

Drought tolerance of dominant tree species in mixed deciduous forests of Myanmar

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1. Introduction

Mixed deciduous forests in Myanmar are extensive natural teak-bearing forests increasingly threatened by excessive logging, land-use change and climatic stress. Restoration efforts commonly rely on a limited number of commercially important tree species, potentially reducing functional diversity and resilience. Broadening the range of promising dominant tree species for restoration is important, particularly under seasonal water limitation and increasing drought stress associated with climate change.

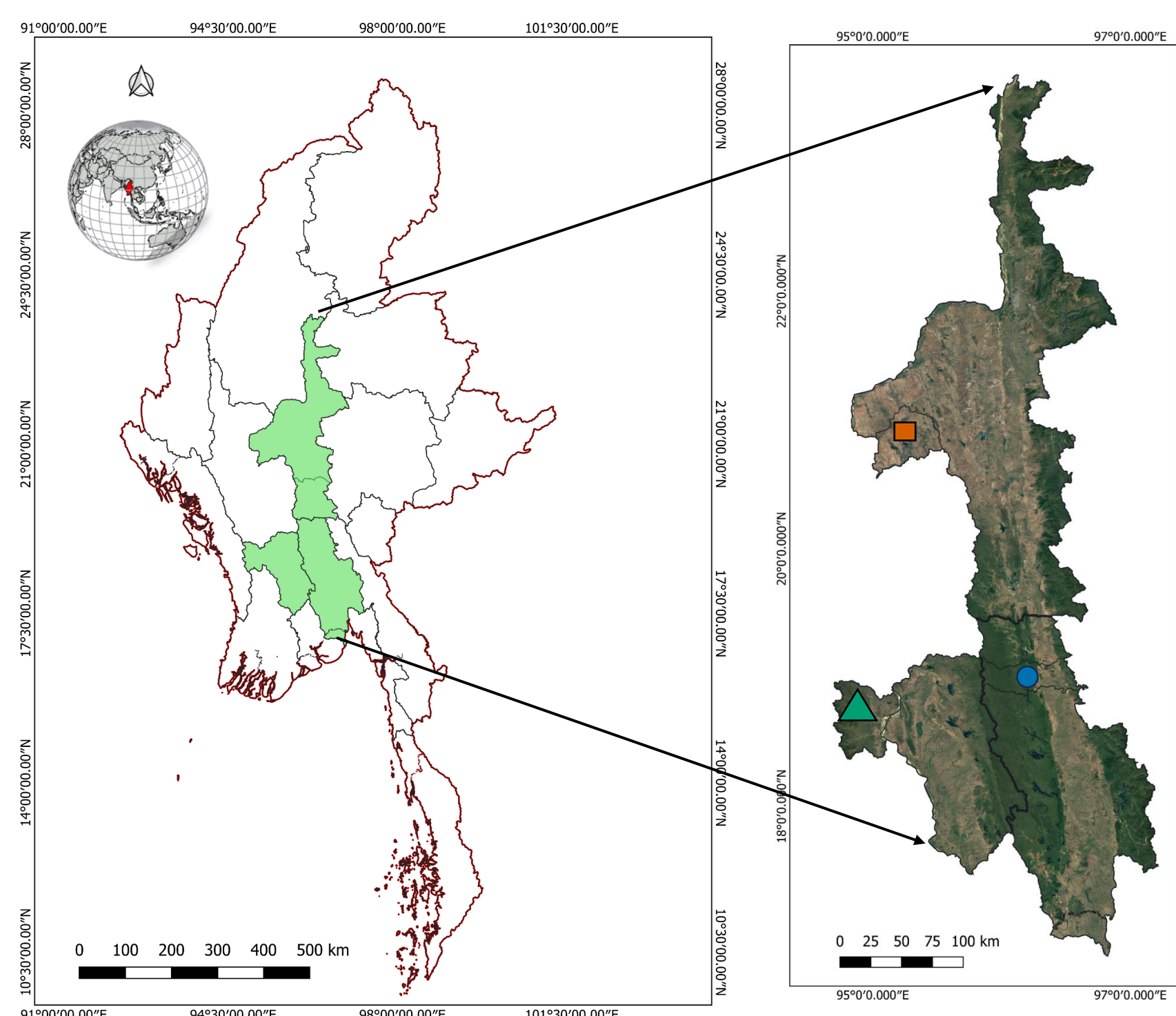
2. Objectives

- To assess physiological drought responses of dominant tree species within the three mixed deciduous forest types.
- To compare physiological drought responses of dominant tree species shared across the mixed deciduous forest types.

3. Study Area

Three different types of mixed deciduous forests were studied in Bago and Mandalay regions of Myanmar.

- Moist Upper Mixed Deciduous Forest (MUMD)
- Dry Upper Mixed Deciduous Forest (DUMD)
- ▲ Lower Mixed Deciduous Forest (LMD)



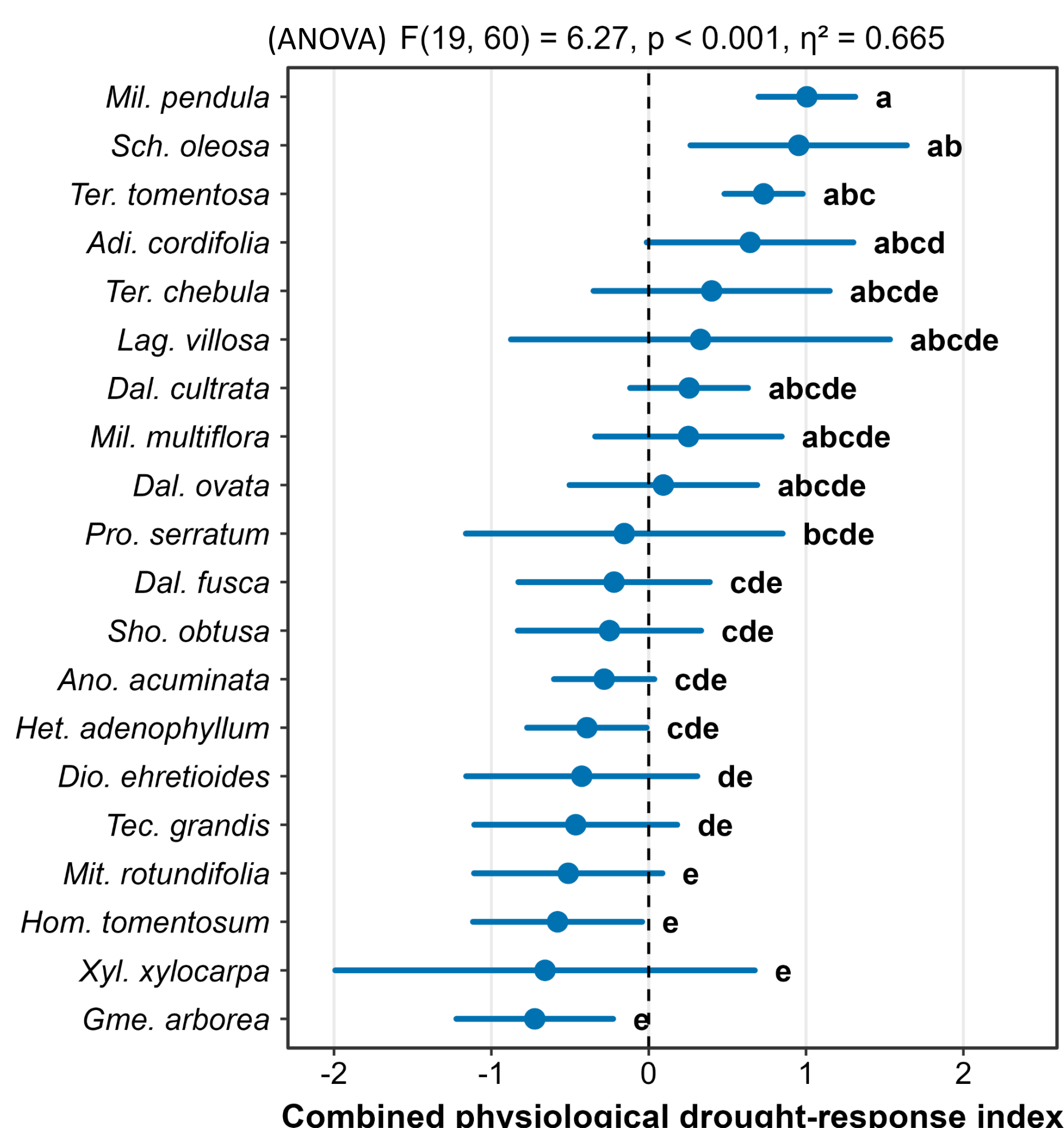
4. Methodology

- Forest inventory:** 1 ha in each forest type.
- Species selection:** 20 dominant tree species from each forest type
- Sapwood sampling:** Four individual trees per species
- Sapwood Osmotic Potential (OP):** by freezing-point osmometry following Kreeb (1990)
- Stable isotopes:** sapwood $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ by isotope-ratio mass spectrometry (IRMS).
- Drought-response index:**
$$\frac{-z(\text{OP}) + z(\delta^{13}\text{C})}{2}$$
- $\delta^{15}\text{N}$ was analyzed separately as a complementary indicator of nitrogen acquisition patterns

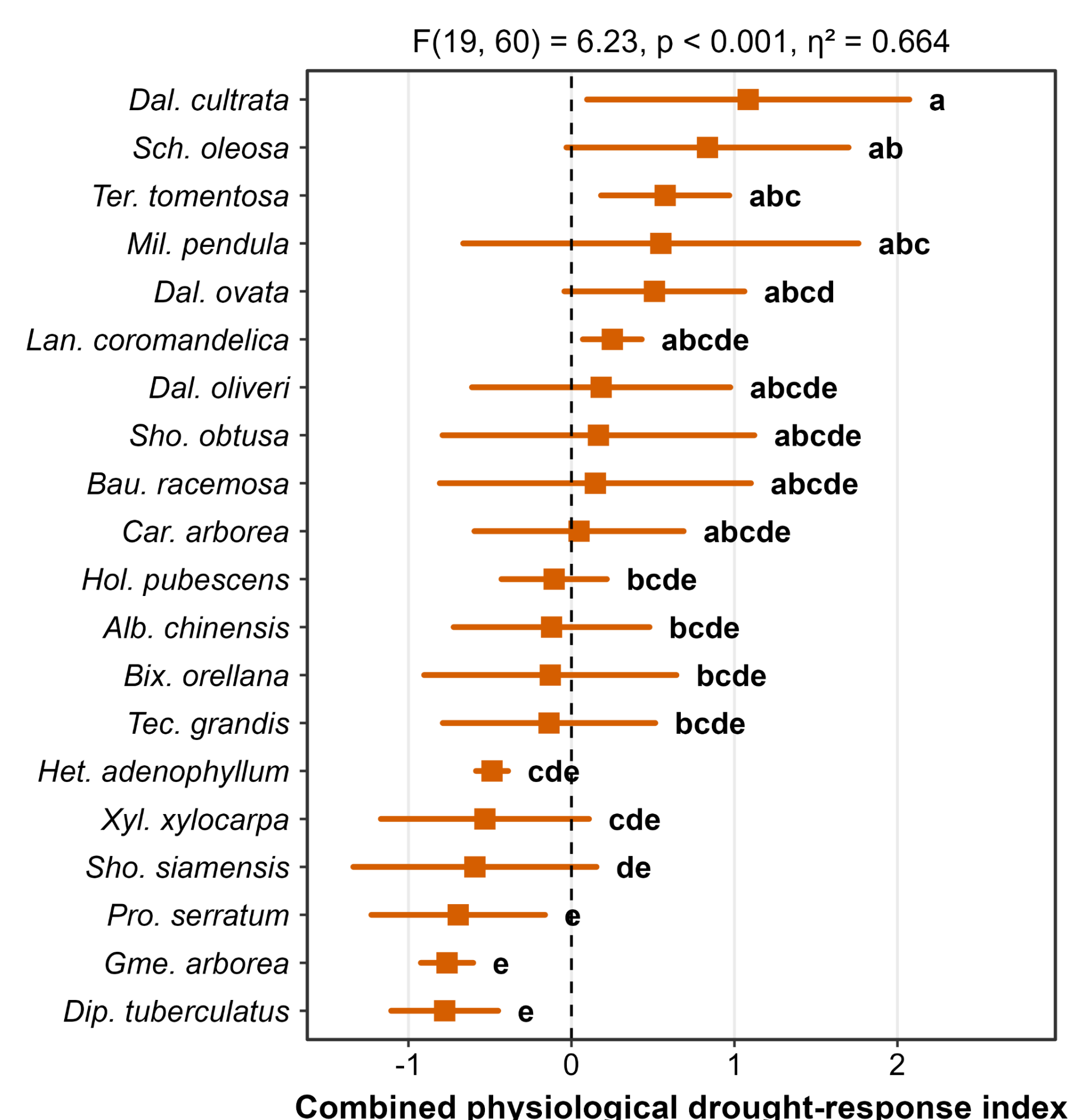
5. Results

5.1 Within-forest Comparison

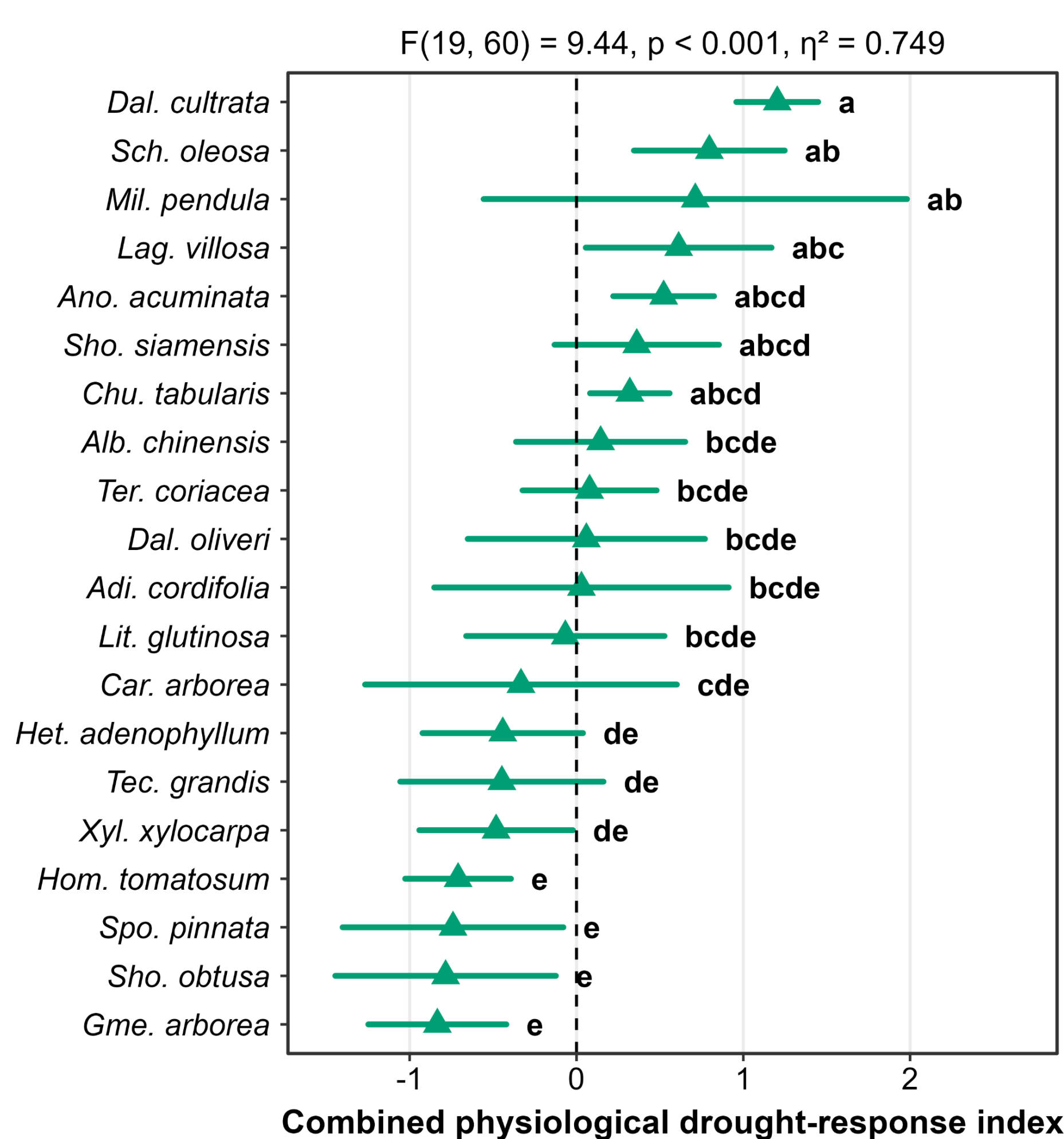
Moist Upper Mixed Deciduous Forest (MUMD)



Dry Upper Mixed Deciduous Forest (DUMD)



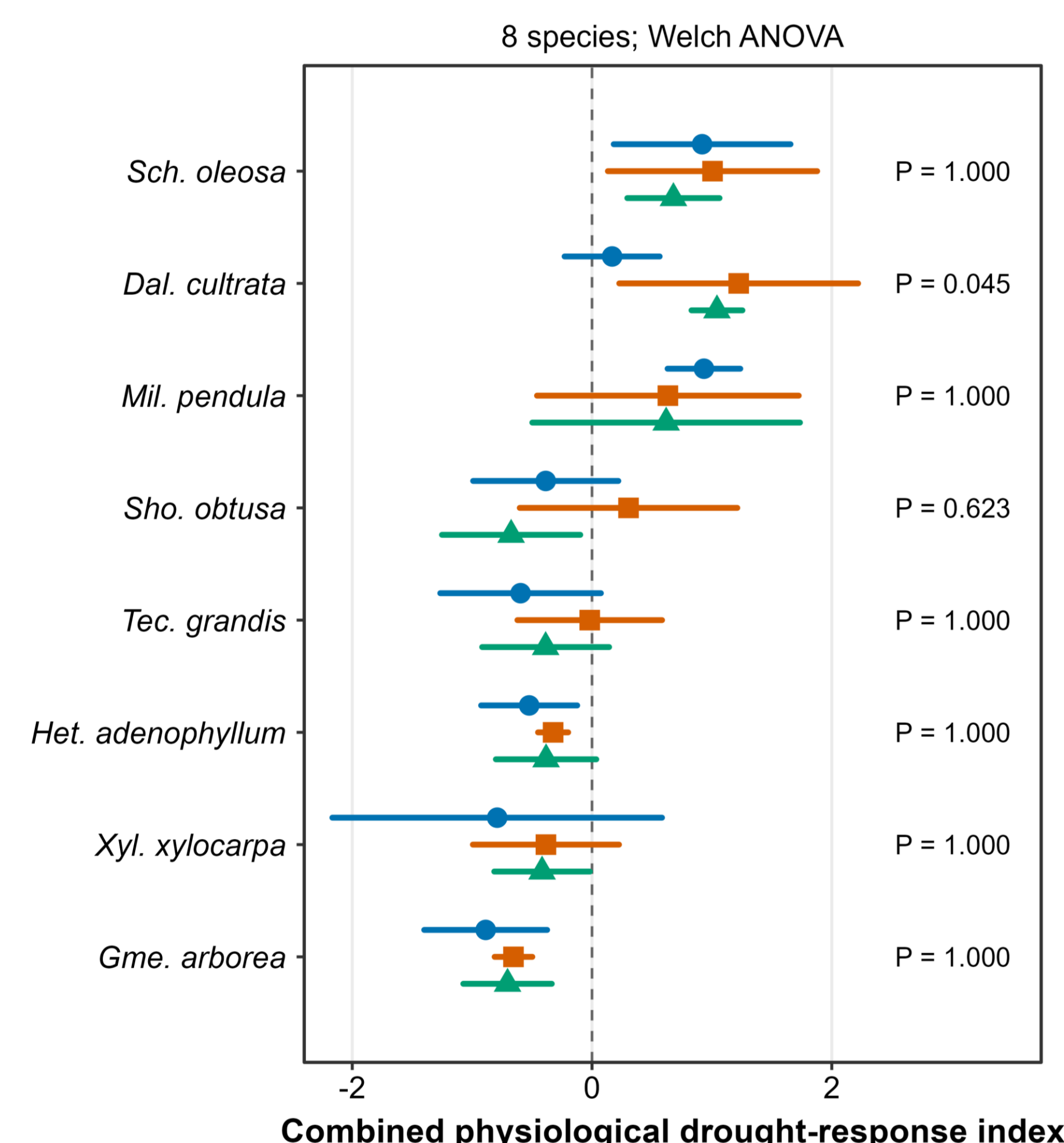
Lower Mixed Deciduous Forest (LMD)



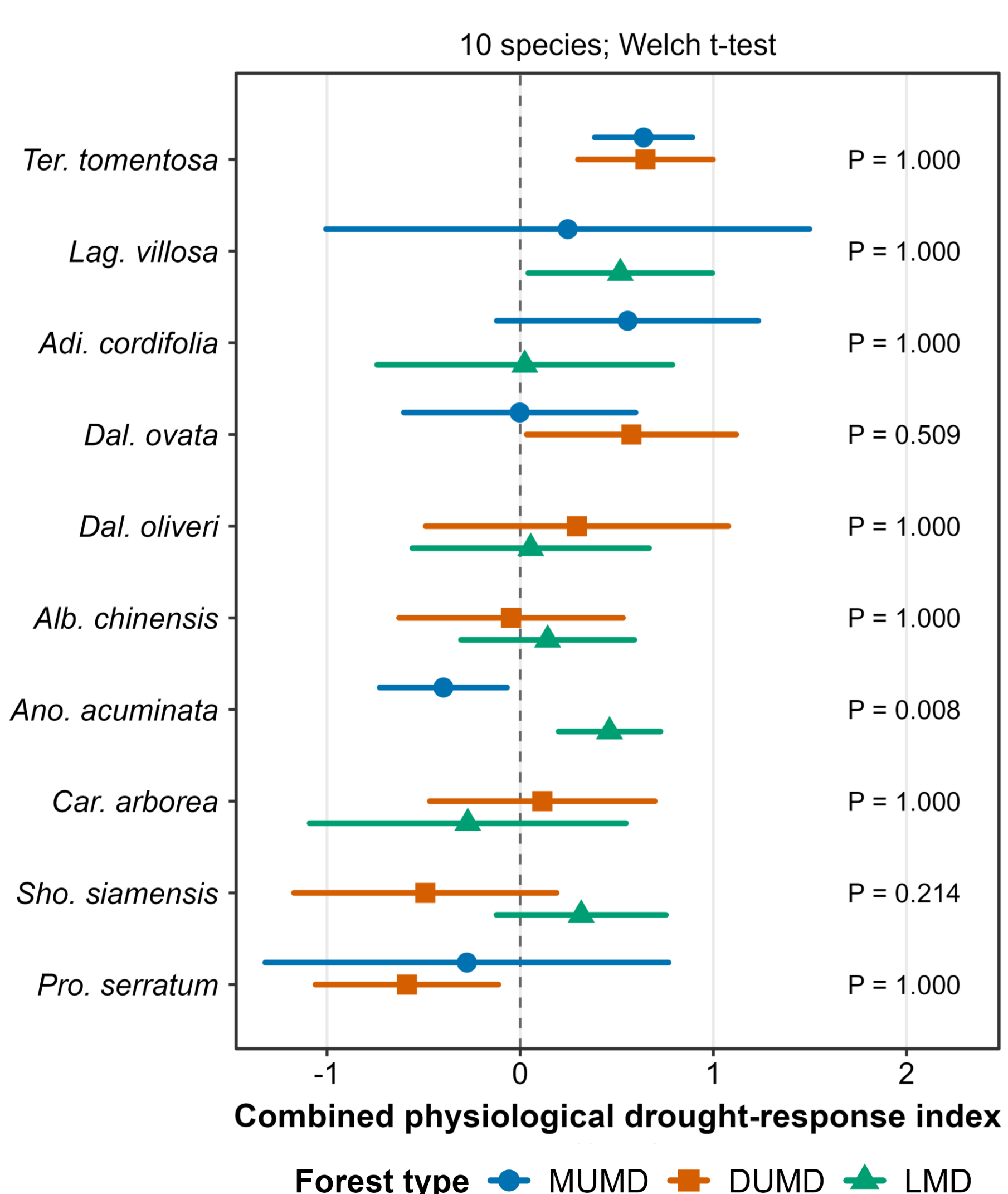
- Higher index; more-negative OP + less-negative $\delta^{13}\text{C}$

5.2 Across-forest Comparison

Tree species shared among three forest types



Tree species shared between two forest types



6. Conclusion

- Variation in combined physiological drought response index among dominant tree species provides useful information for the selection of a broader range of species in forest restoration.



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