

Can prairie grass save ethanol?

By David Adams/Special to the TAB
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As an alternative to gasoline and diesel, ethanol has been on a roller coaster ride over the past five years. The call to promote our own natural resources propelled ethanol ahead of other options to reduce gasoline consumption, such as hydrogen, the sun, vegetable oil and electric-powered cars. Corn-based ethanol was not only touted as more commercially viable, but also embraced as a potential boon to farmers.

Recently, however, ethanol's fortunes have taken a giant hit due to escalating food prices which many economists say are partially caused by the diversion of crops from food to fuel production. Reacting to these concerns, Senate Republicans have sought to reverse new federal regulations that would benchmark the production of 15 million gallons of ethanol by 2015, and 36 million gallons by 2022.

Ethanol's fortunes may rise again. Somewhat lost in the clamor to banish ethanol is that food crops such as corn, soybeans, sunflowers and sugar cane are not the only raw materials from which it can be distilled. Prairie grass and wood are two alternatives. Of the two, the most commercially and environmentally viable appears to be prairie grass, and more specifically, switchgrass. Though much reduced due to urbanization and agriculture, millions of acres of these grasses still exist on the prairie, as well as in parks, preserves and borderlands. Fast-growing switchgrass can also be easily cultivated on marginal farmland and shallow soil that is not amenable to other crops.

Based on its experimental production as an energy crop, there is growing evidence that switchgrass is a more efficient producer of ethanol. The United States Department of Agriculture recently released the results of a five-year study that involved cultivation of switchgrass by farmers in Nebraska and the Dakotas. The switchgrass yielded an average of 300 gallons of ethanol per acre, compared to 350 gallons, for corn. A more recent study conducted by the U.S. Department of Energy found ethanol conversion yields of about 1,500 gallons per acre. Moreover, switchgrass has proven to be a much more energy efficient way of producing ethanol than corn. The cultivated switchgrass produced 540 percent more energy than was needed to grow, harvest and distill it. Switchgrass requires little or no fertilization to grow and actually acts as a natural air purifier since it removes carbon dioxide from the air as it grows. In contrast, corn requires tremendous amounts of energy and natural resources to grow and distill. Commercial corn requires more water for irrigation than virtually any other crop in the United States. According to the National Academy of Sciences, corn production utilizes more herbicides and insecticides, leading to more ground and river water pollution, than any other crop. Given its labor, machinery, fertilization and irrigation costs, corn is nearly four times more expensive to grow than is commercially cultivated switchgrass, according to a study conducted by Cornell University and the University of California.

Despite its advantages over food crops, switchgrass has some of the same downsides as other biofuels. Growing enough switchgrass to supply even half of our car fuel needs would require cultivation of 13 percent of our land, according to one team of scientists. This is seven times the amount of land currently under cultivation. Switchgrass cultivation on such a massive scale would undoubtedly lead to subplanting of food crops and raising of food costs. Ethanol production of any kind is environmentally damaging, though less so than for production of fossil fuels. Ethanol production plants use massive amounts of electricity and water during the distillation process. Once produced, ethanol contributes to air pollution when used in cars. Most studies have shown that ethanol produces marginally less carbon dioxide emissions in cars, about 15 percent less, than those run solely on gasoline. Stanford scientist Mark Jacobson showed that cars using an 85 percent blend of ethanol would significantly increase ozone, one important element of smog as well as global warming. One local expert on alternative fuel technology is MIT Professor of Mechanical Engineering John Heywood, who is a Newton resident. He points out that in flex-fuel vehicles, the only ones currently available, there is no ethanol benefit, nor is there one when ethanol is blended with gasoline. It is only more efficient in ethanol-dedicated engines. Switchgrass may help to revive ethanol's fortunes, but we still have to wonder if that is a good thing.

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