



COST

**Putting halophytes to work-
from genes to ecosystems**

FA0901

Start date: 15/10/2009

End date: 30/05/2014

Ended



Tim Flowers

Chairman and Grantholder

University of Sussex. UK

Scientific context and objectives



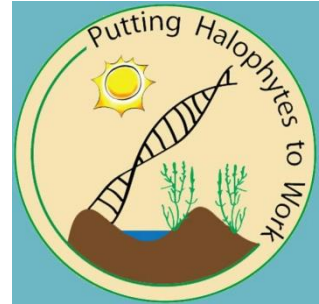
- **Background**

- The human population is growing and requires food
- Crops require water to grow
- Most of the water on earth is saline
- 40% of the earth is arid or semi-arid
- About 1% of the world's plant species can grow in saline water

- **Salt tolerant plants, known as halophytes, are an untapped source of food, fibre and bio-energy**

- **The main objective of FA0901 is collating knowledge of halophytes**

Scientific context and objectives



The Action has:

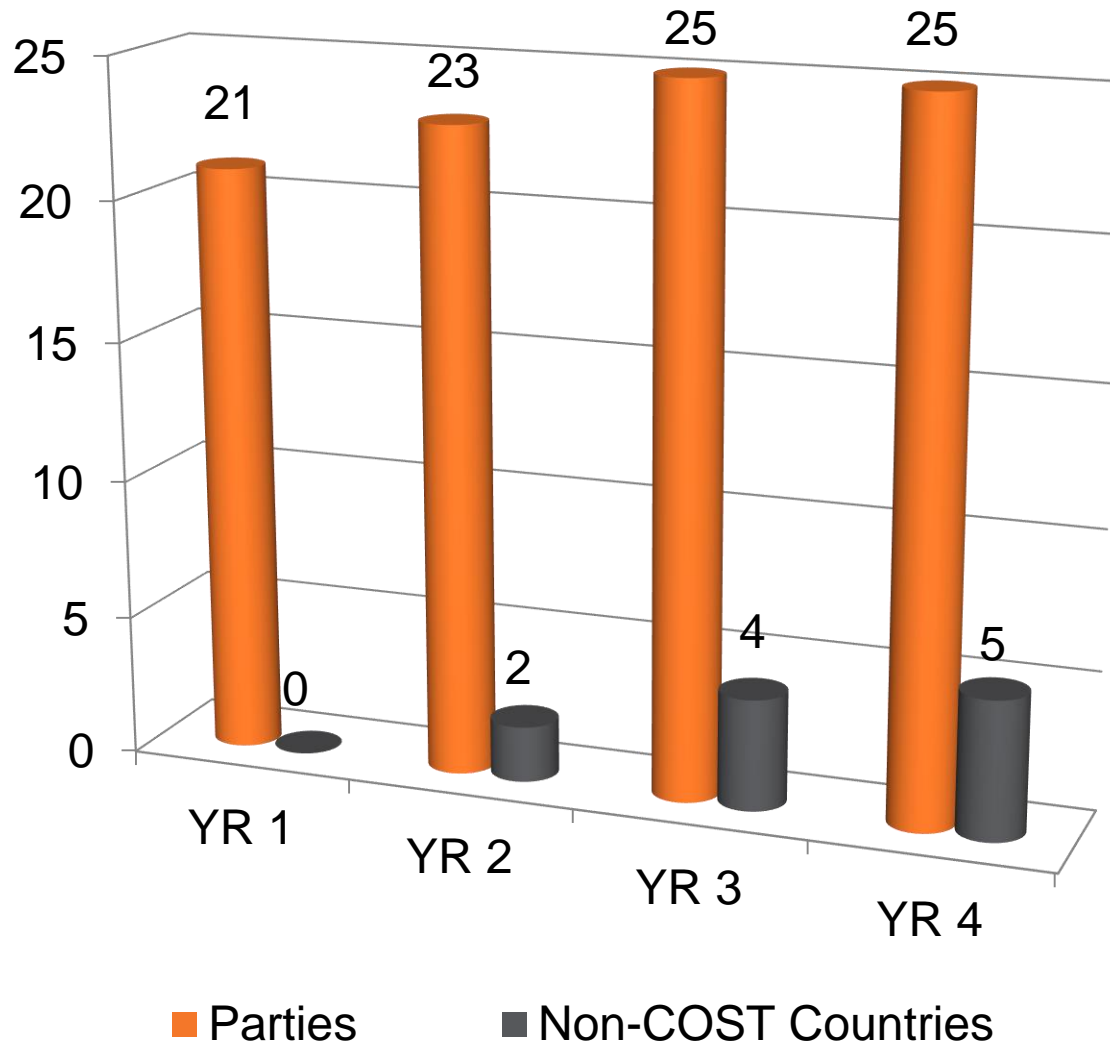
- Improved scientific knowledge and the co-ordination of research programmes among COST countries
- Arranged over 30 STSMs
- Held 5 Conferences and 3 Workshops
- Published 6 Special Issues of scientific journals
- Published over 200 scientific papers
- Created a database of halophytes - eHALOPH

Working groups



- WG 1: Ecology of halophytes and saline habitats (salt marshes, arid and semi-arid land)
- WG 2: Proteomics, genetics, bioinformatics and metabolomics of halophytes; i.e. the molecular biology of halophytes
- WG 3: Modelling water, soils and salt balance, plant development and succession and elaborating principles for a sustainable saline agriculture
- WG 4: Halophyte utilization - agronomic, restorative and economic aspects

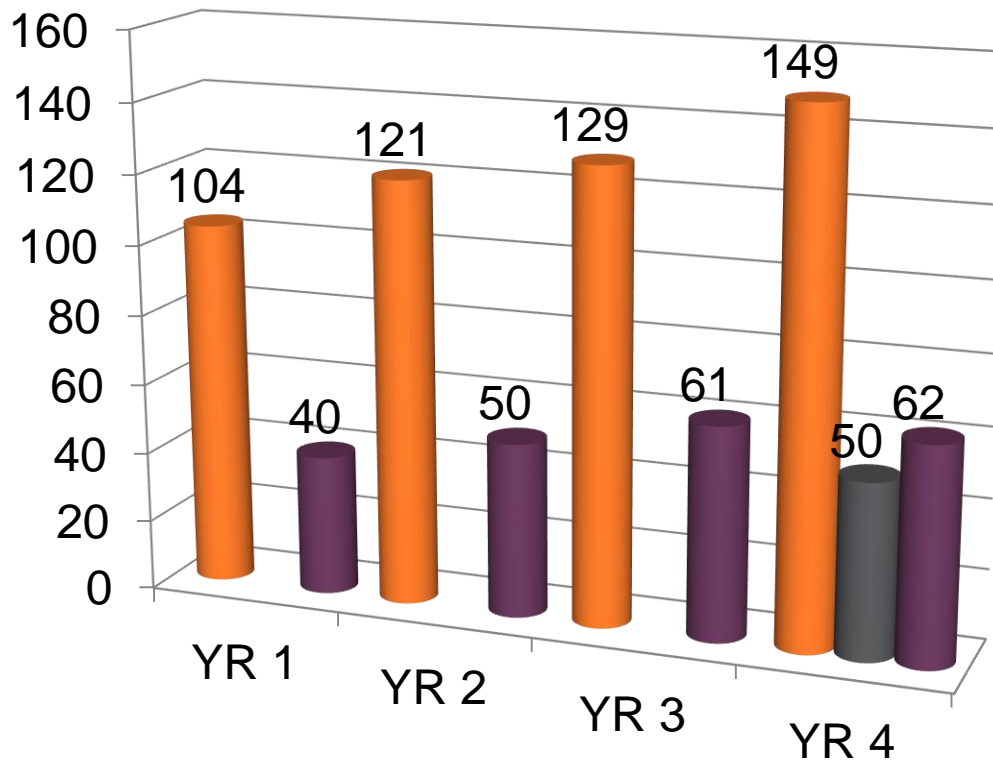
Action Parties



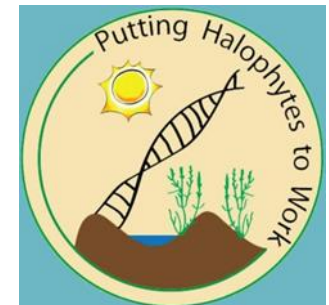
Grant Holder:
University of Sussex
T J Flowers
UK



Action participants



- Total no. of indiv. Participants
- ESRs
- Female



Use of COST Instruments



Activity (No.)	Year 1	Year 2	Year 3	Year 4
MC/WG Meetings	1	1	1	1
STSMs	5	11	8	7(+5)
Training Schools	0	1	0	1
Workshops or Conferences	2	2	2	2
Joint Publications	0	1	3	(2)



Results vs. Objectives

- The main objective was to collate existing knowledge of halophytes from gene function to ecosystems
- This was achieved through publications and eHALOPH
- A single research group could not have produced 150 diverse papers in international journals in four years

Innovative networking



- The world of biological science very rarely produces so-called 'Breakthroughs'. However, as examples, we have reported
 - The first laboratory scale demonstration of production of bioethanol from *Tamarix* biomass
 - The use of halophytes as salt resistant crops
 - That brackish water can be used to irrigate ornamental plants
 - The creation of eHALOPH
- We expect to see more halophytes as crops in the future
- We have generated 25 new grant proposals of which 9 have been funded to date.

Halophytes at work



Zilte Zeekool

- Home →
- Wat is zilte zeekool? →
- Wie stuukt zilte zeekool? →
- Trajecten chief-lekks over zilte zeekool? →
- De trek in beeld** →
- Verkrijgbaarheid →
- Exposities →
- Onderzoeken naar zilte graszoden →
- Stichting Sint Donatus →
- Zeekoolproducten →
- Partners in het project →
- Contact →
- Nieuws →

New networking



- The number of participants grew from 83 to close to 200 over the course of the Action
- 44% of participants were female and about 22% ESRs
- Our conferences were attended by 179 people and our Workshops by 60 people
- We ran two Training Schools involving more than 30 people
- By 2015 we will have published 6 Special Issues of International Journals and over 200 papers
- We have created and developed eHALOPH

eHALOPH



The screenshot shows the eHALOPH Halophytes Database website. The browser address bar displays www.sussex.ac.uk/affiliates/halophytes/index.php. The page features a teal header with the eHALOPH logo and the text "eHALOPH Halophytes Database Version 3.01". A search bar is located in the top right corner. Below the header is a navigation menu with links for Home, Plant Database, Administration, Email, My Account, and About. The user is logged in as t.j.flowers@sussex.ac.uk with a logout option.

The main content area is divided into two columns. The left column features a large photograph of a yellow flower, identified as *Lotus ornifera* L. Below the image is a section titled "Using eHALOPH" with the following text:

Using eHALOPH
To search the database, click on "Plant Database" above; this will allow you to search the existing data. However, if you want to edit any of the existing data or add new entries, you must first create an account.

To edit any of the existing data, you must register and create an account. Once edited, the new entry is assigned an accession number but is not added to the database unless approved by a database administrator.

The right column contains a "Your notifications" section with the following entries:

Your notifications
Records awaiting approval
No records found

Last Records approved

- [Suaeda maritima \(L.\) Dumort.](#)
Submitted by Joaquim Santos
Oct 21st 2013, 5:13 am
Approved by Joaquim Santos
Oct 21st 2013, 5:13 am
- [Zostera tasmanica M Martens ex Asch.](#)
Submitted by T J Flowers
Aug 24th 2013, 2:43 pm
Approved by T J Flowers
Aug 24th 2013, 2:43 pm
- [Zernichellia palustris L.](#)
Submitted by T J Flowers
Aug 24th 2013, 2:43 pm
Approved by T J Flowers
Aug 24th 2013, 2:43 pm
- [Typha glauca Godr.](#)
Submitted by T J Flowers
Aug 24th 2013, 2:43 pm
Approved by T J Flowers
Aug 24th 2013, 2:43 pm
- [Typha domingensis Pers.](#)
Submitted by T J Flowers



Self evaluation, Strengths and Weaknesses

- We achieved the main objectives
- We did not publish a Treatise as outlined in the MoU primarily due to pressures on participants to publish papers not book parts
- We found the rule governing travel from participating institutes in non-COST countries to be unhelpful



Is the Action a success story?

Yes

In the future, in a world where there is more pressure on fresh water due to the consequences of climate change we expect

- those in the network to generate grant proposals, sustaining interest in research.
- to see more small and medium sized enterprises growing halophytes for sale
- the database, eHALOPH, to continue to be developed and provide a source of data for scientists and agriculturalists



Dedicated to the memory of Yoav Waisel, who started it all

For further information see

<http://www.sussex.ac.uk/affiliates/halophytes/>
t.j.flowers@sussex.ac.uk