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**Supplementary Table S6.** Spearman correlations (coefficient) between the degree of decoupling and geographical and environmental variables (positive values indicate a tendency towards decoupled PD, negative values towards decoupled FD), calculated as average values per 50 km × 50 km grid cells for the combined diversity measures and individual trait-habitat combinations. Highly significant correlations (*** p < 0.001) are in bold, non-significant correlations (p > 0.05) are grey. For full names of the variables, see Sup. Table S4.

| | | DRY | | | | | | MESIC | | | | | | | WET | | | | | | | ALPINE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | Lateral spread | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | Lateral spread | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass |
| N | Number of cases | 299 | 529 | 389 | 389 | 245 | 245 | 516 | 558 | 540 | 540 | 502 | 502 | 38 | 351 | 499 | 472 | 472 | 293 | 293 | 148 | 23 | 90 | 51 | 51 | 38 | 38 |
| Lon | Longitude | 0.06 | -0.30 | -0.33 | -0.20 | 0.04 | -0.20 | 0.33 | 0.19 | 0.20 | 0.24 | 0.41 | 0.23 | 0.65 | 0.43 | 0.20 | 0.00 | 0.29 | 0.23 | 0.26 | 0.41 | -0.45 | -0.15 | -0.44 | -0.48 | 0.12 | 0.09 |
| Lat | Latitude | 0.11 | 0.11 | 0.21 | 0.27 | 0.03 | 0.18 | -0.48 | -0.49 | -0.43 | -0.43 | -0.37 | -0.32 | 0.48 | -0.22 | -0.03 | -0.20 | 0.11 | -0.47 | 0.16 | -0.46 | -0.42 | 0.43 | -0.54 | -0.57 | 0.03 | -0.25 |
| b1 | Ann. mean temp. | -0.32 | -0.11 | -0.15 | -0.30 | -0.17 | -0.22 | -0.35 | -0.26 | -0.15 | -0.24 | -0.45 | -0.32 | -0.67 | -0.35 | -0.10 | 0.08 | -0.40 | -0.24 | -0.48 | -0.35 | -0.19 | -0.40 | -0.18 | 0.04 | 0.01 | 0.04 |
| b2 | Mean diurnal rng | -0.14 | -0.23 | -0.41 | -0.25 | -0.06 | -0.17 | 0.54 | 0.44 | 0.39 | 0.45 | 0.51 | 0.37 | -0.31 | 0.50 | 0.32 | 0.15 | 0.29 | 0.45 | 0.23 | 0.57 | -0.33 | 0.09 | -0.58 | -0.61 | 0.07 | 0.12 |
| b3 | Isothermality | -0.11 | 0.25 | 0.15 | 0.13 | -0.04 | 0.23 | 0.08 | 0.16 | 0.12 | 0.11 | -0.05 | 0.05 | -0.46 | -0.06 | -0.01 | 0.10 | -0.13 | 0.24 | -0.15 | 0.24 | 0.46 | 0.27 | 0.30 | 0.30 | -0.08 | -0.06 |
| b4 | Temp. seasonality | 0.05 | -0.28 | -0.34 | -0.22 | 0.02 | -0.17 | 0.49 | 0.34 | 0.34 | 0.38 | 0.52 | 0.34 | 0.53 | 0.52 | 0.26 | 0.06 | 0.32 | 0.40 | 0.26 | 0.55 | -0.43 | 0.00 | -0.50 | -0.52 | 0.08 | 0.12 |
| b5 | Max temp. warmest M | -0.33 | -0.31 | -0.42 | -0.45 | -0.19 | -0.34 | 0.25 | 0.22 | 0.26 | 0.25 | 0.09 | 0.11 | -0.35 | 0.22 | 0.24 | 0.22 | 0.00 | 0.19 | -0.12 | 0.34 | -0.40 | -0.38 | -0.48 | -0.24 | 0.04 | 0.02 |
| b6 | Min temp. coldest M | -0.17 | 0.12 | 0.16 | 0.00 | -0.12 | 0.00 | -0.52 | -0.40 | -0.33 | -0.42 | -0.57 | -0.41 | -0.33 | -0.51 | -0.27 | 0.00 | -0.42 | -0.44 | -0.42 | -0.58 | 0.23 | -0.28 | 0.29 | 0.46 | -0.06 | -0.05 |
| b7 | Temp. ann. rng | 0.00 | -0.24 | -0.33 | -0.19 | 0.03 | -0.14 | 0.48 | 0.36 | 0.34 | 0.40 | 0.48 | 0.34 | -0.06 | 0.51 | 0.32 | 0.09 | 0.34 | 0.41 | 0.29 | 0.54 | -0.51 | 0.11 | -0.66 | -0.65 | 0.11 | 0.21 |
| b8 | Mean temp. wettest Q | -0.15 | -0.39 | -0.44 | -0.36 | -0.19 | -0.22 | 0.20 | 0.09 | 0.11 | 0.16 | 0.23 | 0.15 | 0.32 | 0.34 | 0.16 | 0.05 | 0.22 | 0.09 | 0.19 | 0.27 | -0.53 | -0.13 | -0.63 | -0.61 | 0.02 | 0.23 |
| b9 | Mean temp. driest Q | -0.24 | -0.01 | 0.10 | -0.06 | -0.15 | -0.13 | -0.49 | -0.34 | -0.28 | -0.37 | -0.54 | -0.36 | -0.66 | -0.50 | -0.16 | 0.00 | -0.36 | -0.45 | -0.38 | -0.54 | 0.02 | -0.40 | 0.13 | 0.31 | 0.02 | -0.17 |
| b10 | Mean temp. warmest Q | -0.32 | -0.32 | -0.38 | -0.47 | -0.19 | -0.37 | 0.09 | 0.07 | 0.16 | 0.12 | -0.04 | 0.00 | -0.61 | 0.05 | 0.12 | 0.19 | -0.14 | 0.06 | -0.26 | 0.08 | -0.39 | -0.42 | -0.28 | -0.06 | -0.03 | 0.03 |
| b11 | Mean temp. coldest Q | -0.24 | 0.09 | 0.11 | -0.05 | -0.14 | -0.06 | -0.52 | -0.39 | -0.32 | -0.39 | -0.59 | -0.41 | -0.63 | -0.51 | -0.22 | 0.03 | -0.41 | -0.41 | -0.43 | -0.55 | 0.02 | -0.35 | 0.00 | 0.19 | -0.01 | -0.02 |
| b12 | Ann. prec. | 0.41 | 0.50 | 0.55 | 0.53 | 0.27 | 0.40 | 0.21 | 0.25 | 0.22 | 0.22 | 0.09 | 0.20 | -0.52 | -0.06 | -0.08 | 0.00 | -0.06 | 0.15 | -0.05 | 0.09 | 0.11 | 0.48 | 0.19 | 0.28 | 0.04 | 0.20 |
| b13 | Prec. wettest M | 0.34 | 0.37 | 0.36 | 0.33 | 0.19 | 0.22 | 0.44 | 0.42 | 0.40 | 0.40 | 0.38 | 0.40 | 0.09 | 0.21 | -0.03 | 0.08 | 0.06 | 0.39 | 0.08 | 0.48 | 0.00 | 0.37 | 0.06 | 0.13 | -0.01 | -0.15 |
| b14 | Prec. driest M | 0.32 | 0.47 | 0.52 | 0.55 | 0.26 | 0.44 | 0.13 | 0.19 | 0.15 | 0.16 | 0.00 | 0.13 | -0.45 | -0.11 | 0.00 | 0.02 | -0.03 | 0.11 | -0.02 | 0.07 | 0.12 | 0.49 | 0.23 | 0.35 | 0.12 | 0.04 |
| b15 | Prec. seasonality | -0.12 | -0.27 | -0.33 | -0.36 | -0.13 | -0.28 | 0.23 | 0.14 | 0.18 | 0.15 | 0.36 | 0.23 | 0.59 | 0.34 | -0.04 | 0.01 | 0.13 | 0.22 | 0.15 | 0.40 | -0.17 | -0.27 | -0.39 | -0.45 | -0.13 | -0.25 |
| b16 | Prec. wettest Q | 0.34 | 0.37 | 0.37 | 0.34 | 0.19 | 0.23 | 0.44 | 0.41 | 0.40 | 0.39 | 0.38 | 0.40 | 0.08 | 0.21 | -0.03 | 0.07 | 0.06 | 0.40 | 0.10 | 0.47 | 0.03 | 0.40 | 0.02 | 0.10 | 0.00 | -0.25 |

| | | DRY | | | | | | MESIC | | | | | | | WET | | | | | | | ALPINE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | Lateral spread | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass | Lateral spread | combined | Plant height | Leaf area | Specific leaf area | Leaf nitrogen content | Seed mass |
| b17 | Prec. driest Q | 0.32 | 0.48 | 0.53 | 0.55 | 0.26 | 0.44 | 0.10 | 0.16 | 0.12 | 0.13 | -0.03 | 0.10 | -0.52 | -0.15 | -0.02 | 0.00 | -0.05 | 0.07 | -0.03 | 0.01 | 0.13 | 0.49 | 0.31 | 0.40 | 0.13 | 0.02 |
| b18 | Prec. warmest Q | 0.48 | 0.41 | 0.43 | 0.53 | 0.26 | 0.41 | 0.41 | 0.30 | 0.28 | 0.34 | 0.34 | 0.35 | -0.17 | 0.33 | 0.09 | -0.04 | 0.30 | 0.28 | 0.35 | 0.46 | -0.10 | 0.55 | -0.18 | -0.20 | 0.11 | 0.36 |
| b19 | Prec. of coldest Q | 0.21 | 0.43 | 0.46 | 0.39 | 0.16 | 0.28 | 0.02 | 0.13 | 0.10 | 0.06 | -0.11 | 0.03 | -0.56 | -0.20 | -0.11 | 0.03 | -0.16 | 0.02 | -0.16 | -0.05 | 0.13 | 0.29 | 0.30 | 0.48 | 0.07 | 0.08 |
| e1 | Ann. PET | -0.31 | -0.20 | -0.32 | -0.41 | -0.18 | -0.31 | 0.32 | 0.32 | 0.34 | 0.33 | 0.14 | 0.17 | -0.49 | 0.19 | 0.17 | 0.24 | -0.12 | 0.30 | -0.20 | 0.38 | -0.39 | -0.43 | -0.34 | -0.10 | 0.06 | -0.09 |
| e2 | Thornthwaite aridity | -0.50 | -0.41 | -0.44 | -0.53 | -0.28 | -0.44 | -0.37 | -0.30 | -0.23 | -0.29 | -0.31 | -0.33 | -0.08 | -0.23 | -0.02 | 0.02 | -0.21 | -0.20 | -0.28 | -0.33 | -0.13 | -0.56 | -0.06 | 0.11 | -0.10 | -0.26 |
| e3 | Climatic moist. ind. | 0.51 | 0.44 | 0.58 | 0.58 | 0.32 | 0.44 | 0.00 | 0.01 | -0.01 | -0.01 | 0.03 | 0.07 | 0.02 | -0.13 | -0.18 | -0.14 | 0.00 | -0.04 | 0.05 | -0.09 | 0.45 | 0.60 | 0.49 | 0.33 | -0.04 | 0.11 |
| e4 | Continentality | 0.03 | -0.27 | -0.32 | -0.22 | 0.01 | -0.18 | 0.42 | 0.26 | 0.28 | 0.33 | 0.44 | 0.29 | 0.67 | 0.48 | 0.27 | 0.04 | 0.35 | 0.31 | 0.28 | 0.55 | -0.48 | -0.06 | -0.64 | -0.57 | 0.20 | 0.18 |
| e5 | Emberger's quotient | 0.35 | 0.44 | 0.52 | 0.47 | 0.27 | 0.38 | -0.03 | 0.03 | 0.00 | -0.01 | -0.08 | 0.02 | -0.49 | -0.21 | -0.20 | -0.06 | -0.16 | -0.01 | -0.13 | -0.14 | 0.56 | 0.55 | 0.61 | 0.45 | -0.12 | 0.01 |
| e6 | Sum mean month. temps. > 0°C | -0.29 | -0.04 | -0.06 | -0.22 | -0.14 | -0.17 | -0.42 | -0.32 | -0.22 | -0.31 | -0.53 | -0.37 | -0.79 | -0.41 | -0.15 | 0.06 | -0.42 | -0.28 | -0.48 | -0.45 | -0.20 | -0.42 | -0.21 | 0.02 | 0.01 | 0.01 |
| e7 | Sum mean month. temps. > 5°C | -0.35 | -0.13 | -0.17 | -0.31 | -0.18 | -0.24 | -0.31 | -0.26 | -0.13 | -0.22 | -0.39 | -0.30 | -0.70 | -0.30 | -0.11 | 0.05 | -0.39 | -0.14 | -0.46 | -0.29 | -0.36 | -0.45 | -0.35 | -0.10 | -0.03 | 0.00 |
| e8 | Max temp. coldest M | -0.22 | 0.08 | 0.09 | -0.06 | -0.12 | -0.05 | -0.45 | -0.32 | -0.26 | -0.34 | -0.53 | -0.37 | -0.68 | -0.47 | -0.24 | 0.04 | -0.44 | -0.34 | -0.45 | -0.56 | 0.05 | -0.39 | 0.07 | 0.27 | 0.00 | -0.11 |
| e9 | Min temp. warmest M | -0.31 | -0.34 | -0.32 | -0.42 | -0.21 | -0.34 | -0.32 | -0.35 | -0.17 | -0.25 | -0.31 | -0.30 | -0.08 | -0.20 | -0.06 | 0.04 | -0.21 | -0.25 | -0.33 | -0.33 | -0.18 | -0.40 | -0.31 | -0.08 | -0.03 | 0.03 |
| e10 | No. months mean temp. > 10°C | -0.32 | -0.16 | -0.17 | -0.31 | -0.16 | -0.24 | -0.36 | -0.33 | -0.18 | -0.27 | -0.42 | -0.36 | -0.71 | -0.36 | -0.11 | 0.01 | -0.39 | -0.25 | -0.46 | -0.46 | -0.34 | -0.43 | -0.43 | -0.18 | -0.01 | 0.04 |
| e11 | Mean month. PET coldest Q | -0.19 | -0.02 | -0.09 | -0.21 | -0.09 | -0.15 | 0.10 | 0.16 | 0.16 | 0.12 | 0.01 | 0.00 | 0.16 | -0.11 | -0.12 | 0.18 | -0.30 | 0.11 | -0.34 | -0.01 | 0.22 | -0.41 | 0.24 | 0.38 | -0.08 | -0.21 |
| e12 | Mean month. PET driest Q | -0.15 | -0.03 | 0.05 | -0.10 | -0.08 | -0.10 | -0.30 | -0.17 | -0.17 | -0.24 | -0.35 | -0.23 | -0.65 | -0.38 | -0.16 | 0.01 | -0.34 | -0.24 | -0.39 | -0.37 | 0.11 | -0.37 | 0.19 | 0.36 | -0.11 | -0.22 |
| e13 | Month. variability in PET | -0.26 | -0.29 | -0.40 | -0.38 | -0.14 | -0.30 | 0.28 | 0.20 | 0.25 | 0.25 | 0.17 | 0.14 | -0.30 | 0.32 | 0.28 | 0.12 | 0.13 | 0.24 | 0.03 | 0.40 | -0.49 | -0.27 | -0.56 | -0.36 | 0.13 | 0.06 |
| e14 | Mean month. PET warmest Q | -0.29 | -0.27 | -0.36 | -0.39 | -0.14 | -0.31 | 0.32 | 0.29 | 0.30 | 0.30 | 0.17 | 0.17 | -0.40 | 0.26 | 0.24 | 0.18 | 0.01 | 0.29 | -0.07 | 0.40 | -0.49 | -0.35 | -0.54 | -0.29 | 0.05 | 0.02 |
| e15 | Mean month. PET wettest Q | -0.06 | -0.17 | -0.30 | -0.16 | -0.10 | -0.10 | 0.37 | 0.31 | 0.27 | 0.34 | 0.26 | 0.25 | -0.16 | 0.37 | 0.25 | 0.06 | 0.21 | 0.18 | 0.18 | 0.39 | -0.44 | 0.06 | -0.42 | -0.52 | 0.16 | 0.23 |
| e16 | Comp. thermicity index | -0.29 | -0.09 | -0.07 | -0.22 | -0.15 | -0.16 | -0.49 | -0.38 | -0.28 | -0.37 | -0.57 | -0.42 | -0.78 | -0.47 | -0.16 | 0.03 | -0.45 | -0.34 | -0.50 | -0.52 | -0.03 | -0.40 | -0.07 | 0.14 | 0.00 | -0.06 |
| e17 | Topographic wetness | -0.31 | -0.15 | -0.16 | -0.19 | -0.20 | -0.11 | -0.51 | -0.53 | -0.44 | -0.44 | -0.48 | -0.42 | -0.58 | -0.33 | 0.00 | -0.16 | -0.11 | -0.42 | -0.10 | -0.58 | -0.32 | -0.34 | -0.50 | -0.35 | 0.11 | 0.03 |
| e18 | Terrain roughness index | 0.30 | 0.14 | 0.17 | 0.18 | 0.10 | 0.56 | 0.55 | 0.47 | 0.47 | 0.50 | 0.44 | 0.58 | 0.02 | 0.35 | 0.18 | 0.11 | 0.46 | 0.08 | 0.60 | 0.33 | 0.32 | 0.52 | 0.38 | -0.14 | -0.01 | -0.01 |