

**Root symbiotic fungi :  
key players in the forest ecosystems  
of the Big Thicket.**



**Final report for BITH-2014-SCI-0011**

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## Acknowledgements

We wish to acknowledge the generous assistance of a number of people who have made the work for this project possible. David Lewis was very generous with his time and expertise to guide our investigation of the mushrooms within the Preserve and to help us with collecting and description of samples. David and his wife, Patricia, are also deeply thanked for their hospitality and generosity during our stay. We extend our thanks also to Jay Justice, citizen mycologist from Arkansas, who accompanied us during part of our field trip and helped with description and collecting. The staff of the Big Thicket Association, in particular Mona Halvorson, are thanked for their continued support of our work and the excellent logistics and accommodation offered at the Field Research Station in Saratoga. The funding from the Big Thicket Association made this project possible considering the significant costs of traveling between Europe and the visited BTNP sites in Texas.

**Cover photo:** collecting fungi in the Beaumont unit

## 1. Introduction

Mycorrhizas, a symbiosis between fungi and plant roots, provide the physiological link between the majority of terrestrial plant species and their soil nutrients (Mosse 1973). One particular group of these root symbionts, the ectomycorrhizal (EcM) fungi, are essential for the good health and survival of the dominant trees that compose the various forest ecosystems in the Big Thicket National Preserve. Pines, oaks, beeches, etc... are associated with a very diverse assemblage of sometimes highly specific symbiotic fungi that allow these trees to manage stress, to survive drought and to thrive under sometimes very poor soil conditions. DNA barcoding and sequencing has enabled substantial progress to be made in fungal systematics, evolution, and ecology (Horton and Bruns 2001, Peay et al. 2008). Nonetheless, the pace of molecular data acquisition in fungal research has far exceeded our abilities to keep up with biodiversity inventories and formal descriptions of sporocarps (Hibbett et al. 2009). Unless major efforts are put forth to combine fungal taxonomy with molecular data, progress in understanding the scope and significance of this extraordinary fungal diversity will be limited. In the southern United States, nearly all of the taxonomic studies on these fungi date back to the first half of the 20<sup>th</sup> century and their identification suffers from a severe taxonomic impediment as there are very few local taxonomic experts available for many of the dominant groups of these ectomycorrhizal fungi (Buyck 2012).

This project will focus on some of the dominant groups of these EcM fungal symbionts: i.e. Russulales and Cantharellales. Species of both families have been interpreted to represent late-stage fungi, as opposed to early stage fungi (Dighton et al. 1986). Late stage fungi are believed to be very effective competitors adopting more stress-tolerant or better combative strategies that allow them to dominate the host root systems once established on a large tree, and are therefore typical for climax ecosystems. The PI is the world authority on the taxonomy of these groups and, through regular field work during the past 15 years, has accumulated a substantial experience with the North American taxa, in particular in the southern states, including the Big Thicket (Buyck et al. 2010, 2011, 2014; Buyck & Hofstetter 2011). In accordance with the recommendations of the first FESIN North American Mycoflora Workshop held in New Haven, CT, in July 2012, and in which the PI participated as an invited expert, the objectives of this project are to document the diversity of these root symbionts in the various ecosystems of the Big Thicket National Preserve in collaboration with local experts.

## 2. Methods

### 2.1 Field collecting

**field mission: collecting trip in the Big Thicket between 19 June 2014 and 19 July 2014.**

Our working base included the Field Research Station in Saratoga where we could benefit from excellent laboratory facilities for part of the lab work, for the remainder of our visit we were hosted by David Lewis and family.

#### *a. Mushrooms*

Collecting was done together with local citizen scientists (D. Lewis, J. Justice) in view of building local taxonomic expertise and capacity in these fungal groups. Different sites in the different types of forest communities in the Big Thicket (Watson 2006) were selected to be explored depending on fruiting conditions of the fungi. GPS coordinates allow to precisely locate collecting sites for all collections. Fresh specimens were photographed in the field, then packed in aluminum foil to prevent from mutual contamination and drying out (fig. 2).



Figs. 1-5: 1. Collecting *Cantharellus* in bottomland hardwoods. 2. Collections in aluminum foil ready for photographing in the field. 3. Taking notes on morphology of collections at Lewis' home. 4. Sampling tissues from fresh fruiting bodies at the Saratoga field station. 5. Cleaning ectomycorrhizal root tips from soil samples.

Upon return of a field trip, collections were numbered, photographed again for description purposes (see figs 10-17) and the various features of the fresh fungal fruit bodies were documented in detail (fig. 3). Before drying specimens for future conservation, fruit body tissue of collected specimens was sampled for future molecular purposes (barcoding & phylogeny) using 500µl CTAB buffer in 1.5 ml eppendorf tubes.

*b. Ectomycorrhiza*

The soil underneath collected specimens was explored for tree roots showing ectomycorrhizal structures, which are the symbiotic organs shared between the collected fungi and the surrounding trees, selected soil-root samples were packed in aluminum foil for detailed inspection and sampling.

Upon return of the field trip these samples were unpacked and inspected in detail under a binocular scope for presence of ectomycorrhizal fine roots, which were then carefully cleaned with water and photographed (figs. 6-8)

Small parts of these root samples were then transferred into 1.5 ml eppendorf tubes containing 500µl CTAB buffer for later molecular identification, while the remaining parts of the sample were dried for later microscopic investigation.



Figs. 6-8: examples of cleaned ectomycorrhizae from Russulaceae species in the Big Thicket.

## 2.2 Identification

Identification of the collected mushrooms was performed in three steps: preliminary identification in the field, observation of microscopic features and molecular analysis.

Upon return from the field trip, collections were provisionally sorted by systematic position (subsectional level) or even given provisional species names when possible. Upon return from the field mission in Texas, features of spores and cap cuticle of collected specimens were then examined under the microscope for morphological identification using existing literature and identification keys. In this context, it is important to note that the PI and Dr. S. Adamcik (Botanical Museum Bratislava, Slovakia) are undertaking a detailed morphological revision of all existing type specimens of American *Russulas*

Finally, DNA was extracted from tissues conserved in CTAB buffer for all specimens for molecular identification using BLAST against GenBank or Unite sequence databases. This part of our research will be funded on external budget.

### 3. Results and Discussion

#### 3.1 Sites Collected

In order to cover the highest possible fungal species diversity for the Big Thicket National Preserve, collecting was performed in the different main vegetation types, including beech Magnolia loblolly pine woods, pine oak woods, lower slope pine hardwood forest, pine uplands, long leaf pine woods, hardwood bottomlands, Bay galls and Cypress-tupelo swamps. Over the course of the three week field work, we explored sites within Beaumont Unit, Beech Creek Unit, Big Sandy Creek Unit, Jack Gore Baygall Unit, Lance Rosier Unit, and the Turkey Creek Unit (fig. 9).

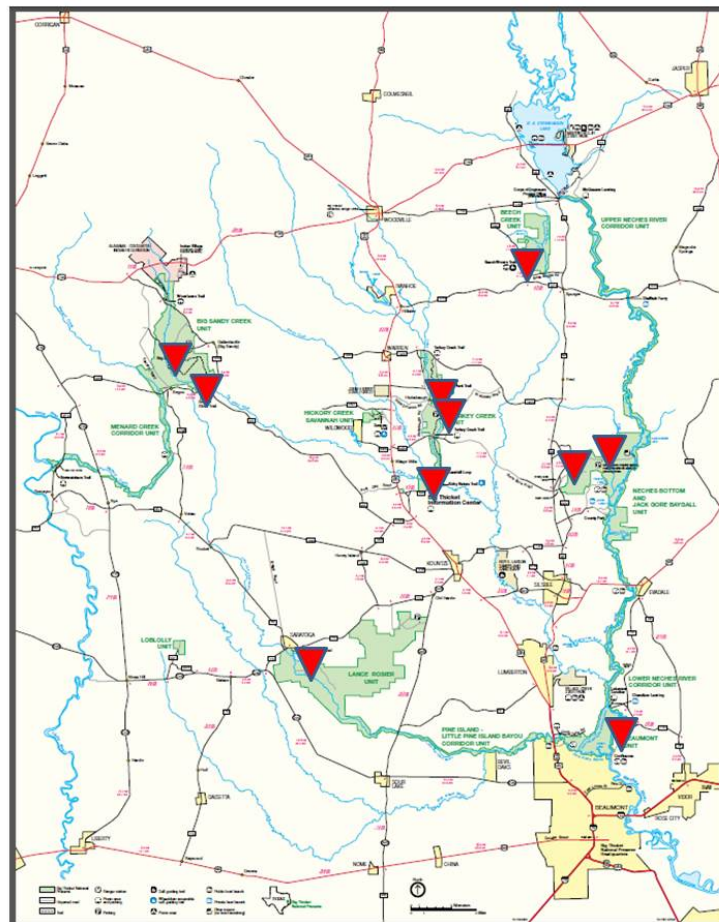


Fig. 9. map of the visited sites in the various units of the Big Thicket.

### 3.2 Specimen data list and long-term conservation

Fresh mushrooms belonging to families Russulaceae and Cantharellaceae have been collected and dried. During our three week inventory, we have collected a total of 181 mushroom collections in Texas: 153 samples were collected within the Big Thicket Natural Preserve's boundaries; the others were collected in similar habitats in the vicinity of the BITH units. All fresh samples have been dried for storage and are presently conserved at the mycology herbarium of the National Natural History Museum in Paris (official abbreviation: PC) as defined in the Appendix A of our application for the research and collecting permit (BITH-2014-SCI-0011). The excel file (in requested format) citing the complete list with details of the collected specimens, with indication of their official PC number, has been transmitted to Mona Halverson in the course of January 2015 and is again attached here as Appendix 3.

### 3.3 Identification and outreach

Since our return from the Big Thicket, we have used the tissue samples that had been taken in physiological buffer to extract, amplify and sequence several parts of the DNA for every collected specimen in view of obtaining precise identifications for the gathered species as well as for their future placement in a phylogenetic framework. Five gene regions were obtained: the official barcode region for fungi (ITS) as well as one additional variable marker for species characterization (*tef-1*), and also three more conserved genes (LSU, *mitSSU* and *RPB2*) for phylogenetic purposes. All obtained sequences will be deposited in public sequence databases (GenBank) upon publication of our results.

This molecular work was possible through additional funding obtained by the PI through some smaller grants from the Paris' Museum. As the result of the molecular work, we can now be affirmative about the correct identification of all samples (see appendix 3).

In addition, the molecular work confirmed the discovery of at least (!) five new species to science: two *Cantharellus*, one *Hydnum* and two *Russula*. Microscopic analyses of the new species are presently being carried out by the PI in view of rapid publication of our results (see for an example Appendix 1-2).

One species was already published in *Fungal Diversity* (Impact Factor 6.9) reporting the new *Russula cortinarioides* Buyck, Adamčík, Lewis & V. Hofstetter sp. nov. (appendix 1).

A preliminary manuscript is being prepared for the publication of *Cantharellus pseudolateritius* Buyck, Lewis & V. Hofstetter sp.nov. (appendix 2)

## 4. Literature Cited

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- Buyck B, Cruaud C, Couloux A, Hofstetter V (2011) *Cantharellus texensis* sp. nov. from Texas, a southern lookalike of *C. cinnabarinus* revealed by *tef-1* sequence data. *Mycologia* 103:1037–1046.



Figs. 10-17: Comparison between photographs taken in the field (left) and those taken for description purposes (right) for four different specimens of *Cantharellus* collected during our field work in the BTNP. From top to bottom, line 1: *Cantharellus lewisii*; line 2: *Cantharellus texensis*; line 3: *Cantharellus lateritius*; line 4, *Cantharellus tenuithrix*.



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## 5. Appendices

- 5.1 Partial pdf for the publication describing *Russula cortinarioides* Buyck, Lewis & V.Hofstetter sp. nov. (in Liu et al., *Fungal diversity notes* 1-110: taxonomic and phylogenetic contributions to fungal species. *Fungal Diversity* 72(1): 1-197. 2015.
- 5.2 Preliminary draft being prepared for the publication of *Cantharellus pseudolateritius* Buyck, Lewis & V. Hofstetter sp.nov., a look-alike of *C. lateritius*.
- 5.3 List of all specimens with correct identification

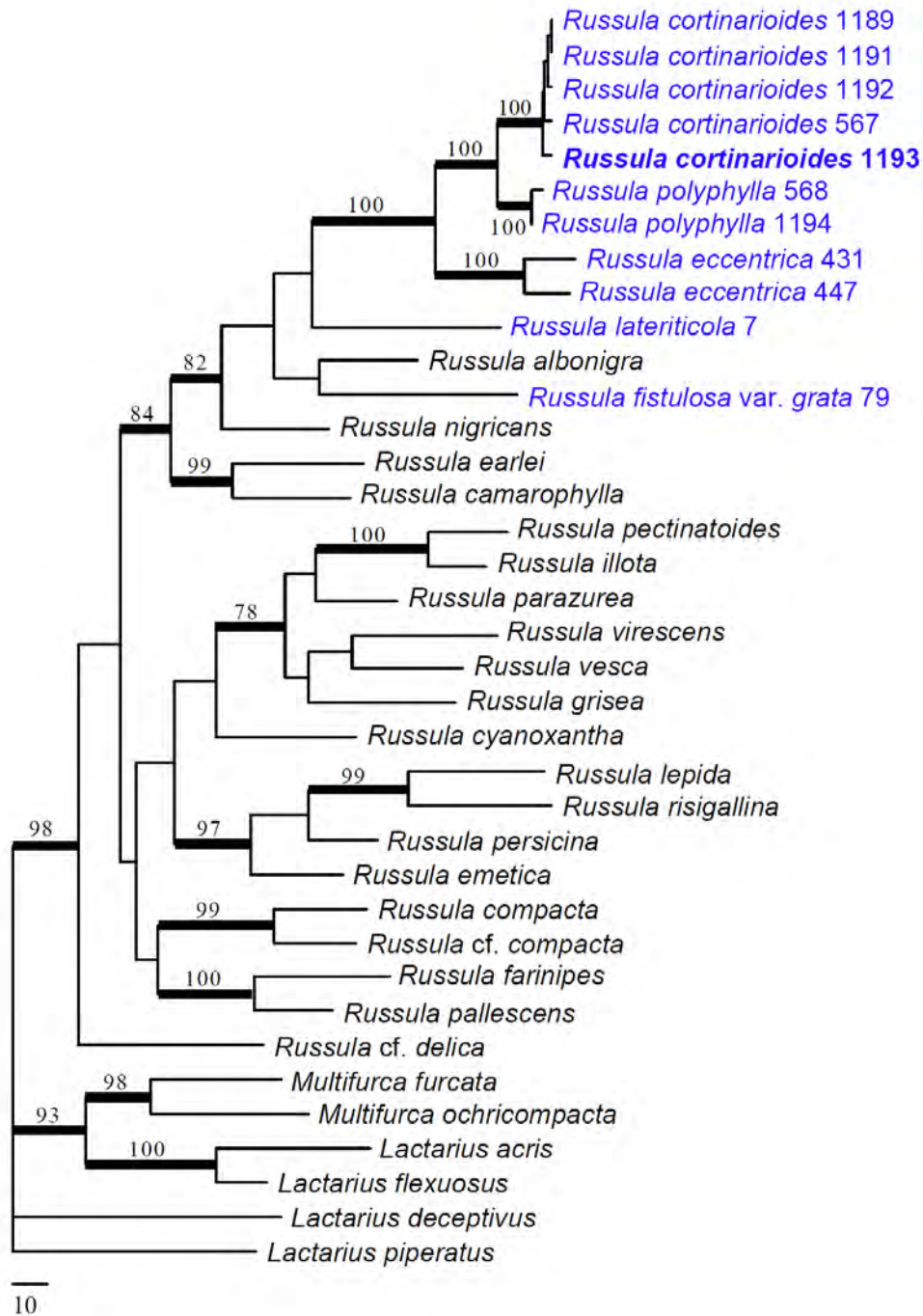
3  
4 **Fungal Diversity Notes 1–115: Taxonomic and phylogenetic contributions to fungal**  
5 **species**

6  
7 **Kevin D. Hyde • Jian Kui Liu • E. B. Gareth Jones • Hiran A. Ariyawansa • Darbhe J.**  
8 **Bhat • Saranyaphat Boonmee • Sajeewa Maharachchikumbura • Eric H. C. McKenzie**  
9 **• Rungtiwa Phookamsak • Chayanard Phukhamsakda • Belle Damodara Shenoy •**  
10 **Mohamed A. Abdel-Wahab • Bart Buyck • Jie Chen • K. W. Thilini Chethana •**  
11 **Chonticha Singtripop • Dong Qin Dai • Yu Cheng Dai • Dinushani A. Daranagama •**  
12 **Asha J. Dissanayake • Mingkhuon Doliom • Melvina J. D’souza • Xin Lei Fan • Ishani**  
13 **D. Goonasekara • Kazuyuki Hirayama • Sinang Hongsan • Subashini C. Jayasiri •**  
14 **Ruvishika S. Jayawardena • Samantha C. Karunarathna • Wen Jing Li • Ausana**  
15 **Mapook • Chada Norphanphoun • Ka Lai Pang • Rekhani H. Perera • Derek Peršoh**  
16 **• Umpava Pinruan • Indunil C. Senanayake • Sayanh Somrithipol • Satinee Suetrong**  
17 **• Kazuaki Tanaka • Kasun M. Thambugala • Qing Tian • Saowaluck Tibpromma •**  
18 **Danuska Udayanga • Nalin N. Wijayawardene • Dhanuska Wanasinghe • Komsit**  
19 **Wisitrassameewong • Faten A. Abdel-Aziz • Slavomir Adamčík • Ali H. Bahkali •**  
20 **Nattawut Boonyuen • Timur Bulgakov • Philipp Callac • Putarak Chomnunti •**  
21 **Katrin Greiner • Akira Hashimoto • Valerie Hofstetter • Ji Chuan Kang • D avid**  
22 **Lewis • Xing Hong Li • XingsXong Liu • Zou Yi Liu • Misato Matumura • Peter E.**  
23 **Mortimer • Gerhard Rambold • Emile Randrianjohany • Genki Sato • Veera Sri-**  
24 **Indrasutdhi • Cheng Ming Tian • Annemieke Verbeke • Wolfgang von Brackel •**  
25 **Yong Wang • Ting Chi Wen • Jian Chu Xu • Ji Ye Yan • Rui Lin Zhao • Erio**  
26 **Camporesi**

27  
28 K. D. Hyde, J. K. Liu, H. A. Ariyawansa, K. W. T. Chethana, C. Singtripop, D. Q. Dai, D. A.  
29 Daranagama, A. J. Dissanayake, M. Doliom, M. J. D’souza, S. Hongsan, R. S.  
30 Jayawardena, S. C. Karunarathna, W. J. Li, S. Maharachchikumbura, A. Mapook, R. H.  
31 Perera, R. Phookamsak, C. Phukhamsakda, Q. Tian, I. C. Senanayake, D. Udayanga, N. N.  
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37 K. D. Hyde, J. K. Liu, H. A. Ariyawansa, S. Boonmee, J. Chen, K. W. T. Chethana, C.  
38 Singtripop, D. Q. Dai, D. A. Daranagama, A. J. Dissanayake, M. Doliom, M. J. D’souza, X.  
39 L. Fan, I. D. Goonasekara, S. Hongsan, S. C. Jayasiri, R. S. Jayawardena, S. C.  
40 Karunarathna, W. J. Li, S. Maharachchikumbura, A. Mapook, C. Norphanphoun, R. H.  
41 Perera, R. Phookamsak, C. Phukhamsakda, Q. Tian, S. Tibpromma, I. C. Senanayake, D.  
42 Udayanga, N. N. Wijayawardene, , D. Wanasinghe, K. M. Thambugala, P. Chomnunti  
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5872 **Fig. 163** Phylogram generated from Maximum Parsimony analysis based on combined sequence data of  
5873 *RPB2*, LSU, ITS for 31 *Russula* and six outgroup sequences (2 *Multifurca* spp., 2 *Lactarius* spp. and 2  
5874 *Lactifluus* spp.). Sequences used in this study have been sampled from a previous study (Buyck *et al*, 2008) or  
5875 newly generated for *R. cortinarioides*, *R. polyphylla*, *R. eccentrica*, *R. lateriticola* and *R. fistulosa* var. *grata*  
5876 [see GenBank accession numbers KP033498–KP033508 (*RPB2*), KP033487–KP033497 (nucLSU), KP033476–  
5877 KP033486 (ITS)]. Branches indicated in bold received significant ( $\geq 70\%$ ) bootstrap support.

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5879

5880 **115. *Russula cortinarioides*** Buyck, Adamčík, Lewis & V. Hofstetter, *sp. nov.*  
5881 *Mycobank* MB 810670; *Facesoffungi* number: FoF 00557; Figs. 164, 165, 166  
5882 *Etymology*: referring to the gradually developing reddish brown colour of the gills,  
5883 giving this species almost a *Cortinarius*-like aspect.  
5884 *Holotypus*: PC 0142175.  
5885 *Basidiocarps* growing individually or in small groups. *Cap* 36–50(65) mm diam.,  
5886 regular, smooth, hardly peeling, glabrous, slightly depressed and not discolouring in the  
5887 centre, unevenly tinged in colours that vary from grayish brown, yellowish brown to reddish  
5888 brown, sometimes also predominantly dirty cream to whitish, particularly closer to the cap  
5889 margin, greasy-viscose when wet, shiny even when dry, separable up to mid-radius, not  
5890 striate at margin. *Gills* adnate to subdecurrent, brittle, unequal and irregularly alternating with  
5891 lamellulae of one, two to sometimes three lengths, not widely spaced (8–15 l+L/cm at cap  
5892 margin), 3–5 mm high, sometimes forked or anastomosing particularly close to the cap  
5893 margin, whitish when very young, then rapidly cream to pale yellowish brown and finally  
5894 turning vinaceous to deep brownish red when old; edges concolourous, even. *Stipe* central,  
5895 shorter or more rarely longer than cap diam., 31–33(55) × 7–11 mm, cylindrical, with the  
5896 base often irregularly deformed-wrinkled and sometimes narrowing (as in *R. adusta*), surface  
5897 smooth, and although not pruinose, often more or less silvery-glistening and whitish, rapidly  
5898 dirty grayish when handled or rubbed gently as the initial whitish covering disappears and  
5899 revealing a distinct longitudinal striation, relatively firm, spongy inside under a hard outer  
5900 cortex which is grayish brown in section, not really chambered but irregularly hollowing in  
5901 the central medulla. *Context* firm and fleshy in the cap center, only 2 mm thick at cap mid  
5902 radius, whitish, turning brown with age, weakly reddening to becoming vinaceous when cut.  
5903 *Smell* distinct and nauseous, somewhat alkaline (as in *R. pseudolateriticola*). *Taste* unpleasant  
5904 and faintly astringent. *Spore print* white.  
5905 *Macrochemical reactions*: stipe surface reacting strongly with guaiac, insensitive to  
5906 FeSO<sub>4</sub>.  
5907 *Spores* ellipsoid, (7.5–)7.8–8.1–8.4(–8.7) × (5.6–)5.8–6.1–6.4(–6.6) μm, Q = (1.25–  
5908 )1.28–1.32–1.36(–1.4), with subreticulate to reticulate ornamentation of low, distinctly  
5909 amyloid, obtuse warts [6–8 warts in a 3 μm diam. circle on the spore surface], 0.2–0.3 μm  
5910 high, connected by fine line connections [2–5 lines in the circle] or fused in pairs or short  
5911 chains [(1–)2–4 fusions in the circle], with a smooth, relatively large, nonamyloid suprahilar  
5912 spot. *Basidia* (39–)46–50–57 × 8–9–10 μm, 4-spored, narrowly clavate to subcylindrical;  
5913 basidiola first cylindrical, then narrowly clavate. *Subhymenium* composed of densely septate,  
5914 narrow cells. *Lamellar trama* with large sphaerocytes only present near the cap trama.  
5915 *Hymenial cystidia* on gill sides abundant, [3000–4000 per mm<sup>2</sup>], (62–)67–80–93(–115) × 7–  
5916 8–9 μm, also numerous but much shorter near the gill edge, measuring (26–)40–47–56 × 6–  
5917 8(–10) μm, thin-walled, subulate, narrowly lageniform to subcylindrical, rarely clavate or  
5918 lanceolate, sometimes mucronate with a short, 1–3(–5) μm long appendage, the interior partly  
5919 filled with granular or slightly crystalline contents, turning reddish grey in sulfovanilin.  
5920 *Marginal cells* not differentiated. *Pileipellis* 110–140 μm deep, gelatinized, orthochromatic in  
5921 Cresyl blue, ill-delimited from the underlying context. Incrustations absent. Hyphal  
5922 extremities ascending, long and slender, becoming gradually denser downwards, uniformly  
5923 cylindrical, sparsely branching, with obtuse terminal cells measuring (19–)30–41–60(–85) ×  
5924 (3–)4–5(–6) μm near cap margin, but narrower, 2.5–3.5–4(–4.5) μm diam. in the cap center.  
5925 Pileocystidia numerous, usually very long (frequently > 100 μm) and originating deep in  
5926 subpellis or cap trama where they continue as abundant cystidioid hyphae, one-celled,  
5927 subcylindrical, apically attenuated and slightly mucronate, without or with one or two  
5928 appendages (2–8 μm long), often shorter, obtuse-rounded and more clavate in cap center,

5929 thin-walled, (3.5–)4.5–5–6  $\mu\text{m}$  diam., filled with granular to yellowish-oily contents that do  
5930 not react in sulfovanilin. *Clamp connections* absent in all parts.

5931 *Specimens examined*: UNITED STATES, Texas, Newton Co., Canyon Rim, near  
5932 Mayflower, along State Highway 87, in Beech-Magnolia-Loblolly Pine woods, 28 July 2007,  
5933 Buyck 07.133 (PC 0142175, **holotypus**); *Ibid.*, 5 July 2002, Buyck 02.115 (PC0142176),  
5934 02.116bis (PC0142183), 29 Jul 2005, Buyck 05.084 (PC0124614), 28 July 2007, Buyck  
5935 07.131 (PC0142177 paratypus); Bleakwood, on Core's residence, in open Oak-Pine  
5936 vegetation, N 30° 42.068', W 93° 49.770', Lewis 9185 (PC0142182). Montgomery Co.,  
5937 Conroe, in Oak-Pine woods, 27 July 2007, Buyck 07.103 (PC0124672), 07.104 (PC 0142178  
5938 paratypus), 07.105 (PC 0142179), 07.111 (PC 0142180 paratypus); Hardin Co., near  
5939 Saratoga, Lance Rosier Unit, Big Thicket National Preserve, along Teel Cemetery road near  
5940 cypress swamp among *Cantharellus texensis* in Oak-Loblolly Pine woods, N 30° 15.901', W  
5941 94° 30.759', ca 50 m alt., 16 June 2013, DP Lewis 10797 (PC 0142181), *ibidem*, 23 June  
5942 2014, Buyck, Hofstetter & Lewis leg., Buyck 14.024–14.027 (PC 0142213– PC 014226);  
5943 Turkey Creek unit, Big Thicket National Preserve, along Kirby nature trail, N 30.47181-W  
5944 94.34888, 2 July 2014, Buyck 14.118 (PC 0142307)

5945 *Notes*: The combined phylogenetic analysis of ITS, LSU & RPB2 sequences (Fig.  
5946 163) shows that the new species, *Russula cortinarioides*, is the most closely related to *R.*  
5947 *polyphylla* Peck the type species of subsect. *Polyphyllinae* Singer 1951 *nom. inval.* (Art.  
5948 39.1). This subsection was originally defined by the presence of numerous “gloeo-vessels or  
5949 macrocystidioid oleiferous hyphae” in the upper layer of the cap cuticle, to distinguish them  
5950 from other members of sect. *Rigidae* Fr. (= subgenus *Heterophyllidia* Romagn.). Singer  
5951 (from 1951 onwards) recognized four species in this subsection: *R. polyphylla* (Peck 1898),  
5952 *R. magnifica* (Peck 1903), *R. polycystis* (Singer 1939) and *R. viridella* (Peck 1906).

5953 Even before introducing this new subsection, Singer (1943) had already suggested the  
5954 co-identity of the former two species, a synonymy he maintained up to the last edition of his  
5955 Agaricales (Singer 1986), and in which he was followed by most mycologists. It is therefore  
5956 difficult to understand why Singer placed *Polyphyllinae* in sect. *Rigidae* near subsect.  
5957 *Virescentinae* (Schaeff.) Fr. because *R. magnifica* was described (Peck 1903) as a whitish  
5958 species having unequal gills, with suggested affinities to a completely different group:  
5959 subsect. *Lactarioideae* in subgen. *Compacta* Fr. (see Buyck & Adamčík 2013). Even Singer  
5960 (as early as 1926) agreed with such a systematic placement for *R. magnifica* until he changed  
5961 opinion in 1951 without any clear argumentation.

5962 The two other species, *R. polycystis* and *R. viridella*, have been placed in  
5963 *Virescentinae*, until Singer (1951) transferred them to *Polyphyllinae*. *R. polycystis* was  
5964 originally described as a new species of *Virescentinae* (Singer 1939) and this position has  
5965 been maintained, although with some hesitation, when Bills (1984) reported on recollecting it  
5966 for the first time since its original description. *R. viridella* has also been associated with  
5967 *Virescentinae* (Singer 1932 and thereafter) notwithstanding its acrid taste. It is more than  
5968 likely that both these species are unrelated to either of these subsections.

5969 It was Buyck (in Buyck et al. 2005) who, for the first time, pointed out the strong  
5970 microscopical similarities between *R. polyphylla* and *R. eccentrica* Peck, a relationship that is  
5971 fully supported (BS=100%) by our phylogenetic analysis (Fig. 163). The molecular data  
5972 indicate that *Polyphyllinae* are neither related to *Virescentinae*, nor to *Lactarioideae*, but are  
5973 closely related to subsect. *Nigricantes* Fr., a species group typically characterized by their,  
5974 often first reddening, then blackening context. The closest, native American taxon to our new  
5975 species seems to be *R. densifolia* var. *paxilloides* Peck, which differs from our species by the  
5976 differentiation of marginal cells and in the less reticulate and less dense, slightly higher spore  
5977 ornamentation (see Buyck & Adamčík 2014).

5978 *Polyphyllinae* differ from *Nigricantes* by the fact that their context is only reddening  
5979 but never blackening, a feature most easily observed on the ageing hymenophore which turns  
5980 pinkish to reddish brown at maturity. As morphd in our diagnosis, *R. cortinarioides* is most  
5981 similar to *R. eccentrica* in the field but has denser gills, a feature that is even much more  
5982 pronounced in the larger, nearly whitish *R. polyphylla*, its sister-species, which has crowded  
5983 gills.

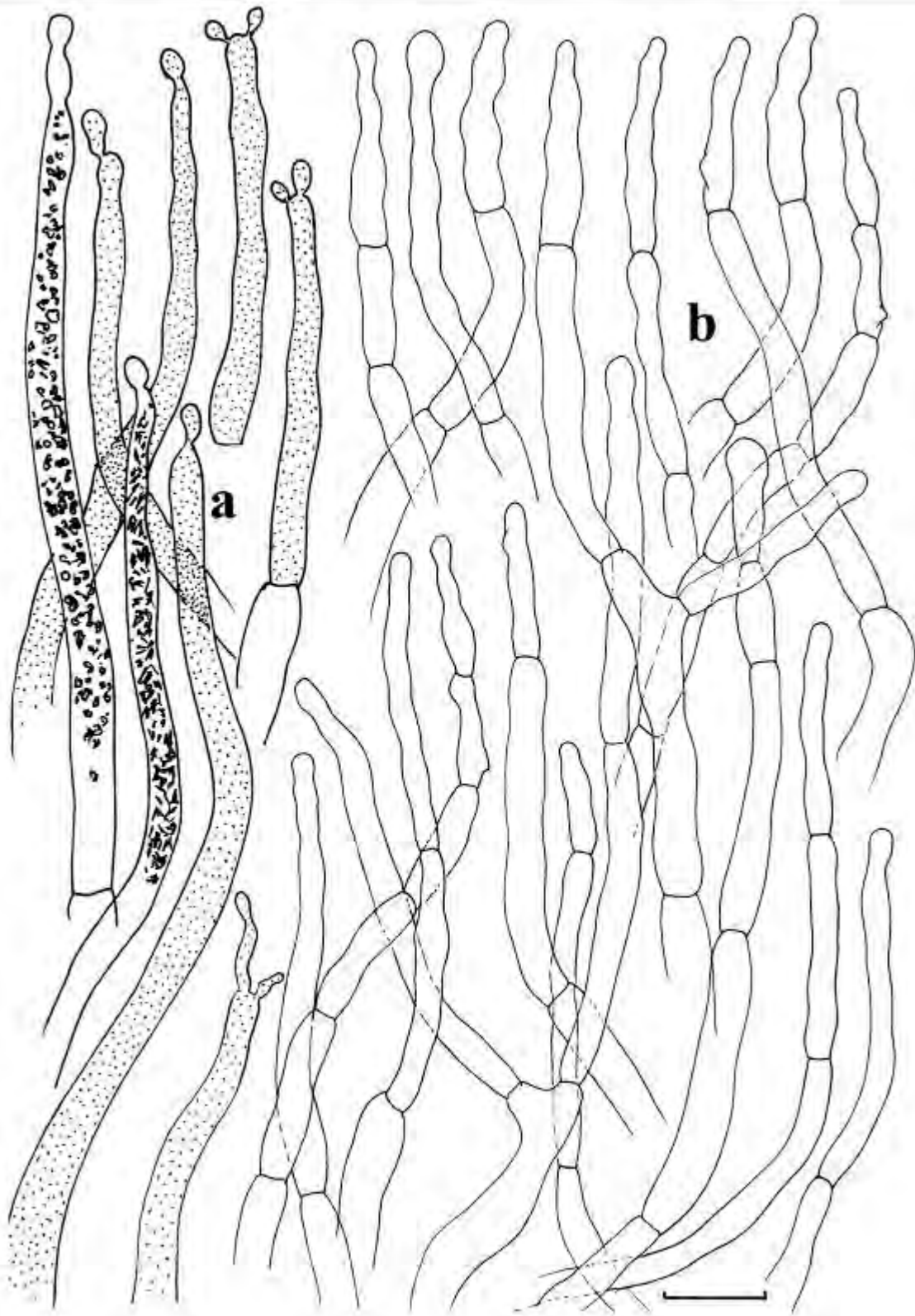
5984 In the field, *R. cortinarioides* is also very easily confused with *R. compacta* Frost  
5985 because of the unequal gills, brownish colours, unpleasant smell, white spore print and  
5986 overall similar habit. The latter differs from our new species in the hymenium bruising  
5987 brownish upon handling but not slowly turning reddish to reddish brown as in *R.*  
5988 *cortinarioides*; both species are also easily distinguished by the very different microscopic  
5989 features of their pileipellis and our phylogeny distinctly shows both species to be quite  
5990 unrelated.

5991 As a result of our molecular analysis, we therefore restrict *Polyphyllinae* in North  
5992 America presently to *R. polyphylla*, *R. eccentrica* and the here newly described *R.*  
5993 *cortinarioides*. *Polyphyllinae* is also known from Costa Rica (see Buyck & Halling 2004,  
5994 Buyck et al. 2005) and the subsection is well represented in most other tropical and  
5995 subtropical areas of the world (Buyck unpubl.). All species of this subsection are  
5996 recognizable by their unequal gills becoming pinkish to reddish brown at maturity, a slowly,  
5997 mostly weakly reddening, but not blackening context; they have gloeoplerous elements in all  
5998 parts of the carpophore and possess very similar spores.  
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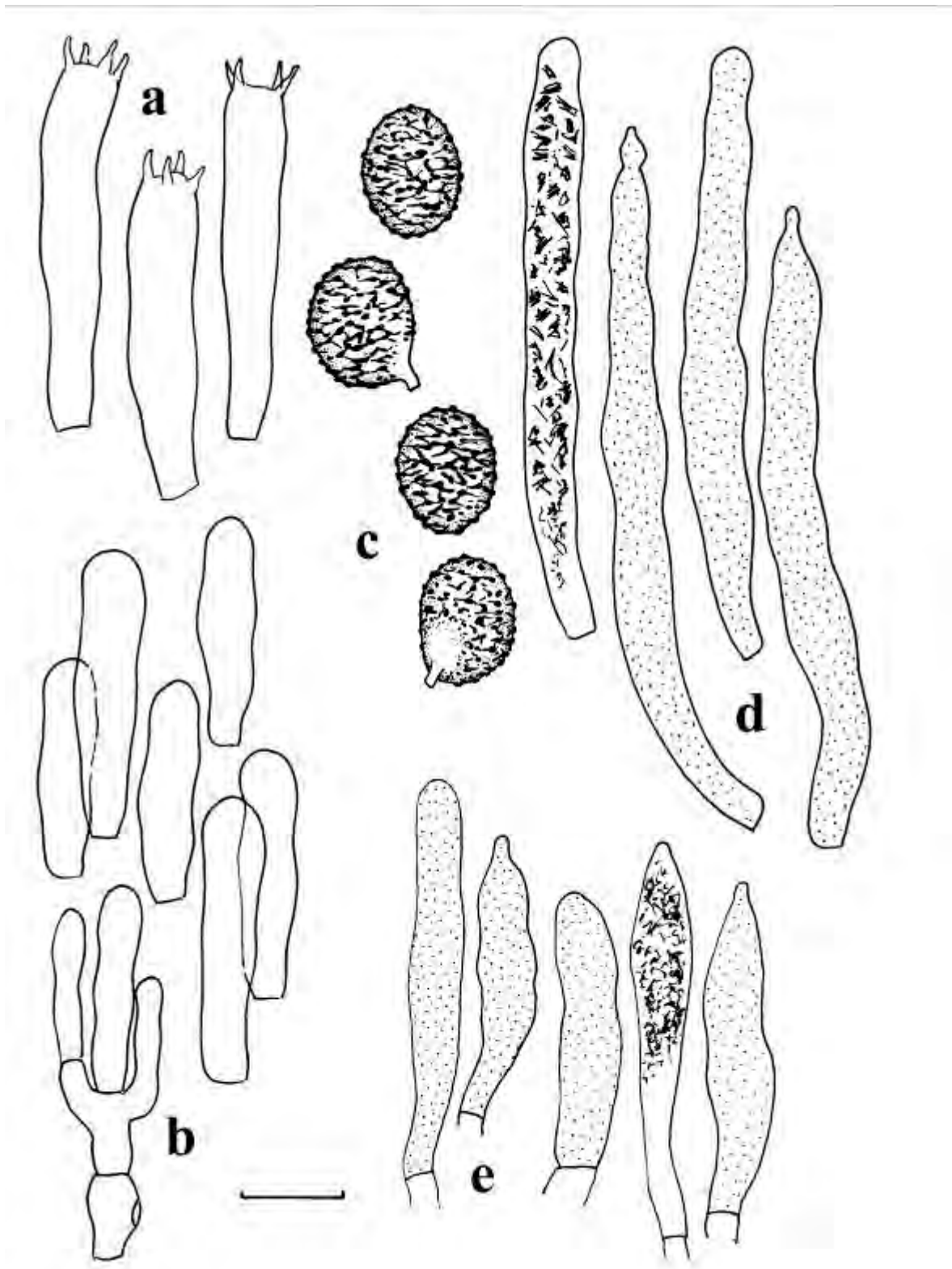
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**Fig. 164** *Russula cortinarioides* (holotype). Habit (Buyck 02.115). Photo B. Buyck



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**Fig. 165** *Russula cortinarioides* (holotype). Microscopic features of the pileipellis. **a** Pileocystidia with indication of contents as observed in Congo Red for two elements, schematically in all other elements. **b** Hyphal extremities. Scale bars = 10  $\mu$ m. Drawings B. Buyck.



6011  
 6012 **Fig. 166** *Russula cortinarioides*. Microscopic features of the hymenium. **a** Basidia. **b**  
 6013 Basidiola. **c** Spores. **d** Gloecephalocystidia. **e** Gloeocystidia (no marginal cells  
 6014 differentiated). Gloeocystidia with indication of contents as observed in Congo Red for two



6015 elements, schematically in all other elements. Scale bars = 10  $\mu m$ , but only 5  $\mu m$  for spores.  
6016 Drawings B. Buyck.  
6017

## ANNEXE 2

5.2 Preliminary draft being prepared for the publication of *Cantharellus pseudolateritius* Buyck, Lewis & V. Hofstetter sp.nov., a look-alike of *C. lateritius*.

*Cantharellus pseudolateritius* Buyck, Lewis & V. Hofstetter *sp.nov.*

*Mycobank:*

*Holotype:* United States. **Texas.** Tyler Co., Big Thicket national preserve, Beech creek Unit, along path running from the beginning of the trail near parking lot inside the Unit, in Beech-Magnolia-Loblolly pine forest, elev. 55-70 m, N 30.72265/W 094.22493, 25 June 2014, leg. Buyck, Lewis & Hofstetter, in BB 14.038 (PC 0142227)

*Etymology:* refers to the strong similarity to *C. lateritius*

**Cap** medium-sized, up to 80 mm in diam., usually an egg-yolk orange to light or deep orange (5A6-7), but also a vivid clear yellow with sometimes almost greenish hue when young, mat, smooth but under handlens distinctly pubescent-hairy when dry, becoming sometimes squamulose or disrupted with age; the cap margin thin, staying inrolled or downward for a long time, mostly irregularly and sometimes strongly lobed-folded finally uplifted with age. **Stipe** 45–50×4–7 mm, slender and very quickly long compared to the comparatively still hardly expanded cap, cylindrical or slightly narrowing downwards, often curved in its lower half, smooth to fibrillose, whitish, turning a dirty yellowish when handled, mostly slightly paler to concolorous with the cap because of a very thin and evanescent yellow outer surface, usually becoming paler at the base. **Hymenophore** veined, strongly decurrent, never with well-developed gill-folds, strongly veined-anastomosing in between, off-white to pale cream, toward the cap margin often with distinct pinkish hues. **Context** firm, fleshy, whitish, not energetically staining on handling but very slowly turning yellow when cut. **Smell** agreeable, apricot. **Taste** mild, agreeable. **Spore print** white.

**Spores** ellipsoid to narrowly ellipsoid, (6.7)7.3-7.84-8.4(9.2) x (3.7)4.2-4.61-5.0(5.2)  $\mu\text{m}$ ,  $Q=(1.4)1.5-1.71-1.9(2.2)$ , often somewhat larmiform or peanut-shaped, thin-walled, smooth. **Basidia** (4)5-6-spored, mostly 60– 75(85) x 8–10  $\mu\text{m}$ , , Subhymenium filamentous. **Cystidia** none. **Hyphal extremities of the pileipellis** with conspicuously thickened cell-walls (ca 1  $\mu\text{m}$ ), composed of rather long, subcylindrical cells, mostly 5-12  $\mu\text{m}$ ; the terminal cell often somewhat undulating or slightly inflated toward apex or base, ca 40-60  $\mu\text{m}$  long, either obtuse-rounded or slightly constricted at the extreme tip, but never truly clavate. **Clamp connections** very obvious and at all septa.

*Additional examined material:* United States. **Texas.** Tyler Co., Big Thicket national preserve, Beech creek Unit, along path running from the beginning of the trail near parking lot inside the Unit, in Beech-Magnolia-Loblolly pine forest, elev. 55-70 m, N 30.72232/W 094.22395, 25 June 2014, leg. Buyck, Lewis & Hofstetter, BB 14.033 (PC 0142222); *ibid.*, N 30.72265/W 094.22493, BB 14.038 (PC 0142227); *ibid.*, N 30.72265/W 094.22493, BB 14.042 (PC 0142231); *ibid.*, N 30.72256/W 094.22269, BB 14.044 (PC 0142233); *ibid.*, N 30.72232/W 094.22395, BB 14.045 (PC 0142234); Hardin Co., Big Thicket national preserve, Jack Gore Baygall Unit, in Beech-Magnolia-Loblolly pine forest, elev. 15-30 m, N 30.48126/W 094.15858, 27 June 2014, leg. Buyck, Lewis & Hofstetter in BB 14.078 (PC 0142267), BB 14.095 (PC 0142284); Big Thicket national preserve, Lance Rosier Unit, along Cotton Rd., in Beech-Magnolia-Loblolly pine forest, elev. 24-32 m, 1 July 2014, N 30.27125/W 094.50455, leg. Buyck, Lewis & Hofstetter in BB 14.104 (PC 0142293); *ibid.*, N 30.27240/W 094.50562, BB 14.105 (PC 0142294), BB 14.106 (PC 0142295), BB 14.111 (PC

0142300), BB 14.115 (PC 0142304); *ibid.*, N 30.26927/W 094.50048, BB 14.110 (PC 0142299), BB 14.112 (PC 0142301). **Mississippi.** Pearl River Co., near Poplarville, Shroomdom property, in bottomland hardwoods, N 30.85495/W 089.63277, elev. 50-70 m, BB 14.198 (PC 0142387). **Arkansas.** Lake Sylvia area, under oak trees in camping ground area, GIS N34,51.906 / W92,49.089, 29 May 2010, Jay Justice AR-CANT-1 (PC 0142426); *ibid.*, GIS N34,51.911 / W92,49.102, Jay Justice AR-CANT-2 (PC 0142427)

*Notes:* This species appears to be quite common in Beech-Magnolia-Loblolly pine forests in the southeastern United States. It could easily be mistaken for specimens of *C. lateritius* – the arche-type of what is considered to represent a smooth chanterelle (Buyck 2014) – but possessing veins that are just a little bit more pronounced than usual. Both species are surprisingly similar in overall color, texture and habit (see figs below), although *C. lateritius* usually has a more pinkish and, at least in certain parts, smoother hymenophore. The latter species is usually also growing in large troops, composed of many, sometimes several dozens of specimens, whereas *C. pseudolateritius* typically forms small groups of a few to less than a dozen specimens. Use of a hand lens also reveals that both species have a pubescent cap surface, but in both it can also appear smooth to almost greasy at the touch, probably depending on the weather conditions. Although the senior author has been collecting in the Gulf States for nearly 15 years now, one interesting observation is that *C. lateritius* and *C. pseudolateritius* were never found in the same locality, as if they were mutually exclusive.

Notwithstanding their strong similarity, both species appear to belong to different subclades within subgenus *Cantharellus* based on our *tef1* analyses (Fig.1). Under the microscope, there are some clear differences between *C. lateritius* and *C. pseudolateritius*. The former has a pileipellis composed of more slender extremities with less thick-walled cells that are more irregular in outline, and also has longer basidia (see Buyck et al. 2011). The spores of both species, however, are nearly identical.

There exist two distinct color forms of this species, at least to the naked eye, because the senior author's notes on 'bright yellow' as opposed to 'bright orange' specimens appear very similar to the camera. Both forms have identical sequences, including the introns, and are therefore not formally distinguished here. We consider the typical form to be orange. Fruitings with bright yellow caps can easily be confused with several other yellow chanterelles in the '*cibarius*' complex, such as the species in the *C. phasmatis-tenuithrix-flavus* complex.

## Illustrations

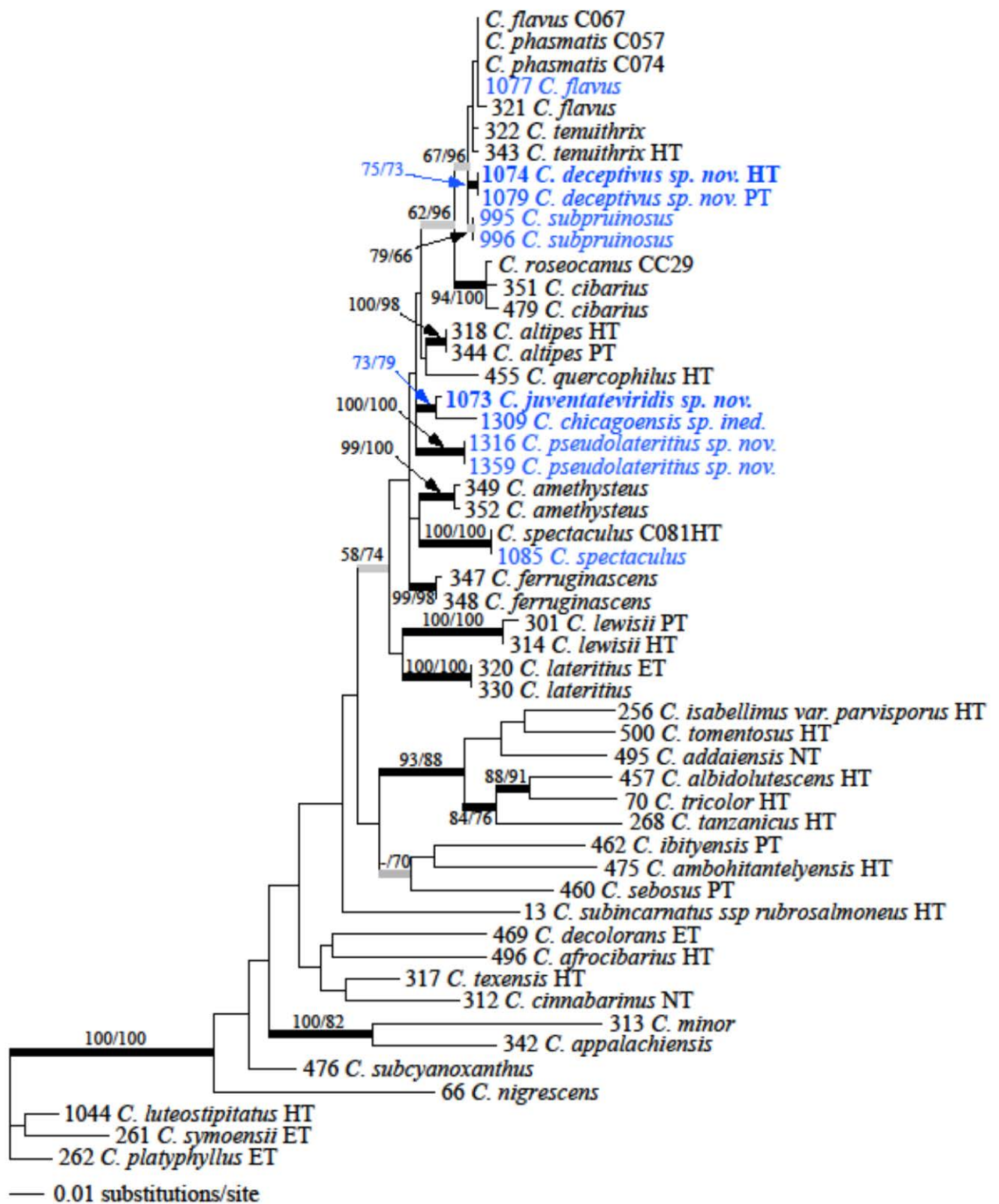


Fig. 1 : phylogenetic tree based on *tef-1* sequence data



Fig. xx: Comparison between *C. lateritius* (on the left) and *C. pseudolateritius* (on the right).

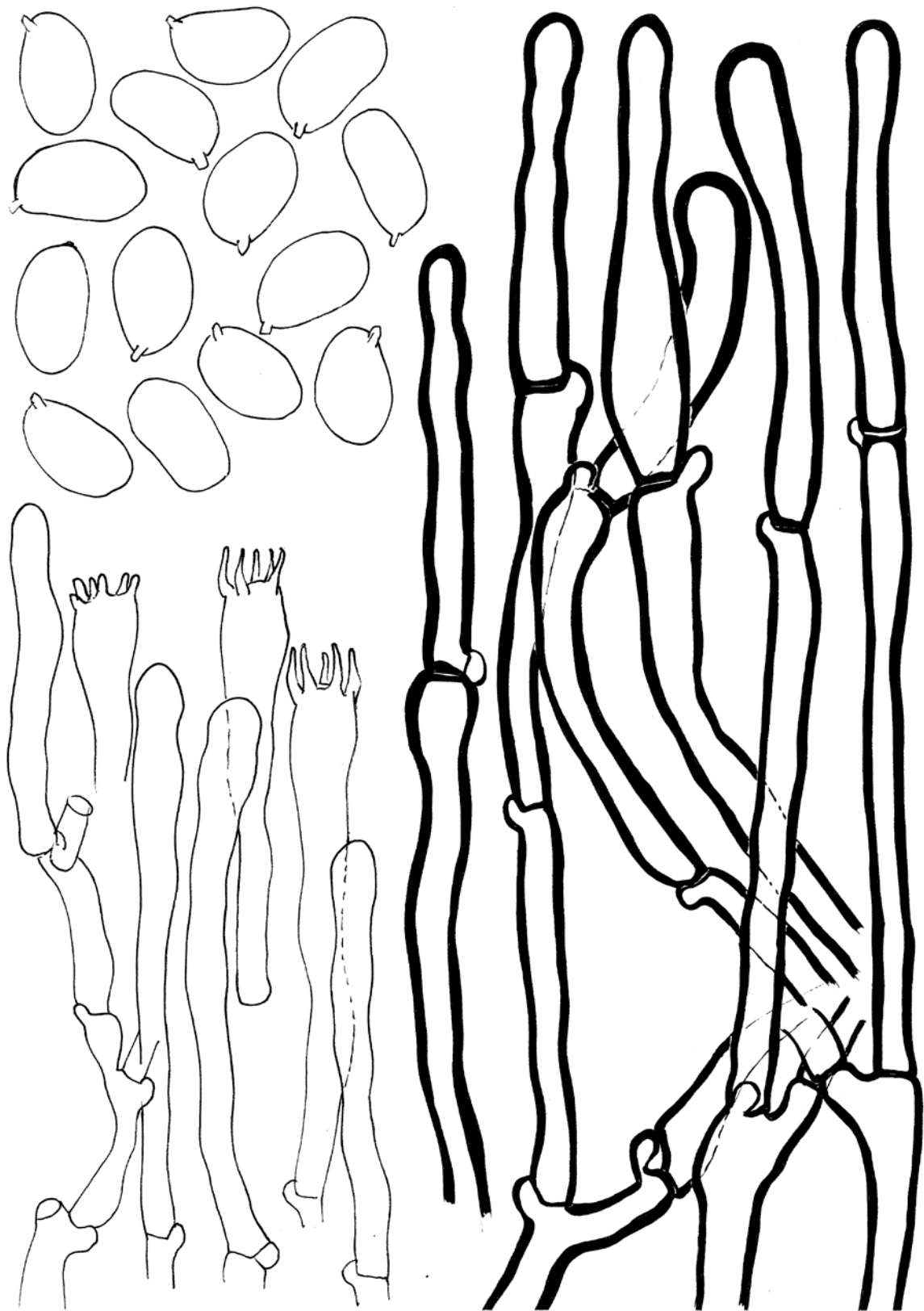


Fig. xx: Spores, basidia and terminations in the pileipellis for *C. pseudolateritius*

Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.032</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.063</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72246	W 094.22076	55-70 m	beech magnolia loblolly pine woods
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.120</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.46857	W 094.34928	16-23 m	bottomland hardwoods
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.127</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58452	W 094.33543	30-45 m	long leaf pine woods
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.129</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.46857	W 094.34928	30-45 m	long leaf pine woods
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.161</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.166</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	altipes	Buyck & V. Hofstetter	<b>BB_14.171</b>	06/07/2014	Lance Rosier, cemetary road	BITH	Hardin	TX	N 30.26873	W 094.51228	27-35 m	beech magnolia loblolly pine woods
Cantharellus	appalachiensis	R.H. Petersen	<b>BB_14.041</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72239	W 094.22150	55-70 m	beech magnolia loblolly pine woods
Cantharellus	cinnabarinus	(Schwein.) Schwein	<b>BB_14.102</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27064	W 094.50433	24-32 m	beech magnolia loblolly pine woods
Cantharellus	cinnabarinus	(Schwein.) Schwein	<b>BB_14.139</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Cantharellus	flavus	M.J. Foltz & T.J. Volk	<b>BB_14.167</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.065</b>	25/06/2014	Bleakwood,CR 3062, bottomland hardwood forest		Newton	TX	N 30.706685°	W 93.827637°	29-31 m	hardwood bottomlands
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.100</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27125	W 094.50455	24-32 m	beech magnolia loblolly pine woods
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.133</b>	02/07/2014	Turkey Creek trail at Hester bridge	BITH	Tyler	TX	N 30.55203	W 094.33096	26-30 m	bottomland hardwoods
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.137</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.141</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57822	W 094.64426	45-50 m	bottomland hardwoods
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.143</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Cantharellus	lateritius	(Berk.) Singer	<b>BB_14.157</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57867	W 094.64295	45-50 m	bottomland hardwoods
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.012</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	hardwood bottomlands
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.064</b>	25/06/2014	Bleakwood,CR 3062, bottomland hardwood forest		Newton	TX	N 30.706685°	W 93.827637°	29-31 m	hardwood bottomlands
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.067</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49996	W 094.11650	0-15 m	bay gall and cypress-tupelo swamp

Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.068</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49996	W 094.11650	0-15 m	bay gall and cypress-tupelo swamp
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.069</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49978	W 094.11852	0-15 m	bay gall and cypress-tupelo swamp
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.142</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57937	W 094.64428	45-50 m	bottomland hardwoods
Cantharellus	lewisii	Buyck & V. Hofstetter	<b>BB_14.153</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57937	W 094.64428	45-50 m	bottomland hardwoods
Cantharellus	lewisii short	Buyck & V. Hofstetter	<b>BB_14.148</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57867	W 094.64295	45-50 m	bottomland hardwoods
Cantharellus	lewisii short	Buyck & V. Hofstetter	<b>BB_14.149</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57867	W 094.64295	45-50 m	bottomland hardwoods
Cantharellus	minor	Peck	<b>BB_14.070</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49994	W 094.11877	0-15 m	bay gall and cypress-tupelo swamp
Cantharellus	minor	Peck	<b>BB_14.138</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Cantharellus	minor	Peck	<b>BB_14.207</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.23912	W 094.10361	10-20 m	pine oak woods
Cantharellus	minor cf	Peck	<b>BB_14.071</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49978	W 094.11852	0-15 m	bay gall and cypress-tupelo swamp
Cantharellus	orange yellow/tabernensis ?		<b>BB_14.079</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.033</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72232	W 094.22395	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.038</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.042</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.044</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.045</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72232	W 094.22395	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.078</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.095</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.104</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27125	W 094.50455	24-32 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.105</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27240	W 094.50562	24-32 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.106</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27240	W 094.50562	24-32 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.110</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.26927	W 094.50048	24-32 m	beech magnolia loblolly pine woods



Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.111</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27125	W 094.50455	24-32 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.112</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.26927	W 094.50048	24-32 m	beech magnolia loblolly pine woods
Cantharellus	<b>pseudolateritius sp.nov.</b>		<b>BB_14.115</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27125	W 094.50455	24-32 m	beech magnolia loblolly pine woods
Cantharellus	small brown		<b>BB_14.130</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58452	W 094.33543	30-45 m	long leaf pine woods
Cantharellus	spec		<b>BB_14.165</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	<b>spnov3</b>		<b>BB_14.037</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72243	W 094.22354	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>spnov3</b>		<b>BB_14.043</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72243	W 094.22354	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>spnov3</b>		<b>BB_14.054</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Cantharellus	<b>spnov3</b>		<b>BB_14.059</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72193	W 094.22540	55-70 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.029</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.034</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72230	W 094.22028	55-70 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.053</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.058</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72246	W 094.22076	55-70 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.062</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.076</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46214	W 094.17075	15-30 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.094</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.107</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27014	W 094.50348	24-32 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.109</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27125	W 094.50455	24-32 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.113</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27187	W 094.50518	24-32 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.114</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27014	W 094.50348	24-32 m	beech magnolia loblolly pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.122</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.47181	W 094.34888	16-23 m	bottomland hardwoods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.126</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.47181	W 094.34888	30-45 m	long leaf pine woods

Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.131</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58452	W 094.33543	30-45 m	long leaf pine woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.164</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.208</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.23912	W 094.10361	10-20 m	pine oak woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.209</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.24151	W 094.09743	10-20 m	pine oak woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.210</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.09780	W 094.09780	10-20 m	pine oak woods
Cantharellus	tabernensis	Feibelman & Cibula	<b>BB_14.211</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.23912	W 094.10361	10-20 m	pine oak woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.097</b>	30/06/2014	Bleakwood, along roadside CR 3062		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	pine-oak woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.008</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707420	W 93.827007	29-31 m	hardwood bottomlands
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.009</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707420	W 93.827007	29-31 m	hardwood bottomlands
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.011</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	hardwood bottomlands
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.018</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	hardwood bottomlands
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.096</b>	30/06/2014	Bleakwood, along roadside CR 3062		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	pine-oak woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.098</b>	30/06/2014	Bleakwood, along roadside CR 3062		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	pine-oak woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.099</b>	30/06/2014	Bleakwood, along roadside CR 3062		Newton	TX	N 30.706724	W 93.825570	29-31 m	pine-oak woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.128</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58480	W 094.33756	30-45 m	long leaf pine woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.132</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58480	W 094.33756	30-45 m	long leaf pine woods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.135</b>	02/07/2014	Turkey Creek trail at Hester bridge	BITH	Tyler	TX	N 30.55268	W 094.33176	26-30 m	bottomland hardwoods
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.159</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	tenuithrix	Buyck & V. Hofstetter	<b>BB_14.170</b>	06/07/2014	Lance Rosier, cemetary road	BITH	Hardin	TX	N 30.26665	W 094.51183	27-35 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.021</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.023</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.028</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.035</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.036</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72230	W 094.22028	55-70 m	beech magnolia loblolly pine woods

Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.055</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.056</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72232	W 094.22395	55-70 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.057</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72253	W 094.22203	55-70 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.060</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72253	W 094.22203	55-70 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.081</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.101</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27064	W 094.50433	24-32 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.103</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27240	W 094.50562	24-32 m	beech magnolia loblolly pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.119</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.47181	W 094.34888	16-23 m	bottomland hardwoods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.121</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.46857	W 094.34928	16-23 m	bottomland hardwoods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.124</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58480	W 094.33756	30-45 m	long leaf pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.125</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58480	W 094.33756	30-45 m	long leaf pine woods
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.158</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Cantharellus	texensis	Buyck & V. Hofstetter	<b>BB_14.163</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Craterellus	odoratus	(Schwein.) Fr.	<b>BB_14.010</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.707234°	W 93.826921°	29-31 m	hardwood bottomlands
Craterellus	odoratus	(Schwein.) Fr.	<b>BB_14.108</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.26978	W 094.50213	24-32 m	beech magnolia loblolly pine woods
Craterellus	odoratus	(Schwein.) Fr.	<b>BB_14.134</b>	02/07/2014	Turkey Creek trail at Hester bridge	BITH	Tyler	TX	N 30.55203	W 094.33096	26-30 m	bottomland hardwoods
Craterellus	odoratus	(Schwein.) Fr.	<b>BB_14.147</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57867	W 094.64295	45-50 m	bottomland hardwoods
Craterellus	odoratus	(Schwein.) Fr.	<b>BB_14.155</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57937	W 094.64428	45-50 m	bottomland hardwoods
Craterellus			<b>BB_14.061</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72221	W 094.22470	55-70 m	beech magnolia loblolly pine woods
Hydnopolyporus	palmatulus	(Hook.) O. Fidalgo	<b>BB_14.091</b>	27/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72230	W 094.22028	55-70 m	beech magnolia loblolly pine woods
Hydnum	<b>sp. nov.</b>		<b>BB_14.154</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57934	W 094.64372	45-50 m	bottomland hardwoods
Hydnum	<b>sp. nov.</b>		<b>BB_14.156</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57934	W 094.64372	45-50 m	bottomland hardwoods

Hypocrea	perlactea		<b>BB_14.092</b>	25/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Lactarius	lames jaunes	ined.	<b>BB_14.086</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Lactarius	lanuginosus	Burl.	<b>BB_14.006</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71070	W093.82636	29-31 m	hardwood bottomlands
Lactarius	maculatipes	Burl.	<b>BB_14.050</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72161	W 094.22626	55-70 m	beech magnolia loblolly pine woods
Lactarius	maculatipes	Burl.	<b>BB_14.082</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46216	W 094.17208	15-30 m	beech magnolia loblolly pine woods
Lactarius	peckii	Burl.	<b>BB_14.073</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.49996	W 094.11650	15-30 m	bay gall and cypress-tupelo swamp
Lactarius	plinthogali small	ined.	<b>BB_14.049</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Lactarius	plinthogali small	ined.	<b>BB_14.075</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Lactarius	plinthogali white	ined.	<b>BB_14.040</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72243	W 094.22354	55-70 m	beech magnolia loblolly pine woods
Lactarius	rimosellus	Peck	<b>BB_14.168</b>	04/07/2014	Big Sandy Creek Unit, near parking of Big Sandy trail, in lawn under postoak	BITH	Polk	TX	N 30.61695	W 094.66999	80-90 m	pine uplands
Lactarius	sp	ined.	<b>BB_14.007</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71071	W093.82637	29-31 m	hardwood bottomlands
Lactarius	sp.	ined.	<b>BB_14.039</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Lactarius	subvernalis	Hesler & A.H. Sm.	<b>BB_14.030</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Lactarius	subvernalis	Hesler & A.H. Sm.	<b>BB_14.206</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.24183	W 094.09456	10-20 m	pine oak woods
Lactarius	yellow gills	ined.	<b>BB_14.172</b>	06/07/2014	Lance Rosier, cemetary road	BITH	Hardin	TX	N 30.26297	W 094.51170	27-35 m	beech magnolia loblolly pine woods
Lactifluus	corrugis	Peck	<b>BB_14.123</b>	02/07/2014	Turkey Creek Unit, Pitcher plant trail	BITH	Tyler	TX	N 30.58762	W 094.34079	30-45 m	long leaf pine woods
Lactifluus	deceptivus	Peck	<b>BB_14.074</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Lactifluus	deceptivus	Peck	<b>BB_14.087</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46206	W 094.17162	15-30 m	beech magnolia loblolly pine woods
Lactifluus	gerardii complex	ined.	<b>BB_14.016</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	<b>quite deep in your bottomlands</b>		29-31 m	hardwood bottomlands
Lactifluus	piperatus aff.	Pers.	<b>BB_14.005</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71069	W093.82635	29-31 m	hardwood bottomlands
Lactifluus	piperatus aff.	Pers.	<b>BB_14.085</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46211	W 094.17477	15-30 m	beech magnolia loblolly pine woods

Lactifluus	piperatus aff.	Pers.	<b>BB_14.117</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27240	W 094.50562	24-32 m	beech magnolia loblolly pine woods
Lactifluus	piperatus aff.	Pers.	<b>BB_14.146</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Lactifluus	piperatus aff.	Pers.	<b>BB_14.152</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57822	W 094.64426	45-50 m	bottomland hardwoods
Lactifluus	plinthogali	ined.	<b>BB_14.169</b>	04/07/2014	Big Sandy Creek Unit, near parking of Big Sandy trail, in lawn under post oak	BITH	Polk	TX	N 30.61695	W 094.66999	80-90 m	pine uplands
Lactifluus	volemus gr	(Fr.) Fr.	<b>BB_14.051</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72193	W 094.22540	55-70 m	beech magnolia loblolly pine woods
Lactifluus	volemus gr	(Fr.) Fr.	<b>BB_14.072</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46214	W 094.17060	0-15 m	bay gall and cypress-tupelo swamp
Lactifluus	volemus gr	(Fr.) Fr.	<b>BB_14.144</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57962	W 094.64467	45-50 m	bottomland hardwoods
Lactifluus	volemus gr	(Fr.) Fr.	<b>BB_14.145</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57962	W 094.64467	45-50 m	bottomland hardwoods
Lactifluus	volemus gr	(Fr.) Fr.	<b>BB_14.150</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57962	W 094.64467	45-50 m	bottomland hardwoods
Multifurca	ochricompacta	(Bills & O.K.Miller) Buyck & V. Hofstetter	<b>BB_14.001</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.706215	W 93.826305	29-31 m	pine oak woods
Multifurca	ochricompacta	(Bills & O.K.Miller) Buyck & V. Hofstetter	<b>BB_14.013</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	<b>quite deep in your bottomlands</b>		29-31 m	hardwood bottomlands
Multifurca	ochricompacta	(Bills & O.K.Miller) Buyck & V. Hofstetter	<b>BB_14.014</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	<b>quite deep in your bottomlands</b>		29-31 m	hardwood bottomlands
Multifurca	ochricompacta	(Bills & O.K.Miller) Buyck & V. Hofstetter	<b>BB_14.015</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	<b>quite deep in your bottomlands</b>		29-31 m	hardwood bottomlands
Russula	albida	Peck	<b>BB_14.136</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.47186	W 094.34887	16-23 m	bottomland hardwoods
Russula	ballouii	Peck	<b>BB_14.004</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71068	W093.82634	29-31 m	hardwood bottomlands
Russula	ballouii	Peck	<b>BB_14.019</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.706215	W 93.826305	29-31 m	hardwood bottomlands
Russula	brevipes	Peck	<b>BB_14.088</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Russula	brevipes	Peck	<b>BB_14.090</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46211	W 094.17477	15-30 m	beech magnolia loblolly pine woods
Russula	brevipes	Peck	<b>BB_14.093</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Russula	compacta	Frost	<b>BB_14.003</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71067	W093.82633	29-31 m	hardwood bottomlands

Russula	compacta	Frost	<b>BB_14.048</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72246	W 094.22076	55-70 m	beech magnolia loblolly pine woods
Russula	compacta	Frost	<b>BB_14.089</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46211	W 094.17477	15-30 m	beech magnolia loblolly pine woods
<b>Russula</b>	<b>cortinarioides</b>	<b>Buyck, Adamčík, Lewis &amp; V. Hofstetter</b>	<b>BB_14.024</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
<b>Russula</b>	<b>cortinarioides</b>	<b>Buyck, Adamčík, Lewis &amp; V. Hofstetter</b>	<b>BB_14.025</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
<b>Russula</b>	<b>cortinarioides</b>	<b>Buyck, Adamčík, Lewis &amp; V. Hofstetter</b>	<b>BB_14.026</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
<b>Russula</b>	<b>cortinarioides</b>	<b>Buyck, Adamčík, Lewis &amp; V. Hofstetter</b>	<b>BB_14.027</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
<b>Russula</b>	<b>cortinarioides</b>	<b>Buyck, Adamčík, Lewis &amp; V. Hofstetter</b>	<b>BB_14.118</b>	02/07/2014	Turkey Creek Unit, Kirby trail	BITH	Hardin	TX	N 30.47181	W 094.34888	16-23 m	bottomland hardwoods
Russula	crustosa	Peck	<b>BB_14.047</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72265	W 094.22493	55-70 m	beech magnolia loblolly pine woods
Russula	crustosa	Peck	<b>BB_14.140</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57621	W 094.64140	45-50 m	bottomland hardwoods
Russula	crustosa	Peck	<b>BB_14.162</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.62648	W 094.64516	80-90 m	pine uplands
Russula	earlei	Peck	<b>BB_14.022</b>	23/06/2014	Lance Rosier, on Teel road (C.texensis type locality)	BITH	Hardin	TX	N 30.264946°	W 94.512583°	50 m	lower slope pine hardwood forest, near Cypres swamp
Russula	earlei	Peck	<b>BB_14.077</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.46214	W 094.17075	15-30 m	beech magnolia loblolly pine woods
Russula	earlei	Peck	<b>BB_14.084</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Russula	eccentrica	Peck	<b>BB_14.002</b>	20/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N30.71066	W093.82632	29-31 m	hardwood bottomlands
Russula	eccentrica	Peck	<b>BB_14.052</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72239	W 094.22150	55-70 m	beech magnolia loblolly pine woods
Russula	eccentrica	Peck	<b>BB_14.066</b>	27/06/2014	Bleakwood,CR 3062, near David Lewis'property		Newton	TX	N30.71066	W093.82632	29-31 m	pine oak woods
Russula	eccentrica	Peck	<b>BB_14.080</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods
Russula	ludoviciana	Shaffer	<b>BB_14.020</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' property		Newton	TX	N 30.706215	W 93.826305	29-31 m	hardwood bottomlands
Russula	<b>pallidocrustosa</b>	<b>sp. nov.</b>	<b>BB_14.017</b>	21/06/2014	Bleakwood,CR 3062, David Lewis' frontyard		Newton	TX	N 30.708602°	W 93.826655°	29-31 m	pine oak woods
Russula	<b>pallidocrustosa</b>	<b>sp. nov.</b>	<b>BB_14.116</b>	01/07/2014	Lance Rosier, Cotton road	BITH	Hardin	TX	N 30.27187	W 094.50518	24-32 m	beech magnolia loblolly pine woods
Russula	<b>pallidocrustosa</b>	<b>sp. nov.</b>	<b>BB_14.205</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.24151	W 094.09743	10-20 m	pine oak woods
Russula	<b>pallidocrustosa</b>	<b>sp. nov.</b>	<b>BB_14.212</b>	15/07/2014	Beaumont unit, near	BITH		TX	N 30.23964	W 094.09969	10-20 m	pine oak woods

Russula	pectinatoides	Peck	<b>BB_14.151</b>	04/07/2014	Big Sandy Creek unit, Beaver slide trail	BITH	Polk	TX	N 30.57822	W 094.64426	45-50 m	bottomland hardwoods
Russula	polyphylla	Peck	<b>BB_14.046</b>	25/06/2014	Beech creek Unit, path toward beginning of trail	BITH	Tyler	TX	N 30.72256	W 094.22269	55-70 m	beech magnolia loblolly pine woods
Russula	polyphylla	Peck	<b>BB_14.160</b>	04/07/2014	Big Sandy Creek Unit, Big Sandy trail	BITH	Polk	TX	N 30.61586	W 094.67059	80-90 m	pine uplands
Russula	vesicatoria	Burl.	<b>BB_14.031</b>	23/06/2014	Sand Ridge Cemetary rd (CR 4045), next to Faith Worship Center		Newton	TX	N 30.723250°	W 93.759368°	35 m	lawn with loblolly pine and water oak
Russula	vesicatoria	Burl.	<b>BB_14.083</b>	27/06/2014	Jack Gore baygall unit	BITH	Hardin	TX	N 30.48126	W 094.15858	15-30 m	beech magnolia loblolly pine woods