

## Full Length Research Article

# Agronomic Performance of Irrigated Cotton Through Organic and Inorganic Sources of Nutrients

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**Abstract:** Field investigation was carried out at Experimental Farm at Annamalai University, to evaluate the various sources of nutrient management in irrigated cotton during the summer season of 2008. Application of 100% RDF + Pressmud @ 5 t ha<sup>-1</sup> had registered the highest seed yield as compared to rest of the treatments. Number of bolls per plant and seed cotton yield (g ha<sup>-1</sup>) were recorded at maximum values under above mentioned treatment.

**Key words:** Seed cotton yield, Farmyard manure, Daincha, Intercropping, soil fertility and urea.

## INTRODUCTION

Cotton is an important cash crop globally known as king of fibre and play vital role in the economy of farmers as well as country and is popularly known as “white gold”. It has been used for industries for manufacture of cloth. Besides this, it is also used for several other purpose like making threads. Cotton seed contain 15-20 per cent oil and used as vegetable oil in soap industries. By products of cotton can also used as manure as it contains 6.4% N, 2.9% P and 2.2% K. It is used in the manufacture of cloths, making of threads and extraction of oil from cotton seed (Deshmukh *et al.*, 2013). The cotton is an important fibre crop, is grown through out India under both rainfed and irrigated conditions on area of 9.5 million hectare (Yang *et al.*, 2014). Nitrogen, phosphorus and potassium are primary element to increase of agricultural crop production. Among these three, nitrogen is one of the decisive as well as expensive inputs, which has quickly and most effect on plant growth. Organic manures play an important role in crop growth and development. Keeping in view, the investigation was planned to evaluate the influence of integrated nutrient management in irrigated cotton for sustaining, productivity and maintaining soil fertility under dry farming situations. Balanced use of nutrients through organic sources like farmyard manure, vermicompost, green manuring, neem cake and biofertilizers are pre requisites to sustain soil fertility to produce maximum crop yield with optimum input level (Dhahipale *et al.*, 2003).

## MATERIALS AND METHODS

The field investigation was carried out at Experimental Farm, Annamalai University to evaluate the agronomic performance of irrigated cotton to organic and inorganic sources of nutrients. The soil characters of pH is 7.1, electrical conductivity is 0.21 mhos cm<sup>-1</sup>, organic carbon 0.51%, available P<sub>2</sub>O<sub>5</sub> 20.5 kg ha<sup>-1</sup> and available K<sub>2</sub>O 34.8 kg ha<sup>-1</sup>.

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The field investigation consisted of totally twelve treatments viz., T<sub>1</sub> – Control, T<sub>2</sub> – Pressmud @ 5 t ha<sup>-1</sup>, T<sub>3</sub> – 100 RDF, T<sub>4</sub> – 100% RDF + Pressmud @ 5 t ha<sup>-1</sup>, T<sub>5</sub> – 100% Nitrogen, T<sub>6</sub> – 100% Nitrogen + 100% P<sub>2</sub>O<sub>5</sub>, T<sub>7</sub> – 50% RDF + Pressmud @ 5 t ha<sup>-1</sup>, T<sub>8</sub> – 50% RDF + Pressmud @ 5 t ha<sup>-1</sup>, T<sub>9</sub> – T<sub>8</sub> + (2% urea and 2% DAP – Foliar spray) and T<sub>10</sub> – 50% RDF + Intercropping of daincha for *in situ* GM. The soil of the experimental field was clay soil in texture with 7.1 pH. The experimental field was conducted with randomized block design with ten treatments with three replications. The cotton variety MCU 5 was sown during the summer season of 2008. The nitrogen, phosphorus and potassium were respectively applied through urea, single super phosphate and muriate of potash. Half the specified dose of N, full dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied basally. Remaining half dose of N was top dressed on 25 days after sowing. Pressmud has been applied before fifteen days of sowing of cotton seed. Five sample at random and labelled for biometric observation. The observations on growth and yield parameters and yield were recorded at different growth stages. Cultural practices were adopted as per need of crop growth. Biometric observations were recorded out different growth stages of crop during cropping period. The experimental data was recorded and subjected to statistical analysis using analysis of variance technique suggested by Panse and Sukhatme (1984).

## RESULTS AND DISCUSSION

The results obtained from the present study as well as relevant discussion have been presented under following title (Table 1). Response of growth and yield attributes of cotton as influenced by integrated nutrient management techniques. The results of the experiment conducted during 2016 indicated that, significantly higher plant height, number of bolls plant<sup>-1</sup>, seed cotton per boll, 100 seed weight and seed cotton yield (q ha<sup>-1</sup>) was recorded with 150% RDF + FYM @ 10 tonnes ha<sup>-1</sup> as compared to other treatments. The significant improvement in yield with these treatments were mainly attributed to significantly higher number of bolls/plant, seed cotton per boll (g), 100 seed weight (g) and seed cotton yield (g kg<sup>-1</sup>) over

**Table 1. Response of growth and yield components of cotton as influenced by integrated nutrient management techniques**

Treatments	Plant height (cm)	No. of bolls per plant	Seed cotton per boll (g)	100 seed weight (g)	Seed cotton yield (q ha <sup>-1</sup> )
T <sub>1</sub> – Control	117	51	3.51	6.8	8.89
T <sub>2</sub> – Pressmud @ 5 t ha <sup>-1</sup>	126	57	3.63	7.1	14.20
T <sub>3</sub> – 100 RDF	129	64	3.81	7.6	16.49
T <sub>4</sub> – 100% RDF + Pressmud @ 5 t ha <sup>-1</sup>	139	73	4.12	8.1	19.74
T <sub>5</sub> – 100% Nitrogen	126	61	3.53	7.9	14.73
T <sub>6</sub> – 100% Nitrogen + 100% P <sub>2</sub> O <sub>5</sub>	132	68	3.79	7.3	16.09
T <sub>7</sub> – 50% RDF + Pressmud @ 5 t ha <sup>-1</sup>	130	69	3.79	7.7	17.17
T <sub>8</sub> – 50% RDF + Pressmud @ 5 t ha <sup>-1</sup>	137	63	3.57	7.4	15.52
T <sub>9</sub> – T <sub>8</sub> + (2% urea and 2% DAP – Foliar spray)	131	65	3.62	7.6	16.77
T <sub>10</sub> – 50% RDF + Intercropping of daincha for <i>in situ</i> GM S.Ed.	134	73	3.77	7.9	19.03
S.Ed.	5.18	3.23	0.11	0.70	1.18
CD (P=0.05)	10.36	6.46	0.22	1.40	2.36

other treatments. The combined application of NPK increased availability of major nutrients to plant due to enhanced early not growth and cell multiplication leading to more absorption of other nutrients from deeper layers of soil ultimately resulting in increased plant growth attributes and finally increased yield. Further, the translocation and of accumulation photosynthates in the economics sinks, resulted in increased yield. Similar results have been reported by Meena and Sharma (2012) and Yadav *et al.* (2007). The results indicated that the beneficial effect of combined application of FYM, green manure and reduced doses of fertilizers. Organic manures, presumably, play a key role in enhancing the efficiency of utilization of native as well as applied nutrients. In addition, they augment the availability of certain micronutrients and provide certain growth promoting substances, which promotes boll retention and improve boll weight in cotton (Katkar *et al.*, 2002). Similar findings were reported by Narayana *et al.* (2009). In summary, for sustained high productivity of a cotton yield in clay loam soil under irrigated conditions, combined application of 100% RDF + Pressmud @ 5 t ha<sup>-1</sup> should be recommended to be irrigated cotton for maintaining soil fertility. The data (Table 1) revealed that application of 100% RDF + Pressmud @ 5 t ha<sup>-1</sup> significantly increased seed cotton yield over the other treatments. The higher seed cotton yield under above mentioned treatment might be due to higher growth parameters as well as yield attributing characters like number of bolls/plant, seed cotton per boll and 100 seed weight (g). Similar findings were reported by Mathur and Matish Chandra (2005), Kumar *et al.* (2007), Hosman *et al.* (2011), Ushanandini *et al.* (2017) and Jadhav *et al.* (2015).

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