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Effect of Nutrition and Moisture Conservation Practices on Growth, Yield Attributes and Yield of Rainfed *Bt* Cotton

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ABSTRACT

A field experiment conducted on clay soil of Regional Agricultural Research Station, Lam, Guntur to find out the effect of nutrition and moisture conservation practices on growth parameters, yield attributes and yield of rainfed *Bt* cotton. The treatment 125% RDF (150:75:75) fertilizer application with opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO_3 at square formation, flowering, and boll development stages recorded maximum seed cotton yield (3411 kg ha^{-1}) and was on a par with 125% RDF (150:75:75) fertilizer application + foliar nutrition with 2% KNO_3 at square formation, flowering, and boll development stages seed cotton yield (3266 kg ha^{-1}). or 100% RDF (120:60:60) + opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO_3 at square formation, flowering and boll development, seed cotton yield (3177 kg ha^{-1}) whereas Lowest seed cotton yield (2285 kg ha^{-1}) recorded with 100% RDF 120:60:60 kg ha^{-1}.

Key words: *Foliar nutrition, Moisture conservation, Growth, Yield attributes and yield.*

Cotton "white gold" is an important fibre as well as cash crop of India. in India *Bt* cotton is grown in an area of 122.35 lakh hectares with an annual production of 377 lakh bales and a productivity of 524 kg lint ha^{-1}. In the state of Andhra Pradesh, *Bt* cotton occupies an area of 5.44 lakh hectares with an annual production of 22 lakh bales and productivity of 688 kg lint ha^{-1} (AICCIP, Annual Report, 2017-2018). The major constraints for low productivity of *Bt* cotton include cultivation under rainfed conditions, non adoption of proper nutrient management and moisture stress during the crop growth stages. The yield levels realized in *Bt* cotton are low due to poor agronomic practices, especially fertilization. In *Bt* cotton special attention must be given to agronomic management,so as to harness its economic benefits, and to sustain high productivity levels.

MATERIAL AND METHODS

A field experiment was conducted during *kharif* 2017 at Regional Agricultural Research Station, Lam, Guntur, The soil of the experimental field was clay in texture, pH 7.45 (neutral in reaction), low in total nitrogen (133.7 kg ha^{-1}), high in available phosphorus (43.5 kg ha^{-1}) and high in available potassium (390 kg ha^{-1}). The experiment was laid out in randomized block design **(**RBD**)** with three replications and eight treatment combinations *viz.,* T_1 - 100 % RDF (120:60:60) NPK kg ha^{-1} , T_2 - 125% RDF (150:75:75) NPK kg ha^{-1}, T_3 - 100 % RDF (120:60:60) + opening furrow for every row during last intercultural operation, T_4 - 125% RDF (150:75:75) + opening furrow for every row during last intercultural operation, T_5 - 100% RDF (120:60:60) + Foliar nutrition with 2% KNO_3 at square formation, flowering and boll development, T_6 - 125% RDF (150:75:75) + Foliar nutrition with 2% KNO_3 at square formation, flowering and boll development, T_7 - 100% RDF (120:60:60)+ opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO_3 at square formation, flowering and boll development and T_8 - 125% RDF (150:75:75)+ opening furrow for every row during last intercultural operation + Foliar nutrition with 2% KNO_3 at square formation, flowering and boll development. Phosphorus was applied as basal in the form singlesuper phosphate as per the treatment**.** Nitrogen and Potassium were applied through urea and muriate of potash in three equal splits at 30, 60 DAS and 90 DAS. The hirsutum *Bt* hybrid **(**Jadoo**)** was sown at a spacing of 105 cm x 60 cm and the treatments were imposed as per the protocol The data on plant height, boll weight and number of bolls plant were recorded from randomly selected five plants from each plot and seed cotton yield was recorded on plot basis and subjected to statistical analysis the and plant protection measures were followed as per recommendations and the on need basis

RESULTS AND DISCUSSION

The results of the study revealed that application 125% RDF (150:75:75)+ opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO_3 at square formation, flowering and boll development(T_8), recorded maximum plant height (199.7 cm), drymatter

Table. Growth parameter, yield attributes, seed cotton and stalk yield as influenced by nutrient management and soil moisture conservation practices

Tretments	Plant height (cm)	Dry matter accumulation (kg ha^{-1})	Mono podial branches plant^{-1}	Sympodial branches plant^{-1}	Number of bolls per plant	Number of bolls per m^2	Seed cotton yield (kg ha^{-1})	Stalk yield (kg ha^{-1})
T_1- 100 % RDF (120:60:60) NPK	184.7	9391.0	1.9	16.8	56.7	63.7	2285.0	5282.0
T_2- 125% RDF(150:75:75) NPK	188.3	9788.0	2.0	19.4	64.0	75.3	2460.0	5505.0
T_3- T_1+ opening furrow for every row during last intercultural operations	186.3	9655.0	1.9	18.2	59.6	69.4	2519.0	5431.0
T_4- T_2+ opening furrow for every row during last intercultural operations	192.1	10053.0	2.3	20.4	70.8	79.5	2947.0	5654.0
T_5- T_1+ foliar nutrition with 2% KNO_3 at square formation, flowering, and boll development.	190.1	9920.0	2.1	19.6	68.4	77.6	2831.0	5580.0
T_6- T_2+ foliar nutrition with 2% KNO_3 at square formation, flowering, and boll development.	196.1	11283.0	2.6	21.4	74.1	86.3	3266.0	5803.0
T_7- T_3+ foliar nutrition with 2% KNO_3 at square formation, flowering, and boll development.	194.1	10650.0	2.4	20.8	71.3	81.8	3177.0	5712.0
T_8- T_4+ foliar nutrition with 2% KNO_3 at square	199.7	11915.0	2.8	23.2	78.1	88.1	3411.0	5877.0
S.Em ±	2.0	651.9	0.1	0.8	2.6	2.3	96.2	394.6
CD (p=0.05)	6.3	1964.7	0.4	2.4	7.8	7.0	292.0	200.1
CV (%)	5.5	11.4	7.4	5.2	12.3	5.1	5.8	12.1

accumulation (11915 kg ha^{-1}) and sympodial branches (23.2) was on a par with 125% RDF (150:75:75) + Foliar nutrition with 2% KNO_3 at square formation, flowering and boll development (T_6) and 100% RDF (120:60:60)+ opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO_3 at square formation, flowering and boll development (T_7) (Table 1).

The number of bolls per plant (78) and bolls per m^2 (88), the seed cotton yield and stalk yield was significantly influenced by nutrient management and soil moisture conservation practices tested (Table 1). The seed cotton yield is the manifestation of yield contributing characters. These yield attributing characters were significantly affected by nutrient management and soil moisture conservation practices the maximum seed cotton and stalk yield (3411 kg ha^{-1}) and (5877 kg ha^{-1}) was recorded with 125% RDF (150:75:75) +opening furrow for every row during last intercultural operation + foliar nutrition with 2% KNO3 at square formation, flowering and boll development (T8) and was on a par with 125% RDF (150:75:75) + foliar nutrition with 2% KNO3 at square formation, flowering, and boll development (T6)

and100% RDF (120:60:60) + opening furrow for every row during last intercultural operation + Foliar nutrition with 2% KNO3 at square formation, flowering and boll development(T7) and found superior to other treatments, tested the lowest seed cotton (2285 kg ha^{-1}) and stalk yield (5282 kg ha^{-1}) was recorded with RDF (120:60:60) NPK kg ha^{-1}(T1). Superior yields at higher levels of fertilization along with opening furrow for every row during last intercultural operation coupled with foliar nutrition of 2% KNO3 at square formation, flowering and boll development might be due to increased fertilization made the plants more efficient in photosynthetic activity by enhancing the carbohydrate metabolism resulted in more yield attributes and hence in increased seed cotton yield. Similar superior seed cotton yield with higher fertilizer levels, foliar nutrition and moisture conservation were reported by Asewar *et al*. (2008), and Narayana *et al.* (2011).

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