LITERATURE UPDATE FOR TEXAS FLESHY BASIDIOMYCOTA
WITH NEW VOUCHERED RECORDS FOR SOUTHEAST TEXAS

David P. Lewis
262 CR 3062
Newton, Texas 75966, U.S.A.
dandplewis@gmail.com

Clark L. Ovrebo
Department of Biology
University of Central Oklahoma
Edmond, Oklahoma 73034, U.S.A.
covrebo@uco.edu

N. Jay Justice
16055 Michelle Drive
Alexander, Arkansas 72002, U.S.A.
justice@aristotle.net

ABSTRACT
This is a second paper documenting the literature records for Texas fleshy basidiomycetous fungi and includes both older literature and recently published papers. We report 80 literature articles which include 14 new taxa described from Texas. We also report on 120 new records of fleshy basidiomycetous fungi collected primarily from southeast Texas.

PART I—MYCOLOGICAL LITERATURE ON TEXAS FLESHY BASIDIOMYCOTA
Lewis and Ovrebo (2009) previously reported on literature for Texas fleshy Basidiomycota and also listed new vouchered records for Texas of that group. Presented here is an update to the listing which includes literature published since 2009 and also includes older references that we previously had not uncovered. The authors’ primary research interests center around gilled mushrooms and boletes so perhaps the list that follows is most complete for the fungi of these groups. We have, however, attempted to locate references for all fleshy basidiomycetous fungi. For a reference to be included in the list, a collection must be cited from Texas. For modern references this is not difficult to discern because of the exacting requirements of locality information and herbarium designations. Not included are publications that give anecdotal records such as “distribution as far as Texas” or something similar without documentation of collections. Liberty is yielded to the literature of the nineteenth or early twentieth centuries where geographic information might not be as complete, nor is there a guarantee that a herbarium specimen exists. Following each reference is a bolded number in parenthesis. This number indicates how many Texas records are included in the article. For taxa that have the holotype from Texas, the binomials and localities (sometimes only the state name was given in the protologue) where collected are provided beneath the reference, followed by the herbarium location of the holotype and following the semicolon is the barcode. We have relied on literature references and online herbaria data (e.g., mycoportal.org) to determine the location of the holotypes. For the older holotypes it is possibly that they have since been nomenclaturally or taxonomically synonymized, but we feel that for the purposes of this paper it is best to give the basionym.

RESULTS

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Montagnites candollei var. texensis Berk. & M.A. Curtis (holotype: TEXAS. Curtis 3917, herbarium unknown)


Hydnum aerostatisporum Buyck, Lewis, & Hofstetter (holotype: TEXAS. Burleson Co.: Caldwell; PC; MNHN-PC-PC0084726)


**Russula cortinarioides** Buyck, Adamčik, Lewis, & V. Hofstetter (Holotype: TEXAS. Newton Co.: Mayflower; PC; PC0142175) (1)

Lloyd, C.G. 1904. Acknowledgment of specimens received from United States and Canada. Puff Ball Letter No. 3, July 1904. (37)


Murrill, W.A. 1922. Dark-spored agarics-II. *Gomphidius* and *Stropharia*. Mycologia 14:200–221. (1)


Combining the results from this and the previous paper (Lewis & Ovrebo 2009) there are now 282 journal articles that cite at least one fleshy basidiomycetous collection from Texas. In additions, 103 species or varieties have holotypes designated from the state. We continue to search for records from Texas and suspect that there are more records to be discovered. It is difficult to find records because articles seldom mention the state name in the title so the articles have to be searched individually for citations of Texas collections. These literature records should provide an initial resource to assist mycologists who are undertaking biogeographical, conservation or biodiversity projects. Lewis and Ovrebo (2009) previously listed some of the field guides that include fungi found in Texas. A recently published field guide by Bessette et al. (2019) is an additional valuable resource to help identify all groups of Texas fleshy fungi.

**DISCUSSION**
PART II—NEW RECORDS OF FLESHY BASIDIOMYCOTA FOR TEXAS

For the listings below the order and family classification as well as specific epithets are those provided in Index Fungorum (http://www.indexfungorum.org/) and Mycobank (www.mycobank.org). It is likely that some of the species below are accessioned in herbaria with older genus or species names; however, we have provided the currently accepted names that mainly result from taxonomic revisions. In this case, searching by collection number might be the best way to locate a collection in a herbarium. Only one record per county is provided but for most counties there may be multiple records that have been made over the years. The fungi reported below are mainly from southeast Texas because that is where most of the collecting has been done by the authors and by those who have forwarded collections to us, but a few records are included from other parts of the state. GPS coordinates are only an indication of the general collection location. Abbreviations for collectors are as follows: DPL—David P. Lewis; CLO—Clark L. Ovrebo. Other abbreviations are as follows: CR—County Road; FM—Farm to Market Road; SH—State Highway; BTNP—Big Thicket National Preserve.

RESULTS

BASIDIOMYCOTA: AGARICOMYCETES: AGARICALES

AGARICACEAE

Battarrea phalloides (Dicks) Pers. Found in arid environments.

Echinoderma asperum (Pers.) Bon. Found in mixed pine and hardwood forest.
Voucher specimens:
Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 12 Nov 2016, DPL-12236 (TAES).
Polk Co: BTNP, Big Sandy Unit, residence by FM 1276, 30.5710, -94.6337, 12 Nov 1989, DPL-4319 (F).
San Jacinto Co.: Evergreen, Little Thicket Nature Sanctuary, 30.5416, -95.2243, 3 Nov 2018, DPL-13192 (TAES).

Lepiota roseotincta A.H. Smith. Found in mixed pine-hardwood and hardwood forests.
Voucher specimens:
Fort Bend Co.: Sugarland, Pepperwood Dr., 29.5846, -95.6109, 28 May 2017, DPL-12384 (TAES).
Hardin Co.: Lumberton, Village Creek State Park, nature trail, 30.2545, -94.1710, 30 May 2015, DPL-11747 (TAES).


Leucocoprinus brunnescens (Peck) Pegler. Found in mixed pine and hardwood forests.
Voucher specimens:
Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 20 Nov 2010, DPL-10065 (TAES).
Orange Co.: Vidor, off Virginia Lane, 30.1540, -94.0110, 8 Aug 1980, DPL-2228 (F, RET).

AMANITACEAE

Amanita arkansana Rosen. Found under hardwoods.

Amanita cinereoconia Atkinson. Found in bottomland hardwoods or mixed hardwood-pine forests.
Voucher specimens:
Hardin Co.: BTNP, Turkey Creek Unit, Gore Road Trailhead North, 30.522183, -94.34685, 4 Oct 2009, DPL-9416 (TAES).
Orange Co.: Vidor, off Virginia Lane, 30.1540, -94.0110, 8 Aug 1980, DPL-2228 (F, RET).
Polk Co.: BTNP, Big Sandy Unit, 30.6794, -94.6996, 11 Jun 2009, DPL-9062 (TAES).


Amanita virginiana (Murr.) Murr. Found under pine and oak.  
Voucher specimen: Orange Co.: Vidor, Virginia Lane, 30.1535, -94.0129, 20 Sep 1987, DPL-4079 (F, RET).

CALLISTOSPORACEAE

Callistosporium purpureomarginatum Fatto & Bessette. Found on hardwood log. 

Macrocybe titans (H.E. Bigelow & Kimbr.) Pegler, Lodge, & Nakasone. Found in open fields, flower beds and open pine and hardwood forests. 

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Entoloma murrayi (B. & C.) Sacc. & Syd. Found in mixed hardwoods, pine and beech forest.

Entoloma rhodopolium (Fr.) P. Kumm. Found in stream bottomland hardwood forests.

Entoloma scabrinellum (Peck) Sacc. Found in mixed pine-hardwoods.

Entoloma sinuatum (Bull.) P. Kumm. Found in pine forests.

Hygrophanaceae
Humidicutis marginata (Peck) Sing. Found in oak, pine and beech forest.

Hygrophorus occidentalis A.H. Smith & Hesler. Found in mixed pine-hardwood forest.

Hygrophorus pratensis (Fr.) Fr. Found in stream bottomland hardwood forests.

Hymnoastaceae
Gymnopilus fulvosquamulosus Hesler. Found on dead hardwood.

Gymnopilus liquiritiae (Pers: Fr.) Karst. Found on decaying hardwood logs.

Hymnoastaceae
Inocybe cincinnata (Fr.) Quél. Found in open pine and oak forest.

Inocybe leptophylla G.F. Atk. Found with upland pines and oak.

Inocybe mutata (Peck) Massee. Found in mixed pine and hardwood forest.

Inocybe neotropicus Singer, I.J.A. Aguiar, & Ivory. Found in mixed hardwood bottomlands.
Voucher specimen: Walker Co.: Huntsville, Sam Houston University Field Research Station, 30.7445, -95.4726, 21 Apr 2018, DPL-12843 (SHSU, TENN).

Inocybe rimosa Britzelm. Found under pine.

Inocybe trechispora (Berk.) P. Karst. Found in mixed pine and hardwood forest.

Inocybe umbrinella Bres. Found in mixed pine and hardwood forest.
Voucher specimen: Hardin Co.: BTNP, Turkey Creek Unit, Gore Road trailhead north, 30.5222, -94.3468, 4 Oct 2009, DPL-9426 (TENN).
Inosperma lanatodiscum (Kauffman) Matheny & Esteve-Rav. Found with Quercus virginiana.  
Voucher specimen: Orange Co.: Vidor, Our Lady of Lourdes Catholic Church, off FM 105, 30.1481, -94.0153, 27 Nov 2013, DPL-J1061 (TENN).

Inosperma rimosoides (Peck) Matheny & Esteve-Rav. Found in mixed pine and hardwood forests.  

LYCOPERDACEAE

Lycoperdon marginatum Vittad. Found in open pine and hardwood forests and fields.  
Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 11 Nov 2006, DPL-7679 (TAES).  
Walker Co.: Huntsville, Sam Houston University Field Research Station, 30.7445, -95.4726, 16 Sep 2018, DPL-13077 (TAES).

LYOPHYLLACEAE

Asterophora lycomperdoides (Bull.) Ditmar. Found on old mushroom likely a Russula in mixed pine-hardwood forest.  
Voucher specimen: San Jacinto Co: Sam Houston National Forest, Big Creek Scenic Area, 30.5074, -95.0903, 18 Oct 2003, CLO-4350 (CSU).

MYCENACEAE

Mycena luteopallens (Peck) Sacc. Found among hickory detritus.  
Voucher specimen: Tyler Co.: BTNP, Turkey Creek Unit, Pitcher Plant Loop Trail, 30.5831, -94.3368, 2 Jul 2014, DPL-11261 (TAES).

Xeromphalina cauticinalis (Fr.) Kuhn. Maire. Found in leaf duff in mixed pine and hardwood forest.  

OMPHALOTACEAE

Voucher specimens: Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 9 Jun 2012, DPL-10347 (TAES).  
Orange Co.: Vidor, residence off FM 105, 30.1481, -94.0153, 14 May 1980, DPL-2182 (F).  
Tyler Co.: Ace, 30.5074, -94.8369, 19 Mar 1984, DPL-3454 (F).

Gymnopus ioecephalus (B. & C.) Halling. Found in leaf duff, various forest types.  
Voucher specimens: Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 7 Jun 2010, DPL-9692 (TAES).  

Gymnopus spongiosus (B. & C.) Halling. Found in various forest types.  
Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.5125, 11 Nov 2006, DPL-7723 (TAES).  
Orange Co.: Vidor, residence off FM 105, 30.1340, -94.0110, 15 Jan 1989, DPL-4237 (F).  
Robertson Co.: N of Benchley, Lakeway Dr., 27 Nov 1993, 30.7778, -96.4857, DPL-5138 (TAES).  
Tyler Co.: BTNP, Turkey Creek Unit, Pitcher Plant Trail, 30.5831, -94.3368, 16 Mar 2014, DPL-11115 (TAES).

Lentinula raphanica (Murr.) Mata & R.H. Petersen. Found on hardwood.  
Voucher specimens: Hardin Co.: BTNP, Lance Rosier Unit, Cotten Road, 30.2701, -94.5062, 3 Oct 2009, DPL-9387 (TAES).  
Orange Co.: Vidor, off FM 105, 30.1450, -94.0110, 17 May 1977, DPL-957 (F).  

PHYSYLACRIAEAE

Armillaria gallica Marxm. & Romagnesi. Found in mixed pine and hardwood forests.  
Montgomery Co.: Sam Houston National Forest, Mitchell Road near SH 149, 30.2892, -95.6847, 28 Dec 2017, DPL-12789 (TAES).  
PLUTEACEAE

*Pluteus atromarginatus* (Konrad) Kuhler. Found on hardwoods and sweetbay magnolia.

*Volvariella bombycina* (Schaeffer: Fries) Sing. Found on various hardwoods.

PTERULACEAE

*Pterula plumosa* (Schw.) Fr. Found by decayed hardwood stump.
Voucher specimen: **Hardin Co.**: Lumberton, Village Creek State Park, nature trail, 30.2545, -94.1710, 30 May 2015, DPL-11752 (TAES).

TRICHOLOMATACEAE

*Tricholoma serratifolium* Peck. Found in hardwood forests.

*Tricholomopsis decora* (Fr.) Sing. Found on dead wood likely pines.

*Tricholomopsis formosa* (Murr.) Sing. Found on pine stumps and logs.

TUBARIACEAE


BASIDIOMYCOTA: AGARICOMYCETES: INCERTAE SEDIS

*Pseudofistulina radicata* (Schw.) Wright and Burdsall. Found in pine uplands with hardwoods.

BASIDIOMYCOTA: AGARICOMYCETES: BOLETALES

BOLETACEAE

*Boletus atkinsonii* Peck. Found in pine uplands under oaks.

*Boletus durhamensis* B. Ortiz, Bessette, & McConnell. Found under oaks.

*Boletus fairchildianus* (Sing.) Sing. Found in mixed pine-hardwoods.
Voucher specimen: **Hardin Co.**: BTNP, Teel Road at Cypress Swamp, 30.2643, -94.5125, 12 Nov 2013, DPL-12228 (TAES).

*Boletus glabellus* Peck. Found under live oak.
Boletus luridellus (Murr.) Murr. Found under live oaks.


Boletus pseudoboletinus (Murr.) Murr. Found in sandy soil under mixed pine woods.


Boletus purpureorubellus T.J. Baroni, Yetter, & Norar. Found on well-decayed stump.


Boletus weberi Singer. Found in sandy soil under oaks.


Buchwaldoboletus sphaerocephalus (Barla) Watling & T.H. Li. On pine logs or stumps.


Harrya chromapes (Frost) Halling, Nuhn, Osmundson, & Manfr. Binder. Found in beech forest.

Voucher specimen: Tyler Co.: BTNP, Beech Creek Unit, Beech Woods Trail, 30.7194, -94.2271, 4 Aug 1982, DPL-3242 (F).

Leccinum chalybaeum Singer. Found in mixed pine-oak forests.


Neoboletus luridiformis var. pseudosulphureus (Kallenb.) A. Urb. & Klofac. Found in bottomland hardwoods.


Pulcroboletus rubricitrinus (Murr.) A. Farid & A.R. Franck. Found under hardwoods or mixed-pine forest.


Pulveroboletus curtisi (Berk.) Sing. Found in mixed pine-hardwoods.


Suillus cothurnatus Singer. Found in pine forests.


Tylophilus griseocarneus Wolfe. Found in hardwood or mixed pine-hardwood forests.


Tylophilus rubrobrunneus Mazzer & A.H. Smith. Found in mixed hardwood or hardwood-pine forests.

CONIOPHORACEAE

Gyrodontium sacchari (Spreng.) Hjortstam. Found on hardwood. New record for U.S.A.

GOMPHIDIACEAE

Chroogomphus ochraceus (Kauffman) O.K. Miller. Found under pines.
Voucher specimen: Tyler Co.: BTNP, Canyonlands Unit, 30.7207, -94.1401, 20 Dec 2007, CLO-4726 (CSU, accessioned as C. rutilus (Schaeff.) O.K. Miller).

BASIDIOMYCOTA: AGARICOMYCETES: CANTHARELLALES

HYDNACEAE

Clavulina cinerea (Fr.) Schroet. Found in mixed pine and hardwood forest.

Craterellus fallax Smith. Found in mixed pine, hardwood and beech forests.

Voucher specimen: Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.3503, 2 Jun 2018, DPL-12882 (TAES).

LAETIPORACEAE

Laetiporus cincinnatus (Morgan) Burds., Banik, & T.J. Volk. Found on wood.

PODOCYPHACEAE

Voucher specimens: Hardin Co.: BTNP, Lance Rosier Unit, Teel Road at cypress swamp, 30.2643, -94.3503, 13 Jun 2009, DPL-9114 (TAES).

POLYPORACEAE

Cryptoporus volvatus (Peck) Shear. Found on Piñon Pine.
Voucher specimen: Brewster Co.: Big Bend National Park, Chisos Mountains at Laguna Meadow, 29.2643, -103.3008, 3 May 1981, DPL-2506 (F).

Favolus tenuiculus P. Beauv. Found on hardwoods.

Trametes nivosa (Berk.) Murr. Found on beech and other hardwoods.

**BASIDIOMYCOTA: AGARICOMYCETES: PHALLALES**

**PHALLACEAE**


**ALBATRELLACEAE**


**HERICIACEAE**


**RUSSULACEAE**


**BASIDIOMYCOTA: AGARICOMYCETES: THELEPHORALES**

**BANKERACEAE**

Hydnellum spongiosipes (Peck) Pouzar. Found in mixed pine-hardwood forest.

Voucher specimen: Tyler Co.: Lake Hyatt, Watson Rare Plant Preserve, 30.5814, -94.3789, 10 Nov 2018, DPL-13241 (TAES).

Phellodon confluens (Pers.) Pouzar. Found in hardwood or mixed pine-hardwood forests.

Sarcodon atroviridis (Morgan) Banker. Found in mixed pine-oak forest.

Sarcodon underwoodii Banker. Found in mixed pine-hardwoods.

TRELEPHORACEAE
Thelephora multipartita Schwein. Found on soil.
Voucher specimen: Polk Co.: BTNP, Big Sandy Creek Unit, Beaver Slide Trail, 30.5732, -94.6425, 11 Jun 2009, DPL-9060 (TAES).

Thelephora vialis Schwein. Found under hardwoods.

BASIDIOMYCOTA: TREMELLOMYCES: TREMELLALES
Phaeotremella foliacea (Pers.) Wedin, J.C. Zamora, & Millanes (accessioned as Tremella foliacea Persoon: Fries.) Found on dead hardwood.

Tremella fuciformis Berkeley. Found on hardwood logs and branches.

DISCUSSION

The 120 new Texas species records reported here as well as the 52 records previously published (Lewis & Ovrebo 2009) are an indication of the diversity of fleshy basidiomycetous fungi for a still largely under-explored region of the U.S.A. The diversity of forest and habitat types in southeast Texas and Texas as a whole will continue to yield many more new records and likely new species. Progress is slow in documenting mushroom diversity for several reasons: the unpredictability of their fruiting patterns which is dependent on sufficient rainfall; the ephemeral nature of the basidiomata—they appear for only a short time; and because of the lack of naturalists or biologists who are willing to devote time to collecting them. Most all field guides give instructions on how to collect and preserve the mushroom-type fungi and so both amateurs as well as professionals can help advance our knowledge of their diversity. As was justified above for publishing journal article records for Texas fungi, the vouchered records listed here as well as those in Lewis and Ovrebo (2009) will likewise provide additional data for biogeographical or biodiversity studies and provide a source for herbaria from which specimens can be borrowed.
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