*)	30°04'51.0"S 51°01'22.0"W**	(6)
	Três Barras, Santa Maria (Trierveiler-Pereira 39: ICN 175598*)	29°41'00.3"S 53°48'23.1"W**	(5, 6)

Lysurus cruciatus (Lepr. & Mont.) Henn.	Fazenda Cambará, São Gabriel (ICN 175571)	30°21'09.0"S 54°18'33.6"W***	(5)
	Fazenda Cambará, São Gabriel ICN 175590)	30°21'12.1"S 54°18'32.6"W***	(5, 6)
	Pinheiro Machado (ICN 154342)	30°23'36.9"S 54°18'22.4"W***	(4, 6)
	Porto Alegre (ICN 154345)		Cortez *et al.*[4] as *Lysurus periphragmoides* with other locality, probably a digitation error, (6)
Lysurus sphaerocephalus (Schltdl.) Hern. Caff., Urcelay, Hosaka & L.S. Domínguez	Baía do Cego, Porto Alegre (ICN 6220)	-	(6)
	Parque Schöenwald, Viamão (ICN 3722 e ICN 3780)		Cortez *et al.*[4] as *L. periphragmoides*, (6)
	Porto Alegre (PACA-FR 14822)		Cortez *et al.*[4] as *L. periphragmoides*, (6)
Phallus campanulatus Berk.	Estância Grande, Viamão (ICN003736)	30°04'51.0"S 51°01'22.0"W**	
	Parque Estadual de Itapuã, Viamão (Trierveiler-Pereira 255: ICN 176970**)	30°04'51.0"S 51°01'22.0"W**	(6)
	Parque Estadual de Itapuã, Viamão (Trierveiler-Pereira 256: ICN 176971**)	30°04'51.0"S 51°01'22.0"W**	(6)
	UFSM, Santa Maria (ICN 154390)	29°41'03.1"S 53°48'24.8"W**	(6)
Phallus indusiatus Vent.	Cachoeira do Sul (ICN 203692)	30°01'49.4"S 52°53'36.9"W	Present study

Table 1: *Checklist with location and bibliography of the species mentioned in the identification key collected in Brazilian Pampa.*
** Voucher number taken from Species Link. **Coordinates taken from Species Link linked to the voucher number. ***Coordinates taken from Google Maps.*

Some specimens of *Lysurus sphaerocephalus* studied by Trierveiler-Pereira *et al.*[6] where treated by Cortez *et al.*[4] as *L. periphragmoides* (Klotzsch) Dring. Dring[17] proposed *L. periphragmoides* as a new combination utilizing as one of heterotypic synonyms the species *Simblum sphaerocephalum* Schltdl. Caffot *et al.*[20] performed a morphological and molecular review and made a new combination: *L. sphaerocephalum*, with a basionym *S. sphaerocephalum*. They utilized for this combination material collected in Argentina and South America, not accepting the synonymy with *L. periphragmoides*. The species *L. sphaerocephalus* have a type locality Argentina (also from the Pampa biome) and is different from Asian species, type locality of *L. periphragmoides*. The species *Lysurus sphaerocephalus* as treated as its orthographic variant *Lysurus sphaerocephalum* in Trierveiler-Pereira *et al.*[6] and Caffot *et al.*[20], however the name has been corrected to *L. sphaerocephalus*[21], which we use in the checklist.

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Declaración de autores:	Los autores aprueban la versión final del artículo.
Contribución de autores:	JRPV: Literature review and manuscript writing; MSR: Literature review and manuscript writing; GSM:Literature review and manuscript writing; N DV: Collection of a specimen of Phallus indusiatus; MMK:Collection of a specimen of Aseroe rubra; MAPV: Literature review; BLG: Collection of a specimen of Aseroe rubra; JP:Review.
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Disponibilidad de los datos:	Los datos están disponibles previa solicitud al autor corresponsal.

REFERENCES

1. Ribeiro MS, Cabral TS, Melanda GCS, Baseia IG, Silva BDB. Funga faloide e floriforme (Phallales, Basidiomycota) no Estado da Bahia, Brasil. Hoehnea. 2022a;49:e142022. Doi:10.1590/2236-8906-14-2022.
2. Melanda GCS, Silva-Filho AGS, Lenz AR. An Overview of 24 Years of Molecular Phylogenetic Studies in Phallales (Basidiomycota) With Notes on Systematics, Geographic Distribution, Lifestyle, and Edibility. Front Microbiol. 2021;12:689374.
3. Trierveiler-Pereira L, Cabral TS. Phallales in Flora e Funga do Brasil. Jardim Botânico do Rio de Janeiro; 2022. Disponible en: https://floradobrasil.jbrj.gov.br/FB22.
4. Cortez VG, Baseia IG, Silveira RMB. Two noteworthy Phallus from southern Brazil. Mycoscience. 2011;52:436-8.
5. Trierveiler-Pereira L, Honaiser LP, Silveira RMB da. Diversity of gasteroid fungi (Agaricomycetes, Basidiomycota) from the Brazilian Pampa Biome. Nova Hedwigia. 2018;106(3-4):305-24.
6. Trierveiler-Pereira L, Meijer AAR, Silveira RMB. Phallales (Agaricomycetes, Fungi) from Southern Brazil. Stud Fungi. 2019;4(1):162-84.
7. Velloso JRP, Maggio LP, Klotz AL, Silva FAB da, Putzke J, Melanda G de S, Heberle M de A. Primeira ocorrência de *Blumenavia rhacodes* (Basidiomycota, Fungi) na porção brasileira do bioma Pampa. Arrudea: A Revista do Jardim Botânico do Recife. 2021;7:32-8. Doi: http://dx.doi.org/10.55513/arrudea0046
8. Maia LC, Carvalho AAD, Cavalcanti LDH, Gugliotta ADM, Drechsler-Santos ER, Santiago ALDA, et al. Diversity of Brazilian fungi. Rodriguésia. 2015;66(4):1033-45.
9. Roesch LF, Vieira FCB, Pereira VA, Schünemann AL, Teixeira IF, Senna AJT, et al. The Brazilian Pampa: a fragile biome. Diversity. 2009;1:182-98.
10. Overbeck G, Muller S, Fidelis A, Pfadenhauer J, Pillar V, Blanco C, et al. Brazil's neglected biome: the south brazilian campos. Perspectives in Plant Ecology, Evolution and Systematics. 2007;9(2):101-16. Doi: https://doi.org/10.1016/j.ppees.2007.07.005
11. Ministério do Meio Ambiente. Biomas: Pampa. 2024. Disponible en: <https://antigo.mma.gov.br/biomas/pampa.html#:~:text=Em%20rela%C3%A7%C3%A3o%20%C3%A0s%20%C3%A1reas%20naturais,protegida%20por%20unidades%20de%20conserva%C3%A7%C3%A3o>.
12. Kornerup A, Wanscher JH. Methuen handbook of colour. London: Eyre Methuen; 1978. 252 p.
13. Ribeiro MS, Cabral TS, Melanda GCS, Oliveira RL, Baseia IG, Silva BDB. Phallales fungi (Phallomycetidae, Basidiomycota) in Brazil: First checklist and key specific for the country. J Torrey Bot Soc. 2022b;149(3):230-52. Doi:10.3159/TORREY-D-21-00043.1
14. Meijer AAR. Preliminary list of the macromycetes from the Brazilian State of Paraná. Boletim do Museu Botanico Municipal (Curitiba). 2006;68:1–55.
15. Rick J. Basidiomycetes Eubasidii in Rio Grande do Sul. Iheringia. 1961;9:451-80.
16. Guerrero RT, Homrich MH. Fungos Macroscópicos Comuns no Rio Grande do Sul. Porto Alegre: Editora da Universidade; 1999. 128 p.
17. Dring DM. Contributions towards a rational arrangement of the Clathraceae. Kew Bull. 1980;35:1-96.

18. Trierveiler-Pereira L, Silveira RMB, Hosaka K. Multigene phylogeny of the Phallales (Phallomycetidae, Agaricomycetes) focusing on some previously unrepresented genera. Mycologia. 2014;106(5):904-11.
19. Cabral TS, Silva BDB, Martín MP, Clement CR, Hosaka K, Baseia IG. Behind the veil – exploring the diversity in *Phallus indusiatus* s.l. (Phallomycetidae, Basidiomycota). MycoKeys. 2019;58:103-27. Doi:10.3897/mycokeys.58.35324
20. Caffot MLH, Hosaka K, Domínguez LS, Urcelay C. Molecular and morphological data validate the new combination of Lysurus sphaerocephalum from Argentina, with some additional records on Phallales (Agaricomycetes). Mycologia. 2018;110(2):419-33. Doi:10.1080/00275514.2018.1456834
21. Caffot MLH, Hosaka K, Domínguez LS, Urcelay C. Correction to Molecular and morphological data validate the new combination of *Lysurus sphaerocephalum* from Argentina, with some additional records on Phallales (Agaricomycetes). Mycologia. 2020;112(4):857. Doi:10.1080/00275514.2020.1788910.