

Linear sequences for seed plants

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Nicholas Hind organising specimens in the Kew Herbarium

Scientists have been working out the best way to arrange plant specimens in herbaria and other collections so that their order best reflects evolutionary relationships.

Classification systems are needed to organize our knowledge of the natural world and aid communication. [Biologists](#) use classifications that reflect the [evolutionary relationships](#) between [organisms](#), and base them on phylogenetic trees that are often branched. Specimen collections need to be arranged in a linear order (e.g. along shelves or in cupboards) so the branching nature of phylogenetic trees creates a problem for curators who wish to arrange collections in a manner that reflects the patterns of evolution rather than, for example, alphabetical order. Curators need an agreed 'linear sequence' to order their collections in a way that represents the phylogenetic classification.

Various linear sequences of plant families have been proposed, and a range of systems are in use. However, our understanding of the relationships between families has changed in recent years and many systems no longer represent this in the best way. Botanists at Kew have been collaborating with colleagues from Cornell University, the Finnish Museum of Natural History and the Royal Botanic Garden Edinburgh to construct new linear sequences for seed plants based on the current understanding of relationships gained through molecular phylogenetics.

Recommended linear sequences have been published in a special, open-access issue of the journal [Phytotaxa](#), edited by Maarten Christenhusz (Finnish Museum of Natural History), Mark Chase and Mike Fay (Kew). One paper updates the linear sequence for flowering plants originally constructed by Haston et al. to accompany the [Angiosperm Phylogeny Group III \(APG III\) classification in 2009](#). The paper also provides synonyms of the orders and families recognised by the APG III classification. A second paper gives a new classification and linear sequence for gymnosperms. In a third paper, other scientific colleagues provide a linear sequence to lycophytes and ferns.

The Herbarium at Kew will be re-organised to reflect the APG III classification. With an estimated 7 million specimens to move, this will be a gargantuan logistical operation that is expected to take two to three years!.

More information: Christenhusz, M., et al. (eds) (2011). Linear sequence, classification, synonymy, and bibliography of vascular plants: Lycophytes, ferns, gymnosperms and angiosperms. *Phytotaxa* 19: 1–134.

Haston, E., et al. (2009). The Linear Angiosperm Phylogeny Group (LAPG) III: a linear sequence of the families in APG III. *Botanical Journal of the Linnean Society* 161: 128–131.

Provided by Royal Botanic Gardens, Kew

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