

BEYOND JUST

YEAST,
HOPS +
MALT

THE ENDLESS NEED TO PRODUCE
NEW INGREDIENTS FOR BEER

One are the days of soulless, bland, indistinguishable beers. Craft beer enthusiasts can rejoice that pours of yellow, fizzy liquid are now reserved for those who truly want it, and the explosion of craft beer styles ensures beer drinkers will always have some level of choice. But even within a specific style the basic ingredients can differ. There are still a range of malts, hops, and yeasts which prove to differentiate that brew among others: subtle differences between colors, tastes, and aroma. Today, it's easy to take these choices for granted—just stroll through your local homebrew shop to get an idea of the plethora of ingredients available to make today's beer. It's not hard to see that while brewing ingredients today are products of practical considerations such as quality and labor, their development is also guided by a sense of passion and expression; moreover, while brewers are often viewed as rock stars, who create the melodies and ballads we love, there are hardworking artists, laborers, executives, and scientists, who create those instruments our beloved brewers use to put gold records in a glass. The explosion of craft beer choices has led to a doubling down of the expertise needed to support production, as well as the communication necessary to collaborate on something great.

There were 3,464 breweries in the USA in 2014, nearly twice as many as in the early 20th century. Of these breweries, 3,283 are on the craft or brewpub scale. This surge in breweries naturally means there's more of a demand for raw materials, but

more importantly, the fact that they're craft breweries means that, as defined by the Brewer's Association, they're concerned with traditional brewing methods and therefore use heaping quantities of malted barley as opposed to rice or corn. According to the Washington Grain Commission, "Craft brewers use roughly 3.4 percent more malt barley to produce a pint of beer than large-scale brewers." With this increase in demand for quality malt, it's no surprise that passionate people all over the country are stepping up to provide artisan products. After all, the craft movement wasn't born out of the notion that beer was hard to find, rather that people wanted better choices, and local ones too. That's the parallel to micro malting, where a rising number of entrepreneurs are using traditional floor malting techniques to turn locally grown grains into craft brewing ingredients.

Huge malt houses like Rahr and Malteurop dominate the market, but in a growing food conscious society, more people are thinking not just about where the beer is brewed, but where the ingredients themselves come from. Josh Oliver, co-founder of Deer Creek Malthouse in Glen Mills, mirrors this sentiment: "We started Deer Creek Malthouse in 2012 after looking

hard at the local beer scene and being very surprised that there wasn't any local supply of brewing ingredients. Craft brewers often choose local ingredients for their kitchens—meats, cheeses, produce—but then source malt from Europe, or Canada, or the Mid-Western States and further. There has been a disconnect between

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'drink local' and 'brew local' which we wanted to address." The balance between resources and production goes back and forth like a conversation: while his malt makes beer, it is the beer that has set the stage for his malt to exist, which in turn has an effect on the industry itself. Oliver admits that the burgeoning craft movement is what has enabled a small business like his to be created—it would have been a Herculean task to open an operation like his in the 70s; furthermore, he says that while his customers do enjoy having someone "make malt in their backyard," the real focus is on quality and flavor—no one wants to pay for a sub-par product just because it's local. This comes at a premium, but Oliver remains optimistic: continued growth and an improved



economy of scale means his costs will come down, and demand will increase. Brewers who have passed on his business because of the cost will revisit the idea, especially when they taste the difference.

unable to be replicated outside this area. These products would not have been possible without Oliver's direct involvement in the growing process, for which Deer Creek supplies the seeds and provides

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The same malt from two different maltsters can still have subtle differences, just as growing the same hops on two different continents can ultimately produce different products influenced by the local terroir. While many malt houses, including Deer Creek, produce a 10L Munich malt, Oliver's Pennsylvania Dutch 10L Munich Malt has all the unique, rich character of a floor-malted barley. This led to the creation of their Double Dutch, which Tröegs used to make a unique dunkel lager—a beer

crop management, essentially acting as the vital link between the field and the brewery. Oliver also sees himself as a networker of sorts, bringing farmers, brewers, and artisans together, who may not have had a reason to share information and resources otherwise. Through a more intimate sense of community, the Craft movement has heightened our sense of terroir, and even though his company has only been malting for a short time, Deer Creek supplies to a handful of local breweries, bakeries, and distilleries.

Local craft distilleries have been able to exist without local malt, because it's not a crucial ingredient in bourbon or rye whiskey, but now the demand for gourmet choices from breweries has made an available channel of quality malt for local whiskey stills. Oliver also supplies his product to bakeries. Fork in Old City uses Deer Creek's diastatic malted barley flour, milled by a friendly neighborhood farmer, in some breads—other bakeries are interested as well. An unforeseen complication of this, Oliver points out, is that its use in food opens up the business to certain FDA regulations they would not have had to deal with otherwise. Craft brewing has not only made the existence of this business possible, but has helped it to proliferate into other sectors of the economy, not to mention making more farmers happy to have their grains in the glass.

But the staff over at Deer Creek have become farmers themselves, in a way. They've been growing Zeus and Cascade hops on just half an acre, with plans to try more varieties. It's far from a local hop business—they invited brewers to get free hops as long as they picked the bines themselves—but dried cones are already making their way into one-off beers you may be lucky enough to try. As great as varieties like Zeus and Cascade are, they are certainly not new or experimental—experimentation is up to hop farmers and breeders like Roy Farms in Washington, who have nearly seven-thousand times the acreage as Deer Creek.

Roy Farms has nearly 3,400 acres of hop trellis in the Moxee and Yakima valley just for crop year 2015. But even with all that land, they remain a small family-owned business. Jim Boyd, Senior VP of Hop Sales, explains the differences in how the big companies operate versus the little guys: "Historically the direction, pricing and information has been controlled by the Large Global Merchants, which has muddied the waters, created an imbalance in supply and demand and slowed the response to consumers demand for changes in new varieties and on farm quality improvements." This parallels the slow, measured response from big breweries to create

more craft-y, niche products while small brewers are more nimble, experimental, and open. Boyd goes on to illustrate the impact that small companies can have on each other: "In recent years the direct dialog and relationship between brewer and grower has opened doors that have improved the flow of information from the producer (grower) and the consumer (brewer). It has also helped brewers realize the benefit of hop contracting all the while helping price points improve to what we would consider fair and sustainable." It would seem that while a specialty product could be cost prohibitive, the growing trend of working in concert makes good business sense. This is especially crucial in hop farming, which is a boom or bust industry, and according to Oliver there are very few boom years. To soften the risk, the farm diversifies its crops. Despite the growing popularity of craft beer and the demand for hops, Roy Farms has been planting apples, berries, and cherries, which have pulled down their acreage share of hops from 100% fifty years ago, to 70% just ten years ago, even as their total acreage grows. Furthermore, Roy Farms adopts certain technological developments, like dwarf hop varieties and low trellis systems, in order to save money on labor and drive down the overall price per unit of Alpha hops. While this does not directly impact their ability to meet customers' needs, it leads to overall success of the business.

The sweet smell of success is that of a total flip in the demand of aroma hops versus alpha hops. Boyd says that seven years ago, they had a 70/30 split, growing more alpha hops than aroma varieties; however, it's now 30/70, and these are not just the typical citrus-focused hops that have distinguished American IPAs—they are working on unique fruit aromas including strawberries, tropical fruits, concord grapes, raspberries, apples, pears, bananas, etc. ADHA 483, better known as Azacca®—after the Haitian god of agriculture—is a tropical fruit aroma hop perfect for dry hop additions. In terms of its family tree, Azacca's mother is Toyomidori, a Japanese hop largely discontinued for mildew issues, whose parents include

Northern Brewer, of minty Anchor Steam fame, and an unnamed USDA hop. On Azacca's father's side, there's a couple of generic American Dwarf Hop Association varieties as well as Summit™, a citrusy and spicy, earthy hop. This kind of lineage doesn't develop overnight, or even in a year—it usually takes ten years. New hop varieties of today are not simply synthesized in a lab, they are birthed over a decade. But born to-do what?

Ideally, in a free market, the purpose of a hop is existential, it takes on whatever meaning the consumer attaches to it, and they will decide if a particular variety is good or bad. But before brewers and drinkers ever experience a new hop, a world of practical considerations are crucial to the design of the hop. Josh Oliver says, "hop growers and breeders are always looking for a plant that has good agronomics [...] resistance to disease and pests [...] good genetic attributes." He emphasizes that it is only after these concerns that the question arises, "What can a brewer do with this hop? If there are unique attributes that provide for good sensory effect, (taste, flavor, clean bitterness, etc.) then the brewer will find ways to use the variety." But hop farms don't live on one-offs; it isn't enough to try something with a new variety, it has to be interesting but also plentiful and readily available so that brewers, who may be reluctant to change recipes to their flagship varieties, can create new beers instead.

Part of creating new styles and varieties often involves evaluating the type of yeast being used; after all, yeast can have the biggest impact on the flavor of a finished beer. But many brewers are reluctant to experiment too much with other yeast strains because sticking to one "all-purpose" house strain is much



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more cost effective. Bryan Pearson, from the Brewing Science Institute, explains how yeast can factor into a brewery's business plan: "Yeast is the only ingredient where you get more of it when you use it." In short, you can buy one dose of American ale yeast and it will grow to the size where you can ferment multiple batches with it. The yeast can be reused multiple times until the brewer feels that it has been expended, similar to fryer oil in a kitchen. The Brewing Science Institute supplies hundreds of strains of yeast to commercial breweries of varying size and scope and in many ways provides a helping hand whenever possible.

While many brewers are reluctant to change up their yeast, there's always going to be the need for a Belgian tripel now and then, even once a year as a seasonal. But you



can't make a Belgian tripel with Chico yeast. Pearson tries to assist the thrifty brewer by suggesting that they make a smaller beer first with the special yeast, letting the organisms multiply naturally, and then using those returns to make the bigger beer. The cost per batch of the yeast is instantly slashed. Another change breweries can adopt to help make more cost-effective and varied beers is to use a yeast brink, which can hold yeast dividends paid out by the fermentation. This dynamic of sharing wisdom, however, is not always taken to heart, and Pearson feels many breweries would benefit from learning more about such an important ingredient, which he says still remains a "black box" to many brewers. But sometimes, Pearson has to pull back. Some brewers may send him a nice, viable yeast strain they isolated

and would like his company to hold on to it, which is fine. But other times the expectation is that they can find a good yeast strain in garbage. "They were sending us sludge," says Pearson, and they do not have the resources to comb through all of it. In respect to wild yeast, he explains that, "There's thousands of organisms out there. Only a few are any good, and only a few of those are interesting." This reflects that while some brewers are very pro-experimentation, they still need guidance and a sense of practicality.

But practicality is not exactly how beer got where it is today. In Sam Calagione's book, *Brewing Up a Business*, he talks about how labor intensive it was to hand package, and in some cases repackage, the now legendary Dogfish Head limited releases. Today, a wide range of equipment is available to help small breweries be more efficient, even if their brew

house resembles a glorified homebrew setup. As the industry grows, the bar is raised. In Michael Tonsmeire's book, *American Sour Beers*, he reflects on the growing trend of sour beers: "American sour beer has gotten to the stage where it is no longer sufficient to brew something that is 'just' sour; beer nerds are becoming beer connoisseurs, demanding levels of refinement, balance, and complexity..." (xiii). These demands can only be satisfied by growing experimentation, education, and communication. But the expression and creativity of craft beer has not changed the fact that good business practices are still important—no matter how special a hop breed, yeast strain, or malt may seem, it needs to possess a certain consistent level of quality, replicability, and cost effectiveness. No energy is put into developing something that is not viable, because choices in the glass start with choices in the field. †