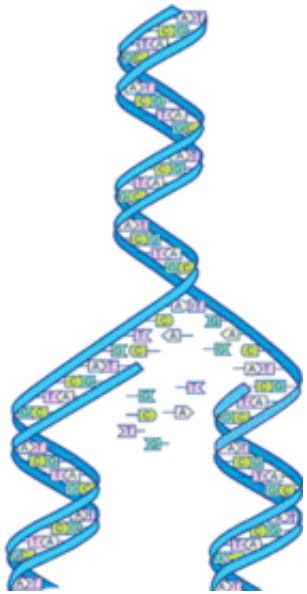
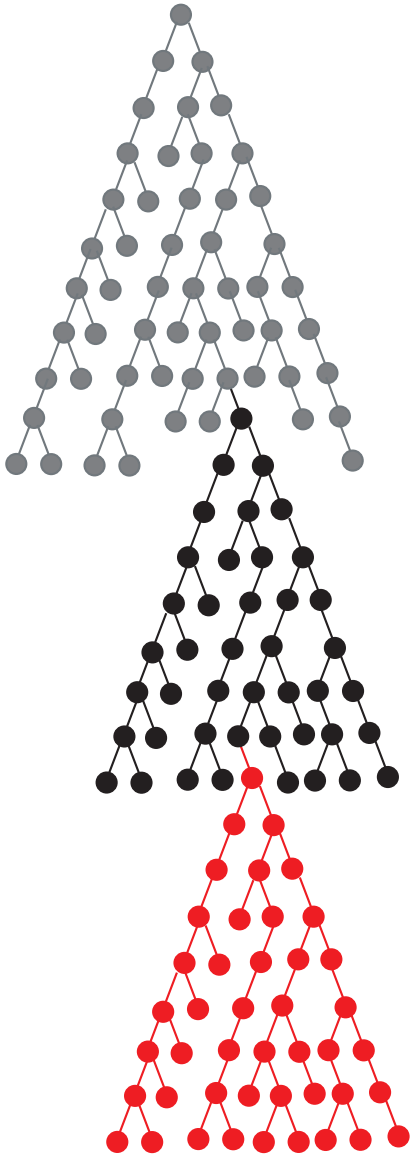
Many types of trees: cellular genealogies





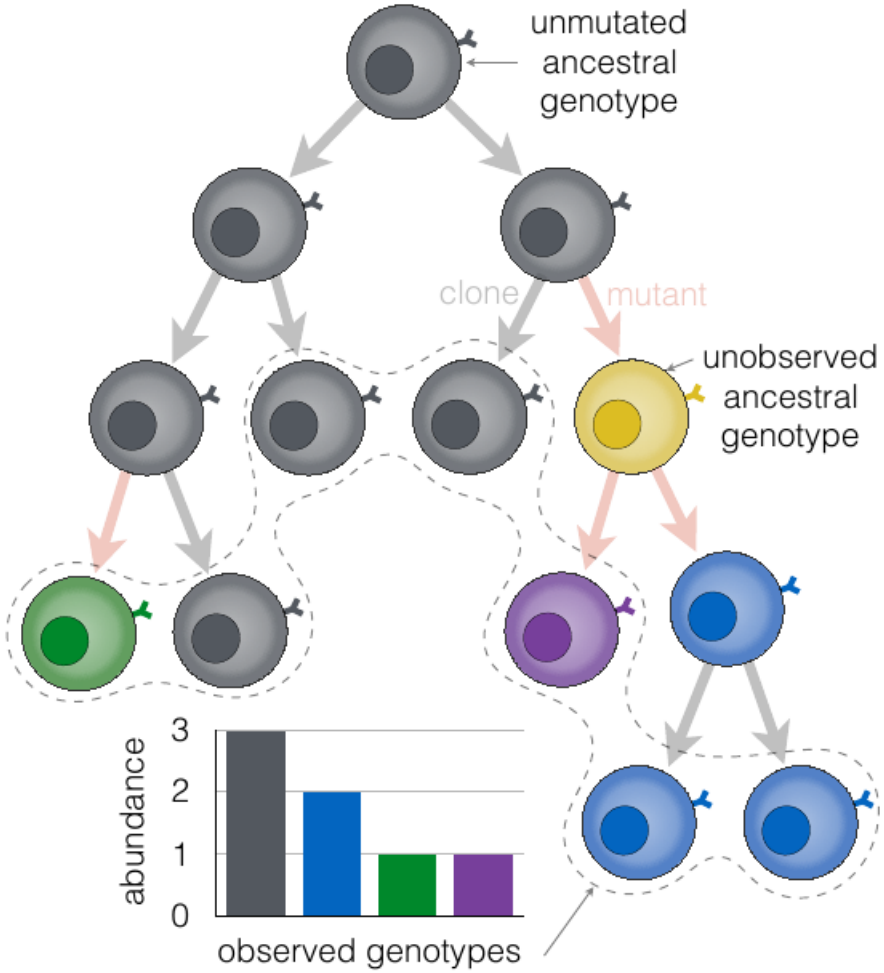
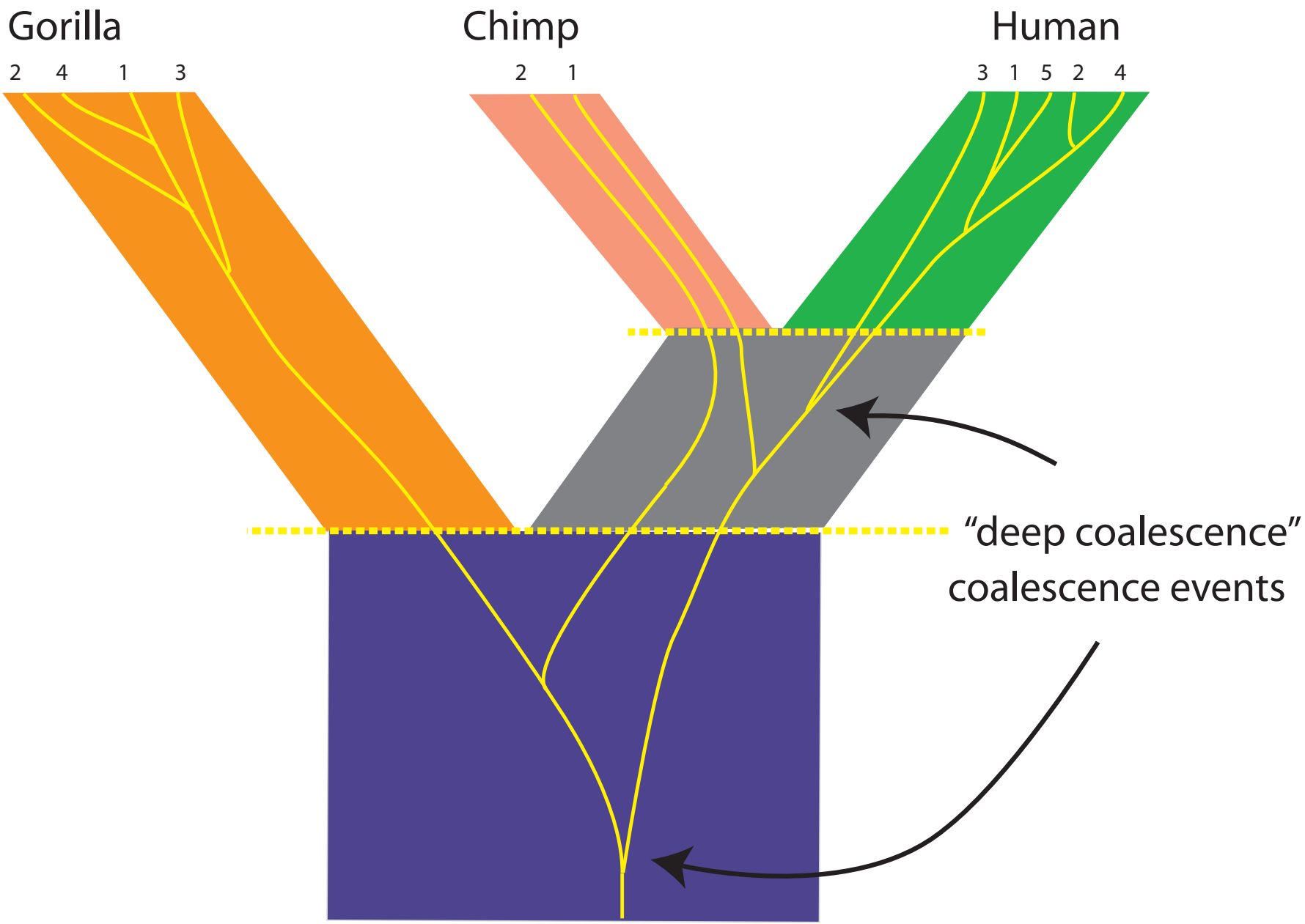


Figure 1 from DeWett *et al.* 2018

Many types of trees: "gene tree" within a species tree



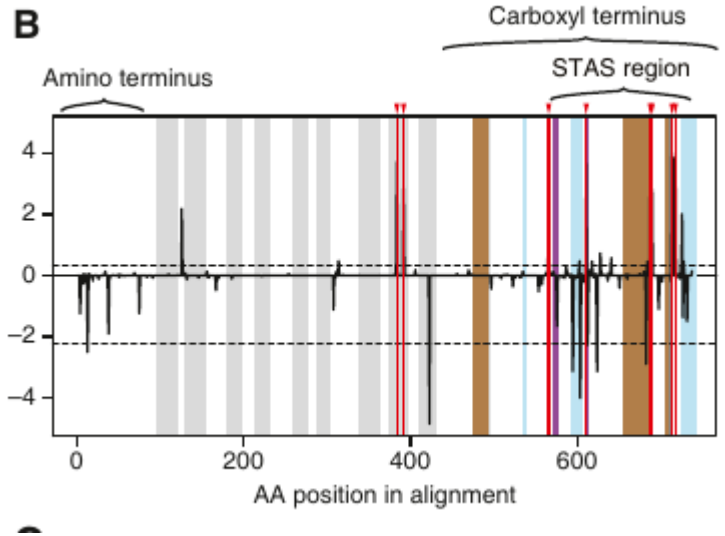


Figure 1 from **?**

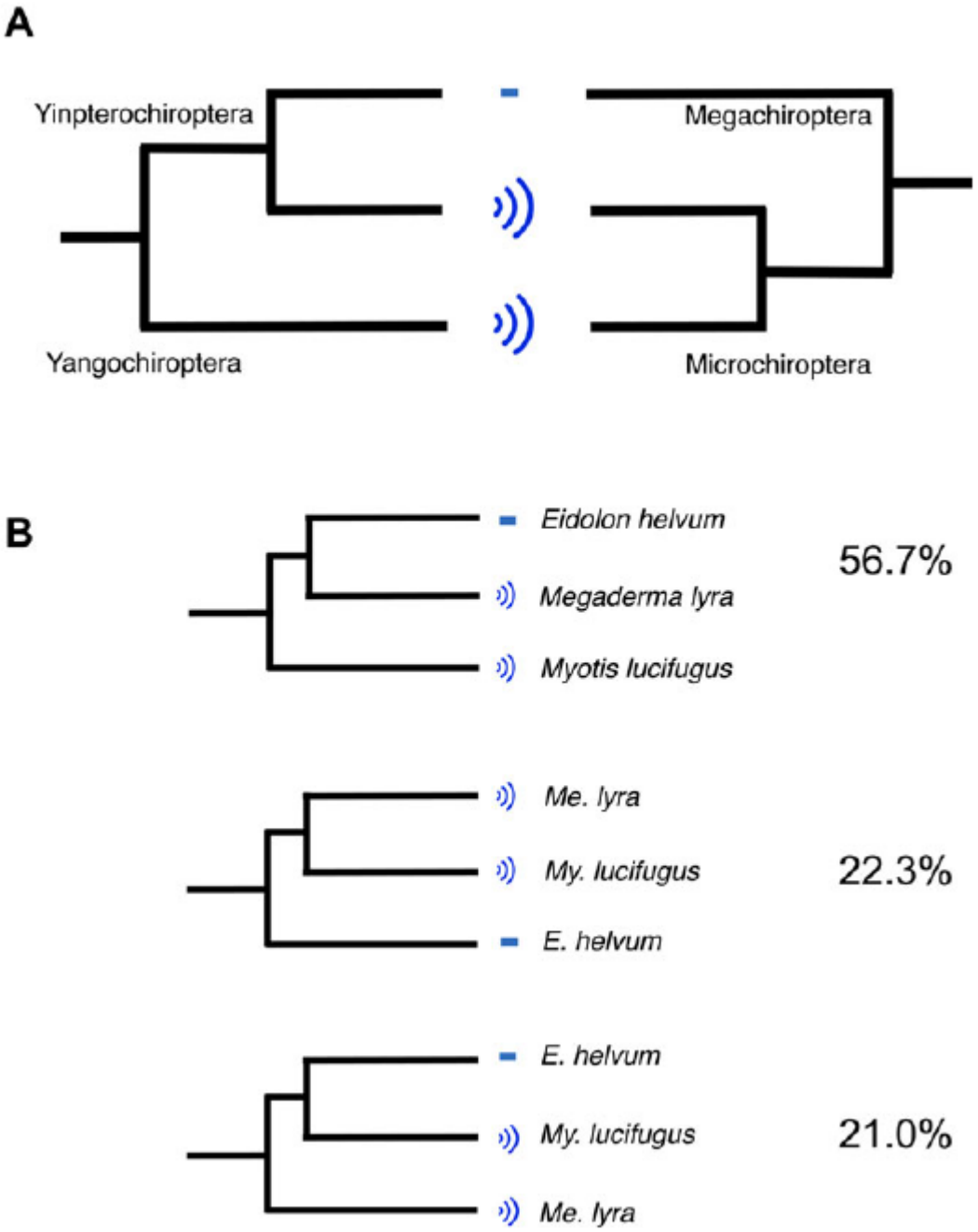


Figure 2 from **?**

Inferring a species tree while accounting for the coalescent

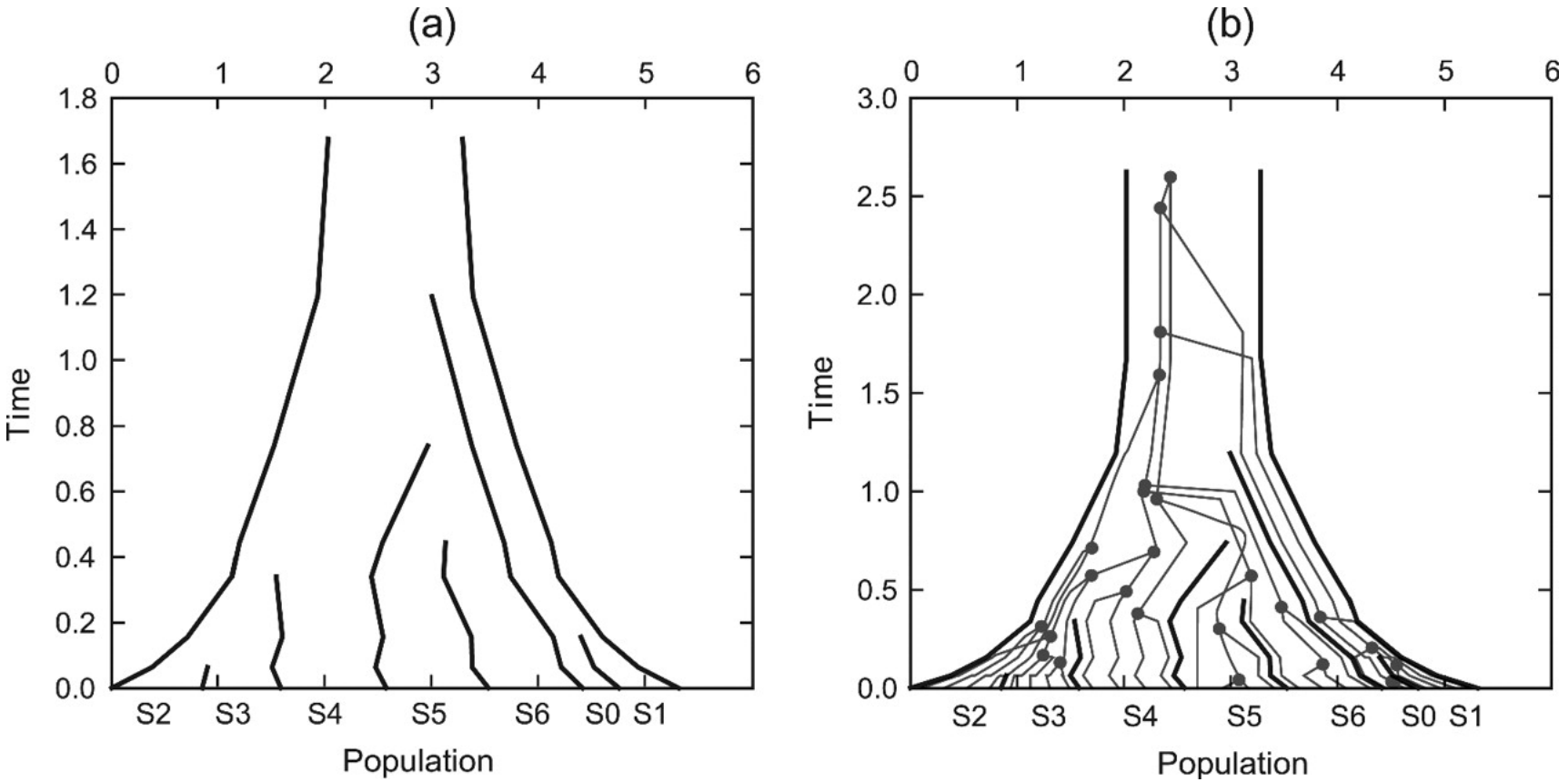


Figure 2 from **?** *BEAST

See also the recent work by Huw Ogilvie and colleagues on StarBEAST2.

Considering ILS effects without modeling gene trees

SVDQuartets

(Kubatko + Swofford

next Thursday)

PoMo model

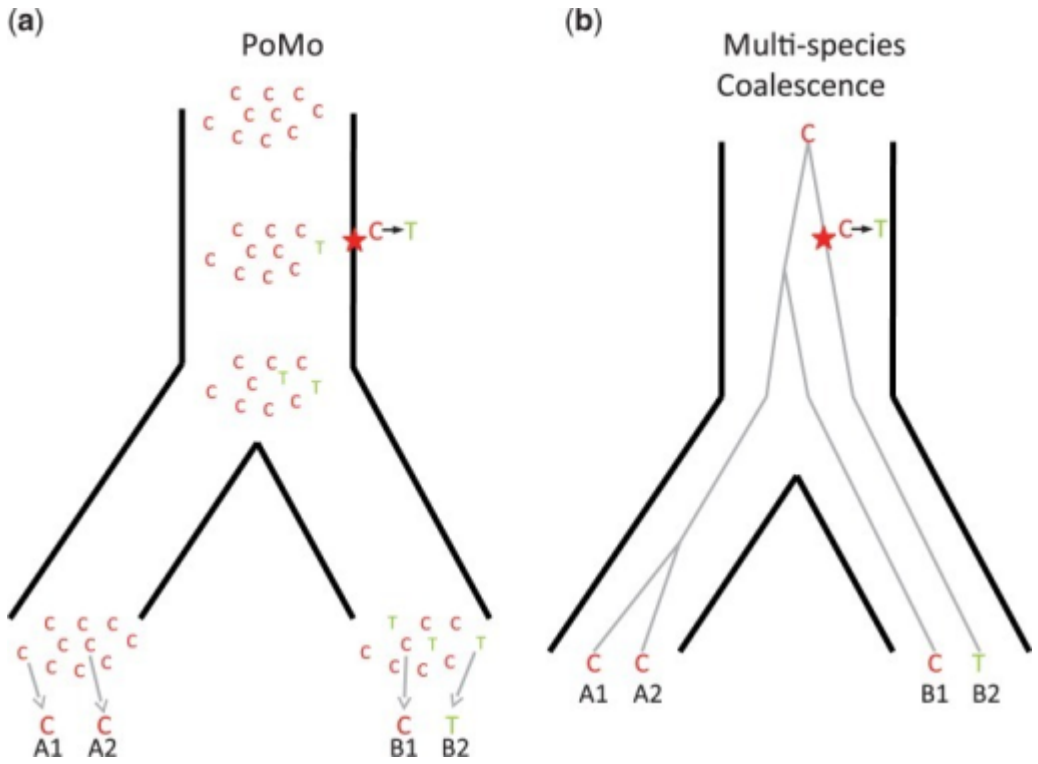
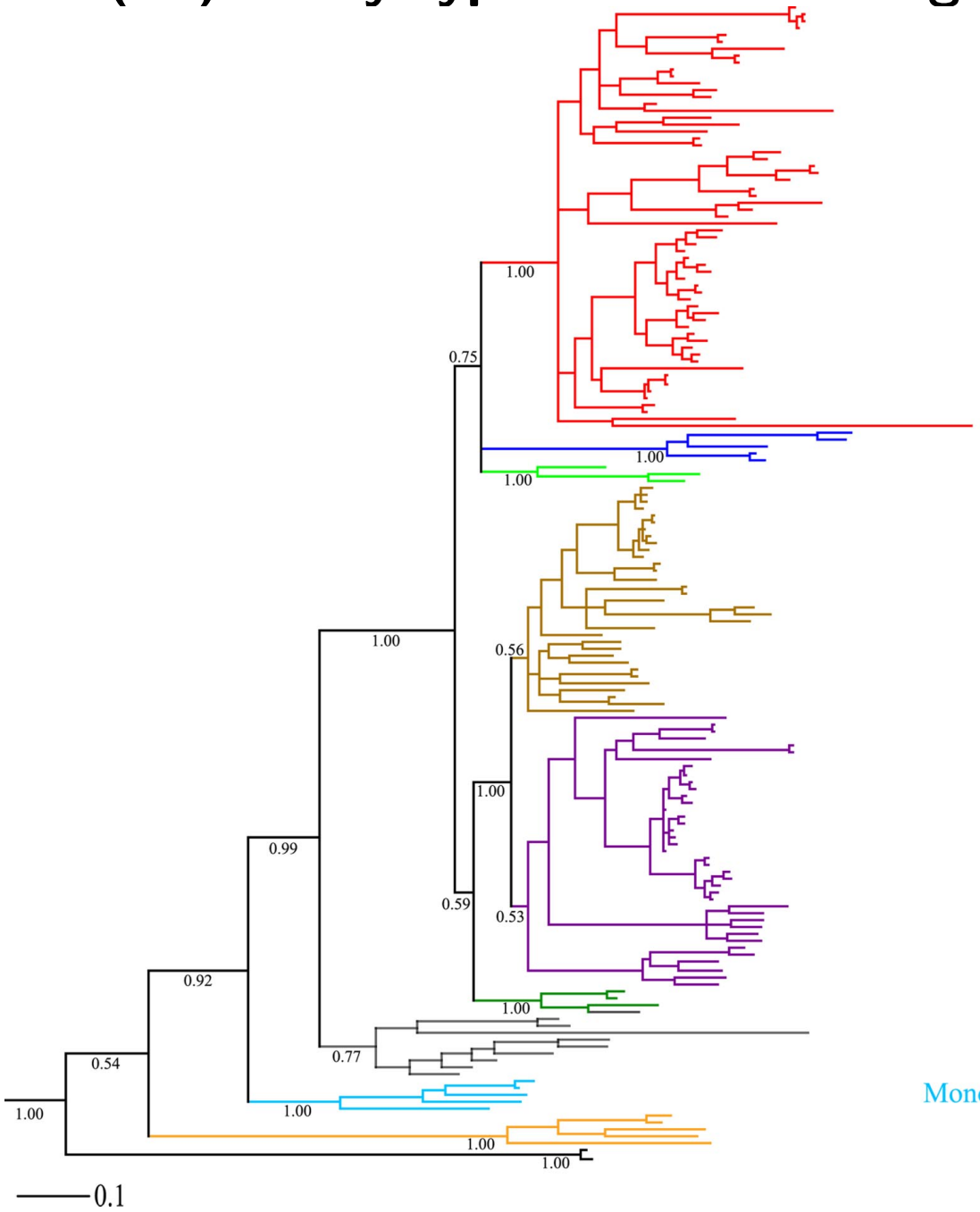


Figure 1 from **?**

(3a) Many types of trees: A "gene family tree"



Eutherian β-δ globin

Marsupial β-globin

Monotreme ε^P-β^Pglobin

Eutherian ε-globin

Eutherian γ-globin

Marsupial ε-globin

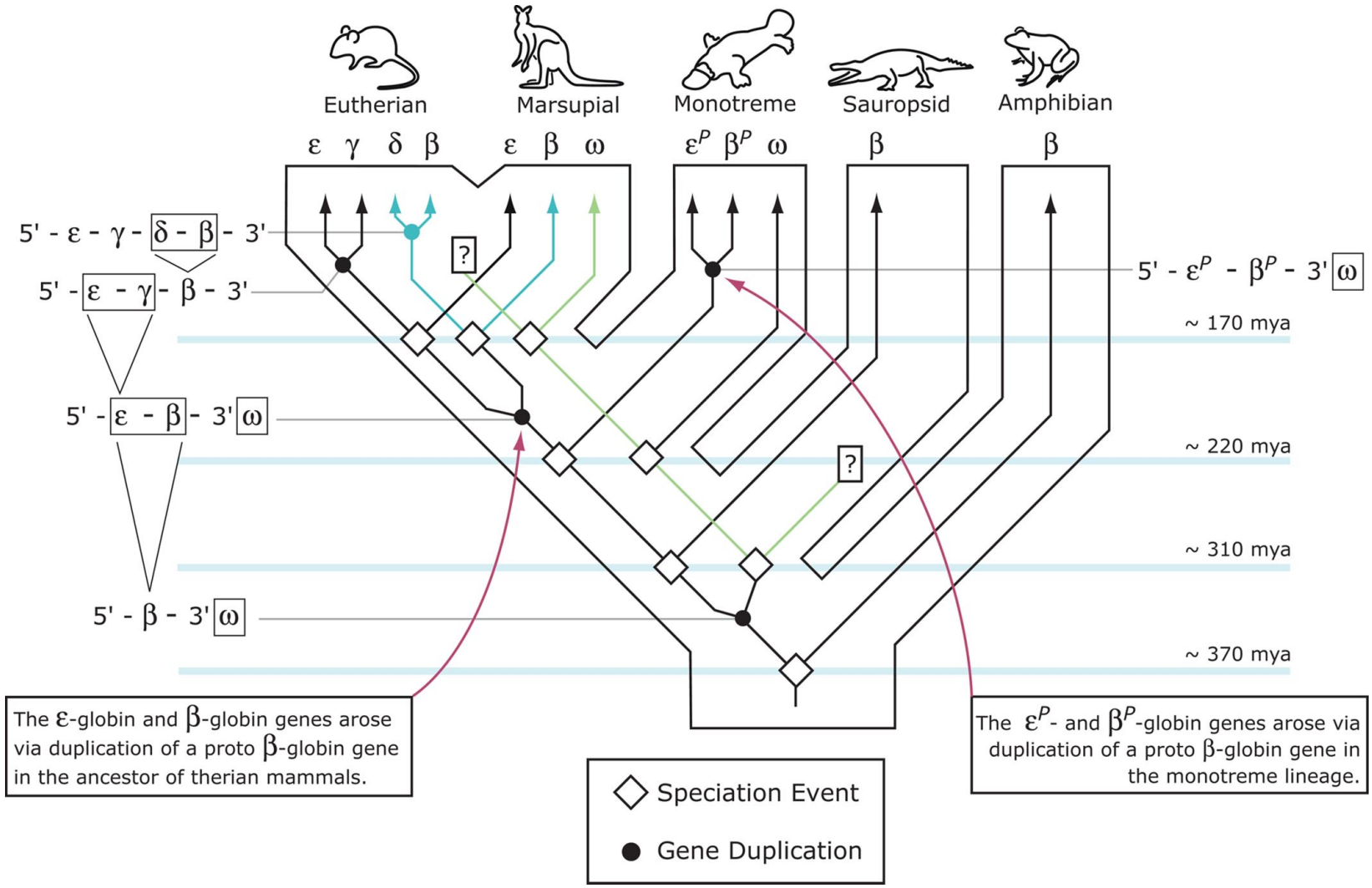
Sauropsida β-like globins

Monotreme and marsupial ω-globin

Amphibian β-like globins

Fish β-like globins

Opazo, Hoffmann and Storz "Genomic evidence for independent origins of β-like globin genes in monotremes and therian mammals" PNAS **105(5)** 2008



Opazo, Hoffmann and Storz "Genomic evidence for independent origins of β-like globin genes in monotremes and therian mammals" PNAS **105(5)** 2008

Joint estimation of gene duplication, loss, and coalescence with DLCoalRecon

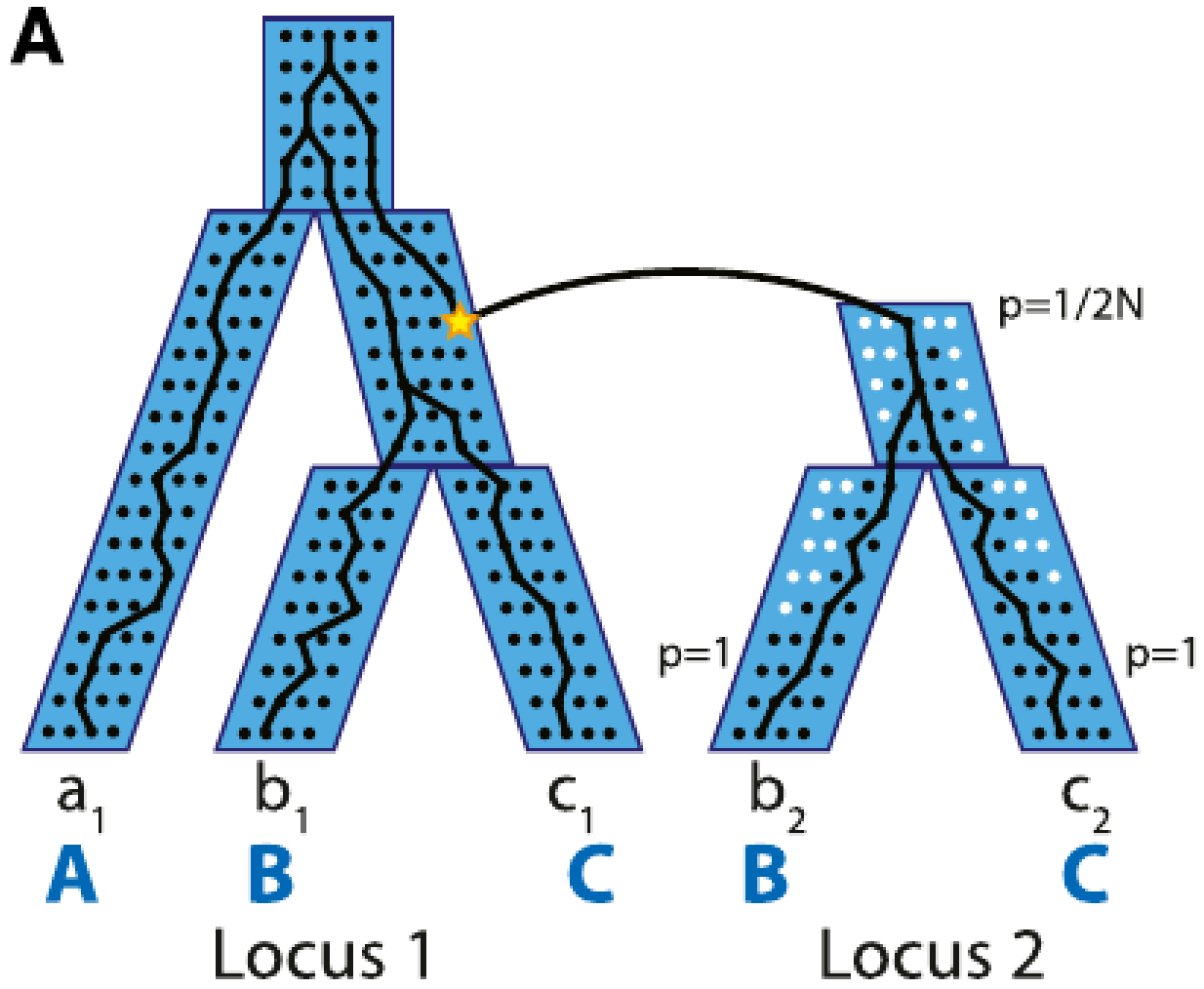


Figure 2A from **?**

DL models and coalescence

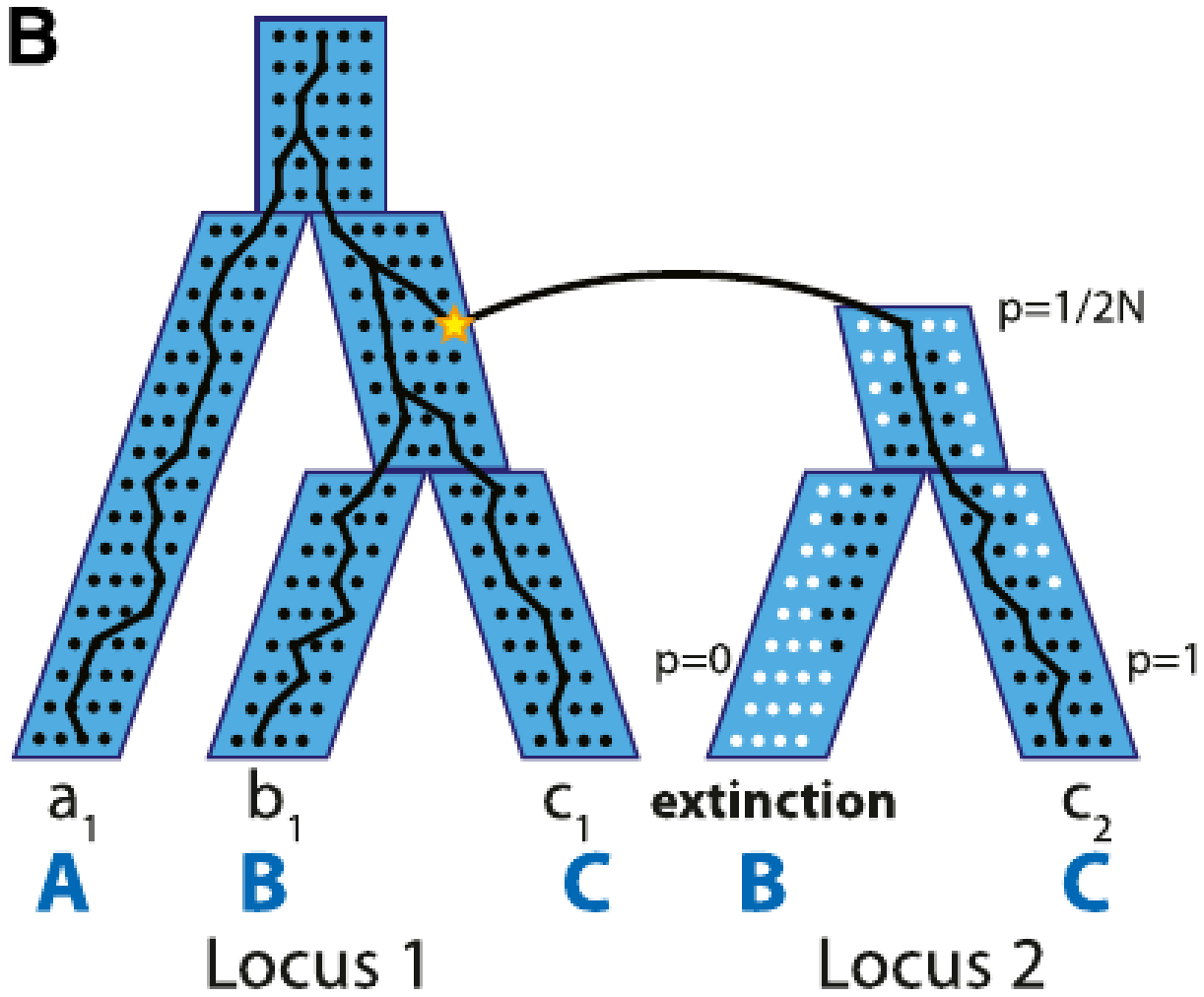


Figure 2B from **?**

Many types of trees: Lateral Gene Transfer

tree - a graph without cycles (loops)
network - general graph; cycles allowed

Cycles can represent

- lateral ("horizontal") gene transfer ,
- hybridization between species,
- introgression between populations.

Cécile Ané (next Friday)

Many types of trees: Lateral Gene Transfer

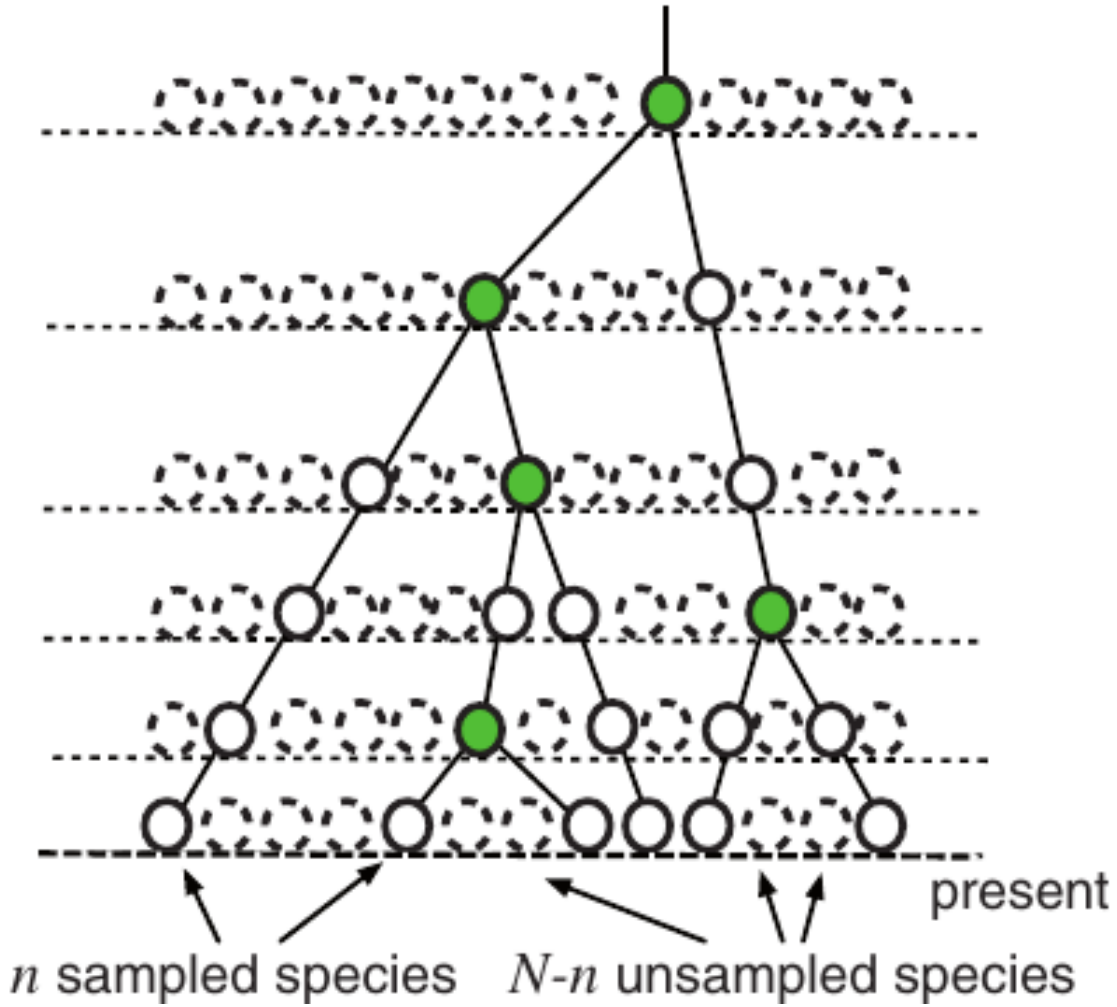


Figure 2c from **?**

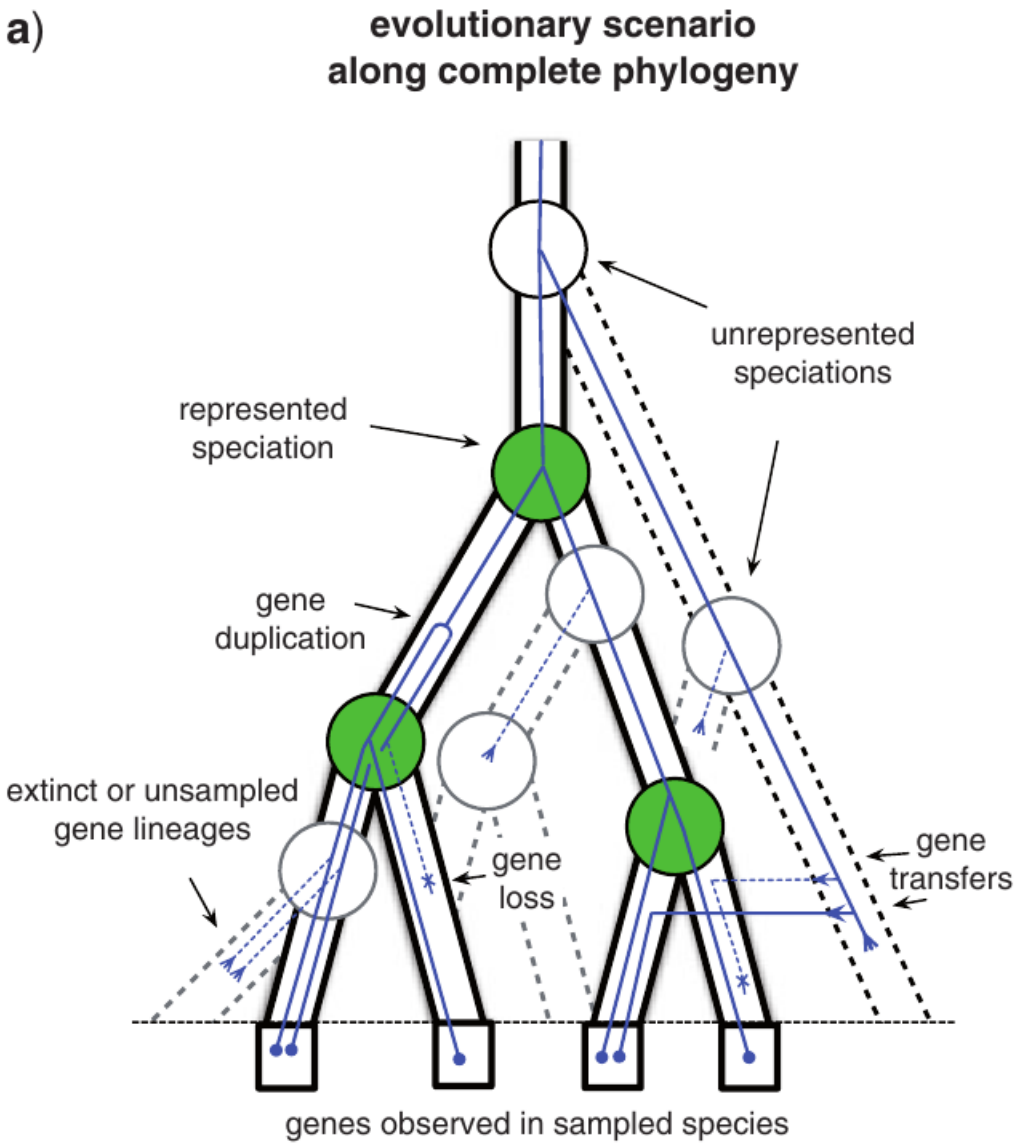


Figure 3 from **?**

They used 423 single-copy genes

in ≥ 34 of 36 cyanobacteria

They estimate:

2.56 losses/family

2.15 transfers/family

$\approx 28\%$ of transfers between

non-overlapping branches

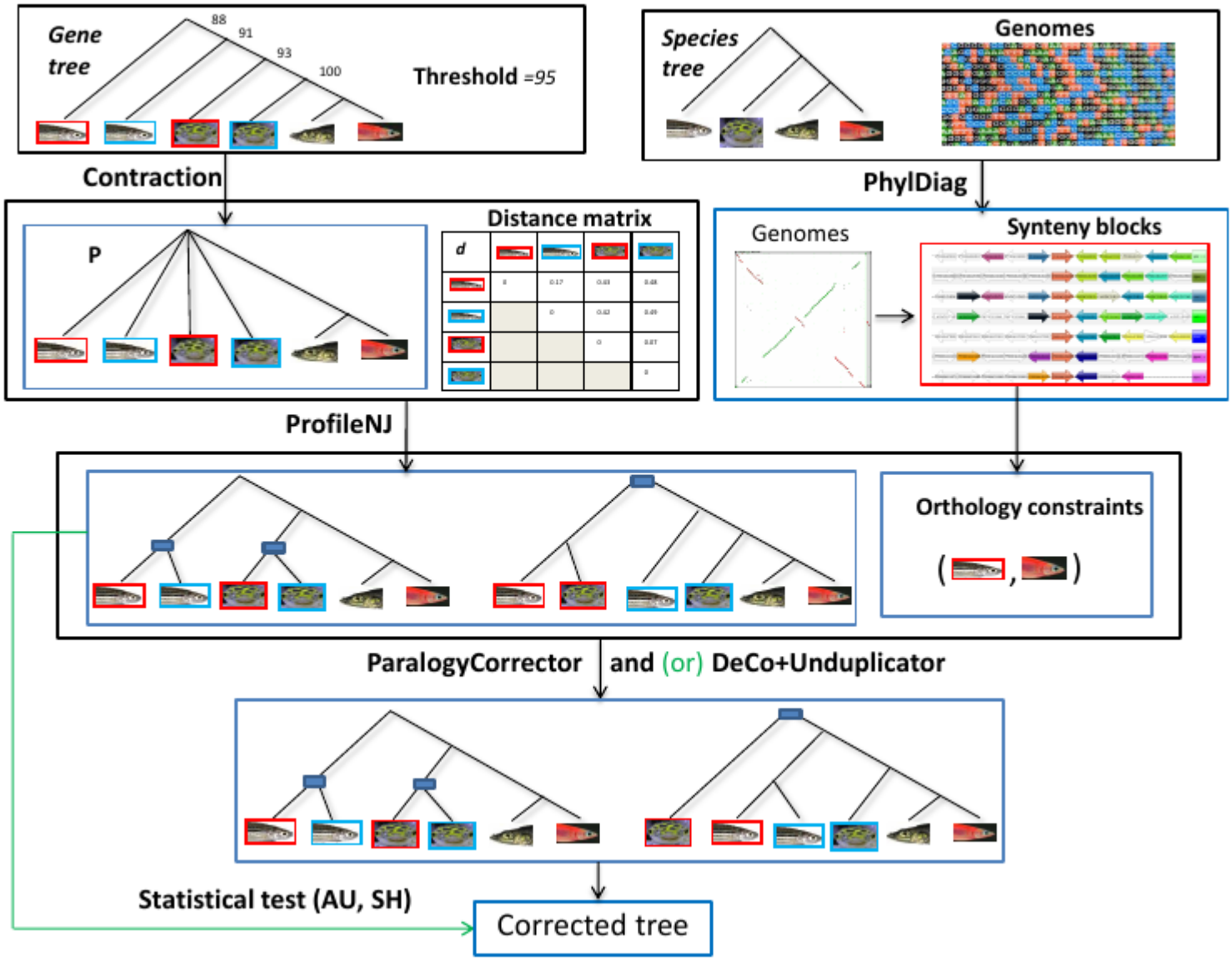


Figure 4 from **?**

(3b) sources of error cartoon