

The Natural Farmer

Bamboo: A Multipurpose Agriforestry Crop - Spring 2002 Special Supplement on AgroForestry

by Steve Diver

The bamboos are gaining increased attention as an alternative crop with multiple uses and benefits. These long-lived, woody-stemmed perennial grasses are usually evergreen in climates to which they are adapted; those of temperate regions grow a complete set of new leaves each spring, the old ones falling away as the new ones develop. Worldwide, approximately 87 genera and over 1,500 species of bamboo exist, with roughly 100 species comprising those of economical importance.

Two species of bamboo are native to the United States — *Arundinaria gigante* (commonly known as giant bamboo, canebrake, or rivercane) and *Arundinaria tect* (switch cane) — but most of the commercial and ornamental bamboos grown in the U.S. have been introduced from China and Japan.

Bamboo consists of two general types: clumping and running. The clumping types are typically of tropical or subtropical origin and therefore have limited geographical suitability in the United States since they cannot withstand freezing temperatures. An important exception among the clumping types is the Panda bamboo from the Himalayas, *Fargesia* spp., which is cold hardy to -25° F.

Running bamboo, which includes the most important genus of temperate climate species, *Phyllostachys*, can withstand occasional low winter temperatures between -10° and +15° F. The running types are typically top-hardy in sections of the Lower South, Southwest, and Pacific Coast (1), and root-hardy in northern climates (i.e., plants regrow from roots even if the exposed canes are winter-killed). Cold hardiness is an important characteristic of temperate bamboo species, along with height of cane, diameter of cane, and intended use.

Bamboo Genera Distinguished by Growing Type: Clumper or Runner

- **Clumper**
- *Arundinaria*
- *Bambusa*
- **Runner**
- *Chimonobambusa*
- *Indocalamus*

- Chusquea
- Dendrocalamus
- Drepanostachyum
- Fargesia
- Himalayacalamus
- Otatea
- Thamocalamus
- Phyllostachys
- Pleioblastus
- Pseudosasa
- Sasa
- Semiarundinaria
- Shibatea
- Sinobambusa

Bamboo has three principal uses: [1] domestic use around the farm (e.g., vegetable stakes, trellis poles, shade laths); [2] commercial production for use in construction, food, and the arts (e.g., concrete reinforcement, fishing poles, furniture, crafts, edible bamboo shoots, musical instruments); and [3] ornamental, landscape, and conservation uses (e.g., specimen plants, screens, hedges, riparian buffer zone).

Bamboo canes intended for strength and durability — furniture, flutes, crafts, fencing — should be harvested at three to five years of age. Prior to the end of the third year, cane tissue is still filled with sap and comparatively soft. Thus, marking and selecting canes is a regular part of grove management. Of course, bamboo canes serve many utilitarian purposes around the farm—bean poles, pecan nut tree limb shakers, vegetable trellises and stakes—and these latter uses can be made of any canes that are available.

Products made from U.S.-grown bamboo include fishing poles, flutes, furniture, and crafts. Much of this bamboo is harvested from stands in southern Mississippi, Louisiana, Florida, and the West Coast. Most Americans are probably more familiar with bamboo as an ornamental specimen plant or living screen, and opportunities exist for bamboo as a niche nursery plant.

Though bamboo acreage has historically been limited in the United States, there is renewed interest in bamboo as a commercial crop with many uses. The Temperate Bamboo Quarterly, published since 1993, features useful bamboo species and developments, and bamboo has been explored as an agroforestry crop through several conferences and workshops in the Pacific Northwest.

There are five steps in developing a successful bamboo venture:

- identification and selection of varieties most suitable for desired end uses
- grove management procedures (planting, maintenance, and harvesting)
- materials processing (grading, cleaning, and drying)
- product manufacturing (equipment, materials, tools, jigs, dyes, paints, varnishes)
- marketing (customer identification, distribution, advertising)

Potential Bamboo Markets

Potential markets and bamboo products in the United States are summarized below. In most circumstances, bamboo should be viewed as a complementary crop that fills a niche market or serves a purpose on the farm, rather than a primary cash crop.

- Plant Material: Landscape nursery plant material; zoos; botanical gardens
- Food: Fresh bamboo shoots
- Construction Material: Concrete reinforcement; bamboo fencing; housing
- Musical Instruments: Flutes; wind chimes; pan pipes; xylophones

- Tools: Bamboo leaf rakes
- Furniture & Crafts: Toys; wood working inlay; trim work; paneling; basketry weaving; frames; jewelry; fishing poles; floral stakes; garden stakes; trellis poles
- Conservation: Living screens; agroforestry; riparian filter strips; constructed wetlands; wildlife habitat

Bamboo Agroforestry

Agroforestry is the integration of woody plants with other agricultural enterprises such as crop or livestock production to derive both economic and ecological benefits, two key goals of sustainable agriculture. Bamboo as a woody grass plant is uniquely suited to agroforestry. Some of the many uses of bamboo in agroforestry are summarized below.

Agroforestry Function - Primary Use

- Intercropping
- Riparian vegetation filter
- Constructed wetlands
- Living screens
- Permaculture

Agroforestry Products - Value-Added

- Timber
- Craftwood
- Fiber crop
- Livestock forage
- Bamboo shoots

Bamboo Shoots as a Commercial Food Crop

Each spring, ATTRA gets phone calls on cultivation of bamboo shoots as a specialty food crop. Bamboo shoots are a popular item in Asian stir fry and as a pickled condiment. The most important genus for bamboo shoot production in the temperate U.S. is *Phyllostachys*, which consists of about 60 species, all of which are edible. Important food species include *P. dulcis*, *P. edulis*, *P. bambusoides*, *P. pubescens*, *P. nuda*, and *P. viridis*.

An early USDA bamboo researcher recommended boiling fresh bamboo shoots prior to use for about 18–20 minutes. Bamboo shoots from species imparting a bitter taste should get a change of water after the first 8–10 minutes of cooking.

Daphne Lewis, author of "Bamboo on the Farm", notes that the United States imports 30,000 tons of canned bamboo shoots each year from Taiwan, Thailand, and China. Small-scale growers are remarkably successful in creating demand for fresh, locally grown produce through niche marketing. Local markets for bamboo shoots include Asian restaurants, farmers' markets, and health food stores, especially in towns with ethnic populations that relish bamboo shoots. Harvesting shoots is also a convenient method of controlling the spread of running-type bamboos.

According to Tim Ogden of the Oregon Bamboo Co. (in Myrtle Creek, OR, 97457 541-863-6834) "bamboo comes into production in 3 to 4 years and reaches maximum productivity in 7 to 8 years, producing 2 to 10 tons of bamboo shoots per acre. We sell everything we can produce off our mature 3-acre grove and we'll be able to sell all the production from our second 3-acre grove, too, when it comes into production." Ogden said distributors pay up to \$2 per pound for his bamboo shoots, which retail for about \$6 per pound.

Ogden plants varieties that originated in Southwestern China. The plants are spaced every 10 ft. in rows spaced 20-ft. apart. Oregon Bamboo Co. sells an informational packet titled American Bamboo Agriculture, which includes a 35-minute video and a hardbound book, for \$22. Sue Turtle, co-editor of Temperate Bamboo Quarterly, explained that bamboo shoots should be harvested as soon as you can feel the tip of the bamboo shoot in the ground with the bottom of your feet. "Once the shoots emerge from the ground, they quickly become tough and bitter". In the following excerpt from the Spring–Summer 1995 issue of Temperate Bamboo Quarterly, she notes:

Studies in China on the changes in nutrient content of bamboo shoots of different ages show there is a definite advantage to harvesting the shoots while they are still underground with sheaths just appearing above ground. Tests were done, using Phyllostachys pubescens, by harvesting at three different stages: underground, 5 days above ground, and 10 days above ground. It was found that protein and amino acid content are highest when shoots are still underground. In fact the author stated that protein content of a bamboo shoot (P. pubescens) underground is higher than any other vegetable.

Bamboo shoot production in perspective:

- It does not seem likely that large-scale bamboo shoot production will become a common agricultural enterprise in the United States. Countries that export this product have decided advantages over American farmers with respect to climate, labor, and processing costs.
- This should not deter market farmers from exploring bamboo cultivars, growing methods, and harvesting techniques to sell fresh bamboo shoots to niche markets, but it does give pause to great expectations that bamboo shoots are an easy cash crop or even the primary reason to raise bamboo.

Bamboo Plant Material

A list of bamboo species and their characteristics (e.g., growth habit, cold hardiness, size) and uses (e.g., bamboo crafts or conservation purposes) is certainly one of the first things potential bamboo growers need information on. In this respect, prior issues of Temperate Bamboo Quarterly and The Journal of the American Bamboo Society are invaluable (see below). Since bamboos are vegetatively propagated, nurseries ship live plants. Consequently, some plant material may be available only during certain months of the year.

A complete listing of bamboo species and suppliers in the U.S. is available in print through the American Bamboo Society - www.bamboo.org/abs/. Categories include Species Descriptions; Bamboo Plant and Product Suppliers List; and Index of Cold Hardy Species.