



AGRONOMY AND
SOILS DEPARTMENT

AUBURN UNIVERSITY

COLLEGE OF AGRICULTURE

November 20, 2012

The Honorable Jeffrey Zientz
Acting Director
Office of Management and Budget
725 17th Street, NW
Washington, DC 20503

Dear Mr. Zientz,

This letter is to summarize my research experience with growing Giant Reed (*Arundo donax*) for multiple uses over the last 14 years, with special reference to its yield, carbon sequestration and invasivity. By way of introduction, I have spent 25 years conducting research with numerous potential cellulosic biomass/energy crops, including switchgrass, and 14 years with Giant Reed. My work with Giant Reed has been focused on both its potential benefits as a biomass crop for multiple uses, including liquid fuels, electricity, pulp and paper, and pharmaceuticals, and its potential to become invasive in the eastern United States. These studies have involved detailed scientific research, as well as careful on-the-ground surveys and observations.

Unfortunately, much of the information available on Giant Reed has been posted on the internet, but most of this information has absolutely no scientific basis at all, and much of it is not correct. Even federal agencies are guilty of providing seriously misleading information. For example, the USDA has published a map with a title of 'Distribution: *Arundo donax*' <http://plants.usda.gov/java/profile?symbol=ARDO4> which suggests that over half of the United States is invaded by Giant Reed. Of course, this amounts to extreme exaggeration. A more scientific approach would be to place a dot on the map for the location of each acre occupied by unwanted Giant Reed. If this were done, the reader would find it difficult to find where Giant Reed is located, except perhaps for along the Rio Grande and in Southern California.

Yield

I have recorded the biomass yield of Giant Reed from small research plots (about half an acre) for 13 years at the Auburn University E. V. Smith Research and Extension Center in south-central Alabama. Results have recently been analyzed and included in a PhD dissertation. Specifically, average biomass yield for switchgrass was 10.46 dry tons/acre/year, while that of Giant Reed was 15.79 dry tons/acre/year, some 51% higher. In addition, Giant Reed received no fertilizer during this time, while switchgrass had to be fertilized with nitrogen, and the quoted yields were achieved with no irrigation. Finally, drought conditions in Alabama during 2000 and 2007 were among the worst on record, but they had virtually no negative impact on biomass yield of Giant Reed, while yields of corn in most of the state were so low that the crop was not worth harvesting. Clearly, this result demonstrates the exceptional drought tolerance of Giant Reed. Since biomass yield and the need for fertilization are the most important factors that determine profitability of a biomass crop for farmers, our results show that Giant Reed is substantially superior to switchgrass, which is the 'model' biomass crop chosen by the US Department of Energy.

Carbon Sequestration

Soil carbon sequestration is critically important for two primary reasons: it reduces greenhouse gases, thus mitigating climate change, and it substantially improves the productivity of soils by increasing water holding capacity and the ability to retain plant nutrients. Our research showed that Giant Reed sequestered 22.4 tons of carbon/acre in the soil,

which was 8 times (800%) that sequestered by switchgrass. In addition, soil content of the key plant nutrients, phosphorus (P) and potassium (K), were increased by Giant Reed, but these nutrients were depleted by switchgrass.

Invasivity and Fire

It is true that Giant Reed has colonized riparian areas along the Rio Grande and in southern California. However, this is due to the total lack of management, and the fact that these watersheds are *very* different from those in the eastern United States. In particular, they are essentially in desert regions where the native vegetation is not competitive, and the rivers in question flood for a few months each year, seriously excavating their banks, and then subside to no more than a trickle for the rest of the year. When banks are excavated, Giant Reed that should never have been planted there, is also excavated and spread out downstream where it forms new colonies.

In contrast, our rivers in the eastern United States are perennial, with a steady flow of water year-round, and are lined with highly competitive woody vegetation. Therefore, even though Giant Reed has been widely grown as an ornamental in the eastern United States for well over a century, there is absolutely no evidence at all of it becoming invasive in this region. I believe that the main reason for this is that Giant Reed does not grow well in shade, and therefore is not competitive with our forests in the east, including those that occupy riparian areas. Fourteen years of experience with multiple research plots of Giant Reed that are up to 30 acres in size, indicates that plants in these plots have not moved at all. While this is largely due to competition from native vegetation, it is also because the plant is sterile, producing no fertile seed. In addition, unlike bamboo that produces long (up to 20 ft) underground rhizomes, Giant Reed rhizomes are very short and continue to die off as new ones are produced, thus eliminating the possibility of spreading. Therefore, its potential to become invasive is almost zero, provided it is properly managed. Furthermore, based on our experience, it can be eradicated easily by plowing and application of Roundup.

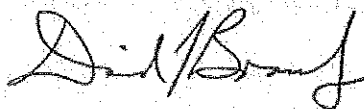
Claims are also made that Giant Reed is a fire hazard. This may be the case in the West at certain times of the year when it is dry, but it is definitely not true for the East. We have specifically tried to burn our Giant Reed research plots in Alabama, to avoid having to cut them by hand, but our repeated attempts to set them alight with blow torches have totally failed.

Conclusion

In conclusion: 1) there is absolutely no evidence that Giant Reed is invasive in the eastern United States; 2) even in the western states, if it is planted away from riparian areas and properly managed, the risk of it becoming invasive is close to zero; 3) it can be easily eradicated; and 4) it can play a major positive role in carbon sequestration, reclamation of disturbed sites such as surface mines, being used to produce electricity, liquid fuels or pharmaceuticals, and providing much needed income for farmers. Results and observations from research on Giant Reed conducted by colleagues at Virginia Tech and USDA at Tifton, GA, are consistent with ours in Alabama. In short, this plant could play a major role in advancing the emerging biofuel and bioproduct industries which promise to provide jobs, improve rural economies and enhance the environment – more so than switchgrass or miscanthus. Therefore, in my opinion, it would be a disservice to the United States to deny this plant the same opportunity as switchgrass to contribute positively to our future.

Please do not hesitate to contact me at (334) 844-3935 or bransdi@auburn.edu if you need more information.

Sincerely,



David I. Bransby
Professor, Energy Crops and Bioenergy