

# Within and Across

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## ALPHA

### Data summary

##	FarmType	variable	mean	SE	min	max
## 1	Monoculture	div_all	3.582	0.035	2.211	4.313
## 2	Polyculture	div_all	3.525	0.036	1.596	4.309
## 3	Monoculture	div_amf	1.046	0.068	0.000	2.263
## 4	Polyculture	div_amf	1.502	0.088	0.000	3.663
## 5	Monoculture	div_par	1.520	0.042	0.343	2.373
## 6	Polyculture	div_par	1.286	0.039	0.358	2.428
## 7	Monoculture	div_path	1.872	0.038	0.640	2.597
## 8	Polyculture	div_path	1.804	0.030	0.730	2.505
## 9	Monoculture	div_sap	3.134	0.042	1.604	3.928
## 10	Polyculture	div_sap	3.071	0.037	1.005	3.729
## 11	Monoculture	obs_all	169.933	2.813	116.000	259.000
## 12	Polyculture	obs_all	174.659	3.273	104.000	272.000
## 13	Monoculture	obs_amf	5.367	0.415	0.000	20.000
## 14	Polyculture	obs_amf	10.697	0.880	0.000	53.000
## 15	Monoculture	obs_par	12.542	0.305	3.000	20.000
## 16	Polyculture	obs_par	13.348	0.330	5.000	25.000
## 17	Monoculture	obs_path	19.875	0.542	9.000	36.000
## 18	Polyculture	obs_path	21.424	0.394	12.000	32.000
## 19	Monoculture	obs_sap	95.625	1.859	60.000	161.000
## 20	Polyculture	obs_sap	94.106	1.624	52.000	133.000
##	FTBL	variable	mean	SE	min	max
## 1	Monoculture_F	div_all	3.577	0.051	2.314	4.268
## 2	Monoculture_N	div_all	3.586	0.049	2.211	4.313
## 3	Polyculture_F	div_all	3.572	0.043	2.577	4.241
## 4	Polyculture_N	div_all	3.477	0.057	1.596	4.309
## 5	Monoculture_F	div_amf	1.088	0.098	0.000	2.263
## 6	Monoculture_N	div_amf	1.003	0.093	0.000	2.192
## 7	Polyculture_F	div_amf	1.478	0.131	0.000	3.322
## 8	Polyculture_N	div_amf	1.527	0.119	0.000	3.663
## 9	Monoculture_F	div_par	1.550	0.063	0.343	2.373
## 10	Monoculture_N	div_par	1.489	0.055	0.498	2.209
## 11	Polyculture_F	div_par	1.384	0.049	0.454	2.263
## 12	Polyculture_N	div_par	1.187	0.058	0.358	2.428
## 13	Monoculture_F	div_path	1.887	0.057	0.640	2.597
## 14	Monoculture_N	div_path	1.856	0.052	0.763	2.534
## 15	Polyculture_F	div_path	1.810	0.046	0.730	2.505

```
## 16 Polyculture_N div_path 1.797 0.040 1.016 2.435
## 17 Monoculture_F div_sap 3.111 0.060 1.733 3.722
## 18 Monoculture_N div_sap 3.157 0.058 1.604 3.928
## 19 Polyculture_F div_sap 3.120 0.046 1.889 3.649
## 20 Polyculture_N div_sap 3.021 0.057 1.005 3.729
## 21 Monoculture_F obs_all 172.783 3.916 120.000 259.000
## 22 Monoculture_N obs_all 167.083 4.039 116.000 257.000
## 23 Polyculture_F obs_all 178.167 4.725 113.000 272.000
## 24 Polyculture_N obs_all 171.152 4.525 104.000 260.000
## 25 Monoculture_F obs_amf 5.900 0.656 0.000 20.000
## 26 Monoculture_N obs_amf 4.833 0.504 0.000 16.000
## 27 Polyculture_F obs_amf 10.439 1.251 0.000 36.000
## 28 Polyculture_N obs_amf 10.955 1.246 0.000 53.000
## 29 Monoculture_F obs_par 12.867 0.417 5.000 19.000
## 30 Monoculture_N obs_par 12.217 0.445 3.000 20.000
## 31 Polyculture_F obs_par 13.773 0.460 5.000 25.000
## 32 Polyculture_N obs_par 12.924 0.471 6.000 22.000
## 33 Monoculture_F obs_path 19.667 0.749 10.000 32.000
## 34 Monoculture_N obs_path 20.083 0.788 9.000 36.000
## 35 Polyculture_F obs_path 22.136 0.586 12.000 31.000
## 36 Polyculture_N obs_path 20.712 0.517 13.000 32.000
## 37 Monoculture_F obs_sap 95.883 2.631 60.000 150.000
## 38 Monoculture_N obs_sap 95.367 2.648 66.000 161.000
## 39 Polyculture_F obs_sap 96.909 2.194 56.000 133.000
## 40 Polyculture_N obs_sap 91.303 2.362 52.000 133.000
```

```
## Block variable mean SE min max
## 1 F div_all 3.575 0.033 2.314 4.268
## 2 N div_all 3.529 0.038 1.596 4.313
## 3 F div_amf 1.292 0.085 0.000 3.322
## 4 N div_amf 1.278 0.080 0.000 3.663
## 5 F div_par 1.463 0.040 0.343 2.373
## 6 N div_par 1.331 0.042 0.358 2.428
## 7 F div_path 1.847 0.036 0.640 2.597
## 8 N div_path 1.825 0.032 0.763 2.534
## 9 F div_sap 3.116 0.037 1.733 3.722
## 10 N div_sap 3.086 0.041 1.005 3.928
## 11 F obs_all 175.603 3.096 113.000 272.000
## 12 N obs_all 169.214 3.046 104.000 260.000
## 13 F obs_amf 8.278 0.751 0.000 36.000
## 14 N obs_amf 8.040 0.745 0.000 53.000
## 15 F obs_par 13.341 0.314 5.000 25.000
## 16 N obs_par 12.587 0.325 3.000 22.000
## 17 F obs_path 20.960 0.481 10.000 32.000
## 18 N obs_path 20.413 0.462 9.000 36.000
## 19 F obs_sap 96.421 1.694 56.000 150.000
## 20 N obs_sap 93.238 1.769 52.000 161.000
```

## Model output

```
## $obs_all
## $obs_all[[1]]
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: Negative Binomial(72.5569) ( log )
```

```

## Formula: round(obs_all, 0) ~ FarmType * Block + scale(pH) + scale(P) +
##       scale(NP_ratio) + scale(TOC) + scale(N) + (1 | farmCode)
## Data: alphaDF
##
##      AIC      BIC    logLik deviance df.resid
## 2387.4    2426.3   -1182.7   2365.4      241
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.03093 -0.62900  0.03559  0.63479  3.09682
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.01785 0.1336
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    5.138872   0.030501 168.480 < 2e-16 ***
## FarmType1     -0.015599   0.031471  -0.496  0.62013
## Block1         0.024233   0.009424   2.571  0.01013 *
## scale(pH)       0.046865   0.022418   2.091  0.03657 *
## scale(P)       -0.057152   0.018528  -3.085  0.00204 **
## scale(NP_ratio) -0.002160   0.020996  -0.103  0.91808
## scale(TOC)      0.042225   0.025121   1.681  0.09279 .
## scale(N)       -0.002351   0.023260  -0.101  0.91949
## FarmType1:Block1 -0.003198   0.009166  -0.349  0.72719
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1 scl(H) scl(P) s(NP_) s(TOC) scl(N)
## FarmType1    0.049
## Block1       0.000  0.044
## scale(pH)    -0.004  0.022  0.083
## scale(P)     0.005  0.060 -0.099 -0.067
## scal(NP_rt) -0.007 -0.145 -0.008  0.230  0.305
## scale(TOC)   0.005  0.107  0.273 -0.082 -0.128 -0.052
## scale(N)    -0.007 -0.143 -0.300  0.059 -0.130 -0.086 -0.759
## FrmTyp1:B11  0.000 -0.007 -0.006 -0.025  0.155  0.023 -0.015  0.105
##
##
## $obs_amf
## $obs_amf[[1]]
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: Negative Binomial(5.2513) ( log )
## Formula: round(obs_amf, 0) ~ FarmType * Block + scale(pH) + scale(P) +
##       scale(NP_ratio) + scale(TOC) + scale(N) + (1 | farmCode)
## Data: alphaDF
##
##      AIC      BIC    logLik deviance df.resid
## 1398.9    1437.7   -688.4   1376.9      241
##

```

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## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -1.8661 -0.7608 -0.1763  0.6275  3.7024
##
## Random effects:
##      Groups      Name      Variance Std.Dev.
## farmCode (Intercept) 0.8868   0.9417
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    1.64476    0.21090   7.799 6.25e-15 ***
## FarmType1      -0.31726    0.21377  -1.484  0.1378
## Block1         0.03442    0.04174   0.825  0.4096
## scale(pH)       0.39244    0.09770   4.017 5.90e-05 ***
## scale(P)        -0.43113    0.08795  -4.902 9.49e-07 ***
## scale(NP_ratio) 0.04456    0.10473   0.426  0.6705
## scale(TOC)       0.20184    0.11049   1.827  0.0677 .
## scale(N)        -0.16969    0.11036  -1.538  0.1241
## FarmType1:Block1 0.05337    0.04091   1.305  0.1920
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1 scl(H) scl(P) s(NP_) s(TOC) scl(N)
## FarmType1    0.057
## Block1      -0.001  0.023
## scale(pH)    -0.016  0.028  0.033
## scale(P)     0.022  0.022 -0.050 -0.107
## scal(NP_rt) -0.010 -0.112  0.004  0.145  0.277
## scale(TOC)  -0.003  0.073  0.286  0.047 -0.187 -0.024
## scale(N)     0.004 -0.088 -0.322 -0.019 -0.098 -0.159 -0.699
## FrmTyp1:B11 -0.006 -0.002  0.103  0.042  0.157  0.023 -0.007  0.118
##
##
## $obs_path
## $obs_path[[1]]
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: Negative Binomial(1502470) ( log )
## Formula: round(obs_path, 0) ~ FarmType * Block + scale(pH) + scale(P) +
##       scale(NP_ratio) + scale(TOC) + scale(N) + (1 | farmCode)
## Data: alphaDF
##
##      AIC      BIC    logLik deviance df.resid
##  1454.7   1493.6   -716.4   1432.7      241
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.0088 -0.5369  0.0077  0.4129  2.1849
##
## Random effects:
##      Groups      Name      Variance Std.Dev.
## farmCode (Intercept) 0.02252   0.1501

```

```

## Number of obs: 252, groups:  farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)   3.0110201  0.0358499  83.990  <2e-16 ***
## FarmType1     -0.0512697  0.0374847  -1.368   0.171
## Block1        0.0142554  0.0146585   0.972   0.331
## scale(pH)      0.0111221  0.0304319   0.365   0.715
## scale(P)      -0.0367495  0.0280220  -1.311   0.190
## scale(NP_ratio) 0.0009822  0.0308410   0.032   0.975
## scale(TOC)     0.0510629  0.0371905   1.373   0.170
## scale(N)       0.0080882  0.0338275   0.239   0.811
## FarmType1:Block1 -0.0195295  0.0142824  -1.367   0.172
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1 scl(H) scl(P) s(NP_) s(TOC) scl(N)
## FarmType1    0.061
## Block1      -0.004  0.053
## scale(pH)   -0.009 -0.007  0.073
## scale(P)     0.012  0.060 -0.120 -0.064
## scal(NP_rt) -0.012 -0.171 -0.017  0.322  0.340
## scale(TOC)   0.003  0.136  0.256 -0.039 -0.181 -0.061
## scale(N)    -0.011 -0.179 -0.267  0.046 -0.083 -0.076 -0.778
## FrmTyp1:Bl1  0.007 -0.013  0.035 -0.018  0.127  0.023 -0.022  0.097
##
##
## $obs_sap
## $obs_sap[[1]]
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: Negative Binomial(113.248) ( log )
## Formula: round(obs_sap, 0) ~ FarmType * Block + scale(pH) + scale(P) +
##          scale(NP_ratio) + scale(TOC) + scale(N) + (1 | farmCode)
## Data: alphaDF
##
##      AIC      BIC    logLik deviance df.resid
## 2088.1 2127.0 -1033.1 2066.1      241
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.11056 -0.57876 -0.03288  0.61243  3.12215
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.019 0.1378
## Number of obs: 252, groups:  farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)   4.5417364  0.0313793 144.737  < 2e-16 ***
## FarmType1     0.0099192  0.0323213   0.307  0.75892
## Block1        0.0208517  0.0093780   2.223  0.02618 *

```

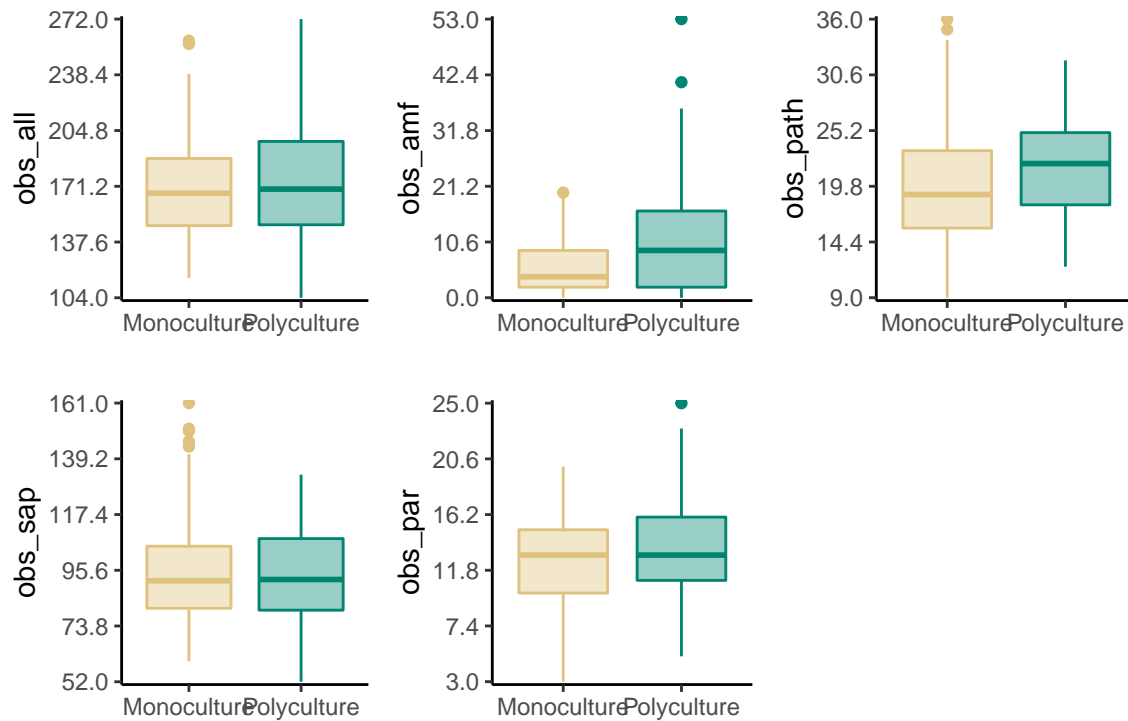
```

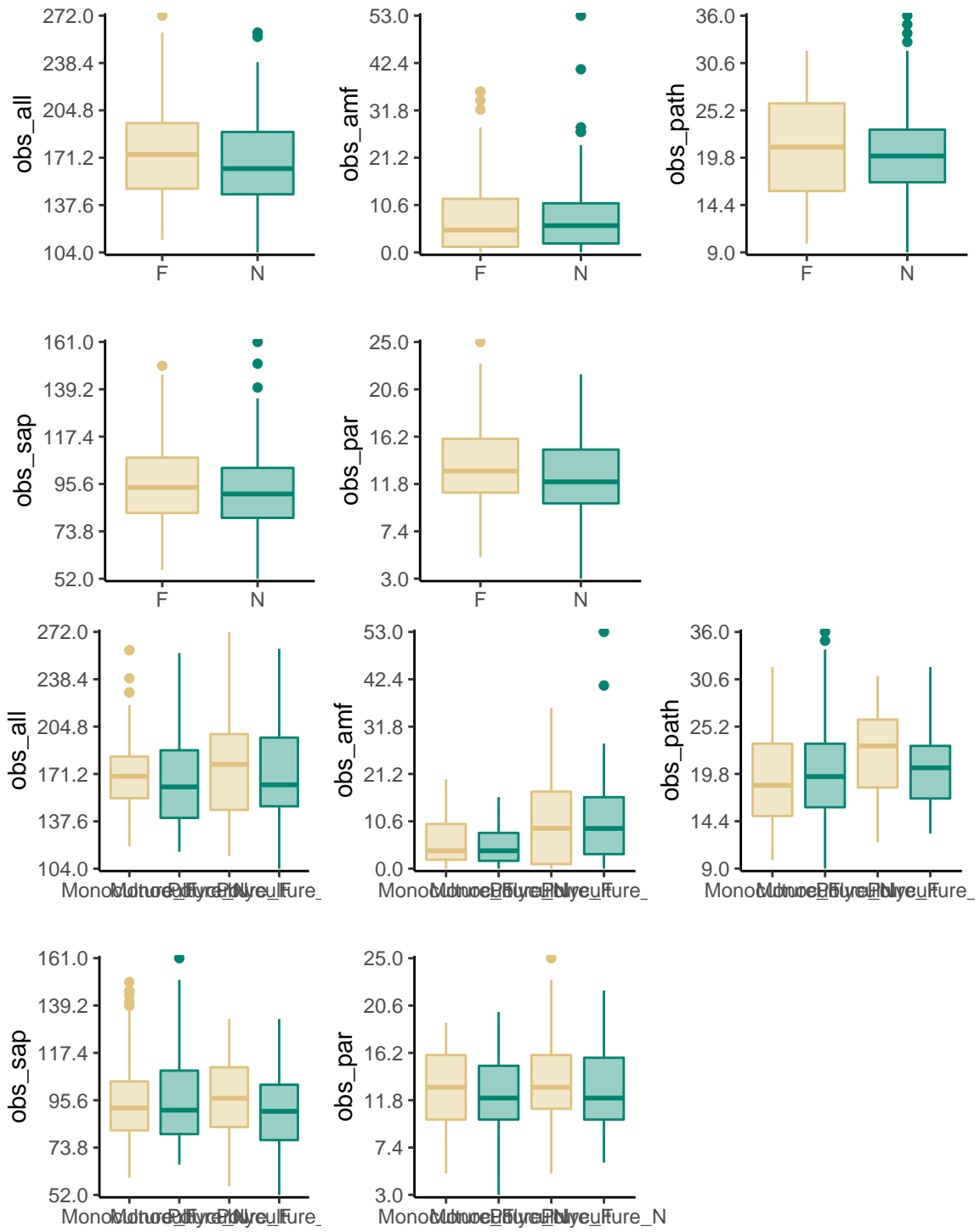
## scale(pH)          0.0201789  0.0218434  0.924  0.35559
## scale(P)           -0.0509043  0.0186432 -2.730  0.00632 **
## scale(NP_ratio)    -0.0341803  0.0212915 -1.605  0.10842
## scale(TOC)         0.0303327  0.0250946  1.209  0.22677
## scale(N)           0.0008815  0.0230258  0.038  0.96946
## FarmType1:Block1 -0.0160516  0.0091347 -1.757  0.07888 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##      (Intr) FrmTy1 Block1 scl(H) scl(P) s(NP_) s(TOC) scl(N)
## FarmType1  0.048
## Block1     -0.001  0.044
## scale(pH)  -0.003  0.016  0.082
## scale(P)    0.007  0.057 -0.102 -0.079
## scl(NP_rt) -0.005 -0.142 -0.011  0.231  0.307
## scale(TOC)  0.005  0.106  0.274 -0.083 -0.114 -0.051
## scale(N)    -0.007 -0.139 -0.299  0.061 -0.131 -0.087 -0.765
## FrmTyp1:B11 0.003 -0.007 -0.013 -0.031  0.161  0.022 -0.011  0.102
##
##
## $obs_par
## $obs_par[[1]]
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: Negative Binomial(761905.3) ( log )
## Formula: round(obs_par, 0) ~ FarmType * Block + scale(pH) + scale(P) +
##      scale(NP_ratio) + scale(TOC) + scale(N) + (1 | farmCode)
## Data: alphaDF
##
##      AIC      BIC    logLik deviance df.resid
##  1342.1   1381.0   -660.1   1320.1     241
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.52339 -0.61249 -0.04597  0.58844  2.34192
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.0114  0.1068
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##      Estimate Std. Error z value Pr(>|z|)
## (Intercept)  2.551247  0.029304  87.063 <2e-16 ***
## FarmType1    -0.040815  0.031545 -1.294  0.1957
## Block1       0.031431  0.018372  1.711  0.0871 .
## scale(pH)    0.053770  0.031088  1.730  0.0837 .
## scale(P)     -0.064868  0.031294 -2.073  0.0382 *
## scale(NP_ratio) 0.003279  0.033616  0.098  0.9223
## scale(TOC)   -0.036794  0.041702 -0.882  0.3776
## scale(N)     0.022732  0.039577  0.574  0.5657
## FarmType1:Block1 -0.011077  0.017949 -0.617  0.5371
## ---

```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##      (Intr) FrmTy1 Block1 scl(H) scl(P) s(NP_) s(TOC) scl(N)
## FarmType1    0.062
## Block1       -0.016  0.060
## scale(pH)    -0.021 -0.030  0.071
## scale(P)      0.030  0.035 -0.128 -0.120
## scal(NP_rt) -0.006 -0.213 -0.017  0.390  0.381
## scale(TOC)   0.016  0.173  0.253  0.079 -0.270 -0.044
## scale(N)     -0.018 -0.243 -0.261 -0.002  0.019 -0.051 -0.776
## FrmTyp1:B11  0.005 -0.036  0.035 -0.012  0.132  0.046 -0.034  0.098
```

### Plots







# Alpha x Environment

## Tables

##	FarmType	variable	mean	SE	min	max
## 1	Monoculture	FarmBi	1.000	0.000	1.000	1.000
## 2	Polyculture	FarmBi	0.000	0.000	0.000	0.000
## 3	Monoculture	N	0.047	0.002	0.019	0.159
## 4	Polyculture	N	0.039	0.002	0.019	0.093
## 5	Monoculture	NP_ratio	0.417	0.054	0.020	3.273
## 6	Polyculture	NP_ratio	0.140	0.009	0.041	0.666
## 7	Monoculture	P	29.126	1.951	1.283	108.662
## 8	Polyculture	P	36.985	1.741	6.527	92.802
## 9	Monoculture	pH	7.210	0.098	4.780	8.640
## 10	Polyculture	pH	7.434	0.067	4.560	8.290
## 11	Monoculture	TOC	0.511	0.015	0.280	1.185
## 12	Polyculture	TOC	0.512	0.015	0.217	1.118

##	FTBL	variable	mean	SE	min	max
## 1	Monoculture_F	FarmBi	1.000	0.000	1.000	1.000
## 2	Monoculture_N	FarmBi	1.000	0.000	1.000	1.000
## 3	Polyculture_F	FarmBi	0.000	0.000	0.000	0.000
## 4	Polyculture_N	FarmBi	0.000	0.000	0.000	0.000
## 5	Monoculture_F	N	0.046	0.003	0.019	0.133
## 6	Monoculture_N	N	0.047	0.003	0.022	0.159
## 7	Polyculture_F	N	0.044	0.002	0.019	0.093
## 8	Polyculture_N	N	0.033	0.001	0.019	0.071
## 9	Monoculture_F	NP_ratio	0.420	0.079	0.039	3.273
## 10	Monoculture_N	NP_ratio	0.414	0.074	0.020	2.929
## 11	Polyculture_F	NP_ratio	0.144	0.014	0.045	0.666
## 12	Polyculture_N	NP_ratio	0.137	0.010	0.041	0.383
## 13	Monoculture_F	P	27.899	2.485	1.283	64.761
## 14	Monoculture_N	P	30.353	3.020	1.297	108.662
## 15	Polyculture_F	P	40.519	2.518	9.226	79.847
## 16	Polyculture_N	P	33.451	2.344	6.527	92.802
## 17	Monoculture_F	pH	7.174	0.143	4.780	8.460
## 18	Monoculture_N	pH	7.245	0.134	4.800	8.640
## 19	Polyculture_F	pH	7.392	0.105	4.560	8.260
## 20	Polyculture_N	pH	7.475	0.085	5.490	8.290
## 21	Monoculture_F	TOC	0.491	0.021	0.280	1.151
## 22	Monoculture_N	TOC	0.531	0.022	0.329	1.185
## 23	Polyculture_F	TOC	0.526	0.022	0.225	1.118
## 24	Polyculture_N	TOC	0.497	0.019	0.217	0.938

##	Block	variable	mean	SE	min	max
## 1	F	FarmBi	0.476	0.045	0.000	1.000
## 2	N	FarmBi	0.476	0.045	0.000	1.000
## 3	F	N	0.045	0.002	0.019	0.133
## 4	N	N	0.040	0.002	0.019	0.159
## 5	F	NP_ratio	0.276	0.040	0.039	3.273
## 6	N	NP_ratio	0.269	0.038	0.020	2.929
## 7	F	P	34.510	1.853	1.283	79.847
## 8	N	P	31.976	1.888	1.297	108.662
## 9	F	pH	7.288	0.088	4.560	8.460
## 10	N	pH	7.366	0.078	4.800	8.640

```
## 11      F      TOC  0.509 0.015 0.225  1.151
## 12      N      TOC  0.513 0.015 0.217  1.185
```

## Model output

```
## $pH
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
## Data: alphaDF
##
## REML criterion at convergence: -723.4
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.8633 -0.3966  0.0324  0.4570  3.5315
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.013984 0.11825
## Residual 0.002066 0.04546
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
## Estimate Std. Error df t value Pr(>|t|)
## (Intercept) 2.112e+00 2.599e-02 1.900e+01 81.243 <2e-16 ***
## FarmType1 -1.577e-02 2.599e-02 1.900e+01 -0.607 0.5513
## Block1 -5.559e-03 2.867e-03 2.290e+02 -1.939 0.0537 .
## FarmType1:Block1 5.983e-04 2.867e-03 2.290e+02 0.209 0.8349
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
## (Intr) FrmTy1 Block1
## FarmType1 0.048
## Block1 0.000 0.000
## FrmTyp1:B11 0.000 0.000 0.048
##
## $P
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
## Data: alphaDF
##
## REML criterion at convergence: 218.8
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2777 -0.4870 -0.0088  0.4972  3.5178
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.5715 0.756
```

```

## Residual          0.0930  0.305
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##               Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)    3.26525   0.16628  19.00000  19.638 4.44e-14 ***
## FarmType1     -0.20566   0.16628  19.00000  -1.237  0.23120
## Block1         0.04957   0.01923 229.00000   2.577  0.01058 *
## FarmType1:Block1 -0.06002   0.01923 229.00000  -3.121  0.00203 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1
## FarmType1    0.048
## Block1       0.000  0.000
## FrmTyp1:B11  0.000  0.000  0.048
##
## $TOC
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
## Data: alphaDF
##
## REML criterion at convergence: -622
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.1568 -0.4937 -0.0256  0.4830  2.8885
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.008292 0.09106
## Residual 0.003355 0.05792
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##               Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)    0.407242  0.020226  18.999999  20.134 2.82e-14 ***
## FarmType1      0.000103  0.020226  18.999999   0.005  0.99599
## Block1        -0.002389  0.003653 229.000000  -0.654  0.51375
## FarmType1:Block1 -0.011097  0.003653 229.000000  -3.038  0.00266 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1
## FarmType1    0.048
## Block1       0.000  0.000
## FrmTyp1:B11  0.000  0.000  0.048
##
## $N
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [

```

```

## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
## Data: alphaDF
##
## REML criterion at convergence: -1415.1
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.7105 -0.4985 -0.0760  0.3825  4.8384
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.0002236 0.01495
## Residual 0.0001416 0.01190
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)  4.165e-02  3.352e-03 1.900e+01 12.425 1.44e-10 ***
## FarmType1    3.961e-03  3.352e-03 1.900e+01  1.182 0.251854
## Block1       2.193e-03  7.505e-04 2.290e+02  2.922 0.003828 **
## FarmType1:Block1 -2.617e-03  7.505e-04 2.290e+02 -3.487 0.000586 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) FrmTy1 Block1
## FarmType1    0.048
## Block1       0.000 0.000
## FrmTyp1:B11 0.000 0.000 0.048
##
## $NP_ratio
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
## Data: alphaDF
##
## REML criterion at convergence: -453.6
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.6063 -0.3858 -0.0514  0.2507  5.2817
##
## Random effects:
## Groups Name Variance Std.Dev.
## farmCode (Intercept) 0.044918 0.21194
## Residual 0.006094 0.07807
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)  2.105e-01  4.656e-02 1.900e+01  4.522 0.000233 ***

```

```

## FarmType1      8.263e-02  4.656e-02  1.900e+01   1.775 0.091977 .
## Block1         1.069e-03  4.923e-03  2.290e+02   0.217 0.828267
## FarmType1:Block1 -8.836e-04  4.923e-03  2.290e+02  -0.179 0.857718
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##           (Intr) FrmTy1 Block1
## FarmType1  0.048
## Block1     0.000  0.000
## FrmTyp1:B11 0.000  0.000  0.048
##
## $FarmBi
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## substitute(log(i + 1) ~ FarmType * Block + (1 | farmCode), list(i = as.name(x)))
##   Data: alphaDF
##
## REML criterion at convergence: -16710.4
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -1.438 -1.438  0.000  0.000  0.000
##
## Random effects:
##   Groups   Name      Variance Std.Dev.
## farmCode (Intercept) 0.000e+00 0.000e+00
## Residual            2.922e-31 5.406e-16
## Number of obs: 252, groups: farmCode, 21
##
## Fixed effects:
##              Estimate Std. Error      df    t value Pr(>|t|)
## (Intercept)   3.466e-01  3.409e-17 1.436e-17  1.017e+16     1
## FarmType1     3.466e-01  3.409e-17 1.436e-17  1.017e+16     1
## Block1        -2.776e-18  3.409e-17 1.436e-17 -8.100e-02     1
## FarmType1:Block1 -2.776e-18  3.409e-17 1.436e-17 -8.100e-02     1
##
## Correlation of Fixed Effects:
##           (Intr) FrmTy1 Block1
## FarmType1  0.048
## Block1     0.000  0.000
## FrmTyp1:B11 0.000  0.000  0.048
## convergence code: 0
## boundary (singular) fit: see ?isSingular

```

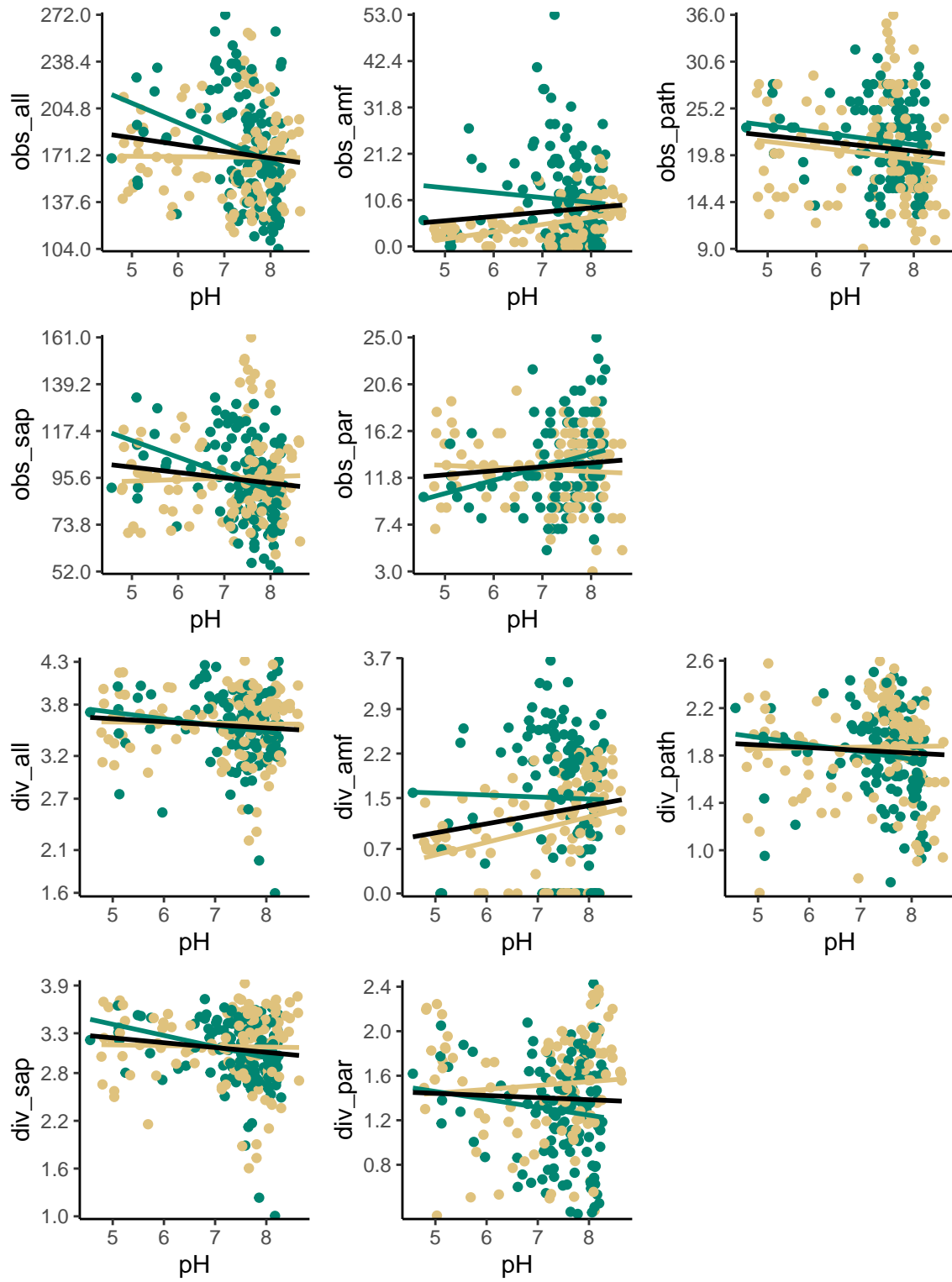
#### Levene's Test

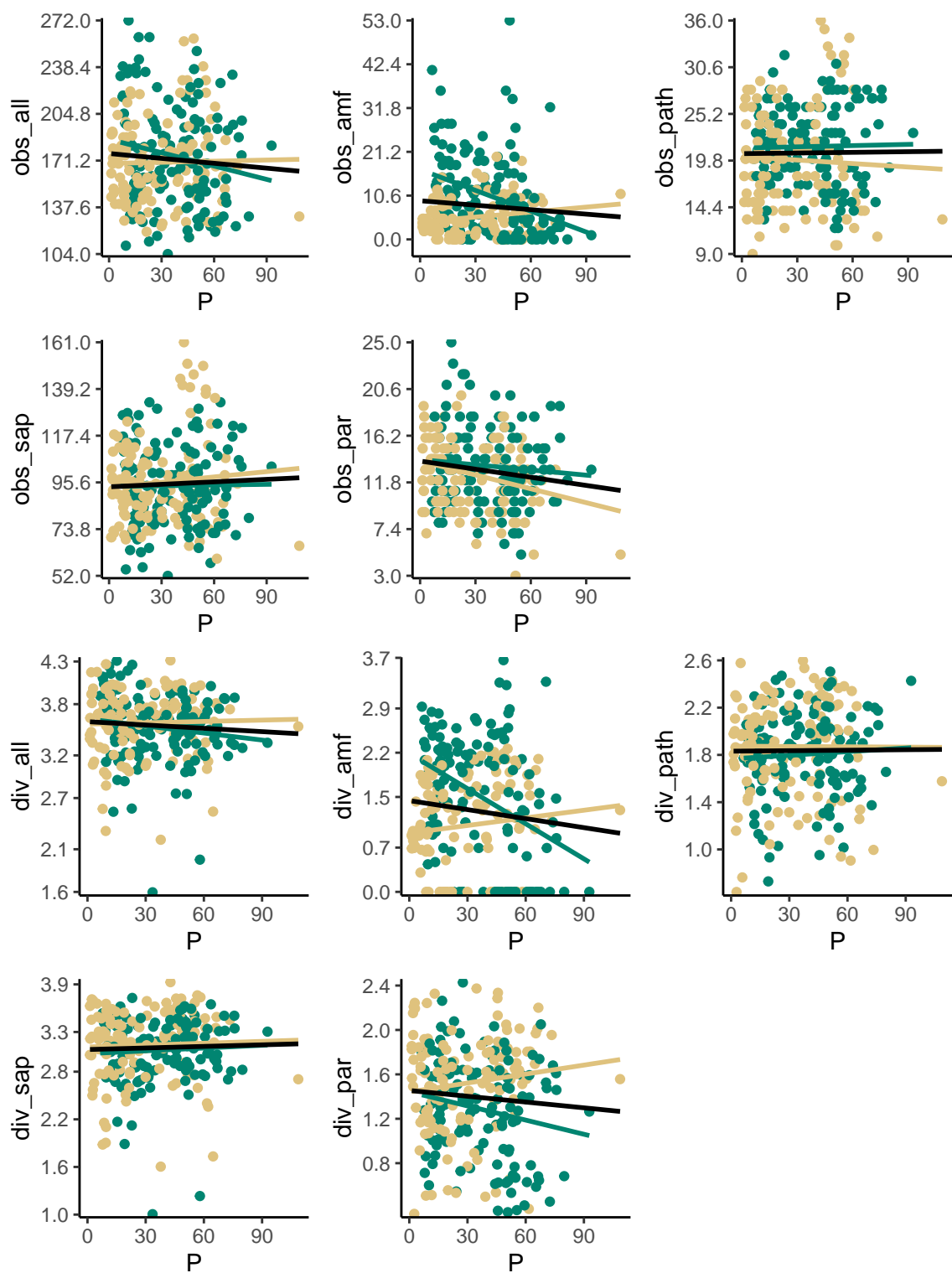
```

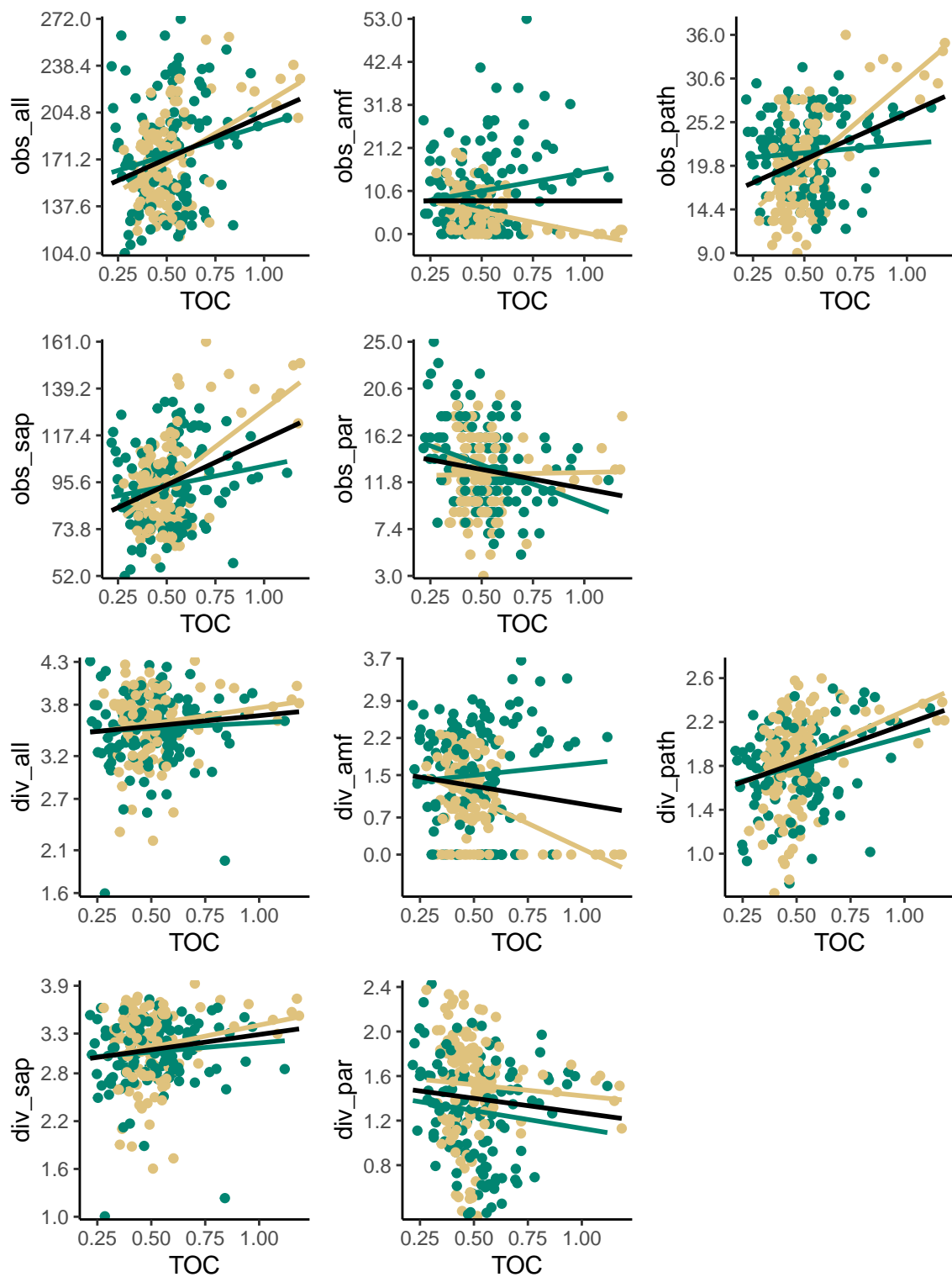
##           F value Pr(>F)
## pH          8.508  0.004
## NP_ratio    26.544  0.000
## P           0.444  0.506
## TOC         3.984  0.047
## N           0.579  0.448

```

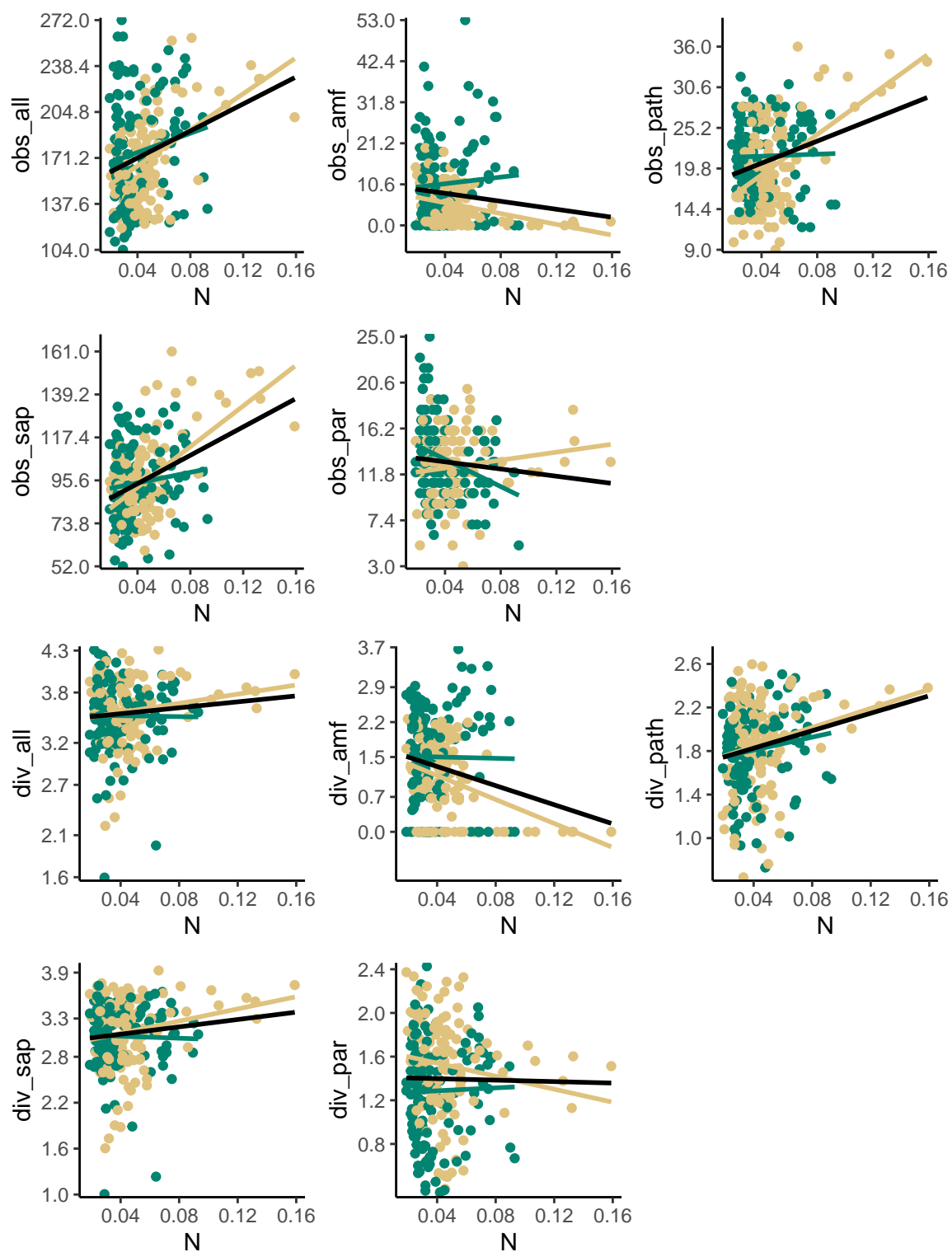
# Plots

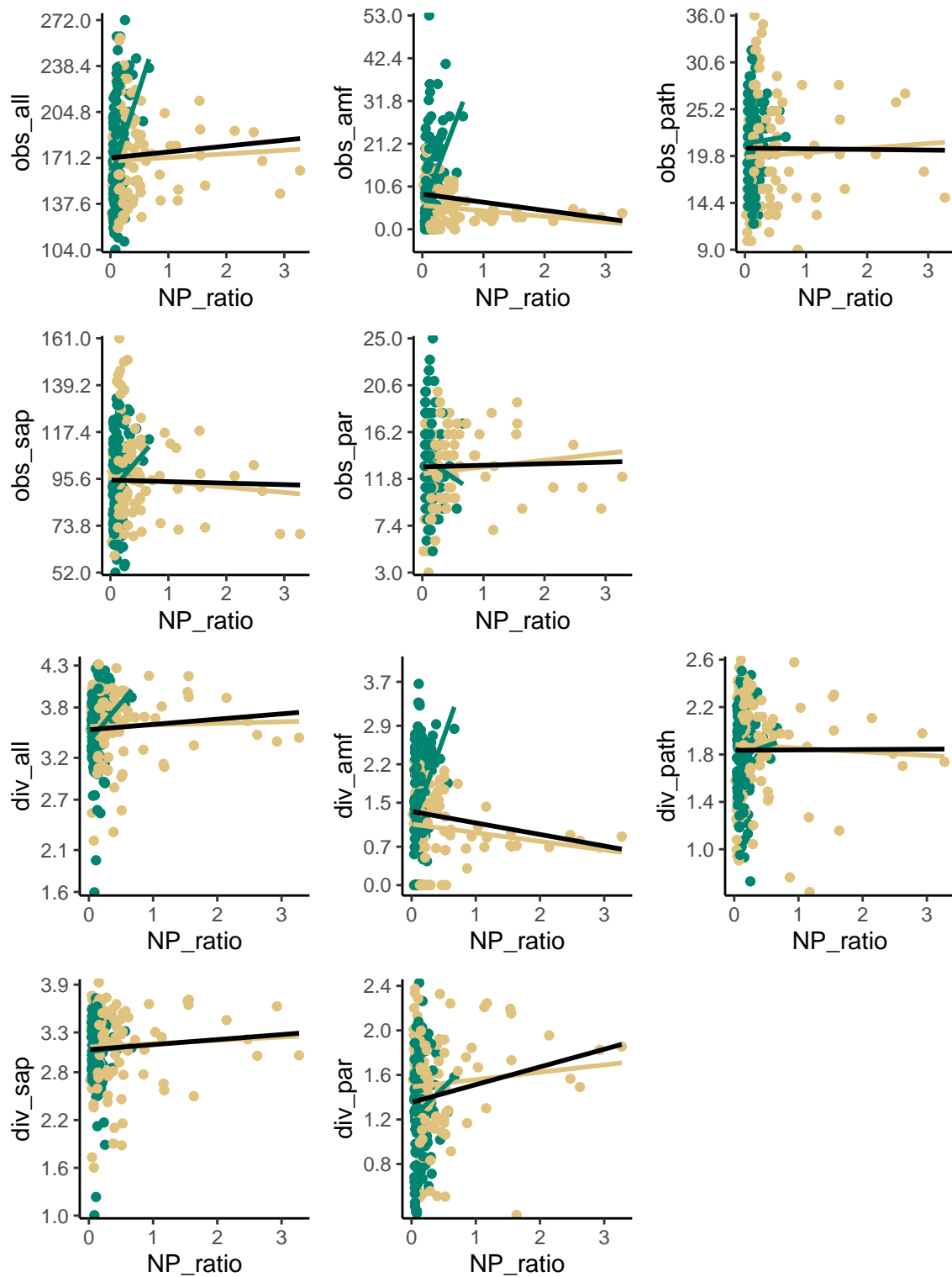












## ALL

## ACROSS

### Tables

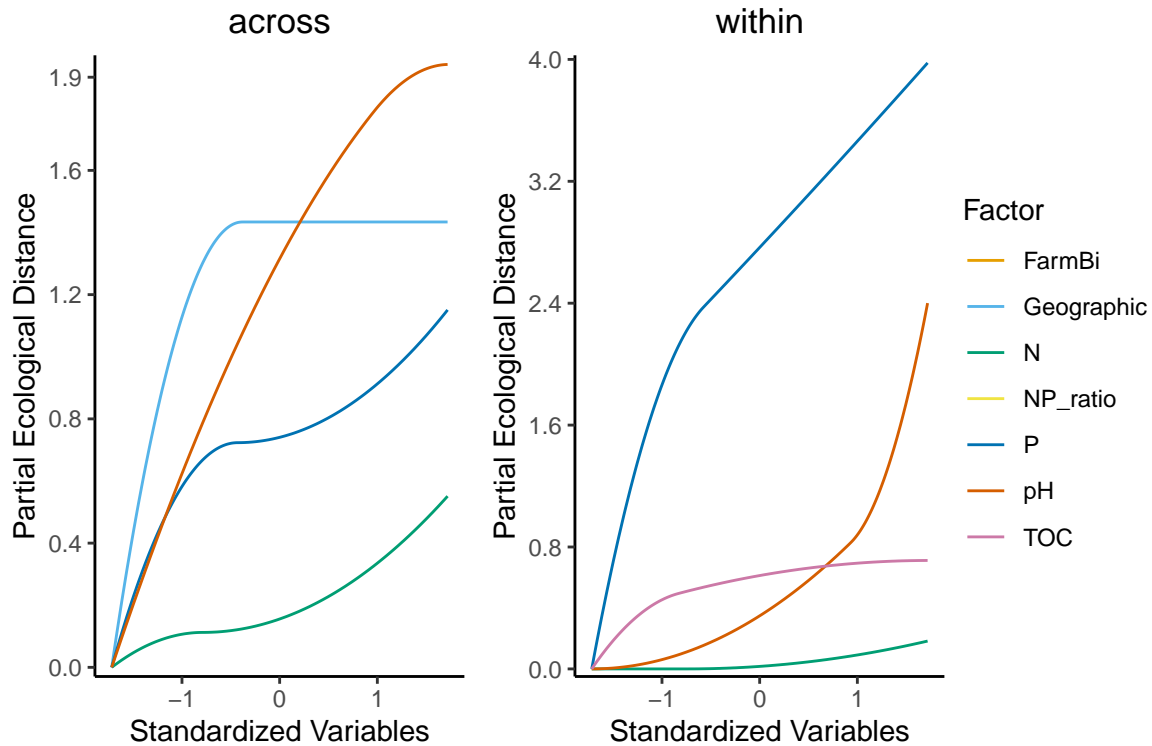
##	Predictors	Coefficients
## 1	Geographic	1.434
## 2	pH	1.941
## 3	P	1.158
## 4	N	0.557
## 5	Percent Deviance Explained	28.102
## 6	DIC	515.686

## WITHIN

### Tables

##	Predictors	Coefficients
## 1	pH	2.459
## 2	P	3.990
## 3	TOC	0.712
## 4	N	0.185
## 5	Percent Deviance Explained	19.357
## 6	DIC	90.271

### Plots



## MONO

## ACROSS

### Tables

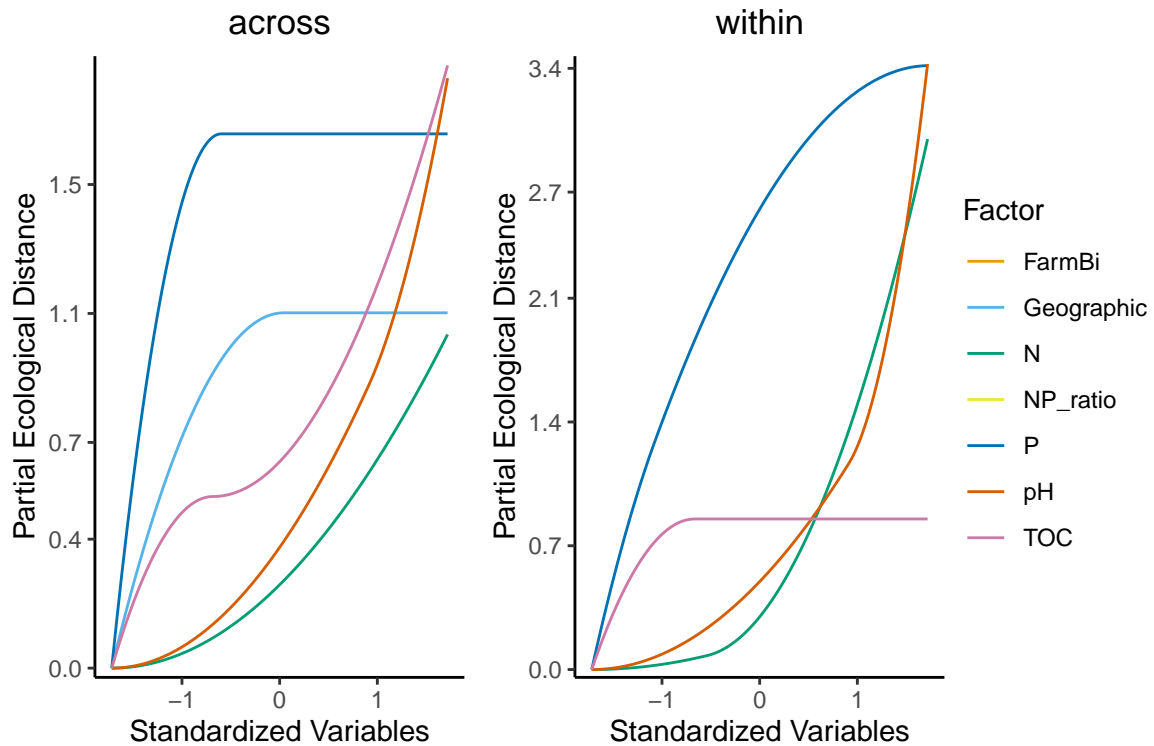
##	Predictors	Coefficients
## 1	Geographic	1.102
## 2	pH	1.859
## 3	P	1.657
## 4	TOC	1.889
## 5	N	1.045
## 6	Percent Deviance Explained	35.436
## 7	DIC	141.934

## WITHIN

### Tables

##	Predictors	Coefficients
## 1	pH	3.506
## 2	P	3.415
## 3	TOC	0.852
## 4	N	3.043
## 5	Percent Deviance Explained	27.130
## 6	DIC	42.379

### Plots



## POLY

### ACROSS

#### Tables

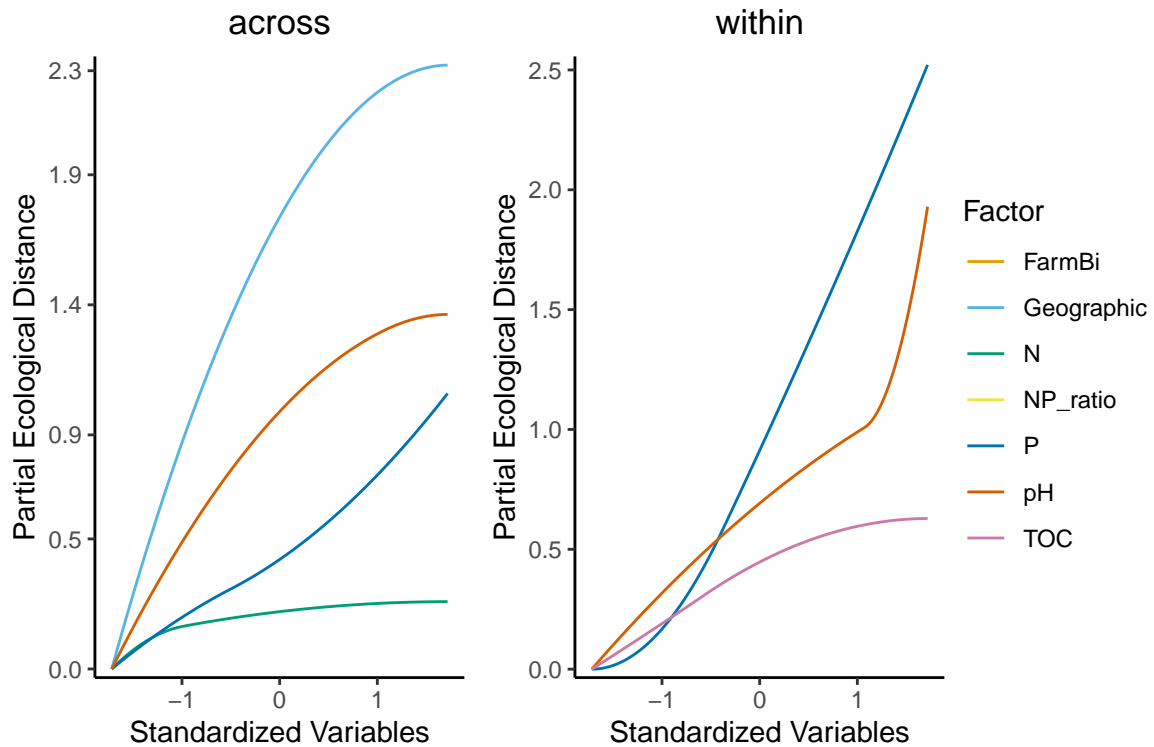
##	Predictors	Coefficients
## 1	Geographic	2.322
## 2	pH	1.363
## 3	P	1.068
## 4	N	0.259
## 5	Percent Deviance Explained	33.908
## 6	DIC	130.348

## WITHIN

#### Tables

##	Predictors	Coefficients
## 1	pH	1.975
## 2	P	2.538
## 3	TOC	0.629
## 4	Percent Deviance Explained	29.974
## 5	DIC	37.558

#### Plots



# ALL PLOTS

Plots

