Macquarie bale up

SEPTEMBER 2023

SEASON UPDATE

After extended flooding periods the valley is now experiencing a much drier period. Burrendong is currently at 91% and environmental water releases have been occurring, delivery of a flow of water (called a "pulse") began in August 2023. This water will inundate up to 40,000 hectares of wetland vegetation in the Macquarie Marshes. Source: Macquarie River Valley 2023–24 Water Use Update 1 September 2023)

There is still cotton left to be ginned from the 22/23 cotton season however for the most part it's a wrap. Overall, it was a very positive result in terms of quality and yield. With one gin still ginning there will still be more information to gather however it's been a great result in terms of yield and quality one of the gins has reported averages with a 12 in front and that is a great result given the cooler season. Base grade was common and very little quality issues for the bulk of the crops were observed. See below for the growing season information available to all Cotton Seed Distributors members on their website.

	2022	2021	2020	2019	2018	10 year mean
Base 12	2143.0	2203.8 ▲	2243.1 ▲	2492.8 ▲	2728.8 ▲	2432.8 ▲
DD1532*	1204.8	1344.7 ▲	1327.7 ▲	1492.9 ▲	1728.3 ▲	1474.0 ▲
Cold shock days (≤ 11°C)	45	25 ▼	37 ▼	33 ▼	13 ▼	29.3 ▼
Days above 36°C	35	18 ▼	28 ▼	47 ▲	59 ▲	42.1 ▲
Nights above 25°C	0	0	1 ▲	13 ▲	16 ▲	5.4 ▲
Days above 40°C	4	0 ▼	5 ▲	23 ▲	20 ▲	10.4 ▲
Total rainfall (mm)	314.6	454.2 ▲	485.8 ▲	367.5 ▲	196.2 ▼	287.3 ▼
Total radiation (MJ/m^2)	4210.7	3838.7 ▼	4262.0 ▲	4195.8 ▼	4438.3 ▲	3922.6 ▼
Average temperature (°C)	22.1	22.6 ▲	22.6 ▲	24.0 ▲	25.3 ▲	23.7 ▲

* Experimental calculation.

Climate observations and data are obtained via the State of Queensland SILO patched point dataset.

Source: csd.net.au

GROWER QUESTION:

What is the temp impact on germination when you're using cold river water into very dry soils? Do we need to adjust planting rate?

The quick answer depends on the impact on soil temperature! If the water temperature reduces soil temperature below 14°C at 8am, then yes, you will need to adjust your planting rate.

We have all heard of cold-water pollution from water released from the bottom of storage dams, it can add colder water to the downstream environment (Preece 2004). It's well documented that water temperature impacts on fish (spawning, breeding, and migration patterns), but what's the impact of adding chilly water to our soils at planting? Pretty obvious…if we put cold water on it will drop soil temperature.

What is my irrigation water temperature?

This link: Real-time water data (waternsw.com.au) will take you to the water quality data collected by Water NSW, scroll down to find the water temperature data along with water quality, see Table 1.

Table 1: Water Temperature at three Gwydir Stations for last 7 days at 6am.

Water quality (electrical conductivity and temperature)

These data values are taken from the recording nearest to 6am.

	Tuesday 26-Sep-2023	Monday 25-Sep-2023	Sunday 24-Sep-2023	Saturday 23-Sep-2023	Friday 22-Sep-2023	Thursday 21-Sep-2023	Wednesday 20-Sep-2023
TURON @ SOFALA (421026)							
Flow (ML/day)	23	23	24	24	24	25	26
Water Temp (DegC)	12	12	12	11	13	13	13
EC 25DegC (uS/cm)	699	698	696	695	693	693	689
MACQ @ YARRACOONA (421191)							
Flow (ML/day)	151	160	169	181	191	201	208
Water Temp (DegC)	15	15	15	15	15	16	16
EC 25DegC (uS/cm)	429	426	418	412	412	409	400
C-GONG DS WINDAMERE (421079)							
Flow (ML/day)	-	21	26	26	25	25	31
Water Temp (DegC)	-	12	12	11	12	13	13
EC 25DegC (uS/cm)	-	438	437	425	427	426	424
MARTHAGUY @ CARINDA (421011)							
Flow (ML/day)	72	64	57	52	48	49	41
Water Temp (DegC)	19	19	18	18	19	20	20
EC 25DegC (uS/cm)	17	17	17	17	17	17	17
MACQUARIE @ CARINDA (421012)							
Flow (ML/day)	397	388	396	508	413	511	513
Water Temp (DegC)	19	19	18	18	19	20	20
EC 25DegC (uS/cm)	434	397	372	347	334	352	355
CASTLEREAGH@GUNGALMN (420020)							
Flow (ML/day)	0	0	0	1	0	1	1
Water Temp (DegC)	17	17	17	17	15	19	19
EC 25DegC (uS/cm)	979	974	965	959	948	945	939

Water temp in the in the Macquarie at Carinda 18-19 ˚C on September 25, which warms up a lot from when it leaves the dam. But no doubt in some seasons and some releases the water could be much cooler. Good thing to consider each season going forward.

"CSD has measured a drop in soil temp of 2-5 degrees on the planting irrigation in the past. We need a soil temp of 14°C at 8am at 10cm depth for planting. Anything that drops is going to slow germination and emergence. This will have other impacts regarding seedling vigor, and the ability of the plant to withstand both disease and insect pests during the critical establishment phase." James Quinn CSD

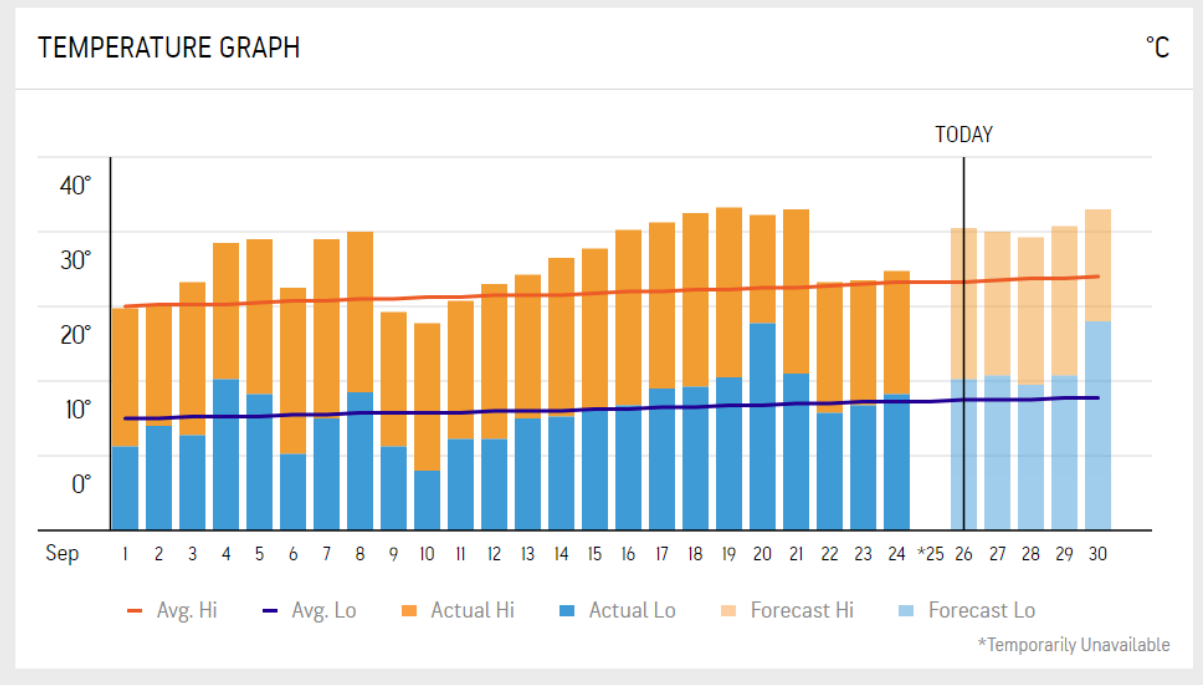

Fig 1: Trangie NSW (source accuweather.com) SEPTEMBER

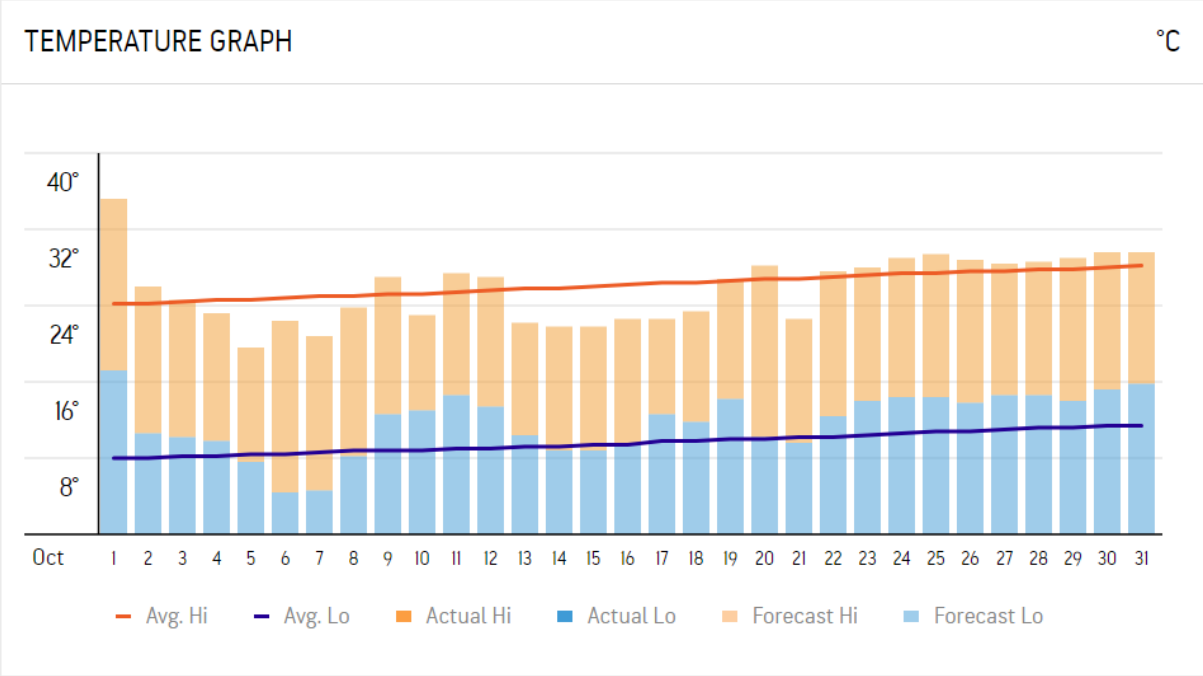

Fig 1: Trangie NSW (source accuweather.com) OCTOBER (predicted only)

HOW IMPORTANT IS TEMPERATURE?

Temperature plays a vital role in the germination and development of a cotton seedling. Below 14°C, the growth of a cotton plant is significantly impacted, and the cotton plant won't function properly until temperatures are above 15°C. Figure 2 shows the strong relationship between establishment and soil temperature. The higher the temp (up to 35°C), the faster the germination. We want our plant to get out of the ground as quickly as possible, as the slower germination and establishment is, the greater chance of seedling death through disease and insect damage. This is shown in Figure 3.

Figure 2: Effect of temperature on germination after 7 days.

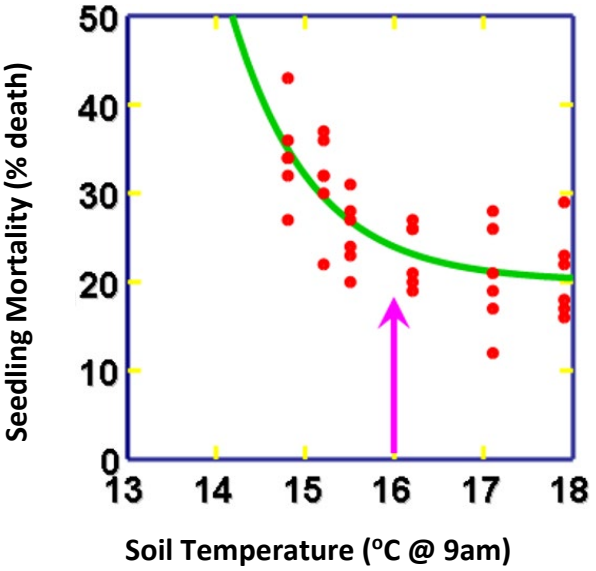

Figure 3: Seedling Mortality (% death) Nehl, NSW DPI

"Beyond germination and establishment. If the water drives soil temperatures below 15.6°C (note this is the average temperature during the day) roots would most like cease to function normally therefore impeding growth and development which affects yield. I would suspect that when you have soil temperatures of anything less than 20°C, things would simply be slower", Mick Bange CSD.

PLANTING RATE

It's not just a case of rolling out the same planting rate each season, many of the factors discussed above will come into play when determining your optimum planting rate.

The cotton planting rate calculator helps you determine the planting rate required to achieve your desired plant stand. It's based on the following factors:

- Variety
- Field conditions
- Disease levels
- Establishment method
- Seed germination percentage
- Soil temp at planting
- 7-day soil temp forecast.

Q: If Cool germ is 56% - Do I have to double my sowing rate?

No. Cool germ only measures the vigour of the radicle after germinating.
Warm germ is the true indicator of how that seed will germinate and establish.
Australian standards for warm germ is 70%. Internationally the minimum warm germ is 60%.
There is no minimum for cool germ as it is a stress test - testing the rate of radicle growth to 4cm in stressed conditions (constant 18 degrees for 7 days).
The warm germ in a true indicator of seed establishment, in cooler conditions it will just take longer to get there (below table).

Table 2: Effect of temperature on cotton seedling survival and growth rate (Constable and Shaw 1988).

Min soil temperature at 10cm	Seed emerging and survival rate	Days to complete emergence
10°C	56%	29
14°C	73%	17
18°C	90%	5

NEW PROJECT ALERT – HOW TO MANAGE RED SOILS FOR MAXIMUM PRODUCTIVITY?

Macquarie cotton growers were successful in obtaining a grass roots grant to look at managing hard setting red soils. These soils are inherently difficult to irrigate. Growers and consultants dealing with these soils have tried a range of approaches to maximize the productivity from these soils.

The primary deliverable for the project is to create a network where growers and consultants can share their experiences and learn from each other as they strive to improve productivity and profitability on hard setting red soils.
The project will enhance the confidence of growers and consultants when they look to amend how they can improve their management of these soils. This is especially important as we transition with younger growers and with the introduction of different irrigation designs and techniques, we may challenge a few rules of thumb in this project and ground truth some benchmarks going forward.

Step one will be to get growers and consultants on board and 'form the network.' CottonInfo's Irrigation technical lead Lou Gall will be bringing some great researchers our way for the first leg of the journey. Further details will become available as it gets closer but if you would like to be involved so far, our first session will have star studded line-up.

29th November - Soil Pit -

- DR Pat Hulme from SSM in Warren – What are the elements in your soil that can have a big impact on how you manage your soils?
- Lou Gall CottonInfo – what irrigation practices suit what soils?
- Jon Baird CottonInfo - Irrigation management to improve nitrogen use efficiency – Jon Baird, NSW DPI
- Dr Oliver Knox – soil structure and impact on irrigation – cover crops and how they fit in

Please get in touch if you would like to be a part of this unique peer to peer learning group going forward.

As always please get in touch if you have any questions or concerns, If I don't know the answer, chances are I probably know someone who does – or I'll find them at least. Looking forward to a great season with a better start than the last two.

Regards

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