CULTURAL TIPS

Miniplug transplants -In the past decade, there has been a steady increase in the demand for larger seedlings and transplants in particular. For example, in the Coast Range of Washington and Oregon where brush competition is intense, foresters are requesting large transplant stock - from 30 to 50 cm in height (12 to 18 in.) and 5 to 10 mm in caliper (0.2 to 0.4 in.). Several things have contributed to this trend. Burning restrictions have left more slash on outplanting sites where fewer mechanical and chemical site preparation options are available. In addition, because of environmental restrictions, foresters are using less herbicides for site preparation. The most important reason, however, is the fact that larger seedlings just grow faster. New "Free-to-Grow" reforestation standards have created a demand for larger stock that not only survive but will quickly outgrow vegetative competition.

This demand for larger transplants has significantly affected nursery production. In the 1986-1987 season, the Webster Forest Nursery of the Washington Department of Natural Resources sold 90% of their stock as 2+0 seedlings and only 10% as transplants. Ten years later, the ratio had changed dramatically to over 50% transplants and that trend shows no sign of changing.

Standard 1+1 and 2+1 bareroot transplants have been around for decades but a relatively new stocktype is being grown in forest and conservation nurseries-the miniplug transplant. "Miniplug + One" seedlings are popular with customers because a larger plant with a vigorous root system can be produced in much less time than other stocktypes (Table 2; Figure 2). Miniplug transplants combine the best of both container and bareroot propagation systems. Growing small volume miniplugs uses much less valuable bench space in greenhouses than standard-sized containers and several crops can be grown per season. Some nurseries are growing a second crop of miniplugs in addition to their normal crop. Transplanting container seedlings also optimizes space efficiency in bareroot beds and produces the greater stem diameter and root systems of transplants (Table 2). Another benefit is that many nurseries do not have to fumigate their transplant beds, or at least not as often as seedbeds.

The procedure consists of sowing seeds into the miniplug containers and growing them for 2 to 4 months, depending on the propagation environment (Figure 2). Containers of around 1 in' in volume have been the most commonly-used size and both hard plastic and styrofoam containers are commercially available. A newer option is the Jiffy 18 mm peat pellet (15 cc expanded volume) which can be transplanted into a larger 50 mm pellet (250 cc expanded volume), or into a larger hard-sided container or bareroot bed. The advantage of using peat pellets is that they can be transplanted over a wider window than seedlings grown in standard containers because you don't need to wait for a firm root plug to develop.

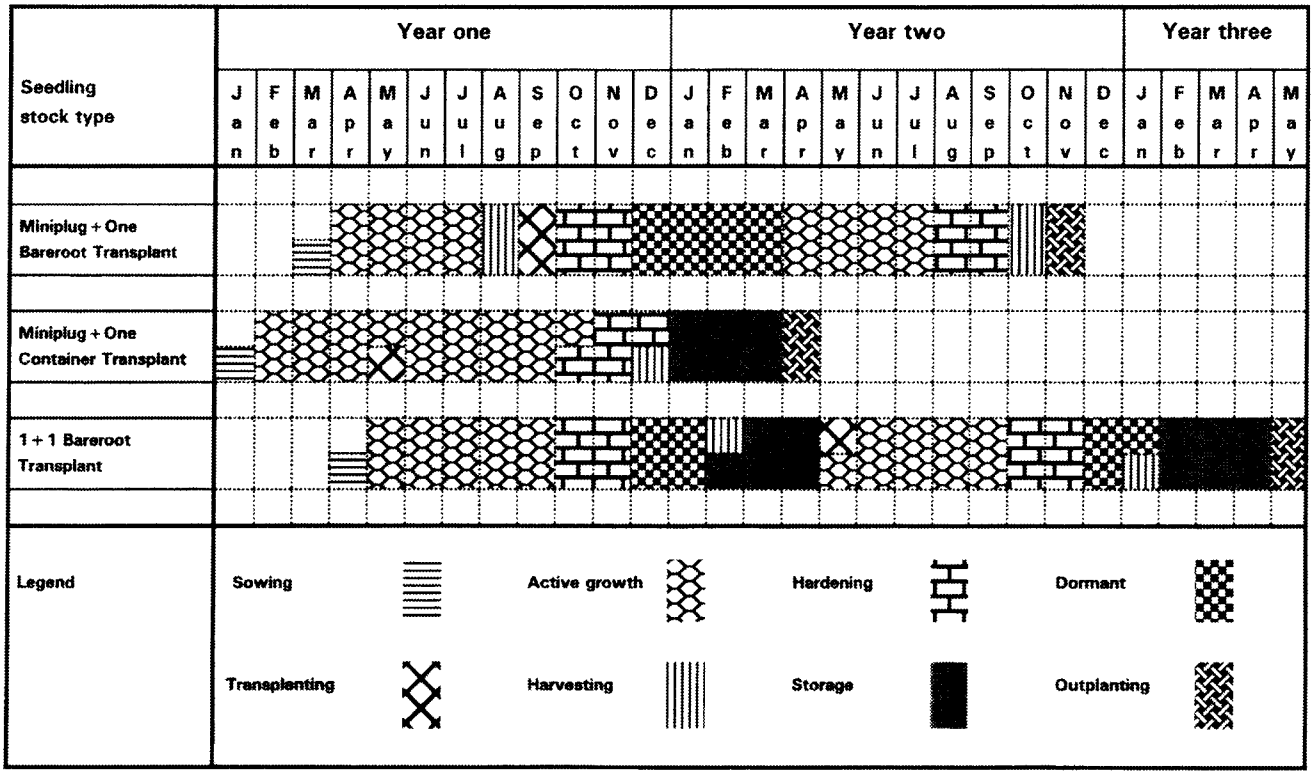
Once the seedlings have become established in the miniplug containers, they can be extracted and transplanted into a bareroot bed or larger container. The stage of seedling development at the time of transplanting is very important because they must have a firm enough root plug to withstand handling but not so many roots that they will become deformed after transplanting. Again, the Jiffy plugs have an advantage because it is almost impossible to transplant them improperly. For bareroot transplants, the miniplugs are transplanted with standard equipment but is usually done by hand with container transplants. Growers have developed innovative tools, such as dibbles and spatulas to make the procedures easier and faster. Plug transplanting equipment has been used for flower and vegetable plugs for many years and is being modified for forest and conservation species. Beaver Plastics (TEL: 888.453.5961; FAX: 403.453.3955) has developed the Sprint Transplanter which automatically transplants miniplugs into their styroblocks.

Table 2—*Miniplug transplants are large seedlings that can be produced in much less time than other stocktypes*

Stocktype	Crop Cycle (yrs)	Shoot Height (cm)	Caliper (mm)
2 + 0 Seedling	2.0	37.0	5.4
1 + 1 Transplant	2.0	52.2	6.9
2 + 1 Transplant	3.0	51.9	7.4
Miniplug Transplant - Spring	1.0	20.6	4.3
Miniplug Transplant - Fall	1.5	47.0	7.6

Source: Hee and others (1988)

Figure 2—*Miniplug transplants can be grown in less time than traditional bareroot transplants and transplanted in either spring or fall*



In conclusion, miniplug transplants are a new stocktype that have many advantages for both the nursery manager and seedling buyer. I think that we'll be see more and more of this technology in the future. For more information, read these articles:

Hahn, PF. 1990. The use of styroblock 1 & 2 containers for P+1 transplant stock production. IN: Rose, R.; Campbell, S.J.; Landis. TD. ed. Target Seedling Symposium: Proceedings, Combined meeting of the Western Forest Nursery Associations; 1990 August 13-17; Roseburg, OR. Gen Tech. Rep. RM-200. Ft. Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station: 223-230. Hee, S.M.; Stevens, TS.; Walch, D.C. 1988. Production aspects of Mini-Plug transplants. IN: Landis, TD., ed. Proceedings, combined meeting of the Western Nursery Associations, General Technical Report RM-167. Ft. Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station: 168-171.

Containers for Miniplug Transplants

Jiffy pellets:

Don Willis
Jiffy Products (N.B.) Ltd.
850 Widdifield Station Road, RR #1
North Bay, ON P1B 8G2
CANADA
TEL: 705.495.4781
FAX: 705.495.4771
E-MAIL: Jiffy@efni.com

Miniplug Containers:

Eric J. Stuewe
Stuewe And Sons, Inc.
2290 SE Kiger Island Drive
Corvallis, OR 97333-9461
USA
TEL: 541.757.7798
FAX: 541.754.6617
E-MAIL: eric@stuewe.com
WEB: http://www.stuewe.com

"If you're not part of the solution, you're part of the precipitate." —Steven Wright