Kangaroo Island Propolis
Types and Their Distribution

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Lepidosperma sp. (Cyperaceae)
Sedge Type 1 Propolis

cinnamates

methyl (E)-4-(4'-hydroxy-3'-methylbut-(E)-2'-enyloxy)cinnamate

methyl (E)-4-(3'-carboxybut-(E)-2'-enyloxy)cinnamate

O-prenylstilbenes

C-prenylstilbenes
Kangaroo thorn propolis
Proton NMR spectrum

Sedge type 1 propolis
Proton NMR spectrum
Sedge type 1 propolis

Lepidosperma sp.
Type 1
Sedge type 2 propolis

Lepidosperma sp.
Type 2
PLANT RESIN

BEE HIND LEGS

PROPOLIS FROM HIVE
## Propolis from 64 Apiary Sites Analysed by $^1$H-NMR

<table>
<thead>
<tr>
<th>Propolis Type</th>
<th># Sites</th>
<th>Purity</th>
<th># Samples</th>
<th>%TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedge Type 1</td>
<td>33</td>
<td>80-100%</td>
<td>157</td>
<td>48.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>25</td>
<td>7.7</td>
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<tr>
<td>Sedge Type 2</td>
<td>2</td>
<td>80-100%</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Kangaroo Thorn</td>
<td>8</td>
<td>80-100%</td>
<td>16</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>&quot;Flavanone&quot;</td>
<td>8</td>
<td>80-100%</td>
<td>9</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>&quot;C-Prenyl&quot;</td>
<td>3</td>
<td>80-100%</td>
<td>6</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>&quot;Purple spot&quot;</td>
<td>2</td>
<td>80-100%</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 90%</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Mixed propolis</td>
<td>43</td>
<td></td>
<td>99</td>
<td>30.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>325</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Distribution of 6 Main Types of Propolis

- **S1** Sedge type 1 propolis
- **S2** Sedge type 2 propolis
- **K** Kangaroo thorn propolis
- **F** “Flavanone” propolis
- **C** “C-prenyl” propolis
- **P** “Purple spot” propolis

Scale: 20 km
Further Research on Propolis

Statistical Evaluation of NMR profiles
• Clustering or scoring of match from comparison of NMR spectra of propolis using computer software
• Statistical evaluation for propolis types based on cluster/match with selected NMR spectral profiles

Quantitative HPLC Analyses
• Major and minor constituent profiles
• Accurate and precise determination of amounts of key constituents
• Statistical evaluation for defining single plant source propolis types based on specific constituents and their quantities
Botanical characterisation of the *Lepidosperma* sp. Sedge Type 1 and Sedge Type 2 through collaboration

- George Plunkett and Jeremy Bruhl, University of New England, NSW, AUSTRALIA
- Karen Wilson, Royal Botanic Gardens, Sydney, NSW, AUSTRALIA

Medicinal evaluation of extracts and constituents

- Indigenous medicinal use of *Lepidosperma* species
- *In vitro* and *in vivo* biological testing
- Antioxidant assays
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