A strengthened research relationship: China and South Africa

A good relationship between the South China Agricultural University (SCAU), the Agricultural Research Council-Institute for Tropical and Subtropical Crops (ARC-ITSC) and South African Litchi Growers’ Association (SALGA) has developed over the last six years. Delegations of the respective parties have visited both countries on several occasions during this time for activities such as industry visits, congresses and symposia. Relationships were strengthened during a recent visit to China and new contacts were established for future collaboration.

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As relationships between China and South Africa were strengthened, the need has arisen to formalise collaboration, which eventually culminated in the drafting of a Memorandum of Understanding (MoU) between ARC and SCAU. Subsequently, Dr. Org van Rensburg, Research Technology Manager at the ARC-ITSC, and Mr. Sakkie Froneman, a litchi researcher at the Institute, were invited by the South China Agricultural University to attend and present at the 2015 Lychee and Longan Workshop, held in June 2015 in Guangzhou, China. The formal signing of a MoU between ARC and SCAU, involving collaboration on research of various tropical and subtropical crops, was also on the agenda for the visit. Apart from Chinese delegates at the 2015 Workshop on litchis and longan, researchers from South Africa, India and Taiwan were invited to attend and present at the workshop. Approximately 200 delegates were present.

The workshop brought together and created the opportunity for litchi scientists to gather and demonstrate the full diversity of their profession.

Furthermore, China is the indigenous home of litchis, offering the opportunity to view an abundance of litchi and longan cultivars in their native environment. The aim of Mr. Froneman attending the congress was to present his litchi research to a broader international community, and also to interact with researchers from around the world on a number of topics that involves his litchi research. China is one of the leading countries in the fields of breeding, propagation, processing and biotechnology in litchi. The main aim of Dr. Van Rensburg was to sign the MoU and to promote collaboration between the respective parties.

This agreement will enable research collaboration on various agricultural crops, the exchange of germplasm for research purposes and will also allow mutual visits to the respective countries for researchers and growers.

Mr. Froneman delivered a presentation ‘Diversification of litchi germplasm in the South African Plant Improvement Programme and opportunities for the future’. A poster ‘Optimising the use of Ethaplon to avoid unwanted shoot growth before flower induction and increase yield of litchi, cv. ‘Mauritius’ (‘Tai So’) from South Africa’, was also on display at the workshop. The poster was authored by R.B. Cronje, I.M. Ratlapane.
and I.J. Froneman of the ARC-ITSC.

After the workshop, visits were done to various litchi and longan research and commercial orchards, nurseries, pack houses and processing units. The northern litchi production area in Sichuan province was also visited to view some later maturing litchi cultivars. In this area some longan and citrus plantings were also visited. In addition, some informal cultivation in rural areas of Sichuan was visited, where vast areas of litchi and longan are cultivated around settlements in the area.

XianJinFeng orchard, Zeng Cheng suburb, Guangzhou

THE XIANJINFENG LITCHI cultivar was developed in the early 2000s as a seedling selection discovered on this farm. The cultivar is believed to be a hybrid between ‘Wai Chee’ and ‘Nuomici’, with all the qualities of the highly revered ‘Nuomici’, but with improvement in some skin qualities. It is believed that the hybridisation with ‘Wai Chee’ has resulted in thicker skin, less susceptible to cracking, a problem found in the ‘Nuomici’.

Fruit is of excellent quality, heart shaped with white-yellow flesh colour. Seeds are tiny, with an abortion rate as high as 80-90%. Externally, fruit is bright red with a thick skin. Because of the thick skin, fruit is less dehiscent and can stay fresh for longer. ‘XianJinFeng’ is capable of high yielding, with average fruit mass of 25-28 q. The edible part of the fruit can be 78-82%. The taste is very similar to the taste of ‘Nuomici’, having a pleasant honey-like aroma and flavour.

The harvesting season of the cultivar in Guangzhou is from mid to late July. Fruit set is from mid-March to beginning of April. Fruit pulp has a total soluble solid (TSS) content of 18-20% at harvest, with the Titratable Acid (TA) being 0.11 at harvest. ‘XianJinFeng’ is currently considered to be one of the top varieties available in China.

The trip to the farm included a tasting session as well as an orchard stroll, where the beauty and bumper crop of the cultivar could be appreciated.

Visit to northern Sichuan litchi and longan areas (July 2015)

AFTER THE 2015 Litchi and Longan Workshop was concluded, a visit was scheduled for Dr. Van Rensburg and Mr. Froneman to the northern litchi and longan production areas of the Sichuan province. Because of altitude and latitude, these northern production areas have a later litchi production season than the southern Guangdong province. The South African delegation was accompanied by Prof. Houbin Chen, head of the College of Agriculture of SCAU, and Mrs. Judy Solani, Plant Pathologist at the Beijing Plant Protection Station.

Student litchi trial orchard

AN ORCHARD ON the premises of the South China Agricultural University containing various germplasm of litchi and longan was visited. The orchard forms part of various research orchards of different crops established. It was explained that one of the main purposes of the orchard is to allow students to also take responsibility for aspects revolving around their research work, such as irrigation, fertilisation, pruning and harvesting of the trees.

Ancient longan forest on banks of Yangste River

UPON ARRIVAL IN Fuzhou, the delegation was taken to an ancient forest of longan trees on the outskirts of the city, situated on the banks of the Yangste River. The forest was declared a national conservancy site, in order to protect the trees against urban encroachment. A seven hundred year-old longan tree was visited, along with several other old longan trees in the conservancy area. Some younger litchi trees were also seen alongside the pathway. The delegation was taken to a high lookout point where a magnificent panorama over the conservancy and the Yangste River could be viewed.
A Memorandum of Understanding

SINCE 2008, RESEARCHERS from the Agricultural Research Council-Institute for Tropical and Subtropical Crops (ARC-ITSC) have maintained good relationships with researchers of the South China Agricultural University (SCAU). These collaborative efforts have eventually culminated in the drafting of a Memorandum of Understanding (MoU) on mutual research between the respective parties.

Litchi research in China is driven by the national research and technology programme, funded by the Chinese Government. Research on litchi is done by the South China Agricultural University, which is a leader in litchi and longan research.

Before departing for South Africa, the Memorandum of Understanding was signed between representatives of the two parties during a ceremony, where the collaboration was formalised.

The signing of the MoU has opened the door to a new era of close collaboration between China and SA regarding subtropical crops. The preparation for a China-SA joint funding application of 2016 to Chinese and South African governments will be the next step to implement collaboration. Cultivar improvement and crop management (growth manipulation, orchard machinery, quality control and food safety), post-harvest and processing, will be major parts of this initiative.

GRAFTING in a nursery

A NURSERY IN the Zeng Cheng suburb, Guangzhou, containing litchi seedlings established on raised beds, were visited on the XianlinFeng farm. In the nursery, seedlings are grafted with a side-graft technique, whereby the cambium layers of the scion is aligned to the cambium of the rootstock. In most cases the rootstock was thicker than the scion, consequently only a part of the rootstock was side-grafted. Topworking of adult trees is done with a “high-grafting technique”, where shoots are grafted at a height of 1.5-2 m. Branches are covered after grafting with cloth as protection against sunlight. This is quite different to the method for topworking in South Africa, where trees are cut back and grafted at a height of approximately 0.5 m. As opposed to protection with cloth in China, branches are painted with white PVA paint in South Africa for sun protection.

Litchi village, Sichuan province

A VISIT TO a rural area on the outskirts of Fuzhou was on the agenda. The landscape consists mostly of litchi and longan trees, scattered in vast numbers around houses and settlements. A huge litchi tree, possibly hundreds of years old, was pointed out as having a bumper crop of more than 1 000 kg of fruit in the previous harvesting season. Many other large trees with a heavy crop load was seen in the area. The practice of high grafting of litchi trees to change to better cultivars, was once again noticed.
Hydrocooling and packing

A Litchi PACK house in the Zeng Cheng suburb of Guangzhou was visited, where fruit of ‘Gui Wei’ were hydrocooled and packed for the market.

Polystyrene containers lined with plastic are used. After placing the fruit inside the plastic bag in the box, a wet foam rubber cloth is placed on top of the fruit, and the plastic is closed. An ice block is also placed on top of the foam rubber cloth before closing the lid. There after the polystyrene boxes are labelled, packed in a colourful carton box and sent to the market. No sulphur fumigation is used for preservation of litchis, only hydro cooling for the extension of the shelf-life of fresh fruit.

Litchi trees in tunnels for accelerated growth at the Northern Sichuan research farm.

Northern Sichuan research farm

THE DELEGATION WAS taken to a research farm near Fuzhou, where the yield and fruit set of several litchi cultivars were viewed and discussed.

Fruit were noticeably at a very early maturing stage, confirming the late harvesting status of the area. Some litchi trees were cultivated in plastic tunnels for acceleration of growth in order to promote rapid research results with trials.

The Chinese techniques for grafting and topworking were also discussed in length. The main difference with the techniques used in South Africa is the height of grafting, and the type of graft technique that is used. Also, whenever graft incompatibility is a problem between cultivars, the Chinese make use of bark-grafting instead of shoot grafting to overcome the incompatibility. This knowledge should be very useful in the South African litchi industry, considering the recent importation and multiplication of new cultivars in the SA industry.

Colourful boxes for dried fruit

The next stop was a litchi processing plant in the Zeng Cheng area. High volumes of litchi and longan are dried here at 90°C in big ovens for 18 hours to a semi-dry state with 25-30% moisture. Dried fruit are packed in colourful carton boxes to enhance the appearance of the rather dull brown dried product. Dried litchis and longans are very popular in China, and are mainly consumed in times of the year when there are no fresh litchis available.