**Table S3.** Comparison of treelikeliness of selected morphological matrices as measured in matrix Delta Value (mDV) and individual Delta Values (iDV) ranges.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study | Group covered | Matrix dimensions  (taxa x characters) | Fossil taxa included | mDV | iDV range |
| Stevenson (1990)a | Cycadales | 12 x 30 | Extant only | 0.21 | 0.15–0.29 |
| Manos et al. (2007)b | Juglandaceae | 33 x 64 | 5 | 0.22 | 0.18–0.31 |
| Jordal et al. (2002) | *Coccotrypes* | 32 x 31 | Extant only | 0.28 | 0.22–0.40 |
| Gandolfo, Nixon & Crepet (2004) | Nympheaceae | 9 x 69 | 1 | 0.30 | 0.24–0.36 |
| Friis et al. (2007) | Spermatophytes | 50 x 102 | 26 | 0.31 | 0.28–0.35 |
| Grimm (1999) | Cycadales | 22 x 40 | 11 | 0.33 | 0.28–0.35 |
| Lehtonen & Myllys (2008) | *Echinodorus* | 70 x 86 | Extant only | 0.33 | 0.26–0.38 |
| Beyra Matos & Lavin (1999) | Aeschynomeneae | 42 x 50 | Extant only | 0.34 | 0.28–0.43 |
| Bortiri, Van den Heuvel & Potter (2006) | *Prunus* | 45 x 25 | Extant only | 0.35 | 0.31–0.41 |
| Les, Moody & Jacobs (2005) | Australian *Aponogeton* | 17 x 19 | Extant only | 0.36 | 0.30–0.41 |
| Denk & Grimm (2005) | *Zelkova* | 8 x 14 |  | 0.37 | 0.30–0.47 |
| **This study** | **Osmundales** | **122 x 45** | **108** | **0.38** | **0.31–0.43** |
| Denk, Grimm & Hemleben (2005) | *Fagus* | 17 x 42 | 3 | 0.38 | 0.32–0.44 |
| Friis et al. (2009) | Angiosperms | 56 x 114 | 1 | 0.39 | 0.35–0.43 |
| Leht (2009) | *Lathyrus* | 48 x 210 | Extant only | 0.41 | 0.37–0.44 |
| Simpson, Tate & Weeks (2004) | *Hoffmanseggia* | 28 x 33 | Extant only | 0.41 | 0.37–0.45 |
| Hermsen et al. (2006) | Cycadales | 32 x 69 | 18 | 0.47 | 0.36–0.46 |

a This matrix, which has been filtered for apparent homoplasies (Stevenson 1990), is the only matrix that allows inference of a (single) most-parsimonious tree with ample support along branches; the resulting tree, however, is in conflict with molecular trees (e.g. Nagalingum et al. 2011) of the group.

b This combined molecular-morphological matrix is the only one in the list that allows inference of a neighbour net with pronounced tree-like portions compatible with molecular trees obtained for the group.

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