A REFEREEED PAPER

VADE LIFE COMPARISON OF ORNAMENTAL ASPARAGUS SPECIES AND CULTIVARS

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Abstract. The cut foliage industry in Florida started in the 1890s when producers started growing Asparagus setaceus (plumosa “fern”). Since then, a number of additional species and cultivars of ornamental Asparagus have been tried for use as florists’ greens. Ten species and cultivars were grown in containers in a shadehouse with 70% light exclusion. Over a seven-year period, stems were periodically harvested for vase life evaluations. After harvest, stems were submerged in water, packed in plastic bags and stored for 2 weeks in corrugated fiberboard boxes held at 4°C (40°F). After storage, stems were held under simulated home/office conditions in glass containers filled with deionized water. Average overall vase life durations ranged from 24.4 days for A. densiflorus ‘Myers’ to 6.2 days for A. pseudosascular, and generally broke out into a number of somewhat discrete groupings: A. densiflorus ‘Myers’ > A. africanus, A. setaceus > A. falcatus, A. virgatus, A. retrofuctus > A. densiflorus ‘Sprengeri’, A. officinalis subsp. prostrata, A. crispus and A. pseudosacular. The primary symptoms at vase life terminations were chlorosis (yellowing) and cladophyll drop (abscission).

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Table 1. Ornamental Asparagus evaluated for vase life.

<table>
<thead>
<tr>
<th>Scientific names (Bailey et. al., 1976; Huxley, 1992)</th>
<th>Common name(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. africanus Lam.</td>
<td>—</td>
</tr>
<tr>
<td>A. crispus Lam.</td>
<td>—</td>
</tr>
<tr>
<td>——</td>
<td>—</td>
</tr>
<tr>
<td>Floral industry Other</td>
<td>—</td>
</tr>
<tr>
<td>basket asparagus thornless sprengeri</td>
<td>foxtail, foxtail “fern” meyeri</td>
</tr>
</tbody>
</table>

The cut foliage industry in Florida started in the 1890s when growers started producing Asparagus setaceus (plumosa “fern”) for shipment to northern markets (Manning, 1984). Over the years, additional Asparagus species and cultivars have been introduced for use as florists’ greens (Hunter, 2000; Scace, 2001; Stamps, 1988; Strong, 1996). However, relative vase lives of these plants, produced and evaluated under the same conditions, have not been studied. In addition, the nomenclature used in several references is dated or incorrect, which can lead to confusion when comparing various ornamental Asparagus.

The purpose of this study was to repeatedly harvest and evaluate a number of Asparagus species and cultivars in order to ascertain the relative variability and duration of their vase lives.

Materials and Methods

Ten species, subspecies and cultivars of Asparagus were evaluated in this study (Table 1, Fig. 1). Please note that the taxonomy of these plants is still in a state of flux, and that some of the names listed are somewhat provisional. Plants were grown in Apopka, Fla., in a shadehouse covered with black polypropylene shade fabric providing 70% light exclusion. During winter, temperatures were maintained above 7°C (45°F) by lining the shadehouse with polyethylene film and heating it using kerosene-fueled space heaters. Substrate used in the plastic pots was a Sphagnum peat:vermiculite:perlite (60%:20%:20% by volume) soilless growing medium (Vergro Container Mix A, Verlite, Tampa, Fla.). Pots were fertilized with a 15N-4P-10K controlled-release fertilizer containing additional macro- and micronutrients (Osmocote Plus 15-9-12 with minors, Scotts, Marysville, Ohio) at an annual nitrogen application rate of 3,192 kg·ha⁻¹·yr⁻¹ [2,850 lb/acre/yr]. Multiple pots, usually five to 12, of each Asparagus being evaluated were maintained. Irrigation was provided as needed using overhead sprinklers.
Recently matured stems were harvested by pulling by hand ('A. densiflorus' 'Myers' and 'Sprengeri', 'A. officinalis' subsp. prostrata) or cutting using clippers and bunched into five- or ten-stem groups. Stem lengths generally ranged from 60 to 76 cm (24 to 30 inches). Bunches were submerged in deionized water for 3 min and immediately placed into 30 cm × 76 cm (12" × 30") plastic bags. Bags were sealed and placed in waxed fiberboard boxes and stored in a cooler at 4°C (40°F) (Nowak and Rudnicki, 1990) for two weeks. After 14 d in storage, stem bases were re-cut using hand clippers to remove about 2.5 cm (1 inch). Cladophylls at base of the stems were stripped off by hand. Stems were then placed in 900-mL glass jars, filled with deionized water, located in an acclimatization room. Only the stems of one species or cultivar were placed in a jar.

Conditions in the rooms simulated home/office conditions with light levels of 17 µmol·m⁻²·s⁻¹ (107 ft-candles) provided for 12 h per day using cool white fluorescent lamps, temperatures of 23 ± 2°C (74 ± 4°F) and relative humidities of 45 ± 15%. Vase life of stems were terminated when they began to exhibit chlorosis (yellowing), necrosis (brown or black tissue), desiccation (graying, curling, wilting) or cladophyll drop (abscission) affecting about 5% or more of the cladophylls or cladophyll surface area.

Statistical analyses were done using analysis of variance and means separations were made using Duncan’s new multiple range test at \( P \leq 0.05 \) (SAS Institute, Cary, N.C.). The experimental units were individual stems.

Table 2. Vase life, in days, of Asparagus species and cultivars after storage for 2 weeks at 4°C.

<table>
<thead>
<tr>
<th>Harvest month and year</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/96</td>
<td>19.7 b'</td>
</tr>
<tr>
<td>10/97</td>
<td>5.6 cd</td>
</tr>
<tr>
<td>6/98</td>
<td>18.7 b</td>
</tr>
<tr>
<td>7/99</td>
<td>16.0 a</td>
</tr>
<tr>
<td>6/01</td>
<td>7.0 bc</td>
</tr>
<tr>
<td>1/01</td>
<td>13.2 b</td>
</tr>
<tr>
<td>8/02</td>
<td>4.6 de</td>
</tr>
<tr>
<td>5/03</td>
<td>—</td>
</tr>
<tr>
<td>A. africanus</td>
<td>14.8 b</td>
</tr>
<tr>
<td>A. crispus</td>
<td>4.5 d</td>
</tr>
<tr>
<td>A. densiflorus 'Myers'</td>
<td>25.8 a</td>
</tr>
<tr>
<td>A. densiflorus 'Sprengeri'</td>
<td>3.6 d</td>
</tr>
<tr>
<td>A. falcatus</td>
<td>16.3 b</td>
</tr>
<tr>
<td>A. officinalis subsp. prostrata</td>
<td>3.8 d</td>
</tr>
<tr>
<td>A. pseudosuber</td>
<td>5.0 d</td>
</tr>
<tr>
<td>A. retrofractus</td>
<td>—</td>
</tr>
<tr>
<td>A. setaceus</td>
<td>11.6 c</td>
</tr>
<tr>
<td>A. virgatus</td>
<td>11.6 c</td>
</tr>
</tbody>
</table>

*Means in a column followed by the same letter are not significantly different at \( P \leq 0.05 \) (Duncan’s new multiple range test).
than 100 years after it was introduced as a cut foliage crop in Florida. Texture of *A. africanus* and *A. setaceus* are similar but *A. africanus* has bluer cladodes. Results for *A. setaceus* are consistent with previous work (Barendse, 1979; Dolci et al., 1989).

The remaining Asparagus, with average overall vase lives greater than one week but less than two, were intermediate between the better and worst performing plants. Of these Asparagus, vase lives found in our trials were consistent with those reported earlier for *A. falcatus* (Dolci et al., 1989) and *A. virgatus* (Barendse, 1979; Stamps and Rock, 2000) but shorter than previously reported for *A. retrofractus* (Barendse, 1979; Broschat and Donselman, 1987).

Chlorosis was by far the most common reason vase lives were terminated (Table 3). Depending on Asparagus type, from 78% to 98% of stems exhibited this symptom. The other significant characteristic ending vase lives was cladophyll drop. Both of these symptoms are typical for ornamental Asparagus (Barendse, 1979; Dolci et al., 1989; Lee et al., 2003) and are likely related to the known ethylene sensitivity of these crops (Nowak, 1985; Dolci et al., 1989; Lee et al., 2003).

In conclusion, ornamental Asparagus have a range of vase life potentials that should be taken into consideration when used by florists. Additional research on the effects of pre- and/or postharvest treatments to extend vase life should be conducted so that these products will perform better as cut foliage.

### Table 3. Vase life termination symptoms displayed by stems of ornamental Asparagus, in percentages.†

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Chlorosis</th>
<th>Cladophyll drop</th>
<th>Necrosis</th>
<th>Dessication</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>A. africanus</em></td>
<td>84.1</td>
<td>72.7</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>A. crispus</em></td>
<td>97.6</td>
<td>23.8</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td><em>A. densiflorus</em> ‘Myers’</td>
<td>86.3</td>
<td>15.7</td>
<td>3.9</td>
<td>11.8</td>
</tr>
<tr>
<td><em>A. densiflorus</em> ‘Sprengeri’</td>
<td>89.7</td>
<td>51.3</td>
<td>10.3</td>
<td>0.0</td>
</tr>
<tr>
<td><em>A. falcatus</em></td>
<td>90.4</td>
<td>17.3</td>
<td>17.3</td>
<td>0.0</td>
</tr>
<tr>
<td><em>A. officinalis</em> subsp. prostrata</td>
<td>94.4</td>
<td>5.6</td>
<td>9.3</td>
<td>1.9</td>
</tr>
<tr>
<td><em>A. pseudosuber</em></td>
<td>95.1</td>
<td>2.4</td>
<td>0.0</td>
<td>12.2</td>
</tr>
<tr>
<td><em>A. retrofractus</em></td>
<td>90.3</td>
<td>16.1</td>
<td>9.7</td>
<td>0.0</td>
</tr>
<tr>
<td><em>A. setaceus</em></td>
<td>78.1</td>
<td>22.6</td>
<td>18.8</td>
<td>3.1</td>
</tr>
<tr>
<td><em>A. virgatus</em></td>
<td>98.0</td>
<td>14.3</td>
<td>2.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

†Percentages are the average of five to eight evaluations, depending on plant (see Table 2). Total percentages may exceed 100% since multiple symptoms may have been observed on individual stems.

### Literature Cited


