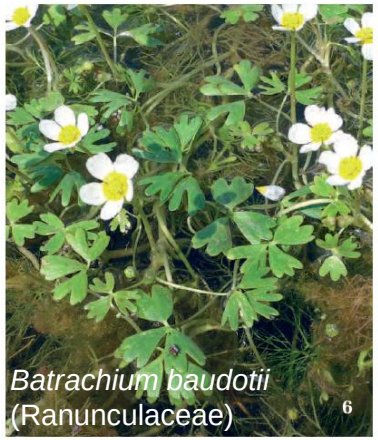
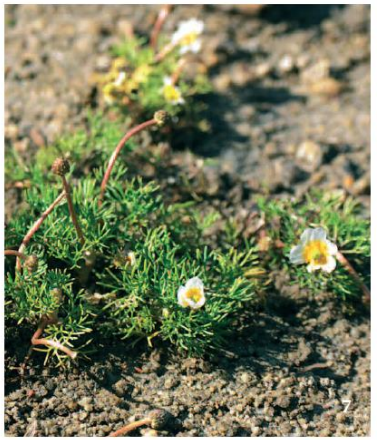
Bi6570 Mikroevoluce, speciace a taxonomie rostlin (podzim 2024)

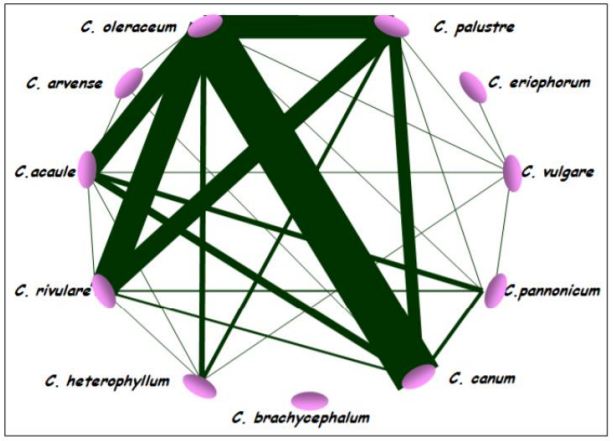
2. Koncept druhu

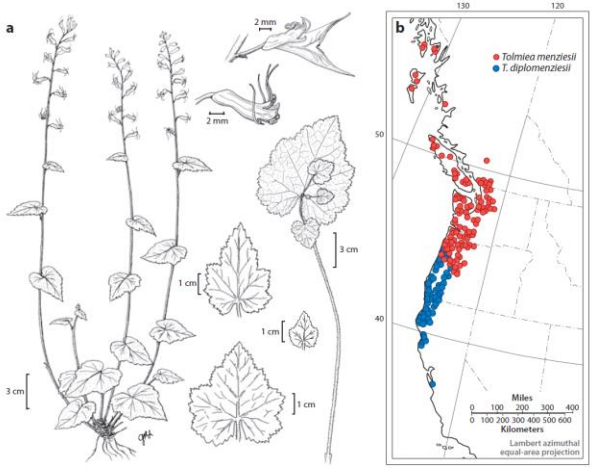
František Zedek

What is a species?









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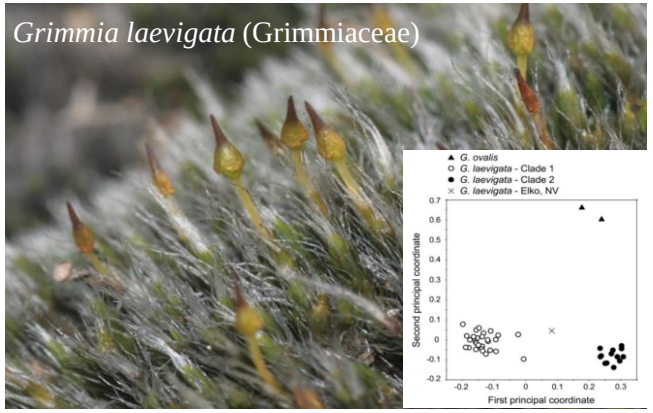
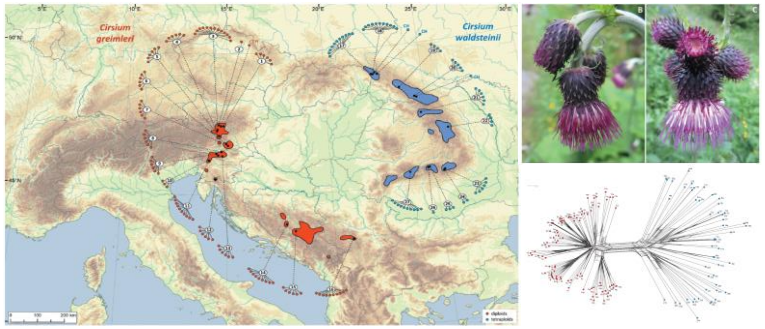
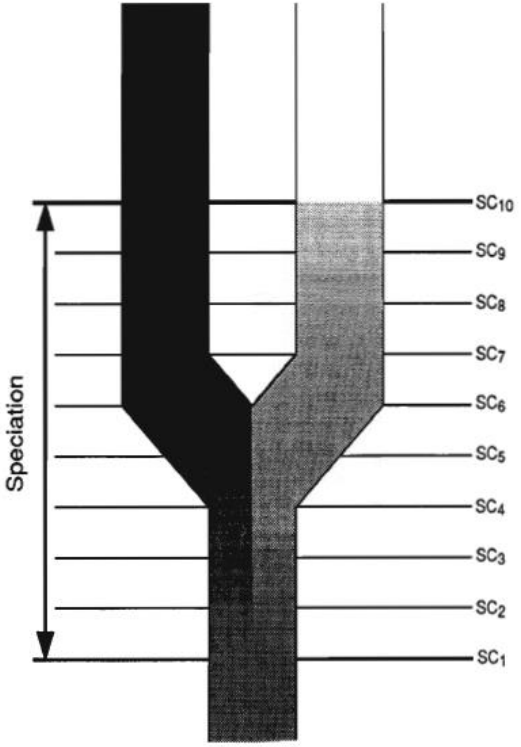
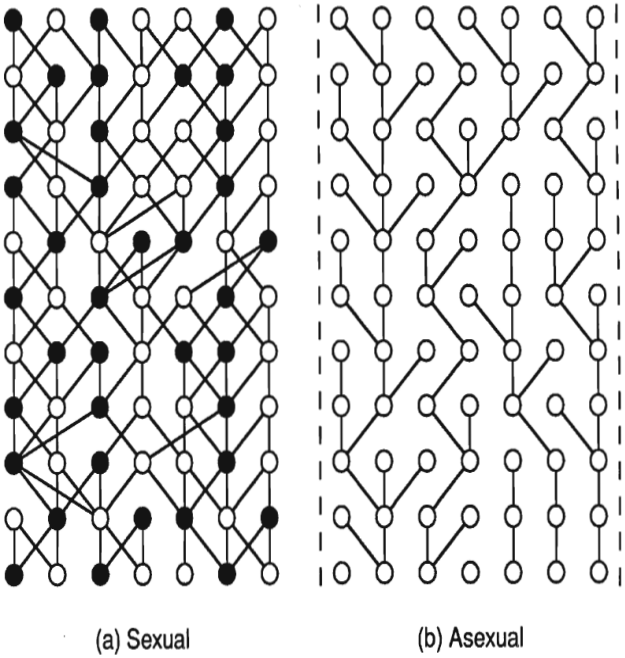
Autopolyploid speciation in *Tolmiea*, showing (*a*) the recently described *Tolmiea diplomenziesii* (83) and (*b*) the allopatric distributions of *T. menziesii* (2*n* = 28; *red circles*) and *T. diplomenziesii* (2*n* = 14; *blue circles*). Modified from Reference 83.









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What is a species?

Tolmiea diplomenziesii: A new species from the Pacific Northwest and the diploid sister taxon of the autotetraploid T. menziesii (Saxifragaceae)

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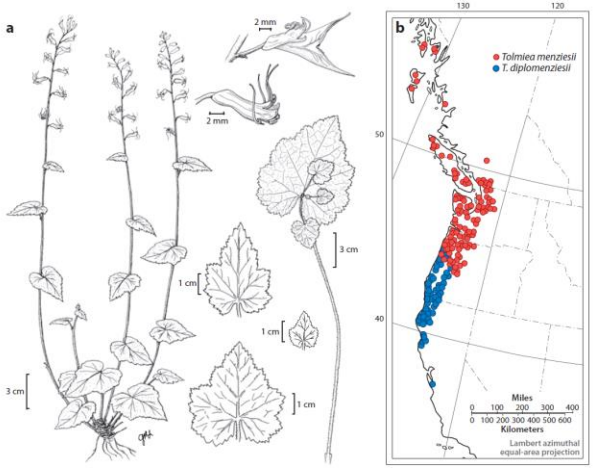
Abstract. Tolmiea diplomenziesii, the diploid entity traditionally treated within a broadly circumscribed *Tolmiea menziesii*, is here formally described. Evidence is provided that this new species represents the diploid sister lineage to *T. menziesii*, which is re-circumscribed to include only autotetraploid plants. The diploid and autotetraploid entities are compared, and serve as an example of the level of taxonomic evidence for specific status that we consider appropriate for recognition of a cytological entity as a distinct species.

Key words: Autopolyploidy, Saxifragaceae, speciation, *Tolmiea*.

Many examples of multiple cytotypes within a species have been shown to represent autopolyploids (or are presumed autopolyploids). However, only rarely has an autopolyploid been formally named and considered to represent a species distinct from its diploid progenitor. As a result botanists have underrepresented the distinct biological entities that actually exist in nature. Although it may seem "practical" to include morphologically highly similar cytotypes in a single species (following a traditional morphology-based or phenetic species concept), this practice obscures insights into evolution and hinders conservation efforts (Soltis et al., in press). It is clear that some cytotypes, at least, fulfill the requirements of multiple species concepts, and thus represent distinct evolutionary lineages. Therefore, we recently suggested in a review of autopolyploidy and speciation (see Soltis et al., 2007) that such cytotypes should be formally recognized as distinct species, and we provide a system for naming them. The diploid and autotetraploid populations currently treated as the single taxonomic species *Tolmiea menziesii* (Pursh) Torr. & A. Gray present the perfect opportunity for us to apply these proposals to a well-studied clade.

Tolmiea menziesii, as currently recognized, comprises a single taxonomic species with both diploid ($2n=14$) and autotetraploid populations ($2n=28$; Soltis, 1984). There are no other species of *Tolmiea* Hook. and the genus is phylogenetically distinct among related Saxifragaceae (see Soltis et al., 2001). Hence, there is no other known progenitor of the autotetraploid entity other than the diploid populations. Molecular and chemical data also suggest autopolyploidy (Soltis & Soltis, 1986; Soltis & Bohm, 1986; Soltis & Doyle, 1987). Isozyme studies revealed that the alleles detected in the tetraploids are all present in the diploid populations, again indicating autopolyploidy. In addition, inheritance studies confirmed tetrasomic inheritance at all isozyme loci examined (Soltis & Rieseberg, 1986; Soltis & Soltis, 1988). Finally, the autotetraploid possesses as many as three or four alleles at a

Brittonia, 59(3), 2007, pp. 217–225. ISSUED: 27 September 2007



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Autopolyploid speciation in *Tolmiea*, showing (*a*) the recently described *Tolmiea diplomenziesii* (83) and (*b*) the allopatric distributions of *T. menziesii* ($2n = 28$; *red circles*) and *T. diplomenziesii* ($2n = 14$; *blue circles*). Modified from Reference 83.

1.Chromosome Number:
1. *T. menziesii* is an autotetraploid species (2n = 28).
2. *T. diplomenziesii* is a diploid species (2n = 14).

2.Leaf Shape:
1. In *T. diplomenziesii*, the **cauline leaves** (leaves along the stem) are generally **longer than they are wide**, with a length/width ratio of **0.83 to 1.44** (average 1.04).
2. In *T. menziesii*, the **cauline leaves** are **either not or only slightly longer than wide**, with a length/width ratio of **0.57 to 1.09** (average 0.89).

3.Plantlet Formation:
1. *T. diplomenziesii* produces **plantlets less frequently** compared to *T. menziesii*, which tends to form more **adventitious buds** at the apex of the petioles that may develop into plantlets.

4.Stature and Rosettes:
1. *T. diplomenziesii* tends to be **smaller** in stature and has **less well-developed rosettes** compared to *T. menziesii*.

Prančl (2015) Lakušníky – vykladní skříň evoluce skrytá v našich vodách. Živa 2015(1): 12-15.
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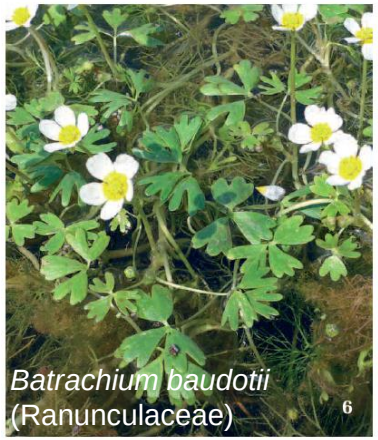

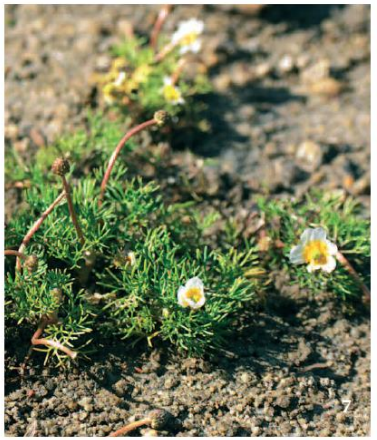

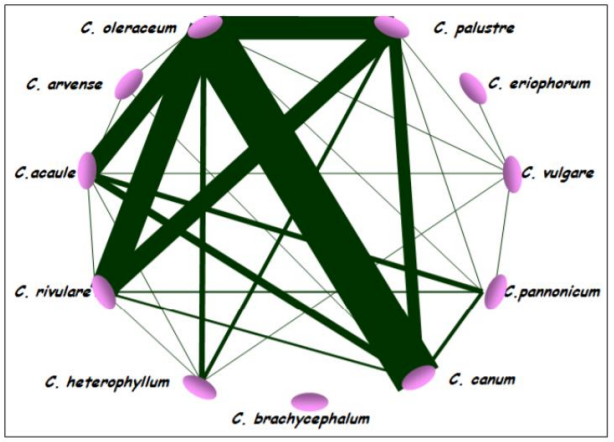

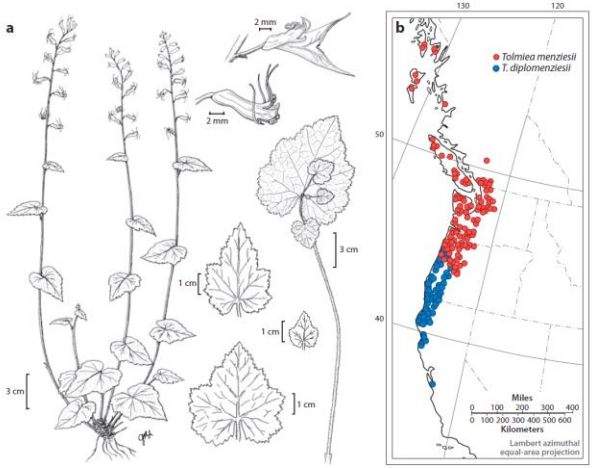

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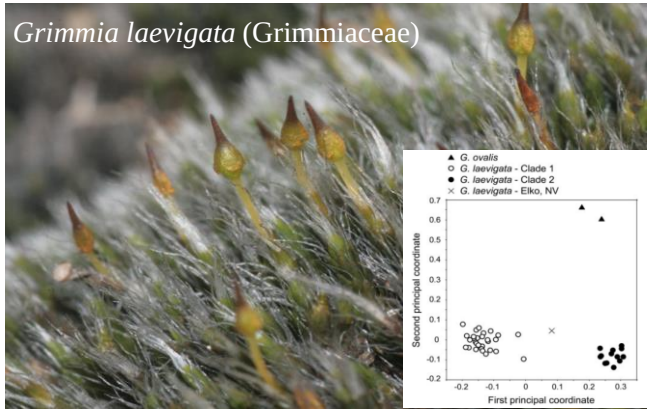

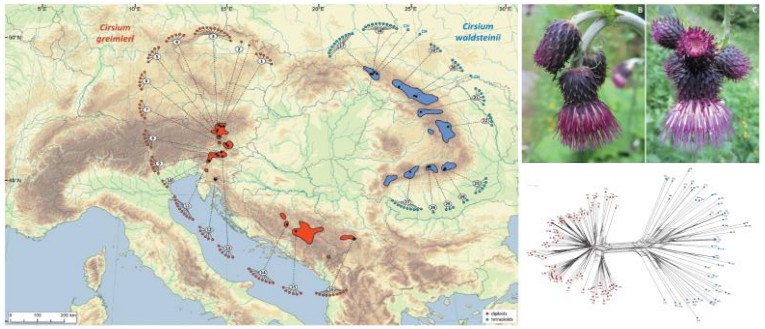

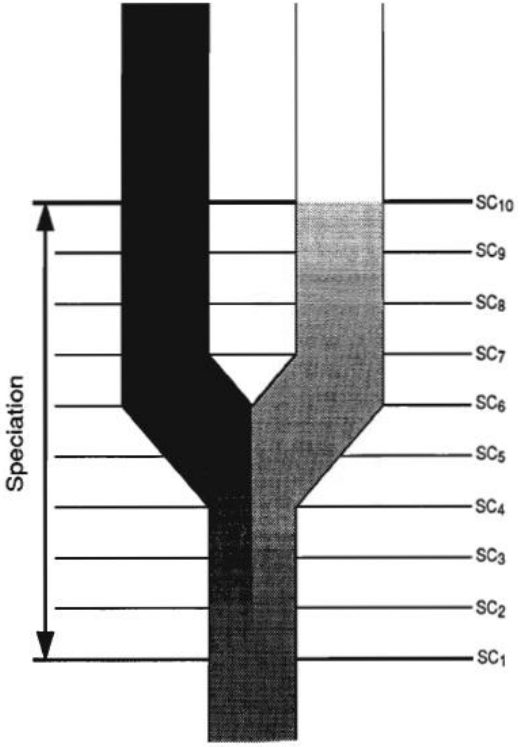

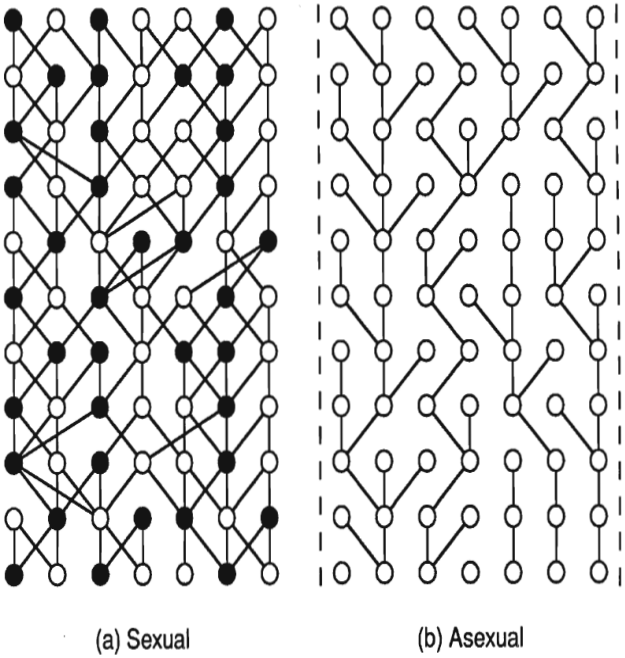

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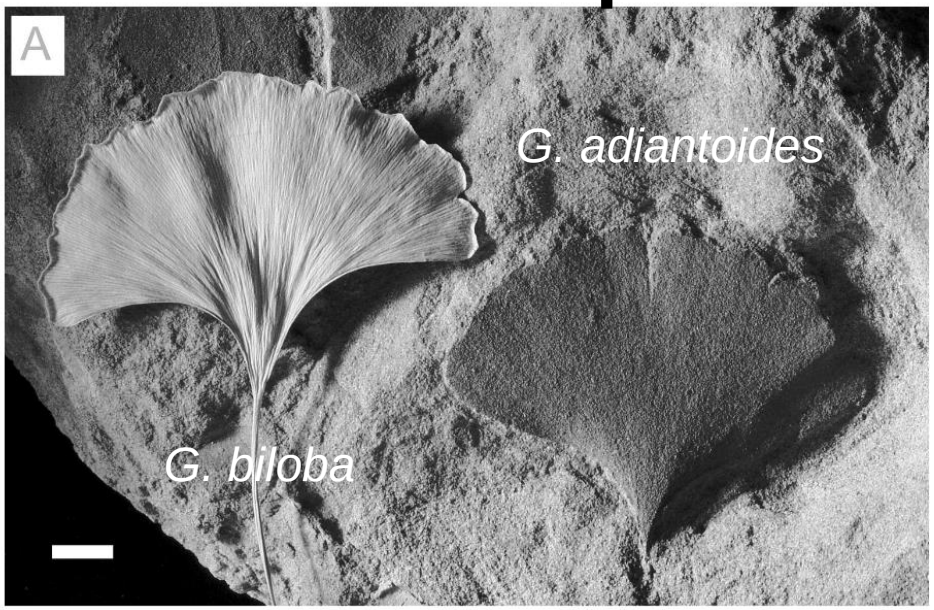

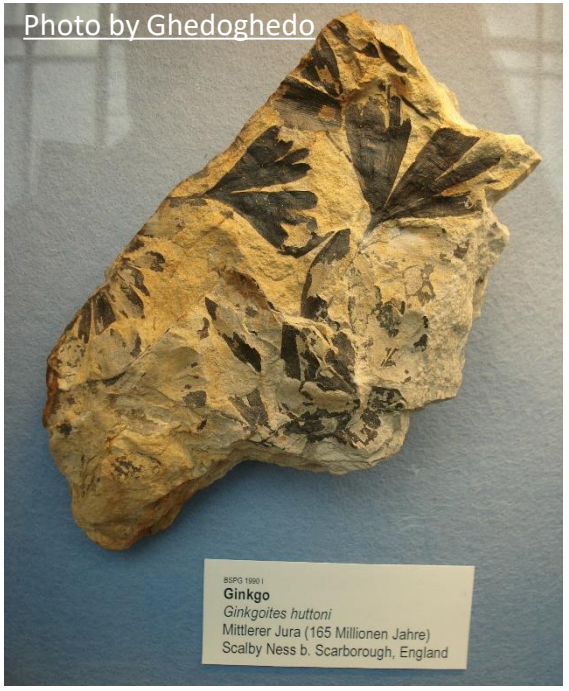

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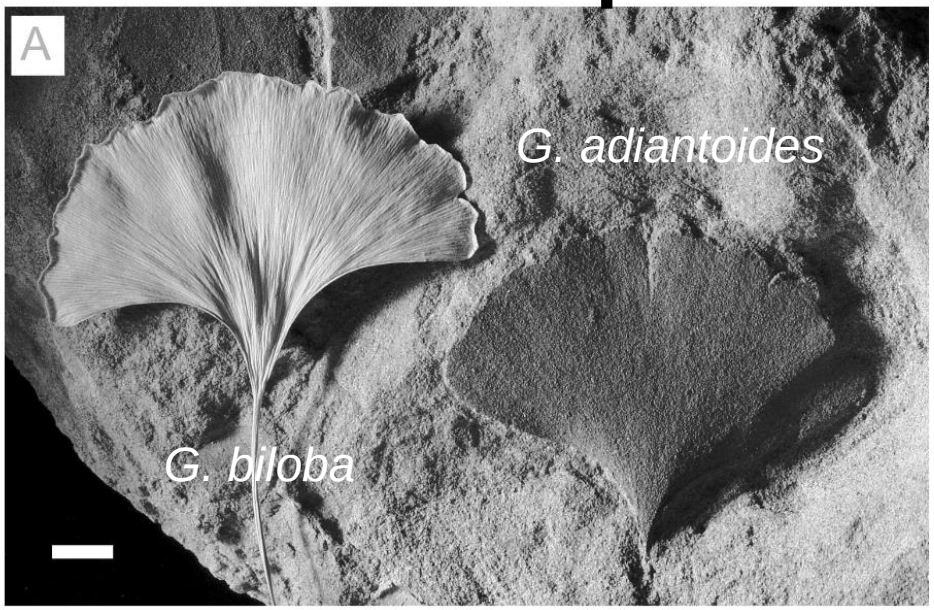

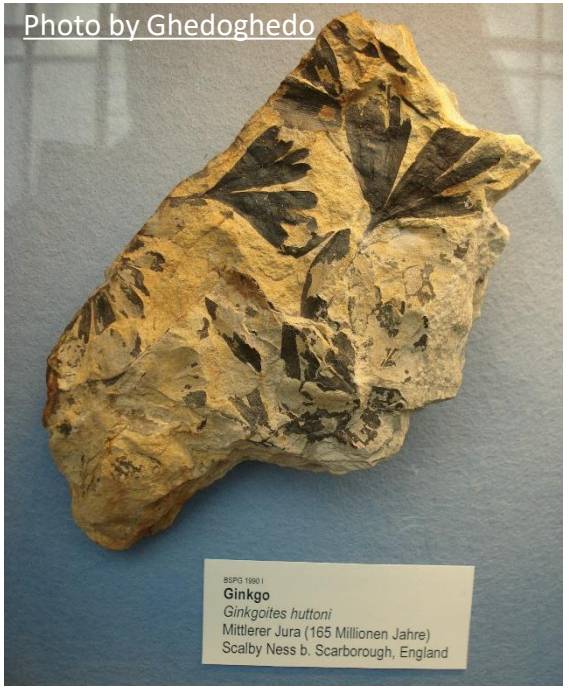

Šmarda et al. *Horticulture Research* (2018)5:55
DOI 10.1038/s41438-018-0055-9

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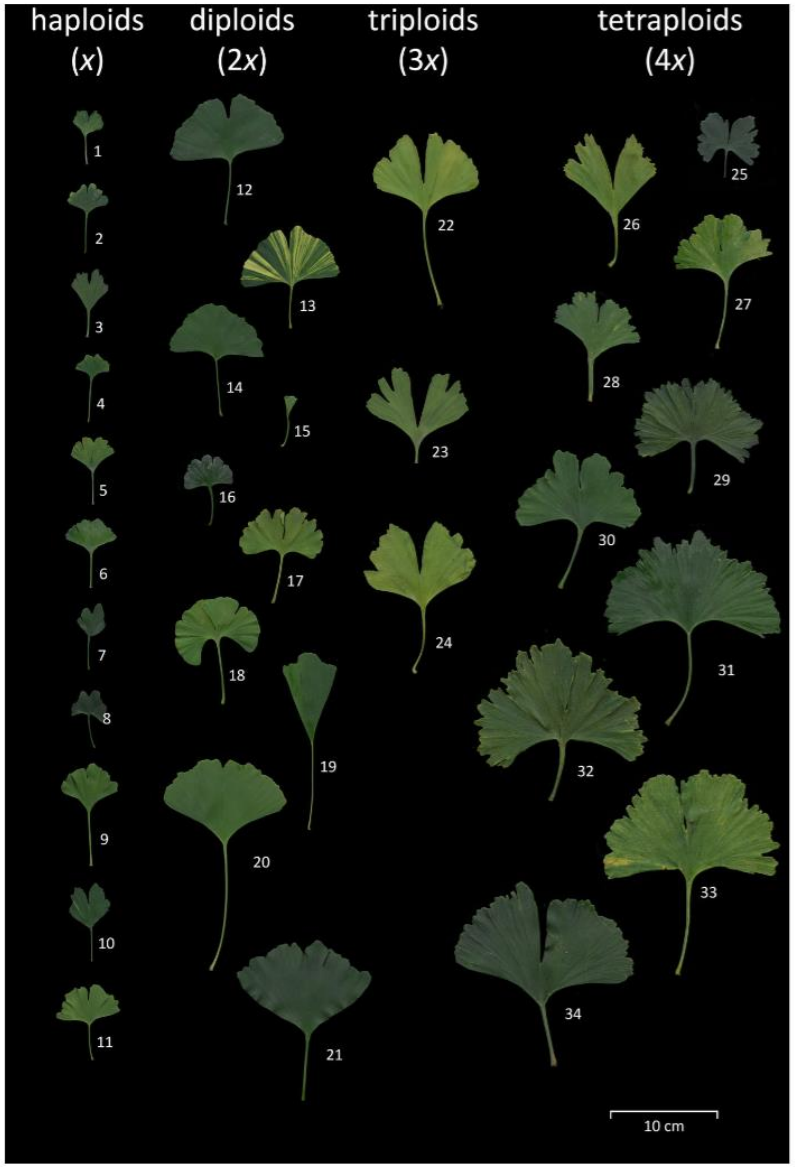
Multiple haploids, triploids, and tetraploids found in modern-day "living fossil" *Ginkgo biloba*

Petr Šmarda[1], Lucie Horová[1], Ondřej Knápek[1], Heidi Dieck[2], Martin Dieck[2], Katarína Ražná[3], Pavel Hrubík[4], Laszlo Orlóci[5], Laszlo Papp[5], Kristýna Veselá[1], Pavel Veselý[1] and Petr Bureš[1]



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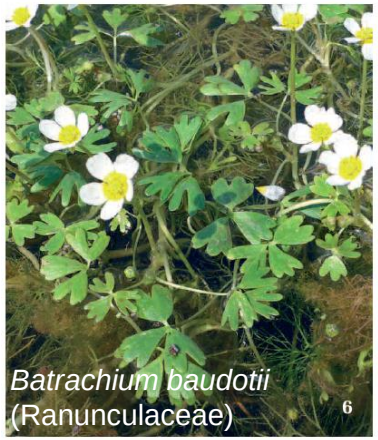

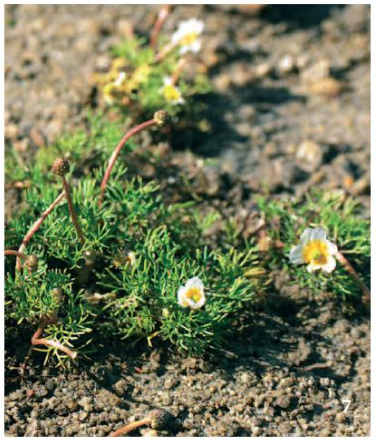

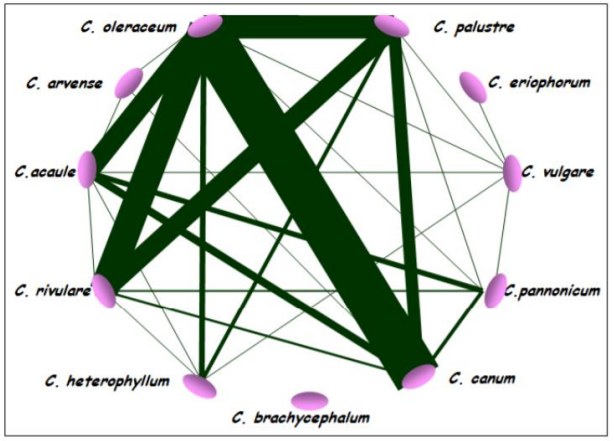

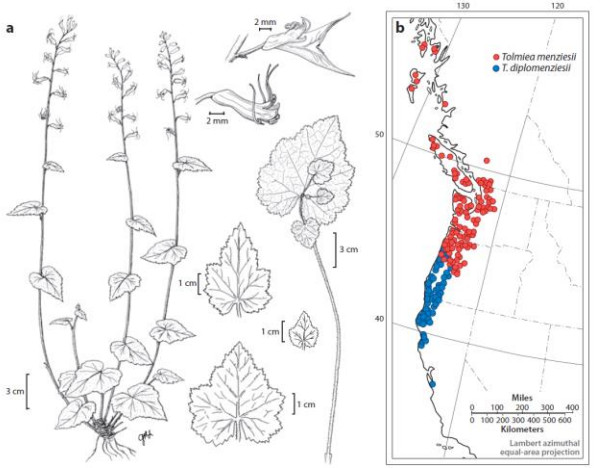

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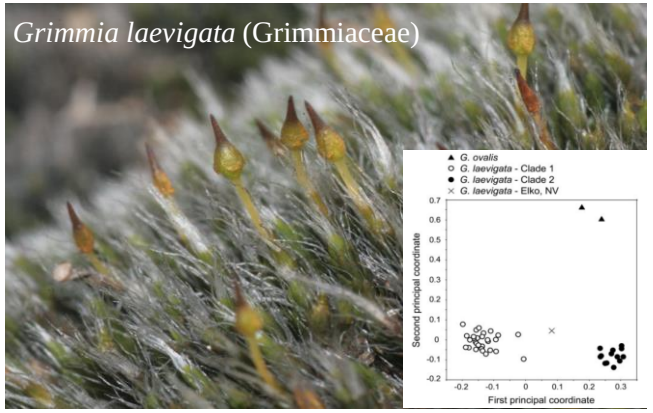

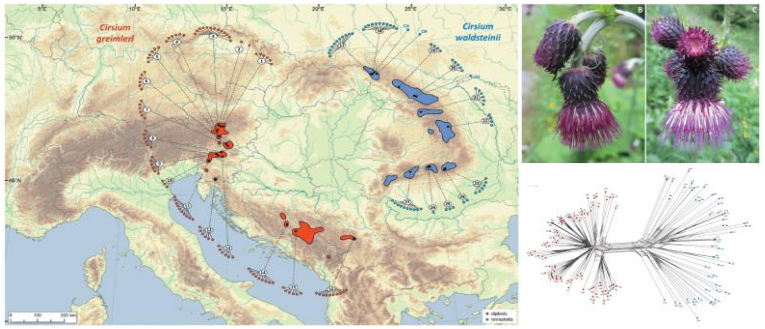

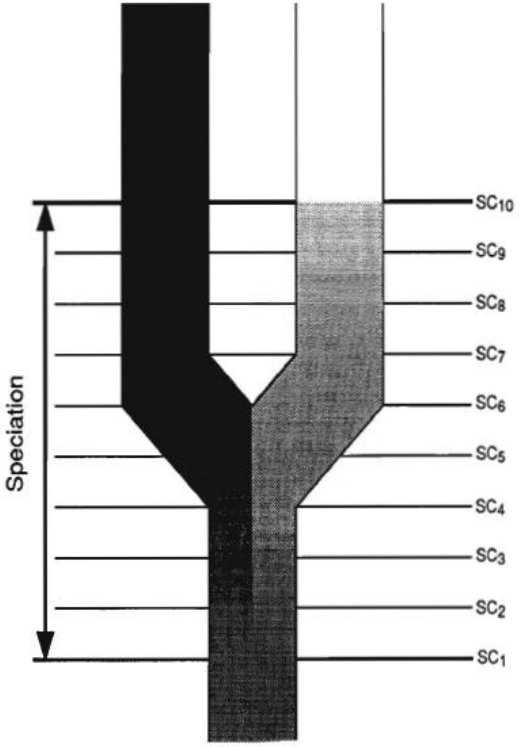

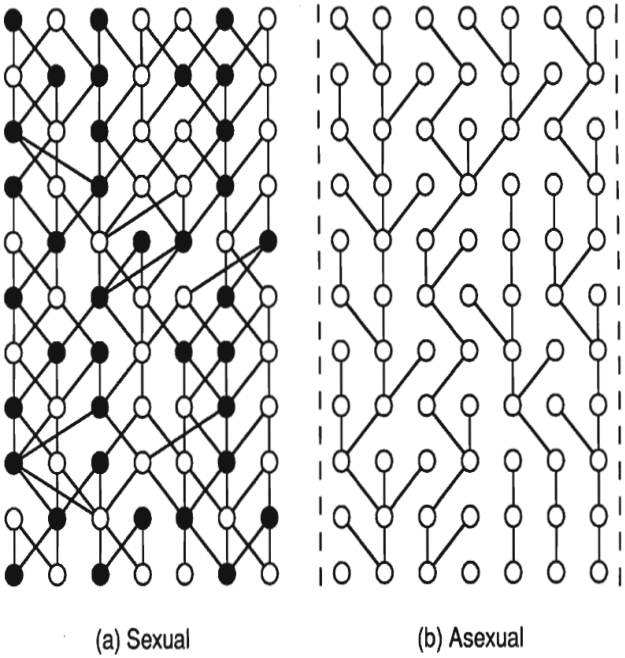

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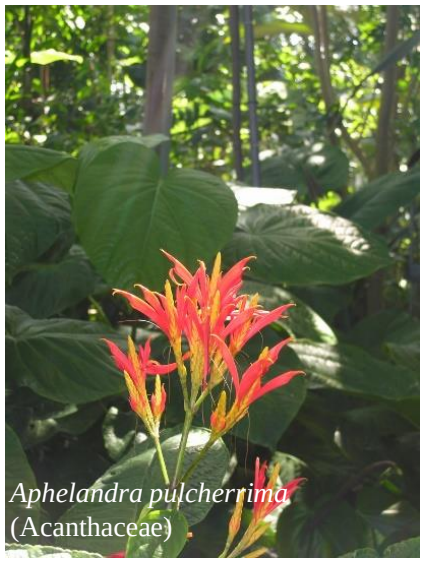
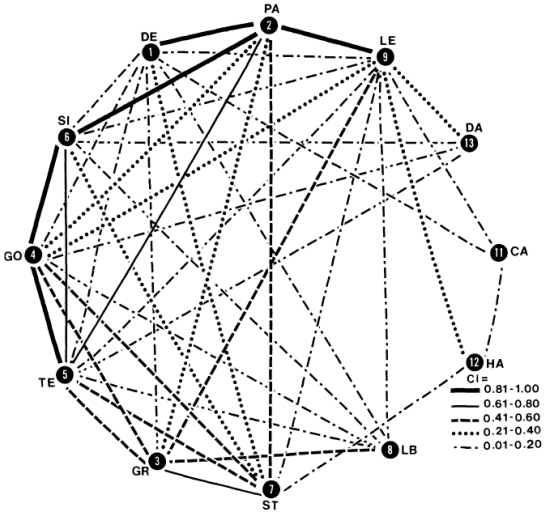
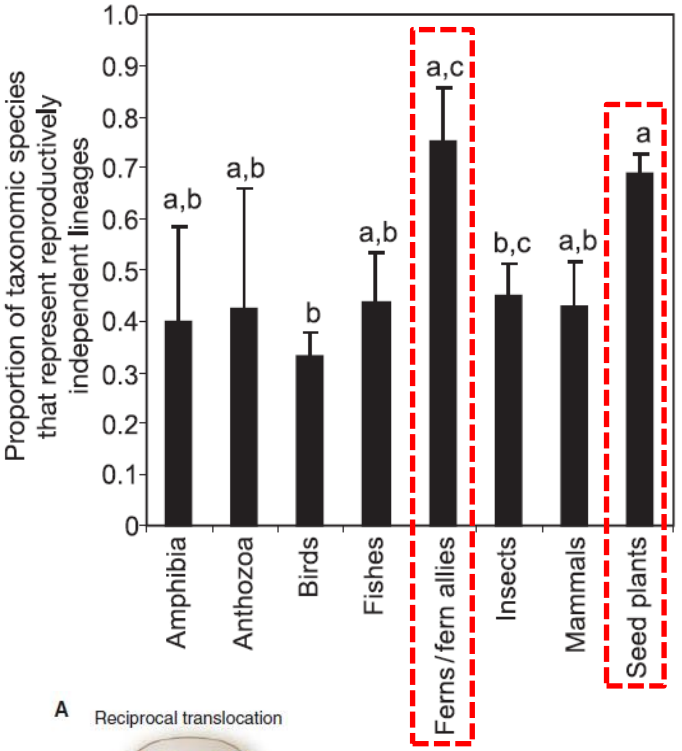
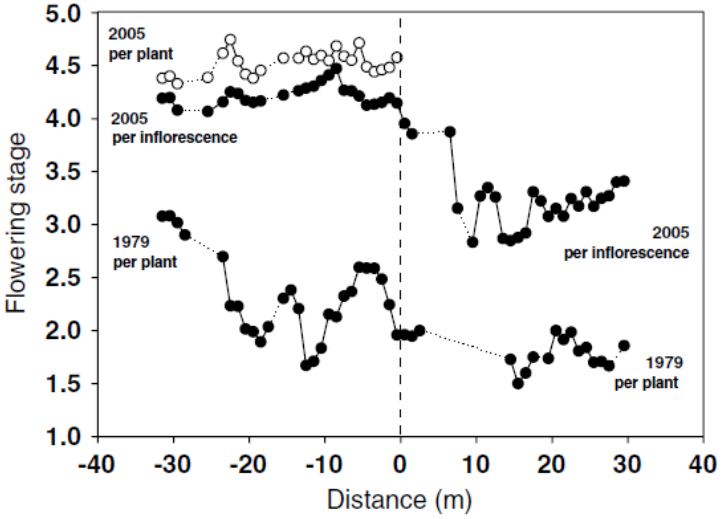
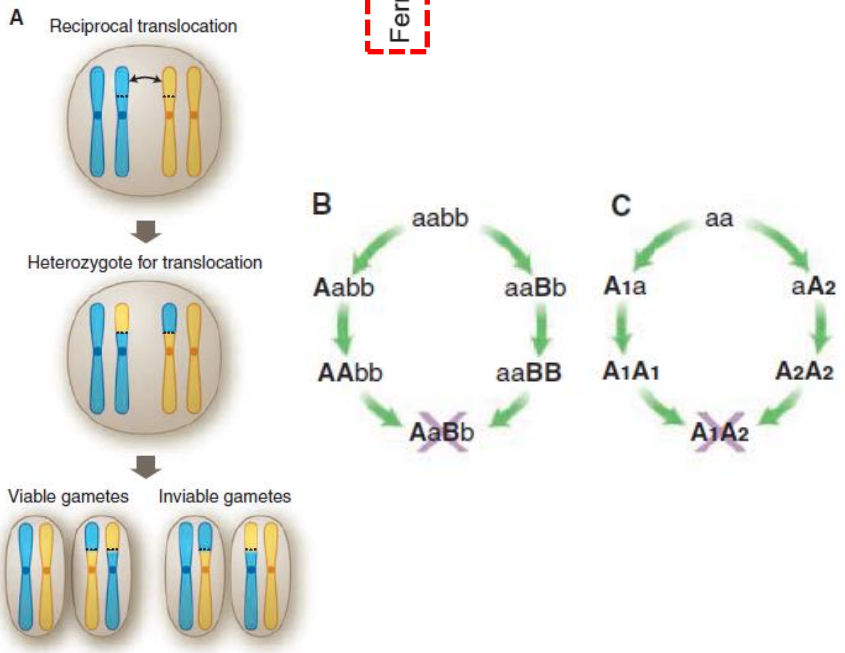
Plant speciation











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