

Many types of trees: cellular genealogies

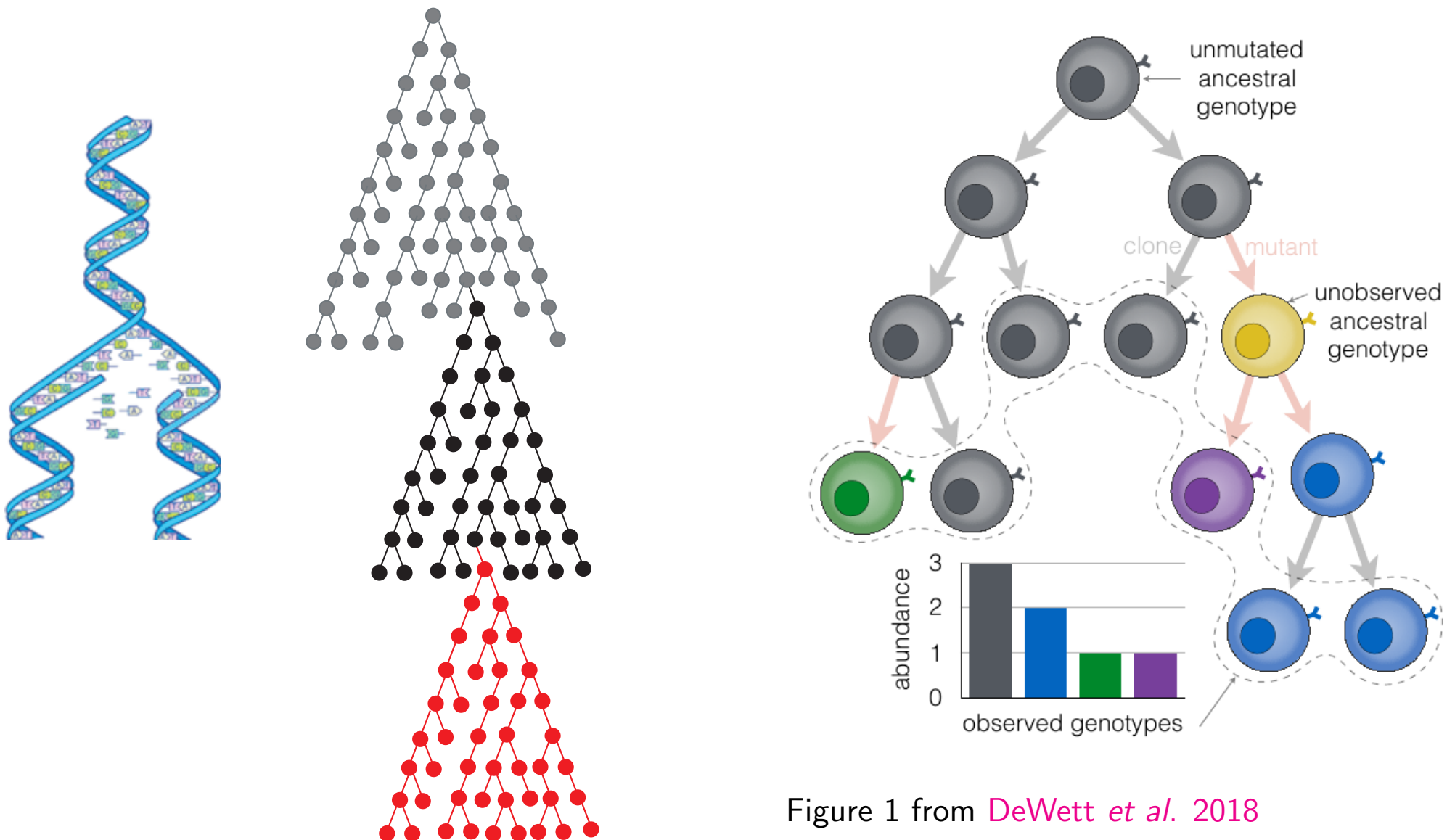
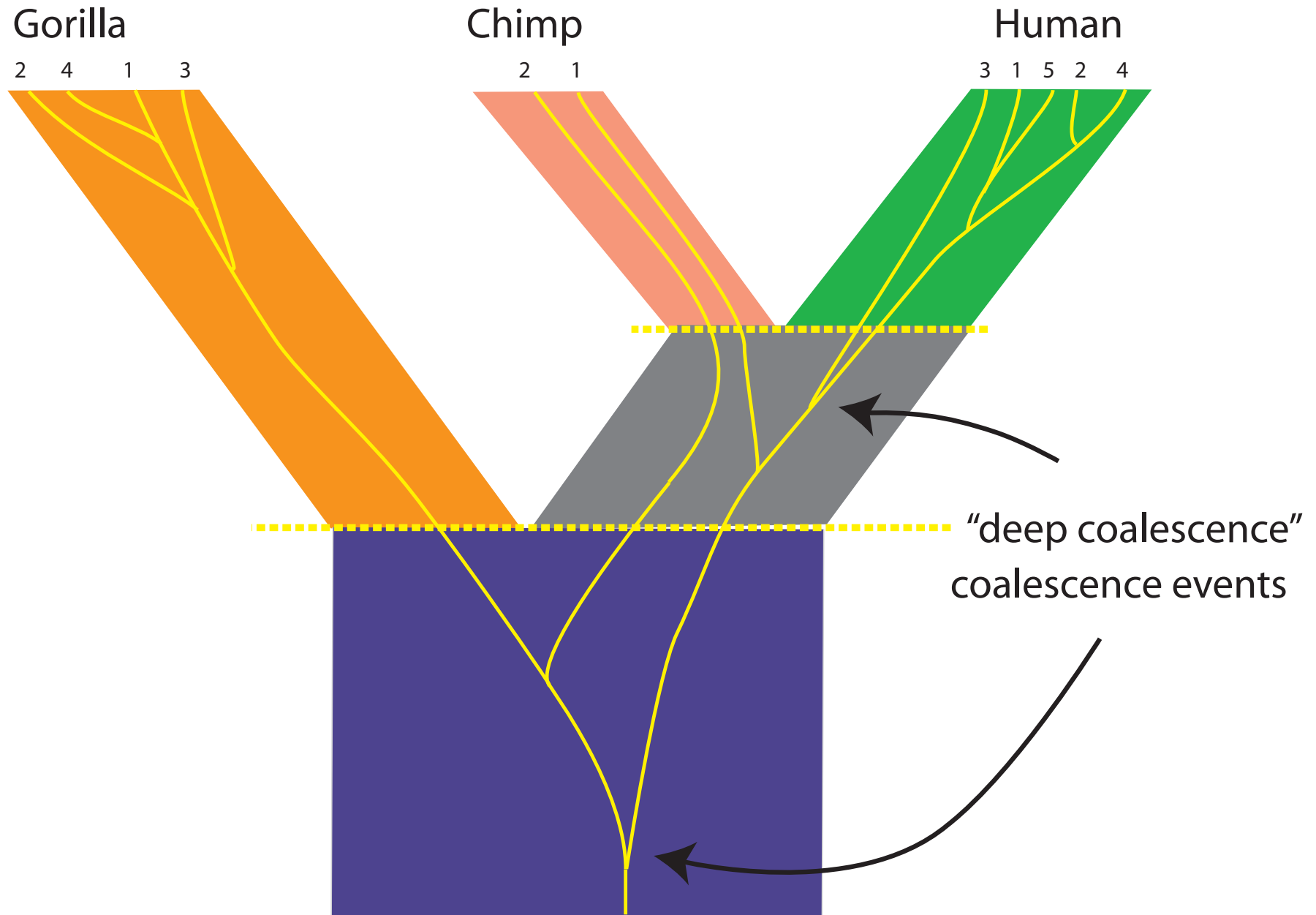


Figure 1 from DeWett *et al.* 2018

Many types of trees: “gene tree” within a species tree



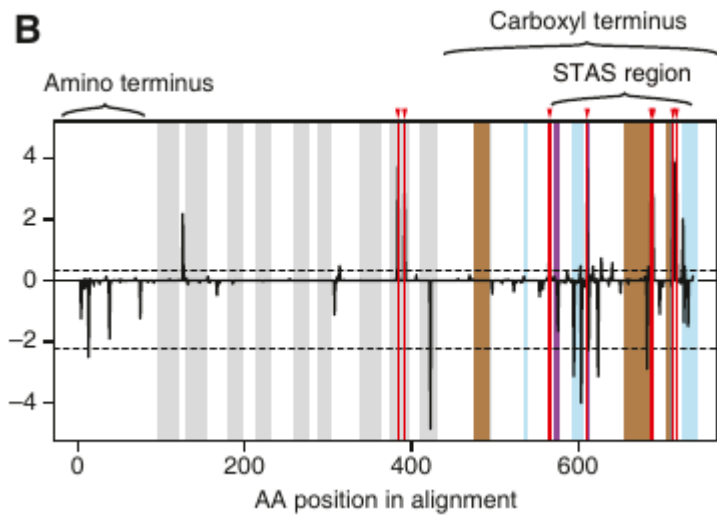


Figure 1 from Liu et al. (2010)

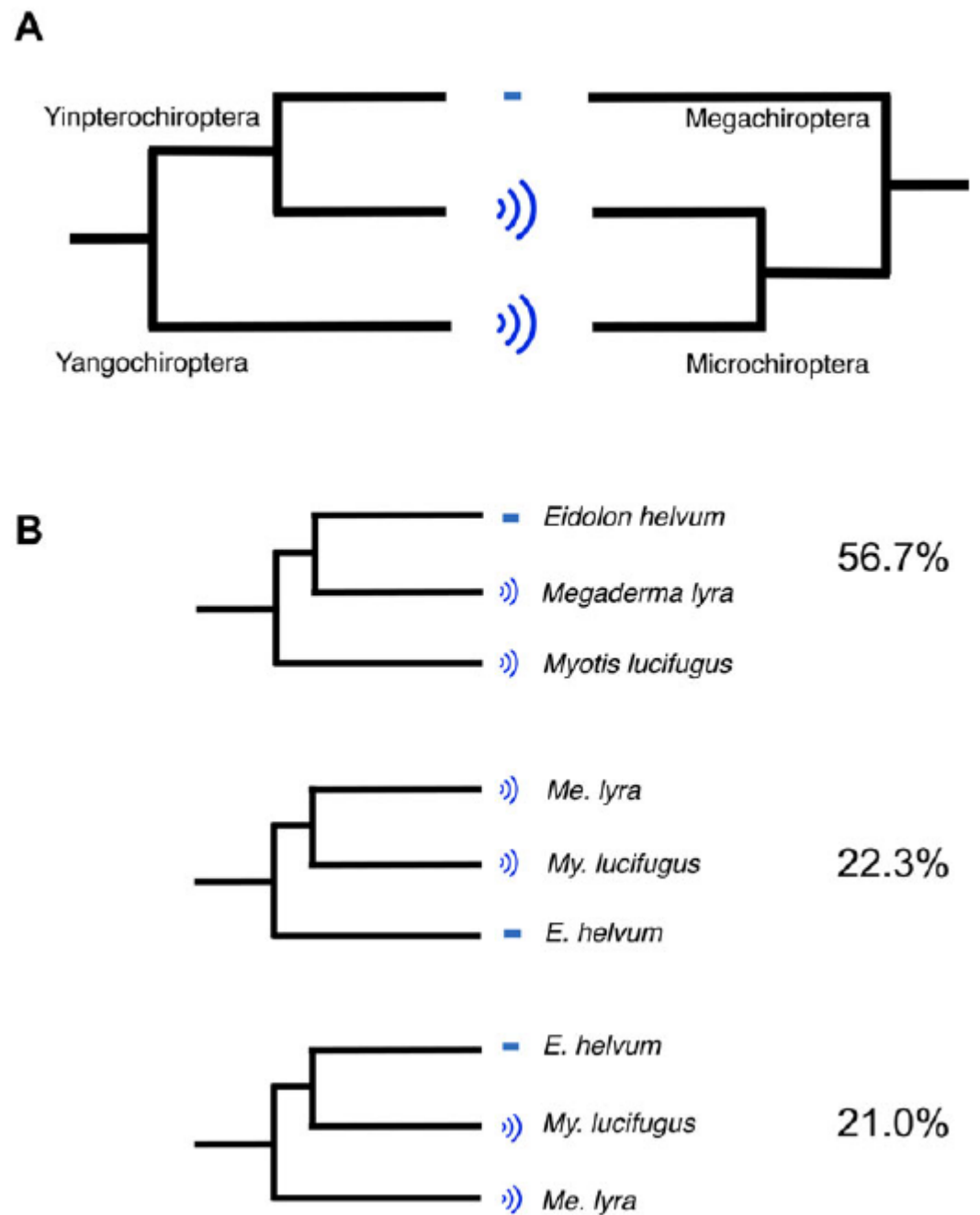


Figure 2 from Hahn and Nakhleh (2016)

Inferring a species tree while accounting for the coalescent

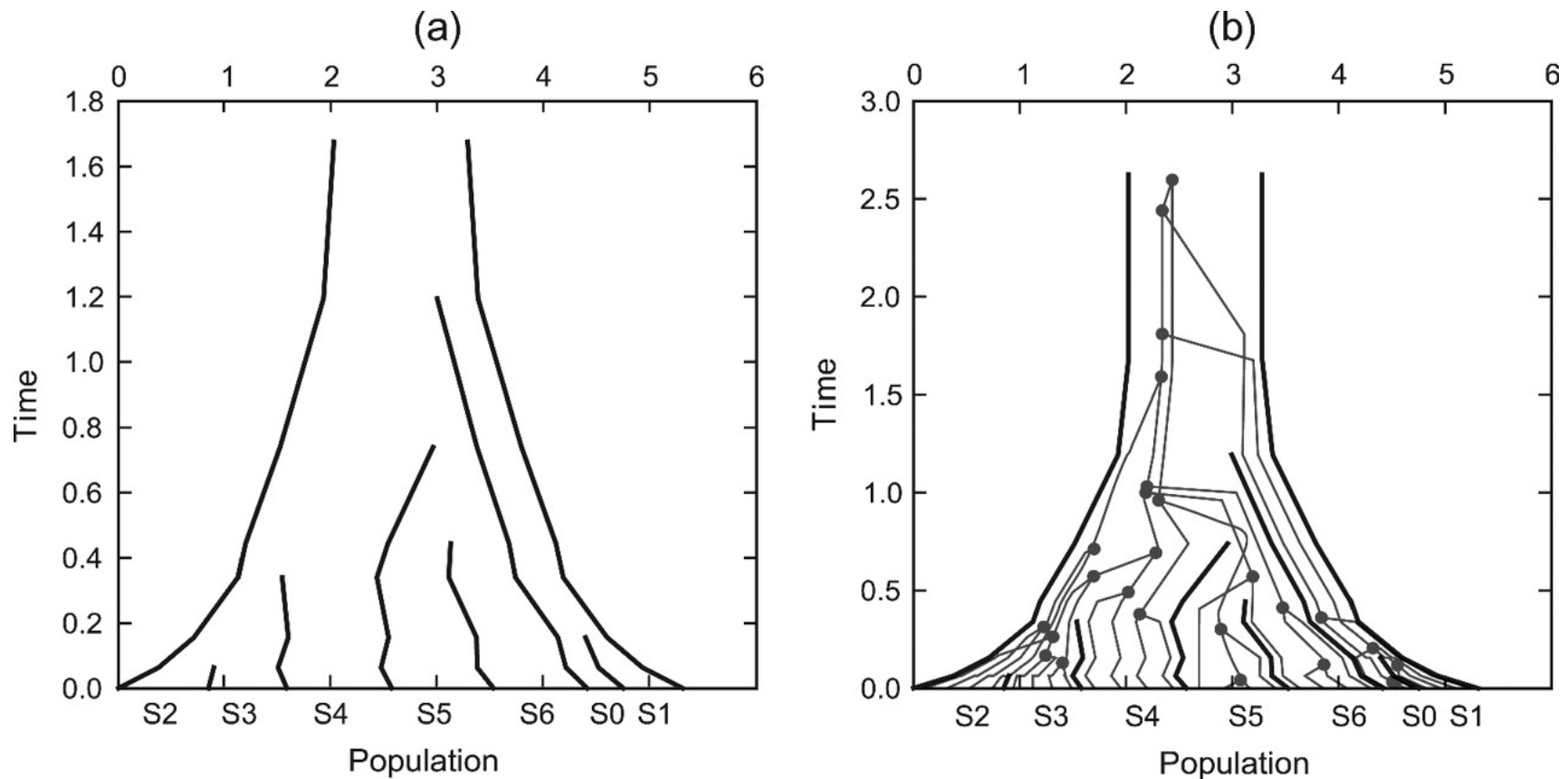


Figure 2 from Heled and Drummond (2010) *BEAST

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

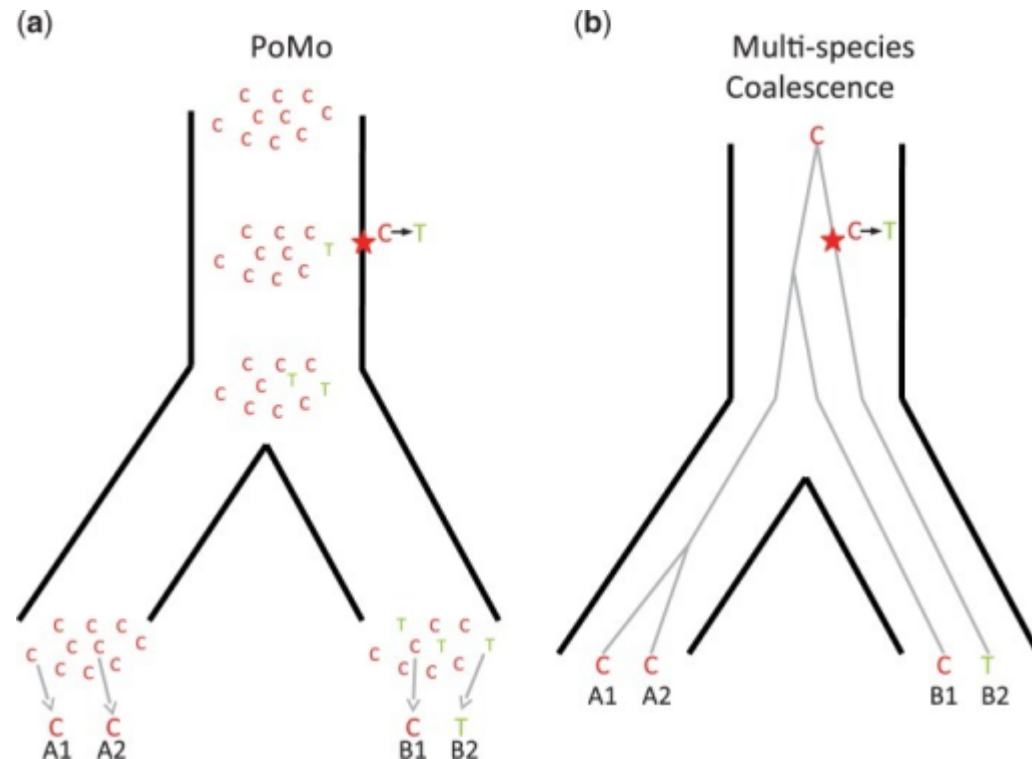
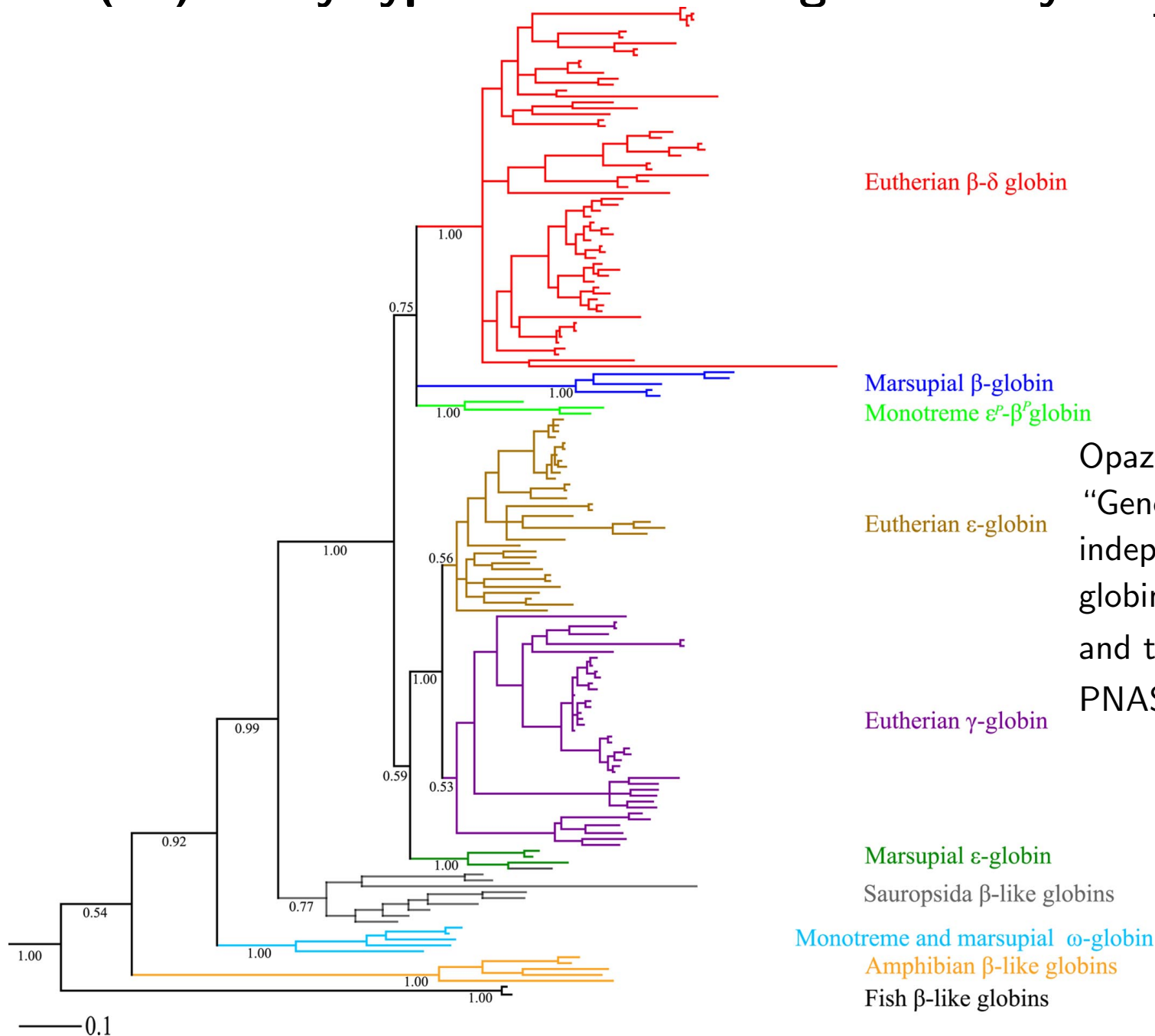


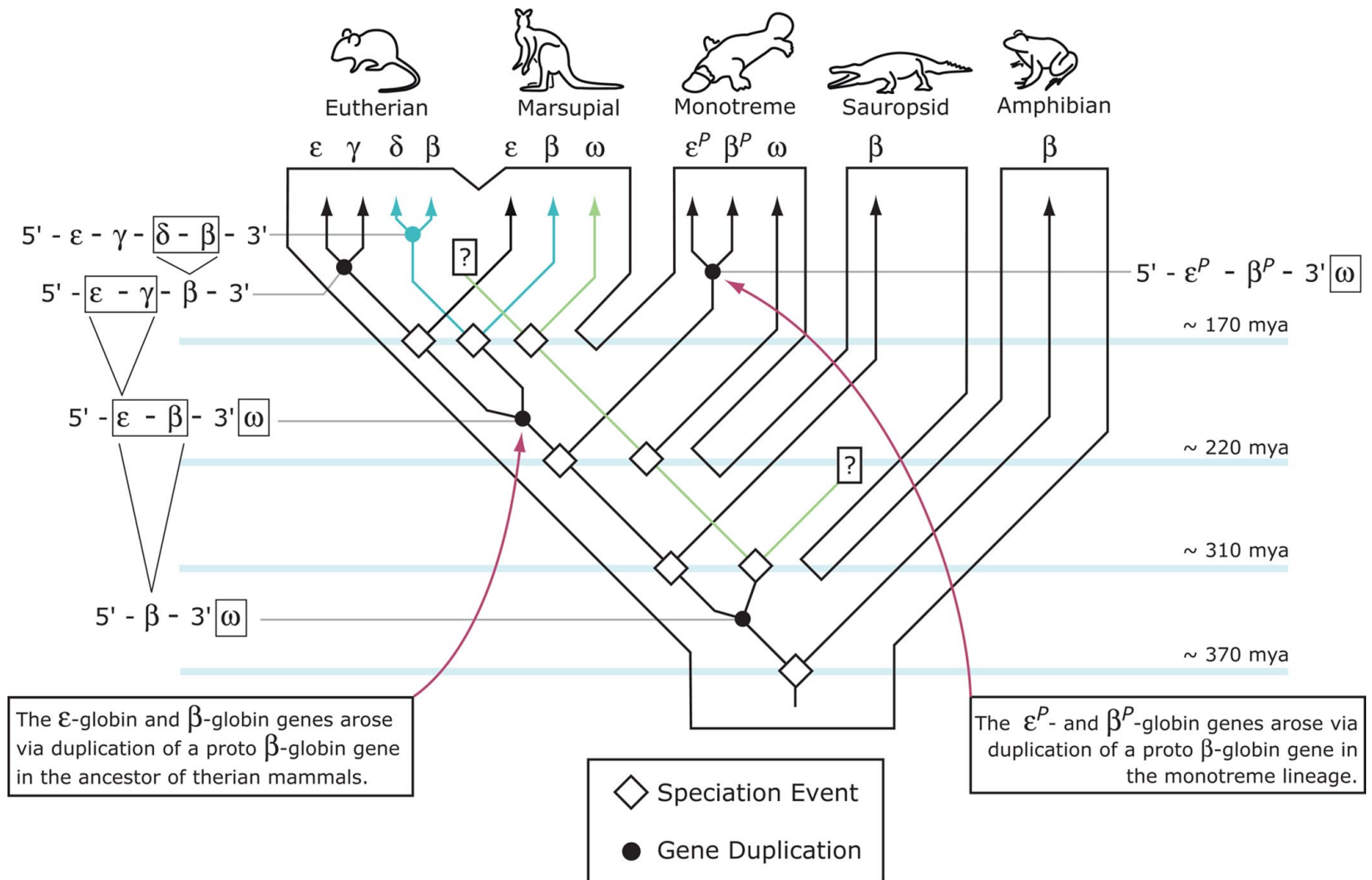
Figure 1 from De Maio et al. (2015)

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



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

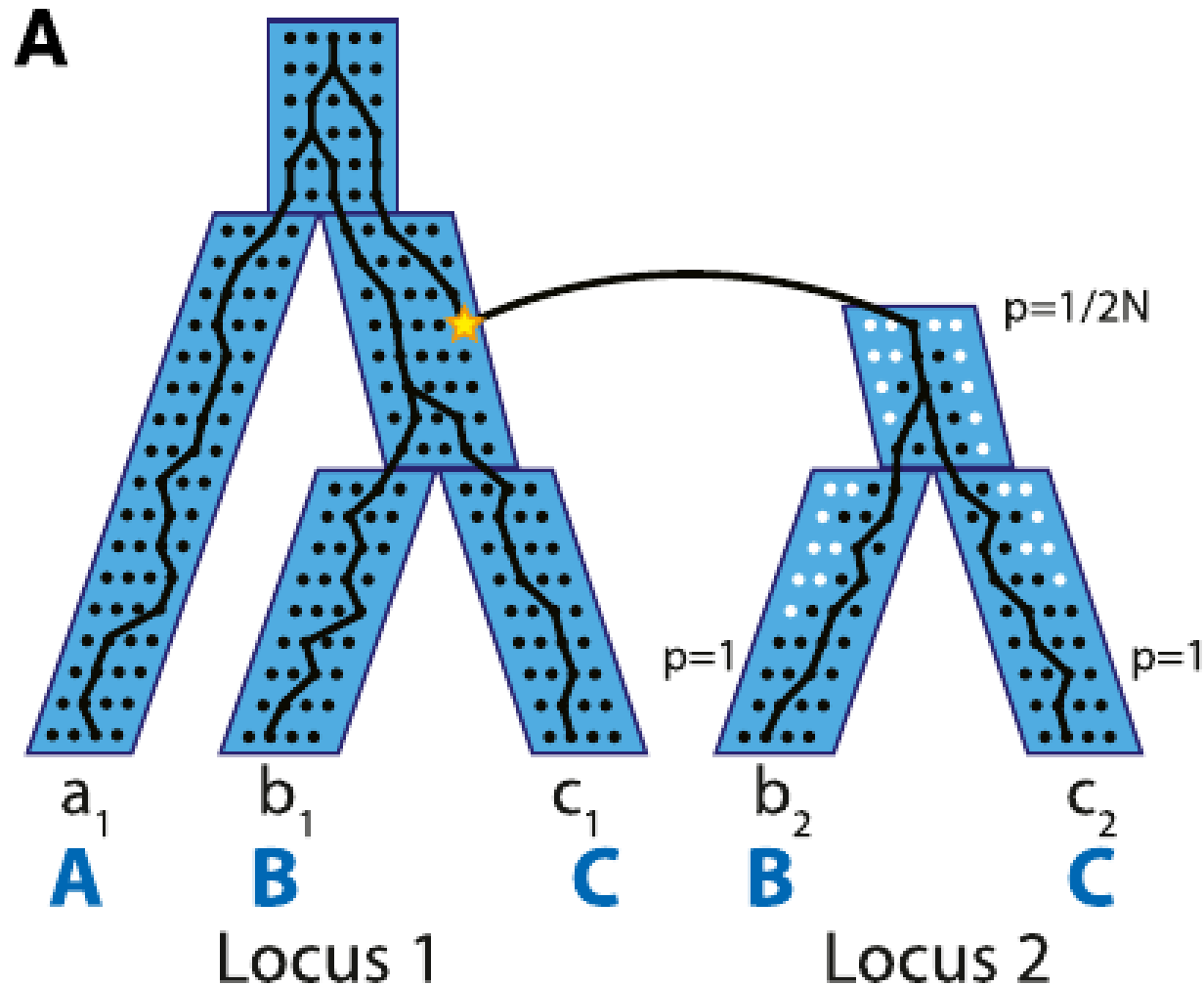


Figure 2A from Rasmussen and Kellis (2012)

DL models and coalescence

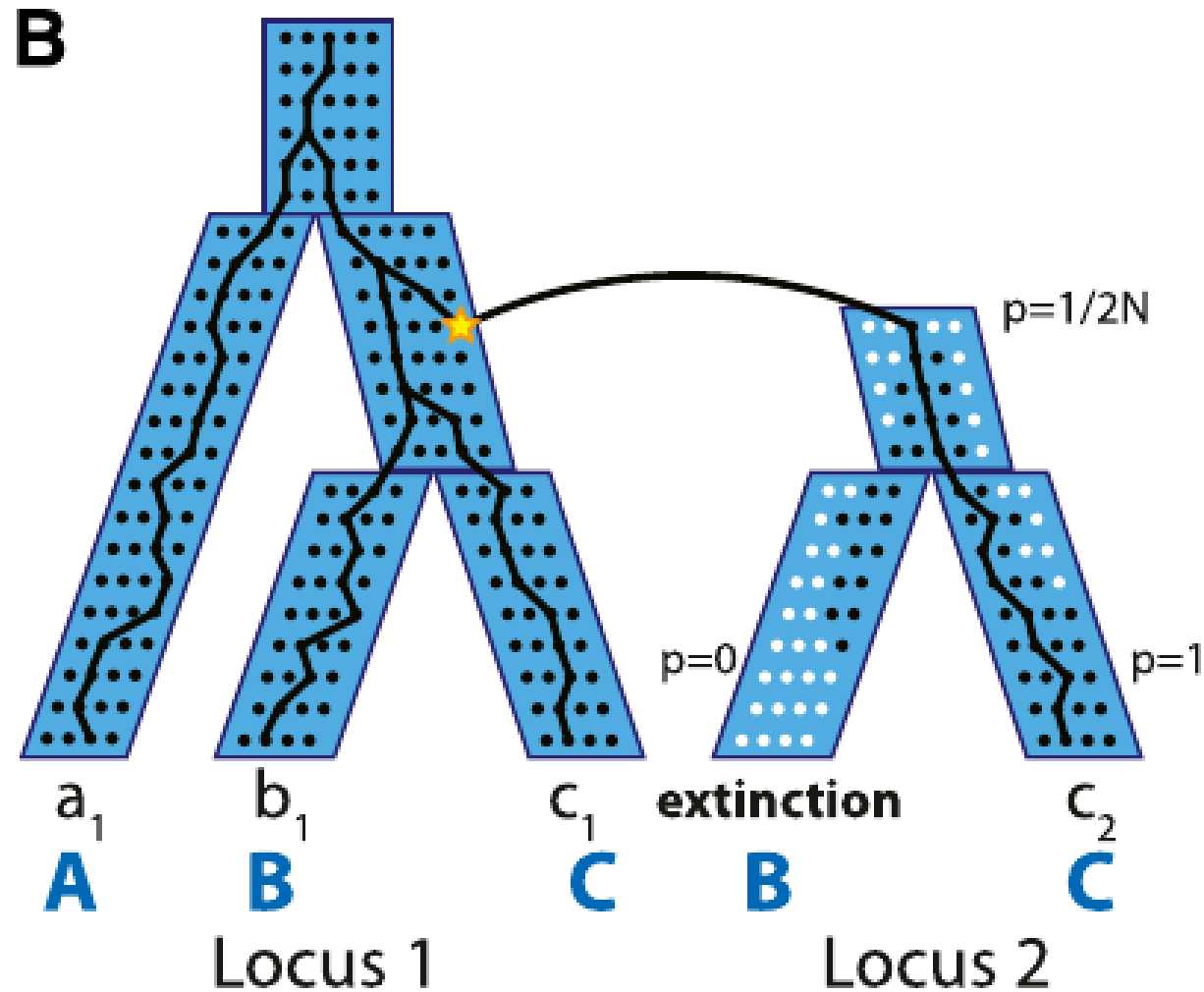


Figure 2B from Rasmussen and Kellis (2012)

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.



Many types of trees: Lateral Gene Transfer

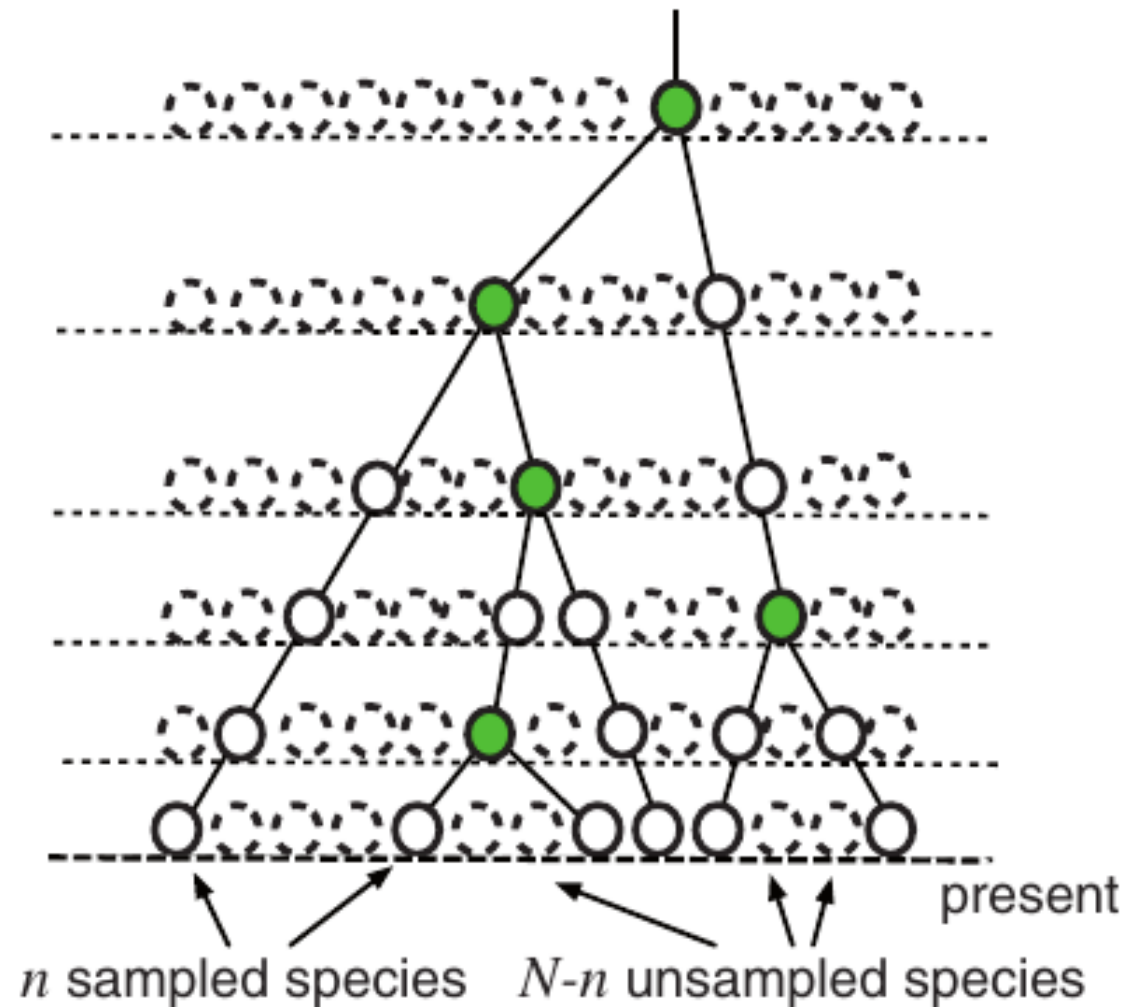
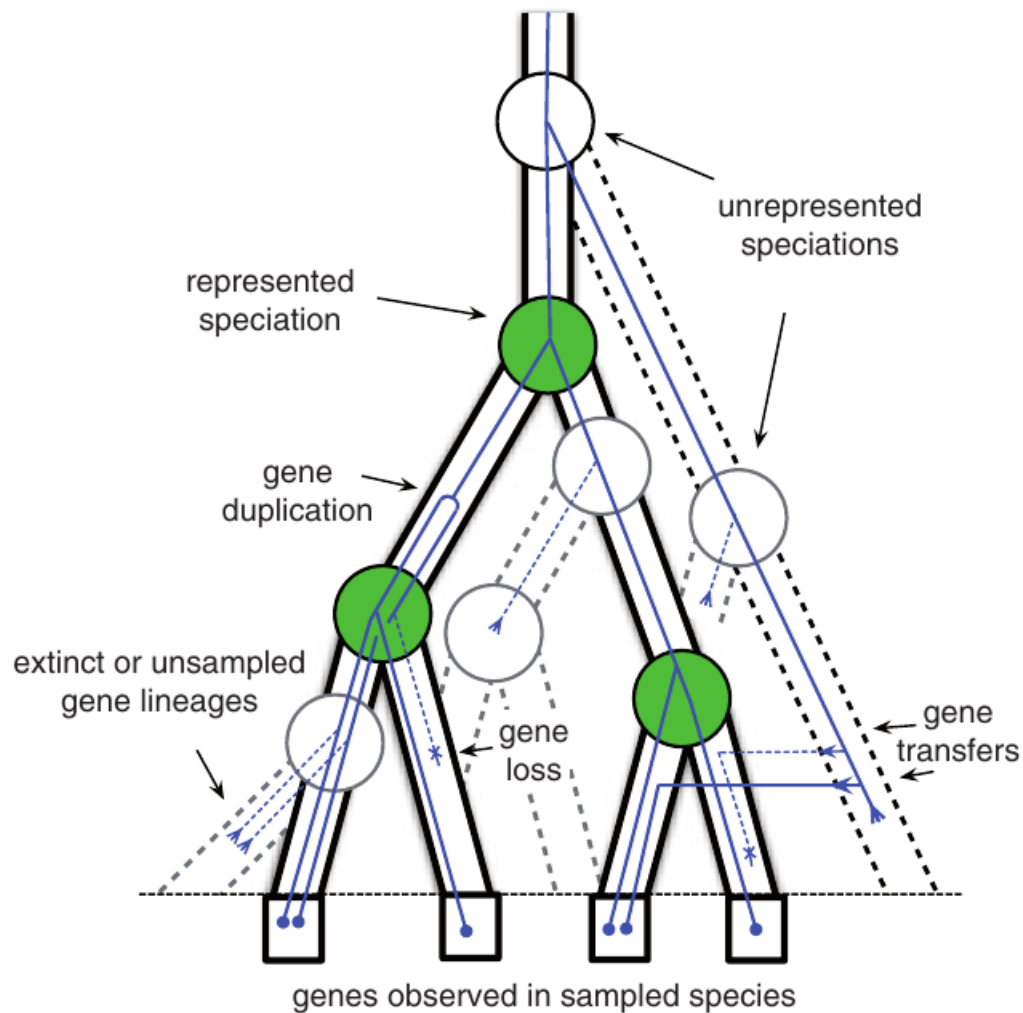


Figure 2c from Szöllősi et al. (2013)

a)

**evolutionary scenario
along complete phylogeny**



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 3 from Szöllősi et al. (2013)

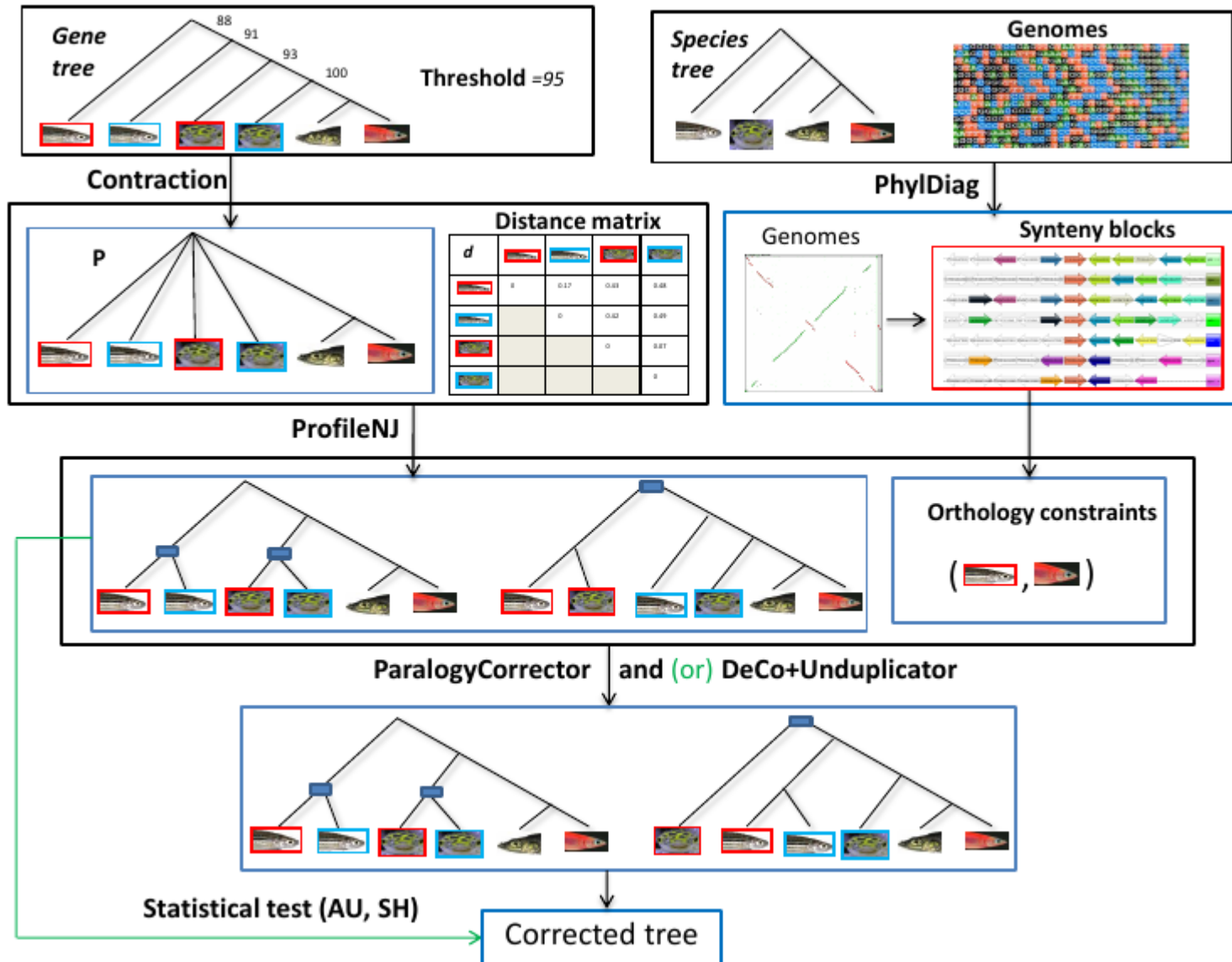
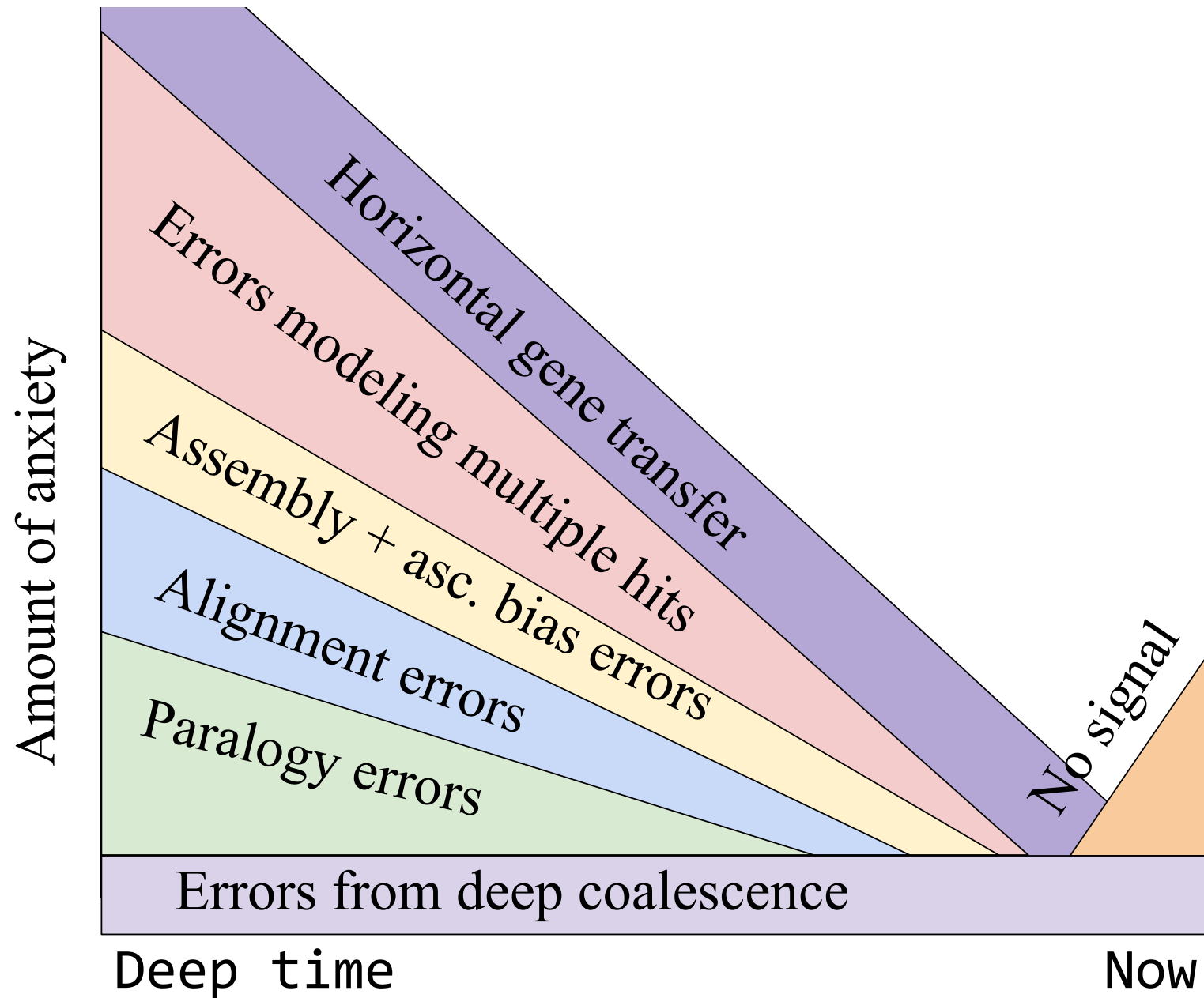


Figure 4 from Noutahi et al. (2016)

(3b) sources of error cartoon



References

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- Liu, Y., Cotton, J. A., Shen, B., Han, X., Rossiter, S. J., and Zhang, S. (2010). Convergent sequence evolution between echolocating bats and dolphins. *Current Biology*, 20(2):R53 – R54.
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