

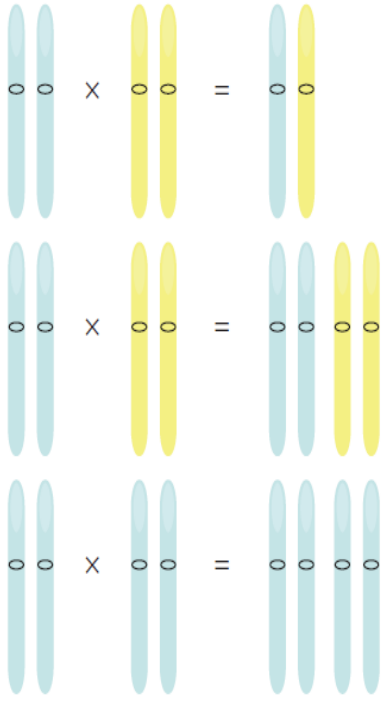


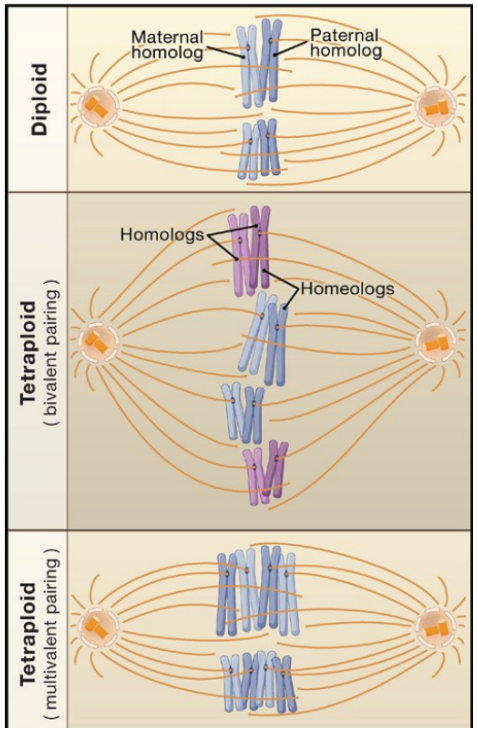
Hybrid speciation

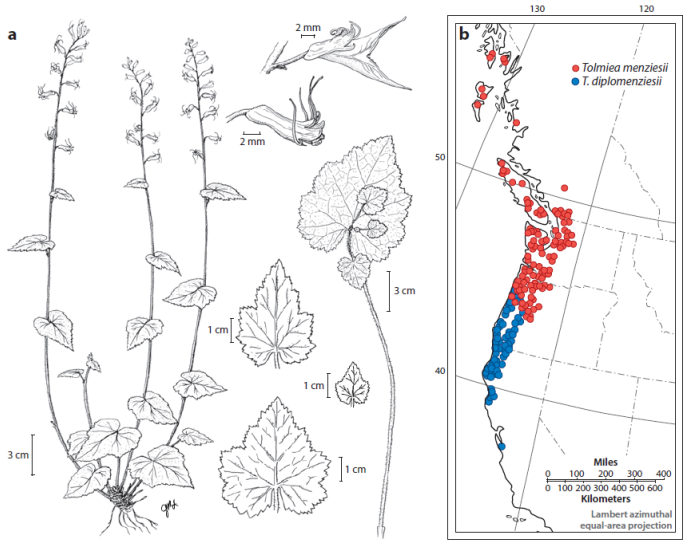
Homoploid and Polyploid



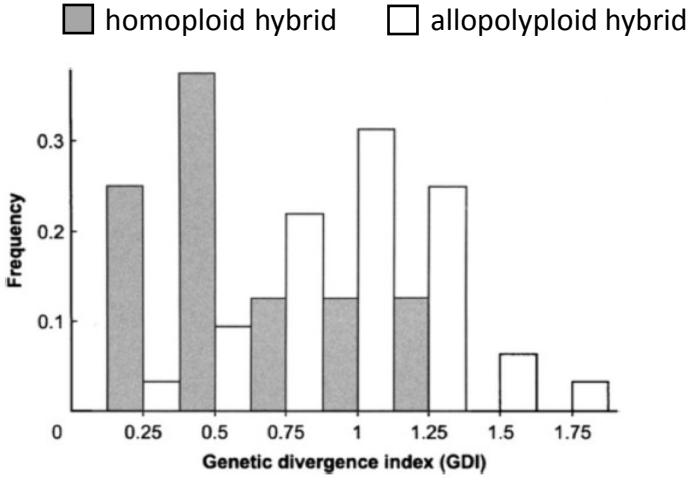
Polyploid hybrid speciation

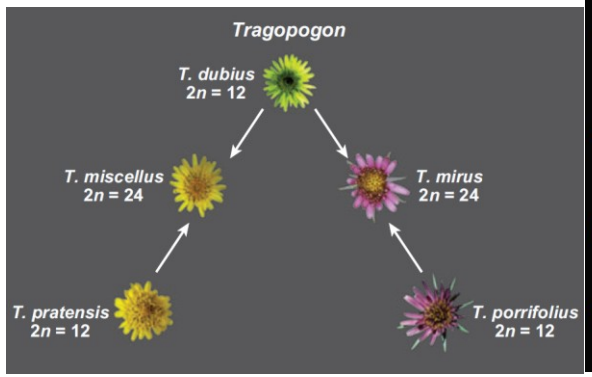


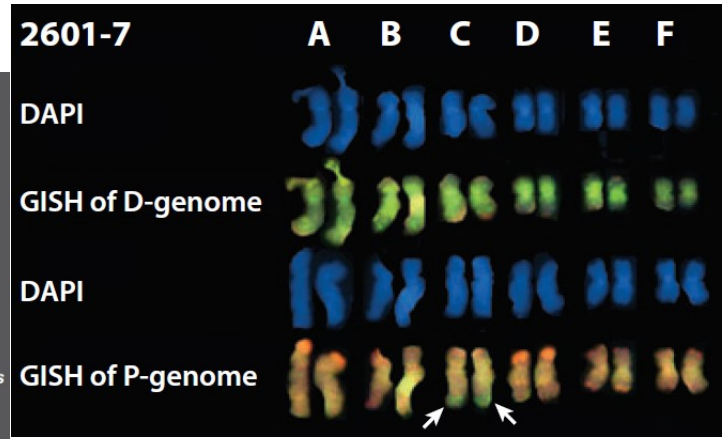


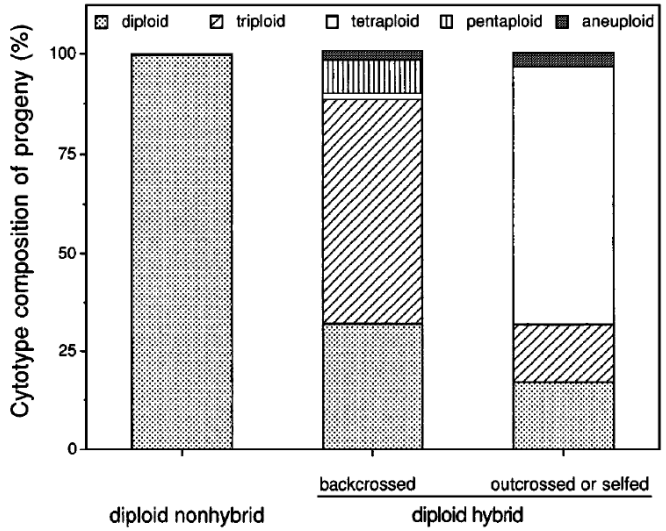


Tolmiea diplomenziesii (2n=14), *T. menziesii* (2n=28)









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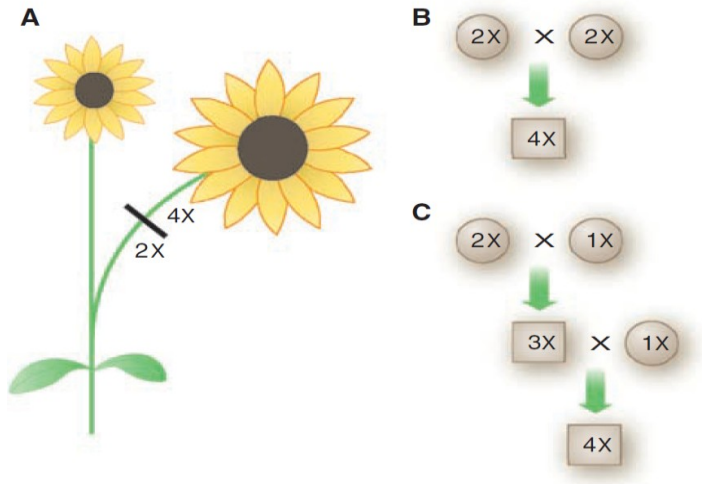
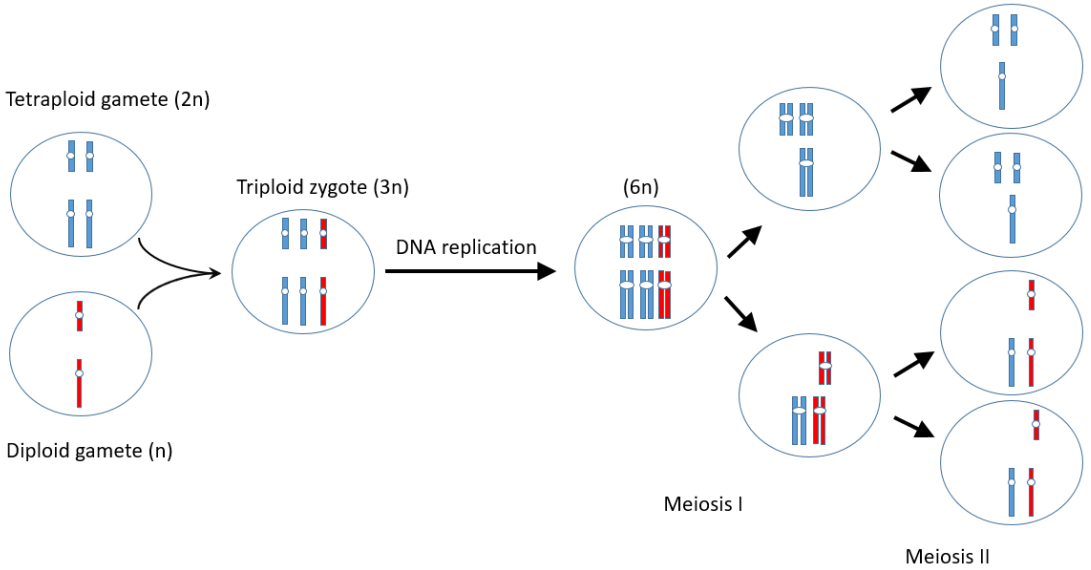
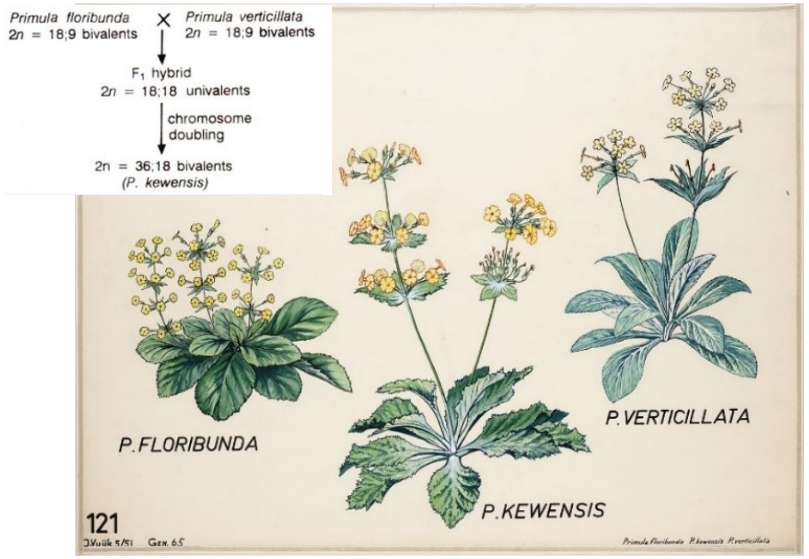
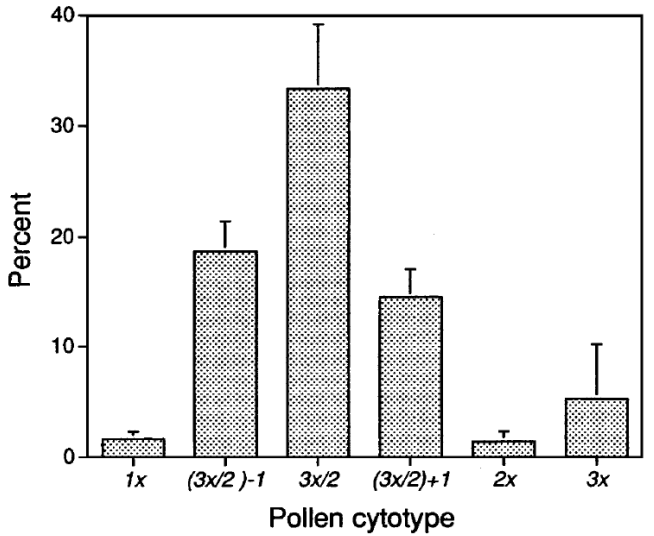
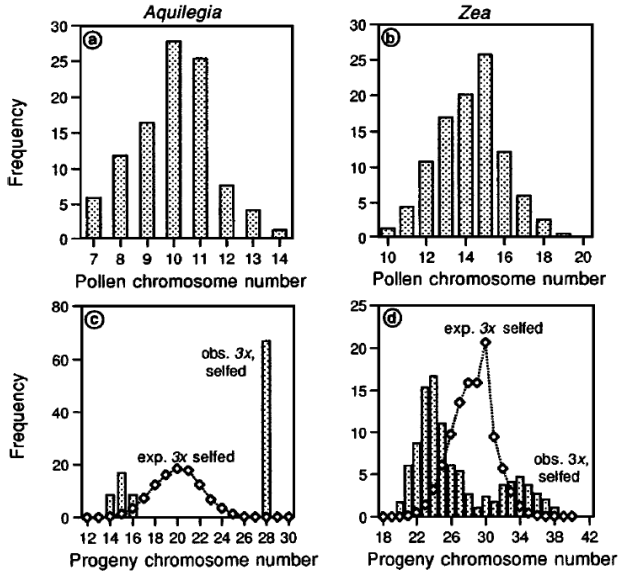
Polyploid hybrid speciation - origin, reproductive isolation











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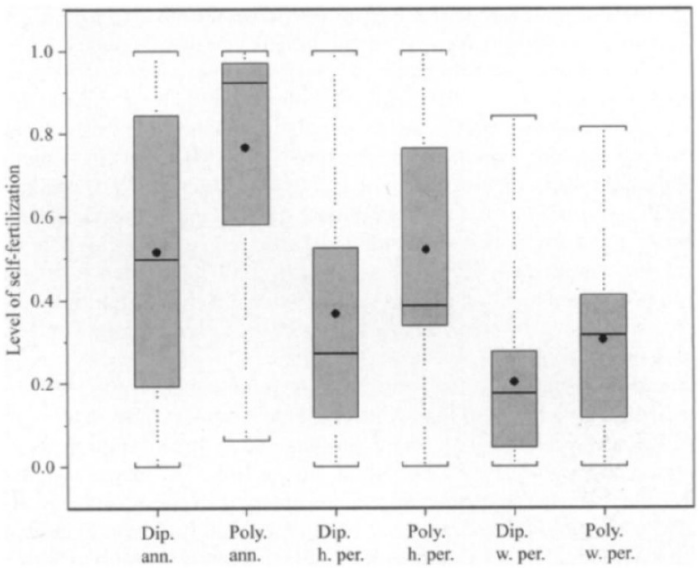
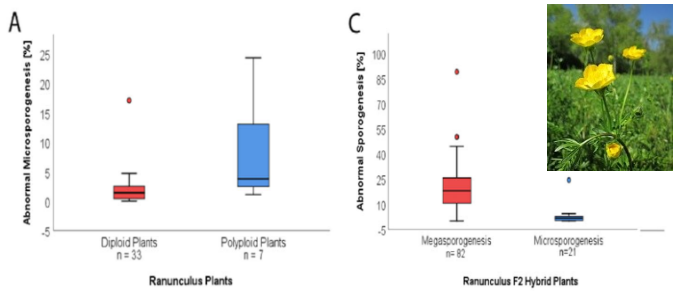
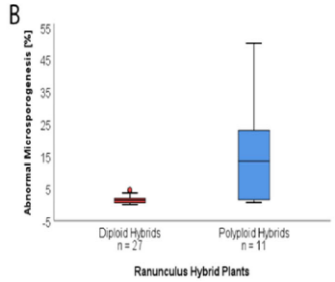
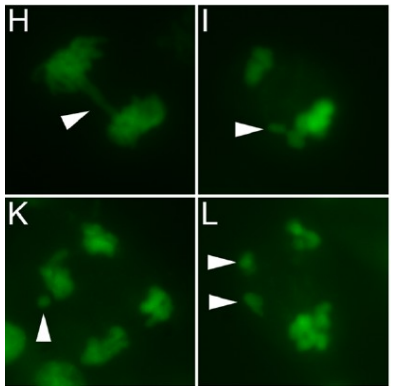
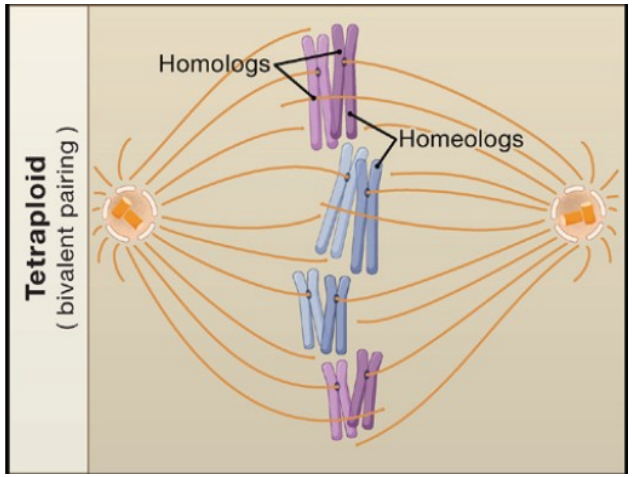
Polyploid hybrid speciation – disadvantages and advantages



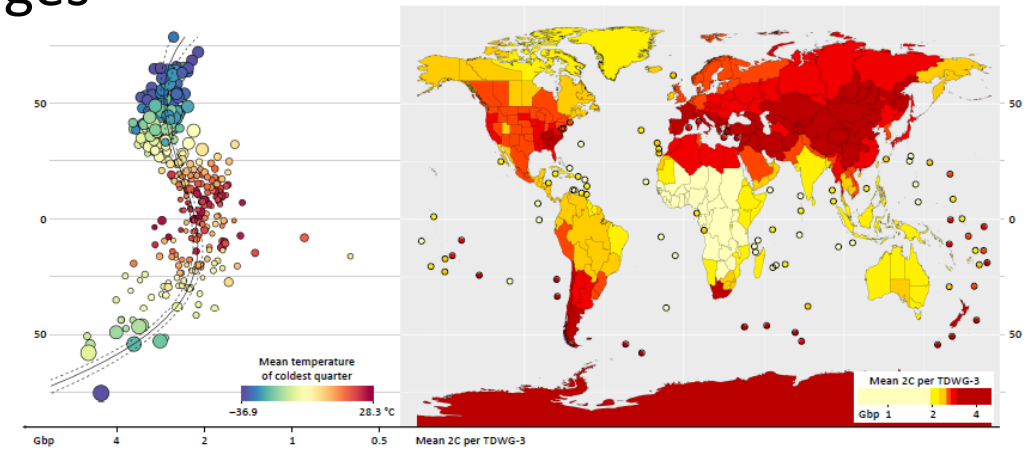




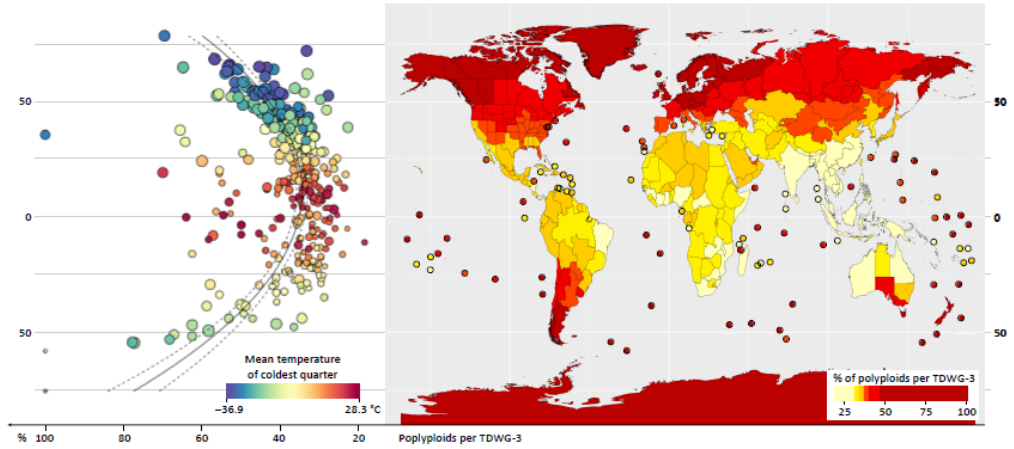




Latitudinal gradient in mean genome size (2C) in flowering plants



Latitudinal gradient in frequency (%) of polyploids in flowering plants



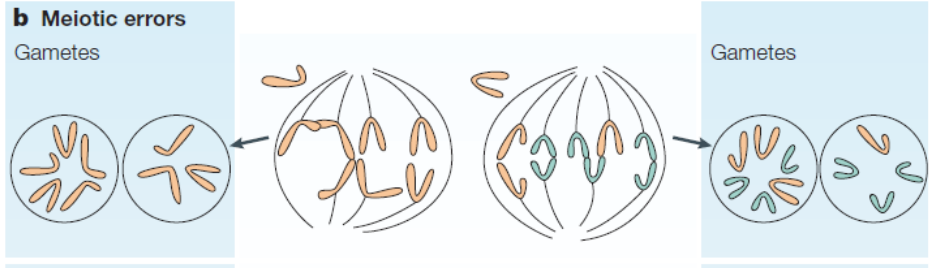


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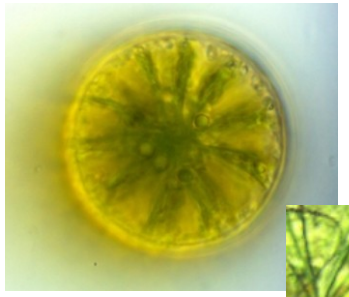
Table 16.1 Frequency of polyploidy, the highest known ploidy level and the record-holder species in different plant groups. The groups do not represent comparable phylogenetic/taxonomic categories (Data compiled from different sources)

Plant group	Number of extant species	Incidence of polyploidy	Maximum ploidy level	Record-holder
Glaucophytes (Glaucophyta)	13	Unknown	Unknown	–
Red algae (Rhodophyta)	~6,000	Frequent	Moderate (~16-ploid)	*Polyides rotundus*, $n = 68–72$ (Cole 1990)
Chlorophyta (Green algae s.s.)	~3,800	Frequent	Moderate (~20-ploid)	*Eraemosphaera viridis*, n = 80 (Mainx 1927)
Charophyta (Green algae, streptophyte algae)	~5,000	(Very) frequent	(Very) high	*Netrium digitus*, $n = 592$ (King 1960)
Liverworts (Marchantiophyta)	~5,000	Rare (~8%)	Rather low (~12-ploid)	*Riccia macrocarpa*, $n = 48$ (Przywara and Kuta 1995)
Mosses (Bryophyta s.s.)	~12,000	Ambiguous (c. 20–80%)	Moderate (~16-ploid)	*Leptodictyum riparium*, *Physcomitrium pyriforme*, $n = 72$ (Przywara and Kuta 1995)
Hornworts (Anthocerotophyta)	~150	Absent	–	*Anthoceros sampalocensis*, $n = 10$ (Przywara and Kuta 1995)
Lycopods (Lycopodiophyta)	~900	(Very) frequent	Very high (~50-ploid)	*Huperzia prolifera*, $2n = ~556$ (Tindale and Roy 2002)
Ferns and allies (Monilophyta)	~11,000	Very frequent (up to ~95%)	Very high (~96-ploid)	*Ophioglossum reticulatum*, $2n = ~1440$ (Khandelwal 1990)
Cycads (Cycadophyta)	~250	Absent	–	*Zamia paucijuga*, *Z. prasina*, $2n = 28$ (Moretti and Sabato 1984)
Ginkgo (Ginkgophyta)	1	Absent	–	$2n = 24$
Conifers (Pinophyta)	~550	Very rare (<2%)	Low (hexaploid)	*Sequoia sempervirens*, $2n = 66$ (Hirayoshi and Nakamura 1943)
Gnetophytes (Gnetophyta)	~50	Moderate (~30%)	Low (octoploid)	*Ephedra funerea*, *E. gerardiana*, $2n = 56$ (Ickert-Bond 2003)
Monocots	~60,000	Very frequent (~75%)	Very high (~50-ploid)	*Voanioala gerardii*, $2n = ~596$ (Johnson et al. 1989)
Dicots s.l.	~200,000	Very frequent (~75%)	Very high (~80-ploid)	*Sedum suaveolens*, $2n = ~640$ (Uhl 1978)



Netrium digitans

Leptodictyum riparium

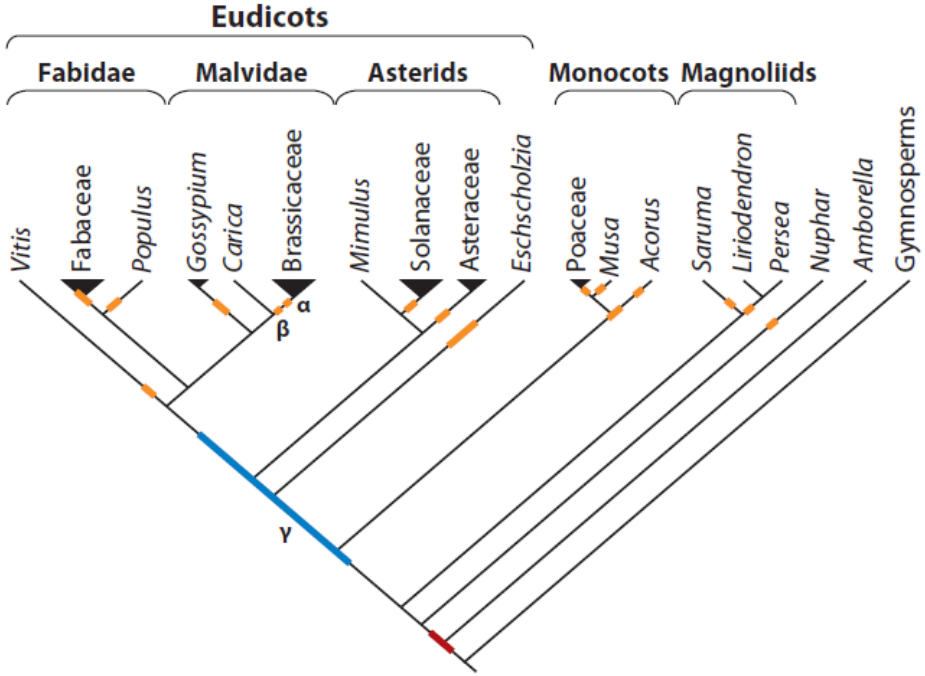
Ophioglossum reticulatum

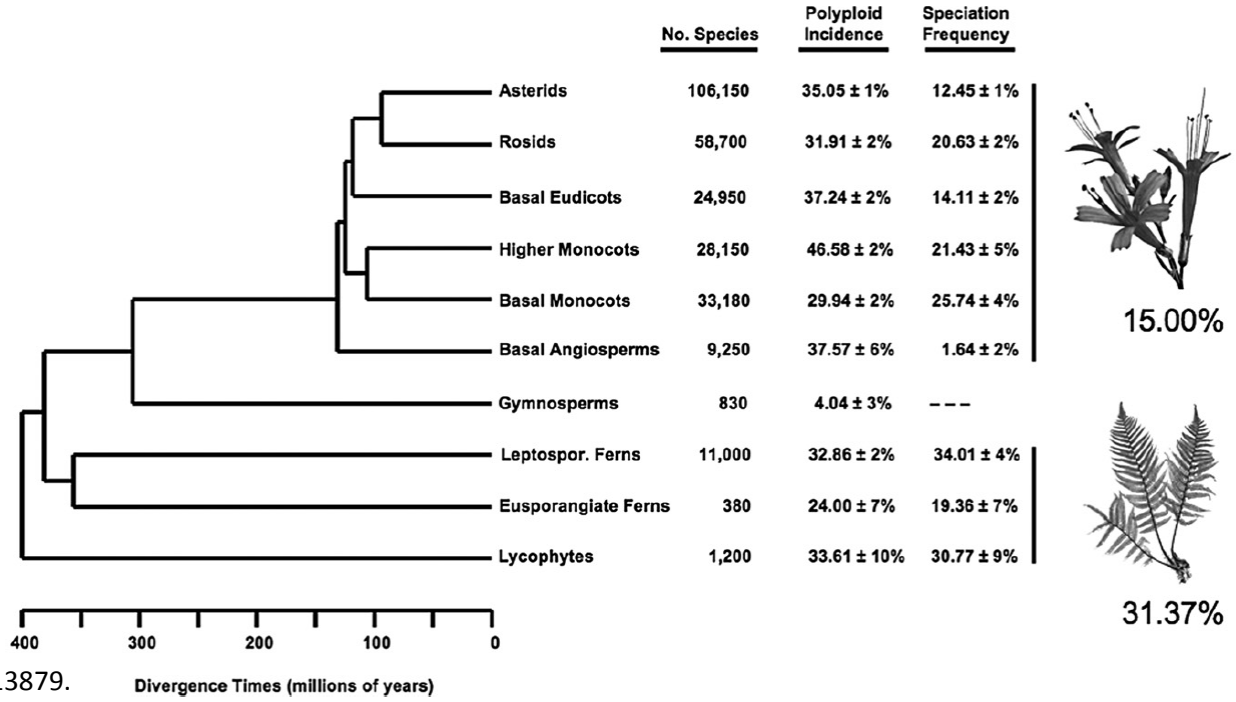
Sequia sempervirens

Sedum suaveolens

Husband et al. (2013) The Incidence of Polyploidy in Natural Plant Populations: Major Patterns and Evolutionary Processes. In: *Plant Genome Diversity Vol. 2,* Springer, pp 255-276.

Polyploid hybrid speciation – recent and ancient polyploid speciation





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