

S3 | Scripts used to analyze the dataset and evaluate the results. Compressed file containing scripts in RUN format (Download file here: <https://www.ni.bio.br/content/v22n1/1982-0224-2023-0113/supplementary/1982-0224-ni-22-01-e230113-s3.zip>).

Search.run

```
macro=;
xpiwe=;
k0; clb;
var: temp temq;
xmu: lev3 repl10;
log searches.txt
xpiwe ]; xpiwe ! 0.520;
pi=16;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK16.tre; save; ts/;
pi=20;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK20.tre; save; ts/;
pi=25;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK25.tre; save; ts/;
pi=32;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK32.tre; save; ts/;
pi=43;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK43.tre; save; ts/;
pi=64;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
BLK64.tre; save; ts/;
ccl; xpiwe ]=3; xpiwe ! 0.520;
pi=16;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD16.tre; save; ts/;
pi=20;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD20.tre; save; ts/;
pi=25;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD25.tre; save; ts/;
pi=32;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD32.tre; save; ts/;
pi=43;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD43.tre; save; ts/;
pi=64;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
COD64.tre; save; ts/;
ccl; xpiwe ]=30; xpiwe ! 0.520;
pi=16;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO16.tre; save; ts/;
pi=20;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO20.tre; save; ts/;
pi=25;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO25.tre; save; ts/;
```

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pi=32;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO32.tre; save; ts/;
pi=43;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO43.tre; save; ts/;
pi=64;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
GRO64.tre; save; ts/;
ccl; xpiwe ! .;;
pi=16;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP16.tre; save; ts/;
pi=20;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP20.tre; save; ts/;
pi=25;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP25.tre; save; ts/;
pi=32;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP32.tre; save; ts/;
pi=43;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP43.tre; save; ts/;
pi=64;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
SEP64.tre; save; ts/;
ccl; ccl; xpiwe ]/1:2:3; xpiwe ! 0.520; xpiwe ! 5746.6786;
pi=16;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS16.tre; save; ts/;
pi=20;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS20.tre; save; ts/;
pi=25;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS25.tre; save; ts/;
pi=32;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS32.tre; save; ts/;
pi=43;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS43.tre; save; ts/;
pi=64;ptnt begin pip 11 = xmult= lev3 repl3; return text; ptnt wait .; ptnt get .; tfuse; bb; cc ] 521.; le; ccl;ts*
POS64.tre; save; ts/;
ts/;
run samples.run;
run ompt.run;
log/;
proc/;
-----
ompt.run
-----
macro=;
sil- all;
quote CALCULATING FITS;
sil= all;
var: concavity[6] condition[30] bestBLK[6] worstBLK[6] bestCOD[6] worstCOD[6] bestGRO[6]
worstGRO[6] bestSEP[6] worstSEP[6] bestPOS[6] worstPOS[6] optim[30] optinew optitemp; /* adjust

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values of concavities and conditions to the analyses you did */
set concavity[0] 16; /* adjust those numbers to the K-values you used */
set concavity[1] 20;
set concavity[2] 25;
set concavity[3] 32;
set concavity[4] 43;
set concavity[5] 64;
k0; p samples.tre; /* you have to include in sample.tre ONE most parsimonious tree from each of the searches
you did; its number must be the same than the possible values of condition, bestfit and worstfit variables */
xpiwe ]; xpiwe ! 0.520; /* first weighting scheme, adjust accordingly */
loop 0 5
piwe= 'concavity[#1]';
sort;
set bestBLK[#1] (fit [0]);
set worstBLK[#1] (fit [29]); /* in all cases adjust the number between brackets to the number of the last tree
(numbers of trees minus 1) */
stop;
ccl; xpiwe ]=3; xpiwe ! 0.520; /* second weighting scheme, adjust accordingly */
loop 0 5
piwe= 'concavity[#1]';
sort;
set bestCOD[#1] (fit [0]);
set worstCOD[#1] (fit [29]);
stop;
ccl; xpiwe ]=30; xpiwe ! 0.520; /* third weighting scheme, adjust accordingly */
loop 0 5
piwe= 'concavity[#1]';
sort;
set bestGRO[#1] (fit [0]);
set worstGRO[#1] (fit [29]);
stop;
ccl; xpiwe ! .; /* fourth weighting scheme, adjust accordingly */
loop 0 5
piwe= 'concavity[#1]';
sort;
set bestSEP[#1] (fit [0]);
set worstSEP[#1] (fit [29]);
stop;
ccl; xpiwe ]/1:2:3; xpiwe ! 0.520; xpiwe ! 5746.6786; /* fifth weighting scheme, adjust accordingly */
loop 0 5
piwe= 'concavity[#1]';
sort;
set bestPOS[#1] (fit [0]);
set worstPOS[#1] (fit [29]);
stop;
/* COMPARISON BETWEEN TREES OF SAMPLE.TRE */

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loop 0 29
sil- all;
quote WORKING ON TREE #1;
sil= all;
k0; p samples.tre;
set optim[#1] 0;
tchoose #1;
cc!; xpiwe ]; xpiwe ! 0.520;
loop 0 5
pi= 'concavity[#2]';
set optitemp (fit[0]-'bestBLK[#2]')/('worstBLK[#2]'-'bestBLK[#2]');
set optinew ((1-'optitemp')*100);
set optim[#1] ('optim[#1]'+'optinew');
stop;
cc!; xpiwe ]=3; xpiwe ! 0.520;
loop 0 5
pi= 'concavity[#2]';
set optitemp (fit[0]-'bestCOD[#2]')/('worstCOD[#2]'-'bestCOD[#2]');
set optinew ((1-'optitemp')*100);
set optim[#1] ('optim[#1]'+'optinew');
stop;
cc!; xpiwe ]=30; xpiwe ! 0.520;
loop 0 5
pi= 'concavity[#2]';
set optitemp (fit[0]-'bestGRO[#2]')/('worstGRO[#2]'-'bestGRO[#2]');
set optinew ((1-'optitemp')*100);
set optim[#1] ('optim[#1]'+'optinew');
stop;
cc!; xpiwe ! .;;
loop 0 5
pi= 'concavity[#2]';
set optitemp (fit[0]-'bestSEP[#2]')/('worstSEP[#2]'-'bestSEP[#2]');
set optinew ((1-'optitemp')*100);
set optim[#1] ('optim[#1]'+'optinew');
stop;
cc!; xpiwe ]/1:2:3; xpiwe ! 0.520; xpiwe ! 5746.6786;
loop 0 5
pi= 'concavity[#2]';
set optitemp (fit[0]-'bestPOS[#2]')/('worstPOS[#2]'-'bestPOS[#2]');
set optinew ((1-'optitemp')*100);
set optim[#1] ('optim[#1]'+'optinew');
stop;
stop;
sil- all;
log metacriterion.txt;
quote -----;

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```
quote FINAL RESULTS (the higher the better);  
quote -----;  
loop 0 29;  
set optim[#1] ('optim[#1]'/30);  
quote Condition #1= 'optim[#1]';  
stop;  
log/;  
proc/;
```

Neotropical Ichthyology



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