Observed tree species – 30-year period

Table S1. Tree species detected on the 26 study plots (13 exclosure and 13 control plots) within the 30-year study period. Occurrence of tree species in control and exclosure plot 9, 18 and 30 years after establishment of study plots is marked with *.

Species scientific name	Control plots			Exclosure plots		
	9 y	18 y	30 y	9 y	18 y	30 y
Abies alba	*	*	*	*	*	*
Acer pseudoplatanus	*	*	*	*	*	*
Betula pendula	*	-	-	-	-	-
Fagus sylvatica	*	*	*	*	*	*
Malus sylvaticus	-	-	-	-	*	-
Fraxinus excelsior	*	*	*	*	*	*
Larix decidua	*	*	*	*	*	*
Picea abies	*	*	*	*	*	*
Quercus sp.	-	-	-	*	*	-
Salix caprea	-	-	-	*	*	*
Sorbus aria	*	*	*	*	*	*
Sorbus aucuparia	*	*	*	*	*	*
Taxus baccata	-	-	-	*	*	*
Ulmus glabra	*	*	*	*	*	*

Observed shrub species – 30-year period

Table S2. Shrub species detected on the 26 study plots (13 exclosure and 13 control plots) within the 30-year study period. Occurrence of shrub species in control and exclosure plot 9, 18 and 30 years after establishment of study plots is marked with *.

Species scientific name	Control plots			Exclosure plots		
	9 y	18 y	30 y	9 y	18 y	30 y
Berberis vulgaris	-	*	*	-	-	-
Clematis vitalba	*	*	*	*	*	*
Corylus avellana	*	*	*	-	-	-
Daphne sp.	*	*	*	*	*	*
Evonymus sp.	-	-	-	*	*	*
Frangula alnus	*	*	*	-	-	-
Hedera helix	-	-	*	-	-	-
Hippocrepis emerus	*	*	*	*	*	*
Lonicera sp.	*	*	*	*	*	*
Polygala chamaebuxus	-	-	*	-	-	*
Rosa sp.	*	*	*	*	*	*
Rubus fruticosus	-	*	*	*	*	*
Rubus idaeus	*	*	*	*	*	*
Sambucus racemosa	-	-	*	-	-	-
Vaccinium myrtillus	*	*	*	*	*	*
Vaccinium uliginosum	-	-	-	*	-	-
Vaccinium vitis-idaea	*	-	*	-	*	*
Viburnum lantana	-	-	-	-	-	*
Viburnum opulus	*	*	*	-	-	-

Tree species diversity – 30-year period

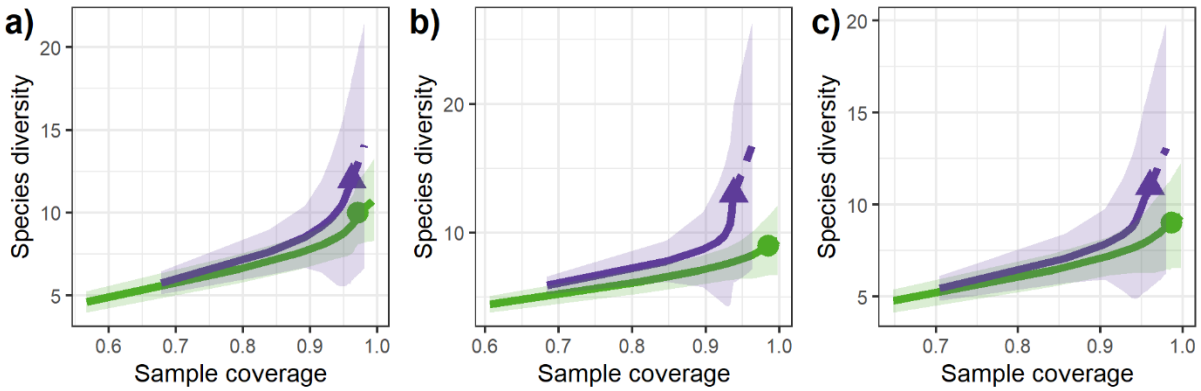

Figure S1. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree species data collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness), a) 9 years, b) 18 years, and c) 30 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Tree species diversity – 18-year period

Within the 43 exclosure-control pairs, tree individuals completely disappeared on one control plot 6 years after the establishment of the plots. Hence, data from the related plot pair could not be included in the statistical analyses. A total of 17 different tree species were detected on the 42 study plot pairs 18 years after establishment of study plots. On the control plots, the observed number of tree species varied between 1 and 7 (median: 4) species. In contrast, we recorded 1 to 8 (median: 5) species on the exclosure plots.

Sample size-based rarefaction and extrapolation sampling curves for Shannon diversity (q = 1) and Simpson diversity (q = 2) levelled off and approached an asymptote, thereby indicating that the number of sampling plots was sufficient to represent frequent and highly frequent tree species in the assemblages (**Figure S1**). For species richness (q = 0), the increasing sample size-based rarefaction and extrapolation curves for exclosure plots revealed that data was insufficient to infer "true" species richness, because some rare tree species might not have been detected within the set of study plots, but could have occurred in the surrounding study region (**Figure S1**, left panel). Thus, the asymptotic estimator represented only a lower bound and rare tree species in exclosure plots might have been underrepresented. Testing for differences in species richness between exclosure and control plots was therefore made at a standardized coverage value of C_{max} = 99.6% (**Table S3**, **Figure S2**). Overlapping 95% confidence intervals implied that species richness (**Figure S2**), as well as Shannon diversity and Simpson diversity (**Figure S1**) of tree species on exclosure plots and control plots did not differ 18 years after establishment of study plots (**Table S3**).

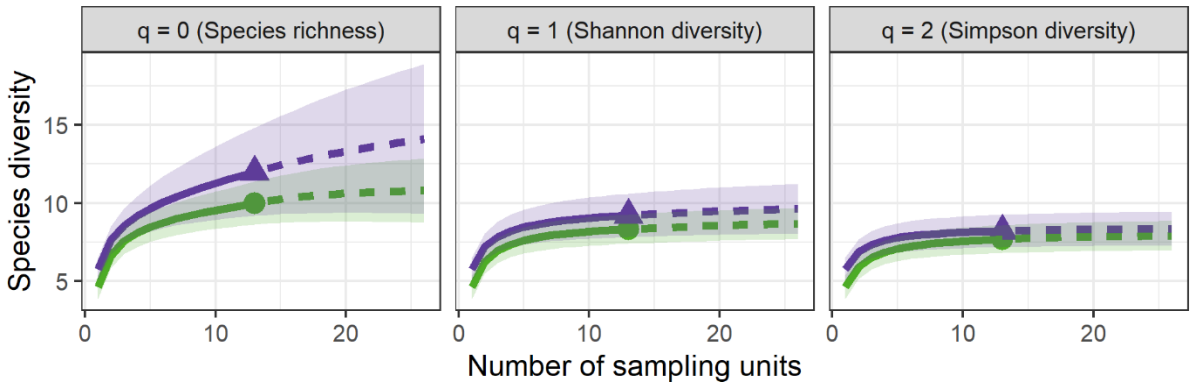

Figure S2. Empirical diversity profiles of sample size-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree species data collected on control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness; q = 1, Shannon diversity; q = 2, Simpson diversity) 18 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

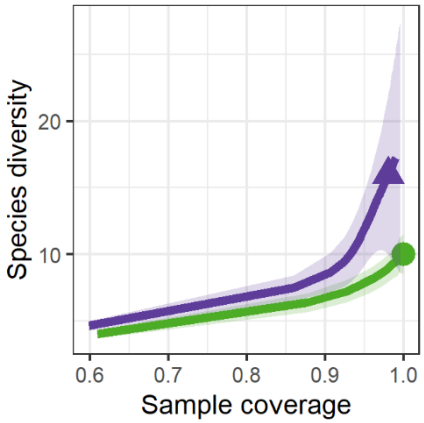

Figure S3. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree species data collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness) 18 years after implementing study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Table S3. Asymptotic and non-asymptotic diversity estimates for incidence-based tree species data collected on control and exclosure plots in Austria 18 years after establishment of study plots. Non-asymptotic rarefaction and extrapolation analyses are based on point diversities for a specified sample coverage of C_{max} = 99.6%. Numerical values for Hill numbers of order q (q = 0, species richness; q = 1, Shannon diversity; q = 2, Simpson diversity).

	Control plots			Exclosure plots		
Year	q = 0	q = 1	q = 2	**q = 0**	**q = 1**	**q = 2**
Asymptotic diversity estimate (mean ± SE)						
18	10.00 ± 0.72	7.47 ± 0.30	6.60 ± 0.28	18.60 ± 5.69	9.47 ± 0.57	7.76 ± 0.37
Non-asymptotic point diversity estimate [95% confidence interval: lower; upper]						
18	9.94 [8.7; 11.2]	7.32 [6.7; 7.9]	6.50 [6.0; 7.0]	18.03 [7.5; 28.5]	9.33 [8.3; 10.4]	7.70 [7.1; 8.3]

Height class diversity of tree species – 30-year period

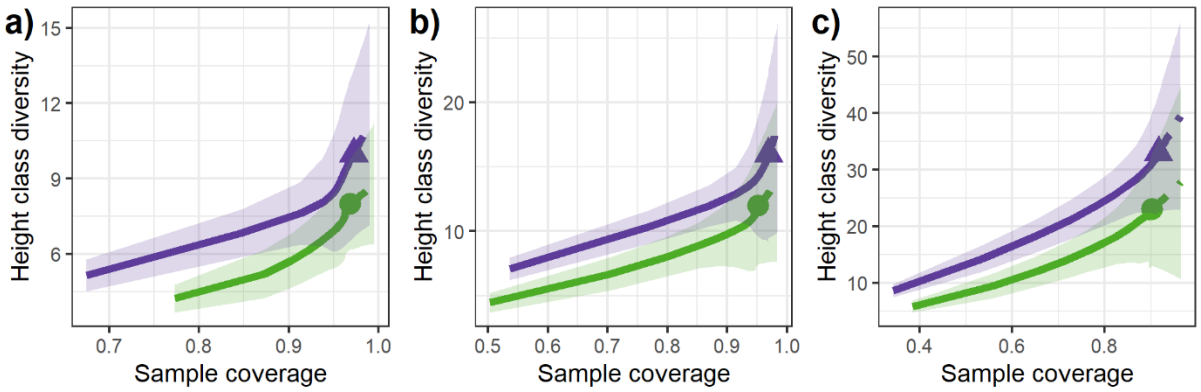

Figure S4. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree height class data collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness), a) 9 years, b) 18 years, and c) 30 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Height class diversity of tree species – 18-year period

Eighteen years after establishment of study plots, 20 different tree height classes were recorded on the 42 study plots. Numbers of height classes ranged between 1 and 10 (median: 5.5) on the exclosure plots, whereas 1 to 8 (median: 4) height classes were observed on the control plots.

Sample size-based rarefaction and extrapolation sampling curves with 95% confidence intervals for Shannon diversity (q = 1) and Simpson diversity (q = 2) levelled off and approached an asymptote, thereby indicating that the number of sampling plots was sufficient to represent frequent and highly frequent height classes of trees in the assemblages (**Figure S3**). In surveys, that were conducted 18 years after establishment of study plots, Shannon (q = 1) and Simpson (q = 2) diversity estimates of tree height classes showed that tree height class diversity was significantly higher in exclosure plots in comparison to control plots.

Based on the asymptotic results, the difference in the observed tree height classes between exclosure and control plots was 4.21 with respect to frequent height classes (q = 1) 18 years after establishment of study plots (**Table S4, Figure S3**). The difference with respect to highly frequent tree height classes (q = 2) between exclosure and control plots was 4.55 after establishment of study plots (**Table S4, Figure S3**).

Table S4. Asymptotic and non-asymptotic diversity estimates for incidence-based tree height class data collected on control and exclosure plots in Austria 18 years after establishment of study plots. Non-asymptotic rarefaction and extrapolation analyses are based on point diversities for a specified sample coverage of C_{max} = 99.1%. Numerical values for Hill numbers of order q (q = 0, height class richness; q = 1, Shannon diversity; q = 2, Simpson diversity).

	Control plots			**Exclosure plots**		
Year	**q = 0**	**q = 1**	**q = 2**	**q = 0**	**q = 1**	**q = 2**
Asymptotic diversity estimate (mean ± SE)						
18	17.20 ± 4.57	9.49 ± 0.59	7.42 ± 0.44	23.86 ± 4.01	13.70 ± 0.55	11.97 ± 0.46
Non-asymptotic point diversity estimate [95% confidence interval: lower; upper]						
18	16.17 [7.7; 24.7]	9.24 [8.0; 10.5]	7.31 [6.5; 8.1]	20.88 [15.0; 26.7]	13.46 [12.3; 14.6]	11.8 [10.9; 12.7]

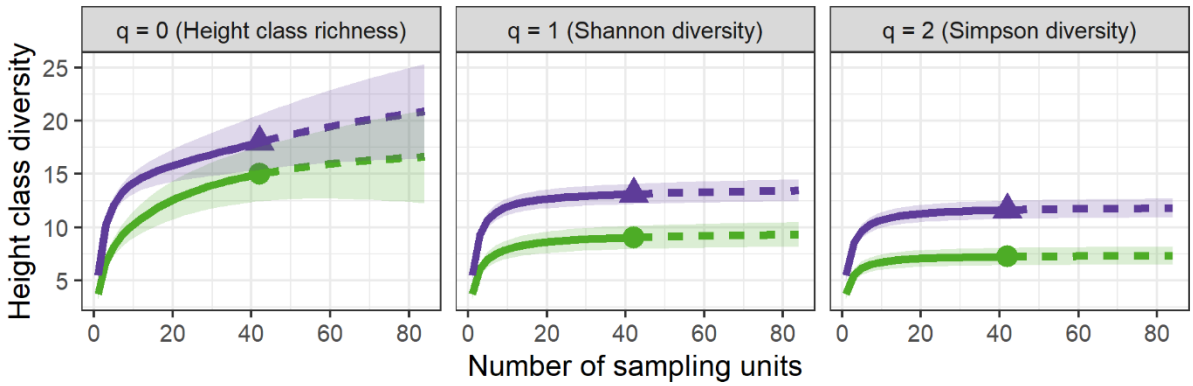

Figure S5. Empirical diversity profiles of sample-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree height class data collected on control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness; q = 1, Shannon diversity; q = 2, Simpson diversity) 18 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

The increasing sample size-based rarefaction and extrapolation curves for study plots surveyed 18 years after plots were implemented revealed that data was insufficient to infer "true" height class richness (q = 0), because some rare height classes might have not been detected within the set of study plots, but could have occurred in the study region (**Figure S3**). Thus, we used a standardized coverage value of C_{max} = 99.1% to test for differences in height class richness between exclosure and control plots. Overlapping 95% confidence intervals implied that height class richness estimates (q = 0) in exclosure plots and control plots did not differ significantly in study plots surveyed 18 and 30 years after establishment (**Table S4, Figure S4**).

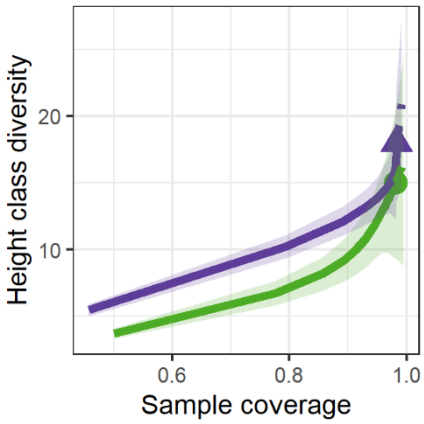

Figure S6. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based tree height class data collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness) 18 years after implementing study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Shrub species diversity – 30-year period

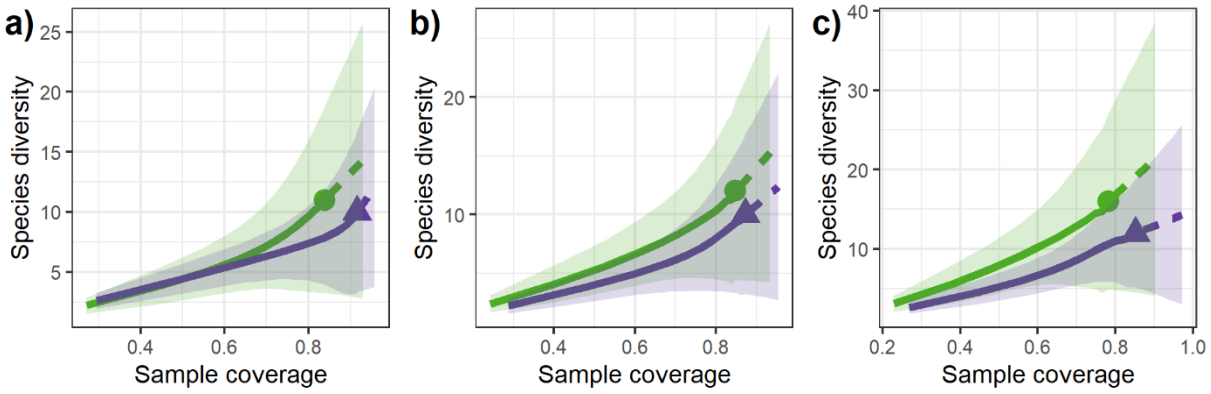

Figure S7. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based shrub species data collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness), a) 9 years, b) 18 years, and c) 30 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Shrub species diversity – 18-year period

A total of 20 different shrub species were detected in the 34 study plot pairs 18 years after establishment of study plots. On seven plot pairs, trees reached maximum heights of up to 18 m, and shrubs disappeared either on the fenced or the control plot, reducing sample size from 41 to 34 plot pairs for the survey conducted 18 years after establishment of study plots. In the control plots, the observed number of shrub species varied between 1 and 8 (median: 2) species. In contrast, the number of observed shrub species in exclosure plots varied between 1 and 4 (median: 2) species in the same period.

Increasing sample size-based rarefaction and extrapolation curves for exclosure study plots revealed that data was insufficient to infer "true" species richness (q = 0), because some rare shrub species might have not been detected within the set of study plots, but could have occurred in the study region (**Figure S5**). Testing for differences in species richness between exclosure and control plots was therefore made at a standardized coverage value of C_{max} = 90.1%. In contrast, sample size-based rarefaction and extrapolation sampling curves for Shannon diversity (q = 1) and Simpson diversity (q = 2) levelled off and approached an asymptote, thereby indicating that the number of sampling plots was sufficient to represent frequent and highly frequent shrub species in the assemblages (**Figure S5**). Overlapping 95% confidence intervals implied that neither species richness (**Figure S6**), nor Shannon diversity or Simpson diversity (**Figure S5**) of shrub species in exclosure plots and control plots differed significantly (**Table S5**).

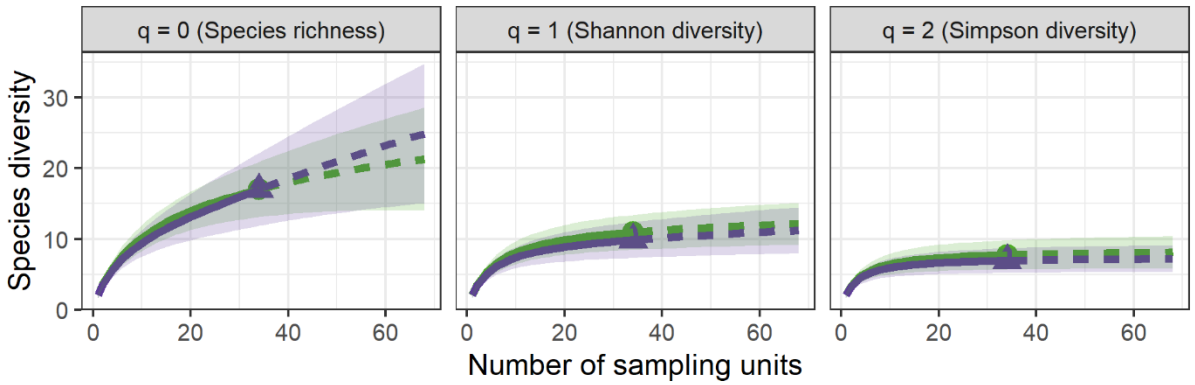

Figure S8. Empirical diversity profiles of sample-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based shrub species data collected on control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness; q = 1, Shannon diversity; q = 2, Simpson diversity) 18 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

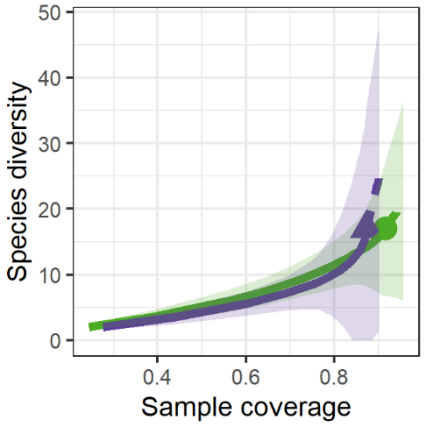

Figure S9. Coverage-based rarefaction (solid lines) and extrapolation (dashed lines) curves for incidence-based shrub species data of top height individuals collected within control plots (green, point) and exclosure plots (purple, triangle) for Hill numbers of order q (q = 0, species richness) 18 years after establishment of study plots. The 95% confidence intervals were obtained from bootstrapping based on 400 replications.

Table S5. Asymptotic and non-asymptotic diversity estimates for incidence-based shrub species data collected within control and exclosure plots in Austria 18 years after establishment of study plots. Non-asymptotic rarefaction and extrapolation analyses are based on point diversities for a specified sample coverage of C_{max} = 90.1%. Numerical values for Hill numbers of order q (q = 0, height class richness; q = 1, Shannon diversity; q = 2, Simpson diversity).

	Control plots			**Exclosure plots**		
Year	**q = 0**	**q = 1**	**q = 2**	**q = 0**	**q = 1**	**q = 2**
Asymptotic diversity estimate (mean ± SE)						
18	25.78 ± 11.14	13.12 ± 1.75	8.46 ± 1.16	51.94 ± 22.76	13.15 ± 2.57	7.48 ± 1.08
Non-asymptotic point diversity estimate [95% confidence interval: lower; upper]						
18	16.75 [7.0; 24.5]	10.54 [7.5; 13.6]	7.60 [5.5; 9.7]	24.91 [0.3; 49.5]	11.21 [6.2; 16.2]	7.20 [5.2; 9.2]

Tree heights – 30-year period

Table S6. Pairwise comparisons of tree height data collected within the 13 control and 13 exclosure plots in Austria 9, 18, and 30 years after implementing study plots using Wilcoxon rank sum tests with Bonferroni correction. Significance level of adjusted Wilcoxon rank sum tests $p < 0.05$.

	Control plots			Exclosure plots		
Year	**9**	**18**	**30**	**9**	**18**	**30**
9	-	< 0.001	< 0.001	-	< 0.001	< 0.001
18	-	-	0.011	-	-	0.004
30	-	-	-	-	-	-