

GCRI Trust Report

**8th International Strawberry Symposium, Quebec City, Canada
13-17th August 2016
Adam Whitehouse, NIAB-EMR**

The International Strawberry Symposium, organised via the International Society of Horticultural Science (ISHS), is held every four years, with the last meeting being held in Beijing in 2012. Quebec City, Canada was the location for the latest (8th) Symposium with the main meeting held between 13-17th August 2016.



Quebec City, dominated by the Le Château Frontenac and the St Lawrence River, provided the perfect location for the 8th International Strawberry Symposium

It was estimated that there were over 700 participants from around the world at the meeting, with representatives from over 50 countries including from North (USA and Canada), Central (Mexico) and South America (Ecuador), Australasia (Australia and New Zealand), Asia (China, Japan, South Korea), Middle East (Iran) and Europe (UK, Belgium, Ireland, France, Italy, Spain, Germany, Switzerland, Turkey, Poland, The Netherlands).

The Symposium programme was split between Scientific and Tech Transfer sessions. The Scientific sessions were diverse and covered a multitude of disciplines with 21 sessions in total: Breeding, Genetics, Molecular Genetics, Genetic Resources, Applied Physiology, Health, Physiology (Flowering/stress), Post-harvest/Quality, Crop Management - soils & substrate - fertilisation, Nursery & Cropping Systems, Organic Production, Greenhouse tunnels, Pathology, Soil-borne Pathogens, Entomology, World Production. Tech Transfer was more grower orientated and ran alongside the Scientific Sessions, and included sessions on the current situation in breeding from different continents, initiative growing systems, extension work on pest and disease management, marketing and health benefits of strawberries to consumers.



A key note speaker addresses delegates as part of the Symposium

Each session commenced with an invited lecture, with the first lecture delivered by Dr Rick Harrison (Driscolls, USA) who gave an 'Overview of world strawberry production and future trends'. As well as outlining the key changes in the industry that have allowed continued growth, Dr Harrison highlighted challenges that were or are very likely to affect worldwide production. This included labour, where availability and cost were becoming critical, even leading to reduced production in some areas. He estimated that 30-50% of production costs were now solely attributable to labour. To overcome this there had been a drive towards better harvest efficiency, a move over to protected substrate production and the renewed interest and developments in robotic picking. Environmental factors, such as water use, were also covered, with some discussion on the possibility of using enclosed, controlled environments, or 'factory farms', in future production. The use of molecular genetics for improved efficiency was also highlighted, but Dr Harrison suggested that the major limiting factor to progress was the ability to phenotype quickly and efficiently and this would therefore require more efficient methods of deployment and possibly automation.

Following on from Dr Harrison's talk, and relevant in light of the discussion on enclosed, environmentally controlled production systems, was a lecture given by Dr Changoo Chung, (Seoul National University, South Korea) who outlined progress in 'Strawberry Transplant Production in Bio factories in Japan and South Korea'. He gave examples of baby vegetable and herb production in both these regions using enclosed bio factories, but emphasised that for strawberries that plant factories with artificial lighting (PFAL) were only being used for strawberry plant production rather than for fruiting. The purpose of this work was to increase the number of strawberry transplants that can be harvested from a mother plant in any one year, and he was able to demonstrate how rapid and efficient transplant production under PFAL conditions was compared to field based production.

There were numerous reports given on current situations in breeding and amongst the many talks on breeding programmes around the world was a lecture given by Dr Klaus Olbricht, (Hansabred, Germany) who discussed the loss of key flavour volatiles in modern cultivars that he considered were due to the 'funnel effect' of breeding for increased shelf-life and yield. He then discussed the key volatiles, particularly lactones that were acting as 'sweet enhancers' and how he had developed a new cultivar, 'Renaissance' from a series of backcrosses to get wild species introgression from *Fragaria chiloensis* which he believed would offer new standard cultivar for flavour for the industry.

Dr Vance Whittaker was another key note speaker, and his talk on 'Progress in the University of Florida Breeding Programme' highlighted some ground-breaking work on the use of molecular markers as tools for breeding as well as introducing the very real concept of genomic selection as a future breeding method for strawberry.

Interestingly four presentations (Japan, The Netherlands, USA and Canada) independently considered the use of seed-raised F1 hybrids as a method for producing day neutral plants for fruit production. This is a break from the traditional method of vegetative propagation, but appears to offer some advantages to the current system by allowing the production of plants that have low runner production, thereby increasing yield, reducing some labour inputs and avoiding a number of disease problems associated with vegetative propagation. In a conventional system lack of runners would limit propagation and increase plant cost.

Within the first Breeding session, I presented 'Progress in Strawberry Breeding at NIAB-EMR, East Malling, UK' which gave an update on the current situation with the East Malling Strawberry Breeding programme and also highlighted the success of 'Malling™ Centenary' which was the subject of a poster that I also presented at the event.

Advances in greenhouse and protected culture were covered in depth, with a number of talks given by the research group from Profcentrum Hoogstraten, Belgium, led by Tom van Delm. They outlined how year-long production is now being achieved in Belgium via the utilisation of number of cropping systems, including winter production under assimilation lighting. Peter Mellis from the same group also reported on the 'Meerle High-Level System' which involves growing strawberries at different levels within a glasshouse to utilise previously unused space, and maximise yield potential per unit area, with an increase of up to 20% being achieved for the cultivar 'Elsanta'. Conversely there was little to report from North America on protected culture, with only one report of glasshouse production for out-of-season production in Arizona. In the USA soil less growing systems represent only <1% of production, compared to 60-70% in the UK and The Netherlands.

A novel approach to crop protection was reported by Sara van Beneden, BioFest, Belgium who reported on the results of trials using bumblebees for targeted application of biopesticides in strawberry crops. She referred to these as 'flying doctors' who dually pollinated and delivered biological control agents (BCA) to plants in both field and glasshouse situations. The design of the hive was critical and BioFest have a patented 'one-way' traffic design for hives that allows the uptake of the BCA on exit. The results of her work demonstrated that this system was effective against a number of pest and diseases (particularly botrytis) when they were at low incidence or infestation levels without detrimental effects to the bees or hive.

The main scientific and business sessions of the meeting were concluded on 16th August, and the following day was set aside for technical tours to farms and/or related industries in three regions: Île d'Orléans, Quebec City south shores and the Montreal. I took the latter tour which included visits to Campanipol Bio Farms, Pépinière Lareault and Fraisebec Enterprises:

Campanipol Bio Farms is a family-run farm/enterprise that produces seasonal crops for its own farm shop and fruit and veg box scheme. It has running for 25 years and farms just under 100km west of Quebec City. Most production is in the open field, and farmed under low input systems.

Pépinière Lareault is the largest strawberry propagator in Canada. In addition to strawberries it also produces plants of a number of Rubus and Ribes species. It has been in business for over 50 years and is located 200km west of Quebec and 60km east of

Montreal. Most production is in open field nursery beds, with a large proportion of plant production for shipping to Florida for fruit production.



Part of the open-field nursery at Pépinière Lareault wherethe majority of production is for plants to be exported to Florida, USA

Fraisebec Enterprises is now Canada's largest strawberry fruit producer with over 60 hectares of strawberry growing area. The business was founded in 1978 in Sainte-Anne-des-Plaines, 50km north-west of Montreal. As well as strawberry production, the business has expanded into autumn Raspberry production, with fruit being supplied to the main Canadian and US retailers (Sobeys, Métro, Loblaws, Provigo and Walmart). The majority of production is still in outdoor, raised bed production, although there was evidence that protection, using Spanish-style tunnels, was being trialled.



The entrance to the Fraisebec site – making a statement to passers-by!

I would like to thank the GCRI Trust for their generous contribution towards the cost of my trip to Canada to attend this symposium. It enabled me not only to present my own work to a global audience but also allowed me to update and broaden my knowledge as well as have the opportunity to interact and exchange ideas with others working in a similar field. The next International Strawberry Symposium returns to Europe in 2020, taking place in Rimini, Italy.

