



CEBAS-CSIC



CEBAS is a multidisciplinary center that carries out research related to Scientific-technical topics based on Agricultural Sciences, Food Technology and natural resources.

Our objective is to development agronomical strategies to produce quality food beneficial to health, and contribute to the socio-economic and environmental progress of future generations



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Objective to the plant nutrition department

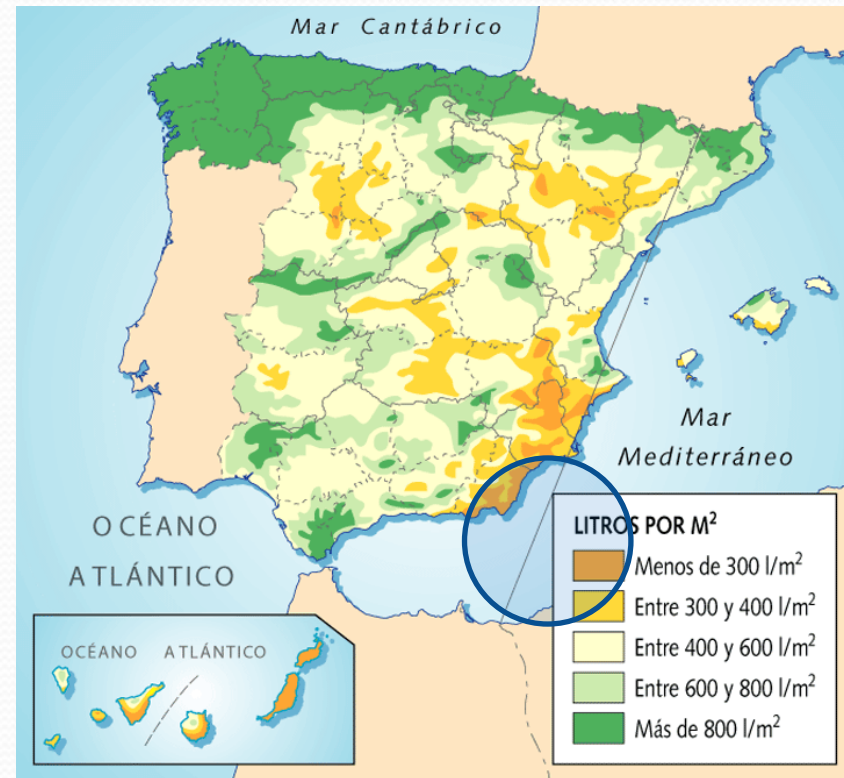
Our objective is to study the physiological, nutritional and morphological responses of tree and horticultural crops under different abiotic stress conditions to design agronomical strategies to reduce the negative effects caused by these stresses.

Abiotic stresses:

Drought; Annual precipitation $< 300 \text{ l m}^{-2}$ with a maximum temperature close 40°C in summer.

Salinity. The growers use waters coming from aquifers containing very high salt concentration $\text{EC} > 4 \text{ dS m}^{-2}$.

Boron toxicity. Currently, growers use water coming from industrial and urban wastewater with high Boron concentration ($> 0,5 \text{ mg/l}$).



Objective to the plant nutrition department

Horticultural crops under greenhouse conditions: tomatoes and pepper plants.

Increase water and fertilizers use efficiency in horticultural crops and improve production and fruit quality.

Technological Tools

- Sensors and crop monitoring
- Automatic control of fertirrigation: monitoring and taken decision in real time

Plant nutrition



Biostimulants: Plant biostimulant is any substance or microorganism applied to plants with the aim to enhance nutri-tion efficiency, abiotic stress tolerance and/or crop quality traits, regardless of its nutrients content.

Amino acid

Prolina

C1CC[C@H](C(=O)O)N1

Glicine-Betaine

C[C@H](N(C)C)C(=O)O


Fórmula A

Salicylic Acid

O=C(O)c1ccccc1O

Metaloids

Silica



Selenium

[O-]S(=O)(=O)[O-]

Ácido Giberélico (GA) Ácido abscísico (ABA) Ácido salicílico Etiléon Metil-jasmonato Poliaminas (Spd y Spm) Quinética	Óxido de calcio (CaO) $\text{Na}_2\text{SiO}_3 \cdot 9\text{H}_2\text{O}$ $\text{NaNO}_2 \cdot \text{Na}_2\text{SiO}_3$ Óxido nítrico (NO) Sulfato de Zinc (ZnSO_4) Carbonato cálcico (CaCO_3) $\text{EDTA} \cdot \text{Na}_2\text{Fe}$ Nitrato amónico (NH_4NO_3) Ácido ascórfico $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
Microorganismos Micorrizas	Metil-glicolal (MG) Hidrógeno de sulfuro (H_2S) Biochar

Nutrient Solutions:

Solución Hoagland

Compuesto	Macronutrientes				Solución de Trabajo	
	Peso Molecular	Concentración (M)	Concentración (g/litro)	Dis. final (ml/litro)	Elemento	Concentración final (ppm)
KNO_3	101.10	1.00	101.10	6.0	N	14
$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	236.16	1.00	236.16	4.0	K	7
KH_2PO_4	136.09	1.00	136.09	1.0	Ca	4
$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	246.49	1.00	246.49	1.0	P	1
					S	1
					Mg	1

	g per 100 l
NO_3Ca	70
NO_3K	40
SO_4Mg	20
KH_2PO_4	30
Micronutrientes	30

Soilless System:

Substrate type

Open and close system

Vertical and Horizontal structures

Floating System

NFT

