You Ain't From Around Here! Exotic Invasive of the Quarter: Don't Get Bamboozled By Bamboo

By: Dr. David Coyle, Clemson University

For many, the word "bamboo" conjures visions of plump panda bears perched on their posteriors amongst a sea of green, happily munching away on bamboo shoots. Unfortunately, to those of us who work in invasive species, that's not what the word "bamboo" brings to our minds. No, we see massive bamboo patches scattered on the landscape, remnants of home gardens gone wrong or abandoned dwellings. They are a desolate sea of emptiness, devoid of any life other than bamboo. They've choked out all the native vegetation, and few animals will venture into a mature bamboo patch. Heck, even the bugs tend to avoid them!

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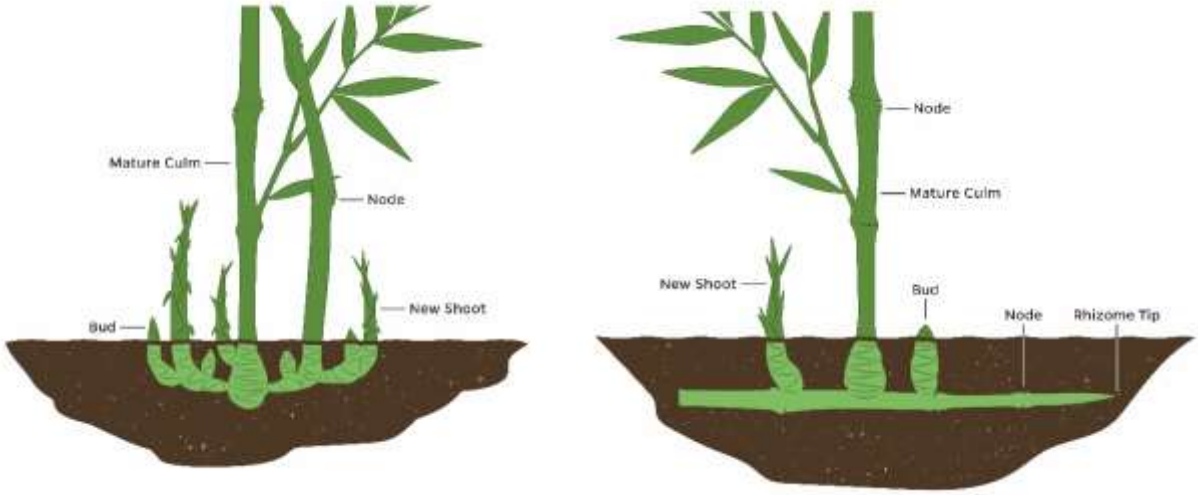
You can find many types of bamboo (which is an evergreen grass) in the U.S. Some, like river canes (*Arundinaria* species), are native to North America (the southeastern U.S. to be specific – see here for more information on native bamboos: http://www.indefenseofplants.com/blog/2017/6/26/north-americas-native-bamboos).

However, many bamboos we see in the landscape are non-native. Most have escaped from managed landscapes (often yards) either by pure stealth or because their owners (or former owners, in some cases) simply stopped tending the plants. When bamboo is left to its own devices, it often spreads rapidly – human actions are pretty much the only things keeping most bamboo plantings in check. Recently there has been a growing push by several organizations to purposely plant bamboo for commercial production. This is happening in many parts of the Southeast, from Texas to Florida (especially Florida!) to Virginia. These companies will tell you that bamboo growth is faster than trees (even faster than pine!), there are so many uses for bamboo, and this cash crop is a NO LOSE proposition! As we all know, if it sounds too good to be true…well, it probably is. Let's look into some of these claims and issues.

Bamboo growth is somewhat unique in that once a shoot (called a culm) comes out of the ground, it doesn't increase in diameter – it comes out at the diameter it will always be. As the plant ages, culms emerge from the ground with larger diameters. So, when you look at a patch of bamboo, the smaller diameter shoots are the older ones, while the larger diameter shoots are the younger ones.



Rhizome structure of clumping (left) and running (right) bamboo. From Lieurance et al. 2018.

There are two types of bamboo: clumping and running. Clumping bamboo grows in (you guessed it) a clump, and expands outwards from the center. The patch of bamboo expands like a growing circle. Running bamboo sends out underground rhizomes, from which culms grow upward. Because of its growth pattern, running bamboo is much more likely to spread and become more invasive. In fact, many bamboos are considered to have a lot of invasive potential. The two main species being promoted for commercial use are running

bamboos: moso bamboo and rubro bamboo (a clumping bamboo is also being promoted in Florida).

Are there a lot of uses for bamboo? Yes – with food, furniture, and flooring being three of the most well-known. Bamboo can also be used as pulp for paper, biofuel, and as a soil amendment (sort of like a fertilizer). There are a lot of potential uses for bamboo.

Can it grow faster than pine trees? Again, yes – provided you have the right conditions, care, and weather. So, if bamboo has that many uses and grows faster than trees, what's the problem? Well, there are many. Many problems and many questions. And many of the organizations encouraging bamboo cultivation have a number of things a grower must agree to when the two parties enter into a contract.

What happens if you plant your acreage with bamboo? It's not cheap to plant, and planting is done by hand. There can be relatively high mortality of newly planted bamboo. But let's say you do get it planted. Then what? You need to keep bamboo weed-free early on, and it may require fertilizer, depending on the soil qualities. If it doesn't rain, you'll need to water the bamboo, especially for the first year. Assuming your bamboo makes it through the first year, you're still several years away from a harvest. How many years depends greatly on the location and weather. Bamboo likes it warm, so a couple of cool years will set back any growth projections you may have been shown, likely delaying that first harvest (and first opportunity to make any money on your bamboo). And how does one harvest bamboo? By hand. You read that right – most bamboo is harvested by hand. Basically, it's cut down and loaded onto trucks. In most cases this will be under contract from the organization promoting it, and they'll buy back your product. Often, they will front you the resources to install the planting, then buy back the harvestable material as a way for you to "pay back" the initial loan. Needless to say, the economics of commercial bamboo production have not yet been truly worked out, regardless of what you might be told. There are still a lot of questions and uncertainty, like what happens to a grower if the bamboo market tanks?

Let's talk about ending bamboo production. A grower might end production if the market fails, or if they simply want to do something different. Bamboo is difficult to both control and eradicate. Sure, there are ways to do it (see: http://southernforesthealth.net/plants/bamboo/growing-bamboo-for-commercial-purposes-in-the-southeastern-u.s.-faqs) but in every case these tactics take time and resources. Controlling an invasive species, such as the bamboo species being touted for commercial use, often takes multiple treatments over multiple years. Treatments are often

not cheap, nor are they fast. Multiple herbicide treatments are usually necessary, or the construction of physical barriers or trenches around the bamboo planting. Repeated mowing will keep bamboo contained, but will rarely kill it. And, when bamboo plantings are left or abandoned they no longer have anything keeping them in check and they grow unhindered into surrounding areas. When bamboo grows into new areas, it chokes out all other vegetation, making a desolate, plant-free, and often animal-free area. This is in no way considered a healthy ecosystem – it's a classic case of an invasive species in a native ecosystem.

Removing an established bamboo population can be costly and time-consuming. Photo by: Dr. David Coyle, Clemson University.

There's a reason the southern U.S. is called the "woodbasket of the world." It's because we know how to grow trees. We have decades of silvicultural research to help us with proper planting and management. We know how to control pests and diseases. We have an infrastructure to handle loads of logs, whether they're going for pulp or sawtimber. We have a solid grasp of the economics of the situation. In short, we know how to do forestry, and there aren't many questions about how any of it works. This is in sharp contrast to bamboo, in which we know relatively little about the management and economics of commercial growth. And, the environmental costs of an abandoned bamboo planting far outweigh the environmental costs of an abandoned loblolly or longleaf pine planting.

So, should you grow bamboo commercially? I can't tell you what to do. But I can tell you there are a lot of questions about the environmental and economic viability of such a thing, while there are far, far fewer such questions in terms of forestry.

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Reference

Lieurance, D., A. Cooper, A.L. Young, D.R. Gordon, and S.L. Flory. 2018. Running bamboo species pose a greater invasion risk than clumping bamboo species in the continental United States. Journal for Nature Conservation 43: 39-45.