

VASCULAR PLANT SPECIES RICHNESS OF THE BIG THICKET, EAST TEXAS

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ABSTRACT

It has been claimed that the Big Thicket of southeastern Texas is exceptionally species rich when compared to other areas of North America. Extensive plant collecting in the Big Thicket has resulted in much more data than previously has been available. These data indicate that the Big Thicket is about average for species richness for comparable areas in the southeastern United States.

RESUMEN

Se ha dicho que el Big Thicket del sureste de Texas es excepcionalmente rico en especies comparado con otras áreas de Norte América. Recolecciones extensivas de plantas en el Big Thicket han aportado muchos más datos que los disponibles previamente. Estos datos indican que el Big Thicket tiene aproximadamente la media de riqueza de especies que áreas comparables del sureste de los Estados Unidos.

INTRODUCTION

For many years it has been claimed that the Big Thicket of southeastern Texas is exceptionally rich in plant species (see Cozine 2004; MacRoberts & MacRoberts 2004; Diggs et al. 2006 for reviews and literature). This claim has been difficult to test since until recently the Big Thicket region has been botanically understudied and underdocumented (MacRoberts et al. 2002; MacRoberts & MacRoberts 2007). However, this problem is now largely overcome by a floristic inventory of the major part of the Big Thicket National Preserve (MacRoberts et al. 2002; Brown et al. 2005, 2006a, 2006b, 2008a, 2008b, in prep a, b), a reexamination of earlier plant collections from the Big Thicket National Preserve (L.E. Brown pers. comm.), the recent publication of *Atlas of the Vascular Plants of Texas* (Turner et al. 2003) and *Illustrated Flora of East Texas* (Diggs et al. 2006), a floristic inventory of Walker, Polk, and San Jacinto counties (Nesom & Brown 1998), an inventory of a Polk County prairie (Brown et al. 2002), and an inventory of the Roy E. Larsen Sandylands Sanctuary in Hardin County (Matos & Rudolph 1985).

Using this information, we attempt to determine the species richness of the Big Thicket.

SETTING

It has long been realized that the Big Thicket is ill-defined and poorly delineated (McLeod 1971; Cozine 2004; Diggs et al. 2006). There are at least five delineations: 1) the "Broadest Conception" of the Big Thicket (Diggs et al. 2006), 2) the "Biological Survey" of Parks and Cory (1938), 3) the "Ecological Area" of McLeod (1971), 4) the "Traditional (Hunter's) Thicket" of the late nineteenth and early twentieth century (Diggs et al. 2006), and 5) the "Artificial Delineation" (Diggs et al. 2006) (see Diggs et al. 2006 and their figures 88 and 94 for details). We will be concerned only with the Broadest Conception ("Broadest Thicket" hereafter) and the Artificial Conception ("Artificial Thicket" hereafter) (Fig. 1), the reasons being that few pay attention to the Traditional Thicket and that the Artificial Thicket basically encompasses both the Biological Survey delineation and the Ecological Area delineation: the two delineations most frequently used.

The Broadest Thicket consists of part or all of 23 counties, a total of about 39,477 square km (Fig. 1) that includes the area between the cities of Nacogdoches and Liberty on a north-south axis and the Sabine River to the Brazos River on an east-west axis. The Artificial Thicket consists of seven and a half counties (Hardin, Jasper, Liberty [north half only], Montgomery, Newton, Polk, San Jacinto, and Tyler) and totals 17,974 square km (Fig. 1). It is located entirely within the Broadest Thicket area. The Broadest Thicket includes not only small isolated prairies, palmetto flats, oak floodplain, baygalls, wetland pine savanna, longleaf pine



Fig. 1. Location of Artificial Thicket and Broadest Thicket in the Big Thicket region of southeastern Texas.

upland, beech-magnolia forest, and xeric sandylands of the Artificial Thicket, but also coastal prairie on its southern edge, blackland prairie and post oak-hickory savanna on its western edge, and pine-oak-hickory forest to the north (Ajilvsgi 1979; Diggs et al. 2006 and references therein).

The Big Thicket National Preserve is located within the Artificial Thicket and consists of 14 units ranging from 2.2 square km to 100 square km and totaling 401 square km. Since the units were originally selected to provide a representative sample of community structure and flora (Peacock 1994; Diggs et al. 2006), a floristic inventory of the units should constitute a fair sample of the entire flora.

METHODS

Using the following sources (Matos & Rudolph 1985; Nesom & Brown 1998; MacRoberts et al. 2002; Brown et al. 2002, 2005, 2006a, 2006b, 2008a, 2008b, in prep. a, b; Turner et al. 2003; Diggs et al. 2006), we determined which species occurred in the Artificial Thicket and which occurred in the Broadest Thicket. Obviously, if a species occurred in the Artificial Thicket, it also occurred in the Broadest Thicket since the Artificial Thicket is encompassed entirely by the Broadest Thicket. If, however, a species only occurred in

TABLE 1. Number of Big Thicket plant species.

	Artificial Thicket	Broadest Thicket
Ferns & Gymnosperms	48	58
Monocots	573	748
Dicots	1144	1549
Total	1765	2355
Native species	1518	1937

the Broadest Thicket outside the Artificial Thicket, it was counted as occurring only in the Broadest Thicket. Only species were counted: if there were two or more varieties or subspecies, they were lumped.

RESULTS/DISCUSSION

Table 1 gives the number of ferns and gymnosperms, monocots, and dicots in the Artificial Thicket and Broadest Thicket. The total is 1765 species in the Artificial Thicket of which 1518 are native and 2355 species in the Broadest Thicket of which 1937 are native. Monocots account for 32.5 percent of the flora of the Artificial Thicket and 31.8 percent of the Broadest Thicket.

Diggs et al. (2006, see also Diggs et al. 2003), using earlier sources (up to about 2003), determined that the Artificial Thicket had 1826 species (native and naturalized) of which 31 percent were monocots. The figure 1826 is very close to ours and is between ours and the figure for the Broadest Thicket. The figure of 31 percent monocots is again almost identical to ours. The high incidence of monocots is indicative of the mesic to wet nature of the Big Thicket region of Texas (Diggs et al. 2006; MacRoberts & MacRoberts 2008). Drier areas, such as North Central Texas, have fewer monocots (Diggs et al. 2006).

These figures are interesting because they are comparable to figures from other places at the same or approximately the same latitude in the southeastern United States. For example, the Florida Panhandle consists of 38,628 square km and has 2359 species, of which 31 percent are monocots, and 1989 are native (Clewell 1985). It is therefore almost identical in size, species number, and percent monocots to the Broadest Thicket. The Artificial Thicket is also comparable to other areas of equal size. For example, Bienville, Bossier, Caddo, Claiborne, Jackson, Lincoln, Ouachita, Union, and Webster parishes in northern Louisiana taken together consist of 16,601 square km and have approximately 1780 species, 30.1 percent of which are monocots (MacRoberts unpublished data developed from MacRoberts & MacRoberts 2006 and Thomas & Allen 1993–1998). However, the Florida Parishes of Louisiana (East Baton Rouge, East Feliciana, Livingston, West Feliciana, St. Helena, St. Tammany, Tangipahoa, and Washington), 200 km due east of the Big Thicket, consist of only 12,129 square km but have 1705 native species, of which 33 percent are monocots. If exotics are added, the total number probably would be between 2000 and 2100 species (MacRoberts unpublished data developed from Thomas & Allen 1993–1998).

These findings support our previous analysis of species/area across the south, in which we used the Diggs et al. (2006) figure of 1826 species, and found that the Big Thicket was not exceptional in species numbers but is about average for the southeastern United States (MacRoberts et al. 2007). Thus, our current analysis confirms our previous conclusion. Although the data are not available, it may transpire that the Big Thicket is slightly below average for similar sized areas at the same latitude in the southeastern United States. The data for the Florida Parishes of Louisiana suggest this, but until other areas such as southern Mississippi, Alabama, Georgia, and northern Florida are sampled, no conclusion is possible.

While we are in process of redefining the Big Thicket, it should be remembered that the Big Thicket is important to preserve because hundreds of southeastern species reach their range limit in the Big Thicket. The Big Thicket is, therefore, a boundary area and is important for a variety of reasons: boundary plants are often genetically unique and peripheral populations are often more sensitive to environmental change and can act as ecological indicators (Diggs et al. 2006). But, the most important reason for considering the

Big Thicket immensely valuable was made by Donovan Correll years ago before the Big Thicket became a preserve. Testifying before the Senate committee in Beaumont in 1970, he pointed out that the vast pine hardwood forest that characterized the southeastern United States had no areas that were preserved. He said: "We ought to have a representation of the great Southeastern pine hardwood forests somewhere, and since the development is so optimum here in Texas," then the Big Thicket would be ideal for that representation.

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