



Optimising Nitrogen Application Rates for Australian Cotton

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Background Information:

Applied cotton Nitrogen rates increasing within Australia-

The Australian Cotton industry in the last decade has enjoyed extraordinary growth in cotton lint yields, increasing by 28% from 2038 kg lint/ha in 2005 to 2610 kg lint/ha in 2015.

Unfortunately the growth in production has led to a trend of cotton farmers applying excessive amounts of nitrogen (N). In many situations the increase of applied N is not required by the cotton plants, resulting in greater N losses from the cotton system and a decline of nitrogen use efficiency (NUE).

Research Question:

Are Australian cotton producers able to incorporate researched optimum N application rates to improve NUE but maintain yields considered high and profitable (> 2700 kg lint/ha)?

The aim of the investigation was to determine the impact of various nitrogen rates on cotton lint yield, NUE and developed an economic optimum N rate.

Results:

Yield-

Applied nitrogen rates had an affect on cotton lint yield ($p < 0.05$), with the highest yield achieved by the 350 kg N/ha rate (2744 kg/ha)(Figure 1). While the 250 kg N/ha rate was within significant difference of the 350 kg N/ha rate, and yielded above the objective yield of 2700 kg lint/ha.

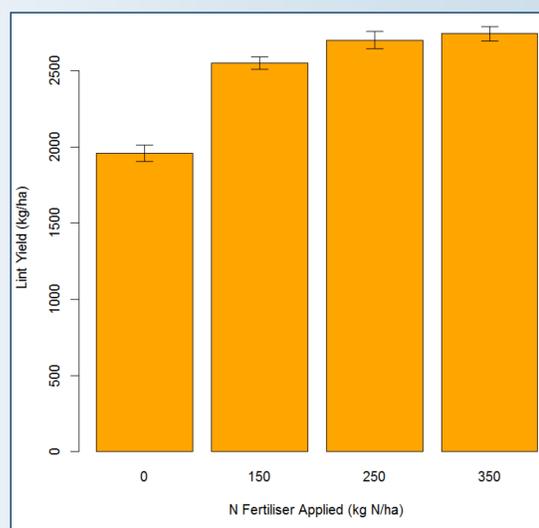


Figure 1; Cotton Lint yield at varied applied N rates from Gunnedah, North Western NSW. Error bars signify N rate standard error.

Economic Optimum N rate-

Utilising methodology of Belanger (2000), the optimum economic rate of N was determined to be 237 kg N/ha (Figure 2).

Applied NUE-

Overlaying the economic optimum N rate onto the applied NUE chart resulted in the optimum applied NUE of 11.4 kg/kg (Figure 2).

Key Findings:

Exceptional yields with greater N efficiency

250 kg N/ha was considered the optimum N rate for farmers in North Western NSW. The N rate yielded similar to the highest yielding treatment and was closest to the optimum economic N rate.

Australian cotton farmers can produce exceptional lint yields, while at the same time have greater farming sustainability and better N efficiency.

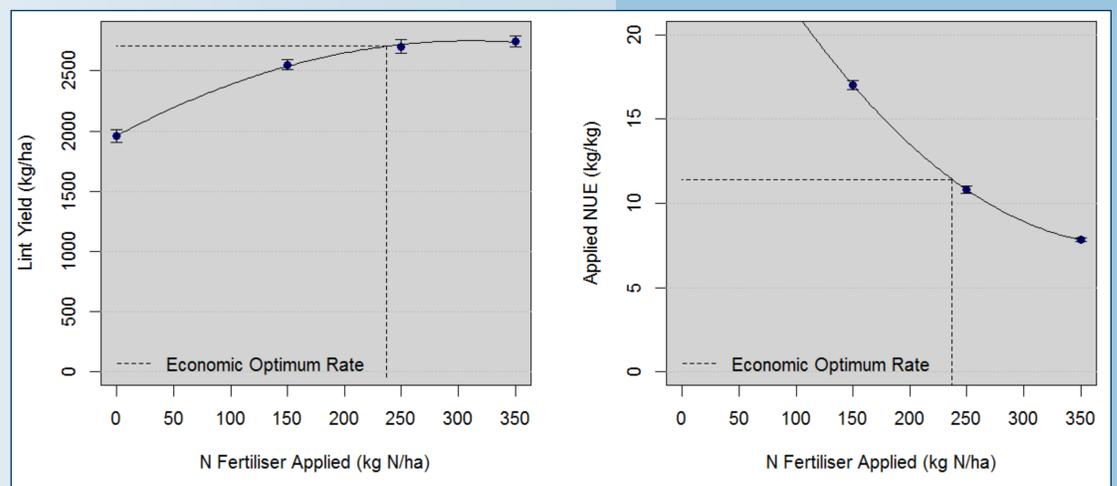


Figure 2; Economic Optimum N rate (dashed line) overlaid on lint yield and Applied NUE. Error bars signify N rate standard error.



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