

Germinating ideas

By CSD Extension and Development Team

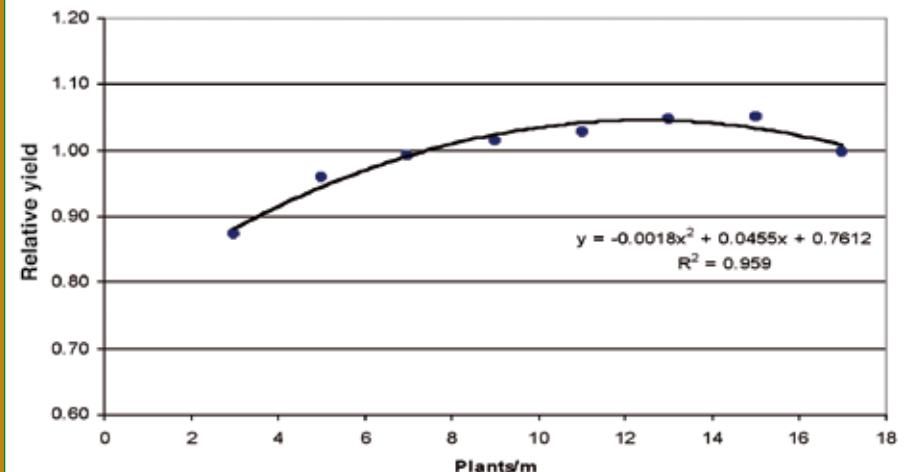
With cotton planting already well underway, this edition of Germinating Ideas will examine a few of the key considerations at planting which influence crop establishment and early crop growth.

Successfully establishing an even, vigorous stand of cotton is the first major step in the production cycle. With the limited water situation still evident across most cotton growing regions, planting is an operation that growers want to get right the first time to avoid wasting time and precious soil moisture.

Usually, significant seedling damage or loss is a result of a combination of factors relating to soil, chemical, disease, insect or climatic conditions at the time of planting. Individually these factors may not cause too many issues but the interaction of any number of these, particularly in combination with adverse weather conditions, can create problems.

Comparing the number of seeds planted per metre to the number of plants established per metre provides an estimate of seedling mortality. This includes the impact of seedling disease (Rhizoctonia and

FIGURE 2: Cotton yield response to plant population from 11 replicated trials conducted by CSD (1999-2005)



Pythium), seed viability, soil insect activity (such as wireworms), physical problems (such as fertiliser or herbicide burn), and adverse environmental conditions.

Seedling mortality rates can vary widely between different seasons and geographies. This is illustrated in Figure 1 which shows seedling mortality rates reported in

the annual cotton disease surveys for the past five seasons in selected regions.

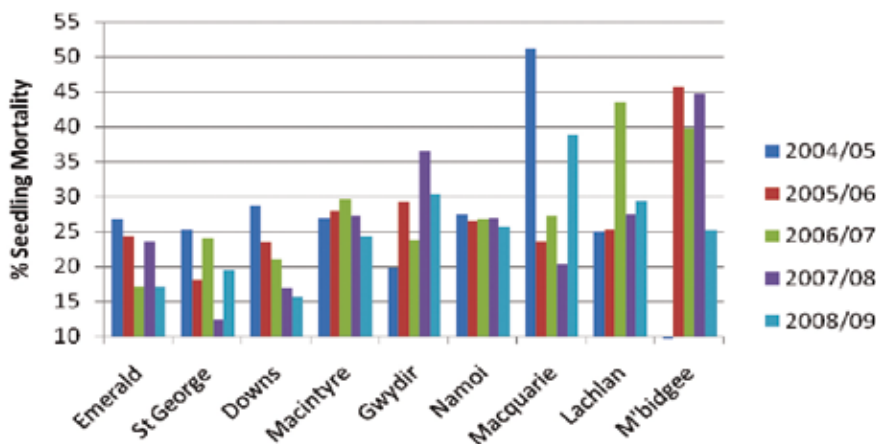
Over this five year period the average seedling mortality rates were around 21 per cent for the Emerald, St George and Downs regions; about 27 per cent for the MacIntyre, Gwydir and Namoi; around 32 per cent for the Macquarie and Lachlan regions; and towards 40 per cent for the Murrumbidgee.

Seedling mortality data can be useful when considering planting rates and the final plant stand you are targeting. To achieve a plant stand of 10 at St George would require a seed drop of 12 to 13 seeds per metre. This would be closer to 18 seeds per metre to achieve 11-12 plants per metre for the Lachlan valley.

Individual growers still need to consider seasonal and field conditions when deciding on planting rates. Under ideal planting conditions, seedling mortality can be as low as 10 per cent while under more difficult conditions as high as 45-50 per cent. Depending on region, this can lead to some wide variations in final plant stand

...50 ▷

FIGURE 1: Percentage seedling mortality estimated from commercial cotton crops across NSW and Queensland



Source: Cotton Pathology 2004-2009; Allen, Anderson, Lonergan, McNamara, Swan & Smith.

but cotton does exhibit a high degree of flexibility in plant population before yields are affected.

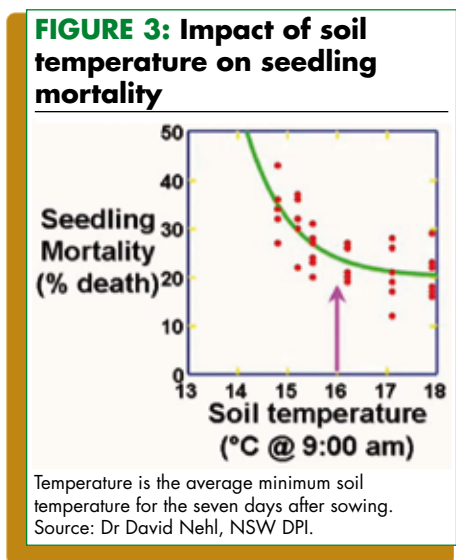
Plant population trials conducted by CSD's Extension and Development team over many seasons has found that with an evenly distributed plant stand of between five and 15 plants per metre there was little impact on yield (Figure 2).

Unfortunately plant loss does not occur evenly throughout the stand and problems arise with gaps of greater than 50 cm. Gappy plant stands result in a large range in plant size which are more difficult to manage, may delay maturity and cause yield reductions. While fluctuations in weather conditions are hard to plan for, there is always a degree of management control possible to reduce the potential for seedling loss and uneven stands.

A few points to consider include:

- Earlier planted crops on average run a higher risk of encountering low soil temperatures.
- Soil insect activity should be monitored carefully, particularly wireworms, as once damage appears it is already too late to treat.
- Rough seed beds or heavy stubble covers can result in uneven planting depth or seed placement, reducing the number of seeds which can come up.
- Planting rates should be adjusted for soil types which tend to crust or fields where Fusarium is known to increase seedling loss.
- Regularly check planting depth especially when planting on rain moisture where there may be more variability.

With the high adoption of Bollgard II cotton varieties there is not the same need to plant early to avoid late season insect pressure. But opportunities to plant into



moisture can entice earlier planting in limited water situations. Ensuring that planters are calibrated and setup ready for planting allows growers to quickly take advantage of any favourable soil moisture conditions. Planting rates may need to be adjusted to accommodate some seedling loss if soil temperatures are lower than ideal.

Soil temperatures for planting cotton should be 12–14°C at 10 cm depth at 9:00am and rising over a number of days. Better seedling establishment occurs when minimum soil temperatures in the seed zone are at least 16°C. Studies conducted by Dr David Nehl (NSW DPI) have shown that seedling mortality increased dramatically when minimum soil temperatures fall below 16°C in the week post planting (Figure 3).

Every degree less than 16°C will significantly slow the rate of emergence. Seedlings also become more susceptible to seedling diseases such as Rhizoctonia, Pythium and Fusarium species. This is due to the sugary exudates produced by plant roots becoming more concentrated around the roots of slow developing crops. Plant pathogens are stimulated by these

exudates and in fast growing crops, the roots move too quickly for the pathogens to colonise them.

As plants grow they develop their own defence mechanisms against disease including a thicker epidermis and substances that prevent disease colonisation. Seed treatment fungicides such as Dynasty provide an additional level of control for seedling damping off caused by *Rhizoctonia solani* and *Pythium* species in cotton. Bion is another seed treatment which works quite differently.

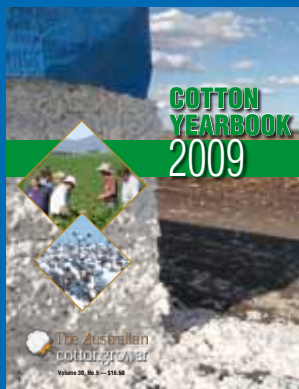
All plants have natural disease resistance mechanisms which recognise pre-existing pathogens, provide physical or chemical barriers and induce the plant's immune defence mechanisms in response to pathogen attack. These natural defence systems can also be turned on by other events such as hail, sand blasting or insect attack.

Bion activates the cotton plant's natural defence against major diseases such as black root rot (BRR) and Fusarium. Trials conducted by Dr Stephen Allen showed that Bion reduced the severity of BRR by 25 per cent and increased seedling size by up to 9.5 per cent at three weeks (means of 25 sites over two seasons). Bion reduced the incidence of Fusarium wilt by 16.5 per cent and resulted in a 3.9 per cent increase in seed cotton yield (mean of 24 trials over two seasons).

While not the solution to these disease problems, as part of an integrated disease management strategy Bion can provide useful advantages in reducing the incidence and impact of these diseases on plant stand and early seedling growth. Other useful strategies include delayed planting and selection of varieties with high F ranks.

Further information on these or related topics can be found on the CSD website (www.csd.net.au).

Become a subscriber to The Australian Cottongrower magazine



A 12-month subscription costs only \$40 (incl GST) and for that you receive six bimonthly magazines PLUS *The Cotton Yearbook* (2009 edition just published which is packed full of valuable information)

The Australian Cottongrower is published every two months and is a sought after source of up-to-date developments in the Australian cotton industry – a must have for growers and support personnel

You can subscribe by filling out the subscription card inside the front cover or go online to www.cottongrower.com.au



New 225 to 345 HP tractor lineup

John Deere has bolstered its line-up of high-powered row-crop tractors with the introduction of its 8R series tractors.

As producers take on more hectares and grow their farm operations, they and their employees are spending more time in the tractor cabs working. New 8R series tractors help operators work more comfortably and productively. The line-up includes six wheeled models that range from 225 to 345 engine horsepower (166–254 kW) and three track models that range from 295 to 345 (217–254 kW) engine horsepower.

“We’ve taken the most fuel-efficient row-crop tractor ever produced, at a time when its reliability is better than ever, and refined it by increasing horsepower output, adding our most spacious, most comfortable, and most productive cab ever. We’ve also dramatically upgraded the ride comfort and capabilities of our track models. These tractors offer customers low operating costs and maximum uptime with ultimate comfort and productivity,” says Royce Bell, John Deere Limited Tactical Segment Manager.

One of the hallmarks of an 8R series tractor is its next-generation John Deere CommandView II Cab. Inside, operators will discover a roomy work environment

8R and 8RT Series Tractor Model Summary				
Model	Engine HP*	PTO HP	Engine Size/Cylinders	RPM
8225R	225 (166)	181 (135)	9.0L PowerTech Plus/6 cyl	2,100
8245R	245 (180)	198 (148)	9.0L PowerTech Plus/6 cyl	2,100
8270R	270 (199)	220 (164)	9.0L PowerTech Plus/6 cyl	2,100
8295R	295 (217)	242 (180)	9.0L PowerTech Plus/6 cyl	2,100
8320R	320 (235)	263 (196)	9.0L PowerTech Plus/6 cyl	2,100
8345R	345 (254)	284 (212)	9.0L PowerTech Plus/6 cyl	2,100
8295RT	295 (217)	235 (175)	9.0L PowerTech Plus/6 cyl	2,100
8320RT	320 (235)	255 (190)	9.0L PowerTech Plus/6 cyl	2,100
8345RT	345 (254)	275 (205)	9.0L PowerTech Plus/6 cyl	2,100

Note: Rated engine hp (ISO), 97/68/EC, at 2,100 engine rpm

that’s equipped with integrated, easy-to-use monitors and controls. Visibility is enhanced in all directions.

“Available best-in-class lighting, plus best-in-class cab and controls, help this tractor stand out from the competition,” says Royce.

The 8RT series track tractors are new from the ground up. Each 8RT Tractor is equipped with John Deere’s AirCushion Suspension System that was first made available on the company’s larger 9030T series track tractors.

“Our exclusive AirCushion suspension provides unsurpassed operator comfort and improved vehicle traction that puts more power to the ground. The power, performance, and comfort of our new

8RT tractors are second to none,” explains Royce.

And for the first time ever, John Deere makes its Infinitely Variable Transmission (IVT) available on 8RT series track tractors. It’s standard on the 8345RT and optional on all other models. With an IVT, operators can use a single lever to smoothly shift from zero to 38 km per hour, or any speed in between.

“Our track tractor customers can now select any track spacing between 1.82 and 4.06 metres wide by using the field-installed kit and can make adjustments without de-tensioning the tracks,” says Royce.

For more information on the 8R/8RT series tractors, visit www.JohnDeere.com.au or FREECALL 1800 800 981 in Australia.



The 8345R is the most powerful row-crop tractor John Deere has ever built – producing up to 345 (257kW) engine horsepower.