Field Establishment and Growth of *Asarum naniflorum* 'Eco Decor'

Sherry Kitto
Delaware Experiment Station, Department of Plant and Soil Sciences, College of Agricultural Sciences, Newark, Delaware 19717

Jeanne Frett
Mt. Cuba Center for the Study of Piedmont Flora, Greenville, Delaware 19807

INTRODUCTION

There are approximately 12 taxa of the genus *Asarum* (syn. *Hexastylis*) native to the deciduous forests of the Southeastern United States. Several ornamental characteristics combine to make these low-growing herbaceous plants suitable for use in the landscape. These include attractive foliage; triangular to heart-shaped evergreen leaves, with or without silvery-grey variegation; rhizomatous growth habit resulting in single specimen (clumping) or groundcover (running) plants; and curious jug- or bell-shaped purplish-brown spring flowers. They are hardy in USDA Zones 5 to 9.

Although these evergreen wild gingers are occasionally seen in gardens, their landscape potential has not been fully realized. This is due in large part to propagation difficulties using traditional methods. Seed set under cultivation is low and potential seed production per plant under optimal conditions is low. Division is possible but slow; on a commercial basis it would require the maintenance of large numbers of stock plants. Establishment of single-clone stock blocks would be time consuming and expensive. Micropropagation offers the potential for large-scale rapid propagation and distribution of clones selected for ornamental qualities, vigor, and cultural adaptability.

METHODS AND MATERIALS

In vitro. Sterile cultures of *A. naniflorum* 'Eco Decor' obtained from SMK Plants (Billings, MT) were cultured onto M.S. (Murashige and Skoog, 1962) basal medium containing (in mg liter^{-1}) 0.4 thiamine-HCl, 0.5 pyridoxine-HCl, 0.5 nicotinic acid, 100 myo-inositol plus 2% sucrose, and 0.7% Phytagar. Plants were subcultured monthly to proliferation maintenance medium consisting of basal medium supplemented with 1 mg liter^{-1} BA. For rooting, basal medium was supplemented with 1 mg liter^{-1} NAA.

Greenhouse and field. In vitro-rooted shoots, single or multiple crowns, were either rooted in the greenhouse in Metro-Mix 510 in market packs under a humidity dome on the mist bench for 4 to 6 weeks, then taken to the field, or rooted directly in the field in a raised bed or in tree bands placed in flats in a raised bed.

In Experiment 1, 122 in vitro-rooted microcuttings were planted 3 inches on center in 5 ft × 10 ft-raised beds under 63% shade in a lath house. The growing mix consisted of sand, peat moss, and loam (1 : 1 : 1, by volume). A 1-inch layer of pine straw mulch was placed around the plants to conserve moisture and reduce weed growth. After an initial thorough watering, water needs were checked daily for 2 weeks then

weekly. There were no problems with pathogens and insects, slugs were controlled with slug bait.

In Experiment 2, 33 in vitro-rooted microcuttings were potted and placed in the greenhouse for 6 weeks and then taken to the field, while 39 microcuttings were planted directly into the growing mix in the raised bed (Expt. 1).

In Experiment 3, 48 in vitro-rooted microcuttings were either planted directly into 2.38 inch × 3.75 inch-tree bands using Metro-Mix 510 and placed in a raised bed in the field, or were planted directly into the growing mix in the raised bed in the field (Expt. 1).

RESULTS

Experiment 1. An initial experiment was set up to determine if original plant size, measured as weight and leaf number, was correlated with plant size after one growing season. Plants were planted and placed in a greenhouse for approximately 1 month and then were planted in the field. After 14 months, 95% of the 122 plants had survived and grown. On average, plants increased their weight by 23 g, or were 6260% heavier, and had almost 18 more leaves which represents a 250% increase in leaf number. Original plant size, measured as either weight or leaf number, had no predictive value for final plant size.

Experiment 2. The next experiment was set up to determine if we could by-pass the greenhouse acclimation period and plant the in vitro-rooted plants directly in the field. A 6-week greenhouse acclimation period had no influence on plant survival or growth after 14 months of growth in the field.

Experiment 3. A third experiment was set up to compare growth and survival of plants placed directly in the field either in a raised bed or in tree bands. After 14 months, the plants placed directly in the raised bed were discarded due to *Thielaviopsis* black root rot and; therefore, there was no way to directly compare growth between plants in tree bands versus those placed directly in a raised bed in the field. While 100% of the plants survived planting in the tree bands, growth was greatly reduced if compared to growth in Experiments 1 and 2. This may be the result of insufficient container size limiting nutrient and water availability.

CONCLUSIONS

In vitro-rooted microcuttings of *A. naniflorum* 'Eco Decor' can be planted directly into the field and survive. Further research needs to be conducted using tree bands to obtain growth comparable to direct field planting. In vitro-rooted microcuttings of *A. naniflorum* were not difficult to establish and grow under field conditions.

Acknowledgment. This research was partially funded by a grant from the Perennial Plant Association.

LITERATURE

Murashige, T. and **F. Skoog.** 1962. A revised medium for rapid growth and bioassays with tobacco tissue cultures. Physiol. Plant. 15:473-479.