Estate, Glasshouse & Field Research Department

G. Wood

Biodiversity, vegetation dynamics, and spatial distribution patterns will be some of the watchwords associated with a novel research initiative planned for the next decade. A 10 ha, broad-leaved wood was established by the Novel Crops Unit, with 22,000 trees planted and one mile of deer and rabbit fence erected during the latter months of 1997. The main species of oak, ash and birch occupy an unique lowland site in a field area taken out of intensive arable cropping. Modern research technologies will be utilised in this large-scale, above- and below-ground level, ecosystem study. Techniques, including DNA-profiling, marker geneflow, non-linear mathematical modelling, biogeochemical changes and natural abundances of stable isotopes, will be used to study species competition, utilisation of resources and soil/plant/microbe/invertebrate interactions during the 'bioremediation' of this fertile site.

The SFPC/MRS strawberry breeding programme expanded and changed its approach to the environment under which selections are made. In the field, this resulted in the adoption by the Soft Fruit Trials Unit of a system of raised beds, and laying of irrigation tape and plastic mulch, followed by machine planting in twin, staggered rows. In the glasshouse, a new growing system was established for research purposes in a complete wing of four Cambridge cubicles. This required erection of two-tier gantries holding plants in growbags, with totally automatic fertigation, heating, lighting, venting and thermal/shade screen environment control. In the field, these changes were implemented to allow selections to be made under conditions mimicking those in which any new cultivars would subsequently be grown commercially. The changes also served to establish a much closer working relationship between colleagues in the SFPC/MRS and EGFR Departments: a relationship further enhanced by regular briefing and feedback meetings of the respective soft fruit breeding, research, glasshouse plant production and field trials unit team leaders.

New glasshouse strawberry system.

George Dow retired after 9½ years of service in the Glasshouse Research Unit. He was largely responsible for the significant improvements achieved over the last 4 years in throughput and quality standards associated with plant production for, and consequential success of, the various blackcurrant, raspberry and strawberry breeding and research programmes at the Institute.

On 14 August 1997, the first joint SCRI/SAC potato field trials Open Day (major sponsor The British Potato Council) was held at the SCRI's site at Gourdie farm. More than 250 people, representing the many and varied interests of the potato industry,

Potato trials open day.

attended the event. They were given a guided tour of the trial plots (including cultivars, fertiliser rates, disease screening, tuber size distribution, and seed multiplication) and were addressed by the various specialists involved with each of the trials. There was time allocated after the tours for individuals to question those undertaking the work in more detail. As well as inspecting the plots, static displays were on view from SCRI, SAC, SASA, and others, on various aspects of potato research and development being conducted by these organisations. The success of the event was due to support from several commercial and grower organisations, the SSCR, and also, in no small part, to David Jack and colleagues in the Field Research Unit of the EGFR Department, Tim Heilbronn of the SLIS Department, and Philip Burgess, Alistair Donald and colleagues from SAC.

Opening of the CEUG Conference (l to r) Director; Councillor Peter Mulheron, Perth & Kinross Council; Peter Gill

The annual meeting of the UK Controlled Environment User Group (comprising engineers and manufacturers, university, commercial and research organisation users) was held at the Institute on 16 and 17 September 1997. This was the first time in the 30+ year history of the Group that this event had been held in Scotland at one of the SABRI centres. Business, paper and exhibit sessions spanned the 2 days. The conference was almost single-handedly organised by Peter Gill (Glasshouse and Controlled Environment Unit Manager) and was supported by SET, Perth and Kinross Council, and Dundee and Angus Tourist Board. More than 50 people attended the very successful event, at which highlights included papers on new technologies in enclosed environment research for experimentation in space, and controlled ecological life support systems, given by Professor T W Tibbitts (University of Wisconsin, USA) and Professor M A Dixon (University of Guelph, Canada), respectively.

Agronomy research field trials by the Arable Trials Unit concentrated on winter and spring barley in 1997. In a spring malting barley small plots trial, cultivars Landlord and Optic were comparable with cultivar Chariot in terms of yield. Yields of just over 7 tonne ha^{-1} were achieved with all varieties at seed rates calculated to produce from 300 to 350 plants m^{-2}. On a large field scale, however, Optic was 2 to 3 days later, outyielded Chariot by on average over 0.5 tonne ha^{-1}, and had lower grain nitrogen levels. In the winter malting barley small plots trial, cultivar Regina outyielded Melanie by over 0.5 tonne ha^{-1}, although the former had higher grain nitrogen and screening levels. In this trial, both those cultivars were superior to cultivars Rifle and Spirit and the standard cultivar Halcyon was in a poor last place. In a seed rate trial using Melanie, highest yields were attained at a seed rate calculated to produce 350 plants m^{-2}. Yields decreased but grain N levels increased at the lowest and highest target densities used in this trial (200 and 450 plants m^{-2}, respectively). The effects of nitrogen fertiliser top-dressings on Melanie were tested at a range of total rates split between applications made at the start of spring growth and at the end of tillering. Dressings from 105 to 140 kgN ha^{-1} raised yields to close to or above 8 tonnes ha^{-1}. Grain N levels, however, became unacceptably high as the fertiliser rate increased above 120 kgN ha^{-1}. The trial highlighted the need for further investigations on the timing of nitrogen fertiliser applications to achieve an acceptable yield and low grain N levels suitable for malting. A small plot trial to test the effect of a novel plant hormone biostimulant chemical (AXIS™, Mandops (UK) Ltd) on yield of Melanie showed no difference between the treated and untreated plots. However, on a large-scale field trial, utilising 4 ha areas of Melanie, the area treated once with AXIS™ at the 3-leaf growth stage outyielded the untreated area by over 0.5 tonne ha^{-1}.

This whole series of investigations served to emphasise, yet again, the inherent dilemma of field trialling: small plot trials may detect an effect which does not materialise when put into practice on a large field scale, and large-scale field trials may show a difference that was not detected by small-scale plot trials.