Advancement of Flowering in Acid Lime (*Citrus aurantifolia* Swingle) by Soil Applied Paclobutrazol

A. Baskaran*, R. Renuga and S. Saraswathy
Oilseeds Research Station
Tamil Nadu Agricultural University, Tindivanam - 604 001

An investigation was carried out to analyze the effect of soil drenching of paclobutrazol at different concentrations (1.25, 2.50, 3.75 and 5.00 g a.i/tree) on five year old acid lime (*Citrus aurantifolia* Swingle) var. PKM 1 trees at Horticultural College and Research Institute, Periyakulam during 2006-2007 and 2007-2008. The treatments were imposed prior to flower bud formation during main season following randomized block design with four replications. In general, soil application of paclobutrazol had significant effect on time taken for flowering and number of flowers/shoot in both the seasons. Paclobutrazol at 2.50 g a.i/tree recorded the lowest number of number of days taken for flowering (66 days and 69 days) in the main and off season of both the years compared with other treatments. Soil application of paclobutrazol at 2.50 g a.i/tree recorded the highest number of flowers/shoot (8.04 and 7.84) in the main and off season of the year 2006-07 and 2007-08.

**Key words:** Acid lime, flowering, paclobutrazol and season

Acid lime (*Citrus aurantifolia* Swingle) known as Kagzi lime is rich in vitamin C and extensively used for culinary purposes. It has several medicinal properties viz., an appetizer, stomachic, antis corbutic and anthelmintic. Generally lime has peculiar tendency of bearing more number of fruits in one season and lean in subsequent season. Thus, acid lime exhibits some sort of alternate bearing that leads to fluctuation in production which renders continuous supply of fruits to markets difficult. In order to break this barrier, paclobutrazol, a growth retardant has been found to be useful to alter plant growth, flowering and quality of fruits not only in acid lime but also in various horticultural crops (Burondkar and Gunjate, 1991). To overcome fluctuations in production of acid lime, this gibberellin bio-synthesis inhibitor is manipulate the cropping possibly by induction of off-season flowering for a constant increased yield in young orchards. This alternate bearing tendency in citrus fruits has an impact in the production and marketing in the economic point of view.

**Materials and Methods**

A statistically laid out field trail in randomized block design (RBD) with three replications was carried out during the year 2006-2008 in five year old acid lime trees during the main cropping season at Horticultural College and Research Institute, Periyakulam located at 100°N Latitude and 77°E Longitude with 300 m above MSL. Uniform sized trees were selected and required dose of manures, fertilizers, irrigation and plant protection measures were given. Paclobutrazol, an aqueous solution was applied as soil drench at 1.25, 2.50, 3.75 and 5.00 g a.i/tree in the month of November with in the drip line making 5-6 holes at 10 cm depth around the tree. Trees with out paclobutrazol treatment were used as control. The observations on number of flowers / shoot during main and off season

**Table 1. Effect of paclobutrazol (PP333) on number of flowers / shoot during main and off season**

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<tbody>
<tr>
<td>1.25 g/tree (T1)</td>
<td>7.07</td>
<td>7.16</td>
<td>7.12</td>
<td>6.85</td>
<td>6.94</td>
<td>6.90</td>
<td>7.01</td>
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<tr>
<td>2.50 g/tree (T2)</td>
<td>7.99</td>
<td>8.09</td>
<td>8.04</td>
<td>7.79</td>
<td>7.88</td>
<td>7.84</td>
<td>7.94</td>
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<tr>
<td>3.75 g/tree (T3)</td>
<td>7.95</td>
<td>8.03</td>
<td>7.99</td>
<td>7.82</td>
<td>7.90</td>
<td>7.86</td>
<td>7.93</td>
</tr>
<tr>
<td>5.00 g/tree (T4)</td>
<td>7.36</td>
<td>7.44</td>
<td>7.40</td>
<td>7.07</td>
<td>7.20</td>
<td>7.14</td>
<td>7.27</td>
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<tr>
<td>Control (T5)</td>
<td>7.48</td>
<td>7.55</td>
<td>7.52</td>
<td>7.29</td>
<td>7.32</td>
<td>7.31</td>
<td>7.42</td>
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<tr>
<td>SEd</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
<td>0.16</td>
<td>0.17</td>
</tr>
<tr>
<td>CD(0.05)</td>
<td>0.50</td>
<td>0.50</td>
<td>0.47</td>
<td>0.48</td>
<td>0.49</td>
<td>0.33</td>
<td>0.34</td>
</tr>
</tbody>
</table>

*Corresponding author email: vabscientist@gmail.com*
flowers/shoot and number of days taken for flowering were recorded during the main and off season of the year.

Results and Discussion

Paclobutrazol, a broad spectrum growth retardant involves in lowering of endogenous gibberellin levels which in turn reduces vegetative growth but improves profuse flowering in fruit crops (Voon et al., 1991). The increased flowering and fruiting in the main season could be due to reduction in gibberellin levels, which may alter the pattern of assimilate partitioning in trees during the flowering (Singh and Bhattacharjee, 2005).

The study revealed that soil application of paclobutrazol effectively increased the number of flowers/shoot irrespective of the season and year. During the year 2007-2008 paclobutrazol at 2.50 g a.i./tree profoundly increased the flowers/shoot, which was low in the year 2006-2007. Increasing concentration of paclobutrazol resulted in simultaneous decrease in the number of flowers/shoot in both the seasons during the year 2006-2007 and 2007-2008. In the present experiment, paclobutrazol treated trees initiated early flowering. Soil drenching of 3.75 g a.i./tree recorded initiation of flowering within 69 days where as untreated control recorded the same in 91 days. Application of paclobutrazol enhanced earliness in maturity than the untreated control (Kachru et al., 1971). It was due to the antigibberellin role of paclobutrazol and also by effective translocation of carbohydrates with the positive effects of cytokinins and auxins in the conversion of vegetative bud to flower bud. Application of paclobutrazol caused an early reduction of endogenous gibberellin levels within the shoots as also observed by Yeshitela et al., (2004) causing them to reach flowering earlier than those of untreated trees.

References


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Received: November 29, 2010; Accepted: December 20, 2010