Influence of liquid fertilizers through drip irrigation on growth and yield of Suru sugarcane

B.C. CHAUDHARI, V.N. PATIL AND P.L. PATEL

ABSTRACT

A field experiment was carried out at AICRP on water management Project, Mahatma Phule Krishi Vidyapeeth, Rahuri during 1997-98 on vertic Ustropept. The experiment was conducted in Factorial Randomized Block Design (FRBD) with three replications and eight treatments. The treatments consisted of (a) four levels of NP and K through Richfield water soluble fertilizers (RWSF) viz., 50%, 75%, 100%, 125% per cent of recommended dose, (b) four levels of NPK through straight fertilizers (SF) viz., 50%, 75%, 100%, 125% per cent of recommended dose. The growth parameters such as cane height, no of internodes, girth of internodes, weight/cane and leaf area were found to be maximum in 125% RD of RWSF as compared to SF. Application of RWSF resulted into higher cane yield (153.35 t/ha) by 9% over to that of SF (141.76 t/ha). The fertilizers application through drip at 125 % RD was found to be significantly superior to those of 100% RD.

Key words : RWSF, SF, Sugarcane, Liquid, Fertilizer

Sugarcane (Saccharum officinarum L.) is one of the important pride cash crops of the tropical region and is the main source of sugar and sugary byproducts in India. Sugar industry is important agro-based industry and has great impact on socio economic development in rural areas. Plant nutrient like N, P and K are the most critical factors, which seriously limit the growth, quality and yield of crops. Nitrogen fertilizer is costly input and every effort needs to be made to improve the utilization of applied nitrogen by a crop. Apart from source of nitrogen, the method and time of application are important deciding factors for increasing its efficiency.

Applying fertilizers directly to crop root zone through drip irrigation and fertigation is thus an answer for judicious use of precious commodity such as water and fertilizer. Therefore the study was undertaken to find out the effects of water-soluble fertilizers through drip on growth and yield of suru sugarcane.

MATERIALS AND METHODS

Field experiment was carried out at MPKV, Rahuri during the year 1997-98 on medium black and clayey soil having pH 8.35. The Soil of experimental plot was low in available N (114.3kg/ha) and P (10.8 kg/ha) and high in available K(773 kg/ha). The experiment was carried out in Randomized Block Design (Factorial) having three replications. The Treatment comprised of

– Sources of fertilizers
  Conventional fertilizers
  Richfield water soluble fertilizers RWSF
– Level of fertilizers
  50% recommended dose
  75% recommended dose
  100% recommended dose
  125% recommended dose

Water soluble fertilizer as a sources were urea (46%N) and Richfield water soluble fertilizers with a grades of (20:10:10), (12:61:0) and (0:0:50) 250 kg N/ha was applied in 4 splits of 10,40,10 and 40 per cent viz., at planting, 6-8 weeks after planting, 12-16 weeks after planting and at earthing up, respectively, phosphorus (115 kg ha⁻¹) and potash (115 kg ha⁻¹) were applied as basal dose. RWSF were splitted in thirty weeks.

The planting of suru sugarcane cv.86032 was done on 15.12.1997 in furrow planting technique (0.9 x 1.8 m). The gross plot size was 10 x 9m² while net plot size was 9.4 x8.4m². All the fertilizers were applied through drip irrigation system.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been presented under following heads :

Height:

The height of sugarcane at harvest was influenced significantly by sources of fertilizers and levels of fertilizers. The RWSF recorded significantly higher plant height as compared to SF, which was 2.84% more than SF. The height of cane was increased with the level of
fertilizers. The height of cane was significantly more with 125% of RD (352.17 cm) but was at par with 100% of RD. The height of cane was at par with 50%, 75% and 100% treatments. The present result are in close conformity to those of Shrivastava et al. (1984).

**Number of internodes:**

The number of internodes at harvest were not significantly influenced by the sources of fertilizer. However, average number of internodes was observed to be more in RWSF (22.93) than conventional when applied through drip (22.05) regardless of levels of fertilizers. Comparatively highest number of internodes was due to application of 125% RD (23.47) closely followed by 100% RD (22.50), 75% and 50 RD (22.00) regardless of sources of fertilizers.

**Girth of internodes:**

The girth of internode was not influenced either by the sources of fertilizers or levels of fertilizers as results were non significant. However, average girth of internodes was found to be more with RWSF than girth of internodes of SF but maximum girth of internodes of sugarcane was observed with 125% RD (10.18cm) The girth of internode of cane was more due to 125% RD (9:17cm).

**Weight/cane:**

The significantly highest weight/cane (2.43 kg/cane) was due to RWSF over SF. Similarly, as far as levels of fertilizers are concerned significantly the highest weight / cane (2.55 kg/cane) was due to application of 125 % RD. The results are in line to that of Shrivastava et al. (1984).

**Leaf area:**

The leaf area at grand growth stage was influenced by sources and levels of fertilizers. The significantly highest leaf area was recorded by RWSF over SF. Application of 125% RD recorded significantly highest leaf area as compared to other levels of fertilizer.

**Cane yield :**

The cane yield was influenced significantly due to both sources and levels of fertilizers. Application of RWSF through drip significantly produced higher yield (153.35 t/ha) than that of SF applied through drip (141.76t/ha).

The cane yield obtained with 125% fertilizers level was significantly higher (159.17 t/ha) than other treatments. There was no significant between the yields obtained 75% (146.57 t/ha) and 100% (148.9 t/ha) fertilizer levels but were significantly more to 50% level of fertilizers (135.6 t/ha).

The interaction between sources and levels of fertilizers were non significant. However, maximum yield was obtained by the application of RWSF fertilizer with 125 % level of application. Similar results were reported by Banker et al. (1995) and Jagtap et al. (1992).

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**Table 1 : Growth and yield of suru sugarcane as influenced by source and levels of fertilizers**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Height (cm)</th>
<th>No of internodes (cm)</th>
<th>Girth of internodes (cm)</th>
<th>Weight/cane (kg)</th>
<th>Leaf area</th>
<th>Cane yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Source of fertilizers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>i) SF</td>
<td>342.83</td>
<td>22.05</td>
<td>8.88</td>
<td>2.22</td>
<td>87.92</td>
<td>141.76</td>
</tr>
<tr>
<td>ii) RWSF</td>
<td>352.17</td>
<td>22.93</td>
<td>9.07</td>
<td>2.43</td>
<td>92.90</td>
<td>153.35</td>
</tr>
<tr>
<td>S.E.</td>
<td>1.22</td>
<td>0.31</td>
<td>0.19</td>
<td>0.05</td>
<td>0.28</td>
<td>2.15</td>
</tr>
<tr>
<td>C.D.(P=0.05)</td>
<td>3.17</td>
<td>NS</td>
<td>NS</td>
<td>0.15</td>
<td>0.86</td>
<td>5.31</td>
</tr>
<tr>
<td>B) Levels of fertilizers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) 50 %</td>
<td>342.83</td>
<td>22.00</td>
<td>8.60</td>
<td>2.05</td>
<td>88.02</td>
<td>135.60</td>
</tr>
<tr>
<td>ii) 75 %</td>
<td>346.83</td>
<td>22.00</td>
<td>8.97</td>
<td>2.30</td>
<td>89.99</td>
<td>146.57</td>
</tr>
<tr>
<td>iii) 100%</td>
<td>347.67</td>
<td>22.50</td>
<td>9.06</td>
<td>2.40</td>
<td>91.14</td>
<td>148.9</td>
</tr>
<tr>
<td>iv) 125%</td>
<td>352.67</td>
<td>23.47</td>
<td>9.17</td>
<td>2.55</td>
<td>92.50</td>
<td>159.17</td>
</tr>
<tr>
<td>S.E.</td>
<td>1.73</td>
<td>0.44</td>
<td>0.27</td>
<td>0.07</td>
<td>0.40</td>
<td>3.30</td>
</tr>
<tr>
<td>C.D.(P=0.05)</td>
<td>5.25</td>
<td>NS</td>
<td>NS</td>
<td>0.29</td>
<td>1.21</td>
<td>7.63</td>
</tr>
<tr>
<td>In the A x B</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>S.E.</td>
<td>2.45</td>
<td>0.62</td>
<td>0.38</td>
<td>0.10</td>
<td>0.56</td>
<td>6.40</td>
</tr>
<tr>
<td>C.D.(P=0.05)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS-Non significant
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REFERENCES


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