Targeted Exon Capture

(TEC)

Tree Estimation

Clean Alignments (Aliscore)

Alignment

(MAFFT)

Orthograph

Sequence Assembly (Trinity)

Concatenated Supermatrix (IQ TREE)

Gene Tree Model Selection & Tree Estimation

Model Selection and Partitioning

Adapter Trimming (TrimGalore)

ASTRAL

(coalescent species tree)

Two Gene Sequences

(COI + 28S)

Tree

(TEC, COI, 28S)

Tree

(COI and TEC)

Tree

(COI and 28S only)

Tree

(IQ Tree)

Alignment with all COI and 28S (MAFFT)

Clean Alignment

(Aliscore)

Pull from TEC taxa

(BLAST)

Diversification Analysis (BAMM)

Ancestral reconstruction

(trait divergence)

**Figure 1.** Targeted exon capture tree assembly steps from 52 species of Limnephilidae



**Figure 2.** Methods steps of COI and 28S gene refinement from 248 samples of Limnephilidae.