



TOMATO TOPICS



Know-how for Horticulture™

NEWS and INFORMATION
FOR THE PROCESSING TOMATO INDUSTRY

ISSN 1038-3522

MARCH 2011

VOL. 20 NO. 1

2010/11 Season

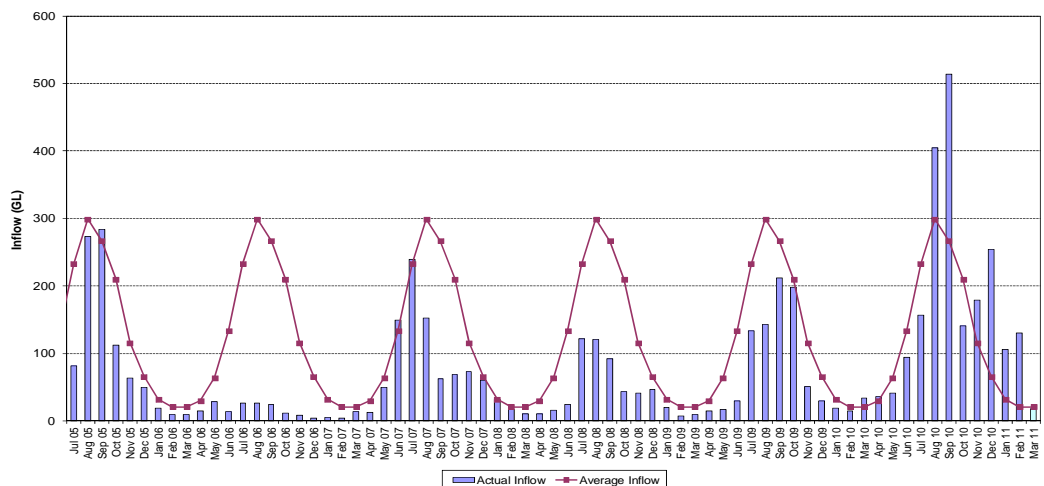
Who would have thought that the region would go from drought to floods in a matter of months. This has drastically impacted upon the industry, with many growers now saying that they much preferred the drought!

At the start of the season the industry consisted of 22 growers planning to produce 287,500 tonnes, with an estimated farm gate value of approximately \$31.6M. Due to heavy rain during planting the total planted area was slightly reduced to 2,796 ha. Based on the average yield being similar to the 2009/10 season a total tonnage of 265,600 would have been achievable for the industry at that time. This estimate has now dropped to around 90,000 to 100,000 tonnes at a farm gate value of less than \$11M.

The total estimate of loss of production from flooding and heavy rain in Victoria is over \$15.7M, and NSW over \$4.9M. 19 growers are located in Victoria and 3 growers in NSW.

During this time inflows into Lake Eildon have exceeded the long term monthly average.

Inflows to Lake Eildon
July 2005 to 11 March 2011



Inside This Issue

	Page
Management of Tomato Soils After Flooding	2
Tomato Tweets	3
Long Term Rainfall Records From Echuca	4
Upcoming Events	5
Tomato and Health	5
Brad Stillard's Nuffield Adventures	6
VicRoads Farmer Page	6
Weather Forecasts	7
2010/11 Season's Cultivar Trials	8

Management of Tomato Soils After Flooding

Harold H. Adem, DPI, Tatura

Flooding following years of drought can significantly increase the risk of soil salinity and sodicity (high levels of sodium) through raised water tables bringing salt closer to the soil surface. Tomato crops generally have a low tolerance to salt present as sodium chloride (NaCl_2) and high levels can result in soil structure damage due to sodicity. This can affect the health of plants and the subsequent yields. A sodic soil will disperse (run together) upon wetting and then set hard upon drying limiting the movement of water, oxygen and the growth of tree roots.

Where does salt come from?

Over years of crop production and irrigation, many of our horticultural soils have accumulated salt in the soil profile. In addition saline groundwater levels can rise to the soil surface or the root zone during wet weather and flooding of soils. While salt levels in floodwaters are low, as the soil dries, the salts remaining from the groundwater can become concentrated and reach dangerous levels in the crop root zone.

Symptoms of salt-affected soils and plants

- White encrustations at the soil surface
- Oily appearance at soil surface
- Brown stunted roots
- Slow plant growth
- New leaves smaller and darker than normal
- Dieback of new shoots
- Dead and brown margins of older leaves
- Low yields of fruit

To determine the salt levels in the water table, water can be sampled directly by:

- Installing test wells and direct sampling of the water
- Sampling water from drains
- Using extraction tubes to extract water from the soils.

The salt concentration can then be determined by measuring the electrical conductivity (EC) of salt in solution with a salinity meter. In irrigation or bore water the salt concentration can be measured directly. In soil the salt is extracted by dissolving in distilled water (1:5 soil:water saturated extract) and then measured to establish the salt levels in the soil.

The figure for comparing salt levels is often expressed in deciSiemen/metre (dS/m). To convert dS/m to parts per million of total dissolved solids (TDS) in water (ppm or mg/L) multiply by 640 e.g. 1.5 dS/m = 960 ppm.

Plant growth and salinity

Depressed growth of plants under saline conditions is thought to be mainly caused by the salt raising the osmotic potential of the soil solution i.e. the salt is making it harder for the plant root to take up water. In saline soils, growth is suppressed more when plants are stressed under arid, low humidity conditions compared with a wet, humid environment.

Plant growth, sodicity and soil structure

Sodic soils limit plant growth indirectly by degrading soil structure. The chloride component present in saline soils can

be leached out of the root zone of plants by irrigation and rainfall. However, the sodium component can be left behind firmly attached to clay particles. Sodic soils tend to disperse easily, swell when wet, slump and then set hard and crack when dry. Affected soils have poor infiltration and drainage resulting in waterlogging, increased run-off, poor water storage and surface crusting. Sodicity restricts plant growth by limiting the movement of oxygen, water and nutrients to the plant roots. Upon drying sodic soils shrink and become hard limiting root growth. When the soil is cultivated hard clods form making it difficult to produce a fine tilth for a seedbed.

Flooding of paddocks and the risk of transient salinity

Rising groundwater levels, as a result of flooding or rain may carry salt into the topsoil and the root zone of tomato crops. In a process termed "transient salting", even low levels of salt in surface layers which initially have a minimal effect on plant growth but can become concentrated and toxic to plants as the soil dries following waterlogging. Soil tests may not identify the problem as the raised salt level passes quickly but the symptoms may be seen afterwards in the bushes and confirmed in leaf tests.

Management of flood-affected soils

Soils that have been saturated for an extended period tend to slake, disperse, slump and become anaerobic. When dry they become hard with poor structure for plant growth. Traditionally, cultivation is used to break up and loosen the soil into a tilth suitable for shaping into beds and creating a seed or root bed. However to restore the structure it is not simply fragmenting the soil into smaller particles i.e. "breaking bricks into smaller bricks". After flooding, there is loss of pore space as the soil particles are packed closer together. Soil aggregates produced by cultivation are often unstable as well as hard clods that are difficult to break down may also appear.

To avoid a cloddy seedbed the soil is best cultivated at the Lower Plastic Limit (LPL) that is described as the moisture content of the soil when it is most friable. The LPL can be determined by rolling the soil into a thin rod on a hard smooth surface e.g. glass. If the soil just breaks up when rolled to a 3mm diameter rod the moisture content is at the LPL. If it cannot be rolled to that thickness it is too dry and if thinner it is too wet. Cultivation to create the correct tilth is a temporary solution as the structure created can collapse under wetting.

After the soil is cultivated and formed into a bed it should be sown to a cover crop to stabilise the structure. The crop roots will help avoid slaking by adding organic matter and creating pores in the soil. Gypsum should be spread on the soil surface to reduce dispersion of the soil. Irrigating the soil by slow wetting will minimise collapse of the soil structure.

(Continued on page 3)

(Continued from page 2)

The role of calcium in plants and in saline-sodic soils

Calcium has an essential role in the physiology of the plant and in the maintenance of productivity in soils. Calcium in plants provides an avoidance mechanism in the plant cells to limit the toxic effects of sodium and heavy metals plus it acts to enhance the uptake of nutrients. Calcium added to the soil restricts sodium adsorption by soil particles and avoids the degradation of soil structure. One of the cheapest and most readily available sources of calcium is gypsum or calcium sulphate (CaSO₄·2H₂O). Gypsum added to the soil or dissolved in the irrigation water will displace and restrict the attachment of sodium to soil particles. Gypsum is moderately water-soluble (~2.0–2.5 g/L at 25 °C) being far more soluble than agricultural lime.

A dispersion test should be carried out prior to application of gypsum to determine the requirements. It is also advisable to carry out a soil test and monitor crops with leaf/petiole analysis to determine fertilizer needs.

To avoid the damaging effects of high levels of salt in soil or water:

- Apply gypsum to the soil or irrigation water (amount determined by a test).
- Monitor soil salinity
- Do not allow the soil to dry out excessively.

Testing for Slaking and Dispersion

There is a relatively simple test for slaking and dispersion to assess whether the application of organic matter (to address slaking) or gypsum (to address dispersion) is needed.

Method

- Put a handful of soil from each layer into a shallow, open container e.g. a dinner plate. Try not to disturb the soil too much when handling it.
- Put the sample in a warm room and leave it to dry for several days.
- Select from each sample three aggregates or fragments around the size of a pea.
- Place them equally spaced apart, in a shallow container e.g. a teacup saucer, filled with rain or distilled water.
- Watch the aggregates carefully drying the first few minutes and note whether they float to the surface or sink, and the rate at which the small particles break away from the larger one. After 2 hours record whether slaking (complete breakdown of particles) was complete, partial or did not occur.
- Leave the dish untouched for 20 hours and then assess the dispersion. A “cloudy” or “milky” halo around the slaked fragments of the aggregates indicates partial dispersion, while the base of the container being completely covered indicates complete dispersion.
- If no dispersion occurred, take a small amount of soil, remove any gravel, stones and plant fragments and moisten with rain or distilled water while kneading into a ball 40mm in diameter. Add small amounts of water as necessary until the soil just begins to stick in the hand.
- Break the ball open and remove some soil to make three pea-size balls and place in the saucer as above.

- Watch and record results to check whether slaking or dispersion will occur after excessive cultivation.

Further References

Further information on sodic soils and managing them is available from Victorian Resources Online at http://www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/sodic_soils.



Tomato Tweets

Ontario Tomato <http://twitter.com/ontariotomato>

Danielle Nierenberg: The Nutritional and Economic Potential of Vegetables <http://huff.to/fuI2Tz>

New issue of Illinois Fruit and Vegetable News: <http://illinoiscapsprogram.blogspot.com/2011/02/illinois-fruit-and-vegetable-news.html?spref=tw>

Field-grown vegetables not only casualty of Mexico freeze | The Packer | <http://bit.ly/hvdPLk>

From <http://twitter.com/aofpfood>: Heinz to use plant-based bottle. <http://ow.ly/42Hvt>

From <http://twitter.com/nprnews>: Hair On Tomato Seeds! And Other Science Visualizations | <http://www.npr.org/blogs/pictureshow/2011/02/22/133868260/sciviz?sc=tw&cc=share>

Research on extending tomato shelf life / USDA Agricultural Research Service <http://www.ars.usda.gov/is/pr/2011/110216.htm>

From <http://twitter.com/TraceyBaute>: New Blog Entry - The Next Major Threat: Brown Marmorated Stink Bug From http://twitter.com/USDA_ERS: Vegetables & Melons Outlook: Cold Weather Haunts Fresh Vegetable Prices (PDF). <http://bit.ly/igs4De>

Latest posts from Mich State Veg Team: heirloom tomatoes, high tunnels <http://www.ipmnews.msu.edu/vegetable/vegetable.aspx>

Interested in soil ecology? Head for Kelowna in May http://web.me.com/soilecology/SES/2011_Meeting_at_UBC_Okanagan.html

Severe Mexican vegetable shortages expected into March | The Packer | <http://bit.ly/hw2FfB>

Update on finding the brown marmorated stink bug in MI > MSU Vegetable Team newsletter <http://bit.ly/gBnXZW>

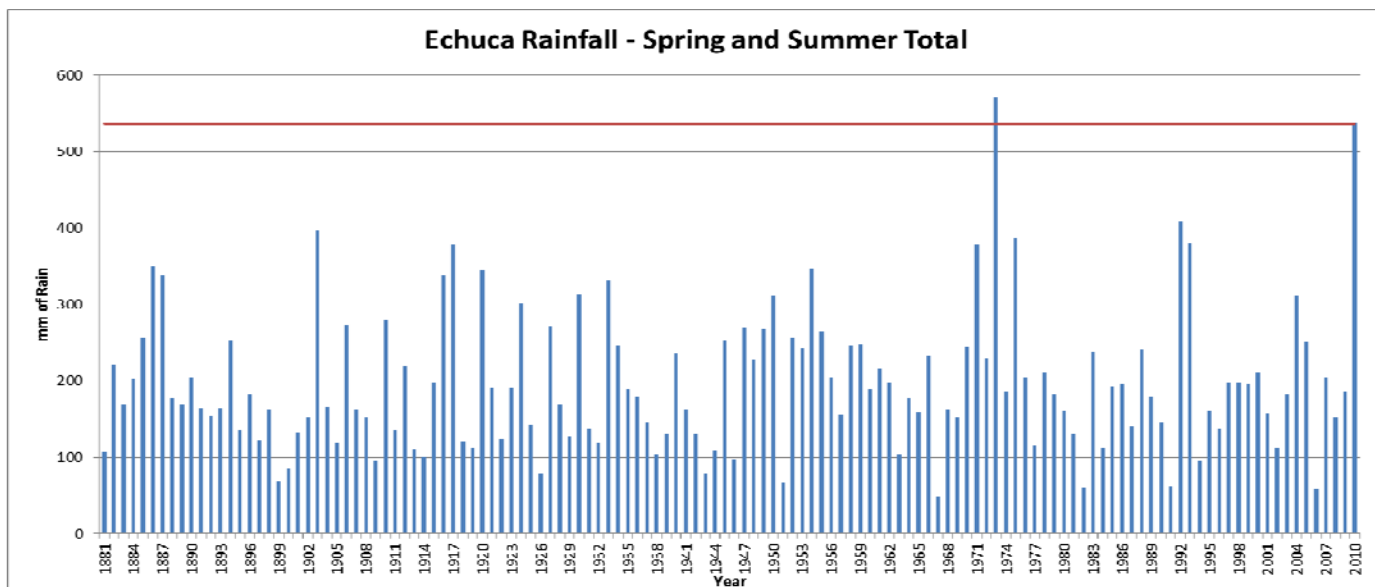
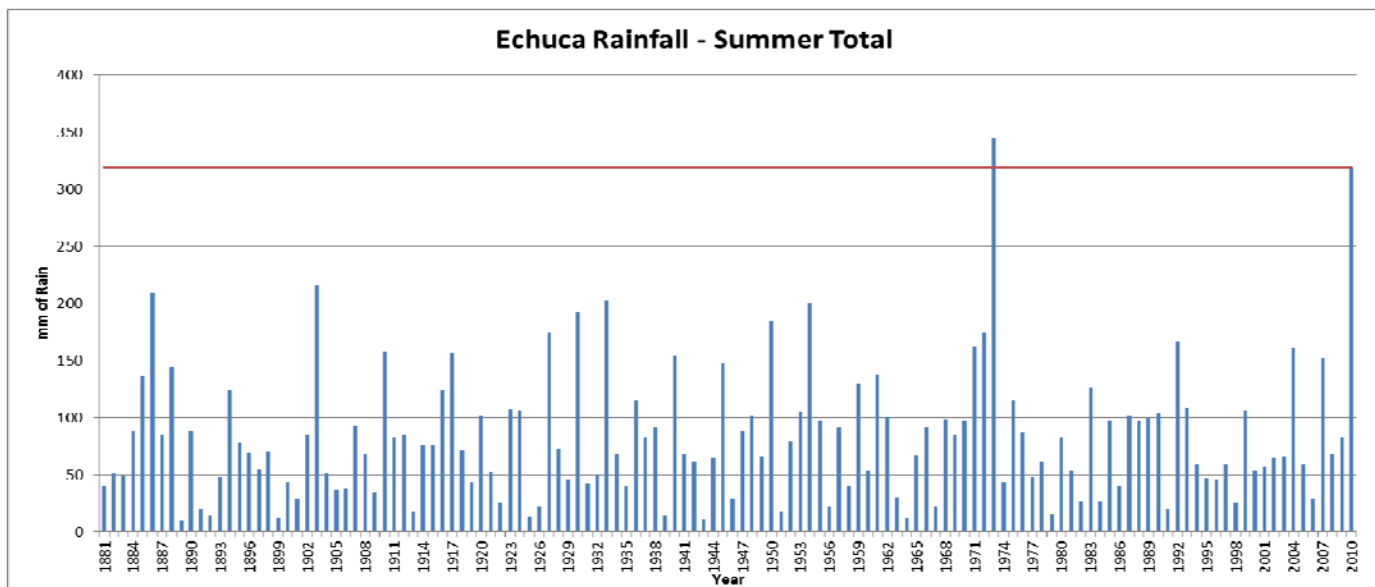
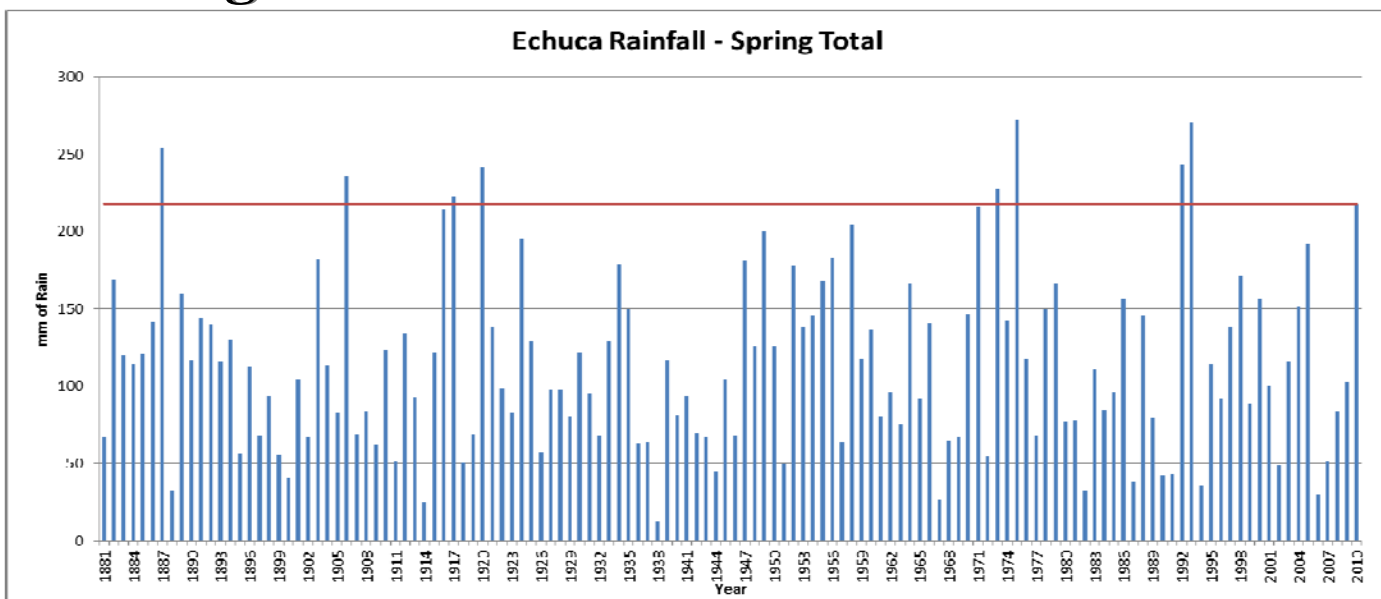
From <http://twitter.com/FoodAgEnvNews>: In Ohio, 2 small-farm conferences set for March: 58+ ways to be more profitable, sustainable: <http://bit.ly/gjSoVm>

Video from Cornell U's farmer roundtable on reduced tillage in vegetables at <http://bit.ly/h95jGX>

Tangerine Tomatoes Top Reds in Lycopene Study in latest USDA-ARS Ag Research Mag <http://www.ars.usda.gov/is/AR/archive/feb11/>

Using Genetics To Build a Better Tomato in latest USDA-ARS Ag Research Magazine <http://www.ars.usda.gov/is/AR/archive/feb11/>

Long Term Rainfall Records From Echuca





UPCOMING EVENTS

APTG Annual Meeting

The Wine Tavern, Rochester

2:30 pm Friday 8th April, 2011

Followed by a meeting with growers and processors (4:30pm)

And a light dinner and drinks (6:30pm)

All growers and partners welcome

RSVP's to Murray Lanyon 0419 875 130

Irrigation Australia (IAL) 2011 Conference

21-23rd August 2011

Launceston, Tasmania

More info www.irrigation.org.au

XII International Symposium on the Processing Tomato & X World Congress on Processing Tomato

"New ideas, challenges and solutions"

Dates: June 10-12th, 2012, Beijing (China)

Venue: Grand Hyatt hotel Beijing (China)

Preliminary Scientific Topics

- Tomato Plant Breeding, Crop Management and Protection
- Tomato Processing and Technology
- Tomato and Health - Consumer Trends

Tomato and Health

A number of YouTube videos are now available to assist in promoting processed tomatoes.

[Tomato Wellness - John Erdman, PhD](http://www.youtube.com/watch?v=qvEDqSBssxY&feature=player_embedded)

[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=qvEDqSBssxY&feature=player_embedded)

[v=qvEDqSBssxY&feature=player_embedded](http://www.youtube.com/watch?v=qvEDqSBssxY&feature=player_embedded)

[Tomato Wellness - Snacks](http://www.youtube.com/watch?v=TW-3LKlg8UA&feature=related)

[http://www.youtube.com/watch?v=TW-](http://www.youtube.com/watch?v=TW-3LKlg8UA&feature=related)

[3LKlg8UA&feature=related](http://www.youtube.com/watch?v=TW-3LKlg8UA&feature=related)

[Tomato Wellness - Egg Salad](http://www.youtube.com/watch?v=nOr7NbjjVig&feature=related)

[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=nOr7NbjjVig&feature=related)

[v=nOr7NbjjVig&feature=related](http://www.youtube.com/watch?v=nOr7NbjjVig&feature=related)

[Tomato Wellness - Tomato, Sausage and Bean Stew](#)

[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=IPFEEeLoslA&feature=related)
[v=IPFEEeLoslA&feature=related](http://www.youtube.com/watch?v=IPFEEeLoslA&feature=related)

[Tomato Wellness - David Heber, MD PhD](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[v=1QWgaWgxDkg&NR=1](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[Tomato Wellness - Penny Kris-Etherton PhD, RD](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[v=1QWgaWgxDkg&NR=1](http://www.youtube.com/watch?v=1QWgaWgxDkg&NR=1)

[Dominos Tomato Farm Advert](http://www.youtube.com/watch?v=t23sgF4B17c)

<http://www.youtube.com/watch?v=t23sgF4B17c>

Brad Stillard's Nuffield Adventures

I'm always amazed by overseas travel, not that I like to be stuck on a plane in cattle class for more than ten hours mind you. My flight from Brisbane to Dubai via Singapore was well over my ten hour limit but it really is amazing to step off the plane into a new country. The sights, sounds and sometimes smells can be so different you realise all the reading or preconceived ideas you may have had are swept away in no time at all.

It was with some trepidation that I took this trip to the Middle East. I was unsure of the reception a western man might receive in the Middle East, although, looking back I'm not sure why I had those fears. The people of Dubai were very welcoming.

Dubai is a modern city full of beautifully designed buildings. The pace at which Dubai has developed in the last decade is amazing. Up until 2009 25% of the worlds supply of cranes resided in Dubai, although the locals say things have slowed down with the down turn in the economy. However, most buildings still sported a crane or two. Narrow streets and ally ways lead to spices and perfumes, jewellery and gems; the home of the Souk - the traditional market place.

A walk through the Souks of Dubai was a lot of fun if you were prepared to stop and talk to everyone who asked you to buy what they were selling. As a bald white guy I stood out like the proverbial.....so received my fair share of attention. I learnt that for most of the traders here it's a game of sorts, a true form of negotiation and trade. I was not good at it and they may have a laugh at my expense after I left but good humour went a long way. A lot of the time they wanted to know who I was and where I came from, in return I asked how business had been and how was trade tonight, with all that done I was free to go. I was told by one local Arab it is tradition in a meeting to ask "how is every one there" meaning your family and homeland. It's a reflection on their culture and attitude in negotiations and the importance of relationships.

All this sight seeing wasn't why I was there I was looking for some answers to using saline water as a viable alternative to fresh water. The International Centre for Biosaline Research (ICBA) in Dubai was the place I'd intended to visit right from day one. With support from the Islamic Development Bank and the United Arab Emirates (UAE) government, ICBA did indeed lived up to my expectations. I met Dr Rao who is a Plants Genetics Scientist. He has been working on

plant and variety selection for salt tolerance at ICBA for 4 years. I was very excited when we walked into one of ICBA's trial sheds to be greeted by a large tomato salinity trial. Salinity trials for vegetables isn't that common as many people believe vegetables cannot be grown with saline water. This isn't the case as Dr Rao had his trial going with water as high as 20dsm (half seawater) with some good potential. Although the tomatoes are not the only vegetable he plans to trial, it stood out to me that, for a vegetable that is classed as a moderately tolerant species, the tomato has shown the potential for very high levels of salt tolerance. There is plenty of genetic variation out there without modification, coming up with open pollinated varieties that can withstand some very salty water and soil conditions. When I told the researchers there that I was using water that was 4.2dsm they simply smiled and told me anything under 4dsm is considered fresh water here. Talk about bringing a bloke back to earth, it really brings home the fact that most untreated water in the area was highly saline and dealing with it is an every day thing.

I also spent several days at ICBA learning about the wide variety of crops that can be grown with saline water. Some are already available in Australia. Triticale was one such plant. I saw lots of varieties being trialled, all of which looked very good and showed no signs of salt damage even after 15 dsm water was applied to them. I was told that Cracker Jack (a Heritage Seeds line from Australia) was doing well. There was a very large sorghum trial there. Starting out as a mini core of 35,000 accessions it has been whittled down to 40 and these will be evaluated for their tolerance as well as other agronomic traits.

For more information visit :
<http://bradstillard.blogspot.com/>



VicRoads Farmer page

<http://www.vicroads.vic.gov.au/Home/Moreinfoandservices/HeavyVehicles/FarmerAndAgriculturalInformation.htm>

Weather Forecasts

(Taken from "The Break" Newsletter March 2011, Vic DPI)

Summary: Tropical Pacific Ocean warms (16th March)
www.bom.gov.au/climate/enso/
 The La Niña event in the Pacific Ocean has continued to weaken over the past two weeks as Pacific Ocean temperatures along the equator have warmed. All available climate models suggest further weakening of the La Niña is likely through the southern hemisphere autumn, with a return to neutral conditions likely by winter 2011.

Current observations of warming in the Pacific Ocean are consistent with the life cycle of past La Niña events. In some contrast to the weakening in the ocean, atmospheric indicators of the La Niña, including trade winds, cloudiness and

the Southern Oscillation Index (SOI) remain consistent with a well developed La Niña event. These atmospheric indicators are expected to return to neutral over the coming months.

During La Niña events, tropical cyclone numbers are typically higher than normal during the November to April period, with February and March the peak. The influence of La Niña on Australian rainfall and temperature typically peaks during winter to mid-summer, and then weakens during the following autumn. The influence of the Indian Ocean Dipole (IOD) on Australian rainfall is limited during the months from December through to April.

SOI: Southern Oscillation Index

<http://www.bom.gov.au/climate/enso/>

SOI: Is the air pressure difference between Tahiti and Darwin.

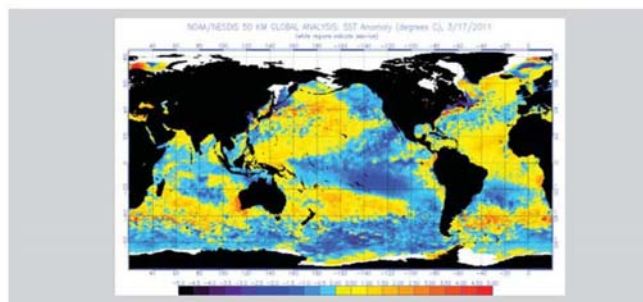
The SOI has been consistently positive since July indicating that the Walker Circulation (wind patterns over the equator region of the Pacific Ocean) is enhanced. This is indicative of La Niña conditions.



SST: Sea Surface Temperature Anomalies

<http://www.osdpd.noaa.gov/ml/ocean/sst/anomaly.html>

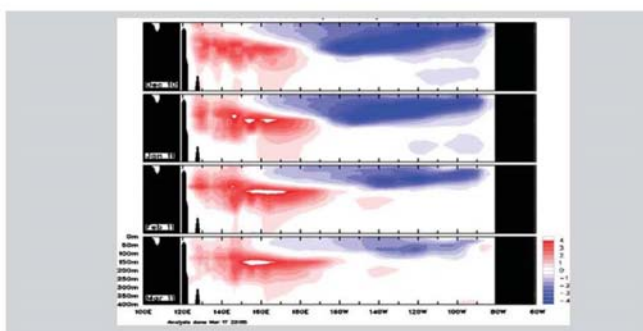
SST's in the central Pacific have recently warmed to neutral conditions. The Coral Sea has warmed after Cyclone Yasi stirred it up. The Timor Sea is cooler, where the Indian Ocean off Carnarvon remains warmer.



Sub-surface Sea Temperatures

www.bom.gov.au/oceanography/oceantemp/pastanal.shtml

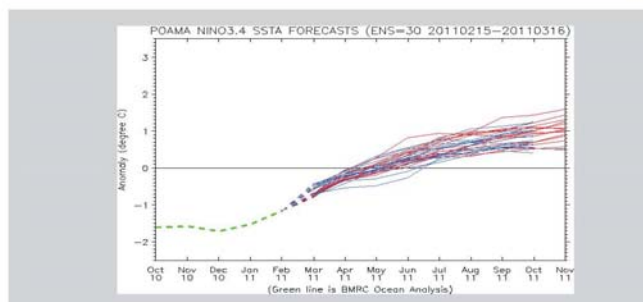
The sub-surface Pacific Ocean equatorial temperature anomaly continues to remain cooler than average at depth but is on a neutralising warming trend. Some heat was lost during February and this is continuing in March.



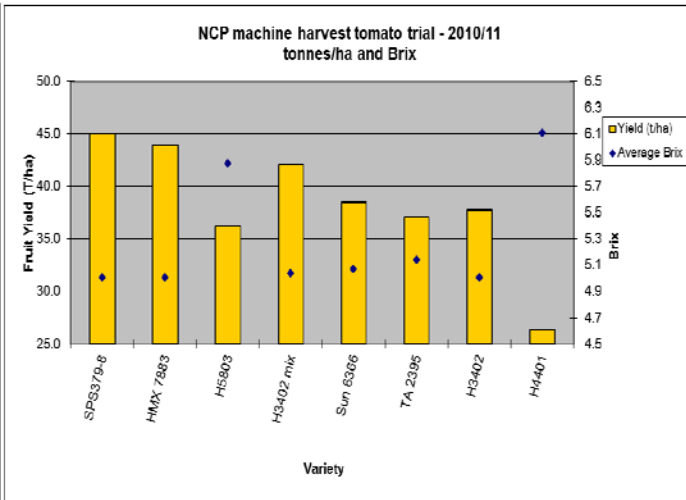
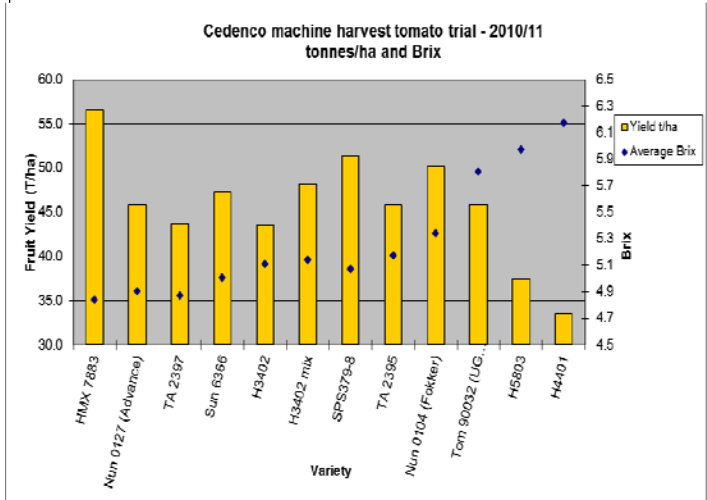
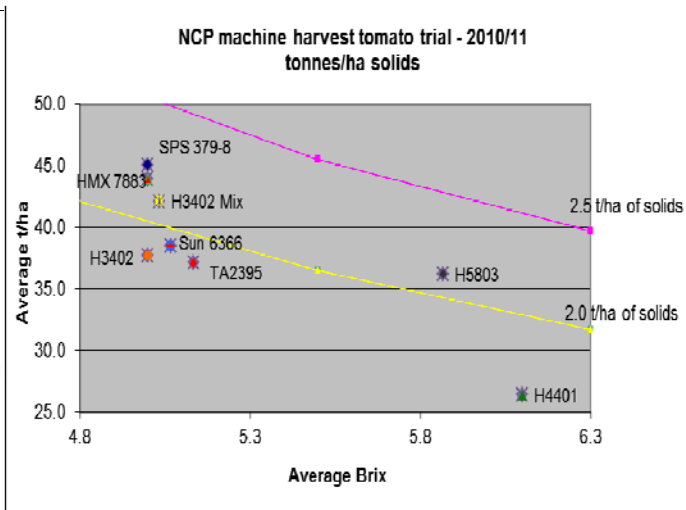
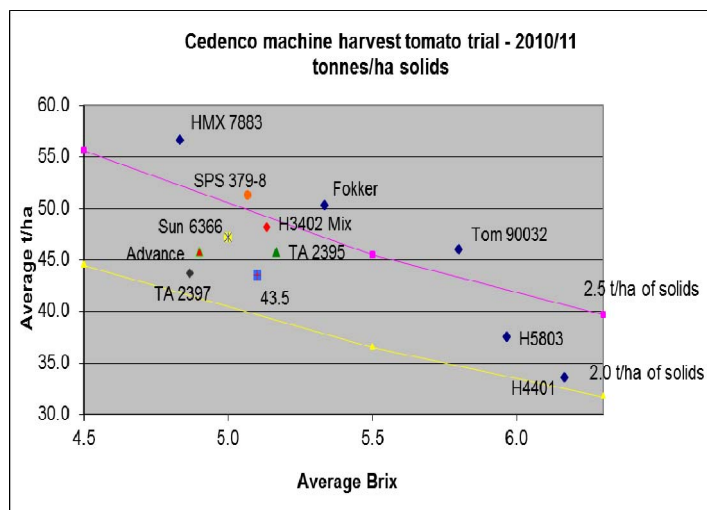
ENSO Forecast Models - POAMA

www.bom.gov.au/climate/ahead/ENSO-summary.shtml

The POAMA model in the NINO 3.4 region predicts ocean temperatures to slowly rise into neutral levels for most of the growing season, but tending close to the El Niño threshold in Spring.



2010/11 Season's Cultivar Trials



ACKNOWLEDGMENTS:

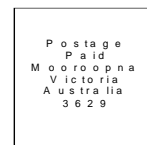
Funding from Horticulture Australia Ltd. (HAL) for the Australian Processing Tomato Industry Development Program (TM09000) is acknowledged. "Tomato Topics" is a quarterly newsletter compiled and edited by Liz Mann, Industry Development Manager, APTRC Inc., P.O. Box 2293, SHEPPARTON, VIC 3632.

Phone: (03) 5825 4633, Fax: (03) 5825 4725, Mobile: (0427) 857-578, E-mail: lizmann@aptrc.asn.au

Opinions expressed in "Tomato Topics" are not necessarily those of the APTRC unless otherwise stated.

Sender:

APTRC Inc.
 P.O. Box 2293
 SHEPPARTON, VIC 3632



Print Post Approved PP343935/0060

