# Subtropical forest vegetation along elevation gradient in Taiwan: Lalashan transect

## Source of data

Zelený, Li, Shen, Chen et al. (data collected within Vegetation Ecology Lab, NTU)

## Description of the dataset

Dataset of 18 vegetation plots (20 m x 20 m) sampled along vertical elevation transect in the submontane and montane forest vegetation of Taiwan. In each plot, all woody species with DBH > 1 cm and taller than 2 m were recorded and their DBH measured. This information was used to calculate the importance value index (IVI, percentage scale) of each species in each plot (combining species relative basal area and relative density). Environmental variables related to topography, soil, light, decomposition rate and microclimate were measured and recorded. A set of leaf and wood traits have been sampled for most of the woody species recorded in the dataset (measurement was done on three leaves per individual, and for each species, we collected at least three individuals in localities along the transect).

## Locality

Lalashan elevation transect, composed of six elevation zones (labelled as L1, L2, ... L6, ordered from high to low elevation; each zone 250 m wide). In each zone, three vegetation plots have been sampled (one on the leeward side of the mountain, one on the ridge and another on the windward side; the plot ID reflects this location by code L, R and W, respectively, attached after the code of elevation zone; e.g. L2W means that the plot was sampled in the L2 elevation zone - the second-highest, and on the windward site of the mountain).

## Environmental variables

| Name of variable | Description |
|---|---|
| Plot_ID | plot number |
| Elevation_zone | zone at which plots were sampled (850, 1100, 1350, 1600, 1850, 2100 m asl) |
| Lat | latitude (DD.DDDD) |
| Long | longitude (DD.DDDD) |
| Elevation | elevation (m asl) |
| Aspect | aspect (°) |
| Aspect_folded | aspect folded along NE-SW axis (°) |
| Heatload | heatload calculated from aspect and slope using the formula by Keon & McCune (200?) |
| MAT | mean annual temperature (°C) measured by loggers located in the plots |
| mean_coldest | mean temperature of the coldest month (°C) measured by loggers located in the plots |
| mean_warmest | mean temperature of the warmest month (°C) measured by loggers located in the plots |
| wet_events | relative proportion of wet events (with relative humidity > 98%) |
| dry_events | relative proportion of dry events (with relative humidity < 75%) |
| frosty_days | number of frosty days (with temperature < 2°C) |
| Slope | slope of the plot (°) |

| Name of variable | Description |
|---|---|
| Soil_depth | soil depth (measured by 30 cm long rod in 12 places of plot and averaged) |
| pH_H2O | soil pH, measured in water solution |
| pH_KCl | soil pH, measured in solution of KCl |
| Ca | concentration of Ca in soil (mg/kg) |
| Cu | concentration of Cu in soil (mg/kg) |
| Fe | concentration of Fe in soil (mg/kg) |
| K | concentration of K in soil (mg/kg) |
| Mg | concentration of Mg in soil (mg/kg) |
| Mn | concentration of Mnin soil (mg/kg) |
| P | concentration of P in soil (mg/kg) |
| Zn | concentration of Zn in soil (mg/kg) |
| CN_ratio | ration of total carbon and total nitrogen in the soil |
| Total_N | concentration of total nitrogen in the soil (%) |
| Total_C | concentration of total carbon in the soil (%) |
| S | stabilization index of decomposition (measured by teabag decomposition method) |
| k | decomposition rate (measured by teabag decomposition method) |
| % Cnpy Open | canopy openness (measured by fisheye photography) |
| % Site Open | site openness (measured by fisheye photography) |
| Trans Dir | amount of direct light passing through canopy |
| Trans Dif | amount of diffuse light passing through canopy |
| Trans Tot | total amount of light passing through canopy |
| % Trans Dir | amount of direct light passing through canopy |
| % Trans Dif | amount of diffuse light passing through canopy |
| % Trans Tot | total amount of light passing through canopy |
| fog_freq | ground fog frequency |

## Species traits

| Name of variable | Description |
|---|---|
| sp_abb | species abbreviation |
| LA | leaf area |
| LDMC | leaf dry matter content |
| SLA | specific leaf area |
| SSD | specific stem density (also woody density) |
| SPAD | chlorophyll content in leaf measured by SPAD |
| Lth | leaf thickness |
| Succ | succulence |
| VD | vein density |
| Drop_up | leaf water repellency (upper leaf surface) |
| Drop_below | leaf water repellency (below leaf surface) |
| d15N | N isotope concentration in the leafs |
| d13C | C isotope concentration in the leafs |
| N_mass | N concentration in the leaf |
| C_mass | C concentration in the leaf |
| CN | CN ratio in the leaf |

## Data for download

| File name | File type | Description |
|---|---|---|
| lalashan.xlsx | Excel file | Contains species × sample matrix, environmental variables, explanation of species abbreviations and metadata |
| lalashan.RData | r object file | An R object, a list of three components, `spe`, `env` and `traits` |

```
load (url
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/lalashan.RData
'))
```

The `lalashan` object which will be loaded into the working space is a list with three components:

- `spe` Compositional matrix of all woody species and their calculated IVI (sample x species, importance value index, values converted into percentage scale 0-100%)
- `env` Matrix of environmental variables (sample x env)
- `traits` Matrix of species traits (species x traits); note that there are some missing values for some of the traits

## References

You can find more details here: https://www.davidzeleny.net/veglab/doku.php?id=cloud_wind:elev_transect

From:
https://anadat-r.davidzeleny.net/ - **Analysis of community ecology data in R**

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Last update: **2026/08/16 15:36**