

Supplementary Materials

Table S1: Model metrics estimated for the GLMMs, presented in Table 1, testing the richness (formula: *Richness of TreMs* ~ *D_scaled* + *Tree grouping type* + (1 | *id_group*) + (1 | *genus*)) and abundance (formula: *Abundance of TreMs* ~ *D_scaled* + *Tree grouping type* + *D_scaled: Tree grouping type* + (1 | *id_group*) + (1 | *genus*)) of TreMs across DBH and monumental tree configuration (single vs. grouped monumental tree).

	Conditional R ²	Marginal R ²	Pearson Correlation	ICC	Mean Absolute Error	Root Mean Squared Error
Richness of TreMs	0.569	0.332	0.789	0.354	1.795	2.206
Abundance of TreMs	0.864	0.407	0.964	0.77	1.946	2.762

Table S2: Results of the SIMPER analysis showing the TreMs that significantly contributed to the Sørensen dissimilarity between native and non-native monumental trees. Average contribution represents the mean contribution of each TreM to the overall dissimilarity. Non-native and Native represent the mean abundance of each TreM in the origin type. Only significant TreMs (p-value<0.05) are reported.

TreMs	Average	non-native	native	p-value
Insect galleries and bore holes (CV31)	0.0233	0.1364	0.3333	0.007
Dendrotelm (CV41)	0.0180	0.0909	0.2222	0.014
Large woodpecker foraging excavation (CV42)	0.0016	0.000	0.0278	0.037
Bark-lined trunk concavity (CV43)	0.0139	0.0795	0.1667	0.042
Pulpy agaric (EP22)	0.0068	0.0113	0.0833	0.013
Sap run (OT11)	0.0121	0.0455	0.1389	0.025
Bark microsoil (OT22)	0.0160	0.0795	0. 2222	0.015

Table S3: Results of the Indicator Species Analysis (IndVal.g) identifying TreMs significantly associated with native and non-native monumental trees. Origin indicates the monumental tree type with which each TreM is significantly associated. Only TreMs with significant indicator values ($p < 0.05$) are reported.

TreMs	Origin	IndVal.g	p-value
Epicormic shoots (GR12)	native	0.547	0.011
Insect galleries and bore holes (CV31)	native	0.486	0.012
Bark microsoil (OT22)	native	0.405	0.034
Dendrotelm (CV41)	native	0.397	0.048

Burr (GR21)	non-native	0.474	0.014
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Table S4: Results of the SIMPER analysis showing the TreMs that significantly contributed to the Sørensen dissimilarity between individual and monumental group trees. Average contribution represents the mean contribution of each TreM to the overall dissimilarity. Individual monumental tree and monumental group represent the mean abundance of each TreM in the monumental tree configuration. Only significant TreMs (p-value<0.05) are reported.

TreMs	Average	individual monumental tree	monumental group	p- value
Bryophytes (mosses and liverworts) (EP31)	0.0426	0.6667	0.4130	0.001
Epicormic shoots (GR12)	0.0361	0.2308	0.0368	0.006
Bark loss (IN11)	0.0428	0.7564	0.4783	0.001
Artificial limb breakage (IN22A)	0.0430	0.5897	0.2826	0.001
Natural limb breakage (IN22B)	0.0459	0.7436	0.3696	0.001
Crown microsoil (OT21)	0.0409	0.7308	0.5217	0.003

Table S5: Results of the Indicator Species Analysis (IndVal.g) identifying TreMs significantly associated with individual and monumental group trees. Tree configuration indicates the monumental tree type with which each TreM is significantly associated. Only TreMs with significant indicator values ($p < 0.05$) are reported.

TreMs	Tree configuration	IndVal.g	p-value
Trunk-base rot-hole (closed top, ground contact) (CV21)	individual	0.350	0.049
Buttress-root concavity (CV44)	individual	0.396	0.023

Crack (IN23)	individual	0.426	0.013
Vertebrate nest (NE11)	individual	0.466	0.008
Bark microsoil (OT22)	individual	0.400	0.012

Table S6: Results of the final GLMMs with Poisson error distribution, using the AICc-selection method, of the relationships between criteria of monumentality and the richness (AICc = 618.6) and abundance (AICc = 858.5) of tree-related microhabitats (TreMs) for 124 urban monumental trees of the Veneto region.

	PARAMETER	ESTIMATE	STD. ERROR	Z VALUE	P- VALUE
RICHNESS OF TREMS	Intercept	2.119	0.12	17.571	<0.001
	Age	-0.259	0.111	-2.322	0.02
	Circumference	0.249	0.101	2.469	0.014
	Landscape value	-0.433	0.087	-4.987	<0.001
	Historical value	0.28	0.087	3.207	0.001
ABUNDANCE OF TREMS	Intercept	2.862	0.152	18.777	<0.001
	Age	-0.407	0.139	-2.92	0.003
	Circumference	0.238	0.127	1.872	0.061
	Landscape value	-0.391	0.112	-3.475	<0.001
	Historical value	0.195	0.108	1.668	0.072
	Botanical rarity	0.237	0.142	1.668	0.095

Table S7: Metrics for the GLMMs, presented in Table 2, testing the richness (formula: *Richness of TreMs ~ Age + Circumference + Landscape value + Historical value + (1 | id_group)*) and abundance (formula: *Abundance of TreMs ~ Age + Circumference + Landscape value + Historical value + Botanical rarity + (1 | id_group)*) of TreMs across 10 criteria of monumentality. The metrics refer to the final model, including the criteria of monumentality as predictors based on AICc-selection methods.

	Conditional R ²	Marginal R ²	Pearson Correlation	Mean Absolute Error	Root Mean Squared Error
Richness of TreMs	0.459	0.299	0.772	1.792	2.293
Abundance of TreMs	0.799	0.265	0.928	2.32	3.617

Table S8: Results of the Indicator Species Analysis (IndVal.g) identifying TreMs significantly associated with each criterion. Only TreMs with significant indicator values ($p < 0.05$) are reported.

Criteria	TreMs	IndVal.g	p-value
Ecological value	Dendrotelm	0.506	0.022
	Perennial polypore	0.464	0.029
	Artificial stem breakage	0.419	0.027
Circumference	Heavy resinosis	0.378	0.04
Shape	Bark microsoil	0.571	0.001
Botanical rarity	Bryophytes (mosses and liverworts)	0.777	0.004
	Small woodpecker breeding cavity	0.543	0.009
	Bark shelter (open at the bottom)	0.543	0.017
Historical value	Artificial stem breakage	0.293	0.041

Table S9: Structure of the GLMMs describing associated model types, error distributions, and formulas implemented in this study.

Response Variable / Analysis	Model	Error distribution	Formula	Random effect
TreMs Richness (DBH & Configuration)	GLMM	Poisson	`Richness of TreMs ~ D_scaled + singolo	(1 id_group) + (1 genus)
TreMs Abundance (DBH & Configuration)	GLMM	Poisson	`Abundance of TreMs ~ D_scaled + singolo + D_scaled:singolo	(1 id_group) + (1 genus)
TreMs Richness (Criteria of Monumentality)	GLMM	Poisson	Richness of TreMs ~ Age + Circumference + Landscape value + Historical value	(1 id_group)
TreMs Abundance (Criteria of Monumentality)	GLMM	Poisson	`Abundance of TreMs ~ Age + Circumference + Landscape value + Historical value + Botanical rarity	(1 id_group)