**Table 1.** The categories of variables predicted to be linked to belowground diversity.

|  |  |  |
| --- | --- | --- |
| **Category** | **Variable** | **Unit** |
| Structural diversity | Standard deviation of vegetation height (VertSD) | m |
| Vegetation area index (VAI) | m2/m3 |
| Vertical complexity index (VCI) | unitless |
| Tree diversity | Tree species richness | Species number |
| AM dominance | Proportion |
| AM tree richness | Species number |
| EM tree richness | Species number |
| Stand productivity and age | Basal area increment (BAI) | m2/year |
| Stand age | Years |
| Soil properties | Soil pH | Unitless |
| C:N ratio | Unitless |
| Oxalate extractable iron (FeOx) | Percent |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **0-5 cm** | | | | **5-10 cm** | | | |
| **Bacteria** | **Total Fungi** | **AM Fungi** | **EM Fungi** | **Bacteria** | **Total Fungi** | **AM Fungi** | **EM Fungi** |
| Total tree richness | - | - | - | - | - | - | - | - |
| AM dominance | - | - | - | - | - | - | - | - |
| Stand age | - | - | - | β= 0.58  R2= 0.21  p= 0.017 | - | - | - | - |
| BAI | - | - | - | - | - | β= 0.41  R2= 0.29  p= 0.004 | - | - |
| VertSD | - | - | - | - | - | - | - | - |
| VAI | - | - | - | β= 0.41  R2= 0.19  p= 0.023 | - | - | - | - |
| VCI | - | - | - | - | - | - | - | - |
| C:N | - | - | - | - | - | - | - | - |
| pH | β= 0.62  R2= 0.37  p< 0.001 | - | β= 0.43  R2= 0.18  p= 0.029 | - | β= 0.63  R2= 0.25  p= 0.008 | β= 0.32  R2= 0.16  p= 0.042 | β= 0.61  R2= 0.19  p= 0.032 | - |
| FeOx (percent) | - | - | - | - | - | - | - | - |
| Nplots | 38 | 37 | 35 | 36 | 36 | 36 | 33 | 36 |

**Table 2.** Effects of plant community, productivity, canopy structure, and soil properties on the alpha diversity of soil microbial communities calculated with the inverse Simpson’s index. Linear coefficients (β) indicate the strength and direction of the effects of model parameters and are standardized within models to allow for comparison. Partial R2 and p values are reported only for trends significant at α= 0.05.

**Table 3.** Significant predictors of microbial community composition (beta diversity) explained by structural diversity and environmental variables in a distance-based redundancy analysis. X2 and p values are reported only for a predictor category that explains significant variation in the community composition at α= 0.05.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group** | **Variable** | **0-5 cm** | | | | **5-10 cm** | | | |
| **Bacteria** | **Total**  **Fungi** | **AMF** | **EMF** | **Bacteria** | **Total Fungi** | **AMF** | **EMF** |
| Structural diversity | Vert SD | - | - | - | Χ2: 12.2  p<0.001 | - | - | - | Χ2: 33.2  p<0.001 |
| VAI | - | - | - | Χ2: 27.4  p<0.001 | - | - | - | Χ2: 37.6  p<0.001 |
| VCI | - | Χ2: 11.2  p<0.001 | - | - | - | - | - | - |
| Tree diversity | Tree richness | - | - | - | Χ2: 49.4  p<0.001 | - | - | - | Χ2: 56.6  p<0.001 |
| AM dominance | Χ2: 12.1  p<0.001 | Χ2: 15.5  p<0.001 | - | Χ2: 29.5  p<0.001 | Χ2: 17.2  p<0.001 | Χ2: 14.7  p<0.001 | Χ2: 22.7  p<0.001 | - |
| Stand properties | BAI | - | - | - | - | - | - | - | Χ2: 89.5  p<0.001 |
| Stand age | - | - | - | Χ2: 13.5  p<0.001 | - | - | Χ2: 12.9  p<0.001 | Χ2: 24.6  p<0.001 |
| Soil properties | C:N | Χ2:7.81  p=0.005 | Χ2: 52.0  p<0.001 | Χ2: 14.6  p<0.001 | Χ2: 333  p<0.001 | Χ2: 38.9  p<0.001 | Χ2: 84.2  p<0.001 | Χ2: 76.3  p<0.001 | Χ2: 188  p<0.001 |
| pH | Χ2: 143  p<0.001 | Χ2: 9.27  p=0.002 | Χ2: 166  p<0.001 | Χ2: 214  p<0.001 | Χ2: 132  p<0.001 | Χ2: 61.3  p<0.001 | Χ2: 309  p<0.001 | Χ2: 81.6  p<0.001 |
| % Fe | - | Χ2: 9.01  p=0.028 | - | Χ2: 53.8  p<0.001 | - | Χ2: 27.2  p<0.001 | - | Χ2: 155  p<0.001 |
| Nplots | | 36 | 37 | 38 | 36 | 34 | 36 | 36 | 36 |