Supplementary materials

Table S1. Summary of methods used for elemental quantification in *H. physodes,* presenting the limit of quantification in the mineralized solution (LoQ [mg/L]), the LoQ recalculated for the lichen sample [LoQ [ug/g]), as well as the wavelength, analytical technique used for each element and CRM values (mean [ug/g] followed by SD and recovery [%] in brackets).

Element	LoQ [mg/L]	LoQ [µg/g]	Wavelength [nm]	Method	CRM
Ca	24.42	298.0	422.7	FAAS	-
Cd	0.53	6.47	228.8	FAAS	0.57 ± 0.04 (101.79)
Cu	0.36	4.39	324.8	FAAS	6.83 ± 0.63 (97.16)
Fe	29.91	365	248.3	FAAS	-
Hg	0.20*	0.0025	253.7	CV-AAS	0.47 ± 0.03 (97.92)
Pb	0.30	3.66	217.0	FAAS	41.23 ± 2.64 (100.81)
S	0.10	1.22	400	UV-VIS	-
Zn	6.06	73.93	213.9	FAAS	105.28 ± 7.5 (104.65)

* LoQ for Hg expressed in ng per sample.

Table S2. Influence of factors identified in the final GLM models (Table 3) on the condition of *H. physodes* collected in the Niepołomice Forest.

Variables	Factor	Estimate	SE	t value	p value
SOD	Season (Heating)	-3653	1712	-2.134	**0.042**
TBARS	Season (Heating)	-0.073	0.017	-4.312	<0.001
	Localization 2	-0.005	0.046	-0.098	0.924
	Localization 3	-0.007	0.046	-0.159	0.876
	Localization 4	0.024	0.046	0.509	0.619
	Localization 5	0.106	0.046	2.272	**0.039**
	Localization 6	0.040	0.046	0.865	0.401
	Localization 7	0.056	0.046	1.200	0.250
	Localization 8	0.164	0.046	3.526	**0.003**
	Localization 9	0.036	0.046	0.771	0.453
	Localization 10	0.073	0.046	1.569	0.139
	Localization 11	0.122	0.046	2.625	**0.020**
	Localization 12	0.062	0.046	1.331	0.204
	Localization 13	0.059	0.046	1.266	0.226
	Localization 14	0.031	0.046	0.669	0.514
	Localization 15	0.088	0.046	1.891	0.079

Bold indicates significant differences ($p < 0.05$).

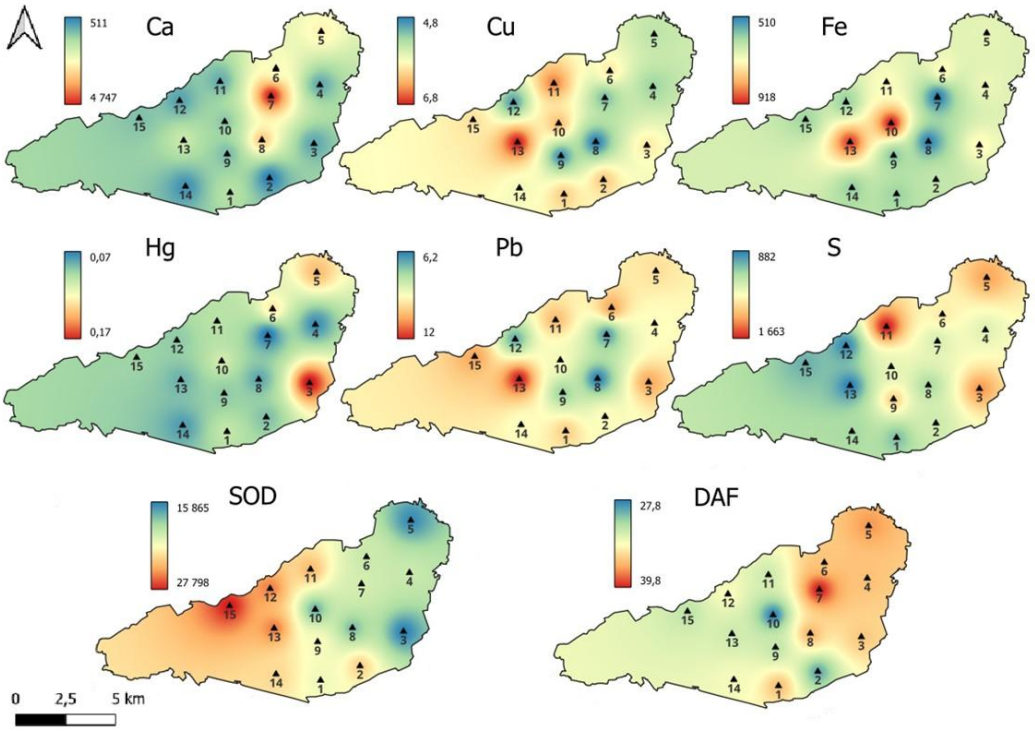

Figure S1. Spatial distribution of Ca, Cu, Fe, Hg, Pb, S [µg/g], SOD [AU], and dead algae fraction [%] in the Niepołomice Forest.

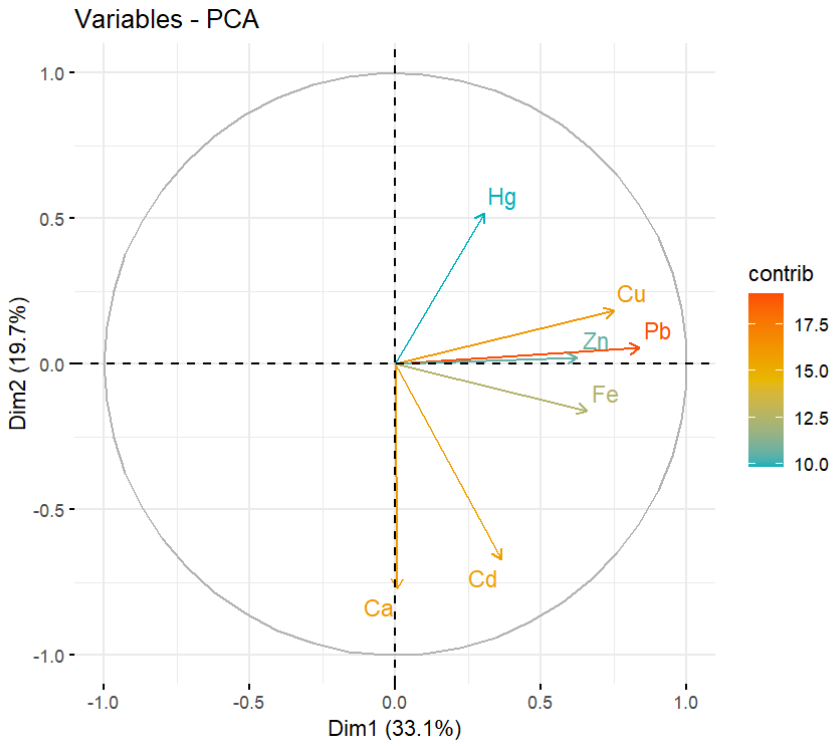

Figure S2. Principal Component Analysis (PCA) biplot of metals, showing their contribution to the first two principal components. Coordinates of the first component (Dim 1) were used as a proxy for metal burden in the GLM models.

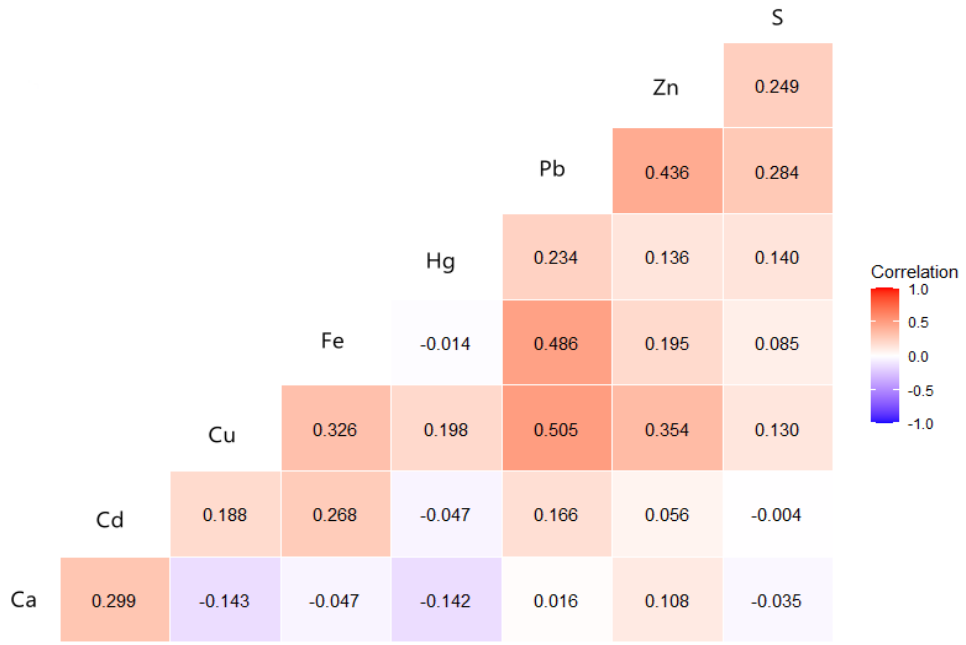

Figure S3. Correlation matrix heatmap presenting Pearson's r coefficients for the relationships between measured elements in *H. physodes*.