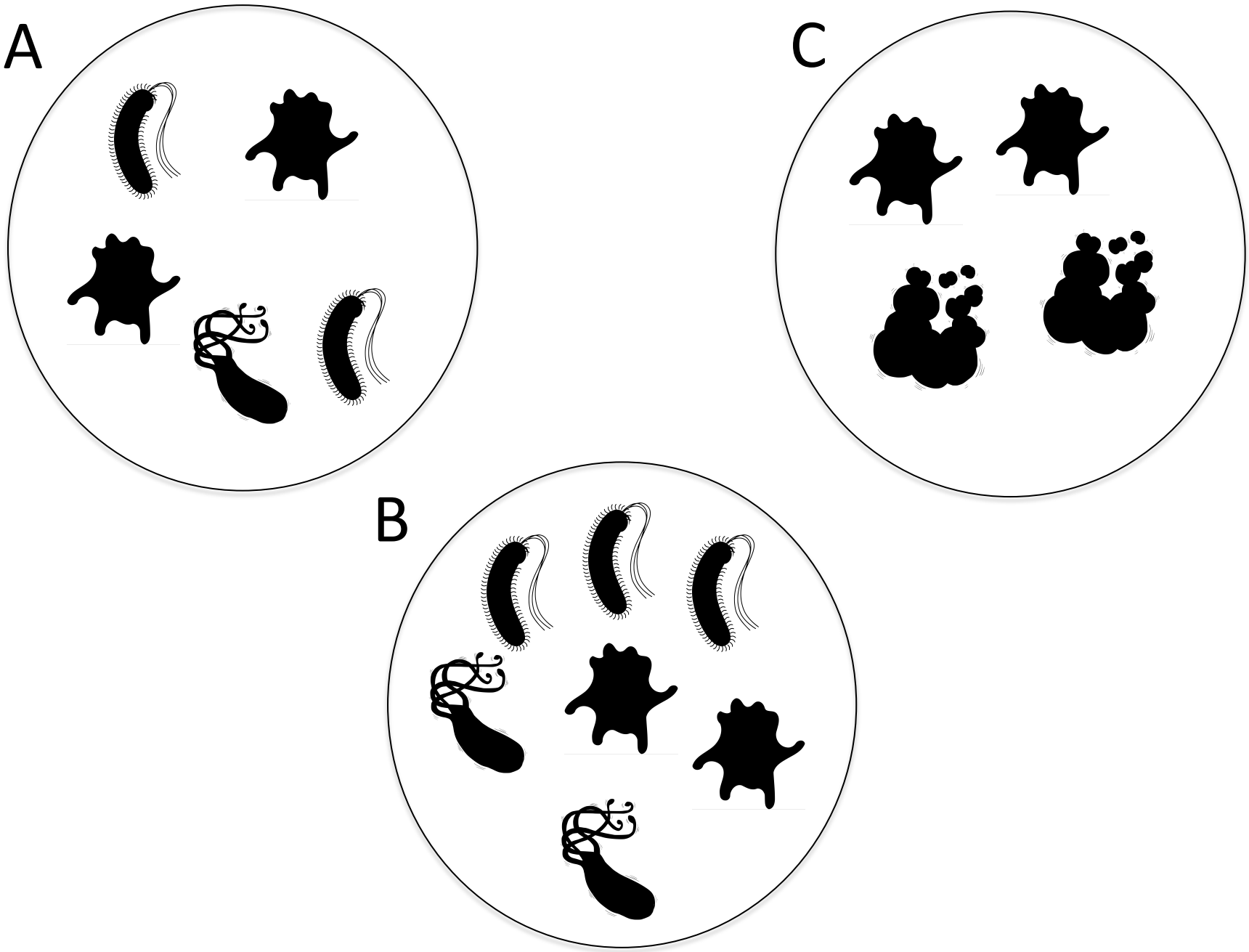
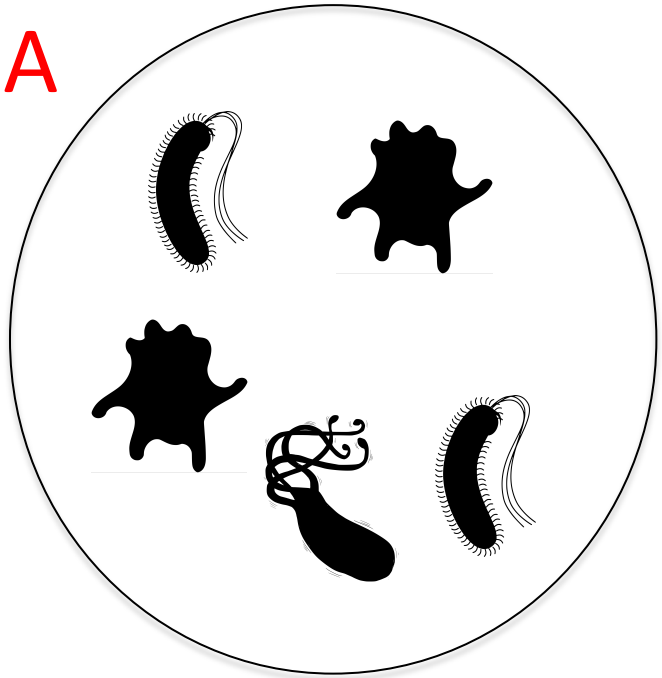
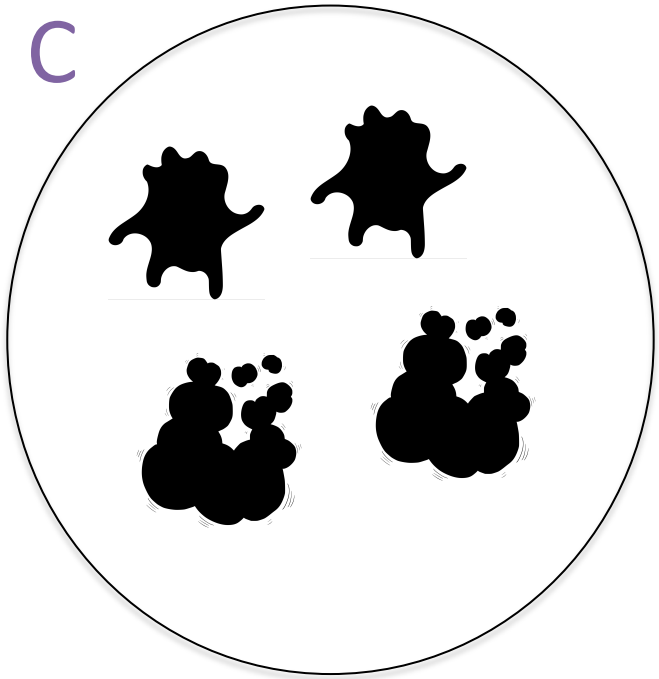
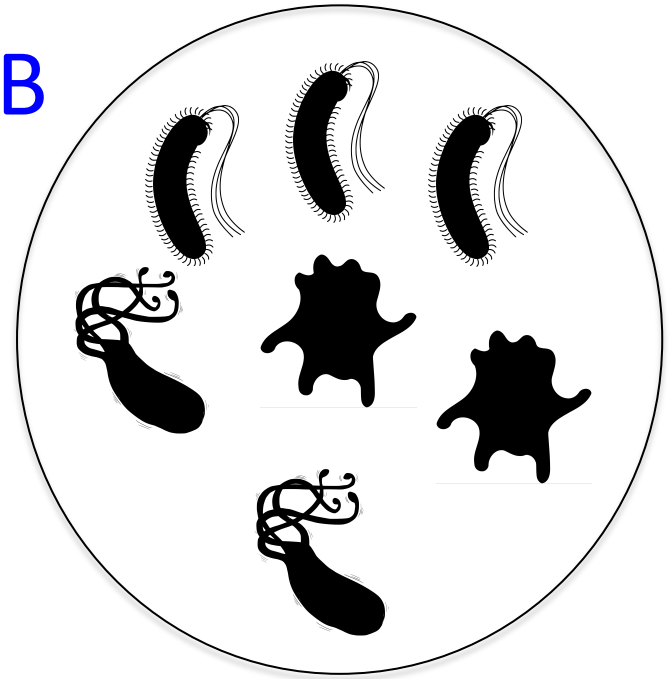

A
B
C



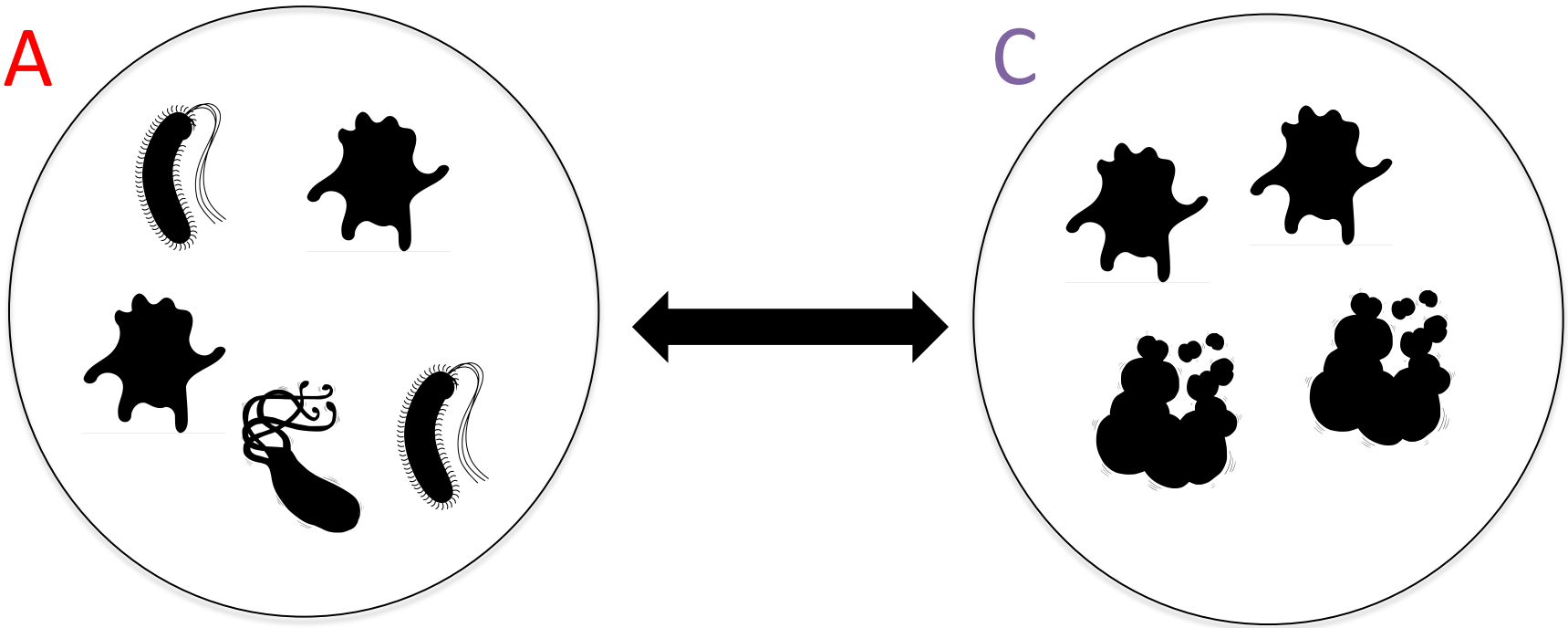
α = 3



α = 2



α = 3



$$(3\text{-}1) + (2\text{-}2) = \beta 2$$

Classes of beta diversity tests

- **Quantitative**
  - Abundance based (e.g., Bray Curtis, Weighted Unifrac)
- **Qualitative**
  - Presence/absence (e.g., Jaccard)

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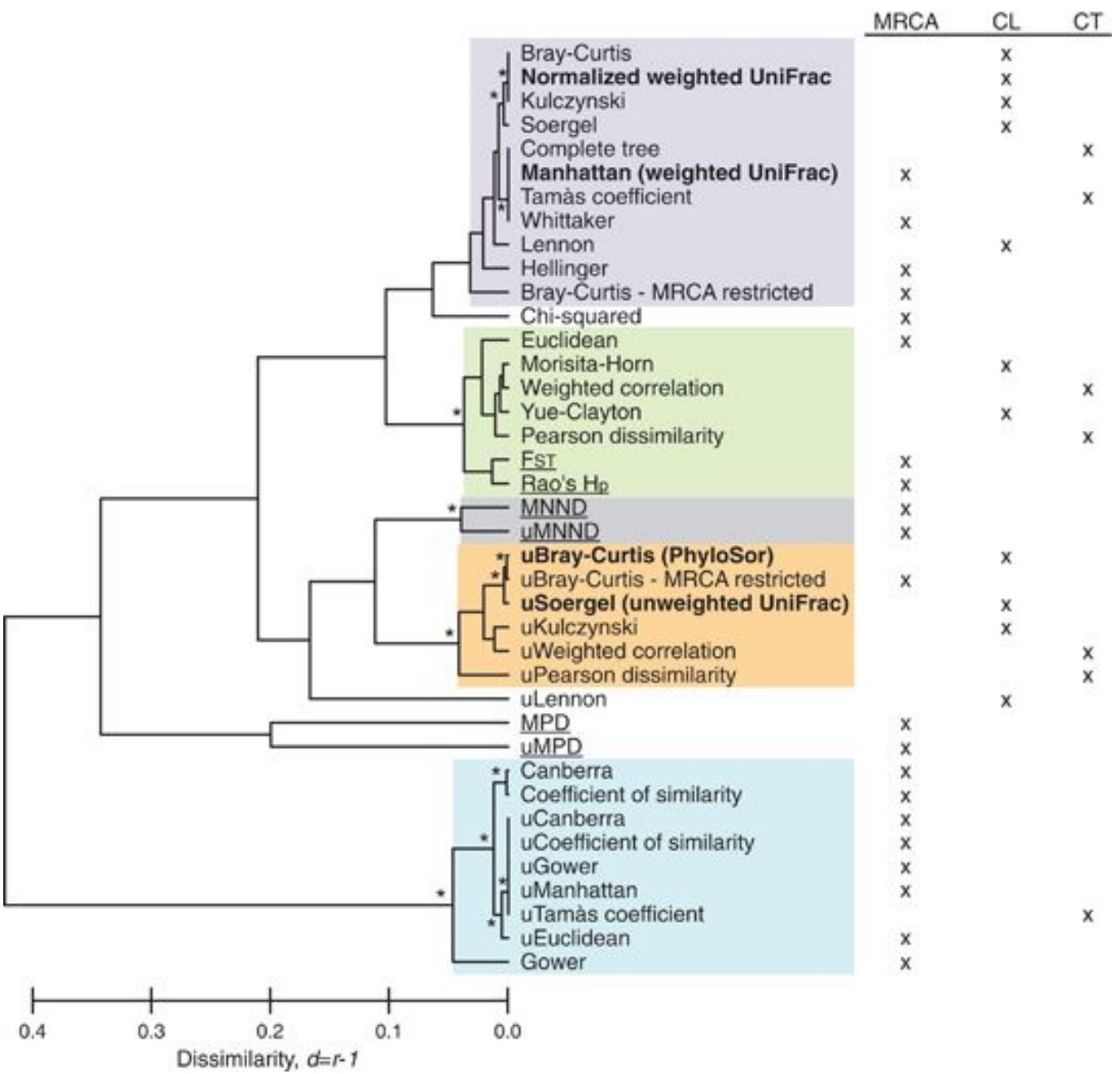
- **Taxon based**
  - Frequency or count data (e.g., Bray Curtis)
- **Sequence based**
  - Genetic distance between aligned sequences (e.g., Fst)
- **Phylogeny based**
  - Computes distance between taxa using a phylogenetic tree (e.g., Unifrac)



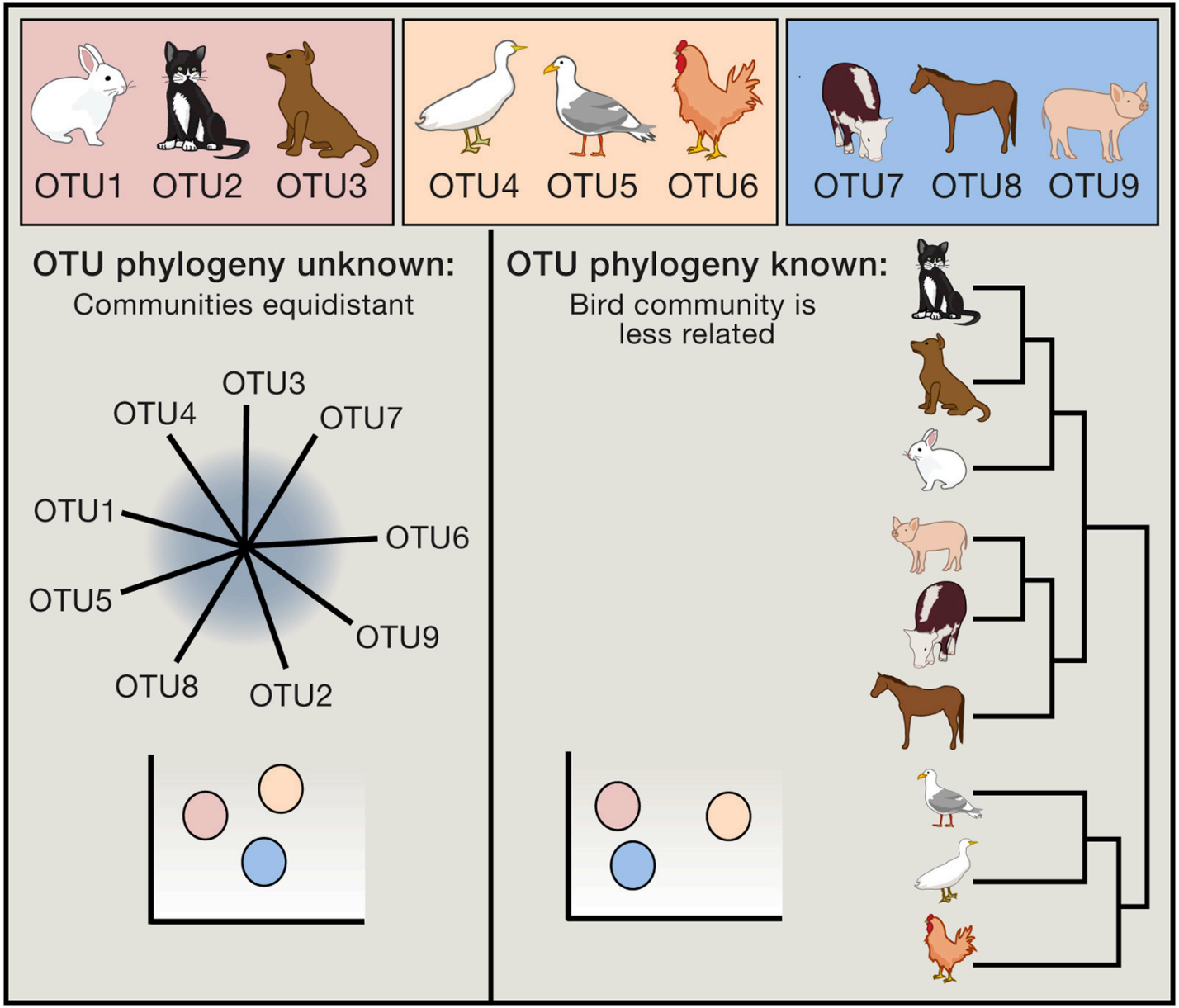
https://www.nature.com/articles/ismej201288

Bray Curtis

- Developed by J. Roger Bray and John T. Curtis (1957)
- **Compositional dissimilarity between two sites based on counts at each site**
- Ranges from 0 to 1:
  - 0 == two sites are the exact same
  - 1 == two sites are completely different

Unifrac

- Developed by Catherine Lozupone and Rob Knight (2005)
- Weighted (quantitative) or unweighted (qualitiative)
- **Considers phylogenetic distance between organisms within a site**



https://doi.org/10.1016/j.cell.2014.06.037

Things to consider

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- How robust is your data to different measures of beta diversity?

More reading

https://aem.asm.org/content/71/12/8228

https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2100

https://www.ncbi.nlm.nih.gov/pubmed/22855211

https://www.ncbi.nlm.nih.gov/pubmed/22915830