Post-Conference Tour
Wednesday 12th September - Friday 14th September 2001

TOUR PARTICIPANTS

Name	Organisation
Dann Adair	University of Minnesota
Tony Agostino	CSIRO Plant Industry, Australia
Paul Austin	HortResearch, NZ
Ian Beckett	SLS/Conviron, UK
Wade Berry	UCLA
Betsy Berry	---------
Conrad Bonsi	Tuskagee University
A. J. Both	Rutgers University
David Brault	Conviron
Changhoo Chun	Chiba University
Richard Denis	Agritechnove Inc.
Ian Flitcroft	University of Georgia
Russ Fortson	Lockheed Martin
Dennis Greer	HortResearch, NZ
Lloyd Jones	Paradigm Genetics
Rob Kerslake	CSIRO Livestock Industries, Australia
Yoshi Kitaya	Osaka University, Japan
Don Krizek	USDA, ARS, ANRI
John Lea-Cox	University of Maryland
Cary Mitchell	Purdue University
Desmond Mortley	Tuskagee University
Paul Puttifoot	The Australian National University
Reg Quiring	Conviron
Mark Romer	McGill University
Erik Runkle	Michigan State University
John Sager	NASA
Barbara Sager	--------
Adrian Southern	Columbia University – Biosphere2
Gary Stutte	Dynamac Corp.
Marc Theroux	Enconair
David Tremmel	National Phytotron, Duke University
Peter Vanderveer	University of Wisconsin
Ray Wheeler	NASA
Dave Wilson	NASA
Marty Winkler	N. C. State University
Allen Wright	Columbia University – Biosphere2
Julian Franklin	IACR Rothamsted, UK

THE TOUR ITINERARY

12th Sept. 2001 **Monsanto,** Cambridge
ACR-Rothamsted: BBSRC Institute of Arable Crop Research, Rothamsted, Harpenden, Hertfordshire

13th Sept. 2001 **SRI Silsoe**: BBSRC Silsoe Research Institute, Wrest Park, Silsoe, Bedfordshire
HRI Wellesbourne: Horticulture Research International, Wellesbourne, Warwickshire
University of Warwick, Coventry

14th Sept. 2001 **University of Reading**: Plant Environment Laboratory, Department of Agriculture, Shinfield, Reading, Berkshire
Syngenta: Jealotts Hill International Research Station, Bracknell, Berkshire

SITE DESCRIPTIONS

1. MONSANTO CAMBRIDGE

Monsanto UK Ltd. (PBIC) The Maris Centre 45 Hauxton Road, Trumpington, Cambridge CB2 2LQ

Contact Person: Rebecca Stratford 01223 849388

Monsanto, Cambridge has large suite of growth rooms built by Conviron during the last two years for cereal transformation studies. A suite of 11 rooms will be on view as well as the ancillary support facilities.

Monsanto acquired Plant Breeding International of Cambridge (PBIC), formerly the Plant Breeding Institute, in 1998. PBIC produces new and improved varieties of agricultural crops and markets them through a network of associated companies and agents, world-wide. PBIC established its reputation through breeding programmes for several crops, including winter wheat, barley, oilseed rape and potatoes. These efforts are still aimed at developing grain crops that offer farmers higher yields, better quality, improved disease resistance and lower production costs. Since the merger with Pharmacia & Upjohn, PBIC has been renamed Monsanto Cambridge.

2. IACR ROTHAMSTED

Rothamsted Experimental Station, Harpenden, Herts AL5 2JQ

Contact Persons: Julian Franklin 01582 763133 x 2690
Ian Pearman 01582 763133 x 2800

The facilities comprise:

1/ *New Controlled Environment Building*, consisting of 16 Sanyo 228 growth cabinets, 8 Sanyo growth rooms, 2 small cabinets, a large cereal growth room and a 'Hotbox' potato chitting cabinet. This building was completed in 2001. The Sanyo cabinets and rooms have only recently been commissioned. The new cabinets and rooms are monitored and controlled by a central SCADA package.

2/ *Controlled Environment Service Building* consisting of 8 growth rooms, 9 large cabinets, 4 Vindon small cabinets, 5 Vindon upright cabinets, 3 'Wisconsin tank' cabinets, 1 Sanyo 660 cabinet and 4 insect rearing rooms. Apart from the Vindon cabinets, this building and rooms and cabinets date from the early 1980's.

3/ *Dupont building.* This building contains 2 large cereal growth rooms and a vernalisation room optimised to produce cereals for transformation studies. In addition there are 3 growth rooms for insect behaviour studies.

4/ *Insectary.* This building contains 3 large rooms containing simulators for insect behavioural studies. In addition there are 37 rooms used for insect rearing. Some of these rooms are used for quarantine work on non-indigenous plant pests.

5/ *Air conditioned Glasshouses.* A suite of 3 glasshouses containing 33 air-conditioned compartments used for growing genetically manipulated plants or for plants requiring quarantine.

Rothamsted Experimental Station was founded in 1843, the first agricultural experiment station in the world, and currently comprises 330 ha of farmland, associated laboratories, offices and plant growth facilities. Redevelopment of the site is currently underway and the view below shows the plant growth facilities (glasshouses, insectary and controlled environment facilities) that have been built over the last few years.

Aerial view of IACR RES facilities

3. SILSOE RESEARCH INSTITUTE

Wrest Park, Silsoe, Bedford MK45 4HS

Contact Person: Edwina Holden 01525 86000

On view will be:

1/ A *recirculation air tunnel* for air flow research e.g. pesticides in real flows;

2/ An *atmospheric flow laboratory* - a larger space to look at flow in relation to animals and buildings, and greenhouse ventilation;

3/ A *pair of controlled greenhouses* for comparative studies.

Atmospheric Flow Laboratory

The Silsoe Research Institute, formerly the Institute of Agricultural Engineering was established at Oxford in 1924. In 1947 the Institute, then the National Institute of Agricultural Engineering, moved to Wrest Park, the former stately home of the de Grey family. It occupies an area of some 200 hectares, 117 of which is arable land. During the early years, SRI's remit was to develop the mechanisation of UK agriculture but over the last twenty years there has been a strong move towards topics with an emphasis on process engineering, modelling and optimisation of environmental objectives.

4. HORTICULTURE RESEARCH INTERNATIONAL, WELLESBOURNE

Wellesbourne, Warwick, CV35 9EF

Contact Person: Alan Morgan 01789 470382

Included in the tour are:

1/ *Two dedicated CE buildings* containing:
6 Weiss rooms with high-grade control of temperature, RH, CO_2, light;
6 Pel rooms, low grade; control of temperature and light;
2 Tissue culture rooms; control of temperature and light;
1 Creemer room low grade; control of temperature and light;
6 small Sanyo chambers; control of temperature, RH, light and leaf wetting;
4 large Sanyo chambers; control of temperature, RH, CO_2 and light;
9 Saxcil chambers; control of temperature, RH, CO_2 and light.
Central monitoring system using secondary sensors. Data available to scientists direct via the site computer network. Part of glasshouse complex is also linked to this system.
Central programming and monitoring system for most of the above room and chambers.

2/ *Large glasshouse complex* controlled by two central computer systems. Glasshouses consist of lit and unlit houses and a large containment block.

3/ *Two thermogradient polytunnels.*

4/ *Gene bank* for genetic conservation.

5/ *Mushroom unit* - self contained experimental mushroom production unit.

Aerial view of HRI Wellesbourne

Large Weiss Growth rooms.

5. DEPARTMENT OF BIOLOGICAL SCIENCES, WARWICK UNIVERSITY

University of Warwick, Coventry CV4 7AL

Contact Person: Greg Anderson 024 7652 2556

Facilities include:

1/ A *Bio-Imaging suite*;

2/ *Plant growth facilities for growing genetically transformed plants*.

6. PLANT ENVIRONMENT LABORATORY, READING UNIVERSITY

Department of Agriculture, The University of Reading, Cutbush Lane, Shinfield, Reading, RG2 9AD

Contact Person: Tim Wheeler 0118 988 3000

The Plant Environment Laboratory is one of the larger facilities in Europe capable of providing artificial climates for research into crop growth and development. It has a range of 13 modified Saxcil growth cabinets, a high performance gas-tight chamber, controlled environment glasshouses, other glasshouses, plastic tunnels, laboratories, and offices.

The Laboratory had its origins in glasshouse research dating back to 1961, and was established under its present name in 1971 as a unit dependent on external funding. Its particular task was to undertake research on the growth and development of tropical-adapted crops under controlled daylength, irradiance, and temperature environments. Early work on cow peas was carried out in collaboration with the International Institute of Tropical Agriculture (IITA) in Nigeria - one of the International Agricultural Research Centres established under the auspices of the Consultative Group on International Agricultural Research (CGIAR); this programme was later expanded to include soyabean. What is now the Overseas Development Administration (ODA) was the sponsor, and this work, together with a major programme on indigenous tropical plants with intensely sweet fruits, sponsored by Tate & Lyle GRD, put the Plant Environment Laboratory on a sound footing. ODA has continued as the major sponsor of collaborative research and has supported programmes on chickpea, lentil, faba bean, barley, maize, rice, and sorghum; while research grants from ICI, Unilever, and the IBPGR (now IPGRI) have involved work on wheat, sugar cane, and soyabean. Collaboration has been extended to include work with six of the International Agricultural Research Centres, with national programmes in the USA, with CSIRO in Australia, with the Asian Vegetable Research and Development Center (AVRDC) in Taiwan, and with various other organisations.

The general theme underlying all this work is the study of plant phenology - the sequence of changes in plants from one morphological and physiological phase to the next, as they grow, in which genetically controlled responses to the environment are involved. The possible threat of global warming has brought increased interest in the study of phenology. Knowledge acquired in trying to suit crop cultivars to particular environments has now become of further interest as people try to estimate the effects of small environmental changes on the growth of particular crop cultivars. Work of this nature is now in progress.

7. SYNGENTA, JEALOTTS HILL

International Research Station, Jealotts Hill, Bracknell, Berks. RG42 6EY

Contact Person: Peter Stratton 01789 470382

The tour will include:

1/ The *Plant Pathology Growth Rooms* (Types 1, 2 and dew rooms) - A suite of 11 CE rooms for Fungal Control Research, of two types, single level growing and 2-tier growing - built in 1998 and 1999.

2/ A *Wheat Donor Room* (high specification room).

3/ A *new 'generic' growth room*, high light - 800 μmol m^{-2} s^{-1} - from tubular fluorescent lamps, dimmable to about 10 μmol m^{-2} s^{-1}. The lamps will be dimmable to 10% of total electronically, and the whole lamp mounting will move from 1200 mm to 2000 mm from floor. Full range of humidity and temperature control from 10 - 40°C and 40 - 90% RH. Fully filtered for GMO, pathogenic spores and insect scales.

3/ *Glasshouse 167*. A Weed Control Glasshouse and headhouse completed November 1997. Total area 3900 m^2 in 22 compartments designed to Category A GMO containment plus 3700 m^2 headhouse. (Venlo research glasshouse).

Jealotts Hill covers 250 hectares and is used for laboratory-based research and development, field trials and as a commercial farm. It is the largest agricultural research centre in the UK with around 900 Syngenta personnel on site, of whom some 420 are graduates and over 170 are PhD's.