Abstract Detail

Evolutionary Developmental Biology (Evo-Devo)

Han, Jiahong [1], Berger, Brent [1], ricigliano, vincent [2], Shepherd, Kelly [3], Tong, Jingjing [4], Thompson, Veronica [5], Lim, Aedric [1], Howarth, Dianella [1].

Phylogenetics and expression of *CYCLOIDEA*-like genes in Goodeniaceae.

Shifts in floral symmetry, especially from radial symmetry to bilateral symmetry, are often correlated with changes in diversification rates and pollinator specificity. Evidence from multiple, independent lineages demonstrates that these shifts are associated with gene duplication and, often, dorsal restriction in expression of transcription factors in the TCP gene family, specifically the CYCLOIDEA-like genes. In this study, we examine the predominantly Australian and Pacific Island fan-flowers of the Goodeniaceae, which contains both radially and bilaterally symmetrical flowered species. We find evidence for three CYC-like gene paralogs (CYC1, CYC2, and CYC3) in Goodeniaceae that correspond to the same three clades found across core eudicots. Unlike other bilaterally symmetrical groups where duplicate CYC2 genes predominate, Goodeniaceae appears to have a single *GoodCYC2* clade and two *GoodCYC3* clades, *GoodCYC3A* and *GoodCYC3B*. This is of special interest given the strongly ventrally placed petals in many bilateral Goodeniaceae and the possibility that the duplication of *GoodCYC3* plays a greater role in the ventral zone of the flower. Also of note, there are several tip duplications in *GoodCYC3A* and *GoodCYC3B*, coincident with the morphological shift to a fan flower. Using the fan-flowered *Scaevola aemula*, we perform realtime qPCR and show that most CYC-like copies are expressed across the entire corolla. *SaeCYC2* was more strongly expressed in dorsal petals than in ventral petals, the predominant pattern found in other core eudicots. Conversely, both *SaeCYC3* paralogs have the highest expression in ventral petals in *S. aemula*. Taken together, these results indicate *SaeCYC2* is expressed in a similar pattern to that in other groups, while *SaeCYC3* exhibits the opposite expression pattern, being more highly expressed ventrally.

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