

FOR THE HOMEBREWER & BEER LOVER

zymurgy®

The Journal of the American Homebrewers Association®

What to Brew for Summer

Kölsch

pg 42

New England IPA

pg 32

Mexican Lager

pg 24



HomebrewersAssociation.org

\$5.50 US / \$8.00 CAN



21

RECIPES
YOU CAN
BREWBrewing
with RiceBREW
HAIR OF THE DOG'S
ADAMThe IBU
is a Lie

PLUS MEASURING MASH PH

SEE YOU @ #HOMEBREWCON!

& SEE OUR NEW LINE OF PREMIUM CLEANERS & SANITIZERS



WHY CHOOSE SAN STEP NS?

Unlike Some Sanitizer's for the Home Brew Market San Step is:

- Virtually Foam Free
- Effective even when used in Hard Water
- Has Organic Acid Base
- One Ounce makes 6 Gallons, (up to 20% More Solution)

Also provides the following benefits:

- No Rinse Sanitizer for Brewing & Wine Making Equipment
- Broad Spectrum Bactericide and Fungicide
- Not Deactivated by Organic Matter
- Provides and Acidified Rinse to Eliminate Scale Formation

WHY CHOOSE BREW CLEAN?

- Specifically designed for cleaning homebrew kegs & brewing equipment
- Non-corrosive - will not cause rust on kegs nor on other equipment
- Formula actually helps protect metal from corrosion
- Wetting agent helps remove beerstone & other soils
- Powerful detergent cuts down on need for scrubbing
- Will not leave a film on kegs, lids, or other equipment like some cleaners
- Non-hazardous! Replaces caustic soda cleaners, very safe to handle
- Cleaner is supercharged with active oxygen



BREW CLEAN
A SUPERIOR EQUIPMENT CLEANER

ALSO SEE OUR ENTIRE LINE OF QUALITY PRODUCTS



CMBecker

INTERNATIONAL, LLC



Precision Products for the Beverage Industry

CMBECKER.COM

OUR PRODUCTS ARE AVAILABLE AT YOUR LOCAL HOMEBREW SUPPLY SHOP AND VARIOUS
ONLINE RETAILERS. EMAIL INFO@CMBECKER.COM TO FIND YOUR LOCAL RETAILER

Publisher Brewers Association™
 Editor-in-Chief Dave Carpenter
 Associate Editor Amahl Turczyn
 Technical Editor Gordon Strong
 Art Director Jason Smith
 Graphic Designers Ashley Peck & Kelli Gomez
 Operations Director Stephanie Johnson Martin
 Sales & Marketing Director Barbara Fusco
 Sales Director Kevin Doidge
 kevin@brewersassociation.org

Business Development Manager
 for Advertising & Sponsorship (East) Tom McCrory
 mcccroy@brewersassociation.org

Business Development Manager
 for Advertising & Sponsorship (West) Kari Harrington
 kari@brewersassociation.org

Advertising & Sponsorship Associate Joe Damgaard
 Marketing Managers Jeb Foster & Rachel Staats
 Member Services/Circulation Manager Dan Goloback

American Homebrewers Association

Director Gary Glass
 Assistant Director Steve Parr
 Web Editor Duncan Bryant
 Events & Membership Coordinator Matt Bolling
 Competition Coordinator John Moorhead
 Administrative Assistant Millie Shamburger

AHA Governing Committee Members

Drew Beechum, Fred Bonjour, Martin Brungard, Debbie Cerda, Sandy Cockerham, Denny Conn, Chris P. Frey*, Aimee Garlit, Jake Keeler, Jeff Rankert, Susan Ruud, Tom Schmidlin, Chip Walton, Roxanne Westendorf*, Kim Wood.

*Indicates representative to the BA Board of Directors.

Published by the American Homebrewers Association, a division of the Brewers Association. The purpose of the Brewers Association is to promote and protect small and independent American brewers, their craft beers, and the community of brewing enthusiasts. The Brewers Association is a not-for-profit trade Association under Section 501(c)(6) of the Internal Revenue Code. Offices are located at 1327 Spruce Street, Boulder, CO 80302 USA. Membership is open to everyone. *Zymurgy* (ISSN 0196-5921, USPS 018-212) is the bi-monthly journal of the American Homebrewers Association and is published six times per year. Periodicals Postage Paid at Boulder, CO and additional mailing offices. Canada Post Agreement Number 41197537. Annual memberships are \$43 U.S., and \$52 International and include a \$35 subscription to *Zymurgy*.

Changing your address? Let us know in writing or e-mail your address changes to info@brewersassociation.org.

Zymurgy® welcomes letters, opinions, ideas, article queries and information in general from its readers. Correspondence and advertising inquiries should be directed to *Zymurgy*, PO Box 1679, Boulder, CO 80306-1679, (303) 447-0816, zymurgy@brewersassociation.org, www.homebrewersassociation.org. All material ©2017, American Homebrewers Association. No material may be reproduced without written permission from the AHA. Reg. U.S. Pat. & TM Off.

The opinions and views expressed in articles are not necessarily those of the American Homebrewers Association and its magazine, *Zymurgy*.



One Swallow Makes It Summer

Brewers once had to rely on natural means to keep beer cool, refreshing, and—hopefully—uncontaminated when the temperature soared. At first that meant taking a summer vacation from brewing altogether. Later, it meant hoarding harvested ice in cellars and caves and hoping it would last until autumn. By the end of the 19th century, artificial refrigeration arrived and made us masters of mercury.

Many of us still brew with the seasons. It began for me as a practical solution to fermenting in a house without air conditioning. But even with the benefit of a temperature-controlled converted chest freezer, I have come to appreciate seasonal brewing as a link to the earth's natural rhythm in an increasingly hermetic society.

On that note, the time has come to stockpile your summer stash of homebrew in anticipation of warmer days ahead, and *Zymurgy* has got your back with in-depth examinations of several refreshing beer styles. Brew them now so you're prepared later.

Mexican-style lagers are a hot commodity among craft brewers at the moment, but if your only experience with *cerveza mexicana* involves a clear bottle laced with windswept sand, I think you'll be pleasantly surprised to discover just how refreshing and flavorful these beers can be when they're treated with care and served fresh. Salt and lime? That's completely up to you. (A pairing with fresh ceviche, however, ought to be compulsory.)

But maybe you can't or don't want to bother with lager. In that case, there's

Kölsch, which remains a gateway to good beer for good reason. It shares enough visual and organoleptic similarities with mass-produced light lager that craft newcomers find it approachable, but there's enough flavor in a good Kölsch to satisfy beer lovers of all stripes. In most parts of the country, you should still have time to pull off a great Kölsch even without temperature control.

Short on time but craving your next hop hit? Maybe New England-style IPA is destined to be your summer fling. Thanks to unholy quantities of hops and zero expectations surrounding clarity, these popular ales demand to be brewed and consumed with haste. No need to wait for NEIPA to drop clear, just hop it like it's hot and enjoy. (Speaking of hops, this issue also features a piece from Denny Conn and Drew Beechum, in which they explain why you shouldn't believe most IBU numbers.)

And then there's rice. Yes, a certain large brewery from St. Louis is famous for including big doses of the stuff in its flagship products, but that doesn't mean you need to eschew it in your homebrew. When used as a legitimate ingredient on its own and not as mere filler, rice can lighten the body of virtually any beer style and turn otherwise heavy ales into sessionable summery delights.

With one—or, better yet, all—of these refreshing beers in your hand, you'll be well prepared to enjoy your summer one swallow at a time.

Dave Carpenter is editor-in-chief of *Zymurgy*.



POSTMASTER:
 Send address changes to:
Zymurgy, 1327 Spruce Street;
 Boulder, CO 80302.
 Printed in the USA.

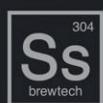
ENGINEERING BETTER BEER



Chronical Brewmaster Edition
7 gal | 14 gal | Half bbl | One bbl



www.SsBrewtech.com



**COLUMNS****1 | EDITOR'S DESK**

One Swallow Makes It Summer

By *Dave Carpenter***9 | FROM THE GLASS**

AHA Governing Committee Election

By *Gary Glass***91 | WORLD OF WORTS**

To Uddala

By *Charlie Papazian***96 | LAST DROP**

What Palmer, Papazian, and Homebrewing Did for My Marriage

By *Leslie Patiño***DEPARTMENTS****4 | BEEROSCOPE****13 | DEAR ZYMURGY****17 | DEAR PROFESSOR****19 | STYLE SPOTLIGHT****69 | WINNERS CIRCLE****74 | KUDOS / CALENDAR****79 | FOR GEEKS ONLY****87 | COMMERCIAL CALIBRATION****90 | ADVERTISER INDEX****FEATURES****24 | Mexican Lager**

Mexican-style lagers are more popular than ever, but what makes a lager a Mexican lager? Learn to make your own summertime cerveza—lime completely optional.

By *Amahl Turczyn***32 | Wicked Good IPA**

Pedants can go 'round and 'round the rotary debating New England-style IPA's stylistic legitimacy. Let 'em argue while you sit back and enjoy a silky, fruity, hazy homebrew.

By *Aaron Ellis***42 | Kölsch**

You'd be hard-pressed to find a more universally appealing beer style than Kölsch. Bridging the gap between pale ale and pale lager, it is as approachable as it is flavorful.

By *Dave Clark***50 | Brewing with Rice***Oryza sativa*, better known as rice, has unique properties that make it an excellent choice for a variety of flavorful beer styles. There's much more to rice than macro lager.By *Cody Gabbard***58 | The IBU is a Lie**In this landmark experiment, the mad scientists behind *Experimental Brewing* set out to discover how accurate those IBU equations really are.By *Drew Beechum and Denny Conn***Homebrew Con Preview**Headed to Homebrew Con this June? Chip Walton—host of *Chop & Brew*—offers a preview of what to expect in Minneapolis.By *Chip Walton*To read this special online feature, go to HomebrewersAssociation.org/mj17**QUICK RECIPE GUIDE**

Adam	6	Rice Makes It Nice American Lager.....	52
Christmas Ale	14	Dojo	54
Bière de Garde Brune	21	Belgian Rice Ale	56
Bière de Garde Blonde	22	Triple Down Belgian Tripel.....	57
The Most Interesting Beer in the World	28	Basic American Pale Ale	61
Austrian Expat	28	Basic American IPA	62
Mexican Logger	30	Basic American DIPA	63
Focal Point	36	Angie's Bursting Citra II (a.k.a. Juice).....	70
Sloop Juice Bomb Clone	37	Sure as Tootin' Pumpernickel Stout - Partial-mash recipe	92
LIC Project Party Crashers	38	Sure as Tootin' Pumpernickel Stout - All-grain recipe	94
Bartolo Cologne Kölsch	47		

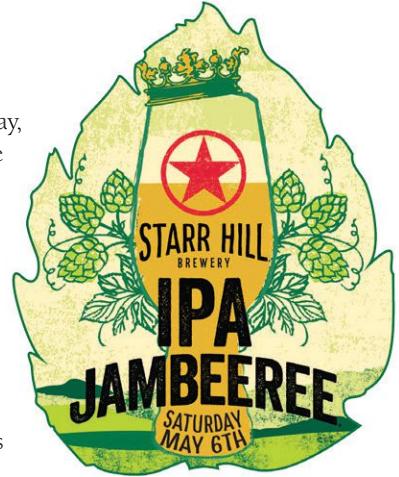
Find more homebrewing recipes on our website @ HomebrewersAssociation.org/homebrew-recipes

>> GET THERE!

STARR HILL IPA JAMBEEREE

Starr Hill Brewery of Crozet, Va. is bringing back its IPA JamBEERee Saturday, May 6, 2017. In addition to more than 60 commercially brewed IPAs, the brewery will serve the winning recipes from Starr Hill's Homebrew JamBEERee Competition. It's all taking place at Hangar Park, right across the street from the taproom.

The IPA JamBEERee showcases Virginia breweries and will include several rare offerings from Starr Hill, along with some non-IPA options for attendees who don't live, breathe, and dream hops (we hear such people exist). Live music, food trucks, and games complement the hoppy pours, and proceeds will support construction of a new amphitheater at Claudius Crozet Park, which is located half a mile (0.8 km) southwest of the brewery.



The Homebrew JamBEERee Competition, judged by the Starr Hill brewing team, was held in April, and the top three entries were invited to pour their beers at the festival. The first place winner will brew a commercial batch of his or her recipe with Starr Hill to be entered into the Great American Beer Festival (GABF) Pro-Am Competition. Last year's winner, Gary Layton, won silver at the 2016 GABF Pro-Am with his Vernal Equinox English IPA (see the Jan/Feb 2017 issue of *Zymurgy* for the winning recipe).

Tickets are \$25, \$65, and \$10 for general admission, VIP, and designated drivers, respectively. The VIP treatment entitles ticketholders to early entrance at 1:00 p.m., a parking spot right next to the festival entrance, and exclusive pours not available in the main area. VIPs will also enjoy a shaded lounge with places to sit and full 16-ounce pours, as well as \$15 to spend at any of the food trucks.

For more information, head over to JamBEERee.com.

May 5–6

Wild West Brewfest

Katy, TX

wildwestbrewfest.com

May 6

Big Brew for National Homebrew Day

Nationwide

HomebrewersAssociation.org

May 13

10th annual Michigan Cask Ale Festival

Westland, MI

caskalefest.blogspot.com

May 15–21

American Craft Beer Week

Nationwide

craftbeer.com

May 20

5th annual Charleston Beer Garden

Charleston, SC

charlestonbeergarden.com

May 27

6th annual Brattleboro Brewers Festival

Brattleboro, VT

brattleborobrewersfestival.com

June 3

Sun Drenched Music Fest

Denver, CO

sundrenchedmusicfest.com

June 10

Beer, Bourbon & BBQ Festival

Richmond, VA

beerandbourbon.com

June 10

Beerfest - The Good One

Santa Rosa, CA

sonomaevents.com/sonoma-events/beerfest-the-good-one

June 15–17

Homebrew Con 2017

Minneapolis, MN

HomebrewCon.org

June 22

6th annual Fermentation Celebration

Bend, OR

bendconcerts.com/event-detail/Fermentation-Celebration

June 24

SOCIETE 5: A Two-Part Quinquennial Anniversary

San Diego, CA

societebrewing.com

For more craft brewing events, go to CraftBeer.com

>> GREAT NEW PRODUCT

CRYO HOPS®

Yakima Chief – Hopunion (YCH HOPS®) is bringing two brand-new hop products to market in 2017, both of which will debut to homebrewers at Homebrew Con this June in Minneapolis. YCH creates its new Cryo Hops® lines using a cryogenic hop-processing method in which whole hop cones are separated into concentrated lupulin powder and low-alpha acid bracts (leaves) in a cold, nitrogenized atmosphere. The powder and bracts go on to become LupuLN2™ hop powder and Debittered Leaf, respectively.

LupuLN2 is the concentrated lupulin of whole-leaf hops and contains resins, aromatic oils, and tons of alpha acid. Its concentrated formulation means you can go hop-nuts while reducing the amount of vegetal material that goes into your boil kettle. With twice the resin concentration of normal leaf and pellet hops, brewers only need use half as much LupuLN2 by weight. In YCH HOPS' early research trials, brewers felt that LupuLN2 offered improved aroma and flavor characteristics over conventional hops. LupuLN2 is available as hop powder or as pellets.

Debittered Leaf is the concentrated bract (leaf) of whole-cone hops that has been separated from the lupulin glands that go



into LupuLN2. These low-alpha leaves hold onto the signature aromas and flavors of the varietals from which they came and deliver what YCH HOPS describes as "an enticing Northwest twist on traditional low-alpha, noble hops." Debittered Leaf products are available in pellet form.

Current Cryo Hops products include Cascade, Citra® (HBC 394), Columbus (LupuLN2 only), Ekuanot™ (HBC 366), Loral™ (HBC 291), Mosaic® (HBC 369), Palisade® (YCR 4), and Simcoe® (YCR 14). Stop by the YCH booth at Homebrew Con this June and pick up your free sample!

>> BIG BREW CLONING ADAM

By Brian Haslip, Oregon Brew Crew

Every year, the American Homebrewers Association promotes two major brew days. Big Brew for National Homebrew Day—Big Brew for short—is held the first Saturday in May to commemorate National Homebrew Day, which Congress declared as May 7 back in 1998. In 2016, participation in Big Brew was widespread, spanning the globe in 12 countries and involving more than 12,000 participants who brewed more than 17,000 gallons (64,000 liters) of beer.

The second big event, Learn to Homebrew Day, takes place the first Saturday of November and was established by the AHA in 1999. In 2016, more than 6,000 gallons (22,700 liters) of beer were brewed in 11 countries involving upwards of 4,400 participants.

F.H. Steinbart (FHS), the oldest homebrew and wine supply store in the US, has host-



ed both of these events for many years in support of the homebrewing community. Located in downtown Portland, Ore., and currently owned and operated by John DeBenedetti, FHS also hosts the monthly general meetings for Oregon Brew Crew (OBC), which is the largest and oldest homebrew club in Oregon. John founded OBC with Fred Eckhardt in 1979, and the club now averages more than 300 members each year.

Alan Sprints, the owner and brewer of Portland's renowned Hair of the Dog Brewing Co. (HOTD), started out as a homebrewer like many other professional brewers. Alan is a member of OBC and



served as club president from 1991 to 1993. He's also one of a handful of OBC members who have been honored with lifetime memberships to the club. Alan started many of the club traditions that still exist today, such as the annual Bung Awards, which acknowledge and honor club members and craft beer industry personalities. Each year, Alan hosts a meeting for OBC members at Hair of the Dog.

In early 2015, Alan happened to be in F.H. Steinbart getting some supplies, and knowing how supportive Alan is of the homebrew industry, Steinbart's employees proposed an idea to him. With Big Brew day approaching, they thought it would be

ADAM

Recipe courtesy Alan Sprints, Hair of the Dog Brewing Co., Portland, Ore.

Batch Size: 5 US gallons (18.9 L)
at 65% efficiency

Original Gravity: 1.112 (26° P)
Final Gravity: 1.027 (6.8° P)

Color: 32 SRM
Bitterness: Lots
Alcohol: 11% by volume

MALTS

19 lb.	(8.62 kg) Gambrinus pale ale malt
2 lb.	(907 g) domestic Munich malt, 10° L
1 lb. 6 oz.	(624 g) British crystal malt, 50–60° L
12 oz.	(340 g) peated malt
8 oz.	(227 g) British chocolate malt
2 oz.	(57 g) British black patent malt

HOPS

2 oz.	(57 g) Northern Brewer @ 90 min
2 oz.	(57 g) Northern Brewer @ 40 min
2 oz.	(57 g) Tettnang @10 min

YEAST

Wyeast 1728 Scottish Ale Yeast

BREWING NOTES

Mash at 152° F (67° C) for 60 minutes.

great to have homebrewers brew a clone of HOTD's highly regarded old ale, Adam. Alan enthusiastically jumped on board with the idea and not only developed a 5-gallon (18.9 L) homebrew recipe, but also offered up a soon-to-be-emptied bourbon barrel in which he'd been aging a batch of his own Adam.

In May 2015, FHS hosted Big Brew and supplied 11 brewers with the Adam recipe. Most of these brewers were members of OBC, but one attendee was actually a staff member from HOTD who brewed 5 gallons of the beer. Alan Sprints came by and joined in the fun, answering questions and sampling many of the homebrewers' beers. As each participant finished brewing his or her wort, they were blended together in two fermenters on site at FHS.

Adam is an old ale with 11% ABV, but achieving a sufficiently high original gravity with so many kinds of brewing systems and techniques wasn't easy. The staff at FHS did the necessary calculations and boiled up just the right amount of dried malt extract to bring the total combined

volume to approximately 60 gallons at an original gravity of 1.112 (26° P). After two weeks of primary fermentation, the Adam clone was ready for the barrel. Alan delivered his just-emptied bourbon barrel to FHS, and the staff filled it with 53 gallons of fantastic homebrew. Five gallons were set aside for topping off the barrel as the angels took their share during aging.

Six months later, FHS hosted Learn to Homebrew Day in November, and the brewers involved with the Adam project back in May brought kegs, buckets, and carboys in which to collect the shared barrel-aged elixir. I was one of those lucky brewers. When I was first approached with the idea, there was no question I wanted to participate. I had already taken part in three collaborative barrel projects, but none of them had involved a professional brewer. The beer turned out great! Some brewers bottled their share, while others kegged their beer and immediately began drinking and sharing it. One keg found its way to OBC's annual holiday party in December and was consumed in quick fashion. I stashed my 5 gallons away in a root cellar for four months and

served the keg at the OBC booth during Club Night at the inaugural Pacific Northwest Homebrewers Conference in March 2016. It was a huge hit.

I joined OBC after having been introduced to homebrewing in 2012, and I have participated in seven of these Big Brew events, missing just one in the last four years. Over the years, I have brewed



all-grain and partial-mash batches with my personal homebrew systems, as well as with the club's pilot system, which is free for all OBC members to use.

I volunteer for these brew days for several reasons. They are fun experiences that give brewers an opportunity to interact with their community, including other brewers and non-brewers alike. They are great educational opportunities that offer participants a chance to share and gain knowledge from fellow brewers. And they're a great way to give back to the local homebrew shop and support my homebrew club.

It's a lot of work to haul out your system, set it up, brew, clean, and then haul it home again, but it's a rewarding experience. If you have an opportunity to participate in one of these events, I highly recommend it. And if you know any brewers like Alan Sprints, don't hesitate to ask them to join in the fun. They'll probably say yes!

Head over to HomebrewersAssociation.org and click on Events to find a Big Brew event near you.



VARIETY PACK



A MALTY, FLORAL
SAISON WITH A
PEPPERY FINISH



A FRUITY & TART
MIXED-FERMENTED
WILD ALE



A CHOCOLATY, ESPRESSO-Y
IMPERIAL STOUT WITH HINTS
OF RAISIN

NOW AVAILABLE IN MIXED 6-PACKS AND LIMITED DRAFT RELEASE!

PicoBrew



BREWER'S BEST FRIEND

PicoBrew Zymatic® is the world's first fully automatic, all-grain brewing appliance.

Whether you are an established craft brewery, ingredient supplier, or a brewery in planning, the Zymatic® is a valuable tool that can save you precious time and money.

Learn more at picobrew.com

By Gary Glass



AHA Governing Committee Election

On March 31, the AHA wrapped up the AHA Governing Committee (GC) election for 2017. This year, there were 14 candidates vying for six seats on the Governing Committee. The winning candidates are Martin Brungard of Carmel, Ind.; Phil Farrell of Cumming, Ga.; Kathy Yan Li of Delaware, Ont.; Jill Marriley of Everett, Wash.; Dennis Mitchell of Chandler, Ariz.; and Jeff Rankert of Milford, Mich.. The new Governing Committee will be seated in June and will participate in our annual in-person meeting at the AHA Homebrew Con in Minneapolis.

The AHA Governing Committee and the GC subcommittees help to guide AHA staff and determine the future direction for your association. I am grateful for the service this dedicated group provides to the staff and members of the AHA, and I look forward to greeting all of the new Governing Committee members in June.

You can find pictures of all of the Governing Committee members, along with email addresses for reaching out to them, in the Membership section of HomebrewersAssociation.org. Thank you to all of the candidates who ran in this year's election, and thanks to all of the AHA members who voted in this year's Governing Committee election!

Big Brew

Big Brew is just around the corner: where will you be brewing? This annual celebration of (Inter-) National Homebrew Day, held the first Saturday in May—May 6 this year—is an opportunity for homebrewers around the globe to honor the hobby we all love. At 12 p.m. Central Daylight Time, homebrewers everywhere are encouraged to offer a toast to our shared art form and then fire up the burner on a new batch.

This year's Big Brew recipes are a nod to the soon-to-be released, completely revised fourth edition of John Palmer's *How to Brew*. John's quintessential book on homebrewing has introduced hundreds of thousands to the hobby of homebrewing, and given his tremendous influence on homebrewers worldwide, it seems fitting to use three of his recipes—an IPA, a saison, and an Oktoberfest—for this year's Big Brew.

More information on Big Brew, as well as a form to register a Big Brew site, is available in the Events section of HomebrewersAssociation.org.

Homebrew Con 2017

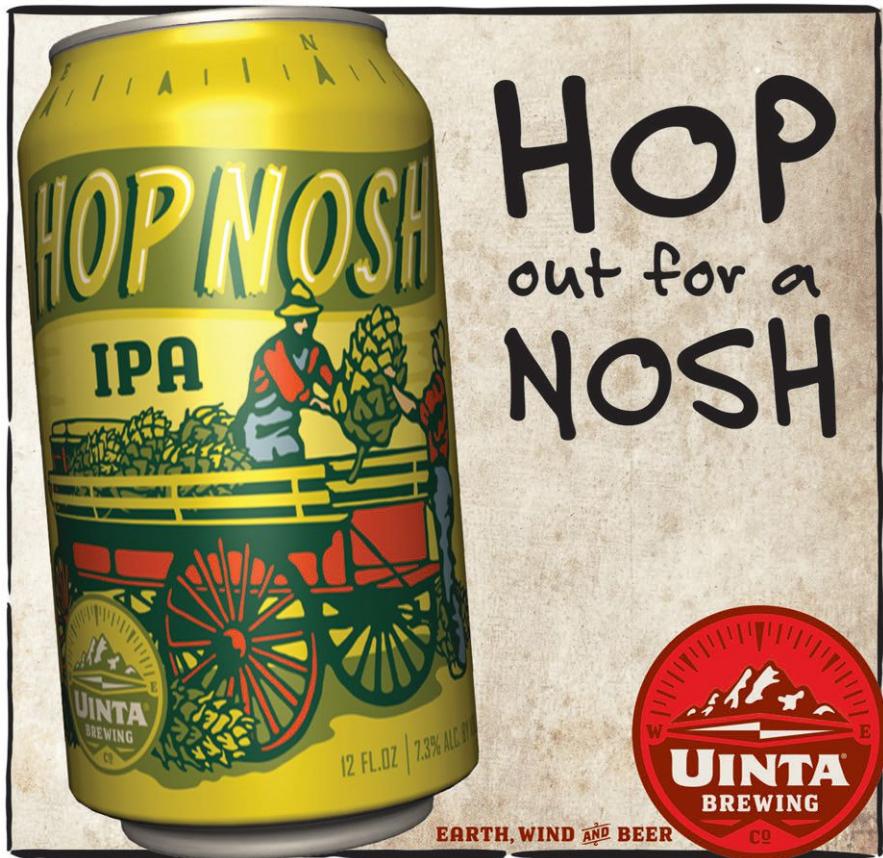
Registration for Homebrew Con 2017, which takes place June 15–17 at the Minneapolis Convention Center in downtown Minneapolis, is open and filling up fast. Will I see you at the homebrew event of the year? I sure hope so, or we will both be sad that you missed it.

This year's Homebrew Con features 49 different educational sessions; nearly 100 exhibitors; scores of homebrew clubs and breweries (i.e. no shortage of great beer); a keynote address by Surly Brewing Co. founder Omar Ansari; commemorative beer by Surly Brewing Co., a commemorative mead collaboration by Prairie Rose, Moonlight, and Meridian Hive meaderies; the crowning of this year's National Homebrew Competition final round winners; and more fun than you can imagine packed into three days.

If you are traveling to Minneapolis, plan to stay an extra day or two on either end of the conference to check out the Twin Cities. It's easy to explore via light rail, and there are tons of great breweries to discover. Throughout the week of Homebrew Con, local breweries, restaurants, and beer bars will be hosting conference week events.

Check out HomebrewCon.org for event details and to register.





National Homebrew Competition

The world's largest beer competition, the AHA National Homebrew Competition, got even bigger this year. There were more than 8,600 entries from 3,530 entrants, up from 7,962 entries submitted by 3,396 entrants in the 2016 competition. We'll be wrapping up first-round judging just as this issue starts hitting mailboxes. All of the first-, second-, and third-place entries in each of the 33 categories judged at the 12 regional judging centers will advance to the final round, which takes place June 15 at Homebrew Con in Minneapolis.

Good luck to all of the AHA members who entered the competition!

Brew Guru™ App

Last year, the AHA launched the Brew Guru app with the primary aim of making your AHA member benefits more accessible. The Brew Guru app doesn't just help you find homebrew shops, breweries, and businesses that participate in the AHA Member Deals program; it also makes it easier to access all kinds of AHA content from Zymurgy maga-

We have a tun of experience

Learn how to brew the Brewlab way

Learn how to brew UK and international styles at our purpose built training centre in the UK. Ideal and highly recommended for career development and brewery start-up

Certificate in Practical Brewing

Three week, intensive course in brewing with practical experience and placements.

Diploma in British Brewing Technology

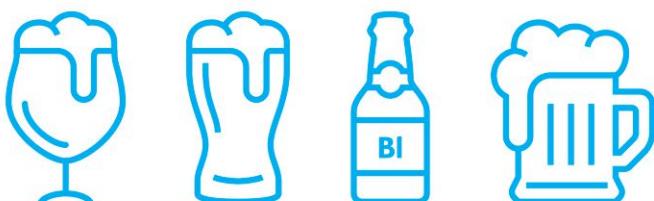
Nine week course covering extensive experience in all aspects of brewing including business and marketing, packaging, laboratory techniques and microbiology.



For further details on any of our services call us on +44 (0) 191 543 6820 or contact info@brewlab.co.uk

/brewlabltd

@BrewlabTraining



Brewlab

www.brewlab.co.uk

zine, HomebrewersAssociation.org, and recorded Homebrew Con presentations. It also includes a digital AHA member card, so there's no need to tote around that plastic card in your wallet anymore.

The app is free to everyone, but unlike other free apps, this one won't bombard you with advertisements. For newcomers to the AHA, the app offers a 15-day, no-strings-attached, free trial membership. After 15 days, the app continues to function, just without access to AHA Member Deals and the app's members-only content—the brewery map alone makes this app totally worth downloading.

We continue to upgrade Brew Guru with bug fixes and improvements to the user experience. We recently surveyed AHA members about the app, and your feedback is helping us plan for updates. If you haven't yet downloaded Brew Guru, go to the Android or Apple app store and download the latest version today.

Zymurgy en Español

A couple of issues back, I wrote in this column about publishing Spanish-language translations of Zymurgy content to post as members-only content on HomebrewersAssociation.org. Those translations are now a reality starting with the January/February 2017 issue, which went live in March, and the March/April 2017 issue which was posted in April. These Spanish translations can be found under the Magazines section of HomebrewersAssociation.org. We're excited to provide this vital content to members throughout the Americas and abroad.

Homebrew Legislation

The AHA is working with homebrewers in Nebraska to update that state's homebrew law and to allow homebrewers to resume showcasing their beers at beer festivals. Several Nebraska homebrewers testified on behalf of the bill during its first hearing before the General Affairs Committee. The bill is currently awaiting a vote by that committee so it can hopefully move on to a vote before the full legislature.

Until next time, happy homebrewing!

Gary Glass is director of the American Homebrewers Association.



Keep your beer safe & hygienic



PART # C545 Hygiene plug

(Fits almost all beer tap types)
Helps keep beer taps clean.
Protects taps from fruit flies and contamination when not in use.
Eliminates the time and waste of wrapping beer taps overnight, as required by health codes.
Stainless Steel 304 brush wire for long life.



PART # C708 JUG -GROWLER FILLER

When jugs won't fit under the faucet, this apparatus allows beer to be filled from the bottom up, generating less foam. Perfect for filling jugs or growlers with beer. One end fits over your beer faucet and the other end goes into your growler



To know more visit our website
www.kromedispense.com



info@kromedispense.com

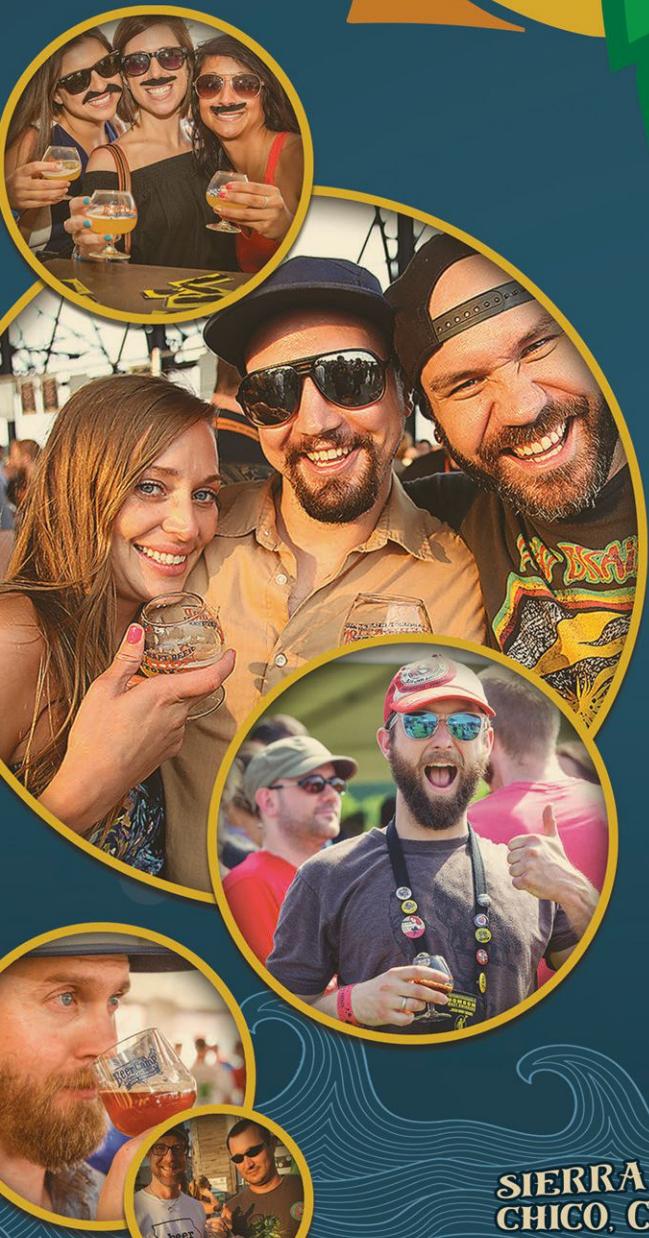
Krome dispense[®]
A VIKING Group Company

THE LARGEST CRAFT BEER CELEBRATION RETURNS!

PRESNTED BY LOCAL NON-PROFTS IN EACH HOST CITY



BEER CAMP ON TOUR®



Beer Camp on Tour—named America's

best beer festival—is heading across

the country this June and everyone's invited!

Sample the Beer Camp Across the World 12 Pack

Hundreds of Breweries · Live Music · Food

For more details on festivals, cities and

non-profit hosts visit

beercamp.sierranevada.com

San Francisco, CA Philadelphia, PA

Portland, ME

Austin, TX

Chicago, IL

Long Beach, CA

Raleigh, NC

Seattle, WA

SIERRA NEVADA BREWING CO.
CHICO, CA AND MILLS RIVER, NC

Please drink responsibly.
© Sierra Nevada Brewing Co.



By Our Readers

That's Cool!



Dear *Zymurgy*,

After reading the Jan/Feb gadgets issue, I thought I would share my backyard beer cooler in case other readers want to rid themselves of the hassle of multiple inefficient fridges.

For years, I had lots of old fridges and chest coolers, but I decided there was a better way to store my homebrew and commercial beer. I found a cheap walk-in freezer with 4-inch walls for added insulation, making sure it had a floor and that its footprint would fit in the allotted area. Then I had an electrician install a line to it, bought a CoolBot temperature controller (see ad on page 18) and a GE window air conditioner, drilled holes for my six taps, and put in shelves.

When I am not using the taps, I use winter faucet covers to shield the taps from the elements, which works really well. During the hot Austin summers, the space remains a cool 41° F (5° C) as the air conditioner cycles on and off. In the end, I



am saving money by not running a bunch of inefficient refrigerators, I get my garage back, and I have a walk-in. It's been working great for more than three years.

Cheers,
Stuart West
Austin, Texas

Animal Instincts

Dear *Zymurgy*,

I have noticed several pictures in *Zymurgy* featuring brew dogs, but they all just seem to be posing and not really part of the process. Here is a pic of Toby. As you can see, he adds value to every brew day by cleaning the mash tun after each batch.



Steve Fry
Kansas City, Mo.

Dear *Zymurgy*,

Enclosed is a picture of my brew cat Gertie. Gertie loves watching the boil, hops, and brewing-related magazines.



Eitan Kaplan
Seattle, Wash.

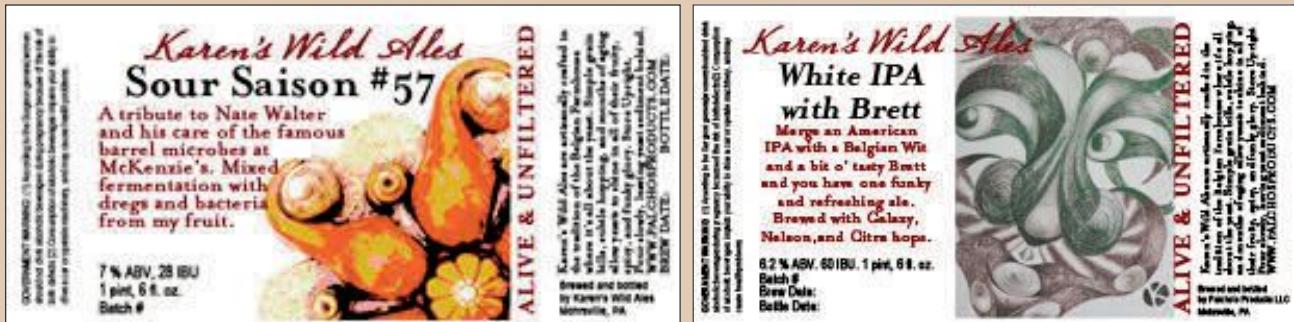
Dear *Zymurgy*,

This is James, a Catahoula Leopard Dog I rescued as a puppy, and my daughter Caregan making sure I brew this Irish red correctly. I think James is just happy he gets more dog biscuits with the grains when I am done.

READER-SUBMITTED HOMEBREW LABELS

I brew all-grain in a modified 10-gallon Sabco-style system. I brewed occasionally in the 1970s, but since 2009, I've been brewing about twice a month. I joined the AHA in 2010 and am a member of the Berks Homebrew Club in Reading, Pa.

Karen Palcho
Oley, Pa.
Berks Homebrew Club



I have been homebrewing for about two years. My all-grain system consists of a 9-gallon (34-liter) stainless steel pot, a propane burner, a converted cooler mash tun, and a copper immersion wort chiller. I occasionally need to pick up a specialty grain I don't have on hand, but I try to keep all of the basics in stock, and I mill 95 percent of my own grain.

My wife Emily and I are expecting our first child in late June 2017. We decided to announce our fantastic news through

Here are some of my labels. The first is my general logo, which is a six-color screen print of a photograph of a sculpture that I made. The other is a label I made from one of my drawings.

beer! I made a Christmas Ale (see accompanying recipe), and Emily and I designed labels with our announcement. I bottled and labeled two cases of 22-oz. bottles, which we handed out to our family and friends on Christmas Eve. We didn't say anything; we just waited to see the reactions from everyone when they read the label. Best. Christmas. Ever!

Travis Shaver,
Denver, Colo.

CHRISTMAS ALE

Recipe courtesy Travis Shaver, Denver, Colo.

Batch Size: 5.5 US gallons (20.8 L)

Original Gravity: 1.067 (16.3° P)

Final Gravity: 1.015 (3.8° P)

Bitterness: 29 IBU

Color: 11 SRM

Alcohol: 7% by volume

MALT

- 10 lb.** (4.54 kg) 2-row malt
- 1 lb.** (454 g) caramel/crystal 40° L malt
- 1 lb.** (454 g) wheat malt
- 4 oz.** (113 g) Briess® Special Roast malt
- 2 oz.** (57 g) roasted barley

HOPS

- 1.5 oz.** (43 g) Cascade @ 60 min
- 1 oz.** (28 g) Hallertauer @ 10 min

YEAST

Danstar London ESB Dry Yeast

ADDITIONAL ITEMS

- 3** cinnamon sticks (add to boil at 60 min)
- 1 oz.** (28 g) ginger root (add to boil at 60 min)
- 1 lb.** (454 g) honey (add at flameout)

BREWING NOTES

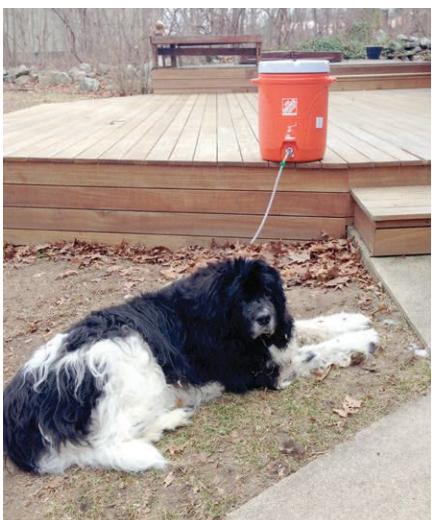
Mash 60 minutes at 154° F (68° C)





Cheers,
Timothy McKinley
Minot, N.D.

Dear *Zymurgy*,
Here's my "brew Newfie" Pearl (named for Janis Joplin). She's an 11-year-old Newfoundland. I wish I could say she is guarding my beer, but the truth is she's waiting for me to leave her alone so she can get into the mash tun and eat the spent grain!



Cheers,
Lisa Lumbruno
Mansfield Center, Conn.

Send your Dear *Zymurgy* letters to zymurgy@brewersassociation.org. Letters may be edited for length and/or clarity.

Hey homebrewers! If you have a home-brew label that you'd like to submit for the Dear *Zymurgy* section, head on over to homebrewersassociation.org/magazine/submit-bottle-label.

Since 1905

South College
Asheville

TURN YOUR PASSION INTO A PROFESSION.

SOUTH COLLEGE NOW OFFERS THE PROFESSIONAL BREWING SCIENCE PROGRAM, A NINE-MONTH PROGRAM THAT WILL GIVE YOU THE SKILLS YOU NEED TO BECOME A PROFESSIONAL BREWER. YOU COULD WORK AT ONE OF AMERICA'S MANY CRAFT BREWERIES OR BREW PUBS, AT A MAJOR BREWING COMPANY, OR START YOUR OWN MICROBREWERY.

So take a long look at that craft brew. If you see a career opportunity, call or visit our website today.

(828) 398-2500 OR SOUTHCOLLEGENC.EDU

SOUTH COLLEGE-ASHEVILLE

140 SWEETEN CREEK RD | ASHEVILLE, NC 28803

For more information on graduation rates, median debt of graduates and other important information, visit <http://www.southcollegenc.edu>. South College-Asheville is accredited by the Accrediting Council for Independent Colleges and Schools (ACICS) to award BS degrees, AAS degrees and certificates.

High Gravity

Homebrewing & Winemaking Supplies



info@worthog.net

WORTHOG.NET

wholesale inquiries welcome

Electric Brewing Controllers for Homebrewers
It's a whole new animal...

918-461-2605
www.highgravitybrew.com

No Payments + No Interest
if paid in full in 6 months
on purchases of \$99 or more
Check out with PayPal
and choose PayPal Credit



BREWING
INDEED
COMPANY

**HOME BREW CON 2017 ATTENDEES
JOIN US AT OUR TAPROOM!**

AMERICAN HOMEBREWERS ASSOCIATION MEMBERS
ENJOY HAPPY HOUR-PRICED BEERS AND 20% OFF MERCHANDISE

711 15TH AVE. NE MINNEAPOLIS, MN 55413

• WE ARE THIRSTY CREATURES INDEED •

HOME BREW CON 2017
PROUD SPONSOR

By Professor Surfeit



Back at You Bill and His Grinding Machine

Dear Professor,

When doing infusion mashes, I have found the time required for the mash to convert based on the iodine test has always been at least twice as long as the recipe says (e.g., when the recipe says "mash at 150° F [66° C] for 75 minutes, the actual rest time required per the iodine test is about 2 1/2 hours).

I discussed this with the local homebrew shop owner; he said to skip the iodine test because you were about 95 percent done at the end of the 75-minute recommended mash rest time. However, when I took his advice and mashed out and sparged after 75 minutes resting time, the specific gravity reading showed I had only gotten about half the expected conversion. The recipe was proven, the grain fresh, and the mash thermometers (I use two) were in calibration.

Do you have any ideas as to what I could do to get the actual mash rest time down to the recommended lengths? I suspect that at a commercial brewery, actual mash rest times that significantly overshoot the expected rest times would get "management attention."

Bill Miller
Dothan, Ala.

Dear Bill,
Maybe your grind is too coarse? That's my immediate reaction. When I see homebrewers grinding their malt in homebrew shops, often when I take a peek, the grind is much too coarse.

About your comment regarding those long mash times: in theory, professors of brewing science will tell you that most of the conversion takes place in about 30 minutes. Within 45 minutes of an all-malt mash, I consis-



tently get excellent conversion with English, American, German, and Belgian base malts.

Here's another thought that crosses my mind: maybe your water needs a bit more acidity? Adding some acidulated malt (sauermalz) or lactic acid might help, but it would likely not address the dramatic non-results you're experiencing.

I'll say it again—your grind might be too coarse. And when you do mash at the desired temperature, finish out a 35 to 45 minute mash by raising the temperature to 158–160° F (70–71° C) for about 10 minutes. That will usually get you where you want to be.

*Setting the coarse,
The Professor, Hb.D.*

Dear Professor,
Good news: setting my mill to a finer crush made today's mash come in on time and at the expected initial gravity.

The bad news is that my mill jammed a lot on the finer setting. I now have to grind my grain about half a cup at a time.

I have a commercial mill called the Barley Crusher, and I gather these are popular mills (a number of my friends have them, and I haven't heard any complaints from them).

A "jam" is indicated when the crank slips (hand operation) or the drill stalls (power operation). I can clear the jam by running the mill in reverse, but that sends uncrushed grain into the milled grist. Grinding in small batches minimizes the amount of grain that has to be reground.

As a retired nuclear plant engineer who used to troubleshoot equipment problems, my mill problem has caught my professional interest. Of course, if you have any ideas, let me know.

Bill Miller
Dothan, Ala.

Dear Back at You Bill,
Good on the good. Frowns upon the bad. Best to seek a way where the mill crank doesn't slip...or a torque adjuster. But I can see why it may be designed that way—if a small rock were to get into the mix, you wouldn't want that to go through.

Try running the grain through your mill twice. Start with a wide gap to get a good coarse crush, and then run your grain back through on a narrower setting to finish the job. Twice is nice!

Aha! I also see that you live in Alabama. I know that once I had a bag of malt that had too much moisture content, and it wreaked havoc on my mill too. High humidity does that. If somehow you could assure yourself that the malt is thoroughly dry, that would also help a lot.

A final adieu. I, too, am a retired nuclear engineer, but I retired the moment I received my BS degree in nuclear engineering. I drank enough beer that I became dyslexic and nuclear became unclear.

Rule the brew,
The Professor, Hb.D.

Running Away from the Runoff

Dear Professor-o,
I started out as an extract brewer and made some really terrific homebrewed lagers and ales. My all-grain friends couldn't

believe my brews were extract-based. I had so much fun with my "in your face" homebrews. But I wasn't satisfied. I wanted to have more fun. So I started all-grain brewing and now go back and forth between extract and all-grain, depending on how much time I have for fun.

Now my question: How important is it to have really clear mash runoff? I mean, like, homebrewers sometimes go nuts recirculating their mash runoff until they get clear wort. That can take up a lot of time, and I tend to drink a bit more homebrew while I wait (well, I suppose that's a good thing). So, if my runoff is a bit cloudy, is that bad?

In perpetuity,
Angelo Comangone

Dear Angelo-oh,
In the back of my mind, I always wondered about the same thing, but I abandoned my efforts to achieve crystal-clear mash runoff a long time ago. As I drifted towards a bit more hazy runoff and shorter runoff times, my beers kept being as good as I wanted them to be. Maybe even better. But I didn't put two and two together. My results and assumptions were not because of a scientific approach to comparison.

And then I was in Germany and attended a presentation by the German equipment manufacturer Ziemann, where they intro-

duced a new and very unique mash filtration system they called "Nessie." It kind of resembles Nessie the Loch Ness monster—sort of. You can learn more with a Google search of "Nessie Ziemann mash filtration." This system meets some very important capacity needs for some brewers. But one of the points that was made is that the resulting runoff is hazier than that of a traditional malt bed mash and lauter system.

Then they proceeded to explain that cloudy runoff is not necessarily a bad thing. It is just different. Equally good beer can be made with cloudy runoff. In fact, they don't know exactly why, but there are certain conditions and nutrients in hazy runoff that provide yeast with a better and more vigorous fermentation. The point here is that if you were to compare beer made from a traditional, clear runoff with that made from a hazy runoff, you may notice some differences, but the quality, stability, and other aspects are still excellent.

My world changed. I was surprised and had never encountered such a clear case for unclear runoff. After the presentation, I spoke with a veteran brewmaster from Molson, and he concurred that hazy runoffs do provide yeast with a different spectrum of nutrient-related conditions that seem to give the yeast a slight boost. If you are starting out with a new recipe, a great beer can be achieved. But if you have a consistent, desirable characteristic in your beer and you switch from clear runoff to hazy, the beer will likely be different—excellent, but not the same. With a clear understanding of brewing science and art, one could dial in a formula to duplicate beer qualities with either system, but that would take resources, and would probably be something a big brewer would rather not deal with. But, hey, homebrewers can turn on a dime! So the point of all this is to relax. Don't worry, have a homebrew, and don't get so crazy with trying to achieve clear mash runoffs. I don't. I love my beer. My yeast loves my wort. My friends love my beer, and my wife loves my beer. What's not to love with a bit of haze in your runoff?

Do it your way,
The Professor-o Yeah, Hb.D.

**Have a question for The Professor?
Send it to professor@brewersassociation.org.**

°CoolBot®

Build affordable cold storage with a **CoolBot** and a **Standard Air Conditioner**. Save **thousands** compared to traditional cooling systems.

Keg Room | Wine Cellar | Lagering | Fermenting

amazon.com
★★★★★
Made in the USA

USE ZYM10 for 10% off through 07/31/17

Ask about our new
CoolBot Walk In Cooler!

(888) 871-5723
sales@storeitcold.com
www.storeitcold.com

By Amahl Turczyn

Bière de Garde

One of my most memorable beer experiences happened way back in 1992, when our local Trader Joe's began carrying a mysterious French strong ale called Septante-Cinq. Named for its daunting 7.5% ABV, it was a dark amber brew, packaged in an elegant 750-mL bottle and topped with a cage and cork. Grande Brasserie Moderne in Roubaix, France brewed the beer, which is sadly no longer available, but it was unlike any beer I'd had before. Dark, ruby brown, with rich caramel aromas, prunes, toffee, a surprisingly dry finish for all that malt body, and a warm afterglow of alcohol—it was like doppelbock and Burgundy, complete with a cellar-like, corky, musty, earthy note. I vowed to visit Lille in Northern France to find out more about these beguiling brews that had an air of the rustic countryside, yet somehow retained the purity and refinement of traditional, malty, dark German ales and lagers.

Soon afterwards, Michael Jackson wrote about Septante-Cinq in his *Beer Hunter* travel notes, noting its blend of French winter and spring barley malt, dark crystal malt, and Flemish and German hops. He also observed that it was fermented with lager yeast, then lagered three months. I had been homebrewing about seven years at that time, and it was a beer I sorely wanted to make on my own.

Eventually, I did make it to Lille and the Franco-Belgian border, after touring Bruges, Flanders, and the Ardennes, and I remember being struck by how different each region's beers were despite the geographic proximity. Bière de garde is often lumped in with saison and other Belgian farmhouse ales, but although there is lots of room for interpretation, the best traditional examples of the style that I tried were as focused on rich malt flavors and



aromas as any bock or Baltic porter out there. Few examples sported farmyard, yeast-derived flavors, Brett, tartness, or herbal or floral distractions; I'd just visited Fantôme, Achouffe, and Oerbier, and most of these bière de garde brewers were going in an entirely different direction.

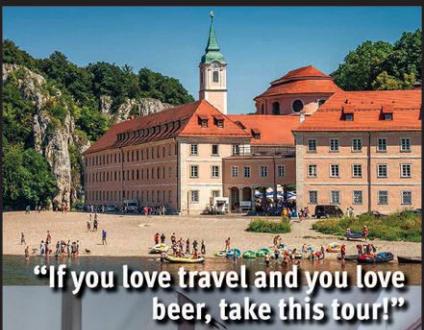
Another thing I quickly came to realize is that the intriguing, musty cork character that seemed to be a unique part of the style was in fact a defect, a result of too much time in transit from France to California. Bière de garde served from its brewery of origin usually did not have that cellar flavor, which is worth bearing in mind when attempting to brew the style at home and enter it for competition. On tap, fresh from three months of lagering, many dark versions of these strong beers were heady, decadent, malty, and mostly clean, with wine- or even port-like fruitiness above the dried fruit character.

BIÈRE DE GARDE WAS TRADITIONALLY BREWED IN THE SPRING, WHEN TEMPERATURES WERE STILL COLD ENOUGH TO MAKE STRONG, RELATIVELY CLEAN “KEEPING BEERS” THAT COULD BE STORED IN COOL CELLARS DURING THE HOT MONTHS.

Bready notes are mainly from the malt bill, whereas fruitiness can come from specialty malts like Special B, which imparts a nutty, date and raisin character, or from yeast. Many bières de garde use lager yeast strains fermented at higher-than-normal temperatures, or a combination of lager and ale yeast strains. This can contribute light ester production, with apple, pear,



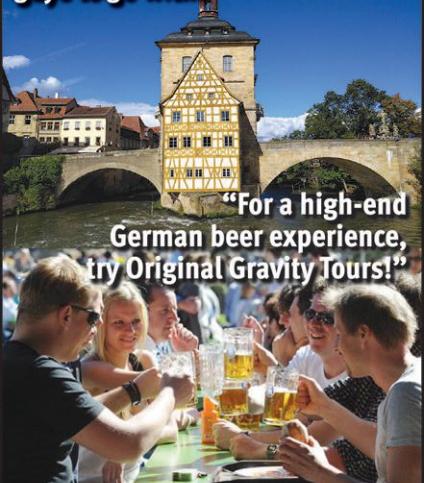
- Explore Munich, Bamberg & Bavaria
- Tour the world's oldest breweries
- Tour the Weyermann Malts® plant
- Ferry the Danube River & more!



"If you love travel and you love beer, take this tour!"



"To learn about the German brewing scene, these are the guys to go with."



Join Original Gravity Tours for a first-class, all-inclusive, 5 day/ 6 night tour of Munich, Bamberg & Bavaria!

Original Gravity Tours
OriginalGravityTours.com
(650) 430-9002
facebook.com/OriginalGravityTours



and plum being the most common. But while I tend to think of classic, traditional bière de garde as dark brown in color, there are light ones as well. As with Bavarian maibock, they carry a little more hop character, even though they are still malt-forward beers. Breweries also make amber *ambrée* versions that fall somewhere between the two.

Of course, there are some similarities to saison in terms of the style's origin and seasonality. Saison was brewed to reflect and celebrate what fresh, local ingredients were available to brewers at any given time of year. Lower in alcohol, drier, and usually with far more yeast (and sometimes bacterial) expression, saison was not a beer for keeping but one for quenching thirst. Bière de garde was traditionally brewed in the spring, when temperatures were still cold enough to make strong, relatively clean "keeping beers" that could be stored in cool cellars during the hot months.

In this and in many other ways, the style resembles Märzen beers of Bavaria, which were fermented cool and stored cool,

and thus had many months to smooth and mellow before they were consumed. Indeed, bières de mars, or March beers, were a subset of the style; as in Bavaria, March was considered about the last "safe" month to brew clean, cellar-bound beers, which would then be consumed as needed over the hot summer months. In more northern latitudes, you could easily get away with brewing one in May to lager until late August or September, especially with a dedicated lagering fridge humming away through the hot months.

It turns out that the brand that inspired my travels was a decent example of the style, but by no means the best. One of the oldest continuously brewed examples, and probably the easiest to find in North America, is Jenlain, brewed by the Duyck Brewery in the town of Jenlain, just south of Lille. It makes a somewhat spicy, though still very malt-forward 7.5% ABV bière de garde, Jenlain Ambrée, that incorporates some of the more rustic elements in the background, like hay, apple, vanilla, and burnt caramel. The finish is quite sweet, however, with caramel and toffee dominating.

A MATCH MADE IN HEAVEN

BIG MOUTH BUBLER® Innovative Fermentor — AND — DEPTH CHARGE™ Stainless Steel Infuser PURPOSE BUILT FOR HOMEBREWING

Hops, Fruit, Spices and Oak can be Easily Added.

Control and Extract with Minimal Mess and Without Over-Extraction.

Universal Lid Design fits Both Plastic and Glass Versions of the Big Mouth Bubbler®.

NORTHERNBREWER.COM

A more drinkable example is brewed by La Choulette in Hordain. The brewery makes the light-colored Bière Sans Culottes, which has a soft, pear-like fruitiness and a malty yet balanced finish. It is 6.5% alcohol by volume. La Choulette Ambrée is slightly stronger at 7.5% ABV and has a cleaner, maltier flavor with a heady warmth. These beers are fermented with an ale and a warm-fermenting lager strain, and they are bottled with a bit of the yeast so that they continue to condition and evolve.

Cuvée des Jonquilles, brewed by Brasserie au Baron in Bailleaux, is rather rare, but a real treat. It is also bottle-conditioned, and homebrewers have reported varying levels of success propagating yeast from the bottle dregs. It is dry, hoppy, and clove/banana fruity, with a medium gold-orange color and a strength of 7% ABV, and is a less clean version of the style. With its caramel and hay farmhouse character and earthy bitterness, it seems to bridge the gap between saison and bière de garde.

One not to be missed is brewed by Brasserie De Saint-Sylvestre, and is simply called 3 Monts. It's another golden bière de garde, and while the brewery is in France, the label reads, "Flanders Golden Ale." But it is a heavenly brew, with huge white lace, pear, banana, and faint pepper/herbal/lemon aromatics along the lines of Saison Dupont. There is more hop bitterness here than in most, with some grassy notes and a white wine finish that hides its formidable 8.5% ABV well. Definitely another one of the more "Belgian" bières de garde, with more yeast-derived character, it leans a bit towards an abbey-brewed tripel.

It's well worth your time to seek out these beers, since most are exported and widely available. A bière de garde tasting party is just the thing to explore the wide variety of this unusual, uniquely French style, and hopefully it will inspire you to home in on just the type you'll want to brew yourself. It's no surprise that the BJCP guidelines leave a lot of room for interpretation—bundled in with Belgian Ales, 24C's most consistent style attributes are malt-forward, strong, only lightly hopped, and usually well-attenuated, with a touch

of alcohol to dry the finish. Just know that if you are buying imported corked and caged 750s, age, oxidation, and musty cork flavors may be part of the profile—your homebrew, by contrast, will have the advantage of freshness, even if you choose to bottle and cork it.

Malt is perhaps the most important ingredient. Pilsner or pale malt can be used as a base, with around 20 percent highly kilned malts like Vienna or Munich to fill in complexity and color in the darker versions. A small percentage of aromatic and crystal malt is also appropriate here, though I tend to favor only the darkest of crystal malts,

like Special B. If you desire the blonde version, all base malt with perhaps Vienna malt and a bit of aromatic malt would be appropriate; the guidelines specify a range of anywhere from 6 to 19 SRM.

Mouterij Dingemans and Malteries Franco-Belges are two very good suppliers for the authentic malt complexity necessary for this style, and their base, high-kilned, and specialty malts can be used for dark and light versions. Adjuncts may also be part of the style's fermentables. Sugar may be added in very modest (8 percent) amounts to assist with the dry finish and boost alcohol slightly. Some

BIÈRE DE GARDE BRUNE

Recipe by Amahl Turczyn

Batch Volume:

5.5 US gallons (20.8 L)

Original Gravity:

1.071 (17.3° P)

Final Gravity: 1.009 (2.3° P)

Bitterness: 28 IBU

Color: 14 SRM

Alcohol: 8% by volume

MALTS

8 lb. (3.63 kg) Dingemans Belgian pale malt (3° L)

3 lb. (1.36 kg) Dingemans Belgian Munich malt (4–7° L)

1 lb. (0.45 kg) Dingemans Belgian aromatic malt (19° L)

1 lb. (0.45 kg) table sugar

8 oz. (225 g) Special B malt (180° L)

HOPS

1 oz. (28 g) Perle, 8% a.a. @ 60 min (22 IBU)

1 oz. (28 g) Strisselspalt, 4% a.a. @ 20 min (7 IBU)

YEAST

French ale yeast or German ale/Kölsch yeast (2 L starter)

WATER

0.4 g/gal. (0.1 g/L) calcium chloride added to reverse osmosis or distilled water

BREWING NOTES

Mash malts at 148° F (65° C) and allow to rest one hour. Apply heat or boiling water to increase temperature to 168° F (76° C) over 20 minutes. Hold at 168° F (76° C) for another 10 minutes to mash out. Sparge at 168° F (76° C). Boil 90 minutes, and add sugar 20 minutes before the end of the boil. Chill to 67° F (19° C) and oxygenate. Pitch a strong starter of yeast. Ferment at 65–69° F (18–21° C) until terminal gravity is reached. Rack, prime, and package in sturdy 750-mL Belgian bottles using a floor coker and wire cages for the corks. Allow the bottled beer to condition at 70° F (21° C) for 7 to 10 days, then lager the beer at 35° F (2° C) for at least 3 months.

EXTRACT VERSION

Substitute 6.25 lb. (2.83 kg) pale malt extract syrup for pale malt and 2.25 lb. (1.02 kg) Munich malt extract syrup for Munich malt. Steep aromatic and Special B malts at 155° F (69° C) for 30 minutes. Drain, rinse grains, and dissolve extract syrups completely in reverse osmosis water, then top off to desired boil volume. Proceed as above.

brewers also choose to add corn or wheat to lighten the body and finish.

Yeast is probably the next most important component, but there is a lot of room for experimentation here. A clean-fermenting lager yeast, perhaps fermented a bit above its normal optimal range, is one approach—I've had good luck with the Ayinger strain (purportedly White Labs WLP833 German Bock Lager and Wyeast 2487 Hella Bock Lager). German ale yeast also works well, especially strains that finish dry and impart clean wine-grape esters. Kolsch strains produce a predictably smooth, strong bière

de garde which then takes very well to prolonged lagering.

There are, however, ale yeasts available that are specific to the style's place of origin, among them White Labs WLP072 French Ale and Wyeast 3725 Bier de Garde. The latter may be hard to find, as it is seasonally available from January through March, but it combines strong fermentation and great alcohol tolerance with malt complexity, subtle spice, restrained ester production, good attenuation, and a slightly tart finish. As vigorous a yeast as it is, it likes things warm and will stall if temperatures fall much

below 70° F (21° C), but you can pitch at 69° F, wait a few days and then let it free rise to the mid 70s °F (low 20s °C) if you want to accentuate spicy characteristics. (Wyeast says you can bring it up as high as 84° F/29° C, but be prepared for more yeast-derived character at this temperature.) The cool start will minimize fusels and hot alcohol production, which is important for higher-gravity examples with sugar added. Fortunately, with this style things seem to mellow quite well during the long lagering.

Water is fairly straightforward if you begin with a reverse osmosis or carbon-filtered base. An addition of 0.4 g/gal. (0.1 g/L) of calcium chloride will keep your yeast happy and accentuate malt flavors.

Hops are not a big part of the style, but for greatest authenticity, try to find varieties grown in French Alsace. The classic is Strisselspalt, but minty, citrusy Aramis, a new aroma variety, is a great late-addition hop for paler examples of the style. Alternates are Continental classics like Perle and Northern Brewer for bitterness, and Saaz or Saphir for aromatics.

Corked 750-mL bottles make for a classy, authentic presentation, and you'll be tempted to cellar several from the batch to see how this strong keeping-beer evolves from month to month and year to year. Consider renting or borrowing a floor coker to insert the thick, mushroom-like Belgian corks at bottling—you might need a couple of trial runs to get the hang of using one, but it makes the whole procedure much easier. You can, of course, resort to kegging. *Bon chance!*

References

Jackson, Michael. "Biere Safari in France's Border Country." *Michael Jackson's Beer Hunter*. Last modified October 1, 1997. www.beerhunter.com/documents/19133-000129.html

Markowski, Phil. *Farmhouse Ales: Culture and Craftsmanship in the Belgian Tradition*. Boulder, CO: Brewers Publications, 2004.

Amahl Turczyn is associate editor of Zymurgy.

BIÈRE DE GARDE BLONDE

Recipe by Amahl Turczyn

Batch Volume: 5.5 U.S. gallons
(20.82 L)

Original Gravity: 1.069 (16.8° P)

Final Gravity: 1.011 (2.5° P)

Bitterness: 26 IBU

Color: 7.5 SRM

Alcohol: 7.6% by volume

MALTS

10 lb. (4.54 kg) Franco-Belges Pilsner malt

3 lb. (1.36 kg) Franco-Belges Vienna malt

1 lb. (0.45 kg) Franco-Belges aromatic malt

HOPS

1 oz. (28 g) Northern Brewer, 8.5% a.a. @ 60 min

1 oz. (28 g) Safir, 3.5% a.a. @ 20 min

1 oz. (28 g) Saaz, 4.5% a.a. @ 10 min

YEAST

Wyeast 3725 Bier de Garde yeast (2 L starter)

WATER

0.4 g/gal. (0.1 g/L) calcium chloride added to reverse osmosis or distilled water

BREWING NOTES

Mash malts at 148° F (65° C) and allow to rest one hour. Apply heat or boiling water to increase temperature to 168° F (76° C) over 20 minutes. Hold at 168° F (76° C) for another 10 minutes to mash out. Sparge at 168° F (76° C). Boil 90 minutes. Chill to 70° F (21° C) and oxygenate. Pitch a strong starter of yeast. Ferment at 70–72° F (21–22° C) until terminal gravity is reached. Rack, prime, and package in sturdy 750-mL Belgian bottles using a floor coker and wire cages for the corks. Allow the bottled beer to condition at 70° F (21° C) for 7 to 10 days, then lager the beer at 35° F (2° C) for at least 3 months.

EXTRACT VERSION

Substitute 7.5 lb. (3.4 kg) Pilsner malt extract syrup for the Pilsner malt. Mash aromatic and Vienna malts at 152° F (67° C) for 60 minutes. (Both have just enough diastatic power to convert their own starches, but they often need a little more time to do it.) Drain, rinse grains, and dissolve extract syrup completely in reverse osmosis water, then top off to desired boil volume. Proceed as above.

MINIBREW[®]
QUALITY BREWING EQUIPMENT

AFFORDABLE QUALITY BREWING EQUIPMENT

MADE IN THE USA

1 F6.5x Conical Fermenter

- Half the cost of stainless
- Ships ready to brew
- All stainless steel fittings and valves included
- Easily fits in a chest freezer
- Perfect for 5 gallon batches

2 15 Gallon Mash Tun

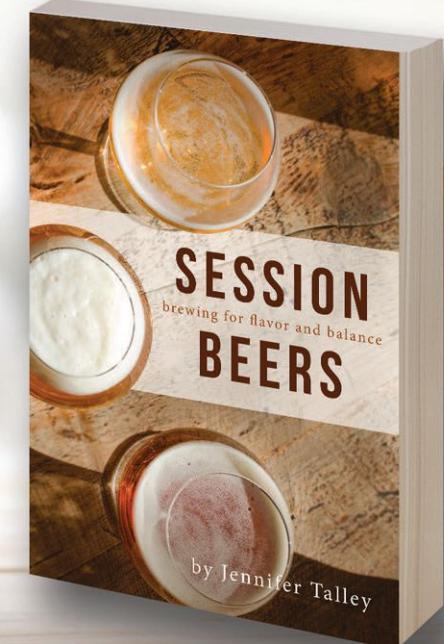
- Hold up to 35 lbs. of grain
- Retains heat better than stainless
- Comes with false bottom
- Optional sparge arm available

3 Easy Seal Stainless Steel Weldless Bulkhead

- Installs in seconds
- Liquid tight and food grade
- Easy to remove and clean
- Threaded on both ends

ORDER NOW & SAVE 10% USE PROMO CODE: **JFZYM** WHEN YOU ORDER!

www.minibrew.com



**COMING SOON
PRE-ORDER NOW!**



BREWERS
PUBLICATIONS

BREWERSPUBLICATIONS.COM



MEXICAN LAGER

By Amahl Turczyn



Modern Mexican lagers share their heritage with Vienna lager and date to the 1860s. Austrians emigrating to Mexico, then under the rule of the Austro-Hungarian empire, brought their fashionable lager style with them and, led by Santiago Graf, forged a hybrid Mexican-Vienna lager variant that has been popular ever since (see Style Spotlight in the Jan/Feb 2017 issue of Zymurgy). Use of abundantly available corn adjunct lightened the body of the new Graf Vienna style, saving brewers money and making a more refreshing, easier-drinking lager better matched to Mexico's warm climate.



But the cold fermentation process remained a part of the style, so clean, smooth lager character also remained, in both light and dark versions. Today, most of the lightest Mexican lagers have evolved into something not unlike mass-produced American light lagers—the “refreshing” aspect got a bit out of hand over the years, and has replaced most of the malt and hop character. Nearly all brands succumbed to this “blandification,” but some managed to retain some of the authentic character of the original Graf Vienna beers: to name a few, Bohemia and Victoria for the light beers, and Dos Equis Dark, Negra Modelo, and Noche Buena for the darker styles.

Mexican lagers have enjoyed widespread popularity for years in North America, alongside—and in some cases, in spite of—the increasing number of craft-brewed brands that have popped up over the past thirty years. Corona has consistently been

one of the top imports, appealing to beer enthusiasts as the ultimate clean, easy-drinking, refreshing summer quencher that, if you believe the marketing, drinks like a vacation in a bottle. Darker styles like Negra Modelo, with its roots in the Graf Vienna style, may have a smaller following, but it's a brand that also carries a distinctive mark of quality. It's also closer to what beer enthusiasts consider “craft beer.” But craft brewers are a wily bunch and not ones to be beaten at their own game—so, since the year 2000 at least, their response has been, if you can't beat Mexican lager, brew your own.

The craft Mexican lager phenomenon is thought to have started with Ska Brewing, in Durango, Colo. As the story goes, the brewers at one point sheepishly admitted they were closet Pacifico drinkers, and in 1999, decided to take a shot at making their own version, releasing it as a seasonal. “Before we started brew-

ing Mexican Logger, the heat of summer would hit us in Durango, and we'd slip into Pacifico mode, albeit pretty much in the closet, and it became difficult to hide our true selves,” admitted Ska president and co-founder Dave Thibodeau. “The only thing we could do was brew our own craft version, so we did, and the recipe remains the same today. And we put limes in it.”

Needless to say, it soon became a hit with craft beer fans too, earning the brewery a silver medal in the International Style Pilsener category at the 2015 Great American Beer Festival®, and Logger remains one of the brewery's most popular canned beers. Ska uses Saaz hops to the tune of 20 IBUs and keeps the beer light at 5% ABV.

Brewers seeking to craft their own Mexican lagers to enter for competition may wish to take note of Ska's choice of category—the BJCP lists Corona Extra as a commercial example of the 2A International Pale Lager, and Dos Equis Amber as a commercial example of 2B International Amber Lager.

Other craft breweries have followed suit. 21st Amendment's El Sully uses Pilsner and Vienna malts with flaked maize to produce a balanced, grainy-sweet 4.8% ABV lager fermented with an authentic Mexican yeast strain. Oskar Blues has added Beerito to its lineup, a dark style with Munich and Vienna malts, Hallertauer Mittelfrüh hops, and 4% ABV. Deep Ellum Brewing uses its house lager yeast (of Austrian origin) to produce a stronger take on the style: the smooth, corn-laden 6% ABV Neato Bandito. Ann Arbor's Wolverine State Brewing and Cleveland's Great Lakes Brewing have also entered the fray with Mexican-style lagers of their own.

As homebrewers, it seems our duty is clear: to take this phenomenon to the next stage and homebrew Mexican lagers of our own. So what are the hallmarks of a great Mexican lager? Across the board, these beers, whether light or dark, are squeaky clean. Like American Pilsners, they are difficult to brew by virtue of their clean signature—any flaws are easy to

Corona has consistently been one of the top imports, appealing to beer enthusiasts as the ultimate clean, easy-drinking, refreshing summer quencher that, if you believe the marketing, drinks like a vacation in a bottle.



Photos © Getty Images; courtesy Ska Brewing Co.;
21st Amendment Brewery; Oskar Blues Brewery

Like American Pilsners, they are difficult to brew by virtue of their clean signature—any flaws are easy to detect.

detect. For the homebrewer, that means good lager brewing technique is imperative. Another key signature is adjunct. Sure, rice can be used to lighten body, but corn can also add a flavor dimension that makes these beers distinct from their North American brethren. Pure water and a fresh grain bill are also obvious requisites, and while hops play a minimal role in this style, classic noble varieties like Saaz, Tettang, and Hallertau are really the only ones worth considering.

For the light style, Pilsner malt with a lesser percentage of Vienna, just enough to add a malty complexity but not enough

to add toasty or biscuit notes, will allow you to reproduce a pale lager with a true Vienna character. For the darker versions, Vienna and a lesser percentage of Munich malt add color and depth of flavor. Dark caramel malts lend a sweetness that goes well with the smoothness of the style and helps to balance adjunct dryness. Finally, to further deepen color, debittered or dehusked black malts can be added, though to avoid any burnt or roast character, it's best to keep them around one percent of the grain bill.

Adding corn adjunct can be easy, or it can be difficult, depending upon how much



WATER FOR MEXICAN LAGER

By Martin Brungard

Mexican lagers are known for their crisp, clean, and slightly sweet character. The water used to create these lagers needs to accentuate that character. Interestingly, the brewing water used for Mexican lagers is characterized by what it doesn't have. Read on!

To produce the clean flavor that is notable for this style, the water should have little ionic (mineral) content. Many tap water supplies are more mineralized than is desirable for brewing this style, and beers brewed with that water can end up with too much water character. That means it may be necessary to start with reverse osmosis (RO) or distilled water if your water supply is too mineralized.

RO and distilled water have little or no mineral content. While you can brew without minerals in your water, it's not ideal. At the very least, the mashing water should have enough calcium to help remove oxalate from your wort (which creates beerstone in the brewery and kidney stones in you!). To keep mineral content low while achieving this desirable goal, a good technique is to add the entire mineral dose calculated for the mash and sparge water volumes to only the mashing water. That temporarily boosts the calcium content in the mash and that content is diluted when the sparge water is added.

Calcium chloride and gypsum are recommended for use in this style. If you prefer a sweeter and fuller beer finish, use only calcium chloride at a rate of about 0.2 grams per gallon (0.053 grams per liter) of water. If you want a slightly drier beer finish, use calcium chloride and gypsum, each at a rate of about 0.1 grams per gallon (0.026 grams per liter) of water. Those rates mean that you need to use about 0.4 teaspoon (2 mL) of calcium chloride in 7 gallons (26 liters) of water, which would be typical for a 5-gallon (19-liter)

batch. Cut that dose in half if you elect to use both gypsum and calcium chloride.

The mash pH can make or break this beer. To produce that crisp flavor and pale color, it is important to make sure the room-temperature mash pH is down around 5.2. For the typical pale grists used in this style, some sort of acid will be needed in the mash to push the pH this low. Solid and liquid acids or acid malt are well-suited to this style.

Since water with low mineral content is recommended to brew this style, it won't take much acid to bring the mash pH into range. Adding about 0.6 mL of 88% lactic acid per gallon (0.16 mL/L) of mash water should be sufficient to bring a pale mash pH down. Don't worry, this low lactic acid dose should not create tangy flavor in your beer. Using a brewing water calculator is helpful for refining your acid and mineral additions.

The treatment recommendations above should enable you to create good beer, but you might consider adding a special touch in the form of citric acid. While the habit of adding a lime wedge to Mexican lagers is reputed to be to keep flies out of beer bottles, the taste of lime has been embraced by many drinkers. Adding citric acid to your finished beer can help mimic that effect. While this addition should be based on trial additions to a glass of the beer, keeping the citric acid dose below about 0.6 grams per gallon (0.16 g/L) should help avoid a citrusy twang in your beer. But that is the beauty of homebrewing: you get to decide what tastes best to you. Remember, when working with a glass of beer, the dose of citric acid is teeny. You can always add more, but you can't take it out of the beer. Start low.

THE MOST INTERESTING BEER IN THE WORLD LIGHT MEXICAN LAGER

Recipe by Amahl Turczen

Batch Volume: 5.5 US gallons (20.8 L)

Original Gravity: 1.048 (11.9° P)

Final Gravity: 1.009 (2.3° P)

Bitterness: 20 IBU

Color: 3.2 SRM

Alcohol: 5.1% by volume

MALTS

6 lb. (2.72 kg) Pilsner malt

2 lb. (0.9 kg) flaked maize

1.5 lb. (0.68 kg) Vienna malt

HOPS

1 oz. (28 g) Tettnang, 4.5% a.a. @ 60 min
(15 IBU)

1 oz. (28 g) Saaz, 4% a.a. @ 10 min (5 IBU)

YEAST

Mexican lager yeast (2 L starter)

WATER

1 g/gal. (0.3 g/L) calcium chloride added to reverse osmosis or distilled water

BREWING NOTES

Mash malts at 148° F (65° C) and allow to rest one hour. Apply heat or boiling water to increase temperature to 168° F (76° C) over 20 minutes. Hold at 168° F (76° C) for another 10 minutes to mash out. Sparge at 168° F (76° C). Boil 90 minutes, chill to 50° F (10° C), and oxygenate. Pitch a strong starter of yeast. Ferment at 50–55° F (10–13° C) until terminal gravity is reached. Raise to 60° F (16° C) and hold 2 days for a diacetyl rest. Crash to 35° F (2° C) and lager the beer at 35–40° F (2–4° C) for at least a month.

EXTRACT VERSION

Substitute 6 lb. (2.72 kg) Pilsner malt extract syrup for Pilsner and Vienna malts and 1 lb. (0.45 kg) dextrose for flaked maize. Omit calcium chloride. Dissolve extract and sugar completely in reverse osmosis water, then top off to desired boil volume. Proceed as above.

AUSTRIAN EXPAT DARK MEXICAN LAGER

Recipe by Amahl Turczen

Batch Volume: 5.5 US gallons (20.8 L)

Original Gravity: 1.052 (12.8° P)

Final Gravity: 1.012 (3° P)

Bitterness: 28 IBU

Color: 13 SRM

Alcohol: 5.2% by volume

MALTS

6 lb. (2.72 kg) Vienna malt

2 lb. (0.9 kg) Pilsner malt

1 lb. (0.45 kg) flaked maize

1 lb. (0.45 kg) 20° L Munich malt

0.5 lb. (227 g) 120° L crystal malt

2 oz. (57 g) Weyermann Carafa® II malt

HOPS

2 oz. (57 g) Tettnang, 4.5% a.a. @ 60 min
(28 IBU)

YEAST

Mexican lager yeast (2 L starter)

WATER

0.4 g/gal. (0.1 g/L) calcium chloride added to reverse osmosis or distilled water

BREWING NOTES

Mash malts at 148° F (65° C) and allow to rest one hour. Apply heat or boiling water to increase temperature to 168° F (76° C) over 20 minutes. Hold at 168° F (76° C) for another 10 minutes to mash out. Sparge at 168° F (76° C). Boil 90 minutes. Chill to 50° F (10° C) and oxygenate. Pitch a strong starter of yeast. Ferment at 50–55° F (10–13° C) until terminal gravity is reached. Raise to 60° F (16° C) and hold two days for a diacetyl rest. Crash to 35° F (2° C) and lager the beer at 35–40° F (2–4° C) for at least a month.

EXTRACT VERSION

Substitute 6.25 lb. (2.83 kg) Vienna malt extract syrup for the Vienna and Pilsner malts. Substitute 8 oz. (227 g) dextrose for the flaked maize. Substitute 1 lb. (0.45 kg) Munich malt extract syrup for the Munich malt. Omit calcium chloride. Steep crystal and Carafa® II malts at 155° F (68° C) for 30 minutes. Drain, rinse grains, and dissolve extract syrups and corn sugar completely in reverse osmosis water, then top off to desired boil volume. Proceed as above.



CELEBRATING
30 YEARS
OF CREATING PREMIUM LIQUID YEAST
AND FERMENTATION PRODUCTS

Wyeast altered the course of brewing history in 1986 when we introduced the Wyeast Culture Collection™. We provide the industry with the freshest quality products for beer, cider, wine, and more. Professionals and home enthusiasts alike have the latitude to brew their best and be part of the thriving craft beverage community.

Explore our strains at:

WYEASTLAB.COM

MEXICAN LOGGER

Recipe courtesy Ska Brewing Company, Durango, Colo.

Batch Volume:	5.5 US gallons (20.8 L)
Original Gravity:	1.047 (11.8° P)
Final Gravity:	1.007 (1.8° P)
Bitterness:	16 IBU
Color:	4 SRM
Alcohol:	5.4% by volume

MALT

3.3 lb.	(1.5 kg) extra-light malt extract syrup
3 lb.	(1.36 kg) extra-light dry malt extract
8 oz.	(227 g) Briess Munich malt 10° L

HOPS

1 oz.	Tettnanger hops, 4% a.a. @ 50 min
1 oz.	Tettnanger hops, 4% a.a. @ 30 min
1 oz.	Tettnanger hops, 4% a.a. @ 5 min
1.5 oz.	Czech Saaz hops, 3.8% a.a. @ 5 min

YEAST

White Labs WLP940 Mexican Lager

BREWING NOTES

Heat 2.5 gal. (9.5 L) of water to 150° F (66° C) and hold. Crush Munich malt, place into a malt bag, and steep at 150° F (66° C) for 20 minutes. Heat and raise the temperature of your brew pot to 170° F (77° C), then remove the malt

bag and let it drip out into your brew pot as you raise the wort to a boil. Compost or discard the spent grain.

Add extra-light malt extract and the extra-light dry malt extract to the brew pot. Heat to a rolling boil and boil for one hour, adding hops per the indicated schedule. At the end of the boil, pour the contents of the brew pot into a clean, sanitized carboy filled with 2.5 gal. (9.5 L) cool water. Aerate the wort. Ska suggests pitching yeast at 68° F (20° C), and holding until signs of fermentation appear, then cooling the beer to 50° F (10° C) for primary fermentation. If pitching a sufficient volume of yeast, however, you may choose to cool directly to 50° F (10° C) and pitch at that temperature. Allow beer to ferment out, about 2 weeks. When fermentation is complete, rack the beer to a secondary fermenter (carboy), and lager for 3 weeks at 40° F (4° C). Prime and bottle as normal, or rack to a keg and carbonate to 2.7 volumes (5.4 g/L) of CO₂.

ALL-GRAIN OPTION

Substitute 9 lb. (4.08 kg) Pilsner malt for malt extracts and mash with Munich malt at 148° F (65° C) for one hour. Apply heat or boiling water to increase temperature to 168° F (76° C) over 20 minutes and hold at 168° F (76° C) a 10-minute mash-out. Sparge at 168° F (76° C) and proceed with boil as above.

effort you want to put in and how much corn flavor you want out of your beer. Between 15 and 25 percent is typical, and it will give your lager Mexican street cred; plus, the extra fermentability of converted corn starches will add to what many craft brewers now refer to as “crushability.”

The easy way is flaked maize. It's already gelatinized, so you just measure it out and stir it in to your mash. Since diastatic power in highly kilned malts like Vienna and Munich is relatively low, a good rule of thumb is to include at least as much Pilsner or two-row malt, by weight, as you do corn adjunct. Popcorn is also a fun way to add pre-gelatinized corn to your mash, but it takes a lot of popping. The nice thing is that you get husk material along with the starches, so your sparge won't suffer as much.

Those seeking stronger corn flavor and aroma may wish to use a cereal mash, which allows you to use polenta corn or grits. You will need to gelatinize the corn

prior to adding it to the mash, but the reward is a noticeable corn aroma and flavor. To go one step further, I've experimented with using whole organic dent or field corn in a light Mexican Vienna style. Because the whole corn contains the germ (unlike grits or polenta), the flavor is even richer. The downside is having to mill the whole corn without introducing a lot of mash-sticking flour. The germ material also tends to gum up the mash, so as delicious a beer as that was, I would hesitate to revisit that 10-hour brew day without first arming myself with a bushel of rice hulls.

Mexican lager strains are good attenuators, and they can be coaxed into producing minimal esters if pitching rates are sufficient and the pitching temperature is on the low end of the fermentation range. Once fermentation starts, it must be kept firmly in control during the first week to ten days. A good, healthy starter is essential; overpitch if you must, but make sure you have a sufficient cell count. If you have a stir plate, this is a great time to break it out.

Some sulfur will be produced with these strains, but it should breathe out by the time you are ready to bump up temperatures for your diacetyl rest. A diacetyl rest is a good idea, as any hint of buttery character will scuttle your efforts at nailing the style. I've had great results from my “house” lager strain, Czech Budějovice. It attenuates a bit further than the Mexican lager strains, but that tends to work well with the style, especially the dark version, as it adds a bit more crispness to the finish.

My water treatment for this style is fairly simple: reverse osmosis or distilled water with 1 gram per gallon of calcium chloride to really bring out malt and corn flavors. For a more detailed discussion of the water chemistry of Mexican lagers, see the accompanying sidebar “Water for Mexican Lager” by Martin Brungard. *Salud!*

Amahl Turczyn is associate editor of Zymurgy.



RAHR MALTING CO.

MALT of REPUTATION

*Since 1847, Rahr has been committed
to long-term relationships
built on quality, service, and consistency.*

*John Heitzman,
retired Rahr maltster*



BSG HandCraft is a proud
distributor of Rahr Malting Co.
products in the U.S.

bsghandcraft.com

@bsghandcraft
 @bsghandcraft
 @bsgcraft



Wicked Good IPA

“Drink from the can!” This suggestion for consuming a Heady Topper double IPA from The Alchemist brewery in Waterbury, Vt. stands out on the container. Beer conspiracy theorists speculate that the brewery’s directive is there to hide the hazy beer from the consumer’s sight, but since Heady Topper’s debut, hazy IPAs have developed a cult following. Since so many examples have been produced in the northeastern corner of the United States, this beer style has been named “New England,” or “North-East” IPA (abbreviated NEIPA). Such beers often showcase robust haze, with some likening them to glasses of orange juice.

By Aaron Ellis



“The defining characteristics of the NEIPA (besides the haze) are a soft mouthfeel, a little bit of sweetness, and lots of hop aroma and flavor with a small amount of bitterness.”



A Hoppy History

Any discussion of NEIPA must necessarily begin with the history of American IPA itself. One of the first “hoppy” American beers in the modern sense of the word—Liberty Ale—was brewed by Anchor Brewing Co. in 1975 and boasted 40 IBUs. Not long after its release, other West Coast breweries started making increasingly bitter beers.

Sierra Nevada Brewing Co.’s Pale Ale was released in 1980 with 38 IBUs, and Blind Pig’s Inaugural Ale in 1994 featured 90 IBUs. Over time, American beers have become more bitter and recognizable by their intense hop flavors, reaching an apex in the 2000s with a “hops arms race” to brew the most bitter, most hoppy beer possible. For the most part, these incredibly hoppy beers remained a West Coast obsession, with Green Flash Brewing Co. in San Diego going so far as to name one of its beers West Coast IPA, which has 95 IBUs and is 8.1% alcohol by volume.

For a time, hopheads could get their fill on extremely hoppy, over-the-top beers. The beers themselves highlighted high alpha acid hops, particularly through late boil and dry hop additions. A classic example of this approach is Sierra Nevada’s Torpedo Extra IPA, which is dry hopped with Citra. West Coast IPAs are perhaps best described in the BJCP’s American

IPA category as “A decidedly hoppy and bitter, moderately strong American pale ale, showcasing modern American or New World hop varieties. The balance is hop forward, with a clean fermentation profile, dryish finish, and clean, supporting malt allowing a creative range of hop character to shine through.” Many IPA recipes now contain table sugar for dryness, neutral malts (standard 2-row), and a neutral yeast (customarily the Chico strain: Wyeast 1056, White Labs WLP001, or Safale US-05). The beer, according to the BJCP, “should be clear,” though some haze is acceptable.

The NEIPA, while full of hop flavor and aroma, is in many other aspects the opposite of the West Coast IPA. NEIPAs are intentionally brewed not to be incredibly bitter and instead to “give you wave after wave of hop flavor without any astringent bitterness,” as Heady Topper is described right on the can. First brewed in 2003 by The Alchemist, Heady Topper, and its similar, but less alcoholic sibling, Holy Cow, offer incredible hoppiness but less bitterness than a West Coast IPA. The outcome is lots of haze and very popular beers. The style spread, first just around Vermont to Hill Farmstead’s Abner and Lawson’s Finest Liquids’ Sip of Sunshine, then around the Northeast to breweries like Trillium, Treehouse, and Tired Hands. This style

has now spread to countless breweries around the country, but the style and technique remain the same.

John Kimmich, founder of The Alchemist, says that haziness is a product of the process rather than by design and that the beer will clear with time. He has demonstrated this by pouring a cloudy, freshly canned Heady Topper next to a clear sample that has sat for several weeks. To many NEIPA fans, letting one of these beers sit around is unthinkable, as this is a style that does not age well and demands to be consumed fresh. The argument is that as the beer sits and ages, the volatile hop oils degrade, malt comes more into focus, and the beer is thrown off balance. The defining characteristics of the NEIPA (besides the haze) are a soft mouthfeel, a little bit of sweetness, and lots of hop aroma and flavor with a small amount of bitterness. Whereas West Coast IPA aims for dryness and bitterness, its East Coast counterpart balances restrained bitterness with sweetness and supreme drinkability.

Having tasted this beer style extensively while living in New England, I have put together some of the best methods to reproduce this beer at home. This information is pulled from my own experience and from brewing blogs of devoted followers of the NEIPA style.

Water for New England IPA

By Martin Brungard

As mentioned in this article, New England style IPA (NEIPA) focuses on creating juicy and fruity perceptions in the beer. The water used to brew this beer can help produce those results. Let's look at several factors for success.

The first item is the ionic content of the brewing water. NEIPA water employs high chloride content and modest sulfate content. This is quite different from typical pale ale brewing water which has sulfate content well above 100 mg/L and low chloride content to impart the dryness that is typical of that style. Chloride enhances the perception of fullness in beer. That fullness accentuates the malt character, including perception of "juiciness" and sweetness in the finish. Big, juicy fullness comes from boosting the chloride content into the 100 to 150 mg/L range while keeping the sulfate content down in the 50 to 75 mg/L range. Don't assume that reducing the sulfate content to zero will be better for this style. The minor degree of drying from the recommended sulfate content helps balance the fullness. Mineral additions of gypsum and calcium chloride are well suited for boosting the sulfate and chloride levels in brewing water.

The pH of the mash and wort is another thing to focus on. Targeting a room-temperature mash and wort pH of about 5.25 to 5.35 will help produce the crispness needed for this style. The typical NEIPA grain bill may not have enough acidity to bring the mash and wort pH that low. Even when starting with very low alkalinity water like reverse osmosis (RO) or distilled, some form of acid addition may be needed for the mash. If your water source has alkalinity, adding acid to the mash and sparge water is necessary.

Liquid acids, such as relatively clean-tasting lactic and phosphoric acids, are well suited to this style. However, malic and citric acids can be used to add more fruity notes to the beer. Malic and citric acids are typically sold in their solid form in the winemaking section of your homebrew shop. Use malic and citric acid sparingly since their flavors can easily overwhelm the beer itself. A combination of these liquid and solid acids can be used to bring the mash and wort pH down while creating appropriate flavor contribution from those acids. Adding acid malt (which contains lactic acid) addition is another option for reducing mashing pH.

To create water suitable for NEIPA, it helps to know what's in your tap water supply. Since you may not have that information, we'll assume that virtually mineral-free RO or distilled water is the starting point in this example. To provide the sulfate level we want, adding gypsum at a rate of up to 0.5 grams (1/8 tsp.) per gallon of water (0.13 grams or 0.62 mL gypsum per liter of water) is recommended. Adding calcium chloride at a rate of up to 0.9 grams (1/4 tsp.) per gallon (0.24 grams or 1.23 mL gypsum per liter of water) will provide a desirable chloride level. Adding those minerals in those doses should push the mash pH down into the desired range without the need for acid additions.

If your water supply is alkaline tap water (most tap water has alkalinity!), it may be necessary to employ acid to neutralize that alkalinity and bring the mash and wort pH into the desired range. This is not necessarily a bad thing since this can enable us to add those fruity malic and citric acids to the beer. To avoid overt flavor impacts from those acids, their dosages should be less than 0.5 and 1.0 grams per gallon (0.13 and 0.26 g/L) for citric and malic acid, respectively. The actual dosage should be based on what is needed to meet the wort's pH target and upon the beer taste. The amount of acid needed depends on the acid strength and the amount of alkalinity in the water supply, so it's not possible to present a single treatment recommendation.

Knowing the ionic content of your water supply and calculating mineral and acid additions with a program like Bru'n Water are recommended when brewing with tap water. If you don't have access to those resources, adding any of those acids directly to a glass of the beer is an option. Be aware that the amount of these acids added to a glass of beer will be very small. Start with a small dose and taste to figure out if the additions improve the beer. Scale your final dose up to the batch size when you're satisfied with the result.



Focal Point (A Focal Banger Approximation)

Recipe by Amahl Turczyn and Dave Carpenter with help from John Kimmich of The Alchemist

We built this recipe with some trial and error here at the AHA. Several of us sat down with a few cans of Focal Banger to take notes and discuss what we tasted. Then, Zymurgy associate editor Amahl Turczyn brewed a few test batches, which we selflessly drank in the name of science as we honed the recipe. What we have here is our best attempt at cloning Focal Banger using our own senses and a few clues from John Kimmich, head brewer and owner of The Alchemist.

Hops and malt are important, of course, but John offers these words of wisdom on water treatment: "I believe that a good IPA has to have a certain level of mineral 'blockiness' to carry the hops and keep it from getting too tiresome on the palate. However, since the changes brought about by different water treatment are so subjective, I like to leave that up to the homebrewer to figure out. There are a lot of people out there who love the soft, chalky stuff that is all the rage now. They'll have to settle on that the same way I did—trial and error. The only really important part, in my opinion, is hitting the proper mash pH of 5.2–5.3."

Many thanks to John for reviewing our recipe and supplying the "control" samples for comparison. We would tell you to be sure to visit The Alchemist in Waterbury, Vt. on your next trip to New England, but as a reader of Zymurgy, we suspect it's already on your list.

Batch Size: 5.5 US gallons (20.8 L)

Original Gravity: 1.064 (15.6° P)

Final Gravity: 1.012 (3.2° P)

Bitterness: 80 IBU

Color: 5 SRM

Alcohol: 7% by volume

MALTS

9 lb. (4.08 kg) Pearl malt (65%)

4.8 lb. (2.18 kg) Pilsner malt (35%)

HOPS

6–7 mL CO₂ hop extract @ 60 min (50 IBU)

1 oz. (28 g) Mosaic, 12.25% a.a. @ 10 min (14 IBU)

1 oz. (28 g) Mosaic, 12.25% a.a. @ 5 min (8 IBU)

1 oz. (28 g) Mosaic, 12.25% a.a., whirlpool or hop stand 10 minutes (8 IBU)

4 oz. (113 g) Citra, 12% a.a., dry hop 3 days before packaging

YEAST

White Labs WLP095 Burlington Ale Yeast, Omega Yeast Labs DIPA, GigaYeast Double IPA, The Yeast Bay Vermont Ale, or Imperial Organic Yeast Barbarian

BREWING NOTES

Mash at 150° F (66° C) for 75 minutes, collect wort, and boil for 60 minutes. If you don't have the equipment to perform a whirlpool at the end of the boil, simply conduct a hop stand by steeping the final addition of Mosaic in the hot wort for 10 minutes before you begin chilling.

EXTRACT VERSION

Substitute 6.3 lb. (2.86 kg) Maris Otter liquid malt extract and 3.4 lb. (1.54 kg) Pilsner liquid malt extract for the Pearl malt and Pilsner malt, and proceed with boil. If boiling a concentrated wort, you may need to increase the 60-minute addition of hop extract to make up for utilization loss.

Sloop Juice Bomb Clone

Sloop Brewing Co. in Elizaville, N.Y. calls Juice Bomb a “hazy, golden, unfiltered IPA.” Low bitterness and late hopping showcase the citrusy, juicy notes of American hops, with a blast of tropical aroma followed by a resiny, balanced flavor.

Batch Size: 5 US gallons (19.8 L)

Original Gravity: 1.060 (15° P)

Final Gravity: 1.012 (3° P)

Bitterness: 32 IBU

Color: 4 SRM

Alcohol: 6.5% by volume

MALTS

11.25 lb. (6.3 kg) 2-row pale malt

1 lb. (454 g) raw unmalted wheat

HOPS

0.5 oz. (14 g) Columbus/Tomahawk/Zeus pellets, 16.9% a.a. @ 60 min

1 oz. (28 g) Citra pellets, 12% a.a., whirlpool

1 oz. (28 g) Simcoe pellets, 14% a.a., whirlpool

1 oz. (28 g) Amarillo pellets, 9% a.a., whirlpool

4 oz. (113 g) Citra pellets, 12% a.a., dry hop 6–7 days

1 oz. (28 g) Simcoe pellets, 14% a.a., dry hop 6–7 days

1 oz. (28 g) Amarillo pellets, 9% a.a., dry hop 6–7 days

YEAST

English Ale yeast with medium attenuation and medium flocculation

BREWING NOTES

Aim for a water profile that has equal concentrations of chloride and sulfate. Perform a single infusion mash rest at 148° F (64° C) for 60 minutes. Transfer wort to kettle and boil for 60 minutes, adding hops as scheduled. At flameout, add whirlpool hops. Let hops stand for 30–60 minutes and rack to a clean, sanitized fermenter. Ferment at 68° F (20° C) for 5–7 days, then rack and add dry hops for an additional 6–7 days. Rack to a clean vessel for packaging.

EXTRACT VÉRSION

Substitute 8 lb. of pale dried malt extract for the grain and follow the same hop and fermentation schedule.



FAST & FREE SHIPPING

Free shipping on orders over \$59.

1 to 2 day ground shipping to 88% of U.S. residents.

WHAT'S NEW AT MOREBEER.COM



NEW! MKII High Temp Magnetic Drive Pump
\$69.99



NEW! Kegerators Starting @ \$579.99
FREE SHIPPING!



NEW! MaltMuncher 2 Roller Grain Mill
\$99.99



NEW! Blichmann Inline Oxygenation Kit
\$114.99



NEW! 2 L Ultimate Double Walled Growler
\$24.99



NEW! 14 G Brewmaster Brew Bucket
\$350.00

LIC Project Party Crasher

Brewed by LIC Beer Project in Queens, N.Y., Party Crasher is an easy-drinking IPA loaded with late addition Citra and Mosaic hops. The aroma is fruity and citrusy with an earthy pine resin. A subtle hop bitterness leads to a soft malt backbone. The beer finishes long and dry.

Batch Size: 5.5 US gallons (20.8 L)
Original Gravity: 1.059 (14.5° P)
Final Gravity: 1.012 (3° P)
Bitterness: 60 IBU
Color: 4 SRM
Alcohol: 6.2% by volume

MALTS
10.5 lb. (4.76 kg) 2-row pale malt
11 oz. (312 g) flaked oats
8 oz. (227 g) Simpsons® Golden Naked Oats
4 oz. (113 g) Vienna malt

HOPS
0.5 oz. (14 g) Nugget, 13% a.a. @ 60 min
1 oz. (28 g) Citra, 12% a.a. @ 5 min
1 oz. (28 g) Mosaic, 12.3% a.a. @ 5 min
1 oz. (28 g) Nugget, 13% a.a. @ 5 min
1 oz. (28 g) Citra, dry hop 7 days
1 oz. (28 g) Mosaic, dry hop 7 days
1 oz. (28 g) Nugget, dry hop 7 days
1 oz. (28 g) Citra, dry hop 3 days
1 oz. (28 g) Mosaic, dry hop 3 days
1 oz. (28 g) Nugget, dry hop 3 days

YEAST

Wyeast 1318 London Ale III

BREWING NOTES

Aim for a water profile that has equal concentrations of chloride and sulfate. Perform a single infusion mash rest at 148° F (64° C) for 60 minutes. Transfer wort to kettle and boil for 60 minutes, adding hops as scheduled. Rack to a clean, sanitized fermenter and ferment at 68° F (20° C) for 5–7 days. Rack to secondary and add dry hops in two stages as indicated. Rack to a clean vessel for packaging.

PARTIAL-MASH VERSION

Mash 2 lb. (0.9 kg) pale malt with oats and Vienna malt at 150° F (68° C) for 60 minutes. Drain, rinse grains, and dissolve 6.5 lb. (2.95 kg) pale malt extract syrup into the resulting wort. Top off to desired boil volume with reverse osmosis water and proceed as above.



GREAT BEER GROWS HERE.

VAN HORN FARMS, MOXEE, WA

YCHHOPS



HOPUNION LLC IS NOW YCH HOPS.

NEW NAME. NEW LOOK.
SAME PREMIUM QUALITY HOPS.

Beginning in early 2016, look for the new YCH HOPS packaging and connect with growers like Rich Van Horn of Van Horn Farms, Inc. For more than 40 years, Rich has been committed to the craft brewing community. His dedication to providing a premium product has led Van Horn Farms to earn top industry honors, including the Hop Quality Group's first-ever Cascade Cup in 2013. To learn more about how our growers' dedication to world-class quality and service is benefiting you, visit ychhops.com.

Phone: 509.453.4792 | Fax: 509.453.1551 | Email: hops@ychhops.com | Web: www.ychhops.com

Water Chemistry

Paying special attention to water chemistry can improve almost any beer, but it is almost essential to adjust your water to accomplish the soft mouthfeel that characterizes NEIPA. Adding calcium chloride (CaCl_2) is the most important, while adding sulfate (SO_4) has become almost standard for hoppy beers. Sulfate enhances hop character, while calcium chloride contributes softness. I've had good success adding at a 1:1 ratio in concentrations of about 150–200 parts per million (ppm), but that's not the only approach. For an in-depth look at the water chemistry of New England IPA, see accompanying "Water for New England IPA" by Martin Brungard.

Malts

NEIPAs do not have a striking grain bill, and in fact are very similar to most other IPAs that a homebrewer might make. Popular recipes stick with English base malts—my favorite is Maris Otter—but Golden Promise is also common. Using crystal malts darker than 20° L is discouraged, as residual sweetness in these beers usually comes from using a less attenuative yeast and not from crystal malt. Sugar is also rarely added since the beer is not dry, and instead aims to have a soft mouthfeel.

Some recipes call for flaked grains such as oats, barley, or wheat to help deliver a smooth mouthfeel, but it is recommended not to exceed 20 percent of the grist by weight. Adding these to my grain bill improved my beer significantly, especially when I was still dialing in my water chemistry. There seems to be a split between commercial brewers of this style on whether to use flaked grains or not—I recommend experimenting and seeing which you prefer.

Hops

To achieve comparatively low bitterness with the high-alpha acid hops typically used in this style, add fewer than 30 IBUs worth of bittering hops at the beginning of the boil. Save the remainder for the final 10 minutes, flameout, whirlpool, and/or a hop stand. Most of the hops used in NEIPA have big citrus and stone fruit aromas. Common examples include Citra,

Galaxy, Mosaic, and Simcoe. Centennial and Columbus are also popular for adding some dank or piney bitterness.

Another key to the style is to add dry hops *before* the end of fermentation to take advantage of biotransformation, in which yeast interacts with hop oils to deliver strong, fruity aromas. I recommend dry hopping with about 1 oz. per gallon about three to seven days after pitching the yeast. Additional conventional dry hop additions can be added after fermentation is complete.

Yeast

The preferred yeast for NEIPA is usually Conan, which is the strain purportedly used by The Alchemist. While culturing some yeast from a can of Heady Topper is possible, the beer is hard enough to find that it makes sense to use the services of a yeast lab. Commercial cultures of Conan include • Omega Yeast Labs DIPA,
• GigaYeast Double IPA,
• The Yeast Bay Vermont Ale,
• Imperial Organic Yeast Barbarian, and
• White Labs WLP095 Burlington Ale Yeast.

GREAT BREWING REQUIRES ACCURATE TEMPERATURE CONTROL

- Convenient switch-selectable COOL or HEAT mode
- Simple, intuitive operation; no programming required
- Unique Duty-Cycle feature for optimizing temperature stability
- 8' Plug-in replaceable sensor probe (optional bottle probe for storage)
- Adjustable from 10 – 220°F, with bright 3-digit LED display
- Load capacity @120VAC up to 13A (1500W for Heating)
- Built-in automatic temp and sensor alarms
- Produced in the USA, with 3-Year Factory Warranty

Dealer Inquiries Invited

UNI-STAT IIa



BH Enterprises • (800) 973-9707 • TempStatControls.com • Since 1984

ONLY TWO HOME
BREWERS HAVE
EVER BEATEN THE
BIG BREWERIES
IN AN INTERNATIONAL
BEER COMPETITION*
AND THEY BOTH USED
OUR INGREDIENTS.

*Asia Beer Awards



THESE ARE PREMIUM QUALITY NO BOIL EXTRACT KITS.
CHECK OUT THE REVIEWS ON AMAZON.

THE RANGE INCLUDES A HARD APPLE CIDER CONCENTRATE KIT



AVAILABLE AT AMAZON.COM
& BETTERBREWING.COM
FOR MORE INFO VISIT US AT
WILLIAMSWARN.COM





Since 1984

Serving You for
Over 30 Years

**BEER • WINE • CHEESE
CIDER • MEAD • SPIRITS**

Supplies • Equipment • Advice
Let us help you make your own!

www.homebrewery.com

Ozark, Missouri
800-321-BREW • (417) 581-0963

Other popular strains include 1318 London Ale III, 1335 British Ale II, and 1028 London Ale from Wyeast, as well as White Labs WLP013 London Ale Yeast and WLP022 Essex Ale Yeast. These yeasts interact with the dry hop additions to create the fruity aromas that are characteristic of the style.

One thing to remember if you are attempting to create a similarly hazy beer is to forgo adding gelatin or other fining agents. Staying away from finings keeps more yeast in suspension, and there is also an argument that finings can strip some of flavor, to which yeast is a contributor.

Other Suggestions

With hop-forward beer styles like NEIPA, it's critical that oxygen be avoided after the initial dose at pitching. My first attempts at bottling this style yielded a pretty good IPA, but once I started kegging, the beer changed into something much better. I suspect that the oxygen introduced at bottling is enough to oxidize and degrade the volatile hop aromas. Those delicate hop compounds also demand that the beer

be consumed fresh. I begin drinking my NEIPA from a keg within 10 to 14 days of brewing, making this a quick turnaround beer to brew as well as to drink.

NEIPA is still relatively new and keeps changing as more breweries play with the style and continue innovating. In January 2017, the BJCP released a statement saying that NEIPAs should be entered into the Specialty IPA category, officially recognizing the beer and giving it a short description as "balanced to fruity or tropical aroma and flavor hops with subdued bitterness, a cloudy appearance, and a fuller, creamier mouthfeel." Perhaps this is the first step in recognizing this new and popular style.

Aaron Ellis is a second-year PhD student in anthropology and food studies at Indiana University. He studies the craft beer revolution and examines how people learn to brew and progress from hobbyists to professional brewers. Aaron currently works at Butler Winery and Homebrew Supply in Bloomington, Ind.



Extra Special.



"For that classic ESB flavor you need look no further than London ESB yeast from Lallemand - all the characteristics of a classic ESB strain in a convenient dry form"

John Keeling

Head Brewer
Fullers Brewery, London

Say hello to London ESB dry yeast, a true English ale strain selected for reliable fermentation performance and moderate ester production that lets the delicacies of the malt and hop aromas shine through. London ESB is a brilliant choice not only for brewing Extra Special Bitter but for other authentic heritage UK styles like Pale Ale, Bitter and Mild. Like all our other brewing yeasts, Lallemand offers the unmatched purity, performance and ease-of-use that only dry yeast can deliver.

Bring out the best in your next English ale with new London ESB premium yeast from Lallemand Brewing. Visit our web site at www.LallemandYeast.com for complete information on London ESB and our entire line of brewing products. Cheers!

WWW. LALLEMAND BREWING.COM



All Natural Since 1876

I WORK FOR BEER



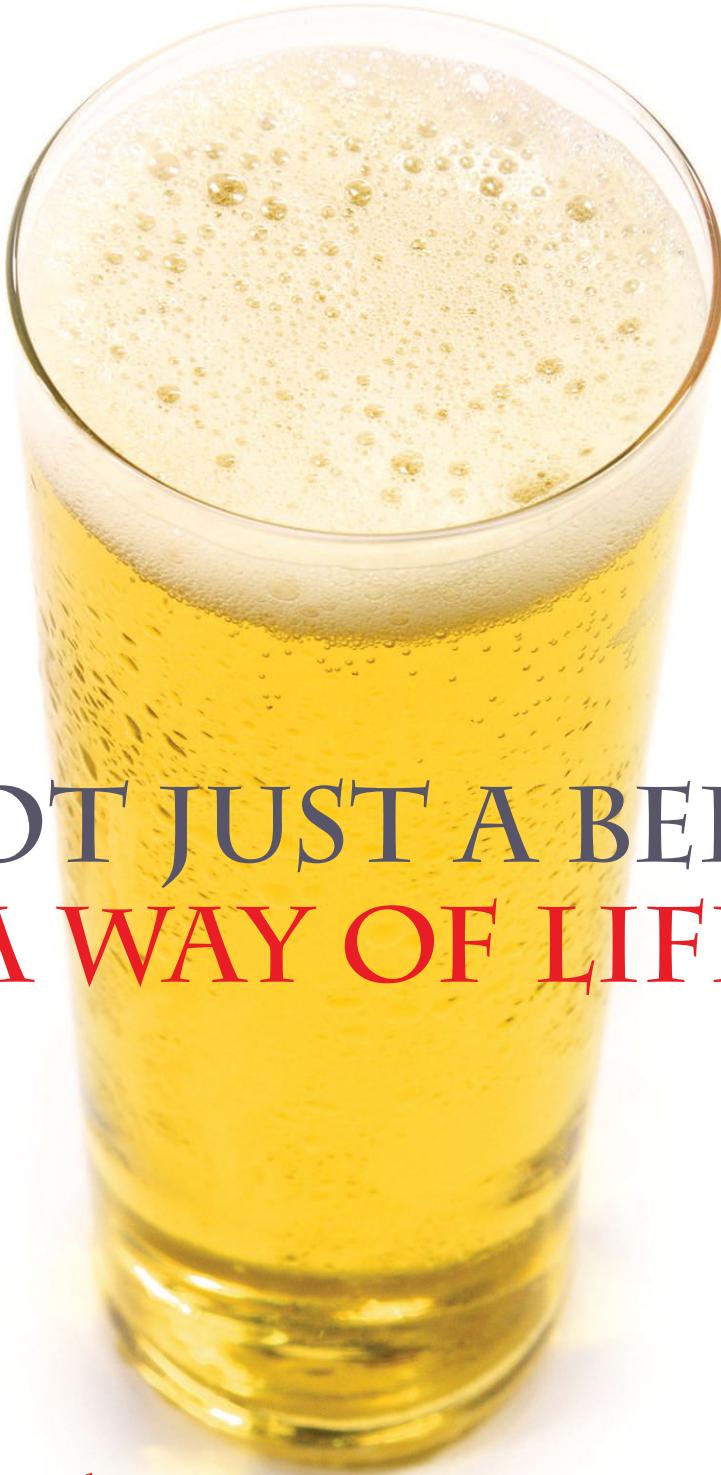
At Briess we work for beer. From our growers to our maltsters, we're as passionate about craft and homebrew beer as you are. So next time you fire up the kettle, brew with our handcrafted specialty malts and taste the passion for yourself.
BrewingWithBriess.com/Homebrew | info@BrewingWithBriess.com



KÖLSCH

By Dave Clark





NOT JUST A BEER, A WAY OF LIFE

Germany is home to some of the finest beer styles in the world, and one of the finest of the finest must certainly be Kölsch. Travel down the Rhine river to Köln (Cologne in English, via French), and you'll find a unique treasure of a beer style. Indigenous to its eponymous city, Kölsch isn't just a beer: it's a way of life. [>>](#)



Köln was a city under siege during the Second World War. Like the city itself, many of its breweries were devastated, and a complete rebuild was necessary after the war had ended. In that spirit, the brewers of Köln rallied together and adopted a style of beer to make their own, calling it, appropriately, Kölsch. This ale would become the pride of Köln, and brewers were determined that it would properly represent their city.

THE BREWERIES OF COLOGNE

A proclamation known as the Kölsch Konvention, signed by two dozen Köln breweries in 1986, decrees that only beers produced within the Köln city limits can officially be called Kölsch. Any beer that mimics the style should instead be referred to as "Kölsch-style." This appellation gave the citizens of Köln their own world-renowned beer, even if they consume much of it on draft within earshot of the breweries that make it.

Servers known as *köbes* (a local form of the name Jakob) eagerly pour Kölsch throughout the bierhäuser (beer houses) of Köln. It's a longstanding custom that these traditionally blue-jacketed, male

servers wind their way through Köln's pubs with determined focus and ensure patrons don't go thirsty. In fact, it's easy to have an empty glass because Kölsch is served in small, 200-mL cylindrical glasses known as *stangen*. The *stange*, which translates as *bar* or *rod*, is the official glassware of Kölsch and is specifically designed for this single style of beer.

A traditional *stange* showcases the brilliant clarity of the ale within and helps sustain its long-lasting, frothy white head. As patrons drain their glasses, *köbes* mark the coasters with slash marks to tally consumption. They continue serving Kölsch at rapid-fire pace until a customer places the coaster atop his or her glass. This signals the *köbes* to stop serving and calculate the tab. Using small glassware gives bar owners more profit per unit volume of beer but keeps servers hustling day and night to satisfy demand.

Not many Köln breweries export their product; most brew it to be enjoyed within the city limits, usually on draft. However, a handful of breweries established near the turn of the 20th century do export to North America. The leading



exporter is Reissdorf, and Gaffel is not far behind. These two large breweries produce classic examples of Kölsch. Other fine examples that can be found beyond Köln include Früh, Sünner, and Zünft.

In his book *Kölsch*, Eric Warner describes two dozen breweries in and around Köln and suggests a few must-sees. Warner emphatically endorses Hausbrauerei Päffgen, where the beer is, in his words, “as good as Kölsch gets. Dispensed from wooden casks that are placed atop the bar, the beer has a delicate carbonation that can only come from beer served this way.” He goes on to say that “if you have time to see only one brewery or brewpub while in Cologne, make it Päffgen.”

Brewmaster Rick Seibt of Willoughby Brewing Company near Cleveland, Ohio, loves Köln and its famous beer style (he has visited at least six times). Seibt says, “In the city of Köln, with all the bierhäuser within a neat walking distance of each other, it’s easy to try all the beers in a day. I usually start with Früh, which is always lively, and the Kölsch is one of the best. Malzmühle has the maltiest Kölsch and is one of the few with the brewery on site.”

He goes on to say, “I generally recommend a couple of places that are off most people’s path. One of my favorites, Schreckenskammer, is north of the train station. They have weird hours, but they are generally tourist-free and the Kölsch is great. World War II destroyed their brewery, so now it is brewed under contract, but once you’re tired of the hustle and bustle of Köln, it’s a nice respite with good food and good beer.”

He also recommends taking a stroll down Salzgasse, a small, quaint alley with three bierhäuser within 200 feet of one another. “Bierhaus en d’r Salzgass is the outlet for Päffgen Kölsch, while Ausschank Brauerei zum Pfaffen has Pfaffenbier. Since their brewery is out of the city limits, it cannot be called Kölsch, so it’s called Pfaffenbier. Finally, Sünner im Walfisch carries the Sünner Kölsch,” says Seibt.

HOW TO BREW KÖLSCH

According to the BJCP 2015 Style Guidelines, the Kölsch Konvention simply defines the style as a “light, highly attenuated, hop-accentuated, clear, top-fermenting vollbier.” *Vollbier* translates to “full beer,” a classification that rep-

resents 99 percent of the market share in Germany. German brewers are taxed based on original gravity, and the sugar content in vollbier wort is, by law, 11 to 16 percent by weight (11° to 16° Plato or 1.044 to 1.065 specific gravity). Other styles in this popular category include Pilsner, helles, and weizen.

Simple and refreshing, Kölsch is neither sweet nor bitter, and this light, delicate, brilliantly clear golden ale is meant to be consumed in quantity. Kölsch is often called a hybrid beer, but make no mistake—it’s an ale through and through. The fermentation temperature is cool for an ale, yes, but the word *hybrid* in this case indicates that Kölsch is typically aged (lagered) after fermentation to gain brilliant clarity and a rounded flavor profile. Kölsch strains are of species *Saccharomyces cerevisiae* and are thus authentic ale yeasts.

Kölsch is a simply brewed beer that typically contains just one or two malts with a moderate amount of hops, mostly for bitterness. German two-row Pilsner malt makes up most of the grist, while a touch of malted wheat or CaraPils®

WATER FOR KÖLSCH BREWING

By Martin Brungard

Kölsch is perceived as a soft beer with a drying finish. The water character in Cologne influences that character.

The Rhine river flows through Cologne, and wells located throughout the city supply the water. The porous soils in the river valley mean that the river water makes its way into the wells and influences the well water profile. Kölsch breweries in Cologne are located near the river.

By the time it reaches Cologne, the Rhine has flowed across hundreds of miles of limestone, marl, and shale that mineralize the water. A review of Cologne water quality shows that it varies seasonally and with location in the city. The typical range of ions in the local water is shown in the table below.

COLOGNE WATER PROFILE	
Ion	Range (mg/L) or (ppm)
Calcium	35 to 110
Magnesium	10 to 15
Sodium	25 to 35
Sulfate	70 to 80
Chloride	35 to 65
Bicarbonate	80 to 280

These concentration ranges include the effects of pre-boiling the water to improve its suitability for brewing. Water boiling has been used in brewing for centuries, and it reduces both calcium and bicarbonate concentrations and leaves other ion concentrations unchanged. That is the reason that the calcium and bicarbonate ranges are large while all other ion ranges are relatively narrow.

An important finding to take from the water profile is that it is relatively mineralized. The ions contributing to flavor (magnesium, sodium, sulfate, and chloride) are present in modest but significant concentrations. Sodium and chloride content enhance the perception of sweetness, and sulfate helps dry the finish. Subdued maltiness and an attenuated, dry finish are key characteristics of the Kölsch style, and including those ions is helpful to achieve those goals.

To improve Kölsch's impression of softness, brewing water should target the lower end of the ion ranges presented

above. With that level of mineralization, many tap water sources may be used as a starting point. While Cologne water has significant bicarbonate content, it must be neutralized with an acid addition to create a pale beer. Since it is a German style, Kölsch water should be neutralized with lactic acid in the form of acid malt, soured wort, or refined lactic acid. If starting with water such as distilled or reverse osmosis (RO) water, the mashing water will still require a small lactic acid addition to bring the room-temperature mash pH down to the desirable level of about 5.2 to 5.3.

Ensuring that the brewing water includes more sulfate than chloride helps dry the beer finish. The elevated sulfate content does not make the resulting beer bitter since there is very little hop bitterness in a typical Kölsch recipe. If starting with RO or distilled water, those desired concentrations might mean adding 1 gram (0.25 tsp.) of gypsum, 2 grams (0.5 tsp.) of epsom salt, and 1.25 grams (0.2 tsp.) of table salt in 5 gallons (18.9 L) of water. Those quantities should be reduced when using tap water with much mineralization.

While there is no need to add the bicarbonate content indicated in the Cologne water profile, it may add a bit more authenticity to the resulting Kölsch if lactic acid is used to neutralize bicarbonate. Lactic acid can add desirable flavor nuances to the beer, and it is metabolized by yeast. If starting with distilled or RO water, only a small amount of lactic acid is needed to reduce wort pH. However, if you want a dose of lactic acid like that used with actual Cologne water, then a dose of calcium lactate can be added when brewing with distilled or RO water.

Calcium lactate can easily be created by mixing 1.75 mL of 88% lactic acid per gram of chalk. The resulting frothy white paste will completely dissolve into water. In 5 gallons (18.9 liters) of distilled or RO water, that means using 2.7 mL of 88% lactic acid and 1.5 g of chalk to create a proper dose of calcium lactate in the beer. Add half of this calcium lactate solution to the mash water and half to the sparge water. The added calcium is desirable since it helps clear the resulting beer. Using a brewing water chemistry calculator such as Bru'n Water is recommended to help refine mineral and acid additions for your Kölsch.

While Cologne water is somewhat mineralized, targeting those minimum concentrations should help you emulate the dry and crisp Kölsch flavor.

BARTOLO COLOGNE KÖLSCH

Batch Size: 5.5 US gallons (20.8 L)
Original Gravity: 1.049 (12.2° P)
Final Gravity: 1.010 (2.5° P)
Color: 3 SRM
Bitterness: 25 IBU
Alcohol: 5% by volume

MALTS

8.5 lb.	(3.86 kg)
	German Pilsner malt
1 lb.	(454 g)
	German wheat malt

HOPS

1.35 oz.	(38 g) Hallertau, 4% a.a. @ 60 min
0.25 oz.	(7 g) Spalt, 2% a.a. @ 15 min

YEAST

White Labs WLP029 German Ale/
Kölsch, Wyeast 2565 Kölsch, or
Fermentis Safale K-97

ADDITIONAL ITEMS

1 Whirlfloc tablet or	
1 tsp. (5 g) Irish moss	@ 15 min
1/2 tsp.	(2.2 g) yeast nutrient @ 15 min

DIRECTIONS

Mash at a water-to-grist ratio of 1.4 qt./lb. (2.9 L/kg) with 3.4 gal. (12.9 L) of low-residual-alkalinity water. Start with a β -amylase rest at 143° F (62° C) for at least 30 minutes to create fermentable sugars. Raise temperature to 158° F (70° C) for an α -amylase rest of at least 15 minutes, or until starches are fully converted, to break down dextrins and lighten body. Mash out at 168° F (76° C), and sparge at 170° F (77° C) until you have collected about 7 gal. (26.5 L) of wort. A single infusion mash at 150° F (66° C) also produces excellent results if you prefer simplicity.

Boil uncovered for 90 minutes to drive off the DMS precursor SMM. After the first 30 minutes of the boil, scoop off and discard any coagulated proteins atop the boil to reduce tannins in the finished product, and then add the 60-minute

bittering hops. At 15 minutes, add the small flavor hop addition, 1/2 tsp. (2.2 g) of yeast nutrient, and either 1 Whirlfloc tablet or 1 tsp. (5 g) of Irish moss.

After the boil, stir wort vigorously to create a whirlpool and precipitate out the trub. Chill wort to 60° F (16° C) as quickly as possible, run off into a fermenter, pitch yeast, and oxygenate for 1 minute using pure oxygen. Use 1 sachet of dry yeast, 2 packs of liquid yeast, or 1 pack of liquid yeast in an appropriately sized yeast starter.

Fermentation should be slow and steady and will last about 4–5 days. Feel free to let it sit for another 10 days to condition, including a diacetyl rest in the upper 60s °F (upper teens °C) near the end of the second week. Transfer to a lagering vessel (glass or stainless steel preferred), and cool to 33–35° F (1–2° C), by about 5° F (3° C) per day if possible. Lager for at least 3 weeks—4 is better and 6 is optimal. Carbonate to 2.4–2.5 volumes (4.8–5 g/L) of CO₂ and enjoy!

EXTRACT VERSION

Replace the grain with 7.7 lb. (3.5 kg) Weyermann® Bavarian Pilsner liquid malt extract. Add extract to boil pot and top up to 6.5 gal. (24.6 L) with water. Boil for 60 minutes and add first hop addition immediately upon first sign of the boil, then continue as above. The malt extract version may be slightly darker than the all-grain recipe. If you do a partial-volume boil, adjust the bittering hop addition to account for the concentrated wort.

VARIATION

To brew Klubot Kölsch, a variation on this recipe, reduce German wheat malt to 0.5 lb. (227 g) and add 0.5 (227 g) CaraPils to the grist. Replace the Hallertau bittering hops with an equivalent amount of Tettnang, and optionally substitute Saaz for the Spalt at 15 minutes. Follow the same directions as above with a 60-minute single infusion mash at 149° F (65° C).

Fast FREE Shipping

(Lower 48 only, please, and not big things like wine presses.)



Maryland Homebrew is your complete source for homebrew supplies for beer, wine, mead, cider, cheese, spirits and much more.

Our well-stocked, warehouse-style store is conveniently located in central Maryland.

You'll find freezers full of hops, refrigerators full of liquid and dry yeast, shelves upon shelves of brewing kits and ingredients, an entire room dedicated to malts, wine kits, fruit presses for rent, kegs, kettles, brewing hardware, burners

If you need it, we've got it.

Our friendly staff loves to answer questions and help you with your own homebrewing adventure. We also offer beginner and intermediate classes.

Marylandhomebrew.com

The difference is service

**6770 Oak Hall Ln.
Suite #108
Columbia, MD 21045
(888)-BREW-NOW**

14G FastFerment for \$190? W/ Free Shipping??!

FastFerment
Won GOLD at
HomebrewCon
2016



**Save Money - Up to 30% off Retail
ONLY Until May. Limited Time Offer!**

**Less Work - One Vessel Means Less
Cleaning, Equipment & Hassle.**

**Easy to Use - Harvest & Reuse Yeast.
NO MORE Racking & Transferring!**

Bundle Pack
14G Conical Fermenter Kit
Stainless Steel Hop Filter
Stand & Leg Extensions
Extra Collection Ball

FAST BREWING
& Wine Making

Bigger is Better.

Visit FastBrewing.com

\$255 USD Shipped!

(\$190 - 14G FastFerment Kit Only)

or CaraFoam® can be added to improve body (German law prohibits the use of wheat in lagers, but since Kölsch is an ale, there's no problem with it here).

Kölsch is meant to be light, so aim to produce a highly fermentable wort in the mash. If employing a single infusion mash, a temperature of 150° F (66° C) would provide good fermentability. A step mash will give an even more accurate, true-to-style example, and rests at 143° F (62° C) and 158° F (70° C) are recommended. Once you are sure conversion is complete, mash out at 168° F (76° C) to end enzymatic activity while keeping the temperature below that at which tannin extraction could become a problem.

Hops are meant to balance Kölsch's sweetness, not to be showcased, and German noble varieties are the norm. Bittering additions of Hallertau or Perle are appropriate, and flavor additions of Hersbrucker, Tettnang, or Spalt are excellent choices. Late-addition aromatic hops and dry hopping are not traditional for this style.

Köln's water plays an important role in the finished beer. Interacting with the beer's ingredients, a soft, slightly minerally, and even faintly wine grape-like character emerges in some versions of Kölsch. It's water that makes the difference between authentic Kölsch and Kölsch-style ale (see Martin Brungard's sidebar "Water for Kölsch Brewing" for more on the water of Cologne).

As a "hybrid style," Kölsch has characteristics of both ale and lager. The beer is fermented with an ale yeast strain on the cool side, around 59–62° F (15–17° C), with 60° F (16° C) offering a great target to shoot for. When fermentation is complete, the beer should be lagered near freezing temperatures for at least a month to develop its smooth character and signature clarity.

Eric Warner's *Kölsch* is a must for anyone who wants to know the ins and outs of what makes Kölsch special. The book offers a detailed history of the style, a vivid description of the breweries of Cologne, and a number of recipes for homebrewers.



Learn more about Kölsch with the Brewers Publications Classic Beer Style Series *Kölsch* by Eric Warner.
BrewersPublications.com



KÖLSCH-STYLE ALES BEYOND COLOGNE

Many American craft breweries make Kölsch-style beers, although it's hard to quite capture the same flavors and aromas produced by the Köln breweries. Brewers in North America can source the same raw ingredients as their German counterparts, but it's the water of Köln that supplies the style's true essence. Fancy Lawnmower from Saint Arnold Brewing Co. in Houston, Texas is a fine example of an American-brewed Kölsch-style ale, as are Heater Allen's Das Bier, Summer Ale from Alaskan Brewing Co., and Victory Brewing Company's Kühl Kölsch.

Kölsch certainly fits the bill for a refreshing summer beer, but this classic style can and should be enjoyed year-round. Do you like to pair food and beer? Kölsch is a fine complement to lightly prepared seafood dishes like pan-fried macadamia-crusted mahi-mahi. Brew your own Kölsch to serve with a home-cooked meal for the ultimate homebrewed experience!

RESOURCES

- "Beer Judge Certification Program 2015 Style Guidelines." Beer Judge Certification Program. http://bjcp.org/docs/2015_Guidelines_Beer.pdf
- Dornbusch, Horst. *German Beer Institute*. <http://www.germanbeerinstitute.com/styles.html>
- Warner, Eric. *Kölsch*. Boulder, CO: Brewers Publications, 1998.

Dave Clark is a self-professed beer geek, a former professional brewer at Hoppin' Frog Brewery in Akron, Ohio, a Certified Cicerone®, and a National-ranked BJCP judge. Dave lives outside Phoenix in Gilbert, Ariz. with his wife, his daughter, and a dog named Porter.

OUTFIT YOUR HOMEBREW BRAND



HUGE SELECTION OF TOP BRANDS

COMPETITIVE PRICES

LOW MINIMUMS

SUPERIOR PRINT QUALITY

APPAREL SHIPS FREE*

GRANDSTAND
GLASSWARE + APPAREL

see more at
eGRANDSTAND.COM

*within the contiguous U.S. only



BREWING WITH RICE

By Cody Gabbard

Rice is sometimes considered a cheap filler ingredient only suitable for American adjunct macro beers and the Japanese lagers found at your neighborhood sushi haunt. But historical precedent at home and abroad, and modern recipes crafted with rice, are proving that the adjunct can be a valuable ingredient in a variety of styles—its contribution to light lager doesn't necessarily have to be the result of large-scale economics. Rice can hold its own as a valuable addition to a number of beer styles.

RICE IN HISTORY

Rice, or *Oryza sativa* if referring to the most prevalent Asian variety, is a cereal grain that was first domesticated for food consumption around 11,000 years ago in China. The harvested kernel, or paddy, is

enclosed by a hull or husk that is often removed at milling. If only the husk is removed, it is called brown rice, but further milling removes the bran to yield white rice, which has fewer nutrients. Broken rice (rice that has broken into smaller pieces during the milling process) is used for most brewing purposes, especially when produced in East Asia. Broken rice is not inherently of lower quality, but it is often referred to as brewer's rice since the appearance lends itself to use in large-scale production more than it does to sitting pretty on a grocery shelf.

Although it is mostly considered an adjunct for light American lagers today, rice was used to brew bolder pre-Prohibition lagers in America. It was even included in some German beers before

the Bavarian Reinheitsgebot was applied throughout modern Germany early in the 20th century. According to beer historian Ron Pattinson, rice and sugar were both listed as adjuncts in the 19th-century *Brausteuergebiet*, or beer tax region, which included most of what is now Germany.

Frugal German brewers had prized rice for its brewing efficiency and affordability. Quoting from an article in a German brewing magazine from the 1890s, Pattinson writes, "Beers brewed with the addition of rice are renowned for their especially pleasant taste and clear, pale color. Since rice is slightly cheaper than malt, and with regard to sugar content is superior (100 kg of rice is equal to 120–130 kg malt in this respect), its use in beer is financially advantageous."

According to Stan Hieronymus in *Brewing Local*, Anheuser-Busch InBev is the largest purchaser of rice in the United States, accounting for eight to nine percent of the total annual crop. Rice makes up about 30 percent of the Budweiser grist. Rice in light lagers is not an invention of modern macro brewers, though, and American brewers have used it for at least a century. Internal revenue data from 1896 reported the use of adjuncts at 30

to 40 percent replacement rates for malt, with regional preferences favoring the use of rice in the Midwest.

The *American Handy-book of the Brewing, Malting and Auxiliary Trades*, published in 1902 by Wahl and Henius, references the use of rice, including specialized equipment such as the “rice rack,” “rice tub,” and “rice storage” when describing 19th-century brewery buildings. Like

Germans in the 1880s, American brewers were also utilizing rice for its high starch content (rice contains about 80 percent starch compared to around 60 percent in barley). Wahl and Henius write, “Owing to its exceptionally high percentage of starch, which is greater than any other cereal, rice seemed particularly suitable for brewing and was so employed at an early date.” The editor and eventual owner of the *American Brewer* publication, Anton Schwarz, is credited as the first person to advocate for rice’s use in America. The benefits he claimed included a paler color, greater stability, and the ability to produce beer more cheaply. He suggested cereal adjuncts could represent up to one-third of a total malt bill for pale lagers but cautioned against higher usage.

CHARACTERISTICS AND USE

Rice is primarily used to lighten color without adding any discernable flavor. Rice contains less protein than barley, so it can also be used to improve clarity. Compared to other cereals, rice has a high percentage of starch, so it can provide more sugar and alcohol content if converted properly. Depending on the diastatic power of the malts used in the mash, rice can account for up to 50 percent of the grist without any assistance from added enzymes. If mashing with two-row barley, rice is recommended at levels of up to 30 to 40 percent; for higher percentages, six-row should be used due to its greater enzyme content. When rice is used in large amounts, tannins can become noticeable (unless the rice is huskless), which accounts for the signature crisp bite of high-adjunct lagers.

Contrary to the popular notion that rice thins body, it can actually add considerable body thanks to its high protein and starch content. Mouthfeel is mostly derived from how the mash is conducted, as with any barley-based beer. It also contributes about the same amount of alcohol as barley at the same efficiency, according to Briess Malting’s director of homebrew, Aaron Hyde. At 72 percent efficiency, flaked rice yields an original gravity of 1.042 at a rate of ten pounds per 5 gallons, compared to an original gravity of 1.047 for barley malt used at

RICE MAKES IT NICE American Lager

A clean American lager made with rice keeps this recipe traditional, light, and refreshing. You will need to cereal mash and boil your rice to make the starches accessible. Experiment with any raw rice—white, brown, and wild should all work!

Batch Volume: 5 US gallons (18.9 L)

Original Gravity: 1.048 (12° P)

Final Gravity: 1.010 (2.5° P)

Bitterness: 13 IBU

Color: 4 SRM

Alcohol: 5% by volume

MALTS

3.3 lb.	(1.5 kg) Briess CBW light malt extract syrup
1 lb.	(454 g) Briess CBW Pilsner light dry malt extract (0 min)
1 lb.	(454 g) Briess brewers malt (main mash)
0.5 lb.	(227 g) Briess brewers malt (cereal mash)
2 lb.	(907 g) raw rice

HOPS

0.5 oz.	(14 g) Hallertau, 4.5% a.a. @ 60 min
0.5 oz.	(14 g) Hallertau, 4.5% a.a. @ 10 min

YEAST

White Labs WLP840 American Lager Yeast (2 packs)

BREWING NOTES

Add 2 lb. (907 g) rice, 0.5 lb. (227 g) barley malt, and 1 gal. (3.8 L) cool water to stockpot and heat slowly to 172° F (78° C) while stirring. Hold temperature for 20 minutes, stirring occasionally. Bring cereal mash to a gentle boil, and stir occasionally for 15 minutes. Mixture should fully gelatinize (liquefy).

Pour cereal mash into a steeping bag with 1 lb. (454 g) additional barley malt, and add water to 2.5 gal (9.5 L) in your boiling kettle. Steep cereal mash and malt at 154° F (68° C) for 30 minutes.

Remove grains and steeping bag, and stir in 3.3 lb. (1.5 kg) malt extract syrup. Bring to a boil, and boil for 60 minutes, adding hops as indicated above. After knockout, add 1 lb. (0.45 kg) Pilsner dry malt extract, and stir until dissolved. Cool wort to 55° F (13° C) and transfer to fermenter.

Pitch two packs of White Labs WLP840 American Lager Yeast, and ferment for 1 week at 50–55° F (10–13° C). Rack to secondary and age for 2 weeks at 50–55° F (10–13° C) before packaging and serving.

the same rate. Rice syrups typically have a higher yield, with an original gravity of 1.043 at a rate of 6 pounds per 5 gallons, compared to barley liquid malt extract (LME) at 1.042 at the same rate.

Unlike malted barley, whole-grain rice must be gelatinized prior to mashing in—that is, its starches must be broken down so that amylase enzymes can convert them to sugar. Rice's gelatinization temperature range is about 154° to 171° F (68° to 77° C). Rice also lacks the enzymes required to break down starch, so it needs to be mashed with barley which has abundant enzymes, or with supplementary enzymes. A cereal mash is used to gelatinize whole-grain rice starch, but several pre-gelatinized rice products are available, including flaked rice, rice syrup, and rice syrup solids. Flaked rice has been pre-gelatinized through high heat treatment (typically through steaming) and rolling (like the crushing of malt) to expose the kernel. Flaked rice hydrates more quickly than non-gelatinized rice and disintegrates quickly in the mash, so no further milling is needed.

Issues that can arise from using flaked rice include a stuck lauter. Hyde recommends 4 ounces of rice hulls in the mash for every pound of rice flakes (250 g rice hulls per kg flaked rice) to provide a sufficient filter bed. Thinning the mash can also prevent sparging issues. Although barley malt provides most of the enzymes needed to convert rice starch during the mash, supplemental amylase enzymes are suggested for grists of more than 30 to 40 percent rice.

Rice syrup and rice syrup solids can be used at higher grist percentages without added enzymes since they have already been converted and are added during the boil. Rice syrup and rice syrup solids are akin to liquid and dried malt extracts, respectively. Rice is nearly colorless and flavorless, so Hyde says there is little difference in character between flaked and syrup versions, except for higher control of fermentability when using flaked.

When including a large portion of rice in your beer, it's also worth adding a quality



DOJO

A homebrew-sized formulation of Mr. Miyagi Karate Rice Ale, courtesy Sean Nook, head brewer and owner at Black Bottle Brewery, Fort Collins, Colo.

Batch Volume: 5 US gallons (18.9 L)
Original Gravity: 1.060 (14.75° P)

Final Gravity: 1.010 (2.5° P)
Alcohol: 6.5% by volume

MALTS

10 lb.	(454 g) OiO BSG flaked rice
5 lb.	(227 g) pale 2-row malt
2 lb.	(907 g) rice syrup solids
3 lb.	(1.36 kg) rice hulls

HOPS

0.5 oz.	(14 g) Centennial @ 45 min
0.75 oz.	(21 g) Equanot™ @ 5 min
0.85 oz.	(24 g) Equanot™ (dry hop 5 days)
0.5 oz.	(14 g) Willamette (mid to late boil)
0.5 oz.	(14 g) Hallertau (dry hop secondary)

YEAST

White Labs WLP060 American Ale Yeast Blend
White Labs WLP705 Sake Yeast

BREWING NOTES

Mash grains and rice hulls at 152° F (67° C) for 60 minutes (Black Bottle suggests mashing in a large, food-grade nylon bag to avoid stuck sparge issues). Sparge at 170° F (77° C) and collect enough wort to yield 5 gallons (18.9 L) after a 60-minute boil. Boil for 60 minutes, adding hops as indicated above.

Chill wort to 65–68° F (18–20° C), aerate, and pitch yeasts. Ferment 2 weeks or until terminal gravity reached. Force carbonate to 2.5–2.7 volumes (5–5.4 g/L) of CO₂ or bottle with approximately 2/3 cup (158 mL) corn sugar.

yeast nutrient to the boil. Rice doesn't provide all of the same vital nutrients as barley malt, and yeast nutrient is cheap insurance against a stalled fermentation.

CEREAL MASHING

If you don't have access to flakes or syrups, or if you simply want to use whole-grain rice, you will need to conduct a cereal mash before adding rice to the main mash. The goal of a cereal mash is to hydrate and gelatinize the internal starches of the rice. First, mill the rice to about the same size as you would barley malt. Rice does not contain the starch-converting enzymes that barley does, so malted barley will need to be added to the cereal mash. Add barley at a rate of 20 percent by weight: if using 5

pounds of rice, add 1 pound of barley to the cereal mash (2 kilograms rice would warrant 400 grams of barley malt).

Next, add water to the rice and barley mixture. The cereal mash should be a bit thinner than usual to ensure the grain doesn't scorch during the boil—1.5 quarts per pound (2.1 L/kg) is a good target. Raise the temperature of the mash to the gelatinization temperature range of 154° to 171° F (68° to 77° C) and hold for 15 minutes. Slowly heat the mash to boiling and boil for 30 minutes. Begin heating your main mash and stabilize it at the target temperature. Allow the cereal mash to cool to the temperature of your main mash,

combine the two, and then follow your regular mashing schedule.

MODERN STYLES AND SUBSTITUTIONS

Modern commercial beers beyond the American adjunct lager style that use rice include Great Divide's Samurai Rice Ale. Wanting to buck the trend of summer wheat ales, Great Divide began brewing Samurai in 2006 and in 2016 added it to its year-round lineup available coast-to-coast. Samurai utilizes OiO Toasted Rice Flakes at just under 20 percent of the total grist. Great Divide brewing manager Ro Guenzel says the rice contains tons of starch and can achieve up to 90 percent extract efficiency. Rice is also used in another year-round offering, Collette saison, to boost alcohol without crowding flavor.



Another Colorado brewer was inspired by drinking Samurai while tailgating for baseball games. Sean Nook, owner and head brewer of Black Bottle Brewery in Fort Collins, Colo., created Mr. Miyagi Karate Rice Ale last summer and included an unheard-of 80 percent rice in the grist. Nook describes Mr. Miyagi as an “unfiltered, easy-drinking, lightly bittered, not-quite-pale ale.” Rice is most apparent in the mouthfeel of the beer, which is similar to a wheat ale, but not as creamy, a bit thinner, and moderately dry. He hopes to make Mr. Miyagi a seasonal specialty around baseball season’s opening day.

Nook mentioned two challenges he experienced while brewing with such large quantities of rice flakes. The high ratio of rice to malted barley led to a lower-than-expected



uKeg™

Pressurized Growler



Designed In Portland, OR
WWW.GROWLERWERKS.COM

efficiency, leading Nook to conclude that for subsequent batches, he'll likely either increase the amount of rice syrup (because it's already converted) or add enzymes to the mash if using the same amount of flaked rice. The second issue came during lautering—the mash effectively turns to a paste, so Nook suggests adding rice hulls to the mash and using a grain sack if possible.



Not content with the selection of gluten-free beers available to his gluten-intolerant wife, maltster Jim Eckert began developing a converted whole grain rice in 2013 at Eckert Malting & Brewing. Eckert's rice malts come in a variety of kilns and roasts from pale rice malt to a dark roast called Gas Hog. Eckert emphasizes that his rice is not an adjunct but a malted grain that shouldn't be boiled, which would destroy the enzymes. Although it is a malted product, he suggests adding supplemental enzymes to aid in conversion during the mash. He also suggests a 60- to 90-minute mash that's slightly warmer than a traditional barley mash.

Eckert supplies both professionals and homebrewers with malted rice, available for purchase at glutenfreehomebrewing.com. It's a whole-grain rice called Calrose,

BELGIAN RICE ALE

Recipe courtesy Brian Kolodzinski of glutenfreehomebrewing.org and Jim Eckert of Eckert Malting & Brewing

Batch Volume: 5 US gallons (18.9 L)

Original Gravity: 1.052 (13.25° P)

Final Gravity: 1.011 (2.75° P)

Alcohol: 5.5% by volume

MALTS

- 20 lb.** (9.07 kg) pale rice malt
- 2 lb.** (0.9 kg) crystal rice malt

HOPS

- 1 oz.** (28 g) Cascade @ 60 min
- 0.5 oz.** (14 g) Cascade (dry hop secondary)
- 0.5 oz.** (14 g) Spalt Select (mid to late boil)
- 0.5 oz.** (14 g) Willamette (mid to late boil)
- 0.5 oz.** (14 g) Hallertau (dry hop secondary)
- 0.5 oz.** (14 g) Spalt Select (dry hop secondary)

YEAST

Mangrove Jack's M27 Belgian Ale dried yeast (or any high-attenuating Belgian ale yeast strain)

OTHER INGREDIENTS:

- 2 tsp.** Brewcraft Amg-300L Liquid Exo-Alpha-Amylase enzyme

BREWING NOTES

Single-infusion mash at 150° F (66° C) for 60–90 minutes, adding 1 tsp. of amylase enzyme at dough-in and another 1 tsp. once mash stabilizes at target temperature. Use the same mash thickness as for an all-barley beer, about 1 qt./lb. (2 L/kg).

Boil 60 minutes, adding hops as indicated above. Ferment at 68° F (20° C) for 7 days, rack to secondary, and hold at 68° F (20° C) for 7 days.

Prime with 6 oz. (170 g) corn sugar and bottle to yield around 3 volumes (6 g/L) of CO₂.

which he sources within 30 miles of his malt house in Chico, Calif. He says Calrose is similar to brown rice in characteristics and flavor. It's a whole grain with an intact husk, so there are no lautering issues. The grain still needs to be milled, which he suggests doing with a narrower mill gap since rice grains are smaller than barley kernels. His rule of thumb for 100-percent rice malt recipes is to use about 20 percent more than the equivalent all-barley formulation to make up the enzyme deficit.

Rice's neutral characteristics make it a good substitute for other commonly used adjuncts. It adds less flavor

than table sugar and has less potential for off-flavors. At elevated fermentation temperatures, table sugars can produce cidery off-flavors, so Hyde recommends using rice as a substitute in beers typically fermented at high temperatures, like Belgian golden strong ale and tripel. Other rice-friendly styles Hyde suggests include fruit beers and India pale lagers: the rice stays out of the way of the flavorful fruit or hops while retaining good malt flavor in the background.

Cody Gabbard is a freelance beer writer based in Denver, Colo. His other published works can be found at codygabbard.com. He is a former mem-

ber of the DC Homebrewers Club and is the current president of FRESHHOP Homebrewers.

Resources

Buhner, Stephen Harrod. *Sacred and Herbal Healing Beers: The Secrets of Ancient Fermentation*. Boulder, CO: Brewers Publications, 1998.

Carpenter, Dave. "Cereal Mashup." *Craft Beer & Brewing*. July 5, 2015, <http://beer-andbrewing.com/VZL4FS0AAIBlzyr/article/cereal-mashup>

"Flaked Rice." Brewer's Lair. Accessed October 10, 2016, <http://www.brewerslair.com/index.php?p=brewhouse&d=fermentables&id=&t=&term=42>

Hieronymus, Stan. *Brewing Local: American-Grown Beer*. Boulder, CO: Brewers Publications, 2016.

"Insta Grains® Brown Rice Flakes Product Information." *BrewingWithBriess.com*. Accessed October 10, 2016. http://www.brewingwithbriess.com/Assets/PDFs/Briess_PISB_IGBrownRiceFlakes.pdf

Mosher, Randy. "Mouthfeel: Beer's Stealthy Charm." *RandyMosher.com*. Accessed October 10, 2016. <http://randymosher.com/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=23>

Parkes, Steve and Chris Colby. "Adjuncts Explained." *Brew Your Own*. Accessed October 10, 2016. <http://byo.com/mead/item/94-adjuncts-explained>

Pattinson, Ron. "Rice Beer." Shut Up about Barclay Perkins. July 1, 2007, <http://barclayperkins.blogspot.com/2007/07/rice-beer.html>

Pattinson, Ron. "Rice in German Beer (again)." Shut Up about Barclay Perkins. May 19, 2014, <http://barclayperkins.blogspot.com/2014/05/rice-in-german-beer-again.html>

"Rice." Encyclopædia Britannica. Last modified January 15, 2015. <http://www.britannica.com/plant/rice>

"Rice." *encyclopedia.com*. Accessed October 5, 2016. <http://www.encyclopedia.com/plants-and-animals/plants/plants/rice>

Wahl, Robert and Max Henius. *American Handy-book of the Brewing, Malting and Auxiliary Trades*, 2nd ed. Chicago: Wahl and Henius, 1902.

TRIPLE DOWN BELGIAN TRIPPEL

Rice obviously isn't a traditional ingredient in a Belgian tripel, but sugar adjuncts are. If you think of rice as a light sugar adjunct, it makes sense in a tripel and creates a unique take on the style.

Batch Volume: 5 US gallons (18.9 L)

Bitterness: 36 IBU

Original Gravity: 1.075 (18.25° P)

Color: 5 SRM

Final Gravity: 1.013 (3.25° P)

Alcohol: 8.2% by volume

MALTS

12 lb. (5.44 kg) Briess Pilsen malt

1.25 lb. (0.57 kg) Dingemans Cara 8 malt

1 lb. (0.45 kg) rice flakes

1 lb. (0.45 kg) rice syrup or rice syrup solids @ 0 min

HOPS

1 oz. (28 g) Styrian Goldings, 6% a.a. @ 60 min

1 oz. (28 g) Styrian Goldings, 6% a.a. @ 30 min

1 oz. (28 g) Styrian Goldings, 6% a.a. @ 0 min

YEAST

Yeast 3787 Trappist High Gravity ale yeast

Yeast 3711 French Saison ale yeast

BREWING NOTES

Bring 4.75 gal. (17.9 L) of mash water to 167° F (75° C) and mash grains at 154° F (68° C) for 1 hour. Heat 4.5 gal. (17 L) of water to 180° F (82° C) sparge water in a kettle. Sparge, collect 6.25 gal. (23.7 L) wort in boil kettle, and boil for 60 minutes, adding hops as indicated above.

Cool wort to 72° F (22° C), transfer to fermenter, and pitch both yeasts. Ferment for 2 weeks at 70–72° F (21–22° C), and then rack to secondary and allow to condition for 2 weeks at 72–75° F (22–24° C) before packaging and serving.

Professional Quality Temperature Control Patent Pending

Dual Heating & Cooling BrewJacket.com

BREW JACKET

Lager Without a Refrigerator

Warm or cool to any temp up to 35° F above / below room temperature

THE IBU ISA LIE

BY DREW BEECHUM AND DENNY CONN

An IBU by any other name would taste just as bitter—or would it?

That's the question that we (Denny and Drew) set out to discover recently with the help of our volunteer experimenters from our podcast *Experimental Brewing*. Our IGORs (Independent Group of Researchers) are homebrewers like you who volunteer to brew beers, conduct blind triangle tastings, and record tasting panels' reactions to the beer. We outline the hypotheses and process, and they take it from there. The results are returned to us for analysis, dissection, and likely endless dissembling.

"Variations in hops and brewing processes can make actual IBUs diverge from predicted values. We set out to see how close the finished beer was to calculated bitterness."



Our goal for this experiment was to determine how closely recipe-calculated IBUs (International Bittering Units) matched IBUs measured in the actual finished beer. Whether homebrewers use a self-made spreadsheet, a pencil and paper, or brewing software, everyone sets an IBU target and then tries to figure out how to hit it. But variations in hops and brewing processes can mess with the actual figures, making them diverge from the predictions. We set out to see how close the finished beer was to the prediction of bitterness.

WHAT'S AN IBU?

What is an International Bittering Unit? Colloquially we think of it as a measure of how bitter a beer is.

That's kinda wrong.

Remember that when we boil hops, our primary goal is to dissolve the alpha acids

locked within and convert them via isomerization to a compound that is (1) bitter and (2) dissolves in an aqueous solution like wort—iso-alpha acid compounds.

Measuring the precise levels of iso-alpha acids in a beer would be a daunting, expensive, time-consuming process for most breweries, let alone a homebrewer. As beer scientists tried to increasingly bring numbers into the brew game, they worked to create a cheaper, easier, and faster way to get into the bitterness ballpark. After hashing through several different approaches to an IBU assay in the 1950s, the American Society of Brewing Chemists (ASBC) in 1968 formally adopted a test that centers on a relatively inexpensive set of reagents and a spectrophotometer to measure IBUs in a beer sample.

Except it doesn't. What the test really does is measure the absorption of light at a wavelength of 275 nanometers (nm)

when passed through a carefully prepared sample. This absorption level does correlate well with the concentration of iso-alpha acids, but a number of other things also affect absorption, including everyone's favorite: dry hops.

While we're at it, iso-alpha acids aren't the only things that cause an organoleptic sensation of bitterness, so the IBU, even when put into a ratio against gravity (like the famous ratio of bitterness units to gravity units—the BU:GU ratio) is an incomplete picture of just how bitter a beer really is.

But it's what we've got and what we know how to use.

DOING THE MATH

Did you ever notice that you never see anyone doing the math to calculate the IBUs on the fly? Here's why. Glenn Tinseth's equations, which are the *de facto* current standard, depend on three things: hop boil time, wort gravity, and the amount of potentially available alpha acids.

$$\text{IBU} = \text{Total alpha acid (mg/L)} \times \text{Gravity factor} \times \text{Boil factor}$$

$$\text{Total alpha acid} = \frac{\text{Hop alpha acid \%} \times \text{Hop weight (g)}}{\text{Final batch volume (L)}}$$

$$\text{Gravity factor} = 1.65 \times 0.000125^{(\text{Wort SG} - 1)}$$

$$\text{Boil factor} = \frac{1 - e^{(-0.04 \times \text{minutes boiled})}}{4.15}$$

So there you go! Just grab a scratch piece of paper and run through those formulae for each of the 30 hop additions in your DIPA. There's a reason we let the computers do this...

The equations naturally have some shortcomings.

- All of the measurements and calculations were developed using Glenn's system, so the process works for *his* brewing process and *his* equipment back when he was homebrewing. (Foreshadowing alert: this comes back in a big way.)



Photos courtesy Dana Garves, Oregon Brew Lab

- Wort gravity is treated as constant, even though we know that gravity increases over the time of the boil as water evaporates and the wort concentrates.
- Hops are assumed to be boiled, so the method doesn't account for mash hops, first wort hops, or whirlpool hops.
- The equations and curves were built using *whole cone hops only*. No pellets! This surprised us because we'd forgotten it until we interviewed Dr. Tinseth. Other investigators have created utilization adjustments for pellet hops, but such fudge factors are extra hand-wavy.

EXPERIMENTING FOR THE IBU TRUTH

OK, we've established what the IBU actually is and how the standard formula works. Now how do we go about figuring out just how closely it correlates with the messiness of the real world of different brewers with different processes?

We wanted more than one or two samples, and we wanted more than one beer style. After all, gravity is a factor, and back when Glenn was developing his formulae, massive-gravity hop bombs weren't as prevalent as they are today. Seriously, half the US hop crop must be going into the IPAs and double IPAs we love to brew and drink. We suspected we'd see more variance as gravity increased.

We started with the hops. One of our podcast sponsors, Niko Lukoff, graciously donated Cascade, Centennial, and Columbus from the same lots to our brewers. Even more awesomely—and the reason this experiment is extra interesting—Niko sent the hops to YCH Hops for analysis so that we'd know the precise alpha acid content before our brewers brewed. This was absolutely necessary to make sure all of our IGORs started from the same baseline.

IGOR volunteers signed up to brew a total of 30 batches, and hops were shipped to each participant. We asked our IGORs to brew our Basic Pale Ale, Basic IPA, or Basic DIPA recipes. Each IGOR indicated ahead of time which styles they were doing. The recipes were all designed

BASIC AMERICAN PALE ALE

This is our model pale ale. Clean, simple and designed to deliver a hop punch without being boring.

Batch Size:	5.5 US gallons (20.82 L)
Original Gravity:	1.054 (13.3° P)
Bitterness:	32 IBU
Color:	7 SRM
Alcohol:	5.5% by volume

YEAST

Wyeast 1056 American Ale, White Labs WLP001 California Ale, or Safale US-05

BREWING NOTES

Mash at 152° F (67° C) for 60 minutes.

MALT

10 lb.	(4.54 kg) domestic 2-row malt
1 lb.	(454 g) Munich malt
0.5 lb.	(227 g) crystal 60° L malt

HOPS

0.6 oz.	(17 g) Columbus pellets, 12% a.a. @ 60 minutes
0.6 oz.	(17 g) Centennial pellets, 7.8% a.a. @ 10 minutes
0.6 oz.	(17 g) Cascade pellets, 4.4% a.a. @ 20 minute steep
1 oz.	(28 g) Cascade pellets, 4.4% a.a., dry hop (optional)

EXTRACT VERSION

Substitute 7.25 lb. (3.29 kg) pale malt extract syrup for pale 2-row and 10 oz. (283 g) Munich malt extract syrup for Munich malt. Steep crystal malt in 155° F (68° C) water for 30 minutes. Drain, dissolve extract completely in reverse osmosis or distilled water, and top up to desired boil volume. Proceed with boil as above.

around a classically American malt bill: domestic two-row pale malt, a little light Munich malt, and a tiny amount of 60° L crystal for color. The DIPA also received a boost of sugar to hold true to its foundations. The hop additions were scaled with gravity, but the timing and varieties remained the same. You'll note that the recipe specifies an optional dry hop, but we asked our IGORs not to dry hop their beer—at least not until after they had packaged their samples for evaluation.

After brewing as they normally would, they bottled samples—three bottles per IGOR—and shipped them to Denny in Oregon. Denny shipped bottles to Drew for hedonistic testing (“drink this and rank it”) and took bottles to Dana Garves of Oregon Brew Lab (oregonbrewlab.com) for analysis. Dana discounted her services to us, but she'll do analysis of your beers for the low price of \$15 to \$35 depending on what you need.

Out of the 30 batches volunteered, we had 22 batches shipped to Oregon. That's

a 73 percent return, which is amazing for a volunteer effort. All told we received eight pale ales, seven IPAs, and seven DIPAs for testing.

We'd like to thank our participating IGORs:

Andrew Brown, Ben Myton, Chris Hamilton, Chris Nelson, Dave Matson, Eric Stonfer, Jason Mundy, Jeremy Wickham, Kelly Wingert, Kevin Kolk, Luke Sooy, Matt Yocum, Mike O'Toole, Nick McLawhorn, Ron Wood, and Sean Dwyer

TASTING THE BEERS

Remember, the IBU only tells part of the story of our perception of bitterness. Knowing that, it's important to get our taste buds on the ground as well. While Dana and Denny made with the chemistry, Drew made with the beer drinking tasting. At a Maltose Falcons meeting, Drew rounded up three teams of three tasters. Each team received all the samples of a style. They were asked to rank each beer in order of preference and also in perceived bitterness.

BASIC AMERICAN IPA

Scaled up from the Basic Pale Ale to keep us in the same footing.

Batch Size: 5.5 US gallons
(20.82 L)

Original Gravity: 1.069 (16.7° P)

Bitterness: 58 IBU

Color: 7.5 SRM

Alcohol: 7.0% by volume

YEAST

Wyeast 1056 American Ale, White Labs
WLP001 California Ale, or Safale US-05

BREWING NOTES

Mash at 152° F (67° C) for 60 minutes.

MALT

13 lb. (5.9 kg) domestic 2-row malt
1 lb. (454 g) Munich malt
0.5 lb. (227 g) crystal 60° L malt

HOPS

1.2 oz. (34 g) Columbus pellets,
12% a.a. @ 60 minutes
1.2 oz. (34 g) Centennial pellets,
7.8% a.a. @ 10 minutes
1.2 oz. (34 g) Cascade pellets,
4.4% a.a. @ 20 minute steep
1 oz. (28 g) Cascade pellets,
4.4% a.a., dry hop (optional)

EXTRACT VERSION

Substitute 9 lb. 10 oz. (4.36 kg) pale malt extract syrup for pale 2-row and 10 oz. (283 g) Munich malt extract syrup for Munich malt. Steep crystal malt in 155° F (68° C) water for 30 minutes. Drain, dissolve extract completely in reverse osmosis or distilled water, and top up to desired boil volume. Proceed with boil as above.

What we were hoping to see was a clear correlation between the IBUs and the perceived bitterness, but the data appeared muddled enough that we couldn't see a clear inference to make. One piece to take away: tasters generally preferred the bitter beers.

SCIENCE-ING THE BEERS

Dana performed the standard ASBC assay on the sample beers, and we've included the results below. The test involves mixing 10 mL of beer with a little bit of hydrochloric acid and iso-octane. The resulting solution is agitated vigorously until it separates into two to three phases. The 275 nm absorption of the distinct clear phase at the top of the sample is compared to pure iso-octane. That comparison gives you the official IBU number. The test takes all of 15 minutes.

But what about the remaining 345 ml of beer? Well, Dana is also trained in sensory analysis, so she personally tasted each beer she tested and noted her *perceived* IBU levels as well as the measured ones. It's amazing to see how close she was on most of the samples, but the ones that she missed showed a similar pattern with the relatively untrained hedonistic judges. Perhaps these skews were due to water chemistry or other perceptual boosters.

Gotta-Brew.com

Control Fermentation Temps Like the Pros!



The advertisement features a large stainless steel conical fermenter with a cooling jacket attached. Below it are several smaller fermenters, including a blue keg, a black carboy, and a stainless steel bucket, each with its own cooling jacket. A small inset shows a close-up of a jacket being applied to a keg. To the right, there is a logo for "COOL ZONE Fermentation Control" featuring a stylized thermometer icon.

✓ Add a Cooling Jacket to your Conical!
✓ Fits Conicals, Carboys, Buckets, Kegs, Jugs, Variable Volume Tanks, just about any fermenter!
✓ Easy to use!
✓ Flexible and removable!
✓ No risk of contamination!

Our Jackets fit a wide range of fermenters!
Visit Gotta-Brew.com for more info.

WALKING THROUGH

THE NUMBERS

As we look through the numbers from our experiment, it's fair to say that the formulae held "truest" to reality in the APAs. Both the median and mode of the sample set were spot on with the formula's calculated estimate. As the beers increase in gravity, the wobbliness we expected begins to emerge. The IPA is still close, with the average about 5 IBUs below the predicted value. The DIPA, though, is a full 21 IBUs (about 28 percent) below the calculated value.

It's fair to share that some of the beers were clear outliers that came in well below the calculation. The lowest values were off by between 36 and 42 percent of the calculated IBU level. Six of the samples actually exceeded the calculated value, but that trend was clustered around

BASIC AMERICAN DIPA

Same malts, same hops, a little sugar, and a whole lotta "bam!"

Batch Size:	5.5 US gallons (20.82 L)
Original Gravity:	1.084 (20.1° P)
Bitterness:	76 IBU
Color:	8 SRM
Alcohol:	9.2% by volume

MALT

- 14 lb.** (6.35 kg) domestic 2-row malt
1.5 lb. (680 g) Munich malt
0.5 lb. (227 g) crystal 60° L malt
1 lb. (454 g) table sugar

HOPS

- 1.75 oz.** (50 g) Columbus pellets,
12% a.a. @ 60 minutes
1.75 oz. (50 g) Centennial pellets,
7.8% a.a. @ 10 minutes
1.75 oz. (50 g) Cascade pellets,
4.4% a.a. @ 20 minute steep
2 oz. (57 g) Cascade pellets,
4.4% a.a., dry hop (optional)

YEAST

Wyeast 1056 American Ale,
White Labs WLP001 California Ale,
or Safale US-05

BREWING NOTES

Mash at 152° F (67° C) for 60 minutes.

EXTRACT VERSION

Substitute 10.25 lb. (4.65 kg) pale malt extract syrup for pale 2-row and 1 lb. (0.45 kg) Munich malt extract syrup for Munich malt. Steep crystal malt in 155° F (68° C) water for 30 minutes. Drain, dissolve extract completely in reverse osmosis or distilled water, and top up to desired boil volume. Proceed with boil as above.

NEW

BREWVISION™

STEP-BY-STEP BREWING INSTRUCTION
REAL-TIME UPDATES AND ALERTS
BEERSMITH™ RECIPE INTEGRATION
RECORDABLE RESULTS

Available on the App Store COMING SOON TO Google play

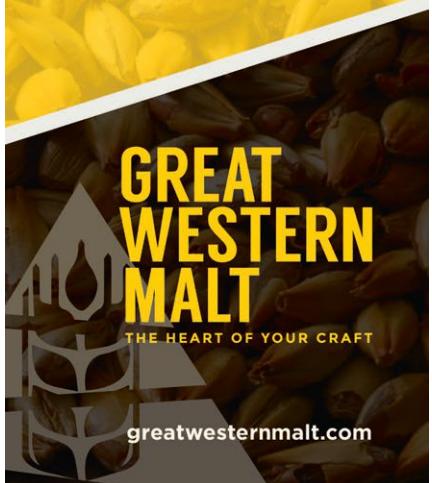
WHAT IF THE MORE YOU KNEW, THE BETTER YOU COULD BREW?

Our latest innovation, the BrewVision® Thermometer, brings real-time data to the palm of your hand. Eliminate the guesswork from your brewing, and focus on what matters most – *your beer*.

BREWING INNOVATION **Blichmann** ENGINEERING blichmannengineering.com



The world's best malt is not created simply by algorithms or recipes. It takes a knowing, an intuition and an instinct that we call *soul*.



Style	Sample ID	IBU Analysis [ASBC Beer-23A]	IBU Sensory (OBL)	Hedonistic Preference (1=most)	Hedonistic Bitterness (1=highest)
American Pale Ale (IPA) 32 IBUS Predicted	1	35	36	3.67	4.33
	2	29	30	2.75	2.33
	3	20	27	3.25	6.00
	4	31	44	3.67	2.25
	5	34	30	2.33	3.00
	6	30	28	4.67	6.25
	7	34	26	6.67	5.33
	8	43	34	6.33	6.00
	9	60	66	5.00	1.67
	10	43	52	2.33	4.33
	11	37	40	5.33	4.33
	12	55	54	6.00	6.67
	13	66	60	3.67	2.33
	14	55	43	3.67	6.00
	15	58	52	2.00	2.67
Double IPA (DIPA) 76 IBUS Predicted	16	44	52	6.00	4.67
	17	55	50	6.00	6.33
	18	71	84	4.00	3.67
	19	61	68	6.00	4.00
	20	45	56	4.33	5.67
	21	46	58	6.00	4.00
	22	61	65	4.33	4.33



the lower gravity APA (four of the eight). Notice that none of the DIPAs overshot the calculation.

EXPLAINING THE RESULTS

To better get a handle on our brewers' performances, we interviewed them to try and discover a through line. Here's the big takeaway (and recall the foreshadowing): we think the "undershoot" is due to the rapid chilling procedures that are more common today than they were during the formulae's development.

Jeremy Wickham, whose APA and IPA entries landed close to target, disclosed that it takes him nearly an hour to chill his wort to pitching temps. (Like Drew he's a victim of warm ground water.) On the other hand, several brewers of the under-bittered samples revealed they have embraced the modern homebrew practice of chill hard, chill rapidly, and get the wort cold yesterday. At least one brewer was also playing with a new electric rig with a lower "boil" temperature that possibly compounded the miss. (Denny doesn't think this was the issue.)

GREAT! MY IBUS AREN'T IBUS...

So what's the takeaway on this? Well, one is that there's probably more work to be done to figure out how the numbers change with different chilling regimes, kettle geometry, and boil vigor. (Maybe wort shear is the new enemy.) We also suspect, after much research and discussion, that wort density might not be the only influencer and that protein levels may also play a role—although that would a much bigger factor for whole hops than for pellets, and that's another experiment for another time. But, more practically, for us as we brew at home and fiddle with our software calculators, what do we do about the IBU?

Here's our recommendation: ignore the number as "concrete reality." No calculation is ever going to be perfect for you. Unless you take the time to dial in your process, analyze your beers, and create your own utilization curves, the number will always be a bit of a lie. Instead, treat it as a squishy imprecise landmark that only has meaning for you.

ONE VESSEL

FERMENT CARBONATE SERVE



The NEW Cornical™



BREWING INNOVATION

Blichmann
ENGINEERING

blichmannengineering.com

A unique fermentation and kegging system unlike anything on the market. The patent pending Cornical™ features a modular keg system with a removable bottom. Add a fermentation kit to convert to a conical fermentor. A revolutionary and modular design, not only saves you money, but allows you to be as creative with your equipment as you are with your brewing.

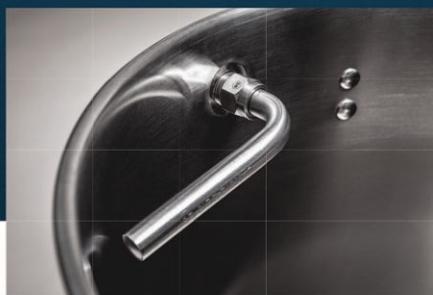


YOU DREAM IT. WE BUILD IT.

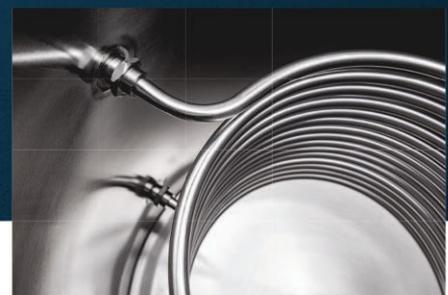
CUSTOM FABRICATED KETTLES.



CUSTOM 1.5" & 2"
TRI-CLAMP WELDING



CUSTOM RECIRCULATION
& WHIRLPOOL PORTS



CUSTOM PORTS
FOR HERMS COIL

YOUR LIVER WILL FAIL BEFORE OUR EQUIPMENT DOES
SPIKEBREWING.COM/CUSTOM

• KETTLE SIZES •

10 15 20 30 50



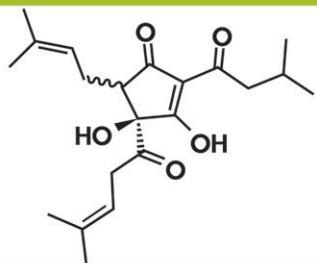
+

CONICALS

Learn what calculated IBU values of 15, 30, 50, 70, and so on mean to your taste buds when brewed on your equipment. Use those landmarks to hit what you want to taste. That's the only value to the number, because, frankly, the number itself is fairly taste-free.

In talking with our lower-IBU IGORs, they all agreed that their beers tasted less bitter than they expected, and that when they calculate, they tend to shoot high for the style. Basically, they already do what we're suggesting.

Isn't science grand? Go looking for a solid answer and instead we end up with a relativistic system. Heck, we haven't even tried to quantify and test the "perceived IBU" that takes into account factors that affect flavor. If this sort of thing quickens your brewer's heart, you can find more of it via our podcast—*Experimental Brewing*—and on our website at experimentalbrew.com. If it really gets you excited, join our IGOR corps and help us with our experiments! Just email us at igor@experimentalbrew.com to get started.



Brewing isn't rocket science.
It's much more important.



UC DAVIS HAS BEEN THE LEADING PROVIDER of university-level qualification in brewing science and brewery engineering since 1958. If you're passionate about brewing, visit our website to learn how the professional brewing programs at UC Davis Extension can help you take your craft to the next level.

COURSES AND PROGRAMS INCLUDE

- Master Brewers Program
- Professional Brewers Certificate Program
- Intensive Brewing Science for Practical Brewing
- Introduction to Practical Brewing
- Brewing Basics: Going Beyond the Kit
- Brewing Microbiology Workshop

extension.ucdavis.edu/brewing

**UCDAVIS
EXTENSION**
**PROFESSIONAL BREWING
PROGRAMS**

Drew Beechum and Denny Conn are co-authors of *Experimental Homebrewing: Mad Science in the Pursuit of Great Beer and Homebrew All-Stars: Top Homebrewers Share Their Best Techniques and Recipes*. They co-host the *Experimental Brewing* podcast and serve on the AHA Governing Committee.

Drew has been brewing and writing about brewing since he picked up a kettle in 1999. He is author of *The Everything Homebrewing Book*, *The Everything Hard Cider Book*, and *The Homebrewer's Journal*. He lives in Pasadena, Calif. with his lovely wife and a loyal army of dogs and cats.

Denny brewed his first batch of homebrew in 1998. He has since brewed more than 500 batches, and several commercial breweries in the United States and Europe have brewed his recipes. Denny is a BJCP National-ranked beer judge, a brewery consultant, and a field educator for Oakshire Brewing in Eugene, Ore.

Castle Malting®

PREMIUM-QUALITY MALTS

More than 70 types of Base and Specialty malts

ORGANIC MALTS

www.castlemalting.com

UNESCO

Intangible Cultural Heritage of Humanity

**malt
brew**

Available on the Android Market Available on the App Store

The easiest way to order your favourite malts

BSG
HandCraft

www.brewerssupplygroup.com



BREWLAB®

Brew your best batch every time!

It's in the Water!

The **BrewLab® BASIC** test kit for Home Brewers quantifies **6 important water test factors** while the **BrewLab® PLUS** measures **6 water test factors** and includes a digital pH meter for monitoring batches from start to finish. Experts agree water conditions affect your final product, so take the mystery out of making great beer. Trust LaMotte, the water analysis experts since 1919, to help you control your most important ingredient—water!



Kit developed in cooperation with John Palmer, author of *Water, a Comprehensive Guide for Brewers*.



7188-01

50+ tests for most factors!
Digital pH Tester for unlimited pH tests!

LaMotte
Chesterlawn, MD 21620 800.344.3100



www.lamotte.com

INTRODUCING HOMEBREW PROBIOTICS



NON-GMO
BREW IN THE BAG
EASY TO BREW AND GOOD FOR YOU

-100%
Natural

ONLY
\$24.99



love2brew
Homebrew Supply

LEARN MORE AT:
LOVE2BREW.COM/PROBIOTICS

By Amahl Turczyn

The 2017 Minnesota Mashout



Founded in 2002 by Al Boyce, Jeff Cotton, Steve Fletty, and Steve Piatz, the Minnesota Mashout has grown into one of the largest amateur brewing competitions in the country. The two original goals of the Mashout, designed as a competition run by brewers for brewers, were to provide entrants with prompt, useful feedback, and to award excellence in brewing. It is now a qualifying event for the prestigious High Plains Brewer of the Year award and the Masters Championship of Amateur Brewing (MCAB). As it's grown over the years, it's attracted an ever-greater cadre of skilled judges, keynote speakers, and quality sponsors.

This year's speakers, who presented at the Friday and Saturday lunches held during the two-day event, included director of brewing and co-owner of the Pinthouse Pizza Craft Brewpub in Austin, Texas, "Danger" Joe Mohrfeld, and long-time AHA Governing Committee member, BJCP Master III judge, and owner of Prairie Rose Meadery in Fargo, N.D., Susan Ruud.

Sponsored by the Minnesota Home Brewers Association and the St. Paul Home Brewers, the Mashout has gone from drawing fewer than 200 entries in its inaugural year to nearly 1,000 entries from

all over the country in 2017. Competition organizer Dr. Kristen England, himself a Grand Master III judge, author, education director emeritus, and now chief of operations and head brewer at the Bent Brewstillery in Roseville, Minn., commented, "Instead of a single club hosting the event, our competition is unique in that it is made up of many individuals, across numerous clubs." This collaboration of clubs is necessary to process the daunting number of entries.

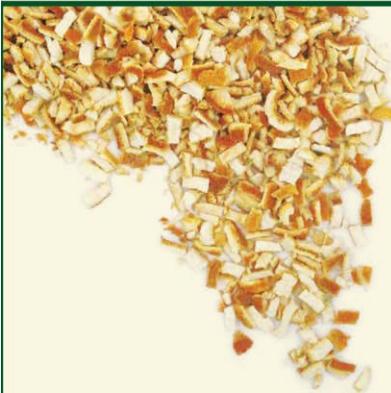
"Even with so many entries, all of the judging is finished in two days," continued England. More than 80 judges—98 percent of whom are BJCP ranked—commit themselves to the task. Ten of them are Master-ranked or higher.

While the Mashout is not billed as a mead-focused event, per se, those in the

know consider it one of the most challenging competitions for meadmakers. Given that competition co-sponsors Fletty and Piatz have won the coveted NHC Meadmaker of the Year award, perhaps it shouldn't come as a surprise. England said, "Beer and cider categories are very competitive, but it's the mead categories that are the most in demand. With six Meadmaker of the Year title winners competing annually, our mead categories are some of the staunchest in the world! If you make great mead, this is the best place to test your mettle."

The competition's return to its first venue was also big news in 2017. "This year we moved back to our original home of Summit Brewing Company, where we could accommodate more people—not just for judging, but for the huge awards ceremony. Not only do we hand out priz-





SAN FRANCISCO HERB Co.

• Since 1973 •

Wholesale Supplier
of Quality Spices &
Aromatic Botanicals

Orange Peel
Coriander
Hibiscus
Lemongrass
Grains of Paradise
Grapefruit Peel
Cardamom
Rose Hips
Star Anise
450+ others

800.227.4530
sfherb.com



ANGIE'S BURSTING CITRA II (A.K.A. JUICE)

American Pale Ale

Recipe by Nicholas Slay

Batch Volume: 5.5 US gallons (20.82 L)

Original Gravity: 1.054 (13.3° P)

Final Gravity: 1.007 (1.7° P)

Bitterness: 70 IBU

Color: 4.2 SRM

Alcohol: 6.3% by volume

MALTS

5.3 lb. (2.4 kg) Rahr pale ale malt

5.3 lb. (2.4 kg) Rahr 2-row malt

2 oz. (57 g) Weyermann acidulated malt

HOPS

0.8 oz. (23 g) Nugget, 13% a.a. @ 60 min

2.25 oz. (64 g) Citra, 12% a.a. @ 5 min

2.25 oz. (64 g) Citra, 12% a.a., whirlpool

2.25 oz. (64 g) Citra, 12% a.a., dry hop ("active")

2.25 oz. (64 g) Citra, 12% a.a., dry hop ("complete")

YEAST

White Labs WLP001 California Ale yeast

BREWING NOTES

Mash malts at 152°F (67°C) and allow to rest one hour. Sparge at 168°F (76°C). Boil 60 minutes. Chill to 70°F (21°C) and oxygenate. Ferment at 68–72°F (19–22°C). "Active" dry hops are added 2 days after fermentation starts, and the "complete" dry hops are added after terminal gravity is reached. Allow to sit on the second dose of dry hops for 3 days, and then rack to secondary for a week. Rack to a keg, chill, and force carbonate.

EXTRACT VERSION

Omit acidulated malt and substitute 8 lb. (3.63 kg) pale malt extract syrup for the rest. Dissolve extract syrup completely in reverse osmosis water, then top off to desired boil volume. Proceed as above.

es for all winners, but our medals change yearly, based on a themed current event. Of all the medals we've awarded over the years, this year's was especially important to us in Minnesota. R.I.P. Prince Rogers Nelson."

One of the highlights of the awards ceremony is a truly giant silent auction and raffle—this is really where the Mashout is able to use the popularity of its brew competition to give back to the community. "All of the money made at the Mashout is donated to our partner, the Southern Anoka Community Assistance (SACA), a local nonprofit food shelf. With our donation this year, we will be able to purchase over 40,000 pounds of food for people in need."

England also weighed in on this year's best-of-show winner, Nicholas Slay. "To wrap up this year's Mashout, Nick won the BOS with an American pale ale. Nick has been brewing for the past 14 years. What started out as brewing while drinking with friends and making many mistakes has turned into a passionate quest to continue and brew better beer. Nick became a BJCP beer judge two years ago and joined the St. Louis Brews; both moves helped him hone his abilities to brew to style and create beers to taste the way he envisioned them. Special thanks have to go to Nick's wife Angie's discerning palate for her critiques of his brews."

Amahl Turczyn is associate editor of Zymurgy.



ALL THE RIGHT FAUCETS

(866) 291-5756
MICROMATIC.COM



DESIGNER STYLE
304 Grade
Stainless Steel
304

STOUT
Perfect for Dispensing
Nitro Beers
JESF-4

FLOW CONTROL
On-Demand
Adjustment
4933-FC-SS

ROTOTAP
Stainless Steel
Style Faucet
4933ROTO

CICERONE®
CERTIFICATION PROGRAM

YOUR BEER SERVER SHOULD
RESPECT BEER
AS MUCH AS YOU DO.
DIRTY vs. CLEAN
REQUEST QUALITY.

Four levels of professional beer certification:

CICERONE CERTIFIED BEER SERVER ADVANCED CICERONE MASTER CICERONE

Learn more about
flawed beer.



Off
Flavor
Kit
&
tutored
tasting
webinar

Visit cicerone.org for more information.



39th Annual
National
Homebrewers
Conference

A Viking horned helmet is positioned on the left side of a red canoe. The canoe is tilted slightly to the right, moving across a calm lake. In the background, a dense forest of evergreen trees is visible, and a city skyline is seen through a hazy atmosphere.

HOME BREW CON 2017

JUNE 15-17 // MINNEAPOLIS
REGISTER AT HOMEBREWCON.ORG

HOMEBREW CON: WHERE HOMEBREWERS COME HOME



HOMEBREW CON HIGHLIGHTS

- Club Night (the biggest homebrew party of the year!)
- Keynote & Welcome Toast
- Craft Beer Kickoff Party
- Educational sessions and demonstrations (three days' worth!)
- Homebrew Expo & Social Club
- Author book signings
- National Homebrew Competition Awards Ceremony (largest beer competition in the world)
- Events for Homebrew Con attendees around the city
- AND awesome homebrewers like YOU!

DESTINATION: MINNEAPOLIS

The City of Lakes! A scenic craft brewery hub home to friendly folks and several cultural landmarks.

KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

November 2016

National Homebrew Championships Southern Round 2016, 50 entries—Wouter Cronje, Cape Town, South Africa.

December 2016

Devil's Peak Homebrew Competition 2016, 33 entries—Chris Pryor, Cape Town, South Africa.

January 2017

KLOB Kup, 31 entries—Brad Wyant, Kalamazoo, MI.

Hop Yard 62 HOP Off Home Brew Contest: Porter, 9 entries—Bill McKendry, Greensboro, NC.

Winterbrew 2017, 201 entries—Robert Rys, Overland Park, KS.

Local Lighthouse Homebrew Competition 2016, 25 entries—Steve Tanner, Ben Lomond, CA.

Concurso de Delícias da Tradição Alemã, 10 entries—Éder Francisco Wege, Pomerode, Brazil.

Four Leaf Brewing Capture the Tap, 21 entries—Steven Smalenberg, Warren, MI.

Reuben's Brews Hop Idol!, 39 entries—3, Jonathan Cooper, Seattle, WA.

2017 Doug King Memorial Homebrew Competition, 134 entries—Noe Tellez, Los Angeles, CA.

10th Annual Virginia Beer Blitz, 383 entries—Brian Berquist, Fredericksburg, VA.

Maillard Beer Cup Hivern, 16 entries—Xavier Butxaca, Barcelona, Spain.

Biere de Rock, 134 entries—Mike Bostwick, Castle Pines, CO.

Champion of the Pint, 297 entries—Matthew White, Lincoln, NE.

OC Mashups Winter 2017 Homebrew Competition, 9 entries—Gabriel Adler & Danny Kemp.

El Dorado County Fair Homebrew and Microbrew Competitions, 105 entries—Mike Galli, Fairfield, CA.

Stout Bout, 85 entries—Danielle Pinkard, Portland, OR.

Groundhog Day Homebrew Competition, 98 entries—Colin Crociati, Plymouth, MA.

February 2017

Single Shot Showdown, 32 entries—Nathan Fleming, Laramie, WY.

Beer Dabbler Winter Carnival Home Brew Contest, 64 entries—Jay Dresher, Minneapolis, MN.

1º Concurso Homebrew Birras Baixas, 40 entries—Francisco P. Plasencia Plasencia, Cáceres, Spain.

Amazing Homebrew Competition, 165 entries—Donghyuk Choi, Daegu, Korea.

Domras Cup 19th Annual Mead Competition, 139 entries—Marek Leczycki, Jelenia Gora, Poland.

Hammond River Brewing 3rd Annual Home Brew Comp, 15 entries—Julien Belliveau & Jean-Marc Landry.

GTA Brews Winter Warmer 2017, 93 entries—Adam Daniels, Toronto, ON.

Home Brew League Championships, 12 entries—Pat Tkacz, Grand Rapids, MI.

Great Northern Brew Ha Ha, 234 entries—Todd Rieck, LaCrosse, WI.

CHAOS Club and Gino's Brewing Challenge, 16 entries—Ben Resch, Chicago, IL.

Homebrew Alley XI, 544 entries—Steven Landgren.

Arizona's Best Strong Beer Award, 89 entries—Wren House.

Kansas City Bier Meisters 34th Annual Competition, 523 entries—Randy Pratt.

Napa Homebrewers Classic, 131 entries—Mike Riddle, Napa, CA.

5th Annual Romancing the Beer Homebrew Competition, 295 entries—Oleg Shpyrko, San Diego, CA.

2017 GEBL IPA Bracket Challenge, 85 entries—Brandon Nuess, Sacramento, CA.

Peterson Air Force Base Homebrew Competition, 320 entries—John Landreman, Colorado Springs, CO.

El Barrilito de Oro, 53 entries—Oscar Suazo, Panama.

Heart of Dixie Open Homebrew Competition, 156 entries—Jay and Ellen Bennett, Birmingham, AL.

Bluff City Brewers and Connoisseurs Extravaganza, 202 entries—Michael West, Memphis, TN.

Florida Craft Brew and Wing Festival, 22 entries—Eric Carson, Sebastian, FL.

All American Homebrew Competition, 347 entries—Eric Carman, Oxford, OH.

SODZ British Beerfest Competition (BBF), 123 entries—Bill Bopp, Westerville, OH.

War of the Worts XXII, 729 entries—Rob Knighton, Columbia, PA.

Beerfest 2017, 137 entries—Brad Hurley, St Kilda, Victoria, Australia.

West Plains Brewfest Homebrew Competition, 14 entries—Chris Gordon and Russell Stewart, Mountain Home, AR.

Great Basin Brew-Off 2017, 119 entries—Chris Whitbeck, Washoe Valley, NV.

Fast Like a Monk! Homebrew Competition, 85 entries—Educator, Jeremiah Petersen, London, UK.

March 2017

Shamrock Open XXII, 285 entries—Eric Darnell, Garner, NC.

Bockfest, 41 entries—Andrew Mitchell, Society of Northeastern Ohio Brewers, OH.

The 18th Annual WertContest, 190 entries—Cory Day, Langley, BC.

BABBLE Brew Off, 185 entries—Gary Lockwood, Madison, WI.

Tex Tubb's ReinheitsRevolt Homebrew Contest, 26 entries—Rick O'Donnell, Madison, WI.

Roxy Hastings Memorial Iron Brewer, 18 entries—Damon Larson, Edmonton, AB.

GO HARD CORE
WITH A DRINK AS BAD ASS AS YOU ARE

RECIPE KIT INCLUDED!

CROOKED APPLE
HARD CIDER
SMALL BATCH STARTER KIT

CROOKED APPLE
HARD CIDER

CUSTOMIZE THE TASTE
OF HARD CIDER IN EVERY SIP.

MIDWESTSUPPLIES.COM

**AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR**

For complete calendar, competition and judging information go to
HomebrewersAssociation.org/pages/competitions



May 6, 2017

NorCal Brew Fest Competition sponsored by Sonoma County Fair
norcalbrewfest.com
Santa Rosa, CA
Entry Deadline: 3/31/2017

May 6, 2017

22nd Annual Boston Homebrew Competition
bhc.worts.org
Boston, MA
Entry Deadline: 4/29/2017

May 6, 2017

UNYHA 39th Annual Homebrew Competition
unyha.com/competition-2017
Webster, NY
Entry Deadline: 4/26/2017

May 6, 2017

2017 North Shore Brewers Homebrew Competition at Notch
northshorebrewers.org/competition
Salem, MA
Entry Deadline: 4/28/2017

May 6, 2017

Wort Transformation Challenge
La Vista, NE
Entry Deadline: 2/4/2017

May 6, 2017

HKHA 5th Annual Homebrew Competition
facebook.com/brewers.hk
Hong Kong
Entry Deadline: 4/13/2017

May 6, 2017

Tamassee Craft Brew Festival Homebrew Competition
tamasseecraftbrewfestival.com
Seneca, SC
Entry Deadline: 5/5/2017

May 6, 2017

Saisonfest
brewfest.dayondraft.org
Middletown, OH
Entry Deadline: 4/16/2017

May 6, 2017

20th Annual Cactus Challenge
ale-iansociety.org/cactus
Lubbock, TX
Entry Deadline: 3/31/2017

May 6, 2017

BLBFIT Professional Brewers Competition
facebook.com/BLBFITPBC
Roanoke, TX
Entry Deadline: 5/4/2017

May 7, 2017

The 8th Annual Appalachian Brew Club IPA Throwdown
abcipathrowdown.brewcompetition.com
Elkins, WV
Entry Deadline: 4/30/2017

May 7, 2017

Lagerpalooza 3
lagerpalooza-proam.com
Midvale, UT
Entry Deadline: 4/30/2017

May 7, 2017

Battle of the Bubbles
bob.brewcomp.com
Frederick, MD
Entry Deadline: 4/30/2017

May 10, 2017

IBEERian Awards
Aveiro, Portugal

May 11, 2017

2017 VanBrewer Awards
Vancouver, BC
Entry Deadline: 5/6/2017

May 11, 2017

BrewMaui Annual Homebrew Contest
brewmaui.com
Maui, HI
Entry Deadline: 5/8/2017

May 12, 2017

Duelo Cerveceros de Occidente
duelocerveceros.com
Guadalajara, Mexico
Entry Deadline: 5/6/2017

May 13, 2017

2017 Alameda County Fair Homebrew Competition (BABO)
beercomps.org/babo
Pleasanton, CA
Entry Deadline: 4/22/2017

May 13, 2017

U.S. Open Homebrew Competition
carolinabrewmasters.com
Charlotte, NC
Entry Deadline: 4/29/2017

May 13, 2017

21st Annual BEER Brew-Off
beerhbc.org
Bay Shore, NY
Entry Deadline: 5/5/2017

May 13, 2017

2017 Heart of Cascadia - The Colors of IPA
hoc.oregonbrewcrew.org
Portland, OR

May 13, 2017

Athens Homebrew Classic
homebrewclassic.com
Athens, GA
Entry Deadline: 4/28/2017

May 13, 2017

Ipswich Home Brew Competition
ipswichbrewco.com.au
Ipswich, Queensland, Australia

May 13, 2017

Wisconsin State Fair Amateur Homebrew Competition
wistatefair.com/competitions/winebeer
West Allis, WI
Entry Deadline: 4/12/2017

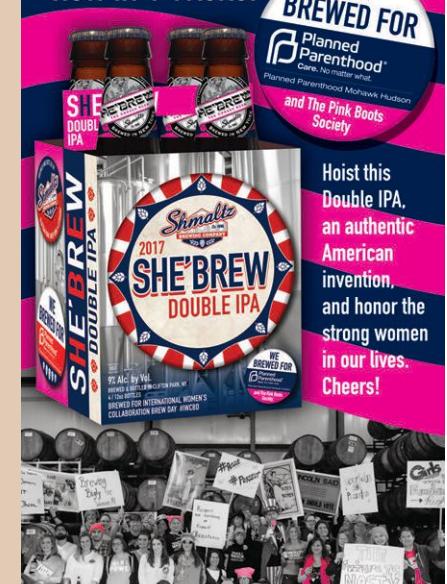
May 13, 2017

Concurso Vitrine da Cerveja
vitrinedacerveja.com.br
Salvador, Bahia, Brazil
Entry Deadline: 5/6/2017

May 14, 2017

Garden County Brewers NEIPA Competition
Bray, Co Wicklow, Ireland
Entry Deadline: 5/1/2017

NOW IN 4-PACKS!



BREWED FOR INTERNATIONAL WOMEN'S COLLABORATION BREW DAY #IWCBD

SHMALTZ BREWING COMPANY, CLIFTON PARK, NY
ShmaltzBrewing.com

AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR

For complete calendar, competition and judging information go to
HomebrewersAssociation.org/pages/competitions



May 19, 2017
Sunset Hill American Homebrew Competition
Valparaiso, IN
Entry Deadline: 4/28/2017

May 20, 2017
London and South East Craft Brewing Competition
londonandsoutheast.brewcompetition.com
London, UK
Entry Deadline: 3/30/2017

May 20, 2017
5th Annual Hop Blossom Homebrew Competition
shenbrew.org/hop_blossom_17
Winchester, VA

May 20, 2017
OC Fair Homebrew Competition
ocfair.com/competitions
Costa Mesa, CA
Entry Deadline: 4/28/2017

May 20, 2017
Boardtown Brewoff
boardtownbrewoff.brewcompetition.com
Starkville, MS
Entry Deadline: 5/6/2017

May 20, 2017
Concurso Homebrewing Fueras de Estilo (I Ed.)
facebook.com/Fueradestilo
Mairena del Aljarafe, Sevilla, Spain
Entry Deadline: 5/6/2017

May 20, 2017
BUZZ OFF 23
buzzhomebrewclub.com
West Chester, PA
Entry Deadline: 5/5/2017

May 20, 2017
Shanghai 2017 National Homebrew Competition
Shanghai, China
Entry Deadline: 5/10/2017

May 20, 2017
NJ Hopz Maifest
njhopz.com
Hackettstown, NJ
Entry Deadline: 5/8/2017

May 20, 2017
The 23rd Annual Boneyard Brew Off
Champaign, IL

May 21, 2017
Big Batch Brew Bash (BBBB)
thekgb.org/Big-Batch-Brew-Bash/Current-News
Houston, TX
Entry Deadline: 5/12/2017

May 21, 2017
San Diego County Fair Homebrew Competition
sdfair.com
Del Mar, CA
Entry Deadline: 4/28/2017

May 25, 2017
Slow Beer Challenge Mx 2017
Puebla, Mexico
Entry Deadline: 4/8/2017

May 25, 2017
South Beer Cup VI
southbeercup.com
Mar del Plata, Argentina

May 26, 2017
Great Alaska Craft Beer and Homebrew Festival
seakfair.org/wp-content/uploads/2017/02/HomeBrew2017.pdf
Haines, AK
Entry Deadline: 5/24/2017

May 27, 2017
Belgian Brew Brawl
saaclub.belgian-brew-brawl-2017
Austin, TX
Entry Deadline: 4/30/2017

May 27, 2017
The 2017 Hogtown Brew-Off
hogtownbrewers.org/Brewoff
Gainesville, FL
Entry Deadline: 5/13/2017

May 27, 2017
Master Cup Home Brew Tournament of China #2 Xi'an
Xi'an, Shaanxi, China
Entry Deadline: 5/26/2017

May 27, 2017
Hogtoberfest Home Brew Competition
groundhog.org/events/hogtoberfest-craft-beer-festival
Punxsutawney, PA
Entry Deadline: 5/20/2017

May 27, 2017
Masters Championship of Amateur Brewing (MCAB)
St Paul, MN

June 3, 2017
Ohio State Fair Homebrew Competition
ohiostatefair.com
Columbus, OH
Entry Deadline: 5/16/2017

June 3, 2017
VI. Hrvatsko homebrew prvenstvo
pivarstvo.info/registration
Zagreb, Croatia
Entry Deadline: 5/12/2017

June 3, 2017
Summer Sizzler
downeastalers.com/index.html
Greenville, NC
Entry Deadline: 5/13/2017

June 10, 2017
Oregon State Fair Homebrew Beer Competition
oregonstatefair.org/competitions/home-brew
Salem, OR
Entry Deadline: 6/2/2017

Explore Local Flavor Using Cultivated and Foraged Ingredients





**AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR**

For complete calendar, competition and judging information go to
HomebrewersAssociation.org/pages/competitions



June 10, 2017

The Homebrew Festival
thehomebrewfestival.co.uk
Market Bosworth, UK

June 10, 2017

Morgan Cup
machadodesign.com/morgancup
Tracy, CA
Entry Deadline: 5/19/2017

June 10, 2017

Seed for Suds
seedsforsuds.com
Solana Beach, CA
Entry Deadline: 4/25/2017

June 10, 2017

2017 Marin County Fair Homebrew Competition
marinmashers.com/mcf-2017-homebrew-competition
San Rafael, CA
Entry Deadline: 5/19/2017

June 12, 2017

Carboys do Celtic
texascarboys.org
Cedar Park, TX
Entry Deadline: 6/9/2017

June 15, 2017

AHA National Homebrew Competition Final Round - Minneapolis
HomebrewersAssociation.org/national-homebrew-competition
Minneapolis, MN
Entry Deadline: 5/31/2017

June 15, 2017

XII Encontro Nacional das ACervAs
Natal, Brazil

June 24, 2017

4th Annual MoM Hot Summer BrewOff
Kansas City, MO
Entry Deadline: 6/2/2017

June 24, 2017

Alamo City Cerveza Fest
accf.bexarbrewers.org
San Antonio, TX
Entry Deadline: 5/5/2017

June 24, 2017

Good Time Brewers' Classic
reggiebeer.com
Lake Charles, LA
Entry Deadline: 6/10/2017

June 24, 2017

Master Cup Home Brew Tournament of China #3 Xiamen
Xiamen, Fujian, China
Entry Deadline: 6/23/2017

June 28, 2017

Red River Valley Fair Home Brew Competition
redrivervalleyfair.com/wp-content/uploads/2016/06/2016-Home-Brew.pdf
West Fargo, ND
Entry Deadline: 6/16/2017



ON THE WEB
For an up-to-date calendar
of AHA and BJCP events
go to the Events section of
HomebrewersAssociation.org



THE OBVIOUS CHOICE FOR BEVERAGE FERMENTATION



Powered by Lesaffre, one of the world's largest yeast and yeast derivatives manufacturer, we offer you the highest quality standard of products for beer manufacturing. Through a dedicated range of active dry yeasts and fermentation aids, we deliver innovative solutions to give you the ability to create the beer you dream about.



Fermentis

LESAFFRE FOR BEVERAGES



www.fermentis.com

TRUST

the folk

WHO HAVE BEEN making malt FOR GENERATIONS

Muntons have been supplying brewers with their malt since the 1920s. As you would expect, over that time we've built a detailed knowledge of what brewers need from their ingredients and we've built a reputation for providing service and quality within the brewing industry.

Today, Muntons malt ingredients portfolio covers the entire gamut of brewers' needs. From homebrewer, to craft brewer, to some of the world's largest breweries.

Our brewing products span branded malt extracts for starter kits thru specialty malt extracts (such as Maris Otter®) to dried spraymalts and bulk grain malts.

So if you're a first time brewer hoping for a painless initiation, a craft brewer with aims to create something totally new or an established brewery looking for a consistent supply of product and support, you can trust Muntons.

Visit your local homebrew store for Muntons homebrew products or contact us at:

**www.muntonshomebrew.com
email: sales@muntons-inc.com**

 @MuntonsUSA
 @muntonshomebrew



Muntons are leading manufacturers of malt and malt extract providing only the finest quality ingredients for the homebrewer, craft brewing industry as well as national and international breweries. Muntons are also the largest manufacturer of homebrew extract kits. Additional kits now include all grain starter kits. Ingredients that may also enhance your brews include a variety of spraymalts.



PURE MALT EXTRACTS



HOMEBREW KITS



SPRAYMALTS



GRAIN MALTS



Measuring Mash pH

Mashing is the physio-chemical process in which various fermentable and non-fermentable substances are extracted from malted grain. The term *extract* refers to the total amount of dissolved material in sweet wort after mashing and lautering malted barley.¹

Several factors affect the extraction rate and total percentage of extract that can be obtained during a mash.² Variables such as mash duration, mash temperature, water-to-grist ratio, degree of malt modification, ions present in the mash water (calcium and carbonate are especially important), and crush size of the milled grain are just a few. Many of these factors are interrelated and influence one another.

One of the most important brewing variables is pH, which affects every step of the brewing process. pH affects extract potential, beer color, hot break formation, foam stability, hop oil extraction, hop bitterness, and beer filterability. pH is also important for beer quality during storage because low pH inhibits bacterial growth.

The pH of the mash is so important that it even dictates the range of optimal temperatures at which sugar can be extracted from malted barley (see Figure 1).³ But what is pH, and how can brewers measure and control this important brewing variable?

Defining pH

We all know that water's chemical makeup is H₂O—two hydrogen atoms (H) for every oxygen atom (O)—but that's only part of the story. Water molecules have a unique chemical structure that makes it fairly easy for one molecule to temporarily “steal” a hydrogen atom from its neighbor. This process of exchange is called dissociation, and it can be symbolically expressed as

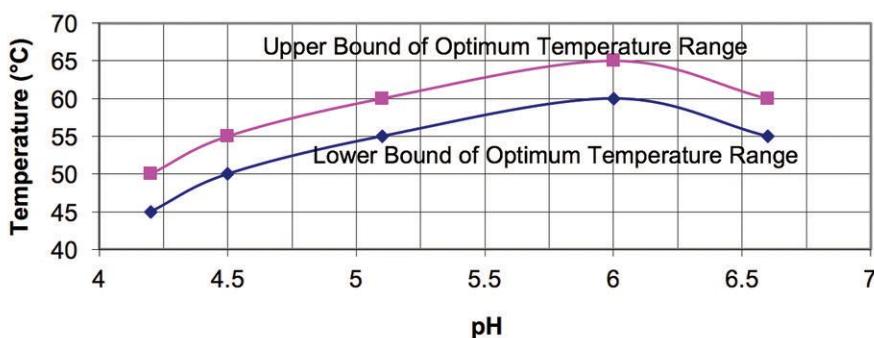
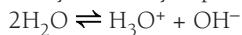


Figure 1: pH controls the best temperatures for mashing

Pure water, thus, contains an equilibrium mixture of “regular” water molecules (H₂O), *hydronium ions* (H₃O⁺), and *hydroxyl ions* (OH⁻). The positive and negative superscripts on the hydronium and hydroxyl ions indicate that these ions are positively and negatively charged, having gained and lost a positively charged hydrogen atom, respectively.

The relative acidity or alkalinity of an aqueous (water-based) solution depends on whether there are more H₃O⁺ ions or OH⁻ ions present. If there are more H₃O⁺

ions, the solution is acidic. If there are more OH⁻ ions, the solution is basic (or alkaline). Adding acid-containing or acid-producing components—like malt, lactic acid, or brewing salts—supplies additional hydrogen ions that drive pH down.

pH is a measure of the acidity or alkalinity of a solution and is defined as the negative logarithm of the hydronium ion concentration:

$$\text{pH} = -\log [\text{H}_3\text{O}^+].$$

The pH scale ranges from 0 (very acidic) to 14 (very basic, or alkaline). The rigorous

definition of pH is related to the equilibrium concentration of the H_3O^+ and OH^- ions present within the aqueous solution through the *water concentration product*, K_w . K_w for water is defined as the product of the concentrations of H_3O^+ and OH^- ions present within the solution:

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-]$$

For pure water at 20° C (68° F), $K_w = 10^{-14}$. Since each dissociated water molecule in pure water provides one ion of H_3O^+ and one ion of OH^- , it follows that the concentrations of the hydronium and hydroxyl ions are equal. Thus, $[\text{H}_3\text{O}^+] = [\text{OH}^-]$, and

$$K_w = [\text{H}_3\text{O}^+]^2 = 10^{-14}.$$

Solving the above for $[\text{H}_3\text{O}^+]$ shows that the concentration of hydronium ions within pure water at 20° C is:

$$[\text{H}_3\text{O}^+] = 10^{-7}$$

Since the hydronium ion concentration, $[\text{H}_3\text{O}^+]$, for pure water is 10^{-7} , and $\text{pH} = -\log [\text{H}_3\text{O}^+]$, it follows that the pH of pure water at 20° C is

$$-\log[10^{-7}] = 7.$$

Shmaltz BREWING COMPANY

COMING IN MAY

NEW! TRIBE CALLED SHMALTZ VARIETY 12-PACKS

SLINGSHOT CANS YES! CANS! 12-PACKS

WISHBONE SESSION DOUBLE IPA 4-PACKS & DRAFT

ShmaltzBrewing.com • ShmaltzBrewing

A pH less than 7 means that the solution is more acidic and the concentration of H_3O^+ is greater than the concentration of OH^- . For example, if the pH of an acidic solution is 4, it follows that $[\text{H}_3\text{O}^+] = 10^{-4}$ and $[\text{OH}^-] = 10^{-10}$. Because of the way pH is defined, the scale is not linear. A solution with a pH of 2 is ten times as acidic as a solution that has a pH of 3, and one hundred times as acidic as a solution that has a pH of 4.

Effect of pH on the Mashing Process

pH has a significant effect on the solubilities, rates of reaction, and surface

charge characteristics of many molecules, as well as yeast surface charge. These factors affect beer production and quality by influencing physical, chemical, and enzymatic characteristics of wort and beer throughout the brewing process. During the mash, we are primarily concerned with the impact of pH on enzymes.

Enzymes are complex proteins that rely on their three-dimensional structures for their activity. The three-dimensional structure of an enzyme is, to a large extent, derived from internal electrostatic (hydrogen) bonding. Since pH affects these internal charges, enzymes usually

Table 1: Optimal pH Range for Important Brewing Enzymes

Enzyme	Purpose	Optimal pH (room temperature)
α -amylase	Hydrolyzes starch	5.6–5.8
β -amylase	Hydrolyzes pairs of maltose sugar from non-reducing ends	5.5
Proteases	Hydrolyzes proteins to polypeptides and amino acids	4.8
β -glucanase	Hydrolyzes beta glucans to reduce wort viscosity	6.0

Table 2: Pros and Cons of pH Measurement Methods

Measurement Method	Positive	Negative
Litmus Paper	Least expensive method. No maintenance.	Can be difficult to accurately read (± 0.5 pH). Dye can run into sample solution.
Precision Test Strips	Easy to read with a reasonable accuracy of ± 0.3 pH. No maintenance.	More expensive than litmus paper. May have a systematic error, which leads to inaccurate pH reading.
pH Meter	Very accurate (± 0.01 pH for some models). Easy to read.	Most expensive option. Replacement electrodes are expensive and may need to be replaced every 1–2 years. Calibration is required prior to each use. Must store electrode(s) in wet storage solution.

exhibit peak activity within specific pH ranges. (Note that most enzymes can work outside their optimal ranges but activity decreases the further the pH deviates from the optimal level.)

The optimum pH ranges for most brewing mash enzymes fit within the “brewer’s window” of 5.2 to 5.6. Table 1 describes the enzymes, their functions, and their optimal pH values.⁴

Enzyme activity is crucial to the mashing process. Without enzymes, there would be no starch conversion. The optimum pH range for mashing is generally 5.5 to 5.6 for both α - and β -amylase. The mash pH that is actually achieved depends upon the types of malts being used, the original pH of the water, and the method of mashing. When mash pH falls within the ideal range, sugar extraction improves, wort lightens in color, mash filtration and runoff are easier, hot break precipitates more readily, and the finished beer is clearer.

A too-low mash pH inhibits protease activity, which may cause a hazy finished beer. If mash pH is too high, starch and protein hydrolysis can be adversely affected, yielding a darker-than-desired beer with a somewhat “sharp” flavor. High pH during the mash also increases the amount of dextrins present in wort, leading to reduced fermentability.

How to Measure pH

Homebrewers have several options to measure pH, each with advantages and disadvantages. Options available to the homebrewer include litmus paper, precision test strips, and pH meters.

Litmus paper contains a dye that changes color when exposed to an acid or base. The extent of the color change is matched against a scale to determine the pH of the sample. Litmus paper (or pH test strips, as they are commonly known) is a cheap way to measure mash pH. Litmus paper can be somewhat difficult to accurately read because it is designed to operate over a fairly large pH range, and the dye may run into the sample.

Precision test strips also use a pH-sensitive dye, but this dye doesn’t run like that

used in litmus paper. Precision test strips also show a more pronounced change of color over a narrow pH range. This makes precision test strips easier to read and more precise than litmus paper. Precision test strips are slightly more expensive than litmus paper.

Both of these methods have similar drawbacks. The relatively low ionic strength of wort means the color response tends to be muted. Wort color can alter our perception of color change and, thus, the inferred pH. And both paper and

strips have limited shelf life and can be degraded by humidity. The bottom line is that they are poor indicators of wort pH. Readings from both should be considered approximate at best.

A pH meter converts the pH difference between the sample liquid and a reference liquid, which is inside a bulb at the tip of its probe, into a voltage difference that can be measured and converted into a pH value. These instruments can measure pH very precisely, but this precision comes at a price. pH meters are relatively

Hopsteiner
est. 1845

HOP VARIETIES

39th Annual National Homebrewers Conference

HOME BREW CON 2017 JUNE 15-17 / MINNEAPOLIS

Visit our Booth

Try a unique beer from BREWING INDEED COMPANY with Eureka! & Denali Hops

EUREKA!

Alpha-Acid %: 17 – 19.9
Beta-Acid %: 4.6 – 6
Total Oils (ml/100g): 2.5 – 4.4

Aroma Specification:
Black Currant, Dark Fruits,
Strong Herbal Notes, Pine Tree

“Holy hop aroma Batman...
this is a seriously aromatic hop.”
– A Ph.D in Beer

Lemondrop™

Alpha-Acid %: 5 – 7
Beta-Acid %: 4 – 6
Total Oils (ml/100g): 1.5 – 2

Aroma Specification:
Lemon, Mint, Green Tea, Melon

“Unique lemon-citrus
character with a
pleasant aroma...”

X07270

Alpha-Acid %: 15 – 18.5
Beta-Acid %: 4 – 5.2
Total Oils (ml/100g): 3 – 4.4

Aroma Specification:
Spicy, Resinous, Tangerine,
Hints of Tropical Fruit

“Big hop for big beers, bursting
at the seams with flavor!”

DENALI™

Alpha-Acid %: 13 – 15
Beta-Acid %: 4 – 5
Total Oils (ml/100g): 2.5 – 4

Aroma Specification:
Pineapple, Pine, Bright Citrus

“Beautiful, honestly like
no hop I’d smelled before.”
– Brûlosophy.com

The Proof is in the Pour™

Ask your local homebrew supply shop
for these exciting new hop varieties.

hopsteiner.com f t i n s

STRIKE NOW WHILE IT'S HOT

NEW PRODUCTS NOW AVAILABLE



ANVIL
BREWING EQUIPMENT®



ANVILBREWING.COM



FB.COM/ANVILBREWINGEQUIPMENT



@ANVILBREWING



A BLICHMANN ENGINEERING COMPANY

expensive, and their electrodes, if not well maintained, can have a useful life as short as one or two years. They also require calibration prior to each use, and the tip of the electrode must be stored wet. A pH meter is a great choice for accurate and precise pH measurement, but the higher initial cost and these "hassle factors" deter many homebrewers from using them.

Table 2 presents a summary of the pros and cons of each method of pH measurement. All three methods are good options for homebrewers, but depending upon your intended use of pH measurement in your home brewery, the best way to measure pH may likely be with a pH meter that offers a reasonable balance between quality and price. Plan to spend at least 50 dollars for a basic meter. More expensive models offer additional features such as temperature compensation.

How pH Meters Work

A pH meter works by measuring the electrical potential between the pH electrode and the reference electrode when immersed into an electrically conductive solution. The pH electrode is sensitive to the concentration of hydronium ions, but the reference electrode is not. The electrical potential change is directly related to the concentration of hydronium ions (H_3O^+) in the solution.

Very specific surface chemistry is necessary for the proper functioning of a pH and reference electrodes.⁵ The pH probe electrode is primarily composed of alkali silicates that are combined to form a hydrogen ion-specific sensing glass. When the glass is put into solution, it undergoes a chemical reaction that forms a leached layer. The leached layer is the area at the surface of the glass where an ion exchange reaction takes place.

In this surface layer, hydrogen ions migrate in and replace other positively charged ions such as sodium or potassium. This causes a silica-oxygen-hydrogen bond to be set up that is essential for sensing hydronium ions in solution. The basic premise behind glass pH electrodes is to have the reference electrode and the hydrogen ion-sensitive



electrode in contact with the solution being measured. The glass electrodes are not limited to any particular configuration or shape, but they must both be in contact with solution.

The pH Electrode

The electrical potential of the pH electrode changes with the H_3O^+ ion concentration in the solution. The pH electrode only senses the hydronium ions. This means that any voltage produced is the result of the presence of the H_3O^+ ions only.

The Reference Electrode

The reference electrode provides a constant voltage potential value against which the voltage potential of the pH electrode is measured.

Although you can easily measure pH using two separate electrode probes, for the sake of user convenience, modern pH probes usually combine both the pH electrode and the reference electrode into a single probe.

Temperature and pH Measurement

Because of the physics and chemistry associated with the way that pH probes work, the measured pH of a solution depends on the temperature of the solution being measured.

To accurately measure pH, the meter must know the temperature of the solution because the pH of a solution changes with its temperature. This must be considered when measuring pH and determining pH targets, and it is especially important when measuring mash pH.

Mash rests span a range from about 104° to 167° F (40° to 75° C), and the difference between mash pH and the pH measured at room temperature is not constant—it's proportional to the difference between mash temperature and room temperature. Briggs states that a pH measured at mash temperature is about 0.3 units lower than the same liquid measured at room temperature.⁶

Practical Tips for pH Meter Use

pH meters are an excellent choice for measuring pH in your homebrewery. Here are some practical suggestions to help ensure your success:

1. When you first get your pH meter, soak the electrode in the electrode storage solution. Be sure that the electrodes are stored in the solution whenever the meter is not in use. For maximum accuracy and the longest possible life, the electrode should never be allowed to become dry.
2. Calibrate the meter according to the manufacturer's instructions, using a pH 7.01 buffer and a pH 4.01 buffer.
3. Take your wort (or other liquid) sample in a clean glass. If the sample is from the mash or sparge runoff, cool it down to room temperature before measuring pH. Even if your pH meter has an automatic temperature compensation feature, taking readings of hot samples will decrease the life of the electrode. The thin glass membranes on a pH probe can easily crack and break when they go from room temperature to hot wort and back to room temperature.
4. Before placing the pH electrode into the sample, rinse the electrode with distilled water and dry it with a tissue. Avoid actually touching the electrode with the tissue; let the tissue barely touch the water droplets and wick them away. Blowing off the bulb and all the recesses at the end of the probe with a light blast of air also works. Either use a sharp mouth blow to move all droplets off the bulb and probe, or go for a can of compressed air.
5. Place the electrode in the sample and give the sample a good swirl. Ensure there are no bubbles clinging to the electrode.
6. Turn on the power to the electrode.
7. Allow enough time for the pH meter reading to stabilize, then note the pH reading indicated by the meter.
8. Once your sample has cooled to room temperature, take a reading. The pH of a cooled sample at room temperature will be about 0.3 units higher than the pH at mash temperature. Thus if you get a reading of pH 5.6 for your cooled sample, the corrected reading is roughly 5.3.

9. Rinse the electrode with distilled water again, then dry as before, and return the electrode to the storage solution.

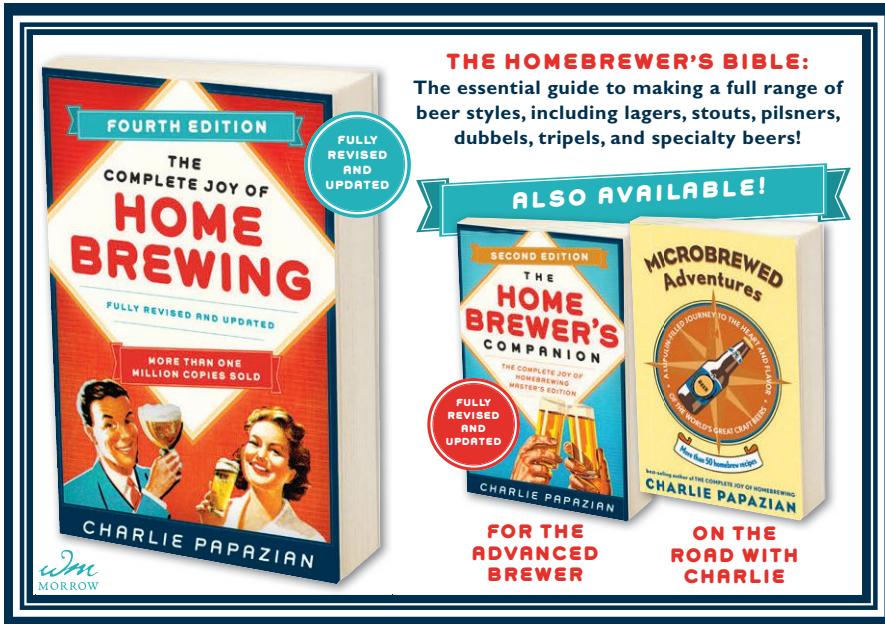
Litmus paper and test strips are convenient but approximate, and the accuracy of pH meters justifies their expense when you need to depend on your measurements.

Finally, don't try to "chase" mash pH if you don't hit your target. Use a brewing chemistry calculator to predict your estimated mash pH, but don't add more acid or base to correct pH during the mash. Live with the result, and use your measurements to correct water chemistry adjustments in the future.

Resources

1. Rabin, Dan and Carl Forget. *Dictionary of Beer and Brewing*, 2nd ed. Boulder, CO: Brewer's Publications, 1998.
2. Goldammer, Ted. *The Brewer's Handbook: The Complete Book to Brewing Beer*. Clifton, VA: KVP Publishers, 1999.
3. Briggs, D.E., et.al. *Malting and Brewing Science Volume 1: Malt and Sweet Wort*, 2nd ed. London: Chapman & Hall, 1981.
4. *The BREWER International*, Volume 2, Issue 8, 2002.
5. The Background of pH Measurement and Hints for Your Daily Work, Author: il@metrohm.ch Version 1.0 (9/1999).

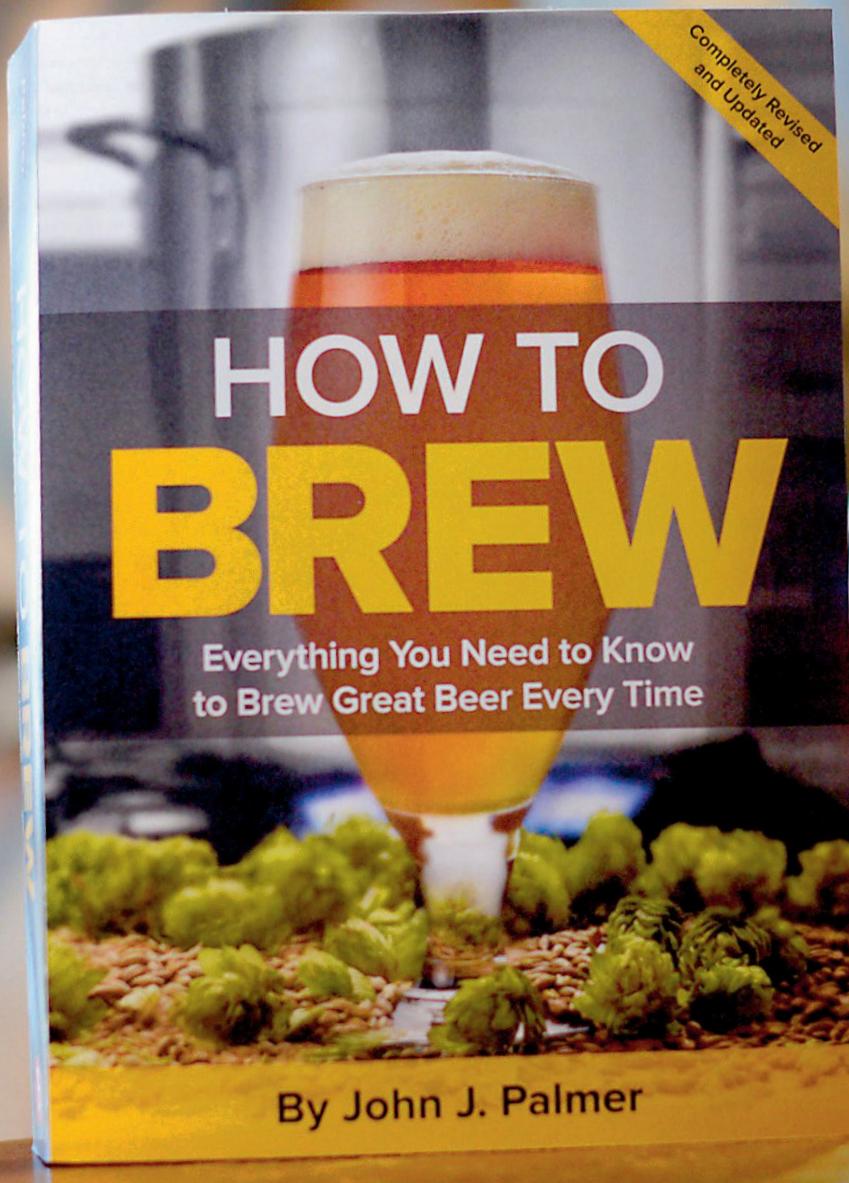
Chris Bible is a chemical engineer and Professional Brewing Science Instructor at South College in Knoxville, Tenn. His love of beer and science intersected when he became a homebrewer almost 20 years ago. He lives in Knoxville with his wife and son, and especially enjoys brewing and drinking porters and stouts.



An advertisement for American Craft Beer Week. The top half features the text 'AMERICAN CRAFT BEER WEEK' in large white letters, with 'MAY 15-21, 2017' below it in a red banner. In the center, a person is shown from the side, wearing glasses and holding a beer glass filled with beer. The bottom half has the text 'SAVE THE DATE!' in large white letters. To the left, the 'Craft BEER.com' logo is visible. On the right, there are social media links: a Facebook icon with 'FACEBOOK.COM/AMERICANCRAFTBEERWEEK' and a Twitter icon with '#ACBW'. The background is a blurred image of a person holding a beer glass.

THE DEFINITIVE GUIDE TO BREWING AT HOME

Now completely updated with new chapters and imagery.



NEW EDITION

*Available wherever
beer books are sold.*



Order today!
BREWERSPUBLICATIONS.COM



BREWERS
PUBLICATIONS





**CLEAN BEER?
START HERE!**

**PBW | Star San | Saniclean | IO Star | LLC | B.S. Remover
10% Phos Acid | 5.2 pH Stabilizer | Super Moss HB | Defoamer 105**



**Five Star Chemicals
& Supply, Inc.**

303.287.0186

www.fivestarchemicals.com

support@fivestarchemicals.com

 Find us on
Facebook

facebook.com/FiveStarChemicals

Find Five Star Products At Your Local Homebrew Store



COMMERCIAL CALIBRATION

One way beer judges check their palates is by using commercial “calibration beers”—classic versions of the style they represent. Zymurgy has assembled a panel of four judges who have attained the rank of Grand Master in the Beer Judge Certification Program. Each issue, they score two commercial beers (or meads or ciders) using the BJCP scoresheet. We invite you to download your own scoresheets at bjcp.org, pick up a bottle of each of the beverages and judge along with them in our Commercial Calibration.

In this issue's installment of Commercial Calibration, our judges consider two beers that go beyond barley. One is a California-brewed example of a classic German wheat beer, the other a hearty celebration of Midwestern cereal grains.

We tend to associate Sierra Nevada Brewing Company with hop-forward West Coast stalwarts like Torpedo Extra IPA, Celebration Ale, and Northern Hemisphere Harvest Wet Hop IPA. Bigfoot is an icon of American big beer, and Sierra Nevada Pale Ale remains the benchmark of its style even after nearly four decades.

But the Chico (and now Mills River, N.C.) brewery also turns out some highly regarded European-style beers, among them Summerfest Lager, Nooner Pilsner, and an Oktoberfest brewed in collaboration with Mahrs Bräu of Bamberg, Germany. Kellerweis, the subject of our attention here, is Sierra Nevada's take on the German wheat beer variously known as hefeweizen, weißbier, weizenbier, and weiße.

Of Kellerweis, the brewery says, “Inspired by traditional Bavarian techniques, Kellerweis is a true artisan experience. With Kellerweis, we brew in open

fermentation tanks—a process rarely seen today—to let the ingredients truly shine. The result is a hazy wheat ale—untamed, raw and alive. With a full, fruity aroma and notes of spicy clove and banana bread, Kellerweis is a truly unique brew.”

Sierra Nevada reveals that the beer is made from two-row pale malt, wheat malt, and Munich malt, and is bittered with Perle or Sterling to yield a 4.8% ABV brew. Kellerweis is available from sea to shining sea and in some locales beyond.

Turning our attention to the Central Time Zone, the aptly named Confluence Brewing Company is located where the Raccoon River flows into the Des Moines River, two miles (3.2 km) southwest of the Iowa State Capitol. According to the brewery, head brewer John Martin got his start as a homebrewer when he attempted—and failed—to whip up a drinkable raisin almond beer in 1991 (check out confluencebrewing.com for photographic evidence of his homebrewer cred). But John's persistence paid off and led to his opening Confluence with co-founder Ken Broadhead in 2012.

Confluence calls Farmer John's Multi-Grain Ale “amber waves of grain in a glass” and says, “A refreshing, blonde ale, it features a base of two row American barley malt along with a large portion of wheat malt, a small dose of rye malt and un-malted oats, corn and wheat. Lightly hopped with English East Kent Goldings hops chosen for their subtle, earthy qualities and finished with Czech Saaz hops for their sweet, floral essence to create a beer that's light in body and color, with a velvety texture and an aroma as sweet as a freshly cut field of hay.”



Farmer John's Multi-Grain Ale has 5.7% ABV and 21 IBUs. At the moment, you'll need to live in Iowa or know someone there to get your hands on it.

You don't have to be a farmer to appreciate these refreshing treats, but Kellerweis and Farmer John's are great reminders that every pint begins in a field of grain.

OUR EXPERT PANEL David Houseman, a Grand Master VI level judge and competition director for the BJCP from Chester Springs, Pa.; Sandy Cockerham, a Grand Master III level judge from Indianapolis, Ind. and an associate exam director and Midwest Representative for the BJCP; Scott Bickham, a Grand Master III judge from Corning, N.Y., who has been exam director or associate exam director for the BJCP since 1995; and Gordon Strong, a Grand Master IX judge, principal author of the BJCP Style Guidelines, and president of the BJCP board who lives in Beavercreek, Ohio.



Sierra Nevada Brewing Company
sierranevada.com

Confluence Brewing Company
confluencebrewing.com

BJCP Style Guidelines
bjcp.org

Commercial Calibration Index
HomebrewersAssociation.org/pages/zymurgy/commercial-calibration

THE SCORES



Kellerweis—Sierra Nevada Brewing Company, Chico, Calif.
BJCP Category: 10A, German Weißbier



DAVE HOUSEMAN

THE JUDGES' SCORES FOR KELLERWEIS



SANDY COCKERHAM



SCOTT BICKHAM



GORDON STRONG

Aroma: Bubblegum and banana aromas dominate up front. There is a nice, bready malt backbone. No hop aroma. Very low phenol aroma. Low fruity fermentation esters. No DMS. No diacetyl. No overt alcohol aroma. Bright, crisp weissbier aroma. (10/12)

Appearance: Yellow color. Cloudy and hazy—appropriate for style. Large, dense, rocky, white head with excellent retention. (3/3)

Flavor: Bready, grainy malt sweetness with light hop bitterness and complex bubblegum and banana esters. Moderate phenol presence and a dry finish; phenols are more evident in aftertaste. No hop flavor, but overall a depth of character. No DMS or diacetyl. No alcohol flavor. Just a tinge of lower pH, perhaps due to higher carbonation. (18/20)

Mouthfeel: Medium to medium-thin body. Light, spritzy mouthfeel from effervescent carbonation. No apparent alcohol warming, but some alcohol is there. Well attenuated with a fluffy, smooth, dry mouthfeel. (5/5)

Overall Impression: This is a well-balanced and complex weissbier, very drinkable and nearly classic to style. Grainy, bready malt sweetness is balanced with hop bitterness and yeast-derived esters. Bubblegum and banana esters and light, clove-like phenols are themselves balanced and not one-sided. If anything, while the bitterness is at the high end for a weissbier, it could be a bit lower for minor improvement. Like all weissbiers, this one would go well with a soft pretzel or a salad, or just enjoyed as a refreshing session beer on a hot summer day. (8/10)

Total Score: (44/50)

Aroma: Leads with moderate notes of banana and clove. The clove increases as the beer warms. Layered below those are light vanilla and lemony citrus tones. Moderate bready wheat and crackery malt are in support. I get some faint herbal hop aroma and a medium-low note of sulfur that vents off fairly quickly. (11/12)

Appearance: The beer pours a dark straw color and is moderately hazy (remembering to roll the bottle sooner would have boosted the haziness!) The thick, white fine-bubbled head stays for a long time. High carbonation is evident. (3/3)

Flavor: Flavor begins with moderate grainy malt and seems less round than the nose suggests. Low bitterness is fairly smooth—not much hop flavor, but there is a light vegetal character. Low banana esters and clove phenols come across as less complex than what I perceive in the aroma. There's a bit of a tart flavor from the wheat and some light, husky flavor lingers into the finish. Evenly balanced. (17/20)

Mouthfeel: The beer comes across a little bigger than medium bodied, and the medium-high level of carbonation gives a light carbonic bite on the tongue that helps make this a refreshing beer. Suspended yeast imparts medium-low creaminess. There's a very slight grainy astringency at the dry finish. (4/5)

Overall Impression: This is a very nice weissbier, but the nose promises more than the flavor delivers in terms of esters and phenols. The flavor strikes me as a bit thin, but this is a very refreshing beer that would be great to drink in the warm days ahead while sitting in a biergarten. (8/10)

Total Score: (42/50)

Aroma: Pronounced yeast character, with assertive banana esters and clove phenols. Secondary notes include moderately low bubblegum and vanilla. Moderately strong bread dough aroma. Low alcohol adds a little sweetness and complexity. Light lemony notes emerge as it warms. (10/12)

Appearance: Golden color with moderate turbidity. It falls in the middle of the color range for the style. The head is dense, mousse-like, and persistent. (3/3)

Flavor: Bready malt provides a backbone with lightly sweet honey notes. Balance is tilted more toward clove phenols than banana and bubblegum esters, unlike the aroma. Hop bitterness is moderate and slightly higher than most German examples of this style. Light lemony notes in the finish add tartness and complexity and help dry out the finish. (18/20)

Mouthfeel: Moderately high carbonation makes the beer light on the palate, but there is pleasant underlying creaminess from the wheat. A touch of alcohol warmth and some chalky mineral notes linger after swallowing. Not quite as smooth in the finish as some examples. (4/5)

Overall Impression: This refreshing weissbier can go head-to-head against its German counterparts, and freshness probably gives it an advantage over imports. Balance between esters and phenols is spot-on, and light lemony notes add complexity and make it quite summery. Excellent conditioning provides a creamy mouthfeel and an attractive mousse-like head. That's a key component of the style, and you nailed it. (9/10)

Total Score: (45/50)

Aroma: Bright lemony-spicy aroma. Clean and crisp. Moderate banana and medium-low spicy clove, which grows as it warms. The initial lemon character is slightly unusual, but swirling the glass releases a big, ripe banana character—nice. Very fresh and clean fermentation character. Very light spicy hops. (10/12)

Appearance: Tall, rocky, white head persists very well. Medium yellow color. Moderately hazy, as appropriate for the style. (3/3)

Flavor: Clean malt flavor, bready and grainy with medium-low bitterness. Doughy bread flavor dominates with a dry finish. Light, spicy hop flavor. Ripe banana, moderately high in intensity, with restrained light clove spice. Hints of lemons and vanilla. Like the aroma, this seems very fresh, clean, and bright. (18/20)

Mouthfeel: Medium to medium-full body, a bit thick for the style. Very high carbonation as expected. Not warming, not astringent, and lightly creamy. (4/5)

Overall Impression: The citrus edge is a little unusual but not unwelcome. Great balance and banana bread character. Has a slight hop character that is often absent in the German examples. Super fresh—that's what I really like about this beer, along with the great banana character and restrained bitterness. It has a dry finish that helps counter the fullness of body, but I would like it a little less heavy in the mouth. Really a nicely drinkable beer. (9/10)

Total Score: (44/50)



THE JUDGES' SCORES FOR FARMER JOHN'S



Aroma: Grassy hop aroma initially with a cooked-vegetable DMS presence. Both are fairly fleeting and dissipate quickly. Very low bready malt aroma. The alternative grains are not shining through in the aroma. No lasting hop aroma. No diacetyl. Low fermentation esters. No alcohol aroma. (7/12)

Appearance: Clear with a light haze that's acceptable and likely from the alternative grains. Pale yellow color. Dense, white, rocky, long-lasting head. (3/3)

Flavor: There are caramel/crystal notes to the malt sweetness but no perceivable alternative grain character. Overall malt presence is a product of all the grains used, even if each is not individually identifiable. Moderate hop bitterness balances the malt. No-to-low hop flavor. A bit of a muddled character, likely the result of oxidation. Low cooked vegetable note, likely DMS. No diacetyl. Moderate fermentation esters from ale fermentation. Finishes fairly dry. Moderate alcohol flavor. (14/20)

Mouthfeel: Medium body. Creamy mouthfeel, especially from caramel notes, with some lingering bitterness. There's a bit of alcohol warming. (4/5)

Overall Impression: This is a good blonde ale that uses a number of non-barley grains that contribute to the nature of the beer but didn't shine through the base to showcase themselves. There may be some production issues with DMS retention as well as oxidation, as evidenced by the muddled caramel-like character. Still, a good beer to have with chili or a burger. (6/10)

Total Score: (34/50)

Aroma: Moderate pale base malt aromas and some bready wheat tones. The medium-low floral hop aromas are pretty much what one would expect from a blonde ale. I also notice low pear and apple esters. Estery notes are the only fermentation-derived character I observe. (8/12)

Appearance: Bright golden in color, this beer is clear but not quite brilliant. A moderate, near-white mousse-like head has average retention. (3/3)

Flavor: This is mostly about the malt. Moderate malt character is a mix of grain, bread, and cereal grains and features a light, nutty tone. Medium-low esters are here, too, and this time they're more like apple and red fruits. Moderate bitterness has a very light, grassy edge to it. I also note a very light spicy tone. As it warms, the flavors meld together and come across more brightly on the palate. Balance is pretty even but gives a nod to the bitterness. (16/20)

Mouthfeel: The body is a bit bigger than medium and seems a touch heavy for a blonde ale. The medium-high carbonation gives a burst of bubbles on the tongue but also gives way to a bit of a soft and creamy feel on the palate. The beer finishes dry. (4/5)

Overall Impression: An enjoyable blonde ale with some complex grain character. Low esters are classic for the style and add a light brightness. Hop character is great in the aroma and fits the 18A style well. The bitterness seems to be at or above the range for a blonde ale. This is a very easy drinker, and while it has some extra layers, it doesn't stray far from the style. (7/10)

Total Score: (38/40)

Aroma: Initial aroma is grainy, similar to fresh-milled malt with an underlying yeasty, bread dough character. No hops are evident (or desired). Moderate fruity esters provide pear notes in the background, but the focus is very much on the malted grains. I pick up some honey sweetness as it warms, but overall character is neutral. (8/12)

Appearance: Amber color with crystal-clear clarity and a tight, white head that lasts well. Impressive head retention. (3/3)

Flavor: Balance is toward the malt, with moderate toasted notes and a light graininess accompanied by light caramel sweetness. The malt profile reminds me of an Oktoberfest, but with a grainy undercurrent that adds complexity. The hop bitterness is bit too low to balance the malty sweetness, and I would bump it up a little to make the finish a little less cloying. The malt backbone is certainly an asset, but in the end, it needs to be a little better attenuated to ensure that the beer is refreshing. (15/20)

Mouthfeel: Excellent conditioning and solid carbonation make the mouthfeel creamy and pleasant. Low alcohol is appropriate for the style, and there is no appreciable astringency from the grains or process. (4/5)

Overall Impression: This is a very nice beer—a bit on the sweet side, but it does highlight the unusual grain bill. The overall character could be a little more assertive, with less residual sugar—to make a true session beer with a little more crispness that would entice the consumer to have more than one pint. (7/10)

Total Score: (37/50)

Aroma: Mild aroma with medium-light hops wafting over a neutral-grainy, slightly sweet malt base. The hops are floral and spicy. Fermentation character is neutral. Malt is lightly bready; grains aren't really distinctive except as a general impression. Very light fruity esters. Good match for a blonde ale, but not showing much else. (10/12)

Appearance: Light golden color. Substantial haze, looks like suspended cloudy particles. Moderate-sized white head, tiny bubbles, and good retention. (2/3)

Flavor: Moderate grainy malt flavor with a balanced, medium-low bitterness. Full palate but dry finish. A hint of alcohol on exhale. Medium to medium-low hop flavor—floral and spicy. Malt flavors are clean and grainy but not distinctive. Has a balanced aftertaste with equal amounts of grainy malt and spicy hops. Neutral fermentation character. (15/20)

Mouthfeel: Full, dextrinous body is heavy on the palate. Not sweet, just thick: a real knife-and-fork beer. Not warming, not astringent. Medium to medium-high carbonation, a little prickly on the tongue. (3/5)

Overall Impression: Not getting much of the grain character except as a mildly bready-grainy aroma and flavor with a very thick and heavy body. Fortunately, the beer is dry, otherwise it could be very hard to drink. Seems well-balanced for a blonde ale. There is a pleasant hop character that's well suited to the style. (7/10)

Total Score: (37/50)

SEARCH. SAVOR. SAVE.

**Locate 1,600+ Member Deal locations
using the Brew Guru™ app and
display your digital membership
card to save!**

Download on the
App Store

GET IT ON
Google Play

ADVERTISER INDEX

American Homebrewers Association	72,73,90,93,95	Gotta Brew, LLC	62	Muntons Malt Ingredients, Inc.	78
www.HomebrewersAssociation.org		www.gottabrew.com		www.muntons.com	
ANVIL Brewing Equipment	82	Grandstand Glassware & Apparel	49	Northern Brewer, LLC.....	20
www.blichmannengineering.com		www.egrandstand.com		www.northernbrewer.com	
Ballast Point Brewing & Spirits	Cover 4	Great Western Malting Co.	64	Original Gravity Tours.....	20
www.ballastpoint.com		www.greatwesternmalting.com		www.originalgravitytours.com	
BH Enterprises	39	GrowlerWerks	55	PicoBrew	8
www.TempStatControls.com		www.growlerwerks.com		www.picobrew.com	
Blichmann Engineering	63,64	Harper Collins	84	Sam Adams	7
www.blichmannengineering.com		www.harpercollins.com		www.samadams.com	
CraftBeer.com	84	High Gravity	16	San Francisco Herb Co.....	70
www.craftbeer.com		www.highgravitybrew.com		www.sfherb.com	
Brewers Publications	23,76,85,95	Hobby Beverage Equipment Co	23	Shmaltz Brewing Co.....	75,80
www.BrewersPublications.com		www.minibrew.com		www.shmaltzbrewing.com	
Brewers Supply Group (BSG)	31	Home Brewery (MO), The.....	40	Sierra Nevada Brewing Co.....	12
www.brewerssupplygroup.com		www.homebrewery.com		www.sierranevada.com	
BrewJacket	57	Hopsteiner	81	South College - Asheville	15
www.brewjacket.com		www.hopsteiner.com		www.SouthCollegeTN.edu	
Brewlab	10	Indeed Brewing Co.....	16	Spike Brewing	66
www.brewlab.co.uk/		www.indeedbrewing.com		www.spikebrewing.com	
Briess Malt & Ingredients Company.....	41	Krome Dispense Pvt. Ltd.....	11	Ss Brewing Technologies	2
www.brewingwithbriess.com		www.kromedispense.com		www.ssbrewtech.com	
Castle Malting	67	LaMotte	68	Store It Cold	18
www.castlemalting.com		www.lamotte.com		www.storeitcold.com/	
Cicerone Certification Program	71	Love2Brew	68	The Grainfather	Cover 3
www.cicerone.org		www.love2brew.com		www.grainfather.com	
CMBecker International,LLC	Cover 2	Maryland Homebrew.....	47	UC Davis Extension	67
www.qualitypour.com		www.mdhb.com		www.extension.ucdavis.edu/brew	
Danstar	40	Micra Matic USA Inc.....	71	Uinta Brewing Co.....	10
www.lallemand.com		www.micromatic.com		www.uintabrewing.com	
FastBrewing & WineMaking	48	Midwest Supplies	74	WilliamsWarn Personal Brewery.....	39
www.thefastrack.ca		www.midwestsupplies.com		www.williamswarn.com	
Fermentis	77	MoreBeer! & MoreWine!	37	Wyeast Laboratories, Inc.	29
www.brewwithfermentis.com		www.morebeer.com		www.wyeastlab.com	
Five Star Chemicals & Supply, Inc.	86			YCH HOPS.....	38
www.fivestarchemicals.com				www.ychhops.com	

By Charlie Papazian



To Uddala

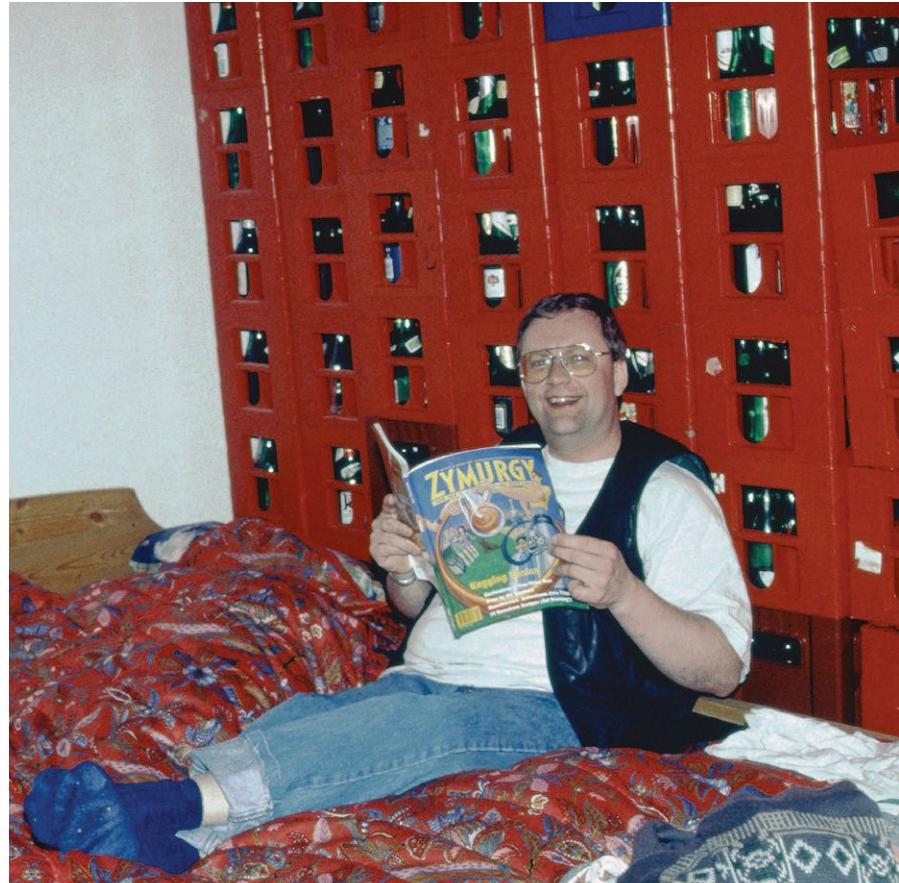
In 1995 I was exploring beer parts of Europe. I visited Sweden for several days. It was my first time there. I recently came across and reread my trip report and reflected. This typifies many of my experiences and captures a lot of what my life has been. I share here excerpts from my first-person account of adventures as a world beer explorer. This is the third of four parts of this story.

Charlie, it is time to go now. We must get ready to visit a homebrewer. It is about an hour's drive. You will go to my house first. Then pack your bags for three nights because we spend the night there, and then you will stay in jail in Stockholm."

Nothing fazed me. I packed for three days, leaving behind kilos of Belgian and Dutch beers and paperwork. We were off to Uddala. I was asleep at the side of the wheel. Dreamland. It was still my arrival day.

We arrived, and by this time, I had learned that just about anything was possible, but I'll be damned—I was astounded once again. I was introduced to Lars Stjernestam, a homebrewer! Every, and I mean *every*, room in his one-story home had beer- or brewing-related stuff in it (he wasn't married). The house itself was pretty damned well designed. It's just that the decor was, well, beer geeky, if you know what I mean.

His laundry room was his brewery. His bedroom had cases of bottles stacked from floor to ceiling. The huge dining and living rooms had bottle collections, refrigerators, beer on tap, and the largest snooker table I've seen in my life. This table must have been 12 feet by 5 feet and occupied center stage in the living room. Lars designs silicon chips for a living. He also has a terrific music collection. He built the house himself, complete with a gazebo in the front yard. The small spare



room I slept in was filled with bags of malt. The other four or five homebrewers who accompanied us, and joined in the gourmet meal Lars prepared, slept somewhere on the floor that night, amidst beer bottles, crates, kegs, refrigerators, and whatever.

The pace continued relentlessly. We tasted about eight or ten more beers for scoring and qualifying for diplomas. After a while, I managed to get silly enough to turn the conversation around to non-beer things. I kept trying to pull away from beer, and they kept bringing me back. When they told me that in some parts of Sweden old men use a dried stretched bull's penis as a walking stick, I conceded the lost cause and drifted back into beer as conversation.

Amidst all the pickled herring and roast beef cooked in porter and black currants, I did manage to identify Tettnang hops and a

decoction mash in one of the homebrews we judged. Even I was impressed. I was finally feeling relaxed. I caught myself. I slowed down. I went outside to pee.

It was about 2 a.m. and still very bright outside. I suddenly realized that tomorrow morning was only four hours away. Shit, I'm screwed.

Back inside, they were telling me that their Swedish Homebrewers Association had told competition contestants, "Don't know what style to enter your beer in? Send two bottles and we'll decide for you." I didn't think this was a very good idea.

I don't recall sleeping, but breakfast was served in the gazebo. And soon we were off to catch our 9 a.m. flight from Stockholm to Gotland for a seven- or eight-hour visit of a homebrewer and a pub brewer.



SURE AS TOOTIN' PUMPERNICKEL STOUT

Partial-mash recipe for 5 US gallons (19 L)

Original gravity: 1.046 (11.5 B)

Target extract efficiency: 79%

Final gravity: 1.012 (3 B)

Bitterness: About 25 IBU

Approximate color: 29 SRM

Alcohol: 4.5% by volume

MALTS

3 lb. (1.36 kg) crushed pale malt

0.5 lb. (227 g) crushed wheat malt

0.5 lb. (227 g) crushed rye malt

0.5 lb. (227 g) flaked corn

1 lb. (454 g) crushed English crystal malt

0.25 lb. (113 g) crushed black malt

0.33 lb. (150 g) crushed roasted barley

0.33 lb. (150 g) crushed chocolate malt

MALT EXTRACT

2 lb. (907 g) light malt extract syrup or 1.7 lb.
(0.8 kg) light dried malt extract

HOPS

1 oz. (28 g) UK Goldings hops 5.2% a.a. @ 60 min
(5.2 HBU/146 MBU)

0.25 oz. (7 g) Cascade hops, 5.2% a.a. @ 15 min
(1.3 HBU/36 MBU)

1 oz. (28 g) Cascade hops. 5.2% a.a., added and
steeped after boil

YEAST

Ale or Irish stout yeast

ADDITIONAL INGREDIENTS

1/4 tsp. (1 g) powdered Irish moss

3/4 cup (175 ml) corn sugar for priming bottles or 0.33
cups (80 mL) corn sugar for kegging

A step infusion mash is employed to mash the grains. Add 6 qt. (6.2 L) of 140° F (60° C) water to the crushed grain, stir, stabilize, and hold the temperature at 132° F (56° C) for 30 minutes. Add 3.25 qt. (3.1 L) of boiling water, add heat if needed to bring temperature up to 155° F (68° C), and hold for about 30 minutes. Raise temperature to 167° F (75° C), then pass the liquid and grains into a strainer and rinse with 170° F (77° C) water. Discard the grains.

Add more water to the sweet extract you have just produced, bringing the volume up to about 2.5 gal. (9.5 L). Add malt extract and 60-minute hops and bring to a boil.

The total boil time will be 60 minutes. When 15 minutes remain, add 15-minute hops. When 10 minutes remain, add Irish moss. After a total wort boil of 60 minutes, turn off the heat and add steeping hops. Then strain and sparge into a sanitized fermenter to which you've added 2 gal. (7.6 L) of water. It helps to pre-chill the water added to the fermenter rather than simply add warmer tap water—33° F (1° C) is ideal. Bring the total volume to 5 gal. (19 L) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week, or until fermentation shows signs of calm and stopping. Rack from primary to a secondary. If you have the capability, "cellar" the beer at about 55° F (12.5° C) for about one week.

Prime with sugar and bottle or keg when complete.



Saving you money is our other favorite hobby.

AHA members save at 1,600+ homebrew supply shops, breweries and restaurants around the country.

AHAMemberDeals.org



Gotland is a small island, about 50 km wide and 100 km long, surrounded by the Baltic Sea. It's a summer haven for Swedes for their six weeks of summer, which begins about June 15 and ends about August 1 or 10. This island of about 40,000 year round inhabitants sees 500,000 tourists in six weeks. Many have summer homes there. It is little wonder why. It is quite pastoral, at least at this time of year.

Trees were greening, and flowering trees were in full bloom. The island was dense with birch and pine. But the odd thing about the pine forests was the carpet of lush grass underneath. Yellow and red tulips were wildly in bloom. The air was cool and windy near the sea. Daffodils and many other

garden blooms proliferated in red, yellow, white, and blue. Huge fields dense with yellow dandelions blazed all over Gotland. It was like a carpet of yellow. At this point, everything I encountered seemed like a hallucination.

Upon our arrival (I was accompanied by Jesper Schmidt), we were met at the airport by a very special homebrewer and gentleman about 64 years old. He was so excited to see us that spittle drooled out of his mouth as he greeted us. He apologized for the drool and just went on about how wonderful it was that we were there. Then he asked me whether I realized what day this was.

"No," I said. I didn't. "Was there something special?"

"Yes. It's the national day of abstinence from alcohol in Sweden. But we'll ignore it..." He was serious. It's called *Folknykterhetens Dag*, which roughly translates to "Day of People's Sobriety."

"Isn't this a humdinger?" I thought to myself.

Beyond the shuck and jive, here's a recipe I published in a 1995 issue of *Zymurgy*, tweaked for 2017.

To be continued in Gotland for Gotlandsdrick...

Charlie Papazian is founder of the American Homebrewers Association and the author of *The Complete Joy of Homebrewing*.



SURE AS TOOTIN' PUMPERNICKEL STOUT

All-grain recipe for 5 US gallons (19 L)

Original gravity: 1.046 (11.5 B)

Target extract efficiency: 79%

Final gravity: 1.012 (3 B)

Bitterness: About 25 IBU

Approximate color: 29 SRM

Alcohol: 4.5% by volume

MALTS

5.5 lb. (2.49 kg) crushed pale malt

0.5 lb. (227 g) crushed wheat malt

0.5 lb. (227 g) crushed rye malt

0.5 lb. (227 g) flaked corn

1 lb. (454 g) crushed English crystal malt

0.25 lb. (113 g) crushed black malt

0.33 lb. (150 g) crushed roasted barley

0.33 lb. (150 g) crushed chocolate malt

HOPS

1 oz. (28 g) UK Goldings hops 5.2% a.a. @ 60 min
(5.2 HBU/146 MBU)

0.25 oz. (7 g) Cascade hops, 5.2% a.a. @ 15 min
(1.3 HBU/36 MBU)

1 oz. (28 g) Cascade hops. 5.2% a.a., added and steeped after boil

YEAST

Ale or Irish stout yeast

ADDITIONAL INGREDIENTS

1/4 tsp. (1 g) powdered Irish moss

3/4 cup (175 ml) corn sugar for priming bottles or
0.33 cups (80 mL) corn sugar for kegging

A step infusion mash is employed to mash the grains. Add 8.4 qt. (7.9 L) of 140° F (60° C) water to the crushed grain, stir, stabilize, and hold the temperature at 132° F (56° C) for 30 minutes. Add 4.6 qt. (4.4 L) of boiling water, add heat if needed to bring temperature up to 155° F (68° C), and hold for about 30 minutes. Raise temperature to 167° F (75° C), lauter, and sparge with 170° F (77° C) water to collect about 5.5 gallons (21 L) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 15 minutes remain, add 15-minute hops. When 10 minutes remain, add Irish moss. After a total wort boil of 60 minutes, turn off the heat and add steeping hops.

Turn off the heat and place the pot (with cover on) in a running cold-water bath for 30 minutes. Continue to chill in the immersion or use other methods to chill your wort. Then strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5.5 gallons (21 L) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week, or until fermentation shows signs of calm and stopping. Rack from primary to a secondary. If you have the capability, "cellar" the beer at about 55° F (12.5° C) for about one week.

Prime with sugar and bottle or keg when complete.



American Homebrewers Association®

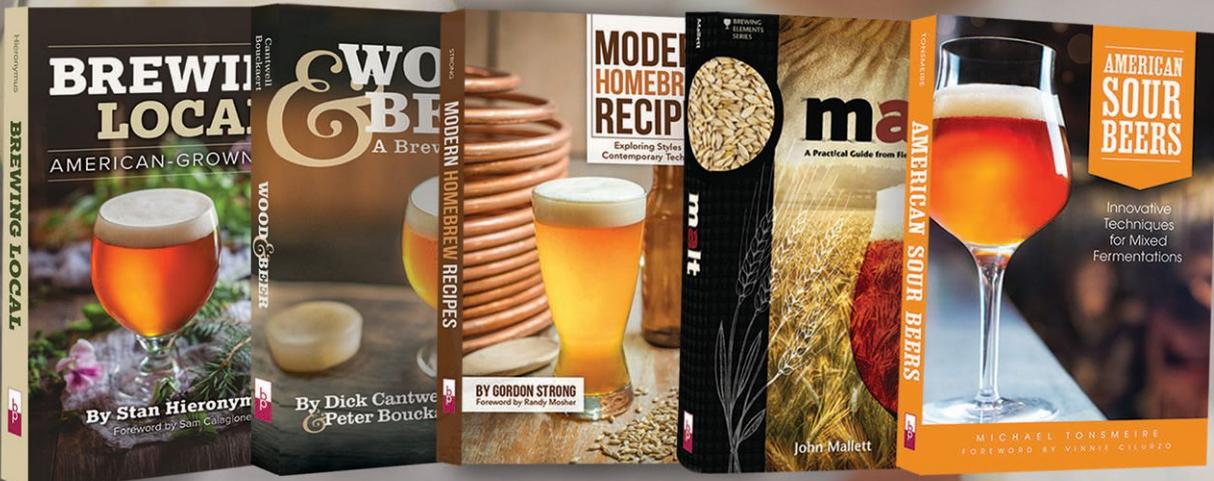
BIG BREW

SATURDAY, MAY 6, 2017

Register your event on
HomebrewersAssociation.org



BEER BOOKS FOR ANY BREWER



BREWERS
PUBLICATIONS

BREWERSPUBLICATIONS.COM



What Palmer, Papazian, and Homebrewing Did for My Marriage



Back in 1979, when my husband Hugo got his first brewing gig with Cervecería Cuauhtémoc, there was no craft beer or homebrewing in Mexico, and macro brewing was a man's world. By the time we moved to Colorado, where Hugo brewed at Coors for 23 years, we were deep into dual careers, bills, kids, and getting to the next piano lesson. Finally, there came that glorious, scary day when we looked at each other and realized we were officially retired empty nesters.

Then Hugo started teaching some site-based brewing classes for the Siebel Institute of Technology. I reveled in the freedom to accompany him and join participants for brewery excursions, dinners, and social events. Inevitably, some experienced homebrewer would ask, "So, do you homebrew?"

When I'd finally had enough of cringing at the question, I told Hugo we had to start homebrewing. But after years of

overseeing highly automated 600-barrel brews, the thought of 5-gallon batches on the kitchen stove just didn't hold much appeal for him.

Finally, one afternoon I declared that I was going to learn to homebrew myself. Hugo sighed, rolled his eyes, and dropped a heavy book in my hands. "I suggest you read this first."

"*How to Brew*," I read aloud, "John Palmer. Everything you need to know to brew beer right the first time." I grabbed a highlighter and headed for a comfortable chair.

This is probably a good point to mention that I was always lousy at science. An hour later, I reported back. "I've finished chapter one," I said smugly, flipping through 14 pages now pink and black with highlights and ink-scribbled notes.

Never mind that *How to Brew* was 347 pages. I kept reading, highlighting, scrib-

bling, and asking questions. Lots and lots of questions. We were having daily conversations about brewing and the science behind it. That led to longer, deeper, exciting discussions about all things beer related.

Of course, talking about beer is like talking about driving. Ultimately, you have to get behind the wheel. I started to grow from a casual beer drinker into a somewhat knowledgeable taster. I couldn't get enough of beer conversations or hops. It was crazy, but the stuff was making sense.

Once I had a basic grasp of extract and partial-mash brewing, I walked into the local homebrew store—nervous as hell—and walked out with a copy of *The Complete Joy of Homebrewing*. Papazian and I clicked from page one. Some nights, in our darkened bedroom, I'd keep Hugo awake as long as I could, peppering him with questions.

It was a discussion about buying equipment that finally hooked him. Here was a novel challenge for the master brewer: make good beer with minimal equipment and expense. For two years, we turned out decent extract and partial-mash brews with a couple hundred dollars' worth of equipment. I kept reading and pestering all the homebrewers I'd come to know with questions. Finally, last November, we invested in a Grainfather, so I now exclusively brew all-grain—even when my "assistant brewer" is off teaching professional brewers.

John, Charlie, I owe you a homebrew.

Leslie Patino writes about beer weekly at "Not My Father's Beer," lesliepatino-author.com/blog.



GRAINFATHER CONNECT*

-AVAILABLE NOW-



- + ADVANCED HEAT CONTROL
- + MOBILE DEVICE REMOTE CONTROL
- + AUTOMATION - PROGRAMMABLE BREW STEPS
- + LARGE 20 LB GRAIN BILL CAPACITY
- + ELECTRIC - INDOOR & OUTDOOR USE
- + MASH, SPARGE, BOIL, COOL ALL IN ONE

**ADDED AUTOMATION WITHOUT REMOVING
THE FUN OF BREWING**

www.grainfather.com





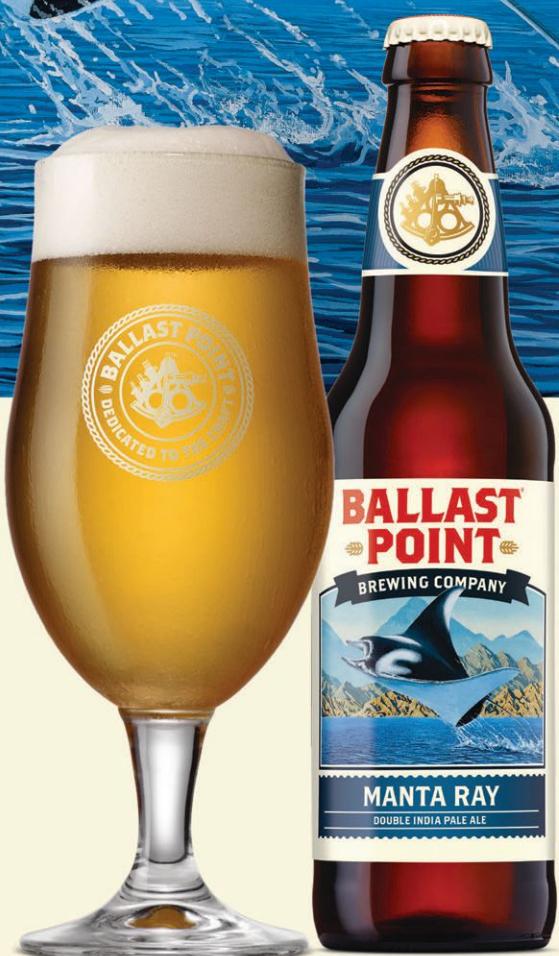
IMPERIAL INDIA
PALE ALE

GOLD AWARD 2016



THIS NEW IPA RISES ABOVE THE REST

Introducing Manta Ray Double IPA. Developed in our R&D program, this brew has aromas of fresh, citrusy tangerine, melon and light pine that leap from the beer and linger over a smooth finish. Like its namesake, this brew can sneak up on you – a big beer without a bite.



BALLASTPOINT.COM

Crafted in San Diego, California

Please Explore Responsibly™