

Introduction

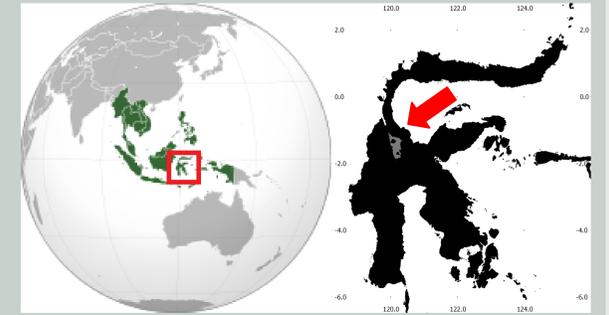
- Tropical rain forests are well-known for their enormous plant diversity, and, in addition to **high on-site diversity**, tropical mountain rain forests show **high species-turnover along elevational gradients**.
- In contrast to other relatively well-studied parts of South-East Asia, Sulawesi, the largest island of the biodiversity-hotspot Wallacea is **one of the botanically least explored areas in the region**¹.
- Our study is the first one focusing on **diversity patterns of all life-forms of terrestrial vascular plants along an elevational transect in Sulawesi**.

Methods and Study Area

We studied patterns of species diversity of vascular plants along an elevational transect in old-growth moist tropical forests in Lore Lindu National Park of Central Sulawesi, Indonesia.

We assessed diversity conducting plot-based inventories at three sites representing different elevational zones:

- sub-montane (850 m a.s.l.)
- lower montane (1450 m a.s.l.)
- upper montane (2350 m a.s.l.)

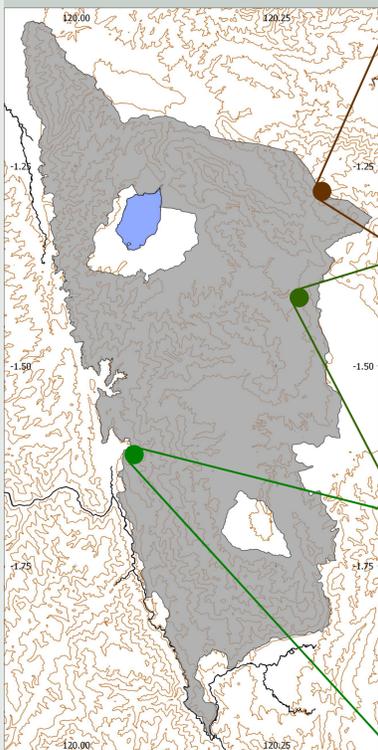


Trees (dbh ≥ 10 cm) were inventoried on 0.24 ha sized rectangular plots. In addition we set up 24 evenly distributed subplots of 10 m² for saplings (dbh 2-9.99 cm) and 4 m² for other life forms (tree seedlings and saplings, herbaceous and woody climbers, terrestrial herbs and ferns).

For each tree, basic measurements were recorded and specimens for species identification collected.

Results

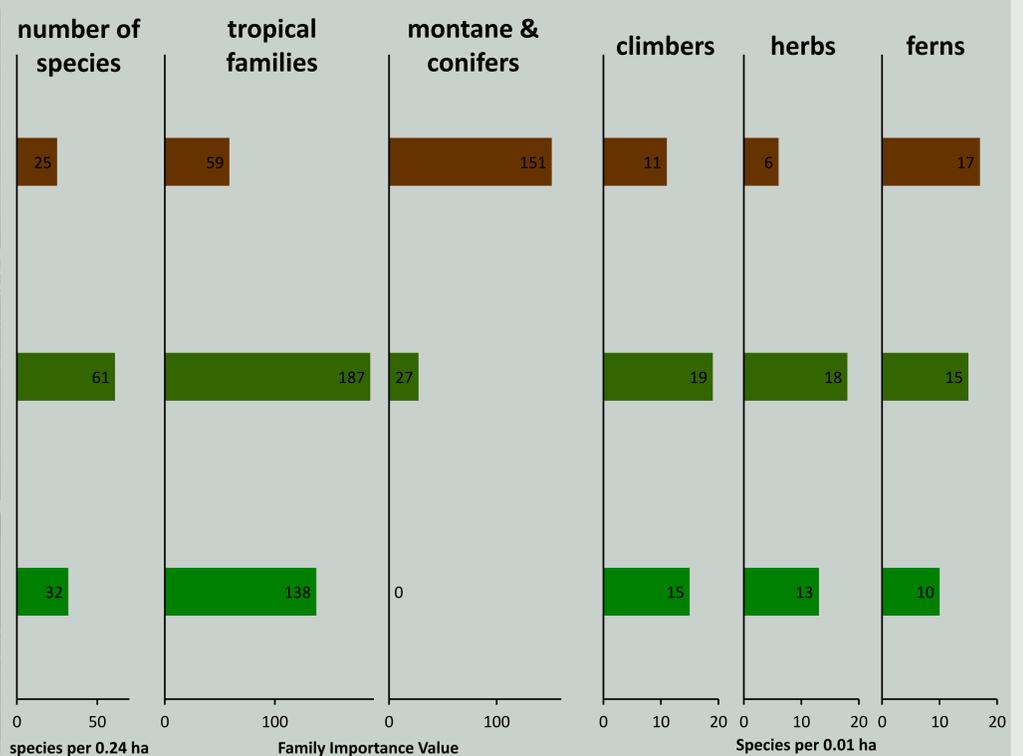
Lore Lindu NP



Plots



Trees



Tree species diversity at the upper and lower limits was **relatively low (25 and 32 spp. respectively)** compared to previously inventoried sites in the study area^{2,3}.

61 tree species at 1450 m a.s.l. are an **unusual high value** for this elevation in Sulawesi².

The **species set was clearly distinct** between the three elevations, only 7 (6% of total) being shared by two plots.



Two **species are probably new to science** and 35 (32%) had not yet been recorded in (Central) Sulawesi⁴ in spite of botanical research during recent years in the area^{2,3}.

The ten families with highest Family Importance Value (FIV)⁵ per plot

Rank	sub-montane 850 m		lower montane 1450 m		upper montane 2350 m	
	Family	FIV	Family	FIV	Family	FIV
1	Fagaceae	75,47	Icacinaceae	35,89	Podocarpaceae	102,02
2	Lauraceae	42,79	Elaeocarpaceae	25,93	Myrtaceae	38,78
3	Ixonanthaceae	22,60	Myrtaceae	23,29	Fagaceae	27,50
4	Burseraceae	19,96	Lauraceae	21,65	Elaeocarpaceae	17,90
5	Cannabaceae	19,95	Moraceae	21,50	Paracryphiaceae	17,21
6	Peraceae	15,83	Magnoliaceae	18,64	Pentaphragaceae	16,67
7	Moraceae	14,89	Fagaceae	14,16	Trimeniaceae	12,86
8	Myrtaceae	13,62	Sapotaceae	10,67	Lauraceae	11,54
9	Gnetaceae	13,13	Rutaceae	10,64	Rutaceae	8,48
10	Sapotaceae	10,45	Proteaceae	9,98	Rosaceae	6,38

At sub- and lower montane elevations **tropical families** are strongly represented, but these drop sharply in the upper-montane belt, where they are replaced by **Conifers and other montane taxa**.

Fagaceae, Myrtaceae, and Lauraceae are the only families that are important components of the tree flora at all three altitudes, Fagaceae being dominant at 850 m a.s.l.

The species richness and lack of dominant families may indicate the proximity of a **floristic ecotone around 1450 m a.s.l.**⁶.

Herb- and fern-diversity was low in our study compared to others in Lore Lindu National Park, possibly owing to smaller plot sizes^{7,8}.

Key findings

- Central Sulawesi's mountain forests remain **insufficiently known** while being threatened by human activities.
- Dominance patterns change most notably between the lower montane and upper montane belts.**
- Fagaceae, Lauraceae, and Myrtaceae are important at all altitudes.**

References

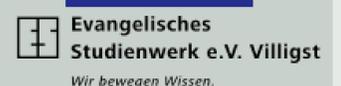
- ¹ Cannon et al. 2007. *Biotropica* 39:747-759
- ² Culmsee & Pitopang 2009. *Blumea* 54:119-123
- ³ Culmsee et al. 2011. *Biodivers. Conserv.* 20:1103-1123
- ⁴ Keßler et al. 2002. *Blumea Supplement* 14
- ⁵ Mori et al. 1983. *Biotropica* 15(1):68-70
- ⁶ Ashton 2003. *Persp. Pl. Ecol. Evol. Syst.* 6(1/2): 87-104
- ⁷ Ciccuzza et al. 2010.
- ⁸ Willinhöfer et al. 2011. *Pl. Ecol.* 213(3): 407-418

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