Anthesis and Abscission of Blue Jade Vine Flowers Treated with Ethephon and AOA

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The blue jade vine (BJV) (Strongylodon macrobotrys Gray.) is a popular ornamental in the tropics because of its spectacular floral display. In Hawaii, the BJV is a perennial and flowers sequentially from October to January. The flowers usually abscise 1 to 2 days after anthesis. We evaluated effects of (2-chloroethyl)phosphonic acid (ethephon) and aminooxyacetic acid (AOA), an inhibitor of ethylene synthesis, on BJV flower abscission.

Plants were propagated by stem cuttings from a single mother plant. The cuttings were rooted under mist and field-grown in the Hamakua District of Hilo, Hawaii, for 2 years before treatment. The average precipitation for the area was 270 mm·month⁻¹, with a day–night mean of 20°C.

Racemes used in the experiment were ~20 to 25 cm long and possessed 30 to 40 flower buds that were 2 to 3 mm long. Uncut racemes were sprayed with 5 mM ethephon (pH 6.0 with 0.01 N NaOH) or 100 μM AOA. The spray volume was 5 ml/raceme and was applied with a chromatography sprayer (Sigma, St. Louis, Mo.). Distilled water served as the control. All sprays contained 1 drop Tween 20/liter as a wetting agent. The experiment was arranged as a randomized complete-block design with five replicates (racemes) per treatment. Elongation of the corolla and abscission of flowers were recorded daily until all flowers abscised. The experiment was conducted twice, during mid- (November) and late (January) season flowering, and our data represent the means of both experiments.

Flowers from AOA-treated racemes did not begin to abscise until 40 hr after the ethephon-treated and control racemes (Fig. 1). All flowers from ethephon-treated racemes had abscised by 75 hr, but those of the control and AOA treatments only after 190 and 220 hr, respectively.

The rate of elongation of the corolla was inhibited by application of AOA (Table 1). Control buds flowered after 6 days; however, all AOA-treated buds abscised before anthesis. Apparently, both a delay in flower abscission and alteration in flower development were associated with lowered ethylene production in the BJV flowers. Ethephon-treated buds also abscised before anthesis, a result consistent with ethylene action on flowers (Abeles, 1973; Blumenfeld, 1975).

Table 1. Effect of AOA and ethephon on corolla elongation and ethylene production from blue jade vine buds and flowers.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Conc</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>Ethylene production after 6 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOA</td>
<td>100 μM</td>
<td>2.0 ± 0.3</td>
<td>2.8 ± 0.3</td>
<td>3.7 ± 0.4</td>
<td>64 ± 14</td>
</tr>
<tr>
<td>Ethephon</td>
<td>5 mM</td>
<td>2.3 ± 0.2</td>
<td>Abscised</td>
<td>Abscised</td>
<td>---</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>2.4 ± 0.3</td>
<td>3.8 ± 0.9</td>
<td>Flowered</td>
<td>370 ± 14</td>
</tr>
</tbody>
</table>

Six days after the ethephon and AOA treatments, a single flower was sampled from the basipetal, middle, and acropetal sections of each raceme. The three flowers from each raceme were placed into a 25-ml glass tube (1.5 × 15 cm) containing 3 g of KOH and a 1-cm layer of spun woolfiber between the flowers and the KOH. Tubes were stoppered with rubber septums and kept on a laboratory bench at 22°C. After 1 hr, 1.0-ml gas samples were removed from the tubes and analyzed for ethylene by gas chromatography (Saltveit and Larson, 1983).

Six days after treatment, ethylene production from AOA-treated flowers was reduced to about one-sixth that of control flowers (Table 1). Data on ethylene production from ethephon-treated buds are not available because the flowers abscised before the sampling period.

Application of AOA to BJV racemes delayed flower bud abscission. In addition, bud development (elongation of the corolla, anthesis) was inhibited with AOA application.

![Fig. 1](image-url) Influence of 100 μM AOA and 5 mM ethephon on percent abscission of blue jade vine flowers. Treatments were applied as a directed spray to 2- to 3-mm buds. Each treatment represents the mean of five replicate racemes.

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