

# FORESTED COMMUNITIES OF THE PINE MOUNTAIN REGION, GEORGIA, USA

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**Abstract**—Seven landscape scale communities were identified in the Pine Mountain region having a mixture of Appalachian, Piedmont, and Coastal Plain species. The diagnostic environmental variables included elevation, B-horizon depth, A-horizon silt, topographic relative moisture index, and A-horizon potassium (K).

## INTRODUCTION

The Pine Mountains of Georgia have been an area of considerable botanical interest since Harper (1903) first visited the region in 1901. To date, the only significant floristic survey performed in the region was by Jones (1974) in which he noted a unique assemblage of Appalachian and Coastal Plain species. However, no study of the plant communities has been performed. The objective of the study was to identify landscape scale plant communities based on the discriminating vegetation, soils, and landform variables.

## METHODS

The study area was the Pine Mountain region in Upson, Meriwether, and Talbot Counties, GA. The elevation ranges from 200 to 347 m. The area is characterized by steep rocky slopes. Between 2003 and 2008, 45 plots were established in suitable forested sites. Vegetation was sampled following the Carolina Vegetation Survey protocol (Peet and others 1998). Soil samples were collected by horizon to determine soil horizon depths and chemical and textural properties. Landform variables sampled included slope, slope position, aspect, and landform index (LFI). The topographic moisture index (Parker 1982) was calculated based on percent slope, aspect, slope position, and site concavity/convexity. A topographic relative moisture index (TRMI) of zero indicates a xeric site, while 60 indicates a mesic site.

Communities were delineated through ordination (detrended correspondence analysis, canonical correspondence analysis) and cluster analysis (TWINSPAN) of importance value data (Hill 1979, McCune and Grace 2002). Environmental variables

were related to the ecological units through stepwise discriminant analysis ( $P = 0.10$ ).

## RESULTS AND DISCUSSION

Seven communities were identified. All communities had some degree of homogenization of Coastal Plain, Piedmont, and Appalachian flora based on Duncan and Kartesz (1981). Communities with more Coastal Plain affinities included longleaf pine (*Pinus palustris*)-turkey oak (*Quercus laevis*)-Goat's Rue (*Tephrosia virginiana*) and sweetgum (*Liquidambar styraciflua*)-cinnamon fern (*Osmunda cinnamomea*)-laurel greenbrier (*Smilax laurifolia*). The rhododendron (*Rhododendron maximum* L.)-heartleaf (*Hexastylis arifolia*)-mountain laurel (*Kalmia latifolia*) and chestnut oak (*Q. prinus*)-longleaf pine-downy milkpea (*Galactia volubilis*) communities had stronger Appalachian affinity. Sand hickory (*Carya pallida*)-Alabama cherry (*Prunus alabamensis*)-broomsedge (*Andropogon virginicus*) community exhibited more Piedmont affinities. The hickory (*Carya*)-rusty blackhaw (*Viburnum rufidulum*)-ebony spleenwort (*Asplenium platyneuron*) and mountain laurel-longleaf pine-slender lespedeza (*Lespedeza virginica*) communities possessed mixed affinity for Appalachian, Coastal Plain, and Piedmont flora (table 1). The five most discriminating abiotic variables were elevation, B-horizon depth, TRMI, B-horizon silt, and A-horizon K.

## ACKNOWLEDGMENTS

This research was supported by a research grant from the Georgia Department of Natural Resources, Georgia Botanical Society, and Jacksonville State University.

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**Table 1—Community type, habitat, and diagnostic species for the Pine Mountain region, Georgia**

Diagnostic species	Community type			
	Rhododendron	Mountain laurel	Longleaf pine	Sand hickory
	Heartleaf	Longleaf pine	Turkey oak	Alabama cherry
	Mountain laurel	Slender lespedeza	Goat's rue	Broomsedge
	Habitat <sup>a</sup>			
	Steep slopes bordering stream	Steep slopes bordering Flint River	Steep rocky upper slopes with low K	Mountain tops and slopes with low K
<i>Magnolia pyramidata</i> 1	X			
<i>Rhododendron minus</i> 2	X	X		
<i>Hexastylis arifolia</i> 4	X			
<i>Lepedeza virginica</i> 4	X	X	X	
<i>Kalmia latifolia</i> 2	X	X		
<i>Dichanthelium boscii</i> 4		X		
<i>Erigeron pulchellus</i> 4		X		
<i>Eupatorium hyssopifolium</i> 4		X		
<i>Quercus laevis</i> 1			X	
<i>Pinus palustris</i> 1	X	X	X	X
<i>Pteridium aquilinum</i> 4		X	X	X
<i>Tephrosia virginiana</i> 4		X	X	X
<i>Galactia volubilis</i> 4			X	X
<i>Andropogon virginicus</i> 4		X	X	X
<i>Prunus alabamensis</i> 1		X	X	X
<i>Quercus prinus</i> 1	X	X	X	X
<i>Carya pallida</i> 1			X	X
<i>Danthonia sericea</i> 4				X
<i>Liquidambar styraciflua</i> 1	X			
<i>Liriodendron tulipifera</i> 1	X			

Diagnostic species	Community type		
	Chestnut oak Longleaf pine Downy milkpea	Hickory Rusty blackhaw Ebony spleenwort	Sweetgum Cinnamon fern Laurel greenbrier
	Habitat <sup>a</sup>		
	Steep rocky midslopes	Mountain tops moist side slopes with high K	Moist sites near streams and springs
<i>Dichantheium boscii</i> 4		X	X
<i>Pinus palustris</i> 1	X		
<i>Pteridium aquilinum</i> 4	X		X
<i>Tephrosia virginiana</i> 4	X		
<i>Galactia volubilis</i> 4	X	X	X
<i>Andropogon virginicus</i> 4	X		
<i>Prunus alabamensis</i> 1	X	X	
<i>Quercus prinus</i> 1	X	X	
<i>Carya pallida</i> 1	X	X	X
<i>Danthonia sericea</i> 4	X		
<i>Carya glabra</i> 1		X	
<i>Asplenium platyneuron</i> 4		X	
<i>Aesculus pavia</i> 2	X		
<i>Viburnum rufidulum</i> 1		X	
<i>Osmunda cinnamomea</i> 4			X
<i>Arundinaria gigantea</i> 4			X
<i>Smilax laurifolia</i> 4			X
<i>Mitchella repens</i> 4			X
<i>Liquidambar styraciflua</i> 1			X
<i>Liriodendron tulipifera</i> 1			X

<sup>a</sup> 1, 2, 3, 4, indicate tree, sapling, seedling, and herb, respectively.

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