

LICHENS OF THE BIG THICKET

A Proposal to the Big Thicket All Taxa Biological Inventory

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Lichens, or more accurately the lichen-forming fungi, are a truly fascinating group of over 18,000 fungal species which have evolved a unique symbiotic life style with photosynthetic partners. These unassuming “plants” have been used to dye Roman togas and Scottish wool, measure pH in the laboratory, make perfumes, and to stem bacterial skin infections. They have helped scientists to date the movements of glaciers and to track radioactive fallout.

These colorful species grow on tree bark, wood, rocks, leaves, soil and even on the backs of Galapagos tortoises! Today we know that their health and vitality reflect the well-being of your own environment—a clean environment has abundant and diverse lichens. They serve as wonderful monitors of the health of our ecosystems and their diversity is a reflection of our stewardship of our planet.

History

Back in the 1970s when the Big Thicket National Preserve (BTNP) was established, I was a faculty member in the Biology Department at Texas A&M University (1975-1979). During this time I concentrated my efforts on the study of Texas lichens and published a state checklist (Egan 1978) and other additions to the lichen flora including records from the Big Thicket (Egan 1976, 1977a, Egan & Derstine 1978). Much of the field work was made possible by a small contract from the National Parks Service (NPS) to our small “cryptogamic” group of biologists at Texas A&M. Results of these efforts were reported to the NPS (Egan 1977b, 1979). Later, after moving to Omaha, I collaborated with Dr. Virginia Gordy (Hitchcock, Texas) on additional ecological work in the BTNP (Egan & Gordy 1981) creating baseline lichen studies for future air quality monitoring. Dr. Gordy followed up on that work by reinvestigating most of the lichen stations that we had originally established.

Specimens from these research efforts, originally deposited in the Biology Department Herbarium at Texas A&M (TAMU), are now housed in the Lichen Herbarium here at the University of Nebraska at Omaha (OMA).

All collections are databased, and currently we have 433 lichen specimens from the official units of the BTNP, including 94 species in 45 genera.

Research Plan

To expand and to document the “all taxa” survey work begun in the 1970s and early 1980s, **I propose to make at least four research trips to the BTNP region over the next 2-3 years, each trip lasting approximately a week to 10 days.** During these trips, we (my students, both **graduate and undergraduate**, and I) will be able to visit all units in the BTNP, concentrating especially on those units which were not extensively sampled in my earlier efforts (especially the “corridor” units). As time permits, we will also visit Nature Conservancy and State and National Forest lands, but we will concentrate on the BTNP properties.

Specimens will be collected from trees, soil and other available substrates using standard techniques (Brodo et al. 2001), placed in small #2 paper bags, labeled with substrate and GPS data, and returned to UNO for processing into herbarium specimens using archival materials. We press larger foliose and fruticose lichen specimens in a plant press, a technique similar to the preservation of flowering plant specimens. Once dried, the lichen material is placed on cotton padding on an archival card and the collection number stamped on the card. Lichens on bark or soil are glued to archival card stock and numbered in the same way. These cards are then placed into folded, rag paper packets which are attached to herbarium sheets with the final specimen label glued into the corner (as in flowering plants).

Identification of lichens requires both microscopic and chemical analyses. All procedures and equipment are available in my laboratory. Once specimens are identified, specimen label data will be entered into our herbarium database system, and any duplicate specimens will be distributed to other lichen herbaria around the country.

I anticipate that we will collect an additional 1,000-1,500 specimens during these trips, and it is likely that we will nearly double the number of lichen species known from this area of SE Texas. Much of my early work concentrated on the larger foliose and fruticose “macrolichens,” and our new efforts will attempt to better document the crustose “microlichens” that have so far been under-collected and understudied for this area.

Written reports and database files will be available once the research is complete and may be placed on the UNO Lichen Herbarium Web Site (under construction). We will be happy to supply any other documentation as

requested. I anticipate that results of this work will also be published in lichenological journals such as *The Bryologist* or *Evansia*.

Funding Request

1. TRAVEL TO BTNP (approximately 2000 miles round trip from Omaha) 4 trips @ \$300.00 per trip (gas expenses only)	\$1200.00
2. LODGING (assuming \$5.00/night at BTA facility, 4 people (per trip, x 4 trips x 9 nights).....	\$720.00
3. MEALS (assuming 4 people at \$10.00 per person per day, x 4 trips x 10 days)	\$1600.00
4. SUPPLIES (chemicals, thin layer chromatography plates, paper bags, herbarium paper, rag paper packets)	\$750.00
5. HERBARIUM STORAGE (2 herbarium cabinets @ \$900 each)	\$1800.00
TOTAL	\$6,070.00

Budget Justification

1. Travel expenses. Since we will be coming in one car or van (probably mine), I am only asking to be reimbursed for gas expenses rather than a mileage expense. The gas expense listed should also be able to cover gas expenses driving from site to site during the research work.

2. Lodging. This estimate is based on our ability to stay at the BTA facility, which I understand is available for \$5.00 per night per person. I anticipate bringing three students to help with the field work. They will not be paid, but will be able to receive academic credit toward their degrees as Independent Research hours.

3. Meals. The estimate for meals assumes we can use the kitchen facilities at the BTA facility, pack lunches, and have an occasional evening meal at a restaurant.

4. Supplies. Specimens in the UNO Lichen Herbarium are mounted on 100% rag herbarium sheets, in rag content packets, and we use 100% rag specimen labels. These herbarium sheets (in bulk) cost approximately \$.75/sheet. This assures maximum archival storage of these valuable collections. TLC plates cost \$150.00 per box of 20 (at least 2-3 boxes will be required for chemical determinations). Cost of materials will be more than is requested, but these costs will be born by the UNO Lichen Herbarium budget.

5. Herbarium Storage. The addition of 1,000-1,500 specimens to the UNO Lichen Herbarium (now containing more than 25,000+ specimens) will

require several additional cabinets. I am requesting funding for 2, full size herbarium cabinets (currently we purchase cabinets from Delta Designs in Topeka, Kansas). Additional storage space will be accommodated in existing cabinets or in new cabinets purchased from the UNO Lichen Herbarium budget.

All other processing, mounting, databasing work will be provided by me and by my students. Some work-study student help will be paid for from on-going Biology Department funds.

Literature Cited

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