**Supplementary information**



Fig. S1. Phase 3 seedling mortality. No treatment has a significant effect on mortality, for statistical analysis see Table S1. Conventions follow Fig. 1.

Table S1. Type 3 sums of squares decomposition of variance for shoot biomass and plant mortality in Phase 3 of the experiment based on linear mixed models (see Methods).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Shoot biomass Phase 3 | Mortality Phase 3 | Shoot biomass Phase 2 | Shoot biomass Phase 1 |
| Terms | d.f. | F | P-value | d.f. | χ2 | P-value | d.f. | F | P-value | d.f. | F | P-value |
| Plant-Phase 3 (P3) | 1,99 | 26.79 | **<0.0001** | 1 | 0.70 | 0.4042 | - | - | - | - | - | - |
| Plant-Phase 2 (P2) | 1,99 | 4.03 | **0.0474** | 1 | 0.03 | 0.8572 | 1,105 | 86.96 | **<0.001** | - | - | - |
| Inoculation | 2,6 | 4.68 | 0.0597 | 2 | 1.28 | 0.5275 | 2,6 | 0.67 | 0.55 | 2,6 | 0.54 | 0.61 |
| P3 x P2 | 1,99 | 4.58 | **0.0349** | 1 | 0.09 | 0.7682 | - | - | - | - | - | - |
| P3 x Inoc | 2,99 | 5.89 | **0.0038** | 2 | 0.15 | 0.9291 | - | - | - | - | - | - |
| P2 x Inoc | 2,99 | 1.98 | 0.1436 | 2 | 0.72 | 0.6962 | 2,105 | 4.12 | **0.0189** | - | - | - |
| P3 x P2 x Inoc | 2,99 | 2.35 | 0.1008 | 2 | 1.38 | 0.5018 | - | - | - | - | - | - |

Table S2. Plant group level planned contrasts comparing their performance on soils conditioned by ruderal and target species, respectively, within each soil inoculation treatment. The planned contrasts were tested within the overall shoot biomass P3 model (Table S1).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Plant group | Inoculation | Estimate | SE | z-value | p-value |
| Ruderal | Arable | 0.559 | 0.278 | 2.01 | **0.0447** |
|  | Grassland | -0.061 | 0.256 | -0.25 | 0.8054 |
|  | Heathland | -0.058 | 0.166 | -0.35 | 0.7256 |
| Target | Arable | 0.053 | 0.065 | 0.81 | 0.4156 |
|  | Grassland | 0.097 | 0.072 | 1.34 | 0.1816 |
|  | Heathland | -0.064 | 0.078 | -0.81 | 0.4154 |

Table S3. Individual species PSF model using type 3 sums of squares for the overall analysis (a) and planned contrasts (b) to evaluate deviations from neutral feedback (i.e. PSF = 0).

|  |
| --- |
| a) overall model decomposition |
| Factor | d.f. | F-value | p-value |
| Plant species | 5,106 | 2.39 | **0.043** |
| Inoculation | 2,6 | 0.18 | 0.838 |
| Plant species x Inoculation | 10,106 | 1.87 | **0.058** |
| b) planned contrasts |
| Species | Inoculation | Estimate | SE | d.f. | t-value | p-value |
| *A. montana* | Arable | 0.036 | 0.403 | 104 | 0.089 | 0.929 |
|  | Grassland | -0.065 | 0.384 | 104 | -0.169 | 0.866 |
|  | Heathland | -0.321 | 0.450 | 104 | -0.713 | 0.477 |
| *C. rotundifolia* | Arable | 0.703 | 0.637 | 104 | 1.104 | 0.272 |
|  | Grassland | 1.007 | 0.736 | 104 | 1.369 | 0.174 |
|  | Heathland | -0.476 | 0.520 | 104 | -0.915 | 0.362 |
| *F. filliformis* | Arable | 0.746 | 0.403 | 104 | 1.852 | **0.067** |
|  | Grassland | 0.397 | 0.384 | 104 | 1.034 | 0.304 |
|  | Heathland | 0.023 | 0.425 | 104 | 0.053 | 0.958 |
| *C. cappilaris* | Arable | 0.519 | 0.482 | 104 | 1.077 | 0.289 |
|  | Grassland | 0.088 | 0.425 | 104 | 0.208 | 0.836 |
|  | Heathland | 0.415 | 0.384 | 104 | 1.082 | 0.282 |
| *L. perenne* | Arable | 0.317 | 0.384 | 104 | 0.826 | 0.411 |
|  | Grassland | -0.025 | 0.384 | 104 | -0.065 | 0.949 |
|  | Heathland | -0.198 | 0.384 | 104 | -0.515 | 0.608 |
| *M. arvense* | Arable | 2.188 | 0.520 | 104 | 4.206 | **<0.0001** |
|  | Grassland | -0.549 | 0.450 | 104 | -1.219 | 0.226 |
|  | Heathland | -0.941 | 0.425 | 104 | -2.216 | **0.029** |

Table S4. Type 3 sums of squares decomposition of variance for shoot biomass in Phase 3 (P3) including Phase 2 (P2) biomass as a continuous predictor.

|  |  |  |  |
| --- | --- | --- | --- |
| Terms | d.f. | F | p-value |
| Phase 2 biomass | 1,87 | 0.8610 | 0.3560 |
| P3 plant group | 1,87 | 106.0291 | **<0.0001** |
| P2 plant group | 1,87 | 0.2044 | 0.6523 |
| Soil inoculation | 2,6 | 0.0292 | 0.9714 |
| P2 biomass x P3 plant group | 1,87 | 0.0567 | 0.8124 |
| P2 biomass x P2 plant group | 1,87 | 1.3457 | 0.2492 |
| P3 plant x P2 plant | 1,87 | 0.0246 | 0.8758 |
| P2 biomass x Inoculation | 2,87 | 0.8639 | 0.4251 |
| P3 plant x Inoculation | 2,87 | 30.8547 | **0.0249** |
| P2 plant x Inoculation | 2,87 | 0.0009 | 0.9991 |
| P2 biomass x P3 plant x P2 plant | 1,87 | 1.1982 | 0.2767 |
| P2 biomass x P3 plant x Inoculation | 2,87 | 0.6965 | 0.5011 |
| P2 biomass x P2 plant x Inoculation | 2,87 | 0.6065 | 0.5476 |
| P3 plant x P2 plant x Inoculation | 2,87 | 3.3901 | **0.0382** |
| P2 biomass x P3 plant x P2 plants x Inoculation | 2,87 | 0.9889 | 0.3761 |