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Original Research Article

Productivity of Bt Cotton as Influenced by Land Configuration and Nutrient Management

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Keywords

Bt. Cotton, Land configuration, Nutrient management, Green manuring, Bio-mulching, Seed cotton yield and Economics

A B S T R A C T

A field experiment was carried out at AICRP on integrated farming system, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani during year 2011-2012 to study the effect of land configuration and nutrient management on productivity of Bt. Cotton. The result revealed that opening of furrow after each row recorded significantly higher yield cotton (1897 Kg ha^{-1}) over opening of furrow after two rows (1571 Kg ha^{-1}) and flatbed sowing (1451 Kg ha^{-1}). While, in case of nutrient management application of 100 per cent RDF recorded highest seed cotton yield (2007 Kg ha^{-1}) than 25 per cent of RDF + 10 tones of FYM + PSB + Azotobacter (1273 Kg ha^{-1}) and 50 per cent of RDF + 5 tones of FYM + PSB + Azotobacter (1892 Kg ha^{-1}).However the interaction effect were not found significant. The combination of opening of furrow after each row and 100 per cent RDF recorded higher seed cotton yield and net returns over other treatments.

Introduction

Cotton is an important fiber crop of India. It contributes about 85 per cent of raw materials to textile industries. India has a unique distinction to cultivation of cotton in 121.91 lakh hectares of land and producing of 355 lakh bales with productivity of 503 Kg lint ha^{-1}. In Maharashtra cotton is cultivated on an area of 41.35 lakh hectares of land producing 85 lakh bales with productivity of 341 Kg lint ha^{-1}. (Cotton Advisory Board, 2011).

In Marathwada region cotton is intensively cultivated on clay loam soils. Area under this crop increase enormously due to high yielding varieties of Bt. Cotton, but it gives low productivity with various reasons. Among these, mono-cropping which declining soil fertility status, late sowing, diseases and pests are some of the major constraints.

Continuous use of organic fertilizers affect soil fertility on long term basis (Malewar and Hasnabade, 1995). For maintaining the productivity of land, use of organic is essential with different land configuration.

Bt. Cotton being widely spaced crop with row spacing of 90 x 120 cm has ample scope for green manuring of sunnhemp and opening of furrow between rows. The present investigation focused to develop sustainable and ecologically sound land configuration and nutrient management practices in Bt. Cotton cultivation.

Materials and Methods

A field experiment carried out to study the effect of land configuration and nutrient management on productivity of Bt. Cotton during 2011-12 at AICRP on IFS, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani on black soil under rainfed condition.

The experiment was laid out in split plot design with three land configurations and four nutrient management practices with three replications. The soil of experimental plot was with 80.1 pH and available NPK content in the soil was 153.60, 11.70 and 556.30 Kg ha^{-1} respectively.

The experiment consisting of thirty three (36) treatment combinations with land configuration i.e. opening of furrow in each row, opening of furrows after two rows and flatbed sowing in main plots and nutrient managements i.e. 100 per cent RDF, 25 per cent RDF + 10 t of FYM + PSB + Azotobacter, 25 per cent RDF + 10 t FYM + Two rows of biomulches with sunnhemp and 50 per cent RDF + 5 t FYM + PSB + Azotobacter in subplot treatments respectively. Recommended dose of fertilizer (RDF) for cotton comprised 120:60:60 NPK Kg $ha^{-1.}$ The cultivar used was NCS-145 (Bunny Bt.).

Cotton crop was dibbled on 13th July during 2011 in *kharif* season with spacing at 12 0 x 45 cm. Opening of furrows as well as sowing of sunnhemp between cotton rows was carried out on same day of dibbling of cotton. Sunnhemp was grown up to 30 days and then incorporated in soil by chopping with cutter. The opening of furrow treatment undertaken 40 DAS of cotton.

Results and Discussion

From the experiment the data revealed that among the land configuration management the opening of furrow after each row recorded significantly higher seed cotton yield (1897 Kg ha^{-1}) than opening of furrow after two rows (1571 Kg ha^{-1}) and flatbed sowing (1451 Kg ha^{-1}). The growth attributing characters i.e. plant height, sympodial branches and boll weight found significant with opening of furrows after each row than flatbed sowing. Similar results were obtained by Gaidhane *et al.*, (2007), Dangore (2001) and Mankar *et al.*, (2008).

Table.1 Growth and yield attributing characters as influenced by different land configuration in Bt. Cotton

Treatments	Number of bolls $plant^{-1}$	Boll weight (gm)	Seed cotton yield $plant^{-1}$	Seed cotton yield ($Kgha^{-1)}$	Moisture use efficiency ($Kgha^{-1}$ mm)
Opening of furrows after each row	37.06	3.15	117.00	1897	4.35
Opening of furrows after two row	34.75	2.84	99.68	1571	3.67
Flatbed sowing	33.83	2.75	93.25	1454	3.39
SE (m)+	0.09	0.11	0.36	59	0.11
CD at 5%	0.28	0.34	1.05	178	0.34

Table.2 Growth and yield attributing characters as influenced by various nutrient management in Bt. Cotton

Treatments	Number of bolls plant^{-1}	Boll weight (gm)	Seed cotton yield plant^{-1}	Seed cotton yield (Kgha$^{-1)}$	Moisture use efficiency (Kgha^{-1} mm$^{)}$
120:60:60 kg NPKha^{-1}	39.43	3.17	115.18	2007	4.42
50% RDF + 5 t FYM + PSB + Azatobactor	38.88	2.90	114.25	1892	4.31
25% RDF + 10 t FYM + two rows of biomulches of sunhemp	33.47	3.10	93.43	1473	3.41
25% RDF + 10 t FYM + PSB + Azatobactor	31.07	2.14	82.74	1273	2.98
SE (m)±	0.08	0.013	0.40	65	0.15
CD at 5%	0.25	0.040	1.21	197	0.44

Among the nutrient management treatments application of 120:60:60 Kg ha^{-1} NPK recorded higher seed cotton yield (2007 Kg ha^{-1}) over the 25 per cent RDF + 10 t of FYM + PSB + Azotobacter (1273 Kg ha^{-1}), 25 per cent RDF + 10 t FYM + Two rows of biomulches with sunnhemp (1457 Kg ha^{-1}) and 50 per cent RDF + 5 t FYM + PSB + Azotobacter (1892 Kg ha^{-1}). Increase in yield is due to the increase in yield component like boll number per plant, boll weight and seed cotton yield per plant. Higher increase in growth attributes as result of improved soil fertility status due to application of FYM. The same results were reported by Balole and More (2000), Katkar *et al.,* (2002) and Kaur *et al.,* (2007).

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