Supplementary Information for “Parallel functional and stoichiometric trait shifts in South-American and African forest communities with elevation”

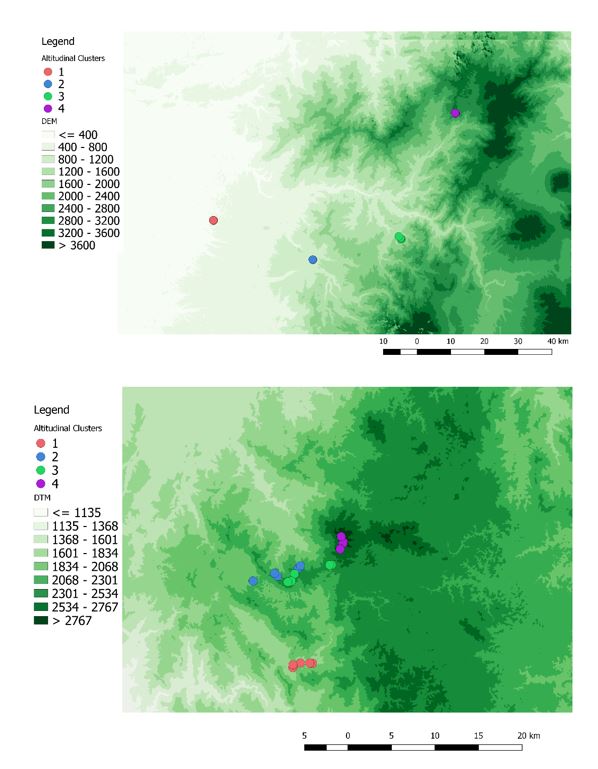


Fig. S1.

Overview map with the locations of the Ecuador transect (upper; 400-3200 masl, 4-5 plots per cluster) and the Rwanda transect (lower; 1600 - 3000 masl, 5 plots per cluster) plot locations projected on a DEM (based on the Aster GDEM product (1). For clarity different scale legends are used in both maps.

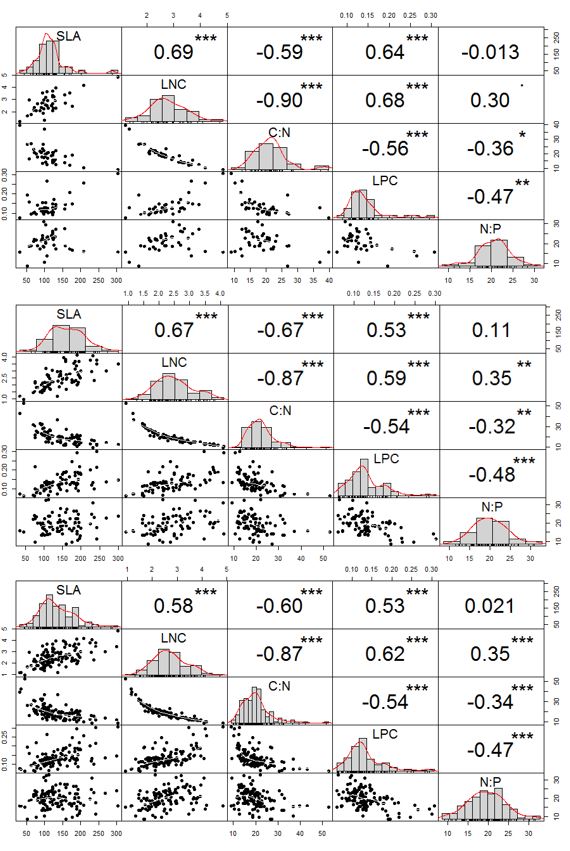


Fig. S2.

Structure and correlations of the trait data in the Rwanda (upper), Ecuador (middle) and both (lower) transects with pearson correlation statistics and their significances (p-value < 0.001 \*\*\*, < 0.01 \*\*, < 0.05\*,< 0.1 .). Diagonal shows the probability density function as fitted with fitted kernel density plots. Shown for specific leaf area (SLA), leaf nitrogen content (LNC), leaf C:N ratio, leaf phosphorus content (LPC) and leaf N:P ratio.

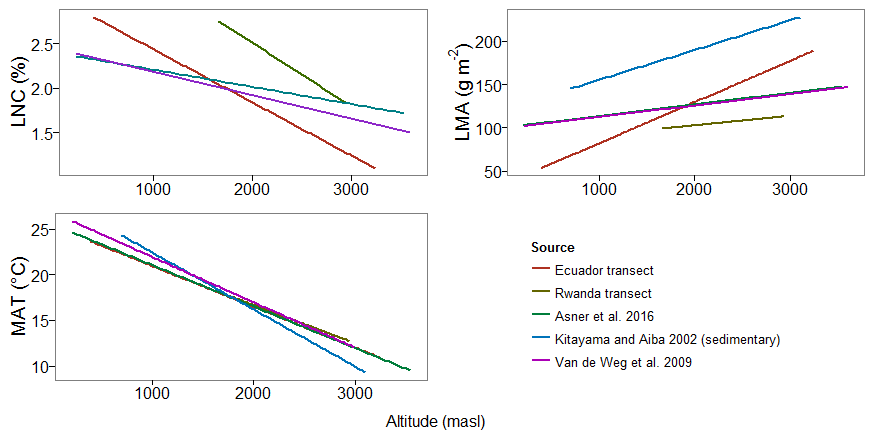


Fig. S3.

Trends in community-level leaf nitrogen content (LNC), leaf mass area (LMA) and mean annual temperature (MAT) on different transects (as described in Asner et al., 2016; Kitayama & Aiba, 2002; Van de Weg et al., 2009) compared to our transects in Ecuador and Rwanda. Figure was obtained by using reported linear regression parameters, and by applying simple linear regression lines to this study’s data.

Table S1.

Coordinates, elevation and cluster membership of the different plots on both transects

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | Ecuador | | |  |  | | Rwanda | | |
| Plot | Cluster | Latitude | | Longitude | Elevation |  | Plot | Cluster | Latitude | Longitude | Elevation |
| 1 | 1 | 00° 08' 50.58" N | | 079° 08' 37.03" W | 406 |  | 1 | 4 | 02° 26' 47.28" S | 029° 15' 09.96" E | 2879 |
| 2 | 1 | 00° 08' 45.79" N | | 079° 08' 34.45" W | 420 |  | 2 | 4 | 02° 26' 50.93" S | 029° 15' 07.55" E | 2875 |
| 3 | 1 | 00° 08' 50.31" N | | 079° 08' 31.87" W | 404 |  | 3 | 4 | 02° 26' 25.68" S | 029° 15' 00.96" E | 2937 |
| 4 | 1 | 00° 08' 50.49" N | | 079° 08' 33.30" W | 410 |  | 4 | 4 | 02° 27' 09.89" S | 029° 14' 57.36" E | 2767 |
| 5 | 1 | 00° 08' 50.27" N | | 079° 08' 35.04" W | 394 |  | 5 | 4 | 02° 27' 12.42" S | 029° 14' 57.29" E | 2761 |
| 6 | 2 | 00° 02' 10.16" N | | 078° 52' 00.04" W | 1098 |  | 6 | 2 | 02° 28' 52.79" S | 029° 11' 04.08" E | 2293 |
| 7 | 2 | 00° 02' 08.27" N | | 078° 51' 59.52" W | 1055 |  | 7 | 2 | 02° 28' 41.45" S | 029° 10' 53.51" E | 2240 |
| 8 | 2 | 00° 02' 06.95" N | | 078° 51' 59.51" W | 1077 |  | 8 | 1 | 02° 27' 33.59" S | 029° 12' 02.52" E | 1745 |
| 9 | 2 | 00° 02' 11.07" N | | 078° 52' 02.51" W | 1041 |  | 9 | 1 | 02° 34' 16.07" S | 029° 13' 14.40" E | 1835 |
| 10 | 3 | 00° 05' 36.80" N | | 078° 37' 17.64" W | 1953 |  | 10 | 1 | 02° 34' 15.35" S | 029° 13' 04.25" E | 1799 |
| 11 | 3 | 00° 05' 45.48" N | | 078° 37' 19.25" W | 1893 |  | 11 | 1 | 02° 34' 15.12" S | 029° 12' 29.88" E | 1760 |
| 12 | 3 | 00° 05' 48.54" N | | 078° 37' 22.21" W | 1873 |  | 12 | 1 | 02° 34' 21.47" S | 029° 12' 01.91" E | 1659 |
| 13 | 3 | 00° 06' 06.87" N | | 078° 37' 40.73" W | 1764 |  | 13 | 2 | 02° 28' 23.51" S | 029° 12' 21.42" E | 2141 |
| 14 | 4 | 00° 26' 58.63" N | | 078° 28' 13.58" W | 3214 |  | 14 | 2 | 02° 28' 13.91" S | 029° 12' 29.69" E | 2158 |
| 15 | 4 | 00° 26' 59.20" N | | 078° 28' 14.94" W | 3222 |  | 15 | 3 | 02° 28' 10.44" S | 029° 14' 25.68" E | 2557 |
| 16 | 4 | 00° 26' 58.11" N | | 078° 28' 12.35" W | 3191 |  | 16 | 3 | 02° 28' 11.09" S | 029° 14' 18.17" E | 2523 |
| 17 | 4 | 00° 27' 04.12" N | | 078° 28' 18.17" W | 3241 |  | 17 | 2 | 02° 29' 10.61" S | 029° 09' 33.90" E | 2167 |
|  |  |  | |  |  |  | 18 | 3 | 02° 28' 43.97" S | 029° 12' 07.85" E | 2456 |
|  |  |  | |  |  |  | 19 | 3 | 02° 29' 10.61" S | 029° 11' 55.74" E | 2500 |
|  |  |  | |  |  |  | 20 | 3 | 02° 29' 14.16" S | 029° 11' 42.83" E | 2522 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transect** | **Plot** | **Altitude** | **SLA (cm2 g-1)** | **LNC (%)** | **LPC (%)** | **C:N** | **C:P** | **N:P** | **δ15N (‰)** | **Percentage of BA sampled** |
| Ecuador | 1 | 404 | 149.74 ± 66.55 | 2.61 ± 0.48 | 0.13 ± 0.03 | 17.43 ± 2.88 | 359.7 ± 65.25 | 20.89 ± 3.06 | 2.7 ± 1.5 | 77% |
| Ecuador | 2 | 420 | 136.43 ± 42.31 | 3.02 ± 0.83 | 0.15 ± 0.05 | 15.45 ± 3.95 | 320.39 ± 107.88 | 21.06 ± 2.52 | 3.24 ± 1.4 | 73% |
| Ecuador | 3 | 404 | 148.83 ± 54.33 | 2.62 ± 0.57 | 0.13 ± 0.03 | 17.69 ± 3.11 | 356.46 ± 76.83 | 20.62 ± 3.72 | 2.66 ± 0.79 | 83% |
| Ecuador | 4 | 410 | 146.62 ± 57.34 | 2.61 ± 0.59 | 0.13 ± 0.03 | 17.64 ± 3.26 | 364.41 ± 76.66 | 20.92 ± 3.03 | 2.74 ± 0.96 | 66% |
| Ecuador | 5 | 394 | 146.04 ± 68.13 | 2.57 ± 0.58 | 0.12 ± 0.03 | 17.73 ± 3.15 | 371.72 ± 67.92 | 21.32 ± 3.26 | 2.54 ± 0.86 | 61% |
| Ecuador | 6 | 1098 | 142.58 ± 35.07 | 2.31 ± 0.52 | 0.14 ± 0.04 | 20.6 ± 4.23 | 369.76 ± 137.5 | 18.57 ± 6.64 | -0.25 ± 1.4 | 30% |
| Ecuador | 7 | 1055 | 164.48 ± 46.3 | 2.68 ± 0.7 | 0.15 ± 0.06 | 17.68 ± 4.64 | 320.68 ± 120.44 | 18.52 ± 5.2 | 1.12 ± 1.87 | 55% |
| Ecuador | 8 | 1077 | 162.65 ± 34.15 | 2.73 ± 0.57 | 0.15 ± 0.03 | 17.22 ± 3.61 | 304.51 ± 55.54 | 18.12 ± 2.35 | 1.5 ± 1.09 | 55% |
| Ecuador | 9 | 1041 | 135.56 ± 45.96 | 2.15 ± 0.54 | 0.14 ± 0.05 | 20.36 ± 3.17 | 332.95 ± 72.91 | 16.41 ± 2.91 | 0.77 ± 1.67 | 44% |
| Ecuador | 10 | 1953 | 115.76 ± 25.38 | 2.08 ± 0.43 | 0.13 ± 0.01 | 22.48 ± 5.34 | 341.55 ± 43.48 | 15.78 ± 2.54 | 0.22 ± 0.81 | 64% |
| Ecuador | 11 | 1893 | 123.92 ± 26.67 | 1.98 ± 0.57 | 0.12 ± 0.03 | 23.74 ± 7.24 | 365.68 ± 95 | 16.02 ± 2.5 | -0.04 ± 1.1 | 83% |
| Ecuador | 12 | 1873 | 113.68 ± 29.9 | 2.28 ± 0.38 | 0.15 ± 0.04 | 20.51 ± 3.75 | 323.25 ± 80.78 | 16.44 ± 4.47 | 0.18 ± 0.73 | 76% |
| Ecuador | 13 | 1764 | 113.57 ± 18.51 | 1.99 ± 0.38 | 0.13 ± 0.01 | 23.28 ± 4.46 | 360.03 ± 37.76 | 15.67 ± 2.39 | 0.12 ± 0.52 | 72% |
| Ecuador | 14 | 3214 | 47.95 ± 26.12 | 0.97 ± 0.36 | 0.06 ± 0.01 | 50.96 ± 13.85 | 772.64 ± 115.72 | 15.56 ± 3.55 | -5.07 ± 1.94 | 85% |
| Ecuador | 15 | 3222 | 49.29 ± 24.14 | 1.02 ± 0.47 | 0.06 ± 0.01 | 49.43 ± 15.54 | 756.2 ± 138.32 | 15.86 ± 3.99 | -4.83 ± 2.3 | 95% |
| Ecuador | 16 | 3191 | 46.88 ± 18.44 | 0.98 ± 0.43 | 0.06 ± 0.01 | 51.07 ± 14.52 | 770.36 ± 141.15 | 15.46 ± 3.23 | -5.05 ± 2.32 | 91% |
| Ecuador | 17 | 3241 | 59.27 ± 30.31 | 1.16 ± 0.38 | 0.07 ± 0.01 | 44.08 ± 14.2 | 697.04 ± 151.06 | 16.47 ± 2.8 | -4.23 ± 1.84 | 95% |

Table S2a.

Summary of the plot-level (mean and standard deviation) leaf nitrogen content (LNC), leaf phosphorus content (LPC), specific leaf area (SLA), and leaf C:N, C:P, N:P and δ15N, along with the total percentage of the basal area (BA) sampled per plot of the Ecuador transect.

Table S2b.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transect** | **Plot** | **Altitude** | **SLA (cm2 g-1)** | **LNC (%)** | **LPC (%)** | **CN** | **CP** | **NP** | **δ15N (‰)** | **Percentage of BA sampled** |  |
| Rwanda | **1** | 2879 | 42.04 ± 28.52 | 1.53 ± 0.94 | 0.09 ± 0.04 | 34.58 ± 13.74 | 564.61 ± 171.59 | 16.81 ± 2.85 | -0.12 ± 1.46 | 90% |  |
| Rwanda | **2** | 2875 | 45.83 ± 23.33 | 1.83 ± 1.03 | 0.1 ± 0.05 | 30.78 ± 14.2 | 508.9 ± 191.33 | 17.16 ± 2.3 | 0.52 ± 1.89 | 95% |  |
| Rwanda | **3** | 2937 | 35.53 ± 26.65 | 1.33 ± 1.09 | 0.08 ± 0.05 | 37.72 ± 15.34 | 598.75 ± 202.9 | 16.09 ± 2.42 | -0.2 ± 1.6 | 99% |  |
| Rwanda | **4** | 2767 | 60.76 ± 31.92 | 2.09 ± 0.93 | 0.11 ± 0.04 | 27.67 ± 11.72 | 483.82 ± 147.81 | 19.26 ± 5.05 | 0.8 ± 1.73 | 91% |  |
| Rwanda | **5** | 2761 | 60.19 ± 32.62 | 2.09 ± 0.98 | 0.11 ± 0.04 | 27.95 ± 12.02 | 488.41 ± 149.64 | 19.55 ± 5.66 | 0.68 ± 1.59 | 97% |  |
| Rwanda | **6** | 2293 | 99.03 ± 21.26 | 2.54 ± 0.49 | 0.12 ± 0.03 | 19.85 ± 3.8 | 398.62 ± 86.35 | 21.01 ± 3.94 | 3.2 ± 1.85 | 86% |  |
| Rwanda | **7** | 2240 | 112.49 ± 25.8 | 2.49 ± 0.53 | 0.13 ± 0.02 | 20.88 ± 4.5 | 380.75 ± 78.3 | 19.57 ± 3.17 | 4.07 ± 1.9 | 94% |  |
| Rwanda | **8** | 1745 | 110.11 ± 25.21 | 2.59 ± 0.66 | 0.13 ± 0.02 | 20.59 ± 4.03 | 385.18 ± 73.06 | 20.44 ± 3.37 | 3.52 ± 1.94 | 99% |  |
| Rwanda | **9** | 1835 | 106.3 ± 32.8 | 2.68 ± 0.74 | 0.13 ± 0.04 | 19.81 ± 4.91 | 384.09 ± 96.91 | 20.83 ± 3.7 | 3.8 ± 1.83 | 97% |  |
| Rwanda | **10** | 1799 | 106.11 ± 30.81 | 2.62 ± 0.72 | 0.13 ± 0.05 | 20.19 ± 5.37 | 388.53 ± 115.94 | 20.4 ± 5.11 | 4.23 ± 1.98 | 92% |  |
| Rwanda | **11** | 1760 | 111.25 ± 21.64 | 2.6 ± 0.63 | 0.12 ± 0.02 | 20.4 ± 4.39 | 388.3 ± 62.55 | 20.89 ± 3.51 | 3.97 ± 1.48 | 100% |  |
| Rwanda | **12** | 1659 | 104.19 ± 39.07 | 2.39 ± 0.71 | 0.12 ± 0.04 | 21.88 ± 4.92 | 404.88 ± 97.93 | 19.63 ± 3.97 | 3.51 ± 2.27 | 100% |  |
| Rwanda | **13** | 2141 | 102.67 ± 21.38 | 2.61 ± 0.56 | 0.12 ± 0.03 | 19.39 ± 4.36 | 413.08 ± 102.42 | 22.01 ± 4.45 | 4.01 ± 1.99 | 97% |  |
| Rwanda | **14** | 2158 | 105.99 ± 22.76 | 2.55 ± 0.39 | 0.11 ± 0.02 | 20.85 ± 3.29 | 439.03 ± 66.3 | 23.06 ± 3.52 | 3.31 ± 1.42 | 100% |  |
| Rwanda | **15** | 2557 | 98.84 ± 24.87 | 2.5 ± 0.73 | 0.11 ± 0.02 | 22.43 ± 4.52 | 433.44 ± 65.02 | 22.89 ± 6.92 | 1.01 ± 0.88 | 99% |  |
| Rwanda | **16** | 2523 | 100.12 ± 27.99 | 2.38 ± 0.73 | 0.11 ± 0.02 | 23.16 ± 5.33 | 440.96 ± 61.48 | 22.02 ± 6.44 | 0.94 ± 0.8 | 100% |  |
| Rwanda | **17** | 2167 | 89.7 ± 30.72 | 2.18 ± 0.63 | 0.11 ± 0.03 | 24.28 ± 7.86 | 448.71 ± 101.96 | 19.45 ± 2.82 | 1.93 ± 1.83 | 97% |  |
| Rwanda | **18** | 2456 | 94.81 ± 32.58 | 2.04 ± 0.46 | 0.11 ± 0.02 | 25.36 ± 5.17 | 452.75 ± 75.93 | 19.01 ± 2.84 | 0.94 ± 0.9 | 99% |  |
| Rwanda | **19** | 2500 | 89.29 ± 32.47 | 2.24 ± 0.43 | 0.12 ± 0.02 | 21.6 ± 3.85 | 386.74 ± 73.89 | 18.15 ± 1.34 | 0.98 ± 1.27 | 93% |  |
| Rwanda | **20** | 2522 | 86.38 ± 23.57 | 2.2 ± 0.55 | 0.12 ± 0.03 | 23.02 ± 5.39 | 410.66 ± 91.2 | 18.45 ± 0.81 | 1.36 ± 1.13 | 98% |  |

Summary of the plot-level (mean and standard deviation) leaf nitrogen content (LNC), leaf phosphorus content (LPC), specific leaf area (SLA) and leaf C:N, C:P, N:P and δ15N, along with the total percentage of the basal area (BA) sampled per plot of the Rwanda transect.

Literature cited Supplementary Information

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