Summary of PCoA

We analyzed freshwater eDNA samples from six rivers in northwestern Italy using two primer markers (tele02 and vert01) to assess community composition via Bray-Curtis dissimilarity and Principal Coordinates Analysis (PCoA). PERMANOVA results showed that river site and primer marker both significantly influenced community structure (p = 0.001, R² = 0.63), with most river pairs exhibiting distinct eDNA communities. Stratified analyses revealed that **tele02 explained a greater proportion of variation (R² = 0.594) than vert01 (R² = 0.421)**, and a PERMDISP test confirmed that **tele02 had significantly lower within-group dispersion (p = 0.021)**, indicating more consistent performance across replicates. These results suggest that **tele02 is a more reliable marker** for detecting spatial patterns in riverine biodiversity using eDNA metabarcoding.

**🧪 What You Did (Workflow Summary):**

1. **Loaded eDNA metabarcoding data** from multiple river sites in northwestern Italy.
2. **Processed OTU tables**: Transformed read counts into presence/absence data to focus on community composition.
3. **Computed Bray-Curtis dissimilarity** to measure beta diversity between samples.
4. **Performed Principal Coordinates Analysis (PCoA)** to visualize community composition differences across rivers and markers.
5. **Ran PERMANOVA** to statistically test if river and primer marker significantly influence community composition.
6. **Ran Pairwise PERMANOVAs** to test for differences between specific river pairs.
7. **Stratified PERMANOVA by marker** (tele02 and vert01) to compare their ability to distinguish river communities.
8. **Performed PERMDISP** to test whether within-group dispersion differs between the two markers.

**🧠 Key Findings:**

* ✅ **Rivers differ significantly** in community composition (PERMANOVA: *p* = 0.001, R² = 0.634).
* ✅ **Primer markers also affect results** — there’s evidence of interaction between river and marker.
* ✅ **tele02 explains more variation** (R² = 0.594) than vert01 (R² = 0.421), indicating better differentiation between rivers.
* ✅ **Most river pairs are significantly different**, especially those farther apart (e.g., Argentina vs. Tanaro).
* ⚠️ **Bevera and Roia are not significantly different**, possibly due to geographic or hydrological connection.
* ✅ **tele02 is more consistent** across replicates (confirmed by PERMDISP: *p* = 0.021), with lower within-group variability than vert01.

eDNA Container App