Sansevieria stuckyi Potential as Potted Plant

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Abstract

Propagation of S. stuckyi was found to be possible when cuttings of juvenile leaves were used without any hormonal or surgical treatments. Anatomical examinations of the tissues where root formation took place indicated no distinctive differences between juvenile and adult leaves. Production of marketable plants is slow and best carried out in tropical or subtropical areas.

INTRODUCTION

Sansevieria stuckyi is a succulent perennial originating in the mountains of Zimbabwe and has been known to botanists and botanical gardens since late 1700s (Brown, 1915), but never produced commercially as an ornamental in pots. S. stuckyi belongs to the monocotyledonous family Dracaenaceae and other members of the genus notably S. trifasciata have been produced and grown in nurseries and homes for centuries. The genus comprises some 60 or 80 species (Eggeli, 1994; Chahinian, 2001) depending on which authority one wishes to follow. Most species are found in dry savannas of east Africa.

S. stuckyi has two life forms: juvenile and adult. The juvenile leaves are flat to involute, bending grey-green with dark green cross stripes. The juvenile phase lasts from four to six years depending on climatic conditions (Chahinian, 2001).

The adult plants (Fig. 1) have large rhizomes, thick almost cylindrical, dark green leaves of 2-3 cm in diameter and up to 2 m length in irregular rosettes; the leaves are very fibrous and coated with thick layers of wax. Flowers are rarely if ever seen in cultivation, in Nature the insignificant flowers appear at the basal side of the leaf rosettes.

The proposed utilization of S. stuckyi as a novel potted plant is seen as a catering to the trend of easy maintenance, sculptural plants (Noack, 2003) for banks, bureaucrats and bachelors.

For use as a potted plant efficient propagation is essential. S. stuckyi can be propagated by division of the rhizomes but this is slow and requires large plants. The propagation of S. trifasciata is generally done by leaf cuttings or sections of leaves and it was decided to examine the possibility of using the same method for S. stuckyi. One of the main problems according to Brown (1915) is the extremely slow rooting of cuttings. In other species it has repeatedly been shown that there are marked differences between cuttings taken from juvenile and adult tissues or organs (eg. Davies et al., 1982, with Ficus pumila and Hackett, 1988, with Hedera helix).

MATERIALS AND METHODS

As stock plants were used adult plants of Sansevieria stuckyi Godefroy-Lebeuf that had been grown in the botanical collection of Copenhagen University for about 50 years. The origin of these plants was a collection of seeds received in exchange from the botanical garden of Abo, Finland, but more details are unavailable. One of these plants has since been multiplied as a clone. They have been grown in a greenhouse with 17 to 26 C RH 70% and supplemental light during the winter months.

Adult leaves were cut in 10 cm sections. Juvenile leaves 7-10 cm long were cut at the base from regenerated adult cuttings (Fig. 2). Cuttings were treated with Floramon rooting powder (0.1 or 0.4% NAA). For the adult cuttings a further treatment consisted of wounding with 3 cuts 3 cm from the base up. The cuttings were placed with one cutting per 9 cm pot filled with Vermiculite. The pots were randomly arranged on a bottom
heated (20°C) greenhouse bench, covered for the first month with shading cloth. Later the shade was removed and supplementary light (400W m²) given for 8 h daily. Air temperature was 25°C day and night. A drench with Octave was given after two weeks for control of fungal diseases. Watering was manual with tap water until two moths then with a standard greenhouse fertigation at pH 6 and EC of 1.

The experiment was repeated.

Number of surviving cutting was recorded throughout the experiments. At selected dates the cuttings were removed from the medium and roots and shoots were counted.

In a separate experiment cuttings were placed in styrofoam plates floating on aerated weak nutrient solutions in 40 liter white plastic boxes. These boxes were in the same greenhouse as the pot experiments.

Statistical treatment of rooting and shoot formation data were done with Kruskal-Wallis one way analysis and Dunn’s test in the program Sigma Stat.

RESULTS

Survival of the cuttings was best in control and inferior with auxin treatments and wounding (Table 1). Rooting of the surviving cuttings was generally unaffected by the auxin treatments. After 39 days 80 to 90% of the juvenile cuttings but only less than 10% of the adult had rooted. At 47 days much more adult cuttings had roots and now the juvenile were almost all rooted (Fig. 3).

Shoot formation occurred much later. Almost three months after cutting about 70% of the juvenile and 30% of the adult cuttings had formed visible shoots. At four months almost 90% of all juveniles had shoots compared to only 60% of the adults (Fig. 4). There was no significant effect of wounding the cuttings. Hydroculture of the cuttings during rooting was possible and produced viable propagules just as fast as the sand cultured cuttings.

Anatomical examinations of the cuttings during rooting revealed no structural impediments to root formation and emergence that could explain the differences between juvenile and adult cuttings. The details of these investigations will be published elsewhere.

DISCUSSION

Propagation of *S. stuckyi* was possible. The differences between adult and juvenile cuttings could not be ameliorated by auxin treatments which on the contrary caused lower survival rates and had no significant effect on rooting or shoot formation. This is similar to observations on a related species – *Agave parrasana* by Santacruz-Revulcaba et al. (1999). Wounding of cuttings did not improve rooting of *S. stuckyi* as has been found for other species with heavy fiber development of tissues surrounding the site of root initiation (Hartmann et al., 1997). As shown by anatomical examinations the roots formed in the leaf cuttings of *S. stuckyi* grew down through the leaf tissues, thus the fibers did not present a real barrier to root growth and emergence.

The further growth of propagules proceeded at a slow rate for all treatments, but after almost a year the plants from juvenile leaves had significantly more, but not longer shoots. For a plant to be marketable meter long shoots or leaves are required. Thus the production time becomes much too long for profitable growing of these plants in greenhouses. However outdoor production in tropical or subtropical areas is feasible.

Literature Cited


Tables

Table 1. Survival percentages of adult cuttings of \textit{Sansevieria stuckyi}.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>91</td>
</tr>
<tr>
<td>Wounding</td>
<td>72</td>
</tr>
<tr>
<td>Auxin 0.1%</td>
<td>69</td>
</tr>
<tr>
<td><strong>Auxin 0.4%</strong></td>
<td><strong>71</strong></td>
</tr>
</tbody>
</table>

Table 2. Further growth of propagules from juvenile leaf cuttings of \textit{Sansevieria stuckyi}: shoot numbers per cutting and shoot lengths per shoot. Means with different letter are statistically different (95%)

<table>
<thead>
<tr>
<th>Time after cutting</th>
<th>Shoot number</th>
<th>Shoot length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>0.1% NAA</td>
</tr>
<tr>
<td>125 days</td>
<td>1.4a</td>
<td>1.8a</td>
</tr>
<tr>
<td>220 days</td>
<td>1.2a</td>
<td>1.3a</td>
</tr>
<tr>
<td>280 days</td>
<td>1.2a</td>
<td>1.3a</td>
</tr>
<tr>
<td>330 days</td>
<td>2.1b</td>
<td>2.8ab</td>
</tr>
</tbody>
</table>

Table 3. Further growth of propagules from adult leaf cuttings of \textit{Sansevieria stuckyi}: shoot numbers per cutting and shoot lengths per shoot. Means with different letter are statistically different (95%)

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</tr>
<tr>
<td>330 days</td>
<td>2.3a</td>
<td>1.7ab</td>
</tr>
</tbody>
</table>
Figures

Fig. 1. Potted plants of *Sansevieria stuckyi* about five years old.

Fig. 2. Adult leaf cuttings of *Sansevieria stuckyi* at different developmental stages from (left to right): At cutting, + 30 days, 50 days, 100 days and 200 days. Note the juvenile characteristics of the shoot, from this can be taken juvenile cuttings, juvenile leaves will continue to develop.
Fig. 3. Root formation in juvenile and adult cuttings of *Sansevieria stuckyi* at 39 days (left group) and 47 days (right) after cutting.

Fig. 4. Shoot formation in juvenile and adult cuttings of *Sansevieria stuckyi* at 39 days (left group) and 47 days (right) after cutting.
Fig. 5. Anatomical observations on root formation in juvenile cuttings of *Sansevieria stuckyi*. 