A Study of the Lichens of Five Big Thicket Plant Communities

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Abstract. One hundred fourteen taxa of lichens are reported for five vascular plant communities of the Big Thicket of Southeast Texas. Parmelia formosana ia 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.[1] 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).

Methods. 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.

1. 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.
2. 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.

3. 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.
4. Hardin Co., ca. 6 mi N of Kountze, E side of Village Creek, ca. 0.9 mi. NE of McNeely Cemetary. AS community.
5. Hardin Co., 1.2 mi. SE of Saratoga, 30 17'N, 94 31'W. Pine Savannah.
6. Hardin Co., Pine Island Bayou floodplain just S of Farm Road 770 bridge, ca. 6 mi. W of Saratoga. Palmetto-hardwood flats.
7. Hardin Co., 3.7 mi NW of Kountze, 94 20'W, 30 26'20"N. BML and Streambank communities.
8. 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).

Results. Preliminary data (4 February 1977) suggested a direct correlation between the number of lichen species and the number of substrates colonized within a community:

Community	# Lichen Spp.	# Substrates Colonized
BML	65	14
UF	57	13
SF	47	11
AS	36	6
PS	15	5

Additional collection gave the following results.

Community	# Lichen Spp.	# Substrates Colonized
BML	65	14
UF	64	13
SF	56	11
AS	51	6
PS	16	5

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.

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:

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

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

2. Barkman (1958) and Yarranton (1972) cite illumination as a variable in determining lichen distribution. It would seem that since fruticose lichens have relatively little bark contact this would affect their distribution more than bark factors. It was found that in the SF community, in which the open-crowned trees were more widely spaced that in the BML or UF, had a greater abundance of fruticose individuals, and had two fruticose and subfruticose 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 Quercus incana was the only tree supporting many epiphytes. These trees were widely spaced, and possibly received added light from the reflective surface of the white quartz sand hills on which they grew. Corticolous fruticose lichens were abundant here. Usnea rubignea 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 Cladonia were abundant. Three species, C. clavulifera, C. leporina, and C. subtenuis 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 Leptogium formed dark bands around the bases of trees. This abundance of individuals was not noted in other communities. Leptogium azureum 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 Myrica cerifera.

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

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

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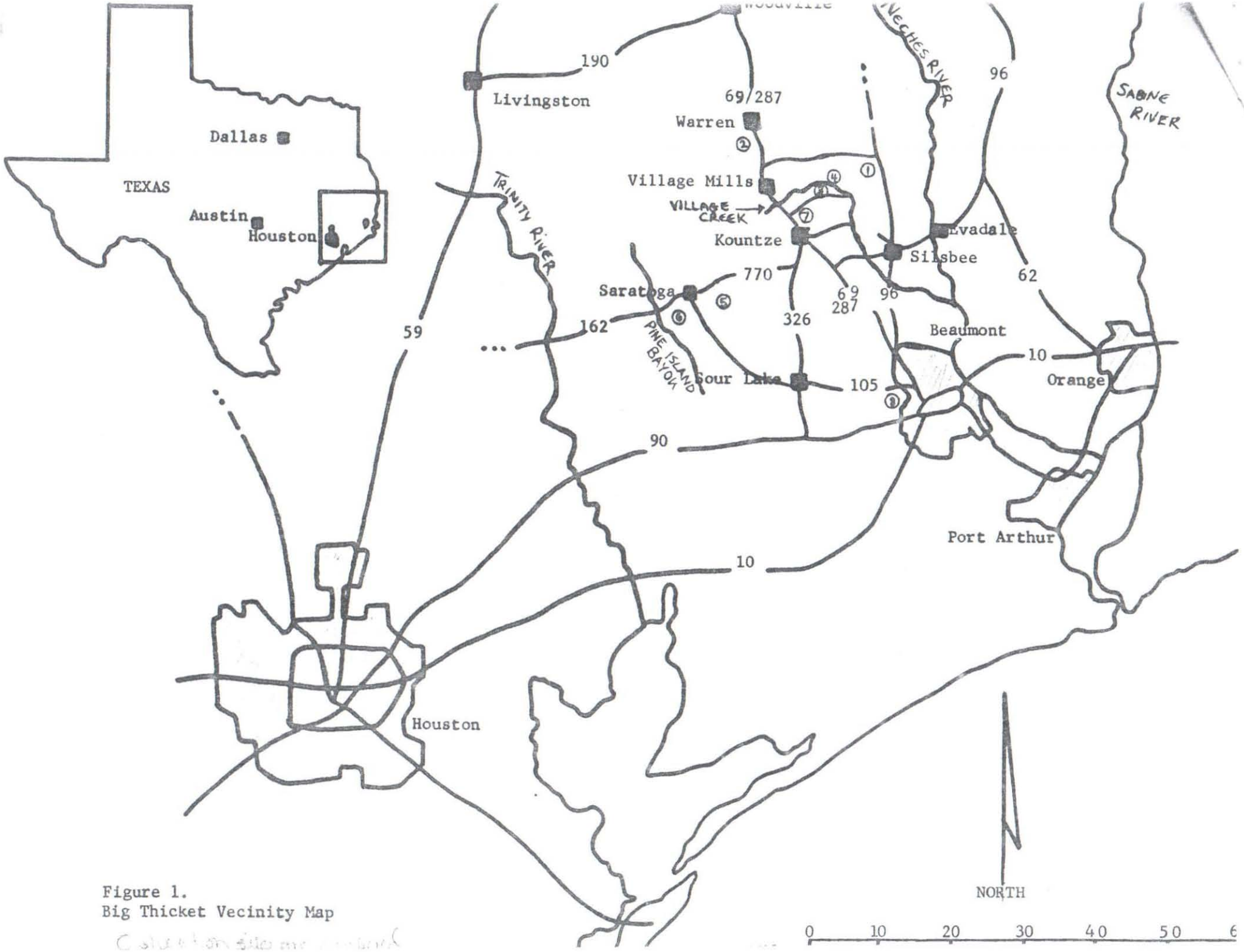

Figure 1.
Big Thicket Vecinity Map

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

TABLE 2: **Lichens Found in the Big Thicket of East Texas**

Foliose Species	Plant Communities Found In				
	BML	UF	SF	AS	PS
Anaptychia echinata			x		
A. obscurata	x	x			
A. ravenelii	x	x	x		
Coccocarpia cronia	x	x			
C. parmelioides		x		x	
Collema nigrescens	x				
C. subfurvum		x	x		
Leptogium austroamericanum	x	x	x		
L. azureum			x		
L. cyanescens	x	x	x		
L. marginellum	x	x	x		
Pannaria halei		x			
Parmelia aurulenta	x				
P. caroliniana	x		x	x	x
P. cetrata			x		
P. cristifera			x		
P. chryptochlorophaea		x	x	x	
P. endosulphurata	x				
P. dissecta	x		x		
P. formosana	x	x		x	
P. horrescens			x		
P. hypotropa		x		x	
P. livida	x	x	x	x	
P. louisianae		x		x	
P. michauxiana	x	x	x	x	
P. perforata	x	x	x	x	
P. praesorediosa		x			
P. rampoddensis	x	x	x	x	
P. reticulata	x	x	x	x	
P. rigida		x	x	x	
P. rudecta	x	x	x	x	x
P. scortella		x	x	x	x
P. subcrinita				x	
P. subisidiosa	x	x	x	x	
P. subtinctoria				x	
P. tinctorum	x	x	x	x	x
Physcia aegialita	x	x	x	x	
P. aipolia			x	x	
P. aspera	x				
P. ciliata			x		x
P. picta		x		x	x
Pseudocyphellaria aurata	x				
Pyxine caesiopruinosa		x		x	
P. sorediata	x				
Physcia tribacoides	x		x		
Xanthoria candelaria		x			
ecorticate foliose lichen	x				

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

TABLE 2 continued-

Crustose Species	Plant Communities Found In				
	BML	UF	SF	AS	PS
Anthracothecium leucostomum	x	x	x		
Arthonia sp.	x	x			x
Arthopyrenia sp.		x			
A. sect. Anisomeridium			x		
A. sect. Euarthopyrenia			x		
Bacidia fuscorubella		x			
B. schweinitzii		x			
Bacidia sp.	x	x			
Bombyliospora domingense			x		
Buellia rappii				x	
Buellia sp.	x	x	x	x	x
Byssoloma leucoblepharum			x		
Caloplaca aurantiaca		x			
C. cerina			x		
C. discolor				x	
Chiodecton montagnaei	x		x	x	
C. sanguineum	x		x		
Glyphis cicatricosa			x		
Graphina glaucoderma			x		
Graphis afzelii	x	x			
G. scripta	x	x	x	x	x
G. sp.	x	x			
Haematomma puniceum	x	x	x	x	
Lecanora atra		x		x	
L. chlarotera	x	x	x	x	x
L. conizaea				x	
L. caesiorubella	x	x	x	x	
L. subfusca group	x	x	x	x	x
Lecidea russula	x	x		x	
Lecidea sp.	x	x	x	x	x
Lepraria sp.		x			
Leptoraphis epidermis	x	x			
Leptotrema monosporum		x			
Lopadium leucoxanthum	x		x	x	
Melanotheca anomala	x		x		
M. cruenta	x		x	x	x
Ocellularia lathraea	x	x	x	x	
O. subtilis	x		x		
Ochrolechia pallescens	x	x	x	x	
Pertusaria sp.	x	x	x	x	
Phaeographis dendritica	x	x	x		x
Porina cestrensis	x				
Pyrenula neglecta	x	x			
P. xyloides	x	x			
Strigula complanata	x				
Trypethelium mastoideum	x	x	x		
T. tropicum	x	x			
Thelotrema interpositum	x		x		
T. lepadinum		x			
T. defecta	x				

TABLE 2 continued-

Fruticose Species	Plant Communities Found In				
	BML	UF	SF	AS	PS
Cladonia balfourii	x	x		x	
C. capitata		x		x	x
C. clavulifera				x	
C. cristatella	x				
C. didyma	x				
C. leporina				x	
C. subtenuis				x	
Cladonia sp.(sterile squamules)			x		
Coenogonium interplexum	x				
Mycocalicium parietinum					x
Ramalina sorediantha	x	x	x	x	
R.willeyi		x	x		
Teloschistes chrysophthalmus			x		
Tricharia melanothrix	x		x	x	
Usnea mutabilis		x		x	
U. rubiginea				x	
U. strigosa	x	x	x	x	