

## Supplementary materials

### Statistical analyses

With regard to the environmental parameters, due to data dependence between sampling times it was not possible to use the ANOVA test to analyse data obtained at the beginning and at the end of the experiment [73]. Therefore, dependent sample *t*-tests were used to compare N, P, pH and conductivity between T0 and Tf for each species and treatment [74]. Moreover, two two-way ANOVAs were run to test for differences in the depletion of the two elements among species (2 levels, orthogonal and fix, *L. major* vs *L. cordofanus*) and treatments (4 levels, orthogonal and fix, A vs B vs C vs D).

Data regarding the functional traits for the two species were also analysed with the ANOVA test. In particular, five one-way ANOVAs for each species were performed to test for differences in the aforementioned traits (excluding the root number and length) among trophy conditions (4 levels, fixed) at the end of the experiment. For the number and the length of roots, instead, only the ANOVAs with data regarding *L. major* were run (one-way ANOVA, treatment, 4 levels fixed), as no data for *L. cordofanus* were available.

Cochran's tests were run prior to each ANOVA to test for homogeneity of variances and normality was assured by Kolmogorov-Smirnov test. Finally, Student–Newman–Keuls (SNK) tests were used for a posteriori comparison in case of significant ANOVA results, testing all the possible pairs of means computed on the considered groups [73].

## Results of the statistical analyses

### *Environmental parameters*

Table S1 – Results of dependent sample *t*-tests used to compare N, P, pH and conductivity between T0 and Tf for each species and treatment.

<i>Treatment</i>		<i>t</i>	<i>P</i>
<b>Nitrogen</b>			
A	<i>L. major</i>	0.57	0.0002
A	<i>L. cordofanus</i>	0.29	0.0004
B	<i>L. major</i>	0.76	0.0007
B	<i>L. cordofanus</i>	3.47	0.0003
C	<i>L. major</i>	0.98	0.0005
C	<i>L. cordofanus</i>	0.06	0.0007
D	<i>L. major</i>	1.88	0.0002
D	<i>L. cordofanus</i>	0.75	0.0012
<b>Phosphorous</b>			
A	<i>L. major</i>	1.89	0.0008
A	<i>L. cordofanus</i>	0.07	0.0009
B	<i>L. major</i>	0.89	0.0001
B	<i>L. cordofanus</i>	3.96	0.0002
C	<i>L. major</i>	0.76	0.0006
C	<i>L. cordofanus</i>	1.67	0.0004
D	<i>L. major</i>	1.56	0.0008
D	<i>L. cordofanus</i>	0.98	0.0003
<b>pH</b>			
A	<i>L. major</i>	0.65	0.0001
A	<i>L. cordofanus</i>	0.78	0.0001
B	<i>L. major</i>	1.87	0.0001
B	<i>L. cordofanus</i>	1.43	0.0003
C	<i>L. major</i>	1.71	0.0005
C	<i>L. cordofanus</i>	1.29	0.0007
D	<i>L. major</i>	1.01	0.0004
D	<i>L. cordofanus</i>	1.76	0.0003
<b>Conductivity</b>			
A	<i>L. major</i>	0.67	0.0004
A	<i>L. cordofanus</i>	1.56	0.0002
B	<i>L. major</i>	2.89	0.0004
B	<i>L. cordofanus</i>	2.95	0.0007
C	<i>L. major</i>	0.45	0.0004
C	<i>L. cordofanus</i>	2.54	0.0002
D	<i>L. major</i>	1.08	0.0004
D	<i>L. cordofanus</i>	0.78	0.0002

Table S2 – Results of the ANOVAs and SNKs to test for differences in N and P depletion among treatments (tA vs tB vs tC vs tD) and species (*L. major* (Lm) vs *L. cordofanus* (Lc)). Significant results are given in bold.

ANOVA		Nitrogen		Phosphorus	
Source	df	F	P	F	P
Treatment (Tr)	3	25.67	<b>0.0432</b>	36.99	<b>0.038</b>
Species (Sp)	1	1.26		1.89	
TrxSp	3	1.67		1.92	
Residual	16				
Total	23				
Cochran test		C=0.4484		C=0.8546	
SNK test		SE= 112.2989		SE=131.89	
		<b>Treatment</b> <sub>(species)</sub>		<b>Treatment</b> <sub>(species)</sub>	
		Lm A=C<B=D		Lm A=B<C=D	
		Lc A=C<B=D		Lc A=B<C=D	
		<b>Species</b> <sub>(treatment)</sub>		<b>Species</b> <sub>(treatment)</sub>	
		A Lm = Lc		A Lm = Lc	
		B Lm = Lc		B Lm = Lc	
		C Lm = Lc		C Lm = Lc	
		D Lm = Lc		D Lm = Lc	

### Functional traits

Table S3 – Results of the ANOVAs and SNKs to test for differences in each of the considered functional traits in relation to the species (*L. major* (Lm) vs *L. cordofanus* (Lc)) and the applied treatment (tA vs tB vs tC vs tD) at the end of the experiment. Significant results are given in bold.

ANOVA		Apical shoot length increase		Lateral shoot n° increase		Lateral shoot length increase	
Source	df	F	P	F	P	F	P
Treatment (Tr)	3	13.53	<b>0.0000</b>	5.45	<b>0.0021</b>	11.89	<b>0.0036</b>
Species (Sp)	1	9.64	<b>0.0012</b>	11.45	<b>0.0034</b>	12.89	<b>0.0021</b>
TrxSp	3	9.42	<b>0.0045</b>	10.42	<b>0.0021</b>	8.91	<b>0.0028</b>
Residual	16						
Total	23						
Cochran test		C=0.5323		C=0.6612		C=0.7123	
SNK test		SE= 64.8397		SE=0.082		SE=115.2134	
		<b>Treatment</b> <sub>(species)</sub>		<b>Treatment</b> <sub>(species)</sub>		<b>Treatment</b> <sub>(species)</sub>	
		Lm B<A=C=D		Lm B=C=A<D		Lm B=C=A<D	
		Lc D<B=C<A		Lc B<A=D<C		Lc B<A=D<C	
		<b>Species</b> <sub>(treatment)</sub>		<b>Species</b> <sub>(treatment)</sub>		<b>Species</b> <sub>(treatment)</sub>	
		A Lc < Lm		A Lc < Lm		A Lc < Lm	
		B Lc < Lm		B Lc < Lm		B Lc < Lm	
		C Lc < Lm		C Lm = Lc		C Lc < Lm	
		D Lc < Lm		D Lc < Lm		D Lc < Lm	

  

ANOVA		Final dry weight increase		Survival (%)		Branching degree	
Source	df	F	P	F	P	F	P
Treatment (Tr)	3	0.50	<b>0.0213</b>	4.76	<b>0.0325</b>	8.43	<b>0.0213</b>
Species (Sp)	1	1.23	<b>0.0021</b>	7.98	<b>0.0027</b>	10.42	<b>0.0045</b>
TrxSp	3	2.87	<b>0.0045</b>	11.32	<b>0.0043</b>	11.43	<b>0.0034</b>
Residual	16						
Total	23						
Cochran test		C=0.1243		C=0.1741		C=0.9345	
SNK test		SE= 123.5654		SE=0.5673		SE=78.9213	
		<b>Treatment</b> <sub>(species)</sub>		<b>Treatment</b> <sub>(species)</sub>		<b>Treatment</b> <sub>(species)</sub>	
		Lm B<A=C=D		Lm A=C=B=D		Lm C<A=B<D	
		Lc A=B<C=D		Lc C=D<A=B		Lc B<A<D<C	
		<b>Species</b> <sub>(treatment)</sub>		<b>Species</b> <sub>(treatment)</sub>		<b>Species</b> <sub>(treatment)</sub>	
		A Lc < Lm		A Lc < Lm		A Lc < Lm	
		B Lc < Lm		B Lc < Lm		B Lc < Lm	
		C Lc < Lm		C Lc < Lm		C Lc > Lm	
		D Lc < Lm		D Lc < Lm		D Lc < Lm	

Table S4 – Results of the ANOVAs and SNKs to test for differences in the root number and length for *L. major* (Lm) in relation to treatments (tA vs tB vs tC vs tD) at the end of the experiment. Significant results are given in bold.

ANOVA		Root number		Root number	
Source	df	P	P	F	P
Treatment (Tr)	3	0.0325	<b>0.0000</b>	4.76	<b>0.0325</b>
Residual	8				
Total	11				
Cochran test		C=0.1567		C=0.1567	
SNK test		SE=0.4127		SE=0.4127	
		<b>Treatment<sub>(species)</sub></b>		<b>Treatment<sub>(species)</sub></b>	
		B<C=A<D		B<C=A<D	

## References

73. Underwood, A. *Experiments in Ecology: Their Logical Design and Interpretation Using Analysis of Variance*. Cambridge University Press: Cambridge, 1996.
74. Gerald, B. A brief review of independent, dependent and one sample t-test. *International journal of applied mathematics and theoretical physics* **2018**, 4(2), 50-54.