New, diverse generation of crops is taking root on Maui plantation

By Andrew Gomes
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BRYAN BERKOWITZ / SPECIAL TO THE STAR-ADVERTISER
HC&S Diversified Agriculture Tour, Maui, August 24, 2016. Mae Nakahata, agronomist, in front of sunflower crop, discusses the diversified ag program. Sunflowers are a potential bio-fuel but are also being attacked by birds, as shown in this photo.

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Hawaiian Commercial & Sugar Co. diversified agriculture project manager Shyloh Stafford-Jones and Mae Nakahata, director of agricultural research and crop control, check out the company's soybean crop. Oil squeezed from soybeans and sunflower seeds can be used to produce biodiesel fuel, but many of HC&S' crops have been eaten by birds. At right, a sunflower that was eaten.

COURTESY HAWAIIAN COMMERCIAL & SUGAR CO.
HC&S has about 180 acres of grasses and legumes in pastures through which roughly 100 cattle graze.

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Sorghum, a tall grass with some similarities to sugar cane, was harvested at HC&S on Maui last month. It can be used for food, animal feed and fuel.

PUUNENE, Maui >> Sugar cane is on pace to disappear in Maui's central valley in December with the closure of Hawaiian Commercial & Sugar Co., but other crops are making headway toward a future envisioned to keep much of the 36,000-acre plantation productive and green.

In one field, rows of sorghum sway in place of the sugar cane that HC&S has planted and harvested for 146 years.

In another field, sunflowers bask in the sun.

And in another, cattle graze on glycine, signalgrass and

crotelaria.
Though the steps have been relatively small and the company has faced some frustrating setbacks, HC&S has made significant progress learning how it might grow plants for energy production and cattle in an effort to sustain agriculture on the land.
“I think we know what we’re focusing on,” Rick Volner, HC&S general manager, said during a tour of the company’s diversified agriculture initiative last month.
So far, one crop standing out is sorghum, a tall grass with some similarities to sugar cane.
According to the nonprofit Whole Grains Council, sorghum is the world’s fifth most important cereal crop, largely because of natural drought tolerance and use for food, animal feed and fuel.
The organization said farmers grew sorghum in 21 states covering 7.7 million acres in 2007, ranking the United States as the world’s largest producer even though relatively few people know what it is.
“Ask a hundred people if they’ve ever eaten sorghum and chances are they’ll have no idea what you’re talking about,” the council states on its website.
Sorghum can be eaten as a grain cooked like rice, popped like popcorn and used as a gluten-free ingredient in bread. Sorghum also produces a sugary syrup similar to molasses, which is popular in the South and can be distilled into something similar to rum. And in China, the country’s national drink, baijiu, is made from distilling fermented grains that include sorghum.
On Maui, HC&S has four varieties of sorghum growing on 182 acres.
The company started with 1-acre plots, and after four harvests its largest field trial covers 140 acres.
“It’s looking real good,” said Mae Nakahata, director of agricultural research and crop control for HC&S.
Some of the reasons HC&S sees promise in sorghum is because it’s similar to the sugar cane that the company knows

how to grow well. Two extra pluses are that sorghum takes three months to mature and it ratoons, or regenerates, after being cut down.

“That’s a real huge advantage because we don’t have to keep planting,” Nakahata said.

Sugar cane, which is harvested every two years, also ratoons but HC&S avoids letting the crop do that more than twice because the ground hardens.

Other nice things about sorghum are that few pests attack it (also similar to sugar cane), cattle like to eat it (HC&S has been giving what it harvests from tests free to local cattlemen who have asked HC&S to grow it for them commercially) and its water needs may be only 80 percent to 90 percent that of sugar cane.

Sorghum puzzle

Still, big challenges remain. For instance, HC&S isn’t sure how the costs to grow, harvest and process sorghum will align with potential revenue.

“This is still R&D,” Volner explained, referring to research and development. “There is still a learning curve.”

One piece of this puzzle that HC&S is exploring for sorghum and other crops deals with one of the company’s biggest input costs: irrigation. For sugar cane, drip irrigation lines are spaced 6 feet apart. For sorghum, HC&S is experimenting with spacing of 2-1/2 feet, 5 feet and 9 feet.

Shyloh Stafford-Jones, a Missouri agronomist who HC&S hired in April 2015 to be its diversified agriculture project manager leading a team of about 14, said the 5-foot spacing appears to be ideal, which he said is good because lines every 2-1/2 feet would be twice as costly.

HC&S has to figure out such things on its own because the crops it is testing haven’t been grown on a large commercial scale in Hawaii. They are grown on the mainland, but the knowledge transfer is limited because of factors that include no use of drip irrigation, longer daylight hours and cold winters there.

In an effort to speed up learning, HC&S in some cases is

trying to move faster than it would if it had been trying to establish a new sugar cane variety. Such tests might start with a 10-square-foot plot, then move on to a quarter-acre plot then a 1-acre plot. Instead, HC&S has started with half-acre or 1-acre plots and jumped to 100 acres relatively quickly.

That said, HC&S also can't rush. "You can't go out and responsibly plant 1,000 acres of a new crop without knowing how it's going to do," Volner said.

Pest control

A few bad experiences with some crops illustrate what can go wrong.

For example, one field of corn didn't do so well because prevalent winds led the plants to devote more energy to staying straight than growing tall.

In another case, birds gobbled up safflower seeds freshly planted in the ground, and later returned to eat any sprouts from seeds they missed.

"They ate everything," Nakahata said, adding that the birds methodically followed the planting machines.

Birds also feasted on soybean and sunflower seeds planted in the ground. As a result, HC&S lost one variety of sunflower and decided not to replant safflower.

To combat the flying seed eaters, HC&S put up nets until young plants sprouted and got big enough not to be snacks. Now the company is waiting to see if birds return when its sunflower plants, which are about 3 feet high, start producing seeds for harvest.

Other pests HC&S must figure out how to counteract include aphids, corn earworm and the three-lined potato beetle.

"These are the challenges that we never had to encounter with sugar," Volner said. "We were really spoiled with sugar cane."

As it stands after early trials, HC&S has 182 acres of sorghum, 3 acres of soybeans, 2 acres of sunflower, close to 5 acres of corn, 8 acres of purple bana grass and nearly 10 acres of energy cane.

The soybeans and sunflowers can produce biodiesel fuel from oil squeezed out of their seeds. The sorghum, corn, bana

grass and energy cane are plants that can be turned into a kind of natural gas through anaerobic digestion.
Volner said the technologies for such production facilities exist and, though expensive, could be deployed if crop development goals are met.
There are also about 180 acres of grasses and legumes in pastures through which roughly 100 cattle move in groups so that they spend 24 hours on one field that then is left to regenerate for 48 days.
Jacob Tavares, an HC&S human resources staffer from a Maui ranching family, heads up the cattle experiment and said it has shown good results since livestock from Maui Cattle Co. arrived in February.
Tavares said one key is irrigating some pastures to ensure against drought. “We just came out of a 13-year drought a few years ago and it was devastating to the ranchers on Haleakala,” he said. “Drought is always the biggest concern of ranchers.”

Return to diversifying

In some ways, what HC&S is doing now hearkens back to its past when the company explored new crop development that led to the creation of Maui Land & Pineapple Co., Nahiku Rubber Co., papaya farm Princess Orchards and Puunene Dairy. The company also at one time grew macadamia nuts, coffee, tea, sugar beets and patchouli, according to Nakahata, who has been at HC&S since 1984.
Past diversified farming initiatives, however, were discontinued, sold or spun off decades ago as HC&S needed to focus on maximizing sugar cane production.
Despite advances over the years, HC&S owner Alexander & Baldwin Inc. said it could no longer contend with low sugar prices and other challenges that produced a $30 million loss for the plantation last year. So A&B announced its decision in January to quit the sugar business.
If the new plan for diversified agriculture succeeds, Volner envisions energy crops taking up maybe as much as 18,000 acres. And cattle pastures might occupy 9,000 to 10,000

acres.
There also is an intent to provide land for orchard crop farmers who so far have expressed interest in growing coffee and cacao, and to develop an agricultural park next year with plots as small as 1 acre for lease to farmers, with priority given to former HC&S employees.
Volner is optimistic that many of the 645 HC&S employees being laid off this year may one day return to the plantation for jobs in expanded diversified ag operations, though getting there will be a long row to hoe.
http://www.staradvertiser.com/hawaii-news/new-diverse-generation-of-crops-is-taking-root-on-maui-plantation/