TWiG Grant Final Report
to the Big Thicket Association and the Big Thicket National Preserve for "Ecological studies of myxomycetes in the Big Thicket National Preserve targeting specific questions about the role of these organisms within the overall community

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Katherine E. Winsett, PhD[1]
Steven L. Stephenson, PhD[2]

[1]Dept of Biology, University of Southern Indiana, 8600 University Blvd, Evansville, IN 47712
katherine.winsett@gmail.com (corresponding investigator)

[2]Dept of Biological Sciences, SCEN 632, University of Arkansas, Fayetteville, AR 72701
slsteph@uark.edu

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1. Abstract

2. Acknowledgements

We wish to acknowledge the assistance of a number of people who have made the work for this project possible. A number of people, both personnel of the Preserve including Dave Roemer and Brian Lockwood and scientists from other Taxonomic Working Groups including David Lewis, Dale Kruse and Paul Roling, were generous with their time and expertise to guide our investigation of the myxomycetes within the Preserve. We also acknowledge the significant contribution by the staff of the Big Thicket Association including Mona Halvorson and Ann Roberts for their continued support of our work. The funding from the Big Thicket Association made this project possible considering the significant costs of traveling between Northwest Arkansas and the BITH in Texas.

3. Introduction

The myxomycetes are one of three groups of organisms traditionally recognized as true slime molds (class Eumycetozoa *sensu* Olive 1975). One group, the myxomycetes, consists of small, eukaryotic amoeboid organisms with trophic stages that feed upon populations of bacteria and other microorganisms associated with decaying plant material in all types of terrestrial habitats. There are approximately 900 species of myxomycetes known worldwide (Lado 2001). They are found at high and low latitudes, including the Antarctic Peninsula, as well as in temperate and tropical ecosystems. Many species have a global distribution, occurring in many varied types of ecosystems worldwide (Stephenson and Stempen 1994).

The role of myxomycetes in soil nutrient cycling is thought to be ecologically significant but is still rather poorly understood (Feest 1987, Madelin 1990, Adl and Gupta 2006). These unique organisms are associated with leaf litter, decaying vegetation, and the surface layers of soils, where they feed on bacteria and yeasts. The activities of slime molds help maintain soil health by stimulating microbial activity and increasing the availability of soil nutrients (Feest 1987). They appear to represent a significant portion of soil amoebae (Feest and Madelin 1985, Feest 1987, Madelin 1990), thus suggesting that their contribution to the functional aspects of terrestrial systems is potentially very important. However, although some efforts have been made to understand the worldwide diversity of these organisms, we still know very little about their role in a particular community.

An initial three-year initiative (2007-2010) by Winsett and Stephenson generated a set of baseline data relating to the diversity of myxomycetes in the diverse habitats that make up the Big Thicket National Preserve (BTNP). More than 80 species were recorded from 44 sites around the preserve, and these sites encompassed all of the different types of terrestrial habitats that make up the BTNP.

The baseline biodiversity data collected allowed for more focused questions to be addressed regarding the ecology of these organisms. The following objectives were proposed to build an expanded knowledge of the diversity of myxomycetes as well as the data required to better understand these organisms as members of the ecological community as a whole.

Four general objectives were investigated:
1) Documentation of the diversity and abundance of myxomycetes associated with submerged substrates.
2) Documentation of the diversity and abundance of myxomycetes associated with bryophytes
3) Continuation of the biodiversity survey of the myxomycetes within the different communities within the Preserve.
4) Assessment of the "genetic relatedness" among what appear to be the same morphospecies in very different microhabitats.

4. Methods

4.1 Site/ Habitat Description

The ecological description of sites that were collected for myxomycetes follows the descriptions in Watson 2006. General ecoregion types were assigned based upon the BITH general vegetation map: Arid Sandylands, Baygall, Bottomland Hardwood Forest, Cypress Slough, Longleaf Pine Uplands, Palmetto Hardwood Flats, Slope Forest, Wetland Pine Savannah. (Figure 1). As this map is a general representation of the ecoregions of the BITH, appropriate ecoregion was assigned based upon first person observation along with the location of the site on the available map.

4.2 Field Collecting

At all collecting sites, appropriate substrate (generally dead, decorticated woody debris on the ground) was examined for fruiting bodies of myxomycetes. At least one collection of each species found was collected by removing the substrate upon which it was fruiting with a pocketknife and brought back to the lab for species identification and preparation for herbarium storage. Collections were allowed to air dry then the substrate with the fruiting bodies was glued onto a paper tray that fits into a cardboard pill box. The species was identified using the keys in Martin and Alexopoulos (1969). All specimens are stored in the myxomycete herbarium (UARKM) at the University of Arkansas in Fayetteville, AR, with duplicates deposited at the S.M. Tracy Herbarium (TAES) at Texas A&M University in College Station, TX.

4.3 Moist Chamber Culture

Plant material was collected in paper bags at each field site and cultured in the laboratory to promote formation of fruiting bodies of myxomycetes. Four general types of material were collected for the general biodiversity survey: aerial litter (dead plant material still attached to the plant and off of the ground), bark (outer

bark from living trees), coarse woody debris (woody material including twigs from the ground), ground litter (dead plant material from the ground). In the laboratory, three moist chamber cultures (image) were set up for each collection. A moist chamber was a Petri dish fitted with a piece of filter paper on the bottom. Plant material was placed in roughly a single layer on the filter paper. The material was covered with distilled water and left overnight. After 24 hours, the pH was measured in the standing water after which most of the water was poured off.

Moist chambers were stored on a shelf in indirect light and checked for the presence of myxomycetes (plasmodium or fruiting body) once a week for 10 weeks. For bryophyte collections, the same process was followed with an effort to collect species representing the diversity of bryophytes in each collecting locality. Submerged plant material was collected from fresh water in each collecting locality. Submerged material was collected in the field in plastic bags, then allowed to dry in paper bags for transport back to the laboratory for moist chamber culture as described above. All fruiting bodies were removed and prepared for herbarium storage in paper pill boxes.

All data is submitted or in preparation for submission to the Thicket of Diversity database as well as the global database through the Eumycetozoan Project at the University of Arkansas. All specimens are stored in the myxomycete herbarium (UARKM) at the University of Arkansas in Fayetteville, AR, with duplicates deposited at the S.M. Tracy Herbarium (TAES) at Texas A&M University in College Station, TX.

4.4 Molecular Analysis

Molecular techniques follow the procedures outlined by Winsett and Stephenson (2008, 2011) and Winsett et al. (unpublished data). Molecular analysis of *Arcyria cinerea* is ongoing. DNA extraction is complete for the entire dataset, but technical issues have hindered further progress.

5. Results and Discussion

5.1 Sites Collected

Over the course of four collecting trips in the preserve (May 2010, June 2010, November 2010, and June 2011), substrate material was collected in sites within Beaumont Unit, Beech Creek Unit Big Sandy Unit Canyonlands Unit, Hickory Creek Savannah Unit, Jack Gore Baygall Unit, Lance Rosier Unit, Little Pine Island Bayou Corridor Unit, Loblolly Unit, Menard Creek Corridor Unit, and the Turkey Creek Unit.

5.2 Field Collections

A total of 69 collections of fruiting bodies found in the field were identified and deposited at UARKM with duplicates deposited at TAES. This is a relatively low number of field collections for the dates and localities examined. However, the area was experiencing significant drought conditions, which affects the habitats and microhabitats for myxomycetes.

5.3 Moist Chamber Culture

328 moist chamber cultures were processed. Moist chamber data is currently incomplete awaiting identification of all specimens. The samples from submerged vegetation (90 moist chambers) are completely processed and a manuscript is in preparation. The data from moist chambers processed through 2010 are included in the recent checklist published in the Journal of the Botanical Research Institute of Texas (Winsett and Stephenson 2012).

5.4 Data and Species List

Complete data to date including ecological, substrate and locality information will be made available through the Thicket of Diversity database (contact: Mona Halvorson, database@bigthicket.org). A full dataset will be submitted upon complete identification of specimens. This is expected to be completed in January or February 2013.

5.5. Other – Publications and Presentations as a result of this work

Winsett, K.E. 2010. Science Café presentation

Winsett, K.E. 2011. Summer Mentor. Eastfield College NSF STEP Big Thicket Summer Institute.

Winsett, K.E. and S.L. Stephenson. 2012. An annotated checklist of the myxomycetes of the Big Thicket National Preserve, Texas. Journal of the Botanical Research Institute of Texas, 6:287-302. (*see attached*)

Winsett, K.E. and S.L. Stephenson. *in prep.* Myxomycetes associated with submerged vegetation in the Big Thicket National Preserve, Texas.

6. Possible Future Research Projects

Ecological study of myxomycetes is a field still for all intents and purposes in its infancy. Because these are microscopic organisms with huge reproductive potential and the ability to disperse by spores over long distances, the design and implementation of ecological study is complex. This baseline diversity data for the Preserve makes this location a good site for future ecological studies like those described below. Because of the scope and diversity within the Preserve, continued inventory work is still a priority.

(a) Submerged Substrate to enhance diversity knowledge across the Preserve

It is known that the life cycle of slime molds makes it possible for this organism to survive in many types of habitats. There are two resting phases, a spore and an

amoeboflagellate cell that can survive and divide by mitosis in aquatic environment. The submerged vegetation examined through this research resulted in a number of previously unreported species for the BTNP. Further biodiversity exploration within the Preserve would focus on aquatic habitats to develop a better idea of both the diversity within the Preserve and the value of using submerged vegetation as part of a complete biodiversity study, an aspect currently not used. The study of submerged substrate would include culturing, in moist chamber, vegetative material that has been underwater in the diversity of aquatic habitats at BITH including lakes, creeks, rivers, or sloughs.

(b) Molecular population analysis and molecular diversity in soil and water

Molecular analysis of myxomycetes is almost solely limited to systematics—the study of the relationships between and among orders and genera. Only one study addresses questions that address within species relationships (Winsett and Stephenson 2008). More studies of this nature are required to understand the dispersal patterns of species and to develop protocols to investigate the actual biodiversity within the soil ecosystem. Field collecting gives us only the diversity within a snapshot in time. While moist chamber cultures of substrate material enhances the study of the diversity in a site, there is no data describing how comprehensive our knowledge is about the diversity because a significant portion of the life cycle is spent in the soil. Further development of intraspecific molecular data would be valuable for developing and using "barcode" markers for species identification from soil and water when no fruiting bodies are available

Literature Cited

Adl, M. S. and V. V. S. R. Gupta. 2006.Protists in soil ecology and forest nutrient cycling. Canadian Journal of Forest Research 36: 1805-1817. **Alexopoulos, C. J. And M. R. Henney. 1971**. Myxomycetes from Texas. II. Additions and corrections. The Southwestern Naturalist 16: 143-150. **Feest, A. and M.F. Madelin**. 1985. Numerical abundance of myxomycetes (Myxogastrids) in soils in the West of England. FEMS Microbiology Ecology 31: 353-360. **Feest, A. 1987**. The quantitative ecology of soil mycetozoa. Progress in Protistology 2: 331-361. **Madelin M.F. 1990**. Methods for studying the ecology and population dynamics of soil myxomycetes. Methods in Microbiology 22: 405-416. **Lado, C. 2001**. Nomenmyx, a nomenclatural taxabase of Myxomycetes. Cuadernos de Trabajo de Flora Micológica Ibérica 16: 1-122. **Martin, G.W. and C.J. Alexopoulos**. 1969. The Myxomycetes. University of Iowa Press, Iowa City. **Olive, L. S**. 1975. The Mycetozoans. Academic Press, New York. **Stephenson, S.L. and H. Stempen.** 1994. Myxomycetes: a Handbook of Slime Molds. Timber Press, Portland, Oregon. **Winsett, K.E. and S.L. Stephenson**. 2008. Using ITS sequences to assess intraspecific genetic relationships among geographically separated collections of the myxomycete *Didymium squamulosum.* Revista Mexicana de Micología 27: 59-65. **Winsett, K.E. and S.L. Stephenson.** 2011. Global distribution and molecular diversity of *Didymium difforme*. Mycosphere 2(2): 135-146).

AN ANNOTATED CHECKLIST OF THE MYXOMYCETES OF THE BIG THICKET NATIONAL PRESERVE, TEXAS

Katherine E. Winsett*
Department of Biological Sciences
University of Arkansas
Fayetteville, Arkansas 72701, U.S.A.
katherine.winsett@gmail.com
**corresponding author*

Steven L. Stephenson
Department of Biological Sciences
University of Arkansas
Fayetteville, Arkansas 72701, U.S.A.

ABSTRACT

The first checklist of the myxomycetes (plasmodial slime molds) of the Big Thicket National Preserve is presented herein. Eighty-eight species are listed. Fifty-three of the species listed are new records for the Preserve of which six are new records for Texas. One of the species new to Texas and the Preserve (*Arcyria margino-undulata*) is considered to be rare. Three other species (*Craterium paraguayense*, *Physarella oblonga*, and *Physarum bogoriense*) are recorded more often from subtropical and tropical than temperate habitats.

RESUMEN

Se presenta el primer catálogo de myxomycetes de la Big Thicket National Preserve. Se listan ochenta y ocho especies. Cincuenta y tres de las especies listadas son citas nuevas para la Reserva y de ellas seis son citas nuevas para Texas. Una de las especies nueva para Texas y la Reserva (*Arcyria margino-undulata*) se considera rara. Otras tres especies (*Craterium paraguayense*, *Physarella oblonga*, y *Physarum bogoriense*) se colectan más a menudo en hábitats subtropicales y tropicales que en templados.

INTRODUCTION

The myxomycetes are small, eukaryotic amoeboid organisms with trophic stages that feed upon populations of bacteria and other microorganisms associated with decaying plant material in all types of terrestrial habitats. There are approximately 900 species of myxomycetes known worldwide (Lado 2001). As a group, many species of myxomycetes are considered cosmopolitan, occurring across the globe in a variety of habitats. However, studies of their biodiversity and distribution suggest that species of myxomycetes are unevenly distributed across terrestrial habitats, with some possible habitat preferences observed for particular species (Stephenson et al. 2008).

The first reference in the literature to myxomycetes in the Big Thicket region was in the biological survey of the region by Parks and Cory (1936) in which the authors commented on the beauty of these organisms in the Big Thicket forests but included no species data. The published information relating to myxomycete diversity in the Big Thicket prior to the checklist presented in this paper is derived from surveys that predate the formation of the Preserve in 1974. None of these specifically targeted the Big Thicket region or East Texas. A herbarium and archive of specimen data survive for one statewide survey of myxomycetes (McGraw 1968). From the collecting localities recorded for each specimen, it was possible to develop a list of species for the area of the Big Thicket. Moreover, Alexopoulos and Henney (1971) specifically mentioned the Big Thicket area in his annotations for some species. It is not possible to determine if the localities from either survey are within what is now the Big Thicket National Preserve, but it is assumed that they fall within the biological Big Thicket region. While no previous survey of myxomycetes specifically targeted the Big Thicket region, it should be noted that much of what is known about the myxomycetes of the state of Texas as a whole was derived from the work of C.J. Alexopoulos and his students while the former was a member of the faculty at the University of Texas. His studies set the stage for both the research reported herein and other similar research efforts in many parts of the world.

The Big Thicket National Preserve is within the West Gulf Coastal Plain in southeastern Texas and represents a significant portion of the remaining sections of a large biological region historically termed the Big

Thicket. The Big Thicket is a collection of diverse biological habitats formed as a result of the co-occurrence of several different ecosystems, including elements of eastern hardwood forests, central North American grasslands, subtropical coastal plains and southeastern swamps that converge on a single region (Watson 2006). Diggs et al. (2006) used the term "biological boundary" to describe the Big Thicket region as the western limit of the Southeastern Mixed Forest Province, encompassing both the diverse eastern deciduous forests and the Outer Coastal Plain Province, with the latter including some subtropical vegetation elements. The humid subtropical climate of the Big Thicket region is noted for the high amounts of rainfall when compared to other areas in Texas, which results in a number of wetland habitats such as upland wet pine savannahs, wetland baygalls, and tupelo- cypress swamps (Marks & Harcombe 1981; Diggs et al. 2006; MacRoberts & MacRoberts 2008).

The historical or original Big Thicket region, which may have once spread across nearly 1.5 million hectares, is highly impacted by human activities, including commercial tree plantations and oil and gas exploration in particular, which frequently have resulted in the clear-cutting of large areas of forest (Gunter 1993; Diggs et al. 2006; Watson 2006). These anthropogenic effects on the region are reflected in the disjunct nature of the property designated as the Big Thicket National Preserve. The Preserve now encompasses just over 40,000 ha of biological Big Thicket spread across seven counties in 15 disjunct units that are areas of preserved forest with corridors along waterways such as the Neches River, Menard Creek, Village Creek, Little Pine Island Bayou, and Big Sandy Creek that connect some of the Preserve divisions.

This checklist is the result of a multi-year survey of the Big Thicket National Preserve in cooperation with the All Taxa Biodiversity Inventory project, the Thicket of Diversity, organized and sponsored by the Big Thicket Association. As indicated below, data were generated through a combination of surveys for fruiting bodies of myxomycetes that had developed under natural conditions in the field and plant litter collections for laboratory cultivation of myxomycetes using the moist chamber culture technique.

MATERIALS AND METHODS

The list was prepared from specimens collected as a result of field-based surveys carried out in the Big Thicket National Preserve from 2007–2010. In all, five collecting trips of approximately five to ten days representing the spring, summer and fall seasons, were made to the Big Thicket National Preserve: June 2007, March 2008, October 2009, May 2010, and June 2010. Specimens were also isolated from samples of dead plant material collected in the field, returned to the laboratory, and used to prepare moist chamber cultures of the type used for myxomycetes.

Collecting sites.—Collecting localities were chosen based upon habitat type in order to survey all of the habitat types found within the Preserve. Each site was geo-referenced using a handheld GPS. Eleven of fifteen Preserve units were included in this survey (Table 1) with collecting localities indicated in Figure 1.

Field collections.—Myxomycetes found in nature were collected along with the piece of substratum upon which the fruiting bodies occurred. These collections were allowed to dry and then preserved according to a standard practice in which the specimen is glued (e.g. Elmer's white glue) to acid-free cardstock paper slips and placed in small cardboard slide pill boxes for permanent herbarium storage.

Laboratory cultivation.—Plant litter was collected for moist chamber from each collection locality. For the moist chamber culture technique, four general types of dead plant material were collected and placed in small paper bags. These were aerial litter (portions, generally leaves, of dead vegetation still standing and above the ground), bark from living trees (small pieces of the outer bark collected at approximately one meter from the base of the tree), coarse woody debris (twigs and woody material on the forest floor), and ground litter (decaying leaf litter on the forest floor). More specific litter types were collected from various collecting localities that represented unique types of plant material for that habitat. These more specific substrata are included as necessary in the annotated checklist. For each collection, three replicate moist chambers were prepared as follows. The plant material was placed in roughly a single layer in a sterile, disposable plastic Petri dish (9 cm diameter) with a disk of filter paper on the bottom of the dish. The dish was filled with non-sterile deionized water to

TABLE 1. Number of specimens and species collected in each Preserve unit as well as the major vegetation communities collected within each unit.

Big Thicket Preserve Unit	Number of Specimens	Number of Species	Number of Sites	Major Vegetation Community/ies* Collected
Beaumont	48	21	4	Floodplain hardwood forest
Beech Creek	47	27	3	Lower slope hardwood-pine forest
Big Sandy	64	29	7	Nyssa Floodplain Seasonally Flooded Forest; upper slope pine oak forest; floodplain hardwood-pine forest
Canyonlands	57	27	2	Upper slope pine-oak forest; mid-slope oak-pine forest; lower slope hardwood-pine forest; cypress-tupelo swamp forest
Hickory Creek Savannah	144	35	7	Wetland pine savannah; upland pine savannah
Jack Gore Baygall	49	24	3	Baygall; floodplain hardwood forest
Lance Rosier	245	49	14	Palmetto hardwood flatland forest; lower slope hardwood-pine forest
Little Pine Island Bayou	35	17	1	Palmetto hardwood flatland forest
Loblolly	24	17	1	Flatland hardwood forest
Menard Creek Corridor	103	39	3	Floodplain hardwood forest; lower slope hardwood-pine forest
Turkey Creek	42	18	3	Cypress-tupelo swamp forest; mid-slope pine-oak forest; upper slope pine-oak forest

*Vegetation communities based on information from Marks & Harcombe (1981), MacRoberts et al. (2002), Brown et al. (2005), Brown et al. (2006a, b), Watson (2006), Brown et al. (2008), Brown et al. (2008), Brown et al. (2009), and Brown et al. (2010).

cover the material and left standing to soak for 15–24 hours. The pH was measured using a portable pH meter from the standing water remaining after the material was soaked then excess water was poured out of the dish. Culture plates were checked weekly and maintained over a period of approximately 10 weeks in indirect light at room temperature. Deionized water was added as necessary to keep the litter moist but without free water in the dish. They were checked weekly using a dissecting microscope for fruiting body formation. Mature fruiting bodies were removed and preserved for herbarium storage as described above. All fruiting bodies of the same species that occurred in the same dish were considered to represent one record or collection. Interestingly, although the culture plates were maintained for 10 weeks, very few species were recorded after 4–5 weeks, and all of these had been recorded previously.

Specimen vouchers.—Vouchers are held in the University of Arkansas Myxomycete Collection (Fayetteville, AR), with duplicates deposited at the S.M. Tracy Herbarium (TAES), Texas A&M University (College Station, TX). Complete data is available online in the collection database at http://slimemold.uark.edu.

Checklist development.—All species represented by specimens collected during this project between June 2007 and June 2010 were included in this checklist. To determine which species were new to the Big Thicket and new to Texas, a thorough search of the literature and the available online databases were examined (e.g. Alexopolous 1965; McGraw 1968; Martin & Alexopolous 1969; Alexopolous & Henney 1971; Cooke 1971; Talley 1976; Talley & Williams 1978; Whitney 1980; Ndiritu et al. 2009; Eumycetozoan database at http://slimemold.uark.edu; Global Biodiversity Information Facility at http://gbif.org [GBIF]).

RESULTS AND DISCUSSION

The surveys carried out between 2007 and 2010 in the Big Thicket National Preserve yielded a total of 858 collections from 48 collecting sites (Figure 1). Fruiting bodies collected in the field accounted for 324 of the reported specimens. A total of 552 moist chamber cultures were prepared and examined from plant material collected at each site, and these resulted in 534 additional collections. Eighty-eight species were recorded for the Big Thicket. Of these, 53 were new records for the Preserve, and six are new records for the state. The number of specimens and species for each unit can be found in Table 1.

There were several noteworthy species collected that reflect the reported tropical and subtropical characteristics of the Big Thicket area (Diggs et al. 2006). *Craterium paraguayense* (Speg.) G. Lister is most commonly

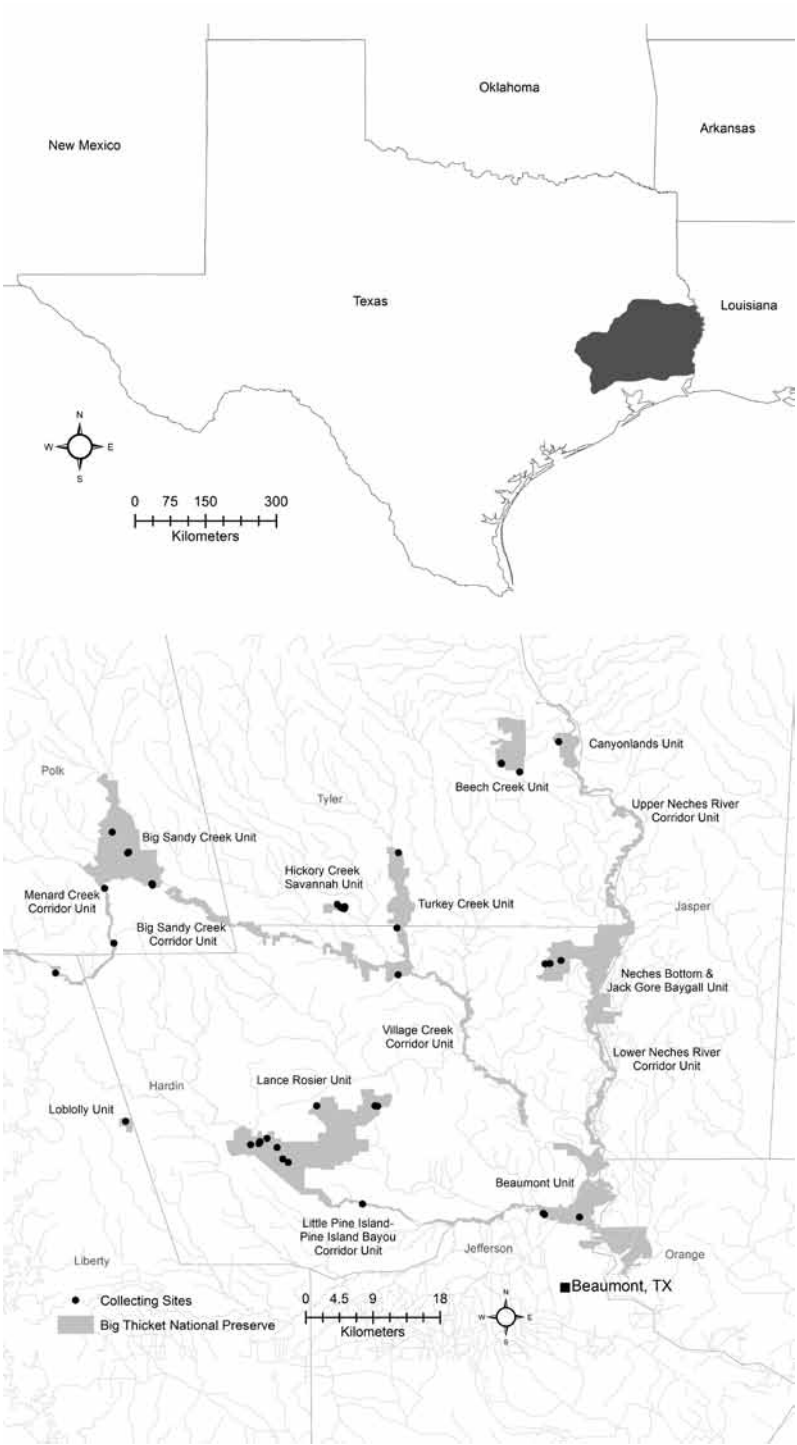

Fig. 1. A map of collecting localities within the Big Thicket National Preserve in eastern Texas.

collected in subtropical and tropical forests (Global Biodiversity Information Facility [GBIF]). Although both are occasionally reported in temperate regions of the world, *Physarella oblonga* (Berk. & M.A. Curtis) Morgan and *Physarum bogoriense* Racib. have distributions centered largely in the tropics (Martin & Alexopolous 1969).

Arcyria margino-undulata Nann.-Bremek. & Y. Yamam. is an unexpected addition to the checklist for the Big Thicket. This is a rare species known from relatively few localities worldwide. Prior to this report, there were approximately 20 records of this species available in the worldwide database of eumycetozoans at the University of Arkansas and GBIF. These records indicate that this species has been found previously only in the state of West Virginia in the United States, France, Germany, the Netherlands, Switzerland, and Japan. The fact that the species was found in two separate localities in the Big Thicket National Preserve is noteworthy.

Seven species reported in the literature as having been found in the general study area were not recorded during the course of our surveys. McGraw (1968) recorded two species, *Reticularia jurana* Meyl. and *Stemonitopsis reticulata* (H.C.Gilbert) Nann.-Bremek.& Y.Yamam, which was reported as *Comatricha reticulata* H.C. Gilbert. Alexopoulos (1971) listed five species that were not found during our surveys. These were *Physarum pulcherrimum* Berk. & Ravenel., *Physarum pulcherripes* Peck, *Enerthenema berkeleyanum* Rostaf., *Lamproderma scintillans* (Berk. & Broome) Morgan, and *Hemitrichia clavata* (Pers.) Rostaf.

It is evident from our collecting effort that myxomycetes are a common component of the ecosystems within the Big Thicket National Preserve. Evidence of myxomycetes appeared in nearly 75% of all moist chamber cultures prepared, with approximately 40% of those having evidence of multiple species. Despite the indications of an abundance of myxomycetes in the Big Thicket, the implications of this with regards to their function, particularly in the soil environment, are still quite limited. The data presented in this checklist establish a framework for the further development of more focused ecological studies within the Big Thicket in order to more fully connect the observations regarding myxomycetes to the unique ecosystems found in this area.

ANNOTATED CHECKLIST

The annotated checklist that follows is organized alphabetically first by genus and then by specific epithet in the six orders traditionally recognized for myxomycetes. In most cases, nomenclature follows Lado (2005–2012). It should be noted that the nomenclatural treatment of the myxomycetes proposed by Lado differs in a number of respects from that used traditionally by North American myxomycologists. For example, Lado recognized several genera (e.g., *Collaria* and *Stemonitopsis*) not included in Martin and Alexopoulos (1969), long considered as the standard source for myxomycete nomenclature. However, most recent publications have used Lado 2001, which is the approach followed in this paper. The total number of collections from each park unit is given in parentheses. The months in which specimens were collected in the field (fc) are listed followed by the months that the litter was collected from which the species was recorded in moist chamber (mc). Species that represent new records for the Big Thicket are indicated by an asterisk (*). Species that may represent new records for Texas are indicated by the state abbreviation (TX).

The following abbreviations are used to represent the park units in which each species was collected:

B Beaumont
BC Beech Creek
BS Big Sandy
CL Canyonlands
HCS Hickory Creek Savannah
JGB Jack Gore Baygall
L Loblolly
LPIB Little Pine Island Bayou
LR Lance Rosier
MCC Menard Creek Corridor
TC Turkey Creek

CERATIOMYXALES

Ceratiomyxa fruticulosa (O.F. Müll.) T. Macbr.
B (1), BC (3), BS (3), HCS (2), JGB (2), L (1), LR (6), MCC (2)
fc: May 2010, Jun 2007, 2010, Oct 2009

Collected in the field on decaying decorticated coarse woody debris from pine (*Pinus* spp.) and unidentified trees. Reported previously by McGraw (1968).

ECHINOSTELIALES

***Clastoderma debaryanum** A. Blytt
B (2), BS (1), CL (1), HCS (7), LR (1), TC (2)
fc: Oct 2009; mc: Mar 2008, Jun 2007, Oct 2009
One field collection associated with coarse woody debris. Eleven collections from moist chamber cultures prepared with samples of twigs, pine bark from living trees, bark from unidentified trees, pine needle ground litter, and aerial litter represented by pine twigs.

*(TX) **Echinostelium apitectum** K.D. Whitney
CL (1), HCS (2)
mc: Mar 2008, Oct 2009
All collections from moist chamber cultures prepared with pine bark from living trees.

***Echinostelium minutum** de Bary
B (2), BC (5), CL (1), HCS (8), JGB (1), LR (14), MCC (2), TC (2)
mc: Mar 2008, Jun 2007, 2010, Oct 2009
All collections from moist chamber cultures prepared with pine bark from living trees, aerial litter, angiosperm bark, ground litter, aerial litter composed of the inflorescences from pitcher plants (*Sarracenia alata* Alph. Wood), twigs, aerial litter from dwarf palmetto (*Sabal minor* [Jacq.] Pers.), and coarse woody debris.

LICEALES

***Cribraria aurantiaca** Schrad.
LR (1), JGB (1)
fc: Jun 2007, 2010
Collected in the field on decaying decorticated coarse woody debris.

Cribraria cancellata (Batsch) Nann.-Bremek.
BS (1), CL (1), HCS (4), JGB (1), L (1), LR (8)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Jun 2007
Fifteen field collections found associated with decaying decorticated coarse woody debris. One collection from a moist chamber culture prepared with a sample of ground litter composed of woody debris. Reported previously (as *Dictydium cancellatum* [Batsch] T. Macbr.) by McGraw (1968).

*(TX) **Cribraria confusa** Nann.-Bremek. & Y.Yamam.
BC (1), BS (4), HCS (10), JGB (2), LPIB (1), LR (20), MCC (3)
mc: Mar 2008, May 2010, Jun 2007, 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of coarse woody debris, pine bark from living trees, burned pine bark from living trees, and bark from unidentified trees.

Cribraria intricata Schrad.
BC (2), LR (4), L (2), LPIB (1)
fc: Jun 2007, 2010, Oct 2009
Nine field collections associated with decaying decorticated coarse woody debris. Reported previously by McGraw (1968).

Cribraria languescens Rex
HCS (4), JGB (2), L (1), LR (3)
fc: Jun 2007, Oct 2009; mc: Jun 2007
Eight field collections associated with decaying coarse woody debris. One collection from a moist chamber culture prepared with a sample of pine coarse woody debris. Reported previously by McGraw (1968).

Cribraria microcarpa (Schrad.) Pers.
HCS (20), JGB (2), L (3), LR (9), MCC (4), TC (7)
fc: Jun 2007, 2010, Oct 2009; mc: Mar 2008, Jun 2007, 2010, Oct 2009
Five field collections associated with coarse woody debris. Thirty-eight collections from moist chamber cultures prepared with samples of coarse woody debris, twigs, pine bark from living trees, bark from unidentified trees, aerial litter, aerial litter composed of the inflorescences from pitcher plants, aerial litter from bracken fern (*Pteridium aquilinum* [L.] Kuhn), ground litter, pine needle ground litter, and sphagnum (*Sphagnum* spp.) Reported previously by McGraw (1968).

***Cribraria minutissima** Schwein.
JGB (1)
fc: Jun 2007
Collected in the field from decaying coarse woody debris.

***Cribraria piriformis** Schrad.
LR (2)
fc: Oct 2009
Collected in the field from decaying pine coarse woody debris.

*(TX) **Cribraria tenella** Schrad.
fc: JGB (2)
Jun 2007
Collected in the field from decaying coarse woody debris.

***Cribraria violacea** Rex
BC (2), BS (1), CL (2), LR (1), MCC (4), TC (1)
mc: Mar 2008, Jun 2007, 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of bark from sweet gum (*Liquidambar styraciflua* L.), bark from unidentified trees, aerial litter, and coarse woody debris.

***Cribraria vulgaris** Schrad.
L (1)
fc: Jun 2007
Collected in the field from decaying coarse woody debris.

***Licea biforis** Morgan
MCC (1)
mc: Oct 2009
Collected from a moist chamber culture prepared with a sample of aerial litter.

***Licea kleistobolus** G.W. Martin
JGB (1)
fc: Jun 2007
Collected in the field on decaying coarse woody debris.

Licea operculata (Wingate) G.W. Martin
HCS (1)
mc: Oct 2009
Collected from a moist chamber culture prepared with a sample of pine bark from living trees. Reported previously by McGraw (1968).

Lycogala epidendrum (L.) Fr.
BC (3), HCS (3), JGB (3), L (2), LR (7), LPIB (1), MCC (2), TC (1)
fc: Jun 2007, 2010, Oct 2009; mc: Mar 2008, Jun 2007, 2010
Eighteen field collections associated with decaying coarse woody debris. Three collections from moist chamber cultures prepared with samples of pine bark from living trees and twigs. Reported previously by McGraw (1968). This species rarely appears in moist chamber culture, but small but perfectly formed aethalia were recorded in the present study. The species also appeared on samples of white oak (*Quercus alba* L.) bark the second author collected in northwest Arkansas. The occurrence in moist chamber cultures of species known almost exclusively from ground sites is an interesting aspect of the potential ecological distribution of myxomycetes. In addition to *Lycogala epidendrum*, two other "ground site" species that are sometimes collected from moist chambers are *Metatrichia vesparia* and *Trichia favoginea*, both of which were recorded from both types of situations in the present study.

Lycogala exiguum Morgan
MCC (2)
fc: May 2010, Oct 2009
Collected in the field from decaying pine coarse woody debris and decaying coarse woody debris from unidentified trees. Reported previously by McGraw (1968).

Tubifera ferruginosa (Batsch) J.F. Gmel.
LR (1)
fc: Jun 2010
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

PHYSARALES

***Badhamia melanospora** Speg.
HCS (1)
mc: Mar 2008
Collected from a moist chamber culture prepared with a sample of ground litter.

***Craterium aureum** (Schumach.) Rostaf.
MCC (1)
mc: May 2010
Collected from a moist chamber culture prepared with a sample of aerial litter.

***Craterium paraguayense** (Speg.) G. Lister
CL (1)
fc: Oct 2009
Collected in the field on ground litter from beech (*Fagus grandifolia* Ehrh.) and oak (*Quercus* spp.).

***Diachea leucopodia** (Bull.) Rostaf.
B (1), BC (1), CL (1), HCS (1), LR (4), MCC (3)
fc: Jun 2010; mc: Jun 2007, 2010, Oct 2009
One field collection associated with ground litter from cypress (*Taxodium distichum* [L.] Rich.). Ten collections from moist chamber cultures prepared with samples of coarse woody debris, aerial litter from oak, and aerial litter from ironwood (*Ostrya virginiana* [Mill.] K. Koch).

***Diderma chondrioderma** (de Bary & Rostaf.) G. Lister
CL (1)
mc: Mar 2008
Collected from a moist chamber culture prepared with a sample of bark.

***Diderma effusum** (Schwein.) Morgan
B (5), BS (3), CL (1), LR (5), L (1), LPIB (3), MCC (10), TC (3)
fc: Jun 2010; mc: Mar 2008, May 2010, Jun 2007, 2010, Oct 2009
One field collection associated with decaying coarse woody debris. Twenty-eight collections from moist chamber cultures prepared with samples of aerial litter, aerial litter from oak, aerial litter from ironwood, bark and leaf litter from tupelo (*Nyssa aquatica* L.), and bark from unidentified trees.

***Diderma hemisphaericum** (Bull.) Hornem.
BS (2), CL (1), HCS (1), LR (1), MCC (1)
mc: Mar 2008, May 2010, Jun 2007
All collections from moist chamber cultures prepared with samples of pine bark from living trees, bark from unidentified trees, ground litter, aerial litter, and aerial litter represented by needles from red cedar (*Juniperus virginiana* L.).

***Didymium iridis** (Ditmar) Fr.
HCS (1), TC (1)
mc: Mar 2008, Jun 2007
Collected from moist chamber cultures prepared with samples of ground litter.

***Didymium cf. minus** (Lister) Morgan
B (1), BS (1)
mc: Jun 2007, Oct 2009
Collected from moist chamber cultures prepared with samples of aerial litter and bark. These collections are limited to just a few sporocarps, so this identification is somewhat problematic. However, they clearly represent a species of *Didymium* that is different from other member of the genus recorded in the present study.

***Didymium nigripes** (Link) Fr.
CL (2), HCS (1), LR (1), TC (1)
fc: Jun 2007; mc: Mar 2008, Jun 2007, Oct 2009
One field collection associated with decaying coarse woody debris. Four collections from moist chamber cultures prepared with samples of ground litter.

***Didymium pertusum** Berk.
MCC (1)
mc: Oct 2009
Collected from a moist chamber culture prepared with a sample of aerial litter from magnolia (*Magnolia grandiflora* L.). Martin and Alexopoulos (1969) did not recognize *Didymium pertusum* as a distinct taxonomic entity, but the species is included in a number of the more recent monographs (e.g., Ing 1999). As it is morphologically similar to other species of *Didymium*, the validity of *D. pertusum* presents an interesting question in myxomycete taxonomy. An ongoing investigation by the first author is utilizing molecular tools together with laboratory cultivation on agar to more fully understand the taxon and its relationship to other species within the genus (Winsett and Parks, unpublished data).

***Didymium squamulosum** (Alb. & Schwein.) Fr.
MCC (3)
mc: May 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of bark, aerial litter, and aerial litter from magnolia.

Fuligo septica (L.) F.H. Wigg.
HCS (1), LPIB (1), MCC (1)
fc: May 2010, Jun 2007, Oct 2009
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

Physarella oblonga (Berk. & M.A. Curtis) Morgan
B (1)
fc: Oct 2009
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

***Physarum album** (Bull.) Chevall.
BS (5), CL (5), LR (11), TC (1)
fc: Oct 2009; mc: Mar 2008, Jun 2007
One field collection associated with decaying coarse woody debris. Eighteen collections from moist chamber cultures prepared with samples of pine bark from living trees and bark from unidentified trees.

***Physarum bivalve** Pers.
HCS (1)
mc: Jun 2007
Collected from a moist chamber culture prepared with a sample of pine bark from living trees.

***Physarum bogoriense** Racib.
LPIB (2)
mc: Oct 2009
Collected in moist chamber cultures prepared with samples of ground litter and coarse woody debris.

***Physarum cinereum** (Batsch) Pers.
MCC (1)
mc: Oct 2009
Collected from a moist chamber culture prepared with a sample of aerial litter from magnolia.

***Physarum crateriforme** Petch
BS (1), CL (1), JGB (1), MCC (1)
fc: Jun 2007; mc: Mar 2008, May 2010, Jun 2007
One field collection associated with decaying coarse woody debris. Three collections from moist chamber cultures prepared with samples of bark and aerial litter.

***Physarum galbeum** Wingate
BC (1), HCS (6), LR (1), MCC (1)
mc: Jun 2007, 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of coarse woody debris, aerial litter, aerial litter composed of the inflorescences from pitcher plants, aerial litter from oak, and aerial litter represented by twigs.

Physarum globuliferum (Bull.) Pers.
B (1), BS (2), L (1), LPIB (2)
fc: Jun 2007, 2010, Oct 2009
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

***Physarum leucophaeum** Fr.
BS (1)
mc: Jun 2007
Collected in a moist chamber culture prepared with a sample of bark.

Physarum melleum (Berk. & Broome) Massee
LR (1), MCC (2)
mc: May 2010, Jun 2007
Collected from moist chamber cultures prepared with samples of aerial litter from holly (*Ilex opaca* Aton.), bark from unidentified trees, and coarse woody debris. Reported previously by McGraw (1968).

***Physarum nucleatum** Rex
LR (1), L (1)
fc: Jun 2007
Collected in the field on decaying coarse woody debris.

***Physarum oblatum** T. Macbr.
CL (1)
mc: Mar 2008
Collected from a moist chamber culture prepared with a sample of ground litter.

***Physarum pusillum** (Berk. & M.A. Curtis) G. Lister
LPIB (2), LR (5), MCC (2)
mc: May 2010, Jun 2007, Oct 2009
All collections from moist chamber cultures prepared with samples of bark, twigs, bark and leaf ground litter from tupelo, aerial litter, and aerial litter represented by holly twigs.

Physarum roseum Berk. & Broome
BC (1), LR (1)
mc: Jun 2007, 2010
All collections from moist chamber cultures prepared with samples of ground litter. Reported previously by McGraw (1968).

Physarum stellatum (Massee) G.W. Martin
LR (1)
fc: Oct 2009
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

Physarum tenerum Rex
B (1), BS (2), L (1), LPIB (1)
fc: Jun 2007, 2010, Oct 2009
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

Physarum viride (Bull.) Pers.
B (2), BC (4), BS (4), HCS (2), LR (13), L (1), MCC (3), TC (2)
fc: Jun 2007, 2010, Oct 2009; mc: May 2010, Jun 2007, 2010, Oct 2009
Eleven field collections associated with decaying coarse woody debris from beech and decaying coarse woody debris from unidentified trees. Sixteen collections from moist chamber cultures prepared with samples of pine bark from living trees, bark from unidentified trees, and ground litter of burned pine bark from living trees. Reported previously by McGraw (1968).

***Willkommlangia reticulata** (Alb. & Schwein.) Kuntze
B (1), MCC (2), TC (1)
mc: Mar 2008, May 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of bark, twigs, and coarse woody debris.

STEMONITALES

Collaria arcyrionema (Rost.) Nann.-Bremek. ex Lado
B (5), BC (3), BS (1), CL (8), HCS (4), JGB (4), LR (11), LPIB (1), L (1), MCC (3), TC (2)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Jun 2007, Mar 2008, Oct 2009
Fourteen field collections associated with decaying pine coarse woody debris and decaying coarse woody debris. Twenty-eight collections from moist chamber cultures prepared with samples of bark from sweet gum, pine bark from living trees, and bark from unidentified trees, coarse woody debris from pine, coarse woody debris, ground litter, leaf and bark ground litter from tupelo, twigs, aerial litter, and aerial litter represented by holly twigs. Reported previously (as *Lamproderma arcyrionema* Rost.) by McGraw (1968).

Collaria lurida (Lister) Nann.-Bremek.
HCS (6)
mc: Jun 2007
All collections from moist chamber cultures prepared with samples of ground litter, ground litter from bracken fern, and aerial litter composed of the inflorescences from pitcher plants. Reported previously (as *Comatricha lurida* Lister) by Alexopoulos and Henney (1971).

Comatricha elegans (Racib.) G. Lister
BS (1), HCS (7), JGB (2), LR (5), MCC (1)
mc: May 2010, Jun 2007, Oct 2009
All collections from moist chamber cultures prepared with samples of pine bark from living trees, burned pine bark from living trees, bark from unidentified trees, coarse woody debris, and pine needle ground litter. Reported previously by McGraw (1968).

***Comatricha laxa** Rostaf.
CL (1), MCC (1)
mc: Mar 2008, May 2010
Collected from moist chamber cultures prepared with samples of ground litter and aerial litter.

***Comatricha nigra** (Pers. ex. J.F. Gmel.) J. Schröt.
BS (1), HCS (1), LR (3), MCC (1)
mc: Jun 2007, Oct 2009
All collections from moist chamber cultures prepared with samples of pine bark from living trees, bark from unidentified trees, and pine needle ground litter.

***Comatricha pulchella** (C. Bab.) Rostaf.
B (3), BC (2), HCS (4), JGB (2), LPIB (4), LR (4), MCC (2), TC (3)
fc: Jun 2007; mc: Jun 2010, Oct 2009
Two field collections associated with decaying coarse woody debris. Twenty-two collections from moist chamber cultures prepared with samples of coarse woody debris, twigs, bark, pine needle ground litter, ground litter, aerial litter, aerial litter from oak, aerial litter represented by pine needles, and aerial litter composed of the inflorescences from pitcher plants.

***Comatricha tenerrima** (M.A. Curtis) G. Lister
B (1), LR (1)
mc: Jun 2007, Oct 2009
Collected from moist chamber cultures prepared with samples of coarse woody debris and aerial litter represented by twigs.

Enerthenema papillatum (Pers.) Rostaf.
BC (1), LR (4)
fc: Jun 2010; mc: Jun 2007
One field collection associated with decaying coarse woody debris. Four collections from moist chamber cultures prepared with samples of pine bark from living trees and bark from unidentified trees. Reported previously by McGraw (1968).

***Macbrideola cornea** (G. Lister & Cran) Alexop.
BC (1)
mc: Jun 2010
Collected from a moist chamber culture prepared with a sample of bark.

***Macbrideola decapillata** H.C. Gilbert
LR (1)
mc: Jun 2007
Collected from a moist chamber culture prepared with a sample of twigs.

Stemonitis axifera (Bull.) T. Macbr
BC (2), BS (2), CL (2), JGB (1), LPIB (2), LR (3), MCC (2)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Oct 2009
Thirteen field collections associated with decaying coarse woody debris. One collection from a moist chamber culture prepared with a sample of coarse woody debris. Reported previously by McGraw (1968).

Stemonitis flavogenita E. Jahn
BC (2), JGB (1), LR (1)
fc: Jun 2007, 2010
Collected in the field on decaying coarse woody debris. Reported previously by McGraw (1968).

Stemonitis fusca Roth
BS (3), CL (1), HCS (2), JGB (2), LR (8), TC (1)
fc: May 2010, Jun 2007, 2010; mc: Mar 2008
Fourteen field collections associated with decaying coarse woody debris. Three collections from moist chamber cultures prepared with samples of twigs and ground litter. Reported previously by McGraw (1968).

***Stemonitis fusca** var. **nigrescens** (Rex) Torrend.
B (3), BC (1), CL (1), LR (3), MCC (2), TC (1)
fc: Jun 2010; mc: Jun 2007, Oct 2009
One field collection associated with decaying coarse woody debris. Ten collections from moist chamber cultures prepared with samples of coarse woody debris, ground litter, aerial litter, aerial litter from magnolia, and aerial litter from oak.

Stemonitis herbatica Peck
HCS (2), JGB (1), MCC (1)
fc: May 2010, Jun 2007, 2010; mc: Jun 2007
Three field collections associated with decaying coarse woody debris. One collection from a moist chamber culture prepared with a sample of bark. Reported previously by McGraw (1968).

Stemonitis smithii T. Macbr.
HCS (1), LR (2), LPIB (3)
fc: Jun 2010, Oct 2009; mc: Jun 2007
Five field collections associated with decaying coarse woody debris and decaying woody debris from pine. One collection from a moist chamber culture prepared with a sample of bark. Reported previously by McGraw (1968).

***Stemonitis splendens** Rostaf.
LPIB (1), LR (2)
fc: Jun 2007, 2010; Oct 2009
Collected in the field on decaying coarse woody debris.

Stemonitis virginiensis Rex
BC (1)
mc: Jun 2007
Collected in a moist chamber culture prepared with a sample of aerial litter. Reported previously by McGraw (1968).

***Stemonitopsis hyperopta** (Meyl.) Nann.-Bremek.
LR (3)
fc: May 2010, Jun 2010
Collected in the field on decaying wood and decaying cypress coarse woody debris.

Stemonitopsis typhina (F.H. Wigg.) Nann.-Bremek.
B (1), BS (1), CL (1), JGB (2), L (1), LR (3)
fc: May 2010, Jun 2007, 2010, Oct 2009
Collected in the field on decaying coarse woody debris. Previously reported (as *Comatricha typhoides* [Bull.] Rostaf.) by McGraw (1968).

TRICHIALES

Arcyria cinerea (Bull.) Pers.
B (9), BC (9), BS (12), CL (6), HCS (26), JGB (13), LR (41), LPIB (5), L (5), MCC (17), TC (12)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Mar 2008, May 2010, Jun 2007, 2010, Oct 2009
Forty-three field collections associated with pine coarse woody debris, coarse woody debris from beech, and decaying coarse woody debris. Ninety-five collections from moist chamber cultures prepared with samples of twigs, coarse woody debris, pine bark from living trees, bark from unidentified trees, ground litter, pine needle ground litter, aerial litter, aerial litter composed of the inflorescences from pitcher plants, and sphagnum. Reported previously by McGraw (1968).

Arcyria denudata (L.) Wettst.
BC (3), BS (2), CL (4), HCS (4), JGB (2), LR (15), LPIB (4), L (2), MCC (9), TC (1)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Jun 2007, 2010, Oct 2009
Twenty-eight field collections associated with decaying coarse woody debris and decaying pine woody debris. Fourteen collections from moist chamber cultures prepared with samples of coarse woody debris, bark from beech, pine twigs, aerial litter represented by twigs, aerial litter, and ground litter. Reported previously by McGraw (1968).

Arcyria incarnata (Pers. ex J.F. Gmel.) Pers,
LR (1)
fc: Jun 2010
Collected in the field from decaying coarse woody debris. Reported previously by McGraw (1968).

*(TX) **Arcyria margino-undulata** Nann.-Bremek. & Y. Yamam.
BC (1), MCC (1)
mc: Jun 2010, Oct 2009
Collected from moist chamber cultures prepared with samples of ground litter and coarse woody debris.

***Arcyria pomiformis** (Leers) Rostaf.
BC (1), JGB (1)
fc: Jun 2007; mc: Jun 2007
One field collection associated with decaying coarse woody debris. One collection from a moist chamber culture prepared with a sample of bark.

***Calonema aureum** Morgan
HCS (1)
fc: Jun 2007
Collected in the field from decaying coarse woody debris.

Hemitrichia calyculata (Speg.) M.L. Farr
B (3), BC (1), BS (3), CL (3), HCS (1), JGB (2), L (1), LPIB (3), LR (20), MCC (9)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Jun 2007
Forty-three field collections associated with decaying coarse woody debris. One collection from a moist chamber culture prepared with a sample of bark. Previously reported (as *H. stipitata* [Massee] T. Macbr.) by McGraw (1968).

*(TX) **Hemitrichia pardina** (Minakata) Ing
BC (1), CL (1)
mc: Jun 2010, Oct 2009
All collections from moist chamber cultures prepared with samples of bark and ground litter from beech and oak.

Metatrichia vesparia (Batsch) Nann.-Bramek. ex G.W. Martin & Alexop.
B (2), CL (6), HCS (3), LR (4), MCC (1)
fc: May 2010, Jun 2007, 2010, Oct 2009; mc: Jun 2007, Oct 2009
Nine field collections associated with decaying coarse woody debris. Six collections from moist chamber cultures prepared with samples of beech bark, coarse woody debris, ground litter from holly, and pine needle ground litter. Previously reported (as *Hemitrichia vesparia* [Batsch] T. Macbr.) by McGraw (1968). In all but the most recent publications on the myxomycetes, species is given as *M. vesparium*. However, Lado (2005-2012) considered as the correct spelling of the specific epithet to be *vesparia* instead of *vesparium*.

***Perichaena chrysosperma** (Curr.) Lister
B (4), BC (2), BS (9), CL (3), HCS (3), LR (1), MCC (7), TC (2)
mc: Jun 2007, Oct 2009
All collections from moist chamber cultures prepared with samples of bark from sweet gum, bark from beech, bark from unidentified trees, samples of twigs, coarse woody debris, ground litter, and aerial litter.

***Perichaena corticalis** (Batsch) Rostaf.
MCC (1)
mc: Oct 2009
Collected from a moist chamber culture prepared with a sample of bark. There are relatively few records of this species from bark, although in some situations (e.g., Novozhilov et al. 2006) it can be relatively abundant on this substratum.

***Perichaena depressa** Lib.
B (1), BS (2), HCS (1), LR (3)
mc: Jun 2007
All collections from moist chamber cultures prepared with samples of twigs, bark, ground litter, aerial litter, and aerial litter represented by holly twigs.

Perichaena microspora Penz. & Lister
BS (1)
mc: Jun 2007
Collected from a moist chamber culture prepared with samples of ground litter from magnolia. Reported previously by McGraw (1968).

***Perichaena vermicularis** (Schwein.) Rostaf.
BC (1), MCC (1)
mc: Jun 2007, Oct 2009
Collected from moist chamber cultures prepared with samples of ground litter and aerial litter.

Trichia favoginea (Batsch) Pers.
BS (1), HCS (4), LR (1), MCC (1)
fc: Jun 2007, 2010; mc: Jun 2007, Oct 2009
Five field collections associated with decaying coarse woody debris. Two collections from moist chamber cultures prepared with samples of bark from fallen tree and ground litter. Reported previously by McGraw (1968).

*(TX) **Trichia munda** (Lister) Meyl.
BC (1), BS (1)
mc: Jun 2007
Collected from moist chamber cultures prepared with samples of ground litter and bark.

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REFERENCES

Alexopoulos, C.J. 1965. First list of myxomycetes from Texas, with notes on some rarely reported species. Southw. Naturalist 10:221–226.

Alexopoulos, C.J. and M.R. Henney. 1971. Myxomycetes from Texas II. Additions and corrections. Southw. Naturalist 16:143–150.

Biodiversity occurrence data published by: The Fungal Collection at the Senckenberg Museum für Naturkunde Görlitz; Planetary Biodiversity Inventory Eumycetozoan Databank; National Botanic Garden Belgium – Myxomycetes; Myxomycetes Collection of National Museum of Nature and Science; Herbarium of The New York Botanical Garden; Real Jardin Botanico, Madrid: MA-Fungi; Ibaraki Nature Museum, Fungi collection; The Myxomycetes Collections at the Botanische Staatssammlung München - Collection of Hermann Neubert; The Myxomycetes Collections at the Botanische Staatssammlung München - Collection of Martin Schnittler; The Myxomycetes Collection at the V. L. Komarov Botanical Institute, St. Petersburg (Accessed through GBIF Data Portal, data.gbif.org, 2012-01-27).

Biodiversity occurrence data published by: The Eumycetozoan Collection at the University of Arkansas (Accessed through the Eumycetozoan Project database, slimemold.uark.edu, 2012-01-27).

Brown, L.E., B.R. MacRoberts, M.H. MacRoberts, P.A. Harcombe, W.W. Pruess, I.S. Elsik, and D. Johnson. 2005. Annotated checklist of the vascular flora of the Turkey Creek Unit of the Big Thicket National Preserve, Tyler and Hardin Counties, Texas. Sida 21:1807–1827.

Brown L.E., B.R. MacRoberts, M.H. MacRoberts, P.A. Harcombe, W.W. Pruess, I.S. Elsik, and S.D. Jones. 2006a. Annotated checklist of the vascular flora of the Lance Rosier Unit of the Big Thicket National Preserve, Hardin County, Texas. Sida 22:1175–1189.

Brown L.E., B.R. MacRoberts, M.H. MacRoberts, P.A. Harcombe, W.W. Pruess, I.S. Elsik, and S.D. Jones. 2006b. Annotated checklist of the vascular flora of the Big Sandy Creek Unit, Big Thicket National Preserve, Texas. Sida 22:705–723.

Brown, L.E., B.R. MacRoberts, M.H. MacRoberts, P.A. Harcombe, W.W. Pruess, I.S. Elsik, and S.B. Walker. 2008. Annotated checklist of the vascular flora of the Beech Creek Unit of the Big Thicket National Preserve, Tyler County Texas. J. Bot. Res. Inst. Texas 2:651–660.

Brown, L.E., B.R. MacRoberts, M.H. MacRoberts, and W.W. Pruess. 2009. Annotated checklist of the vascular flora of the Menard Creek Corridor Unit of the Big Thicket National Preserve, Polk, Liberty, and Hardin counties, Texas. J. Bot. Res. Inst. Texas 3:443–455.

Brown, L.E., B.R. MacRoberts, M.H. MacRoberts, W.W. Pruess, I.S. Elsik, and S. Jones. 2010. Annotated checklist of the vascular flora of the Jack Gore Baygall and Neches Bottom Units of the Big Thicket National Preserve, Tyler, Jasper and Hardin Counties, Texas. J. Bot. Res. Inst. Texas 4:473–488.

Brown, L.E., B.R. MacRoberts, M.H. MacRoberts, W.W. Pruess, I.S. Elsik, and S.B. Walker. 2008. Annotated checklist of the vascular flora of the Loblolly Unit of the Big Thicket National Preserve, Liberty County, Texas. J. Bot. Res. Inst. Texas 2:1481–1489.

Cooke, W.B. 1971. The 1967 Foray in Texas. Mycologia 63:1063–1067.

Diggs, G.M., B.L. Lipscomb, M.D. Reed, and R.J. O'Kennon. 2006. Illustrated flora of east Texas. Sida, Bot. Misc. 26:1–1594.

Gunter, P.A.Y. 1993. The Big Thicket: an ecological reevaluation. University of North Texas Press, Denton.

Ing, B. 1999. The Myxomycetes of Britain and Ireland: an identification handbook. The Richmond Publishing Co., Ltd, Slough, England.

Lado, C. 2001. Nomenmyx. A nomenclatural taxabase of Myxomycetes. Cuad. Trab. Fl. Micol. Ibér. 16:1–221.

Lado, C. (2005–2012). An on line nomenclatural information system of Eumycetozoa. http://www.nomen.eumycetozoa.com (last consulted Jan 2012).

MacRoberts, M.H. and B.R. MacRoberts. 2008. The Big Thicket of Texas as floristically unique habitat. J. Bot. Res. Inst. Texas 2:665–671.

MacRoberts, B.R., M.H. MacRoberts, and L.E. Brown. 2002. Annotated checklist of the vascular flora of the Hickory Creek Unit of the Big Thicket National Preserve, Tyler County, Texas. Sida 20:781–795.

Marks, P.L. and P.A. Harcombe. 1981. Forest vegetation of the Big Thicket, southeast Texas. Ecol. Monogr. 51:287–305.

Martin, G.W. and C.J. Alexopoulos. 1969. The Myxomycetes. University of Iowa Press, Iowa City, IA. 560 pp.

McGraw, J.L., Jr. 1968. A study of the myxomycetes of Texas. PhD Dissertation. Texas A&M University.

Ndiritu, G.G., F.W. Spiegel, and S.L. Stephenson. 2009. Distribution and ecology of the assemblages of myxomycetes associated with major vegetation types in Big Bend National Park, USA. Fungal Ecol. 2:168–183.

Novozhilov, Y.K., I.V. Zemlianskaia, M. Schnittler, and S.L. Stephenson. 2006. Myxomycete diversity and ecology in the arid regions of the Lower Volga River Basin (Russia). Fungal Diversity 23:193–241.

Parks, H.B. and V. Cory. 1936. Biological survey of the east Texas Big Thicket area. Texas Agric. Exp. Sta., College Station.

Stephenson, S.L., M. Schnittler, and Y.K. Novozhilov. 2008. Myxomycete diversity and distribution from the fossil record to the present. Biodivers. & Conservation 17:285–301.

Talley, L.L. 1976. Myxomycetes of four West Texas counties. Masters Thesis. Abilene Christian University.

Talley, L.L. and K.B. Williams. 1978. Eight new species of myxomycetes from West Texas. Southw. Naturalist 23:689–691.

Watson, G.E. 2006. Big Thicket plant ecology: an introduction, 3rd ed. University of North Texas Press, Denton.

Whitney, K.D. 1980. The myxomycete genus *Echinostelium*. Mycologia 72:950–987.