

## Growth Behavior of Pineapple cv. Mauritius under Integrated Nutrient Management in Northern part of West Bengal, India

Nilesh Bhowmick<sup>1\*</sup>, Partha Sarathi Munsi<sup>2</sup>, Swapan Kumar Ghosh<sup>1</sup>,  
Pralhad Deb<sup>2</sup> and Arunava Ghosh<sup>3</sup>

<sup>1</sup>Department of Pomology and Post-Harvest Technology, Uttar Banga Krishi Viswavidyalaya, PO-Pundibari, Dist-Cooch Behar, West Bengal-736165, India

<sup>2</sup>Department of Horticulture and Post-Harvest Technology, Institute of Agriculture, Visva-Bharati, Sriniketan, West Bengal-731235, India

<sup>3</sup>Discipline of Agricultural Statistics, Uttar Banga Krishi Viswavidyalaya, PO-Pundibari, Dist-Cooch Behar, West Bengal-736165, India

\*Corresponding author

### ABSTRACT

#### Keywords

Growth, Behavior, Pineapple, Nutrient, West Bengal.

#### Article Info

##### Accepted:

26 August 2017

##### Available Online:

10 September 2017

Pineapple is an important fruit crop and West Bengal is the leader in pineapple production in India. In West Bengal the commercial cultivars is Kew under Smooth Cayenne group which suitable for processing purpose. Table purpose cultivars like Queen is being grown as home stead condition in some pockets of West Bengal. Mauritius cultivar (Queen Group) of pineapple was introduced first time in West Bengal from the south India and its growth performance under the integrated nutrient management practices was assessed in this present experiment. The experiment was conducted at farmers field near Bidhannagar area of Siliguri under the Darjeeling district from 2014-16. The experiment was conducted with Factorial Randomized block design having three factors- Chemical fertilizer (Factor A), organic manure (Factor B) and bio-fertilizer (Factor C) and eighteen treatment combination with three replication. It is found from the present experiment that the treatment combinations having chemical fertilizer, organic manure and bio-fertilizers shows better performance than the other treatment combinations. The plant height, canopy spread, number of leaves, D-leaf length, D-leaf breadth, and leaf area was recorded highest in T<sub>12</sub> (Chemical 75% RDF + Vermicompost + Bio-fertilizer).

### Introduction

Pineapple (*Ananas comosus* L. Merr.) is an important tropical fruit of world under the Bromeliaceae family. Pineapple is one of the most internationalized fruit traded globally; it is third only to bananas and citrus in this respect. The major pineapple products are canned slices, chunks, crush, juice and fresh fruit. Processed pineapple products, such as juices, largely dominate this market,

accounting for 80 percent of the trade (Jacob and Soman, 2006). India ranks 6<sup>th</sup> (7.4%) in terms of world pineapple production (National Horticulture Database-2014) but productivity is quite low (15.8t/ha) compare to leading countries like Indonesia (124.5t/ha), Costa Rica (59.2t/ha), Brazil (40.9t/ha). West Bengal is leader in pineapple production in India (316 thousand metric

tonnes). Pineapple is an important commercial fruit crop of West Bengal and it is intensively cultivated in Siliguri sub-division of Darjeeling district, Sadar sub-division of Jalpaiguri district, Islampur sub-division of Uttar Dinajpur district and parts of Cooch Behar district.

In West Bengal the commercial cultivars is Kew since long back. The Kew comes under Smooth Cayenne group suitable for processing purpose.

Table purpose cultivars like Queen is being grown as home stead condition in some pockets of West Bengal. Whereas, pineapple cv. Mauritius under the Queen group is very popular in southern parts of India (Kerala, Karnataka region) due to its taste, sweetness, flavor (Annon, 2017).

Considering the fact the Mauritius cultivar of pineapple was introduced first time in West Bengal from the south India and its performance under the integrated nutrient management practices was assessed in this present experiment.

**Materials and Methods**

The experiment was conducted at farmer’s field near Bidhannagar area of Siliguri under the Darjeeling from 2014-16 with Spacing: 90cm×35cm×25cm having individual bed size of: 3×0.7 m=2.1m<sup>2</sup> with 25 number of plants per plot. The experiment was conducted with Asymmetrical Factorial Randomized Block design having three factors- Chemical fertilizer (Factor A), organic manure (Factor B) and bio-fertilizer (Factor C) and eighteen treatment combination with three replication. Chemical fertilizers were applied in 3 levels (A<sub>0</sub>-zero, A<sub>1</sub>-75 percent and A<sub>2</sub>- 100 percent recommended dose), organic manure were applied also in 3 levels (B<sub>0</sub>-zero, B<sub>1</sub>-FYM, B<sub>2</sub>-Vermicompost), bio-fertilizer were applied

in 2 levels (C<sub>0</sub>-zero and C<sub>1</sub>- Azotobactor + Phosphate Solublising Bacteria). The doses for integrated nutrient management was as follows: Regular Dosages of Fertilizer (RDF)= 12:4:12 g/plant, Farm Yard Manure (FYM) = 500g/ plant, Vermicompost = 300g/Plant, Azotobactor = 10g, Phosphate Solublising Bacteria (PSB) = 10g was applied. It was reported that of 12g/ plants of nitrogen and potash has been found to be optimum and no effect of phosphorus was observed, however, 4g of P<sub>2</sub>O<sub>5</sub> increased fruit weight and yield in pineapple (Reddy and Prakash, 1982).

**Treatment combinations**

T <sub>1</sub> -	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	T <sub>10</sub> -	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>
T <sub>2</sub> -	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	T <sub>11</sub> -	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>
T <sub>3</sub> -	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	T <sub>12</sub> -	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>
T <sub>4</sub> -	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	T <sub>13</sub> -	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>
T <sub>5</sub> -	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	T <sub>14</sub> -	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>
T <sub>6</sub> -	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	T <sub>15</sub> -	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>
T <sub>7</sub> -	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	T <sub>16</sub> -	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>
T <sub>8</sub> -	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	T <sub>17</sub> -	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>
T <sub>9</sub> -	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	T <sub>18</sub> -	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>

Regarding the growth behaviour the height of the plant (cm), plant spread in North-South and East-West direction (cm), number of leaves, D-leaf length (cm), leaf length (cm), leaf breadth (cm), and leaf area (cm<sup>2</sup>) were recorded 3 months after planting and continue upto 18 months with 3 months interval for 2015 and 2016. Analysis of variance for each parameter was performed using ProcGlm of Statistical Analysis System (SAS) software (version 9.3). Mean separation for different treatment under different parameter were performed using Least Significant Different (LSD) test (P≤ 0.05). Normality of residuals under the assumption of ANOVA was tested using Kolmogrov-Smirnov procedure using Proc-Univariate procedure of SAS (version 9.3).

## **Results and Discussion**

### **Plant height (cm)**

The plant height of pineapple cv. Mauritius was varied significant among different treatments and it was found highest in T<sub>10</sub> and T<sub>12</sub> for 2015 and 2016 at 3 months after planting. From 9 months after planting to 18 months after planting the maximum plant height was recorded in T<sub>12</sub> for 2015, 2016 and for pooled values. The height of pineapple plant was 83.71cm (pooled) and 90.76cm (pooled) for 15 and 18 months after planting in T<sub>12</sub> followed by 79.96cm (pooled) and 87.53 cm (pooled) in T<sub>10</sub>, respectively. The result from table 1 show clearly there is significant role of nutrient management for increasing the height of pineapple plants. Comparing the T<sub>11</sub> and T<sub>12</sub> it is clear that there is a great role of bio-fertilizer for the growth of pineapple plants.

### **Plant canopy spread (cm)**

Observation revealed (Tables 2 and 3) that the plant canopy on North-South and East-West direction was increased in all the treatments from 3 months after planting up to the 18 months after planting. Significant variation between the main factor and treatments combination with respect to canopy spread was observed among several nutrient treatments.

Treatments combination T<sub>10</sub>, T<sub>11</sub>, T<sub>12</sub>, T<sub>18</sub> shows the better performance compare with other treatment combinations. For all observation months the lowest canopy spread was recorded with T<sub>1</sub> (no nutrient). The performance of canopy spread was better in treatments where chemical, organic and bio-fertilizers were applied combined compared with sole application of bio-fertilizers, or organic or only chemical fertilizers. The rate of increase of canopy was higher from 3

months to 6 months and 12 months to 15 months after planting for both north-south and east- west direction. Maximum canopy spread in north-south and east-west direction was observed with T<sub>12</sub> for 2015, 2016 and pooled values. The spread was 117.64cm and 124.20cm respectively for north-south and east-west direction at 18 months after planting.

### **Number of leaves**

The number of leaves of pineapple increased from three months to eighteen months and it varied significantly mostly among all the treatments. Flower induction is an important practice in pineapple normally done during 11-12 months after planting and for effectiveness the number of leaves in pineapple has an important factor and 30-40 leaves are required for flowering of pineapple. At 12 months after planting, the number of leaves was 49.47 and 49.27, respectively with T<sub>12</sub>. Lowest number (pooled mean) of leaves (36.14 and 39.27) was observed with T<sub>1</sub> (no nutrient) and maximum number (pooled mean) of leaves (55.75 and 58.87) were recorded with T<sub>12</sub> which was statistically at par with T<sub>9</sub>, T<sub>10</sub>, T<sub>11</sub>, T<sub>14</sub>, T<sub>16</sub>, T<sub>18</sub>, respectively at 15 and 18 months after planting, respectively. The rate of increase of number of leaves was higher from 9 to 12 months after planting. Treatments with having all the chemicals, organic and bio-fertilizers combinations showed better performance compare with individual effect of organic, chemical and bio-fertilizers.

### **D-leaf length, breadth and area**

D-leaf is the most physiological active leaves of pineapple and it is highly co-related to growth behaviour, nutrient content of pineapple leaves. Leaf size is an important parameter for most of the crop regarding the flowering, fruiting and subsequent yield.

**Table.1** Effect of Nutrient management on plant height (cm)

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	23.95c	23.97c	23.96c	30.1c	32.36c	31.23a	37.96b	38.16b	38.06b
A <sub>1</sub>	32.64a	33.13a	32.89a	40.08a	42.40a	41.24a	53.85a	54.8a	54.33a
A <sub>2</sub>	31.29b	31.88b	31.59b	39.16b	41.28b	40.22b	50.61a	50.73a	50.67b
<b>S.Em. (±)</b>	<b>0.28</b>	<b>0.29</b>	<b>0.26</b>	<b>0.24</b>	<b>0.27</b>	<b>0.23</b>	<b>1.67</b>	<b>1.69</b>	<b>1.68</b>
<b>L.S.D(P≤0.05)</b>	<b>0.81</b>	<b>0.85</b>	<b>0.76</b>	<b>0.70</b>	<b>0.76</b>	<b>0.67</b>	<b>4.80</b>	<b>4.85</b>	<b>4.82</b>
B <sub>0</sub>	28.49b	28.72b	28.61b	34.68b	36.81b	35.75b	43.52b	44.30b	43.91b
B <sub>1</sub>	29.64a	29.92a	29.78a	37.07a	39.30a	38.19a	48.84a	49.02ab	48.93a
B <sub>2</sub>	25.75a	30.34a	30.05a	37.59a	39.92a	38.76a	50.06a	50.37a	50.22a
<b>S.Em. (±)</b>	<b>0.28</b>	<b>0.29</b>	<b>0.26</b>	<b>0.24</b>	<b>0.27</b>	<b>0.23</b>	<b>1.67</b>	<b>1.69</b>	<b>1.68</b>
<b>L.S.D(P≤0.05)</b>	<b>0.81</b>	<b>0.85</b>	<b>0.76</b>	<b>0.70</b>	<b>0.76</b>	<b>0.67</b>	<b>4.80</b>	<b>4.85</b>	<b>4.82</b>
C <sub>0</sub>	28.08b	28.26b	28.18b	34.66b	36.89b	35.78b	44.59b	45.00b	44.79b
C <sub>1</sub>	30.50a	31.06a	30.78a	38.24a	40.46a	38.36a	50.36a	50.80a	50.58a
<b>S.Em. (±)</b>	<b>0.23</b>	<b>0.24</b>	<b>0.21</b>	<b>0.2</b>	<b>0.22</b>	<b>0.19</b>	<b>1.36</b>	<b>1.38</b>	<b>1.37</b>
<b>L.S.D(P≤0.05)</b>	<b>0.66</b>	<b>0.69</b>	<b>0.62</b>	<b>0.57</b>	<b>0.62</b>	<b>0.54</b>	<b>3.92</b>	<b>3.96</b>	<b>3.93</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	21.02f	21.01g	21.02g	26.19h	28.84g	27.52h	31.91g	32.5g	32.21g
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	25.63d	25.39f	25.51e	31.86f	33.69e	32.78f	38.61efg	40.03efg	39.32efg
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	21.51ef	22.03g	21.77fg	28.18g	30.38fg	29.28g	35.75fg	36.33fg	36.04fg
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	26.37d	26.09f	26.23e	32.83f	34.66e	33.75f	40.95defg	40.13efg	40.54efg
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	23.02e	22.97g	23.00f	29.44g	31.09f	30.27g	38.85efg	38.47efg	38.66efg
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	26.17d	26.3f	26.24e	32.10f	35.51e	33.81f	41.72defg	41.5defg	41.61defg
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	30.34c	31.06cde	30.70cd	36.53de	38.97cd	37.75de	45.97cdef	46.7cdef	46.34cdef
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	31.59bc	32.34bcd	31.97bc	38.69bc	40.53bc	39.61be	49.28bcde	49.97bcde	49.63bcde
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	33.34ab	33.00abc	33.17ab	38.65bc	41.32b	39.99bc	52.06abcd	52.67abcd	52.37abcd
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	33.86a	34.32ab	34.09a	42.41a	44.68a	43.55a	58.57ab	59.73ab	59.15ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	32.61a	33.51ab	33.06ab	41.74a	43.88a	42.81a	53.99abc	55.47abc	54.73abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	33.07ab	34.56a	33.82ab	42.48a	44.99a	43.74a	63.20a	64.27a	63.74a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	29.94c	29.76e	29.85d	35.61e	37.7d	36.66e	45.57cdef	46.53cdef	46.05cdef
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	32.39ab	32.77abc	32.58ab	39.19b	41.14b	40.17b	49.81bcde	50.07bcde	49.94bcde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	30.10c	30.38de	30.24cd	38.13bcd	40.34bc	39.24bcd	49.71bdde	49.53bdce	49.62bdce
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	32.67ab	33.68ab	33.18ab	42.25a	44.45a	43.35a	55.98abc	55.7abc	55.84abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	29.86c	30.66de	30.26cd	37.45cd	39.52bcd	38.49cd	47.49bcdef	46.77cdef	47.13cdef
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	32.75ab	34.05ab	33.40ab	42.33a	44.53a	43.43a	55.08abc	55.77abc	55.43abc
<b>S.Em. (±)</b>		<b>0.69</b>	<b>0.72</b>	<b>0.64</b>	<b>0.6</b>	<b>0.65</b>	<b>0.57</b>	<b>4.09</b>	<b>4.14</b>	<b>4.11</b>
<b>L.S.D.(P≤0.05)</b>		<b>1.98</b>	<b>2.07</b>	<b>1.85</b>	<b>1.72</b>	<b>1.87</b>	<b>1.63</b>	<b>11.76</b>	<b>11.89</b>	<b>11.80</b>

MAP-Month after planting. \*\*Means with the same letter are not significantly different

**Table.1** Effect of Nutrient management on plant height (cm) (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	52.45b	54.39b	53.39b	60.64b	63.95b	62.30b	68.79b	69.71b	69.25b
A <sub>1</sub>	66.37a	66.59a	66.49a	76.10a	74.69a	75.40a	81.11a	81.89a	81.50a
A <sub>2</sub>	65.81a	63.78a	64.80a	72.89a	72.04a	72.47a	77.85a	78.39a	78.12a
<b>S.Em. (±)</b>	<b>1.78</b>	<b>2.01</b>	<b>1.77</b>	<b>1.68</b>	<b>2.09</b>	<b>1.85</b>	<b>1.58</b>	<b>1.79</b>	<b>1.57</b>
<b>L.S.D(P≤0.05)</b>	<b>5.12</b>	<b>5.78</b>	<b>5.09</b>	<b>4.84</b>	<b>6.00</b>	<b>5.32</b>	<b>4.54</b>	<b>5.13</b>	<b>4.50</b>
B <sub>0</sub>	58.93a	57.32b	58.12b	66.19b	66.71b	66.45b	71.83b	72.62b	77.23b
B <sub>1</sub>	61.85a	62.74b	62.30ab	70.93b	70.83b	70.88ab	77.25a	77.69ab	77.49a
B <sub>2</sub>	63.85a	64.65a	64.25a	72.51a	73.16a	72.84a	78.67a	79.68a	79.18a
<b>S.Em. (±)</b>	<b>1.78</b>	<b>2.01</b>	<b>1.77</b>	<b>1.68</b>	<b>2.09</b>	<b>1.85</b>	<b>1.58</b>	<b>1.79</b>	<b>1.57</b>
<b>L.S.D(P≤0.05)</b>	<b>5.12</b>	<b>5.78</b>	<b>5.09</b>	<b>4.84</b>	<b>6.00</b>	<b>5.32</b>	<b>4.54</b>	<b>5.13</b>	<b>4.50</b>
C <sub>0</sub>	59.17b	58.89b	59.03b	67.15b	67.31b	67.23b	73.30b	73.40b	79.35b
C <sub>1</sub>	63.91a	64.25a	64.08a	72.60a	73.15a	72.88a	78.53a	79.93a	79.23a
<b>S.Em. (±)</b>	<b>1.45</b>	<b>1.64</b>	<b>1.45</b>	<b>1.38</b>	<b>1.71</b>	<b>1.51</b>	<b>1.29</b>	<b>1.46</b>	<b>1.28</b>
<b>L.S.D(P≤0.05)</b>	<b>4.18</b>	<b>4.72</b>	<b>4.15</b>	<b>3.95</b>	<b>4.90</b>	<b>4.34</b>	<b>3.71</b>	<b>4.19</b>	<b>3.67</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	43.25f	45.5e	44.38 f	55.43f	57d	56.22f	63.08f	62.60f	62.84f
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	55.85cde	56.37cde	56.11 def	61.68ef	66.33bcd	64.01ef	68.93def	71.30def	70.12ef
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	49.36ef	52.67de	51.02ef	59.64ef	61.1d	60.37ef	67.15ef	67.90ef	67.53ef
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	56.23cde	57.8bcde	57.02cde	62.91def	66.87bcd	64.89def	72.70cdef	72.80cdef	72.75def
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	52.65def	54.47de	53.56def	61.01ef	64.27cd	62.64ef	70.66def	70.30ef	70.48ef
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	57.35bcde	59.17bcde	58.26bce	63.13def	68.13abc	65.63cdef	70.23def	73.33cdef	71.78ef
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	64.28abcd	59.7bcd	61.99abcde	68.47cde	68.5abcd	68.49bcdef	73.65cdef	74.33cdef	73.99cde
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	62.32abcd	61.07abcd	61.70abcde	69.20bcde	69.67abcd	69.44bcde	74.87cde	76.60bcde	75.74cde
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	62.23abcd	62.33abcd	62.28abcde	75.27abc	70.67abcd	72.97abcde	78.60bcd	77.73bcde	78.17bcde
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	67.93adc	70.73ab	69.33abc	80.62ab	79.3ab	79.96ab	86.96ab	88.10ab	87.53ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	69.00ad	71.8ab	70.40ab	78.00abc	77.67abc	77.84abcd	82.60abc	83.03abcd	82.82abcd
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	72.47a	73.93a	73.20a	85.05a	82.37a	83.71a	89.98a	91.53a	90.76a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	64.95abcd	59.53bcde	62.24abcde	68.28cde	68.4abcd	68.34bcdef	73.56cdef	73.97cdef	73.77cdef
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	62.91abcd	61.73abcd	62.32abcde	74.10abcd	70.33abcd	72.22abcde	76.90bcde	76.90bcde	76.90bcde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	65.48abc	64.2abcd	64.84abcd	69.03bcde	69.63abcd	69.33bcde	75.20cde	75.50cde	75.35cde
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	69.85ad	68.7abc	69.28abc	78.07abc	77.4abcd	77.74abcd	82.87abc	84.10abc	83.49abcd
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	61.34abcde	59.77bcd	60.56bcde	69.24bcde	68.57abcd	68.91bcdef	75.20cde	75.20cde	75.20cde
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	70.31a	68.77abc	69.54ab	78.62abc	77.93abc	78.28abc	83.35adc	84.67abc	84.01abc
<b>S.Em. (±)</b>		<b>4.36</b>	<b>4.93</b>	<b>4.34</b>	<b>4.13</b>	<b>5.12</b>	<b>4.53</b>	<b>3.87</b>	<b>4.38</b>	<b>4.53</b>
<b>L.S.D.(P≤0.05)</b>		<b>12.54</b>	<b>14.16</b>	<b>12.47</b>	<b>11.86</b>	<b>14.70</b>	<b>13.03</b>	<b>11.13</b>	<b>12.58</b>	<b>13.03</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.2** Effect of Nutrient management on Canopy Spread (cm) on North- South Direction

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	21.84b	22.09b	21.97b	30.74c	33.29b	32.02c	44.16b	44.70c	44.43c
A <sub>1</sub>	25.88a	26.48a	26.18a	40.90a	44.42a	42.66a	55.75a	57.58a	56.67a
A <sub>2</sub>	25.34a	25.84a	25.59a	40.02b	43.16a	41.59b	55.23a	55.27b	55.25b
<b>S.Em. (±)</b>	<b>0.39</b>	<b>0.52</b>	<b>0.44</b>	<b>0.27</b>	<b>0.45</b>	<b>0.25</b>	<b>0.44</b>	<b>0.44</b>	<b>0.43</b>
<b>L.S.D(P≤0.05)</b>	<b>1.11</b>	<b>1.50</b>	<b>1.27</b>	<b>0.76</b>	<b>1.29</b>	<b>0.73</b>	<b>1.25</b>	<b>1.25</b>	<b>1.22</b>
B <sub>0</sub>	23.41b	24.03b	23.72b	35.31b	38.31b	36.81b	49.81b	50.26b	50.04b
B <sub>1</sub>	24.66a	24.84b	24.75ab	37.80a	40.99a	39.40a	52.52a	53.32a	52.92a
B <sub>2</sub>	25.00a	25.54a	25.27a	38.55a	41.57a	40.06a	52.81a	53.97a	53.39a
<b>S.Em. (±)</b>	<b>0.39</b>	<b>0.52</b>	<b>0.44</b>	<b>0.27</b>	<b>0.45</b>	<b>0.25</b>	<b>0.44</b>	<b>0.44</b>	<b>0.43</b>
<b>L.S.D(P≤0.05)</b>	<b>1.11</b>	<b>1.50</b>	<b>1.27</b>	<b>0.76</b>	<b>1.29</b>	<b>0.73</b>	<b>1.25</b>	<b>1.25</b>	<b>1.22</b>
C <sub>0</sub>	23.86b	24.19a	24.03b	35.51b	39.03b	37.28b	49.66b	50.56b	50.11b
C <sub>1</sub>	24.85a	25.41a	25.13a	38.93a	41.55a	40.24a	53.77a	54.47a	54.12a
<b>S.Em. (±)</b>	<b>0.32</b>	<b>0.43</b>	<b>0.36</b>	<b>0.22</b>	<b>0.37</b>	<b>0.21</b>	<b>0.36</b>	<b>0.36</b>	<b>0.35</b>
<b>L.S.D(P≤0.05)</b>	<b>0.91</b>	<b>NS</b>	<b>1.03</b>	<b>0.62</b>	<b>1.05</b>	<b>0.59</b>	<b>1.02</b>	<b>1.02</b>	<b>1.00</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	19.84 g	19.67 e	19.76 g	27.39 g	30.37h	28.88i	41.48 g	40.59i	41.04i
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	23.29cdef	23.07bcde	23.18cdef	32.19 e	33.73g	32.96fg	47.08 f	45.83gh	46.46g
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	21.24fg	21.63 de	21.44fg	28.37fg	32.82gh	30.60hi	42.47 g	43.60hi	43.04hi
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	22.09efg	22.24cde	22.17efg	32.87e	34.24g	33.56fg	46.70 f	46.34gh	46.52g
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	22.18efg	22.96bcde	22.57defg	29.98 f	33.62g	31.80gh	42.99 g	44.75gh	43.87ghi
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	22.41defg	22.96bcde	22.69defg	33.66 e	34.96g	34.31f	44.25fg	47.06g	45.66gh
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	24.72abcde	25.72abc	25.22abcde	37.39 cd	40.13ef	38.76de	51.98 de	53.23ef	52.6ef
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	24.55bcde	25.33abc	24.94abcde	38.73bc	42.88bcde	40.81bc	53.14cde	54.98cde	54.06cde
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	26.53ab	25.98ab	26.26abc	39.96 b	44.64abcd	42.30b	54.77 cd	56.74cd	55.76bcd
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	26.45ab	27.24 a	26.85ab	43.12 a	46.54a	44.83a	59.35 a	61.32a	60.34a
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	25.68abc	27.02 a	26.35ab	42.55 a	45.68abc	44.12a	55.81bc	57.78bc	56.80bc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	27.35 a	27.60 a	27.48 a	43.64 a	46.64a	45.14a	59.44 a	61.41a	60.43a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	23.68cdef	24.68abcd	24.18bcdef	36.32 d	39.35f	37.84e	50.65 e	51.45f	51.05f
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	24.35bcde	25.71abc	25.03abcde	39.82 b	43.38bcd	41.60bc	54.55 cd	55.48cde	55.02cde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	25.08abcd	24.8abcd	24.94abcde	39.34 b	42.05def	40.70bc	53.25cde	54.15def	53.70def
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	26.55ab	27.15 a	26.85ab	43.16 a	45.67abc	44.42a	58.55ab	57.75bc	58.15ab
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	25.81abc	25.31abcd	25.56abcd	38.32bc	42.64cde	40.48cd	53.52cde	52.74ef	53.13def
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	26.56ab	27.39 a	26.98ab	43.15 a	45.88ab	44.52a	60.85 a	60.05ab	60.45a
<b>S.Em. (±)</b>		<b>0.65</b>	<b>1.28</b>	<b>1.08</b>	<b>0.65</b>	<b>1.10</b>	<b>0.62</b>	<b>1.07</b>	<b>1.07</b>	<b>1.04</b>
<b>L.S.D(P≤0.05)</b>		<b>2.72</b>	<b>3.67</b>	<b>3.10</b>	<b>1.86</b>	<b>3.16</b>	<b>1.78</b>	<b>3.06</b>	<b>3.07</b>	<b>2.99</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different



**Table.2** Effect of Nutrient management on Canopy Spread (cm) on North- South Direction(contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	58.64c	59.11c	58.88c	73.10b	76.06b	74.58b	81.86b	84.13b	83.00b
A <sub>1</sub>	75.52a	74.91a	73.22a	89.32a	92.02a	90.67a	107.54a	109.18a	108.36a
A <sub>2</sub>	72.71b	73.08b	72.90b	85.59a	88.26a	86.93a	104.96a	106.78a	105.87a
<b>S.Em. (±)</b>	<b>0.49</b>	<b>0.43</b>	<b>0.45</b>	<b>2.36</b>	<b>2.43</b>	<b>2.39</b>	<b>1.25</b>	<b>2.20</b>	<b>1.62</b>
<b>L.S.D(P≤0.05)</b>	<b>1.42</b>	<b>1.22</b>	<b>1.29</b>	<b>6.78</b>	<b>6.97</b>	<b>6.87</b>	<b>3.59</b>	<b>6.31</b>	<b>4.65</b>
B <sub>0</sub>	66.05b	66.07b	66.06b	78.09b	81.18b	79.64b	93.57b	94.79b	94.18b
B <sub>1</sub>	70.05a	70.23a	70.14a	83.89b	86.51ab	85.20ab	99.57a	101.49a	100.53a
B <sub>2</sub>	70.77a	70.81a	70.79a	86.03a	88.65a	87.34a	101.24a	103.81a	102.52a
<b>S.Em. (±)</b>	<b>0.49</b>	<b>0.43</b>	<b>0.45</b>	<b>2.36</b>	<b>2.43</b>	<b>2.39</b>	<b>1.25</b>	<b>2.20</b>	<b>1.62</b>
<b>L.S.D(P≤0.05)</b>	<b>1.42</b>	<b>1.22</b>	<b>1.29</b>	<b>6.78</b>	<b>6.97</b>	<b>6.87</b>	<b>3.59</b>	<b>6.31</b>	<b>4.65</b>
C <sub>0</sub>	65.82b	65.57b	65.70b	78.88b	81.69b	80.29b	92.99b	94.35b	93.67b
C <sub>1</sub>	72.10a	72.50a	72.30a	86.46a	89.20a	87.83a	103.26a	105.71a	104.49a
<b>S.Em. (±)</b>	<b>0.40</b>	<b>0.34</b>	<b>0.37</b>	<b>1.92</b>	<b>1.98</b>	<b>1.95</b>	<b>1.02</b>	<b>1.79</b>	<b>1.32</b>
<b>L.S.D(P≤0.05)</b>	<b>1.16</b>	<b>1.00</b>	<b>1.05</b>	<b>5.53</b>	<b>5.69</b>	<b>5.61</b>	<b>2.93</b>	<b>5.15</b>	<b>3.80</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	53.06i	53.59g	53.33i	61.23e	65.1e	63.17e	67.74g	68.6f	68.17i
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	61.08g	61.53e	61.31g	75.32cdc	78.33cde	76.83cde	86.16de	86.9cde	86.53gh
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	56.01hi	56.60f	56.31hi	70.56de	73.17de	71.87de	76.30fg	77.83ef	77.07hi
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	61.27g	62.04e	61.66g	78.04bcd	80.63bcde	79.34bcde	90.71d	94.73bcd	92.72fg
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	57.23h	57.75f	57.49h	74.87cde	77.43cde	76.15cde	78.87ef	79.77def	79.32hi
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	63.19g	63.16e	63.18g	78.57bcd	81.67bcde	80.12bcd	91.41cd	96.93bc	94.17efg
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	69.73ef	68.93cd	69.33ef	81.47bcd	84.2bcde	82.84bcd	100.40b	101.07bc	100.74def
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	71.98de	71.31bc	71.65cde	84.07bcd	87.57abcd	85.82bcd	103.74b	104.93ab	104.34de
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	74.40cd	73.44b	73.92c	86.47abcd	89.23abcd	87.85abcd	105.07b	106.4ab	105.74bcd
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	80.39ab	80.27a	80.33ab	94.31ab	96.97ab	95.64ab	116.17a	116.83a	116.50ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	74.36d	73.89b	74.13c	87.13abcd	89.6abcd	88.37abcd	103.57b	106.9ab	105.24bcde
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	82.28a	81.61a	81.95a	102.48a	104.57a	103.53a	116.30a	118.97a	117.64a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	68.08f	67.65d	67.87f	80.34bcd	83.07bcde	81.71bcd	99.67bc	101bc	100.34def
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	72.36de	73.38b	72.87cd	86.13abcd	88.8abcd	87.47abcd	103.68b	106.27ab	104.98cde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	70.37ef	69.85cd	70.11def	84.20bcd	86.93bcde	85.57bcd	103.40b	104.07ab	103.74def
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	77.86bc	79.19a	78.53b	89.75abc	92.1abc	90.93abc	105.77b	109.1ab	107.44abcd
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	69.11ef	68.44cd	68.78ef	83.65bcd	86.47bcde	85.06bcd	101.87b	103.53ab	102.70def
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	78.47b	79.98a	79.23ab	89.46abc	92.17abc	90.82abc	115.40a	116.73a	116.07abc
<b>S.Em. (±)</b>		<b>1.21</b>	<b>1.04</b>	<b>1.10</b>	<b>5.77</b>	<b>5.94</b>	<b>5.85</b>	<b>3.06</b>	<b>5.38</b>	<b>3.96</b>
<b>L.S.D(P≤0.05)</b>		<b>3.48</b>	<b>2.99</b>	<b>3.15</b>	<b>16.59</b>	<b>17.07</b>	<b>16.82</b>	<b>8.80</b>	<b>15.46</b>	<b>11.39</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.3** Effect of Nutrient management on Canopy Spread (cm) on East- West Direction

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	26.80b	27.29b	27.05b	38.91b	39.66b	39.28b	49.12c	49.54c	49.33c
A <sub>1</sub>	30.34a	31.66a	31.28a	52.18a	52.39a	52.29a	61.93a	63.28a	62.60a
A <sub>2</sub>	30.90a	30.97a	30.66a	50.72a	51.00a	50.86a	59.90b	61.34b	60.62b
<b>S.Em. (±)</b>	<b>0.44</b>	<b>0.53</b>	<b>0.48</b>	<b>0.62</b>	<b>0.61</b>	<b>0.61</b>	<b>0.36</b>	<b>0.38</b>	<b>0.31</b>
<b>L.S.D(P≤0.05)</b>	<b>1.27</b>	<b>1.51</b>	<b>1.38</b>	<b>1.80</b>	<b>1.75</b>	<b>1.76</b>	<b>1.03</b>	<b>1.08</b>	<b>0.88</b>
B <sub>0</sub>	28.67a	29.22a	28.95a	45.99b	46.20b	46.10b	55.38b	56.02c	55.70b
B <sub>1</sub>	29.44a	29.99a	29.72a	47.54ab	48.11a	47.83ab	57.77a	58.45b	58.11a
B <sub>2</sub>	29.92a	30.70a	30.31a	48.27a	48.74a	48.51a	57.77a	59.68a	58.74a
<b>S.Em. (±)</b>	<b>0.44</b>	<b>0.53</b>	<b>0.48</b>	<b>0.62</b>	<b>0.61</b>	<b>0.61</b>	<b>0.36</b>	<b>0.38</b>	<b>0.31</b>
<b>L.S.D(P≤0.05)</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>1.80</b>	<b>1.75</b>	<b>1.76</b>	<b>1.03</b>	<b>1.08</b>	<b>0.88</b>
C <sub>0</sub>	28.89a	29.39a	29.14a	45.39b	45.69b	45.54b	54.79b	55.43b	55.11b
C <sub>1</sub>	29.80a	30.55a	30.18a	49.15a	49.68a	49.41a	59.17a	60.67a	59.92a
<b>S.Em. (±)</b>	<b>0.36</b>	<b>0.43</b>	<b>0.39</b>	<b>0.51</b>	<b>0.50</b>	<b>0.50</b>	<b>0.29</b>	<b>0.31</b>	<b>0.25</b>
<b>L.S.D(P≤0.05)</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>1.47</b>	<b>1.43</b>	<b>1.43</b>	<b>0.84</b>	<b>0.88</b>	<b>0.72</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	24.46e	24.87e	24.67f	34.25g	35.30g	34.78f	46.01i	44.76j	45.39i
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	28.66bcd	28.27cde	28.47bcde	40.22f	41.27f	40.75e	50.44h	51.26gh	50.85fg
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	27.32cde	26.83de	27.08def	38.04fg	38.82fg	38.43ef	48.57h	47.83i	48.20h
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	26.48de	27.44cde	26.96ef	40.22f	41.00f	40.61e	50.64h	51.79gh	51.22f
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	27.29cde	28.16bcde	27.73cdef	38.59fg	39.37fg	38.98ef	48.81h	49.21hi	49.01gh
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	26.59de	28.16bcde	27.38cdef	42.11f	42.16f	42.14e	50.22h	52.37g	51.30f
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	30.05abc	30.92abc	30.49abc	49.22cde	48.25de	48.74cd	57.38g	59.02ef	58.20e
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	29.73abc	30.63abc	30.18abcde	51.36abcde	52.25abcd	51.81abcd	60.96de	61.75d	61.36d
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	30.24abc	31.18ab	30.71abc	50.53bcde	51.31bcde	50.92bcd	61.45cde	61.32de	61.39d
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	31.25ab	32.31a	31.78ab	54.39ab	53.9ab	54.15ab	65.12ab	66.70ab	65.91ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	31.86a	32.22a	32.04a	52.54abcd	52.8abc	52.67abc	59.92ef	62.75cd	61.34d
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	32.25a	32.68a	32.47a	55.04a	55.84a	55.44a	66.74a	68.12a	67.43a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	29.18abcd	29.88abcd	29.53abcde	48.77de	47.88e	48.33d	56.14g	57.1f	56.62e
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	29.97abc	30.78abc	30.38abcd	52.13abcde	52.25abcd	52.19abcd	61.38cde	62.21cd	61.80cd
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	29.81abc	30.17abcd	29.91abcde	48.67de	49.45cde	49.06cd	57.43fg	58.61f	58.02e
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	31.57ab	32.22a	31.90a	53.41abc	54.19ab	53.80ab	63.42bcd	64.44bc	63.93bc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	29.81abc	30.52abcd	30.17abcde	47.93e	48.04de	47.99d	57.41fg	58.23f	57.82e
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	31.71ab	32.46a	32.09a	53.44abc	54.22ab	53.83ab	63.61bc	67.42a	65.52ab
<b>S.Em. (±)</b>		<b>1.08</b>	<b>1.29</b>	<b>1.18</b>	<b>1.53</b>	<b>1.49</b>	<b>1.50</b>	<b>0.88</b>	<b>0.92</b>	<b>0.75</b>
<b>L.S.D.(P≤0.05)</b>		<b>3.10</b>	<b>3.70</b>	<b>3.39</b>	<b>4.40</b>	<b>4.29</b>	<b>4.30</b>	<b>2.53</b>	<b>2.65</b>	<b>2.15</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different



**Table.3** Effect of Nutrient management on Canopy Spread (cm) on East- West Direction (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	59.71b	61.35c	60.53c	68.76b	74.62b	71.69b	86.14b	85.87b	86.01b
A <sub>1</sub>	78.56a	77.78a	78.17a	91.23a	92.69a	91.96a	112.82a	112.68a	112.75a
A <sub>2</sub>	77.12a	75.95b	76.54b	86.85a	87.87a	87.36a	107.53a	107.82a	107.67a
<b>S.Em. (±)</b>	<b>0.53</b>	<b>0.43</b>	<b>0.43</b>	<b>2.97</b>	<b>3.02</b>	<b>2.96</b>	<b>2.57</b>	<b>2.39</b>	<b>2.33</b>
<b>L.S.D(P≤0.05)</b>	<b>1.52</b>	<b>1.22</b>	<b>1.23</b>	<b>8.53</b>	<b>8.68</b>	<b>8.52</b>	<b>6.53</b>	<b>6.87</b>	<b>6.69</b>
B <sub>0</sub>	68.91b	68.73b	68.82b	76.99b	79.87a	78.43b	98.27b	98.06a	98.17b
B <sub>1</sub>	72.76a	72.89a	72.82a	83.70b	87.10a	85.40b	102.67b	103.57a	103.12ab
B <sub>2</sub>	73.72a	73.47a	73.60a	86.14a	88.22a	87.18a	105.55a	104.73a	105.14a
<b>S.Em. (±)</b>	<b>0.53</b>	<b>0.43</b>	<b>0.43</b>	<b>2.97</b>	<b>3.02</b>	<b>2.96</b>	<b>2.27</b>	<b>2.39</b>	<b>2.33</b>
<b>L.S.D(P≤0.05)</b>	<b>1.52</b>	<b>1.22</b>	<b>1.23</b>	<b>8.53</b>	<b>NS</b>	<b>8.52</b>	<b>6.53</b>	<b>NS</b>	<b>6.69</b>
C <sub>0</sub>	68.45b	67.81b	68.13b	79.13a	80.56b	79.85b	97.48b	97.85b	97.67b
C <sub>1</sub>	75.14a	75.58a	75.36a	85.42a	89.56a	87.49a	106.85a	106.39a	106.12a
<b>S.Em. (±)</b>	<b>0.43</b>	<b>0.35</b>	<b>0.35</b>	<b>2.42</b>	<b>2.47</b>	<b>2.42</b>	<b>1.86</b>	<b>1.95</b>	<b>1.90</b>
<b>L.S.D(P≤0.05)</b>	<b>1.24</b>	<b>1.00</b>	<b>1.00</b>	<b>NS</b>	<b>7.09</b>	<b>6.95</b>	<b>5.34</b>	<b>5.61</b>	<b>5.46</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	54.73g	55.82g	55.28g	60.48f	62.3e	61.39f	80.50f	79.27f	79.89f
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	61.87ef	63.78e	62.83e	69.21ef	77.87cde	73.54def	88.96ef	88.1ef	88.53ef
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	58.18fg	58.83f	58.51f	71.25def	73.13de	72.19ef	81.22f	82.3f	81.76f
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	62.07e	64.29e	63.18e	68.56ef	79.3bcde	73.93def	90.30ef	90.3def	90.30ef
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	59.01ef	59.98f	59.50f	73.52cdef	74.97cde	74.25def	83.79f	84.5f	84.15f
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	62.38e	65.41e	63.90e	69.53ef	80.13bcde	74.83cdef	92.08def	90.73def	91.41def
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	72.11cd	71.18d	71.65d	80.63abcdef	81.73abcde	81.18bcdef	101.87cde	101.63cde	101.75cde
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	75.73bc	74.81bc	75.27bc	87.01abcde	88.17abcd	87.59abcde	106.96bcd	108.23abc	107.60bcd
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	76.66b	75.67b	76.17b	88.67abcde	90.47abcd	89.57abcde	107.54bcd	110.4abc	108.97abc
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	83.83a	83.77a	83.80a	98.33ab	100.03ab	99.18ab	121.68ab	120.57ab	121.13ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	77.17b	76.12b	76.65b	91.31abcd	92.93abcd	92.12adcde	113.82abc	111.9abc	112.86abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	85.84a	85.11a	85.48a	101.42a	102.83a	102.13a	125.06a	123.33a	124.20a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	71.98d	69.90d	70.94d	78.73bcdef	80.27bcde	79.50bcdef	101.57cde	101.57cde	101.57cde
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	77.02b	76.88b	76.95b	85.90abcde	88.87abcd	87.39abcde	109.77abc	109.57abc	109.67abc
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	72.65cd	72.08cd	72.37cd	82.37abcde	85.27abcd	83.82abcde	103.76cde	105.03bcd	104.40cde
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	83.13a	82.69a	82.91a	93.03abc	94.4abc	93.72abcd	111.53abc	112.8abc	112.17abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	73.60bcd	70.69d	72.15d	85.24abcde	84abcd	84.62abcde	103.27cde	104.07bcde	103.67cde
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	84.36a	83.48a	83.92a	95.82ab	94.43abc	95.13abc	115.27abc	113.87abc	114.57abc
<b>S.Em. (±)</b>		<b>1.29</b>	<b>1.04</b>	<b>1.05</b>	<b>7.27</b>	<b>7.40</b>	<b>7.26</b>	<b>5.57</b>	<b>5.86</b>	<b>5.70</b>
<b>L.S.D.(P≤0.05)</b>		<b>3.72</b>	<b>2.99</b>	<b>3.01</b>	<b>20.91</b>	<b>21.26</b>	<b>20.86</b>	<b>16.01</b>	<b>16.83</b>	<b>16.39</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.4** Effect of Nutrient management on Number of leaves

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	12.06b	11.17b	11.61b	20.00b	20.23b	20.11b	27.87b	28.36b	28.12b
A <sub>1</sub>	15.77a	16.46a	16.11a	25.84a	26.84a	26.34a	34.69a	35.46a	35.08a
A <sub>2</sub>	15.55a	15.58a	15.56a	25.52a	26.22a	25.87a	33.83a	34.90a	34.37a
<b>S.Em. (±)</b>	<b>0.28</b>	<b>0.35</b>	<b>0.29</b>	<b>0.48</b>	<b>0.57</b>	<b>0.51</b>	<b>0.43</b>	<b>0.53</b>	<b>0.44</b>
<b>L.S.D(P≤0.05)</b>	<b>0.80</b>	<b>0.99</b>	<b>0.85</b>	<b>1.39</b>	<b>1.63</b>	<b>1.47</b>	<b>1.23</b>	<b>1.52</b>	<b>1.27</b>
B <sub>0</sub>	13.73b	13.92a	13.83b	22.71b	23.75a	23.23a	31.09b	32.26a	31.67b
B <sub>1</sub>	14.93a	14.52a	14.73a	24.13a	24.72a	24.42a	32.44a	33.11a	32.78ab
B <sub>2</sub>	14.71a	14.77a	14.74a	24.52a	24.82a	24.67a	32.86a	33.36a	33.11a
<b>S.Em. (±)</b>	<b>0.28</b>	<b>0.35</b>	<b>0.29</b>	<b>0.48</b>	<b>0.57</b>	<b>0.57</b>	<b>0.43</b>	<b>0.53</b>	<b>0.44</b>
<b>L.S.D(P≤0.05)</b>	<b>0.80</b>	<b>NS</b>	<b>0.85</b>	<b>1.39</b>	<b>NS</b>	<b>NS</b>	<b>1.23</b>	<b>NS</b>	<b>1.27</b>
C <sub>0</sub>	13.66b	13.82b	13.74b	23.10b	23.84a	23.47b	31.36	32.27b	31.81b
C <sub>1</sub>	15.26a	14.98a	15.12a	24.47a	25.02a	24.74a	32.90a	33.55a	33.22a
<b>S.Em. (±)</b>	<b>0.23</b>	<b>0.28</b>	<b>0.24</b>	<b>0.40</b>	<b>0.46</b>	<b>0.42</b>	<b>0.35</b>	<b>0.43</b>	<b>0.36</b>
<b>L.S.D(P≤0.05)</b>	<b>0.65</b>	<b>0.82</b>	<b>0.69</b>	<b>1.14</b>	<b>NS</b>	<b>1.20</b>	<b>1.00</b>	<b>1.24</b>	<b>1.04</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	10.63h	9.9 d	10.27f	18.30f	18.9c	18.60e	25.83e	26.5b	26.17c
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	12.40fgh	11.57 d	11.99def	20.20ef	20.57bc	20.39e	28.33e	28.8b	28.57c
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	11.60gh	10.7d	11.15ef	19.63f	20.03c	19.83e	27.57e	28.07b	27.82c
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	13.50efg	11.87cd	12.69de	21.07def	20.87bc	20.97cde	28.80de	29b	28.90c
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	11.00 h	11.07d	11.04ef	20.23ef	20.07c	20.15e	28.03e	28.4b	28.22c
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	13.20efg	11.93cd	12.57de	20.57def	20.93bc	20.75de	28.67e	29.4b	29.04c
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	14.43cde	15.83ab	15.13abc	23.37cde	25.47a	24.42abc	32.60bc	34.07a	33.34b
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	15.50abcd	16.03ab	15.77abc	24.90abc	26.7a	25.80ab	33.87abc	35.13a	34.50ab
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	15.60abcd	16.4ab	16.00ab	25.07abc	26.4a	25.74ab	34.17abc	34.97a	34.57ab
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	17.03 a	17.03a	17.03a	27.63a	27.7a	27.67ab	35.57ab	36.07a	35.82ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	15.47abcd	16.47ab	15.97ab	26.53abc	26.8a	26.67ab	35.33ab	35.53a	35.43ab
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	16.60ab	16.97a	16.79ab	27.53a	27.97a	27.75a	36.60a	37a	36.80a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	13.70def	14.03bc	13.87cd	23.87bcd	24.37ab	24.12bcd	31.80cd	33.7a	32.75b
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	15.73abc	16.17ab	15.95ab	25.63abc	26.5a	26.07ab	34.10abc	35.33a	34.72ab
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	15.00bcde	14.6ab	14.80bc	25.53abc	26.5a	26.02ab	33.47bc	34.8a	34.14ab
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	16.87ab	16.5a	16.69ab	25.83abc	26.8a	26.32ab	35.07ab	35.77a	35.42ab
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	15.47abcd	15.4ab	15.44abc	25.40abc	26.07a	25.74ab	33.43bc	34.37a	33.90ab
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	16.53ab	16.77a	16.65ab	26.87ab	27.1a	26.99ab	35.10ab	35.43a	35.27ab
<b>S.Em. (±)</b>		<b>0.68</b>	<b>0.85</b>	<b>0.72</b>	<b>1.19</b>	<b>1.39</b>	<b>1.26</b>	<b>1.05</b>	<b>1.30</b>	<b>1.08</b>
<b>L.S.D.(P≤0.05)</b>		<b>1.96</b>	<b>2.45</b>	<b>2.07</b>	<b>3.98</b>	<b>3.98</b>	<b>3.61</b>	<b>3.01</b>	<b>3.73</b>	<b>3.11</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.4** Effect of Nutrient management on Number of leaves (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	32.28c	34.48b	33.88b	37.08b	39.67b	38.37b	41.11b	41.78b	44.44b
A <sub>1</sub>	42.28a	42.38a	42.33a	48.53a	48.89a	48.71a	52.47a	53.00a	52.74a
A <sub>2</sub>	39.73b	39.38a	39.55a	46.04a	45.67a	45.85a	49.47a	49.50a	49.48a
<b>S.Em. (±)</b>	<b>0.85</b>	<b>1.26</b>	<b>1.01</b>	<b>1.49</b>	<b>1.75</b>	<b>1.60</b>	<b>1.44</b>	<b>1.60</b>	<b>1.51</b>
<b>L.S.D(P≤0.05)</b>	<b>2.45</b>	<b>3.61</b>	<b>2.90</b>	<b>4.29</b>	<b>5.04</b>	<b>4.59</b>	<b>4.11</b>	<b>4.59</b>	<b>4.34</b>
B <sub>0</sub>	36.13b	36.72a	36.43b	40.76a	42.39a	41.58a	45.26a	45.72a	45.49a
B <sub>1</sub>	38.99a	39.34a	39.17ab	44.86ab	45.56a	45.21a	48.57a	48.89a	48.73a
B <sub>2</sub>	40.16a	40.17a	40.17a	46.03a	46.28a	46.15a	49.22a	49.67a	49.44a
<b>S.Em. (±)</b>	<b>0.85</b>	<b>1.26</b>	<b>1.01</b>	<b>1.49</b>	<b>1.75</b>	<b>1.60</b>	<b>1.44</b>	<b>1.60</b>	<b>1.51</b>
<b>L.S.D(P≤0.05)</b>	<b>2.45</b>	<b>NS</b>	<b>2.90</b>	<b>4.29</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>
C <sub>0</sub>	36.63b	36.68b	36.65b	41.26b	42.67b	41.97b	45.18b	45.78b	45.48b
C <sub>1</sub>	40.23a	40.81a	40.52a	46.50a	46.82a	46.66a	50.19a	50.41a	50.30a
<b>S.Em. (±)</b>	<b>0.70</b>	<b>1.03</b>	<b>0.82</b>	<b>1.22</b>	<b>1.43</b>	<b>1.30</b>	<b>1.18</b>	<b>1.30</b>	<b>1.23</b>
<b>L.S.D(P≤0.05)</b>	<b>2.00</b>	<b>2.95</b>	<b>2.36</b>	<b>3.50</b>	<b>4.11</b>	<b>3.75</b>	<b>3.88</b>	<b>3.75</b>	<b>3.54</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	33.03g	32.63e	32.83f	34.27g	38.00d	36.14f	39.20e	39.33d	39.27a
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	33.40g	35.67cde	34.54ef	38.20efg	40.33cd	39.27def	42.27de	43.00cd	42.64cde
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	33.10g	34.00de	33.55ef	36.30fg	39.00cd	37.65ef	39.03e	40.33d	39.68de
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	33.47fg	34.80cde	34.17ef	38.40efg	40.33cd	39.37def	42.73de	43.00cd	42.87cde
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	33.13g	34.17de	33.65ef	36.37fg	39.67cd	38.02ef	40.17e	41.60cd	40.92de
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	33.53fg	35.53cde	34.53ef	38.93efg	40.67cd	39.80def	43.23cde	43.33cd	43.28cde
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	36.33efg	36.77cde	36.55def	42.77cdefg	43.00abcd	42.89cdef	45.37bcde	46.33bcd	45.85bcde
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	38.30defg	38.63bcde	38.47cdef	43.07cdefg	45.00abcd	44.04bcdef	49.00abcde	49.67abcd	49.34abde
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	40.40cde	40.6abcde	40.50bcde	46.27abcdef	47.33abcd	46.80abcdef	51.93abcd	52.00abc	51.97babc
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	47.17ab	47.47ab	47.32ab	54.90ab	54.67ab	54.79ab	57.77a	58.33a	58.05a
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	42.00bcde	41.53abcd	41.77bcd	48.00abcde	48.00abcd	48.00abcde	52.03abcd	52.67abc	52.35abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	49.47a	49.27a	49.37a	56.17a	55.33a	55.75a	58.73a	59.00a	58.87a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	36.27efg	36.27cde	36.27def	41.10defg	42.67bcd	41.89cdef	45.20bcde	46.00bcd	45.60bcde
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	39.43cdef	40.37bcde	39.90cdef	45.17bcdef	45.33abcd	45.25abcdef	50.50abcd	50.00abcd	50.25abcd
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	37.33defg	37.27cde	37.30cdef	42.67cdefg	43.33abcd	43.00cdef	47.00bcde	47.00bcd	47.00bcde
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	42.50bcd	41.83abcd	42.17bcd	50.60abcd	48.67abcd	49.64abcd	52.97abc	52.67abc	52.82abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	38.03defg	36.90cde	37.47cde	43.63cdefg	43.00abcd	43.32cdef	46.67bcde	46.67bcd	46.67bcde
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	44.80abc	43.63abc	44.22abc	53.07abc	51.00abc	52.04abc	54.47ab	54.67ab	54.57ab
<b>S.Em. (±)</b>		<b>2.09</b>	<b>3.08</b>	<b>2.47</b>	<b>3.66</b>	<b>4.29</b>	<b>3.91</b>	<b>3.53</b>	<b>3.91</b>	<b>3.7</b>
<b>L.S.D.(P≤0.05)</b>		<b>5.99</b>	<b>8.85</b>	<b>7.10</b>	<b>10.51</b>	<b>12.34</b>	<b>11.24</b>	<b>10.13</b>	<b>11.24</b>	<b>10.63</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.5** Effect of Nutrient management on D-leaf length (cm)

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	20.02b	19.71b	19.86b	24.62b	25.24b	24.93b	29.79c	32.85b	31.32c
A <sub>1</sub>	22.54a	22.47a	22.64a	27.80a	28.04a	27.92a	34.68a	36.01a	35.35a
A <sub>2</sub>	22.51a	22.40a	22.47a	27.31a	27.69a	27.50a	34.03b	35.045a	34.74b
<b>S.Em. (±)</b>	<b>0.33</b>	<b>0.27</b>	<b>0.29</b>	<b>0.31</b>	<b>0.27</b>	<b>0.28</b>	<b>0.21</b>	<b>0.26</b>	<b>0.20</b>
<b>L.S.D(P≤0.05)</b>	<b>0.94</b>	<b>0.78</b>	<b>0.84</b>	<b>0.90</b>	<b>0.78</b>	<b>0.81</b>	<b>0.60</b>	<b>0.75</b>	<b>0.58</b>
B <sub>0</sub>	21.42ab	21.15a	21.29a	26.45a	26.46b	26.45a	32.22b	34.07b	33.14b
B <sub>1</sub>	21.29ab	21.82a	21.56a	26.52a	27.20ab	26.86a	33.01a	35.00a	34.01a
B <sub>2</sub>	22.36a	21.87a	22.12a	26.78a	27.31a	27.05a	33.27a	35.24a	34.26a
<b>S.Em. (±)</b>	<b>0.33</b>	<b>0.27</b>	<b>0.29</b>	<b>0.31</b>	<b>0.27</b>	<b>0.28</b>	<b>0.21</b>	<b>0.26</b>	<b>0.20</b>
<b>L.S.D(P≤0.05)</b>	<b>0.94</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>0.78</b>	<b>NS</b>	<b>0.60</b>	<b>0.75</b>	<b>0.58</b>
C <sub>0</sub>	21.21b	21.22b	21.22b	26.21b	26.63b	26.42b	32.18b	34.11b	33.15b
C <sub>1</sub>	22.16a	22.01a	22.09a	26.95a	27.35a	27.15a	32.49a	35.43a	34.46a
<b>S.Em. (±)</b>	<b>0.27</b>	<b>0.22</b>	<b>0.24</b>	<b>0.26</b>	<b>0.22</b>	<b>0.23</b>	<b>0.17</b>	<b>0.21</b>	<b>0.17</b>
<b>L.S.D(P≤0.05)</b>	<b>0.77</b>	<b>0.64</b>	<b>0.69</b>	<b>0.73</b>	<b>0.63</b>	<b>0.66</b>	<b>0.49</b>	<b>0.62</b>	<b>0.48</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	17.43d	17.96f	17.70f	23.01g	23.60f	23.31f	28.62i	30.28h	29.45h
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	21.66abc	20.26cde	20.96bcde	24.81efg	25.48cdef	25.15ef	30.10gh	33.74efg	31.92efg
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	18.33d	19.57ef	18.95ef	25.25def	25.26ef	25.26ef	29.35hi	32.17g	30.76gh
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	19.69cd	20.31bcde	20.00de	25.56cdef	25.57cde	25.57de	30.29gh	33.87efg	32.08efg
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	22.05ab	20.02e	21.04bcd	24.95defg	25.42def	25.19ef	29.49ghi	33.07fg	31.28efg
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	20.94bc	20.16de	20.55cde	24.16fg	26.08bcde	25.12ef	30.90g	33.97defg	32.44ef
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	21.38abc	22.19ab	21.79abcd	27.68abc	27.34abc	27.51abcd	33.54def	34.99bcde	34.27cd
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	23.61a	22.34a	22.98ab	28.06ab	27.60ab	27.83abc	34.06bcde	35.38abcde	34.72bcd
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	21.58abc	22.64a	22.11abc	27.10abcd	27.99a	27.55abc	34.60abcde	36.08abc	35.34abc
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	22.51ab	23.39a	22.95ab	28.08ab	28.65a	28.37abc	35.46ab	36.51ab	35.99ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	23.00ab	22.43a	22.72ab	26.63bcde	27.93ab	27.28abcd	34.58abcde	36.04abc	35.31abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	23.14ab	23.42a	23.28a	29.27a	28.68a	28.98a	35.82a	37.05a	36.44a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	22.52ab	22.05abcd	22.29abc	28.36ab	27.30abcd	27.83abc	32.39f	34.25cdef	33.32de
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	21.90abc	22.12abc	22.01abcd	26.77bcde	27.38abc	27.08abcde	34.60abcde	35.76abcd	35.18abc
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	23.02ab	22.09abc	22.56abc	26.48bcde	27.51ab	27.00bcde	33.37ef	35.18bcde	34.28cd
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	22.59ab	22.93a	22.76ab	26.63bcde	28.19a	27.41abcd	34.98abcd	36.19ab	35.59abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	21.59abc	22.01abcd	21.80abcd	26.43bcde	27.27abcd	26.85cde	33.69cdef	34.91bcdef	34.30cd
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	23.41a	23.20a	23.31a	29.22a	28.46a	28.84ab	35.16abc	36.41ab	35.79abc
<b>S.Em. (±)</b>		<b>0.81</b>	<b>0.67</b>	<b>0.72</b>	<b>0.76</b>	<b>0.67</b>	<b>0.72</b>	<b>0.51</b>	<b>0.64</b>	<b>0.50</b>
<b>L.S.D.(P≤0.05)</b>		<b>2.31</b>	<b>1.91</b>	<b>2.06</b>	<b>2.20</b>	<b>1.90</b>	<b>1.97</b>	<b>1.48</b>	<b>1.85</b>	<b>1.43</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.5** Effect of Nutrient management on D-leaf length (cm) (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	37.64b	41.48b	39.56b	46.11b	48.31b	47.21b	54.44b	55.25b	54.85b
A <sub>1</sub>	44.90a	45.39a	45.15a	51.56a	51.86a	51.71a	59.18a	60.35a	59.77a
A <sub>2</sub>	43.77a	44.40a	44.09a	50.77a	51.42a	51.10a	58.22a	59.34a	58.78a
<b>S.Em. (±)</b>	<b>0.77</b>	<b>0.79</b>	<b>0.65</b>	<b>0.71</b>	<b>0.61</b>	<b>0.62</b>	<b>0.42</b>	<b>0.45</b>	<b>0.39</b>
<b>L.S.D(P≤0.05)</b>	<b>2.20</b>	<b>2.28</b>	<b>1.87</b>	<b>2.04</b>	<b>1.76</b>	<b>1.79</b>	<b>1.22</b>	<b>1.28</b>	<b>1.11</b>
B <sub>0</sub>	40.80b	42.63a	41.71b	48.58a	49.40b	48.99b	55.91b	56.73b	56.32b
B <sub>1</sub>	42.39ab	44.15a	43.27ab	49.62a	50.67ab	50.15ab	57.88a	58.74a	58.31a
B <sub>2</sub>	43.13a	44.49a	43.81a	50.25a	51.51a	50.88a	58.06a	59.47a	58.77a
<b>S.Em. (±)</b>	<b>0.77</b>	<b>0.79</b>	<b>0.65</b>	<b>0.71</b>	<b>0.61</b>	<b>0.62</b>	<b>0.42</b>	<b>0.45</b>	<b>0.39</b>
<b>L.S.D(P≤0.05)</b>	<b>2.20</b>	<b>NS</b>	<b>1.87</b>	<b>NS</b>	<b>1.76</b>	<b>1.79</b>	<b>1.22</b>	<b>1.28</b>	<b>1.11</b>
C <sub>0</sub>	40.98b	42.76b	41.87b	48.73a	49.55b	49.15b	55.88b	56.99b	56.44b
C <sub>1</sub>	43.23a	44.75a	43.99a	50.23a	51.50a	50.87a	58.68a	59.63a	59.16a
<b>S.Em. (±)</b>	<b>0.63</b>	<b>0.64</b>	<b>0.53</b>	<b>0.58</b>	<b>0.50</b>	<b>0.51</b>	<b>0.35</b>	<b>0.36</b>	<b>0.31</b>
<b>L.S.D(P≤0.05)</b>	<b>1.80</b>	<b>1.86</b>	<b>1.53</b>	<b>NS</b>	<b>1.43</b>	<b>1.46</b>	<b>1.00</b>	<b>1.05</b>	<b>0.90</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	36.72g	39.33d	38.03h	44.59d	46.07e	45.33c	50.87g	51.30h	51.09i
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	37.76fg	42.07bcd	39.92efgh	46.33bcd	48.77de	47.55bc	56.40def	56.03fg	56.22fgh
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	37.26g	41.2cd	39.23gh	46.15cd	47.9de	47.03bc	54.00f	54.70g	54.35h
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	38.34defg	42.33bcd	40.34defgh	47.0bcd	49.2cde	48.12bc	56.40def	56.70efg	56.55efgh
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	37.60fg	41.5cd	39.55gh	46.30bcd	48.6de	47.45bc	54.75ef	55.50fg	55.13gh
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	38.19efg	42.43bcd	40.31defgh	46.25cd	49.3cde	47.78bc	54.23f	57.27defg	55.75fgh
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	42.68bcdef	42.93abcd	42.81bcdefg	49.93abc	49.93cde	49.93ab	55.39ef	57.50cdefg	56.45fgh
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	43.58abcd	44.33abcd	43.96abcdef	50.45abc	50.33bcde	50.39ab	57.44cde	58.40cdef	57.92cdef
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	42.88abcdef	44.73abcd	43.81abcdefg	50.26abc	51.27abcd	50.77ab	58.80bcd	60.00bcd	59.40bcd
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	47.48ab	47.33ab	47.41a	53.80a	53.43abc	53.62a	61.32ab	62.30ab	61.81ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	44.55abc	44.9abcd	44.73abcd	51.30ab	51.37abcd	51.34ab	59.05bcd	60.30bcd	59.68bcd
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	48.20a	48.1a	48.15a	53.63a	54.8a	54.22a	63.10a	63.60a	63.35a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	40.15cdefg	42.63abcd	41.39cdefgh	49.78abc	50cde	49.89ab	56.82def	57.37defg	57.10defg
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	43.88abc	44.47abcd	44.18abcde	50.38abc	51.3abcd	50.84ab	58.52bcd	59.80bcde	59.16bcde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	43.40abcde	44abcd	43.70abcdefg	49.75abc	50.3bcde	50.03ab	56.87def	58.20cdef	57.54cdefg
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	44.95abc	45.3abc	45.13abc	50.75abc	51.93abcd	51.34ab	59.87bc	60.53abc	60.20bc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	43.55abcde	43.6abcd	43.58abcdefg	50.53abc	50.53abcd	50.53ab	56.43def	58.10cdef	57.27defg
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	46.71ab	46.4abc	46.56ab	53.46a	54.47ab	53.97a	60.81ab	62.07ab	61.44ab
<b>S.Em. (±)</b>		<b>1.88</b>	<b>1.94</b>	<b>1.59</b>	<b>1.74</b>	<b>1.50</b>	<b>1.53</b>	<b>1.04</b>	<b>1.09</b>	<b>0.94</b>
<b>L.S.D.(P≤0.05)</b>		<b>5.40</b>	<b>5.58</b>	<b>4.59</b>	<b>5.00</b>	<b>4.30</b>	<b>4.39</b>	<b>2.99</b>	<b>3.14</b>	<b>2.71</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.6** Effect of Nutrient management on D-leaf breadth (cm)

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	3.08c	3.18b	3.13c	3.18c	3.24b	3.21c	3.33b	3.41b	3.37b
A <sub>1</sub>	3.76a	4.02a	3.89a	3.92a	4.21a	4.06a	4.12a	4.29a	4.21a
A <sub>2</sub>	3.35a	3.89a	3.62b	3.49b	4.06a	3.78b	3.73ab	4.16a	3.95a
<b>S.Em. (±)</b>	<b>0.07</b>	<b>0.10</b>	<b>0.07</b>	<b>0.07</b>	<b>0.13</b>	<b>0.08</b>	<b>0.14</b>	<b>0.15</b>	<b>0.15</b>
<b>L.S.D(P≤0.05)</b>	<b>0.19</b>	<b>0.28</b>	<b>0.21</b>	<b>0.19</b>	<b>0.36</b>	<b>0.24</b>	<b>0.41</b>	<b>0.44</b>	<b>0.42</b>
B <sub>0</sub>	3.38a	3.58a	3.48a	3.42b	3.74a	3.58a	3.62a	3.75a	3.69a
B <sub>1</sub>	3.38a	3.72a	3.55a	3.52ab	3.88a	3.70a	3.73a	4.03a	3.88a
B <sub>2</sub>	3.43a	3.78a	3.61a	3.65a	3.90a	3.78a	3.84a	4.08a	3.96a
<b>S.Em. (±)</b>	<b>0.07</b>	<b>0.10</b>	<b>0.07</b>	<b>0.07</b>	<b>0.13</b>	<b>0.08</b>	<b>0.14</b>	<b>0.15</b>	<b>0.15</b>
<b>L.S.D(P≤0.05)</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>0.19</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>
C <sub>0</sub>	3.28b	3.58a	3.43b	3.43b	3.75b	3.59a	3.60a	3.81a	3.71a
C <sub>1</sub>	3.51a	3.81a	3.66a	3.63a	3.93a	3.78a	3.85a	4.09a	3.98a
<b>S.Em. (±)</b>	<b>0.05</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.10</b>	<b>0.07</b>	<b>0.12</b>	<b>0.12</b>	<b>0.12</b>
<b>L.S.D(P≤0.05)</b>	<b>0.15</b>	<b>NS</b>	<b>0.17</b>	<b>0.15</b>	<b>0.29</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	3.03g	3.03f	3.03e	3.11e	3.08e	3.10g	3.30c	3.23d	3.27c
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	3.11efg	3.22cdef	3.17de	3.26de	3.24cde	3.25efg	3.40bc	3.41cd	3.41c
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	3.14efg	3.11ef	3.13e	3.23de	3.2de	3.22fg	3.28c	3.33cd	3.31c
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	3.02g	3.12ef	3.07e	3.10e	3.34bcde	3.22fg	3.25c	3.49bcd	3.37c
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	3.12efg	3.18def	3.15e	3.14e	3.21de	3.18fg	3.30c	3.42cd	3.36c
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	3.07fg	3.27bcdef	3.17cde	3.23de	3.39bcde	3.31defg	3.45abc	3.55bcd	3.50bc
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	3.51bcdef	3.80abcd	3.66bcd	3.69bcd	4.02abcd	3.86abcd	3.84abc	3.73abcd	3.79abc
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	3.64abcd	3.84abcd	3.74abc	3.89abc	4.06abcd	3.98abc	3.99abc	4.2abcd	4.10abc
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	3.53bcde	3.9abc	3.72abc	3.75abc	4.12abc	3.94abc	4.05abc	4.26abcd	4.16abc
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	4.09a	4.32a	4.21a	4.13ab	4.38a	4.26ab	4.35ab	4.56ab	4.46ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	3.75abc	3.91abc	3.83ab	3.86abc	4.13ab	4.00abc	4.07abc	4.28abcd	4.18abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	4.02a	4.32a	4.17a	4.19a	4.54a	4.37a	4.44a	4.7a	4.57a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	3.05fg	3.75abcde	3.40bcde	3.11e	3.97abcd	3.54cdefg	3.34c	3.71abcd	3.53bc
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	3.25ab	3.82abcd	3.54ab	3.45cde	4.04abcd	3.75bcdef	3.84abc	4.21abcd	4.03abc
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	3.16efg	3.82abcde	3.49bcde	3.29de	4.04abcd	3.67cdefg	3.50abc	4.19abcd	3.85abc
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	3.32cdefg	4.09ab	3.71abc	3.64cd	4.18ab	3.91abc	3.96abc	4.33abc	4.15abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	3.24defg	3.74abcde	3.49bcde	3.64cd	3.96abcde	3.80abcde	3.75abc	4.12abcd	3.94abc
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	3.37cdefg	4.14a	3.76ab	3.82abc	4.19ab	4.01abc	4.01abc	4.38abc	4.20abc
<b>S.Em. (±)</b>		<b>0.16</b>	<b>0.24</b>	<b>0.18</b>	<b>0.16</b>	<b>0.31</b>	<b>0.20</b>	<b>0.35</b>	<b>0.37</b>	<b>0.36</b>
<b>L.S.D.(P≤0.05)</b>		<b>0.46</b>	<b>0.70</b>	<b>0.50</b>	<b>0.46</b>	<b>0.88</b>	<b>0.58</b>	<b>0.01</b>	<b>1.07</b>	<b>1.03</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different



**Table.6** Effect of Nutrient management on D-leaf breadth (cm) (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	3.54b	3.81b	3.68b	3.76b	3.84b	3.80b	3.97b	4.06b	4.02b
A <sub>1</sub>	4.50a	4.54a	4.52a	4.54a	4.63a	4.58a	4.73a	4.85a	4.79a
A <sub>2</sub>	4.32a	4.34a	4.32a	4.38a	4.52a	4.45a	4.58a	4.72a	4.65a
<b>S.Em. (±)</b>	<b>0.09</b>	<b>0.11</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.10</b>	<b>0.10</b>
<b>L.S.D(P≤0.05)</b>	<b>0.25</b>	<b>0.32</b>	<b>0.27</b>	<b>0.27</b>	<b>0.27</b>	<b>0.27</b>	<b>0.27</b>	<b>0.29</b>	<b>0.28</b>
B <sub>0</sub>	3.98b	4.07b	4.02b	4.12a	4.32a	4.18a	4.28b	4.41a	4.35a
B <sub>1</sub>	4.13ab	4.19b	4.16ab	4.19a	4.32a	4.26a	4.43ab	4.55a	4.49a
B <sub>2</sub>	4.26a	4.42a	4.33a	4.35a	4.45a	4.40a	4.56a	4.67a	4.12a
<b>S.Em. (±)</b>	<b>0.09</b>	<b>0.11</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.09</b>	<b>0.10</b>	<b>0.10</b>
<b>L.S.D(P≤0.05)</b>	<b>0.25</b>	<b>0.32</b>	<b>0.27</b>	NS	NS	NS	<b>0.27</b>	NS	NS
C <sub>0</sub>	3.98b	4.02b	4.00b	4.09b	4.22a	4.16b	4.28b	4.40b	4.34b
C <sub>1</sub>	4.27a	4.44a	4.35a	4.39a	4.44a	4.40a	4.57a	4.69a	4.63a
<b>S.Em. (±)</b>	<b>0.07</b>	<b>0.09</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>
<b>L.S.D(P≤0.05)</b>	<b>0.20</b>	<b>0.26</b>	<b>0.22</b>	<b>0.22</b>	NS	<b>0.22</b>	<b>0.22</b>	<b>0.24</b>	<b>0.23</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	3.40f	3.44f	3.42g	3.46e	3.55f	3.51e	3.68f	3.75e	3.71e
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	3.58ef	3.88cdef	3.73efg	3.82cde	3.93def	3.88cde	4.05cdef	4.19cde	4.12cde
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	3.51ef	3.53f	3.52fg	3.55e	3.63f	3.59e	3.81ef	3.84e	3.83e
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	3.52ef	3.85def	3.69efgt	3.91cde	3.94cdef	3.93cde	4.04cdef	4.16cde	4.10cde
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	3.56ef	3.71ef	3.64fg	3.72de	3.83ef	3.78de	3.96def	4.02de	3.99de
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	3.70ef	4.44abcde	4.07cdefg	4.07bcde	4.19bcdef	4.13bcde	4.28abcdef	4.42bcde	4.35bcde
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	4.11bcde	4.14abcdef	4.13bcde	4.34abcd	4.48abcde	4.41abcd	4.47bcd	4.67abcd	4.57abcd
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	4.40abcd	4.42abcde	4.41abcd	4.45abc	4.42abcde	4.44abc	4.50abcd	4.64abcd	4.57abcd
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	4.50abcd	4.48abcde	4.49abcd	4.41abc	4.60abc	4.51abc	4.62abc	4.79abc	4.70abc
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	4.68ab	4.78ab	4.73ab	4.64ab	4.76ab	4.70ab	4.90ab	4.97ab	4.93ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	4.44abcd	4.51abcd	4.48abcd	4.41abc	4.62ab	4.52abc	4.72ab	4.82abc	4.77abc
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	4.85a	4.88a	4.87a	4.97a	4.9a	4.94a	5.15a	5.18a	5.17a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	3.97cdef	4.06bcdef	4.02cdefg	4.31bcd	4.39abcde	4.35abcd	4.31bcdef	4.37bcde	4.34bcde
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	4.41abcd	4.48abcde	4.45abcd	4.37abcd	4.57abcd	4.47abc	4.69abc	4.82abc	4.76abc
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	3.97def	3.96cdef	3.97defg	4.31bcd	4.48abcde	4.40abcd	4.49abcd	4.69abcd	4.59abcd
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	4.58abc	4.55abcd	4.57abcd	4.35abcd	4.54abcd	4.45abc	4.71ab	4.85abc	4.78abc
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	4.34abcd	4.32abcde	4.33abcde	4.32abcd	4.44abcde	4.38abcd	4.46bcde	4.63abcd	4.55abcd
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	4.66ab	4.64abc	4.65abc	4.59ab	4.70ab	4.65ab	4.81ab	4.94ab	4.87ab
<b>S.Em. (±)</b>		<b>0.21</b>	<b>0.27</b>	<b>0.23</b>	<b>0.23</b>	<b>0.23</b>	<b>0.23</b>	<b>0.23</b>	<b>0.25</b>	<b>0.24</b>
<b>L.S.D.(P≤0.05)</b>		<b>0.61</b>	<b>0.78</b>	<b>0.65</b>	<b>0.65</b>	<b>0.67</b>	<b>0.65</b>	<b>0.66</b>	<b>0.72</b>	<b>0.68</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.7** Effect of Nutrient management on D-leaf area (cm<sup>2</sup>)

Treatments	3 MAP			6 MAP			9 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	61.70c	62.72b	62.21c	78.31c	81.84b	80.07c	99.19c	111.79b	105.49b
A <sub>1</sub>	84.73a	91.62a	88.17a	109.15a	118.24a	113.69a	143.12a	154.65a	148.90a
A <sub>2</sub>	75.25b	87.30a	81.27b	95.43b	112.71a	104.07b	127.19b	147.52a	137.36a
<b>S.Em. (±)</b>	<b>1.76</b>	<b>2.63</b>	<b>1.99</b>	<b>2.21</b>	<b>3.79</b>	<b>2.66</b>	<b>4.74</b>	<b>5.35</b>	<b>4.97</b>
<b>L.S.D(P≤0.05)</b>	<b>5.07</b>	<b>7.55</b>	<b>5.72</b>	<b>6.35</b>	<b>10.89</b>	<b>7.66</b>	<b>13.62</b>	<b>15.37</b>	<b>14.28</b>
B <sub>0</sub>	72.61a	76.28a	74.44a	90.77b	99.48a	95.13a	116.99a	128.16b	122.57a
B <sub>1</sub>	72.25a	82.05a	77.15a	93.87b	106.05a	99.96a	124.12a	141.60b	132.86a
B <sub>2</sub>	76.82a	83.31a	80.06a	98.24a	107.25a	102.74a	128.42a	144.20a	136.31a
<b>S.Em. (±)</b>	<b>1.76</b>	<b>2.63</b>	<b>1.99</b>	<b>2.21</b>	<b>3.79</b>	<b>2.66</b>	<b>4.74</b>	<b>5.35</b>	<b>4.97</b>
<b>L.S.D(P≤0.05)</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>6.35</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>15.37</b>	<b>NS</b>
C <sub>0</sub>	69.81b	76.67b	73.24b	90.03b	100.54a	95.29b	116.45b	130.59b	123.52b
C <sub>1</sub>	77.97a	84.42a	81.20a	98.55a	107.98a	103.27a	129.90a	145.38a	137.64a
<b>S.Em. (±)</b>	<b>1.44</b>	<b>2.14</b>	<b>1.63</b>	<b>1.80</b>	<b>3.09</b>	<b>2.17</b>	<b>3.87</b>	<b>4.37</b>	<b>4.06</b>
<b>L.S.D(P≤0.05)</b>	<b>4.14</b>	<b>6.16</b>	<b>4.67</b>	<b>5.18</b>	<b>NS</b>	<b>6.25</b>	<b>11.12</b>	<b>12.55</b>	<b>11.06</b>

Treatments/ Combination		3 MAP			6 MAP			9 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	52.85f	54.39 f	53.62 e	71.97 i	72.92 f	72.45 g	94.53 g	98.21 h	96.37 g
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	67.34cde	65.07ef	66.21 de	80.93 ghi	82.73 def	81.83 efg	102.51efg	114.90 efgh	108.71 efg
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	57.58ef	61.03f	59.31 e	81.65 fghi	81.05 f	81.35 efg	96.06 fg	107.27 gh	101.67 fg
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	59.47ef	63.62f	61.55 e	79.08 hi	84.23 cdef	81.66 efg	98.16 fg	116.55 efgh	107.36 efg
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	68.73cde	63.74f	66.24 de	78.22 hi	81.55 ef	79.89 fg	97.23 fg	112.97 fgh	105.10 fg
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	64.23def	68.45def	66.34 de	77.98 hi	88.53 bcdef	83.26 defg	106.67 defg	120.84 defgh	113.76 defg
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	75.12bcd	84.95abcd	80.04 cd	102.16 bcde	109.83 abc	106.00 bc	128.71 abcdef	130.12 bcdefgh	129.42 bcdefg
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	85.40ab	85.6abcd	85.50 abc	108.96 abc	111.85 ab	110.41 abc	135.82 abcde	148.5 abcdef	142.16 abcde
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	76.38bcd	88.94abc	82.66 bc	102.05 bcde	116.03 a	109.04 abc	140.35 ab	154.4 abcd	147.38 abcd
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	92.08a	101.1ab	96.59 ab	116.28 ab	125.88 a	121.08 ab	154.43 a	166.55 ab	160.49 ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	86.29ab	87.81abc	87.05 abc	102.86 bcd	115.46 a	109.16 abc	140.80 ab	154.39 abcd	147.60 abcd
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	93.09a	101.31a	97.20 a	122.56 a	130.36 a	126.46 a	158.74 a	173.94 a	166.34 a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	68.77cde	82.82bcde	75.80 cd	88.25 defgh	108.57 abcd	98.41 cdef	107.30 cdefg	126.46 cdefgh	116.88 cdefg
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	86.16ab	84.84abcd	85.50 abc	92.37 defgh	110.96 ab	101.67 cd	133.06 abcde	150.79 abcde	141.93 abcde
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	72.78cd	83.81abcd	78.30 cd	87.01 efghi	111.32 ab	99.17 cde	116.98 bcdefg	147.87 abcdef	132.43 abcdef
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	75.19bcd	93.79abc	84.49 abc	97.15 cdef	117.8 a	107.48 bc	138.74 abcd	156.94 abcd	147.84 abcd
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	69.82cde	82.53cde	76.18 cd	96.14 cdefg	108.17 abcde	102.16 c	126.11 abcdefg	143.61 abcdefg	134.86 abcdefg
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	78.78bc	96.00abc	87.39 abc	111.65 abc	119.46 a	115.56 abc	140.97 ab	159.45 abc	150.21 abc
<b>S.Em. (±)</b>		<b>4.32</b>	<b>6.43</b>	<b>4.88</b>	<b>5.41</b>	<b>9.28</b>	<b>6.52</b>	<b>11.61</b>	<b>13.10</b>	<b>12.17</b>
<b>L.S.D.(P≤0.05)</b>		<b>12.41</b>	<b>18.49</b>	<b>14.01</b>	<b>15.55</b>	<b>26.67</b>	<b>18.75</b>	<b>33.35</b>	<b>37.64</b>	<b>34.97</b>

MAP-Month after planting

\*\*Means with the same letter are not significantly different

**Table.7** Effect of Nutrient management on D-leaf area (cm<sup>2</sup>) (contd....)

Treatments	12 MAP			15 MAP			18 MAP		
	2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
A <sub>0</sub>	133.29c	158.56b	145.93b	173.52b	186.07b	179.79b	216.33b	224.67b	220.50b
A <sub>1</sub>	202.30a	206.51a	204.4a	234.35a	240.60a	237.48a	280.48a	293.04a	286.76a
A <sub>2</sub>	189.23b	192.45a	190.84a	222.51a	232.74a	227.63a	266.01a	280.03a	273.32a
<b>S.Em. (±)</b>	<b>4.36</b>	<b>6.23</b>	<b>4.80</b>	<b>6.22</b>	<b>6.17</b>	<b>6.12</b>	<b>5.54</b>	<b>6.24</b>	<b>5.77</b>
<b>L.S.D(P≤0.05)</b>	<b>12.53</b>	<b>17.92</b>	<b>13.79</b>	<b>17.87</b>	<b>17.73</b>	<b>17.60</b>	<b>15.92</b>	<b>17.95</b>	<b>16.58</b>
B <sub>0</sub>	163.02b	173.65b	168.33b	201.16b	209.40b	205.28b	239.88b	250.68b	245.28b
B <sub>1</sub>	176.14a	186.26b	181.2ab	209.59ab	220.03b	214.77a	257.38a	268.35b	262.87a
B <sub>2</sub>	185.67a	197.61a	191.64a	219.71a	229.99a	224.85a	266.17a	278.72a	272.44a
<b>S.Em. (±)</b>	<b>4.36</b>	<b>6.23</b>	<b>4.80</b>	<b>6.22</b>	<b>6.17</b>	<b>6.12</b>	<b>5.54</b>	<b>6.24</b>	<b>5.72</b>
<b>L.S.D(P≤0.05)</b>	<b>12.53</b>	<b>17.92</b>	<b>13.79</b>	<b>17.87</b>	<b>17.73</b>	<b>17.60</b>	<b>15.92</b>	<b>17.95</b>	<b>16.58</b>
C <sub>0</sub>	163.70b	172.36b	168.03b	200.36b	210.15b	205.25b	239.84b	251.55b	245.69b
C <sub>1</sub>	186.18a	199.32a	192.75a	219.90a	229.46a	224.68a	269.11a	280.28a	274.70a
<b>S.Em. (±)</b>	<b>3.56</b>	<b>5.09</b>	<b>3.91</b>	<b>5.08</b>	<b>5.04</b>	<b>5.00</b>	<b>4.52</b>	<b>5.10</b>	<b>4.71</b>
<b>L.S.D(P≤0.05)</b>	<b>10.23</b>	<b>14.63</b>	<b>11.26</b>	<b>14.59</b>	<b>14.48</b>	<b>14.37</b>	<b>13.00</b>	<b>14.65</b>	<b>13.54</b>

Treatments/ Combination		12 MAP			15 MAP			18 MAP		
		2015	2016	Mean	2015	2016	Mean	2015	2016	Mean
T <sub>1</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>0</sub>	124.68h	136.19g	130.44h	154.44f	164.57f	159.51f	187.19h	192.21f	189.70j
T <sub>2</sub>	A <sub>0</sub> B <sub>0</sub> C <sub>1</sub>	135.23gh	163.23defg	149.23fgh	177.39def	191.59def	184.49def	228.61efg	234.51def	231.56ghi
T <sub>3</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>0</sub>	130.35gh	145.81fg	138.08gh	164.29f	174.11f	169.20f	205.73gh	210.25ef	207.99j
T <sub>4</sub>	A <sub>0</sub> B <sub>1</sub> C <sub>1</sub>	134.87gh	163.37defg	149.12fgh	184.38cdef	193.81cdef	189.10cdef	227.28efg	234.96def	231.12ghi
T <sub>5</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>0</sub>	133.96gh	154.37efg	144.17fgh	172.34ef	186.18ef	179.26ef	216.71fgh	223.4ef	220.06ghi
T <sub>6</sub>	A <sub>0</sub> B <sub>2</sub> C <sub>1</sub>	140.67gh	188.37bcdefg	164.52efg	188.26cdef	206.15cdef	197.21cdef	232.47efg	252.72cde	242.60fghi
T <sub>7</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>0</sub>	175.66def	176.96cdefg	176.31de	216.17bcd	223.63bcde	219.90bcde	247.00def	268.31bcd	257.66defg
T <sub>8</sub>	A <sub>1</sub> B <sub>0</sub> C <sub>1</sub>	191.82bcde	196.03abcde	193.93bcde	224.35abc	222.54bcde	223.45bcd	258.49cde	271.23bcd	264.86cdefg
T <sub>9</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>0</sub>	192.53bcde	201.31abcd	196.92bcde	221.95bc	236.22abc	229.09abc	272.05bcd	287.98abc	280.02bcdef
T <sub>10</sub>	A <sub>1</sub> B <sub>1</sub> C <sub>1</sub>	221.83ab	227.08ab	224.46ab	250.82ab	255.24ab	253.03ab	301.17ab	310.47ab	305.82ab
T <sub>11</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>0</sub>	197.95bcde	202.34abcd	200.15bcd	226.14abc	237.03abc	231.59abc	278.88bcd	290.5abc	284.69bcde
T <sub>12</sub>	A <sub>1</sub> B <sub>2</sub> C <sub>1</sub>	233.99a	235.34a	234.67a	266.65a	268.96a	267.81a	325.31a	329.77a	327.54a
T <sub>13</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>0</sub>	157.68fg	171.3defg	164.49efg	214.51bcde	219.66bcde	217.09bcde	243.78defg	249.57cde	246.68efghi
T <sub>14</sub>	A <sub>2</sub> B <sub>0</sub> C <sub>1</sub>	193.02bcde	198.19abcde	195.61bcd	220.11bcd	234.39abcd	227.25abcd	274.21bcd	288.23abc	281.22bcdef
T <sub>15</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>0</sub>	171.47ef	173.99cdefg	172.73def	214.70bcde	225.14bcde	219.92bcde	255.75cde	273.02bcd	264.39cdefg
T <sub>16</sub>	A <sub>2</sub> B <sub>1</sub> C <sub>1</sub>	205.77abcd	205.98abcd	205.88abcd	220.90bcd	235.66abc	228.28abc	282.30bcd	293.0abc	287.85abcd
T <sub>17</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>0</sub>	188.98cde	188.94bcdef	188.96cde	218.68bcd	224.77bcde	221.73bcde	251.48def	268.69bcd	260.09cdefgh
T <sub>18</sub>	A <sub>2</sub> B <sub>2</sub> C <sub>1</sub>	218.44abc	216.31abc	217.38abc	246.19ab	256.83ab	251.51ab	292.16abc	307.25ab	299.71abc
<b>S.Em. (±)</b>		10.68	15.27	11.75	15.23	15.11	15.00	13.57	15.29	14.13
<b>L.S.D.(P≤0.05)</b>		30.68	43.89	33.77	43.77	43.42	43.11	39.00	43.96	40.62

MAP-Month after planting

\*\*Means with the same letter are not significantly different

It is clear from the tables 5, 6 and 7 that the D-leaf length, breadth and area has increased continuously from 3 months after planting to eighteen months after planting in both 2015, 2016 and significantly varied among the most of the treatments for both the years and for pooled mean values which suggest there is a role of integrated nutrient management for growth behaviour of pineapple. It is also noticed that organic manure as main factor has non-significant role for D-leaf length, breadth and leaf area for some observation time. The rate of increase of length was higher from 9 to 12 and 12 to 15 months after planting. At 18 months after planting the D-leaf length (pooled) was highest (63.35 cm) with T<sub>12</sub> which was statistically at par with T<sub>10</sub> and T<sub>18</sub>. Almost similar observation was recorded (pooled) for D-leaf breadth which was recorded maximum (5.17cm) with T<sub>12</sub>. It is also observed from the pooled means of table 7 that the highest D-leaf area (327.54 cm<sup>2</sup>) was recorded with T<sub>12</sub> which was statistically at par with T<sub>10</sub> (305.82cm<sup>2</sup>), T<sub>18</sub> (299.71cm<sup>2</sup>), and T<sub>16</sub> (287.85cm<sup>2</sup>). Several scientist had reported regarding the nutritive management which confirms the result of present experiment. Omotoso and Akinrinde (2013) and (Bhugaloo, 1998). Reported the effect of N fertilizer application on growth and behavior in pineapple. Singh *et al.*, (2010), to study the response of integrated nutrient management on growth, yield and quality of papaya cv. Surya. Organic manure, urea and their combination have also important role in growth behavior like D-leaf length, number of leaves, root length and leaf area (Omotoso and Akinrinde, 2012).

The different parameters for growth behaviour study of pineapple cv. Mauritius under the integrated nutrient management showed significant variation for 2015, 2016 and pooled means among most of the treatments. It is also found from the present experiment that the treatment combinations having chemical fertilizer, organic manure and bio-fertilizers shows better

performance than the other treatment combinations. The plant height, canopy spread, number of leaves, D-leaf length, D-leaf breadth, and leaf area was recorded highest in T<sub>12</sub> (A<sub>1</sub>B<sub>2</sub>C<sub>1</sub>).

## References

- Anonymous, 2017. Accessed from on [http://prsvkm.kau.in/sites/default/files/documents/pineapple\\_sector\\_in\\_kerala\\_status\\_opportunities\\_challenges\\_and\\_stakeholders.pdf](http://prsvkm.kau.in/sites/default/files/documents/pineapple_sector_in_kerala_status_opportunities_challenges_and_stakeholders.pdf) on 12.6.2016
- Bhugaloo, R. A., 1998. Effect of different levels of nitrogen on yield and quality of pineapple variety Queen Victoris. *Food and Agricultural Research Council*, Reduit, Mauritius.
- Jacob, C., and Soman M. 2006. In: *Pineapples. Working Paper Series*. Institute for Financial Management and Research Centre for Development Finance.
- Omotoso, S.O., and Akinrinde E. A. 2013. Effect of nitrogen fertilizer on some growth, yield and fruit quality parameters in pineapple (*Ananas comosus* L. Merr.) plant at Ado-Ekiti Southwestern, Nigeria. *International Research Journal of Agricultural Science and Soil Science*, 3(1): 11-16
- Omotoso, S.O., and Akinrinde, E. A. 2012. Effects of nutrient sources on the early growth of pineapple plantlets (*Ananas comosus* (L) Merr) in the nursery. *Journal of Fruit and Ornamental Plant Research*, 20(2): 35-40
- Reddy, B.M.C., and Prakash, G. S. 1982. Standardization of optimum depth of trench of planting Kew Pineapple. In: *Annual Report. Indian Institute of Horticultural Research*, p. 19.
- Singh, K., Barche, K. S., and Singh, D. B. 2010. Integrated nutrient management in papaya (*Carica papaya*) cv. Surya. *Acta Horticulturae*, 851:377-380

### How to cite this article:

Nilesh Bhowmick, Partha Sarathi Munsu, Swapan Kumar Ghosh, Prahlad Deb and Arunava Ghosh. 2017. Growth Behavior of Pineapple cv. Mauritius under Integrated Nutrient Management in Northern part of West Bengal, India. *Int.J.Curr.Microbiol.App.Sci*. 6(9): 2471-2488. doi: <https://doi.org/10.20546/ijcmas.2017.609.305>