

OPTIMISING AMINOETHOXYVINYLGLYCINE APPLICATION RATE FOR WATERLOGGED COTTON

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Outline

Cotton (*Gossypium hirsutum* L.), an important economic crop of Australia, often experiences yield losses due to environmental fluctuations. Increased ethylene accumulation in waterlogged cotton plant induces young fruit abscission of waterlogged cotton. Earlier studies proposed the effectiveness of anti-ethylene agent aminoethoxyvinylglycine (AVG) for limiting ethylene biosynthesis in plants experiencing a variety of stresses e.g. salinity, drought and waterlogging. Through a series of glasshouse and field experiments, we optimised AVG application rate and time for waterlogged cotton.

Outcomes

- Reduced development of fruiting node, fruit retention and boll weight were the major causes of yield reduction in waterlogged cotton.
- Increasing application rate of AVG up to 125 g [ai] ha⁻¹ significantly improved cotton

yield, especially when applied during early reproductive growth phase of cotton.

- Pre-waterlogging AVG application caused 11-13% and 7-9% increase in seed cotton yield of waterlogged and non-waterlogged cotton, respectively, compared with non-AVG treated plants.
- AVG-induced yield improvement of waterlogged cotton was associated with increased boll number and weight, while in non-waterlogged cotton it increased final boll number only.

Summary

Higher fruit abscission is a common response of cotton to many stresses, which is accelerated by higher ethylene synthesis. Appropriate application rate and timing of AVG was found equally effective in increasing yield of waterlogged and non-waterlogged cotton. Positive effect of AVG on growth and yield of waterlogged suggested the importance of understanding the role of ethylene in cotton under abiotic stresses.



FIGURE 1 Field operations; AVG spray (A) and waterlogging (B)

FIGURE 2 Plant growth inhibition under waterlogging conditions

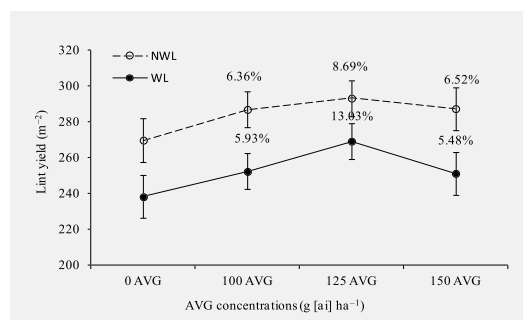


FIGURE 3 AVG-induced lint yield increase (%) in waterlogged and non-waterlogged cotton

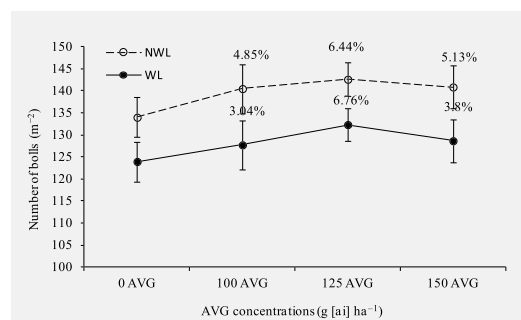


FIGURE 4 Increased fruit development (%) in AVG-treated waterlogged and non-waterlogged cotton