STACKED PROPAGATION

a new way to grow native plants from root cuttings

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ABSTRACT

Stacked propagation is a novel method of growing quaking aspen *(Populus tremuloides* Michx. [Salicaceae]) and other plants that reproduce from underground stems or root cuttings. Because the mother plant is not damaged, it is particularly well suited for rare plants or those that can't be propagated by normal methods. Our initial trials indicate that hundreds of vigorous plants can be produced by this method in each propagation cycle.

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KEY WORDS

Populus tremuloides, vegetative propagation, restoration

NOMENCLATURE

USDA NRCS (2006)

Quaking aspen with splendid fall color. Photo by Thomas D Landis

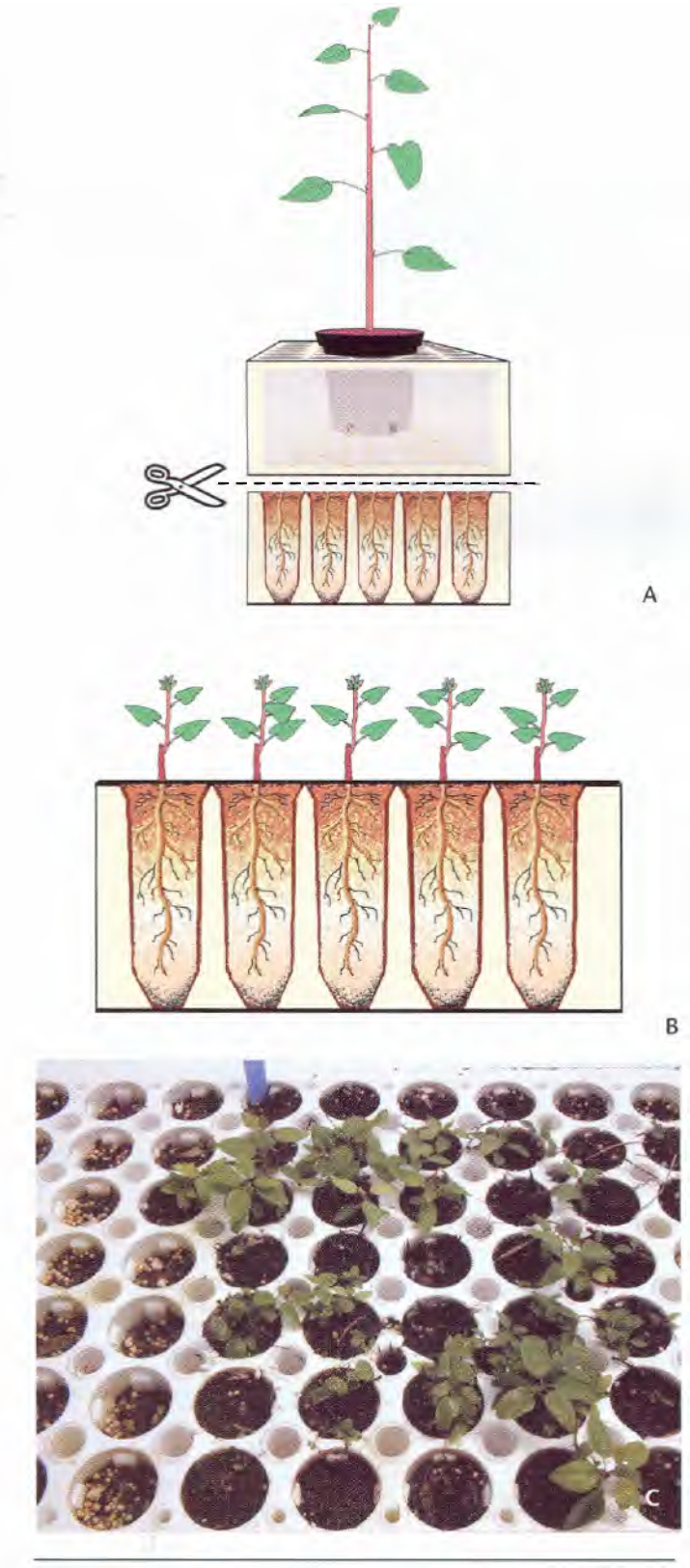

Figure 2. The concept behind stacked propagation is that roots from the mother plant will grow down through the cells of the lower propagation blocks, which will then be severed (A). Sprouts will develop from the cut roots and grow into shippable plants (B). In spite of losing a considerable amount of growing media, our first attempt was moderately successful (C).

Illustrations by Steve Morrison Graphics; Photo C by Thomas D Landis

Figure 3. Spunbonded fabric is used to prevent growing medium from washing out of this 3 layer stack of propagation Styroblock TM containers. Photo by David R Dreesen

Figure 4. The latest modification is to use Styrofoam TM strips to seal the gaps between the Styroblock TM containers. Photo by Jeremy R Pinto

containers per stack to determine if roots from the aspen stock plant would grow into more than one propagation block (Figure 3). About 1 y after assembly of 2 stacked block units, approximately 85% of the cavities had aspen roots emerging from the bottom rooting block. This system, however, was labor intensive and not efficient.

In our third iteration, we used strips of expanded polystyrene approximately 2 cm x 2.5 cm (0.75 in x 1 in) to form a perimeter barrier to retain the potting mix. The strips were pinned to the propagation blocks with rigid wire pins to allow removal when the mother plant was cut away. The small gaps above and below the perimeter strips allow some drainage and aeration while still retaining the potting mix (Figure 4). The cover block was secured to the propagation blocks with plastic twine, and filament tape was used to cover the vent holes in the propagation block to prevent the loss of growing medium.

After 3.5 mo, 7 aspen stacks were assessed for root emergence. The percentage of cavities with emerging roots ranged from 55% to 85% with a mean of 75%. With a full growing season, higher root emergence percentages might be achieved. Root emergence in itself does not guarantee shoot development, but these percentages give an indication of increase potential. The stock aspen plants appear to be vigorous.

APPLICATION TO OTHER SPECIES

The Hopi are also interested in propagating shrub oaks, which do not regularly produce acorns. To that end, we have initiated trials with 2 thicket-forming oak species, Gambel oak (*Quercus gambelii* Nutt. [Fagaceae]) and wavyleaf oak (*Quercus* × *pauciloba* Rydb. (pro sp.) *[gambehi* × *turbinella]* [Fagaceae]). Gambel oak has the capability of sprouting from adventitious buds on lignotubers and rhizomes; adventitious buds are concentrated in the top 30 cm (12 in) of soil (Simonin 2000). The only stock plants available for the test were growing in Tall One Treepots™ (2830 cm^3 [173 in^3]; Stuewe & Sons Inc, Corvallis, Oregon), so the cover block unit required 2 stacked Styroblock" gallons (8 cavities, each 3000 cm^3) (Beaver Plastics, Edmonton, Alberta) for each single propagation block. Therefore, 8 seedlings of each species were supported and insulated by the stacked cover blocks (Figure 5A).

Stacked propagation may have application to other native plants that have been propagated with root cuttings, especially several genera in the Rosaceae, including *Amelanchier* Medik., *Prunus* L., *Rosa* L., and *Rubus* L. (Figure 5B), as well as *Aesculus* L. (Hippocastanaceae), *Populus* L. (Salicaceae), *Rhus* L. (Anacardiaceae), *Robinia* L. (Fabaceae), *Sambucus* L. (Caprifoliaceae), and *Symphoricarpos* Duham. (Caprifoliaceae) (Del Tredici 1996).

CONCLUSIONS

Stacked propagation is particularly attractive when plant material is limited,

Figure 5. Stacked propagation is also being tried on native shrub oaks (A) as well as wild raspberry (B). Photo A by David R Dreesen and Photo B by Jeremy R Pinto

when other propagation techniques are not effective, or when vegetative propagation is preferred. Another benefit is that the original mother plant is not damaged and can be used for several more iterations. In spite of its novelty, however, this is still vegetative propagation—be sure to use as many mother plants as possible to ensure maximum genetic variation. In the case of dioecious plants such as quaking aspen, you must also use both male and female mother plants (Landis and others 2003).

REFERENCES

Del Tredici P. 1996. The propagation of hardy, woody plants from root cuttings: a review. International Plant Propagators' Society, Combined Proceedings, 1995, 45:431-439.

Dreesen DR, Harrington JT. 1999. Vegetative propagation of aspen, narrowleaf cottonwood, and riparian trees and shrubs. In: Landis TD, Barnett JP, technical coordinators. National proceedings, forest and conservation nursery associations-1998. Asheville (NC): USDA Forest Service, Southern Research Station. General Technical Report SRS-25. p 129-137.

LaFleur L. 2004. Personal communication. Smoky Lake (AB): Smoky Lake Nursery. Nursery Manager.

Landis TD, Tinus RW, Barnett JP. 1999. The Container Tree Nursery Manual. Volume 6, seedling propagation. Washington (DC): USDA Forest Service. Agriculture Handbook 674. 167 p.

Landis TD, Dreesen DR, Dumroese RK. 2003. Sex and the single *Salix*. Native Plants Journal 4(2):110-117.

Pinto JR, Landis TD. 2003. Propagating plant materials for the Hopi Reservation, Arizona. In: Riley LE, Dumroese RK, Landis TD, technical coordinators. National proceedings, forest and conservation nursery associations-2003. Ogden (UT): USDA Forest Service, Rocky Mountain Research Station. Proceedings RMRS-P-38. p 80-84.

Simonin KA. 2000. *Quercus* In: Fire Effects Information System [Online]. URL: http://www.fs.fed.us/database/feis/ (accessed 17 Aug 2006). Missoula (MT): USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.

[USDA NRCS] USDA Natural Resources Conservation Service. 2006. The PLANTS database, version 3.5. URL: http://plants.usda.gov (accessed 27 Jul 2006). Baton Rouge (LA): National Plant Data Center.

Wycoff GW, Zasada JC. 2003. *Populus* L.: poplar, cottonwood, aspen. In: Woody Plant Seed Manual. URL: http://www.nsl.fs.fed.us/wpsm/Populus.pdf (accessed 22 Aug 2006).

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