

Description of Additional Supplementary Files:

- **Supplementary data file 1.** *SD1_fish_database.csv*. Database of life history and nutrient content values for all included species.
- **Supplementary data file 2.** *SD2_phyloPred_lambda.totalfat.csv*. Predicted total fat content for Actinopterygii species.
- **Supplementary data file 3.** *SD3_phyloPred_lambda.omega3.csv*. Predicted omega-3 fatty acids content for Actinopterygii species.
- **Supplementary data file 4.** *SD4_phyloPred_lambda.omega6.csv*. Predicted omega-6 fatty acids content for Actinopterygii species.
- **Supplementary data file 5.** *SD5_phyloPred_lambda.iron.csv*. Predicted iron content for Actinopterygii species.
- **Supplementary data file 6.** *SD6_phyloPred_lambda.zinc.csv*. Predicted zinc content for Actinopterygii species.
- **Supplementary data file 7.** *SD7_phyloPred_lambda.vitA.csv*. Predicted vitamin A content for Actinopterygii species.
- **Supplementary data file 8.** *SD8_phyloPred_lambda.vitB12.csv*. Predicted vitamin B12 content for Actinopterygii species.
- **Supplementary data file 9.** *SD9_phyloPred_lambda.vitD.csv*. Predicted vitamin D content for Actinopterygii species.
- **Supplementary data file 10.** *SD1_phyloPred_lambda.protein.csv*. Predicted protein content for Actinopterygii species.
- **Supplementary data file 11.** *SD11_bionut.evolCorMat.R*. Script for evolutionary correlations.
- **Supplementary data file 12.** *SD12_bionut.PGLS.R*. Script for phylogenetic least squares regression.
- **Supplementary data file 13.** *SD13_phylosigByVar.R*. Script for estimating phylogenetic signal of nutrient variables.
- **Supplementary data file 14.** *SD14_predValidation.lambda-only.R*. Script for carrying out validation for predictions under the lambda model.
- **Supplementary data file 15.** *SD15_predValidation.pgls-lambda.R*. Script for carrying out validation for predictions under the lambda plus phylogenetic regression model.