

Lamellae Variation in the Lesser Smoothcap Moss, *Atrichum angustatum* (Brid.) B.S.G. (Polytrichaceae), in the Big Thicket National Preserve, Southeast Texas

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Abstract

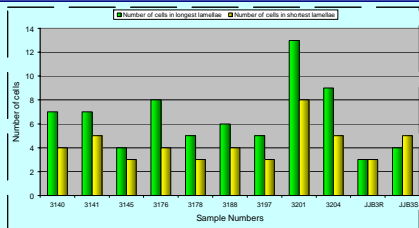
Eleven samples of *Atrichum angustatum*, collected from seven different units at the Big Thicket National Preserve, were examined in order to compare the variation in lamellae characters. The results of the study supported similar characters in the lamellae, which are in accordance with previous morphological characteristics recorded in literature for *A. angustatum*.

Introduction

Bryophytes (mosses, liverworts, and hornworts) are among the most primitive of land plants. Fossil traces suggest bryophytes were on earth as early as 400 million years ago (1). *Atrichum angustatum* is part of the Polytrichaceae family. A prominent morphological feature of this genera is the presence of several vertical rows of cells directly above the costa (midrib of a bryophyte) within each leaf. These structures are called lamellae. The morphological features of the lamellae (Fig. 1, 2, 3, 4) in *A. angustatum* were analyzed in this study. The function of the lamellae is to aid in photosynthesis by providing the ability of a pseudomesophyll (the internal parenchyma of a leaf, pressed between the upper and lower epidermis) (2). In *A. angustatum* individual stems typically range from 10-20mm but may reach 45mm (5, 6). Small leaves, the leaves close to the center of the stem frequently measure less than 1mm wide, often with 6 or more lamellae and covering 1/3 of the leaf near the center (Fig. 2) (2). It has been recorded that the lamellae vary from 5 to 6 components, they are wavy and 5-14 cells high each (5, 6, 7). The purpose of this study was to compare the variation in *A. angustatum* at the Big Thicket National Preserve (BTNP). Sampling was conducted to observe the morphological characteristics of the lamellae and to compare the findings with previously recorded data.

Methods

The samples used for this research came from seven different units at the BTNP. A total of eleven samples were used for this research. Samples were collected and placed into small paper bags and labeled with the specimens name, substrate, and specific location within each unit. Samples were examined using an American Optical (AO) dissecting microscope and a light microscope with an ocular micrometer. The longest stems were taken from each sample. Leaves from the middle of each stem were extracted and cut in three different transverse sections (tip, middle, and base) using a razor blade. The middle sections were put on slides and examined under the light microscope to observe the morphology of the lamellae.



Graph 1. Comparison of the number of cells in the shortest and longest lamellae of *A. angustatum*

Results

The results obtained during this study are represented in Table 1 and Graph 1. Samples 3140-Lance Rosier, 3201-Jack Gore Baygall, and 3204-Little Rocky Nature Reserve, units in which only one sample was collected, contained six lamellae in each of their leaves. Sample 3201 gave a result of 13 cells in its longest lamella (Graph 1). The highest number of cells in the shortest lamella was eight in sample 3201 (Graph 1). Samples 3145, 3178, 3197, and JJB3R had three cells in their shortest lamellae. The highest lamella width was 290µm in sample 3201. When comparing leaf with it was observed that the largest and the smallest samples were both found in the same unit; Jesse Jones Park. A repetitive pattern of leaf width was 770µm in samples 3178, 3201, and 3204. The percentage of lamellae width versus leaf width was over 32% in four samples; these samples were 3140, 3176, 3201, and JJB3S.

SAMPLE NUMBERS	COLLECTION UNITS	NUMBER OF LAMELLAE	NUMBER OF CELLS IN LONGEST LAMELLA	NUMBER OF CELLS IN SHORTEST LAMELLA	LAMELLAE WIDTH IN µM	LEAF WIDTH IN µM	PERCENTAGE OF LAMELLAE WIDTH VS. LEAF WIDTH
3140	Lance Rosier	6	7	4	210	640	32.81
3141	Canyonlands	6	7	5	180	650	27.69
3145	Canyonlands	5	4	3	150	650	23.08
3176	Big Sandy Creek	6	8	4	250	780	32.05
3178	Big Sandy Creek	6	5	3	150	770	19.48
3188	Turkey Creek	6	6	4	150	990	15.15
3197	Turkey Creek	6	5	3	190	680	27.94
3201	Jack Gore Baygall	6	13	8	290	770	37.66
3204	Little Rocky Nature Reserve	6	9	5	130	770	16.88
JJB3R	Jesse Jones Park	5	3	3	130	990	13.13
JJB3S	Jesse Jones Park	5	4	5	200	620	32.26

Table 1. Lamellae Characters in *A. angustatum*. Specimens collected in the BTNP Units (sample numbers according to Dale Kruse, Curator, S.M. Tracy Herbarium Texas A & M University)

Discussion

Observation of the lamellae suggested that *A. angustatum* in the BTNP have differences and similarities in lamellar structure. The samples showed noticeable differences from one another in some cases. This study led to the differentiation in the number of cells between the longest and the shortest lamella. The percentage of lamellae width versus leaf width did not show any particular patterns. The results of the study provided an insight to examine soil and other surfaces where the bryophytes grow.

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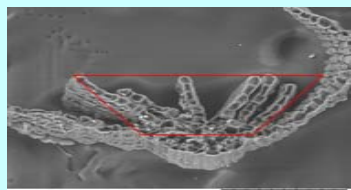


Figure 1. Transverse section of *A. angustatum* leaf showing lamellae structures

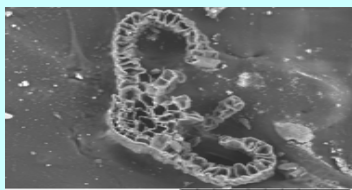


Figure 2. Transverse section of a *A. angustatum* leaf

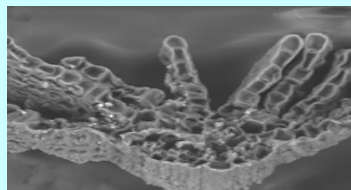


Figure 3. Transverse section of the lamellae and costa of *A. angustatum*

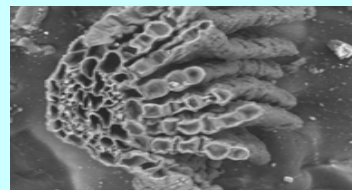


Figure 4. Transverse section showing cells in lamellae of *A. angustatum*