

Effect of conventional and organic practices on cotton quality parameters compared across 12 years



Background

- Cotton is the most widely used fibre crop and quality parameters such as fibre length are crucial for successful processing. These quality parameters can be influenced by a variety of factors, such as nutrient supply to the plant and varieties used.

Aim

- To assess cotton fibre quality from the SysCom long-term farming systems comparison trial under different organic and conventional systems in semi-arid conditions in Madhya Pradesh, central India.

Methods

- The trial has been running since 2007, comparing biodynamic (BD), organic (ORG), and conventional with GM (Bt-CONV) and without GM cotton (CONV) management. All treatments include a two-year crop rotation which is first-year cotton-wheat/chickpea and second-year soybean-wheat (Figure 1).
- To assess fibre quality, we analysed cotton fibre samples for quality parameters like fibre fineness, maturity index (MI), upper half mean length, uniformity index (UI), short fibre index (SFI) and fibre strength.

Results

- On average, less nitrogen was applied to the ORG and BD systems compared to Bt-CONV (-44% and -43%, respectively) and CONV (-36% and -35%) (Figure 2).
- Cotton yield was on an average 29.11% and 28.17% lower in ORG and BD compared to Bt-CONV and 18.44% and 18.28% lower than CONV (Figure 3).
- There was no significant difference between systems for the quality parameters fibre fineness, fibre strength, SFI, MI and upper half mean length, even though less nitrogen was provided to the organic systems (Figure 4).
- Only UI was significantly higher in Bt-CONV compared to ORG by 1.15%

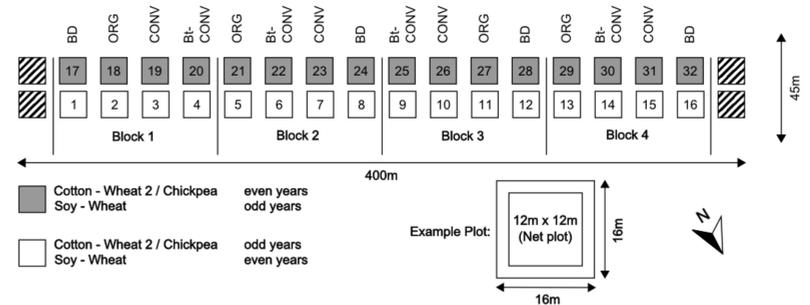


Figure 1: Experimental design of the long-term farming system comparison trial

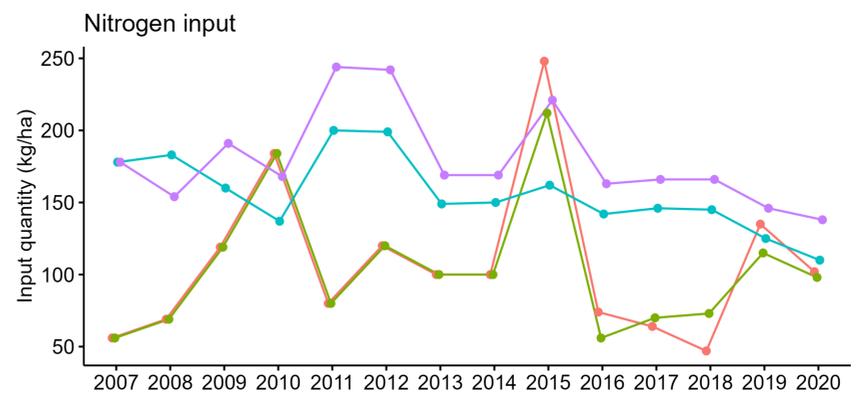


Figure 2: Yearly quantities of nitrogen applied in the different systems over the years.

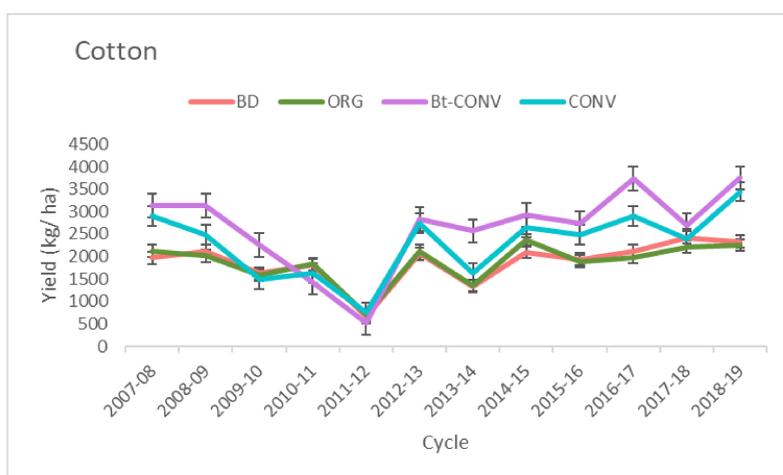


Figure 3: Development of seed cotton yield in the different systems over the years.

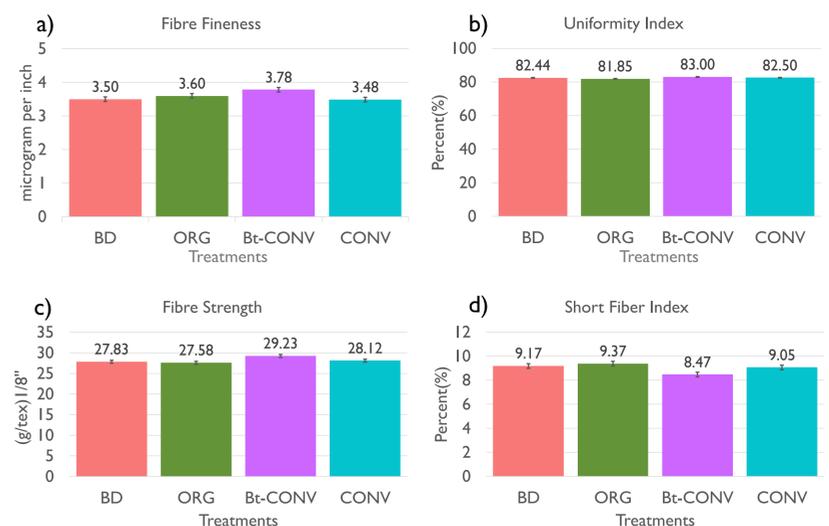


Figure 4: Average values of selected cotton lint quality parameters in the four different systems. a) Fibre Fineness b) Uniformity Index (UI) percentage c) Fibre Strength and d) Short Fibre Index (SFI).

Conclusion

- Even though organic and biodynamic systems received on average less nitrogen, there was no significant reduction in their lint quality.
- While Verma et al. (2017) found higher lint quality in Bt cotton with increasing N supply, this dynamic did not translate into our comparison across different management systems.
- The holistic organic and biodynamic management systems seem to be able to make up for the lower N inputs by other mechanisms.

References:

Verma, V.P., Ramanjit Kaur, Y.S. Shivay, Anchal Dass, Seema Sepat. 2017. Yield and Quality Parameters of Bt Cotton as Affected by Nitrogen Dose and its Scheduling.

Donors

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