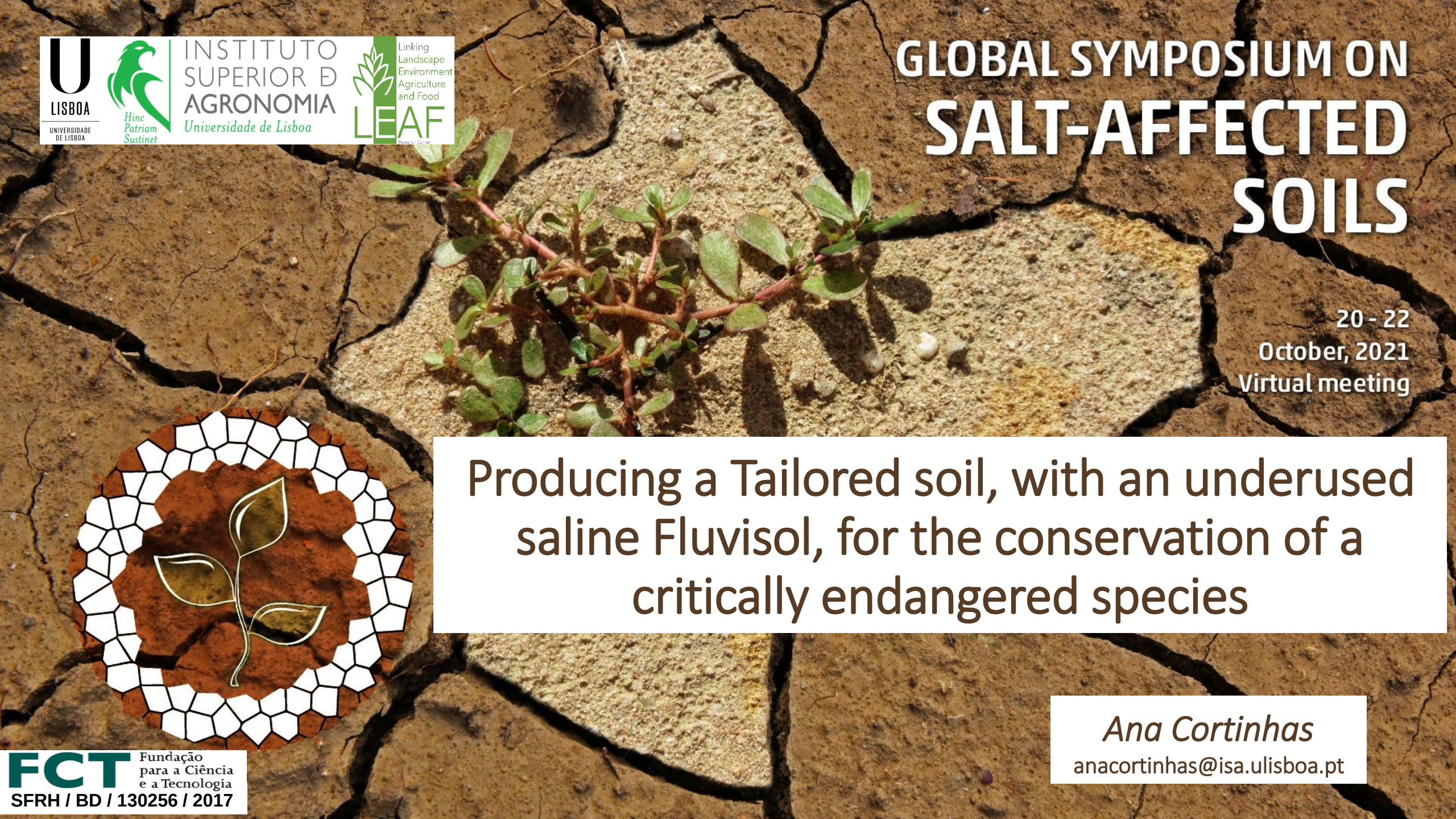

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Linking Landscape Environment Agriculture and Food
LEAF Research Center

Producing a Tailored soil, with an underused saline Fluvisol, for the conservation of a critically endangered species

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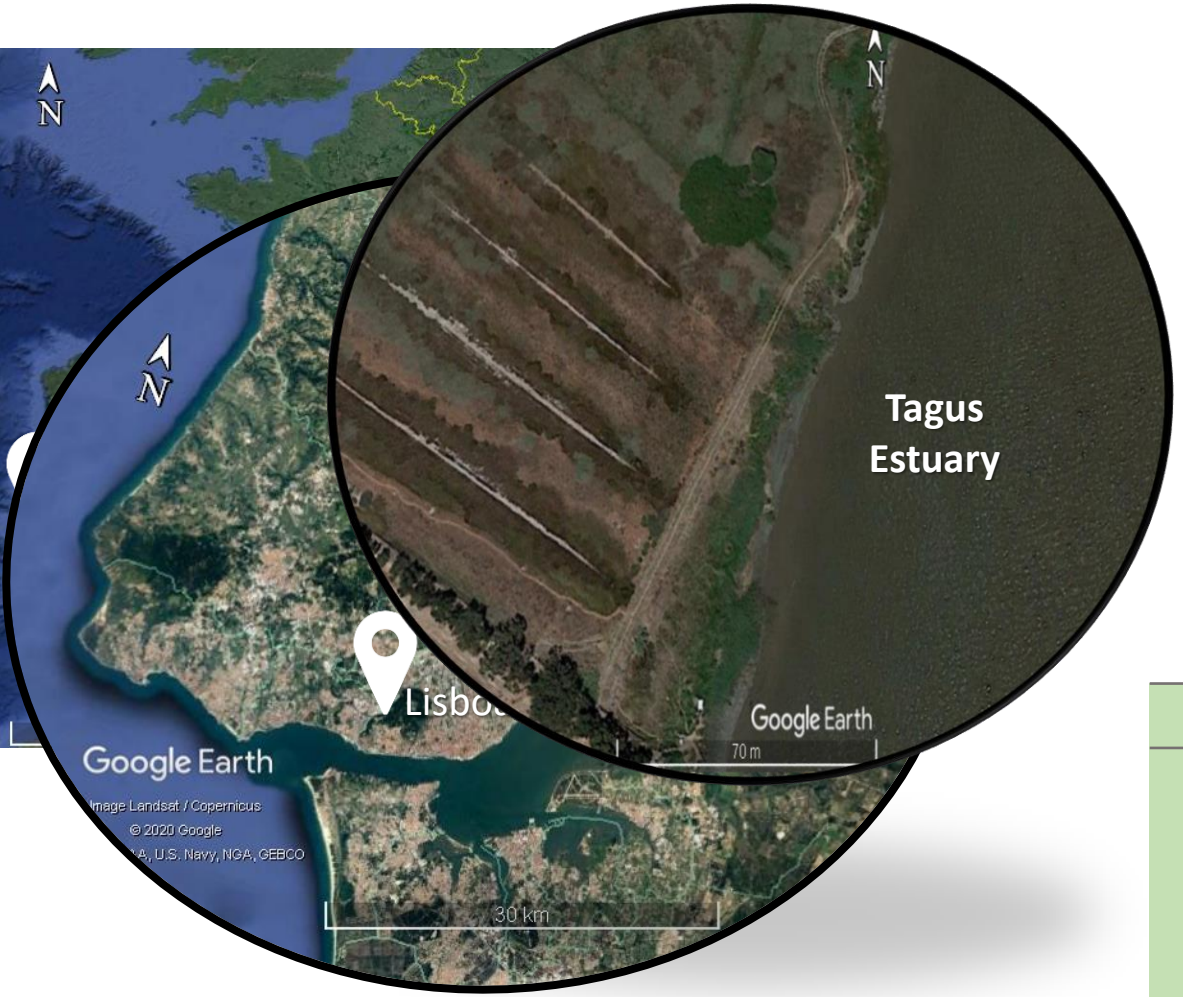
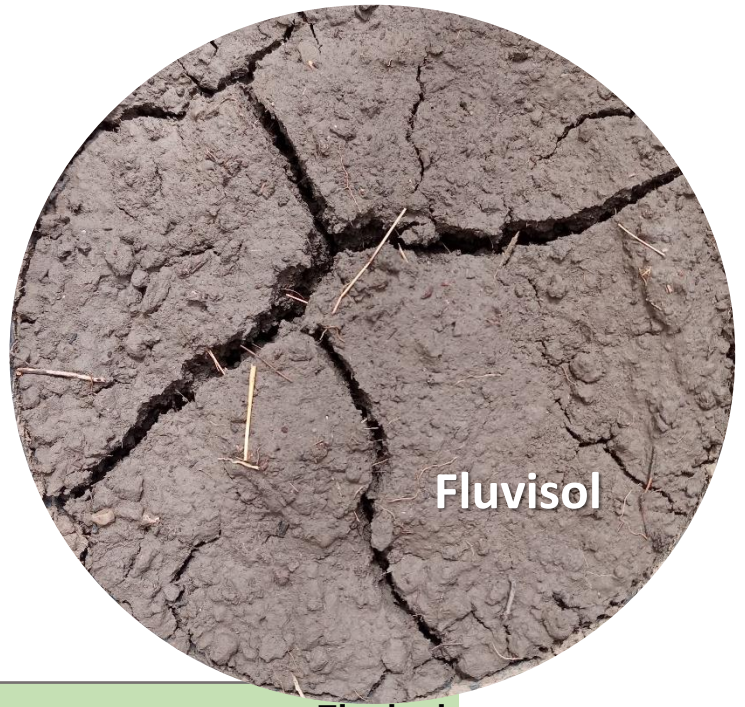
FCT Fundação para a Ciência e a Tecnologia
SFRH / BD / 130256 / 2017

Limonium daveuai Erben

- Critically endangered Lusitanian endemism
- In the past, widespread in the Tagus estuary (SW Portugal, SW Europe)
- Currently, it is narrowly distributed in this area
- Deterioration of its habitat:
  - invasive species (e.g., *Carpobrotus edulis*)
  - anthropic pressures (e.g., industries)

(Caperta and Carapeto, 2020)





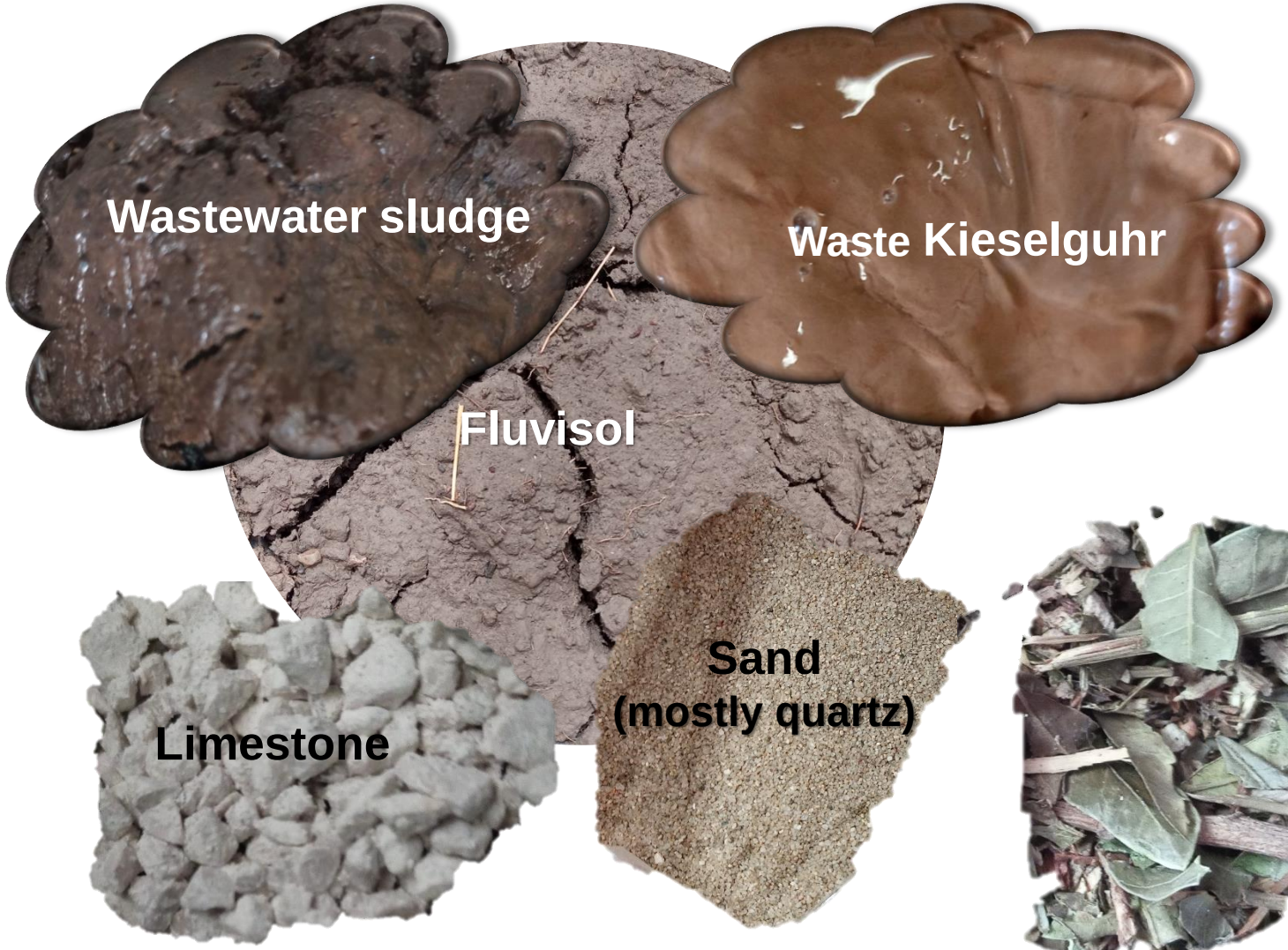
Estuarine water

Parameters	Fluvisol
pH	8.03
EC (mS/cm)	5.60
Organic C (g/kg)	19.95
Ntotal (g/kg)	1.69
Kextractable (g/kg)	0.85
Pextractable (g/kg)	0.01
ESP* (%)	25.10

*Exchange sodium percentage

Chemical characteristics of estuarine water	
pH	7.78
E.C. (mS/cm)	22.03
Cl^- (mmol/L)	207
HCO_3^- (mmol/L)	4.37
Na^+ (mmol/L)	187
Ca^{2+} (mmol/L)	5.24
Mg^{2+} (mmol/L)	22.14
SAR*	35.43

*Sodium adsorption ratio



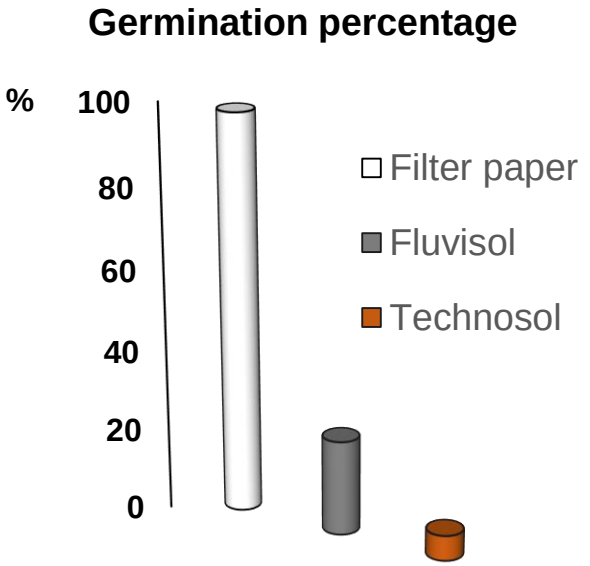
Parameters	Amendments	
	Wastewater sludge	Waste Kieselguhr
pH	8.47	7.17
EC (mS/cm)	3.18	0.77
Corg (g/kg)	223.13	31.33
Ntotal (g/kg)	46.48	7.13
Extractable K (g/kg)	3.55	0.12
Extractable P (g/kg)	1.05	0.15

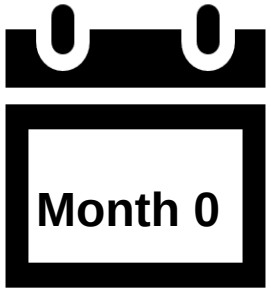
Prunning Residuals

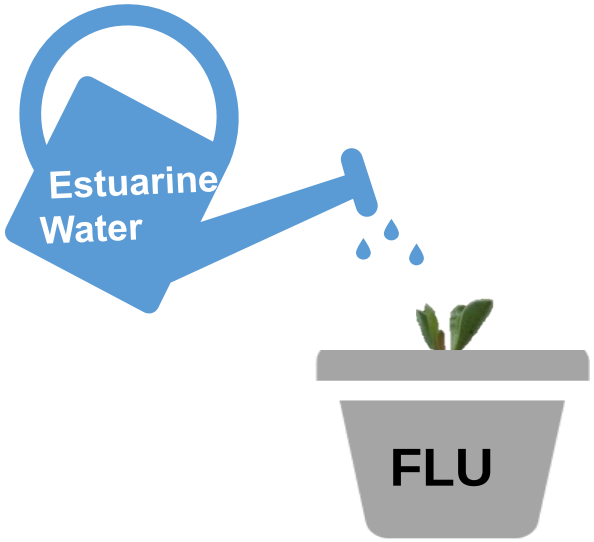
source of C and other nutrients in the long run by slow mineralization

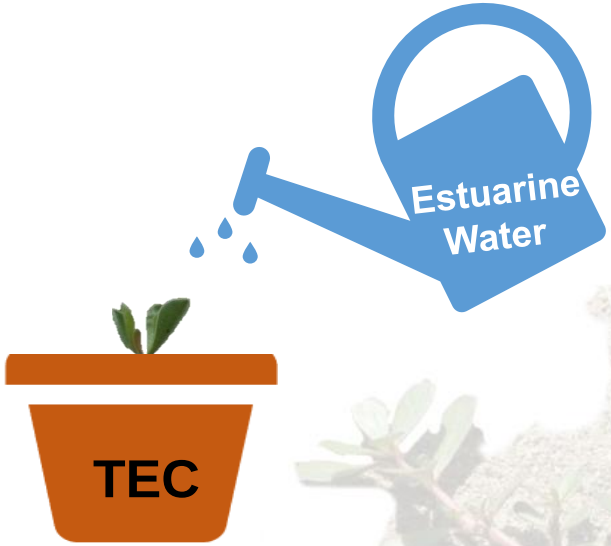
Improve the soil texture/aggregation enhancing its permeability

Parameters	Technosol
pH	7.92
EC (mS/cm)	5.96
Organic C (g/kg)	26.76
Ntotal (g/kg)	2.50
Kextractable (g/kg)	1.20
Pextractable (g/kg)	0.12







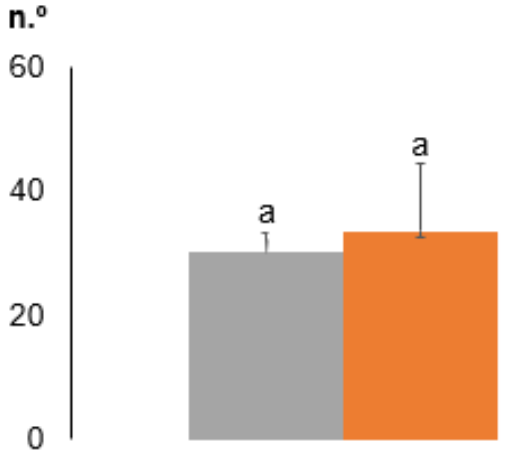


- Scape length
- Leaf number
- Leaf length
- Leaf width
- Dry Biomass

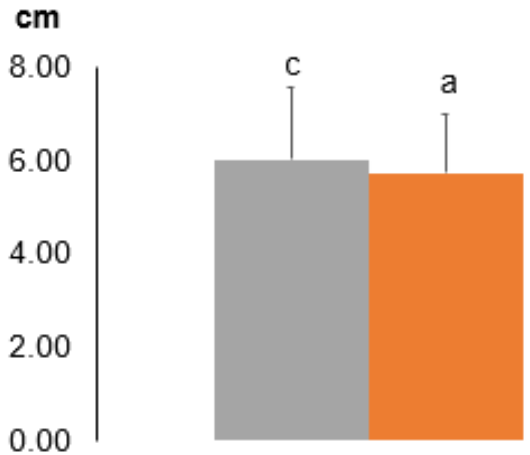
Month 8

Fluvisol Technosol

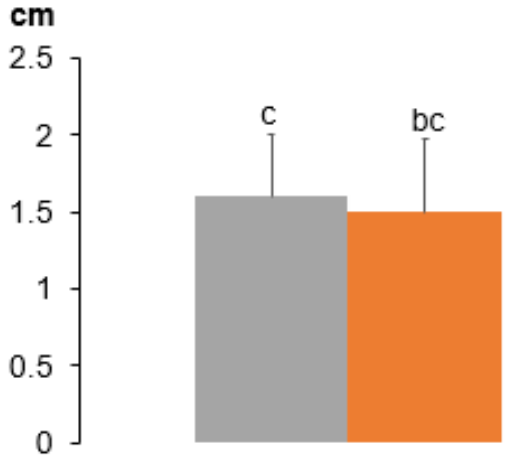
Leaf number



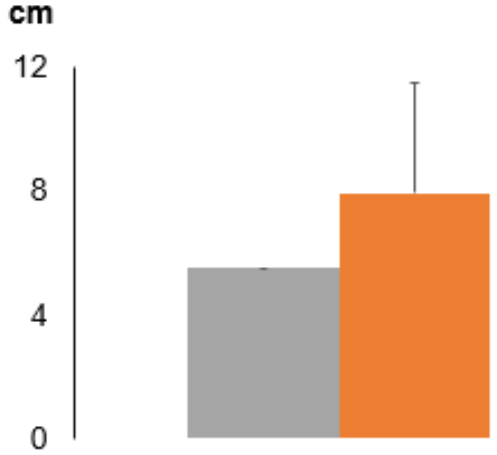
Leaf Length



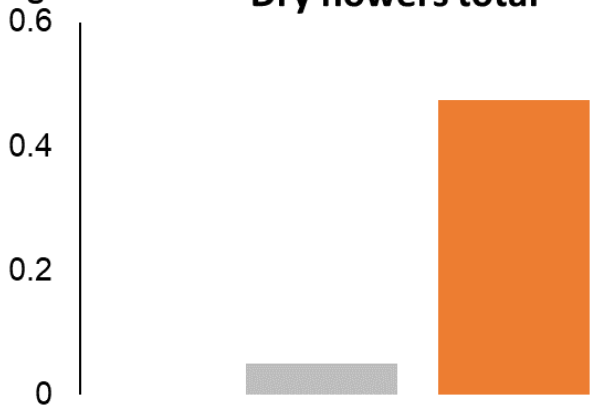
Leaf Width



Scape length

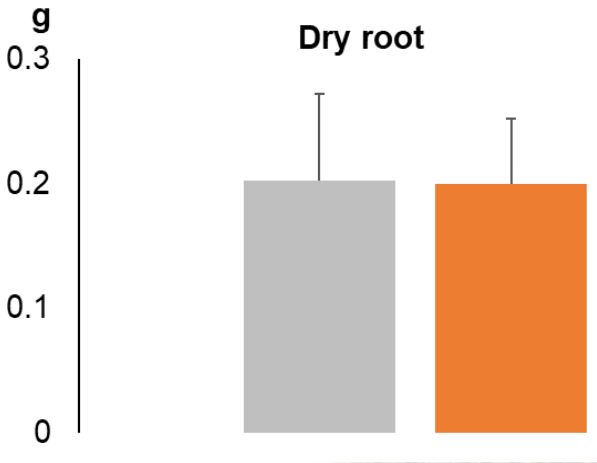


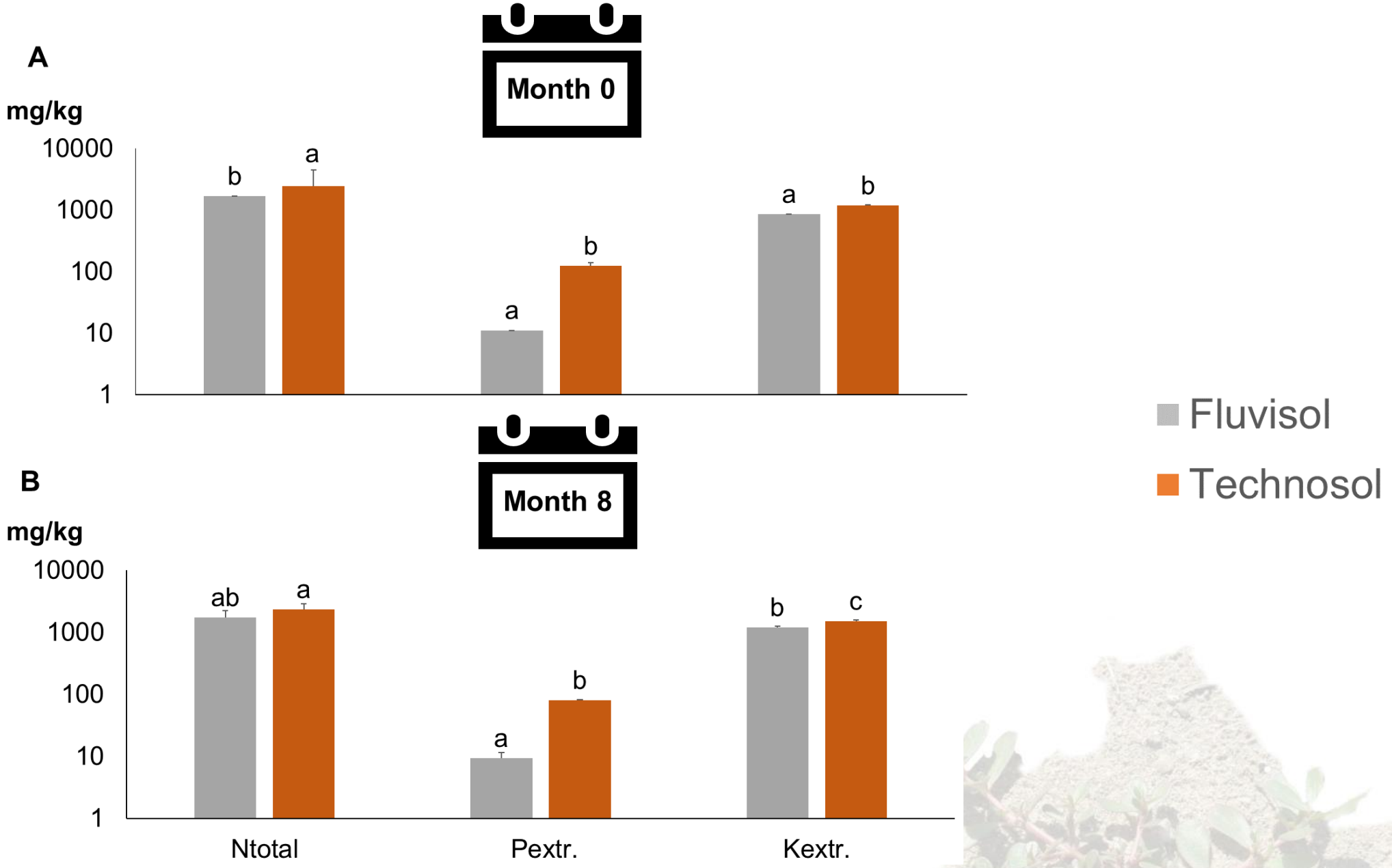
Dry flowers total



Dry aerial part

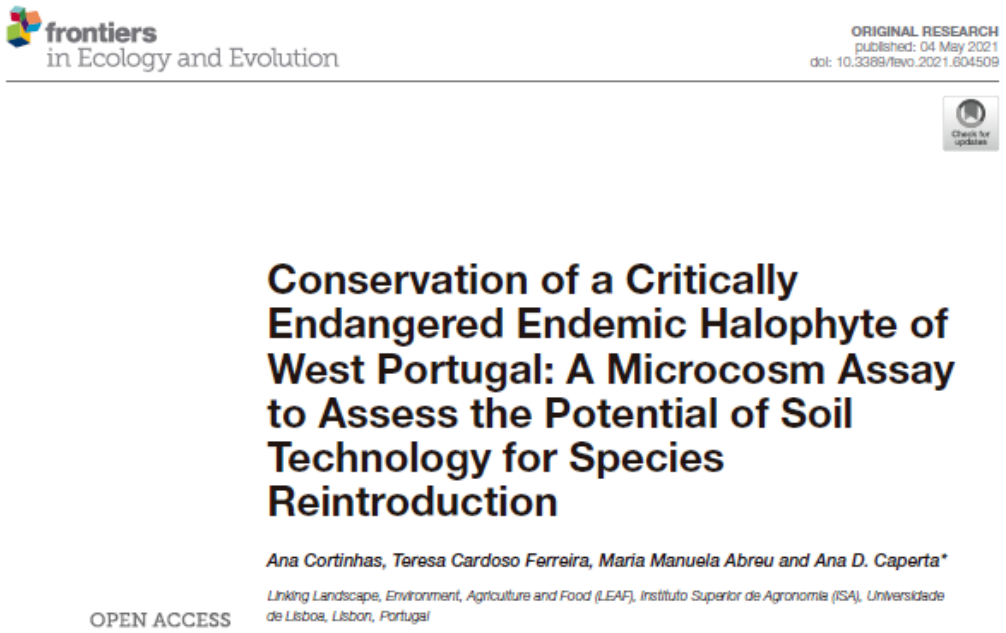
Dry root




A
Month 0
mg/kg
10000
1000
100
10
1
b
a
a
b
a
b
B
Month 8
mg/kg
10000
1000
100
10
1
ab
a
a
b
b
c
Ntotal
Pextr.
Kextr.
Fluvisol
Technosol

- The total absence of salinity is the most favourable condition for *L. daveaui* germination
- The deficient Fluvisol structure, due to colloid dispersion, is an obstacle to roots penetration and oxygen circulation harming the plant development
- The Technosol substrate, rich in essential nutrients and with better texture and structure to plants allowed a better plant development.
- The plants cultivated in Technosol had a higher vegetative and reproductive growth and have more flowers production than in Fluvisol.

This study demonstrates this soil technology that uses wastes and underused resources has an enormous potential in the reintroduction success of this species, contributing to a circular economy too.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Conservation of a Critically Endangered Endemic Halophyte of West Portugal: A Microcosm Assay to Assess the Potential of Soil Technology for Species Reintroduction

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