

Diversity in seed morphology and anatomy in selected genera of the Lythraceae



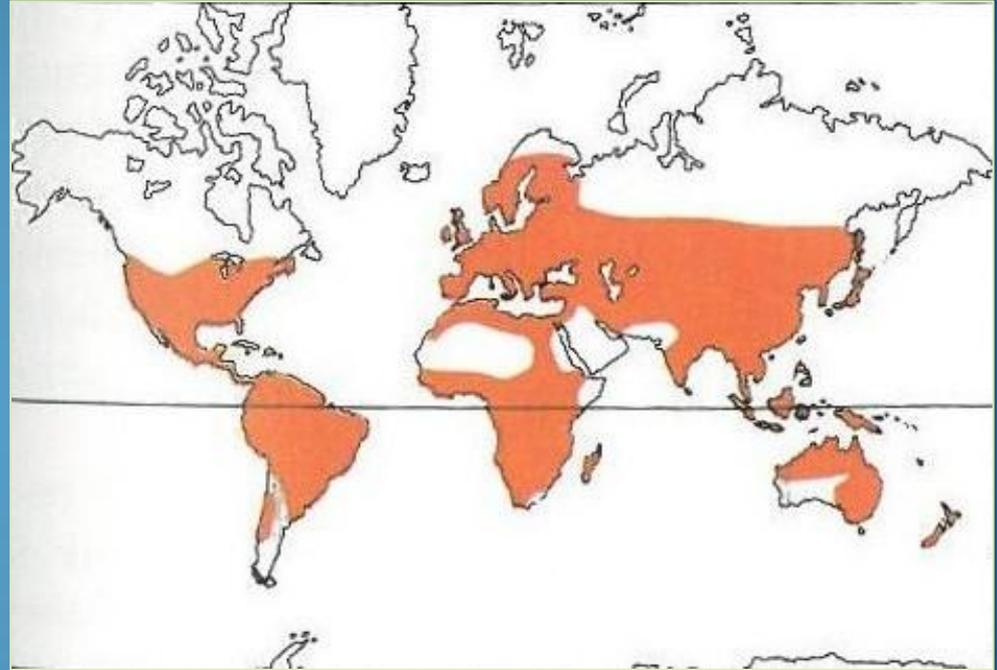
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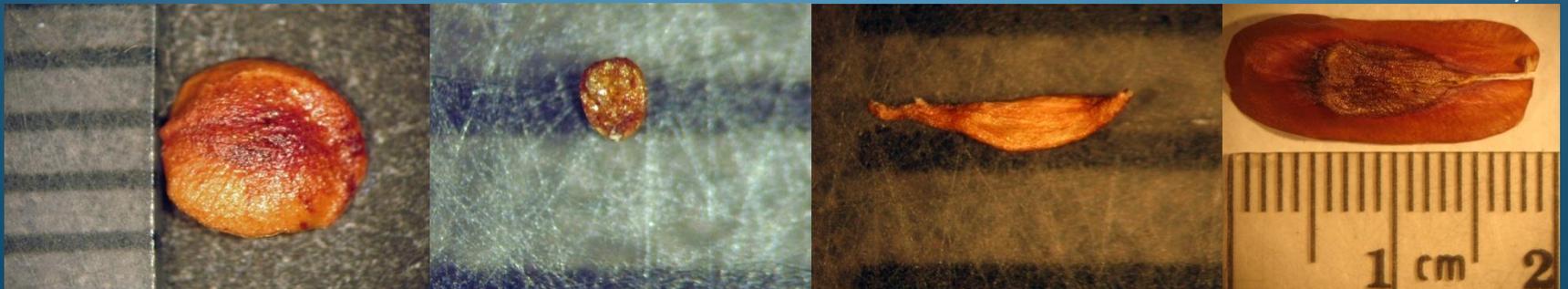
REU Missouri Botanical Garden 2012

Introduction

- Lythraceae is a globally distributed family
- Occupies a range of habitats including woodland, mangrove, and aquatic
- Lythraceae seeds have a diverse morphology and a large range in size



Mackeith, 1978



Galpinia

Ammannia

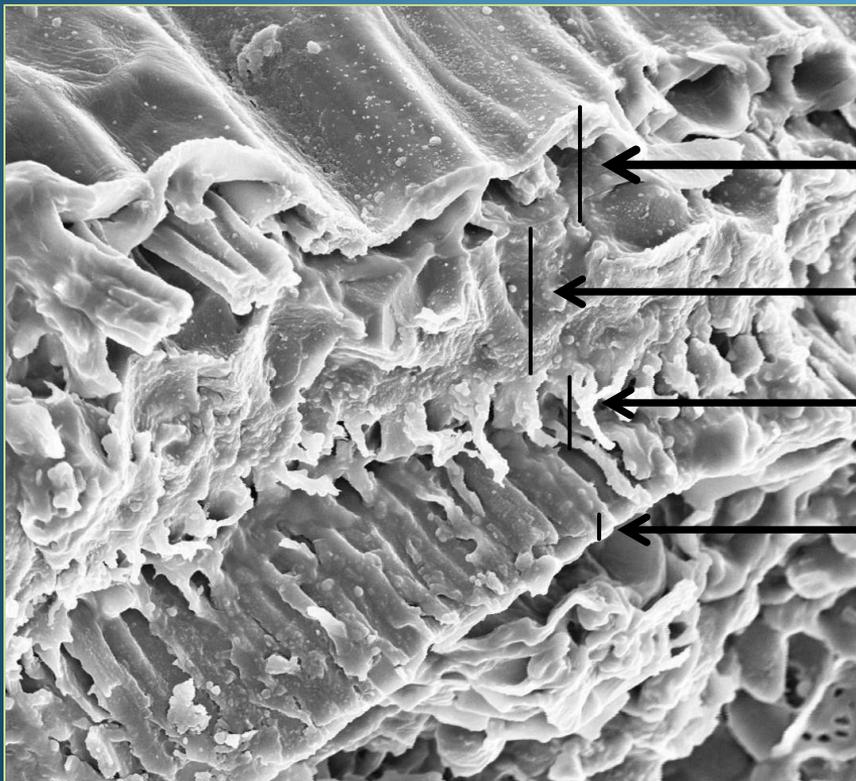
Ginoria

Lafoensia

Introduction

The seed coat is comprised of an outer integument called the testa and an inner integument called the tegmen.

The Lythraceae are known to have a seed coat with a well-developed, multi-layered testa.



Exo-testa (epidermis)

Meso-testa

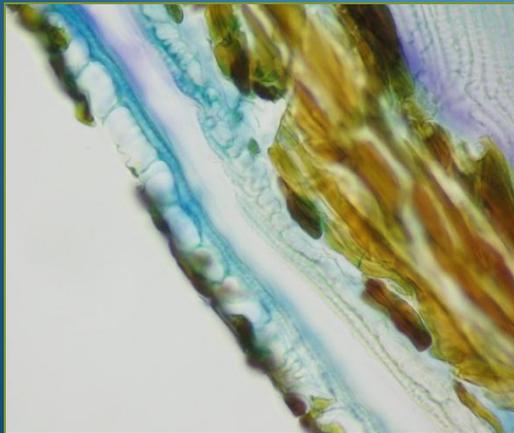
Endo-testa

Tegmen

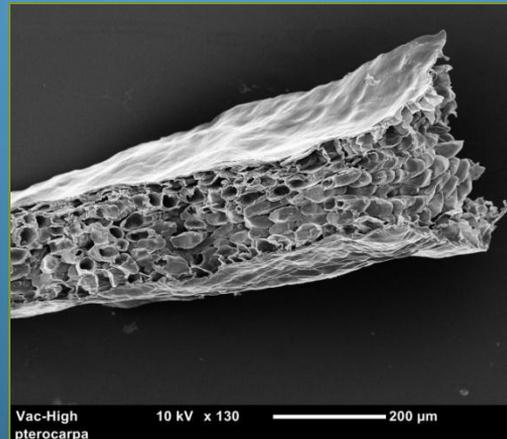
Lythrum

Objective

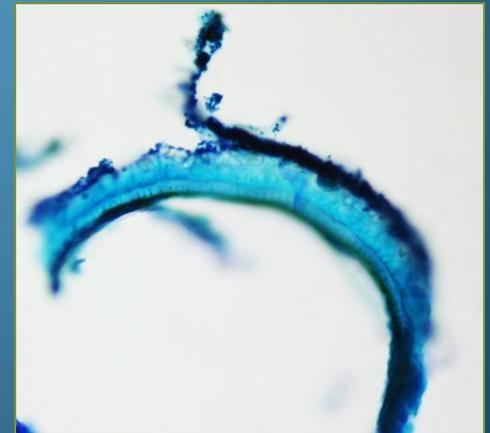
- This study used light microscopy and scanning electron microscopy to observe and describe seed characters in selected genera of the Lythraceae.



Ginoria



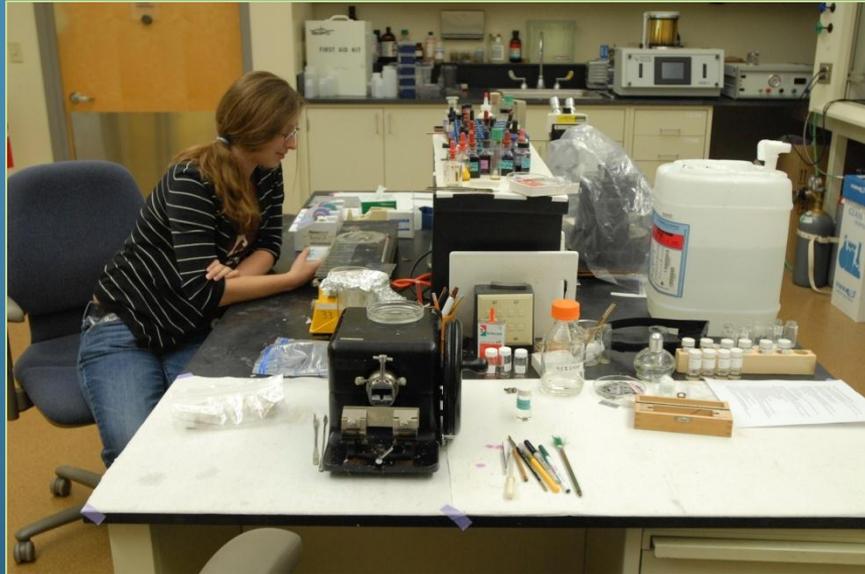
Galpinia



Lythrum

Methods

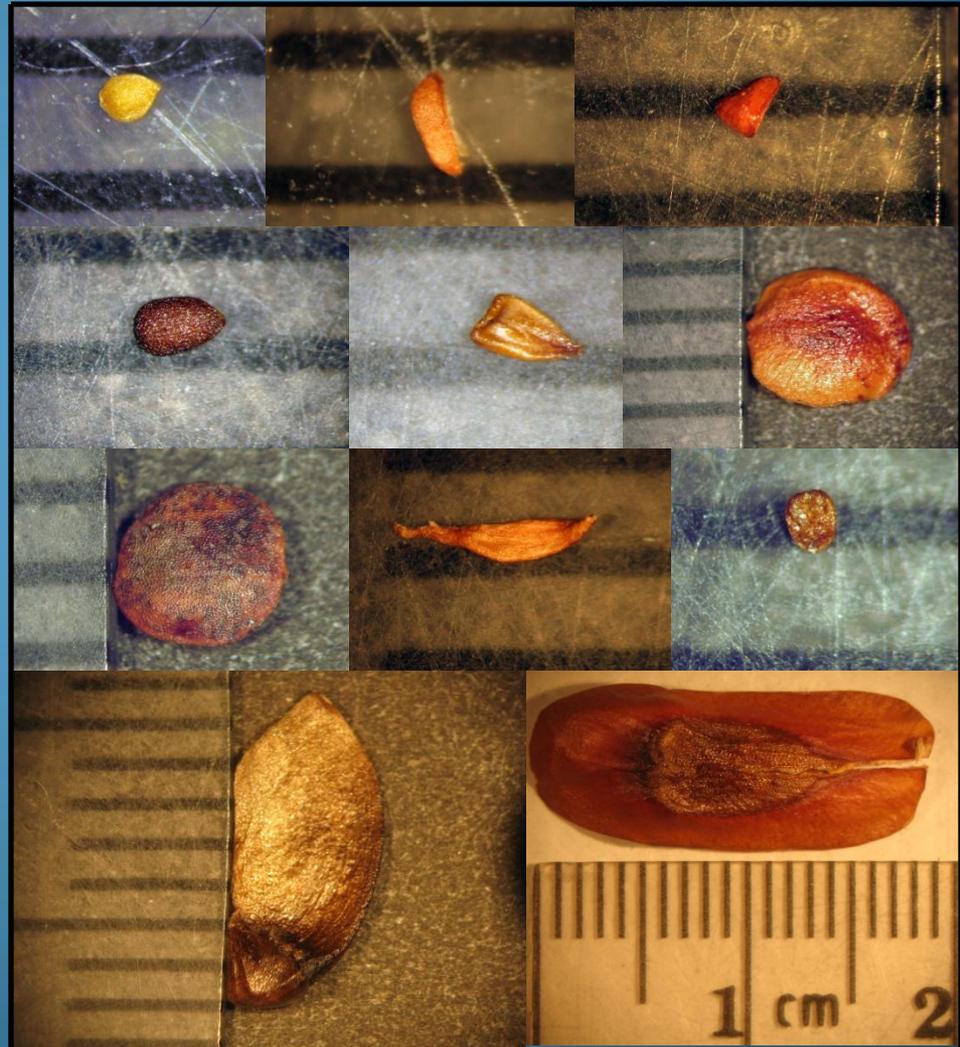
- Seeds were soaked in 4% ethylenediamine overnight to soften the tissue
- The paraffin blocks were sliced with a rotary microtome at 10 μ m
- Specimens were mounted and stained with toluidine blue
- Seeds observed with SEM were broken or cut with a razor blade



Results & Discussion

Genera

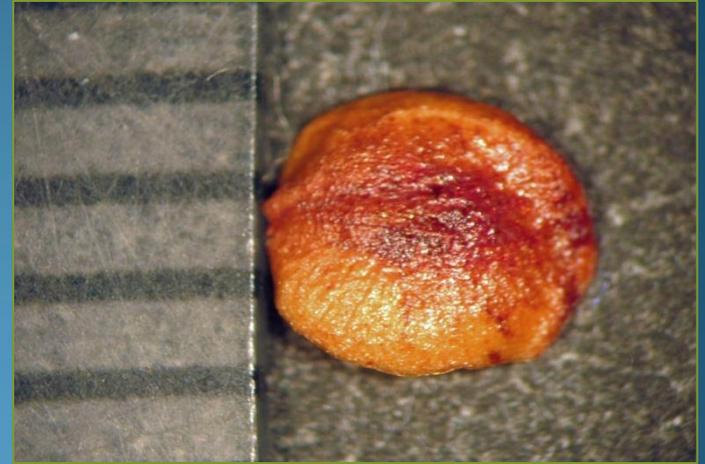
- *Lythrum*
- *Didiplis*
- *Heimia*
- *Pleurophora*
- *Pehria*
- *Galpinia*
- *Cuphea*
- *Ginoria*
- *Ammannia*
- *Lagerstroemia*
- *Lafoensia**



* SEM only

Wings

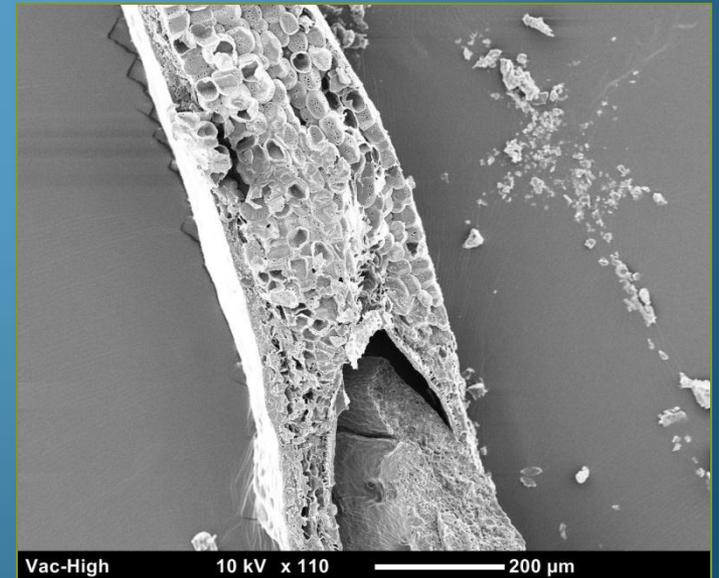
- Diversity in wing morphology within the family
- Light, thin-walled cells imply wind dispersal



Galpinia



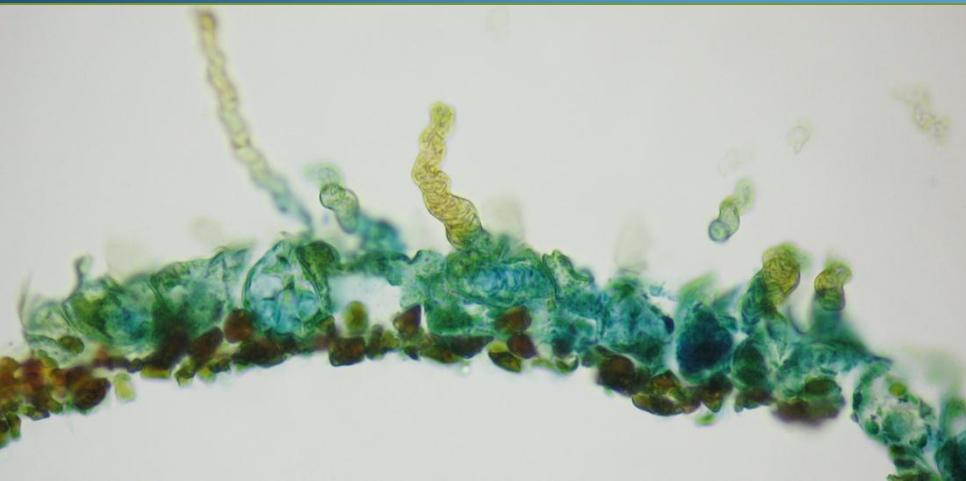
Lagerstroemia



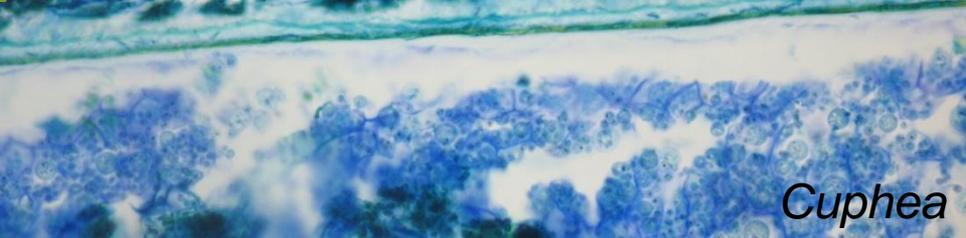
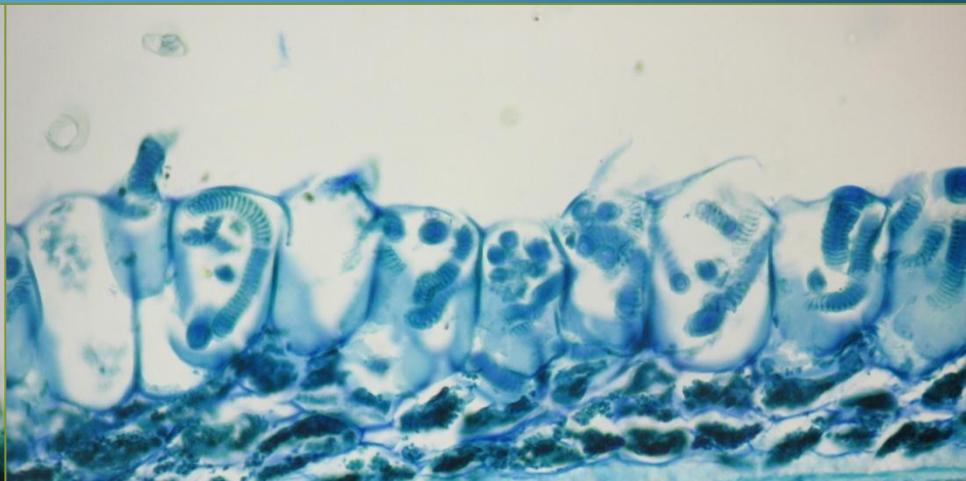
Lafoensia

Spiral epidermal trichomes

- Found in epidermal layer
- Spiral shaped in *Cuphea*, *Pleurophora*, *Lafoensia*
- Seeds are more easily fixed to the soil



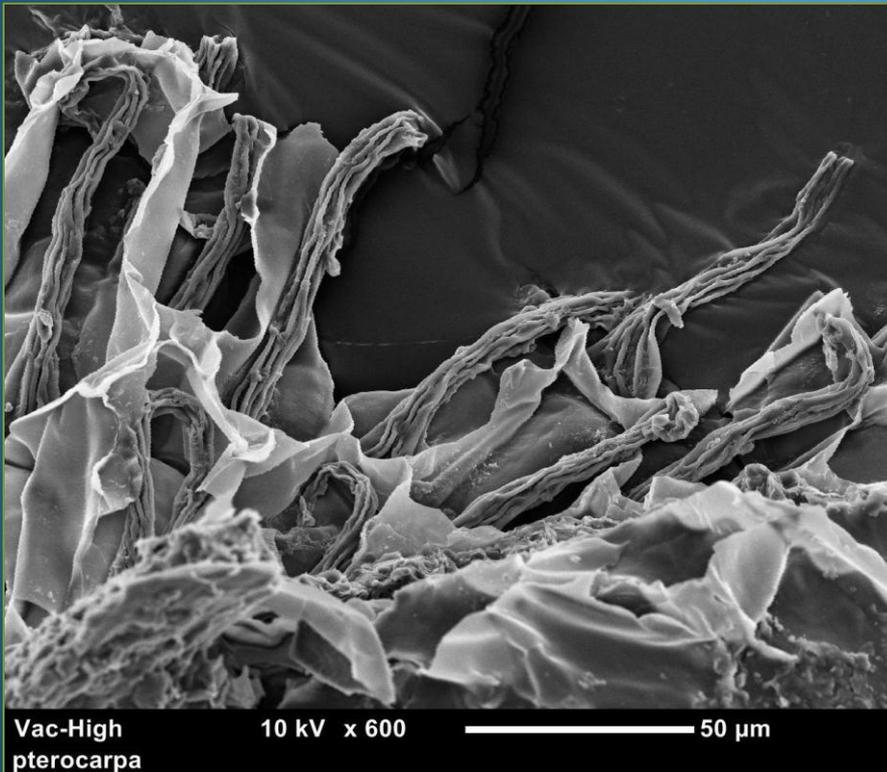
Pleurophora



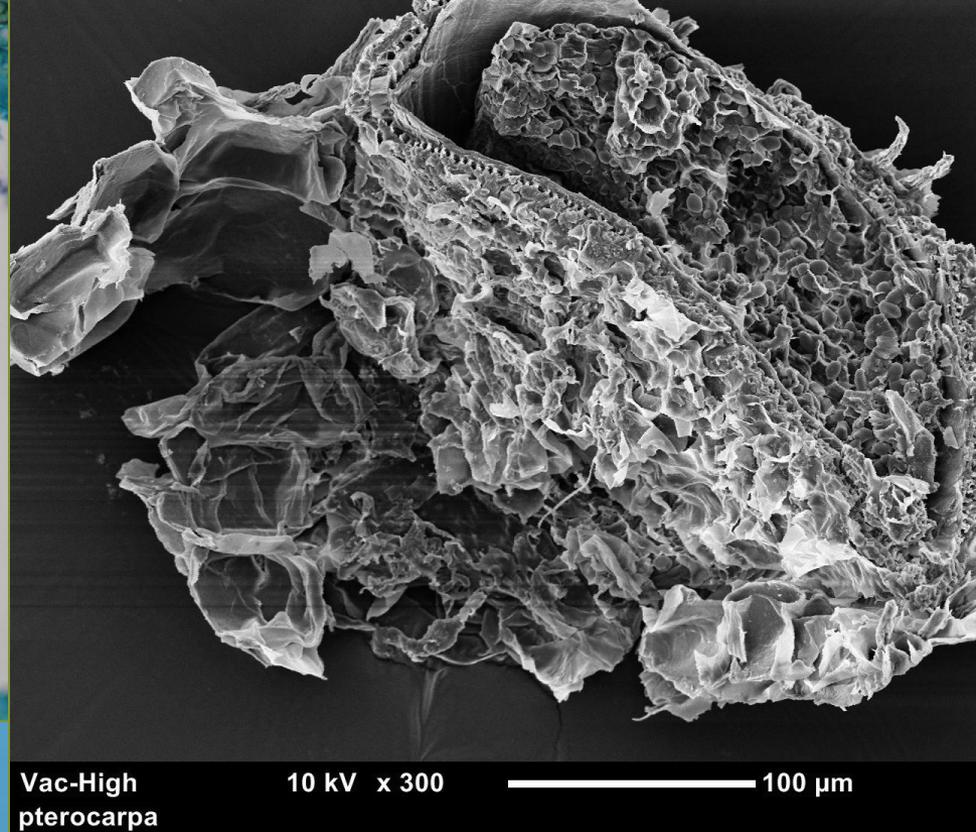
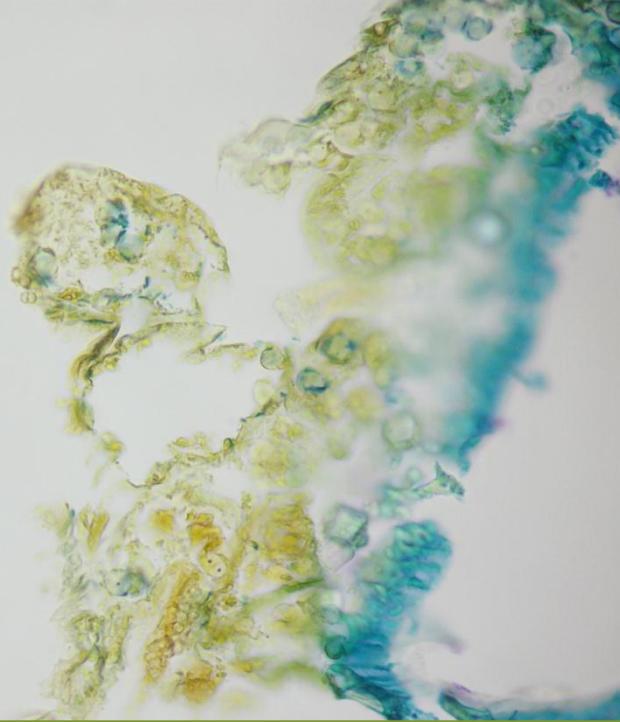
Cuphea

Straight epidermal trichomes

- Found in epidermal layer
- *Ammannia*, *Ginoria*,
Pehria, *Heimia*, *Didiplis*,
Lythrum



Ammannia



- Epidermal layer
- Assist in dispersal in aquatic environments

Float Cells - *Ammannia*

Summary of Seed Characters

Table 1. Seed characters of selected genera of Lythraceae

Taxon	Size L,W (mm)	Outline	Wings	Spiral epidermal trichomes	Straight epidermal trichomes	Aerenchyma float cells	Crystals present
<i>Lythrum californicum</i>	0.4, 0.3	obovate	-	-	+	-	+
<i>Didiplis diandra</i>	0.7, 0.3	oblong	-	-	+	-	+
<i>Heimia apetala</i>	0.6, 0.4	obtriangular	-	-	+	-	+
<i>Pleurophora saccocarpa</i>	0.8, 0.5	obovate	-	+	-	-	+
<i>Pehria compacta</i>	0.6, 0.3	obong	-	-	+	-	+
<i>Galpinia transvalica</i>	3.0, 3.0	sub-orbicular	+	-	-	-	-
<i>Cuphea confertiflora</i>	2.0, 2.0	orbicular	-	+	-	-	+
<i>Ginoria midiflora</i>	1.8, 0.4	oblong	-	-	+	-	-
<i>Ammannia coccines</i>	0.3, 0.3	obovate	-	-	+	+	+
<i>Lagerstroemia indica</i> cultivated	7.0, 4.0	obtriangular	+	-	-	-	-
<i>Lafoensia vandelliana</i>	19.0, 10.0	oblong	+	+	-	-	+

Conclusion

- The diversity in seed characters supports a variety of dispersal mechanisms suited for a range of habitats.
- The variety of characters that enhance dispersal have allowed Lythraceae to occupy habitats across the globe.

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