TOMATO TOPICS

Hort Innovation
Strategic levy investment

PROCESSING TOMATO FUND

Australian Processing Tomato Research Council Inc.

NEWS and INFORMATION
FOR THE PROCESSING TOMATO INDUSTRY

ISSN 1038-3522 **March 2024** **VOL. 34 NO. 1**

Advanced Drip Irrigation Management Workshop — Echuca

By *Matthew Stewart*

In response to increasing demand for updated training in drip irrigation management and efficiency gains, the APTRC coordinated a specialized training session on Friday, 19th January.

Nick O'Halloran

The session, facilitated by Nick O'Halloran of Agriculture Victoria and Peter Henry from Netafim, spanned three hours and focused on critical aspects such as System Specifications, Monitoring, Maintenance, and Agronomy.

A comprehensive 34-page manual, meticulously compiled by Nick O'Halloran, accompanied the training, offering the latest insights and best practices in drip irrigation management.

Twenty-five industry members actively participated in the training session and complimented its organisation, depth of information, and interactive nature.

For those unable to attend the event, Nick can provide additional copies of the manual, please reach out myself on 0400751100 or via email at aptrc.idm@outlook.com.

Peter Henry

In this edition: **Page:**

APTRC Netafim Sponsored Field Day — Mathoura, Katunga, Nathalia

By ***Matthew Stewart***

Our annual January field day, which took place on the afternoon of Friday, January 19th, saw a cohort of 50 members convene for a comprehensive bus tour.

The day commenced with a visit to Kagome's Jennison farm, where Nick O'Halloran from Agriculture Victoria conducted a live, in-field demonstration on drip tape pressure testing and end point flushing.

This practical demonstration provided tangible reinforcement of the theoretical concepts discussed earlier by Nick and Peter during the morning training session.

Ann Morrison, our Research Manager, engaged the group by discussing her cultivar trial program, elucidating the intricacies of trial layout plans crucial for acquiring statistically significant data. Darcy Kirchhofer, the Kagome NSW Regional Manager, shared insights into the agronomy management of the crop, underscoring the season's limitations and how Kagome had pivoted plans to meet the challenge.

The tour took a stimulating turn with a visit to Katunga Fresh Hydroponic tomatoes, where owner Peter Van Den Goor provided a comprehensive account of the history of his operation, covering aspects such as market dynamics, energy conservation initiatives, and hydroponic agronomy. We extend our gratitude to Peter for his hospitality, which was thoroughly appreciated by the group.

The final leg of the tour led us to GoFarm's newest tomato venture at Sandmount Farms, part of their Nathalia aggregation. Here, Nick Raleigh, General Manager, outlined the GoFarm strategy for the future and showcased innovative farm equipment. Of particular note was the Einboeck Finger Weeder with Row-Guard camera steering system, a technology highlight that enabled effective weed management this season and helped avoid manual labour.

The day concluded at the Moama Bowling Club, where 55 members, including children, gathered for a barbecue buffet and social bowling session, fostering camaraderie and networking opportunities.

Climate Outlook

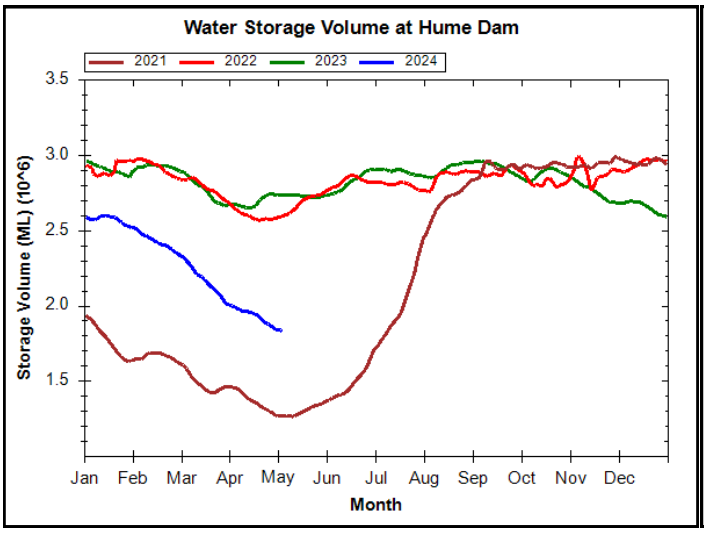
Over the next three months maximum and minimum temperatures are predicted to be above the long-term median values for southeastern Australia. Rainfall is likely to be below average over this period, although not by more than 50%. The current El Niño continues but is near its end. Climate models indicate sea surface temperatures in the central tropical Pacific are expected to return to ENSO-neutral later in autumn 2024.

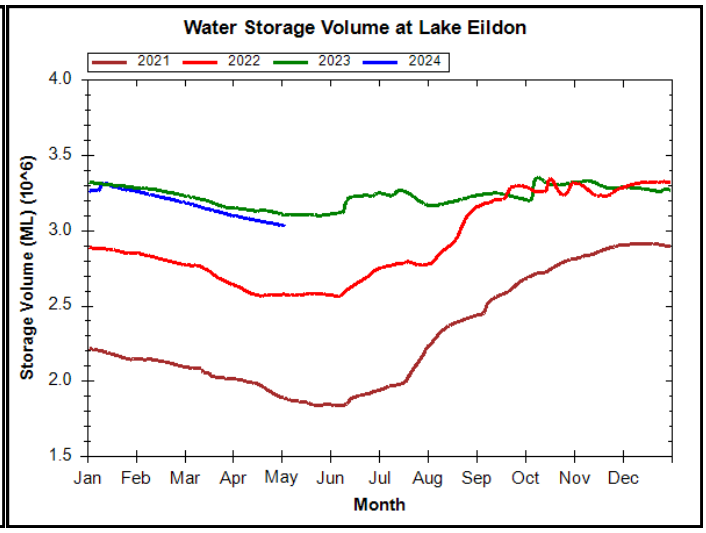
Oceanic and atmospheric indicators are now consistent with a decaying El Niño. The 90-day Southern Oscillation Index (SOI) is currently indicative of ENSO-neutral conditions. International climate models suggest the central tropical Pacific Ocean will continue to cool in the coming months, with four out of seven climate models indicating the central Pacific is likely to return to neutral El Niño–Southern Oscillation (ENSO) levels by the end of April (i.e., neither El Niño nor La Niña), and all models indicating neutral in May.

While four out of seven international models are predicting a La Niña by late winter, El Niño and La Niña predictions made in early autumn tend to have lower accuracy than predictions made at other times of the year. This means that current forecasts of the ENSO state beyond May should be used with caution.

It is also worth noting that the oceans have been the warmest on record globally since April 2023. Sea surface temperatures continue to increase, with temperatures in February 2024 setting a record for that month, and March 2024 on track to be the warmest March on record (final data for March is not yet available). The global pattern of warmth is affecting the typical historical global pattern of sea surface temperatures associated with ENSO variability. As the current global ocean conditions have not been observed before, inferences of how ENSO may develop in 2024 that are based on past events may not be reliable.

Source: The Bureau of Meteorology





Vale Stuart Hill

It is with much regret that we note the recent passing of Colbinabbin resident, Stuart Hill, after a long illness.

Stuart began growing processing tomatoes in 1991 and continued until the 2010/11 season. After this, Stuart's passion for growing tomatoes continued, however from 2012 until the current season he specialized quite successfully in the 'hand-picked' market.

While in the industry, Stuart took a lot of interest in the tomato growers' group and was an active and vocal participant for many years.

He was also a great supporter of the industry's overseas study tours and those closest to him commented on how he highly appreciated the learning and comradery that came from these events.

Stuart is survived by his wife Rhonda and children Kate, Christian and Sam. Our deepest sympathies go to them and their families.

Processing Tomato Advisory Board 2023 top 25 varieties

(Based on loads delivered between 9/7/2023 – 11/11/2023)

Company	Variety	Use	Attributes	Solids	Color	pH
Harris Moran	HM 8237	Inter	F3, Fr, EFH, Mv	5.13	19.9	4.4
Seminis	SVTM 9016	Thick	F3, EFH	5.1	19.9	4.4
Seminis	SVTM 9023	Thick	F3, EFH	5.05	20.3	4.48
Harris Moran	HM 58841	Inter	EFH	5.24	19.7	4.45
Seminis	SVTM 9013	Inter	F3	5.06	19.4	4.46
Heinz	H1996	Thick	F3, EFS™	4.97	19	4.48
Harris Moran	HM 5522	Inter	Fr	5.66	18.7	4.39
Nunhems	N 6428	Inter	F3, EFH	4.89	20.3	4.52
Harris Moran	HM 7103	Early	EFH	5.23	19.3	4.41
Heinz	H 2016	Thick	F3	4.92	18.5	4.43
Harris Moran	HM 4521	Inter	EFH	5.28	19.3	4.43
Harris Moran	HM 8268	Inter	F3	5.36	18.5	4.47
Seminis	SVTM 9019	Thin	F3, EFH	5.41	20.9	4.3
Seminis	SVTM 9027	Early	F3, Lv	5.47	19.2	4.41
Heinz	H1662	Thick	F3, Lv	5.06	20.1	4.51
Seminis	SVTM 1082	Thin	F3	5.52	19.7	4.41
Orsetti	BOS 0811	Thick	EFH	4.98	18.9	4.46
Heinz	H5608	Thick	-	4.97	18.8	4.43
Seminis	SVTM 9021	Inter	F3, Fr	5.15	19.7	4.42
Seminis	SVTM 9032	Early	F3, Fr, Lv	5.33	19.9	4.33
BHN Seed	BP 74	Thin	F3, EFH	5.47	19.2	4.48
Seminis	SVTM 9025	Thick	F3, Fr, EFH	5.22	19.7	4.34
Nunhems	N 6475	Thick	F3, EFH	4.68	19.9	4.55
Harris Moran	HM 8163	Pear	-	5.7	18.4	4.5
Woodbridge	BQ 400	Early	-	4.99	19	4.51

(*Source: http://www.ptab.org/*)

PTAB: The Processing Tomato Advisory Board (PTAB) is a quasi-governmental organization whose primary function is managing processing tomato inspection in California.

Top 25 Californian varieties which have been or are currently being assessed in the APTRC trial program are highlighted in blue.

Following from Tomato News

Kagome Co., Ltd. acquires majority stake in Ingomar Packing Company

30/01/2024 - Press release , François-Xavier Branthôme - 2023 Season

Kagome converts Ingomar (US), a world's 4th largest primary tomato processing company, into a consolidated subsidiary.

Kagome announced on Friday, January 26, 2024, after the market closed that it was buying a 50% stake in Ingomar Packing, adding to its existing 20% stake in the producer of tomato paste and diced tomatoes. The Japanese company said the acquisition would strengthen its capabilities for cultivation and processing of tomatoes to boost its U.S. business.

Kagome expects the company's revenue would increase roughly 30% and its net profit to double as a result of the acquisition. It has estimated 9.00 billion yen (USD 60.7 million) in net profit on revenue of Y222.00 billion for 2023. The sellers of the stake are four California-based farming businesses that produce raw tomatoes and other agricultural crops, including two companies led by Ingomar Chief Executive Greg Pruett.
Kagome's shares jumped after the Japanese maker of ketchup and vegetable juices acquired a majority stake in a California-based tomato processing company for USD 243.3 million.

We present below the press releases published by each of the two companies.

ingomar PACKING COMPANY

Kagome Co., Ltd. Acquires Majority Stake in Ingomar Packing Company, LLC, Expanding Global Presence in Tomato Processing

Nagoya, Aichi, Japan / Los Banos, California, USA – January 26, 2024 – Kagome Co., Ltd. (Kagome), a leading global player in the food industry headquartered in Nagoya, Aichi, Japan, has successfully acquired a majority interest in Ingomar Packing Company, LLC (Ingomar), based in Los Banos, California, USA. This strategic move solidifies Kagome's position as a key player in the global tomato processing industry.

Ingomar Packing Company, LLC, the 4th largest processor of tomatoes worldwide, will now be majority owned by Kagome, marking a significant milestone in the Kagome’s pursuit of a sustainable global

tomato processing business model rooted in agriculture and primary processing. This move aligns with Kagome's strategic vision to strengthen its foothold in the tomato processing sector and explore new avenues for sustainable growth.

Greg Pruett, CEO of Ingomar, expressed his enthusiasm about the acquisition, stating, "*Ingomar and Kagome have had a long and mutually beneficial relationship. We have a fantastic opportunity to work with Kagome in their areas of strength such as product quality, innovation and process improvement*." Pruett will continue to lead the company as CEO, ensuring a seamless transition and leveraging his expertise to drive further growth.

Satoshi Yamaguchi, President of Kagome, communicated his eagerness to "*learn a lot from Ingomar about tomato farming and processing while using Kagome's resources and experience to encourage significant growth of our global tomato business. Collaboration between Kagome and Ingomar will result in competitive advantages that will contribute to the growth of the California tomato industry and hopefully bring about solutions to some of the agricultural challenges that we are facing*."
One of the key aspects of this acquisition is Kagome's pledge to work closely with Ingomar's existing grower-owners, ensuring a continued and robust supply chain of tomatoes for Ingomar's processing operations. The collaboration with growers highlights Kagome's commitment to fostering strong agricultural partnerships and sustaining the flow of high-quality products.

Californian growers reduce plantings.

Californian farmers are scaling down their processing tomato acreage this year as processors enter the planting season with boosted inventory.

The state's tomato processors planned to contract for 10.5 million metric tonnes (t) (11.6 million short tons) this year, down about 10% from the 11.7 million t (12.9 million tons) they contracted for in 2023, according to a January report from the U.S. Department of Agriculture. "*Every grower for the most part has been reduced*," said Mike Montna, President and CEO of the California Tomato Growers Association. Planted acreage was projected to fall from 103,200 ha (255,000 acres) last year to 94,000 ha (232,000 acres) this year, according to USDA, with growers aiming to produce 112 t/ha (50 tons per acre).

In 2023, California growers harvested their largest tomato crop in several years after winter storms replenished water supplies. Processors looking to bolster inventory that was depleted during drought years paid a record-high price. After that crop, Morning Star, the state's largest tomato processor, said in a December statement that "*inventory levels have been buffered, and a respectable carryover stock is anticipated for 2024*." (*See also related articles below*). Meanwhile, experts in the sector reported softened demand for processed tomato products as consumer habits shifted in response to inflation.

Tomato juice could help treat food poisoning caused by salmonella.

American researchers have found that drinking tomato juice could treat food poisoning caused by the bacterium *Salmonella Typhi*. Salmonella is the second most common cause of food poisoning in America, affecting 1.3 million people every year.

Researchers at Cornell University studied the effect of tomato juice on salmonella bacteria, which is most commonly found in meat like chicken, turkey and beef that hasn't been cooked properly. The research team evaluated antimicrobial peptides in tomato juice, small proteins that destroy the membrane that keeps the harmful organism intact. They found that two antimicrobial peptides could stop salmonella Typhi, a foodborne illness that causes symptoms like vomiting and diarrhea, in its tracks. Roughly 5,000 of the 1.3 million cases of salmonella that occur in America every year are thought to be of the Typhi sort.

First they checked to see if tomato juice really does kill Salmonella Typhi, and once they had confirmed it did, the team analyzed the DNA of the tomato, to find the antimicrobial peptides that were involved. The team studied four of them and found that two were effective in killing Salmonella Typhi by impairing the bacterial membrane, a protective layer that surrounds the pathogen. The team also found that peptides in tomato juice could kill other variants of salmonella.

Reference: *Ryan S. Kwon et al.: Antimicrobial properties of tomato juice and peptides against typhoidal Salmonella, Microbiology Spectrum (2024).*

New tomatoes use less water without losing yield.

Researchers at Tel Aviv University (TAU) have succeeded in cultivating and characterizing tomato varieties with higher water-use efficiency without compromising yield. The researchers, employing CRISPR (Clustered regularly interspaced palindromic repeats) genetic editing technology, were able to grow tomatoes that consume less water while preserving yield, quality, and taste.

Because of global warming and the decline in freshwater resources, there is a growing demand for agricultural crops that consume less water without compromising yield. Naturally, because agricultural crops rely on water to grow and develop, it is particularly challenging to identify suitable plant varieties that meet this challenge.

In this study, the researchers induced a modification in the tomato through genetic editing using the CRISPR method, targeting a gene known as ROP9. The ROP proteins function as switches, toggling between an active or inactive state.

They discovered that eliminating ROP9 by the CRISPR technology cause a partial closure of the stomata, special openings in the surface of leaves that open and close, serving as a mechanism through which plants regulate their water status. This effect was particularly pronounced around midday, when the rate of water loss from the plants in the transpiration process is at its highest. Conversely, in the morning and afternoon, when the transpiration rate is lower, there was no significant difference in the rate of water loss between the control plants and ROP9-modified plants.

Because the stomata remained open in the morning and afternoon, the plants were able to take up enough carbon dioxide, preventing any decline in sugar production by photosynthesis even during the afternoon hours, when the stomata were more closed in the ROP9-modified plants.

To assess the impact of the impaired ROP9 on the crop, the researchers conducted an extensive field experiment involving hundreds of plants. The results revealed that although the ROP9-modified plants lose less water during the transpiration process, there was no adverse effect on photosynthesis, crop quantity, or quality (defined as the amount of sugar in the fruits). Furthermore, the study identified a new and unexpected mechanism for regulating the opening and closing of the stomata, related to the level of oxidizing substances, known as reactive oxygen species, in the stomata. This discovery holds significant implications for basic scientific knowledge as well. "There is great similarity between the ROP9 in tomatoes and ROP proteins found in other crop plants such as pepper, eggplant, and wheat," researcher Dr. Sade concluded. "The discoveries from this work could form the basis for the development of additional crop plants with enhanced water use efficiency, and for a deeper understanding of the mechanisms behind stomatal opening and closing."

For further detail about the study, click here.

How tomato plants use their roots to ration water during drought

When water supplies are low, tomato roots produce suberin - the molecule that gives wine corks and waxy potato skins their water-repellant qualities - to control water flow.

Plants have to be flexible to survive environmental changes, and the adaptive methods they deploy must often be as changeable as the shifts in climate and condition to which they adapt. To cope with drought, plant roots produce a water-repellent polymer called suberin that blocks water from flowing up towards the leaves, where it would quickly evaporate. Without suberin, the resulting water loss would be like leaving the tap running.

In some plants, suberin is produced by endodermal cells that line the vessels inside the roots. But in others, like tomatoes, suberin is produced in exodermal cells that sit just below the skin of the root.

The role of exodermal suberin has long been unknown, but a new study by researchers at the University of California, Davis, published recently in Nature Plants shows that it serves the same function as endodermal suberin, and that without it, tomato plants are less able to cope with water stress. This information could help scientists design drought-resistant crops.

This study focused on the role of exodermal suberin and mapping the genetic pathways that regulate its production. The researchers started by identifying all the genes that are actively used by root exodermal cells. Then they performed gene editing to create mutant strains of tomato plant that lacked functional versions of several genes they suspected might be involved in suberin production. They discovered seven genes that were necessary for suberin deposition.

Next, they tested exodermal suberin's role in drought tolerance by exposing some of the mutant tomato plants to a ten-day drought. For these experiments, the researchers focused on two genes—SlASFT, an enzyme involved in suberin production and SlMYB92, a transcription factor that controls the expression of

other genes involved in suberin production.

The experiments confirmed that both genes are necessary for suberin production, and that without them, tomato plants are less able to cope with water stress. The mutant plants grew as well as normal plants when they were well-watered but became significantly more wilted after ten days with no water. Having shown suberin's worth in a greenhouse setting, the researchers now plan to test suberin's drought -proofing potential in the field.

Reference: *Cantó-Pastor A, Kajala K, Shaar-Moshe L, et al. A suberized exodermis is required for tomato drought tolerance. Nat Plants. 2024*

Below Source: nature.com

Study: Impact of climate change on the potential distribution of *Tuta absoluta* (South American tomato pinworm)

Globally, the incursion of invasive species into new environments outside their native range is increasing at unprecedented rates. This could be further exacerbated by climate change. Based on model prediction, under future climatic scenarios (the years 2050 and 2070), the establishment risk index for this pest is expected to increase across Europe, North America, Northern Asia, South Australia, and South and East Africa.

Once invasive species arrive and establish themselves in a new environment, they can pose serious threats to crop production if they are not effectively managed. This was the case with the invasion by South American tomato pinworm, *Phthorimaea absoluta* (Meyrick) (= *Tuta absoluta*) (Lepidoptera: Gelechiidae). Since its first report in Spain in 2006, *P. absoluta* has rapidly spread and become established in many countries across the Afro-Eurasian Supercontinent, causing devastating yield losses, especially for solanaceous vegetables.

Over seventeen years after its first detection, *P. absoluta* continues to expand its geographical range with the latest invasion reported in Togo in West Africa and China in Asia, the largest global producer of tomatoes. The success of invasion and the subsequent establishment of *P. absoluta* is attributed to its innate dispersal ability, high reproductive rate, short life cycle, wide thermal tolerance, and high phenotypic plasticity.

Although tomato is the primary host of *P. absoluta*, the pest also attacks and completes its life cycle on other wild and cultivated plants belonging to the family Solanaceae such as the black nightshade (*Solanum nigrum L.*), potato *(Solanum tuberosum L.)* and eggplant *(Solanum melongena L.)*. The damage is caused by larval feeding on the leaves, flowers, stems, and fruits, producing tunnels that disrupt sap flow and photosynthesis. The infestation of *P. absoluta* on tomato fields is highly detrimental and can cause a yield loss of up to 100% if it is left uncontrolled, leading to severe economic impacts, especially for small-scale farmers.

Although several attempts have been made to manage the pest using eco-friendly strategies, the application of synthetic insecticides remains the main control practice. Therefore, a better understanding of the ecological traits and distribution of *P. absoluta* could help in developing effective control measures adapted to specific agroecological zones. Over the last few decades, modelling the responses of insect pests to climatic factors, and predicting their geographical distribution, abundance, and risk of invasion have gained much interest. Temperature is known to be the key abiotic factor that affects the distribution, abundance, and population dynamics of insects. In the context of climate change, the increase in temperature from 1.5 to 5.8 °C by the end of the twenty-first century is likely to have either direct or indirect effects on the population of many insect pests.

The temperature increase could directly affect insects' life cycles, physiology, and behavior. The indirect effect is expected to be through the interactions between the pests and their host plants and natural enemies, which in turn might influence the distribution and population dynamics of insect pests. Under favourable climatic conditions and in the absence of natural enemies, rapid multiplication of the pests occurs, and this might result in huge crop losses. In this regard, predicting the responses of insect pests to climate change has become more relevant for assessing the risk of invasion and developing ecologically sound management strategies.

Phthorimaea absoluta (Meyrick) (= *Tuta absoluta*) (*Lepidoptera: Gelechiidae*), is the most damaging insect pest threatening the production of tomato and other solanaceous vegetables in many countries. In this study, researchers predicted the risk of establishment and number of generations for P. absoluta in the current and future climatic conditions under two Shared Socioeconomic Pathways (SSP2-4.5 and SSP5 -8.5) of the years 2050 and 2070 using insect life cycle modelling (ILCYM) software. They used a temperature-dependent phenology model to project three risk indices viz., establishment risk index (ERI), generation index (GI), and activity index (AI) based on temperature data.

The model projected large suitable areas for *P. absoluta* establishment in the Southern hemisphere under current and future climatic scenarios, compared to the North. However, the risk of *P. absoluta* is expected to increase in Europe, USA, Southern Africa, and some parts of Asia in the future. Under current conditions, *P. absoluta* can complete between 6 and 16 generations per year in suitable areas. However, an increase in generation index between 1 and 3 per year is projected for most parts of the world in the future, with an increase in activity index between 1 and 4. Results provide information on the risk of establishment of *P. absoluta* which could guide decision-makers to develop control strategies adapted for specific agro-ecological zones.

The Following from AusVeg

New farm biosecurity guides

A farm biosecurity plan is an essential tool for farmers who want to prevent, eliminate, and minimise biosecurity risks on-farm. It is recommended that anyone who keeps or owns livestock or who operates a cropping or horticulture business, has a biosecurity plan for their property. Agriculture Victoria has released a series of new farm biosecurity guides to help you through the process.

READ MORE

Fact sheet: Spray application essentials

Crop protection products play an important role in tomato production and are regularly used to control insect pests, diseases, and weeds. This new fact sheet from the Soil Wealth ICP team provides guidance on the essentials of spray application to maximise the amount of product reaching the target area.
The Soil Wealth ICP project is funded by Hort Innovation using the vegetable and melon research and development levies and contributions from the Australian Government.

READ MORE

UPCOMING EVENTS

Annual APTRC Processing Tomato Forum & Dinner

When: Friday 10th May, 2024

Where: Rich River Golf Club, Tatalia Function Room. (24 Lane, Moama NSW)

Hort Connections

When: 3-5 June, 2024

Where: Melbourne Convention Centre

Links: **https://hortconnections.com.au/**

15th World Processing Tomato Congress & 17th ISHS Symposium on Processing Tomato

When: 9-12 June, 2024

Where: Hilton Budapest (Hungary)

Links: www.worldtomatocongress.com

ACKNOWLEDGMENTS:
This project [Australian Processing Tomato Industry Development and Extension (TM20000)] has been funded by Horticulture Innovation Australia Limited with co-investment from Australian Processing Tomato Research Council Inc. and funds from the Australian Government.
"Tomato Topics" is a quarterly newsletter compiled and edited by the Industry Development Manager, APTRC Inc., P.O. Box 547, ECHUCA, VIC 3564. **E-mail: aptrc.idm@outlook.com**