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> A Study of the Lichens of Five Big Thicket Plant Communities

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# BIG THICKET NATIONAL PRESERVE

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#### A Study of the Lichens of Five Big Thicket Plant Communities

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Cynthia L. Troxell

Abstract. One hundred fourteen taxa of lichens are reported for five vascular plant communities of the Big Thicket of Southeast Texas. <u>Parmelia formosana</u> is a new record for this area.

Little has been published concerning the lichen flora of the Big Thicket of Southeast Texas, although the biological diversity of the region has long been recognized.<sup>1</sup> McLeod (1967) defines the Big Thicket as a 350,000 acre biological unit whose vegetation is that of an edaphic-mesophytic climax forest, predominately loblolly pine-hardwood association. Eight different plant communities or associations are recognized within the Big Thicket, depending upon whether one follows the system of McLeod or of Watson (1975).

<u>Methods</u>. Study sites were representative of the following five plant communities: Beech-Magnolia-Loblolly Pine (BML); Upland Forest (UF); Streambank-Floodplain (SF); Arid Sandyland (AS); and Pine Savannah (PS). Indicator tree species for each community are listed in Table 1. Collections were made in eight areas, shown in Figure 1, between May 1976 and February 1977, as follows.

 Hardin County, vicinity of Camp Waluta, Camp Fire Girls' Camp on Beech Creek, 6 mi NNE of Kountze, 8 mi ESE of Village Mills, 30 28'N, 94 16'W. BML and UF communities.
Tyler Co., John H. Kirby State Forest, 15 mi. S of Woodville, 15.75 mi N of Kountze, on US Highway 287, 30 35'N, 94 24'W. BML and UF communities.  Hardin Co., Kirby Primitive Area, ca. 7 mi. NNE of Kountze, and 2.5 mi SE of Village Mills, on Farm Road 420, 30 28'N, 94 21'W. BML and Streambank communities.
Hardin Co., ca. 6 mi N of Kountze, E side of Village Creek, ca. 0.9 mi. NE of McNeely Cemetary. AS community.
Hardin Co., 1.2 mi. SE of Saratoga, 30 17'N, 94 31'W. Pine Savannah.
Hardin Co., Pine Island Bayou floodplain just S of Farm Road 770 bridge, ca. 6 mi. W of Saratoga. Palmetto-hardwood flats.
Hardin Co., 3.7 mi NW of Kountze, 94 20'W, 30 26'20"N. BML and Streambank communities.
Jefferson Co., "Pinewood" subdivision W of Beaumont on Farm Road 105. Upland Forest.

The method of collection within a community was not quantitative, but an effort was made to sample representative trees at the base, about 1.4 m high on the trunk, and in the canopy, if recently fallen branches were available or if the trees were easily climbed. Substrates such as logs, stumps, snags, soil, and leaves were also examined. Lichen nomenclature follows Hale and Culberson (1970).

correlation between the number of lichen species and the number of substrates colonized within a community:

Community	# Lichen Spr	o. # Substrates Colonized
BML	65	14
UF	57	13
SF	47	11
AS	36	6
PS	15	5
Community	# Lichen Spr	. # Substrates Colonized
	and the second sec	. # Substrates Colonized
BML	65	14
BML UF	65 64	14 13
BML UF SF	65 64 56	14 13 11
BML UF	65 64	14 13

Results.

Table 2 shows which lichen species were found in each community.

While no direct relation between the boundaries of the vascular plant communities and the distribution of lichen species was found, several points concerning lichen distribution can be made.

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1. Culberson (1955) states that in regions where the woody vegetation is of relatively homogeneous floristics, the most important factors in the determination of bark communities are factors of the substrate, such as hardness, facility for water absorption, etc. The BML, UF, and SF communities have a similar variety of hardwoods, and for the most part their lichen species are the same. The distribution of a few species seems to be dependent upon substrates unique to one community:

<u>Graphina glaucoderma</u> was found only on the very hard, smooth bark of <u>Fagus</u> grandfiolia, and <u>Strigula</u> complanata was found only on the leaves of <u>Magnolia</u> grandiflora in the BML community.

<u>Glyphis cicatricosa</u> and <u>Byssoloma leucoblepharum</u> were found only on the smooth, relatively soft bark of <u>Carpinus caroliniana</u> in the SF community.

2. Barkman (1958) and Yarranton (1972) cite illumination as a variable in determining lichen distribution. It would seem that since fruiticose lichens have relatively little bark contact this would affect their distribution more than bark factors. It was found that \_ the SF community, in which the opencrowned trees were more widely spaced that in the BML or UF, had a greater abundance of fructicose individuals, and had two fructicose and subfructicose species not found elsewhere-Teloschistes chrysophthalmus and Anaptychia echinata .

This effect also seems to account for the rich variety of lichen species found in the Arid Sandyland, where <u>Quercus</u> <u>incana</u> was the only tree supporting many epiphytes. These trees were widely spaced, and possibly received added light from the reflective surface of the white quantz sand hills on which they grew. Corticolous fruiticose lichens were abundant here. <u>Usnea rubignea</u> was found only in the AS and the SF.

3. The Arid Sandyland had the greatest variety of soil lichens probably because its quartz sand was the most well-drained soil sampled. Lichens require alternate periods of wetting and drying to maintain their symbiosis, and thus would find the sandy soil an ideal substrate. Soil lichens of the genus <u>Cladonia</u> were abundant. Three species, <u>C. clacvulifera</u>, <u>C. leporina</u>, and <u>C. subtenuis</u> were unique to the AS. The latter two formed conspicuous mats. 4. Moisture has also been discussed by Barkman (1958) as a factor influencing lichen distribution. In the Stream Floodplain gelatinous lichens of the genus <u>Leptogium</u> formed dark bands around the bases of trees. This abundance of individuals was not noted in other communities. <u>Leptogium azureum</u> was found only in the SF.

5. Barkman and others have noted that conifers usually support only a poor epiphytic vegetation due to factors such as high acidity, presence of resins, and rapid rate of bark scaling. The Pine Savannah's lichen flora was clearly depauperate compared to those of the other predominantly hardwood communities. Most of the lichens which do occur in the PS are found on the understory shrub <u>Myrica cerifera</u>.

It is worth mentioning one lichen unique to the PS; <u>Mycocalicium parietinum</u>, which was found on beetle-damaged, ecorticate trees only. This lichen might be looked for in the other communities where beetle damage has occured. Acknowledgements

The assistance of Dr. Robert S. Egan, who made or confirmed some of the <u>Parmelia</u> determinations, was greatly appreciated. Dr. Stephen Whipple provided helpful suggestions along ecological lines. Special thanks go to Dr. Shirley Tucker, who as my advisor for this project gave many helpful suggestions and encouragement.

Note 1. See Egan (1976) and Hale (1969- distribution maps).

#### Literature Cited

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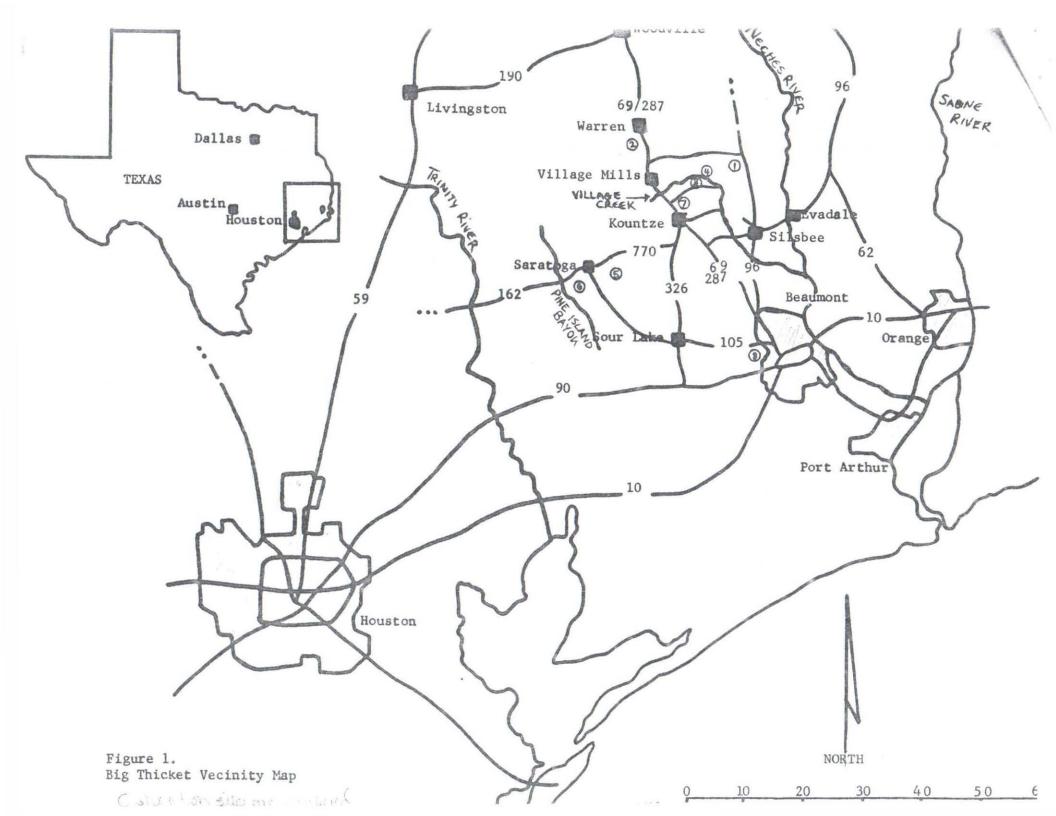
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# TABLE 1: Indicator Tree Species of Five Big Thicket Plant Communities

#### Beech-Magnolia-LoblollyCommunity

Fagus grandifolia Magnolia grandiflora Pinus taeda Quercus michauxii Q. alba Acer sp. Carya tomentosa Fraxinus americana Ilex opaca I. vomitoria

Upland Forest Community

Pinus palustris P. echinata Liquidambar styraciflua Quercus marilandica Prunus serotina Viburnum rufidulum

#### Streambank-Floodplain Community

Sabal minor Taxodium distichum Quercus nigra Q. phellos Betula nigra Salix nigra Carpinus caroliniana Crataegus brachyacantha Gleditsia tricanthos

# Arid Sandyland Community

Pinus palustris Quercus incana Vaccineum arboreum

#### Pine Savannah Community

Pinus palustris P. taeda Myrica cerifera 1

Foliose Species	Plant Communities Found In						
	BML		SF	AS			
Anaptychia echinata			х			and and an other states of the	
A. obscurata	x	x					
A. ravenelii	x	x	x				
Coccocarpia cronia	ж	x					
C. parmelioides		x		х			
Collema nigrescens	x	Constanting of	Contraction Contraction		PROMPTO A	NBC 214	
C. subfurvum		x	х				
Leptogium austroamericanum	x	x	х				
L. azureum			x				
L. cyanescens	x	х	x				
L. marginellum	х	x	X	overgae also comp	and the start		
Pannaria halei		x					
Parmelia aurulenta	х						
P. caroliniana	x		х	х	x		
P. cetrata			x				
P. cristifera		A log allor of	X	electronic and inco		CP STATE OF STATE	
P. chryptochlorophaea		х	x	x			
P. endosulphurata	×						
P. dissecta	x		x				
P. formosana	X	х		x			
P. horrescens	Harthactorough (Spogle organity or po	- Countradores	X	Conceptual and and	padding Christians	a grant and a	
P. hypotropa		х		x			
P. livida	х	ж	x	x			
P. louisianae		x		x			
P. michauxiana	x	x	х	x			
P. perforata	x	x	X	X	Ket L-Dunk-10	-	
P. praesorediosa		x					
P. rampoddensis	x	x	x	x			
P. reticulata	x	x	x	х			
P. rigida		x	x	x			
P. rudecta	x	x	x	x	Х	and the second	
P. scortella		x	x	х	x		
P. subcrinita				x			
P. subisidiosa	x	х	x	x			
P. subtinctoria				x			
P. tinctorum	x	x	x	x	х		
Physcia aegialita	x	x	x	x			
P. aipolia			x	x			
P. aspera	х						
P. ciliata			х		x		
P. picta	and the second	x	and the second	x	x	and a second sec	
Pseudocyphellaria aurata	x	0.00					
Pyxine caesiopruinosa	100	х		х			
P. sorediata	х	10070					
Physcia tribacoides	x		х				
Xanthoria candelaria	and the second sec	x					
ecorticate foliose lichen	x						
construct solvore resulti	~						

Abbreviations: Beech-Magnolia-Loblolly (BML); Upland Forest (UF); Streambank-Floodplain (SF); Arid Sandyland (AS); Pine Savannah (PS).

# TABLE 2 continued-

Anthracothecium leucostomumxxxArthonia sp.xxxArthopyrenia sp.xxxA. sect. AnisomeridiumxxA. sect. EuarthopyreniaxBacidia fuscorubellaxB. schweinitziixB. schweinitziixBombyliospora domingensexBuellia rappiixBuellia sp.xXxSyssoloma leucoblepharumxC. cerinaxC. cerinaxC. discolorxC. sanguineumxXxChiodecton montagnaeixXxGlyphis cicatricosaxCraphis afzeliixXxL. chlaroteraxXxL. caesiorubellaxX <t< th=""><th>Crustose Species</th><th>Plant C</th><th></th><th></th><th></th><th>ound In</th></t<>	Crustose Species	Plant C				ound In
Arthonia sp. x x x   Arthopyrenia sp. x x   A. sect. Anisomeridium x   A. sect. Ruarthopyrenia x   Bacidia fuscorubella x   Bacidia fuscorubella x   Bacidia fuscorubella x   Bacidia sp. x   Bombyliospora domingense x   Byssoloma leucoblepharum x   C. discolor x   C. sanguineum x   X x   C. sorripta x   G. sp. x   Haematomma puniceum x   X x   L. charotera x   L. conizaea x   L. conizaea x   L. colocation x   Leptorema monosporum x   Leptorema monosporum x   Kalanda x   M. cruenta x   Ochrolechia pallescens x   Y x <td></td> <td>BML</td> <td>UF</td> <td>SF</td> <td>AS</td> <td>PS</td>		BML	UF	SF	AS	PS
Arthopyrenia sp. x   A. sect. Anisomeridium x   A. sect. Anisomeridium x   A. sect. Evarthopyrenia x   Bacidia fuscorubella x   Bacidia fuscorubella x   B. schweinitzii x   Bacidia sp. x   Bacidia sp. x   Bombyliospora domingense x   Buellia rappii x   Buellia sp. x   Buellia sp. x   Caloplaca aurantiaca x   C. cerina x   C. discolor x   C. discolor x   C. discolor x   C. discolor x   C. sanguineum x   X x   C. sanguineum x   X x   C. sanguineum x   C. discolor x   C. sanguineum x   C. sanguineum x   C. sanguineum x   K. C. sanguineum x   L casiosoub		х	x	x		
A. sect. Anisomeridium   x     A. sect. Ruerthopyrenia   x     Bacidia fuscorubella   x     Bacidia sp.   x     Bacidia sp.   x     Bacidia sp.   x     Bombyliospora domingense   x     Buellia rappii   x     Buellia sp.   x   x     Buellia sp.   x   x     C. cerina   x   x     C. discolor   x   x     C. cerina   x   x     C. discolor   x   x     C. sanguineum   x   x     Scripta   x   x     G. sp.   x   x     Haematomma puniceum   x   x     L. chlarotera   x   x     L. conizaea   x   x     L. conizaea   x   x     X   x   x     Leptotream monosporum   x   x     Lecidea sp.   x   x     L. chizaea   x   x     L. charotera   x   x     Leptotrema monosporum <td></td> <td>x</td> <td>x</td> <td></td> <td></td> <td>ж</td>		x	x			ж
A. sect. Euarthopyrenia   x     Bacidia fuscorubella   x     B. schweinitzii   x     Bacidia sp.   x x     Bombyliospora domingense   x     Buellia rappii   x     Byssoloma leucoblepharum   x     Caloplaca aurantiaca   x     C. cerina   x     C. discolor   x     C. sanguineum   x     X   x     Glyphis cicatricosa   x     Graphia afzelii   x     X   x     Baematoma puniceum   x x     L conizaea   x     L. conizaea   x     L. conizaea   x     X   x     Leptoraphis epidermis   x     x   x     Leptoraphis epidermis   x     x   x     Lonizaea   x     X   x     Lopadium leucoxanthum   x     X			ж			
Bacidia fuscorubella   x     B. schweinitzii   x     Bacidia sp.   x     Bombyliospora domingense   x     Buellia rappii   x     Buellia sp.   x   x     Buellia sp.   x   x   x     Buellia sp.   x   x   x   x     Busciona leucoblepharum   x   x   x   x     Caloplaca aurantiaca   x   x   x   x   x     C. cerina   x   x   x   x   x   x     C. cerina   x   x   x   x   x   x   x     C. discolor   x   x   x   x   x   x   x   x     C. discoler   x   x   x   x   x   x   x   x     Glyphis cicatricosa   x   x   x   x   x   x   x     G. scripta   x   x   x   x   x   x   x     L chlarotera   x   x   x   x   x				x		
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Buellia rappii   x		x	х			
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C. cerina   x     C. discolor   x     Chiodecton montagnaei   x   x     C. sanguineum   x   x     C. sanguineum   x   x     Clyphis cicatricosa   x   x     Graphia glaucoderma   x   x     Graphis afzelii   x   x     G. scripta   x   x     G. scripta   x   x     G. scripta   x   x     Maematomma puniceum   x   x     Lecanora atra   x   x     L. chlarotera   x   x     L. conizaea   x   x     X   x   x     L. conizaea   x   x     X. caesiorubella   x   x     L. conizaea   x   x     L. chiarotera   x   x     Lecidea sp.   x   x     Lecidea sp.	Byssoloma leucoblepharum			ж		
C. discolor   x   x     Chiodecton montagnaei   x   x   x     C. sanguineum   x   x   x     Glyphis cicatricosa   x   x   x     Graphina glaucoderma   x   x   x     Graphis afzelii   x   x   x   x     G. scripta   x   x   x   x   x     G. sp.   x   x   x   x   x   x     Haematomma puniceum   x   x   x   x   x   x     L. charotera   x   x   x   x   x   x   x     L. conizaea   x   x   x   x   x   x   x     L. caesiorubella   x   x   x   x   x   x   x     Lecidea russula   x   x   x   x   x   x     Lecidea sp.   x   x   x   x   x   x     Lecidea sp.   x   x   x   x   x     Leptortrema monosporum   x	Caloplaca aurantiaca		х			
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C. sanguineum x x   Clyphis cicatricosa x   Graphina glaucoderma x   Graphis afzelii x   G. scripta x   G. scripta x   X x   Maematomma puniceum x   X x   Lecanora atra x   L. chlarotera x   L. conizaea x   L. conizaea x   L. caesiorubella x   L. subfusca group x   X x   Lecidea russula x   Leptoraphis epidermis x   Leptoraphis epidermis x   Leptoraphis epidermis x   K x   Leptoraphis epidermis x   Loadium leucoxanthum x   X x   M. cruenta x   Q. subtilis x   X x   Pertusaria sp. x   X x   Y x   Paeographis dendritica x   X x   Prina cestrensis x   Pyrenula neglecta x   X x   Prypethelium mastoideum x   X	C, discolor			the second second	X	and a state of the
Glyphis cicatricosa   x     Graphina glaucoderma   x     Graphis afzelii   x     G. scripta   x   x     G. scripta   x   x   x     G. scripta   x   x   x   x     G. scripta   x   x   x   x   x     G. scripta   x   x   x   x   x     Haematomma puniceum   x   x   x   x   x     Haematomma puniceum   x   x   x   x   x     Lecanora atra   x   x   x   x   x     L. chlarotera   x   x   x   x   x     L. conizaea   x   x   x   x   x     Lecidea russula   x   x	Chiodecton montagnaei	x		х	X	
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		×	~			

# TABLE 2 continued-

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Fruticose Species	Plant	Co	manu	niti	es I	Found	In
	BM	a.	UF	SF	AS	PS	
Cladonia balfourii	X	5	х	C S CELEVILLE S . PAR	х		
C. capitata			х		х	х	
C. clavulifera					х		
C. cristatella	X	2					
C. didyma	х			Taxan delana	No. S. MINGS	ALL OF MALE IN CASE OF	distants in
C. leporina					х		
C. subtenuis					X		
Cladonia sp. (sterile squamules)	)			к			
Coenogonium interplexum	×	2					
Mycocalicium parietinum	the second second second	and the second		In some clinic local	the sector sector	х	Cite Sine
Ramalina sorediantha	х		x	x	х		
R,willeyi			x	х			
Teloschistes chrysophthalmus				x			
Tricharia melanothrix	X			x	x		
Usnea mutabilis	on on other states of the second		х		х	Contracting the lite	and the second se
U. rubiginea					X		
U. strigosa	x		x	x	ж		