Shannon Nickolay uses a German-made Comet press to extract oil from sun flower seeds.

He Makes His Own Fuel With On-Farm Biodiesel Plant

By Jim Ruen, Contributing Editor

Shannon Nickolay grows his own tractor fuel. His simple production system produces fuel, feed for his cattle, and adds a crop to his corn and soybean rotation. From May through September he burns mostly homemade fuel in his diesel-powered equipment.

"It only takes a few minutes a day to make biodiesel at a cost of about $1.75 per gal.," says Nickolay. "When we started in 2006, diesel fuel was pushing $4 per gal., and the equipment paid for itself quickly. Even today, it's saving us money."

Faced with high fuel prices, Nickolay read about a Wisconsin man who was making biodiesel. The man shared his experience with him and helped set him up with needed equipment, selling him a German-made Comet press. Nickolay had a local metal fabricator make a 400-gal. reactor with pumps and heater.

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"The only problem with the press is getting parts from Germany when pieces wear out," he says. "The guy I bought my press from is getting out of the business, so I have to find a new supplier."

Nickolay keeps wear to a minimum by using "sacrificial" belts. Although the press gearbox has a double pulley drive, Nickolay uses only one belt and tightens it down.

"If a piece of bearing or something enters the press, the belt will burn out before the chrome-plated parts get scratched," he explains. "Once the chrome is scratched, it wears much faster."

Nickolay avoids using soybeans, in part because of their low oil content, but also to avoid rocks and dirt picked up by the combine. Instead, he plants about 100 acres of sunflowers and about 40 acres of canola each spring. Seed is pressed in 50-bushel batches, with sunflower seed producing about 50 to 60 gal. of oil per batch and canola seed producing 90 gal. of oil per batch.

While the meal is pushed off to the side for use in Nickolay's cattle ration, the oil is collected in a large plastic tank. Most of the sediment in the oil drops out as the oil enters the tank. Once a day the oil is pumped to a second plastic tank where it settles over a 5-day period.

"The sediment from the first tank is fed to young stock by the bucket full," says Nickolay. "They will follow me through the yard for it."

Oil at the top of the second tank gets pumped into a 400-gal. stainless steel reactor tank. He heats the oil to 120 degrees. Nickolay adds about 15 1/2 lbs. of potassium hydroxide flakes to 30 to 35 gal. of methanol. Sunflower oil gets a little more potassium hydroxide, while canola gets a little less.

Once the flakes are dissolved, the methanol solution is pumped into the reactor tank. Pumps on the bottom of the tank recirculate the methanol-oil mix to the top of the tank for about a 3-hr. period. Nickolay leaves it in the reactor for a day or so. This allows glycerin (a byproduct) to settle out, with more settling out while the biodiesel is in storage.

Nickolay estimates getting about 35 gal. of glycerin per batch of fuel. When he has collected about 300 gal. or so from storage tanks, he heats it up and pushes air through it.

"I reclaim about 50 gal. of methanol per batch for reuse in the reactor," says Nickolay.

The biodiesel is pumped into the farm's 10,000-gal. fuel barrel or into smaller plastic totes. "We pump the biodiesel off the top of the tanks as we need it," says Nickolay. "We burn the oil straight in older equipment, but mix it 50:50 with diesel fuel for use with engines 2005 and newer."

He explains that fuel filters on the newer equipment are too tight to allow the biodiesel molecules through.

"The equipment does require an up-front investment, but if you have the land to produce your own seed and cattle to feed the meal to, the cost to produce biodiesel drops pretty fast," says Nickolay.

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Fast Fix For Punctured Ag-Bags

When a hailstorm punched hundreds of tiny holes in a neighbor's Ag-Bags, Adam Mueller was asked if he could seal them back up with insulating foam since he was in the foam insulation business.

"The foam didn't stick well enough to seal the bags, but I checked with my supplier, Oak Ridge Foam and Coating Systems, and they had another product," says Mueller. "We did a trial, and it worked very well on small holes."

Mueller knew one guy who had tried spraying acrylic paint as a patch for holes. However, the paint took 5 hrs. to dry, limiting when it could be applied and how.

Oak Ridge's coating went on fast, dried instantly, had no bleed-through, and didn't require unsealing the bag.

"We can start as soon as the bag dries off and work until the dew appears or there is rain," says Mueller. "We had one site that was level with poor drainage with water between the bags. We would do one side, drag the hoses across it, do the top and then drag them across it to do the other side. We couldn't have done more than one side with paint."

Mueller notes that the material, which is applied at 160°F, eliminates another problem. Simply walking on an Ag-Bag can cause the plastic to stretch. However, applying the hot spray causes it to shrink right back.

Mueller has found that larger holes and tears can also be repaired. "We had some holes from really big hail," he explains. "We taped them and then sprayed over the tape. We found that we didn't need special tape, just a smooth surface."

As word got around, Agri-Seal, Mueller's new business, started expanding. Last year he traveled up to 3 hrs. from his southwestern Wisconsin farm. He now has a patent pending on the process and the specialized use of his foaming equipment.

Adam Mueller started up a new business using spray foaming equipment to seal punctured Ag-Bags.

"Not every spray foam machine works with the coating, but many can," says Mueller.

Pricing varies based on the area to be covered and what insurance companies will agree to cover. "The cost can also vary by the material stored in the Ag-Bag," notes Mueller. "Bags filled with wet, lumpy materials can be more wrinkled and require more coating than a bag filled with corn silage," he says.

Mueller believes demand will grow as word spreads. He is exploring franchising Agri-Seal and would like to hear from interested FARM SHOW readers.

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Three Ag Businesses Keep Him Busy

"Sometimes there doesn't seem to be enough hours in the day for everything I need to do, but I wouldn't have it any other way," says Dr. Justin Luther, who raises sheep on his Wisconsin family farm, is a college professor in Reproductive Animal Physiology, and operates Reproductive Services, LLC.

Luther says when he was a kid showing sheep he always wanted better animals in the show ring and the only way to do that was through natural selection and breeding, which took time and quite a lot of money. In his junior year at UW-River Falls he became interested in laparoscopic artificial insemination, a way to infuse superior genetics without owning the sire.

After earning his M.S. and PhD in Reproductive Physiology at North Dakota State University, Luther trained veterinarians in "Lap AI" and learned that many producers were interested in the procedure. In 2009 he joined the UW-River Falls faculty as an Animal Science professor and began offering Lap AI services on his farm.

Since then, Luther says, "This business has grown from an idea for a 4-H project into something way beyond what I ever expected." In 2017 he built a special building at his farm for Lap AI services. From that facility he offers artificial insemination, semen collection and evaluation, semen cryopreservation and reproductive consulting services.

Customers from Minnesota and Wisconsin bring sheep and goats to his facility, where most services are scheduled on weekends during the school year or in the summer. He also takes his AI services on the road in the fall to game farms that raise deer.

Luther notes that raising his own sheep and offering AI services brings value to his role as a professor. "Being able to combine my hands-on work with teaching makes me a better educator and gives my students a better feel for what to expect in their work," he says. Pre-veterinary students sometimes help at his farm to gain valuable work experience.

Even as his business grows, he and his family will continue raising Hampshire/Suffolk ewes. His wife and children are actively involved in day-to-day sheep management and they assist with AI at the farm facility. All three of his children manage and show their own market lambs during the summer.

In the future, Luther plans to offer embryo transfer and in-vitro fertilization to small ruminants using eggs collected from elite female breeding stock. "My work is a balancing act no doubt, but it's very fulfilling for everyone involved," Luther says.

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