Propagating Native Plants

Forest and conservation nurseries are being asked to propagate an increasing variety of native plants from noncommercial trees, to woody shrubs, to wetland plants **(Figure 8a-c).** This trend shows no signs of decreasing anytime soon, and I feel that native plant propagation will be one of the defining issues of the next decade.

Finding Propagation Information

Learning how to propagate these new plants can be a challenge, however. Research is the traditional source of new technology but I'm not aware of any scientists working on new native plant propagation techniques in the US. This problem can be traced to the recent personnel downsizing as well as a lack of priority by research administrators.

So, most of new propagation techniques are being developed on-the-job by operational nurseries but, unfortunately, this information is not being shared. There are several reasons for this. Obviously, private nurseries have a economic reason for not wanting to share their trade secrets and so the burden falls on the government (see Editorial section in this issue). This is a traditional role for USDA Forest Service nurseries and a team headed by Frank Bonner is currently gathering propagation information on trees and woody shrubs. The new edition of *Seeds of Woody Plants in the United States* should be available by later next year. State nurseries and universities are also responding to the demand. The Nursery Technology Cooperative at Oregon State University in Corvallis has been gathering propagation information in a 3-volume series called *Propagation of Pacific Northwest Native Plants: a Manual.* These publications currently are available only to Co-op members although this information will be published as a single book which will be available for general sales in 1998. The State of Illinois has one of the best native plant propagation programs in the US and is currently producing over 130 species: 35 trees, 18 shrubs, 47 forbs, 7 grasses, and 20 herbs in their two nurseries. Government nurseries have been documentin g their propagation techniques in production manuals; for example, the *Greenhouse and Shadehouse Production Manual* from the Mason State Nursery in Illinois covers grasses, forbs, wildflowers, riparian and wetland plants, woody shrubs, and trees for the Great Plains. Again, there is a problem with how to get this information published and distributed because state nurseries are not funded for this purpose.

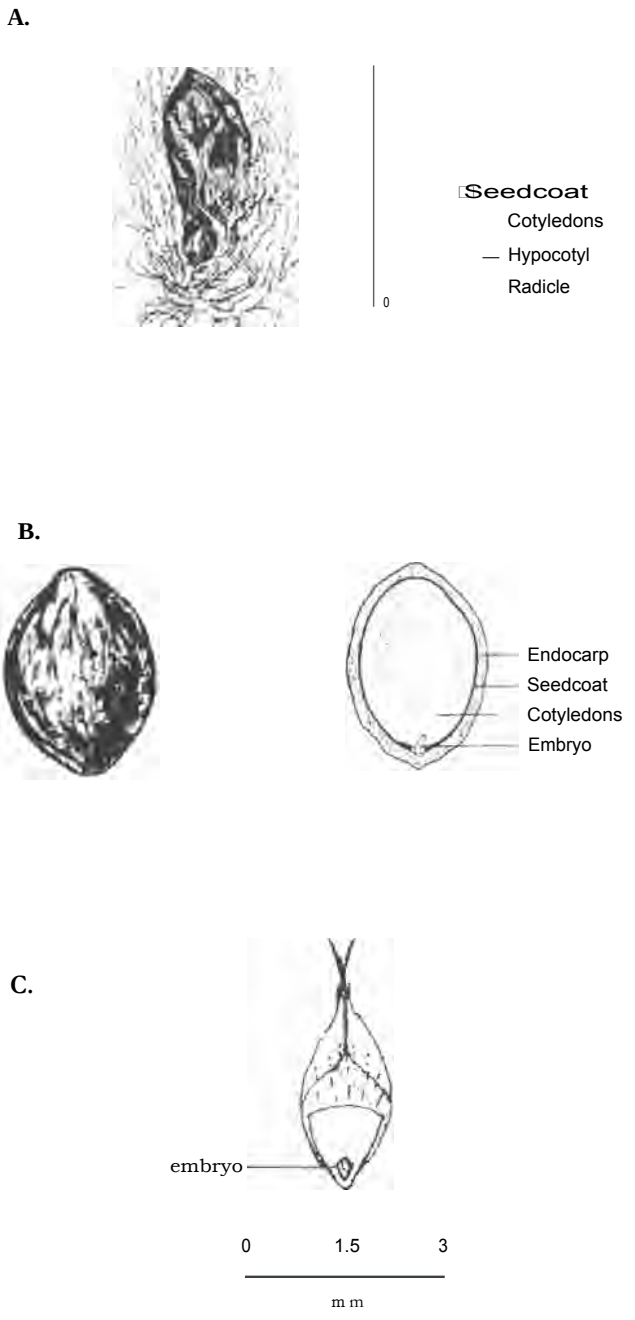

Figure 8. Propagating native plants is a particular challenge because of *the wide variety* of *seed sizes and shapes, and type and degree of dormancy: A=Populus tremuloides, B=Prunus americana; C=Carex spp. (A, B from Schopmeyer; C from Hurd and Shaw).*

Okay, so what are you supposed to do if a customer asks you grow a new species of plant? The first step is to decide whether you should use seed or vegetative propagation. This decision will depend on several other propagation considerations **(Figure 9).** Some plants are more easily propagated by one technique than another. You should also discuss the amount of genetic variability that they want. Seed propagation preserves the most variation but vegetative propagation may be needed if your customer want to produce plants for some specific reason such as to maintain a valuable clone. Sometimes, propagule availability or delivery date will be the determining factor. If your customer wants their plants in a short time then if may be impossible to find seed and you will have to use vegetative propagation. Some species only produce seed crops at long intervals or the seed may have complex dormancy requirements and so vegetative propagation may be more practical. Finally, economics must be considered because plants propagated from seed will, almost always, be less expensive than those produced vegetatively.

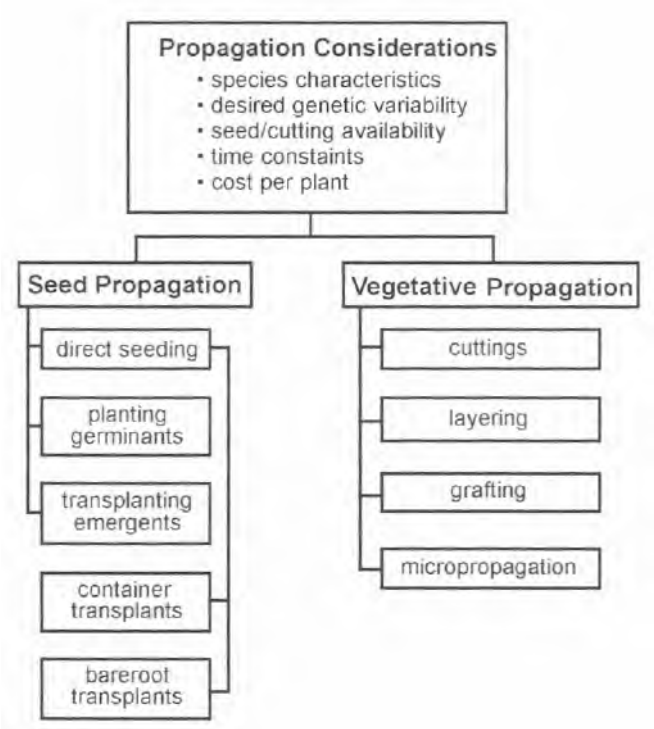

Figure 9. Many factors must be considered before deciding how best to propagate native plants.

Some other possible sources of propagation information include:

1. Systematically search the published literature. Someone may have propagated your species before, and so you may want to conduct a literature search. I know that most of you don't have the means to do this, and as already mentioned, most of the best propagation information never gets published. I try to include as many new propagation articles as I can find in the "Diverse Species" category in the New Nursery Literature section of each issue of FNN. General horticultural texts may contain some specific information but you will have more luck with technical journals. In particular, the *Combined Proceedings of the International Plant Propagators' Society* is a wealth of information and trade journals such as *American Nurseryman* have featured articles on propagating natives which can be used for landscaping purposes. Regional and special publications from Botanic Gardens and Native Plant Societies can also be helpful.

2. Compare propagation methods for related species. If you can find no information for your specific plant. then consider how they propagate close relatives within the genus or family. Some plants have relatives that are being grown as ornamentals and so the propagation information is available. Be aware that there is considerable variation even with a genus. For example, the seed treatments for two shrubby *Acer* species vary considerably. *Acer circinatum* seeds must be stratified under warm, moist conditions for 1 to 2 months followed by cold, moist stratification for another 3 to 6 months. The seeds of *Acer spicatum,* on the other hand, only require the cold stratification treatment.

3. Study the native environment and natural growth habit of the plant. Environmental factors such as total precipitation, distribution of precipitation through the year, and maximum/minimum temperatures affect seed germination. Many other clues can be gained by studying how plants grow in nature. For example, ecological information such as growth habit, type of fruit, and how the seeds are disseminated in nature may provide helpful clues. Most forest and conservation species from the temperature zone require some exposure to cold temperatures and moist conditions that naturally occur during winter. Species from this climate therefore would logically require a cold, moist stratification treatment before the seeds would germinate. Species that are adapted to fire-dominated ecosystems, such as many of the chaparral species, often have seeds that need hot water or acid scarification **(Figure 10).** Species that grow in low thickets, such as rose and wild berries, root quite easily and so can be vegetatively propagated by cuttings or by layering.

While these techniques may occasionally provide propagation hints, the truth is that we still have a lot to learn about propagating natives. With the rising interest in native plants, nurseries are developing innovative new techniques and I think that the best solution is to share what we know. Since I already don't have enough to do, I am proposing that we start a network of people who are interested in the propagation of native plants.

Native Plant Network

We have established a place on our World Wide Web home page (See "Nursery Networks" section in this issue) where we can accumulate propagation protocols and share them with each other. What is a propagation protocol? It's a comprehensive and systematic documentation of all the steps necessary to propagate a plant, starting with collection of seeds or cuttings and ending with harvest, storage, and shipping. I have developed a tentative format (see following example) and am using bur oak as an example. This format is just a suggestion and I would be most interested in any improvements that you can provide. Even if you don't have an entire protocol worked out yet, we also would be interested in any type of information such as seed treatments. By accumulating these bits of propagation information and listing them by species, we will eventually gain a more complete picture. Photographs, slides, or any other illustrations that you want to include are also welcome. Be assured that you will ᵍet full credit for your work - note that I have included a listing for personal information at the end of the form.

Figure 10. Seeds of native plants like this Rhus trilobata *have hard and impermeable seed coats and will not germinate readily without special pre-treatments, such as acid scarification (courtesy of Nancy Shaw, USDA Forest Service).*

We have included a blank protocol form in the back of this issue and will also post one on our World Wide Web home page— see page 32. Send or FAX the completed forms back to me, and we'll see about getting them posted. I may also be able to use some of this new propagation information in Volume Six: Seedling Propagation of the Container Tree Nursery Manual which will have an entire chapter dedicated to propagation protocols for natives. Thanks in advance for your help!

Sources:

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