Petroleum that Grows on Trees

Twenty-six hours on a plane, two hours of sleep, and eight hours on a bus across country and down windy mountain roads. A young, wild haired American finally steps off the bus in a small town in La Trinidad on the northernmost island of the Philippines.

Just 2 weeks earlier, Blake Joyce, a graduate student in plant biology at University of Tennessee, had made the decision to travel halfway across the world just to study a nut. Sounds crazy. Probably is. However, the nut in question has one particularly interesting property: a high content of petroleum, the base chemical of gasoline.

"Whoa!" you say. "I need a hundred of these gasoline trees in my back yard pronto! Where do I place my order?"

Ha! Who's crazy now? Unfortunately, many realities make farming your own gasoline somewhat difficult and perhaps even impractical. Let's start by considering the tree that grows our wonder nut, Petroleum Nut tree (*Pittosporum resiniferu*), current estimates put the tree at a fruit bearing age between 3-5 years, producing more petroleum nuts every year thereafter. The harvest from one plant can yield about a gallon of oil per year, but this varies drastically from tree to tree. The process of fruit to fuel is a rather labor intensive one. First, someone lacking a fear of heights must climb upwards of 25 feet and collect the nuts. While often referred to as nuts, the fruit from the Petroleum Nut tree is actually rather fleshy, like peaches or apples. Thus, you simply squeeze the oil directly from the fruit. The squeezing also exudes sticky goo (other research efforts are aimed at turning this goo into an adhesive). Finally, the whole process of removing impurities from the crude extract yields roughly 1 gallon per 80 pounds of fruit. That is a lot of nuts and tedious work for one gallon of freshly squeezed gasoline.

Assuming you drive at least a couple hundred miles a year, you're looking at a lot of planting, climbing, and squeezing. If you value your time, paying yourself at least $7.25 an hour, and work ultra fast collecting one gallon per hour, expect to pay over $7.25 a gallon. Don't forget to factor in the upfront cost of planting and caring for the trees for the first 5 years. Shortening this process may be possible by using a machine to extract the oil; however, such a machine would have an upfront cost of $100-200 (something akin to a wine press).

So, let's say you're willing to put in the time and effort to plant these trees and go through the tiring process of extracting the oil. The question is: will it even run your car/truck/gas-powered dog scooter? There are many stories from La Trinidad natives of people running vehicles on the crude extract. During World War II, when the Philippine natives were dug in against the Japanese, fuel supplies were low and it was thought that the Japanese ran their tanks on nut oil, though there is no hard evidence of this. Yet the story might actually be true; some preliminary experiments with blends of 20% petroleum nut oil and 80% standard fossil fuels look promising. The results suggest that in the short term, the oil extracted from these fruit will power your car or truck, but the longer-term effects on a given vehicle's engine are not yet known.

We won't be fueling up anytime soon at the neighborhood petroleum nut tree. So, you might ask, why even study this nut? In the more remote parts of the world, one cannot simply walk into a corner gas station, and the solution is not as simple or cost-effective as building gas stations, ports, refineries, and delivery systems. In these parts of

the world, these trees would offer energy as a valuable, homegrown commodity that people of developed countries often take for granted.

Efforts by Dr. Michael Bengwayan the director of PINE TREE and lead on the initiative to plant these trees in needy, rural areas are underway to grow this plant in places that lack the proper infrastructure to power things as simple and necessary as a cooking stove, a supply truck, or an ambulance. In more remote parts of the world, traveling 10 miles to the hospital plays a defining role in life and death. Having a grow able source of portable energy would go much further than saving lives; it would improve the basic quality of life for people living in these areas.

Blake Joyce supports this effort in one fundamental way: research to develop genetic markers which will be predictive in determining overall oil production in a petroleum nut plant before putting seed to soil. Genetic markers are kind of like the resume you submit when applying for a job, giving a future employer an idea of the traits a potential employee has in hopes of selecting only the best. Farmers use this "resume" in order to select the seeds that will grow into trees with the most desirable traits: large fruit size, high oil content, and higher fruit yield. Using genetic markers such as these would allow petroleum nut tree farmers to select the best of the seed stock to increase their yields instead of breeding over countless generations.

Joyce expects to start seeing the effects of his research within the next 10 years. His greatest hope is that his work will make a difference in the lives of destitute and often forgotten people in distant lands.

END ARTICLE

Possible sidebar (maybe find some way to incorporate it into the flow of the article):
"Oh yah!!! What happens when you set it in on fire?!"
link to video of setting this nut on fire or pictures.

dried fruit burned in lab:
http://www.youtube.com/watch?v=ka9iwgW7-4E&context=C3b814beADOEgsToPDskKJtNuhJtWXD3KsF6yP2cGX

fresh fruit in Philippines:
http://www.youtube.com/watch?v=iBvULdLDHDQ&context=C3b814beADOEgsToPDskKJtNuhJtWXD3KsF6yP2cGX

Notes:

Interests apart from the markers:
We're also interested in: the biochemical pathway itself (looking at three different genera with the alkane biosynthesis phenotype)
Tissue culture and transformation of the plant for myriad applications
applied: increasing oil content through overexpression, rapid production of trees through micropropagation

basic: evolution of alkane biosynthesis versus terpene biosynthesis, metabolic cost of alkane biosynthesis, plant-insect interaction and alkanes as defense molecules

Blake also did work on "The Diesel Tree". Traveled to remote parts of Brazil in order to collect samples.

Place where study is taking place:
La Trinidad, northern Luzon.
Northeast-ish of Baguio city
Rural communities scattered throughout La Trinidad

Analogy for petroleum nut tree's importance to rural communities in remote parts of the world:
Consider celephones…
Celephones don't require much more than a cell tower whereas running land lines are considerably more expensive.

Pictures:

most travel happens by Jeepenys (pronounced JEEP-knees), extended cab military vehicles

Some of the devastation resulting from a typhoon that came through causing a land slide (nearly 10,000 people killed or displaced).

Hospital sign proudly paid for by McDonald's