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Front Cover

Sundrop Farms CEO Philipp Saumweber amongst their Merlice tomato crop in Port Augusta, South Australia

Photo by James Elsby, News Corp, Newspix



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By SUE NEALES, The Weekend Australian Magazine 9/8/16

Driving across the wide saltbush plains towards Port Augusta, north of Adelaide, the first thing a visitor notices on the horizon is the sky-piercing solar tower of Sundrop Farms.

Only when you get close do you see the 24,000 mirrors arrayed at its base, each of them beaming the sun's rays to the tower's tip, 127m above the ground.

The thermal energy harnessed here powers 20ha of adjoining glasshouses, which in turn produce about 350 tonnes of tomatoes each week.

Welcome to farming of the future: a hi-tech, capital-intensive system growing food sustainably and cleanly for the masses - all located in rocky, arid country where southeast Australia's cropping zones meet the Outback and annual rainfall is less than 250mm.

"If you can farm successfully here, you can farm almost anywhere in the world," says CEO Philipp Saumweber, who began his career at Goldman Sachs, and comes from a wealthy German family that co-funded Sundrop Farms' development.

"I'm no eco-warrior but I wanted to create a new business model for farming, based on a concept of doing more with less and growing in the most sustainable or restorative manner. This is what we have achieved."

Saumweber's project - born seven years ago in a small nearby glasshouse, where it ran on homemade solar panels, backyard hydroponics and big dreams - is

now a \$175 million, highly productive "farm" that opened in June and is now producing 10-15 per cent of Australia's truss tomatoes.

It runs almost entirely on solar thermal power, courtesy of the 15ha array of mirrors that feeds the tower with heat energy, rather than using the more common photovoltaic light-converting panels.

The energy is used to heat seawater in vast boilers, generating electricity from the resulting steam and thermal heating for the hothouses.

The steam-generated power drives a large desalination plant, turning constantly circulating seawater from the nearby Spencer Gulf into fresh water.

In the glasshouses, 750,000 tomato plants dangle their roots into hydroponic pipes.

"When you look at how many resources modern conventional agriculture uses now - rivers, fresh water, fossil fuels, chemicals, land - it is not sustainable, and our family didn't want to continue to fund or encourage that," Saumweber says.

"We looked all around the world for where to start our Sundrop model and Australia was ideal - it was coming out of drought and there was a keen interest in water-saving farming."



Sundrop Farms CEO Philipp Saumweber amongst their Merlice tomato crop

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Sundrop Farms' head grower Adrian Simkins.
PHOTO: Dean Martin

In addition, *"most produce here was still grown in the field so [the industry] was open to new concepts; the climate was ideal and you had good universities and technology knowledge."*

Standing in one of Sundrop's vast glasshouses, surrounded by a forest of Merlice tomato vines laden with ripening fruit and climbing towards the sun in 200m-long rows, Saumweber says he has to pinch himself to believe his vision has become reality.

The glasshouses are hubs of quiet activity: small, driverless electric trains trailing carts laden with red tomatoes glide around, delivering the harvest through automatic doors to the packing shed.

Ladders slide along each row, with workers plucking off the ripe fruit twice a week and others manually pollinating the emerging flowers on the vines every two days.

The farm employs 150 workers from Port Augusta and nearby Port Pirie, including many long-term unemployed or those displaced by the mining downturn.

The air inside is balmy on this wintry outback day, thanks to the thermal heating, which helps the fruit ripen naturally on the vine.

In summer, when temperatures outside can hit 47°C, the glasshouses are climate-controlled with evaporative cooling and sliding shade cloths.

No artificial gases are used to redden or ripen the tomatoes.

But in another hi-tech innovation, carbon dioxide levels are elevated in the glasshouses to boost crop production by about 30 per cent.

Head grower Adrian Simkins says no pesticides are used; instead, friendly or beneficial bugs such as ladybirds are encouraged, and traps and pheromones are used to suppress unwanted insects. Pest and bug problems are minimal, in any case, due to the farm's isolation.

The intensity of Port Augusta's light and the controlled growing environment mean tomatoes can be picked just 10 weeks after each seedling is embedded in its hydroponic pipe.

New seedlings are planted between mature vines, giving Sundrop a unique production cycle spanning 50 weeks a year - crucial for supplying Coles supermarkets with up to 25,000 tonnes of tomatoes each year.

"It sounds like high-cost farming but because of our scale and low running costs we can actually grow tomatoes incredibly competitively," Saumweber says.

"You have to put in a lot more capital up-front to build it but we don't have to buy water, electricity, fuel or insecticides, our land is cheap and our annual costs of running a big horticultural operation are very low."

Investors and retailers have been quick to see the merits of Sundrop Farms' methods and the potential to expand the model globally.

In 2014, private equity firm Kohlberg Kravis Roberts helped to fund construction of the SA flagship facility when it injected more than \$US100 million into a partnership with the Germany-based Saumweber family.

It recently kick-started trials to build similar solar-powered glasshouses in Portugal and the United States.

And while the first 10 years are dedicated to producing truss tomatoes for Coles - six double container truckloads leave the Port Augusta farm each day, bound for distribution centres in Perth, Darwin, Adelaide, Melbourne, Sydney and Brisbane - the glasshouses could easily grow other tomato varieties and vegetables such as capsicums or cucumbers.

"This is the future," says Saumweber. **"Just as the green revolution of the '70s gave us bigger tractors, more seed varieties and better irrigation, I think the next giant leap forward in food production will be the sustainable intensification of farming - doing more with less inputs but on a bigger scale and with greater efficiency."**

"It's already here - we are up and running - but I think we will now see a lot more innovation in agriculture generally, and not just because we have to feed more people in Asia. Millennials care about how they eat, what they are eating and how it is produced and grown; inevitably the farming status quo will be challenged. What we are doing here is just the start of a much bigger trend towards a new way of producing food."

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Research update on Australia's

Cucumber Green Mottle Mosaic Virus (CGMMV)

By LEN TESORIERO, PCA Director and Senior Plant Pathologist NSW DPI

A new R&D project has commenced to investigate CGMMV in Australia.

This virus was first recorded in 2014 on watermelon crops near Katherine in the NT and subsequently on cucumbers grown under protected cropping near Darwin.

It has been present in Europe for many years where it can cause a serious disease on susceptible greenhouse cucumber varieties.

In recent years it appears that an aggressive strain of CGMMV emerged that has spread around the world with infected seed.

There have been new reports of this disease from countries including Israel, Canada and the USA just prior to the detection in Australia.

The R&D project is a collaboration of scientists from across Australia and is led by Dr Lucy Tran-Nguyen from the NT Department of Primary Industries and Fisheries (who incidentally was awarded Vegetable Researcher of the Year at the recent national horticulture convention on the Gold Coast).

Funding has been provided by the Australian vegetable industry levy but in future may also draw on funds from the newly established Australian melon industry levy.

These levy funds are matched by the Australian Government through Horticulture Innovation Australia.

The project has five broad areas of activity:

1. Identify the weed host and non-host plants. This will be important to determine if the virus is spread with weed seeds and therefore to inform the industry on management of the spread of the disease.
2. Determine how long the virus can persist in soil and plant debris. Again this is critical knowledge to manage the disease in fields or substrates where

CGMMV was previously shown to occur.

3. Develop more sensitive CGMMV detection techniques. As most imported cucurbit seed must now be tested either overseas or in Australia it is important that the detection methods are validated and sensitive enough to pick up low infection levels. In-field detection methods may also help to determine if the virus is in weeds and soils.
4. Field cucurbits rely upon bee pollinators and there is some preliminary evidence that CGMMV may be transmitted by them. Research is required to confirm this occurs, and will link with current studies led by Dr Aviv Dombrovsky in Israel.

5. An extension and capacity-building component will keep growers and industry stakeholders informed about the research findings and management options. Detection of this exotic disease in Australia exposed an uncontrolled biosecurity pathway of infection via untreated and untested imported seed. A testing regime is now in place to mitigate this risk. More importantly the Australian melon industry now has an R&D levy to fund relevant R&D as well as a Biosecurity Levy component to assist with any future incursions. This includes a provision to compensate affected growers for financial losses.

PCA will keep you informed on the progress of this project which has broader implications than simply the melon and cucurbit industry.

CMV-infected plants are more alluring to bumble bees

Bumble bees have a thing for tomato plants, especially if they're harbouring a destructive virus. That's the curious finding of a new study, in which researchers released the insects into spaces that contained either normal tomato plants or those infected with the cucumber mosaic virus (CMV).

CMV alters the gene expression of the tomato plants it infects, stunting their growth and distorting their leaves, and it can cause severe losses of crops worldwide. It also causes the plant to emit a different scent than noninfected tomatoes, researchers report today in PLOS Pathogens.

The scent appears to make a difference; the bees were more likely to visit infected plants than noninfected plants, and they spent more time buzzing around them. That preference likely keeps the virus going in tomato plants, according to a mathematical model the team developed. The team says further research could lead to ways to increase bee pollination of important crops.

Source: Science Magazine



WINTER 2016

Biosecurity Alert

CGMMV detected on greenhouse cucumbers in Geraldton WA

LEFT: Symptoms on young leaves are vein clearing and crumpling may be visible, while mature leaves may show mottling or mosaic patterns, or look pale, yellow, or bleached.

Young seedling symptoms may be indistinct or difficult to recognise as being caused by a virus. In severe infections, embryonic leaves may become yellow, but symptoms may not be apparent until more mature leaves emerge.

The safety harness of an EPPRD, R&D levy and a biosecurity levy by ROBERT HAYES PCA Chair

Let us hope that the CGMMV disease is controlled and hopefully eliminated before it causes a major problem for the cucumber and melon industries elsewhere in Australia.

I can only hope that the key players in the Australian greenhouse tomato industry are watching this event unfold.

The tomato industry needs to learn from this experience and look at applying a similar approach to their biosecurity vulnerability by implementing at the very least, a biosecurity levy and signing up an Emergency Plant Pest Response Deed (EPPRD).

Further, it needs to be lobbying the government to ensure that imported tomato seeds are treated and tested against the various potentially disastrous diseases lurking overseas.

Is it too much to suggest, once again, that the largest horticultural industry by value in Australia needs to consider implementing an R&D and Biosecurity levy?

This would attract matching government dollars to invest preemptively in being prepared for an almost inevitable incursion, rather than find itself reacting to a disaster after the event.

PCA is prepared to assist and facilitate this process, as it has done on two previous occasions.

PCA is the only national industry representative body with a direct interest in the protected cropping tomato industry.

However, as a voluntary organisation PCA is not resourced to pursue the agri-political activities involved in lobbying the Federal Government and the various arms of bureaucracy.

Neither is it resourced to be involved in the biosecurity monitoring and management process. Despite this, PCA is prepared to assist where it can to facilitate a third, and hopefully more successful attempt to implement a Tomato Levy.

Recent developments in other horticultural IRB's and the new independence of HIA from them, mean that the pathways to establishing a statutory R&D and Biosecurity levy are probably now a little less obstructive than they have been in the past.

The PC tomato industry needs to take a good hard look at its risk profile into the future.

It needs to figure out whether it is prepared to continue risking the massive capital investment it has made and continues to make, whilst walking a biosecurity high wire without the safety harness of an R&D Levy, an EPPRD and a Biosecurity Levy.

The smaller segments of the PC tomato industry have long supported such an approach.

It is the larger players, who actually have far more to lose, that need to take the lead on this. The real question is this - will they stand up and be counted?

