INTERVIEW: TIMOTHY A. WISE ON THE FUTURE OF FOOD

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Flour Power

New York Farmer Creates a Sustainable Market for Organic Grains

Buckwheat flowers are very attractive to pollinators.

BY JILL HENDERSON

Many people know the Finger Lakes Region of New York for its green rolling hills and vineyards. It also happens to be home to Thor Oechsner, one of America's leading figures in the field of large-scale organic grain farming. As a boy, Thor spent much of his childhood helping out on his uncle's dairy farm. He also cultivated his very first "cornfield" in the backyard of his parents' suburban home. When the time came for college, Thor attended Cornell University. Afterwards, he started a Volkswagen and Audi repair business and taught mechanics at the local vocational college. Still dreaming of farming, Thor broke ground on his first agricultural enterprise in 1991 with a three-acre market garden that he worked part-time. By 2003, Oechsner had fulfilled his financial goal of being able to buy his own farm, and today Oechsner Farm grows 1,200 acres of food-grade grains.

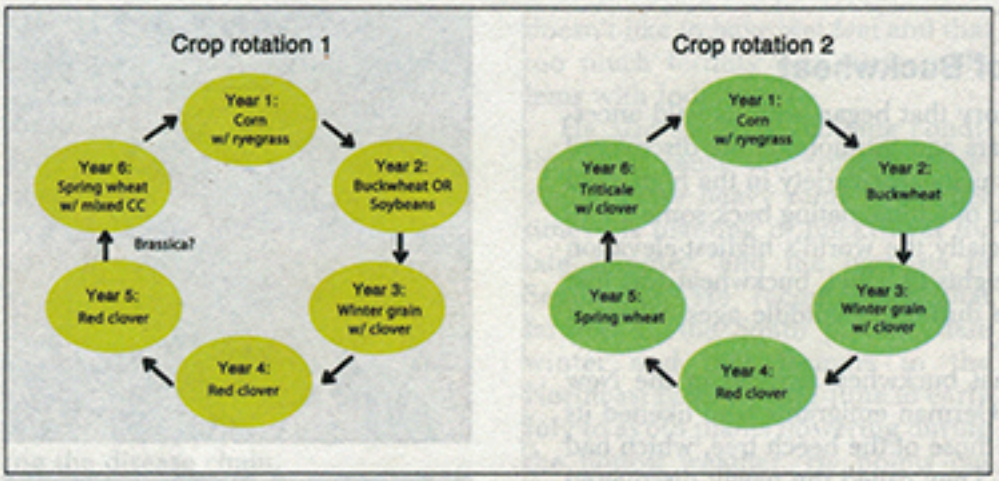
FLOUR AND FARMING

With his grain farming enterprise in full swing, it was a natural move for the grandson of a German pastry chef to delve into the flour business. In 2009, Oechsner partnered with Greg Russo and Erick Smith of Cayuga Pure Organics to launch Farmer Ground Flour. The trio's goal was to start a specialty milling company that would provide fresh organic stoneground flour and promote a "sustainable grain economy" for farmers in the Finger Lakes region. After Smith passed away in 2014, Neal Johnston joined Farmer Ground Flour as the third partner in the business.

Although Oechsner had become an expert in the field of organic grain production, he admits that the nuances of flour milling were much more involved and complex than he ever could have imagined. He praised his partner Greg Russo for his expertise and skill in that arena. While Oechsner grows the majority of the grains for the mill, six additional local farmers are also producing grains for the company.

Just one year after Farmer Ground Flour began, Oechsner was dining with Stefan Senders and his wife, Liz, when he was served a slice of Sender's handcrafted bread made with Farmer Ground Flour. Oechsner was so impressed that he suggested that he and Senders start a bakery. At first Senders thought Oechsner was crazy, but after he slept on the idea he decided that was exactly what he wanted to do. And after quite a bit of intensive hands-on experience and studying the art of breadmaking from experts near and far, Wide Awake Bakery opened its doors in Ithaca in 2011.

Wide Awake Bakery crafts over 200 different types of bread and has added pasta, pastries and other goodies to the menu. The bakery's products routinely get glowing reviews from customers and have found their way into numerous specialty grocers and local retailers. The company is serious about its



An example of Oechsner's two-year rotation schedule.

Buckwheat is mown for cover crop or hay at 6 weeks to prevent volunteers.

community and offers a bread CSA merrily dubbed the "Crust Fund." Wide Awake Bakery's website declares that they have a mission to create tasty, healthy and organic products in an atmosphere of local community and cooperation. And the majority of the flour they use to make their magic comes directly from Farmer Ground Flour.

THE ROTATION GAME

Although Oechsner is a partner in both these businesses, the majority of his time is spent doing the thing he loves the most – growing grain. After much tinkering and experimentation, Oechsner believes he has found the best way to grow high-quality grains while enriching the soil and deterring weeds, pests and diseases. His method is based on carefully crafted crop rotations using a wide variety of cash and cover crops. Oechsner's main allies in the rotation game include grass and mixed hay, corn, buckwheat, red clover, triticale, Japanese millet, perennial rye and occasionally soybeans. His primary wheat varieties include perennial intermediate wheatgrass (Kernza), soft white wheat, hard red winter wheat and hard red spring wheat.

Over the years, Oechsner has polished his rotation schedule down to two 6-year cycles. Although they appear simple and fixed, he says that they are not written in stone. In fact, he says that his rotations can and do vary from season to season and crop to crop. The most important thing for him is reaping high-quality grain crops while breaking the cycles of pest and disease that affect them, while at the same time providing for the soil's needs for nutrients and rest.

Oechsner explains how he might approach a 6-year rotation, which begins in mid- to late-May when corn is sown into a field that has been in red clover. By late spring, the clover has smothered all of the early annual weeds and enriched the soil with nitrogen to support the heavy-feeding, 90-day hybrid corn Oechsner grows. After the last cultivation of the corn, he overseeds the field with annual ryegrass, which will stand all winter long.

In year two, the following spring, Oechsner plows the ryegrass under and leaves the field fallow until he sows buckwheat (or occasionally soybeans) in mid-June to early July. The buckwheat offers several advantages at this point. The first is that it is a low-fertility cash and cover crop that smothers summer weeds and doesn't rob the soil of nitrogen and other nutrients. The second is that buckwheat doesn't host any of the diseases that might affect any of his other crops; along with the fallow period, it rounds out a year-long break in the disease cycle of grass, grain and cereal crops. The buckwheat is harvested in the fall at

A Brief History of Buckwheat

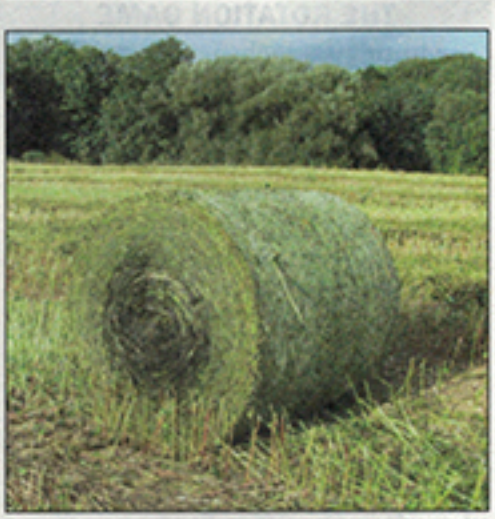
Buckwheat has a long, diverse history that began with its wild ancestors in Southeast Asia some 6,000 years ago. Ethnobotanists discovered the remains of the first domesticated buckwheat variety in the high, cold mountain plains of the Tibetan Plateau of China, dating back some 2,600 years. This original buckwheat is officially the world's highest-elevation domesticated plant. From the lofty heights of Tibet, buckwheat was first carried across Asia, then into Europe during the middle ages, where it enjoyed centuries of popularity.

It wasn't until the 17th century that buckwheat arrived in the New World – most likely by the hands of German emigrants who likened its black triangular (three-sided) seeds to those of the beech tree, which had long been used for food in Germany. They called the newly discovered grain *Buchweizen*, which translates into English as "beech wheat"; it is now pronounced with just a trace of the original German accent as "buck wheat."

Everywhere buckwheat went it was grown and used as a cereal and a grain, though technically it is neither. Today, ethnobotanists classify buckwheat as a pseudo-cereal. Botanically speaking, buckwheat is an angiosperm and a eudicot, belonging to the family *Polygonaceae*. Much like its German name, the Latin botanical name for buckwheat is *Fagopyrum esculentum*. The genus name, *Fagopyrum*, is derived from the Latin word *Fagus* (beech) and the Greek word *pyros* (wheat). The specific epithet, *esculentum*, describes the species as being edible.

Through the ages, buckwheat has been used to feed humans, poultry and various forms of livestock. Revered for its high protein content and nutty flavor, buckwheat found its way into just about every manner of food and drink, including beer. It was particularly used to make bread, pastries and pasta, including the soba noodles of Japanese origin. Of course, buckwheat pancakes are famous here in America, and buckwheat groats are often made into a hot porridge around the world.

Buckwheat is an ancient grain that has been grown throughout the world for thousands of years. In America, the multipurpose crop reached its peak of production in 1866 when it was grown primarily in the German-settled areas of the Northeast. In 1918, U.S. acreage sown to buckwheat totaled roughly one-million acres but slowly dwindled down to a mere 50,000 acres by the 1960s. Buckwheat essentially was erased from the American farm lexicon due to the increased consumption of refined white flour. The reduction in popularity as a food and feed forced farmers to focus on growing only the cash crops desired by the big grain companies if they wanted to survive. And while buckwheat fell out of use on a large scale, it continued to be utilized by gardeners, small organic and sustainable farmers and beekeepers. The crop persisted, but many of the unique varieties once available were slowly lost to time.



TOP: Buckwheat for grain is harvested at 10 weeks. MIDDLE: Overwintered forage turnips are worked in with a chisel with sweeps. BOTTOM: Buckwheat hay has a feed value similar to alfalfa.

around 10-12 weeks for grain, but it might also be harvested for hay at 5-6 weeks.

Oechsner says that this is a crucial period in the rotation because it breaks the cycle of soil-borne fusarium diseases that are common in corn. Fusarium not only reduces the productivity and quality of corn, wheat and oats; it also generates a mycotoxin known as vomitoxin, which creates a safety risk to food and feed. Breaking the cycle of pests and diseases reduces their occurrence and damage and reduces the need for expensive inputs to deal with them year after year.

After the buckwheat comes off, Oechsner normally starts year three by sowing a winter grain like hard red winter wheat or rye. This is later oversown with red clover, which will stay on the fields for years four and five to enrich them with nitrogen and, once again, break the disease cycle. Oechsner says that he sometimes sows spring wheat in year five, but only if the soil and weather conditions seem right.

Oechsner points out that if he sows spring wheat in year five, he generally follows it with triticale and clover in year six. If not, he plows down the clover in year six and sows spring wheat oversown with a mixed cover crop. Once the wheat

is harvested in July, he uses shallow tillage and sows a winter crop of oats or peas, or perhaps one of the brassica species like forage rape or turnips. He likes forage turnips because they aerate the soil and bring minerals into the root zone, and their large leaves create a layer of mulch on the surface. He is also quick to note that decomposing turnip roots act as a biofumigant that kills many of the pathogens inherent in wheat crops – once again breaking the disease chain.

Oechsner says that while he has a method to his rotation, many factors play into what he decides to plant and when. His experience has taught him that having different roots in the soil, like small grains in rotation with corn and soy, not only act as important disease breaks but improve soil structure and balance nutrient loads without a lot of inputs. Breaking the chain of pests, disease and weeds using diversity makes it less stressful and more profitable to grow food-grade, organic grains.

THE BEAUTY OF BUCKWHEAT

At first glance, buckwheat may seem like the least crucial player in the rotation game. But Oechsner would argue that buckwheat is not only incredibly important – it is one of his personal favorites. For while buckwheat is the straw that breaks the back of disease in the rotation game, it also provides a valuable and profitable crop. Oechsner says that buckwheat excels at smothering perennial weeds like quackgrass, bindweed and Canadian thistle, and it doesn't bring any crop-infecting diseases of its own to the fields. Because it is such a light feeder, buckwheat doesn't rob the soil of crucial nutrients that are needed for heavy-feeding crops like corn, and it is an exceptional green manure, loosening and conditioning soil to improve tilth.

Because of its origins in cold, arid regions and marginal soils – including acidic and low-fertility conditions – Oechsner says buckwheat is a natural at getting the most out of the least. He says that it is important to keep in mind that buckwheat doesn't like to have wet feet and that too much fertility can cause problems with lodging.

He also suggests avoiding conditions that cause soil crusting, especially before heavy rains. Oechsner times his planting of buckwheat for late summer, and the harvests in September. He recommends that farmers in the South plant in late winter and that farmers in the Northeast plant by mid-June to early July to avoid plants flowering during the hottest weather. He points out that while plants will maintain vegetation in hot weather, flowers blast (abort) at temperatures over 90°F. Oechsner suggests sowing rates of 35 pounds per acre for grain and 50-plus pounds per acre for cover crops or forage, seeding at depths of 0.5-1.5 inches.

Buckwheat grows exceptionally fast, often breaking its first buds within two weeks of sowing. Oechsner says that buckwheat needs no fertilization or applications of herbicides, pesticides or fungicides. He said that to harvest buckwheat for silage, it is best to cut the plants

Buckwheat is the knockout blow for weakened perennial weeds

at roughly 5-6 weeks after planting or when plants begin to bloom. It is best to use a swather or cutter bar without conditioners to harvest green plants. He also says farmers shouldn't stress out too much on the chances of a little rain, because eventually it will dry out. With that he also emphasizes patience; even without rain, he said, it takes "forever" to dry. The only drawback of baling buckwheat is that it might gum up the baler a bit, but it's worth a little extra work since buckwheat has a feed value equal to alfalfa. Because cows don't necessarily love buckwheat, so it's best to use it as a part of a total mix ration.

When it comes to growing buckwheat for grain, Oechsner suggests swathing at approximately 10 weeks in order to get the crop off early. Because buckwheat doesn't produce its seed all at once, he also suggests harvesting when 70-75 percent of the seeds are brown by swathing windrows in the early morning while the dew is still on the plants; this helps prevent shattering. He points out that immature seeds will continue to ripen in the windrows, which can be combined in 2-4 weeks. And if rain happens to fall after cutting, Oechsner says not to worr – buckwheat seed is naturally weatherproof.

THE FINAL WORD

As buckwheat regains its rightful place in the world of both food and farming in America, farmers are realizing that it's not that easy to get their hands on a quality variety. According to the SARE article, *New Buckwheat Varieties for Greater Sustainability*, farmer Anne Ongstad from The Whitman Ranch in central North Dakota writes, "There have not been new varieties released to the public in thirty to forty years and these public varieties are 'running out.' There are a few new varieties that are closed to the public and can only be grown under contract for resale back to the seed company. We need better buckwheat varieties that are available for us to put to our own uses, including cover cropping."

Because of the lack of buckwheat varietals, SARE awarded Ongstad, Rick Mittleider and Wayne Mittleider an $18,881 group Farmer-Rancher grant from NCR-SARE in 2013. You can read more about the ongoing development and trials of new buckwheat varieties by visiting the SARE website and searching for the article's title.

If you decide to grow buckwheat, do yourself a favor and don't buy seed from the local feed store because it's probably not going to be as vigorous and productive as you might like it to be. Do your homework and ask a lot of questions first. Some of the varieties on the market are emphasizing leaf size over seed size and quality, because at present there is more interest in growing buckwheat as a cover crop than as a grain. Oechsner plants and sells Culver VNS buckwheat, an old heirloom that has been grown in his county since before 1847. His interest in the quality of vegetative growth and seed goes hand-in-hand, but in the end, he says, "the benefits from harvesting buckwheat seeds are almost secondary to supporting our agricultural ecosystem."

Jill Henderson writes about agriculture and the environment from her home in Pottersville, Missouri.