biospain 2014
7th INTERNATIONAL MEETING ON BIOTECHNOLOGY

Sociedad Española de Ciencias Forestales
YSECF

Will we be able to modulate stress tolerance in woody plants in the near future?

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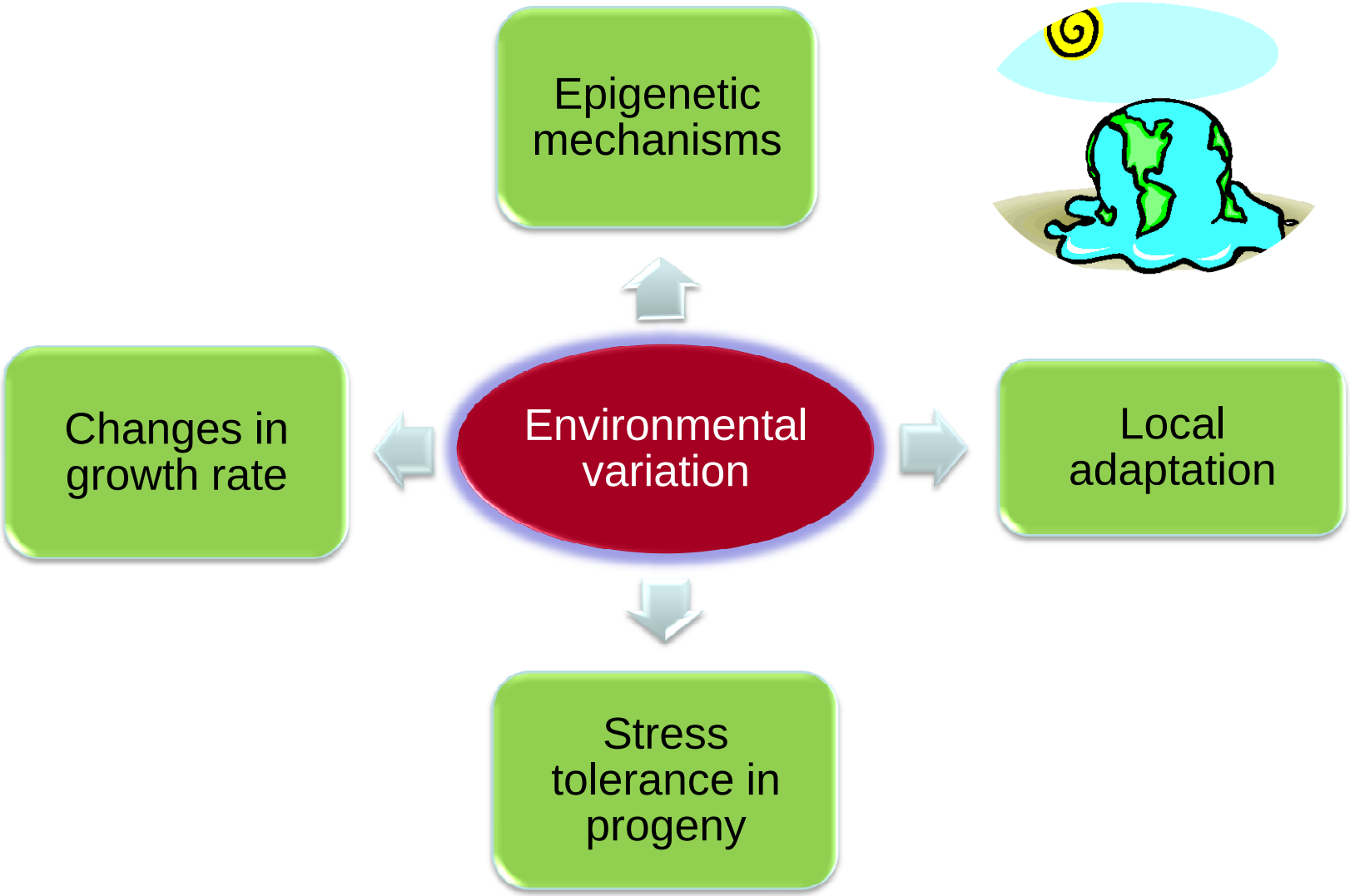
Montalbán I.A.
Moncaleán P.

Santiago de Compostela (España), 2014

Current situation: What can we do?



Biotechnological tool

Somatic embryogenesis

Cell lines → Great amount of clonal plants → *Ex vitro* adaptation

Can we modulate the capacity of plants to tolerate stress?

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Objective

- To be able to modulate the characteristics of the plantlets produced by manipulating the environmental conditions during the somatic embryogenesis process

- To analyse the different responses to drought stress in these plants

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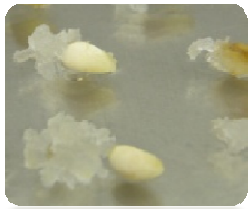
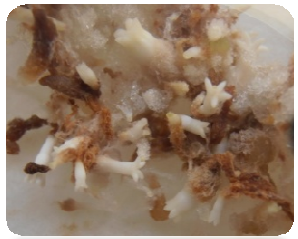
Material and methods

Initiation | Proliferation | Maturation | Germination





18 ºC

2 g L^{-1}
3 g L^{-1}
4 g L^{-1}

23 ºC

2 g L^{-1}
3 g L^{-1}
4 g L^{-1}

28 ºC

2 g L^{-1}
3 g L^{-1}
4 g L^{-1}

2880 megagametophytes
124 embryogenic cell lines maturated

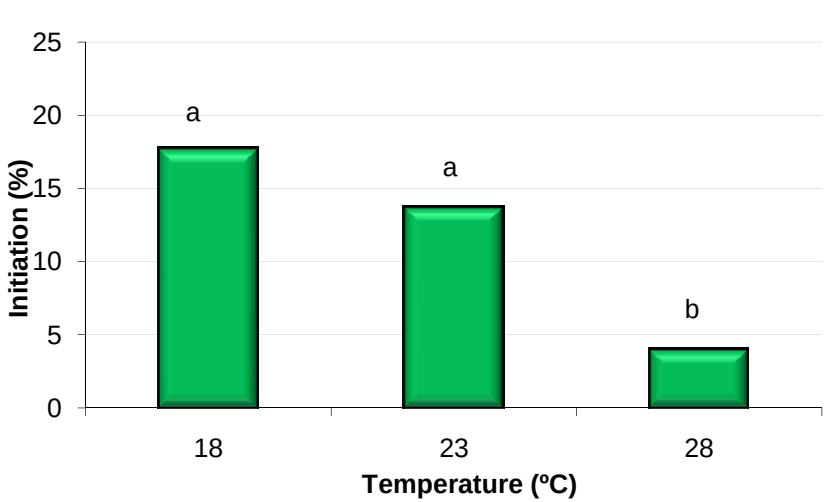
Same culture conditions

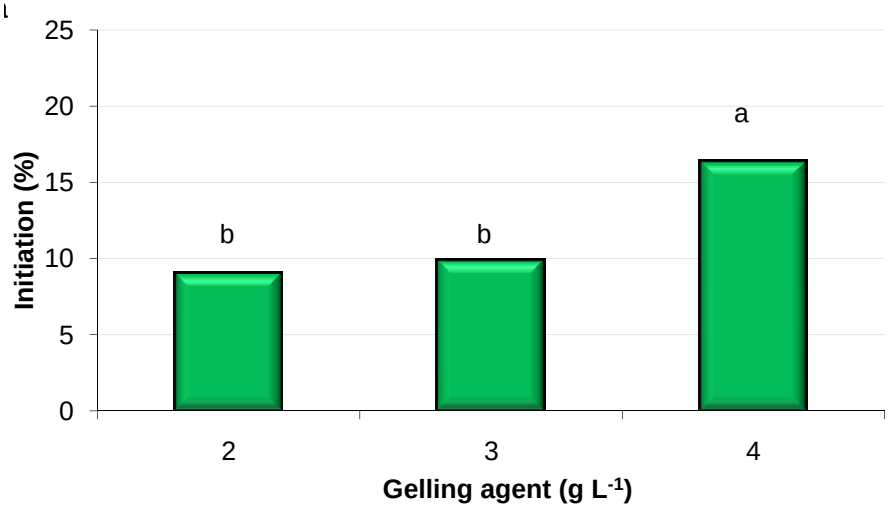
EDM

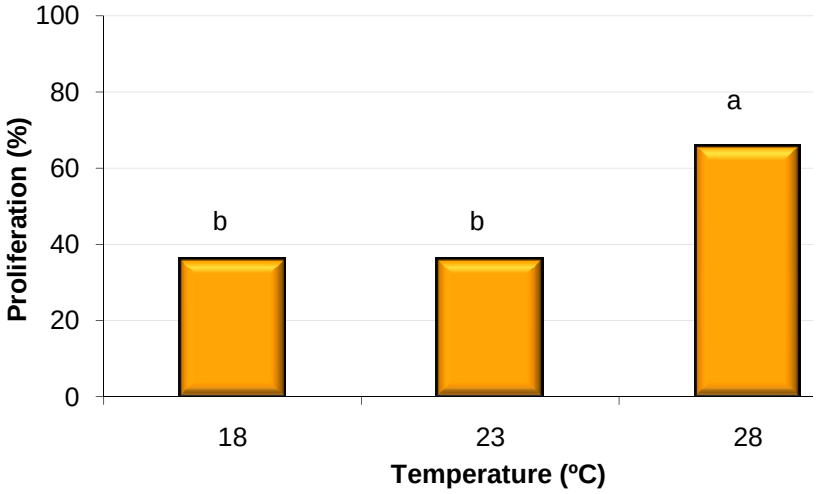
23ºC

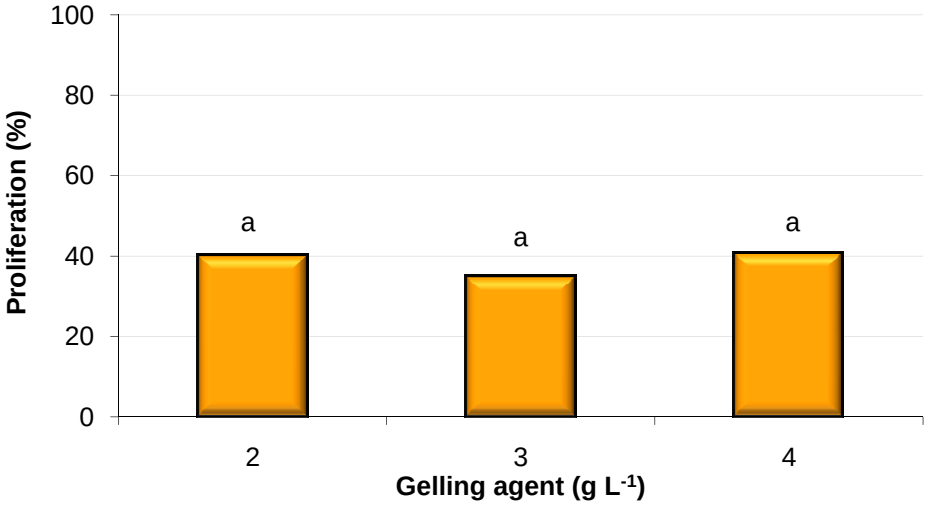
4,5 g L^{-1} | 9 g L^{-1} | 7 g L^{-1}

Results

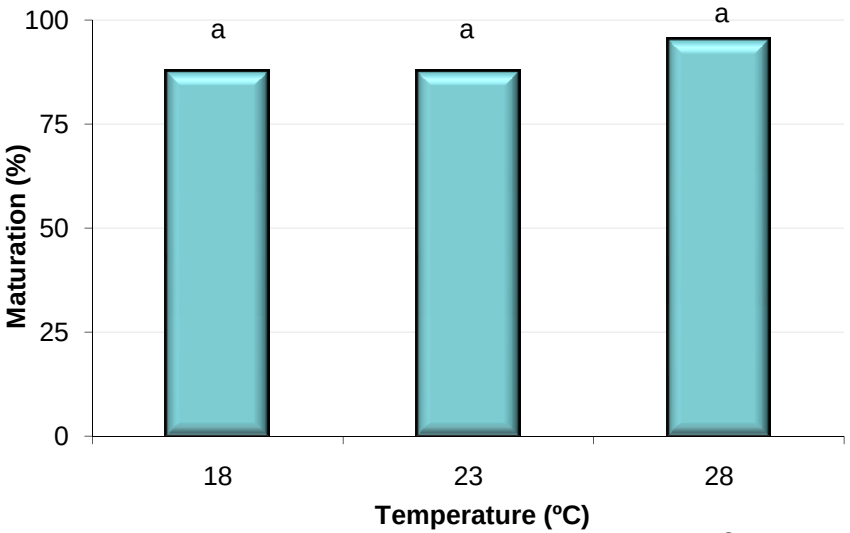

Initiation (%)
25
20
15
10
5
0
a
a
b
18
23
28
Temperature (ºC)

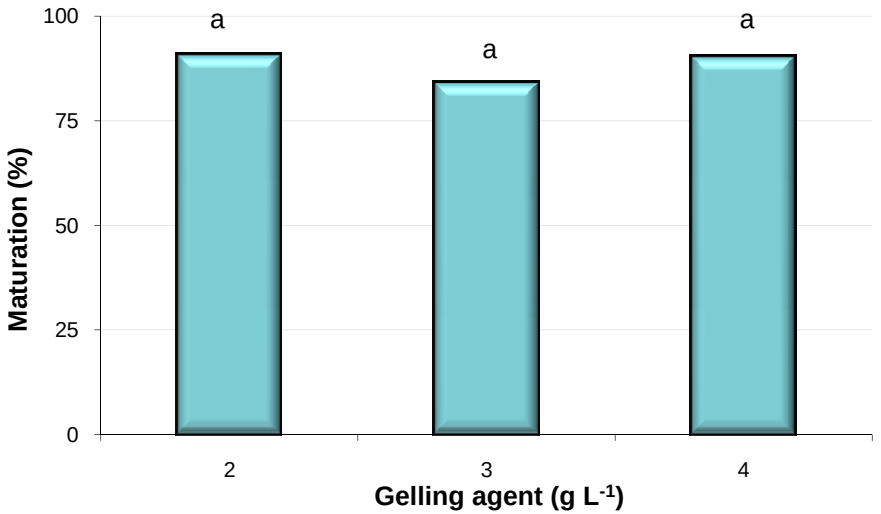

Initiation (%)
25
20
15
10
5
0
b
b
a
2
3
4
Gelling agent (g L-1)

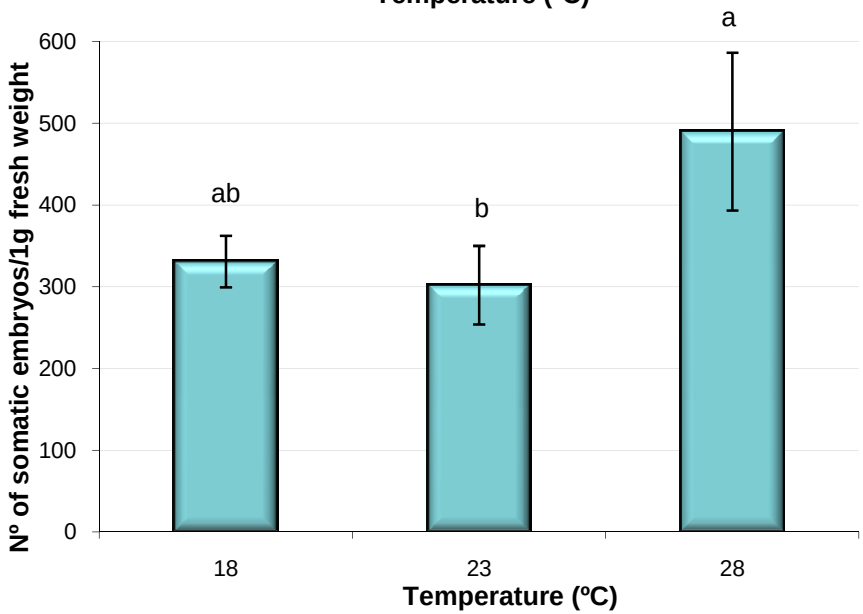

Proliferation (%)
100
80
60
40
20
0
b
b
a
18
23
28
Temperature (ºC)

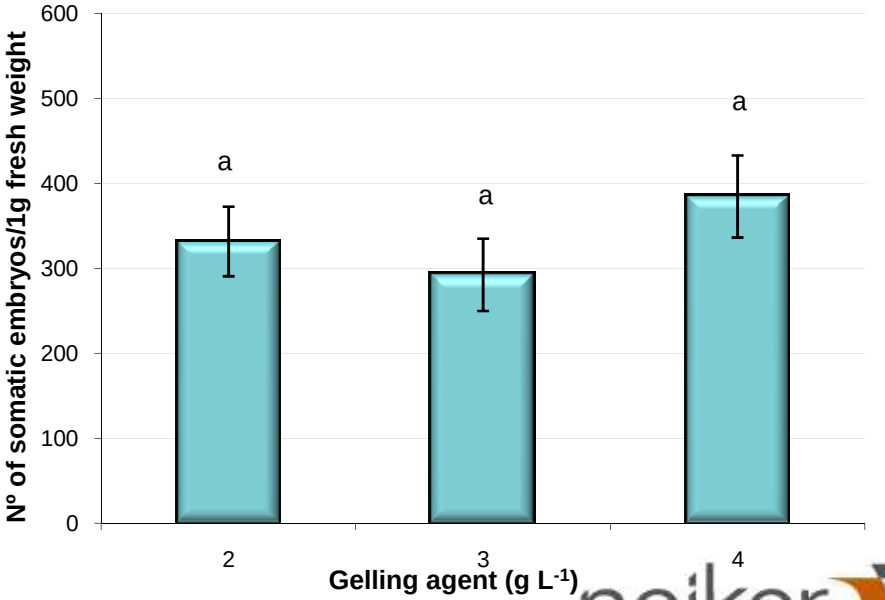

Proliferation (%)
100
80
60
40
20
0
a
a
a
2
3
4
Gelling agent (g L-1)

Results









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Scheme of Drought Experiment

Initiation

18º C

23º C

28º C

Proliferation, Maturation and Germination

Same culture conditions

Control plants

Stressed plants

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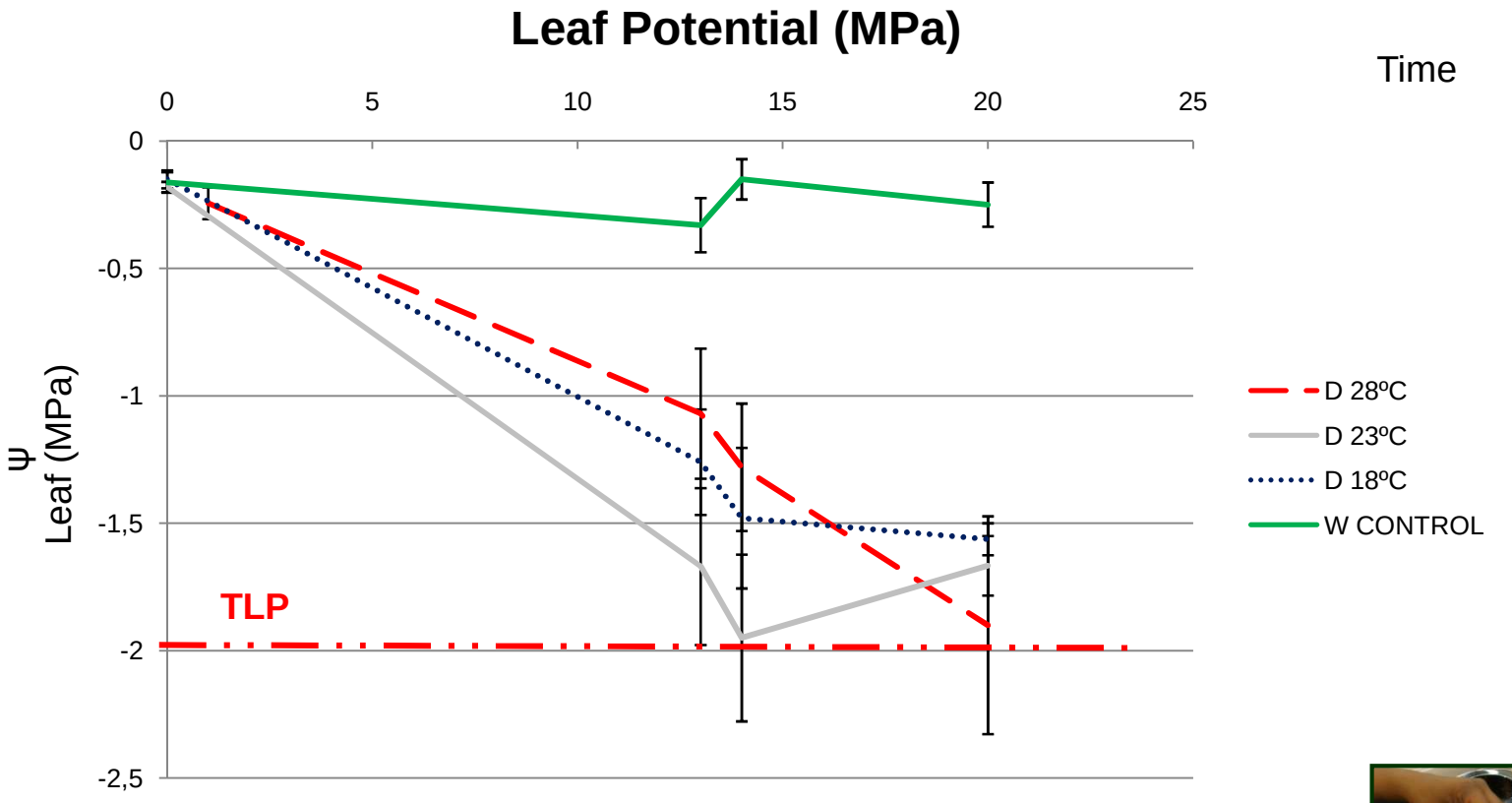
Water potential measurements



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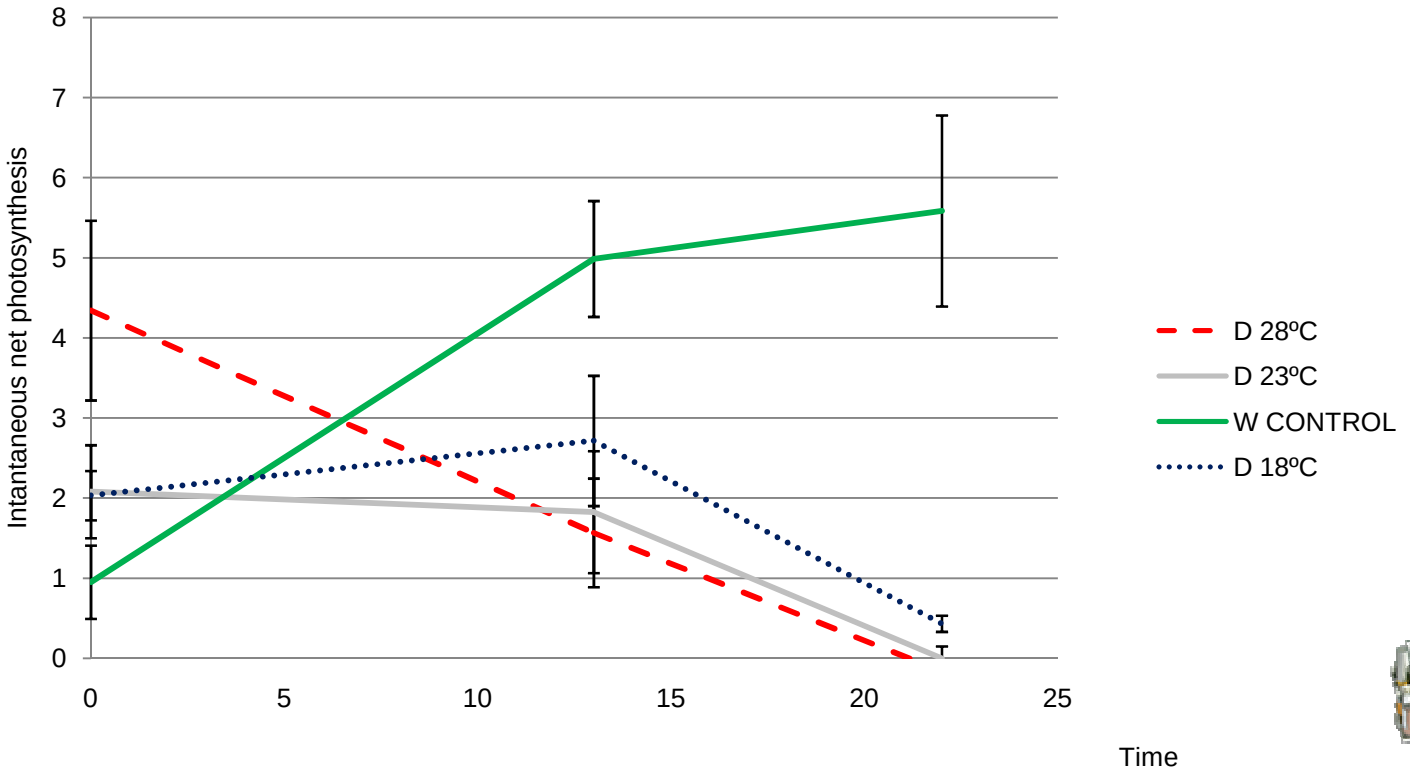
Water potential measurements

Instantaneous net photosynthesis (A_N)



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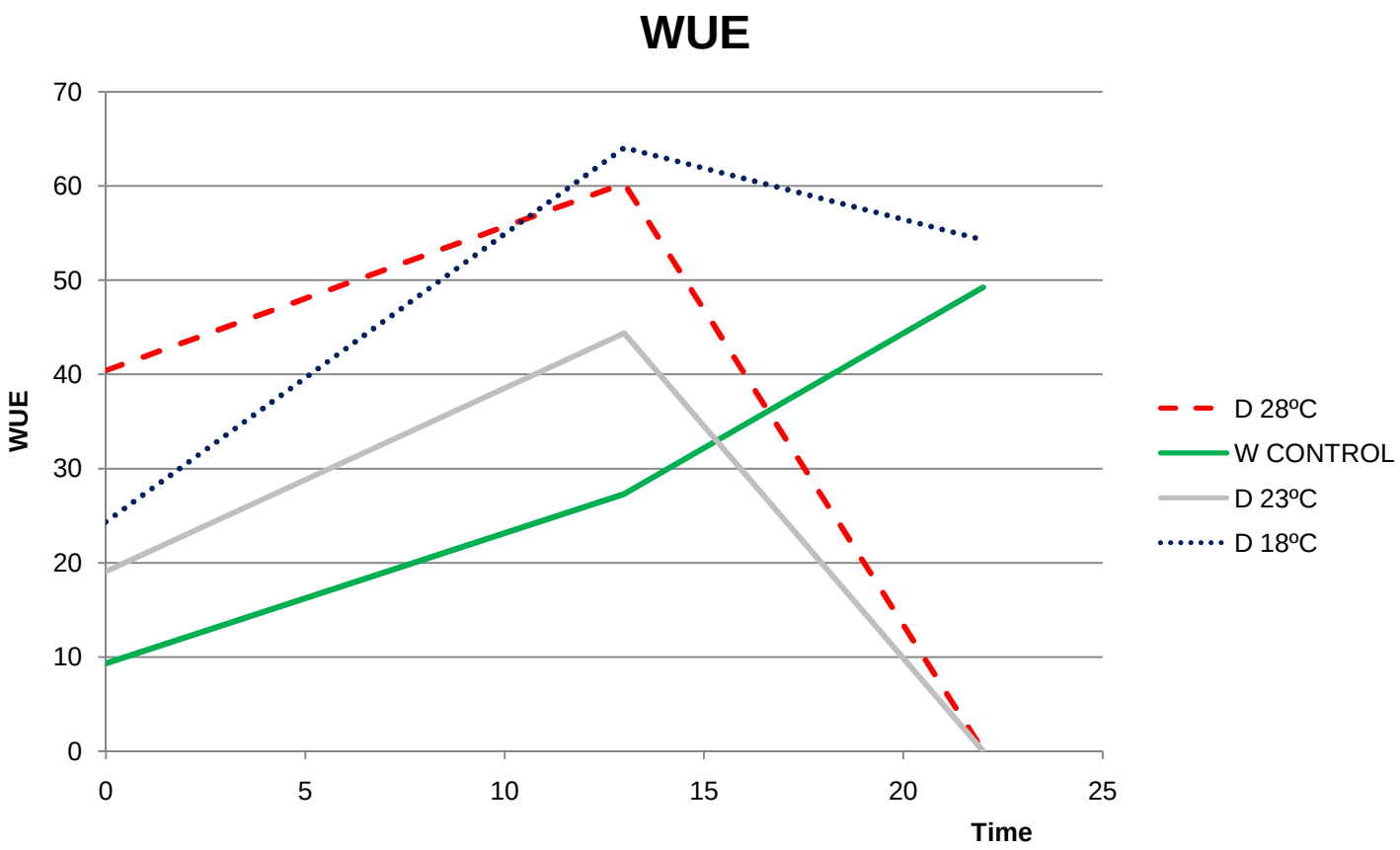
Water potential measurements



Conclusions

•Stressful conditions during initiation of the embryogenic tissue affect the quantity and quality of plantlets produced at the end of maturation stage.

•It seems that the embryogenic tissue has a “memory” to remember after 15 months the conditions in which it has been initiated.

•It seems possible to modulate the tolerance to water stress by changing environmental conditions in the initiation phase of embryonal masses.

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Acknowledgment

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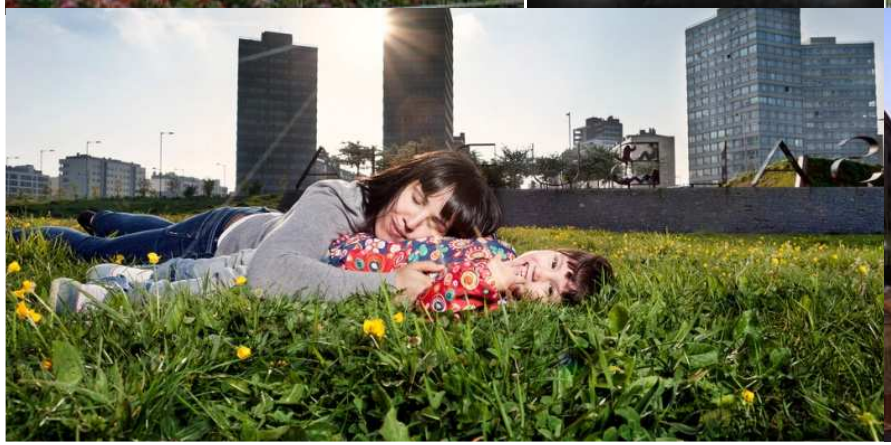
VITORIA GASTEIZ!

where **the green** is capital