



Supplement of

Drivers of drought-induced canopy mortality in conifer and broadleaf forests across Luxembourg

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Supplementary Material

Tables

Table S1: Summary of the geospatial datasets used in this study, including orthophotos (2017–2020), LiDAR-derived elevation models (DTM and DSM), land cover data, and soil type information, with corresponding sources, sensor types, spatial resolution, and acquisition periods.

Data	Source	Sensor Type	Resolution	Acquisition date/year
Orthophoto 2017	https://data.public.lu/en/datasets/orthophoto-officielle-du-grand-duche-de-luxembourg-edition-2017/	Optical RGB	20 cm	14 June 2017; 19–20 June 2017
Orthophoto 2019	https://data.public.lu/en/datasets/orthophoto-officielle-du-grand-duche-de-luxembourg-edition-2019/	Optical RGB	20 cm	4–5 July 2019; 22 August 2019
Orthophoto 2020	https://data.public.lu/en/datasets/orthophoto-officielle-du-grand-duche-de-luxembourg-edition-2020/	Optical RGB	20 cm	30–31 July 2020; 5–7 August 2020; 13–15 September 2020; 19 September 2020
Digital Terrain Model (DTM)	https://data.public.lu/en/datasets/digital-terrain-model-high-dem-resolution/	LiDAR	50 cm	October 2017
Digital Surface Model (DSM)	https://data.public.lu/en/datasets/digital-surface-model-high-dem-resolution/	LiDAR	50 cm	October 2017
Lis-L Land Cover Data	https://data.public.lu/en/datasets/inspire-annex-ii-theme-land-cover-landcoversurfaces-land-information-system-for-luxembourg-lis-l-2018/	Optical RGB, LiDAR, Sentinel-2	20 cm	2018
Soil Type	https://data.public.lu/en/datasets/inspire-annex-iii-soil-soil-map-1-100-000/	-	1:100,000	1969

Table S2: Soil type classes with corresponding drainage and soil moisture characteristics (ASTA, 2020). Soil drainage ranges from very poorly to excessively draining soils, resulting in very dry to very moist soils. No soil drainage or moisture data was available for seepage areas. All soil characteristics were translated from the French original.

Soil type	Soil drainage	Soil moisture
Slightly stony loamy soils, non-gleyed to moderately gleyed, with a structural B horizon	imperfect to perfect	dry to moderately moist soils
Loamy-stony soils with schisto-phylladic content,	perfect	dry soils

non-gleyed, structural B horizon		
Loamy-stony soils with weathered schisto-phylladic content, non-gleyed, structural B horizon	perfect	dry soils
Loamy-stony soils with schisto-phylladic content, slightly to moderately gleyed, structural B horizon	imperfect to moderate	moderately dry to moderately moist soils
Loamy-stony soils with schisto-sandy content, non-gleyed, structural B horizon	perfect to excessive	very dry to dry soils
Loamy-stony soils with weathered schisto-sandy content, non-gleyed, structural B horizon	perfect to excessive	very dry to dry soils
Loamy-stony soils with schisto-sandy content, slightly to moderately gleyed, structural B horizon	imperfect to excessive	very dry to moderately moist soils
Loamy-stony soils with clayey-schisto-sandy content, slightly to moderately gleyed, structural B horizon	imperfect to moderate	moderately dry to moderately moist soils
Loamy-stony soils with schist content, non-gleyed, structural B horizon	perfect	dry soils
Loamy- and clayey-stony soils with quartzite pebbles, non-gleyed to moderately gleyed, structural or textural B horizon	imperfect to perfect	dry to moderately moist soils
Clayey-stony soils with dolomitic content, non-gleyed, structural B horizon	imperfect to perfect	dry to moderately moist soils
Clayey-stony soils with calcareous content, non-gleyed, structural B horizon	perfect	dry soils
Sandy, loamy-sandy, and sandy-loamy soils, non-gleyed, structural or textural B horizon, on limestone sandstone, sand, or weathered clay substrate	perfect	dry soils
Sandy, loamy-sandy, and sandy-loamy soils, slightly to moderately gleyed, textural B horizon, on clay substrate	imperfect to excessive	very dry to moderately moist soils
Sandy-loamy and sandy-clayey soils, non-gleyed, structural or	perfect	dry soils

textural B horizon, on variegated sandstone substrate		
Sandy-loamy and loamy soils, non-gleyed to moderately gleyed, textural B horizon	imperfect to perfect	dry to moderately moist soils
Sandy-loamy and loamy soils, strongly to very strongly gleyed, textural B horizon	poor to fairly poor, without reduced horizon	moist to very moist soils
Clayey and heavy clayey soils, non-gleyed, structural or textural B horizon, on limestone substrate	perfect	dry soils
Clayey soils, non-gleyed, structural or textural B horizon, on macigno substrate	imperfect to perfect	dry soils
Clayey soils, slightly to moderately gleyed, textural B horizon, on macigno substrate	imperfect to moderate	moderately dry to moderately moist soils
Clayey soils, slightly to moderately gleyed, textural B horizon, on clay substrate	imperfect	moderately moist soils
Clayey soils, non-gleyed to moderately gleyed, textural B horizon, on shelly sandstone substrate	imperfect to perfect	dry to moderately moist soils
Clayey and heavy clayey soils, non-gleyed to moderately gleyed, structural or textural B horizon, on marl and limestone substrate	imperfect to perfect	dry to moderately moist soils
Clayey and heavy clayey soils, non-gleyed, structural B horizon, on marl substrate	perfect	dry soils
Heavy clayey soils, slightly to very strongly gleyed, structural or textural B horizon, on marl substrate	poor to moderate, without reduced horizon	moderately dry to very moist soils
Colluvium and Alluvium	poor to imperfect, with and without reduced horizon	moderately dry to very moist soils
Seepage areas	-	-

Figures

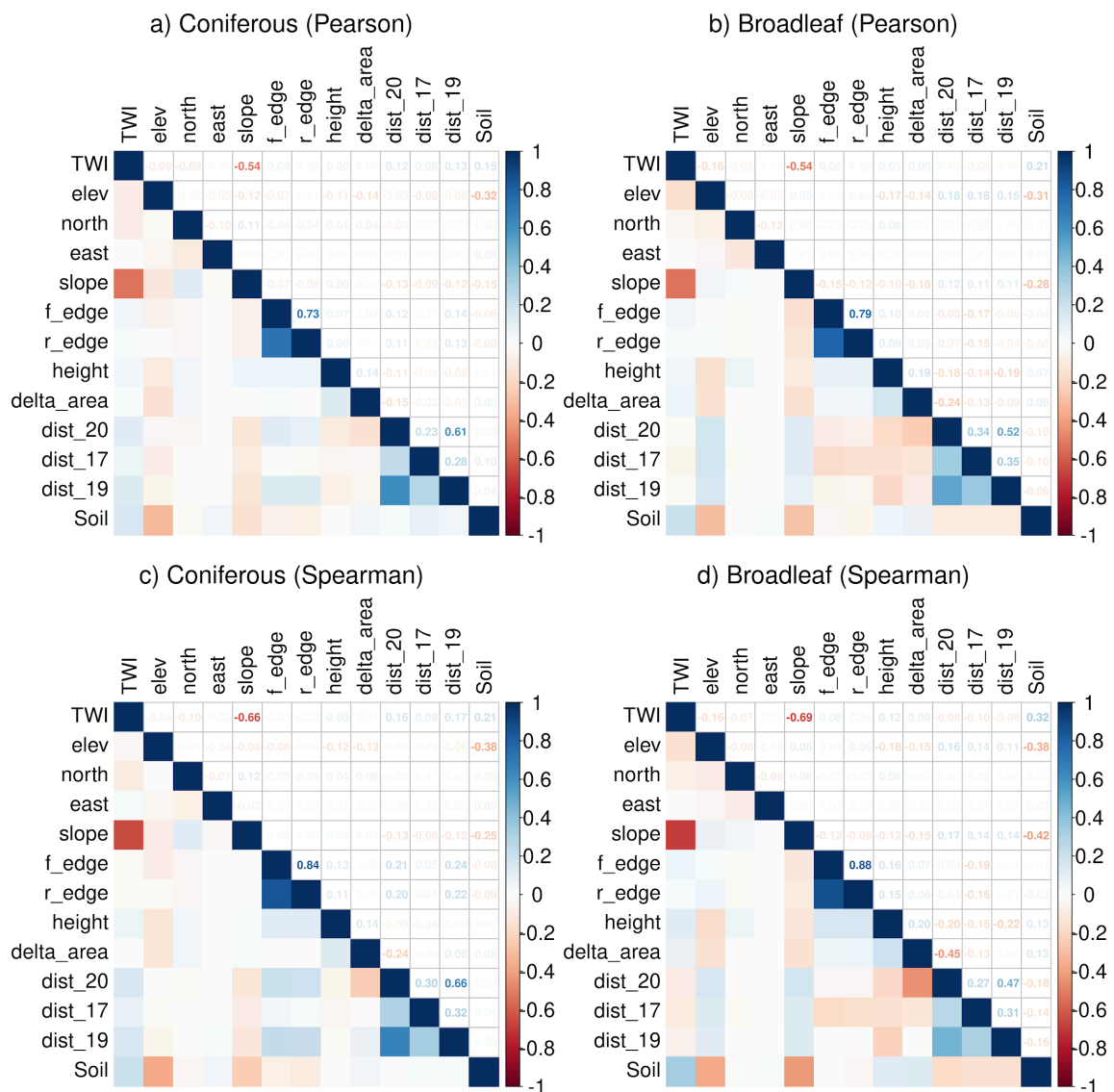


Figure S1: Pearson and Spearman correlation matrices of predictors for coniferous and broadleaf models. The matrices highlight both linear (Pearson) and monotonic (Spearman) relationships between predictors, providing insight into multicollinearity and potential interactions. Shown are correlation matrices for coniferous (left column) and broadleaf (right column) models. The top row depicts Pearson correlation coefficients, while the bottom row displays Spearman rank correlations. Color intensity indicates the strength and direction of correlations, with positive correlations shown in blue and negative correlations in red. Numeric values are overlaid on the upper triangle of each matrix for easier interpretation.