Australian Plants Society
NORTH SHORE GROUP
Ku-ring-gai Wildflower Garden

Monocotyledons

John Ray, at the end of the 17th century realised that there were two radically different kinds of flowering plants, which he called **Monocotyledons** (one seed leaf) and **Dicotyledons** (two seed leaves). Modern botany has proved, maintained and amplified the discovery. It has added differences in leaf, flower and internal structure, though none by itself is as distinctive as the number of seed leaves.
It's important to note that a specific plant we regard as a **Monocot** or a **Dicot** may **not** exhibit all the characteristics to be mentioned. A good example of variation includes leaf venation. Dicots are now recognised (since 1990's) as paraphyletic.

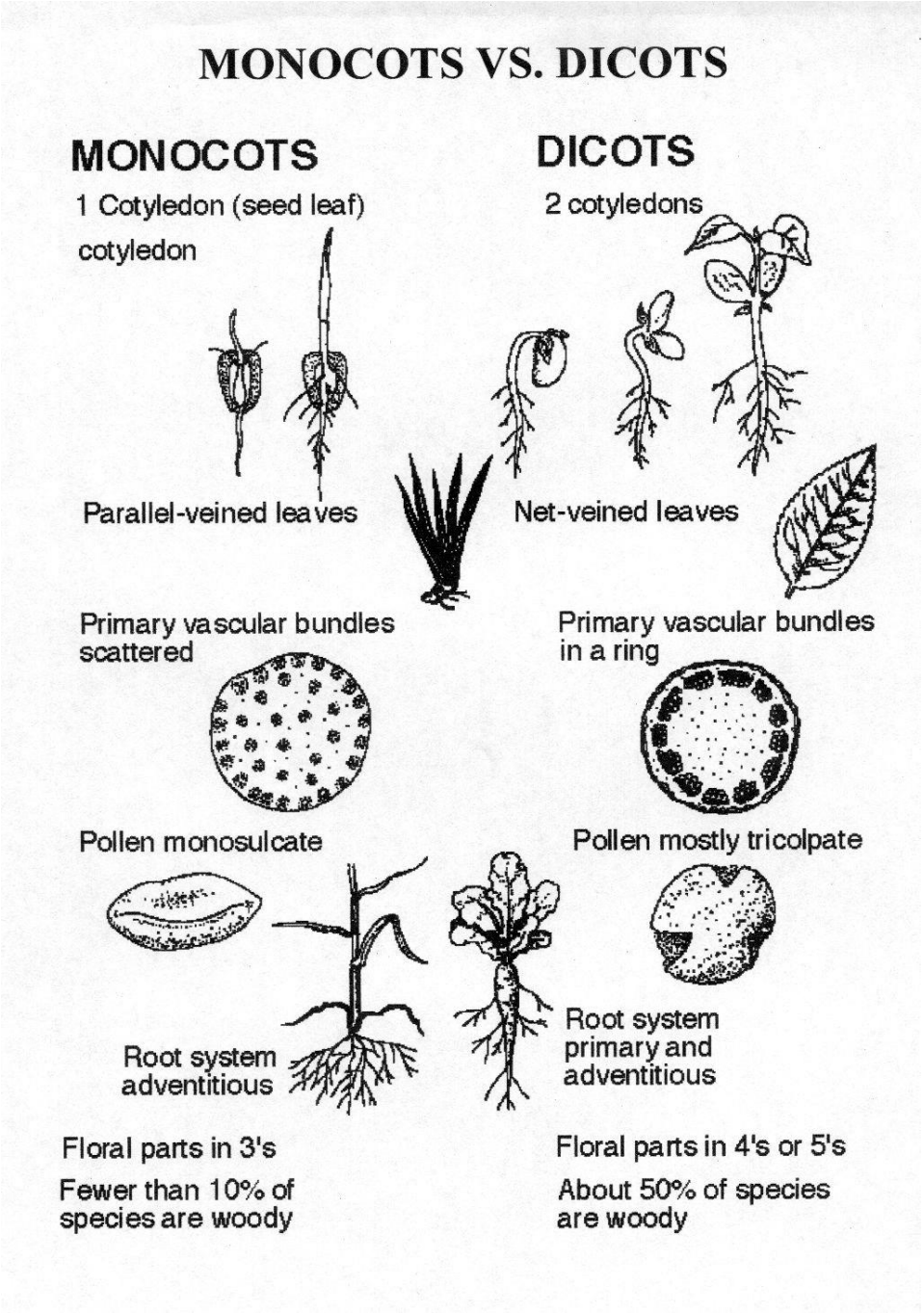
Summary of Main Differences between Monocots and Dicots:

Characteristic	Monocots	Dicots
Cotyledons (seed leaves)	one	two
Roots	fibrous	tap with laterals
Flower parts	in 3s usually	in 4s or 5s
Leaf venation	parallel usually	netlike usually
Stems: primary vascular bundles	scattered	in a ring
Stems: true secondary growth with vascular cambium	absent	present usually

A contrast in the number of flower parts:

Monocots: 3 or 6 (*Patersonia sericea*)

Dicots: 4 or 5 (*Crowea saligna*)



Leaf Structure and Venation

Sometimes included as a difference is that monocot leaves generally do not have a central vein or petiole (leaf stem) and often have a stem clasping leaf.
The leaves of monocots are often basal, giving a tufted appearance to the plants. Most have parallel veins. They grow from the base and being eaten off or cut at the tops does not affect their further growth, hence it is possible to graze or mow them without permanent damage. The **meristem** (comprising tissue in which all the cells are able to divide) is at the base of the leaf in such plants, and provides a soft juicy 'nibble' compared with the tougher, more fibrous, cells of the older part of the leaf.

Stem Structure

Many monocots are herbaceous plants. However, even the larger ones, such as palms (*Archontophoenix* and *Livistona*) lack the massive trunks and tremendous height of the great gymnosperm and dicot trees. In these the **xylem** tissue (water carrying 'pipes') fills the central core and becomes highly lignified, whilst the **phloem** (food transporting 'pipes') forms an outer ring. In monocots the 'pipes' are typically in groups throughout the stem or trunk and do not develop much lignin. In perennials a region of tissue exists in which the cells retain the ability to divide in both cases, but its position is quite different in monocots from that in dicots.

Pollen Structure

The first angiosperms had a single furrow or pore through the outer layer (monosulcate). This feature is retained in the monocots.
Most dicots are descended from a plant which early on developed three furrows or pores in its pollen (tricolpate).

Root Structure

Roots are often fibrous in monocots and form a taproot in dicots.

Monocotyledons include many plants that reproduce by vegetative organs such as stolons, rhizomes, bulbs and corms.

Stolons are horizontal 'runners' which spread out above the ground and produce roots as well as branches with leaves at the nodes. Common in grasses and in the *Commelinaceae* such as *Commelina.*

Rhizomes are usually thickened horizontal 'runners' which spread below the ground and produce roots and branches at the nodes. They often contain stored food such as starch.

Corms are thickened, vertical stem bases containing stored food and bearing rings of buds which give rise to a new plant. They may also produce runners from which extra corms arise.

Bulbs are swollen bases of leaf clusters which are typically buried in soil. The central leaves give rise to a new plant. Stored food may provide for overwintering in bulbs and corms.

Tubers are more characteristic of dicotyledons. They are much enlarged stems, borne on rhizomes, containing stored food (e.g. starch in potatoes) and bearing buds in axils of much reduced modified leaves.

Abundance of Monocots

Monocots have been a very successful form of flowering plants (Angiosperms). They make up about a quarter of the world's Angiosperm species. In the Ku-ring-gai Wildflower Garden, they make up about 17 of 71 recorded families for the Garden. From about 50 monocot families in Australia. *Orchidaceae* and *Poaceae*, each have more species than any other family of Angiosperms. The classification of monocots in the *Flora of New South Wales* differs substantially from that used in the *Flora of Australia* which has resulted in the anomaly of there being more families in New South Wales than there are in Australia.

Examples of Monocots found in Ku-ring-gai Wildflower Garden

- **Anthericaceae**: *Caesia parviflora, Thysanotus sp.*
- **Arecaceae**: (Palms) *Livistona australis**
- **Blandfordiaceae**: *Blandfordia nobilis*
- **Centrolepidaceae**: *Centrolepis fascicularis*
- **Colchicaceae**: *Burchardia umbellata*
- **Commelinaceae**: *Commelina cyanea*
- **Cyperaceae:** *Caustis flexuosa, Caustis pentandra*, *Cyanthochaeta diandra, Gahnia sp. Lepidosperma concavum, Lepidosperma viscidum, Ptilothrix deusta, Schoenus imberbis, Schoenus melanostachys*
- **Doryanthaceae**: *Doryanthes excelsa*, Doryanthes palmeri**
- **Haemodoraceae**: *Haemodorum planifolium*
- **Iridaceae**: *Libertia paniculata, Patersonia glabrata, P. sericea*
- **Juncaceae:** *Juncus sp.*
- **Lomandraceae:** *Lomandra cylindrica, Lomandra glauca, Lomandra longifolia, Lomandra obliqua*
- **Orchidaceae**: *Acianthus, Pterostylis species* and many others
  Phormiaceae: *Dianella caerulea var. producta, D. prunina*
- **Poaceae**: (Grasses) *Cymbopogon refractus, Entolsia stricta, Imperata cylindrica, Microlaena stipoides, Oplismenus imbecillis, Themeda triandra*
- **Restionaceae**: *Lepyrodia scariosa*
- **Smilacaceae***: Smilax glyciphylla*
- **Xanthorrhoeaceae**: *Xanthorrhoea arborea, Xanthorrhoea glauca, Xanthorrhoea media, Xanthorrhoea resinosa*
- **Xyridaceae**: *Xyris bracteata*

Acknowledgements and References used by HD & FL

- Hilary Davidson: Who kindly provided notes from earlier Talks.

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