

### **The evolution of unisexual flowers in the Annonaceae: evidence from *Pseuduvaria mulgraveana***

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The early-divergent angiosperm family Annonaceae has predominantly hermaphroditic flowers, although unisexuality has evolved in several disparate lineages. *Pseuduvaria*, an Asian-Pacific distributed genus with 57 species has largely unisexual flowers. A recent monograph of this genus reported that many species have both staminate and structurally hermaphroditic flowers; the latter were previously considered to be functionally pistillate, with stamens that produce small, irregular pollen that was likely to be sterile. We investigated the viability of the freshly-collected pollen from both structurally hermaphroditic and staminate flowers of *Pseuduvaria mulgraveana* and the phenology and pollination biology of the species in order to evaluate the relationship between the pollination ecology and breeding systems. Results showed that the pollen from both hermaphroditic and staminate flowers is viable with no significant difference in germination rate. The structurally hermaphroditic flowers were nevertheless functionally pistillate since they exhibit delayed anther dehiscence, a phenomenon not previously been reported in the family. The flowers show diurnal anthesis and are pollinated by a small nitidulid beetle species. The evidence presented here on the formation of fertile pollen in structurally hermaphroditic flowers of *Pseuduvaria mulgraveana* indicates the need for a reappraisal of the assumptions underlying previous interpretations of the evolution of unisexual flowers. We present an alternative interpretation based on the ratio of the mean number of stamens in staminate flowers to that in hermaphroditic flowers. Sub-andromonoecy (or sub-androdioecy) appears to be synapomorphic for *Pseuduvaria*, with truly unisexual flowers evolving in several different clades. Andromonoecy (or androdioecy) and hermaphroditism is common in species from New Guinea. New Guinea is topographically and ecologically complex, and it is hypothesized that an increased chance of selfing may have been advantageous for the colonization of such regions.

### **To be or not to be a myrmecophyte: inter-site variation in myrmecophytic traits within a semi-myrmecophytic tree**

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*Humboldtia brunonis* (Fabaceae) is an understory tree, endemic to the low elevation, tropical wet evergreen forests of the Western Ghats of India. While all individuals bear active extrafloral nectaries on the young leaves and bracts of floral buds, only some individuals of the population have ‘domatia’ – modified swollen hollow internodes with a terminal self-opening slit. These domatia house not only ants but various other invertebrates, the most unique being an arboreal earthworm. The polymorphism