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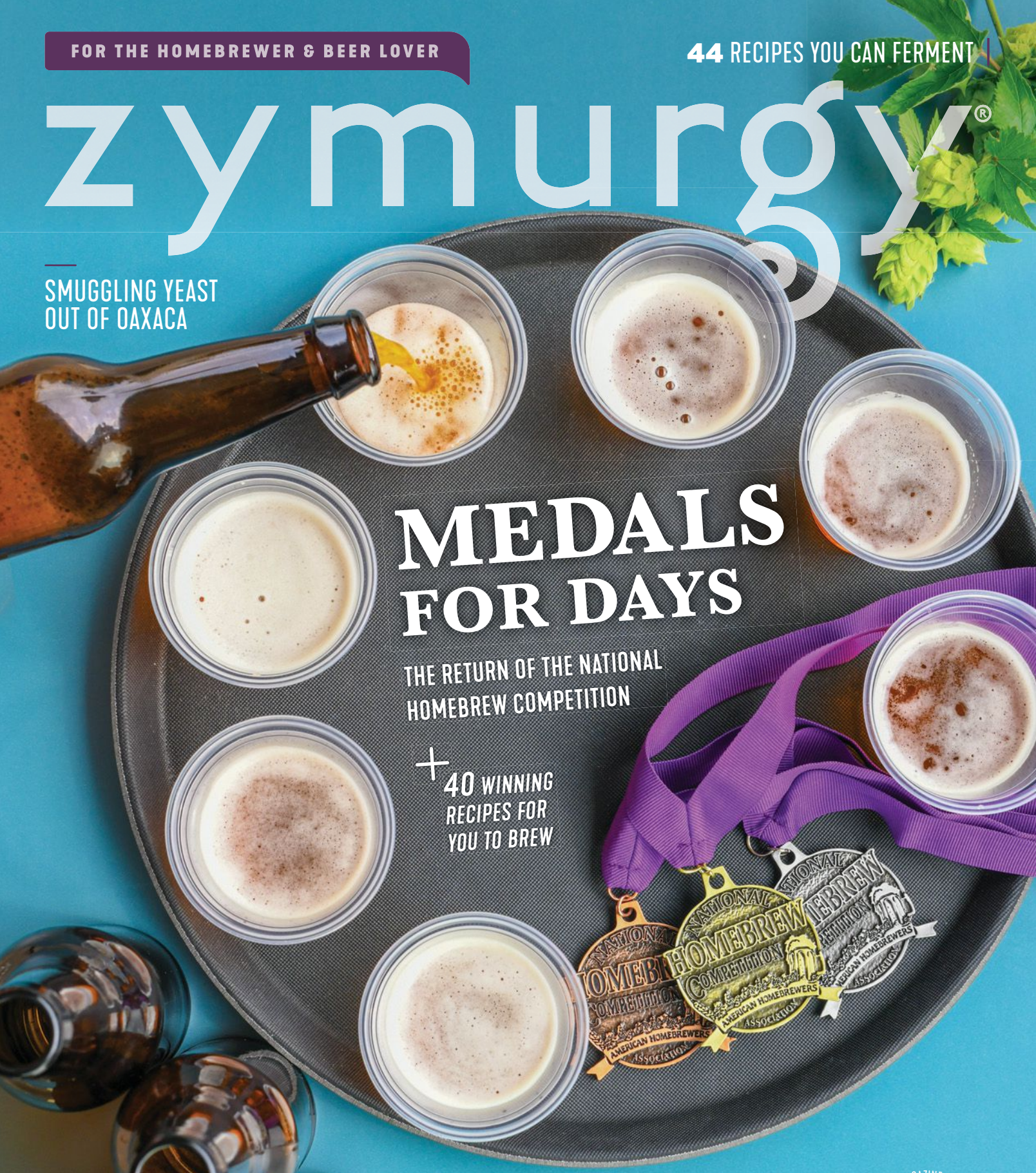

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VOL 44 · №5
SEPTEMBER//OCTOBER 2021

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A Return to Form

In 1553, Duke Albrecht V outlawed brewing in Bavaria from April 23 to September 29. He rarely gets the credit he deserves.

Beer geeks are generally quite familiar with Albrecht's father, Wilhelm IV, who issued the famous Reinheitsgebot in 1516. Wilhelm's decree that Bavarian beer could only be made from barley, hops, and water—and, later, yeast—certainly influenced the types of beer for which German brewers have become world-famous. But his son's prohibition on summer brewing, which remained on the books until 1850, played an even more crucial role in defining the beer styles of the region.

Duke Albrecht V of Bavaria

Albrecht's summer brewing prohibition stemmed from the observation that beer made in the warm months tended to be more drain-pour-y than products brewed in cooler weather. If you've ever visited Germany in summer, you understand just how ripe things can get on a hot day, but at least you're not trying to ferment beer in a stifling U-Bahn carriage.

Forcing brewers to restrict their craft to the period spanning late September to late April improved quality and eventually gave us things like Märzenbier and the Biergarten. It also placed selective pressure on the microbes that fermented said beer. Cool conditions favored *Saccharomyces pastorianus*, and Bavaria became forever associated with lager beer (the House of Wittelsbach notwithstanding, which continued to enjoy a monopoly on Weissbier for another couple of centuries, but that's another story for another day.)

The point here is that my springtime stash is running out. I don't (always) brew according to the Reinheitsgebot, but I do, generally, follow a summer brewing prohibition of my own. Mine is based more on actual weather conditions than on the calendar and concerns (1) my temperature control system's ability to keep up and (2) my tolerance for standing next to a propane burner on the back patio, which is inversely proportional to the height of the mercury. Usually, by mid-June or so, I've made my last Weissbier and shut things down until the weather is reliably mild or cool again.

Now, as we head into autumn, I find myself thinking about and salivating over dark lagers. I recently revisited the excellent *Dark Lagers: History, Mystery, Brewing Techniques, Recipes* by Thomas Kraus-Weyermann and Horst Dornbusch (Master Brewers Association of the Americas, 2018) and found myself inspired to make more of them. I know not whether my inaugural autumnal brew will be a comforting tmavý ležák, a poundable Munich dunkel, or a fiery rauchbier. In the meantime, though, I'll have to drain the final spring-brewed kegs of Maibock and saison, my own versions of Märzenbier, at least etymologically speaking.

In this issue of *Zymurgy*, we celebrate the return of the National Homebrew Competition and the awarding of 120 category medals plus major awards. The cover feature tells the stories of those AHA members whose attention to detail and willingness to share their best beers with a bunch of thirsty judges yielded some coveted hardware.

Normally we print all the gold-medal-winning recipes in the Sept/Oct issue,

Duke Wilhelm IV of Bavaria

and this year we're 37 for 40. Three gold-medal recipes were unavailable when we went to press (the publication schedule stops for nothing), but we'll get them onto HomebrewersAssociation.org as soon as we can. In the meantime, I hope you enjoy the silver-medal recipes for categories 28. Fruit Beer, 32. Wood-Aged Beer, and 36. Fruit Mead.

Finally, I want to send a thank-you to my new friends in Iceland. My wife and I took our first international trip since December 2019 when we traveled to Reykjavík at the beginning of July. A highlight of the journey was a visit to the Fagradalsfjall volcano, which started erupting in March after having taken an 800-year-long nap. Somewhat inconsiderately, the volcano decided to take another short nap on the particular day we went to see it, but the steaming, still-warm lava field was nonetheless impressive.

Another highlight of the trip was getting to meet homebrewers in Reykjavík. Iceland's thriving craft beer scene has grown considerably since my first visit to the country in 2013. The beer is expensive—as is all alcohol on the North Atlantic island—but the quality and variety are very good. Many thanks to Hravnkell, Jökull, and Ásgeir for helping me better understand it by way of many pleasant pints.

Dave Carpenter is editor-in-chief of Zymurgy.

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Luke Trautwein

Vol 44 • No. 6
September/October 2021

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(zī'm ɚr jē) n: the art and science of fermentation, as in brewing.

ON THE WEB
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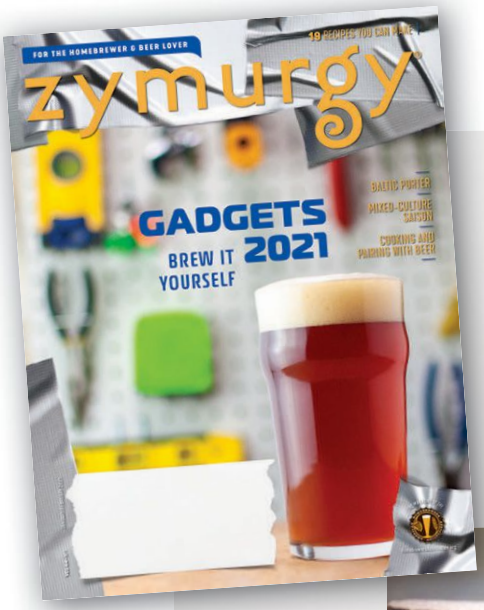
This past June, the AHA hosted Homebrew Con Online 2021. We were meant, of course, to have been in San Diego, but—you know the words—COVID-19 precautions forced us to go virtual for the second straight year. An inspiring keynote address by Marcus Baskerville of Weathered Souls Brewing Co. kicked off an information-packed three days that included talks by Ken Grossman, Lars Garshol, Annie Johnson, Keith Villa, and the AHA Governing Committee's own Jen Blair, among many other luminaries.

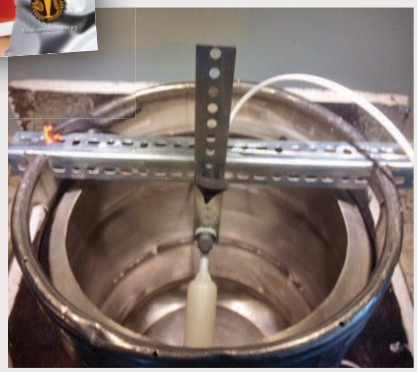
Recordings of the educational sessions are currently available to Homebrew Con 2021 attendees at HomebrewCon.org and will be made available to all AHA members in the coming weeks.

Homebrew Con 2020 and 2021 were a great deal of fun, especially considering the challenging circumstances, but nothing beats being in person. We really are ecstatic to host a face-to-face event again next summer! The 44th annual Homebrew Con—including the triumphant return of Club Night—takes place June 23–25, 2022, in Pittsburgh. Look for more details on HomebrewCon.org and in *Zymurgy* as the event draws nearer.



Share Your Best Gadgets with *Zymurgy* Readers

It's that time again: time to submit your favorite DIY brew gear. *Zymurgy*'s annual Gadgets Issue, which publishes every year in the Jan/Feb issue, celebrates the innovative spirit that homebrewers employ in pursuit of everyone's favorite beverage (or at least yours and ours). From creative re-purposing of everyday items to complex Rube Goldberg machines, we can't wait to see what you've come up with. Go to **HomebrewersAssociation.org/gadgets-submission** now to upload images and a description of your best DIY gadget (or gadgets). The deadline to submit is Monday, October 4.



Brew This!

Crimson Stag

Blackberry and aronia berry pyment

Recipe courtesy of Adam Crockett, Upper Reach Meadery.
For background information on this award-winning mead, read "Mead Matters" by Andrew Luberto on page 96 of this issue of *Zymurgy*.

Batch volume: 5 US gal. (18.9 L)
Original gravity: 1.126–1.132 (29.3–30.6˚Bx)
Final gravity: 1.030 (7.6˚Bx)

HONEY & FRUIT

15 lb. (6.80 kg) wildflower honey
11 lb. (4.99 kg) Carménère grapes
7 lb. (3.18 kg) black raspberries
5 lb. (2.27 kg) aronia berries

YEAST

15 g Lalvin Bourgovin RC212 yeast

ADDITIONAL ITEMS

19 g Go-Ferm
3 g Rouge Berry
9 g Fermaid O @ yeast pitch
9 g Fermaid O @ 1/3 sugar break (1.085)
4 g Fermaid K, @ active fermentation (24–30 hours)

PROCESS

Rehydrate yeast with Go-Ferm dissolved in a small amount of water. Crush grapes and add to honey, along with whole black raspberries and aronia berries. Top up with water to reach 5 gal. (18.9 L)

Pitch yeast. Ideal fermentation temperature is 70–72˚F (21–22˚C) but it's not a problem to ferment warmer. Add Fermaid O and Fermaid K according to indicated schedule. Cold crash when gravity reaches 1.033 (8.3˚Bx) and press off fruit. Add sulfites and sorbate to stabilize.

Filter out yeast through step filtration until stable. Let bulk age for 3–6 months and enjoy!

From the AHA Director

PULLING BACK THE CURTAIN

The American Homebrewers Association Governing Committee held its annual planning sessions over two evenings in July and I wanted to pull back the curtain. This meeting is an annual tradition that typically happens in a single day at Homebrew Con (see you in Pittsburgh!). We didn't let Zoom stop us from having beers in hand.

This year, Jill Marilley, chair of the Governing Committee, gave everyone a homework assignment: get out and talk with at least three homebrewers and pick their brains about what they'd love to see the AHA work on. What would get them excited to hear coming out of the AHA?

When we came together, the 15-person volunteer group and five AHA staff members all shared what we'd heard and then broke into small groups to see if we could put a hop charge in the best ideas.

Some of my favorite parts of these conversations revolved around not just ways we could do more for homebrewers, but ways we could *meet homebrewers where they are*. If COVID-19 has taught us anything, it's that people love having things delivered to them. One theme into which we're diving more deeply is how we can help those who aren't in a homebrew club find community. Many of us brew alone, and the AHA and your Governing Committee are working on ways we can help.

Keep an eye out in the coming months for more new ideas on this and much more from the AHA!

Cheers,
Ryan Farrell

Bitter QUESTIONS

Photo © Getty/zmurciuk_k

***Dear* Zymurgy,**
Thanks for publishing the Chiswick Bitter recipe in the Jul/Aug 2021 issue. The world needs more good bitter! I have a few questions about it.

First, my recollection is that Fuller's parti-gyles their beers. Is that no longer the case, or did they not ever do that with Chiswick?

Second, WLP013 and Wyeast 1968 are quite different. Was that supposed to be WLP002?

And finally, 638 ppm sulfate seems really, really high. The water book [Palmer & Kaminski] agrees, saying that "At concentrations over 400 PPM however, the resulting bitterness can become astringent and unpleasant." That description is a far cry from anything I've had from Fuller's. Do they do anything to moderate sulfate levels?

Thanks,
Jeff Muse
St. Louis, Mo.

Zymurgy *editor-in-chief Dave Carpenter responds:* *You're right that Fuller's conducts a parti-gyle method in which several beers of different strengths are brewed from a single mash. My recollection is that they draw a strong wort and a weak wort and then blend them in various ratios to produce ESB, London Pride, and Chiswick Bitter. Recognizing that most Zymurgy readers probably would rather brew one beer from a single mash and call it a day, we chose a standalone recipe. But you could use the same malt ratios if you'd like to do a parti-gyle brew day.*

Regarding yeast, the original recipe from the 2008 AHA Big Brew listed WLP013 and Wyeast 1968, but WLP002 would probably yield a beer closer to the original. Yeast strains mutate and diverge over time, but both Wyeast 1968 and White Labs WLP002 are purported to have originated from Fuller's.

Finally, I checked with water expert and friend of the AHA Martin Brungard about the sulfate issue. He notes that this is Burton-level mineralization and says he's unaware of any

bitters brewed using that kind of water. English brewers have practiced "Burtonization" for about 150 years, but a London-level mineral profile might be a better choice in this case. For more detailed information, including some suggestions for London water profiles, see Martin's article "Brewing Water Series: London" in the May/June 2014 issue of Zymurgy.

READER FEEDBACK

***Dear* Zymurgy,**

Domo arigato for the wonderful article on sake making. I wanted to throw out another gem on sake making to all interested parties called *Brewing Sakē: Release the Toji Within* by William G. Auld. With a history of sake production from rice to bottle, I found his book informative and easy to read. I would recommend it alongside Fred Eckhardt's works since it was through Auld's book that I learned about Fred Eckhardt's contribution to sake as well as the process outlined in Amahl Turczyn's article.

My copy of Auld's book is still in storage, which sucks because I wanted to make some sake. Thanks for the article, Amahl. It'll come in handy.

Kanpai!
JJ Vallejo
Federal Way, Wash.

***Dear* Zymurgy,**

Got my copy of *Zymurgy* yesterday and had the chance tonight to sit down and read it. I loved your synopsis on the beginner's mindset (Editor's Desk, Jul/Aug 2021), as I feel that's a smart approach to remember how we found success (or, rather, good learning moments/disasters) starting out.

On that note, I just had a boil over myself a few batches ago (maybe 40 or so under my belt now, mostly extract), and there's nothing quite like that to keep you humble. Hope your new stovetop color is settling in nicely.

All my best,
Maxwell Wilkos
Milwaukee, Wis.

***Dear* Zymurgy,**

After reading Rich Toohill's article ("Homebrewing into the Golden Years," May/June 2021), I thought I would send you some photos of tools I use to ease wort weight! The first photo is of my beer truck that I use to move the fermenter from my brewing shed to the house, about 150 feet (45 m). The second is the LoadBear harness, typically used by carpenters, for transferring the fermenter into the house and down to the basement. The third photo is an electric winch contraption that lifts the bottling bucket to a comfortable height.

I have been homebrewing ten years and have been an AHA member eight or nine years.

Cheers,
John Ludwig
Lud's Brewery, *Cold Spring, Minn.*

IT'S RAINING ...

This is our brew dog Oscar. He patiently waits for his favorite parts of brew day: playing with water from the chiller and eating homemade spent-grain treats!

Mike and Devan Lavorgna
Hamden, Conn.

This is Gino, assistant brewer at Boilerbräu. He closely su-purr-vises all brew-day operations and sniff tests the wort to ensure quality.

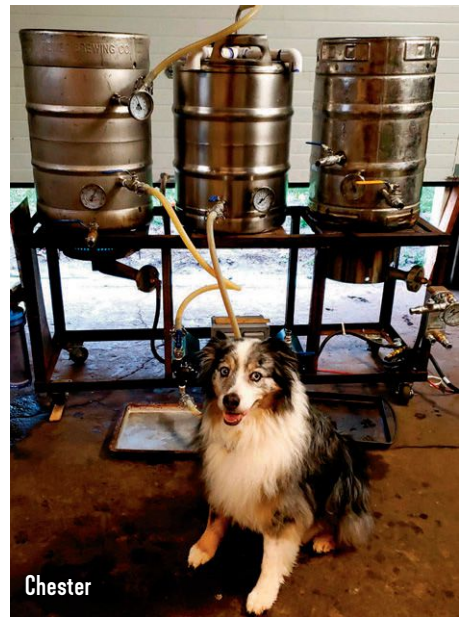
Jeremy Anderson
Hudsonville, Mich.

Here's Doppler. This guy loves hanging out with me on brew day. However, I think he loves the spent-grain dog biscuits even more.

Cheers,
Matt Mehle
Monterey, Calif.

My 15-year-old black Lab has been present for over 100 brew sessions from Virginia to Ohio. He loves it and I love him! Shadow is his name; brewing is his game!

Steve Bradbury
Jackson, Ohio



Thanks for sharing all the brew buddies out there. Here is our assistant brewer Chester making sure everything is going right.

Cheers!
Jason and Torri Bauer
Saint Helens, Ore.

Here is my brew buddy Marty patiently waiting for his bag of spent grain while it cools on the table.

Greg Nieberle
West Chester, Pa.

DEAR *ZYMURGY*
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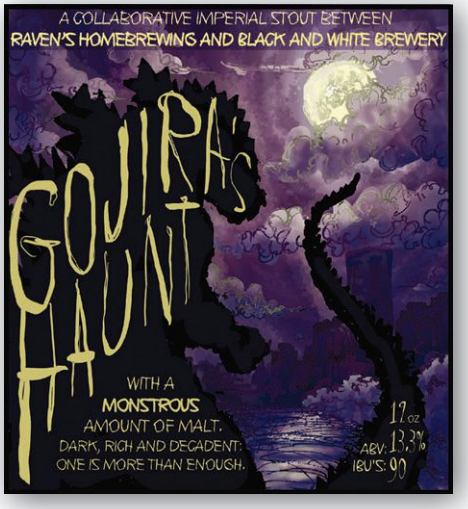
YOUR HOMEBREW LABELS



My best friend and I tasted BrewDog's Tokyo imperial stout in 2015 while attending a board game convention in Columbus, Ohio. We decided to collaborate on our own version in spring of 2019. The name, Gojira's Haunt, is an homage to Tokyo from one of its more infamous denizens. Luckily, the beer had time to mature and was a bright spot in 2020.

My niece is an artist and fellow beer enthusiast. After describing the beer to her, I asked her if she could come up with something. She produced this amazing label for us.

Kanpai!
James Burk, *Sykesville, Md.*

My son Jack and I started homebrewing as Superior Brewing last year as the perfect COVID-19 activity. It was my return to this great hobby after an 18-year break.

Back then, my children would be fascinated by the freshly sanitized tools and, of course, pick them up to play with. After a half-dozen batches or so, my wife suggested I find a hobby where "you don't yell at the kids so much." So, I set it aside until last summer when Jack (now 24) and I could really spend time crafting our favorites.

As a graphic designer, I'm able to create the labels and branding for our venture using Adobe Illustrator and Photoshop. Online vendors print them for me, 50 at a time. Homebrewing has been a great source of father-son time, and one of Jack's friends grabbed a starter kit and has gotten into brewing as well.

Cheers!
Rick Brozek, *Decatur, Ga.*

The hop cone in my label contains an image of a canoe; eddy-out is a paddling term used to take a break among rapids, for example. As my last name is Eddy, I had some shirts made up. On the back, it reads, "When the rapids get too gnarly, eddy-out and have a homebrew."

Chris Eddy
Stoughton, Wis.

SUBMIT YOUR LABEL

Do you make custom labels for your homebrew? Want it featured here in the pages of *Zymurgy* for all to see your work?

Send them to us at **HomebrewersAssociation.org/magazines/submit-bottle-label** and we will take it into consideration!

YOUR HOMEBREW EXPERIENCE

Homebrewing is all about sharing, and we get hoppy when *Zymurgy* readers share their homebrewing and fermentation experiences with us. We'd love to show the AHA community what *your* experience looks like. From 1-gallon batches on the stovetop to 20-gallon brew days on your custom sculpture, we all have fun with family and friends while we make and enjoy our favorite beverage. Show us your brewing/fermentation day, who you brew with, the ingredients you include, what special processes you use, and how you enjoy the final product.

Upload photos of your homebrew-related fun at HomebrewersAssociation.org/your-homebrew-experience

SCAN ME

Here are a few of ours to get things started. Cheers to homebrewed beers!

Jason Smith

Sarah Baldwin

Sarah Baldwin

Marc Preo

Dave Carpenter

Dave Carpenter

AHA Brew Crew - Megan Wabst, John Moorhead & Marc Preo

Erich Hanke

Jason Smith

TableRocktoberfest

SHARE YOUR BEST HOMEBREWING SHOTS!

Homebrewing is all about fun and sharing. We would love to show others in the community what your homebrewing/fermentation experiences looks like. Upload photos of your homebrew related fun at **HomebrewersAssociation.org/your-homebrew-experience** and you may see it in the pages of *Zymurgy*!

SCAN ME

“WHEN SOMEONE LOOKS AT THAT EMPTY PINT GLASS AND CAN TELL HOW MANY DRINKS THEY HAD OUT OF IT, YOU KNOW YOU’RE HAVING A GOOD QUALITY BEER.”

MIKE HEINRICH
Sales Manager - Great Western Malting

Dextrin Malt, What’s up with that Chit?
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Kombucha

By
Amahl Turczyn

You'd be forgiven for thinking the name *kombucha*, a sweet/tart sparkling fermented beverage made from sweetened tea and fermented with both yeast and bacteria, came from the Japanese terms *kombu* (kelp) and *cha* (tea). However, most sources agree it originated in Manchuria, what is now northeast China, around 220 BCE, and was brought to Japan by a Korean doctor named Kombu to cure the digestive ailments of Emperor Ingyo in 414 CE. Since then, the so-called "mushroom tea" has enjoyed various surges in popularity around the world and has been touted for its health benefits. It's currently one of the most popular "health tonics" in North America, though evidence for some of the wilder claims—curing cancer, for example—is somewhat lacking.

While store-bought kombucha tends to be fairly expensive, it's easy to brew at home with a little patience. The base recipe is simply 5 g tea leaves steeped in a liter of boiling water; then you stir in 50 g sucrose until it dissolves, cool to room temperature, and add the fermenting culture, which is a slimy, blob-like thing called a SCOBY—a symbiotic culture of bacteria and yeast. It isn't too different from the rubbery SCOBY used to make water kefir, but composition varies. You can purchase a kombucha SCOBY at your homebrew shop, or you can find a regular brewer of kombucha and get a piece of theirs. It tends to grow a little from batch to batch, and as long as you keep it hydrated in a low-pH solution (a few hundred milliliters of your last successful fermented kombucha acts as a perfect preservative), you can use it indefinitely and give it out to friends and family for their next batch.

WHAT'S IN A SCOBY?

Back to composition. Within the rubbery cellulose structure of the SCOBY is embedded a host of microflora. The bacteria are most commonly vinegar-producing species: *Acetobacter xylinum*, *A. pasteurianus*, *A. aceti*, *A. intermedius*, and the cellulose-producing *Gloconacetobacter kombuchae* are often present. Common yeasts include species of our well-mannered friend *Saccharomyces*: *Saccharomycodes*, *Schizosaccharomyces*, and *Zygosaccharomyces*; but also a few wilder cousins, which may include *Brettanomyces/Dekkera*, *Candida*, *Torulospora*, *Koleckera*, *Pichia*, *Mycotorula*, and *Mycoderma*.[1]

What this means is that your SCOBY's yeasts will first hydrolyze some of the sucrose you add into glucose and fructose to produce ethanol via glycolysis, which the acetic bacteria will then process into various organic acids, mainly gluconic and acetic. All the microflora work in tandem, but the beverage is constantly evolving during fermentation, and pH steadily drops as organic acids increase.

However, it can be a lengthy process—after seven days, only about 65 percent of the sucrose present has become ethanol, CO_2, and other compounds. After 21 days, about 80 percent will have been metabolized. The rest remains unfermented, so depending upon when you determine the kombucha to be ready for consumption, it could be sweet, balanced between sweet and tart, or mostly tart. While there is evidence to suggest that the kombucha SCOBY is capable of producing L-lactic, citric, and even ascorbic acid, the most common acids by far are acetic, gluconic, and glucuronic. So, you may want to be cautious letting your ferment go for a full three weeks—you may get a bit of a vinegar burn at the back of the throat.

ALCOHOL

This parallel fermentation process also means your kombucha will have varying amounts of ethanol as it ferments, usually peaking around the sixth day. Alcohol content will then begin decreasing as bacteria convert it to acetic and other organic acids. This also depends, of course, on which yeasts are present in your SCOBY—fermentation time and composition can be tailored to produce a more alcoholic kombucha, but without a really complex lab setup, it's difficult to determine just how much alcohol is present at any given time. (And as we learned from a breathalyzer incident involving Lindsay Lohan, it's probably not wise to assume that your finished kombucha is alcohol-free, so exercise caution when letting your kids drink it!)

TEAS & SUGARS

Pretty much any variety of tea can be used to brew kombucha, but black and green teas are the most popular. Sugar is pretty much sugar, but you can use other fermentable sweeteners as well, including fruit juice and honey. There are even companies selling kombucha SCOBYs that are tailored to specific ingredients.

For example, Jun kombucha SCOBYs are fine-tuned for green tea sweetened with raw honey. Most sources say black tea produces an end product that carries the most health benefits, from antioxidants to trace minerals and amino acids, many of which are produced during fermentation and are not present in the unfermented tea. (In that respect, kombucha can be more than the sum of its component parts, which may explain some of the health benefit claims.)

The variety of teas and sugars available means the sky's the limit as far as the range of flavors you can impart to your kombucha, but it also means that you may get a sluggish or stuck ferment if your SCOBY is not cut out to effectively process the tea and sugar you feed it. I tried a batch with cascara tea, which is made from the rind of the coffee fruit and makes a naturally low-pH, dark red beverage that only slightly resembles coffee. My SCOBY was less than impressed. I did get some fermentation, but it was never as rapid or thorough as it was with the control black- and green-tea batches.

PRECAUTIONS

As with any ferment involving *Acetobacter*, you'll need to take a few precautions. First, isolate your kombucha operations and equipment from your homebrewing. Cross-contamination is a real concern. Second, remember that acetic bacteria like free access to oxygen, but fruit flies like free access to anything that contains vinegar. What's commonly recommended for kombucha fermentation is a wide-mouth jar or bucket with a tea towel, piece of cheesecloth, or a large coffee filter secured over the top with a rubber band. This will let the air in and keep the bugs out.

Your SCOBY's microflora are also sensitive to temperature fluctuations. The suggested range is 70–80°F (21–27°C) for healthy fermentation. Cooler than 68°F (20°C) and fermentation will slow or even halt. Warmer than about 85°F (29°C) and you risk mold or harmful bacteria growing in your ferment. If you find mold in your kombucha, the best and safest course of action is to throw out the whole thing (SCOBY included), sterilize your equipment, and start over. Unlike miso, you can't just scrape the mold off and continue because kombucha doesn't have that extra layer of protection afforded by salt. Once mold spores are present, they are nearly impossible to get

Photos courtesy of Amahl Turczyn

Cascara, assam and oolong kombucha.

rid of without also killing the microflora in your SCOBY.

One precaution you can and should take to prevent unwanted microflora from growing, as with so many fermented foods, is controlling pH. A good pH meter is almost a necessity with kombucha making; at the very least, get some reliable test strips. A good baseline pH for beginning your ferment is 4.5. If the pH is any higher, add an acid, preferably distilled white vinegar, to get it below that mark. A good target pH for finished kombucha is 3.6. That's definitely acidic, but as mentioned earlier, there will still be some unfermented sucrose in the kombucha to balance.

CHOOSING THE RIGHT SCOBY

When choosing a SCOBY from a local homebrew shop, there are a couple of things to keep in mind. One company, Fermentaholics, offers a live kombucha pellicle immersed in a 12-fluid-ounce (355-milliliter) starter solution of finished tea. This is enough to start a one-gallon (3.79-liter) batch of your own. They suggest brewing the tea, adding the sugar (or honey—they also offer a Jun SCOBY), cooling to a maximum temperature of 85°F (29°C), and then adding the pellicle and all the starter liquid.

Stir, take a small sample, measure its pH, and then if it's below 4.5, secure the fermenter with a cloth or coffee filter and rubber band, and allow it to ferment in the proper temperature range. After a week, taste the tea (and don't be too grossed out by the pellicle that should have formed on the surface). If things smell and taste good, you can bottle all of the batch except for a cup or two and then use that plus the pellicle for the next batch.

That said, my liquid pellicle was actually quite sluggish for the first couple of weeks; while refermentation in the bottle is supposed to take only a matter of days, I had some bottles that required a couple of weeks before they were fully carbonated. This, of course, varies with temperature and ingredients, but try and get the freshest SCOBY you can—otherwise you may need to be patient.

Speaking of patience, other companies offer a dried pellicle for sale. The good thing is it keeps in its mummified state nearly indefinitely and requires no refrigeration. What it does require, though, is a period of rehydration in a low-pH tea solution, and that period is at least 30 days. Yes, bringing your leathery little pellicle back from the dead takes a full month at least before it's ready and active enough to start producing kombucha for you. This may be a conservative estimate, however; the one I tested started picking up with fermentation after a couple of weeks of rehydration.

BOTTLING

As I hope you've gleaned from the multiple symbiotic fermentations happening in kombucha, it can be unstable stuff. It's not as predictable as bottle conditioning homebrew. The risk of bottle bombs is a pretty serious reality. For that reason, I strongly recommend plastic PET bottles designed for carbonated beverages. Not only will they hold tremendous pressure and not cause serious damage to life and property if they do happen to explode, but they can also be gently squeezed during bottle fermentation to determine, or at least approximate, the level of carbonation. PET bottles also have twist tops, so if you are concerned too much pressure is building up, you can burp them as needed.

I recommend buying a case of inexpensive sparkling water, enjoying the contents (while taking care to never drink directly from the bottles), and using the clean empties as dedicated kombucha bottles. Fill them with fermented tea, keep them in a warm spot, give them an occasional squeeze, and when they feel nice and tight, move them to the fridge, where the low temperature will halt any further gas buildup. Then you can enjoy your fizzy, tart, healthy beverage within a couple of weeks without fear of detonation.

RESOURCES

1. Rasu Jayabalan, Radomir V. Malbaša, Eva S. Loncar, Jasmina S. Vitas, Muthuswamy Sathishkumar; *A Review on Kombucha Tea—Microbiology, Composition, Fermentation, Beneficial Effects, Toxicity, and Tea Fungus*, Wiley Online Library, 21 June 2014.

Amahl Turczyn continues to brew and write at his home in Lafayette, Colo.

Ferment This!

Basic Kombucha

Batch volume:
4 liters (1.06 US gal.)

FERMENTABLES

200 g	(7 oz.) sucrose (table sugar)
20 g	(0.7 oz.) tea leaves (bagged or loose)

YEAST

1	fully hydrated, active kombucha SCOBY

OTHER INGREDIENTS

- 4 liters (1.06 gal.) filtered, chlorine-free water
- distilled white vinegar as needed to adjust pre-ferment pH
- other flavorings to add at bottling: fruit purees, spices, herbs, etc. (optional)

EQUIPMENT

- pH meter or test strips in the 2.8 to 4.4 range
- wide-mouth 1.5-gallon (5.7-liter) jar or bucket to use as a fermenter
- coffee filter or tight-weave cloth and rubber band to cover fermenter
- pressure-ready PET bottles

NOTES

Boil water and add tea leaves. Steep 1–5 minutes, depending upon tea variety. Remove tea leaves and stir in sugar until it dissolves. Cover tightly with a lid or plastic wrap and allow to come to room temperature (70–80°F or 21–27°C). Add sweetened tea to sanitized fermenter, then add SCOBY and 2 cups of starter kombucha (or ¼–½ cup distilled vinegar). Stir well, then remove a small sample and test pH. If below 4.5, cover fermenter with screen material and secure with rubber band. Keep fermenter in the correct temperature range for 7 days.

Take a small sample, smell, and taste. If you are happy with the flavor and acid balance, use a sanitized funnel to fill your bottles. Don't worry about splashing—*Acetobacter* likes air. Leave about an inch (2.5 cm) of head space in each bottle. If your tea is still too sweet, ferment a few days more and taste again.

To carbonate, there's no need to add additional priming sugar—your tea should still have plenty of sucrose. Just keep the bottles at the same temperature for 3–7 days, squeezing them gently every day or two to gauge the level of condition. When fully carbonated, transfer to the fridge and enjoy cold.

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Techniques for Using Cannabinoids in Brewing

By Keith Villa, Ph.D.

Brewers have explored various strategies to put cannabis into alcoholic and non-alcoholic brews. Since cannabidiol (CBD) is very similar to delta-9-tetrahydrocannabinol (THC) and other cannabinoids, and since alcoholic and non-alcoholic beverages are very similar and usually greater than 95% water, any methods described below should apply generally to CBD, THC, and/or many other cannabis phytocannabinoids used in a malt beverage. Additionally, beer is described below, but the beverage can be hard seltzer, non-alcoholic beer, or even sparkling water.

Cannabis remains illegal under federal law, and it is important to note that the addition of any cannabinoid to any kind of alcoholic beverage is illegal. At our brewery, CERIA Brewing Company, THC and CBD are dosed into non-alcoholic beer only and never into beer with alcohol. Other beverages for sale that contain CBD, where legal, are also non-alcoholic, usually sparkling or still flavored waters. Finally, consumers of cannabis beverages should avoid overconsumption at all times. Perhaps a friend or budtender suggests that 100 mg of CBD is optimal, or a popular TV personality suggests that 1 mg per pound of body weight is most effective. Taking advice from unproven sources should be avoided at all costs. →

Editor's Note:
This article is excerpted from chapter 4 of Brewing with Cannabis *by Keith Villa, Ph.D., available now from Brewers Publications. It has been very lightly edited for* Zymurgy.

Prior to the passage of the Agriculture Improvement Act of 2018 (often referred to as the 2018 farm bill), in which hemp was removed from the Controlled Substances Act, professional brewers were very hesitant to consider brewing with hemp for fear of losing their federally issued brewer's permit. In contrast, homebrewers experimented with hemp and even posted recipes on websites for others to try to replicate. Some craft breweries made a name for themselves by naming beers after marijuana strains or after cannabis vocabulary, such as "420" Extra Pale Ale by Sweetwater Brewing Company in Georgia. However, none were daring enough to try brewing with hemp, even though hemp contains less than 0.3% dry weight of the psychoactive component, THC.

It should be noted that hemp seeds are specifically mentioned in the 2018 farm bill as a part of the hemp plant that can be harvested and sold in the food chain in the US because they do not contain cannabinoids; specifically, they do not contain THC or CBD.

USING CBD IN BEVERAGES

Much like liquid hop extract, CBD and other cannabinoids have an oily, sticky texture when extracted from the cannabis plant, and these oils do not readily mix with water and water-based beverages. Therefore, any brewer who uses cannabinoids or cannabis extracts in the brewing process must figure out a way to get the oily components into beer successfully. Certainly, innovators like Mason Hembree proved that processes exist or can be created (see "Hemp Ale and Washington's Secret Stash" sidebar), but some of the known processes are not suitable for the food industry. Additionally, most processes to make cannabis oil mixable with aqueous liquids are proprietary, such as one for water soluble cannabinoids (Martin, Razdan, and Mahadevan 2008), or classified as trade secrets.

In layman's terms, emulsification is simply the forced mixing of two liquids that normally do not mix together, such as oil and water. For example, when a chef is making a vinaigrette dressing it is necessary to add an emulsifier so that the oil fraction does not separate from the vinegar (water-based) fraction. In this case, many chefs will use a small amount of egg yolk or honey, or more refined ingredients such as xanthan gum or soy lecithin, to emulsify or "mix" the two immiscible ingredients. The end result is a salad dressing that is well blended and pours smoothly without separating because the oil has been formed into microscopic droplets that remain stable in suspension. The same can be done with cannabis oils. Although most cannabis emulsification processes are proprietary, they can generally be grouped into two categories: a conventional emulsification process, and a more complex process that makes CBD water compatible.

Emulsification of CBD

The first method to emulsify CBD is to mix the extract with a specific amount of emulsifying agent, such as vegetable gum. This is mixed at a very high speed, sometimes using ultrasonic waves, to create a stable solution that can be mixed into aqueous solutions like beer. While the final CBD

HEMP ALE AND WASHINGTON'S SECRET STASH

Figure 1. The original labeling for the Hemp Ale brand, brewed by Humboldt Brewing Company. *Courtesy of David and Andy Ardell.*

One of the first—and still existing—brewers to brew a beer with hemp and offer it for sale was the Humboldt Brewing Company from California, run by siblings David and Andy Ardell. When I interviewed them for this book, the Ardell brothers told me that they used toasted hemp seeds to give the base brown ale style a "unique, herb-accented flavor." Humboldt launched the beer in the mid- to late-1990s and called it, appropriately, Hemp Ale. It did not contain CBD or other cannabinoids, nor did it have the aroma of hemp, but Hemp Ale had a unique flavor and plenty of talk value at the time it was launched and for several years afterward. Humboldt's Hemp Ale continues to be brewed with toasted hemp seeds and enjoyed by fans, even after legalization of recreational cannabis in its home state of California.

The next big leap in the use of hemp in alcoholic craft beer occurred in 2015, when a Colorado cannabis enthusiast named Mason Hembree wanted to create a platform for serving CBD. I was able to interview Hembree to get his story of how his hemp beer came to be. Hembree believed CBD had true medical value in reducing perceived pain and inflammation, and further believed that CBD would be the perfect agent to counter the inflammation caused by alcohol. Besides his own belief in the power of CBD, Hembree relied on consumers' preexisting beliefs or experience, and knew it would be unwise to make explicit health claims about ethanol combined with CBD in his beers. He decided to open a brewpub to bring his theories to life, opening Dad and Dude's Breweria in Aurora, Colorado in 2015 and so launching the first beer brewed with hemp in the modern American era. Hembree and his brewer, Brian Connelly, created many recipes that incorporated hemp into their three-barrel brewing system. They made sure to send their finished beers to a certified lab to verify that THC was not detectable, and to quantify the amount of CBD. According to Hembree when I interviewed him, the lab analysis revealed that each 12-ounce bottle of beer contained 4.2 mg of CBD.

Hembree carried out numerous trials, and the final, successful process was unique enough that he decided to file a patent in 2015 to protect his intellectual property. Although an invention is not fully protected until a patent is granted, Hembree could have started brewing and packaging with labels that stated "patent pending." However, Hembree decided to wait for full, legal protection and so he had to re-file in 2017 to keep the provisional "patent pending" status alive. The patent application is currently pending until the United States Patent and Trademark Office decides to review it and make a ruling. The specifics of how Hembree brews with hemp to extract and obtain a consistent CBD content in the beer will remain a mystery until the final patent is granted.

Of all the hemp beer recipes that Dad and Dude's Breweria created, the only one that was officially offered for sale was an IPA named George Washington's Secret Stash (Figure 2). This IPA was appropriately named, since the first American president's Mt. Vernon property not only had a small brewery, it was also a site where hemp was grown. Some stories allege that Washington incorporated hemp into some of his brewing recipes. George Washington's Secret Stash was offered at the 2016 Great American Beer Festival® and resulted in long lines of curious beer drinkers eager to taste the new cannabis brew. It was never entered into a judging category and so never stood to win a medal.

The story of George Washington's Secret Stash goes a little deeper. According to Hembree, he decided to file the appropriate paperwork for recipe and label approval from the federal Alcohol and Tobacco Tax and Trade Bureau (TTB), which, surprisingly, approved his request. However, after internal discussions, the TTB reversed its decision and asked Hembree to formally withdraw his request, surrender his approval, and discontinue brewing his CBD IPA. After consulting with his attorney, Hembree refused to surrender his recipe. Figuring he was in a legal gray area, Hembree disregarded numerous threats from the TTB to revoke the recipe

as he believed he had the legal right to brew the approved recipe.

After a few years of hard work to ensure the beer met all the appropriate guidelines and, most importantly, contained no THC, Hembree officially put the beer on tap and for sale at Dad and Dude's Breweria in 2018. People loved it. Plans were made to expand production and distribution throughout the United States, and beer distributors were excited to carry it. However, the legal issues kept mounting and Hembree soon halted expansion plans.

Over the next few months, news and announcements from Dad and Dude's stopped and things became very quiet. In March of 2019, the brewpub and recipe were reported to have been sold to a cannabis company from California,* but that did not come to fruition. Later that year, the brewpub property and equipment were seized by the city of Aurora, Colorado. Hembree told me he maintains ownership of his intellectual property and is counting the days until he receives a patent for his process to brew cannabis beer.

* Jonathan Shikes, "Dad & Dude's Breweria Closes; Future of Its CBD Beer Uncertain," Westword, October 22, 2019, 8:54 a.m., https://www.westword.com/restaurants/dad-and-dudes-breweria-closes-future-of-its-cbd-beer-uncertain-11518546.

Figure 2. Dad and Dude's hemp beer, General Washington's Secret Stash. *Courtesy of Mason Hembree.*

oil solution can remain stable for weeks or months, eventually it will settle out in the same way many oil-vinegar dressings do when they have been sitting on grocery store shelves for a long time. Settling out or "layering" of the oil and water components causes inhomogeneity that can only be reversed by agitation, clearly undesirable for a beer or soda. To ensure that every serving contains a reasonably consistent amount of bioactive "oily" molecules, it is imperative to verify that the CBD oil solution does not settle out during the time between mixing and packaging. This forced mixing is similar to the naturally occurring "ouzo effect" (see sidebar). Depending on the emulsifier, the final product can be milky white or have a slightly hazy appearance due to the presence of very small, microemulsified oil droplets.

Water-Compatible CBD

The second method for emulsification is to make the cannabis oil into a more water-compatible mixture. This is not the same as water soluble. For example, a compound that is water soluble, like table salt (sodium chloride, chemical formula NaCl) will dissolve in water by dissociating into separate ions of sodium (Na^+) and chloride (Cl^-) and not affect the clear appearance of the water. An oily compound, such as cannabis extract, will never dissolve in water, but can appear to dissolve under the right conditions. This is called water compatibility.

Water compatibility also involves emulsification, but it requires more complex ingredients and methodologies. The aim is to form nanoparticles, that is, particles much smaller than the microparticles seen in conventional emulsification. In speaking with anonymous sources in the cannabis emulsification industry, I found that the main strategy for this concept emerged from the former Soviet Union, with the technology becoming more widely available after the country's breakup in 1991. In short, Soviet scientists discovered that a specific form of vitamin E known as d-a-tocopherol could be combined with other ingredients and then subjected to ultrasonic mixing to form nanoparticles, called micelles, that contained vitamin E. Micelles are extremely small, globular objects that have a lipophilic ("oil-loving") core and hydrophilic ("water-loving") outer shell; they are very stable and water compatible. Vitamin E is an oily compound that does not readily dissolve in water. The critical aspect of the Soviet scientists' discovery was that the micelles could be made to contain small amounts of oil-soluble compounds, such as certain drugs, providing a mechanism that allowed these compounds to readily pass through the cell membrane structures of the human body and deliver them to desired targets with a high degree of speed and efficiency.

According to two cannabis processors I spoke to, one application of this method involved doping athletes with steroids using this highly effective delivery system, and the athletes displayed the effects within minutes. These athletes could theoretically get tested for steroids prior to an event, then drink a liquid that looked like water that had nanoparticles of steroids for quick uptake immediately prior to a competition. This method was difficult to recognize because most performance steroids at the time had to be delivered by injection. More recently, researchers have found that this technology is suitable for the delivery of anticancer drugs and other helpful pharmaceuticals into the human body, especially since the FDA has approved its use as a safe pharmacological adjuvant (Guo et al. 2013).

In the world of cannabis, it is easy to see that the micelle emulsification technology can be used to create nanoparticles of cannabinoids that are water compatible, and therefore able to be put into beverages. Indeed, it appears that some suppliers are using these methods, creating products that have an almost crystal-clear appearance yet contain relatively high doses of CBD. I have tested at least one such product and found

it to be very compatible with beer and it does not cause problems with haze or foam over its six-month shelf life, even though the oily characteristics of CBD would predict poor foam stability.

In addition to appearance and accurate and consistent dosing, the important aspect of the emulsification process is that the nanoparticles increase the bioavailability of pharmaceuticals, which could include cannabinoids, by delivering them into the body more efficiently (Guo et al. 2013). This is unlike cannabinoids ingested through edibles, which can take up to two hours to get into the bloodstream because they go through the digestive tract and can be altered into a more potent form by the liver (Huestis 2007).

The flavor of the final product can also be affected greatly by the type of CBD that is used in the emulsion. If the CBD is a pure distillate then flavor-active terpenes are not captured and the resulting product usually has no or very low aroma, but a slightly bitter taste due to the natural bitterness of cannabinoids. This natural bitterness does not usually lead to a palatable flavor in sweet beverages, but can complement drinks that are inherently bitter, such as beer, coffee, and tea. CBD might also be isolated as a full-spectrum or a broad-spectrum (or crude) extract rather than a distillate. A full-spectrum extract refers to a complete extract of the plant and will therefore also contain whatever THC was present, which should be below the legal limit of 0.3% THC by dry weight. A broad-spectrum CBD extract refers to an extract from the plant that has all cannabinoids except THC and is usually extracted from industrial hemp that contains less than 0.3% THC. Either extract will generally have a bitter taste because of the naturally bitter tasting cannabinoids. Both extracts can be refined to remove any aromatic terpenes and, thus, can either smell like cannabis or have no aroma.

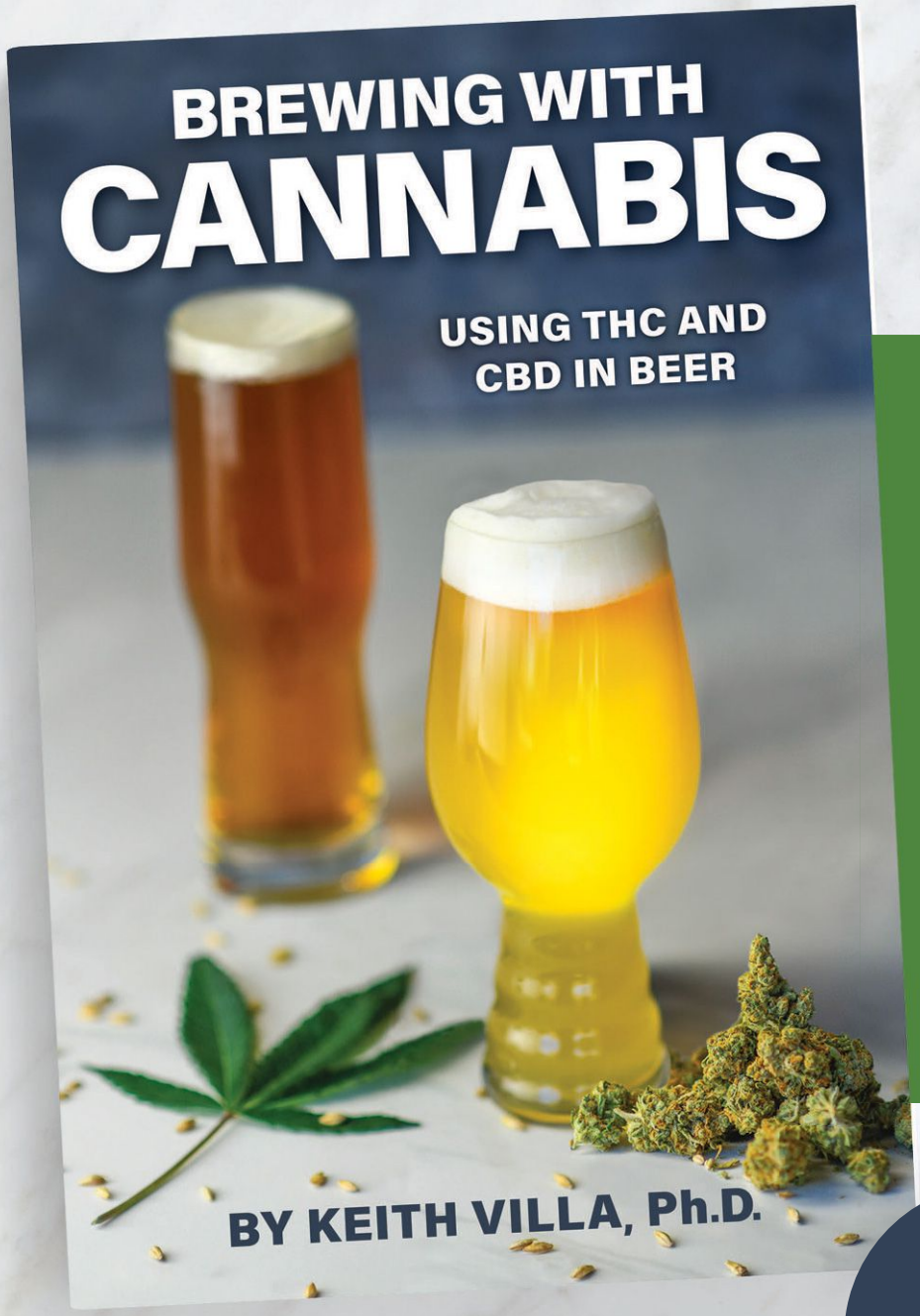
Wine is not considered a bitter beverage, but at least one winery has been busy creating CBD-infused versions of its wines. This raises the question of how to balance the flavors so that the wine is not overtly bitter. The answer can possibly be found in the form of "bitterness blockers." These blocking agents are found naturally in certain plants, such as mushrooms, and work by either masking bitter flavors, altering the perception of bitterness, or preventing bitter compounds from interacting and binding to taste buds on the tongue that detect this flavor. It is also conceivable that the tannins in wine help minimize the bitter effect of cannabinoids. In general, bitterness blockers can work very well to allow the use of cannabinoids in beverages and foods. However, there are some beverages, such as soda and flavored waters, where it can be very difficult to employ this strategy because of the simpler flavor profiles of these beverages. In these cases, other emulsifiers must be tested, such as alternative vegetable gums or other oils. In addition, other bitterness blockers should be explored, which can include alternative sweeteners or even salt or salt substitutes.

THE OUZO EFFECT

The ouzo effect is a natural example of spontaneous emulsification that occurs when water is added to a liqueur that contains highly hydrophobic essential oils, such as ouzo or limoncello, and the mixture changes from a clear liquid to a slightly milky looking solution. In theory, the hydrophobic oils should slowly join together in a process called coalescing until complete separation takes place, revealing an oil phase and a water phase. However, it is possible in some cases to create a stable colloid where oils form very small droplets that stay in suspension rather than joining together.

The scientific explanation of this observation is that the clear liqueur begins as a stable solution of hydrophobic essential oils in ethanol. However, when a small amount of water is added, it pulls some of the water-soluble ethanol away from the oil phase, causing the oils to form hydrophobic microscopic droplets that remain in stable solution but result in the solution taking on a milky white appearance. Scientists have determined that the size of the microscopic oil droplets can range from about 1 to 10 microns (Vitale and Katz 2003, 4108).

Note that the use of ethanol as the carrier might present a challenge from regulators, but TTB has recognized a blanket exemption for small amounts of ethanol used to make hop extracts soluble in beer. So, this could change in the future.



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NEW RELEASE!

Keith Villa, Ph.D., is brewmaster and co-founder of Colorado-based CERIA Brewing Company, a trailblazer in the rapidly growing market of non-alcoholic, cannabis-infused beers. After earning his Ph.D. in brewing from the University of Brussels in Belgium, Keith began his 32-year career as founder and head brewmaster at Blue Moon Brewing Company, an operating unit of MillerCoors. Since then, this beer doctor has gone on to brew several award-winning beers and continues to set new standards and push the boundaries of flavor, styles, and ingredients. Keith also is co-founder and head brewer of family business Donavon Brewing Company based in Arvada, Colorado.

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WHY INCLUDE CBD IN BEER?

Aside from creating a naturally bitter-tasting beverage like beer that can lead to intoxication, there are several reasons that a brewer might choose to include CBD. In the case of Dad and Dude's Breweria, Mason Hembree wanted to use the perceived curative power of cannabis to reduce inflammation and provide pain relief to customers. Hembree did not make any health claims for his beer. Studies exist showing that CBD and other cannabinoids can provide relief from inflammation and pain (see further reading at the end of this chapter). Additionally, the perceived relaxing effect of CBD is something consumers look for; in the same way someone enjoys an alcoholic drink after work, someone can enjoy a non-alcoholic CBD beer while winding down from a stressful day at the office. Another reason to include CBD in beers is to provide a more flavorful experience when combining it with flavor-active hemp terpenes, so that the final product has an aroma of cannabis to complement the effect of CBD and the flavors of the beer. Certain terpenes, while non-intoxicating, have been suggested to work in conjunction with cannabinoids to amplify physiological effects (Russo 2011). Finally, CBD in a non-alcoholic beer has an allure due to its novelty, and customers may appreciate the convenience of a ready-to-drink beverage with CBD.

One argument in favor of using CBD is the suggestion that cannabinoids help cancer patients relieve the nausea caused by oncology treatments. Cannabinoids do this by inhibiting stimulation of neurones affected by signals from the vagus nerve, thereby greatly diminishing the need to vomit, or the "dry heaves" (Sharkey et al. 2014, 138–139). Although cannabinoids can be a source of extreme relief for oncology patients, this same effect can be detrimental during a binge drinking episode, when the body would normally react to excessive alcohol intake by forcefully expelling the contents of the stomach. In this scenario, the absence of vomiting could lead to alcohol poisoning, a very dangerous outcome. For this reason, **extreme caution should be taken before combining cannabis with alcohol.**

LABELING AND PACKAGING

Labeling Challenges

Some companies that offer cannabis beverages usually state very clearly that CBD is a major part of the ingredients. After the passage of the 2018 farm bill, many producers were careful to label any CBD as hemp-derived CBD or, rather, as hemp extract. Additionally, FDA guidelines stated that CBD cannot be legally introduced into food and beverages destined for human consumption. However, after the farm bill passed, the FDA's practice appeared to focus its limited enforcement resources on CBD beverages for which specific health claims were being made. This was interpreted as "permission" for CBD products to be offered for sale in the US as long as health claims were avoided. Currently, CBD products available for consumption can be purchased in numerous retail outlets and online. However, it is not without risk for the sellers as there have been several instances where FDA authorities presented cease and desist orders to retailers in multiple states.[1]

The FDA is very clear that health claims are not permitted and that it will take enforcement action against companies that make such claims. Anecdotal evidence and budtender experience are not science-based, and how cannabinoids interact in the human body is not well understood. Sadly, there are still companies that will take advantage of consumers desperately looking for a cure or treatment for their condition. A recent study by researchers in the UK found that of the over-the-counter (OTC) CBD products consumers were able to buy only 31% contained the amount of CBD that was stated on the label (Chesney et al. 2020). One can only wonder if the popularity of CBD is mainly due to advertising or the placebo effect. A different study conducted in the US found that 43% of the CBD products analysed were under what the label stated, with some containing negligible amounts; and about 26% contained more than the label claimed (Bonn-Miller et al. 2017). The researchers identified two other major issues. First, about one in five CBD products contained THC at measurable levels above the legal limit. Secondly, the amount of CBD contained in the OTC products was much lower than levels found to produce physiological effects in published studies. Generally, the OTC products contained 10–20 mg per serving, while previous clinical studies have found the minimum level of CBD necessary to give observable effects was 300 mg. As Chesney et al. (2020, 7) noted, 100 mg and 150 mg doses were found to be ineffective in pre-clinical trials involving anxiety relief. The key takeaway is that dosage is critical and consumers should take care to educate themselves.

Packaging Challenges

It is very important to ensure that the dosage in a CBD beverage is meaningful and that the potency is consistent.

BITTERNESS BLOCKERS

Cannabinoids are bitter tasting, which can be problematic when they are emulsified into lighter and non-bitter beverages, such as flavored water, because they lead to a bitter off-taste in the final product. There are a few ways to solve this problem including masking, altering the perception of bitterness, or preventing bitter compounds from binding to taste buds on the tongue. Masking involves the use of traditional flavorings like salt or sugar, or the use of synthetic flavors such as GIV3616,* to mask the bitter flavor. Altering the perception of bitterness involves using adenosine monophosphate, which blocks the gustducin protein that normally functions in the mouth to register bitter-tasting compounds.† Prevention of bitter taste involves the use of mushroom extracts to temporarily bind to bitter taste receptors on the tongue, which prevents bitter compounds from being detected in the mouth.

* Stephanie Pappas, "New Bitterness Blocker Makes Food Seem Sweeter," Live Science, March 29, 2011, https://www.livescience.com/13450-bitter-blockers-processed-foods.html.

† "Bitter blocker backed by FDA," FoodNavigator, September 20, 2004, last updated March 14, 2017, https://www.foodnavigator.com/Article/2004/09/20/Bitter-blocker-backed-by-FDA.

CAN LINERS FOR CANNABINOID EMULSIONS

One emulsion supplier, Vertosa, has studied the cannabinoid adhesion issue in canned products. It found that, under pressure, hydrophobic polymer can liners will attract emulsion droplets that contain hydrophobic oil in their core.* Over time, this results in the loss of potency of canned beverages with cannabinoids. With these findings, Vertosa was able to create unique cannabis emulsions that do not adhere to various can liners.

* "Vertosa emulsions reduce potency loss in aluminum cans," Vertosa, February 6, 2020, https://vertosa.com/blog/reduce-cannabinoid-potency-loss-in-cans.

If potency tests over the course of the product's shelf life show a decrease in cannabinoid content, it is imperative that the cause be identified. In general, cannabinoid emulsion suppliers and packagers indicate that decreasing potency is due to either breakdown of the cannabinoid, settling out/stratification, or adhesion of the cannabinoid to the spray-on liner of the can that the beverage is packaged in. The breakdown of THC into non-psychoactive cannabinol has been studied in controlled storage samples of cannabis and the results show that the level of THC decreases 16.6% after one year of storage at room temperature and then a 26.8% decrease from the original level after two years of storage.[2]

In the case of beverages packaged with a high amount of oxygen or stored at a high temperature, these conditions may lead to degradation in packaged products, but this route would be relatively slow. Although settling and stratification could be factors, the most likely cause for decreased potency is the adhesion of cannabinoids to the can liner. This issue is being studied by major can producers. Initial solutions are to use beverage cans with liners that minimize cannabinoid adhesion and use emulsions that have been tested to prevent or minimize cannabinoids from sticking to can liners. Obviously, another solution is to package cannabis beverages in glass bottles, where regulations allow.

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Keith Villa, Ph.D., is brewmaster and co-founder of Colorado-based CERIA Brewing Company, a trailblazer in the rapidly growing market of non-alcoholic, cannabis-infused beers. He began his 32-year career as founder and head brewmaster at Blue Moon Brewing Company.

NATIONAL

HOMEBREW COMPETITION

- 2021 -

5,045 entries

2,037 homebrewers

50 states + Washington, D.C. and Puerto Rico

13 countries

120 medals

40 categories

By
Kristen Kuchar

Although it was the 43rd time the homebrew community gathered to honor the best in their craft, the awards for the 2021 National Homebrew Competition (NHC) were like no other. There were 5,045 beers entered this year from 2,037 homebrewers in 50 states (plus Washington, D.C., and Puerto Rico) and 13 countries. The American Homebrewers Association (AHA) awarded 120 medals in 40 categories to recognize the best brews in that bunch.

Further underscoring those statistics was the uncertainty surrounding whether or not the competition could even take place after the COVID-19 pandemic forced cancellation of the previous year's NHC.

In March 2020, the AHA had already received upwards of 15,000 bottles of beer at First Round NHC sites around the country. But as the severity of the COVID-19 pandemic continued to reveal itself, the American Homebrewers Association, like the rest of the world, had to navigate a path forward through uncertain and potentially dangerous times. At the 11th hour, the difficult decision was made not to continue with the 2020 competition.

"The safest thing for everyone involved was to postpone it, unfortunately," says John Moorhead, AHA competition manager, who adds most people understood the circumstances. →

So, what happened to all that beer? Much of it was turned into hand sanitizer, which was then in short supply, or donated to homebrew clubs for sensory training purposes.

When the time came to make a call on this year's NHC, the successful and safe execution of the 2020 Great American Beer Festival (GABF) competition the previous autumn offered optimism that homebrewers would get their chance this year, too. "That opened up a possible avenue for the homebrew competition," Moorhead says. "We felt after GABF completed their competition, we could pull that off for our members."

The chosen way forward was to host a one-week, single-site judging competition "with pretty stringent health and well-being protocols so everyone was comfortable and stayed healthy," Moorhead says. Typically, there are 13 First Round judging locations whose results feed into a single Final Round at Homebrew Con.

To ensure safety, four exhaust fans and two make-up air vents allowed proper ventilation in the 20,000-square-foot building during judging. Face shields were required at all times, and only judges were able to sample entries, which limited overall touching of cups and bottles. All judges remained 6 feet (2 m) apart during the seven days of judging, and capacity was limited to 100 people at any one time.

A sanitizing team worked to disinfect frequently touched surfaces and objects, and each shift kicked off with a reminder on physical distancing, hand washing, and proper cleaning and disinfecting. The check-in procedure included a COVID-19 screening with a temperature check.

Directions throughout the venue guided judges, staff, and volunteers along one-way routes to help maintain distancing, and, of course, an abundance of hand sanitizer was readily available at all times.

"In the midst of a pandemic, I think it went really well," Moorhead says, who is immensely proud of his team and inspired by the support from the community. He says with a skeleton crew, they were still able to uphold the integrity of the competition efficiently and safely.

Moorhead was amazed to get the numbers needed to execute the week-long competition, which usually requires just two or three days' commitment.

In addition to helping execute enhanced safety measures, the move to a single site also enabled consistent judging in which beers were evaluated in parallel in flights rather than sequentially over a six-week period. Whether or not the single-site format for judging will carry over to future competitions has not yet been decided. Changes were also made to the documentation, including opting for a scoreless system, about which Moorhead and the team are gathering feedback and looking to continue making improvements.

Moorhead said judges loved the format and overall, the positive feedback received highlighted the efficiency and the ability to increase the integrity of the competition. Judges consisted of a mix of GABF professional judges and high-ranking BJCP judges, with the aim to have National and above judges. This year, half the judges were from Colorado and half were from out of state.

"It was a major success to have something for our members to participate in and look forward to," he says.

Another new aspect of the competition was a completely pre-recorded, award cer-

John Moorhead, AHA competition manager.

emony streamed on YouTube. "It was weird standing in front of a podium with no one in front of you," Moorhead laughs. He and his colleagues tried to make it funny and not boring. "We wanted to take something that is mundane and make it a little more interesting and entertaining."

While the experience of winning an award in-person is great, Moorhead points out that this year's virtual ceremony allowed guest speakers to participate, which is harder to do live. The award ceremony was the end to this year's virtual Homebrew Con, which showcased more than 30 live seminars, speakers, and virtual meetups.

Another big change in 2021 was the actual beer itself. The most frequent styles entered this year differed from years past. "IPAs and Specialty IPAs did not dominate, which was interesting to see, given how craft beer and homebrewing are often synonymous with IPAs," Moorhead says.

Strong Belgian Ale was the most-entered category, totaling 246 entries. "That has never happened before," Moorhead says. Coming in second was Pilsner at 199 entries. Moorhead says that while lager categories continue to grow, specifically seeing a rise in Pilsners was remarkable.

Other popular categories included Amber European Beer (185 entries), New England IPA (191 entries), and Imperial Porter & Stout (191 entries).

As Moorhead points out, the 120 awards given out this year were on a whole different level due to the judging that changed the game. "Those honors were definitely elevated since you're going up against every entry in the category," he explains. A beer might be compared against 200 single-round entries, for example, instead of, say 40 First Round entries in the past.

Next year, Homebrew Con and the award ceremony will be held in Pittsburgh. Sites are chosen based on a survey of where people want to go, a destination's craft-beer and homebrew scene, and costs for AHA members to travel to and stay at a particular destination.

For the future of the competition, Moorhead says he and his team are always striving to continue to make it a better, more accessible experience. The last two years were a learning experience, and he is thankful for everyone—including staff, contract staff, judges from all over, table captains, volunteers, and more—who donated many hours to make this competition great. He's also thankful to all of the passionate homebrewers who continued to believe in them to put on this competition.

HOMEBREWER OF THE YEAR AWARD

Muntons
Passionate about malt

Ben Amidon

Arlington, Mass.

Ben Amidon has been homebrewing for 20 years, but he still "just about had a heart attack" when he saw his name next to the 2021 Homebrewer of the Year announcement. In fact, after seeing it, he asked his wife to independently verify the results to confirm.

His gold-medal beer, one of five he entered this year, was an American lager, which has over time become his favorite style to create. Lagers are his go-to homebrews thanks to the clean flavor profile and his New England home outside of Boston, which he says has a garage and basement that are well-suited for lagers most of the year. It's also fitting that his water profile is similar to that of Pilsen, he says.

Besides temperature, Amidon notes that another could-be challenge with pale American lagers is that there's nothing left to the imagination and nowhere to hide. He enters competitions, in part, for the feedback from certified judges so he can understand what he needs to do to brew better beer.

The award-winning beer is clean with a very mild flavor, he says. He describes it as a "lawnmower beer" that pairs nicely with summertime grilling staples. "It's not going to overpower anything," he says.

Amidon got started in homebrewing when the hard worker's wife thought he could use a hobby to get a little more work-life balance. "It provided an outlet that she knew I would enjoy," he says.

The duo drove a few miles to the local homebrew shop and dived in from there. He became enamored with a variety of aspects of homebrewing along the way. He loves the science of it all. "I'm amazed at how many facets of science go into making a beer," he says.

Homebrewing has also exposed him to different people, and he appreciates how the hobby can bring a community together. "Brewing always brings joy to people," he says, noting that the person brewing is having a good time and then, in turn, friends who share in the brewer's creations enjoy it, too.

He has evolved as a homebrew over the years by reading books, listening to podcasts, and learning to pay attention to the details, which make a difference, he says. "It's like anything in life," he says. "The more you get to know something, the more you start to ask more specific questions."

The long-time homebrewer encourages inexperienced homebrewers not to be intimated. "It's easier than what it sounds like," he says. "If you can make tea, you can make beer." He adds that it doesn't take a whole lot of equipment to get started making beer and understand it's all about having fun.

His advice is to take your time, keep in mind it doesn't take a lot of equipment to get started, and brew something you yourself enjoy and want to drink. A little patience and focus along with a relaxed, ready-to-have fun attitude are key. "Make something that *you* enjoy," he says.

SAMUEL ADAMS NINKASI AWARD

Jason Lowery

Amherst, Ohio

Jason Lowery eagerly anticipated live streaming the NHC award ceremony, but a change of plans came and priorities shifted when it was scheduled at the same time as his son's baseball tournament in Columbus, Ohio. Mobile phone service was a bit spotty, so he couldn't check in to see how it was going. Then he looked down at his phone to see 30 plus messages and he knew something must have happened. And it did—the passionate, talented homebrewer took home three silver medals and the 2021 Samuel Adams Ninkasi Award.

The Ninkasi Award, named for the Sumerian goddess of beer, is awarded to the brewer who accumulates the most medal points in the competition—gold medals earn six points, silver medals earn four points, and bronze medals earn two.

Before this competition, Lowery sent a few of his beers to a homebrew competition at Reuben's Brews in Seattle. He appreciated the feedback from judges, made some adjustments, sent the new-and-improved versions to this year's NHC competition, and walked away with a victory.

His medal-winning beers included a session IPA/pale ale he describes as a "crushable beer," perfect for boating and hanging out on the back porch. His American IPA is a West Coast–style IPA built almost entirely on Pilsner malt and paired exclusively with Citra, his favorite hops to brew with. Finally, his award-winning New England IPA is brewed with Apollo and Citra hops.

This year, he also entered a California common brewed entirely with grains from the Pacific Northwest; a winter ale with local honey and apple cider, fresh ginger, cinnamon sticks, and nutmeg; and a citrus basil pale ale made with homegrown basil from his wife Danielle's garden.

While his craft beer journey started with a taste of Great Lakes Brewing's Dortmunder in the early 2000s, it wasn't until 2019 that he ventured into brewing himself. He met Ben Northeim, head brewer of Collision Bend Brewing Company in Cleveland, Ohio, through a mutual friend, and Ben invited him down to their brewery for a brew day. To brew for the first time on their 15-barrel (17.6-hectoliter) system was overwhelming at first, but he still had fun.

A few weeks later, Ben invited him to his house to brew a home batch and Lowery was instantly hooked. "I always joke that Ben drug me down the rabbit hole," he laughs. But in reality, he considers Ben a mentor in brewing, as well as Mathia Hauck of Avon Brewing Company, Dave Bertolotti and Keith McFarlane of Missing Mountain Brewing Company, and Erik Stewart of Crooked Pecker Brewing Company.

His own system is a 20-gallon kettle in which he brews all-grain brew-in-a-bag. He has a single vessel on the hot side with an electric heating element and a panel to control everything.

In addition to proper cleaning and sanitation, Lowery says it's important to learn as much as you can. When not brewing, he's reading about beer and brewing. One of his many favorites is *The New IPA: Scientific Guide to Hop Aroma and Flavor* by Scott Janish.

He feels entering competitions is another way to improve one's brewing. With all the time and energy trained beer judges put into what they do, it's great to utilize that knowledge for feedback, he says. "It's their craft."

Lowery loves the community aspect of homebrewing, but with three kids and a chaotic work schedule as an air traffic controller, he also appreciates that it's something he can focus on without leaving the house.

The strong beer community includes not just homebrewers, but professional brewers, too, who he says are some of the best people he's met. Don't be intimidated by a pro brewer, he says, as most have been more than happy to answer his questions and share insight on how he could be a better brewer.

"The craft beer community is amazing, and I love how everyone supports each other and doesn't look at each other as competition, but as allies," he says.

NATIONAL

HOMEBREW COMPETITION

- 2021 -

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NINKASI AWARD

GAMBRINUS CLUB AWARD

HOMEBREWER OF THE YEAR AWARD

HOMEBREW CLUB AWARD

MEADMAKER OF THE YEAR AWARD

CIDERMAKER OF THE YEAR AWARD

HOMEBREW SHOP OF THE YEAR

RADEGAST AWARD

HomebrewersAssociation.org

MEADMAKER OF THE YEAR AWARD

Stephen Kilburn
Bonita, Calif.

The award-winning mead that beat out 269 other entries is the first mead Stephen Kilburn has ever created. And he only submitted it to NHC because the sour beer he had planned to enter wasn't quite ready yet.

Kilburn's wine and beer journey started way back when he was a kid and his grandfather made wine. "I was his shadow," he says. He learned how to make wine and would make wine with his friends in Cleveland. For the past 10 years though, he's opted for homebrewing since it's quicker and easier.

"When I heard about mead, I thought, *That's a lot like wine—let me try it*," he said. Mead's rise in popularity and the opening of nearby meaderies, such as Lost Cause Meadery in San Diego, also inspired his quest to make this ancient beverage.

Kilburn made his award-winning mead three years ago, and it has been aging since then. Even the circumstances of making this mead were by chance. Two friends from Chicago, Brian and Amelia Watkins, with whom he used to homebrew, were in town. Since his former brew buddies were only in town for one day, they opted to make a mead together instead of beer. And thus, the 2021 prized mead was made.

For this mead, which also won best of show at the 2018 San Diego County Fair, he used a few different kinds of honey, including leatherwood, orange blossom, and sunflower varietals. He describes the mead as earthy and spicy with hints of minerality.

Kilburn still brews beer, including IPAs, helles, Pilsners, and stouts. He's also made

a series of inventive porters, including one with chocolate, one smoked wit porter fermented with Belgian yeast, and a coffee porter made with homemade orange liqueur from his backyard orange trees.

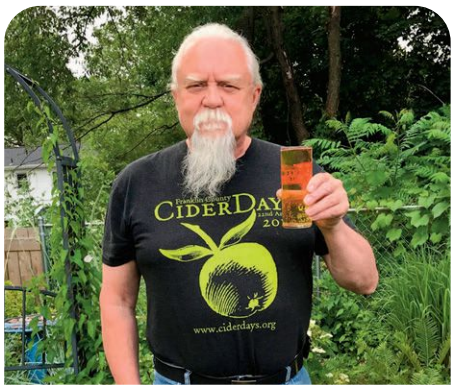
While his winning mead was created three years ago, Kilburn has since made other meads, including a tasty holiday spiced mead made with apple juice. When he began, he was surprised to learn that mead is so much like wine production.

Whether crafting mead or beer, Kilburn's words of encouragement are to "be adventurous," saying he'd rather dump a bad beer than not be creative in brewing. He stresses the importance of cleanliness, even in simple steps like laying a spoon down in between stirring. He also reminds new brewers that mistakes are part of the learning experience.

He also encourages homebrewers to keep good records because you may not remember everything you do. He also values the feedback he has received from judges. "I save all the sheets, and if I'm going to make the beer again, I'll reread the comment section," he says. "My problem is I don't often make the same recipe," he laughs.

But one thing for sure, he says, is he'll always have a mead in the works.

ON THE WEB
Find past winners' homebrew recipes on our website @ HomebrewersAssociation.org/homebrew-recipes



CIDERMAKER OF THE YEAR AWARD

Jeff Carlson
Grand Rapids, Mich.

It shouldn't have come as a surprise when the 2021 Cidermaker of the Year Award was announced. This was Jeff Carlson's—not first, not second—sixth time winning the prestigious award. The clearly exceptional cidermaker had previously won the top prize in 2000, 2001, 2008, 2009, and, most recently, 2016. He has claimed 14 NHC cider medals and four for beer, and he actually swept the Standard Cider category in 2006. Carlson has also won Michigan Cider Maker of the Year seven times, earned two medals in the U.S. Open Cider Championship, and amassed a collection of 246 cider medals.

But despite his impressive list of awards, the longtime cider maker was still thrilled. "My wife peeled me off the ceiling again," Carlson says. For this year's winning creation, he opted for a perry, using half Kieffer pears and half Shenandoah, El Dorado, and Harrow Sweet pears.

Carlson has been making beer since the early '90s and cider since the mid '90s, after tasting craft beer from Bell's and Sierra Nevada. "There was a homebrew club in town, so I joined and went from there," he says.

He says his cidermaking has evolved over the years thanks to better ingredients and more knowledge. He notes there are many good books out there on cider, such as *Craft Cider Making* by Andrew Lea and the Scott Laboratories Cider Handbook.

But he keeps his system simple. "My cidermaking setup is nothing more than glass carboys and plastic buckets, pH meter, refractometer, Buon Vino Mini Jet filter, numerous kegs, and a good ol' three-valve counterpressure bottle filler," he says.

Carlson shares that there's a strong cider community in Michigan, pointing out that all three winners this year in the Standard Cider & Perry category are from the state. He also adds that Michigan is one of the country's largest apple producers and that the Great Lakes International Cider and Perry Competition (GLINTCAP) sees hundreds of non-commercial entries for ciders and perries.

He's been a long-time member of the Grand Rapids–based PrimeTime Brewers Club homebrew club, where he has served in just about every role he could (president, vice president, secretary, and treasurer). He also frequents other local clubs, including the Brewsquitos Homebrewing Club and Rivertown Homebrewers.

This multi-award-winner's advice to newcomers? Start by keeping it simple. "Learn to make a basic cider first and get good at it," he says. He advises against jumping right into adding additional ingredients.

Although he leans toward a straightforward cider, Carlson has experimented and made cider with spruce tips, Chinook hops (for an added pine note), and cinnamon Red Hots candy. He has also made an award-winning jalapeño cider, in which he says nationally renowned judges couldn't believe how well everything meshed.

When it comes to beer, his favorite styles to brew are pale ale and West Coast IPAs. He likes to use Cascade and Centennial hops.

Even with six Cidermaker of the Year wins and turning 70 years old, he's not hanging up his cidermaking hat just yet. "If I'm alive and above ground and I can make a gallon or two, I'll send it in," he says. "Nothing's gonna stop me."

GAMBRINUS CLUB AWARD

LD Carlson COMPANY

Foam Rangers Homebrew Club

Houston, Texas

The Gambrinus Club Award is awarded to the homebrew club that achieves the most success in the National Homebrew Competition. This year's award went to Houston's Foam Rangers Homebrew Club. The win came at a good time, says club president Dave Frankowski, since the homebrew shop where the group had held meetings for the last 20 years, closed this year.

While the pandemic offered its share of challenges to the group, they were able to make the best of it by participating in virtual meetings, which allowed members to move out of the geographical area but still participate. It also allowed the group to host brewers and brewing experts. "For instance, this year we have hosted John Palmer, Jamil Zainasheff, and Mitch Steele, which is something we never would have been able to do in the past," he said. "As meetings move back to in-person, we may continue to host virtual technical talks, born out of the success of pandemic-induced virtual meetings."

The Foam Rangers are the oldest homebrew club in Texas and have about 30

members. Pre-pandemic, the group met monthly to showcase a specific beer style. Members shared their attempts at the brew (determined a month or two in advance) and sampled commercial examples while certified judges in the bunch talked a bit about what made the style unique, key elements, and how one would judge the beer.

They also hosted "brew-ins" every other month in which a club member would set up their brewing equipment at the local homebrew shop and invite veteran members, new members, and non-members to join them for a brew day.

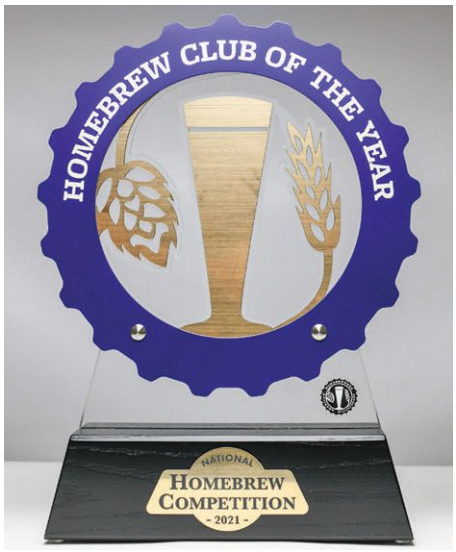
The crew does a vertical flight tasting every year. The first time Frankowski set foot in a meeting in 2017 (his first homebrew club meeting ever), he was greeted with a vertical flight of Sierra Nevada's Bigfoot Barleywine going back to 2006. Barleywine is somewhat of an official style for the group, Frankowski explains, because it was one of the original members' favorite styles. However, he says the group has some amazing sour-beer brewers, too.

Newbie brewers are more than welcome in the club. In fact, as members upgrade their brew systems, they often sell, share, or give away gear to newcomers. Frankowski points out that this makes the barrier to entry lower for homebrewing and makes the club more accessible. "It's like hand-me-downs with a younger sibling," he laughs, "but it works."

Frankowski says the club has an incredibly strong sense of camaraderie—so much, in fact, that he plans to fly in each month from his new home in Washington, D.C., so he can still lead meetings. "It feels like home," he says.

Frankowski, who started homebrewing in college, says that being a part of a club made his wife Megan more inclined to take part in the hobby as well. The social aspect combined with a number of female members helped her not feel intimidated, he says.

The feedback members share with one other is very beneficial in continuing to make great beer. "It's extremely helpful since everyone has a different threshold for different flavor components," he says. "We always think we know what we're doing, and this [the award] is a nice reminder we might be right."



HOMEBREW CLUB OF THE YEAR AWARD *AND* RADEGAST CLUB AWARD

Diablo Order of Zymiracle Enthusiasts (DOZE)
Concord, Calif.

For the first time in history, a club has taken home both the Homebrew Club of the Year Award and the Radegast Club Award.

The Radegast Club Award, named for the Slavic god of hospitality and the creator of beer, is given to a club that goes above and beyond as a homebrew club. The group must demonstrate brewing education, promotion of homebrewing to all, and volunteer work. The Homebrew Club of the Year award is awarded to the club whose members collectively win the most medal points in the competition.

In addition to the dual awards, the Diablo Order of Zymiracle Enthusiasts (DOZE) are celebrating their 25th year in 2021. "I can't think of a better way to ring in the anniversary," says Jordan Reed, club president, who says this was a big moment for the crew. "Being able to win both in one year is a huge boost for the club," he says.

To ensure that all of the club's approximately 167 entries made it to the judging site safely, club members Max Brown and Jim Bergmann drove all 42 cases of beer bottles from the Bay Area to the AHA sorting site in Colorado. They encountered a whiteout blizzard in Wyoming that almost stranded them, and the weight of all of those full bottles of beer (more than half a ton) well exceeded the maximum cargo load of the small SUV they were driving. "We dubbed the trip the Great Colorado Run," Reed says, in the spirit of *The Cannonball Run* and *Smokey and the Bandit*.

"It just exemplifies the dedication we have not only to competing well but to one another," Reed says.

Traditionally, club members meet monthly to socialize and share what they've been making. Often, a local brewer or industry professional is invited to speak, such as Professor Charlie Bamforth.

During the pandemic, the group still met regularly with upwards of 60 people joining in on Zoom. The online format even allowed them to bring in speakers they normally couldn't host, including Russian River Brewing Co. co-owner Vinnie Cilurzo, a representative from Portland's Imperial Yeast, and even a brewer who joined live from Peru.

"It's a really great community of men and women who love to brew and share their brew with other people," Reed says.

They look for ways to reach out and make a difference. DOZE members have helped with groups that support foster youth and organizations for cancer and diabetes research. The group brewed most of the beer for an event that raised $2,000 for juvenile diabetes research. They also provided all the beer for a Hops for Hope Fundraiser event for Youth Homes that raised $50,000. Members have also helped the local food bank pick pears from local orchards. Pears the food bank couldn't accept were given to the members to make perry.

"As a club, we rally in whatever way we can," he says. "We're always looking for ways to help each other to make better beers." Members help teach BJCP classes so people can become judges. Members also teach open classes at a nearby homebrew shop (MoreBeer! in Concord, Calif.) so anyone can come to have a hands-on opportunity.

Reed appreciates the numerous advantages that come from being a part of the group. Club members offer one another feedback for growth as brewers, enter competitions together, and root for one another. Members also get to know other people who may even be in the same type of work or same stage of raising a family.

Most of all, though, it's about having fun in a hobby that brings joy to people, whether they're creating the end product or just enjoying it. "Beer makes the heart happy," he says.

HOMEBREW SHOP OF THE YEAR

BSG HandCraft

Micro Homebrew

Kenmore, Wash.

Whether seasoned or just starting out, homebrewers know how pivotal their local store can be in honing their craft. The Homebrew Shop of the Year Award highlights a standout shop that not only offers an exceptional shopping experience, but also further promotes the hobby of homebrewing in a positive way.

If you browse the hundreds of glowing reviews on this year's winning shop, you'll find customers raving about the impressive variety of hops and malts and a large selection of equipment. But what's most loved about Micro Homebrew in Kenmore, Wash., are the people. Patrons describe all the qualities you'd want in a homebrew store staff: passionate, knowledgeable, easy-going, happy to help and, simply put, nice.

And that's exactly what Tony Ochsner was striving for when he opened his Seattle-area shop on a whim in 2014, with his wife, co-owner Kat Ochsner. When space opened up near his existing auto repair business, the homebrewer and businessman decided to take advantage and open a small 900-square-foot homebrew shop. Fast forward to present day and the shop has now expanded to 3,900 square feet, and Ochsner has left his 30-year-plus auto repair career to run Micro Homebrew full time.

From the start, Ochsner wanted a space that was inclusive for both beginner and advanced brewers and to give customers an inviting and comfortable environment.

"Friendliness of the team is priority," Ochsner says.

New brewers can find detailed instruction sheets on how to brew, as well as recipe kits Ochsner and his team put together themselves. There isn't pressure to buy the latest and greatest equipment, either. Ochsner often guides beginners to the minimal amount of equipment in case brewing ends up not being a good fit. He himself started on a Mr. Beer kit gifted from his kids 12 years ago.

Advanced brewers love the selection. "We're constantly bringing in new stuff," he says. At any given time, the store boasts 98 types of malt from around the world, more than 100 varieties of hops, and more than 120 strains of yeast. Ochsner has even seen first-time customers flourish to become professional brewers at their own breweries, which is a rewarding feeling for him.

Regardless of where a customer is on their brewing journey, the attentive, engaging staff is eager to help. Many shoppers comment on the welcoming vibe. "That's really gratifying," Ochsner says, especially when, as he points out, there are other online options when shopping for beer gear.

But it's the strong community he's built and the camaraderie that get people away from scrolling their phones for homebrew supplies and into the store. In fact, there are no online sales offered at Micro Homebrew, and that is intentional to engage customers.

It's evident that community feel and spreading the homebrew love are important to Oschner. He serves as president of his local homebrew club, the Cascade Brewers Guild, and is a member of the Greater Everett Brewers League. He notes there are many supportive clubs in the area, including North Seattle Homebrewers and Beer Renegades of Everett Washington, to name a few.

He also collaborates with nearby Cairn Brewing, which brews one of the shop's recipes a few times per year in their taproom. The brewery owners, Cascade Brewers Guild members Bill and Jen Boyd, keep the homebrew recipe on hand so interested brewery goers may be inspired to try their hand at the hobby.

In addition to the community and social aspects brick and mortar bring, Ochsner says quality feedback keeps people coming back. "Sometimes you just want to run your recipe by someone," he says. The shop owner shares that even for him, if a fellow brewer says a recipe looks good, he feels more comfortable jumping in.

Ochsner is even glad to sample beers to offer constructive feedback and help customers improve their creations. Besides benefiting the brewer, the BJCP-certified beer judge takes it as an opportunity to practice with his own palate as well.

Another great reason to get in the store? They also stock a wide variety of rotating beer from nearby breweries to support local brewers, many of whom were customers when they were homebrewers. Some Washington breweries making an appearance on the shelf include Lucky Envelope Brewing, Chainline Brewing Company, Matchless Brewing, Fair Isle Brewing, Stoup Brewing, Foggy Noggin Brewing, and Chuckanut Brewery, among others.

There are also supplies for wine-, cheese-, and kombucha-making, as well as coffee-roasting equipment.

Pre-pandemic, the store hosted beginner how-to-brew classes monthly, classes on kombucha- and cheesemaking, and larger events for Learn to Homebrew Day and the 500th anniversary of the Reinheitsgebot.

The store hosted long-time homebrewers, authors, and hosts of the *Experimental Brewing* podcast Denny Conn and Drew Beechum for the store's Big Brew day. Annie Johnson, 2013 Homebrewer of the Year, joined in to brew a beer and talk with the podcast hosts.

When it comes to running a retail store during the pandemic, Ochsner credits his supportive customers, of whom he is immensely appreciative. "People were just amazing," he says.

After closing down completely for two weeks, upon reopening, it was just Ochsner and his wife Kat taking phone orders since they've opted for no online sales.

"People would wait outside in line and never complain," he says.

After a whirlwind year in retail, Ochsner gathered with a small group—just four people—to watch the live-streamed award ceremony. He was happy that the AHA made the ceremony available to homebrewers. "The way they put it together was outstanding," he says. Despite the size of the party, there were 25 beers total entered in the competition. The group was excited to celebrate two gold medals and the coveted Homebrew Shop of the Year award.

With immense attention to customers' experiences, a shared enthusiasm for brewing among staff, and a welcoming, friendly environment, it's no surprise that this local homebrew shop with humble beginnings has grown to what it is now and has taken home the 2021 Homebrew Shop of the Year Award.

AHA GOVERNING COMMITTEE RECOGNITION AWARD

Gary Glass

Longmont, Colo.

Each year, the American Homebrewers Association Governing Committee selects one exceptional individual who has made significant contributions to the homebrew community for the AHA Governing Committee Recognition Award.

When Gary Glass found out he was this year's recipient, he felt very much honored. "If you look at the list of people who have received this award, I was humbled and awestruck to be part of the group," Glass says. But it comes as no shock to anyone who knows him or understands the impact he has had on homebrewing.

Glass served as director of the American Homebrewers Association for 14 years, and with passion and persistence, developed it into what it is today. Membership soared from 10,000 to more than 40,000, and Homebrew Con attendance grew more than fivefold under his direction.

He's also served as a beer judge for both the World Beer Cup and the Great American Beer Festival, as well as competitions throughout the Western Hemisphere.

Among Glass's biggest accomplishments was facilitating legalization of homebrewing in Alabama, Mississippi, Oklahoma, and Utah. Alabama and Mississippi had particularly substantial hurdles to overcome and took upwards of four years to change.

Successful legalization meant keeping the homebrew communities in those states engaged and enthusiastic about legislative needs. "It was a real challenge, and I'm proud of the homebrewers there," he says. Making those changes required educating, explaining what homebrewing is, and emphasizing the good it could bring. Glass points out that since legalization, these states have seen significant brewery growth.

Glass started homebrewing in 1993 and the American Homebrewers Association seemed like a good fit for a job when

he was wrapping up graduate school in Boulder, Colo., in 2000. He turned out to be the only candidate who had previously entered a homebrew competition. He was promoted to director of the AHA in 2006 and was at the forefront of growing interest in homebrewing and improving its image.

Glass notes that homebrewing has driven the explosion of craft beer in the United States: "It's really important for the continuation of America's brewing culture." Glass says when he started in the industry, the United States had a reputation for producing bland, light lagers but that it has now grown into the most advanced brewing culture in the world. He attributes that shift in landscape to Americans' creative spirit and willingness to change, a charge led by amateur brewers. "Homebrewers have really pushed what beers can be."

Glass is now a professional brewer at Left Hand Brewing Company in Longmont, Colo., but he still homebrews regularly. "I love that I am able to customize my beers to my own personal taste," he says. His favorite styles to brew are saison, Pilsner, and Maibock. He especially loves the challenge that goes into brewing a good lager.

His advice for new homebrewers, besides the importance of sanitation, is to keep things simple. "If you have success the first time out, you're more likely to keep up with the hobby," he says. He recommends opting for simple processes and styles with fewer ingredients, which means starting with extract and perhaps brewing an American pale ale or brown ale and saving the double IPA and imperial stout for later.

Glass encourages aspiring judges to get involved in local competitions. Becoming a steward lets one see the process, become familiar with the language judges use, and sometimes even taste the beers along with judges. He also recommends checking out the BJCP program's extensive resources.

Kristen Kuchar has covered the food and beverage industries for the past 14 years. She has written for Brew Your Own, BeerAdvocate, *CraftBeer.com,* The Beer Connoisseur, DRAFT, All About Beer, *VinePair, and many more.*

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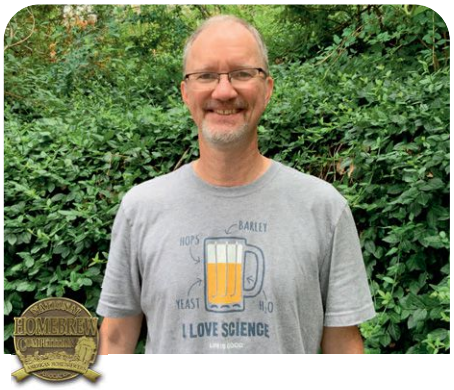
Category 1

PALE AMERICAN BEER

103 entries



Ben Amidon
Arlington, MA

"Canoe-Chuk Lager"
1B American Lager

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.044 (11°P)
Final gravity:	1.014 (3.7°P)
Efficiency:	70%
Color:	4 SRM
Bitterness:	11 IBU
Alcohol:	4% by volume

MALTS & ADJUNCTS

1.5 lb.	(680 g) Briess Pilsner dried malt extract @ 60 min
1.5 lb.	(680 g) Briess Pilsner dried malt extract @ 15 min
2 lb.	(907 g) rice solids @ 60 min

HOPS

0.75 oz. (21 g) Czech Saaz, 3.8% a.a. @ 45 min

YEAST

3 L starter Fermentis SafLager W-34/70

ADDITIONAL ITEMS

1 tsp.	Irish moss @ 15 min
½ tsp.	Wyeast Beer Nutrient Blend
1 vial	White Labs Clarity Ferm
15 g	gelatin, optional, to clarify
4.75 oz.	(135 g) dextrose if bottling

WATER

Very soft municipal water treated with ¼ Campden tablet and 8 g $CaCl_2$

BREWING NOTES

Prepare 5 gal. (18.9 L) brewing water and bring to boil. Boil 60 minutes, adding rice solids and half of malt extract at the start of the boil. Add 0.75 oz. (21 g) Saaz at 45 minutes. At 15 minutes, add remaining extract and Irish moss. Cool to 70°F (21°C) and add Clarity Ferm.

Cool to 45°F (7°C), pitch yeast from 3 L starter, and let temperature free rise to 52°F (11°C). After 1 week of fermentation, let temperature free rise to 68°F (20°C) for 5 days for diacetyl rest. Bottle condition with 4.75 oz. (135 g) dextrose to achieve approximately 2.5 vol. (5 g/L) CO_2, optionally clarifying with 15 g gelatin before packaging. Allow to carbonate for 1 week at room temperature and then lager at 52°F (11°C) for 3 weeks.

RUNNERS-UP

Silver Medal: Wayne Doucette of Big Lake, MN, River City Brewers, American Lager
Bronze Medal: Jordan Reed of Martinez, CA, Diablo Order of Zymiracle Enthusiasts (DOZE), American Lager

Category 2

PALE EUROPEAN BEER

146 entries

Kris Haskins
Seattle, WA
Cascade Brewers Guild

"Rombergpark"
5C German Helles Exportbier

Batch volume:	5.75 US gal. (21.8 L)
Original gravity:	1.051 (12.6°P)
Final gravity:	1.011 (2.8°P)
Efficiency:	85%
Color:	4 SRM
Bitterness:	25 IBU
Alcohol:	5.4% by volume

MALTS

7 lb.	(3.18 kg) Skagit Valley Malting Francin Pilsner malt
1.5 lb.	(680 g) BESTMALZ Munich malt
1 lb.	(454 g) BESTMALZ Vienna malt

HOPS

1 oz.	(28 g) Spalter Select, 4.7% a.a. @ 60 min
0.75 oz.	(21 g) Spalter Select, 4.7% a.a. @ 15 min
0.75 oz.	(21 g) Hallertauer Mittelfrüh, 3.6% a.a. @ 5 min

YEAST

411 billion cells Imperial Yeast L17 Harvest

WATER

Seattle tap water treated with 0.6 g/gal. $CaSO_4$ and 0.4 g/gal. $CaCl_2$. Mash water further treated with enough lactic acid to achieve mash pH of 5.3.

BREWING NOTES

Mash at 152°F (67°C) for 60 minutes with half of the total water (approx. 4.8 gal. or 18.2 L). Target a mash pH of 5.3. Run off mash, then batch sparge with second half of water (approx. 4.8 gal. or 18.2 L) with a temperature that brings the grain bed to 168°F (76°C). Let sit for 10 minutes, then run off into the kettle.

Boil wort long enough to achieve a post-boil volume of 5.75 gal. (21.8 L), about 90 minutes, adding hops as indicated. Chill wort to 52°F (11°C) and pitch starter of Imperial Harvest at 1.5 M cells/ml/°P.

When activity slows (or apparent attenuation reaches roughly 50%), start raising the temperature by 3°F (1.7°C) per day until it reaches 65°F (18°C). Rest for another 2 days at this temperature before cold crashing and packaging. Force carbonate to your preferred level—I targeted 2.4 vol. (4.8 g/L) CO_2.

RUNNERS-UP

Silver Medal: Wayne Doucette of Big Lake, MN, River City Brewers, International Pale Lager
Bronze Medal: Kevin Otting of Fort Collins, CO, Liquid Poets, Kölsch

Category 3

PILSNER

199 entries

Jeff Klatt
San Bruno, CA
Worts of Wisdom Homebrewers

"Tougher than the Sun"
3B Czech Premium Pale Lager

Batch volume:	17.5 US gal. (66.2 L)
Original gravity:	1.047 (11.7°P)
Final gravity:	1.007 (1.8°P)
Efficiency:	62%
Color:	3 SRM
Bitterness:	35 IBU
Alcohol:	5.3% by volume

MALTS

34.5 lb.	(15.7 kg) Weyermann Barke Pilsner malt
1.1 lb.	(482 g) Weyermann acidulated malt

HOPS

5.3 oz.	(151 g) Saaz, 2.4% a.a. @ 60 min
1 oz.	(28 g) Hallertauer Mittelfrüh, 3.1% a.a. @ 60 min
5.3 oz.	(151 g) Saaz, 2.4% a.a. @ 30 min
5.3 oz.	(151 g) Saaz, 2.4% a.a. @ 5 min

YEAST

Wyeast 2124 Bohemian Lager

WATER

Start with reverse osmosis water and build a very soft Pilsen profile using $CaSO_4$, $CaCl_2$, and $MgSO_4$: Ca 7 ppm, Mg 1 ppm, Na 8 ppm, SO_4 9 ppm, Cl 11 ppm.

BREWING NOTES

Conduct a Hochkurz mash with rests at 144°F (62°C) for 30 minutes, 160°F (71°C) for 45 minutes, and 170°F (77°C) for 15 minutes. Use phosphoric acid to adjust mash pH to 5.3–5.4.

Boil 90 minutes, adding hops as indicated. Chill the wort as fast as possible and keep as much trub out of the fermenter as possible. For this particular beer, I sent the hot wort through the chiller and back into the kettle through the whirlpool valve. When it got to around 100°F (38°C), I switched to pre-chilled water and was able to crash the beer into the kettle to about 70°F (21°C) while it whirlpooled. Then I let it settle for about 20 minutes and pumped it to the fermenter, leaving a very large amount of trub and hops material in the kettle. You must be very careful not to contaminate the wort when doing this, but for this beer it is very important to have as little trub in the fermenter as possible. I have conicals, so after the beer settled overnight to its pitching temperature of 48°F (9°C) I also dumped a small amount of trub. If you don't have a conical, consider doing the kettle cooling method.

Fermentation performance is paramount for this beer. This particular batch was a 4th-generation pitch after a series of helles lagers. My yeast collection process is to crash the beer, dump out the bottom layer, collect all of the middle layer and a little of the top layer of yeast, and store it at 35°F (2°C). On brew day, I decant the old beer off of the yeast and add some of the 70°F (21°C) wort without aeration or a stir plate . Since the yeast is cold this usually settles the pitch at the target temperature of 48°F (9°C). I'll hold it there overnight while the main batch cools to that temperature.

The result is a high kräusen pitch the next morning that's ready to be added to the main batch. After oxygenating the main batch, I'll then gently swirl the pitch and pour all of it in, probably pitching more than the recommended 1.5 million cells/mL/°P. I leave any brown or dark-colored yeast stuck to the bottom of the starter flask.

Ramp the temperature from 48°F (9°C) to 62°F (17°C) during fermentation, making your first temperature increase once the beer has attenuated 50% and making temperature bumps at 75% and 90% attenuation milestones. Hold at 62°F (17C) until it passes a forced diacetyl test.

I believe that you need to slowly cool lagers and not crash them so that there is still some yeast activity present for lagering. Cool slowly, about 2-3°F (1–1.5°C) per day, down to 33-35°F (1–2°C) and then rack to a purged keg with some Biofine Clear and a floating dip tube. Place it on CO_2 at about 10 psi (690 mbar) and wait a month. Undoubtedly, you'll start drinking it after about a week, but it really does get nice and crisp after a month. This particular batch was judged about 4 months from brew day.

RUNNERS-UP

Silver Medal: Rob Hardisty of Fort Collins, CO, Liquid Poets, German Pils

Bronze Medal: Patrick Mousaw of Granger, IN, Michiana Extract & Grain Association (MEGA), Czech Premium Pale Lager

Category 4

PALE MALTY EUROPEAN BEER

136 entries

Gilberto Narez
Red Bluff, CA

"Helles This"
4A Munich Helles

Batch volume:	7 US gal. (26.5 L)
Original gravity:	1.049 (12.2°P)
Final gravity:	1.009 (2.3°P)
Efficiency:	90%
Color:	3 SRM
Bitterness:	19 IBU
Alcohol:	5.3% by volume

MALTS

8 lb.	(3.63 kg) Weyermann Pilsner malt
1 lb.	(454 g) Bohemian Pilsner malt
8 oz.	(227 g) Weyermann Munich I malt
8 oz.	(227 g) Weyermann Munich II malt
4 oz.	(113 g) Weyermann Carahell malt

HOPS

1.5 oz.	(43 g) Hallertauer Mittelfrüh, 4.2% a.a., FWH

YEAST

Wyeast 2308 Munich Lager

WATER

Base water has Ca 21 ppm, Mg 12 ppm, Na 15 ppm, SO_4 4 ppm, Cl 4 ppm, HCO_3 128 ppm.
Mash water treated with 9 mL lactic acid, 1.9 g CaCO3, and 0.27 g $MgSO_4$.
Add 2.86 g CaCO3 and 0.4 g $MgSO_4$ to boil.

BREWING NOTES

Mash and recirculate 60 minutes at 149°F (62°C) with a mash thickness of 1.5 qt./lb. (3.1 L/kg). Sparge for an hour, add first wort hops, and boil 90 minutes.

Cool to fermentation temperature of 55°F (13°C), add oxygen with diffusion stone, and pitch yeast.

Ferment at 55°F (13°C) for 10 days and then allow temperature to rise to 65°F (18°C). Lager at 34°F (1°C).

RUNNERS-UP

Silver Medal: Tim Haran of Cottonwood Heights, UT, Lauter Day Brewers, Munich Helles
Bronze Medal: Bob Hall of Napoleon, OH, Glass City Mashers, Munich Helles

ON THE WEB
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Category 5

AMBER EUROPEAN BEER

185 entries

Jon Serluco
Brooklyn, NY
Brewminaries

"Dobrý Den"
3C Czech Amber Lager

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.049 (12.2°P)
Final gravity:	1.006 (1.5°P)
Efficiency:	79%
Color:	13 SRM
Bitterness:	28 IBU (Tinseth)
Alcohol:	5.7% by volume

MALTS

4 lb.	(1.81 kg) floor-malted Bohemian Pilsner malt
3 lb.	(1.36 kg) Maris Otter pale malt
1.5 lb.	(680 g) Munich malt, 10°L
8 oz.	(227 g) aromatic malt
8 oz.	(227 g) crystal malt, 60°L
4 oz.	(113 g) chocolate rye malt

HOPS

2 oz.	(57 g) Saaz, 3.2% a.a. @ 60 min
1 oz.	(28 g) Saaz, 3.2% a.a. @ 10 min
1 oz.	(28 g) Saaz, 3.2% a.a. @ 0 min

YEAST

2 L starter	Omega Yeast OYL-101 Pilsner 1

ADDITIONAL ITEMS

¼ tsp.	$CaCl_2$ @ 60 min
½ tablet	Whirlfloc @ 15 min
¼ tsp.	yeast nutrient @ 10 min

WATER

Ca 7 ppm, Mg 2 ppm, Na 12 ppm, SO_4 4 ppm, Cl 17 ppm, HCO_3 24 ppm

BREWING NOTES

Mash at 150°F (66°C) for 60 minutes. Lauter and sparge to collect 7.8 gal. (29.5 L) of wort and boil 90 minutes. Add hops, $CaCl_2$, Whirlfloc, and yeast nutrient as indicated. Post-boil volume should be 5.5 gal. (20.8 L).

Chill to 50°F (10°C), add 45 seconds of O_2, and pitch yeast starter. Ferment at 50°F (10°C). On day 10, when fermentation is within a few points of final gravity, begin a diacetyl rest by increasing temperature to 60°F (16°C). Hold temperature for 2 days, then increase to 65°F (18°C). Taste to ensure no detectable diacetyl.

On day 14, cold crash to 31°F (–1°C) for 24 hrs. Transfer to keg and force carbonate to 2.5 vol. (5 g/L) CO_2.

RUNNERS-UP

Silver Medal: Matt Lennon of Redwood City, CA, Bitches & Studs Brew Club, Vienna Lager
Bronze Medal: Joe St. John of Los Angeles, CA, Yeastside Brewers, Vienna Lager

Category 6

DARK EUROPEAN LAGER

174 entries

Kevin Olson
Raymore, MO
ZZHops Homebrewing Club

"Temny"
3D Czech Dark Lager

Batch volume:	5.2 US gal. (19.9 L)
Original gravity:	1.055 (13.6°P)
Final gravity:	1.014 (3.6°P)
Efficiency:	60%
Color:	29 SRM
Bitterness:	29 IBU
Alcohol:	5.4% by volume

MALTS

8 lb.	(3.63 kg) Mecca Grade Pelton Pilsner malt
2 lb.	(907 g) Mecca Grade Metolius Munich malt
1 lb.	(454 g) Briess Carapils malt
1 lb.	(454 g) pale chocolate malt
1 lb.	(454 g) Briess Victory malt
4 oz.	(113 g) Weyermann Carafa Type II malt
2 oz.	(57 g) Weyermann CaraAmber

HOPS

1 oz.	(28 g) Saaz, 2.9% a.a., FWH
0.25 oz.	(7 g) Magnum, 11.8% a.a., FWH
1 oz.	(28 g) Saaz, 2.9% a.a. @ 20 min

YEAST

400 billion cells Imperial Yeast L28 Urkel

ADDITIONAL ITEMS

1 tablet	Whirlfloc @ 15 min
½ tsp.	yeast nutrient @ 10 min

WATER

Ca 63 ppm, Mg 3 ppm, Na 5 ppm, SO_4 25 ppm, Cl 59 ppm, HCO_3 87 ppm

BREWING NOTES

Single infusion mash at 152°F (67°C) for 60 minutes, targeting a mash pH of 5.3. Mash out at 168°F (76°C) for 10 minutes, then collect wort. Boil 60 minutes, adding hops and additional items as indicated.

Chill to 50°F (10°C) and pitch yeast. Ferment at 51°F (11°C) for 10 days, then raise to 60°F (16°C) for 3 days. Confirm final gravity has been reached and crash to 40°F (4°C) over 3 days. Force carbonate to 2.4 vol. (4.8 g/L) CO_2.

RUNNERS-UP

Silver Medal: Michael Wilcox of Wichita, KS, Kansas City Bier Meisters, Munich Dunkel
Bronze Medal: Larry Bentley of North Plainfield, NJ, Garden State Homebrewers (GSHomebrewers), Munich Dunkel

Category 7

AMERICAN WHEAT & BLONDE ALE

100 entries

Caleb Meinke
Cambridge, WI
Madison Homebrewers & Tasters Guild

"Willow Run"
1D American Wheat Beer

Batch volume:	5.25 US gal. (19.9 L)
Original gravity:	1.049 (12.2°P)
Final gravity:	1.013 (3.3°P)
Efficiency:	72%
Color:	3 SRM
Bitterness:	19 IBU (Tinseth)
Alcohol:	4.8% by volume

MALTS & ADJUNCTS

4.25 lb.	(1.93 kg) Briess Brewers malt
4.25 lb.	(1.93 kg) Briess white wheat malt
8 oz.	(227 g) Briess flaked oats

HOPS

0.3 oz.	Loral, 10.2% a.a. @ 60 min
0.7 oz.	Loral, 10.2% a.a. @ 5 min
1 oz.	Loral, 10.2% a.a., whirlpool 10 min, 175°F (79°C)

YEAST

White Labs WLP830 German Lager or your preferred lager yeast (yes, lager yeast!)

ADDITIONAL ITEMS

1 lb. (454 g) rice hulls in mash

WATER

Ca 45 ppm, Mg 10 ppm, Na 4 ppm, SO_4 70 ppm, Cl 60 ppm, HCO_3 16 ppm

BREWING NOTES

Mash at 152°F (67°C) for 60 minutes (don't forget the rice hulls!), targeting a pH of 5.3. Lauter and then boil 90 minutes, adding kettle hops as indicated.

After flameout, chill to 175°F (79°C), add whirlpool hops, and allow 10 minutes of contact time. Chill to 50°F (10°C) and pitch yeast starter propagated to 1.75 M cells/mL/°Plato. Ferment at 50°F (10°C) to 52°F (11°C) until attenuated to 1.017 (4.3°P).

Ramp by 2°F (1°C) every 12 hours until temperature reaches 65°F (18°C). Upon reaching terminal gravity of 1.013 (3.3°P), maintain fermenter at 65°F (18°C) to complete a 48-hour diacetyl rest.

Cold crash when fully attenuated and force carbonate to 2.5 vol. (5 g/L) CO_2.

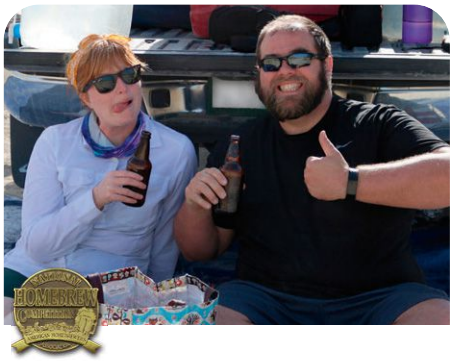
RUNNERS-UP

Silver Medal: Mike Ireson of Alexandria, VA, American Wheat Beer
Bronze Medal: Brian Kleinman of Cincinnati, OH, Blonde Ale

Category 8

GERMAN WHEAT & RYE BEER

103 entries



Brian Rower & Amber Rower
Pinole, CA

"Jeff The Hefe"
10A Weissbier

Batch volume:	5.5 US gal. (20.8 L)
Original gravity:	1.051 (12.6°P)
Final gravity:	1.015 (3.8°P)
Efficiency:	72%
Color:	4 SRM
Bitterness:	12 IBU
Alcohol:	4.7% by volume

MALTS

6 lb.	(2.72 kg) white wheat malt
4 lb.	(1.81 kg) German Pilsner malt

HOPS

1 oz.	(28 g) Tettnang, 3.4% a.a. @ 60 min

YEAST

1.5 L starter	White Labs WLP300 Hefeweizen Ale Yeast

ADDITIONAL ITEMS

1 lb.	(454 g) rice hulls in mash

BREWING NOTES

Prepare a 1.5 L yeast starter about 2 days prior to pitching yeast.

If you're not looking to win any competitions, feel free to skip the step mash. It's a lot of extra work for a fairly minimal gain. But if you want to try out the step mash and don't have a mash tun with a heating element try a decoction mash.

Mash in at 113°F (45°C) and rest 30 minutes. Use a heating element or decoctions to achieve rests at 135°F (57°C) for 30 minutes, 156°F (69°C) for 30 minutes, and 168°F (76°C) for 10 minutes. The rice hulls add no sugar or flavor, but help to prevent a stuck mash. If you're not used to brewing with wheat, do not skimp on the rice hulls; they could save you a lot of time. On a Brewzilla, I find I *need* a full pound (about half a kilogram) of rice hulls to prevent a stuck mash.

Drain mash tun and sparge with 168°F (76°C) water until you have 7 gal. (26.5 L) of pre-boil wort. Boil 60 minutes, adding Tettnang hops at the start of the boil. Add Whirlfloc tablet 5 minutes before the end of boil. Chill wort to 75°F (24°C), transfer to fermenter, and pitch yeast starter. Expect a very active fermentation—use a blowoff tube rather than an airlock. Lower the temperature of the fermenter to 68°F (20°C) when you see signs of activity. Allow fermentation to run for two weeks.

Fermentation temperature control is key to success with this recipe since so much of the flavor comes from the yeast. If you don't have any special equipment for controlling the temperature, I suggest putting your carboy into a large bucket of water to help stabilize the temperature, like the buckets you use to ice your keg at a party. You can also take temperature readings of the water a couple times a day the first couple of days and adjust using warm water or ice as needed.

Bottle with 4 oz. (113 g) corn sugar and condition at room temperature for 3 weeks.

RUNNERS-UP

Silver Medal: Gordon Mauger of Walnut Creek, CA, Diablo Order of Zymiracle Enthusiasts (DOZE), Roggenbier (Historical Beer)
Bronze Medal: Bradford Berger of Pioneertown, CA, Mojave Desert Brewers Guild, Weizenbock

Category 9

PALE BRITISH ALE

107 entries

Ben Miller
Rio Rancho, NM
The Brewing Network

"Herbal Joe's Best Bitter"
11B Best Bitter

Batch volume:	6.5 US gal. (24.6 L)
Original gravity:	1.044 (11°P)
Final gravity:	1.017 (4.3°P)
Efficiency:	72%
Color:	11 SRM
Bitterness:	45 IBU
Alcohol:	3.7% by volume

MALTS

7.5 lb.	(3.40 kg) pale ale malt
1 lb.	(454 g) Weyermann Caramunich Type I malt
12 oz.	(340 g) rye malt
8 oz.	(227 g) Briess Special Roast malt
4 oz.	(113 g) Weyermann Caraaroma malt

HOPS

1.5 oz.	(43 g) Fuggle, 4.8% a.a. @ 60 min
1 oz.	(28 g) Fuggle, 4.8% a.a. @ 20 min
1 oz.	(28 g) Fuggle, 4.8% a.a. @ 10 min
3 oz.	(85 g) Fuggle, 4.8% a.a. @ 1 min

YEAST

Wyeast 1968 London ESB Ale

WATER

Use reverse osmosis water with 10 g $CaCl_2$ and 10 g $CaSO_4$ in mash. Also add 5 g $CaCl_2$ and 5 g $CaSO_4$ in kettle.

BREWING NOTES

Mash at 158°F (70°C) for 30 minutes. Recirculate mash for 10 minutes before collecting first runnings. Sparge until desired kettle volume is reached and boil 90 minutes total, adding first hop addition with 60 minutes remaining in boil.

Chill to 67°F (19°C) and pitch yeast. Oxygenate with pure O_2 for 2 minutes at 1.5 liters/minute. Raise fermentation temperature slowly to 72°F (22°C) by day 5 (roughly). Once complete, crash cool before kegging. Carbonate to 2.2 vol (4.4 g/L) CO_2.

This recipe can also be dry hopped: add 2–3 oz. (57–85 g) Fuggle on day 5 and leave at 72°F (22°C) for an additional 2–4 days before kegging.

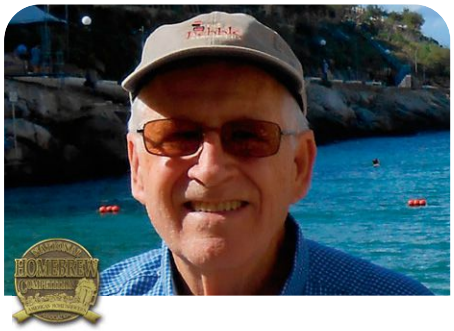
RUNNERS-UP

Silver Medal: Brandon Holladay of Sandy, UT, Brewing Asshats of Utah (BRAU), British Golden Ale
Bronze Medal: Mike Shea of Beverly, MA, North Shore Brewers, Strong Bitter

Category 10

SCOTTISH & IRISH ALE

128 entries



Keith Wright
Edmond, OK
Red Earth Brewers

"Beam Me Up Scotty"
14C Scottish Export

Batch volume:	6 US gal. (22.7 L)
Original gravity:	1.060 (14.7°P)
Final gravity:	1.015 (3.8°P)
Efficiency:	70%
Color:	16 SRM
Bitterness:	17 IBU (Rager)
Alcohol:	6% by volume

MALTS & ADJUNCTS

8 lb. (3.63 kg) Maris Otter pale malt
1 lb. (454 g) toasted Maris Otter malt
8 oz. (227 g) caramel Munich malt, 40°L
8 oz. (227 g) wheat malt
8 oz. (227 g) brown malt
8 oz. (227 g) Briess Carapils malt
8 oz. (227 g) flaked corn
1 oz. (28 g) Weyermann Carafa Type III malt

HOPS

1 oz. (28 g) Goldings, 4.75% a.a. @ 60 min

YEAST

2 qt. starter White labs WLP005 British Ale

ADDITIONAL ITEMS

1 lb. (454 g) caramelized cane sugar @ 60 min
8 oz. (227 g) dark brown cane sugar @ 60 min
1 packet Knox gelatine, clarifier

WATER

Mash with city water treated with 1 tsp. $CaSO_4$. Sparge with rainwater adjusted to pH of 5.2 with phosphoric acid.

BREWING NOTES

Mash at 155°F (68°C) until saccharification is complete, as indicated by an iodine test, approximately 60 minutes. Lauter, collect approximately 7 gal. (26.5 L) of wort, and boil 60 minutes, adding sugars and hops as indicated.

Chill to 68°F (20°C) and pitch yeast. Ferment for 10 days and rack to secondary when specific gravity has fallen to 1.015 (3.8°P).

When ready to bottle or keg, rack onto gelatin and refrigerate at 34°F (1°C) for 2 weeks to clear. Then package with 2.4 vol. (4.8 g/L) CO_2.

RUNNERS-UP

Silver Medal: Janine Weber of Houston, TX, Foam Rangers Homebrew Club, Irish Red Ale
Bronze Medal: Mike Durrant of Pacific Grove, CA, MASH831, Irish Red Ale

Category 11

AMERICAN PALE ALE

154 entries

Mike & Stephanie Butler
Olathe, KS
Kansas City Bier Meisters

"You and the Hops You Rode In On"
18B American Pale Ale

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.057 (14°P)
Final gravity:	1.012 (3.1°P)
Efficiency:	70%
Bitterness:	46 IBU
Color:	5 SRM
Alcohol:	6% by volume

MALTS

8.2 lb. (3.72 kg) Mecca Grade Lamonta pale malt
1.8 lb. (816 g) Avangard Vienna malt
13 oz. (368 g) Mecca Grade Shaniko white wheat malt
6 oz. (170 g) Briess Carapils malt

HOPS

0.31 oz. (9 g) Citra, 13.2% a.a. @ 60 min
0.58 oz. (16 g) Rakau, 9.1% a.a., 0 min into whirlpool, 190°F (88°C)
0.38 oz. (11 g) Citra, 13.2% a.a., 0 min into whirlpool, 190F (88°C)
0.38 oz. (11 g) Mosaic, 13.2% a.a., 0 min into whirlpool, 190°F (88°C)
1.15 oz. (33 g) Rakau, 9.1% a.a., 10 min into whirlpool, 170°F (77°C)
0.77 oz. (22 g) Citra, 13.2% a.a., 10 min into whirlpool, 170°F (77°C)
0.77 oz. (22 g) Mosaic, 13.2% a.a., 10 min into whirlpool, 170°F (77°C)
0.38 oz. (11 g) Simcoe, 13.2% a.a., 10 min into whirlpool, 170°F (77°C)
0.83 oz. (24 g) Simcoe, 13.2% a.a., dry hop (Day 1)
0.83 oz. (24 g) Rakau, 9.1% a.a., dry hop (Day 5)
0.83 oz. (24 g) Citra, 13.2% a.a., dry hop (Day 5)
0.83 oz. (24 g) Mosaic, 13.2% a.a., dry hop (Day 5)

YEAST

200 billion cells White Labs WLP001 California Ale Yeast

ADDITIONAL ITEMS

1 tsp. Irish moss @ 10 minutes

WATER

6.9 gal. (26.1 L) reverse osmosis water treated with 0.24 oz. (6.76 g) $CaCl_2$, 0.1 oz. (2.93 g) $CaSO_4$, and 0.24 fl. oz. (7 mL) lactic acid.

BREWING NOTES

Mash at 152°F (67°C) for 60 minutes, targeting a mash pH of 5.2 10 minutes into the mash. Boil 60 minutes, adding the 60-minute hop addition at the start of the boil.

After flameout, chill wort to 190°F (88°C) and add first whirlpool hop addition. After whirlpooling at 190°F (88°C) for 10 minutes, rapidly chill wort again until temperature is approximately 170°F (77°C) and add second whirlpool hop addition. After whirlpooling for a further 20 minutes at 170°F (77°C), for a total whirlpool of 30 minutes, rapidly chill the wort to 64°F (18°C), transfer to fermenter and pitch a healthy yeast starter.

Begin fermentation at 64°F (18°C) and ramp to 67°F (19°C) over the first 3 days. Maintain fermentation temperature at 67°F (19°C) for 4 additional days. Add first dry hop addition on day 1 of fermentation. Add second dry →

hop on day 5, or when beer is 80–90% attenuated. Starting on day 8, perform diacetyl rest and confirm full attenuation, then cold crash to 38°F (3°C) over 4 days. Allow to condition another 7 days prior to packaging. Force carbonate to 2.5 vol. (5 g/L) CO_2. Enjoy!

RUNNERS-UP

Silver Medal: Jason Lowery of Amherst, OH, Brewly Homebrew Club, American Pale Ale

Bronze Medal: George Sabato of Warrenton, VA, Rhode Island Fermentation Technicians (RIFT), American Pale Ale

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Category 12

AMBER & BROWN AMERICAN ALE

153 entries

Ryan Stack
Saint Cloud, MN

"Tall Tines Brown"
19C American Brown Ale

Batch volume:	5.5 US gal. (20.8 L)
Original gravity:	1.065 (15.9°P)
Final gravity:	1.018 (4.6°P)
Efficiency:	74%
Color:	32 SRM
Bitterness:	33 IBU (Tinseth)
Alcohol:	6.2% by volume

MALTS

13.5 lb.	(6.12 kg) Golden Promise pale malt
1.5 lb.	(680 g) Munich malt
1 lb.	(454 g) crystal malt, 40°L
1 lb.	(454 g) English medium crystal malt
8 oz.	(227 g) chocolate malt, 350°L
8 oz.	(227 g) chocolate malt, 450°L
12 oz.	(340 g) brown malt
12 oz.	(340 g) honey malt
5 oz.	(142 g) Simpsons DRC (Double Roasted Crystal) malt

HOPS

2 oz.	(57 g) Cascade, 8.3% a.a. @ 20 min
1 oz.	(28 g) Glacier, 5.1% a.a. @ 10 min
2 oz.	(57 g) Amarillo, 8.6% a.a @ 5 min
2 oz.	(57 g) Amarillo, 8.6% a.a., whirlpool 10 min, 170°F (77°F)
2 oz.	(57 g) Amarillo, dry hop 5 days
1 oz.	(28 g) Cascade, dry hop 5 days

YEAST

Wyeast 1450 Denny's Favorite with appropriate starter, decanted

ADDITIONAL ITEMS

3 g	kosher salt @ 60 min
1 tablet	Whirlfloc @ 10 min
½ tsp.	Wyeast Beer Yeast Nutrient @ 10 min

WATER

Carbon-filtered City of St. Cloud water with 5 g $CaCl_2$ and 1 g $CaSO_4$.

BREWING NOTES

Mash at 154°F (68°C) for 1 hour. Estimated pre-boil volume is 9.5 gal. (36 L). Estimated wort loss (to trub, pump, etc.) is 2.25 gal. (8.5 L).

Bring to boil and add 3 g kosher salt. Boil 75 minutes, adding kettle hops, Whirlfloc, and yeast nutrient as indicated. After flame-out, chill to 170°F (77°C), add whirlpool hops, and hold for 10 min.

Chill to 63°F (°C), rack 6.5 gal. (24.6 L) of wort to an intermediate vessel, and allow most of the cold break to settle. Once settled, transfer 5.5 gal. (20.8 L) of clear wort to another fermenter and pitch yeast. Aerate for 90 seconds with pure oxygen.

Ferment at 66°F (19°C), ramping up to 72°F (22°C) towards the end of fermentation. Hold at 72°F (22°C) for 5 days to allow maximum attenuation and to clean up any diacetyl.

Dry hop 5 days before racking to a keg. Cold crash and force carbonate to 2.4 vol. (4.8 L) CO_2.

RUNNERS-UP

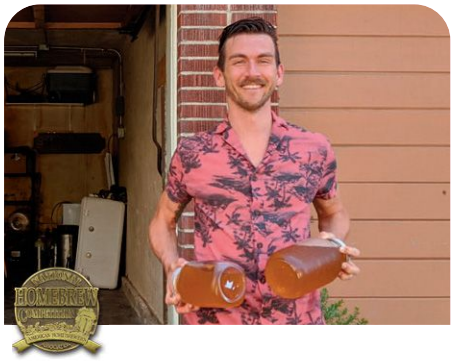
Silver Medal: Mike Riddle and Alex Riddle of Napa, CA, HOME Brewers, American Brown Ale

Bronze Medal: John Horton of Aurora, CO, Aurora City Brew Club, American Amber Ale

Category 13

BROWN BRITISH BEER

140 entries



Hugs Mitts
Eugene, OR
Hugglebrau Good Brews Club

"Chocolate Macadamia Nut Porter"
13C English Porter

Batch volume:	15 US gal. (56.8 L)
Original gravity:	1.062 (15.2°P)
Final gravity:	1.017 (4.3°P)
Efficiency:	72%
Color:	30 SRM
Bitterness:	35 IBU
Alcohol:	5.9% by volume

MALTS & ADJUNCTS

20.5 lb.	(9.30 kg) Maris Otter pale malt
7.2 lb.	(3.29 kg) Weyermann Caramunich Type I malt
3 lb.	(1.36 kg) brown malt
2.5 lb.	(1.13 kg) Simpsons Golden Naked Oats
1.5 lb.	(680 g) chocolate malt
1.2 lb.	(567 g) crystal malt, 75°L

HOPS

2.5 oz.	(71 g) Willamette, 4.5% a.a., mash
1.7 oz.	(48 g) Willamette, 4.5% a.a. @ 60 min
0.5 oz.	(14 g) East Kent Goldings, 5% a.a. @ 60 min
4.5 oz.	(128 g) East Kent Goldings, 5% a.a. @ 10 min

YEAST

Wyeast 1028 London Ale

ADDITIONAL ITEMS

10 oz.	(283 g) raw, unsalted macadamia nuts, chopped
12.5 oz.	(354 g) Tanzania cacao nibs
20 drops	Fermcap @ 70 min
1.5 tablets	Whirlfloc @ 30 min
4 g	yeast nutrient @ 15 min

BREWING NOTES

Bake macadamia nuts and cacao nibs at 400°F (204°C) for 15 minutes. You're aiming for a slight burnt character.

Mash at 150°F (66°C) for 60 minutes, adding the mash hops (Willamette), cacao nibs, and macadamia nuts at the start of the mash rest. Target a mash pH of 5.22. Lauter, then boil for 70 minutes, adding hops, Whirlfloc, and yeast nutrient as indicated.

After flameout, chill to 60°F (16°C) and pitch yeast. Ferment at 62°F (17°C) until specific gravity falls to 1.017 (4.3°P) and cold crash.

RUNNERS-UP

Silver Medal: Marcos Sant'Anna of San Jose, CA, Silicon Valley Sudzers, British Brown Ale

Bronze Medal: Evangelos "Laki" Gletsos of Los Alamos, NM, Los Alamos Atom Mashers, British Brown Ale

Category 14

BRITISH STOUT

101 entries

Ben Miller
Rio Rancho, NM
The Brewing Network

"Herbal Joe's Stout Trousers"
16C Tropical Stout

Batch volume:	6.5 US gal. (24.6 L)
Original gravity:	1.122 (28.5°P)
Final gravity:	1.040 (10°P)
Efficiency:	72%
Color:	57 SRM
Bitterness:	67 IBU
Alcohol:	11% by volume

MALTS & ADJUNCTS

25 lb.	(11.34 kg) 2-row pale malt
1.5 lb.	(680 g) flaked oats
1.5 lb.	(680 g) British black patent malt
1 lb.	(454 g) Dingemans Special B malt
8 oz.	(227 g) pale chocolate malt
8 oz.	(227 g) chocolate malt
8 oz.	(227 g) Weyermann Caramunich Type I malt

HOPS

2 oz.	(57 g) US Magnum, 10.8% a.a. @ 60 min
1 oz.	(28 g) Columbus, 17.5% a.a. @ 20 min

YEASTS

260 billion cells Wyeast 1968 London ESB Ale
260 billion cells Wyeast 1056 American Ale

WATER

Begin with reverse osmosis water. In mash, add 15 g $CaCl_2$, 15 g $CaCO_3$, and 15 g $CaSO_4$. In kettle, add 10 g $CaCO_3$.

BREWING NOTES

Mash at 154°F (68°C) for 60 minutes. Recirculate for 10 minutes before collecting first runnings. Sparge until desired kettle volume is reached. Boil for a total of 120 minutes, adding first hop addition with 60 minutes remaining in the boil.

Chill to 66°F (19°C) before pitching yeast. Pitch equal amounts 1056 and 1968, ensuring the total pitch rate is appropriate for the high gravity. Oxygenate with pure O_2 for 3.5 minutes O_2 at 1.5 liters/minute.

Ferment at 66°F (19°C) and raise to 72°F (22°C) by end of fermentation, allowing beer to finish completely. Crash cool and keg when fermentation is complete. Carbonate to 2.4 vol. (4.8 g/L) CO_2. Spicy chiles play well with this beer's sweet finish and can be added after fermentation if desired.

RUNNERS-UP

Silver Medal: Sherman House of Sacramento, CA, Oatmeal Stout

Bronze Medal: Brian Phad of Lockport, IL, Plainfield Ale and Lager Enthusiasts (PALE), Tropical Stout

Category 15

IRISH STOUT

59 entries

Matthew Harrington
Raleigh, NC

"Deep Focus Stout"
15B Irish Stout

Batch volume:	16 US gal. (60.6 L)
Original gravity:	1.045 (11.2°P)
Final gravity:	1.012 (3.1°P)
Efficiency:	76%
Color:	34 SRM
Bitterness:	33 IBU
Alcohol:	4.33% by volume

MALTS & ADJUNCTS

20 lb.	(9.07 kg) Maris Otter pale malt
6 lb.	(2.72 kg) flaked barley
3 lb.	(1.36 kg) roasted barley
1.5 lb.	(680 g) chocolate malt

HOPS

2 oz.	(57 g) Nugget, 14.5% a.a. @ 60 min

YEAST

White Labs WLP004 Irish Ale Yeast

WATER

Ca 85 ppm, Mg 3 ppm, Na 33 ppm, SO_4 93 ppm, Cl 119 ppm

BREWING NOTES

Mash at 149°F (65°C) for 60 minutes and fly sparge for 20 minutes with 165°F (74°C) water using the same water profile as used for the mash.

Boil 60 minutes. At flameout, whirlpool through counterflow chiller for 20 minutes. Chill to 64°F (18°C). Pitch yeast and ferment 4 days at 64°F (18°C). Raise temperature to 66°F (19°C) and ferment for 4 more days, then increase temperature again to 68°F (20°C) for 6 more days, or until target gravity is reached. Cold crash, keg, and force carbonate to 2.34 vol. (5.2 g/L) CO_2 at 35°F (2°C).

RUNNERS-UP

Silver Medal: Mike Riddle and Alex Riddle of Napa, CA, HOME Brewers, Irish Stout
Bronze Medal: Team Brewery602 of Phoenix, AZ, Arizona Society of Homebrewers, Irish Stout

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Category 16

AMERICAN PORTER & STOUT

165 entries

Christian Chandler
Chandler, AZ
Arizona Society of Homebrewers

"Sable Porter"
20A American Porter

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.065 (15.9°P)
Final gravity:	1.016 (4.1°P)
Efficiency:	72%
Color:	39 SRM
Bitterness:	37 IBU
Alcohol:	6.4% by volume

MALTS

9.5 lb.	(4.31 kg) Maris Otter pale malt
1.25 lb.	(567 g) chocolate malt
1 lb.	(454 g) Munich malt
10 oz.	(283 g) Briess Carapils malt
8 oz.	(227 g) crystal malt, 120°L
4 oz.	(113 g) black patent malt

HOPS

0.75 oz.	(21 g) Nugget, 13.3% a.a. @ 60 min
0.75 oz.	(21 g) Crystal, 4.5% a.a. @ 20 min
0.75 oz.	(21 g) Willamette, 5% a.a. @ 20 min
0.25 oz.	(7 g) Willamette, 5% a.a. @ 0 min
0.25 oz.	(7 g) Crystal, 4.5% a.a. @ 0 min

YEAST

Fermentis SafAle US-05

WATER

Ca 63 ppm, Mg 5 ppm, Na 99 ppm, SO_4 86 ppm, Cl 75 ppm, HCO_3 115 ppm

BREWING NOTES

Mash at 155°F (68°C) for 60 minutes. Mash out at 167°F (76°C) for 10 minutes. Lauter and boil 60 minutes, adding hops as indicated. Chill, aerate, and pitch yeast at 63°F (17°C). After 10-14 days (or when fully attenuated), cold crash for 3 days at 35°F (2°C). Force carbonate to 2.4 vol. (4.8 g/L) CO_2.

RUNNERS-UP

Silver Medal: Kevin Kiernan of Washington, DC, DC Homebrewers, American Stout
Bronze Medal: Carter Bundy & Claire Davis of Richmond, VA, James River Homebrewers, American Stout

Category 17

AMERICAN IPA

186 entries

David Jones
Mission Viejo, CA

"Old Mission IPA"
21A American IPA

Batch volume: 5 US gal. (18.9 L)
Original gravity: 1.068 (16.6°P)
Final gravity: 1.015 (3.8°P)
Efficiency: 72%
Color: 5 SRM
Bitterness: 80 IBU
Alcohol: 7.1% by volume

MALTS

13 lb. (5.90 kg) US 2-row pale malt

HOPS

1 oz. (28 g) Warrior, 15% a.a. @ 60 min
1 oz. (28 g) Mosaic, 12.2% a.a. @ 15 min
2 oz. (57 g) Citra, 12% a.a., whirlpool
2 oz. (57 g) Galaxy, 14.0% a.a., whirlpool
1 oz. (28 g) Mosaic, 12.2% a.a., whirlpool
1 oz. (28 g) Cryo Hops Citra, 25% a.a., keg

YEAST

236 billion cells Imperial Yeast A07 Flagship

ADDITIONAL ITEMS

1 tablet Whirlfloc @ 10 min

WATER

Filtered tap water

BREWING NOTES

Mash at 151°F (66°C) with 18 qt. (17 L) of water. Batch sparge at 170°F (77°C). Collect approx 6.5 gal. (24.6 L) of pre-boil wort. Boil 60 minutes, adding hops as indicated. Add whirlpool hops immediately after boil and leave in contact with wort during chilling.

Chill to 75°F (24°C) and pitch yeast. Ferment at 70°F (21°C). Ferment for 2 weeks but do not rack to secondary. Perform a low-oxygen transfer to a keg with 1 oz. Cryo Hops Citra in a stainless tube and force carbonate.

RUNNERS-UP

Silver Medal: Jason Lowery of amherst, OH, Brewly Homebrew Club, American IPA
Bronze Medal: Max Brown of antioch, CA, Diablo Order of Zymiracle Enthusiasts (DOZE), American IPA

Category 18

SPECIALTY IPA

101 entries

Andrew Simsak
San Francisco, CA
San Francisco Homebrewers Guild

"Forgiveness Machine"
21B Specialty IPA – White IPA

Batch volume: 6 US gal. (22.7 L)
Original gravity: 1.054 (13.3°P)
Final gravity: 1.012 (3.1°P)
Efficiency: 69%
Color: 4 SRM
Bitterness: 42 IBU
Alcohol: 5.4% by volume

MALTS & ADJUNCTS

7.5 lb. (3.40 kg) Viking Pilsner malt
5.25 lb. (2.38 kg) flaked wheat
1.25 lb. (567 g) flaked oats
4 oz. (113 g) Weyermann Munich Type I malt

HOPS

1 oz. (28 g) Citra, 13.1% a.a., mash
0.25 oz. (7 g) Citra, 12.7% a.a., FWH
0.34 oz. (10 g) US Magnum, 13.5% a.a. @ 60 min
0.25 oz. (7 g) Amarillo, 8.1% a.a. @ 15 min
0.25 oz. (7 g) Centennial, 8.1% a.a. @ 15 min
0.5 oz. (14 g) Amarillo, 8.1% a.a. @ 10 min
0.5 oz. (14 g) Centennial, 8.1% a.a. @ 10 min
1 oz. (28 g) Amarillo, 8.1% a.a. @ 0 min
1 oz. (28 g) Centennial, 8.1% a.a. @ 0 min
0.75 oz. (21 g) Citra, 13.1% a.a., dry hop 6 days
0.25 oz. (7 g) Galaxy, 14% a.a., dry hop 6 days
0.75 oz. (21 g) Citra, 13.1% a.a., dry hop 17 days

YEAST

2 packs Wyeast 3944 Belgian Witbier

ADDITIONAL ITEMS

8 oz. (227 g) rice hulls in mash
1 tablet Whirlfloc @ 15 min
½ tsp. yeast nutrient @ 10 min
1.5 oz. (43 g) fresh zest from various types of oranges @ 5 min
0.3 oz. (8.5 g) crushed coriander seed @ 5 min

WATER

Ca 62 ppm, Mg 9 ppm, Na 6 ppm, SO_4 106 ppm, Cl 53 ppm, HCO_3 0 ppm

BREWING NOTES

Prepare yeast with 2 packs in a 1.2 L simple starter fermented at 66°F (19°C) for 24 hours.

Using a 1.25 qt./lb. mash thickness (2.6 L/kg), start with a protein rest at around 122–124°F (50–51°C) for 15 minutes. Slowly heat the mash with direct heat to 152°F (67°C) and then hold for 60 minutes. Mash out with enough water to achieve a full-volume, no-sparge mashout, aiming for a temperature of 170°F (77°C), and hold 10 minutes.

Lauter and boil 90 minutes, adding kettle hops as indicated. After boil, chill to 68°F (20°C), pitch entire yeast starter, and aerate. Ferment at 68°F (20°C) for 3 days and slowly increase temperature to 72°F (22°C) by day 6. Add first dry hop addition, spund (if possible), and naturally carbonate to 2.6 vol. (5.2 g/L) CO_2.

Reduce temperature to 33°F (1°C) after reaching terminal gravity. At day 17, close-transfer beer onto the second dry hop addition. Package at day 26 or when beer tastes how you want it to.

RUNNERS-UP

Silver Medal: Jeff Poirot and Nicholas McCoy of Fort Worth, TX, Draft Punk, Specialty IPA
Bronze Medal: Ryan Stack of Saint Cloud, MN, Specialty IPA

Category 19

NEW ENGLAND IPA

191 entries

Keith Linn
Rogers, AR
Fayetteville Lovers Of Pure Suds (FLOPS)

"Big O!"
21B New England IPA

Batch volume:	5.5 US gal. (20.8 L)
Original gravity:	1.059 (14.5°P)
Final gravity:	1.012 (3.1°P)
Efficiency:	76%
Color:	7 SRM
Bitterness:	87 IBU (Tinseth)
Alcohol:	6.2% by volume

MALTS

9 lb.	(4.08 kg) Maris Otter pale malt
3 lb.	(1.36 kg) German wheat malt
12 oz.	(340 g) crystal malt, 20°L
8 oz.	(227 g) Briess Carapils malt
1.25 oz.	(35 g) acid malt

HOPS

1.5 oz.	(43 g) Dr. Rudi, 8.5% a.a. @ 45 min
1.25 oz.	(35 g) Citra, 13.2% a.a., whirlpool
1.25 oz.	(35 g) El Dorado, 13.7% a.a., whirlpool
2 oz.	(57 g) Citra, 13.2% a.a., dry hop on day 3
1 oz.	(28 g) Amarillo, 8.5% a.a., dry hop on day 3
2 oz.	(57 g) Citra 13.2% a.a., dry hop, keg
1 oz.	(28 g) Amarillo, 8.5% a.a., dry hop, keg

YEAST

1 L starter Wyeast 1318 London Ale III

ADDITIONAL ITEMS

orange zest

WATER

Adjust water using gypsum and calcium chloride to achieve a sulfate-to-chloride ratio of 1.5:1. Adjust sparge water to 5.8 pH using phosphoric acid.

BREWING NOTES

Mash at 155°F (68°C) for 60 minutes. Boil 45 minutes. Chill wort to 65°F (18°C), pitch yeast, and oxygenate with pure O_2. Ferment at ferment 68°F (20°C).

RUNNERS-UP

Silver Medal: Jason Lowery of Amherst, OH, Brewly Homebrew Club, New England IPA

Bronze Medal: Paul Arends of Rockford, MI, Brewsquitos Homebrewing Club, New England IPA

Category 20

STRONG AMERICAN ALE

157 entries

Charles Macaluso
St. Helens, OR
Oregon Brew Crew

"Fubarleywine"
22C American Barleywine

Batch volume:	6 US gal. (22.7 L)
Original gravity:	1.104 (24.6°P)
Final gravity:	1.020 (5.1°P)
Efficiency:	76%
Color:	11 SRM
Bitterness:	100 IBU
Alcohol:	11.4% by volume

MALTS & ADJUNCTS

18 lb.	(8.16 kg) Simpsons Finest Pale Ale Maris Otter malt
2 lb.	(907 g) Briess Golden Light liquid malt extract (boil)
1 lb.	(454 g) cane sugar (boil)
4.8 oz.	(136 g) crystal malt, 40°L
4.8 oz.	(136 g) crystal malt, 120°L
4.8 oz.	(136 g) caramel Munich malt
3.2 oz.	(91 g) Briess Carapils malt

HOPS

0.3 oz.	(7 g) Chinook, 12.8% a.a., FWH
1 oz.	(28 g) Chinook, 13% a.a. @ 60 min
1 oz.	(28 g) Columbus/Tomahawk/Zeus, 16.6% a.a. @ 60 min
1 oz.	(28 g) Centennial, 8.2% a.a. @ 15 min
1 oz.	(28 g) Simcoe, 10.2% a.a., whirlpool 20 min
1 oz.	(28 g) Amarillo, 6% a.a., dry hop 5 days
1 oz.	(28 g) Centennial, 8.2% a.a., dry hop 5 days
1 oz.	(28 g) Simcoe, 10.2% a.a., dry hop 5 days

YEAST

420 billion cells Imperial Yeast A18 Joystick

ADDITIONAL ITEMS

1 tablet	Whirlfloc @ 15 min
1.2 tsp.	yeast nutrient @ 15 min

WATER

Ca 228 ppm, Mg 7 ppm, Na 43 ppm, SO_4 265 ppm, Cl 217 ppm, HCO_3 132 ppm
Adjust mash with 75% phosphoric acid to a pH of 5.4.

BREWING NOTES

Single infusion mash at 149°F (65°C) for 60 minutes. Mash out for 10 minutes at 168°F (76°C). Lauter and then boil for 120 minutes. Add whirlpool hops post-boil and allow 20 minutes of contact time at 180°F (82°C).

Transfer chilled wort to fermenter at 60°F (16°C) and pitch yeast cold. Slowly raise fermentation temperature to 69°F (21°C) over 5 days and hold at 69°F (21°C) until fermentation is complete.

Add dry hops to fermenter when beer is just a few points from final gravity. Dry hop for 5 days. Rack to keg and cold crash when fermentation is complete. Force carbonate to 2.5 vol. (5 g/L) CO_2.

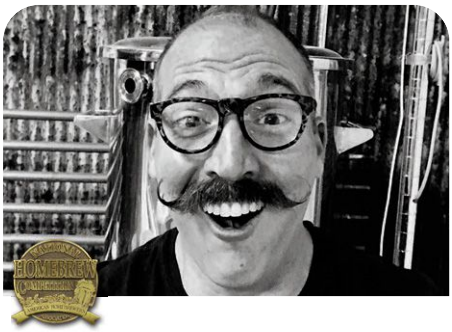
RUNNERS-UP

Silver Medal: Drew Kaiser of Wrightwood, CA, High Desert Home Brewers Anonymous, Double IPA
Bronze Medal: Kevin Olson of Raymore, MO, ZZHops Homebrewing Club, Wheatwine

Category 21

STRONG EUROPEAN LAGER

93 entries



Tré Haydel
Baton Rouge, LA
Bicycle Brew Club

"Googly Eis"
9B Eisbock

Batch volume:	30 US gal. (113.6 L)
Original gravity:	1.103 (24.4°P)
Final gravity:	1.029 (7.3°P)
Efficiency:	73%
Color:	23 SRM
Bitterness:	23 IBU
Alcohol:	10% by volume

MALTS & ADJUNCTS

35 lb.	(15.88 kg) BESTMALZ Munich malt
30 lb.	(13.61 kg) BESTMALZ Munich Dark malt
30 lb.	(13.61 kg) BESTMALZ Pilsen malt
8 lb.	(3.63 kg) BESTMALZ Vienna malt
8 lb.	(3.63 kg) crystal malt, 40°L
3 lb.	(1.36 kg) Bairds Dark Crystal malt
5.6 oz.	(159 g) Weyermann chocolate wheat malt
5.6 oz.	(159 g) Viking roasted wheat malt
3 lb.	(1.36 kg) dark brown sugar (boil)

HOPS

5 oz.	(142 g) Hallertauer Mittelfrüh, 3.3% a.a. @ 60 min
5 oz.	(142 g) Tettnang, 3.1% a.a. @ 60 min
1 oz.	(28 g) Warrior, 15.4% a.a. @ 60 min

YEAST

White Labs WLP833 German Bock Lager

ADDITIONAL ITEMS

3 tsp.	yeast nutrient

WATER

Carbon-filtered Baton Rouge water treated with Campden tablets and adjusted to Munich water profile: Ca 32 ppm, Mg 1 ppm, Na 109 ppm, SO_4 19 ppm, Cl 61 ppm, HCO_3 214 ppm.

BREWING NOTES

Mash at 150°F (66°C) 60 minutes, then mash out at 169°F (76°C) for 10 minutes. Fly sparge, dissolve brown sugar in wort, and boil 120 minutes, adding hops and yeast nutrient as indicated.

Chill to 50°F (10°C), oxygenate with stone for 90 seconds, and pitch yeast. Oxygenate again 24 hours after pitching yeast. Ferment 10 days and then allow temperature to rise to 65°F (18°C) for diacetyl rest.

Cool to 38°F (3°C) and lager for 2 months. Move to clear plastic carboys, partially freeze 40–50% of total volume, and siphon off beer. Keg, carbonate, and age for 1 year.

RUNNERS-UP

Silver Medal: Josh Strupp of Franklin, WI, Eisbock
Bronze Medal: Jeff Pond of Harrington Park, NJ, Jersey City Brew Club, Dopplebock

Category 22

STRONG UK ALE

120 entries

Kevin Shaw
Tracy, CA
Diablo Order of Zymiracle Enthusiasts (DOZE)

"Granny's Tipple"
17D English Barleywine

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.100 (23.8°P)
Final gravity:	1.026 (6.6°P)
Efficiency:	72%
Color:	23 SRM
Bitterness:	54 IBU
Alcohol:	10% by volume

MALTS & ADJUNCTS

8.75 lb.	(3.97 kg) Simpsons Golden Promise malt
4 lb.	(1.81 kg) Maris Otter pale malt
1.5 lb.	(680 g) invert sugar @ 10 min
12 oz.	(340 g) Simpsons DRC (Double Roasted Crystal) malt
12 oz.	(340 g) Briess Victory malt
12 oz.	(340 g) Briess white wheat malt
7 oz.	(200 g) crystal malt, 40°L
7 oz.	(200 g) crystal malt, 120°L
4 oz.	(113 g) Simpsons pale chocolate malt

HOPS

1 oz.	(28 g) Northern Brewer, 8% a.a., FWH
1.25 oz.	(35 g) Challenger, 5.7% a.a. @ 90 min
1.75 oz.	(50 g) East Kent Goldings, 6.2% a.a. @ 10 min

YEAST

338 billion cells	White Labs WLP007 Dry English Ale

ADDITIONAL ITEMS

1 tablet Whirlfloc @ 10 min

BREWING NOTES

Co-brewed by DOZE homebrew club. Recipe provided by Robbie Proctor.

Single infusion mash at 148°F (64°C) for 60 minutes, targeting 5.3 pH. Lauter then boil for 120 minutes, adding hops at prescribed times.

During the boil, make invert sugar by combining 1.5 lb. cane sugar, 1.5 pint (0.7 L) water and 1 tsp. 88% lactic acid. Bring mixture to a boil, raise temperature to 240°F (116°C), and hold for 90 minutes. Allow to cool.

Add Whirfloc and invert sugar to boil kettle 10 minutes prior to flameout. After flameout, chill immediately to 65°F (18°C) and pitch yeast.

Ferment at 66°F (19°C). On day 3, allow temperature to free rise to 68°F (20°C). and then slowly raise to 72°F (22°C) over a few days. Cold crash when fully attenuated and specific gravity stabilizes at 1.020. Transfer to keg and cold condition for two weeks. Force carbonate to 2.5 vol. (5 g/L) CO_2.

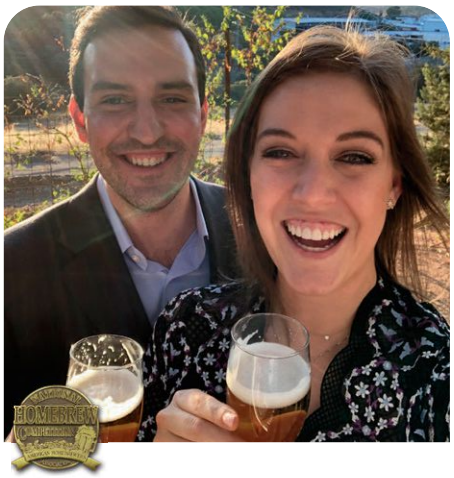
RUNNERS-UP

Silver Medal: Hank Keller of Cypress, TX, Foam Rangers Homebrew Club, Old Ale
Bronze Medal: Mark Beatty & Kim Theesen of Lincoln, NE, Lincoln Lagers, Old Ale

Category 23

IMPERIAL PORTER & STOUT

191 entries



Mandy Naglich & Wesley Carmichael
New York, NY

"Imperial Stout"
20C Imperial Stout

Batch volume:	6 US gal. (22.7 L)
Original gravity:	1.101 (24°P)
Final gravity:	1.027 (6.8°P)
Efficiency:	73%
Color:	44 SRM
Bitterness:	66 IBU
Alcohol:	10% by volume

MALTS & ADJUNCTS

15 lb.	(6.80 kg) Maris Otter pale malt
1 lb.	(454 g) Weyermann Carafa Special Type III malt
1 lb.	(454 g) flaked oats
1 lb.	(454 g) flaked wheat
1 lb.	(454 g) table sugar (boil)
8 oz.	(227 g) chocolate malt
8 oz.	(227 g) Great Western crystal malt, 120°L
8 oz.	(227 g) Great Western crystal malt, 40°L
8 oz.	(227 g) Great Western crystal malt, 75°L
8 oz.	(227 g) Dingemans Special B malt
4 oz.	(114 g) Weyermann acidulated malt

HOPS

3 oz.	(85 g) Magnum, 9.9% a.a. @ 90 min
1 oz.	(28 g) Fuggle, 4.5% a.a. @ 10 min

YEAST

407 billion cells	White Labs WLP007 Dry English Ale

BREWING NOTES

Mash 75 minutes at 150°F (66°C). Collect runoff, dissolve table sugar into wort, and boil 90 minutes, adding hops as indicated.

Chill wort to 66°F (19°C), pitch yeast, and ferment to completion, allowing temperature to rise to 72°F (22°C) by the end of fermentation.

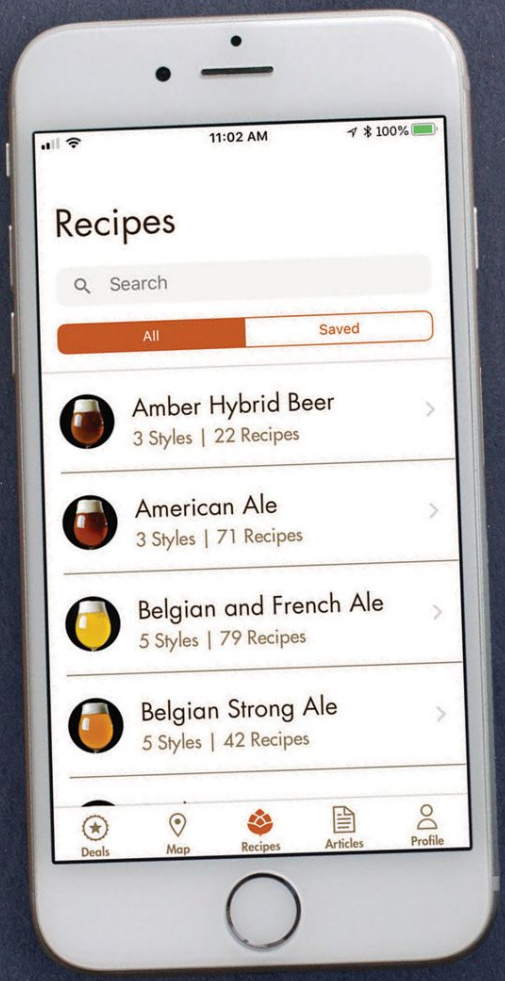
RUNNERS-UP

Silver Medal: Zack Rice of West Des Moines, IA, Iowa Brewers Union, Baltic Porter
Bronze Medal: Ryan Stack of Saint Cloud, MN, Cloudy Town Brewers, Imperial Stout

ROCK-SOLID RECIPES

Commercial craft beer clones

National Homebrew Competition Winners



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Category 24

SAISON

125 entries

Mark Messmer
Lake St. Louis, MO

"Saison"
25B Saison

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.057 (14°P)
Final gravity:	1.006 (1.5°P)
Efficiency:	82%
Color:	6 SRM
Bitterness:	26 IBU
Alcohol:	6.6% by volume

MALTS & ADJUNCTS

7 lb.	(3.18 kg) Dingemans Pilsner malt
2 lb.	(907 g) Dingemans Munich malt
8 oz.	(227 g) Dingemans Biscuit malt
8 oz.	(227 g) flaked oats

HOPS

1.5 oz.	(43 g) Styrian Goldings 3.5% a.a., FWH
0.5 oz.	(14 g) Styrian Celeia 2.9% a.a. @ 60 min
0.5 oz.	(14 g) Styrian Goldings 3.5% a.a. @ 5 min

YEASTS

1.8 L starter	Wyeast 3724 Belgian Saison
1 L starter	Omega Yeast OYL-500 Saisonstein added at 1.035 SG

ADDITIONAL ITEMS

1 tsp.	Fermax @ 10 min
1 tablet	Whirlfloc @ 10 min
3 tsp.	Biofine Clear at kegging

WATER

Ca 34 ppm, Mg 9 ppm, Na 28 ppm, SO_4 72 ppm, Cl 49 ppm

BREWING NOTES

Target a mash pH of 5.3. Mash in at 133°F (56°C), hold 20 minutes, and then raise mash to 147°F (64°C) and hold 60 minutes. Mash out at 168°F (76°C) and hold 10 minutes. Lauter, then boil for 75 minutes, adding hops, Fermax, and Whirlfloc as indicated.

Chill to 78°F (26°C) and pitch starter of Wyeast 3724. Raise temperature to 94°F (34°C) over 5 days and hold at 94°F (34°C) for 3 days. On day 9, cool to 72°F (22°C) and pitch starter of Saisonstein on day 10. By day 17, gravity should settle at 1.006. Cool by 9°F (5°C) per day to 36°F (2°C). Force carbonate to 2.5 vol. (5 g/L) CO_2.

RUNNERS-UP

Silver Medal: Timothy Lambert of Albuquerque, NM, Dukes of Ale, Saison
Bronze Medal: Steven Severn of Santa Ana, CA, Orange County Mash Ups, Saison

Category 25

BELGIAN ALE

145 entries

Fred Brophy & Paul Duddles
San Diego, CA
Mash Heads

"Listen to the Lion"
24A Witbier

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.051 (12.6°P)
Final gravity:	1.011 (2.8°P)
Efficiency:	70%
Bitterness:	14 IBU
Alcohol:	5.4% by volume

MALTS & ADJUNCTS

6 lb.	(2.72 kg) Pilsner malt
3 lb.	(1.36 kg) flaked winter wheat
3 lb.	(1.36 kg) unmalted spring wheat
1 lb.	(454 g) flaked oats
1 lb.	(454 g) acidulated malt

HOPS

1 oz.	(28 g) Hallertauer, 3.7% a.a. @ 60 min
1 oz.	(28 g) Sterling, 6% a.a. @ 5 min

YEAST

White Labs WLP410 Belgian Wit II

ADDITIONAL ITEMS

4 oz.	(113 g) Sumo orange zest @ 1 min
1 oz.	(28 g) Ethiopian grains of paradise @ 1 min
1 oz.	(28 g) fresh coriander seed @ 1 min

BREWING NOTES

Mash at 131°F (55°C) for 20 minutes and then 152°F (67°C) for 60 minutes. Boil 60 minutes, adding hops and spices as indicated. Begin fermentation at 65°F (18°C) and hold for 48 hours. After 48 hours, let temperature free rise to as warm as it wants to go. Bottle condition, aiming for 2.9 vol. (5.8 g/L) CO_2.

RUNNERS-UP

Silver Medal: George Moyer of Long Beach, CA, Trappist Single
Bronze Medal: Steve Petcavich of Novato, CA, Marin Society of Homebrewers (MaSH), Belgian Blonde Ale

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Category 26

STRONG BELGIAN ALE

246 entries

Daniel Kukuk
Grosse Pointe, MI
Motor City Mashers

"Kraken"
26D Belgian Dark Strong Ale

Batch volume:	8 US gal. (30.3 L)
Original gravity:	1.099 (23.6°P)
Final gravity:	1.013 (3.3°P)
Efficiency:	75%
Color:	25 SRM
Bitterness:	28 IBU
Alcohol:	11.6% by volume

MALTS & ADJUNCTS

17.5 lb.	(7.94 kg) Avangard Pilsner malt
4.5 lb.	(2.04 kg) Weyermann Munich Type I malt
1 lb.	(454 g) Briess Aromatic malt
9.6 oz.	(272 g) Dingemans Special B malt
2 lb.	(907 g) D-180 Candi Syrup @ 15 min
1.6 lb.	(726 g) table sugar @ 15 min

HOPS

1.2 oz.	(35 g) US Goldings, 5% a.a. @ 60 min
0.9 oz.	(25 g) Hallertau Magnum, 12.7% a.a. @ 60 min

YEAST

535 billion cells	Imperial Yeast B63 Monastic

ADDITIONAL ITEMS

1 tablet	Whirlfloc @ 10 min
2 tsp.	yeast nutrient @ 10 min
1.5 tsp.	gelatin

WATER

Ca 67 ppm, Mg 8 ppm, Na 5 ppm, SO_4 97 ppm, Cl 30 ppm, HCO_3 41 ppm
Adjust mash pH to 5.3 with 2.5 mL lactic acid.

BREWING NOTES

Mash at 148°F (64°C) for 60 minutes and slowly raise to mashout temperature of 169°F (76°C). Fly sparge, collect runoff, and boil 90 minutes (or until you're happy with the gravity), adding the first and only hop addition at the 60-minute mark. When 15 minutes remain in the boil, add table sugar and Candi Syrup. Add Whirlfloc and yeast nutrient with 10 minutes remaining.

Chill wort to 66°F (19°C) and pitch active yeast starter. Ferment at 67°F (19°C) and raise temperature to 73°F (23°C) as fermentation begins to subside. After full attenuation, cold crash and add gelatin. Transfer to kegs and force carbonate to 2.75–3 vol. (5.5–6 g/L) CO_2. This beer ages nicely, and it is great to bottle or can and enjoy as it matures.

RUNNERS-UP

Silver Medal: John Thompson of Encinitas, CA, Belgian Tripel
Bronze Medal: John Horton of Aurora, CO, Aurora City Brew Club, Belgian Dark Strong Ale

Category 27

EUROPEAN SOUR ALE

126 entries

Tony Schubert
Des Moines, IA
Iowa Brewers Union

"Blue Gueuze"
23E Gueuze

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.045 (13.3°P)
Final gravity:	1.004 (1°P)
Efficiency:	60%
Color:	4 SRM
Bitterness:	20 IBU
Alcohol:	5.3% by volume

MALTS & ADJUNCTS

4 lb.	(1.81 kg) German Pilsner malt
3 lb.	(1.36 kg) US wheat malt
2 lb.	(907 g) unmalted wheat
1.5 lb.	(680 g) unmalted barley
1.25 lb.	(567 g) Weyermann Munich Type I malt
8 oz.	(227 g) acid malt

HOPS

2 oz.	(57 g) aged hops, 2% a.a. @ 60 min
2 oz.	(57 g) aged hops, 2% a.a. @ 20 min

YEASTS

Fermentis SafAle T-58 (primary)
Brettanomyces claussenii/bruxellensis (barrel)

BREWING NOTES

This recipe has changed and evolved over the last 5 years, as the beer is in a 15-gallon solera barrel. Usually, I pull 5 gallons and top up with fresh beer every 4 months. A beer from this same barrel won gold in the American Wild Ale category at the 2018 NHC.

This recipe is closest to the more recent additions over the last year. I have increased the IBUs to try and arrest some of the lactic acid production. The bottles that were submitted to the competition this year were several years old.

Step mash from 130°F (54°C) to 158°F (70°C) over the course of 90–120 minutes. Sparge and then boil 2 hours. Chill and ferment with T-58 for 2 weeks in the low to mid 70s °F (low 20s °C).

Transfer to solera barrel and age 3–6 months. Add Brettanomyces to barrel a couple of times per year when transferring beer.

Carbonate high, 3–4 vol. (6–8 g/L) CO_2 and age another 2–3 months at cellar temperature, evaluating for tetrahydropyridines (THP), if any. Bottle and age another 2 years for Brett/hop development reminiscent of gueuze.

RUNNERS-UP

Silver Medal: Tony Economou of Chester, NJ, Garden State Homebrewers (GSHomebrewers), Historical: Gose
Bronze Medal: Ryan Stansbury of Johns Creek, GA, Covert Hops Society, Flanders Red Ale

Category 28

FRUIT BEER
(Silver Medal)

171 entries

Nelson Crowle
Brighton, CO
Indian Peaks Alers

"Pinot Grigio Oenobeer"
X3 Italian Grape Ale

Batch volume:	3 US gal. (11.4 L)
Original gravity:	1.085 (20.5°P)
Final gravity:	1.015 (3.8°P)
Efficiency:	72% (mash)
Color:	5 SRM
Bitterness:	12 IBU
Alcohol:	9.2% by volume

MALTS & ADJUNCTS
6.5 lb. (2.95 kg) Proximity Base Malt
96 fl. oz. (3.8 L) Mivino Italian Pinot Grigio grape juice concentrate, primary

HOPS
0.2 oz. (6 g) Magnum, 13.2% a.a. @ 60 min
0.15 oz. (4 g) Strisselspalt, 2.7% a.a. @ 20 min
0.1 oz. (3 g) Strisselspalt, 2.7% a.a. @ 5 min

YEAST
Lalvin EC-1118 *Saccharomyces bayanus*

ADDITIONAL ITEMS
Go-Ferm for rehydrating yeast

WATER
Tap water treated with Campden tablet to remove chloramine and phosphoric acid to start at pH 6.

BREWING NOTES
The Mivino Pinot Grigio juice concentrate in this recipe comes from a kit that yields 3 gal. (11.4 L) of wine when diluted 50:50 with water. The kit includes 1.5 gal. (5.7 L juice). This recipe uses half of that (0.75 gal., 2.8 L) for a 3 gal. (11.4 L) batch of beer.

Mash malt at 152°F (67°C) for 45 minutes using a thickness of 1.25 qt./lb. (2.6 L/kg), or about 8.13 qt. (7.7 L) of mash water. Vorlauf, lauter, and sparge with 7.12 qt. (6.7 L) sparge water. Pre-boil volume should be approximately 3 gal. (11.4 L).

Boil 60 minutes, adding hops as indicated. Post-boil volume will be approximately 2.25 gal. (8.5 L). Chill to 65°F (18°C), then add the grape juice concentrate to bring total fermenter volume to 3 gal. (11.4 L).

Microwave 4 oz. (118 mL) bottled water for 15 seconds to warm it to 100°F (38°C), then add yeast and Go-Ferm. Allow 30 minutes to rehydrate and pitch to wort. Oxygenate at 2 liters/minute for 30 seconds. Ferment at 65°F (18°C) for 17 days then transfer to a Corny keg. Chill to 40°F (4°C) and force carbonate to 2.5 vol. (5 g/L) of CO_2.

OTHER MEDALISTS
Gold Medal: Jack Lowney of Springfield, PA, Band of Media Brewers (The B.O.M.B.), Fruit and Spice Beer
Bronze Medal: Chico Milani of Florianópolis, Brazil, Acerva Catarinense, Catharina Sour

Category 29

SPICED BEER

135 entries

Matthew McIntosh
Lexington, KY

"Serrano Pale Ale"
30A Spice, Herb, or Vegetable Beer

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.056 (13.8°P)
Final gravity:	1.012 (3.1°P)
Efficiency:	72%
Color:	8 SRM
Bitterness:	44 IBU
Alcohol:	6% by volume

MALTS
8 lb. (3.63 kg) US 2-row pale malt
1.5 lb. (680 g) Briess Carapils malt
1.5 lb. (680 g) Weyermann Carared malt

HOPS
0.5 oz. (14 g) Citra, 12% a.a. @ 30 min
0.5 oz. (14 g) Citra, 12% a.a. @ 15 min
1.5 oz. (43 g) Citra, 12% a.a. @ 5 min
2 oz. (57 g) Citra, 12% a.a., dry hop

YEAST
1 L starter Fermentis SafAle US-05

ADDITIONAL ITEMS
3 fresh serrano chiles @ 5 min

BREWING NOTES
Mash at 151°F (66°C) for 60 minutes. Mash out at 170°F (77°C) for 10 minutes.
Boil 90 minutes, adding hops as indicated and adding 3 fresh serrano chilis, sliced in half lengthwise, 5 minutes before end of boil. Rapidly chill wort and transfer to fermenter, leaving chiles behind.

Pitch starter after aerating wort. Dry hop on day 8 and cold crash on day 15. Transfer to keg and carbonate.

RUNNERS-UP
Silver Medal: Marcos Sant'Anna of San Jose, CA, Silicon Valley Sudzers, Spice, Herb, or Vegetable Beer
Bronze Medal: Mike Thicke of Dayton, NV, 395 Homebrewers, Spice, Herb, or Vegetable Beer

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Category 30

SEASONAL SPICED BEER

47 entries

Mark Boelman
Loveland, CO
Weiz Guys

"Sleep Now in the Fire"
30C Winter Seasonal Beer

Batch volume:	11 US gal. (41.6 L)
Original gravity:	1.092 (22°P)
Final gravity:	1.024 (6.1°P)
Efficiency:	72%
Color:	13 SRM
Bitterness:	50 IBU
Alcohol:	9.4% by volume

MALTS & ADJUNCTS

15 lb. (6.80 kg) Maris Otter pale malt
12 lb. (5.44 kg) pale malt
4 lb. (1.81 kg) white wheat malt
2 lb. (907 g) Munich malt, 20°L
8 oz. (227 g) crystal malt, 40°L
8 oz. (227 g) chocolate malt, 350°L

HOPS

1.75 oz. (50 g) Columbus/Tomahawk/Zeus, 17% a.a. @ 60 min
2 oz. (57 g) US Goldings @ 15 min

YEAST

Inland Island INIS-001
Northern California Ale Yeast

ADDITIONAL ITEMS

yeast nutrient
10-gallon freshly dumped rum barrel
vodka
cassia cinnamon
3 Madagascar vanilla beans, scraped and chopped

WATER

Ca 52 ppm, Mg 5 ppm, Na 15 ppm, SO_4 30 ppm, Cl 79 ppm

BREWING NOTES

The base wort came from one of my homebrew club's sponsor breweries—Mash Lab in Windsor Colo.—via their amazing brewer Ryan Joy. The high-gravity second runnings came in around 1.080 from a triple-mashed single batch he was kind enough to share.

Mash at 152°F (67°C) for 60 minutes, targeting a mash pH of 5.4. Sparge to hit pre-boil volume appropriate for 90-minute boil. Run off one extra gallon (3.8L) into a second pot or kettle; start a side boil on this pot to transform the wort into a melanoidin-rich malt syrup—without scorching!—and add back to main boil.

Add plenty of oxygen, pitch a large yeast starter, and ferment for the first 3 days at 62°F (17°C). After 3 days, warm fermenter to 68–70°F (20–21°C) for a diacetyl rest. Then rack to a rum barrel to sleep for 6 months or until desired character is achieved.

Meanwhile, prepare two infusions in two Mason jars: one of cassia cinnamon and vodka and another of three scrapped, chopped Madagascar vanilla beans and vodka. Let those jars get happy while the beer ages. Dose your racked beer to taste, about 30 mL each per 5-gallon keg.

RUNNERS-UP

Silver Medal: Josh Baas of Elk Grove, CA, Diablo Order of Zymiracle Enthusiasts (DOZE), Winter Seasonal Beer
Bronze Medal: Mark Vick of White Stone, VA, James River Homebrewers, Winter Seasonal Beer

Category 31

SMOKE-FLAVORED BEER

95 entries

Andrew Mitchell
Richmond Heights, OH
Society of Northeast Ohio Brewers

"Lagerfeuer"
32A Classic Style Smoked Beer

Batch volume:	10 US gal. (37.9 L)
Original gravity:	1.055 (13.6°P)
Final gravity:	1.014 (3.6°P)
Efficiency:	72%
Color:	6 SRM
Bitterness:	19 IBU
Alcohol:	5.4% by volume

MALTS

11 lb. (4.99 kg) Pilsner malt
5 lb. (2.27 kg) beechwood-smoked malt
4 lb. (1.81 kg) Pilsner malt, home-smoked with alder wood
8 oz. (227 g) melanoidin malt

HOPS

1.5 oz. (43 g) Perle, 7.2% a.a. @ 60 min

YEAST

768 billion cells White Labs WLP833 German Bock Lager

WATER

Reverse osmosis water with additions of NaCl, $MgSO_4$, $CaSO_4$, $CaCl_2$

BREWING NOTES

Mash at 144°F (62°C) for 15 minutes and then raise to 152°F (67°C) over the course of 15 minutes. Rest at 152°F (67°C) for 30 minutes. No mash out.

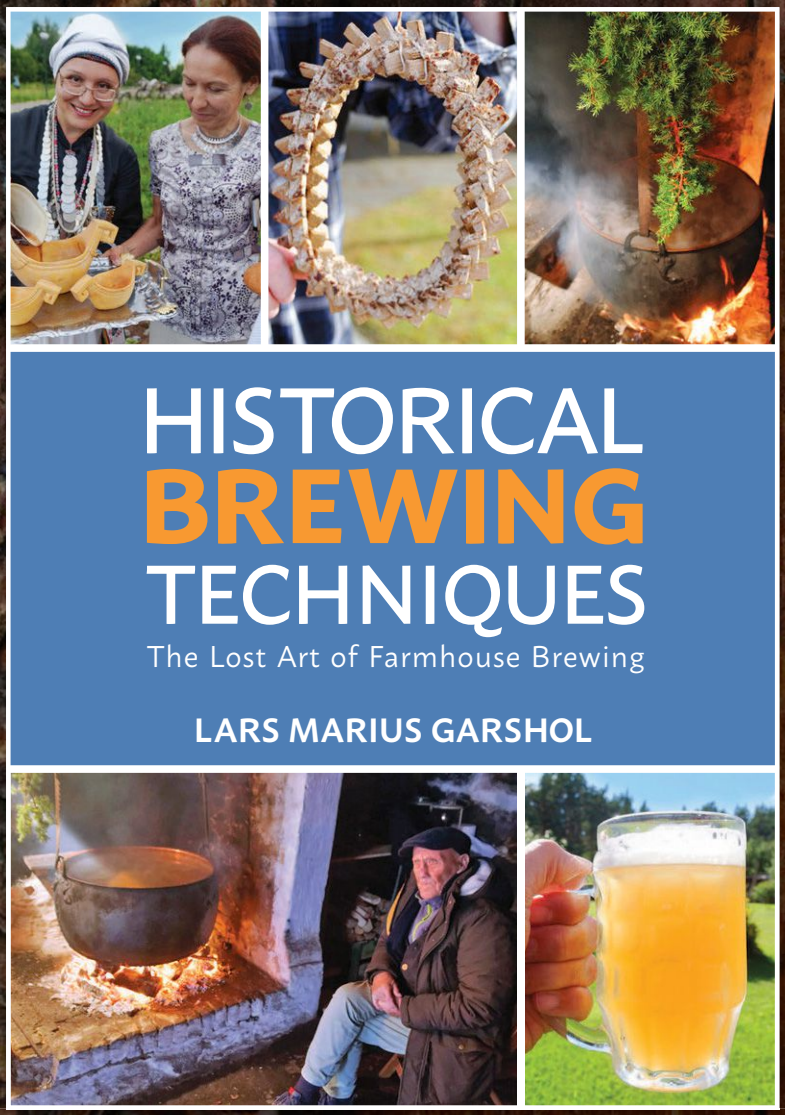
Boil 90 minutes, adding hops as indicated. Chill to 50°F (10°C), oxygenate with 0.5-micron stone for 30 seconds, and pitch yeast.

Ferment 4 weeks at 52°F (11°C). Raise temperature to 60°F (16°C) and hold 48 hours for diacetyl rest. Cool by 2°F (1°C) per day to a lagering temperature of 30°F (–1°C), about 2 weeks.

Rack off yeast and lager 8 weeks at 30°F (–1°C). Rack to a keg and force carbonate to 2.5 vol. (5 g/L) CO_2.

RUNNERS-UP

Silver Medal: David Byer of Hot Springs, NC, Mountain Ale and Lager Tasters (MALT) [NC], Rauchbier
Bronze Medal: Indy & Ric of Austin, TX, Austin Zealots, Piwo Grodziskie (Historical Beer)



"IT'S NOT AN EXAGGERATION TO SAY THAT *HISTORICAL BREWING TECHNIQUES* IS THE MOST IMPORTANT BOOK ON BREWING IN AT LEAST TWENTY YEARS."

—JEFF ALWORTH, AUTHOR OF *THE BEER BIBLE*

Category 32

WOOD-AGED BEER
(Silver Medal)

144 entries

Brian & Christy McBeth
Salem, OR
Cascade Brewers Society

"Three Witches"
33B Specialty Wood-Aged Beer

Batch volume:	8 US gal. (30.3 L)
Original gravity:	1.102 (24.2°P)
Final gravity:	1.031 (7.8°P)
Efficiency:	62%
Color:	17 SRM
Bitterness:	29 IBU
Alcohol:	9.6% by volume

MALTS & ADJUNCTS

35 lb.	(15.88 kg) Bairds 1823 Maris Otter malt
3 lb.	(1.36 kg) Gambrinus Munich Dark malt, 30°L
1.6 oz.	(45 g) Bairds black malt

HOPS

1.1 oz.	(31 g) Warrior, 17.7% a.a. @ 60 min

YEAST

Imperial Yeast A31 Tartan

ADDITIONAL ITEMS

Rye whiskey barrel

BREWING NOTES

First, source a fresh or full rye whiskey barrel. I was able to get a 15-gallon (57-liter) barrel from a local distiller and arrived just as they were emptying it. This batch is based on half of what was needed to fill the barrel, so I brewed it twice.

Mash at 156°F (69°C) for a full body. Pull 1.5 gal. (5.7 L) of first runnings to the boil kettle. Boil this down, stirring continuously, to yield a caramelized syrup. Add the remainder of the wort to collect a pre-boil volume of about 11 gal. (41.6 L) aiming for a finished wort volume of 8 gal. (30.3 L).

Add all the hops at 60 minutes, then a fining agent near the end of boil. Cool, transfer to fermenter, pitch yeast, and ferment at 68°F (20°C).

Brew recipe twice to yield enough beer to fill the barrel. When both batches have completed fermentation, transfer immediately to the freshly emptied barrel. Do not rinse or flush the barrel before use. After 2 weeks, transfer from barrel to kegs and age for 9 months or more. When you remember you have these kegs, sample to taste and put on tap. Or continue to age for another 2 years as I did.

OTHER MEDALISTS

Gold Medal: Dan Hansen of Everett, WA, Greater Everett Brewers League, Specialty Wood-Aged

Bronze Medal: Seven City Barrel Brewers of Chesapeake, VA, Seven City Brewers, Specialty Wood-Aged

Category 33

AMERICAN WILD ALE

145 entries

Nick Ladd
Seattle, WA
Homebrewers Guild of Seattle Proper

"Pew! Pew!"
28C Wild Specialty Beer

Batch volume:	8.25 US gal. (31.2 L)
Original gravity:	1.047 (11.7°P)
Final gravity:	1.004 (1°P)
Efficiency:	59%
Color:	3 SRM
Bitterness:	4 IBU
Alcohol:	5.6% by volume

MALTS & ADJUNCTS

10.75 lb.	(4.88 kg) Weyermann Pilsner malt
7.25 lb.	(3.29 kg) Briess unmalted wheat

HOPS

0.15 oz.	(4 g) Warrior, 15% a.a. @ 60 min

YEAST

Appropriated cultures from more than 10 commercial wild beers

ADDITIONAL ITEMS

1 tablet	Whirlfloc @ 15 min
¾ tsp.	yeast nutrient @ 10 min
2 oz.	(57 g) dried black limes (secondary)

WATER

Very soft Seattle water with 7 g $CaCl_2$, 5 g $CaSO_4$, and 1.5 g $MgSO_4$ in the mash. Lactic acid added to mash to adjust pH.

BREWING NOTES

Turbid mash with rests at 113°F (45°C) for 10 minutes, 136°F (58°C) for 5 minutes, 149°F (65°C) for 35 minutes, 162°F (72°C) for 20 minutes, and 170°F (77°C) for 10 minutes. Use hot water infusions to reach the first two rests; use turbid mash decoctions to achieve the remaining temperature changes. Boil 180 minutes.

The finished beer was a blend of three different batches, each of which was fermented with distinct cultures stepped up from wild commercial beers. Beer was then blended to taste and aged on 2 oz. of dried black limes (lightly crushed) into a total blended volume of 5 gal. (18.9 L).

RUNNERS-UP

Silver Medal: Brian Stephens of Portage, MI, Keepers of Craft, Wild Specialty Beer

Bronze Medal: Thien Le of Garden Grove, CA, Orange County Mash Ups, Wild Specialty Beer

Category 34

SPECIALTY BEER

72 entries

Alex Hannagan
Springfield, VA
Downright Obsessed Homebrewers (DOH)

"King of the Nubtars Imperial White Ale"
34B Mixed-Style Beer

Batch volume:	5.5 US gal. (20.8 L)
Original gravity:	1.078 (18.9°P)
Final gravity:	1.020 (5.1°P)
Efficiency:	68%
Color:	5 SRM
Bitterness:	20 IBU
Alcohol:	7.8% by volume

MALTS & ADJUNCTS

5 lb.	(2.27 kg) German wheat malt
4 lb.	(1.81 kg) US 2-row pale malt
4 lb.	(1.81 kg) German Pilsner malt
4 lb.	(1.81 kg) flaked wheat

HOPS

1 oz.	(28 g) Saaz, 4.2% a.a. @ 60 min
1 oz.	(28 g) Mandarina Bavaria, 8.5% a.a. @ 15 min
2 oz.	(57 g) Waimea, 17.5% a.a., dry hop 3 days

YEAST

1 packet	Lallemand Abbaye Belgian Ale Yeast

ADDITIONAL ITEMS

1 tsp.	lactic acid (mash)
1 lb.	(454 g) rice hulls, optional (mash)
5 tsp.	yeast nutrient (primary)
1 g	fresh ground grains of paradise @ 5 min
0.5 oz.	(14 g) fresh ground bitter orange peel @ 5 min
0.33 oz.	(9 g) fresh ground coriander seed @ 5 min

WATER

Ca 109 ppm, Mg 17, Na 13 ppm, SO_4 100 ppm, Cl 89 ppm, HCO_3 57 ppm

BREWING NOTES

Mash at 152°F (67°C) for 60 minutes and then heat to 168°F (76°C) and hold 10 minutes. Boil 60 minutes. After flameout, whirlpool 5 minutes. Chill to 70°F (21°C) or cooler and pitch yeast.

Ferment at 67°F (19°C) for 3 days, allow one day of free rise, and then 3 additional days at 72°F (22°C). Dry hop in primary. Do not cold crash. Keg and force carbonate to 2.6 vol. (5.2 g/L) CO_2.

RUNNERS-UP

Silver Medal: Mark Pennick of Denver, CO, The Brew Crew, Experimental Beer

Bronze Medal: Zacc Hutchings & Annastasia Hutchings of Plymouth, IN, Other Historical Beer

Category 35

TRADITIONAL MEAD

70 entries

Stephen Kilburn
Bonita, CA

"Leatherwood Mead"
35A Dry Mead

Batch volume:	3 US gal. (11.4 L)
Original gravity:	1.130 (30.2°Bx)
Final gravity:	1.023 (5.8°Bx)
Color:	3 SRM
Alcohol:	14% by volume

HONEY

4.4 lb.	(2 kg) leatherwood honey
1.1 lb.	(500 g) orange blossom honey
1.1 lb.	(500 g) raw sunflower honey

YEAST

Wyeast 4184 Sweet Mead

ADDITIONAL ITEMS

1 tsp.	Wyeast Beer Nutrient Blend, dissolved in 4 cups (950 mL) boiling water)

WATER

Bottled spring water

MEADMAKING NOTES

Prepare a yeast nutrient mixture by boiling 4 cups (950 mL) water and dissolving in 1 tsp. of yeast nutrient.

Stir honeys and about 2 gallons (7.6 L) water, together to reach the 3-gallon (11.4 L) mark on your fermenter. Add 1 cup (237 mL) of the yeast nutrient mixture. Check pH and adjust to between 3.7-5.5 if necessary. Add yeast and stir.

Ferment 10 days at 67°F (19°C). Check pH on days 2, 4, and 6, each time adding another cup (237 mL) of the nutrient mixture.

Rack to secondary and age 120 days at 63°F (17°C). Rack to tertiary and age another 90 days at 60°F (16°C). Bottle and store in a dark, cool place to condition. This mead ages well.

RUNNERS-UP

Silver Medal: Carvin Wilson of Mesa, AZ, Kansas City Bier Meisters, Semi-Sweet Mead

Bronze Medal: Donald & Stephen Boyle of Colonia, NJ, WHALES (Woodbridge Homebrewers Ale and Lager Enthusiast Society), Semi-Sweet Mead

Category 36

FRUIT MEAD
(Silver Medal)

105 entries

Matthew Mead
Grand Rapids, MI
Michigan Mead Coalition

"Michigan U-Pick: Montmorency Vs. Balaton"
36D Stone Fruit Mead

Batch volume:	6.5 US gal.
Original gravity:	1.178 (39.8°Bx)
Final gravity:	1.082 (19.8°Bx)

HONEY & FRUIT
24 lb. (10.89 kg) wildflower honey
20 lb. (9.07 kg) Balaton cherries
20 lb. (9.07 kg) Montmorency cherries

YEAST
Lalvin Bourgovin Rc212

ADDITIONAL ITEMS
Lallzyme EX-V
Opti-Red
FT Rouge Berry
Ferm-K
Go-Ferm
Kieselsol
Chitosan
Medium toast American oak cubes

WATER
Bottled spring water used for yeast rehydration

MEADMAKING NOTES
Freeze and then thaw cherries (measure Brix readings for each type) and place fruit into fermenter. Add Lallzme EX-V and Opti-Red according to instructions on packages. Wait 24 hours, add FT Rouge Berry tannins, and then add and blend honey on top of fruit. Make sure to take a Brix reading of your honey so you can estimate gravity calculations. At this point wait another 24 hours before pitching yeast to give honey time to blend well with the fruit and juice.

Rehydrate 25 g yeast with 33 g Go-Ferm and 650 mL spring water at 104°F (40°C). After 20 minutes, add an equal amount of must into the rehydrated yeast mixture and wait 20 more minutes to make sure yeast is active and happy. Repeat as needed to temper yeast to within 10°F (6°C) of must temperature. When that's the case, pitch yeast into must.

24 hours after pitch, begin yeast nutrient additions. For this mead, I just did one pitch of 14.3 g Ferm-K and skipped the TOSNA protocol.

At this point, monitor fermentation and punch the fruit cap down into the must daily. After a few weeks, as fermentation slows, rack fruit off the must and strain it through a colander. Press the fruit to squeeze out extra juice and then rack mead back into carboy with the remainder of the juice. Continue fermentation until complete. Clear the mead using finings (my choice is kieselsol, then chitosan an hour later—Super Kleer packages have both).

Let the mead rest a week to settle and clear. Once cleared, rack off once more to another clean, sanitized carboy and add 8 cubes of medium-toast American oak. Age until it achieves the flavor you like.

OTHER MEDALISTS
Gold Medal: Matthew Williamson of Bakersfield, CA, Melomel
Bronze Medal: Lincoln Mettler of Edgewood, WA, Stone Fruit Mead

Category 37

SPICE MEAD

47 entries

Jeremy Voeltz
Vancouver, WA

"Ode to Repas"
37A Fruit & Spice Mead

Batch volume:	3 US gal. (11.4 L)
Original gravity:	1.104 (24.6°Bx)
Final gravity:	1.002 (0.5°Bx)
Alcohol:	13.5% by volume

HONEY
9 lb. (4.08 kg) raspberry blossom honey

YEAST
10 g Lalvin D47

ADDITIONAL ITEMS
10 lb. (4.5 kg) pineapple chunks
5 lb. (2.3 kg) mango chunks
2 lb. (907 g) raspberry blossom honey for back sweetening
3 dried habanero chiles
Super-Kleer K.C.
potassium metabisulfite
potassium sorbate

MEADMAKING NOTES
This mead was inspired by a BOS winner at the 2017 Mazer Cup made by my good friend Tom Repas. Prepare yeast according to the guidelines at meadmaderight.com. After primary fermentation is complete; stabilize with potassium metabisulfite and potassium sorbate and rack onto 10 lb. (4.5 kg) pineapple chunks and 5 lb. (2.3 kg) mango chunks. After one month, rack to a clean carboy with 2 lb. (907 g) raspberry blossom honey to target a final back-sweetened gravity of 1.035 (8.9°Bx). Clarify with Super-Kleer K.C. per manufacturer instructions. Rack to clean carboy with 3 dried habanero chiles and an additional dose of potassium metabisulfite. Remove chiles at desired spice level and bottle.

RUNNERS-UP
Silver Medal: Scott Voak of San Diego, CA, QUAFF, Fruit & Spice Mead
Bronze Medal: Tom Repas of Hermosa, SD, Ale Riders Homebrew Club, Fruit & Spice Mead

Category 38

SPECIALTY MEAD

48 entries

Tom Repas
Hermosa, SD
Ale Riders Homebrew Club

"Dwójniak Figa"
38B Historical Mead

Batch volume:	12 US gal. (45.4 L)
Original gravity:	1.209 (45.8°Bx)
Final gravity:	1.041 (10.2°Bx)
Alcohol:	16.3% by volume

HONEY

36 lb.	(16.3 kg) dark wildflower honey
24 lb.	(10.9 kg) eastern buckwheat honey

ADDITIONAL ITEMS

30 lb.	(13.6 kg) dried Turkish figs
1 Tbsp.	cloves
1 tsp.	allspice
36 g	Go-Ferm (1.5 g per g of yeast)
43 g	DAP, divided into three 14 g additions
45 g	Fermaid K, divided into three 15 g staggered additions
22.8 g	Opti-White (1.9 g/gal.)
3.6 g	FT Blanc (0.3 g/gal.)

YEAST

24 g	Uvaferm 43

MEADMAKING NOTES

Day 1
Make a 1.120 (28°Bx) honey starter using Uvaferm 43 yeast rehydrated with Go-Ferm.

Day 2
In a honey mixing vessel (something large enough to hold the entire volume of must, but not your fermenter), prepare your honey must with dark wildflower honey and buckwheat honey to 1.209 (45.8°Bx). You'll likely need to use 5.5–6 gal. (20.8–22.7 L) water with the 60 lb. (27.2 kg) of honey. Later you'll slowly transfer this must to the fermenter (see below). Add Opti-White at 1.9 g/gal. and FT Blanc tannin at 0.3 g/gal.

Add the yeast starter to the vessel in which you intend to ferment the entire batch (primary fermentation vessel); then add a portion of the must to the yeast starter in the primary fermenter, about 10–20 percent of the must. Be aware that you will eventually need to have enough room in the fermenter for the figs, about 12 gal. (45.4 L) total.

After yeast activity is noted (in about 1–2 hours), add another 10–20% of the total must to the primary fermenter. Repeat until all of the honey must has been transferred from the honey mixing vessel to the primary fermentation vessel (within 24 hours).

Day 3
Add 14 g DAP and 15 g Fermaid K (dissolve both of these in a small amount of water first to prevent foaming), stir to mix thoroughly, and oxygenate 90 seconds using a stainless-steel diffuser.

Day 4
Add 14 g DAP, 15 g Fermaid K, and dried Turkish figs. Stir to mix thoroughly and oxygenate 90 seconds using a stainless-steel diffuser.

Day 5
"Punch down" figs that are floating on the surface to mix and prevent mold.

Day 6
Add 14 g DAP and 15 g Fermaid K, stir to mix thoroughly, and oxygenate 90 seconds using a stainless-steel diffuser.

Days 7–21
At least once a day, "punch down" figs that are floating on the surface to mix and prevent mold.

Day 22
Remove figs, and place into a wine press. Press to remove as much liquid as possible. There will be some volume loss. Even though I started with 12 gal. (45.g L) of must, I was down to 10 gal. (37.9 L) or so due to absorption by the dried figs. Alternatively, you could strain instead of press, but the volume loss will be much greater.

Day 22 to 3 months
Add the cloves and allspice (I eventually racked off these spices a few weeks later). Allow any additional fermentation to complete for a few more weeks. Uvaferm 43 is a strong and steady, but slow, fermenter, especially towards the end

If excess sediment forms, rack carefully off of any deep gross lees (fine lees are acceptable, though). By month 3, I had transferred most of the batch into a 8-gallon (30.3 L) neutral oak barrel. I reserved the extra leftover 2 gal. (7.6 L) for topping up later
Month 3 and beyond

Allow to age slowly, occasionally taking small samples to taste and make sure all is proceeding as expected. Top up if needed. Rack off, sulfite (if you choose to do so), and bottle when done.

Additional Notes
Because of the high sugar concentration, there is always a chance of a stuck fermentation. Monitor progress of fermentation closely—if there are any signs of stuck fermentation, be ready to address by adding yeast hulls and making up a restart batch.

I used a neutral oak barrel that had already been used for three previous batches. I was not trying to get much oak flavor; rather I wanted to achieve the micro-oxidation Polish Dwójniak is known for.

Alternatively, you could age in a bucket or carboy, but it may be more challenging to achieve the intentional controlled oxidation we are aiming for. The goal is to age in the barrel for at least 2 to 5 years before sulfiting and bottling (I have not yet added sulfites as this batch is still aging in the barrel).

Fining agents are typically not needed, as the tannins from the oak help with clarification, and the long-term aging itself allows the mead to become very clear over time.

If there are any signs of over-oxidation or VA (volatile acidity), remove from the barrel immediately and treat with high-dose sulfites at 50–100 ppm.

RUNNERS-UP

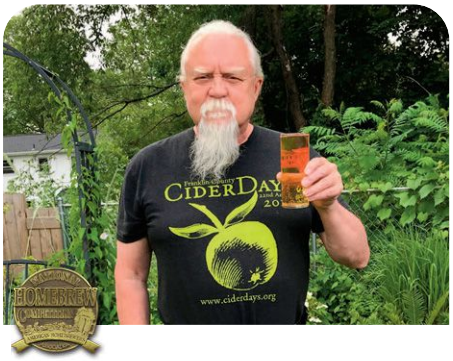
Silver Medal: Pavel Anisimov of Concord, CA, Diablo Order of Zymiracle Enthusiasts (DOZE), Historical Mead

Bronze Medal: Michael Wilcox of Wichita, KS, Kansas City Bier Meisters, Historical Mead

Category 39

STANDARD CIDER & PERRY

59 entries



Jeff Carlson
Grand Rapids, MI
PrimeTime Brewers

"PrimeTime Perry"
39D New World Perry

Batch volume:	5 US gal. (18.9 L)
Original gravity:	1.054 (13.3°Bx)
Final gravity:	1.004 (1°Bx)
Alcohol:	6.6% by volume

JUICE

2.5 gal.	(9.5 L) Keifer pear juice
2.5 gal.	(9.5 L) Blend of Shenandoa, El Dorado, and Harrow Sweets pear juices

YEAST

5 g	Lalvin QA23

CIDERMAKING NOTES

Rehydrate yeast with Go Ferm and add nutrients at start of fermentation. Ferment at 62°F (17°C) for 3 weeks. Secondary 4 months at 60°F (16°C). Force carbonate and bottle with a counterpressure filler.

RUNNERS-UP

Silver Medal: Paul Arends of Rockford, MI, Brewsquitos Homebrewing Club, New World Cider

Bronze Medal: George Turner of Warren, MI, Kuhnhenn Guild of Brewers (KGB), French Cider

Category 40

SPECIALTY CIDER & PERRY

75 entries

Pavel Anisimov
Concord, CA
Diablo Order of Zymiracle Enthusiasts (DOZE)

"California-style Fire Cider/Cidre de Feu"
40F Specialty Cider/Perry

Batch volume:	2.5 US gal. (9.5 L)
Original gravity:	1.065 (15.9°Bx)
Concentrated gravity:	1.160 (36.2°Bx)
Final gravity:	1.077 (18.7°Bx)
Alcohol:	11% by volume

APPLES

50 lb.	(22.7 kg) McIntosh
20 lb.	(9.1 kg) Spartan
20 lb.	(9.1 kg) Cortland

YEASTS

Lalvin DV10 (Champagne)
Lalvin 71B-1122 (Narbonne)

ADDITIONAL ITEMS

3 tsp.	pectic enzyme
4 tsp.	Fermaid O, divided into two 2 tsp. additions

Super-Kleer K.C. for fining

CIDERMAKING NOTES

Fire cider is similar to ice cider and is sometimes produced by the same cideries in Quebec. The goal is to concentrate the juice, but instead of freezing and thawing, it is concentrated by boiling. The method is similar to maple syrup production, but it's much more manageable since the starting gravity of apple juice is higher than that of maple sap. Apples like Spartan, Cortland, and McIntosh are traditionally used in Quebec's ice- and fire-cider production.

First, I pressed 90 lb. of apples to yield 6 gallons of juice at 1.065 (15.9°Bx) starting gravity. I then placed this juice into a pot on a gas stove, slowly brought it to a boil, and continued boiling on low heat. It took approximately 4.5 hours to boil down from 6 gallons to 2.5 gallons with a gravity of about 1.160 (36.2°Bx). The concentrated juice was left overnight to chill to room temperature.

At this point, I added the 3 tsp. pectic enzymes and divided the 2.5 gal. into two batches of 1.25 gal. each, which I fermented at 60˚F (16˚C) with DV10 (Champagne) and 71B-1122 (Narbonne) yeasts. I added 2 tsp. Fermaid O to each batch on the first day, and fermentation took approximately 4 weeks. The 71B batch finished at 1.080 (19.3°Bx), while the DV10 batch finished at 1.073 (17.7°Bx).

After aging the ciders for two years, I re-assessed both batches. The 71B batch turned out fruitier (estery), while the DV10 batch turned out more apply (neutral fermentation). After playing with blends, I settled on a straight 50/50 ratio, which yielded the best profile. The finishing gravity of the blended cider was approximately 1.077 (18.7°Bx) with 11% ABV.

Ciders were clarified with Super-Kleer K.C. and blended before bottling. This cider can be bottle conditioned. The oldest commercial fire cider I've seen was 11 years old.

RUNNERS-UP

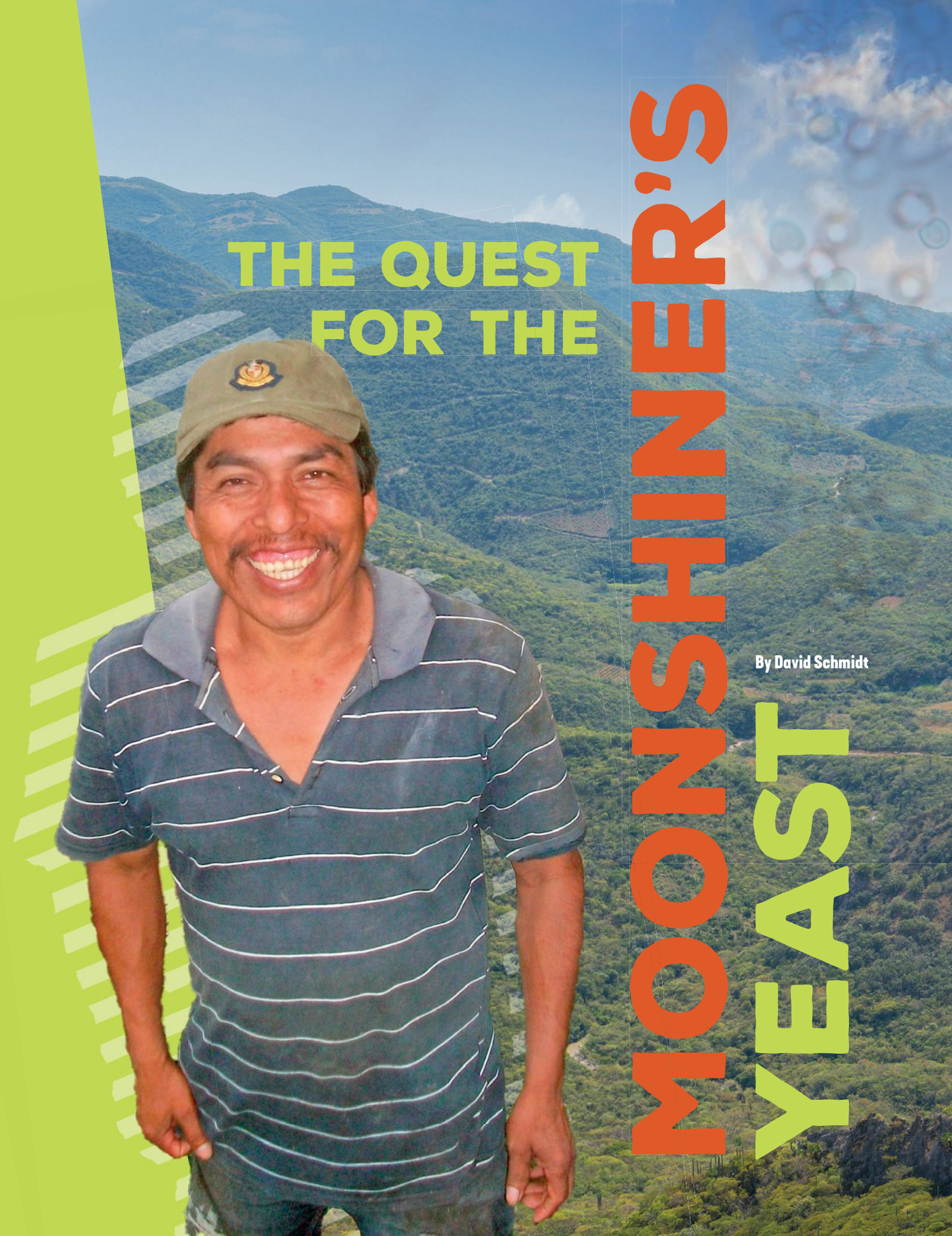
Silver Medal: Kevin Wagner of Stilwell, KS, Kansas City Bier Meisters, Specialty Cider/Perry

Bronze Medal: Bruce Wilson of Canoga Park, CA, Maltose Falcons, Ice Cider

ON THE WEB
Find past winners' homebrew recipes on our website @ HomebrewersAssociation.org/homebrew-recipes

THE QUEST FOR THE MOONSHINER'S YEAST

By David Schmidt



<< Domingo, the author's moonshiner friend.

YEASTS HAVE HAD A RELATIONSHIP WITH HUMANKIND SINCE OUR EMEARGENCE ON THIS PLANET. WE LOVE THEIR EXCREMENT, THE WASTE PRODUCTS THEY GIVE OFF AS THEY EAT SUGAR—ALCOHOL AND CARBON DIOXIDE.

—Stephen Harrod Buhner in
Sacred and Herbal Healing Beers: The Secrets of Ancient Fermentation

After hours of searching, I found my moonshiner friend in a secluded clearing surrounded by sugarcane fields. The lush forests of Oaxaca, southern Mexico, towered above us. Domingo crouched next to his still, tending the fire. He stood to greet me, his shirt and jeans stained with soot and sugarcane juice. I followed him over to the massive fermentation vats, where gallons of sugarcane juice slowly fermented into *tepache*.

I peered into the frothy surface of the fermentation vat, where bubbles expanded and burst in the morass, teeming with life. On the rim of the tank, grainy yeast residue glistened in the sunlight, millions of living spores.

This was what I had come for.

Ever since I met Domingo years before, I had been dying to know what strain of yeast he used to ferment tepache. It was an ancient mystery, passed on from generation to generation, back to Domingo's grandfather and possibly much further. This yeast might represent an unbroken chain, an organism connecting us to the ancient civilizations of Mesoamerica, used by brewers long before Europeans ever set foot on this continent.

I pulled out my pocket knife and scraped the rim of the tepache tank. Finally, after years of waiting, I had collected a sample of the moonshiner's yeast.

MEETING THE MOONSHINER

Long before I brewed my first batch of beer, I was fascinated by the magic of fermentation. Homebrewing goes back at least four generations in my family, all the way to our ancestors in Russia. My grandfather and uncle kept the tradition alive in California. We understood that beer was a living, breathing thing, a happy home for microorganisms to thrive and multiply.

Meanwhile, I felt a darker fascination with the idea of moonshine. While homebrewing was wholesome and family-friendly, moonshining was illicit and secretive, a sinister alchemy from shadowy hollers and valleys. I had read about illegal homemade liquor in history and folklore books but never thought I'd meet a real-life moonshiner.

That all changed when I first traveled to the remote mountains of Oaxaca. My encounter with a native Mazatec moonshiner would blossom into a friendship of several years and teach me volumes about brewing and the magic of yeast in the process.

The state of Oaxaca is home to some of Mexico's most diverse and ancient indigenous traditions. At least sixteen major languages are spoken there, the native tongues of civilizations that had developed astronomy and brain surgery long before Columbus first set sail. I had spent years in northern Mexico and spoke fluent Spanish, but I knew next to nothing about these ancient native cultures of Mexico. So in the summer of 2006, I headed south.

I had some friends who hailed from San Juan Coatzóspama, a small Mixtec indigenous community in the mountains. They invited me to visit their hometown, and I accepted. I spent my first weeks there adjusting to country living: chopping wood, working in the coffee fields, and learning the Mixtec language. When I heard of a moonshiner who worked downhill from town, I knew I had to pay him a visit. Two friends offered to walk with me down the mountain.

We left the cloudy, chilly climate of Coatzóspam and descended into the warmer lowlands. After hiking for an hour, the air grew humid and hot. We came to a vast sugarcane field and slowly navigated the towering cane as we simultaneously watched for snakes. I soon caught a whiff of two familiar scents: stale alcohol and fresh yeast working its magic.

Top to bottom:
The author next to the moonshine still, glass of tepache in hand. Bottle of fermented tepache, in all its pulpy, grainy glory.

We emerged in a clearing among the cane, with a breathtaking view of the surrounding mountains and valleys. A dozen men milled about the clearing; some drank from plastic cups while others cut sugarcane and fed the long stalks into a motorized press, squeezing fresh juice from it.

My friends introduced me to the man in charge of the operation. "Domingo," he said with a friendly handshake. Like the other people who lived in the lowlands, he was of Mazatec ethnicity. He had a kind face, a thick black moustache, and an affable twinkle in his eyes.

Domingo called out instructions to the laborers in Mazatec, then switched to Spanish for my benefit. "That's what we use to make *aguardiente*, the liquor." He pointed to a simple contraption that stood beneath a makeshift thatched roof. It was composed of two thick metal cylinders connected by pipes and tubes. A low fire burned beneath one tank that was black with soot. This was the still, referred to in Spanish as an *alambique*.

"But first, we need to ferment the sugarcane juice into tepache." He pointed out two massive plastic tanks at the other end of the clearing, each holding 1,100 liters of liquid. A few men dipped their plastic cups in to take a drink. "Before you can distill, you need to brew tepache."

"But people drink the tepache all by itself?" I asked.

"Sure. Lots of people who never touch the hard stuff love to drink tepache. It's a refreshing drink. Some people like the unfermented sugarcane juice as well, *la miel de caña*."

I was fascinated. I explained to him that, in the United States' moonshining tradition, fermented corn mash was not consumed on its own; it was only a means to an end. Tepache, on the other hand, sounded like a brew all its own.

"It's not just a drink," Domingo continued, "it's medicinal, too. It works great as a cure for any stomach troubles: indigestion, gas, stomachaches. Some people tell me they've treated dysentery with it. It's good for fatigue, too. If you're exhausted from working in the fields, it replenishes your strength. And some guys have even used tepache to treat sexual problems. Not me, of course," he winked, "but other men. Want to try some?"

He chuckled and led me over to the two fermentation tanks. I made the mistake of peering down into the brew. A thick layer of wasps swam in the foamy surface of the liquid, wriggling drunkenly.

"They like the sugar," Domingo said casually. He picked up an old plastic cup, pushed the wasps over to one side, and dipped it into the tank. He handed it to me. "Bottoms up."

I closed my eyes, put my trust in the power of yeast to triumph over evil, and took a swig.

It was delicious. The tepache had a delightfully sweet, yeasty flavor. Domingo explained that this batch was still at mid-fermentation, with an alcohol content of 5 or 6 percent by volume. I took another sip. The sweetness was wholesome and natural, nothing like the synthetic white sugar and artificial flavoring that go into so many commercial cocktails that I would never be caught ordering. But I could definitely get used to this sweet tepache. I wouldn't be ashamed to order it in a bar, even if it came in a big blue glass with a tiny umbrella.

After a few sips, I noticed the significant aftertaste of alcohol. I mentioned it.

"That's what's dangerous about this sweet stuff," Domingo said. "You don't really notice how much you're drinking. The real trouble is, it keeps fermenting in your gut. You could drink ten cups now and feel totally fine …. But tomorrow morning, you'll wake up drunk. It'll ferment in your stomach all night long. And you won't sober up until the afternoon!"

He then gave me a sample from the second tank, which contained fully fermented tepache. The flavor was more well-rounded and balanced, pleasantly dry with a fruity nose. It was similar to a very dry hard cider—like one made in Julian, Calif.—with one key difference: instead of an apple flavor, the tepache had a slight hint of pineapple. I could immediately taste the high alcohol content. This was a drink to be sipped slowly, not chugged.

"That's around 12 percent," Domingo explained. "It takes three or four days to fully ferment. We test it every now and then and take a look at it. When the color is like this"—he pointed to the dark, opaque honey color in my cup—"the tepache is ready. We'll start distilling this batch into liquor tomorrow."

"Where do you get the yeast to ferment it?" I asked.

"It's the same yeast from the previous batch. We always keep it active. We pitch some of the fermented tepache into a tank of freshly squeezed sugarcane juice, and it goes to work right away."

"How long have you been using that yeast?" I asked.

He shrugged. "Who knows. Decades? Centuries? I learned to brew tepache from my dad, and he learned it from his grandpa. This yeast goes back farther than I can remember."

I marveled at the thought. While distillation was a fairly modern phenomenon, people had been brewing in Mexico for millennia. "So it's possible that it is much older? Maybe it even goes back to those ancient cultures, before the Spanish ever got here?"

"Maybe." Domingo took a sip from his own cup. "Why do you know so much about yeast and fermentation, anyway?"

That was when I explained my own family's history of homebrewing. His eyes lit up as he realized he was talking to a kindred spirit. We discussed the similarities of brewing beer and tepache: variables in ferment time, temperature control, and excess sediment clogging up the tubes. We exchanged a knowing smile, a look of brewers' solidarity. We had momentarily

"THEY LIKE THE SUGAR,"

DOMINGO SAID CASUALLY. HE PICKED UP AN OLD PLASTIC CUP, PUSHED THE WASPS OVER TO ONE SIDE, AND DIPPED IT INTO THE TANK. HE HANDED IT TO ME. "BOTTOMS UP."

Top to bottom:
The author with moonshiner Domingo.
The author next to the moonshine still.

Moonshiner Domingo and one happy customer.

crossed all boundaries of time, land, and culture, linked by those first humans who had discovered the miracle of fermentation.

The summer rain started to fall, and I figured I should head back to Coatzóspam before the storm. We said goodbye, and my friends and I began the long hike back up the mountain. It was a terrifying, grueling hour-and-a-half march through the pitch-black Oaxacan night as we sloshed through puddles of mud, slipping and falling as we went. Unseen dogs attacked me, and I beat them off with a staff of sugarcane.

And yet, it was worth it. I had met Domingo the moonshiner. Somehow, I knew that our paths would cross again.

YEAST: SACRED AND NUTRITIOUS

Over the following seven years, I made a couple of short trips back to the mountains of Oaxaca. During one of those visits, I tracked down Domingo and brought him a copy of an article that I'd written about him. ("Viva la Fermentación: Ancient Homebrewing in Modern Mexico," *Zymurgy*, May/June 2011.) He proudly tacked it up on the wall of his home and gave me a bottle of aged fruit-infused moonshine as a gift.

Back in San Diego, as I continued to explore ancient brewing traditions from around the world, my fascination with Domingo's tepache grew. I found an invaluable source of knowledge in Stephen Harrod Buhner's book, *Sacred and Herbal Healing Beers: The Secrets of Ancient Fermentation*. Throughout human history, Buhner explains, fermentation was seen as a sacred phenomenon, one that transformed an already revered food or plant into a sacrament:

> *Eating such a [sacred] plant was an occasion of great reverence, but bringing it together with water and the magic of yeast ceremonially allowed the unique qualities of the sacred to come into the body. "Thus wine or some other fermented beverage becomes 'the supreme symbol of unity between human and divine.'" When taken in this context, human beings literally become "intoxicated with the god."*[2]

This idea of the divine and the human coming together in a creative act is common in ancient Mexican spirituality. Author Bonifaz Nuño describes it at length in his analysis of the ritual statue known as *Coatlicue*. The statue, which to many outsiders looks like a fearsome fanged monster, actually represents a sophisticated and complex theology, a belief in the renewal of the universe through divine and human cooperation.

This sort of co-creation is also what makes the magic of fermentation happen. Brewer's yeast, that organism that brings about the transformation, has been revered in cultures all over the globe. Buhner's book describes one Norwegian brewer who always took care to make an offering to the fermentation spirits inhabiting her brewhouse. Before pitching the yeast, she would pour some unfermented wort into the four corners of the building, "for the *corner crones*."

Beyond spirituality, however, yeast and fermentation were often revered for their medicinal properties, many of which have now been confirmed by modern science.

Much of the world's diet is lacking in B12 and C vitamins. Yeasts contain ample supplies of both and are the primary source of B-complex vitamins in many indigenous diets. Furthermore, yeasts synthesize B-complex vitamins. Yeast is high

in protein and contains the most glucose tolerance factor (GTF) of any food on earth. This acts with insulin to promote the body's use of glucose. It can reduce the need for insulin in diabetics and reduces serum cholesterol and triglyceride levels in the elderly. Yeasts also contain trace minerals—selenium, chromium, copper—that are found in many fruits and vegetables.

"Apart from any medicinal or nutritional qualities contributed by hops or other plants used in making traditional beers," Buhner explains, "the act of fermentation itself creates a powerful medicinal and nutritional beverage."[3] While breads and brews provide nourishment, the yeast used to make them contains its own nutrients that those foods lack. This may have influenced the Jewish tradition of eating unleavened bread during Passover. Along with its ties to the Exodus story, it may be a ritual form of fasting from the nutritious benefits of yeast.

The more I learned about the myriad strains of yeast that exist, the more I thought back to the tepache that Domingo brewed in Oaxaca. What variety might he be using? Could it go back hundreds of years? Could it be a strain that science hadn't even studied yet? My curiosity grew.

One brewer friend in California told me, "I hate to burst your bubble, David, but it might not be that exotic. Yeast is a tricky thing. It can migrate and reproduce easily. And remember, commercial beers used to be unpasteurized. For all you know, your moonshiner friend's yeast might have escaped from an old can of Bud in the 1940s."

The idea dismayed me. Bud yeast, in that artisanal Oaxacan tepache? I longed to know for sure. Finally, eight years after my first trip there, I met someone who could help me find the answers.

I developed a friendship with Rex Garniewicz, an anthropologist and homebrewer. We shared a natural interest in ancient, traditional brewing techniques, and experimented together with making Amazonian "spit beer" out of manioc root ("Would You Drink My Spit?", *Zymurgy*, May/June 2021). Rex worked at San Diego's anthropology museum, the Museum of Man, recently renamed the Museum of Us. When he told me the museum was preparing an exhibit about beer and fermentation, I asked if he might know anyone who could identify a strain of yeast. "Sure," he said, "I've got some contacts at White Labs."

It was settled. The next time I went to Oaxaca, I would try to collect a sample of the moonshiner's yeast and bring it back. The quest had begun.

IN SEARCH OF THE YEAST

My next trip to southern Mexico was in June 2013. Once I reached Mexico City, I washed out a couple of small shampoo bottles in which to store the yeast. I sent Rex an email before heading up into the remote mountains and asked for pointers on collecting a sample. He replied:

> *You can store it in a shampoo bottle or other bottle, but be careful that there is absolutely no soap in it. Soap will break down yeast cell walls and kill the yeast, even a small amount. This is why you wash your hands with soap! Yeast can also be collected in dry "spore form" from the crust around fermentation vessels that have been used for years. Scrape some off with a knife and stick it in a bag.*

He also added that if the bottles failed, human beards were great for transporting yeast spores. *Thanks*, I replied, *I'll stop shaving immediately. I'm headed off to the jungle soon, but I can't wait to try our spit beer when I get back to San Diego … if I don't get eaten by an anaconda first.*

The following week, I was off to the mountains of Oaxaca. As I took the small bus up to the town of Coatzóspam, I thought about the best way to collect the

yeast. I couldn't just *take* it, not something that ancient that had been handed down for generations. No, I would have to ask permission. And I would have to make sure the lab only *identified* the strain; it couldn't be sold or commercialized.

After I arrived in Coatzóspam, it took me a while to track down my moonshiner friend. Domingo often disassembled and relocated his still for security reasons. To be sure, making unlicensed liquor is not as risky in Oaxaca as it used to be in old Appalachia, where moonshiners were frequently killed by the authorities or by their competitors. Here in Mexico, the federal government has bigger fish to fry when it comes to illicit substances, and small-scale moonshiners are usually left in relative peace.

Still, it isn't exactly legal, either. I had to discreetly ask around town to figure out where Domingo was working. Finally, the townsfolk gave me some rough coordinates: his still was set up at such-and-such a bend in the road, just off the federal highway downhill from Coatzóspam, right before the road sign for La Soledad. After a couple weeks, I had enough information to track Domingo down. Added bonus: my beard had now grown out long enough to collect yeast spores in case the plastic bottles failed.

I hitched a ride in one of the pickup trucks that served as public transportation up and down the mountain. I hopped in the truck's bed with the other passengers, sat on one of the thin wooden benches, and surveyed the landscape out the back of the truck. I watched the scenery carefully, looking out for landmarks that would tell me we were approaching the hot lowlands. The unbroken mass of thick highland forest soon gave way to open fields of sugarcane and other crops. The air grew dense and humid, thick with tropical smells and lush greenery.

Finally, I spotted a tin roof just below ground level, with a telltale plume of black smoke escaping from it. That must be the place. I slapped the truck's tailgate to request my stop, paid my 10 pesos, and hopped out of the truck, backtracking to where I'd seen the smoke. Sure enough, there was Domingo's entire operation.

He had it set up in a small depression that had been dug out of the earth, just a couple of meters below ground level and tucked out of sight. The tin roof provided some cover and shelter from the rain. The tepache fermenting tanks, two massive plastic drums, stood in the far corner. Next to them stood the twin metal canisters that comprised the still, looking resilient and black with soot; a low fire burned beneath them. At the other end of the workspace, I spotted the motorized press used to squeeze the sugarcane, next to a towering pile of dry sugarcane husks.

One of Domingo's faithful drinkers was tending the fire under the still. He told me that the moonshiner was working in the sugarcane fields down the road. I walked in that direction until I spotted Domingo's familiar blue truck parked by the roadside. The din of tropical insects and birds was punctuated by the sound of machetes chopping cane. A young boy carried a bundle of it down the hill, and I asked him if he knew where Domingo was.

"Who, that asshole?" cried a man from up the hillside. "He died, man!"

The voice was familiar. I peered between the shafts of cane and saw Domingo up on the hillside, machete in hand, grinning through his thick black moustache. His clothes were deliciously stained with sugar sap. He hiked down to greet me, I helped him and his son load the heavy bundles of sugarcane into the truck, and we drove back up to his still.

"You know," he said as we unloaded the cane, "just the other day, I was saying, 'I bet that Schmidt guy is going to come back any day now.'" I've often heard this

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sort of thing in Oaxaca. Folks speak as if you have only been gone a couple of days, not years. Time flows differently up in the mountains.

We descended into the lowered clearing beneath the tin roof and walked across a spongy bed of old sugarcane husks. The familiar smell of yeast hung in the air and bees buzzed about lazily, drunk on the free sugar.

"Want to try some of the good stuff?" Domingo pointed to the still.

"Just a taste," I said. I had learned, on previous trips, to give moonshine a respectfully wide berth. "Then I'd better stick to the milder tepache. I need to get home in one piece."

He poured some of the freshly distilled liquor into the cut-off top of a plastic soda bottle. It was just as sweet and acrid and horrible as I had remembered it. Although he swore that it was only 20 or 25 percent ABV, it burned like fire going down. I wondered if it tasted extra harsh because it was fresh from his still. Another more disturbing possibility crossed my mind: in addition to ethanol, some homemade liquor contains toxic methanol, famous for making drinkers go blind.

Domingo chuckled at the faces I made and walked me over to the fermenting tanks of tepache. "Now this is more my speed," I said as I smelled the familiar yeasty aroma. He handed me an old, worn plastic cup, and I dipped it into the morass of the fermenting tank. The beverage had a tawny, dark color, with heavy sediment floating in it that gave the impression of liquid sandpaper: wild, gritty, and untamed. This sediment boded well—the yeast would be more likely to survive.

I took a sip. It was the fully fermented tepache, with its familiar, tart, cidery flavor, the tangy bite of live yeast followed by sweetness.

"This is the fully fermented tepache, so it's a little strong," Domingo said. "You can cut it with this." He gave me a plastic cup of fresh, unfermented sugarcane juice, which was refreshing after the tepache. A summer rainshower started to fall and beat a soft tattoo on the tin roof.

We stood around drinking with his son and his friend as we caught up on our lives. After a while, I casually peered back into the fermenting vat. I noticed the thick cake of yeast on top of the tepache and told Domingo how common this was with fermenting beer as well.

"You know what it's like to brew, Schmidt."

It was finally time to broach the subject. "Hey, Domingo," I said, "do you think I could take some of this yeast back with me? I'd like to try brewing a batch of beer with it myself."

"Of course." He smiled. "I remember what you said about your family making beer. Take it, from one brewer to another. Just tell me how the beer turns out in the end."

I pulled out my knife and scraped some residue off the tank's edge. I took a piece of paper from my pocket, used it to wipe the blade off, and stored the paper safely inside my shirt pocket.

Dry spores: collected.

The rain started coming down hard and pounded on the tin roof. I felt a pleasant buzz from the fourth cup of tepache and slowly drank in the tropical setting: the smoky smell of the distillery fire, the sweet sugarcane aroma, and the rain pouring down around us, shaking the flat, shiny leaves of nearby banana trees.

Domingo and his friend switched to aguardiente while I stuck to tepache. We toasted to each other, to the rain and the forest, to the ancient traditions of the Mazatec and Mixtec peoples. Eventually, Domingo's friend crawled on top of the pile of dry, pressed sugarcane husks and went to sleep. A couple bees quietly buzzed about his head. I had to admit it looked very cozy. Better judgement prevailed, though, and I told Domingo I should get back to Coatzóspam before dark. He agreed, and poured me a plastic bottle of tepache for the road. This would provide me with a liquid version of the yeast as well.

Sample #2: collected.

His son gave me a ride up to a tiny mountain roadside chapel that provided shelter from the rain. I stood inside the chapel, where I waited for a truck to come up the road. I lit two candles before the Virgin and the Cristo Negro crucifix as silent offerings of thanks for a successful day.

THE JOURNEY NORTH

Late that evening, four hours after I had hitched a ride back up the mountain, I still felt a lethargic buzz. The brew was actively fermenting inside my gut, and the bee and wasp larvae did me no favors. I got back to the house where I stayed in Coatzóspam, unrolled my *petate* mat, and conked out on the floor. I made several trips to the outhouse that night, each one more rushed and desperate than the last. Still, I had the yeast.

A week later, when I made it to a small internet cafe an hour away, I sent Rex a follow-up email.

> *I put some tepache into one of my shampoo bottles, but the tepache is still halfway through its fermentation, still bubbling and brewing. Is it recommendable to save the sample at this point, while the yeast is still alive, or let it finish fermenting and then bottle it? I'm going to try both. One difficulty with storing it now is, I keep having to uncap the bottle to let the air out. Any suggestions?*

Rex replied with instructions:

> *For storing yeast: As long as it will be reactivated within a week or so, you should let it fully ferment, then it will flocculate and accumulate on the bottom of a vessel. This "sludge" is live and dead yeast cells, which are best preserved under a layer of beer. For improvising an airlock: you can put a piece of saran wrap or any plastic over the top of a bottle and then use a rubber band to hold it on. As long as it is not too tight, air will pass through the rubber band. You can also poke a pin hole in it, but that is not as desirable, because as fermentation slows, contamination can get in if you don't cap it right away.*

I followed his instructions and tightly closed the bottles after they had finished fermenting. In addition to Domingo's dry and liquid samples, I had another sample from a neighboring moonshiner, Raymundo. I wondered if his yeast would differ at all from Domingo's.

The samples all survived the bumpy bus ride down the mountain, all the way to Mexico City. I kept them safely stashed in my backpack for the rest of my stay. Just for good measure, I saved my beard clippings in

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a plastic baggie as well. Nothing wrong with having a back-up plan.

The next challenge was getting the liquid yeast onto the airplane. Mexico's airport security wasn't quite as strict about liquids as the TSA, but they certainly wouldn't let me take a whole bottle of tepache onto the plane. How to get it past? I bought a plastic bottle of apple-flavored soft drink—similar in color to tepache—and washed it out. I then poured the thick tepache sediment into the soft drink bottle. I nonchalantly carried it in my hand as I walked through security, pretending to polish off my soda. No questions asked. The yeast survived the flight from Mexico City to Tijuana and, with a little luck, the same trick worked with US Customs.

The yeast had made it home.

Rex was out of town when I arrived, so I needed to brew some homemade tepache to keep the yeast alive. I bought some *piloncillo* brown sugar, also known as *panela*, the natural cane sugar sold in many Latin American markets in the form of hard, dark-brown cones. I dissolved it and pitched the yeast.

Of course, it wasn't the same as brewing tepache with fresh sugarcane. It lacked the tang of freshly harvested sugarcane, the fresh mountain air, and the subtle spice of dying wasp carcasses. Still, it did the trick of keeping the yeast alive. A couple of weeks later, I delivered it to Rex and waited to hear back from the lab.

NIGHT AT THE MUSEUM

A month after I returned from the mountains of Oaxaca, the Museum of Man held a reception to inaugurate their exhibit about brewing around the world, aptly named *BEERology*.

The anthropology museum lies in the heart of scenic Balboa Park. Built in the Spanish colonial style for the Panama-California Exposition in 1915, its profile is a San Diego landmark with its domed cathedral roof and Baroque facade. The iconic clock tower even appears in the Orson Welles film, *Citizen Kane*.

On that balmy September evening, the museum's central Rotunda Gallery was filled with patrons and donors, San Diego academics and journalists, community members, and, of course, brewers. Dozens of craft breweries offered samples at tables scattered throughout the museum, and the smell of hops and yeast filled the air. The soft lighting produced an intimate, cozy feel.

I walked around and examined the *BEERology* exhibit. Some of the display panels quoted my previous articles, in this magazine and others, about Mexico's traditional brews: the corn beer made by the Rarámuri natives of the Sierra Madre and the pulque made from agave nectar. I found Rex in the Rotunda Gallery. We shared an IPA at the foot of the massive Mayan stelae, recreations of an archaeological site in Guatemala.

I wondered whether Domingo's yeast dated all the way back to those ancient civilizations and asked Rex if he'd heard back from the lab yet. "No word yet, David. But I've sent the yeast in."

I looked up at the hieroglyphs, the stylized animal figures and deities. At the thought of such an ancient yeast, one that could possibly be new to Western science, I felt a renewed concern. "By the way, Rex, your friends who work at the lab—they're not going to, you know, *sell* the yeast. Are they?"

He laughed. "No, of course not. They're just analyzing it to identify the strain. Don't worry, nobody's going to accuse you of exploiting your friends in Oaxaca."

"Good to know."

"Unless you want to try and sell it, of course," he joked.

I replied with my best Indiana Jones impression: "That yeast is not for sale! It belongs in a museum!"

"Well, that can be our next big exhibit. 'Great Yeasts of the World: bring your own microscope to view them.'" We laughed and had another IPA.

A warm September breeze blew in from Balboa Park. The smell of yeast hung in the air. I couldn't wait to hear back from the lab.

THE MOONSHINER'S TEPACHE

In central and southern Mexico, the term *tepache* refers to a variety of drinks. In Mexico City, tepache is a sweet, refreshing, mildly fermented drink made from brown cane sugar and pineapple. It is served with ice on street corners and markets across the city.

In the Cañada region of the state of Oaxaca, where much of this story takes place, tepache refers to fermented sugarcane juice. It can be distilled into *aguardiente* liquor or enjoyed on its own as a delicious alcoholic beverage. The tepache that Domingo and other Oaxacan moonshiners brew is extremely simple and easy to make.

Perhaps the most interesting use of it, however, is as a vehicle for the nutritious probiotic yeast *Saccharomyces cerevisiae boulardii*. This yeast strain is available commercially from a wide variety of health product providers. Many people take it in tablet form to treat gastrointestinal issues and other health conditions.

To really get the authentic flavor of Oaxacan mountain tepache, I recommend using fresh sugarcane juice. You can use any available hardware to press the juice out of the cane: clamps, a rolling pin, whatever works.

Of course, the process is quite labor intensive. Alternatively, you can buy some *piloncillo* brown sugar, also known as *panela*. This is a form of natural cane sugar sold in many Latin American markets in the form of hard, dark-brown cones. For starters, plan on making one gallon (3.8 liters) of tepache. This recipe will give you roughly 5% ABV. Of course, as with many traditional brews, the exact chemistry may vary.

WARNING:

Novices should never try to distill their own liquor at home. Not only is it illegal, but it can be highly toxic.

INGREDIENTS

1 gal. (3.8 L) water
1 lb. (454 g) *piloncillo* (*panela*) brown sugar, or 16 fluid ounces (473 mL) of fresh sugarcane juice

YEAST

Saccharomyces cerevisiae boulardii

BREWING NOTES

Bring the water to a boil and then dissolve the hard sugar cones in it over low heat, or boil with sugarcane juice to sterilize. Cool and pitch the yeast. You can experiment with drinking tepache at varying levels of fermentation. Take a taste every few days. Whenever the palate is to your liking, go ahead and put it into the fridge, chill, and start drinking. Alternatively, unfermented fresh-pressed sugarcane juice is a delicious drink on its own, especially when served over ice.

THE VERDICT: THE YEAST IS IDENTIFIED AT LAST

Months had passed since the museum reception, and I was getting nervous. I started to wonder if my yeast samples had survived the journey to the lab. Had they been dead on arrival? Should I have sent them my beard clippings, too?

Finally, in February of the following year, I heard back from Rex. He forwarded me the email from White Labs: the results were in. They had been able to identify two of the three samples, one from Domingo and the other from Raymundo, the neighboring moonshiner. The samples were labeled *Sample #1: Oaxaca (A)* and *Sample #3: Oaxaca (X)*.

I took a deep breath before scrolling down to the description of the yeast. I closed my eyes, then read the text:

Both samples were identified as Saccharomyces cerevisiae boulardii.

I exhaled with disappointment. So the yeast already had a name. It wasn't an undiscovered strain after all. I had been hoping to have uncovered a "new" strain. In my more egotistical moments, I confess, I had halfway hoped that they would name it after me. (Although the more ethical decision would have been to name it after Domingo, or to give it a Mixtec or Mazatec name.) But no, this strain already had a name. Science already knew about it. It was old news.

I called Rex about it. "Yes, David, it's a tropical yeast, a substrain of the basic brewer's yeast, *Saccharomyces cerevisiae*. It's very common all over the world."

"Common." I sighed. "So much for making an exciting new discovery."

"Look at it this way, though. This is a hearty, tropical strain that occurs naturally. It's not some commercial yeast that snuck into the tepache recently. They've found this strain all across Asia and Latin America. So who knows how long the moonshiners of Oaxaca have been using it? It might go back to those ancient civilizations after all."

The author Bruhner had described this hearty nature of naturally occurring yeasts and how often they were used by brewers around the world.

> *Many yeasts have been domesticated. They have been used by brewers and bakers for a very long time—as humans measure time. But like medicinal plants, the wild species are more potent, less liable to weaken. If you compare the power of a wolf—look into its eyes—with a dog, you can see the difference between the wild and the domesticated.*[4]

My romantic ideas about the yeast's history were still plausible. This could hypothetically be the same strain used by ancient brewers. How long had it been used to ferment sugarcane juice in the mountains of Oaxaca? We would never know for sure.

As I read up on this strain, I found one intriguing characteristic: its medicinal properties. They were identical to those that Domingo had attributed to his tepache.

Saccharomyces cerevisiae boulardii has been proven to support gastrointestinal health. It has been used in studies to treat antibiotic-related diarrhea, HIV-associated diarrhea, and gastroenteritis.

The strain was first identified in 1923 by French scientist Henri Boulard, who found it on the skin of lychee and mangosteen fruits. Boulard noticed that people in Southeast Asia would chew the skins of these fruits to alleviate the symptoms of cholera. Part of *boulardii*'s potential lies in the fact that it produces proteins that inhibit pathogenic bacteria and their toxins. To this day, holistic medicine practitioners prescribe the yeast to patients as a probiotic.[5]

One scientific study, published in the *World Journal of Gastroenterology* in 2016, examined the medicinal uses of this yeast: "Effects of *Saccharomyces cerevisiae* or *boulardii* yeasts on acute stress induced

intestinal dysmotility."[6] The study found that the yeast did, indeed, mediate the effects of stress on the small and large intestines of adult mice.

Buhner's book explains how *Saccharomyces* yeasts, in general, were used as medicine in the ancient world. They promoted normal bowel movements, rejuvenated patients after a long illness, and even formed an antiseptic poultice for wounds and ulcers. "*Saccharomyces* yeasts were used in standard practice herbal medicine in the nineteenth and early twentieth centuries and were considered stimulant, tonic, nutritive, antiseptic, and laxative."[7]

Buhner further explains that the process of fermentation itself can unlock the medicinal properties of both a yeast and a brew's other ingredients. I thought back to the medical problems that Domingo mentioned—indigestion, gas, stomachaches, even dysentery—which could be treated with tepache. They were the exact same conditions that modern science treated with this strain of yeast. The yeast itself is medicine.

I haven't managed to tell any of this to Domingo. After my 2013 trip, my visits to the mountains of Oaxaca became less frequent. Domingo constantly moves the location of his still, and I haven't succeeded in tracking him down yet. I long to share the news with him, to tell him how his ancestral knowledge of tepache's medicinal benefits has been confirmed by Western science. But then again, I don't know if he'd even care.

I imagine telling him this "exciting news," as he nods and smiles politely. And yet, for him, it wouldn't even be news. I didn't "discover" anything—folks in the mountains of Oaxaca have always known about tepache's health benefits. This brew is medicinal, plain and simple. And Domingo doesn't need some distant stranger in a lab coat to confirm what his ancestors have known for centuries.

I am eternally indebted to Domingo for all that he taught me about tepache and moonshining. Many thanks as well to Rex Garniewicz, PhD, for his expertise during this and other brewing adventures.

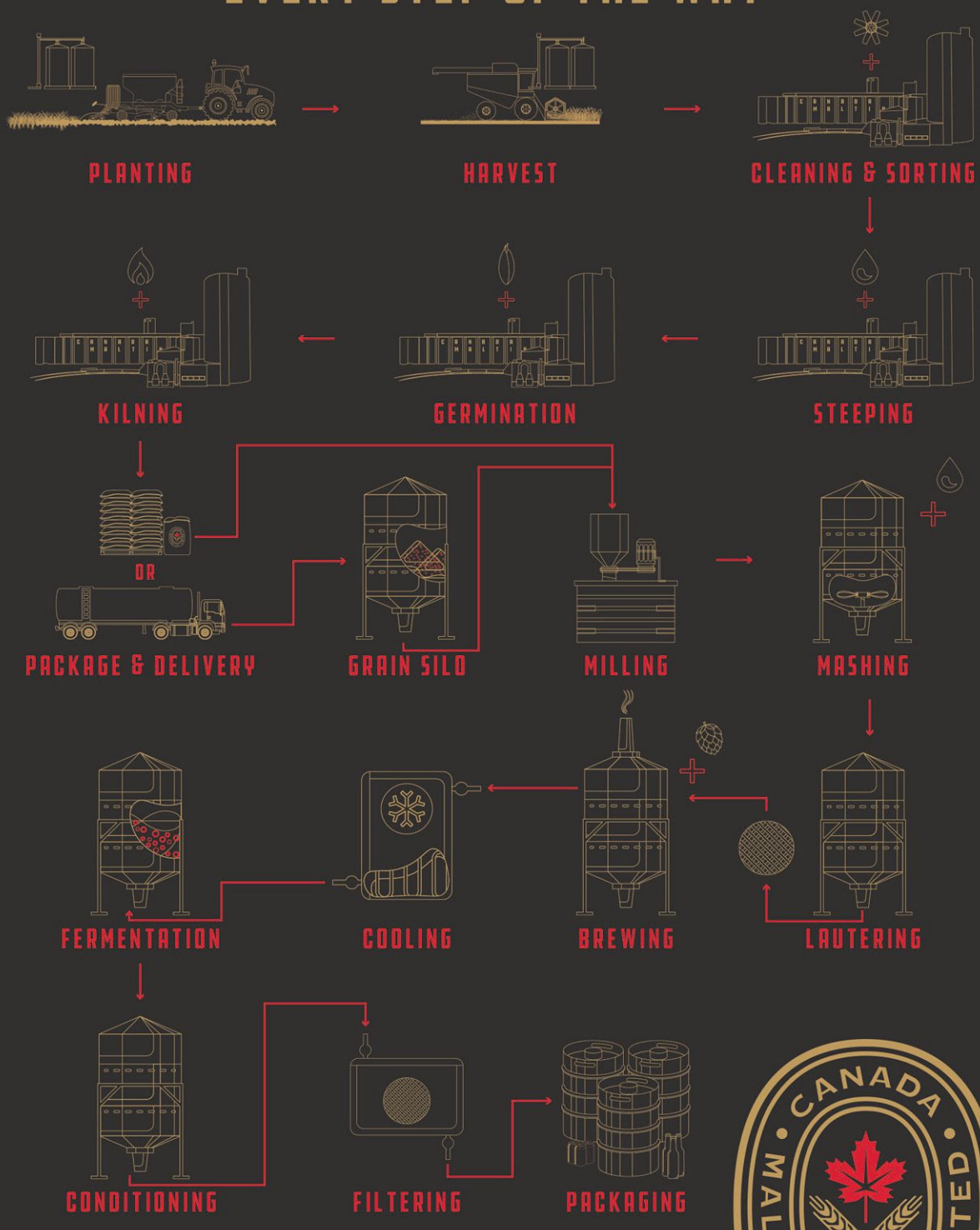
RESOURCES

1. *Sacred and Herbal Healing Beers: the Secrets of Ancient Fermentation*. Stephen Harrod Buhner, Siris Books, Boulder, CO 1998. p. 63.
2. ibid, p. 160.
3. ibid, p. 70
4. ibid, p. 63.
5. Wikipedia article on Saccharomyces boulardii: https://en.wikipedia.org/wiki/Saccharomyces_boulardii
6. *World Journal of Gastroenterology*, "Effects of *Saccharomyces cerevisiae* or *boulardii* yeasts on acute stress induced intestinal dysmotility." Christine West, Andrew M Stanisz, Annette Wong, and Wolfgang A Kunze. Accessed online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5192264/
7. Buhner, p. 71.

David J. Schmidt is an author, homebrewer, and multilingual translator who splits his time between Mexico City and San Diego, California. Schmidt speaks twelve languages and has spent the past fifteen years traveling throughout rural Mexico, Latin America, and Africa in search of ancient folk brews, making him a veritable Indiana Jones of home brewing. (Think Harrison Ford with a beer gut.) He can be found on Facebook, YouTube, and Twitter with the handle "Holy Ghost Stories," or via the website HolyGhostStories.com.

FROM FARMER TO BREWER

WE NURTURE DEEP-ROOTED RELATIONSHIPS EVERY STEP OF THE WAY



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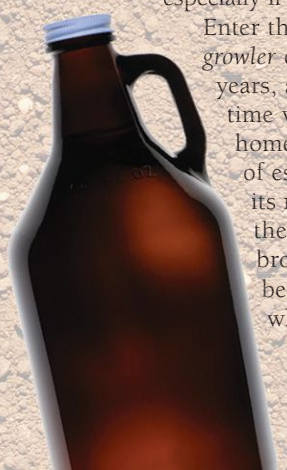
GOING MOBILE

THE LATEST GROWLERS MOVE YOUR HOMEBREW IN STYLE

By Bryan Cohen

Despite being available almost anywhere in the world, beer is a surprisingly delicate beverage. Contamination, ill-timed oxygen exposure, temperature, and sunlight can all affect the flavor and experience of your homebrew, sometimes within minutes.

Since many of us drink where we brew (it is called "homebrew" for a reason), these agents may not be much of an issue most of the time. But take your beer somewhere? That's something else. Beer may have been given to us by God to make us happy, as Ben Franklin is said to have quipped. But transporting it? God left us on our own, especially if you keg your beer.



Enter the trusty growler. The term *growler* dates back more than 100 years, and some say it refers to a time when to-go beer was carried home in buckets and the sound of escaping CO_2 gave the vessel its name. Today's interpretation, the trusty moonshine-jug-shaped brown glass bottle, is common because it is cheap and somewhat serviceable: brown glass minimizes the effect of light, while the lid keeps carbonation for a couple of days.

Despite its current popularity, glass was not always the first choice for growlers. The original pails used to transport beer in the late 1800s were often galvanized or enameled. Glass and stoneware jugs were sometimes used as well. After the repeal of Prohibition, breweries and bars switched to waxed cardboard containers, similar to the material used for modern-day milk cartons. But in the 1960s, industry consolidation, better shipping techniques, mass production, and most states' allowing the sale of pre-packaged beer after hours made the idea of "take-out" draft beer fade away.

That is, until an addendum was introduced to H.R. 1337 by Senator Alan Cranston of California. A group of Golden State homebrewers lobbied Cranston to introduce legislation that exempted homebrew from federal taxation. Cranston slipped the legislation into H.R. 1337, →

a transportation bill, which Jimmy Carter signed in October, 1978. The number of breweries in the United States soon exploded, quadrupling in a decade, with almost all of that growth coming from new regional craft breweries.

One of those regional microbreweries was a small Wilson, Wyo., suds factory called Otto Brothers Brewery, now known as Grand Teton Brewing. Unable to fund a bottling line, brothers Charlie and Ernie Otto revived the idea of a lidded pail for take-home beer and updated it by using a clear glass jug on which their logo was silk-screened. The modern growler was born. Except for changing from clear to brown glass, the jug would stay little changed for the next 25 years.

KEEPING YOUR BEER FRESH

Yet, the challenges of transporting beer and keeping it healthy remained. Growlers were great if you took the jug straight home, put it in the fridge, and enjoyed the beer within a couple of days, but the beer still continued to lose carbonation and change flavor during those 48 hours. Cleaning the growler didn't eliminate all of the bacteria, and after a pint or two was poured, the remaining carbon dioxide would diffuse into the headspace and flatten the beer further.

Most homebrewers follow processes that minimize risks. Sanitized surfaces, controlled fermentation temperatures, and limited exposure to oxygen during and after fermentation all help control the introduction of off flavors. But beer is a finicky beast.

"All beer is susceptible to microbiological and physical degradation," said Tim Yarrington, professor of the Pennsylvania College of Technology's Brewing and Fermentation Science program affiliated with Penn State. "It's like bread from a bakery. Once exposed, you open the door to instability."

Bacteria, heat, and oxygen are just a few of the villains. Take note, hazy IPA brewers—the more ingredients in your beer, the greater the instability. And all beer benefits from an oxygen-free environment after fermentation.

"Up to the point of dispensing, if we've done our brewing job well, we can say that the beer is very low in oxygen." But, Yarrington warns, "as soon as beer is dispensed, it is exposed to oxygen, and like rust on a car, changes begin. The oxygen begins to fire up all sorts of biochemical reactions which degrade your beer."

These reactions cause new flavors, many of them unpleasant, in addition to changing the color of the beer or the sense of freshness.

When your beer begins to warm, or if it is shaken during transport, even more reactions can occur. Toss in a little bit of sunlight, and it becomes clear that the common brown glass growler isn't popular because of its effectiveness at warding off these flavors but for a simple, other reason: it's cheap.

You didn't spend hours on a batch of milkshake IPA infused with the essence of Algerian tangerine, willow leaf, and fondante d'automne pears only to have it turn mustardy during a growler fill, did you? Of course not. But if you've upgraded to kegging, how can you make your beer portable?

A variety of modern growler solutions have come to market over the last few years with huge technology advancements in steel and vacuum chambers. Today's reusable growler is now a versatile super-jug, with many keeping beer cold for more than a day. Far more convenient than the tin pails of old, these new growlers are better for the environment and go where glass is not allowed, like beaches or pools.

More than a dozen growler manufacturers now offer products that are as perfect for your beer as they are for your lifestyle. To help you pick, we've done the hard work of testing growlers from a variety of manufacturers.

We evaluated growlers according to a number of categories, including style and appearance; durability and maintenance; features and options; temperature control; carbonation control; flavor preservation; and overall value. Five testers were provided with score sheets that were tallied into an overall score for each growler, with extra weighting applied to core categories of temperature, carbonation, and flavor control.

We quickly realized that overall total scoring and ranking were inappropriate, as the growlers varied tremendously in the purposes for which they were designed. For example, some growlers were designed to maintain a cold temperature for one or two days without refrigeration. That's great, but if you don't need that feature, it's meaningless.

We used the 64-ounce (1.9-liter) versions of all growlers for testing. Each one was filled using our Yellow Rose SMaSH recipe, a nice light ale that pairs Mosaic hops and pale malt with WLP001 California Ale yeast. The balance of the beer and slight fruitiness of the hops helped us determine slight differences in maltiness or hop flavor and nose.

Growlers were filled using a growler attachment on a standard kegerator faucet at 42°F (6°C). Ambient room temperature was a constant 72°F (22°C). The beer was carbonated to 2.3 volumes, or about 5.6 grams per liter of CO_2.

HOW TO FILL YOUR GROWLER

Growlers are among the most neglected pieces of homebrewing equipment. They get banged around and abused, left in sweltering in car trunks, tossed onto passenger floorboards, thrown into boat storage bins, and left in scorching sheds with the camping gear. And if you rinsed your growler out after the last use, it's probably cleaner than most.

Don't expect your local brewpub to give your nasty growler a special cleaning, either. At best, they might rinse it with water before filling it up with their brew. Purchasing one of the growlers in this article is a start, but if you don't control the three T's—time, temperature, and tidiness—your beer is going to get funky, and we don't mean that in a George Clinton Parliament-Funkadelic way, either.

How you pour your beer into a growler is as important as which growler you use. Besides maintaining good sanitation and cleanliness, growler filling should follow a certain technique, using supplies most homebrewers already have on hand.

Growlers with stainless steel linings can be cleaned using half a tablespoon of One-Step and then sanitized with Star San before filling. Using a sanitized growler extension tube is a good option to minimize oxidation as it allows for bottom-up growler fills. The tube should extend to the bottom of the growler so that as you fill it, the beer coming out of the end of the tube is not exposed to open air. Filled properly into a quality growler, your beer should encounter minimum oxygen without the need to invest in a counterpressure filler.

Beer changes flavor the instant it is poured, but if you follow these tips, it should stay fresh for some time.

KEEP IT CLEAN

The same rules that apply to a perfect beer glass also apply to your growler. Use a no-fat or no-oil based cleaner, otherwise CO_2 that should stay in your beer may cling to the sides or be released too quickly, and you are likely to get off-flavors. StarSan works well, and Bar Keeper's Friend is great for stainless-steel lined growlers. Be sure to clean the lid, too. Use the proper ratio of cleaner to hot water to avoid detergent flavor or residue.

STORAGE

After cleaning, it's important to let your growler dry upside down to remove excess water. Leave the lid off and store it upright so the water flows down the lid threads and dries completely. Use a stainless steel wire basket to hold your growler and allow for maximum air circulation—storing on a towel, rubber durian pad, or other smooth surface can slow the drying process and may transfer unwanted odors to the growler, especially if it is lined with glass.

FILLING

Sanitize your growler and then chill it. Do not put it in the freezer, which could cause ice crystals to form. Twenty minutes in the fridge with the lid off should be fine. Next, connect a cleaned, sanitized growler filler tube to your beer faucet. The filler should have a tube 12 to 18 inches in length. Now, drop the serving pressure. Typical serving pressure on your tank is likely 10 to 15 psi, but low and slow is the way to go with a growler fill since you want to keep as much CO_2 in the beer as possible.

RDWHAHB

This has less to do with you chilling out and more to do with dropping the residual pressure in the keg and the beer line. It will also chill the beer lines, faucet, and growler fill tube, as well as helping purge extra foam. While enjoying a quick sip of your brew, purge your growler with CO_2 to reduce the amount of oxygen.

POUR

Put the tube in your cleaned and sanitized growler, running it all the way to the bottom of the vessel. Open the beer faucet, and let the good times flow. Keep the tube at the bottom even after the foam forms so your growler fills from the bottom up. Pause and let the foam settle and then top off gently, leaving about 5 percent headspace (typically the growler "neck") empty.

CAP AND STORE

Add the cap while the foam is at the top or spilling over, as this minimizes oxygen from getting in. Wrap the growler in a towel or sleeve, or store it in the shade during transport. Well-insulated growlers might maintain temperature for hours, but the more original chill you can maintain, the better. Once you arrive at your destination, store in a fridge or cooler.

OPEN AND ENJOY

Homebrew dispensed into one of the reviewed growlers will keep for 24 to 48 hours unopened and refrigerated. Once opened, drink the contents within 24 hours.

THE WELL-ROUNDED GROWLER

STANLEY CLASSIC EASY-POUR GROWLER

$55.00

Stanley is a name synonymous with rugged, time-tested camping gear. Since 1913, Stanley has been making indestructible equipment that is so well built, you might end up handing down the Classic Easy-Pour growler to your grandchildren.

Made from 18/8 stainless steel and featuring double-wall insulation, the Easy-Pour growler kept beer cold longer than any other model tested. The large handle makes pouring easy, and the clasp-style lid keeps your suds under pressure. This growler is designed for durability, and it feels sturdy enough to be dropped from an airplane (please don't try this), so tossing it in your trunk is nothing.

The lid stays attached while pouring, which is a tad inconvenient for left-handers as it blocks the view. Colors are limited to three choices—Nightfall Blue, Hammertone Green, or Matte Black—but at $55.00, this growler does everything you need it to do.

THE STYLISH GROWLER

MIIR 64 OZ. GROWLER

$54.95

"That looks like a growler Patrick Bateman would have in his apartment," my co-tester Chris said, referring to the uber-chic character portrayed by Christian Bale in *American Psycho*. Indeed, this unit from Seattle-based MiiR easily gets the nod for being the coolest-looking growler among those we tested.

While most other premium growlers have industrial or campground styling, the MiiR wraps your craft brew in haute couture that would look just as good holding 64 ounces of mimosas as it would your precious homebrew. Available in powder-coated black or white, the MiiR has a Grolsch-style clasp lid that smartly stays open and out of the way.

But style does not sacrifice performance. Our tests showed the MiiR's double-wall insulation kept beer consumption-cold for 12 hours to within a degree of the top models. At $54.99, the MiiR is an excellent choice for brewers looking for a multi-purpose growler with a modern touch, no sets of crunches or videotapes required.

THE HIP GROWLER

HYDRO FLASK NSULATED BEER GROWLER

$64.95

If you have a teenage daughter, you've probably heard of Bend, Oregon's Hydro Flask, whose water bottle became a sticker-emblazoned, must-have accessory for teens in 2019. The powder-coat exterior of this growler makes it easy to grip, but the twist-off cap was disappointing. The handle, a small loop along the mouth, made pouring from a full container a two-handed affair. The growler is only available in basic colors: white, black, and stone (grey).

Where the Hydro Flask excels, though, is temperature control. This growler warmed very little over the first 8 hours and only a couple of degrees after 12 hours. In our tests, the 18/8 stainless steel and double-wall insulation outperformed all other growlers in temperature maintenance. If you are looking for a sturdy growler for the long-haul, the Hydro Flask would be a good choice.

THE GROWLER THAT DOES IT ALL

DRINKTANKS 64 OZ. INSULATED GROWLER

$74.95

The DrinkTanks 64 oz. Growler is an absolute beast. CEO Nicholas Hill said that his company is very particular about quality and versatility, and it shows. The growler features 18/8 passivated stainless steel, ensuring you do not get a funky metallic taste in your first few uses. Double-wall insulation maintains temperatures as well as the Stanley and Hydro Flask models, and the dual-bale style clasp lid holds pressure. The handle is easy to grasp and pour, requiring only one hand. The coated exterior does not gather condensation and is available in eight different colors.

But this is more than just a growler; it's a platform. For $44.95 you can add the keg cap accessory kit, which transforms your growler into a mini-keg by equipping it with a party tap and a handheld CO_2 injector. The keg cap is interchangeable with the company's 64- and 128-ounce growler models. Although it is pricier than many other growlers, the robust engineering and optional accessories make the DrinkTanks model a solid choice.

→

Brew This!

YELLOW ROSE SMASH

AMERICAN IPA

Recipe courtesy of Bryan Cohen.

Batch volume:	5.5 US gal. (TK L)
Original gravity:	1.063 (15.4°P)
Final gravity:	1.012 (31.°P)
Efficiency:	73%
Bitterness:	51 IBU
Color:	6 SRM
Alcohol:	6.8 % by volume

MALTS

13 lb. (5.90 kg) Dingemans Pale Ale malt

HOPS

0.75 oz. (21 g) Mosaic, 12.25% a.a. @ 60 min
0.25 oz. (7 g) Mosaic, 12.25% a.a. @ 30 min
0.75 oz. (21 g) Mosaic, 12.25% a.a. @ 20 min
0.25 oz. (7 g) Mosaic, 12.25% a.a. @ 0 min
1 oz. (28 g) Mosaic, 12.25%, dry hop 5 days

YEAST

White Labs WLP001 California Ale

BREWING NOTES

Mash with 5.9 gal. (22.4 L) water at 150°F (66°C) for 75 minutes. Sparge with 4.9 gal. (18.5 L) of 168°F (76°C) water to collect 7.4 gal. (28 L) of pre-boil wort. Boil 60 minutes, adding kettle hops as indicated. Chill wort to 65°F (18°C) and ferment until specific gravity stabilizes at or near 1.012 (3.1°P). Dry hop 5 days before bottling or kegging.

EXTRACT VERSION

Replace pale malt with 9 lb. (4.1 kg) pale liquid malt extract and 4 oz. (113 g) corn sugar. Dissolve extract and sugar completely in hot water, top up to desired boil volume, and proceed with recipe as above.

Photos © Stanley; Hydro Flask; DrinkTanks; Craft Master Trailkeg; Getty/cherezoff (dirt); Getty/rasiija (glass growler); courtesy of Bryan Cohen

THE ULTRALIGHT GROWLER

CRAFT MASTER 64 OZ GROWLVELLER LIGHTWEIGHT PRESSURIZED GROWLER

$89.00

Don't let the price startle you. The Craft Master unit is a super-lightweight growler and mini-keg system built into one unit. Tucked inside the cap is a liquid-tight CO_2 regulator with an easy-to-read external pressure gauge, which maintains carbonation during storage and pouring. A ball-lock adapter and party tap make dispensing as fun as it is versatile. The unit also comes with a standard screw tap if you decide to go sans carbon dioxide.

The low price point makes the Growlveller the least expensive growler-with-tap and CO_2 system we've seen. The unit suffers, though, in temperature maintenance. A lack of insulation means this unit warms up fairly quickly. Still, if you want something that's easy to transport and you can keep it chilled, the Growlveller is a great pick. Plus, the party tap makes opening the fridge and pouring a fresh cold one a treat.

THE BUY ONCE, CRY ONCE GROWLER

TRAILKEG'S HALF GALLON GROWLER

$49.99/$179.99

TrailKeg's 64-ounce growler enters the competition with a great price ($49.99) and solid performance. The slim profile, solid lid construction, and durability received good marks, but the small handle and lower-performing temperature maintenance cost some points. Used just as a growler, the TrailKeg model is a good performer for a fair price.

But where the TrailKeg rocks is if you get the full bore package, which turns the growler into a mini-keg system that includes a solid-metal lid, ball-lock faucet (which, unlike the party tap attachments of other growlers, does not leak as much), and a dual-stage regulator. You can use the unit as a standalone mini-keg or connect it easily to a Corny-keg-equipped kegerator to serve your beer.

This isn't a cheap option, as the full mini-keg package and a 64-ounce growler will set you back $179.99. But if you want one unit that does it all, this is it.

Bryan Cohen is a full-time geek and part-time beer and travel writer living in Philadelphia. He has been published in Zymurgy, Growler, *the* Wall Street Journal, *and* Beer Connoisseur. *He can be reached at bryancohen1@mac.com.*

Relax, Don't Worry, Have a *Homebrew!*

That mantra rings as true today as it did in 1978 when Charlie Papazian cofounded the American Homebrewers Association with Charlie Matzen. Homebrewing can be as simple or as complex as you want to make it, but the first step is always to relax and not worry.

To aid your relaxation and help you get the most out of *Zymurgy*, here are some standard assumptions and methods for our recipes. Of course, when a recipe says to do something different, follow the recipe. But you can always fall back on these general tips to brew great beer.

ON THE WEB
For more detailed info, head over to HomebrewersAssociation.org and dive into our How to Brew resources.

BREWING WITH *ZYMURGY*

MAKING WORT

Most recipes in *Zymurgy* offer an all-grain version and a malt extract or partial-mash alternative. Pick the procedure you prefer and prepare some wort! Some recipes might include a water profile. If you can't (or don't want to) deal with water chemistry, don't worry about it: just go ahead and brew! Extract brewers needn't add minerals to water.

Malt Extract Recipes
Making wort from malt extract is easy.

- Crush specialty grains, if any.
- Place milled grains in a mesh bag and tie it off.
- Steep bag of grains in 150–160°F (66–71°C) water for 30 min. in your brew pot.
- Remove bag of grains from the pot.
- Fully dissolve extract in the hot, grain-infused water (if there are no specialty grains in the recipe, you can skip directly to this step).
- Top up with water to your desired boil volume. (Leave some room for foam!)

All-Grain and Partial-Mash Recipes
Unless otherwise specified, all-grain brewers can conduct a single-temperature infusion mash with these parameters:

- Water/grain ratio: 1.25 qt./lb. (2.6 L/kg)
- Mash efficiency: 70%
- Mash temperature: 150–153°F (66.7–67.2°C)
- Mash duration: 60 minutes

Partial-mash recipes make the same assumptions but use a smaller amount of grain and augment the wort with malt extract.

BOILING

No matter how you get here, everyone loves adding hops.

- Boil time is 60 minutes unless otherwise stated.
- Boils are assumed to be the full batch volume, but you can also boil a concentrated wort and top up with water in the fermenter.
- Hop additions are given in minutes before the end of the boil.

Brew Lingo

Every field has specialized language, and homebrewing is no different. Here are a some of the key terms, abbreviations, and acronyms you'll find throughout *Zymurgy*.

AA – alpha acid

ABV – alcohol by volume

AHA – American Homebrewers Association

BBL – US beer barrel (31 US gal or 117.3 L)

BIAB – brew in a bag

BJCP – Beer Judge Certification Program

Chico – American ale yeast, AKA Wyeast 1056, WLP001, SafAle US-05, and others

CTZ – Columbus, Tomahawk, and Zeus: interchangeable high-alpha-acid hops

DME – dry malt extract

DMS – dimethyl sulfide, an off flavor similar to canned corn or cooked vegetables

DO – dissolved oxygen

EBC – European Brewing Convention (beer color)

FG – final gravity

FWH – first wort hops, added to the boil kettle as it fills with sweet wort after mashing

HERMS – heat exchange recirculating mash system

HLT – hot liquor tank

IBU – international bittering unit

LHBS – local homebrew shop

°L – degrees Lovibond (malt color)

LME – liquid malt extract

LTHD – Learn to Homebrew Day

MLT – mash-lauter tun

NHC – National Homebrew Competition

OG – original gravity

°P – degrees Plato (density of wort or beer)

RIMS – recirculating infusion mash system

RO – reverse osmosis, a water purification process that removes most dissolved ions

SG – specific gravity (wort/beer density)

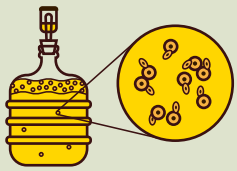
SMaSH – single malt and single hop

SMM – S-methyl methionine, precursor to dimethyl sulfide (DMS)

SRM – Standard Reference Method (beer color)

FERMENTING & CONDITIONING

Pitch yeast into chilled, aerated or oxygenated wort.



- Use twice as much yeast for lagers as you do for ales.
- Ales ferment at 60–70°F (15–20°C). Lagers ferment at 45–55°F (7–13°C).
- Condition ales at room temperature or colder for a week or two.
- Condition lagers at close to freezing for several weeks if you can (traditional but not required).

BOTTLING & KEGGING

If you bottle,

- Use 1 oz. of dextrose (corn sugar) per gallon of beer (7.5 g/L) for a good, all-purpose level of CO_2.
- Use less sugar for less fizz.
- Take care with higher carbonation levels—many single-use beer bottles aren't designed for high pressure.

If you force carbonate in a keg,

- Use the chart to dial in the gauge pressure on the regulator.
- Add 0.5 psi (35 mbar) for every 1,000 feet (300 meters) you live above sea level.
- To convert psi pressures to mbar, multiply by 69.
- To convert volumes of CO_2 to g/L, multiply by 2.

REGULATOR PRESSURES (PSI) FOR VARIOUS CARBONATION LEVELS AND SERVING TEMPERATURES

TEMP. (°F)	VOL. CO_2										
	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
33	5.0	6.0	6.9	7.9	8.8	9.8	10.7	11.7	12.6	13.6	14.5
34	5.2	6.2	7.2	8.1	9.1	10.1	11.1	12.0	13.0	14.0	15.0
35	5.6	6.6	7.6	8.6	9.7	10.7	11.7	12.7	13.7	14.8	15.8
36	6.1	7.1	8.2	9.2	10.2	11.3	12.3	13.4	14.4	15.5	16.5
37	6.6	7.6	8.7	9.8	10.8	11.9	12.9	14.0	15.1	16.1	17.2
38	7.0	8.1	9.2	10.3	11.3	12.4	13.5	14.5	15.6	16.7	17.8
39	7.6	8.7	9.8	10.8	11.9	13.0	14.1	15.2	16.3	17.4	18.5
40	8.0	9.1	10.2	11.3	12.4	13.5	14.6	15.7	16.8	17.9	19.0
41	8.3	9.4	10.6	11.7	12.8	13.9	15.1	16.2	17.3	18.4	19.5
42	8.8	9.9	11.0	12.2	13.3	14.4	15.6	16.7	17.8	19.0	20.1

■ = PSI

Source: Brewers Association Draught Beer Quality for Retailers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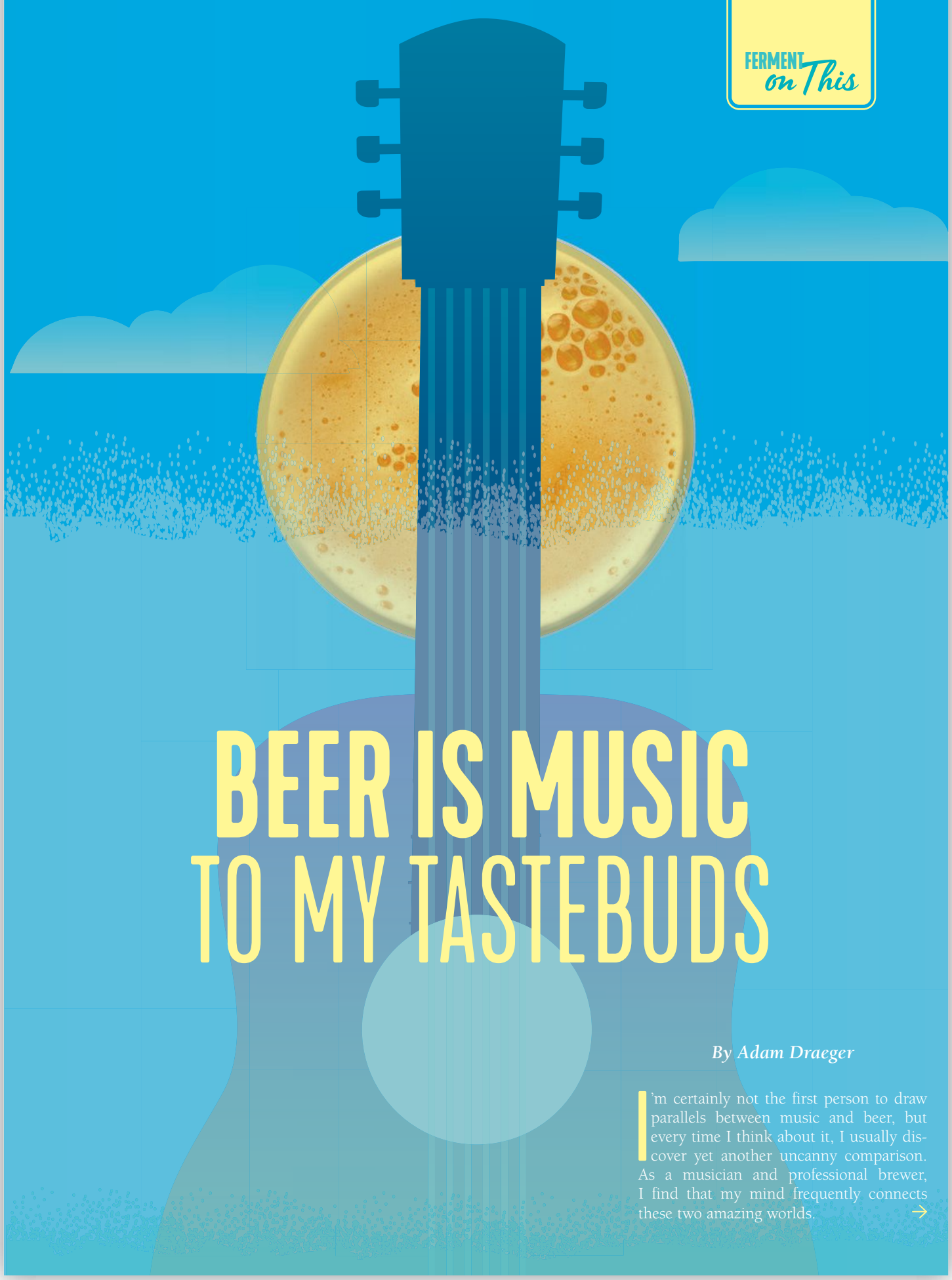

BEER IS MUSIC TO MY TASTEBUDS

By Adam Draeger

I'm certainly not the first person to draw parallels between music and beer, but every time I think about it, I usually discover yet another uncanny comparison. As a musician and professional brewer, I find that my mind frequently connects these two amazing worlds. →

The most obvious parallel is a shared vocabulary word—*styles*. You might ask someone what their favorite style of music is, but it's perhaps more common to discuss *genres*. As a brewer, I can attest that we are constantly asked to name our favorite beer or favorite style of beer.

Pop, rock, blues, jazz, classic rock, K-pop, rap, oldies, or electro-swing could all be answers to the music question. You might hear IPA, hazy IPA, Belgians, sours, German lagers, fruit beers, English cask ales, stouts, or kveik for beer.

When I think about the brand image of certain breweries and their respective fan bases, I compare them to bands and their devout followers. New Belgium Brewing Co. caters to zero-carbon bike enthusiasts who call their ambassadors Rangers, while margarita-slugging Parrotheads remain loyal to Jimmy Buffet. Hop heads probably got named in a nod to Dead Heads.

Speaking of hops, cannabis and hops are close relatives. Is it any wonder that fans of these two plants have built reputations for themselves? Think Jerry Garcia, Willie Nelson, Bob Marley, and Jimmy Hendrix. Lagunitas founder Tony Magee famously noted, "It takes a lot of good weed to make great beer."

It's hard to find a brewery in America that doesn't have at least one flagship hoppy IPA. Is it a band or a solo artist? The brewing world, of course, has its own rock stars—Ken Grossman, Jim Koch, Greg Koch (no relation), Peter Bouckaert, Keith Villa, Sam Calagione, Garrett Oliver, Adam Avery, Mitch Steele, Tomme Arthur, Vinnie Cilurzo, Chad Yakobson, Jeppe Jarnit-Bjergsø, and many others.

Some breweries have music-inspired names or emphasize music. Ska Brewing, Oskar Blues, CODA, Black Shirt, Spangalang, Black Sky, are just a few in Colorado. If you are a craft beer enthusiast or love music, you can probably rattle off some of your favorite bands and breweries that you like to support. Seeing your favorite band live in concert is no different than making a road-trip pilgrimage to one of your must-see breweries.

The Buggles' "Video Killed the Radio Star" kicked off a new era with the first video played on MTV. A cult brewery's popularity can influence others to define a whole new kind of beer, as The Alchemist arguably did with Heady Topper.

Some hits, like "Macarena" by Los Del Rio and Cave Creek Chili Beer, are popular for just a few years, while others become celebrated gold standards, like Sierra Nevada Pale Ale and Led Zepplin's "Stairway to Heaven."

Some beers aren't made for the masses, and neither is some music. The small but devout group who ensure that Wynkoop Brewing Co. continues to brew Rocky Mountain Oyster Stout may very well be the same folks who follow The String Cheese Incident's "Up the Canyon." We can't forget that Bruce Dickinson from Iron Maiden created his own beer called Trooper or that the Hanson brothers created a pale ale called MmmHops.

Even the way music and beer are packaged with bright shiny labels and brought to market is eerily similar. (OK, music may be almost entirely digital now, but this held true for many decades.) Many bands need record labels, but many still feel contempt for the percentage of profits taken off the top. Musicians were feeling that pain well before the Beatles broke off and started Apple Records to circumvent their frustrations.

Similar frustrations have been real with many brewers' relationships with their distributors, so much so that many breweries have dabbled in self-distribution, not unlike independent bands who self-distribute their own music.

The concept of the collaboration beer is not new. Queen's Freddie Mercury and David Bowie brought us "Under Pressure" in 1981. Other famous collaboration pairs include Stevie Wonder and Paul McCartney, Aerosmith and Run DMC, and Tom Petty and Stevie Nicks.

There are equivalent parallels with the album release (beer release), the tribute band (tap takeover), new concept album (the "fill in the blank" beer series), and songs that get reissued as acoustic versions (think barrel-aged beer).

Some hits become celebrated gold standards, like Sierra Nevada Pale Ale and Led Zepplin's "Stairway to Heaven."

If you want to see hundreds of bands, you can go to Summerfest in Milwaukee, just as you can visit hundreds of breweries at the Great American Beer Festival® in Denver. Or you can support local music venues and regional beer fests. If you can't decide whether to download a single track, you can always buy a whole album (variety pack).

Many songs have been written about beer, including "There's a Tear in My Beer," just as many beers have been created as homages to songs (Abita's Purple Haze).

Good beer and good music—it's a perfect pairing that improves with age.

***Adam Draeger is owner and head brewer at Inventors Brewpub in Port Washington, Wis. He studied at the Siebel Institute in Chicago and Doemans Academy in Munich and has won many brewing awards at his two previous Colorado brewpubs. His Chai Milk Stout Soap recipe appears in the May/June 2013 issue of* Zymurgy.**


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LAST Drop

BY ANDREW LUBERTO

Mead Matters

This past April, the Home Governing Committee of the American Mead Makers Association (AMMA) launched a webinar series entitled "Mead Matters." The name was a (perhaps unintentional) play on words that simultaneously acknowledged that mead occupies a small fraction of the commercial beverage industry and that we'd be covering a wide range of topics concerning mead and meadmaking.

I had the privilege of hosting the first episode, in which I interviewed my longtime friend and outstanding meadmaker Adam Crockett, owner and head meadmaker of the newly rebranded Upper Reach Meadery in Phoenixville, Pa. We were joined by nearly 90 people who all stayed for the entire one-hour talk and tasting.

I always enjoy talking to Adam. It's fun to listen to his meadmaking techniques, and he seems to be enamored with undertaking difficult processes—less for the sake of difficulty, per se, than for a belief that the more time and effort you invest in a project, the better the end result. It's sort of a mash-up of the principle of sweat equity and the Ikea Effect. I think he might be the last person in America who still watches VHS. He even made me a mixtape on an actual cassette in the not-too-distant past.

Some of you might be nodding your head in recognition, as this is a not an uncommon personality trait among most homebrewers and home meadmakers I know, people who regularly occupy the intersection of hands-on DIY and excitement at the prospect of a new experiment. I would, however, distinguish between this and a more self-admiring seeking of complexity simply to be complicated. The former is rooted in the sincere belief that, given the opportunity, spending 50 percent more effort to possibly yield a 10-percent-better product is an easy choice.

This may leave some economists scratching their heads, but there is something to be said about the connection between a producer and what they make, a sacrifice of time and efficiency in the interest of serving something other than yourself. I think most would consider that the highest expression of love.

In his novel, *Around the World in Eighty Days*, Jules Verne wrote, "Mr. Fogg played, not to win, but for the sake of playing." I remember reading that a single worker honeybee would have to fly the equivalent of three times around the world to make one pound of honey. Perhaps, on some level, meadmakers share some natural affinity with their insect suppliers.

For the talk and tasting with Adam, the Upper Reach team curated a selection of four different meads that were available for purchase as a special discount bundle from their website. The bundle consisted of So Below, a *pétillant naturel* dry mead made with grapes, blackberries, and cherries; Grand Parlor, a nod to the old fashioned cocktail, a fruit-and-spice mead aged twice in bourbon barrels; Weekend Water, a series of carbonated draft-strength meads they're calling "mead spritzers" and packaged in 12-ounce cans; and, finally, the award-winning Crimson Stag, a pyment with blackberries and aronia berries.

The meads represented a good cross-section of different mead styles, recipes, and processes and made for an interesting discussion. Not all of the webcasts will feature mead to purchase, though. Episodes focusing on various aspects of sensory training and mead evaluation, recipe formulation and execution, as well as a wide range of ingredient education, are in the works for the future.

Our second webcast aired Thursday, June 3, and was moderated by Annie Zipser, an experienced and award-winning meadmaker and mead judge, who interviewed Tony Qualls of Manic Meadery. Needless to say, the Home Governing Committee is optimistic about Mead Matters.

Check out the AMMA's website and Facebook page for more information and Crowdcast links. If you'd like to watch the replay of the first episode, it's posted on the AMMA website, or you can visit crowdcast.io/e/ammameadmatters. The mead bundle is no longer available, but the products we tasted are available for individual purchase on Upper Reach's website at upperreachmead.com/buy-mead.

So, cue up the VCR, chart out the time on the Big Dipper, grab your favorite homemade bottle opener or corkscrew, and join us for some excellent mead and lively discussion. You're welcome.

Andrew Luberto sits on the Home Governing Committee of the American Mead Makers Association and is a frequent Zymurgy contributor.

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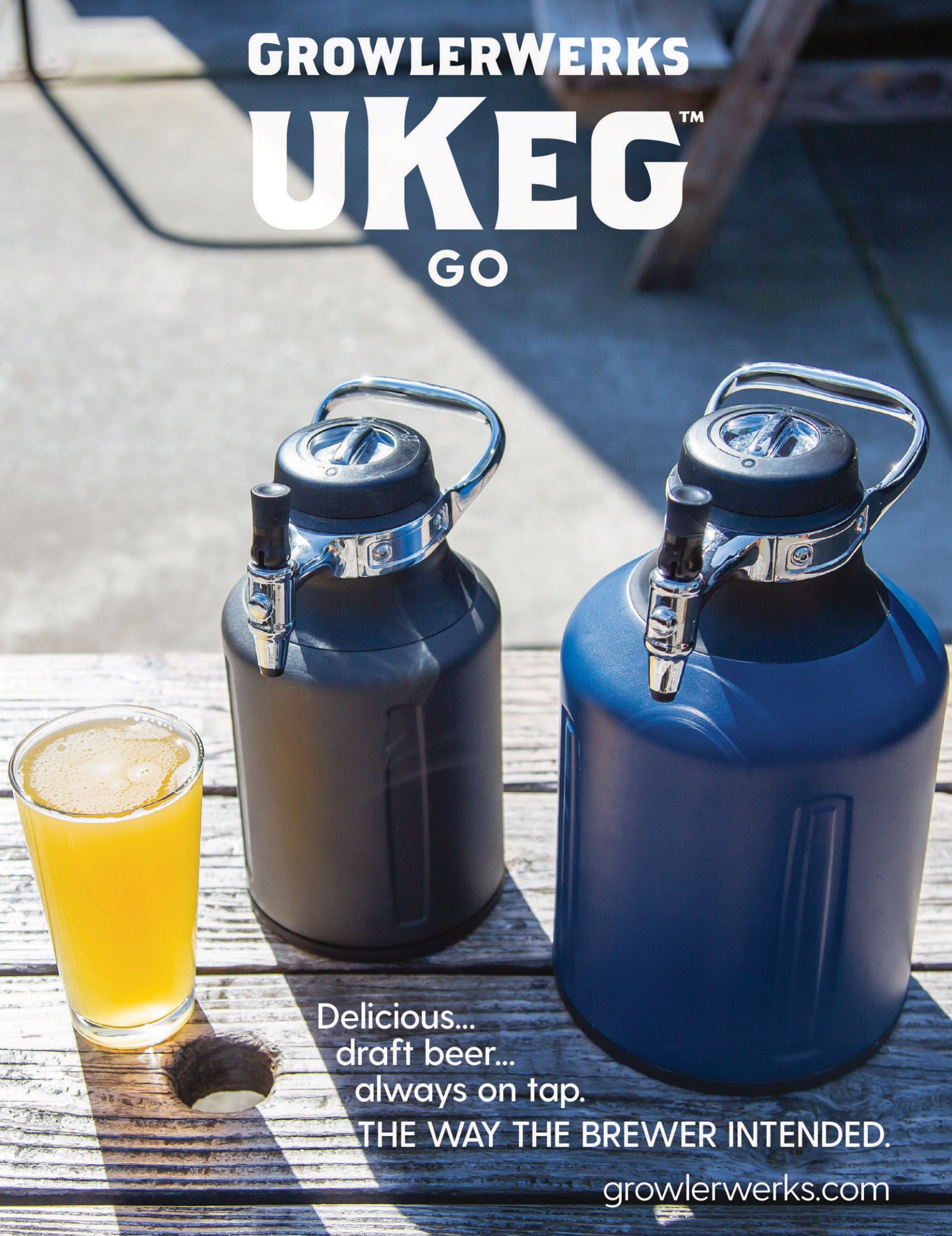
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