Histological Distribution of Anthocyanins in *Anthurium* Spathes

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Anthocyanins are flavonoid pigments located in cell vacuoles responsible for most of the scarlet, orange, red, purple, and blue colors in plant organs (Hrazdina, 1982). Although the location of the anthocyanin-containing cells within the organ has been reported to play some role in coloration (Biran et al., 1974), the histology of anthocyanin accumulation has received relatively little attention. The present study explored the distribution of anthocyanin in the spathes of several *Anthurium* species.

Anthurium species grown in the polypropylene shadehouse at the Univ. of Hawaii were used in this study. Freehand sections of fresh spathes were placed in deionized water before examination under a light microscope at $\times 100$. The spathe tissue layers were scored for cellular anthocyanins as follows: 0 = the absence of anthocyanins, 1 = very few cells with anthocyanins, 2 = few cells with anthocyanins, 3 = moderate number of cells with anthocyanins, 4 = most cells with anthocyanins, and 5 = all cells with anthocyanins.

The location of anthocyanin accumulation in spathes differed among *Anthurium* species (Table 1). In *A. andraeanum* of the section *Calomystrum*, anthocyanins were found exclusively in the hypodermal layers, just as reported by Higaki et al. (1984). In three other species belonging to the same section, anthocyanins were distributed in the hypodermic and mesophyll cells. None of the *A. andraeanum* individuals contained anthocyanins.

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anins in the epidermal layers.

The distribution of anthocyanins in the lavender-flowered *A. amnicola* of the section *Porphyrochitonium* was restricted to the epidermal layers. The closely related *A. antioquiense* had a few pigmented cells in the abaxial epidermis and hypodermic. *A. wendlingii*, also of the same section, showed anthocyanins in cells of all spathe tissues. Three other species in the same section had no anthocyanin in the epidermal layers. *Porphyrochitonium* is a large section with at least two intercrossable groups (Croat and Sheffer, 1983). One group included *A. amnicola* and *A. antioquiense*, which are crossable with members of the section *Calomystrum*.

In three of the four species examined in

the section *Pachyneurium*, anthocyanins were concentrated in the adaxial epidermis. In contrast, *A. coriaceum* showed no anthocyanins in the epidermis and a high concentration of anthocyanins in the mesophyll layers. This result suggests a possible taxonomic divergence of *A. coriaceum* in the section *Pachyneurium*.

Even though few species were investigated, our results suggest that the histological distribution of anthocyanins might be valuable in establishing intrasectional species relationships.

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Table 1. Histological distribution of anthocyanin-containing cells in *Anthurium* spathes.²

Species	Adaxial			Abaxial		
	Epidermis	Hypodermic	Mesophyll	Epidermis	Hypodermic	Mesophyll
Section <i>Belolonchium</i>						
<i>A. cerrobaulense</i> Matuda	3	1	3	0	1	3
Section <i>Calomystrum</i>						
<i>A. andraeanum</i> Lind. ex André	0	5	0	0	5	0
<i>A. formosum</i> Schott.	0	0	0	0	1	1
<i>A. kamemotoanum</i> Croat	0	4	3	0	0	0
<i>A. ravenii</i> Croat & Baker	0	0	4	0	0	5
Section <i>Digitinervium</i>						
<i>A. lentii</i> Croat & Baker	3	0	0	0	0	0
Section <i>Pachyneurium</i>						
<i>A. coriaceum</i> Endl.	0	1	4	0	1	4
<i>A. plowmanii</i> Croat	5	0	1	0	0	1
<i>A. superbum</i> Madison	5	4	0	5	0	0
<i>A. watermaliense</i> Bailey	5	0	0	5	0	0
Section <i>Porphyrochitonium</i>						
<i>A. amnicola</i> Dressier	5	0	0	5	0	0
<i>A. antioquiense</i> Engler	1	1	0	0	0	0
<i>A. bicollectivum</i> Croat	0	3	3	0	0	0
<i>A. friedrichsthalii</i> Schott.	0	0	1	0	0	1
<i>A. jefense</i> Croat	0	1	3	0	3	3
<i>A. wendlingii</i> Barroso	5	4	3	5	4	3
Section <i>Urospadix</i>						
<i>A. gladiifolium</i> Schott.	0	0	4	0	0	1

²Scoring of the presence of anthocyanins on cells of tissue layers: 0 = no anthocyanins, 1 = very few cells with anthocyanins, 2 = few cells with anthocyanins, 3 = moderate number of cells with anthocyanins, 4 = most cells with anthocyanins, and 5 = all cells with anthocyanins.