

# A User's Guide to Nursery Stock Types

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**F**oresters must consider many factors when selecting nursery stock types for their planting projects. Forest nurseries can now produce a vast array of stock types to meet any challenge in the field—these target seedlings can be defined for particular sites. It is important that foresters work with a nursery that is known from experience or reputation to provide a consistently good product at a reasonable price. Foresters and nurseries must foster open and effective communica-



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tion to continually improve stock type quality. To facilitate communication between nurseries and foresters, a system of naming stock types developed and those stock type descriptions fall into three broad categories: bareroot, container and “plug plus.”

Some stock types afford advantages over others under certain circumstances. If seedlings are needed on short notice, container seedlings can be grown faster than bareroot. If only small amounts of seed are available, or the seeds are extremely valuable, container nurseries can usually make more efficient use of seeds. Slow-growing, high-elevation species can be grown larger and faster in containers. Container stock is generally easier to plant in shallow or rocky soils.

Bareroot seedlings are a better choice for fall or early spring planting on sites prone to frost heaving. Large, robust bareroot seedlings are often useful on very stressful sites where big game browse or dense plant competition exists. Bareroot stock is generally less expensive than comparably sized container stock.

Larger seedlings, whether container or bareroot, usually outperform smaller seedlings and are always more expensive to purchase and plant. Foresters should remember, however, that seedling physiological condition and morphology are more important than stock type.

For bareroot stock types, a two-number notation is used, for example 1+0 or 2+1. The first number indicates how many years (growing seasons) seedlings grew in their original seedbed. The second number tells

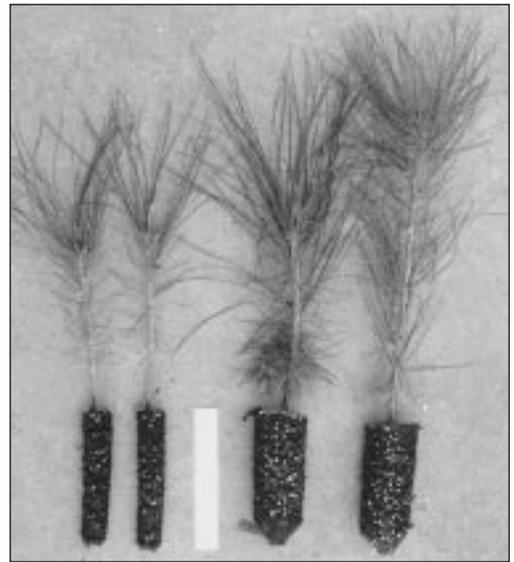


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**Seven-month-old ponderosa pine seedlings grown in 5.5 inches<sup>3</sup> (left) and 20 inches<sup>3</sup> (right) containers. The ruler is 15 cm (6 inches) long.**

how many years seedlings grew after being transplanted into a different nursery bed. Therefore, a 1+0 seedling grew one year in the seedbed, whereas a 2+1 grew two years in the seedbed and another year in a transplant bed. Other common stock types are 2+0, 1+1 and 2+1. Selection of species is, of course, an important matter, but is not considered as part of the stock type designation. Seedling sizes are not usually included in stock type designations either, but local growers and users can and do, through experience, infer general sizes from stock type designations.

In container nurseries, describing different stock types is difficult because of jargon. Many terms are used interchangeably although they should not be because, technically, they mean different things.

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Regardless of local jargon, in reforestation nurseries in the western United States and Canada, most seedlings for reforestation are grown in rectangular block containers, usually made of Styrofoam®, containing a number of cavities in a regular pattern. Although the dimensions (width and length) are mostly uniform (about 14 x 23.5 inches and usually six inches deep), cavity volume and density (that is, number per square foot or meter of area) vary. Root volume for typical reforestation stock ranges from 4 inches<sup>3</sup> to 20 inches<sup>3</sup>, although container stock can be much larger for specialty projects. Generally, volume and density are related, with larger-volume cavities having lower densities within the container. For



PHOTO COURTESY OF DAVID STEINFELD

**A plug+1 Engelmann spruce seedling.**

most nursery managers and reforestation foresters, cavity volume is of paramount importance. Stock type volumes have been steadily increasing and densities decreasing, with cavity volumes of 8-15 inches<sup>3</sup> now being commonly used for reforestation. The advantage of larger-volume stock types grown at lower densities is seedlings with larger root collar diameters, larger diameters have been correlated with enhanced seedling per-

formance after outplanting.

Generally in U.S. nurseries, container stock types are sold by the volume of the root plug, either in milliliters, cubic centimeters or cubic inches. In Canadian nurseries, stock type designations are more detailed and the container is designated with a code indicating the cavity width, depth and cavity density within the block. As with bareroot stock, the designation starts with an abbreviation for species and ends with an abbreviation for planned season of planting. In between, container type, container size and seedling age are indicated. The code for size includes approximate top diameter, cavity volume and cavities per block; and seedling age is described using the two-number system to indicate whether a seedling was grown in one or two places and for how long (with 0.5 used to indicate half-growing seasons). For example, coastal Douglas-fir seedlings destined for fall planting and grown for one year in a Styrofoam container that has cavities 3 cm wide by 13 cm deep and 160 cavities per block, has the stock type designation “Fdc PSB 313B 1+0 Fa.”

In the last decade, the line separating bareroot and container stock types has blurred because of increased production of “plug plus” (plug+) stock types. Plug+ stock types involve container seedlings being transplanted into bareroot beds for further growth. Essentially, growers can achieve the rapid growth of container seedlings and then realize the advantages of bareroot seedling culture, notably better root collar diameter and more fibrous root systems.

Larger, more robust seedlings can be produced in a shorter period of time and less expensively with this hybrid system, particularly for high-elevation seed sources. The designation for stock types followed the traditional bareroot nomenclature, except that “plug” is used to designate the container portion of production and the following number to indicate the time spent bareroot. So, historically, a plug+1 was grown one year in a container, transplanted to a bareroot bed, and grown an additional year. As container culture has improved, the time that seedlings are grown in containers has decreased. Some growers are now extensively using mini-plugs (volumes less than 2 inches<sup>3</sup>) as the starting stock types, so a plug+1 may now be a three-month-old mini-plug sown in February, transplanted to a bareroot bed in April, and harvested in November—essentially less than a year old.

Foresters have many stock types to choose from for their reforestation and restoration projects. Foresters and nursery managers must work together to identify the target seedling necessary to meet planting objectives. ♦

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