

SALTMED

A systems approach to a sustainable increase in irrigated vegetable crop production in salinity-prone areas of the Mediterranean region

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SALTMED

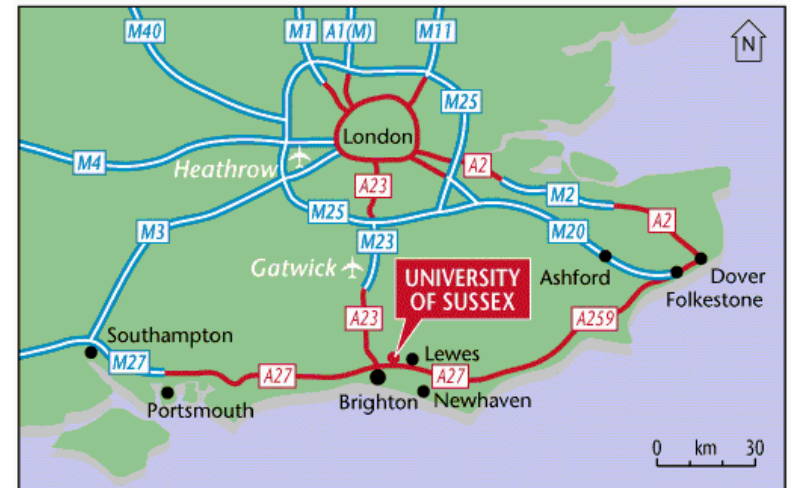
- The project was funded by the European Union between 1998 and 2002
- We started with an initial meeting in Brighton in February 1999
- The project was coordinated from Sussex in the UK and there were four other main Partners

Partners

Consejo Superior de Investigaciones Cientificas, Spain	Professor Jesús Cuartero
The Arab Centre for the Studies of Arid Zones and Dry Lands, Syria	Dr Abdel Rahman Gaibeh Dr Gilani Abdelgawad
Menoufiya University, Egypt	Professor Nabeel Malash
Centre for Ecology & Hydrology, UK	Dr Ragab Ragab

Co-ordinator

- Coordinator Dr **Tony Yeo** (and then Professor T J Flowers)
- University of Sussex
Plant Stress Unit
School of Biological Sciences
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Dr. Tony Yeo



**Dr. Abdel Rahman
Ghaibeh
1940-2001**

Objective

- To increase productivity and sustainability of irrigated vegetable cropping in salinity-prone land
 - the project focused on **tomato** with field sites in Egypt and Syria
 - the project had relevance to all salt-affected irrigated systems and
 - one hectare in five world-wide

Goals

- To provide Guidelines for farmers of salinity-prone irrigated land
- To enhance the salt tolerance of tomato through the application of physiological criteria to established conventional breeding programmes with the help of molecular markers

Work Packages

EU projects are divided into WorkPackages

1. Modelling at field sites
2. Laboratory studies on plant salt/water balance and seedling pre-adaptation
3. Breeding of elite lines of tomato

Field sites



Egypt

Field sites



Syria

Water regimes

- The experimental design was based on **Drip** (Trickle) and **furrow** irrigation systems
- Water was applied in one of two regimes, either *Mixed*: apply mixed saline and fresh water with different ratios or *Alternate*: apply fresh and saline water separately i.e. fresh water when the crop is at sensitive stage for salinity and saline water when the crop is at a more salinity tolerant stage.

Water regimes

100% fresh (all irrigations with fresh water)

80% fresh and 20% saline

60% fresh and 40% saline

40% fresh and 60% saline

20% fresh and 80% saline

100% saline (all irrigations with saline water)

Main findings

- In **field** conditions, tomato volume decreased with increasing salinity of the irrigation water for both irrigation methods
- Fruit yield and fruit number were highest with the combination of **drip irrigation and mixed management**

Main findings

- In **glasshouses**, salinity reduced the commercial yield, mainly due to a decrease in fruit weight and to a lesser extent by a reduction in fruit number and by increasing blossom end rot in fruits.
- In controlled conditions, tomato plants haloconditioned at the 3 to 5 day-old stage produced more shoot and root biomass than non-treated controls plants

Main findings

- Of the physiological traits, ‘Root Na selectivity’, ‘Leaf tissue tolerance’, ‘Leaf-to-leaf tolerance’ and the ‘K/Na ratio’, root Na selectivity showed the highest correlation with dry weight.
- Particular care is required for the PCR based AFLP procedure using tomato

Main findings

- Professor Cuartero will describe the effects of salinity on
 - Tomato yield, plant water uptake and tomato fruit quality
- He will also discuss overcoming the negative effects through
 - Pre-treatment, increasing relative humidity and choice of cultivars

Main findings

- A mathematical model, entitled **SALTMED**, was developed that incorporated evapotranspiration, plant water and solute transport, crop yield and biomass production
- There was good agreement between simulated and observed yield for the three years tested confirming the value of SALTMED as a tool for use by experts in the management of salt-prone irrigation systems

Main findings

- You will hear about the experiments used to generate data to check the model and
- Ragab will describe the model in some detail and give you a demonstration of it in action.

This Workshop

- Generated from SALTMED
- Funded by the EU to enable the dissemination of the findings
- After the presentations the Partners will be pleased to try to answer any questions that you might have