XIV INTERNATIONAL MANGO SYMPOSIUM - MAZATLAN – MEXICO

FINAL REPORT

Andre Botha – SAMGA

The symposium took place in the coastal town of Mazatlán, located in eastern Mexico. All presentations were held at the *Centro Internacional Mazatlán*, the designated venue for the event. On the final day, participants embarked on a field excursion to nearby inland orchards situated just outside the town.

This year's symposium centred on the overarching theme of climate change and its impact on mango production. Dr. Victor Galán-Sauco opened the event with a presentation addressing this critical issue, discussing various strategies that could be implemented to mitigate the challenges posed by changing environmental conditions.

Key facts about the mango industry in Mexico, which ranks fifth globally in mango production, contributing 4.28% of the world's supply. Mangoes in Mexico are cultivated across 23 states, covering 207,000 hectares and yielding approximately 2 million tons annually. The country is home to an estimated 53,000 producers, with an average productivity of 9 tons per hectare. Despite this significant output, the industry largely relies on traditional farming methods and has seen minimal adoption of new plantings. Most producers depend on rainfall for irrigation; however, a few supplement it with single-line drip systems during drier periods.

Plant spacing are wide in most of the plantings all over Mexico.

The main mango varieties grown in Mexico include Ataúlfo (30%), Manila (15%), Kent (15%), Tommy Atkins (14%), Haden (9%), Criollo (7%), and other varieties making up the remaining 10%.

Ataúlfo fruit and packaging

Over the three-day symposium, 43 presentations and 17 posters were showcased. Day one featured a Spanish-language workshop that primarily targeted local growers and students. This session focused on practical topics such as tree size management, improving fruit size, and the health benefits of mango consumption. It also explored production and market dynamics in countries like the United States, Europe, Russia, and Japan.

Day two hosted two parallel sessions, both centred on managing heat stress in mango production. Presentations addressed the effects of heat stress on mango trees, the adaptation benefits of using shade nets in Israel, pollination practices under Mediterranean conditions, and the influence of temperature on fruitlet drop. Concurrently, another session focused on crop management and included discussions on high-density plantings in Australia, water availability impacts on potted mangoes, flowering-to-maturity growing degree day targets, pest management for hoppers and fruit flies, and technological advancements in mango harvest management.

The conclusions from Dr. Ian Ballay from Australia on high-density orchards is that it offers numerous advantages, though they come with higher establishment costs and demand precise, timely management. Among all factors, the choice of cultivar stands out as the most critical and influential. Despite the progress made, key challenges remain, and there is still much to learn. A deeper understanding of individual system components and how they interact is essential. This work spans multiple scales—from molecular to node, limb, tree, and orchard—highlighting the complexity of the system. Ultimately, developing successful high-density orchards is a long-term endeavour, and the journey of discovery and improvement continues.

Dr. Frederic Normand presented on rootstocks and its effects on vegetative growth and found that linear mixed models have proven to be effective tools for analysing and quantifying the influence of various factors on the growth patterns of young mango trees. Notably, rootstock plays a significant and early role in shaping vegetative growth. However, its effects are not uniform—they vary depending on environmental conditions, the specific mango cultivar, and the growth variables being measured. The site's growing potential also influences early vegetative development, either amplifying or diminishing the impact of rootstock. Interestingly, the growth potential of each rootstock tends to remain consistent across different cultivars. In practical terms, it is essential to evaluate rootstocks under diverse environmental conditions and using multiple growth variables. Looking ahead, future research should focus on assessing rootstocks not only for vegetative growth but also for fruit production. Additionally, understanding the underlying causes of the differences in growth rates induced by various rootstocks will be key to optimizing mango cultivation strategies.

On the third evening of the symposium, delegates were treated to an authentic cultural night showcasing local traditions and entertainment.


Cultural dancers entertaining the delegates.

The final day of the symposium covered topics related to breeding, germplasm, and genetic diversity. While only a few new cultivars were introduced, four new ARC/SAMGA cultivars, as well as a number of promising selections from the breeding program from South Africa, were unveiled for the first time and was presented by Andre Botha on behalf of Salomie Willemse, the project leader.

Andre Botha from SAMGA presenting on the new cultivars and promising selections out of the SA breeding program.

Israel has yet to release any new cultivars, whereas Australia is still evaluating four new promising selections (WS1, WS2, WS3 and WS4). India has released 30 hybrids and 10 selections locally, although these have not significantly impacted the market. Mexico has introduced a new early-season cultivar named *Kankun*, which was showcased at the symposium. However, its commercialization remains in the initial stages of development, and it is currently unclear when it will be available for testing. Potential benefits for SA are mainly that it is an early cultivar, but its specific agronomic traits—such as yield, pest resistance, or flavour profile—are yet to be confirmed.



The cultivar - *Kankun*

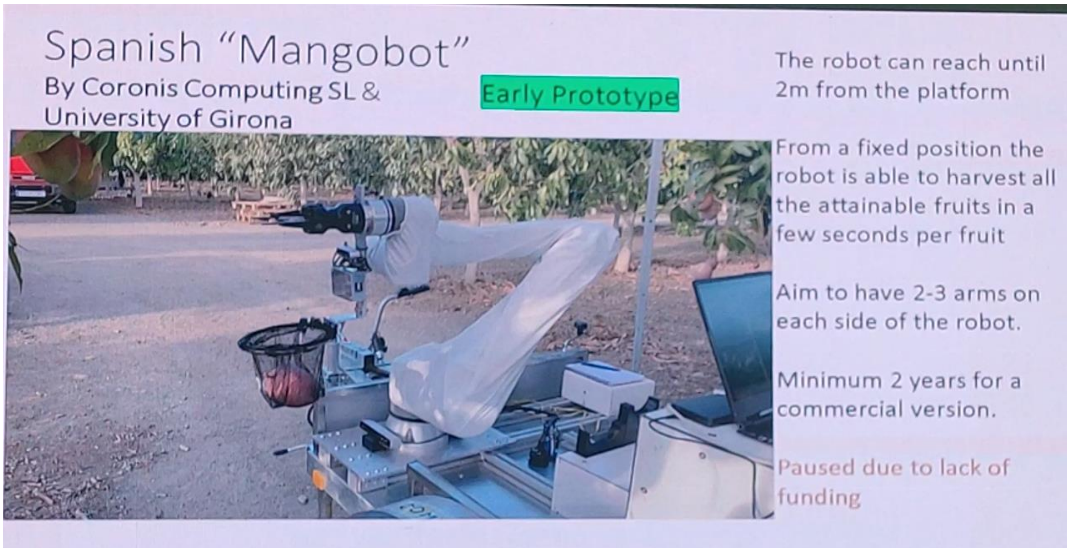
A strong emphasis was placed on the role of genomics in breeding programs, particularly for developing cultivars with desirable traits. Dr Yuval Cohen from Israel gave a talk on the characterisation of mango populations and found that segregating populations is essential for effective genetic analysis of traits. It has been shown that identifying parents from selected open or assisted pollination progenies can be done efficiently. Juvenility appears to be dependent on vigour, with more vigorous progenies tending to flower at a younger age. The patterns of ground and blush colour are complex, involving different genetic pathways; notably, green ground colour and red blush are dominant traits in the selected populations. To deepen understanding, further molecular analysis is recommended.

The concluding sessions addressed harvest and post-harvest topics, such as chilling injury, radiation use to enhance post-harvest quality, NIR technology for internal quality evaluation, and the use of hot water treatment to control anthracnose.

The scientific part of the symposium closed with a compelling presentation on automated mango harvesting as a sustainable solution in the face of climate change and labour shortages. It emphasizes how climate change exacerbates extreme weather conditions, disrupting harvest operations and narrowing the optimal window for picking mangoes. These environmental shifts also heighten labour stress, particularly due to increased heat and humidity. Simultaneously, persistent labour shortages make it difficult to harvest mangoes efficiently and on time, resulting in significant crop losses and economic strain for producers.

Multiple drone apple harvester currently used in the USA. (TEVEL)

Australian ‘mango auto harvester’ – commercial by 2026.



Spanish ‘Mangobot’

On the final day of the symposium, delegates embarked on field trips to two mango orchard sites. These orchards produce fruit specifically for export to the United States, and strict biosecurity protocols are enforced for all visitors. Remarkably, the orchards yield approximately 28 tons per hectare—significantly higher than the national average of 9 tons per hectare. However, the trees are over 20 years old and are planted with wide spacing: 10 meters between rows and 7 meters within rows.

Field trip in Kent orchard

Local farmers

Export orchards - biosecurity

Ataúlfo orchard

SA Delegates that attended the symposium.

Andre Botha and Johann du Preez

Johan and Lohansi van Vuuren

I would like to express my sincere gratitude to SAMGA for the incredible opportunity to attend the international symposium and to engage in meaningful networking with scientists from around the globe.