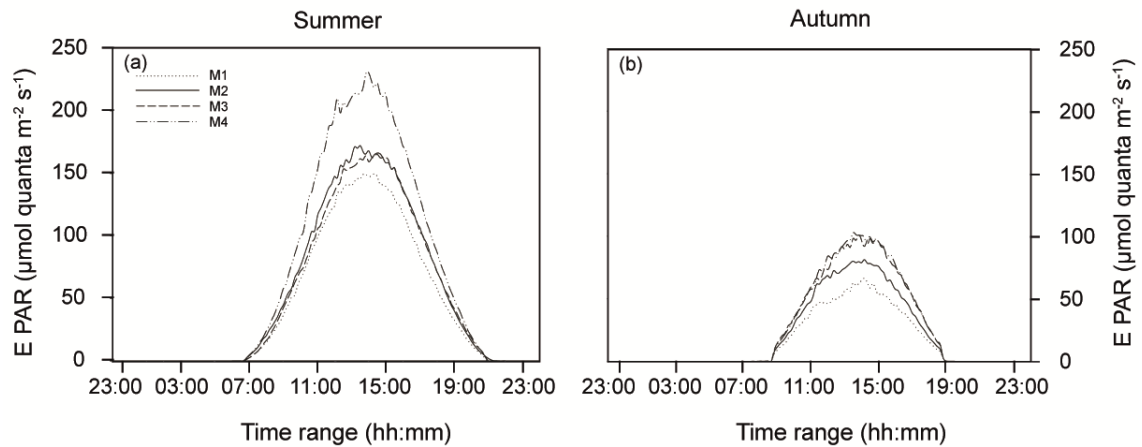
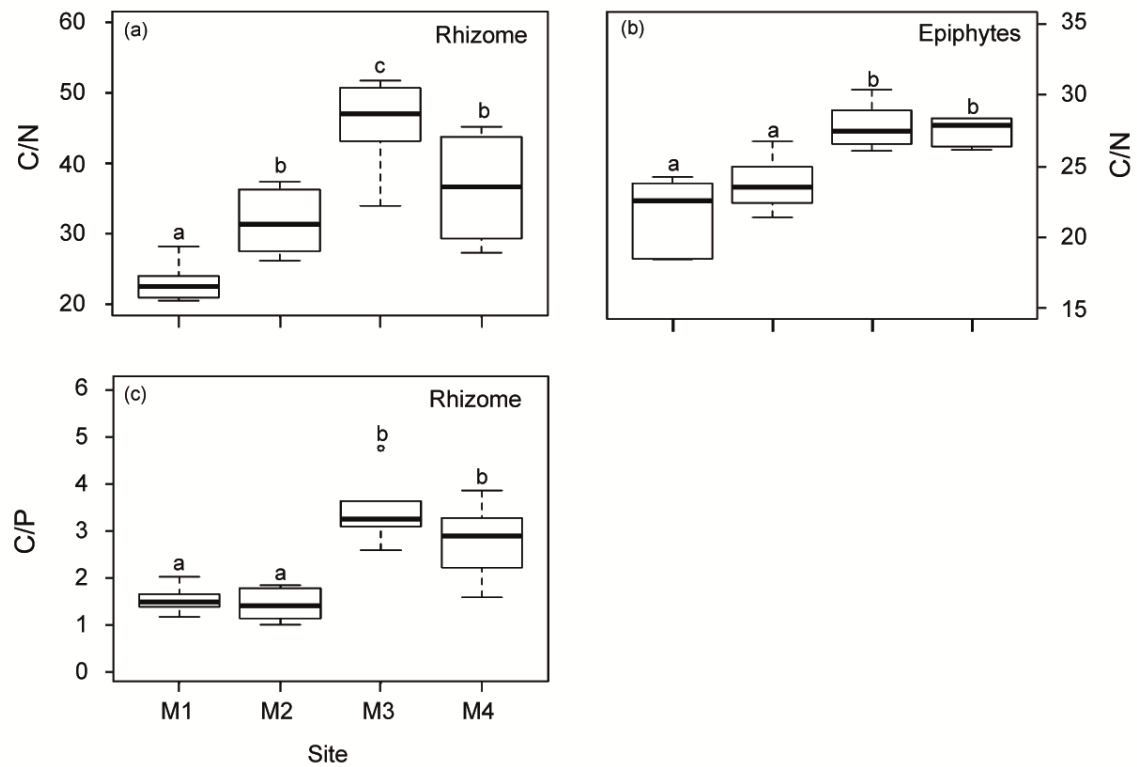


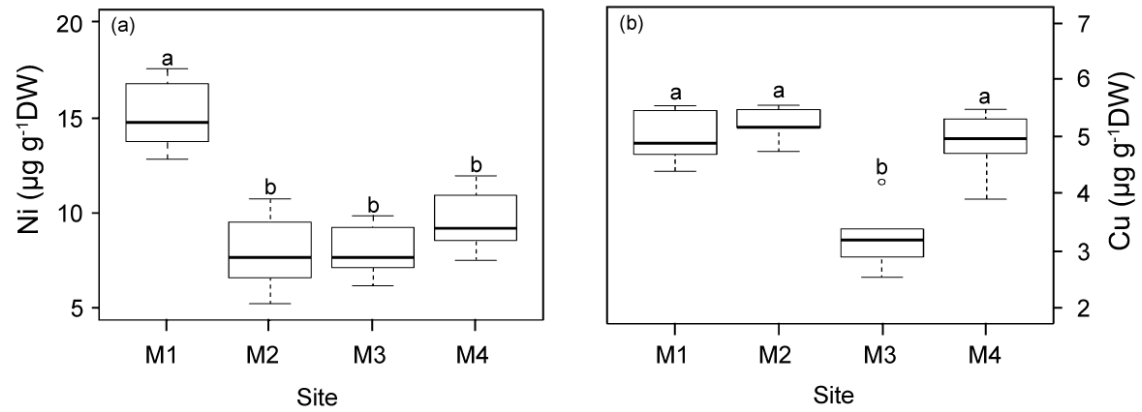
## Supplementary material



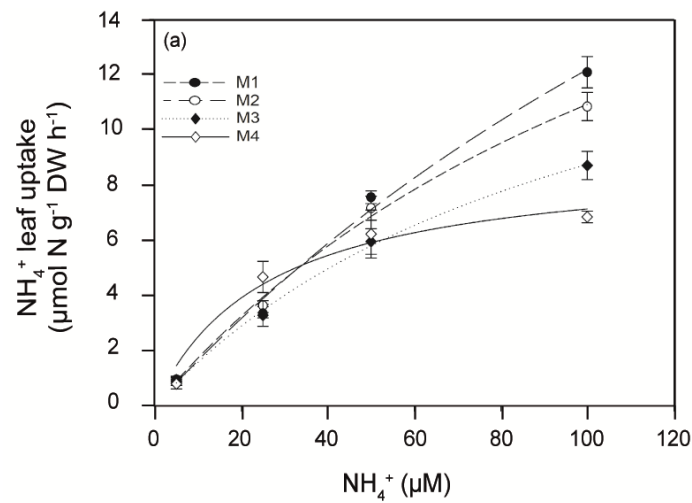
**Figure S1.** Daily PAR irradiance (E PAR; a and b) curves measured at the canopy level at the four sampling sites (M1–M4).



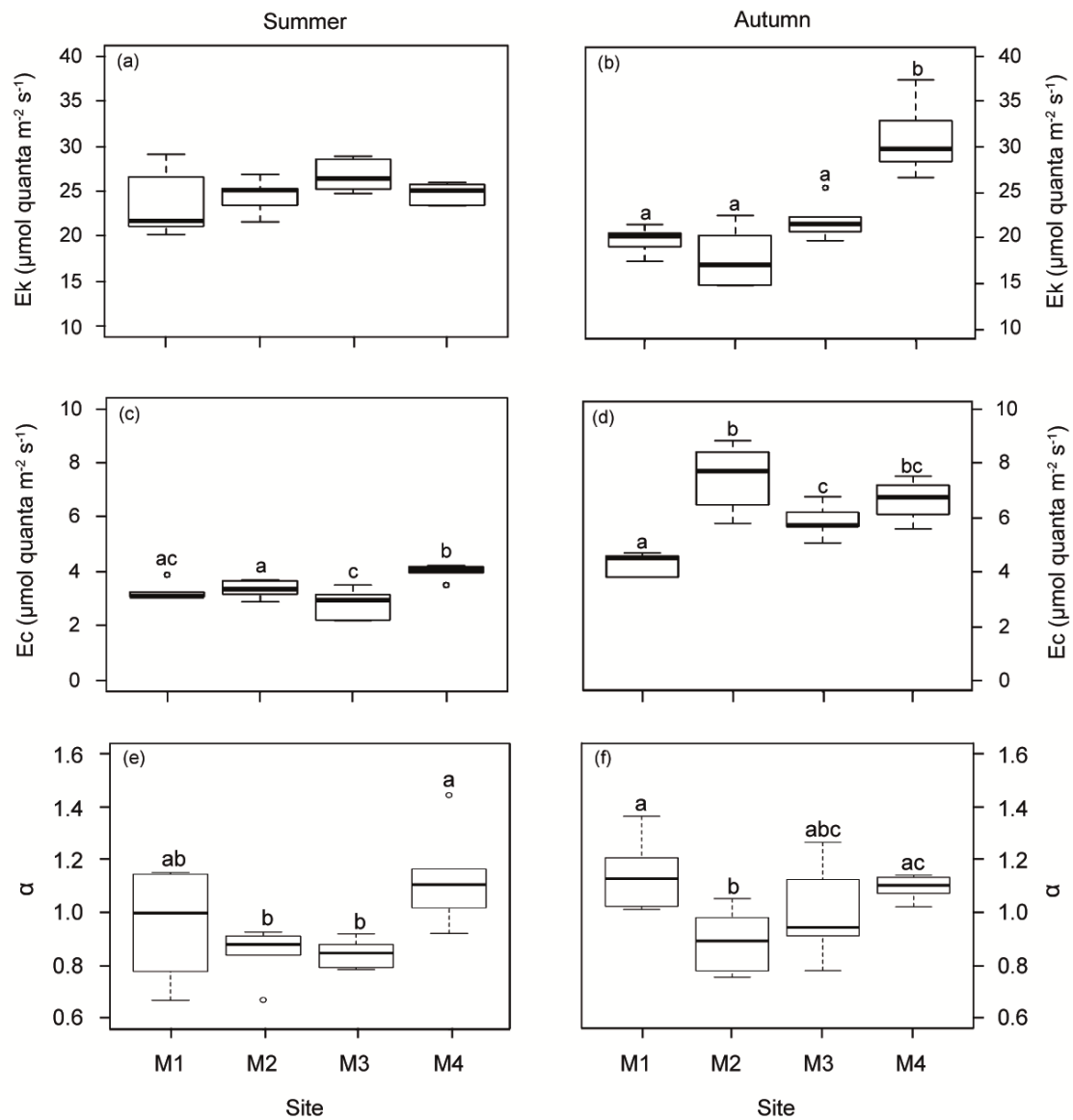
**Figure S2.** C/N ratio (a-b) and C/P ratio (c) measured in epiphytes and/or rhizome in autumn at the four sampling sites (M1–M4). Different letters denote significant differences among sites (Tukey test,  $p < 0.05$ ).



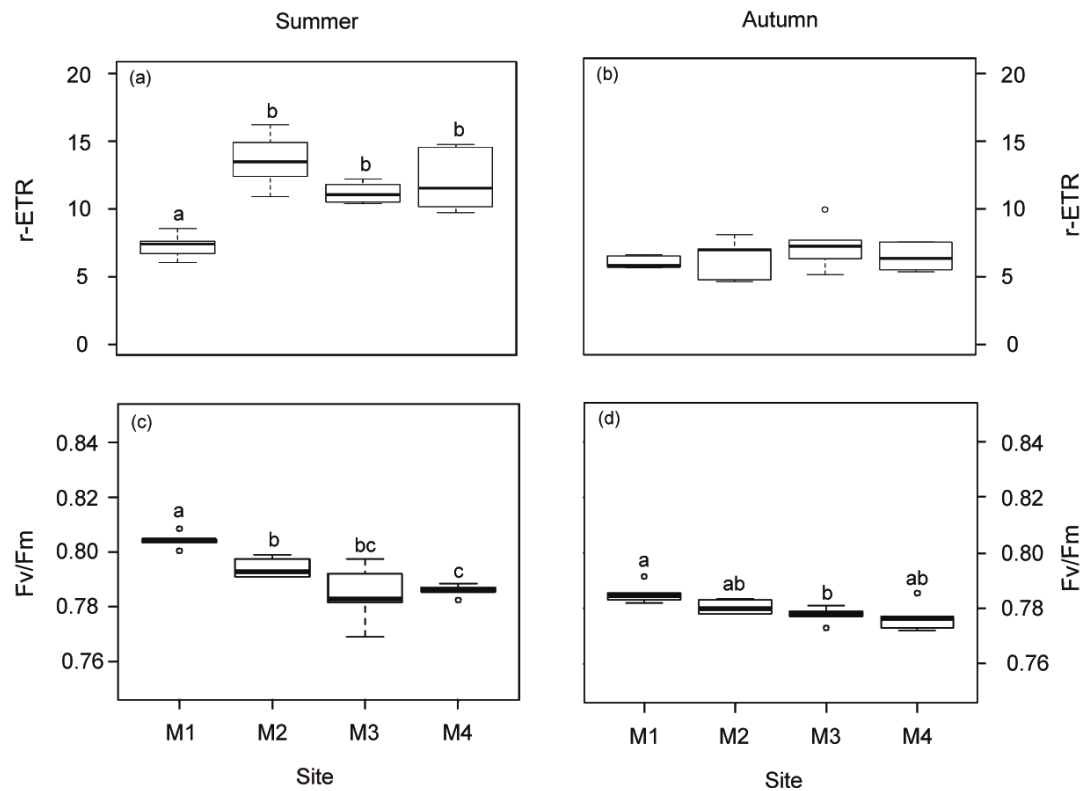
**Figure S3.** Metal content (Ni and Cu; a and b, respectively) measured in the rhizome in autumn at the four sampling sites (M1–M4). Letters denote significant differences among meadows (Tukey test,  $p < 0.05$ ).



**Figure S4.** Leaf uptake kinetics for  $\text{NH}_4^+$  at increasing concentration determined in *P. oceanica* in autumn at the four sampling sites (M1–M4). Uptake kinetics was adjusted by the Michaelis-Menten model. Values are means ( $n=6$ ) and standard error.



**Figure S5.** Saturation irradiance ( $E_k$ ; a and b), compensation irradiance ( $E_c$ ; c and d) and photosynthetic efficiency ( $\alpha$ ; e and f) in summer and autumn (left and right, respectively) at the four study sites (M1–M4). Different letters denote significant differences among sites (Tukey test,  $p < 0.05$ ).



**Figure S6.** Chlorophyll fluorescence emission measured on *P. oceanica* leaves. Relative electron transport rate (r-ETR; a and b) and maximum quantum yield of photosystem II (Fv/Fm; c and d) in summer and autumn (left and right, respectively) at the four study sites (M1–M4). Different letters denote significant differences among sites (Tukey test,  $p < 0.05$ ).

**Table S1.** Percentage of variance explained by axes I and II, and eigenvalues obtained for biotic indicators of external nutrients enrichment, and abiotic factors included in the Principal components analysis (PCA).

Variance	Axis I	Axis II
	84.80 %	11.27 %
Eigenvalue	Axis I	Axis II
Ni	-0.5516	-0.5464
Cu	-0.2150	-0.9070
% P	-0.6171	-0.5445
% N rhizome	-0.7142	-0.6742
$\delta^{15}\text{N}$ rhizome	-0.9158	0.2661
C/N rhizome	0.7255	0.6827
N epiphytes	-0.9699	-0.1287
$\delta^{15}\text{N}$ epiphytes	-0.9491	-0.3112
C/N epiphytes	0.8960	0.4384
C/P rhizome	0.7708	0.6081
$V_{\max}$	-0.9991	0.0425
$K_m$	-0.9874	0.1579
$\alpha_{\text{uptake}}$	0.8205	-0.5708
r-ETR	0.4496	0.8932
Fv/Fm	-0.9341	-0.3197

OM %	-0.9236	-0.0961
DPPF	0.8438	0.2891
Distance	0.9567	-0.2477