

## UK CONTROLLED ENVIRONMENT USERS' GROUP

### MINUTES OF THE 1999 BUSINESS MEETING

The annual meeting of the CE Users' Group was held on Tuesday 21<sup>st</sup> September 1999. The meeting opened at 20:00 hours.

The chairman, L. Incoll (Leeds University), opened the meeting.

*Apologies* were received from A. Nichols (John Innes).

#### 1. Minutes of the previous meeting

The minutes of the previous business meeting, which had been distributed beforehand, were approved.

#### 2. Matters arising

There were no matters arising that were not covered by the following agenda.

#### 3. Future meeting - 2000

L. Incoll (Leeds University) had received notice that Lancaster University would not be ready to host the 2000 meeting. Subsequently R. Randall had suggested that the meeting be held in Kent at Wye College and HRI, East Malling.

B. Wilson (Wye College) and B. Roberts (HRI East Malling) had agreed to organise the next CEUG meeting at Wye College and HRI, East Malling on 5/9/2000 to 6/9/2000. L. Incoll suggested that the theme of this meeting be 'Controlled Environments for Specialist Applications'. These could include tissue culture, cold storage, seed banks, culture collections and soil science. He asked for five CEUG members to volunteer to each take responsibility for one application and to prepare a half-hour talk to cover the same set of subjects for each specialism, including biological, engineering and health and safety aspects. He emphasised that specific problems and solutions should be considered. He then requested feedback on these ideas.

I. Pearman (IACR Rothamsted) noted that this approach was closer to that of the original Group meetings, in contrast to recent meetings with their greater emphasis on scientific aspects. K. Forsyth (Biogemma UK Ltd) noted that the containment of GMOs will be discussed in 2001 along with other health and safety issues. J. Franklin (IACR Rothamsted) discussed work on soil microbiology in simple temperature-controlled conditions. Most of this work is carried out in glasshouses, but could be in controlled environments. R. Quiring (Conviron) described other soil science research carried out in controlled environments, such as 2-tiered chambers and water-beds for root examination, but added that these were unusual. D. Brault (Conviron) suggested that the question of when to use a glasshouse, and when to use controlled environment chambers, be discussed. He also suggested that the control of vapour pressure deficit be discussed. P. Gill (SCRI) mentioned cold storage, the manipulation of strawberry runners, and vernalisation as specific uses of controlled environments. G. Taylor (Sanyo Gallenkamp) mentioned that high humidity conditions are used to encourage

fungal infections for pathology studies. I. Pearman (IACR Rothamsted) mentioned the use of controlled environment conditions for environmental testing in various industries, e.g. electronics and automotive.

L. Incoll asked for volunteers to take responsibility for each of the five suggested topics, who would summarise what is going on in around the UK and Europe. He requested that these volunteers contact B. Wilson (Wye College) by e-mail (b.wilson@wye.ac.uk).

#### 4. Future meeting - 2001

L. Incoll explained that plans for this meeting have evolved from an enquiry from the North American group, NCR-101, to him, suggesting a joint meeting of NCR-101 with UK CEUG in Europe. Following his visit, by invitation, to attend the annual meeting of NCR-101 at Cornell University in March 1999, a joint meeting of UK CEUG and NCR-101 was proposed in 2001. It is proposed that we meet at the John Innes Centre from 9/9/2001 to 12/9/2001. The JIC were already scheduled to host the 2001 meeting and they were willing to host the international meeting.

L. Incoll introduced the NCR-101 Committee on Controlled Environment Technology and Use. It dates from 1969 from a group within the American Society of Horticultural Science (ASHS) organised to understand how to utilise growth chambers effectively to ensure consistent and comparable growth between laboratories. It expanded in 1972 to include other societies when an USDA-sponsored North Central Regional Committee called NCR-101 was formed. At that time private industry groups were encouraged to participate. Its activities over the years have been summarised by Ted Tibbitts at our Dundee meeting. They are responsible for the guidelines for the description of controlled environment chambers. They produce a CE manual, keep a calibrated instrument package (that members can borrow), provide instrument evaluation, and produce an annual report. For the report, every member produces an annual "station" report. Their membership is around 120; 75 from universities including Agricultural Experiment Stations, 20 from government institutes (mainly NASA plus USDA), 15 controlled environment manufacturers, 7 plant-based AgrEvo-type companies and 11 technology companies. (D. Brault (Convion) pointed out that NCR-101 includes Canadians as well as people from the USA, and has one member from New Zealand.) Their communications are handled by Mark Romer of McGill University in Montreal. They have a very impressive webpage <http://www.ncr101.duke.edu>. The Controlled Environment Working Group of the ASHS also has a web page <http://www.ashs.org.ce>.

L. Incoll presented the structure of the programme of the March NCR-101 meeting:

Day 1	am	ASHS CE Working Group meeting
Day 2	am pm	NCR-101 business meeting NCR-101 information exchange
Day 3	am pm	NCR-101 information exchange Tour of research and development greenhouses, growth chambers etc at Cornell University, Ithaca NY

At the Cornell meeting L. Incoll described to NCR-101, the history of the CEUG, our membership of 130, our group communications, our style of meeting and illustrated the range

of facilities in the UK. CEUG now has members attending from 30 institutions. He thanked members for the slides of facilities they had provided.

L.Incoll presented the programme he had proposed to NCR-101 for the joint meeting as follows:

Day 0 (evening)	Arrival, registration & reception
Day 1	Scientific sessions, tour of facilities, trade display and business meeting
Day 2	Scientific sessions, information exchange sessions & conference dinner
Day 3(half day)	Information exchange session

He then described and opened for discussion the elements of the meeting.

He quickly outlined the John Innes facilities, including growth cabinets, rooms and glasshouses, the genetic seed store, laboratories and their rare book collection, which could be seen on the tour of facilities. He suggested that it should be up to the committee to decide who was to be invited to participate in the concurrent trade display.

He proposed that the scientific programme consist of a mixture of speakers from the UK, continental Europe, the USA and Canada. P. Gill (SCRI) described the current thinking on the structure of the programme, which might include

- contained environments for GMO's and related legal, health and safety issues,
- technology for the future CEs including modern lighting,
- conservation of energy and recycling including refrigeration, heat pumps and pollution,
- guidelines for reporting on CEs in research - history, practice and evaluation,
- CEs mimicing real environments v. simplicity,
- CEs in space.

He proposed that NCR-101 provide a variety of papers for the same sessions e.g. on space CE research in NASA, on guidelines and on the success (?) of Cornell's commercial CE lettuce production unit, etc. D. Grant (Van Vliet Automation) suggested that methods of research management could also be discussed.

On guidelines for example, L. Incoll said he would like someone in NCR-101 or the CEUG to examine the top journals from the USA and Canada, and the UK and Europe, to assess the effectiveness of the NCR-101 guidelines in ensuring proper description of controlled environments used in published research.

L. Incoll said that UK CEUG and NCR-101 might have to forego their usual discussions of CE issues and their information exchange respectively for reasons of time, though there would be a slot for their business meetings.

L. Incoll requested feedback on the proposed joint meeting; which did members consider more important - the information exchange or the presentation of papers?

R. Hughes (IACR Long Ashton) asked about the expected greater expense of the proposed conference for participants because a 3-day rather than the usual 2-day meeting was being proposed.

L. Incoll explained that the registration fee should be kept low at £15, so as not to overcharge NCR-101 members in particular as they would be spending a lot to come. For full-board from Sunday afternoon to Wednesday lunchtime, including inflation (but not wine) was estimated to cost around £197 for each participant. G. Taylor (Sanyo Gallenkamp) discussed the budget of the conference. He explained that around £5,000 needed to be raised through sponsorship of displays or handouts, and logos on papers, etc.

J. Franklin (IACR Rothamsted) briefly discussed a planned post-conference tour for overseas delegates. This would last days, and might include visits to installations at CSL York, Leicester University, HRI Wellesbourne, IACR Rothamsted, Zeneca, Silwood Park and (possibly) IACR Long Ashton. Anyone would be welcome, as long as they paid. He suggested using university accommodation wherever possible. He thought the total cost would be £200 - £250 per participant. A parallel tour for partners could be arranged if needed.

A motion on whether or not the joint meeting in 2001 should go ahead as proposed was passed.

L. Incoll asked for volunteers to speak at the 2001 meeting, and for any information on potential speakers amongst mainland European controlled environment users. H. Rennenberg (Freiburg University) offered to use his contacts in Europe to research into this. B. Wilson (Wye College) offered to do the same. P. Gill (SCRI) requested that members did not assume that we know many contacts in Europe.

L. Incoll reported that the organising committee for the 2001 meeting was:

J. Aldous (John Innes) M. Crawley (John Innes) A. Nichols (John Innes Centre)	Local organisation
P. Gill (SCRI) L. Jones (Dundee University)	Scientific programme and information exchange
G. Taylor (Sanyo Gallenkamp) R. Hughes (IACR Long Ashton) A. Morgan (HRI Wellesbourne)	Finances
J. Franklin (IACR Rothamsted) I. Pearman (IACR Rothamsted)	Tour

## 5. Group Communications

L. Incoll reported that the CEUG web pages have been revised. He noted that it was a very basic site and that he would welcome a volunteer with an interest in web communications to act as "webmaster" for the group. The site now has a different web address:  
<http://www.biology.leeds.ac.uk/school/societies/ceug/wwwhome.htm>

He noted that the number of members using the Group's Majordomo mailing list, a newsgroup-like information exchange, is low. He stressed that this is not the same as his own

list used for passing information to users, and anyone joining the Majordomo mailing list would not be flooded with e-mail messages. He encouraged members to join.

## **6. Treasurer's report**

J. Aldous (John Innes Centre) presented the financial report on behalf of the treasurer A. Nichols (John Innes Centre).

The credit balance of the account on 9/8/1999 was £2,723.19. The expenditure was for speakers at the 1998 meeting, and expenses incurred by L. Incoll whilst planning the 1999 and 2001 meetings. The account was unaudited, but was accepted as presented.

## **7. Humidification and Irrigation**

I. Pearman (IACR Rothamsted) mentioned that he was worried about the appearance of *Legionella* in a new mist propagator. J. Aldous (John Innes Centre) said that they had experienced *Legionella* problems. At times, whole systems have had to be shut down. They are taking advice on this problem at present. P. Stratton (Zeneca Agrochemicals) reported similar problems, but said these are being overcome by a combination of UV filters, lagging of irrigation systems, and automatic drain-downs. R. Quiring (Convion) stressed that any mist that rises in a growth chamber will encourage *Legionella*. L. Incoll noted that A & A humidifiers are arranged so that no reservoir is present when the humidifier is not in use. P. Nadin (Nadin Environmental Control) asked whether steam sterilisation could be used, especially since some of these systems had automatic drain-down. G. Taylor (Sanyo Gallenkamp) replied that there are control problems with these systems. Tight control cannot be maintained. Also, there are problems with drain-down, since bacteria adhere to the sides of pipes and fittings. He emphasised that if you look for *Legionella* you will find it. Only a heat-treatment is guaranteed to kill - even ultrasonics are not guaranteed to kill it.

## **8. Lighting**

P. Henley (University of Wales Aberystwyth) explained the use of a new device for modifying lighting circuits to give a dawn and dusk effect, at an adjustable level. This will not work with fluorescent lights, but will work with tungsten. He has run lights on these circuits with success. He will give details of these by e-mail on request (pjh@aber.ac.uk). G. Taylor (Sanyo Gallenkamp) noted that fluorescent systems can give a dawn and dusk effect with the right equipment, but one must be careful with the spectral effects. He pointed out that with a feedback system, one can adjust for the ageing of lamps.

J. Aldous (John Innes Centre) discussed problems involving large numbers (over 1,000) of 400W sodium and HQI lamps. Harmonics (specifically, the third, fifth and seventh) are causing heating and 'fuzz buzz'. They have seen currents of over 400A in the neutral circuits. They are looking for solutions to this problem, since the only one they have found so far was costed at over £100,000. P. Stratton (Zeneca Agrochemicals) suggested that John Innes contact the Zeneca engineering department, since he was sure they could overcome it, although he did not know how. J. Aldous added that this problem is only seen where large numbers of lamps are run off one supply. R. Quiring (Convion) said this was a common problem. Manufacturers in the USA and Canada have developed new 'K factor' transformers that will not heat up, but these are expensive. Alternatively, loads can be shared between different transformers, although this too is expensive. He concluded that there is no cheap

solution to this problem. C. Fryars (Percival / CLF) proposed the use of LED chambers and travelight / railight to overcome the problem by reducing the total number of lights. Good intensities, and an even distribution of light, can be achieved using this system.

I. Pearman (IACR Rothamsted) reported that he had bought some 400 W Sylvania lamps. He tested these to reveal that they gave only 2/3 of the output of a 400 W Osram lamp.

## **9. Sensors**

A. Morgan (HRI Wellesbourne) explained that he had been collaborating with Sanyo, and now has the results of tests of a new chamber. They have optimised all conditions, and have built a prototype. He requested that anyone interested in the report contact him.

## **10. Maintenance, Control systems, Heating, Fabric, New equipment, Plant growth problems, Safety issues, Management**

The meeting had no matters for discussion on the above topics.

## **11. General points**

R. Darby (University of Wales Aberystwyth) reported problems with a home-made growth room fitted with internal condensers that blow air to reduce temperatures. He requested advice on how to reduce the air flow. R. Quiring (Convicon) pointed out that home-made chambers do tend to have problems with environmental homogeneity. R. Darby said that he had had very different results in this chamber compared to Convicon equipment. K. Forsyth (Biogemma UK Ltd) asked whether this was a humidity problem, and if so whether he had tried bagging the plants. G. Taylor (Sanyo Gallenkamp) agreed that the air from condensers is often very dry. L. Incoll said that this can cause changes in the cuticle and morphogenetic effects. R. Darby said that morphogenetic effects had been seen in the affected plants. R. Quiring (Convicon) suggested using a diffuser to reduce air flow in particular places, or simply reducing air speed. G. Taylor stressed that one needs to be careful when reducing motor speeds, since this can cause overheating. Instead, one should concentrate on the distribution of air flow.

L. Incoll expressed his appreciation on behalf of the group of C. Abbott's work in organising the 1999 meeting with support from Paul Chapman (CSL) and to York University, Department of Biology and CSL for providing the venues.

The meeting closed at 22:35 pm.

Recorder: L.D. Incoll