

On Neotropical *Fuscoporia* with strigose pileus surface: Redescription and phylogenetic study of *Polyporus sarcites* and a new species *Fuscoporia dollingeri* (Hymenochaetaceae, Basidiomycota)

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Abstract. Specimens of poroid *Hymenochaetaceae* with uniquely strigose pileus surfaces were collected and studied morphologically and phylogenetically (using as markers ITS and nrLSU ribosomal DNA). Detailed morphological examination showed that the specimens belong to two distinct species of *Fuscoporia*. *Fuscoporia sarcites* comb. nov., which is proposed and recorded for the first time in Guatemala, Honduras, and Venezuela, and the newly described *Fuscoporia dollingeri* sp. nov., which was collected several times in Florida (USA). Morphological and ecological data of these species are compared to other similar species, and an identification key of Neotropical *Fuscoporia* is provided.

Key words: *Hymenochaetales*, molecular phylogeny, Neotropics, *Phellinus* s.l., tropical forest

Introduction

Hymenochaetaceae Donk is a large group of fungi mostly recognized by brownish basidiomata with xanthochroic reaction, poroid, irpicoid or smooth hymenophore, simple septate generative hyphae and setae variably present. The traditional classification of the family (Ryvarden 1991, 2004) relied on macro and micromorphological characters and comprised few poroid genera, namely *Coltricia* Gray, *Cyclomyces* Kunze ex Fr., *Phylloporia* Murrill,

Inonotus P. Karst and *Phellinus* Quél, with the latter two containing most species (Ryvarden 2004). With the beginning of phyletic and phylogenetic studies in 20th century (Fiasson & Niemelä 1984), intensified in the 21st century (Niemelä et al. 2001; Wagner & Fischer 2001, 2002), it was demonstrated that the traditional circumscription of *Hymenochaetaceae* was not natural, and that *Inonotus* and *Phellinus* comprised various non-related lineages. Many small genera long considered as synonyms of *Phellinus* s.l. and *Inonotus* s.l. were recovered (Fiasson & Niemelä 1984; Wagner & Fischer 2002), while others were proposed as new (Fiasson & Niemelä 1984; Rajchenberg et al. 2015; Zhou et al. 2015; Drechsler-Santos et al. 2016). The taxonomy of *Hymenochaetaceae* continues to be the subject of taxonomic discussions and proposals (Wagner & Fischer 2001; Zhou et al. 2015; Drechsler-Santos et al. 2016; Pildain et al. 2018; Wu et al. 2022).

In the Neotropics, recent research on *Hymenochaetaceae* diversity uncovered many new taxa and valuable information for species identification such as hosts, vegetation types, distribution range and new morphological characteristics (e.g., Raymundo et al. 2013; Pires et al. 2015; Drechsler-Santos et al. 2016; Alves-Silva et al. 2020). Molecular studies of known species supported proposals of new genera, such as *Nothophellinus* Rajchenb. & Pildain (Rajchenberg et al. 2015) and *Phellinotus* Drechsler-Santos, Robledo & Rajchenb. (Drechsler-Santos et al. 2016). Numerous new combinations have been

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made on neotropical species of *Hymenochaetaceae* in accordance with their modern classification (Baltazar & Gibertoni 2010; Gomes-Silva et al. 2013; Campos-Santana et al. 2015; Alves-Silva et al. 2020; Yuan et al. 2020; Wu et al. 2022). Even so, numerous taxa remain without recent sampling and molecular data, requiring comprehensive morphological and phylogenetic investigations to ensure accurate classification within the modern classification of the *Hymenochaetaceae* family. Also, regions such as the Neotropical Mountain Cloud Forests with high endemism levels for fungi (Olmo-Ruiz et al. 2017) and undescribed taxa (Figueiró et al. 2016; Alves-Silva et al. 2020) are still poorly explored for hymenochaetoid fungi.

During field surveys of lignicolous fungi in the Mountain Cloud Forests and other high-elevation sites of the Neotropics and lowland tropical forests in Florida, several specimens presenting strigose pileus surfaces were collected. These collections presented unique morphological features pointing towards the genus *Fuscoporia* Murrill. One of them presented a combination of characters pointing to *Phellinus sarcites* (Fr.) Ryvar den. The second morphotype was not conspecific with any described species so far. The current work aimed: (i) to re-describe *P. sarcites* and to test its phylogenetics within *Hymenochaetaceae*; and (ii) to describe a new *Hymenochaetaceae* species in detail.

Materials and methods

Study site and morphological analyses

Field expeditions were carried out in the Neotropical Mountain Cloud Forests of São Joaquim National Park in Southern Brazil, La Tigra National Park in Honduras, San Pedro Mount in Guatemala and Myakkahatchee Creek Environmental Park in Florida, USA. Specimens were dried in a fruit dryer at 40°C, packed into hermetic plastic bags to be incorporated in FLOR and PRM herbaria (acronym follows Thiers 2023) and in the private herbarium of J. Vlasák (JV).

Specimens were studied macro and micromorphologically. Measurement of microscopic structures was made based on photos of microscopic slides mounted in Melzer's reagent and phloxine 1% with KOH 3%, using the software ImageJ (Image Processing and Analysis in Java) (Abràmoff et al. 2004). To determine the hyphal system, sections from the trama of the tube layer and context of basidiomata were carefully dissected under a stereomicroscope after incubation in 3–5% NaOH for 48h at 40°C (Decock et al. 2010). In order to display the size of microscopic structures, 5% of the measurements of each extreme are shown between parentheses. In the text, the following abbreviations were used: avg. = average, diam. = diameter, Q = the range of the ratio length/width, Qm = the mean of the ratio length/width from basidiospores. At least 20 basidiospores and hymenial setae of each fertile specimen were measured.

DNA sequences and molecular phylogenetic analyses

Dried basidiomata were used for DNA extraction using the CTAB method (Góes-Neto et al. 2005). Primer pairs ITS8-F/ITS6-R or ITS5-F/ITS4-R were used to amplify ITS (ITS1-5.8S-ITS2) and LR0R/LR7 to amplify nrLSU (28S) (Binder & Hibbett 2003; Dentinger et al. 2010). PCR products were purified with PEG 20% (Polyethylene glycol 8,000 plus NaCl 2.5M) (Sambrook et al. 1989) or in silica columns Machery-Nagel NucleoSpin PCR Clean-up, and sequenced by commercial facility. Sequences were assembled and manually corrected with Geneious v.4.8.5 (Drummond et al. 2010). All sequences generated in this study were deposited in GenBank® (<https://www.ncbi.nlm.nih.gov/genbank/>).

For molecular phylogenetic analyses, two datasets were built using sequences of ITS and nrLSU generated in this study and from previous studies available on GenBank® (e.g., Chen et al. 2019, 2020; Vlasák et al. 2020; Yuan et al. 2020) (Table 1). The first one, containing a great sampling of major clades of *Hymenochaetaceae*, aimed to investigate the phylogenetic relationships of collected species within *Hymenochaetaceae* genera using *Rigidoporus corticola* (Fr.) Pouzar as outgroup based on data from Larsson et al. (2006), Drechsler-Santos et al. (2016) and Wang et al. (2023). The second one was focused on *Fuscoporia* based on the results of the first one, aiming to investigate the relationships of the samples within the genus using closely related genera as outgroups, *Coniferiporia* L.W. Zhou & Y.C. Dai and *Phellinidium* (Kotl.) Fiasson & Niemelä, based on data from Zhou et al. (2016). Sequences were automatically aligned with MAFFT v.7 (Katoh & Standley 2013) under the auto strategy. The alignment was manually adjusted, when necessary, in the software MEGA 7 (Kumar et al. 2016).

For the phylogenetic analyses both datasets were subdivided into four partitions each: ITS1 + 5.8S + ITS2 + nrLSU. All analyses were performed online using the CIPRES Science Gateway (Miller et al. 2011). Maximum likelihood (ML) analysis was carried out in RAxML v.8 (Stamatakis 2014). The analysis initially involved 100 ML searches, each one starting from one randomized stepwise addition parsimony tree, under a GTRGAMMAI model, with all the parameters estimated by the software. We provided a partition file to force RAxML software to search for a separate evolution model for each dataset. To access the reliability of the nodes, rapid bootstrapping replicates under the same model are computed, allowing the program to halt bootstrapping automatically by the autoMRE option. Bootstrap (BS) values above 75% were considered significant.

Bayesian analysis (BI) was performed in the program Mr. Bayes v.3.2.6 (Ronquist et al. 2012), and evolutionary models for BI were estimated using the AIC (Akaike Information Criterion) for each partition, as implemented in jModelTest2 v.1.6 (Guindon & Gascuel 2003; Darriba et al. 2012). The best-fit models for each partition were implemented as partition specific models for each partition of the combined dataset. We set two independent runs,

Table 1. List of vouchers or strains with its respective country of origin and access number on GenBank® of ITS and nrLSU sequences used in the molecular phylogenetic analyses.

Species	Voucher	Country	GenBank accession numbers		Source
			ITS	LSU	
<i>Arambarria cognata</i>	CIEFAPcc16	Argentina	KY907680	KY907700	Pildain et al. (2017)
<i>Coltricia perennis</i>	DSH 93.198	unknown	DQ234560	AF287854	Bian et al. (2016); Binder & Hibbet (2002)
<i>Coniferiporia qilianensis</i>	Yuan 6424	China	KR350561	KJ635808	Zhou et al. (2016)
<i>Coniferiporia sulphuracens</i>	Cui 10429	China	KR350565	KR350555	Zhou et al. (2016)
<i>Coniferiporia weirii</i>	CFS 504	Canada	AY829341	AY829345	Lim et al. (2005)
<i>Cylindrosporus flavidus</i>	Dai 13213	China	KP875564	KP875561	Zhou (2015a)
<i>Fomitiporella inermis</i>	JV 1009/56	USA	KX181306	KX181347	Ji et al. (2017)
<i>Fomitiporella umbrinella</i>	JV 0904/149-J	USA	KX181293	KX181329	Ji et al. (2017)
<i>Fomitiporia langloisii</i>	MUCL 46375	USA	EF429242	EF429225	Decock et al. (2007)
<i>Fomitiporia robusta</i>	MUCL 51297	Mexico	JQ087892	JQ087919	Amalfi et al. (2012)
<i>Fulvifomes squamosus</i>	CS 385	Peru	MF479268	MF479265	Salvador-Montoya et al. (2018)
<i>Fulvifomes robiniae</i>	CBS 211.36	USA	AY558646	AY059038	Jeong et al. (2005); Wagner & Fischer (2002)
<i>Fulvoderma australe</i>	Cui 10343	China	MF860767	MF860719	Zhou et al. (2018)
<i>Fuscoporia acutimarginata</i>	Dai 15137	China	MH050751	MH050765	Chen & Dai (2019)
<i>Fuscoporia acutimarginata</i>	Dai 16892	China	MH050752	MH050766	Chen & Dai (2019)
<i>Fuscoporia ambigua</i>	Cui 9244	China	MN816706	MN809995	Chen & Dai (2019)
<i>Fuscoporia ambigua</i>	JV 0509/151	USA	MN816707	MN809996	Chen & Dai (2019)
<i>Fuscoporia americana</i>	JV 1209/100	USA	KJ940022	MG008467	Chen et al. (2020)
<i>Fuscoporia atlantica</i>	SP 465829	Brazil	KP058514	KP058516	Pires et al. (2015)
<i>Fuscoporia atlantica</i>	SP 445618	Brazil	KP058515	KP058517	Pires et al. (2015)
<i>Fuscoporia atlantica</i>	JV 1612/28-D	Guadeloupe	MZ169038	–	This work
<i>Fuscoporia australasica</i>	Dai 15625	China	MN816726	MN810018	Chen & Dai (2019)
<i>Fuscoporia australasica</i>	Dai 15636	China	MG008397	MG008450	Chen et al. (2019)
<i>Fuscoporia bambusae</i>	Dai 16599	Thailand	MN816711	MN809999	Chen & Dai (2019)
<i>Fuscoporia bambusae</i>	Dai 16607	Thailand	MN816713	MN810000	Chen & Dai (2019)
<i>Fuscoporia caymanensis</i>	JV 1908/74	French Guiana	MT676832	MT676833	Vlasak et al. (2020)
<i>Fuscoporia caymanensis</i>	JV 1408/5	Costa Rica	MW009110	MW009109	Vlasak et al. (2020)
<i>Fuscoporia centroamericana</i>	O 908267	Costa Rica	MG008443	–	Chen et al. (2019)
<i>Fuscoporia centroamericana</i>	JV 1607/93	Costa Rica	MG008444	MG008460	Chen et al. (2019)
<i>Fuscoporia chrysea</i>	JV 1607/106-J	Costa Rica	MN816736	MN810027	Chen & Dai (2019)
<i>Fuscoporia contigua</i>	JV 1204/22.3a,b-J	USA	KX961104	KY189104	Chen & Yuan (2017)
<i>Fuscoporia contigua</i>	Dai 13567A	China	MG008402	MG008455	Chen et al. (2019)
<i>Fuscoporia contigua</i>	Dai 16045	China	KX961105	KY189105	Chen & Yuan (2017)
<i>Fuscoporia costaricana</i>	JV 1504/85	Costa Rica	MG008413	MG478454	Chen et al. (2019)
<i>Fuscoporia costaricana</i>	JV 1407/92	Costa Rica	MG008446	MG008461	Chen et al. (2019)
<i>Fuscoporia dollingeri</i> sp. nov.	Dollinger 623	USA	MW908540	MW898444	This work
<i>Fuscoporia dollingeri</i> sp. nov.	Dollinger 652	USA	MW908541	MW898445	This work
<i>Fuscoporia eucalypti</i>	Dai 18634A	Australia	MN816729	MN810020	Chen & Dai (2019)
<i>Fuscoporia eucalypti</i>	Dai 18792	Australia	MN816731	MN810022	Chen & Dai (2019)
<i>Fuscoporia ferrea</i>	FP-133592-Sp	USA	KU139189	KU139259	Brazee (2015)
<i>Fuscoporia ferrea</i>	JV 1606/2.2-J	USA	KX961100	KY189100	Chen & Yuan (2017)
<i>Fuscoporia ferrea</i>	Cui 11801	China	KX961101	KY189101	Chen & Yuan (2017)
<i>Fuscoporia ferrea</i>	MUCL 45984	France	KX961112	KY189112	Chen & Yuan (2017)
<i>Fuscoporia ferruginosa</i>	Dai 13200	France	MN816702	MN809993	Chen & Dai (2019)
<i>Fuscoporia ferruginosa</i>	JV 1507/11-CN	Slovakia	MG008400	MG008453	Chen et al. (2019)
<i>Fuscoporia formosana</i>	URM 91197	Brazil	MH392551	MH407350	Yuan et al. (2020)
<i>Fuscoporia formosana</i>	URM 91243	Brazil	MH392552	MH407351	Yuan et al. (2020)
<i>Fuscoporia gilva</i>	RP 17	Brazil	KP859295	KP859305	Drechsler-Santos et al. (2016)
<i>Fuscoporia gilva</i>	FLOR 67295	Brazil	MN809970	MN809979	This work
<i>Fuscoporia gilva</i>	JV 1006/16	USA	MZ169042	–	This work
<i>Fuscoporia gilva</i>	URM 83957	Brazil	MH392545	MH407344	Yuan et al. (2020)
<i>Fuscoporia gilva</i>	URM 91228	Brazil	MH392546	MH407345	Yuan et al. (2020)
<i>Fuscoporia insolita</i>	Spirin 5208	Russia	MN816724	MN810016	Chen & Dai (2019)
<i>Fuscoporia insolita</i>	Spirin 5251	Russia	KJ677113	–	Spirin et al. (2014)
<i>Fuscoporia latispora</i>	JV 0610/VII-Kout	Mexico	MG008436	MG008469	Chen et al. (2019)
<i>Fuscoporia latispora</i>	JV 1109/482	USA	MG008439	MG008468	Chen et al. (2019)
<i>Fuscoporia licnoides</i>	Dai 17388	Brazil	MN121824	MN121765	Chen & Dai (2019)

Table 1. Continued.

Species	Voucher	Country	GenBank accession numbers		Source
			ITS	LSU	
<i>Fuscoporia licnoides</i>	Dollinger 868	unknown	MN816701	MN809992	Chen & Dai (2019)
<i>Fuscoporia licnoides</i>	URM 91236	Brazil	MH392554	MH407353	Yuan et al. (2020)
<i>Fuscoporia licnoides</i>	URM 85067	Brazil	MH392557	MH407356	Yuan et al. (2020)
<i>Fuscoporia marquesiana</i>	URM 83094	Brazil	MH392544	MH407343	Yuan et al. (2020)
<i>Fuscoporia monticola</i>	Dai 11860	China	MG008406	MG008457	Chen et al. (2019)
<i>Fuscoporia monticola</i>	Dai 10909	China	MG008410	–	Chen et al. (2019)
<i>Fuscoporia palomari</i>	JV 1004/5-J	USA	MN816737	–	Chen & Dai (2019)
<i>Fuscoporia palomari</i>	JV 1305/3-J	USA	MN816738	MN810028	Chen & Dai (2019)
<i>Fuscoporia punctatiformis</i>	Dollinger 872	unknown	MH050753	–	Chen & Dai (2019)
<i>Fuscoporia punctatiformis</i>	Dai 17443	Brazil	MH050755	MH050764	Chen & Dai (2019)
<i>Fuscoporia ramulicola</i>	Dai 15723	China	MH050749	MH050762	Chen & Dai (2019)
<i>Fuscoporia ramulicola</i>	Dai 16155	China	MH050750	MH050763	Chen & Dai (2019)
<i>Fuscoporia rufitincta</i>	JV 1008/25	USA	KJ940029	KX058575	Chen et al. (2019)
<i>Fuscoporia rufitincta</i>	JV 0904/142	USA	KJ940030	KX058574	Chen et al. (2019)
<i>Fuscoporia sarcites</i>	FLOR 67299	Brazil	MN809972	–	This work
<i>Fuscoporia sarcites</i>	FLOR 67948	Brazil	MN809973	MN809981	This work
<i>Fuscoporia sarcites</i>	FLOR 67297	Brazil	MN809974	MN809982	This work
<i>Fuscoporia sarcites</i>	FLOR 67298	Brazil	MN809975	–	This work
<i>Fuscoporia sarcites</i>	Dammrich 8947	Honduras	MZ169041	–	This work
<i>Fuscoporia sarcites</i>	JV 0402/20-Kout	Venezuela	MZ169039	–	This work
<i>Fuscoporia sarcites</i>	JV 0611/K2-Kout	Guatemala	MZ169040	–	This work
<i>Fuscoporia semiarida</i>	URM 83800	Brazil	MH392562	MH407361	Yuan et al. (2020)
<i>Fuscoporia semiarida</i>	URM 83926	Brazil	MH392565	MH407364	Yuan et al. (2020)
<i>Fuscoporia senex</i>	KUC20110922-13	South Korea	JX463658	JX463652	Jang et al. (2012)
<i>Fuscoporia septoseta</i>	JV 0509/78	USA	MG008404	–	Chen et al. (2019)
<i>Fuscoporia septoseta</i>	Dai 12820	USA	MG008405	MN810033	Chen et al. (2019)
<i>Fuscoporia setifera</i>	Dai 15710	China	MH050758	MH050767	Chen & Dai (2019)
<i>Fuscoporia setifera</i>	Dai 15706	China	MH050759	MH050769	Chen & Dai (2019)
<i>Fuscoporia shoreae</i>	Dai 17800	Singapore	MN816733	MN810024	Chen & Dai (2019)
<i>Fuscoporia shoreae</i>	Dai 17818	Singapore	MN816735	MN810026	Chen & Dai (2019)
<i>Fuscoporia sinica</i>	Dai 15489	China	MG008407	MG008458	Chen et al. (2019)
<i>Fuscoporia sinica</i>	Dai 15468	China	MG008412	MG008459	Chen et al. (2019)
<i>Fuscoporia subchrysea</i>	Dai 16201	China	MN816708	MN809997	Chen & Dai (2019)
<i>Fuscoporia subchrysea</i>	Dai 17656	China	MN816709	MN809998	Chen & Dai (2019)
<i>Fuscoporia subferrea</i>	Dai 16326	China	KX961097	KY053472	Chen & Yuan (2017)
<i>Fuscoporia subferrea</i>	Dai 16327	China	KX961098	KY053473	Chen & Yuan (2017)
<i>Fuscoporia torulosa</i>	Dai 15518	China	MN816732	MN810023	Chen & Dai (2019)
<i>Fuscoporia torulosa</i>	isolate 759	Czech Republic	AM269803	AM269865	Guglielmo et al. (2007)
<i>Fuscoporia torulosa</i>	JV 1312/19-Kout	Spain	KX961107	KY189107	Chen & Yuan (2017)
<i>Fuscoporia viticola</i>	He 2081	USA	MN121829	MN121770	Chen & Dai (2019)
<i>Fuscoporia viticola</i>	He 2123	USA	MN816725	MN810017	Chen & Dai (2019)
<i>Fuscoporia viticola</i>	JV 0911/6	Czech Republic	KX961110	–	Chen & Yuan (2017)
<i>Fuscoporia wahlbergii</i>	JV 1312/20-Kout	Spain	MN816727	MG008462	Chen & Dai (2019)
<i>Fuscoporia wahlbergii</i>	JV 0709/169-J	USA	MN816728	–	Chen & Dai (2019)
<i>Fuscoporia wahlbergii</i>	FLOR 67947	Brazil	MN809976	–	This work
<i>Fuscoporia wahlbergii</i>	FLOR 67950	Australia	MN809977	–	This work
<i>Fuscoporia wahlbergii</i>	FLOR 52882	Brazil	MN809978	MN809983	This work
<i>Fuscoporia yunnanensis</i>	Cui 8182	China	MH050756	MN810029	Chen & Dai (2019)
<i>Fuscoporia yunnanensis</i>	Dai 15637	China	MH050757	MH050768	Chen & Dai (2019)
<i>Inocutis dryophila</i>	L(61)5-20-A	USA	AM269783	AM269845	Guglielmo et al. (2007)
<i>Inonotus compositus</i>	Wang 552	China	KP030781	KP030768	Zhou et al. (2015)
<i>Inonotus hispidus</i>	S45	Spain	EU282482	EU282484	González et al. (2009)
<i>Mensularia radiata</i>	85-107	Germany	AY624992	–	Fischer et al. (2005)
<i>Mensularia radiata</i>	HAI 1247	Germany	GQ253460	–	Tura et al. (2012)
<i>Neomensularia duplicata</i>	Dai 13578A	China	KU573970	KU573972	Wu et al. (2016)
<i>Neomensularia kanehirae</i>	Dai 10418	China	KX078220	KX078223	Wu et al. (2016)
<i>Neophellinus uncisetus</i>	MUCL 47061	Argentina	GU461972	GU462000	Amalfi et al. (2010)
<i>Nothophellinus andinopatgonicus</i>	CIEFAPcc42	Argentina	KP347534	KP347529	Rajchenberg et al. (2015)
<i>Nothophellinus andinopatgonicus</i>	CIEFAPcc367	Argentina	KP347544	KP347531	Rajchenberg et al. (2015)

Table 1. Continued.

Species	Voucher	Country	GenBank accession numbers		Source
			ITS	LSU	
<i>Onnia tomentosa</i>	Bud-551-C-1	Canada	JX110072	JX110116	Brazee & Lindner (2013)
<i>Phellinidium asiaticum</i>	Spirin 5097	Russia	KR350572	KC859424	Zhou et al. (2014, 2016)
<i>Phellinidium ferrugineofuscum</i>	Cui 10042	China	KR350573	KR350559	Zhou et al. (2016)
<i>Phellinidium fragrans</i>	CBS 202.90	USA	AY558619	AY059027	Jeong et al. (2005); Wagner & Fischer (2002)
<i>Phellinopsis andina</i>	CIEFAPcc297	Argentina	KP347542	KP347528	Rajchenberg et al. (2015)
<i>Phellinopsis asetosa</i>	Dai 13553	China	KJ425524	KJ425523	Zhou (2015b)
<i>Phellinotus neoaridus</i>	URM 80362	Brazil	KM211294	KM211286	Drechsler-Santos et al. (2016)
<i>Phellinotus piptadeniae</i>	URM 80345	Brazil	KM211291	KM211283	Drechsler-Santos et al. (2016)
<i>Phellinus caribaeo-quercicola</i>	MUCL 46003	Cuba	HM635697	DQ127279	Yombiyeni et al. (2011); Decock et al. (2006)
<i>Phellinus ellipsoideus</i>	MUCL 47867	China	KU954545	KU954540	Campos-Santana et al. (2016)
<i>Phylloporia elegans</i>	FLOR 51179	Brazil	KJ639050	KJ631409	Ferreira-Lopes et al. (2016)
<i>Phylloporia gabonensis</i>	MUCL 55572	Gabon	KU198354	KU198352	Decock et al. (2015)
<i>Porodaedalea cancriformans</i>	1-Sp	USA	JX110042	JX110086	Brazee & Lindner (2013)
<i>Porodaedalea pini</i>	No-6170-T	Portugal	JX110037	JX110081	Brazee & Lindner (2013)
<i>Pseudoinotus dryadeus</i>	FP-105836-4	USA	AM269808	AM269870	Guglielmo et al. (2007)
<i>Rigidoporus corticola</i>	ZRL20151459	unknown	LT716075	KY418899	Zhao et al. (2017)
<i>Sanguangporus sanguang</i>	Cui 14420	China	MF772790	MF772811	Zhu et al. (2019)
<i>Sanguangporus weirianus</i>	CBS 618.89	USA	AY558654	AF458465	Park et al. (2002)
<i>Tropicoporus drechsleri</i>	CTES:570140	Argentina	MG242439	MG242444	Salvador-Montoya et al. (2018)
<i>Tropicoporus tropicalis</i>	IDR1300012986	USA	KF695121	KF695122	Ramesh et al. (2014)

each one starting from random trees, with four simultaneous independent chains and performed 10,000,000 generations, sampling trees at every 100th generation. The convergence diagnostic was calculated every 10⁴ generations, and its critical value was set to stop the analysis automatically when the standard deviation of the split frequencies reached the value defined by the stopval command (stoprule = yes, stopval = 0.01). A total of 25% of the sampled trees was discarded as burn-in, while the remaining were used to reconstruct a 50% majority-rule consensus tree and to estimate Bayesian posterior probabilities (PP) of the branches. PP values above 0.95 were considered as significant. The topologies of BI and ML analyses were visually verified for congruence in the significantly supported clades.

Results

Molecular phylogeny

The topologies of ML and BI analyses were congruent regarding the well-supported clades. The displayed topologies were recovered in ML analyses, with BI and ML support values appearing above or below branches (Figs 1 and 2).

The *Hymenochaetaceae* ITS + nrLSU dataset included 55 specimens from various genera of *Hymenochaetaceae*. The DNA sequence alignment resulted in 2,243 characters, of which 1,144 were variable positions and 827 were parsimony-informative positions. The following substitution model were obtained for each partition: GTR+G (ITS 1), TVMef+I (5.8 S), TPM2uf+I+G (ITS 2), TrN+I+G (nrLSU).

The *Fuscoporia* ITS + nrLSU dataset included 88 specimens. The DNA sequence alignment resulted in 2,241 characters, of which 790 were variable positions and 630 were parsimony-informative positions. The following substitution model was obtained for each partition: TPM2uf+I+G (ITS 1), TPM1 (5.8 S), TVM+I+G (ITS 2), GTR+I+G (nrLSU).

In the *Hymenochaetaceae* ITS + nrLSU dataset, 23 well-supported main clades were recovered, each one corresponding to a genus, except by a miscellaneous clade including *Arambarria* Rajchenb. & Pildain, *Fomitiporella* Murrill and *Inocutis* Fiasson & Niemelä. The specimens tested here, *F. dollingeri* sp. nov. and *F. sarcites* comb. nov. clustered with the remaining *Fuscoporia* species (BS = 97/PP = 1), including the type species *F. ferruginosa* (Schrad.) Murrill.

A total of 39 species of *Fuscoporia* were recovered in the *Fuscoporia* ITS + nrLSU dataset phylogenetic analyses. Among them, *F. sarcites* comb. nov. is recovered as a single lineage (BS = 92/PP = 0.99), as well as *F. dollingeri* sp. nov. (BS = 100/PP = 1). Those two species grouped with *F. formosana* (T.T. Chang & W.N. Chou) T. Wagner & M. Fisch., *F. gilva* (Schwein.) T. Wagner & M. Fisch., *F. atlantica* Motato-Vásq., R.M. Pires & Gugliotta and *F. setifera* (T. Hatt.) Y.C. Dai in a fully supported lineage labeled as “*Fuscoporia gilva* group” (BS = 100/PP = 1).

Considering the phylogenetic analyses and morphological evidence, *P. sarcites* is combined in *Fuscoporia* and a new species of *Fuscoporia* is proposed, both described in the taxonomy section.



Figure 1. Phylogenetic reconstruction of *Hymenochaetaceae* main lineages inferred after ITS and nrLSU sequences. The presented topology is from the Maximum Likelihood analysis. Only support values equal or higher than 75% for bootstrap and 0.95 for posterior probability are presented, in this order, above or below branches. The sequences generated in this study are in bold. *Rigidoporus corticola* was selected as outgroup. Country codes are according to ISO 3166-1.

Taxonomy

Fuscoporia sarcites (Fr.) Bittencourt, J. Vlasák, Drechsler-Santos, comb. nov. (Figs 3–4)

Mycobank MB 839623

Basionym: *Polyporus sarcites* Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 1(1): 66. 1851.

Type: U.S. Virgin Islands, Saint John: ad truncos, A.S. Ørsted (NY 00730951 – holotype [image!]).

≡ *Fomes sarcites* Fr. Cooke, Grevillea 14no. 69: 19. 1885.
 ≡ *Scindalma sarcites* Fr. Kuntze, Revis. gen. pl. Leipzig 33: 519. 1898. ≡ *Pyropolyporus sarcites* Fr. Murrill, N. Amer. Fl. New York 92: 110. 1908. ≡ *Fulvifomes sarcites* Fr. Murrill, Tropical Polypores: 85. 1915. ≡ *Phellinus sarcites* Fr. Ryvarden [as ‘sarcitus’], Norw. JI Bot. 19: 235. 1972.

= *Coriolopsis sarcitiformis* Murrill, Bull. New York Bot. Gard. 8: 140. 1912.

Type: Mexico, Teperte Valley, near Cuernavaca, 28 Dec. 1909, W.A. & E.L. Murrill 555 (BAFC – isotype!).

= *Polystictus sarcitiformis* (Murrill) Murrill, Bull. New York Bot. Gard. 8: 153. 1912.

Description. Basidiomata seasonal, effused-reflexed to pileate, gregarious, occasionally imbricate. Pileus semi-circular to dimidiate, flexible, 13–44 mm long, 12–60 mm wide, up to 9.5 mm thick; pileus surface hispid in developing basidiomata to strongly adpressed when mature, yellowish brown to ferruginous brown; context homogeneous, compact, fibrous, golden yellow in young basidiomata to yellowish brown at maturity, 1–5 mm thick; tubes one-layered, fragile and brittle, concolorous to the context, 1–6 mm thick; margin sterile, acute, concolorous to the remaining pileus surface in mature basidiomata, round and bright yellow in young basidiomata, up to 1 mm wide. Hymenophore poroid, yellow in young basidiomata, becoming greyish brown in mature basidiomata; pores round to angular, 4–8(–9) pores per mm, (56–)79–346(–459) μm in diam.; dissepiment thin, entire, (12–)20–97(–180) μm thick, sometimes irregular in height giving an appearance of an irpicoid hymenophore (Fig. 3D). Hyphal system dimitic in the trama of tubes, monomitic in context; generative hyphae simple septate; in trama thin to thick-walled, wide lumen, regularly branched, hyaline

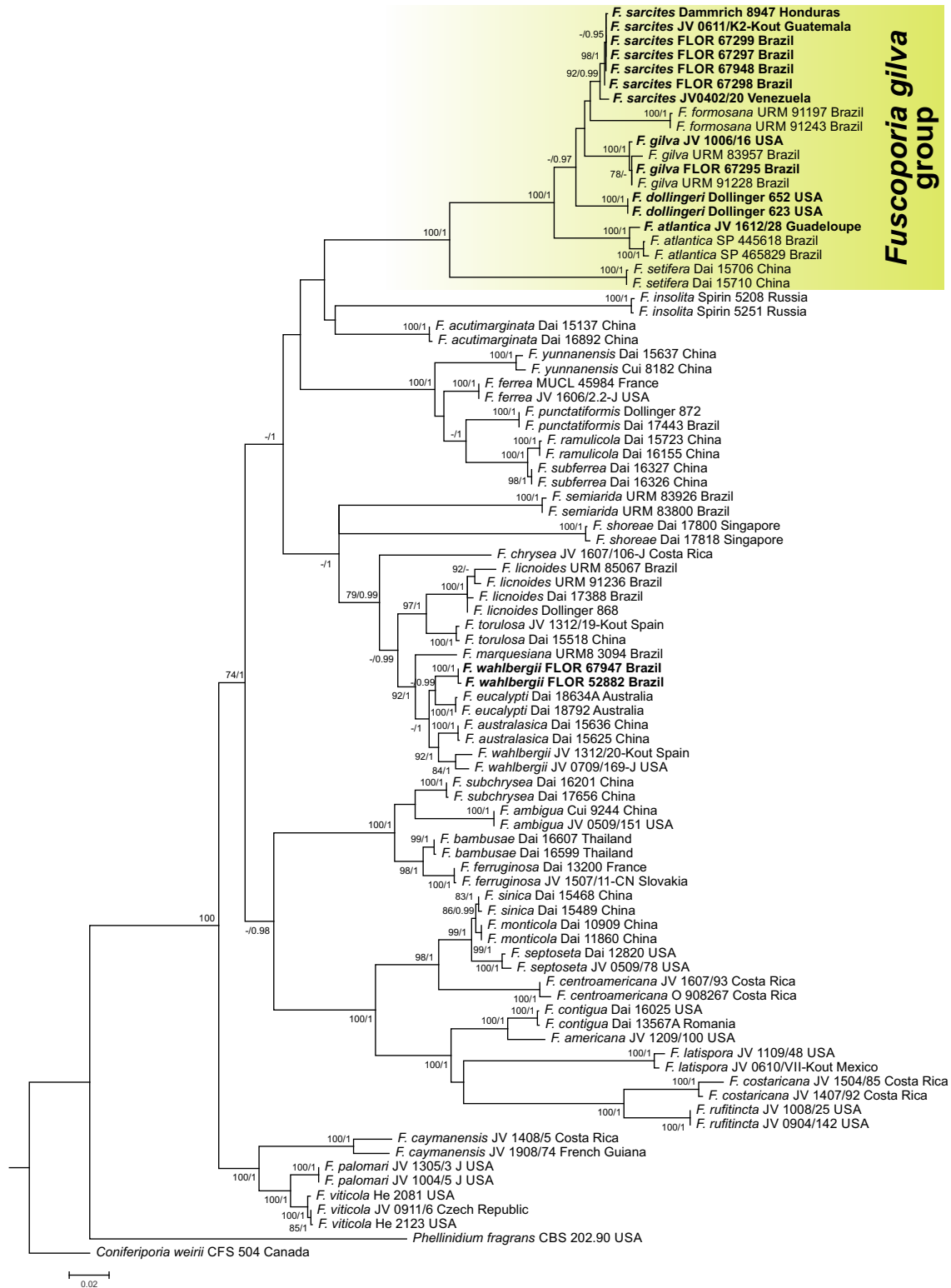


Figure 2. Phylogenetic reconstruction of *Fuscoporia* inferred after ITS and nrLSU sequences. The presented topology is from the Maximum Likelihood analysis. Only support values equal or higher than 75% for bootstrap and 0.95 for posterior probability are presented, in this order, above or below branches. The sequences generated in this study are in bold. *Coniferiporia weirii* was selected as outgroup. Country codes are according to ISO 3166-1.

to golden yellow, (1.2–)1.7–3.3(–4.1) μm diam., lumen (0.8–)1.1–2.2(–2.9) μm wide, thin-walled generative hyphae variably encrusted projecting above the hymenium; in context thin to thick-walled, with a wide lumen, regularly to sparsely branched, frequently septate, sometimes with unbranched long segments resembling skeletal

hyphae, hyaline to golden yellow, sometimes with a golden, refractive and granulose content (Fig. 4A), (1.8–)2.7–6.6(–8.9) μm diam., lumen (0.9–)1.6–5.1(–8) μm wide; skeletal hyphae in trama yellowish brown, unbranched or rarely branched with short or aborted branches, parallel arranged, (144–)287.5–1191(–1432.5) μm long,

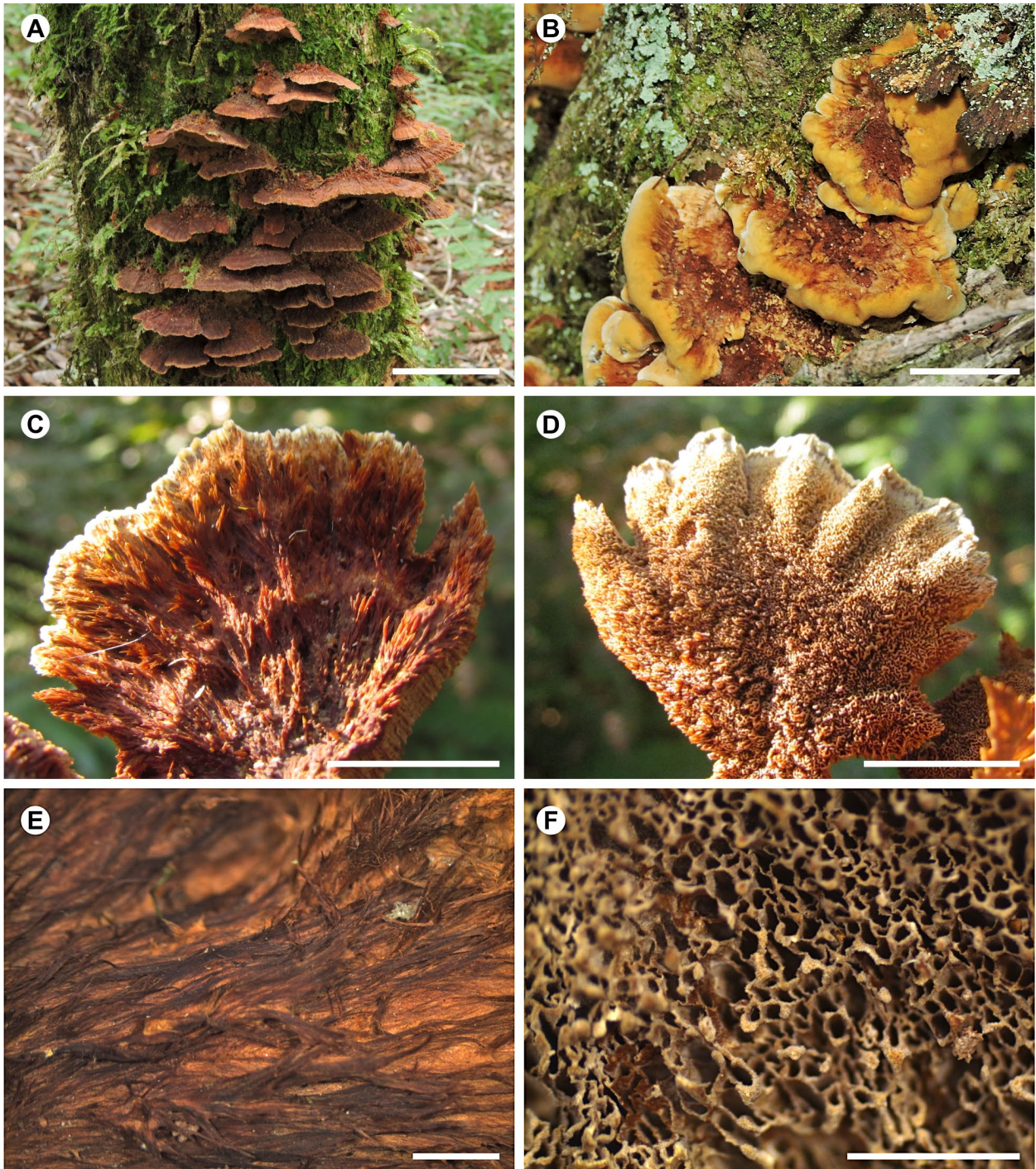


Figure 3. *Fuscoporia sarcites* comb. nov. A and B. Basidiomata in situ. A – habitat (FLOR 67304); B – developing basidiomata (FLOR 67303); C – hispid pileus surface (FLOR 67300); D – hymenophore (FLOR 67300); E – detail of hyphal strands in pileus surface (FLOR 67300); F – detail of hymenophore with dissepiment irregular in height (FLOR 67300). Scales: A = 30 mm; B–D = 10 mm; E–F = 2 mm. Photos: F. Bittencourt (A–B, E–F) and W.R. Nardes (C–D).

(1.9–)2.5–4.8(–5.8) μm diam., lumen 0.6–1.6(–1.9) μm wide. Hymenial setae subulate with straight apex, aseptate, frequently mono and bi-rooted, rarely three-rooted, (15.1–)18.5–32.6(–37) \times (4–)4.5–8(–9) μm ; basidia clavate to barrel-shaped, (6–)7–14(–15) \times (3–)3.5–5 μm ; cystidioles lageniform, ventricose-rostrate or ampulliform, frequently with a filiform apex up to 33 μm long, 7–27.4(–70) \times (1.5–)2.9–5 μm . Basidiospores broadly ellipsoid to ellipsoid, (2.6–)3.2–4.6(–5.4) \times (1.9–)2.3–3(–3.3) μm , $Q = 1.2–1.9$, avg. = 3.9 \times 2.6 μm , $Q_m = 1.5$, thin-walled, hyaline, IKI–.

Habitat and distribution. On dead trunks and branches of undetermined angiosperms, as well as on living *Quercus microphylla* Née (Raymundo et al. 2012) and *Myrcogenia* spp. Found on Cloud Forests, *Quercus* dominated forests (Valenzuela et al. 2002; Mueller et al. 2006) and other montane ecosystems across the Neotropics (Caranza et al. 2018). Recorded from Brazil (Drechsler-Santos et al. 2008, this work), Colombia (Ryvarden 2004; Ruíz & Varela 2006; Vasco-Palacios & Franco-Molano 2013), Costa Rica (Lowe 1957; Ryvarden 2004; Mueller et al. 2006), Guatemala (this study), Honduras (this study),

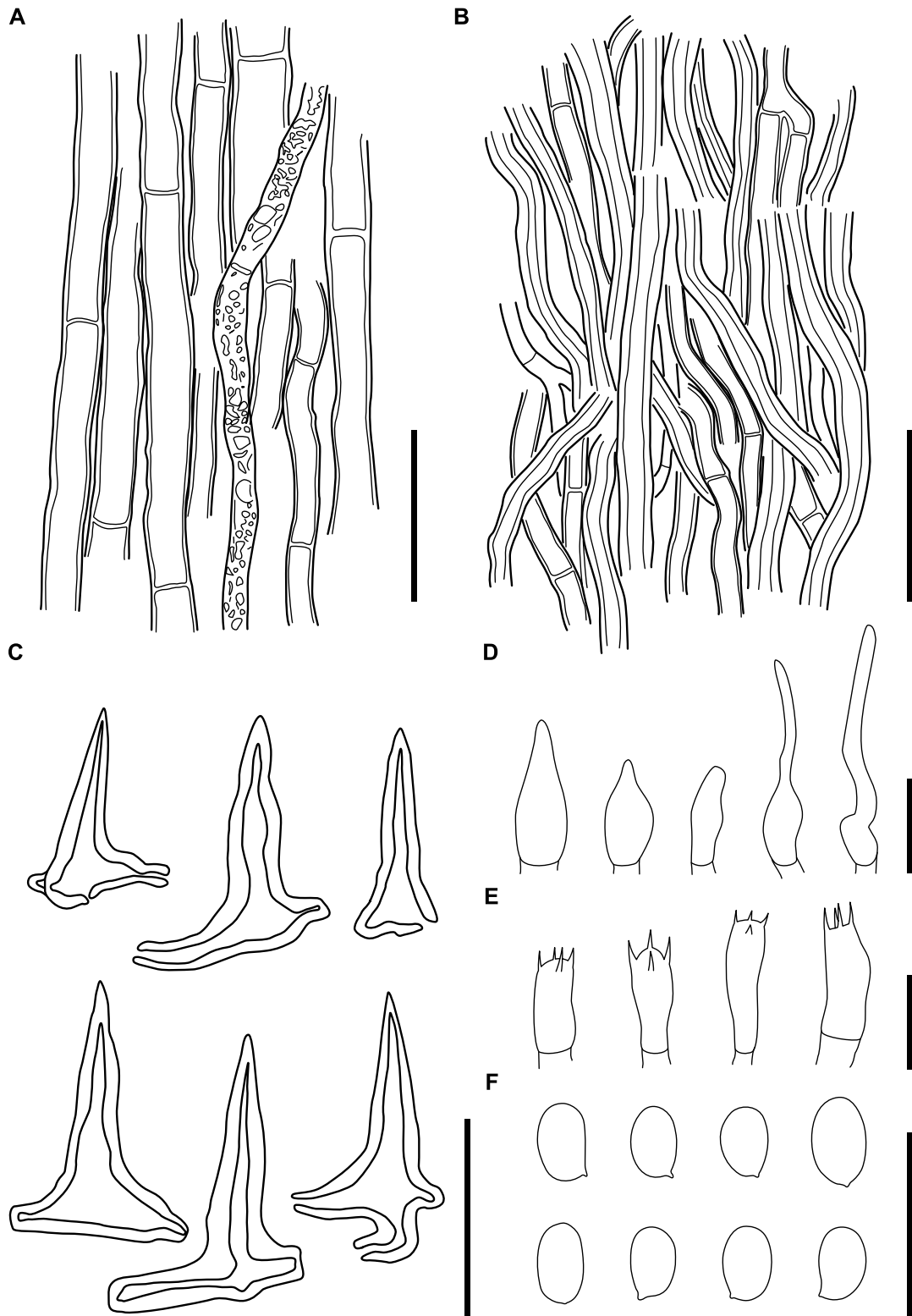


Figure 4. *Fuscoporia sarcites* comb. nov., illustration of microscopic features. A – context, composed by generative hyphae, some with a refracting content; B – trama of the tubes with dominating skeletal hyphae; C – hymenial setae; D – cystidioles; E – basidia; F – basidiospores. Scales: A–C = 20 µm; D–F = 10 µm. Illustrations: F. Bittencourt.

Mexico (Murrill 1915; Lowe 1957; Bandala-Muñoz et al. 1993; Herrera-Fonseca et al. 2002; Valenzuela et al. 2002) and Venezuela (this study).

Specimens examined. BRAZIL. Santa Catarina: Urubici, São Joaquim National Park, Santa Bárbara, Module 1 RAPELD, Plot PPBio TN3500, 28°09'18.1"S, 49°38'24.1"W, 1500 m, on fallen branch, 15 Mar. 2018, E.R. Drechsler-Santos 2189 (FLOR

67297); *ibid.*, on dead standing trunk, 27 Nov. 2018, F. Bittencourt 1193 (FLOR 67302); *ibid.*, on dead standing trunk, 21 Jun 2014, G. Alves-Silva 604 (FLOR 67298); *ibid.*, 27 Nov. 2017, E.R. Drechsler-Santos 2149 (FLOR 67299); *ibid.*, Santa Bárbara, Module 1 RAPELD, Plot PPBio TN3500, Cloud Forest, on fallen wood, L.A. Funez 7749 (FLOR 67300); *ibid.*, Santa Bárbara, Module 1 RAPELD, Plot PPBio TN3500, Cloud Forest, on fallen wood, 29 Aug. 2018, L.A. Funez 7750 (FLOR 67301);

ibid., nearby to Plot PPBio TS3500, Cloud Forest, 28°09'43"S, 49°38'14"W, on dead trunk, 28 Nov. 2018, F. Bittencourt 1217 (FLOR 67303); ibid., Santa Bárbara, Module 1 RAPELD, Plot PPBio TN3500, Cloud Forest, on *Myrceugenia* sp., 28 Nov. 2018, D.K. Souza-Guimarães 120 (FLOR 67304); ibid., Plot PPBio TS3500, Cloud Forest, 28°09'43"S, 49°38'14"W, on dead branch of a living tree (*Myrceugenia regnelliana*), 15 Mar. 2018, Drechsler-Santos, E.R. 2182 (FLOR 67948). GUATEMALA. San Pedro Mt., 2500 m, Nov. 2006, J. Kout 0611/K2 (JV). HONDURAS, Tegucigalpa, La Tigra National Park, 1800 m, Feb. 2005, H.J. Hardtke (Dammrich 8947, JV). MEXICO. Teperte Valley, near Cuernavaca, 28 Dec. 1909, W.A. & E.L. Murrill 555 (BAFC, isotype of *Corioloopsis sarcitiformis*). USA. U.S. Virgin Islands: St. John, ad truncos, A.S. Ørsted s.n. (NY 00730951, holotype of *Polyporus sarcites* [image]). VENEZUELA. Merida, Feb. 2004, J. Kout 0402/20 (JV).

Additional specimens examined. *Fuscoporia gilva*: BRAZIL. Santa Catarina: Urubici, São Joaquim National Park, Santa Bárbara, Module 1 RAPELD, Plot TN1500, on dead branch of a living *Baccharis* sp., 12 Oct. 2016, E.R. Drechsler-Santos 1833A (FLOR 67295); ibid., Plot TN3500, 28°09'18.1"S, 49°38'24.1"W, 1500 m, 14 Mar. 2018, E.R. Drechsler-Santos 2178 (FLOR 67296).

Notes. *Fuscoporia sarcites* can be identified in the field by the yellowish color of young basidiomata and the hispid to adpressed pileus surface, distinct from most Neotropical *Fuscoporia* species. Other important macroscopic features are the pileate, flexible pileus, fragile and brittle tube layer with 4–8(–9) pores/mm and lacerate dissepiment in older basidiomata, with the hymenophore becoming irpicoid. Micromorphologically, *F. sarcites* is distinguished from other *Fuscoporia* species by having a monomitic hyphal system in the context and dimitic in the trama.

The macro and micromorphological characters of *F. sarcites* resemble *F. callimorpha* (Lév.) Groposo, Log-Leite & Góes-Neto, *F. flavomarginata* (Murrill) Groposo, Log-Leite & Góes-Neto, *F. gilva*, *F. licnoides* (Mont.) Oliveira-Filho & Gibertoni, *F. marquesiana* Gibertoni & C.R.S. de Lira, *F. rhabarbarina* (Berk.) Groposo, Log-Leite & Góes-Neto and *F. semiarida* Lima-Júnior, C.R.S. de Lira & Gibertoni. These species share the pileate basidiomata, hymenial setae with straight apex, trama with dimitic hyphal system and ellipsoid basidiospores with similar size (Loguercio-Leite & Wright 1995; Groposo et al. 2007; Yuan et al. 2020). However, all of them have glabrous to velutinate or scrupose pileus surface and are described as having a dimitic hyphal system throughout all basidiomata.

Fuscoporia formosana is the only fully monomitic species in the genus, being known from Asia (Chang & Chou 1998; Tsujiyama 2011) and Brazil (Yuan et al. 2020). It was originally described as *Inonotus formosanus* T.T. Chang & W.N. Chou, being characterized by having pileate basidiomata with yellowish pore surface in young basidiomata, tomentose to hispid pileus surface, hymenial setae with straight apex and hyaline, ellipsoid and thin-walled basidiospores (Tsujiyama 2011). It differs from *F. sarcites* by having a darkening pore surface when bruised or touched, larger pores [3–5 vs. 4–8(–9) per mm], entire dissepiment, monomitic hyphal system

in the trama and smaller basidiospores [$3.5\text{--}4 \times 1.8\text{--}2.5$ vs. $(2.6\text{--})3.2\text{--}4.6(-5.4) \times (1.9\text{--})2.3\text{--}3(-3.3) \mu\text{m}$] (Chang & Chou 1998; Tsujiyama 2011).

Fuscoporia semihispida (Ryvarden) Y.C. Dai & F. Wu known from the Dominican Republic is similar to *F. sarcites*, but is mainly differentiated by its dimitic hyphal system and hooked hymenial setae (Ryvarden 2004). Currently, there are no molecular data of this species.

The name *F. sarcites* was previously mentioned by Wu et al. (2022). However, this reference lacks the requisite information, i.e., basionym citation, for a valid proposal of a new combination, as stipulated by Article 41 of the International Code of Nomenclature for algae, fungi, and plants (Turland et al. 2018).

***Fuscoporia dollingeri* J. Vlasák, sp. nov.** (Figs 5–6)
Mycobank MB 839691

Diagnosis: The species is characterized by its small and dark brown basidiomata with a densely strigose pileus cover found on the underside of thin branches. Microscopically, it has hymenial setae up to 65 μm long and cylindrical basidiospores measuring $(7\text{--})7.5\text{--}9(-11) \times 3\text{--}4 \mu\text{m}$.

Type: USA, Florida: North Port, Myakkahatchee Creek Environ. Park, on a pile of mixed hardwood debris, 30 Dec. 2015, Dollinger 623 (PRM – holotype!).

Description. Basidiomata annual, resupinate or semi-resupinate to pileate, nodulose, usually with several small, round pilei on the underside of substrata, occasionally fused laterally. Pileus semicircular, coriaceous to rigid, 7–30 mm long, 5–20 mm wide, up to 7 mm thick; pileus surface dark tobacco brown, densely covered with stiff, erect hairs or hydroid processes, 2–4 mm long, often forked at tips, context homogeneous, lacunose towards pileus surface, comprised of loosely arranged hymenial fascicles from which tubes or surface hairs arise, dark brown, 1–2 mm thick; tubes one-layered, fragile, dark brown, but with silvery hymenial layer inside the tube, 2–4 mm long, margin indistinct, membranaceous, appressed. Hymenophore poroid, brown to greyish brown; pores angular to hexagonal, in places elongated to slightly labyrinthine, 2–3 per mm; dissepiments thin, entire, or sometimes with hydroid processes developed on tube dissepiments. Hyphal system dimitic; generative hyphae simple septate; in the trama thin to slightly thick-walled, branched, hyaline to light yellow, 1.5–3.0 μm diam., encrusted by scattered to abundant crystal complexes, which are round in outline, 2–5 μm diam.; skeletal hyphae in trama and context yellowish brown, unbranched or rarely branched 2.5–4.7 μm diam. Hymenial setae rare to abundant, subulate, straight or sometimes slight bent to sickle-shaped or S-shaped, dark brown, the very apex fragile and sometimes broken, hyaline and bent, 35–65 \times 6.5–8 μm ; basidia and cystidioles not seen. Basidiospores cylindrical, $(7\text{--})7.5\text{--}9(-11) \times 3\text{--}4 \mu\text{m}$, $Q = 2.3\text{--}2.7$, $Q_m = 2.41$, with a very distinct apiculus, thin-walled, hyaline, IKI–.

Etymology. In honor of Neil Dollinger, a keen Florida naturalist, who collected this species.

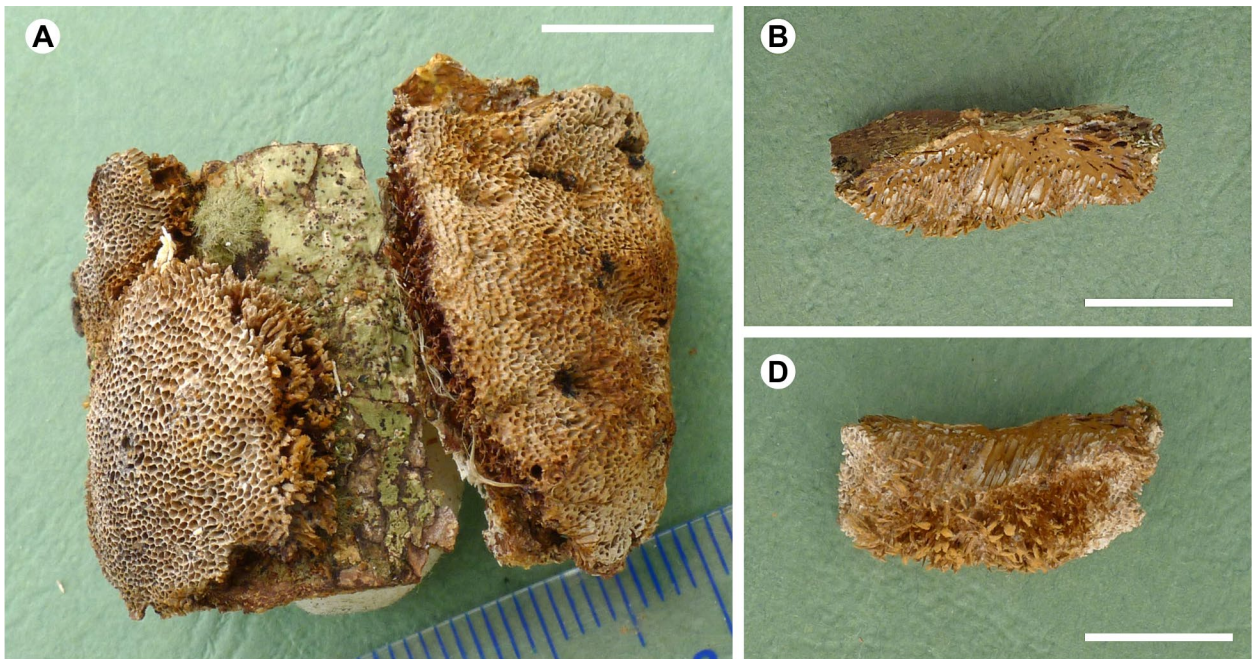


Figure 5. *Fuscoporia dollingeri* sp. nov., basidiomata, lab photo. A – holotype (Dollinger 623); B–C – detail of the lacunous context and strigose outgrowths on tube edges (Dollinger 671). Scales: A–C = 10 cm. Photos: J. Vlasák.

Habitat and distribution. On thin branches of undetermined angiosperm trees lying on the ground. Known only from the type locality in the USA, Florida, North Port, Myakkahatchee Creek Environmental Park, where it is however not rare.

Specimens examined. USA. Florida: Sarasota Co., North Port, Myakkahatchee Creek Environ. Park, hardwood twig, 4 Feb. 2016, Dollinger 652 (JV – paratype!); *ibid.*, 667 (BJFC – paratype!); *ibid.*, 670 (JV); *ibid.*, 671 (JV – paratype!).

Notes. *Fuscoporia dollingeri* develops small basidiomata on the underside of thin branches, very inconspicuous in

the field. They look unique in *Phellinus* s.l. and remind more of small *Hexagonia hydnoidea* (Sw.) M. Fidalgo or *Trichaptum perrottetii* (Lév.) Ryvar den, because of dark brown colors and densely strigose pileus cover. Crystals on generative hyphae with simple septa, hymenial setae, and cylindrical, hyaline basidiospores indicate that the species belongs to *Fuscoporia*. Other *Fuscoporia* species with large, cylindrical spores [*F. cinchonensis* (Murrill) Bondartseva & S. Herrera, *F. cylindrospora* (Ryvarden) Y.C. Dai & F. Wu and *F. lutea* (Ryvarden) Y.C. Dai & F. Wu] differ by their small pores and by the absence of strigose pileus cover [Ryvarden & Johansen 1980 as

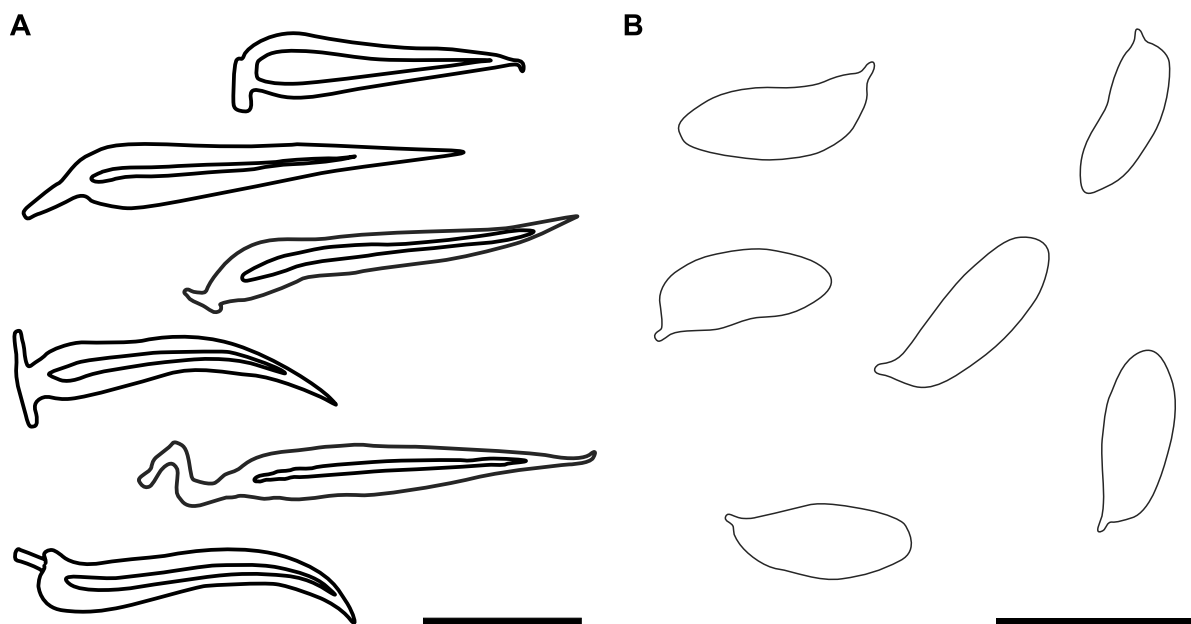


Figure 6. *Fuscoporia dollingeri* sp. nov., illustration of microscopic features. A – hymenial setae; B – basidiospores. Scales: A = 20 μ m; B = 10 μ m. Illustrations: J. Vlasák.

'*P. chinchonensis*' (Murrill) Ryvar den, Ryvar den 2004 as *P. cylindrosporus* Ryvar den and *P. luteus* Ryvar den]. Rather large setae of *F. dollingeri* can be seen under binocular stereoscope on tube walls and they are inconspicuous in young tubes, but distinct and abundant in older ones. Thin-walled hymenial elements were collapsed in all specimens collected and the basidiospores are very rare.

Discussion

Fuscoporia sarcites was a long-recognized neotropical species of *Phellinus*, despite being similar to other species of *Fuscoporia gilva* group. This study provides the first detailed phylogenetic discussion of this species and a proper description of its hyphal system. *Fuscoporia sarcites* was originally described as *Polyporus sarcites* based on a specimen collected on Saint John Island (U.S. Virgin Islands) (Fries 1851) and it was later combined in the genera *Fomes*, *Fulvifomes*, *Polystictus*, *Pyropolyporus* and *Scindalma*. We studied the type of *Corioloopsis sarcitiformis* Murril, a species described from Mexico (Murril 1912) and regarded as a synonym of *F. sarcites* (Larsen & Cobb-Pouille 1990). Its macro and micromorphological characteristics fit well with *F. sarcites*. This work presents the first published record of the species in Guatemala, Honduras, and Venezuela. It has frequently been reported in montane areas (Herrera Fonseca et al. 2002; Valenzuela et al. 2002; Raymundo & Valenzuela 2003; Raymundo et al. 2012; Vasco-Palacios & Franco-Molano 2013; Carranza et al. 2018; Alcántar et al. 2019, this work). There are also herbarium specimens from the United States, Florida (AN 034821) and Dominican Republic (NY 12974) that require revision.

The new species proposed here, *F. dollingeri*, presents a particular combination of features: small, annual basidiomata with large pores and hydroid processes on pileus and sometimes also on tube edges. Both morphological (crystals on simple-septate generative hyphae, hymenial setae, and ellipsoid, hyaline basidiospores) and phylogenetic evidence indicate that the species belongs to *Fuscoporia*.

As shown by the phylogenetic analyses, *F. sarcites* and *F. dollingeri* are grouped with *F. atlantica*, *F. formosana*, *F. gilva* and *F. setifera*, conforming to the '*Fuscoporia gilva* group' (Chen et al. 2020). This group is characterized by annual growth, effused-reflexed to pileate basidiomata, presence of hymenial setae and ellipsoid to cylindrical basidiospores. Remarkably, this group displays a broad macromorphological range, encompassing taxa with glabrous to hispid and conspicuously hairy pilei, and with regular to irpicoid hymenophore. Except for *F. setifera* from Asia, all species in this group are Neotropical. It is worth noting that morphologically distinct, but phylogenetically related, species have already been reported in *Fuscoporia* (Chen et al. 2020).

Although numerous *Hymenochaetaceae* species with intercontinental distributions are known (Ryvarden 2004), some recently described taxa are known to have a limited distribution range or to be restricted to specific hosts and vegetation types (e.g., Raymundo et al. 2013; Pires et al. 2015). Despite *F. sarcites* being widespread in the

Neotropics and can be found growing in multiple host species, most records have been made from high-elevation forests (Valenzuela et al. 2002; Mueller et al. 2006; Raymundo et al. 2012; Carranza et al. 2018), such as Cloud Forests, suggesting a habitat preference that must be investigated further. Until now, *F. dollingeri* has only been found growing on fallen branches from unknown angiosperm species in lowland tropical forests in Florida.

Our phylogenetic analysis also shows that the specimen JV1612/28-D of *F. atlantica* collected in Guadeloupe is closely related to sequences originating from South-Eastern Brazil, the type locality of the species (Pires et al. 2015), confirming its identification. Consequently, this is the first record of this species outside of the Atlantic Rainforest Domain in Brazil, greatly extending its distribution and suggesting a potentially widespread distribution across the Neotropical Forests.

Since the phylogenetic studies of Wagner & Fischer (2001, 2002), *Fuscoporia* has become a widely accepted genus, but its relationship with closely related genera with monomitic hyphal system, namely *Coniferiporia*, *Fulvoderma* and *Phellinidium*, is still uncertain (Zhou et al. 2018, Wu et al. 2022). Although Wagner & Fischer (2002) treat *Fuscoporia* as having monomitic or dimitic species, a monodimitic hyphal system as the one found in *F. sarcites* has never been reported previously. The presence of multiple hyphal types in the same basidioma (monodimitic or intermediary hyphal system) have been observed in other genera of *Hymenochaetaceae* (Corner 1991; Wagner & Fischer 2001; Hattori et al. 2014; Zhou et al. 2015; Drechsler-Santos et al. 2016; Chen et al. 2017; Salvador-Montoya et al. 2018). The hyphal structure in numerous *Hymenochaetaceae* genera is more complex than previously thought. This may be the case in most of them, and thus we reinforce the importance of the detailed observation of the hyphal system in all the distinct parts of the basidiomata.

Identification key to neotropical *Fuscoporia* species

- | | | |
|------|---------------------------------------------------------------------------------------------|---------------------|
| 1 | Tramal setae present. | 2 |
| | Tramal setae absent | 6 |
| 2(1) | Pores 1–3 per mm | |
| | <i>F. contigua</i> complex (Chen et al. 2019) | |
| | Pores <3 per mm | 3 |
| 3(2) | Basidiospores globose to subglobose, up to 4.5 µm long | 4 |
| | Basidiospores ellipsoid to cylindrical, 4 µm or longer | 5 |
| 4(3) | Pores 7–9 per mm; hymenial setae 24–36 µm long | |
| | <i>F. nicaraguensis</i> | |
| | Pores 4–5 per mm; hymenial setae 48–52 µm long | |
| | <i>F. xerophila</i> | |
| 5(3) | Hymenophore regular, basidiospores 7–8 × 1.6–2 µm | |
| | <i>F. contiguiformis</i> | |
| | Hymenophore labyrinthiform with some sinuous pores; basidiospores 4–5 × 2–2.5 µm | <i>F. palmicola</i> |
| 6(1) | Hymenial setae with hooked apex and/or with small projections, spines or branches | 7 |

- Hymenial setae with straight and simple apex, rarely bent or branched 10
- 7(6) Hymenial setae frequently branched or with projections and spines, never hooked *F. bifurcata*
Hymenial setae with hooked apex, rarely with small projections, spines or branches 8
- 8(7) Basidiospores cylindrical, >7 µm long
..... *F. dollingeri* sp. nov.
Basidiospores subglobose to ellipsoid, up to 5 µm long 9
- 9(8) Pileus flexible to leathery, glabrous to tomentose, developing a crust in the pileus surface *F. atlantica*
Pileus hard, glabrous, never developing a crust
..... *F. wahlbergii* group (incl. *F. marquesiana*)
- 10(6) Basidiomata resupinate or with small reflexed portions 11
Basidiomata effused-reflexed to pileate 13
- 11(10) Basidiospores subglobose to ellipsoid, >4 µm long ...
..... *F. chrysea*
Basidiospores narrowly ellipsoid to cylindrical, 4–8 µm long 12
- 12(11) Tube layer distinctly stratified; basidiospores 5–8 µm long *F. ferrea*
Tube layer indistinctly stratified; basidiospores 4–6 µm long *F. punctatiformis*
- 13(10) Pileus with upper surface tomentose, velutinous to hispid 14
Pileus surface completely glabrous 18
- 14(13) Pileus surface hirsute, composed of thick “hairs”; lacerated dissepiment at maturity; context monomitic 15
Pileus surface velutinate; dissepiment entire; context dimitic 16
- 15(14) Hymenophore darkening when bruised; hyphal system monomitic throughout the basidiomata .. *F. formosana*
Hymenophore not darkening when bruised; hyphal system monomitic in the context, dimitic in the trama
..... *F. sarcites*
- 16(14) Basidiospores cylindrical to allantoid *F. viticola*
Basidiospores ellipsoid 17
- 17(16) Basidiomata triquetrous to unguulate; hymenial setae ventricose, <16 µm wide *F. mesophila*
Basidiomata applanate; hymenial setae subulate to ventricose, rarely >10 µm *F. senex*
- 18(13) Crust or cuticle present in the pileus surface
..... *F. flavomarginata*
Crust or cuticle absent in the pileus surface 19
- 19(18) Tubes distinctly stratified; context yellow
..... *F. rhabarbarina*
Tubes indistinctly stratified or annual; context brown 20
- 20(19) Hymenial setae subulate to ventricose; basidiospores 3.6–4.8 × 2–3 µm *F. callimorpha*
Hymenial setae ventricose to subulate; basidiospores 4–5 × 2.5–3 µm *F. gilva* group
(incl. *F. licnoides* and *F. semiarida*)

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