EFFECT OF PLANT GROWTH REGULATORS ON FLOWERING AND YIELD OF MUSKMELON (CUCUMIS MELO L.)

Y. Reenata Devi and P. Madhanakumari
Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar-608 002 (Tamil Nadu), India

Abstract
The effect of plant growth regulators on flowering and yield of muskmelon (Cucumis melo L.) was carried in January – April 2015. Two sprays of plant growth regulators i.e. Ethrel, Naphthalene acetic acid, Gibberellic acid, SADH and Kinetin were given at 2nd and 4th leaf stages in the treatment NAA 150 ppm + Ethrel 250 ppm. The lowest number of male flowers (63.23), the highest number of female flowers (17.43), the number of fruits per vine (10.63) and fruit weight (0.679) were recorded. The yield characters such as fruit diameter (12.97) and yield per plant (7.01) were observed maximum in the treatment NAA 150 ppm + Ethrel 250 ppm. The application of NAA 150 ppm + ethrel 250 ppm observed the best treatment, while compared to other treatment and control.

Key words : Ethrel, Naphthalene acetic acid, gibberellic acid, SADH (Succinic acid 2-2- dimethyl hydrazide), Kinetin.

Introduction
The muskmelon (Cucumis melo L.) is one of the most important vegetables crop. It belongs to the family Cucurbitaceae. Edible melon belongs to either Cucumis melo var. reticulatus or C. melo var. cantaloupensis. In India, this crop is popular in northern states especially in Uttar Pradesh and Punjab and in most every place in plains. It is said to be the native of Tropical Africa with Central Asia and North - West India as secondary centres of origin (Whitaker and Davis, 1962). The total area under muskmelon cultivation in world estimated to be 803 thousand hectare with an annual production of 13.8 million metric tonnes (Anonymous, 2014). Plants are either monoecious or andro-monoecous annuals with long trailing vines, with shallow lobed round leaves, small and yellow coloured flower and show considerable variation in fruit size and shape. In muskmelon, 250 ppm of ethrel is generally recommended to promote more number of female flowers (Rudich et al., 1969). Growth regulators have tremendous effects on sex expression and flowering in various cucurbits leading to either suppression of male flowers or increase in number of female flowers (Al-Masoum and Al-Masri, 1999). Growth regulators plays an important role in both morphology and physiology of the plants. The exogenous application of plant growth regulators can alter the sex ratio and sequence when applied at two or four leaf stage (Hossain et al., 2006).

Materials and Methods
The present investigation was carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India. It is geographically situated at 11°24’ North latitude and 79°41’ East longitude and at an altitude of ± 5.79m above the mean sea level. The seed of the muskmelon variety “Pusa Sharbati” was chosen for the investigation. The experiment was laid out in Randomized Block Design with three replications and ten treatments viz., T₁ : Absolute control, T₂ : NAA 50 ppm + Ethrel 250 ppm, T₃ : NAA 150 ppm + Ethrel 250 ppm, T₄ : SADH 500 ppm + Ethrel 250 ppm, T₅ : SADH 1000 ppm + Ethrel 250 ppm, T₆ : GA₃ 10 ppm + Ethrel 250 ppm, T₇ : GA₃ 20 ppm + Ethrel 250 ppm, T₈ : Kinetin 10 ppm + Ethrel 250 ppm, T₉ : Kinetin 20 ppm + Ethrel 250 ppm, T₁₀ : Ethrel 250 ppm. Observations were recorded days to first male and female flowering, number of male and female flowers per vine and yield characters number of fruits per vine, fruit weight, fruit yield per plant and yield per hectare.

Results and Discussion
In different concentrations response of NAA with Ethrel on days to first male and female flowering and number of male and female flowers was found significant over control. Stankovic et al. (2001) also reported that the NAA effect has got in sex expression and delayed
the staminate flowering process for 25 to 30 days compared to control in muskmelon. Earlier finding confirmed with Vadigeri et al. (2001) in cucumber, Hidayatullah et al. (2012) in bottlegourd and Baset Mia et al. (2014) in bittergourd. NAA can increase the fruit set ratio, prevent fruit dropping and promote sex ratio in plant (Raoofi et al., 2014). Among the treatment earliest male flower was observed (18.22) in control, earliest female flowering (21.42) was observed in the treatment NAA150 ppm + ethrel 250 ppm. Manzano et al. (2008) reported that ethrel promotes feminization of melon plants, but concluded that ethrel had strongest effect in gynoecious than in monoecious and andromonoecious in plant. Minimum number of male flowers (63.23) and maximum number of female flowers (17.43) was recorded in the treatment NAA150 ppm + ethrel 250 ppm. Ethrel is the substances that slow down the cell division and cell elongation in meristematic tissue of shoot and regulated the plant height without change in the morphology and physiology of the plant (Hilli et al., 2010) in riddegourd. Similar result was observed by Chaudhry and Khan (2006). The response of different concentrations of NAA with Ethrel on number of fruit per vine, fruit weight, fruit yield per vine and yield per hectare was found significant overcontrol.

Among the treatment NAA 150 ppm with ethrel 250 ppm concentrations recorded the maximum fruit per vine (10.63), fruit weight (0.679), fruit yield per vine (7.01), yield per hectare (16.4). Vadigeri et al. (2001) reported that application of ethrel (200 and 400 ppm) at 4 to 6 true leaf stage proved effective in increasing number of fruits per plant and improved the quality of fruits as compared to GA$_3$ at 5 and 10 ppm in cucumber. Hidayatullah et al. (2012) reported that application of GA$_3$ (30 ppm) at 2 and 3 leaf stages recorded maximum fruit per plant as compared to control in bottlegourd. It was concluded that the among all the treatments, treatment NAA 150 ppm + Ethrel 250 ppm showed significant difference over control. This treatement improve earliness in male and female flowers and number of male and female flowers per vine and yield attributing character like number of fruits per vine, fruit weight, fruit yield per plant and fruit yield per hectare. A increase in fruit yield in treated plant may attributed to reason that plants remain physiologically more active to build up sufficient food for developing flowers and fruits, ultimately leading to higher yield. Similar results was reported by Arora and Pratap (1988) in pumpkin.

**Table 1: Effect of plant growth regulators on flowering and yield of muskmelon**

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Days to first male flowering</th>
<th>Days to first female flowering</th>
<th>No. of male flowers per vine</th>
<th>No. of female flowers per vine</th>
<th>No. of fruits per vine</th>
<th>Fruits weight (kg)</th>
<th>Fruit yield per plant (kg)</th>
<th>Fruits yield (t ha$^{-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T$_1$</td>
<td>18.22</td>
<td>49.07</td>
<td>120.53</td>
<td>8.45</td>
<td>3.39</td>
<td>0.159</td>
<td>0.53</td>
<td>1.30</td>
</tr>
<tr>
<td>T$_2$</td>
<td>31.97</td>
<td>32.12</td>
<td>80.92</td>
<td>13.95</td>
<td>6.39</td>
<td>0.433</td>
<td>3.22</td>
<td>7.01</td>
</tr>
<tr>
<td>T$_3$</td>
<td>42.76</td>
<td>21.42</td>
<td>63.23</td>
<td>17.43</td>
<td>10.63</td>
<td>0.679</td>
<td>7.01</td>
<td>16.4</td>
</tr>
<tr>
<td>T$_4$</td>
<td>36.52</td>
<td>28.61</td>
<td>72.69</td>
<td>15.49</td>
<td>9.40</td>
<td>0.527</td>
<td>4.73</td>
<td>10.50</td>
</tr>
<tr>
<td>T$_5$</td>
<td>26.09</td>
<td>36.51</td>
<td>92.14</td>
<td>12.27</td>
<td>6.45</td>
<td>0.412</td>
<td>2.42</td>
<td>5.09</td>
</tr>
<tr>
<td>T$_6$</td>
<td>32.02</td>
<td>33.05</td>
<td>82.95</td>
<td>12.41</td>
<td>8.47</td>
<td>0.509</td>
<td>4.18</td>
<td>9.41</td>
</tr>
<tr>
<td>T$_7$</td>
<td>40.57</td>
<td>25.10</td>
<td>64.46</td>
<td>16.31</td>
<td>9.68</td>
<td>0.603</td>
<td>5.76</td>
<td>13.15</td>
</tr>
<tr>
<td>T$_8$</td>
<td>26.36</td>
<td>40.07</td>
<td>101.37</td>
<td>11.25</td>
<td>7.47</td>
<td>0.336</td>
<td>2.24</td>
<td>5.49</td>
</tr>
<tr>
<td>T$_9$</td>
<td>23.11</td>
<td>44.16</td>
<td>103.22</td>
<td>9.71</td>
<td>5.43</td>
<td>0.310</td>
<td>1.53</td>
<td>3.51</td>
</tr>
<tr>
<td>T$_{10}$</td>
<td>20.06</td>
<td>48.12</td>
<td>105.13</td>
<td>9.51</td>
<td>4.42</td>
<td>0.234</td>
<td>1.42</td>
<td>2.84</td>
</tr>
</tbody>
</table>

The response of different concentrations of NAA with Ethrel on number of fruit per plant, fruit weight, fruit yield per vine and yield attributing characters like number of fruits per vine, fruit weight, fruit yield per plant and fruit yield per hectare was found significant over control.

Among the treatment NAA 150 ppm with ethrel 250 ppm concentrations recorded the maximum fruit per vine (10.63), fruit weight (0.679), fruit yield per vine (7.01), yield per hectare (16.4). Vadigeri et al. (2001) reported that application of ethrel (200 and 400 ppm) at 4 to 6 true leaf stage proved effective in increasing number of fruits per plant and improved the quality of fruits as compared to GA$_3$ at 5 and 10 ppm in cucumber. Hidayatullah et al. (2012) reported that application of GA$_3$ (30 ppm) at 2 and 3 leaf stages recorded maximum fruit per plant as compared to control in bottlegourd. It was concluded that the among all the treatments, treatment NAA 150 ppm + Ethrel 250 ppm showed significant difference over control. This treatment improve earliness in male and female flowers and number of male and female flowers per vine and yield attributing character like number of fruits per vine, fruit weight, fruit yield per plant and fruit yield per hectare. A increase in fruit yield in treated plant may attributed to reason that plants remain physiologically more active to build up sufficient food for developing flowers and fruits, ultimately leading to higher yield. Similar results was reported by Arora and Pratap (1988) in pumpkin.

**References**


