

Appendix A

Results

Ecological indices

Table A.1. Results for the Shapiro-Wilk normality test conducted through the species diversity and stand structure indices, for the mixed broadleaf woodlands (habitat 1), beech forest (habitat 2) and Pyrenean oak (habitat 3).

		Habitat 1			Habitat 2			Habitat 3		
Index	Code	Statistic	Df	<i>p</i> -value	Statistic	Df	<i>p</i> -value	Statistic	Df	<i>p</i> -value
Shannon	H'	.944	9	.631	.869	22	.007	.916	15	.165
Evenness	J'	.765	9	.008	.884	22	.014	.842	15	.013
Richness	D_{Mn}	.781	9	.012	.774	22	.000	.848	15	.016
Simpson complement	$1 - D$	.908	9	.301	.984	22	.967	.948	15	.495
Reciprocal Berger-Parker	$1/d$	.868	9	.117	.757	22	.000	.960	15	.699
Clark-Evans	R	.987	12	.998	.985	22	.975	.951	15	.540
Mingling complement	$1 - M_i$	.987	12	.998	.552	22	.000	.802	15	.004
Uniform angle	W_i	.991	12	.999	.984	22	.967	.995	15	1.00

Table A.2. Descriptive statistics for the ecological indices, and statistical test results (T= two sample t-test, W= two sample Wilconxon rank-sum test) between the plots inside and outside Picos de Europa, for the mixed broadleaf woodlands.

		Test of difference			Pool	Outside		Inside	
Index	Code		Df	<i>p</i> -value	Mean ($\pm$ SD)	N	Mean ($\pm$ SD)	N	Mean ($\pm$ SD)
Shannon	H'	T	7	.197	.805 ($\pm$.529)	5	.594 ($\pm$.197)	4	1.07 ($\pm$.282)
Evenness	J'	W		.050	.659 ($\pm$.302)	5	.506 ($\pm$.337)	4	.849 ($\pm$.070)
Richness	D_{Mn}	W		.085	.348 ($\pm$.275)	5	.245 ($\pm$.186)	4	.477 ($\pm$.340)
Simpson complement	$1 - D$	T	7	.172	.451 ($\pm$.251)	5	.346 ($\pm$.266)	4	.584 ($\pm$.090)
Reciprocal Berger-Parker	$1/d$	T	7	.135	1.72 ($\pm$.653)	5	1.43 ($\pm$.167)	4	2.09 ($\pm$.394)
Clark-Evans	R	T	10	.498	1.49 ($\pm$.093)	8	1.50 ($\pm$.037)	4	1.46 ($\pm$.033)
Mingling complement	$1 - M_i$	T	10	.127	.646 ($\pm$.198)	8	.708 ($\pm$.070)	4	.521 ($\pm$.071)
Uniform angle	W_i	T	10	.812	.469 ($\pm$.0.99)	8	.463 ($\pm$.036)	4	.479 ($\pm$.052)

Table A.3. Descriptive statistics for the ecological indices, and statistical test results (T= two sample t-test, W= two sample Wilconxon rank-sum test) between the plots inside and outside Picos de Europa, for the beech forests (*Fagus sylvatica* L.). In bold, significant differences between outside and inside studied plots based on their *p*-values after Bonferroni correction (** *p*-value ≤ 0.005; * *p*-value ≤ 0.025).

		Test of difference			Pool	Outside		Inside	
Index	Code		Df	<i>p</i> -value	Mean (±SD)	N	Mean (±SD)	N	Mean (±SD)
Shannon	H'	W		.004	.397 (±.410)	4	.952** (±.206)	18	.274** (±.335)
Evenness	J'	W		.009	.364 (±.346)	4	.763* (±.151)	18	.275* (±.313)
Richness	D_{Mn}	W		.011	.356 (±.288)	4	.729* (±.445)	18	.273* (±.165)
Simpson complement	$1 - D$	T	20	.990	.544 (±.364)	4	.546 (±.039)	18	.543 (±.095)
Reciprocal Berger-Parker	$1/d$	W		.009	1.28 (±.400)	4	1.80* (±.472)	18	1.16* (±.285)
Clark-Evans	R	T	20	.629	1.51 (±.100)	4	1.49 (±.042)	18	1.52 (±.025)
Mingling complement	$1 - M_i$	W		.064	.898 (±.185)	4	0.771 (±.258)	18	.926 (±.161)
Uniform angle	W_i	T	20	.236	.496 (±.107)	4	.437 (±.040)	18	.509 (±.026)

Table A.4. Descriptive statistics for the ecological indices, and statistical test results (T= two sample t-test, W= two sample Wilconxon rank-sum test) between the plots inside and outside Picos de Europa, for the Pyrenean oak stands.

		Test of difference			Pool	Outside		Inside	
Index	Code		Df	<i>p</i> -value	Mean (±SD)	N	Mean (±SD)	N	Mean (±SD)
Shannon	H'	T	13	.391	.897 (±.430)	12	.946 (±.104)	3	.698 (±.412)
Evenness	J'	W		.312	.653 (±.254)	12	.699 (±.198)	3	.468 (±.416)
Richness	D_{Mn}	W		.665	.459 (±.219)	12	.470 (±.239)	3	.413 (±.131)
Simpson complement	$1 - D$	T	13	.699	.559 (±.202)	12	.470 (±.413)	3	.412 (±.076)
Reciprocal Berger-Parker	$1/d$	T	13	.651	1.76 (±.521)	12	1.79 (±.135)	3	1.63 (±.472)
Clark-Evans	R	T	13	.259	1.46 (±.126)	12	1.44 (±.037)	3	1.54 (±.052)
Mingling complement	$1 - M_i$	W		.556	.811 (±.210)	12	.826 (±.144)	3	.75 (±.433)
Uniform angle	W_i	T	13	.878	.505 (±.066)	12	.507 (±.066)	3	.5 (±.083)

Explanatory variables

Table A.5. Results for the Shapiro-Wilk normality test conducted through the explanatory variables. See table 2 for codes of variables.			
Variable	Statistic	Df	p-value
<i>Plot topography</i>			
UTMY	.967	50	.168
UTMX	.934	50	.008
SLO	.980	49	.569
<i>Soil characteristics</i>			
PH	.975	45	.423
TEX	.991	48	.971
OM	.982	50	.647
STO	.991	50	.968
<i>Plot isolation</i>			
DIST1	.725	50	.000
DIST2	.926	50	.004
POP	.903	48	.001
<i>Anthropogenic disturbances</i>			
GRA	.975	50	.013
SILV	.981	50	.354
FEL	.999	50	1.00
COV	.986	50	.809
GRO	.545	50	.000

Table A.6. Correlation matrix and contingency table for categorical variables conducted through the explanatory variables. See table 2 for codes of variables.

Variable	UTMY	UTMX	SLO	PH	TEX	OM	STO	DIST1	DIST2	POP	GRA	SILV	FEL	COV
UTMX	.234 ^S (.135)	-												
SLO	.095 (.517)	-.175 ^S (.267)	-											
PH	-.100 (.512)	.171 ^S (.279)	.211 (.168)	-										
TEX	.027 (.853)	.339 ^S (.028)*	-.165 (.266)	-.120 (.437)	-									
OM	.406 (.003)*	.102 ^S (.519)	.042 (.773)	.010 (.949)	-.048 (.745)	-								
STO	-.111 (.443)	.057 (.722)	.318 (.026)*	-.071 (.631)	3.63 (.726)	.152 (.290)	-							
DIST1	.018 ^S (.911)	.003 ^S (.987)	-.221 ^S (.160)	.201 ^S (.202)	-.306 ^S (.049)	.039 ^S (.808)	.156 (.324)	-						
DIST2	-.439 ^S (.004)*	.433 ^S (.004)*	-.109 ^S (.492)	.401 ^S (.008)*	-.074 ^S (.641)	-.131 ^S (.408)	.256 (.102)	.114 ^S (.743)	-					
POP	-.619 ^S (.000)*	-.099 ^S (.534)	-.086 ^S (.588)	.143 ^S (.366)	-.0124 ^S (.435)	-.557 ^S (.000)*	.258 (.099)	-.032 ^S (.842)	.324 ^S (.036)*	-				
GRA	-.050 ^S (.753)	.050 ^S (.753)	-.065 ^S (.684)	-.044 ^S (.783)	1.17 (.556)	-.206 ^S (.191)	1.52 (.678)	-.117 ^S (.461)	.075 ^S (.637)	.048 ^S (.762)	-			
SILV	-.287 (.100)	.083 ^S (.602)	-.159 (.276)	.081 (.598)	-.777 (.678)	-.181 (.208)	1.39 (.708)	.049 ^S (.758)	.274 ^S (.079)	-.045 ^S (.778)	.128 (.720)	-		
FEL	-.252 (.255)	.045 ^S (.775)	-.090 (.537)	.005 (.975)	-.183 (.402)	-.243 (.088)	1.44 (.695)	-.012 ^S (.941)	.108 ^S (.494)	-.057 ^S (.717)	.038 (.846)	21.95 (.000)*	-	
COV	-.373 (.008)*	.075 (.637)	-.266 (.065)	.001 (.995)	.504 (.777)	-.165 (.253)	2.29 (.514)	-.119 (.453)	.279 (.073)	.050 (.751)	.613 (.434)	37.76 (.000)*	18.84 (.000)*	-
GRO	-.092 ^S (.953)	-.018 ^S (.908)	.314 ^S (.043)*	-.037 ^S (.816)	1.33 (.515)	.023 ^S (.884)	2.09 (.554)	-.295 ^S (.057)	-.083 ^S (.601)	.056 ^S (.726)	.980 (.322)	1.07 (.300)	1.92 (.166)	1.17 (.279)

Correlation coefficients are presented, Spearman rank correlation (indicated by S superscript) when the data were not normally distributed.

Table A.7. Summary of the ten best-ranked models of the ecological data for the dependent variables Shannon index (H') and Richness (D_{Mn}), including the total number of parameters in the model (K), followed by the values for both AIC, ΔAIC_i and w_i . Rankings based on Akaike's Information Criterion (AIC). See table 2 for codes of variables.

Model no.	Model variables	K	AIC	ΔAIC_i	w_i (%)
Shannon					
1	$H' = (-0.002) \times SLO + (-0.003) \times PH + (-0.0002) \times DIST2 + (-0.196) \times FEL + 1.287$	6	47.75	0	5.7
2	$H' = (-0.002) \times SLO + 0.015 \times PH + (-0.0003) \times DIST2 + 1.083$	5	48.08	0.3	4.8
3	$H' = (-0.0005) \times SLO + 0.112 \times TEX + (-0.0003) \times DIST2 + 0.904$	5	48.97	1.2	3.1
4	$H' = (-0.002) \times SLO + (-0.0003) \times DIST2 + (-0.184) \times FEL + 1.271$	5	49.15	1.4	2.8
5	$H' = (-0.001) \times SLO + 0.100 \times TEX + (-0.0003) \times DIST2 + (-0.162) \times FEL + 1.031$	6	49.16	1.4	2.8
6	$H' = (-0.002) \times SLO + 0.014 \times PH + (-0.0003) \times DIST2 + (-0.118) \times SILV + 1.180$	6	49.38	1.6	2.5
7	$H' = 0.0004 \times SLO + (-0.083) \times STO + (-0.0002) \times DIST2 + (-0.228) \times FEL + 1.310$	6	49.39	1.6	2.5
8	$H' = (-0.005) \times PH + (-0.0003) \times DIST2 + 1.084$	4	49.46	1.7	2.4
9	$H' = 0.129 \times TEX + (-0.0003) \times DIST2 + 0.823$	4	49.46	1.7	2.4
10	$H' = (-0.003) \times SLO + 0.011 \times PH + (-0.0003) \times DIST2 + (-0.104) \times COV + 1.212$	6	49.54	1.8	2.3
Richness					
1	$D_{Mn} = 0.028 \times OM + (-0.0004) \times DIST1 + 0.289$	4	5.22	0	2.3
2	$D_{Mn} = 0.024 \times OM + (-0.0001) \times DIST2 + 0.357$	4	5.48	0.3	2.0
3	$D_{Mn} = 0.029 \times OM + (-0.0001) \times DIST2 + 0.103 \times FEL + 0.282$	5	5.54	0.3	2.0
4	$D_{Mn} = 0.032 \times OM + (-0.0004) \times DIST1 + 0.077 \times FEL + 0.224$	5	6.13	0.9	1.5
5	$D_{Mn} = 0.026 \times OM + (-0.0001) \times DIST2 + 0.083 \times COV + 0.306$	5	6.26	1.0	1.4
6	$D_{Mn} = 0.002 \times SLO + 0.026 \times OM + (-0.0001) \times DIST2 + 0.278$	5	6.29	1.1	1.4
7	$D_{Mn} = 0.026 \times OM + (-0.0001) \times DIST2 + 0.081 \times SILV + 0.305$	5	6.34	1.1	1.3
8	$D_{Mn} = 0.023 \times OM + (-0.0001) \times DIST2 + 0.171 \times GRO + 0.348$	5	6.52	1.3	1.2
9	$D_{Mn} = 0.03 \times OM + (-0.0001) \times DIST1 + 0.062 \times SILV + 0.240$	5	6.53	1.3	1.2
10	$D_{Mn} = 0.028 \times OM + (-0.0004) \times DIST2 + 0.145 \times GRO + 0.282$	5	6.54	1.3	1.2