Distribution and Taxonomic Significance of Flavonoids in the Olacaceae and Icacinaceae

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Key Word Index—Olacaceae; Icacinaceae; flavonoids; distribution; taxonomic significance.

Subject and Source
The Olacaceae and Icacinaceae embrace some 23 and 56 genera, respectively, predominantly located within the tropical and sub-tropical regions of both the Old and New Worlds, with the distribution of certain genera of the families extending well into the temperate zone (Sleumer, 1971, 1983, 1984; Brummitt, 1992). To date, there is a lack of knowledge on the phytochemistry of Olacaceae and Icacinaceae, particularly on the flavonoids (Hegnauer, 1969; Gilba, 1974). This present study is primarily aimed at utilising phytochemical data based on the leaf flavonoids to interpret phylegetic relationships.

Previous Work
Proanthocyanidins in Olacaceae have been reported from Heisteria pallida, Anacolosa species, Olax cf. andromeda and Ximenia calis natalensis (Diersch et al., 1993).

Present Study
Fresh and herbarium specimens were used, depending upon the availability of the specimens. Herbarium specimens were obtained from Forest Research Institute, Kepong, Malaysia (KEP); Royal Botanic Gardens, Kew (K); Rijksherbarium, Leiden (L); Sarawak Forest Department, Malaysia (SAR); Singapore Botanic Gardens (SING); and University of Malaya (KL). Fresh specimens were collected from the field and the voucher specimens deposited in the University of Malaya herbarium (KL). For each species, four specimens were studied. The flavonoids study was carried out following the method described by Harborne (1984). Results obtained are provided in Table 1. Myricetin was absent from all the species investigated, with quercetin the most commonly appearing flavonol in both Olacaceae and Icacinaceae. In the Olacaceae, quercetin is present in 83.3% of the species studied, absent only from Erythrophalum scandens. Kaempferol is only recorded from Olax scandens within the Olacaceae, whilst in Icacinaceae, quercetin is present only in the three varieties of Gomphandra quadrifida. Flavonols were found only from Cantho, Gomphandra and Strombosis in Icacinaceae. Conversely, flavones are generally found throughout the Olacaceae (68.7% of the species studied have apigenin while 50% have luteolin). Proanthocyanidins are present only in Ximenia, Scordocarpus and Strombosis of Olacaceae, and are completely absent from the Icacinaceae.

Chemotaxonomic Significance
The absence of myricetin and the presence of kaempferol and quercetin in both Olacaceae and Icacinaceae suggests a link between the two families. The presence of proanthocyanidins in Strombosis and Scordocarpus supports the close relationship between the two genera, which already have many other common anatomical and cuticular characteristics as well as the proanthocyanidin, prodelphinidin, which is common to both. The presence of proanthocyanidins in Strombosis and Scordocarpus also indicates that the two genera are more primitive, as reported by Van den Oever (1994) based on wood anatomy. The present study further underlines the heterogeneous characteristics of the Olacaceae. There are both primitive and advanced characters. The combination of primitive and advanced features and the very high number of monotypic genera suggest early

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<th>Species</th>
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<td>Myricetin</td>
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<td>Kaempferol</td>
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<td>Erythrophleum scandens Bl.</td>
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<td>Dracaena fragrans Masters</td>
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<td>Scordospermum borneense (Bail.) Becc.</td>
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<td>Ximenia americana var. americana Delilips</td>
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+ = Present, - = absent.
family differentiation, prior to the separation of the continents during the Cretaceous (Sleumer, 1984). The absence of proanthocyanidins from the Icacinaceae suggests that Olacaceae is more primitive than Icacinaceae.

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References