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Propagation of Hardy Begonia (*Begonia grandis* subsp. *evansiana*) from Seeds and Tubers

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Abstract

Hardy begonia (*Begonia grandis* subsp. *evansiana*) has received a revival in popularity as a shade-tolerant, summer flowering perennial. It produces seeds and aerial tubers late in the summer under short daylengths. There is limited information on the propagation of hardy begonia related to seed or tuber propagation. Seed harvested from dried capsules collected from fruit showing some observable natural desiccation had a high percentage of filled seeds and these seeds germinated in less than 1 week. Aerial tubers form in leaf axils and tuber size varied based on node location on the plant. Tubers of various sizes were placed in plastic bags and placed at 10°C for 0 to 10 weeks. Tubers did not form plants without a chilling treatment. Plant formation began after 4 weeks of chilling, but the highest plantlet formation occurred after 8 and 10 weeks of chilling.

INTRODUCTION

Hardy begonia (*Begonia grandis* subsp. *evansiana*) is one of the tuber-producing begonia species and is the only reliably frost-hardy begonia (USDA Zone 6). Hardy begonia has received a revival in popularity as a shade-tolerant, late summer flowering perennial. It apparently survives winter temperatures as basal or dispersed aerial tubers. Aerial tubers form late in the summer under short daylengths and hardy begonia is one of the few begonias to form these aerial structures. Aerial tubers form in leaf axils and tuber size varies based on node location on

the plant. Larger tubers generally form in the center of the axillary node and this tuber can be subtended by two smaller tubers. Hardy begonia may also persist and spread by seeds. Flowers form in late summer and fruits may not reach full maturity before frost. The objective of this study was to investigate the dormancy requirements for seed and tuber propagation of hardy begonia.

MATERIALS AND METHODS

Seed Afterripening and Germination

Seeds were harvested from swollen seed capsules following petal abscission and allowed to dry for several weeks in the capsules under ambient lab conditions. Seed capsules were also harvested later in the season from capsules that had undergone natural desiccation and initial seed dispersal. Dry seeds were germinated within 2 weeks of harvest or allowed to afterripen for 40 days in paper bags at ambient temperature and lab humidity.

Tuber Chilling

Mature tubers were collected in mid-October from hardy begonias grown outdoors. Tubers were separated by size (small or large) and placed in petri dishes filled with dry vermiculite sealed with parafilm. Dishes were placed in a cooler at 10 ℃ for 0, 2, 4, 6, and 10 weeks. Following chilling treatments, tubers were placed on the surface of a moist Pro-Mix® substrate and moved to short day conditions (8-h light). Approximately 100 small and 60 large tubers were used for each treatment. Shoot emergence from tubers was measured 2 and 5 weeks after tubers were removed from the cooler. Sprouted tubers were moved to greenhouse conditions to observe growth.

RESULTS AND DISCUSSION

Seed Afterripening and Germination

Seeds harvested from dried capsules collected from fruit prior to observable natural desiccation contained seeds that germinated slowly and at low percentages. Seeds harvested from dried capsules collected from fruit showing observable natural desiccation had a higher percentage of filled seeds and these initially germinated slowly (>2 weeks) apparently showing a degree of nondeep physiological dormancy. These seeds allowed to afterripen for 40 day germinated at high percentages in less than 1 week.

Tuber Chilling

Non-chilled tubers or tubers chilled for 2 weeks failed to initiate shoot development. Shoot formation began in tubers after 4 weeks chilling (<10% for both small and large tubers). The highest plantlet formation occurred after 6- or 8-weeks chilling with small tubers producing shoots at approximately 85%, while large tubers produced shoots between 65% and 75% (Fig. 1). The need for chilling treatment may support the idea that hardy begonia overwinters as dispersed aerial tubers, which will sprout in the following spring. Larger tubers produced larger plantlets compared to plants developed from small tubers (Fig. 2). Tubers displayed polar development and produced one shoot with one or more leaves at the tuber apex.

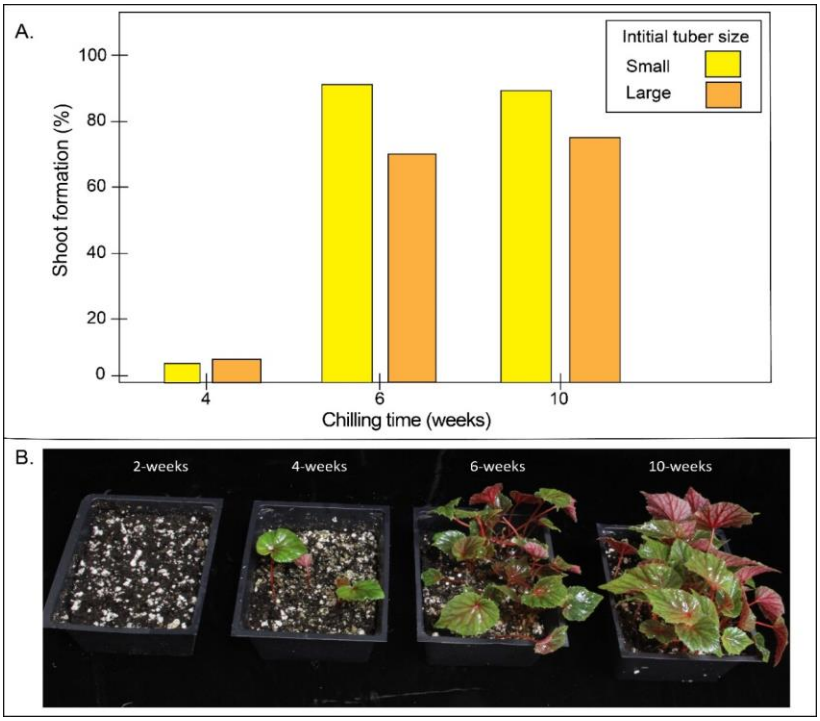

Figure 1. A. Shoot formation in hardy begonia tubers moist chilled for up to 10 weeks. B. Shoot formation after 5 weeks in tubers chilled between 2 and 10 weeks.

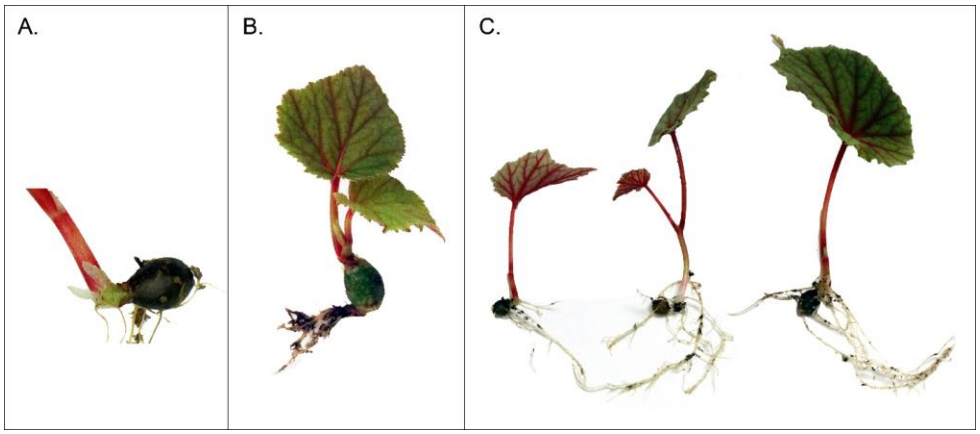

Figure 2. Polar shoot and root formation in hardy begonia tubers moist chilled for eight weeks. A. Shoots emerge from the apical end of the tuber. B. Apical shoot emergence is followed initially with roots from the basal end of the tuber. C. Eventually adventitious shoots will also form on the emerging stem.

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