Let's just harvest invasive species—problem solved?

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This is *Arundo donax*, invading along the Santa Ana River in Riverside, Calif. Credit: Lauren Quinn

Although invasive Asian carp have been successfully harvested and

served on a dinner plate, harvesting invasive plants to convert into ethanol isn't as easy.

According to a recent study at the University of Illinois, harvesting invasive plants for use as biofuels may sound like a great idea, but the reality poses numerous obstacles and is too expensive to consider, at least with the current ethanol pathways.

"When the topic of potential invasion by non-native biofuel crops has been raised at conferences I've attended, the ecologists in the room have suggested we use biomass from existing invaders instead," said Lauren Quinn, an invasive plant ecologist in U of I's Energy Biosciences Institute. "They worry about the potential deployment of tens of thousands of acres of known invaders like *Arundo donax* for ethanol production. They'd say, 'we have all of these invasive plants. Let's just harvest them instead of planting new ones!' But when I analyzed the idea from a broader perspective, it just didn't add up."

Quinn explored the idea of harvesting invasive plants from many angles but said that the overarching problem is the non-sustainability of the profit stream. "From a business person's perspective, it just doesn't function like a typical crop that is harvested and then replanted or harvested again the following year," she said. "Here, land managers are trying to get rid of an invasive plant using an array of methods, including herbicides, so there wouldn't necessarily be multiple years of harvest."

Other obstacles Quinn examined are the need for specially designed harvesting equipment, the development of new conversion technologies for these unique plants, and even the problems associated with transportation.

"One of the biggest issues is the absence of appropriate biorefineries in any given area," Quinn said. "If there isn't one nearby, growers would

have to transport the material long distances, and that's expensive."

Perhaps more important, Quinn discussed the issues with the high variability of the cell wall composition across different species. "Most existing or planned biorefineries can process only a single, or at best, a small handful of conventional feedstocks, and are not likely to be flexible enough to handle the variety of material brought in from invasive plant control projects," Quinn said. "The breakdown and processing of plant tissues to ethanol requires different temperatures, enzymes, and equipment that are all highly specific. The proportion of cellulose, lignin, and other fractionation products can differ even within a single genotype if it is grown in multiple regions so the variations between completely different plant types would be an even greater hurdle."

Quinn isn't discounting the idea of harvesting invasive plants, however. She encourages control of invasive populations and subsequent ecological restoration but does not believe that invasive biomass can replace dedicated energy crops at present.

"One day there might be a pathway toward ethanol conversion of invasive biomass," Quinn said. "But until we do get to that point, there may be possibilities to use invasive plants as alternative sources of energy, like combustion for electricity. Invasive biomass could drop into the existing supply of biomass being co-fired with coal in the already huge network of electrical power plants across the country. That would eliminate the technological barriers that conversion to ethanol presents.

"I'm not saying that we shouldn't continue to look at ethanol conversion processes eventually, I'm just saying that right now, it doesn't seem to make a lot of economic sense."

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