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

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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.
Objective

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

- Seeds were soaked in 4% ethylenediamine overnight to soften the tissue
- The paraffin blocks were sliced with a rotary microtome at 10μm
- Specimens were mounted and stained with touludine 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
Spiral epidermal trichomes

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

- Found in epidermal layer
- *Ammannia, Ginoria, Pehria, Heimia, Didiplis, Lythrum*
- Epidermal layer
- Assist in dispersal in aquatic environments

Float Cells - *Ammannia*
### Summary of Seed Characters

#### Table 1. Seed characters of selected genera of Lythraceae

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Size L,W (mm)</th>
<th>Outline</th>
<th>Wings</th>
<th>Spiral epidermal trichomes</th>
<th>Straight epidermal trichomes</th>
<th>Aerenchyma float cells</th>
<th>Crystals present</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lythrum californicum</em></td>
<td>0.4, 0.3</td>
<td>obovate</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Didiplis diandra</em></td>
<td>0.7, 0.3</td>
<td>oblong</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Heimia apetala</em></td>
<td>0.6, 0.4</td>
<td>obtriangular</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Pleurophora saccocarpa</em></td>
<td>0.8, 0.5</td>
<td>obovate</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Pehria compacta</em></td>
<td>0.6, 0.3</td>
<td>oblong</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Galpinia transvalica</em></td>
<td>3.0, 3.0</td>
<td>sub-orbicular</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Cuphea confertiflora</em></td>
<td>2.0, 2.0</td>
<td>orbicular</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Ginoria midiflora</em></td>
<td>1.8, 0.4</td>
<td>oblong</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Ammannia coccines</em></td>
<td>0.3, 0.3</td>
<td>obovate</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><em>Lagerstroemia indica</em></td>
<td>7.0, 4.0</td>
<td>obtriangular</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Lafoensia vandelliana</em></td>
<td>19.0, 10.0</td>
<td>oblong</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
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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Stubbs JM, AR Slabas. 1982. Ultrastructural and biochemical characterization of the epidermal hairs of the seeds of *Cuphea procumbens*. *Planta* 155: 392-399