



# Differential Morphology of Pitted Morningglory Populations from the Southern U. S.

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## INTRODUCTION

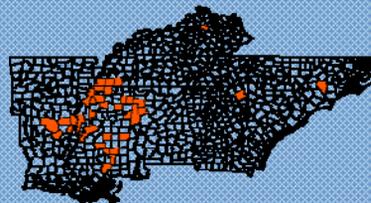
Morningglories are very important weeds and are frequently some of the most difficult to control broadleaf weeds in row crop and other agricultural and non-agricultural areas in the southeastern U.S. Morningglories are very competitive and reduce both crop yields and harvest efficiency. McWhorter and Barrentine (1988) found that morningglories were the most troublesome weeds in the U.S., regardless of the agricultural system, and, in a recent survey, morningglories were the most important and troublesome weedy genus in southern row crop production (Webster 2000; Webster 2001). Of the assemblage that comprises the weedy morningglories in the southeastern United States, pitted morningglory seems to be one of the most variable in terms of morphology and control with glyphosate.

Little is known about the diversity of leaf shape and other macro-morphological characteristics in the pitted morningglory and its close relative cotton morningglory. Leaf shape in the ivyleaf-entireleaf morningglory complex [*Ipomoea hederacea* (L.) Jacq.] is due to a single gene difference and the ivyleaf shape is the dominant allele (Elmore 1986a). Despite the dominance of the ivyleaf trait, the entireleaf phenotype is more abundant than ivyleaf phenotypes in many fields in the Mississippi Delta Region (Elmore 1986b).

Pitted morningglory (*Ipomoea lacunosa* L.) susceptibility to herbicides varies; however, little is known about the morphological diversity among biotypes and a closely related species cotton morningglory [*Ipomoea cordatotriloba* Dennst. (= *I. trichocarpa* Ell.)] and a fertile hybrid (*Ipomoea x leucantha* Jacq.) between pitted morningglory and cotton morningglory as described by Abel and Austin (1981) and Austin and Huáman (1997).

## MATERIAL AND METHODS

Seed of pitted, hybrid, and cotton morningglory biotypes were collected from eight southeastern states during the fall of 2003 and 2004. Ten morningglory plants per accession (1 plant/pot) were grown in a greenhouse during 2005 at Stoneville, MS. Morningglory seedlings were established in the greenhouse in 30 by 45 cm trays and transplanted into 15 cm-diam pots. Growth media was a mixture of a Bosket sandy loam (Mollic Hapludalfs) soil and commercial potting mix (Jiffy Mix, a registered trademark of Jiffy Products of America, Inc., Batavia, IL) at 1:1, v/v. The greenhouse was maintained at temperatures of 20/30 C night/day. Data from individual live and dried plants were recorded including leaf size, leaf dry weight, flower size, flower color, number of nodes to first elongated internode, and other morphological characteristics.



## RESULTS AND DISCUSSION

The average size of first four fully expanded leaves and dry weights overlapped among pitted, hybrid, and cotton morningglory accessions. Leaf size ranged from 8.6 to 14.7, 10.3 to 14.5, and 8.8 to 22.6 mm<sup>2</sup> for pitted, hybrid, and cotton morningglories, respectively. Average dry weight of the first four true leaves was 0.02 to 0.04, 0.03 to 0.04, and 0.03 to 0.04 g for pitted, hybrid, and cotton morningglories, respectively. Node to first internode elongation (vine initiation) did not differ significantly among pitted, hybrid, and cotton morningglories. Flower size also varied among morningglory accessions. Flower diameter was generally larger in cotton morningglory (14.6 to 19.3 mm) compared to pitted morningglory (13.7 to 17.2 mm), while hybrid morningglory flower size (14.3 to 19.3) was intermediate to pitted and cotton morningglories. Leaf shape on mature vines varied from entire to deeply lobed after the 10-leaf stage in pitted, hybrid, and cotton morningglories; however, leaves in some pitted morningglory were never lobed. Corolla color was consistently white for pitted morningglory and lavender for cotton morningglory. Hybrid morningglory corolla color was white, pink, and lavender.



## OBJECTIVES

The objectives of this research were 1) to identify macro-morphological parameters for distinguishing pitted morningglory biotypes from hybrid and cotton morningglory biotypes and 2) to determine variability in growth characteristics of pitted, hybrid, and cotton morningglory biotypes.



Morphological traits	Unit of measure	Morningglory species		
		Pitted	Hybrid	Cotton
Leaf Shape		Entire to lobed	Entire to lobed	Entire to lobed
Mean leaf area	mm <sup>2</sup>	8.6 to 14.7	10.3 to 14.5	8.8 to 22.6
Leaf dry weight	g	0.02 to 0.04	0.03 to 0.04	0.03 to 0.04
Average node below first internode elongation	number	2.6 to 3.3	2.6 to 3.5	2.6 to 3.5
Corolla color		White	White, Pink, and Lavender	Lavender
Flower diam.	mm	13.7 to 17.2	14.3 to 19.3	14.6 to 22.2



## CONCLUSIONS

These results indicate that some morphological traits overlap and other traits differ among pitted morningglory, hybrid morningglory, and cotton morningglory populations in the southeastern U.S.

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