

# Effect of wind and soil conditions on inter- and intraspecific leaf trait variation of broadleaf trees in the cloud forest: a case study from Taiwan

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## Introduction

- Knowing the community-level trait-environment relations is crucial for understanding how plants respond to and survive in the environment.
- However, the trait-environment relations are less concerned than the physiology of plants in cloud forests.
- Intraspecific trait variation (ITV) is known to have an impact on the community-level trait-environment relations.

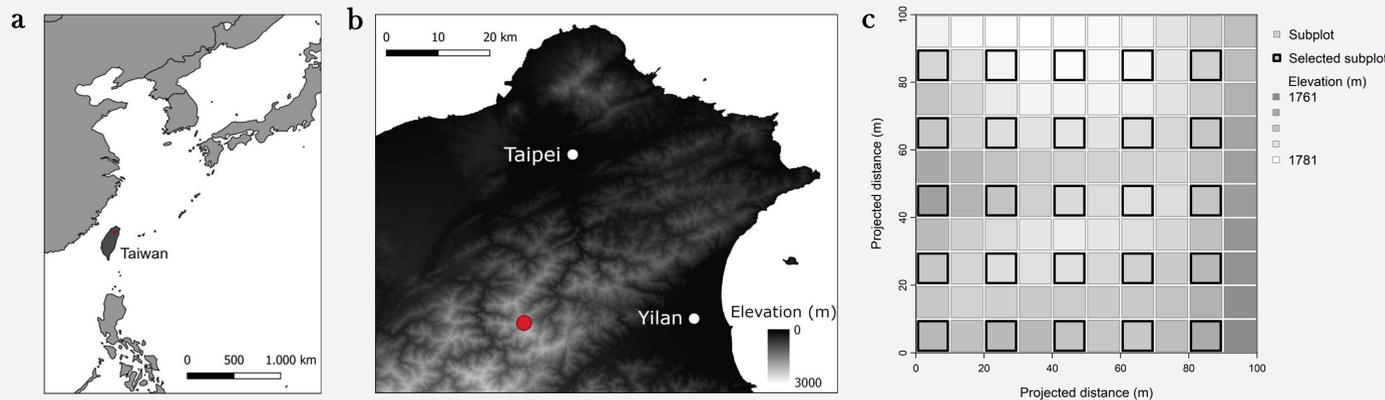


## Study aims

By studying a 1-ha cloud forest plot, we aim to answer the following questions:

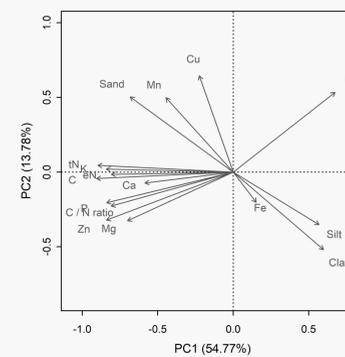
- When comparing leaf trait variation on inter- and intraspecific levels, which trait-environment relations are the most important?
- What is the relative importance of inter- and intraspecific trait variation in these trait-environment relations?

## Materials & Methods

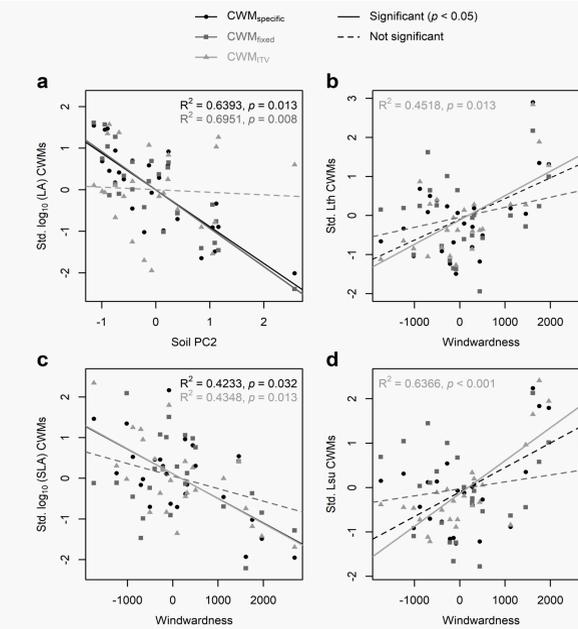


**Figure 1.** The one-hectare Lalashan forest dynamics plot (LFDP, shown as red dot) is located on the mountain ridge (1761-1781 m.a.s.l.) of northern Taiwan (a & b). Our study was performed within 25 selected 10 m × 10 m subplots (c, shown in black squares).

## Results



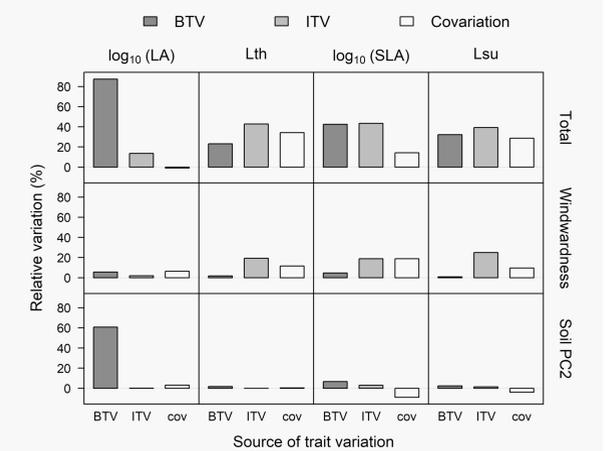
**Figure 2.** Ordination diagram of PCA of soil parameters in LFDP. tN: total N; eN: extractable N.



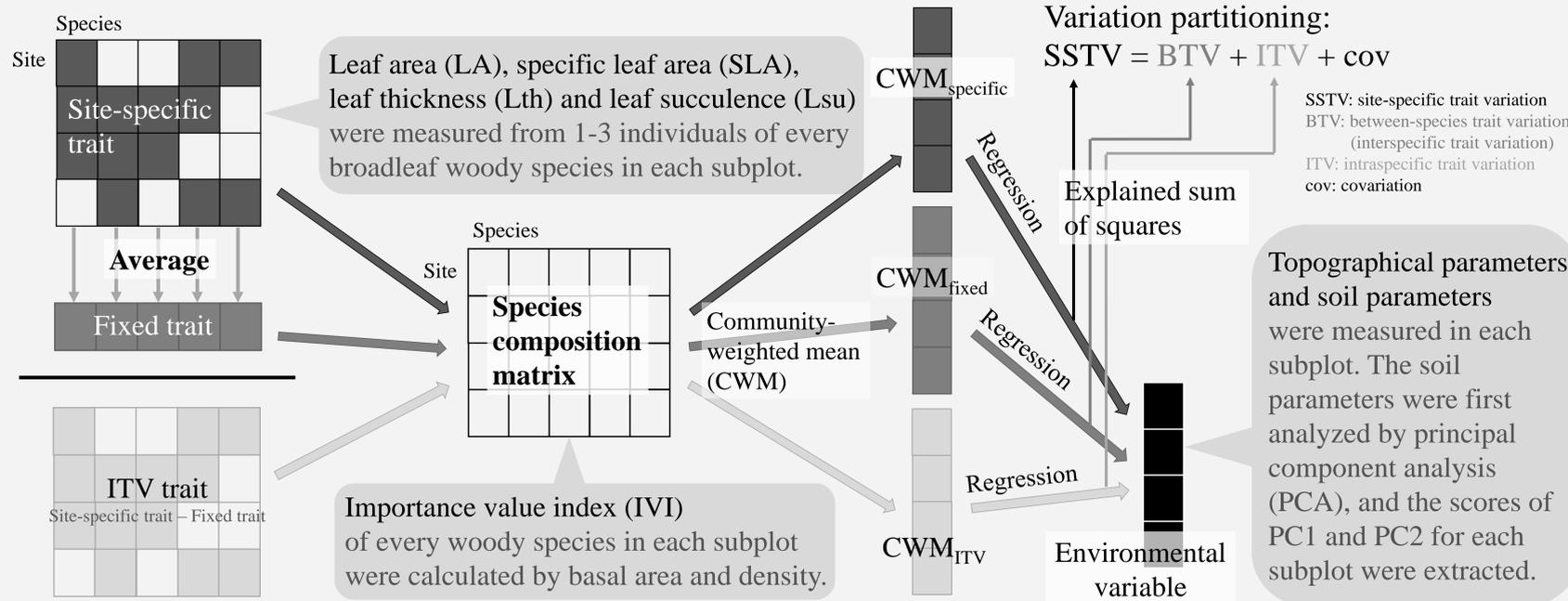
**Figure 3.** Major trait-environment relations in LFDP. The  $R^2$  and  $p$ -value of the significant regressions of  $CWM_{specific}$ ,  $CWM_{fixed}$  and  $CWM_{ITV}$  to the environmental variables are shown in the corresponding grey scale.

## Acknowledgement:

We thank to numerous volunteers who helped us with forest survey, trait collection and trait measurement.



**Figure 4.** Main results of variation partitioning of each trait-environment relations in LFDP. The windwardness is a topographical parameter indicating the intensity of chronic wind's impact.



## Conclusions

- The intraspecific change of several leaf traits to windwardness indicates the acclimation of individuals to the chronic wind.
- The interspecific shift of LA along the soil PC2 indicates the niche preference of small-leaved species.
- ITV is more important than BTV in certain trait-environment relations, indicating the necessity of incorporating ITV when seeking for the trait-environment relations.