04_combined_model

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2024-09-19

We finally explored to which degree a combination of physicochemical and fungal soil parameters could improve the modelling of the observed variability in BRI

0. Data importation

1. Exhaustive screening of the best comined model

Again, we screened for the best OLS model based on previsouly selected otus and soil parameters

```
##
## Call:
## fitfunc(formula = as.formula(x), data = data, trace = ..1)
##
## Residuals:
##      Min      1Q  Median      3Q     Max
## -11.1851  -1.5407   0.2097   3.4747   7.5027
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -44.23461   14.46606  -3.058  0.00678 **
## OTU25         1.86698    0.87194   2.141  0.04619 *
## OTU576      -68.30461   20.83595  -3.278  0.00418 **
## OTU2203     301.10961   90.94927   3.311  0.00389 **
## OTU110        8.78397    2.59455   3.386  0.00330 **
## WHC           0.17943    0.06624   2.709  0.01438 *
## Corg         -5.43836    1.43479  -3.790  0.00134 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.293 on 18 degrees of freedom
## Multiple R-squared:  0.8485, Adjusted R-squared:  0.7979
## F-statistic:  16.8 on 6 and 18 DF,  p-value: 1.729e-06
```

1.1 Normality assumptions

Assessing the residuals normality assumptions the produced model. The best model is not fully respecting the residuals normality assumptions. These values are aggregated into the Table S5 for each model.

```
## -------------------------------------------------
##       Test            Statistic        pvalue
## -------------------------------------------------
## Shapiro-Wilk          0.9465           0.2089
## Kolmogorov-Smirnov    0.1284           0.7574
## Cramer-von Mises      1.5722           1e-04
## Anderson-Darling      0.4806           0.2126
## -------------------------------------------------
```
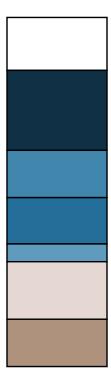
1.2 Predictors relative importance

1.3 Table S10

Summary of the model coefficients and relative importance.

Table S10

Parameter	Coefficient	Relative importance
OTU25	1.8669792	0.0509739
OTU2203	301.1096088	0.1326230
Corg	-5.4383591	0.1354581
OTU110	8.7839709	0.1355170
WHC	0.1794303	0.1647592
OTU576	-68.3046149	0.2291305
(Intercept)	-44.2346127	NA

1.1 Figure 5A

2. Redundancy analysis

We used redundancy analysis (RDA) to visualise the relationship between the parameters included in this model and BRI ## 2.1 RDA

```
##
## Call:
## rda(formula = otus ~ Humus + Clay + Sand + pH + P_H2O + K_H2O +     Mg_H2O + Ca_H2O + P_AAE + K_AAE
##
## Partitioning of variance:
##               Inertia Proportion
## Total           63.01     1.0000
## Constrained     52.87     0.8391
## Unconstrained   10.14     0.1609
##
## Eigenvalues, and their contribution to the variance
##
## Importance of components:
##                          RDA1    RDA2    RDA3    RDA4    RDA5    RDA6    RDA7
## Eigenvalue            5.11329 4.48829 3.94200 3.44978 3.34543 3.16179 3.04105
## Proportion Explained  0.08115 0.07123 0.06256 0.05475 0.05309 0.05018 0.04826
## Cumulative Proportion 0.08115 0.15238 0.21494 0.26969 0.32278 0.37296 0.42122
##                          RDA8   RDA9   RDA10   RDA11   RDA12   RDA13  RDA14
## Eigenvalue            2.87432 2.5644 2.47369 2.38008 2.16185 2.14003 1.9972
## Proportion Explained  0.04562 0.0407 0.03926 0.03777 0.03431 0.03396 0.0317
## Cumulative Proportion 0.46684 0.5075 0.54679 0.58456 0.61887 0.65284 0.6845
##                          RDA15   RDA16   RDA17   RDA18   RDA19   RDA20     PC1
## Eigenvalue            1.91364 1.80711 1.75758 1.48847 1.38688 1.38298 3.07594
## Proportion Explained  0.03037 0.02868 0.02789 0.02362 0.02201 0.02195 0.04882
## Cumulative Proportion 0.71490 0.74358 0.77148 0.79510 0.81711 0.83906 0.88787
##                          PC2     PC3     PC4
## Eigenvalue            2.70741 2.36710 1.99083
## Proportion Explained  0.04297 0.03757 0.03159
## Cumulative Proportion 0.93084 0.96841 1.00000
##
## Accumulated constrained eigenvalues
## Importance of components:
##                          RDA1    RDA2    RDA3    RDA4    RDA5   RDA6    RDA7
## Eigenvalue            5.11329 4.48829 3.94200 3.44978 3.34543 3.1618 3.04105
## Proportion Explained  0.09671 0.08489 0.07456 0.06525 0.06328 0.0598 0.05752
## Cumulative Proportion 0.09671 0.18161 0.25617 0.32142 0.38469 0.4445 0.50202
##                          RDA8   RDA9   RDA10   RDA11   RDA12   RDA13   RDA14
## Eigenvalue            2.87432 2.5644 2.47369 2.38008 2.16185 2.14003 1.99724
## Proportion Explained  0.05437 0.0485 0.04679 0.04502 0.04089 0.04048 0.03778
## Cumulative Proportion 0.55638 0.6049 0.65168 0.69669 0.73758 0.77806 0.81584
##                          RDA15   RDA16   RDA17   RDA18   RDA19   RDA20
## Eigenvalue            1.9136 1.80711 1.75758 1.48847 1.38688 1.38298
## Proportion Explained  0.0362 0.03418 0.03324 0.02815 0.02623 0.02616
## Cumulative Proportion 0.8520 0.88621 0.91946 0.94761 0.97384 1.00000
```

2.2 Figure 5B

We report the combined relationships of chemistry and fungi for all soils in the RDA

3