

FOR THE **HOMEBREWER & BEER LOVER**

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# zymurgy<sup>®</sup>

► The Journal of the American Homebrewers Association ◀

## The Fermentation Equation: *Secrets of Healthy Yeast*



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In this issue:



**BEERS  
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The Coming  
of the  
Beer Sommelier

**TOTALLY  
TWISTED**  
Barleywines

*Basic  
Brewing  
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by Jill Redding

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# Beer's To Good Health

**H**opefully you raised a glass of homebrew to toast the New Year. You could have easily toasted to beer's contribution to your health as well.

The health benefits of red wine have long been known, but beer's health benefits are beginning to emerge more and more each passing year as new scientific data is presented. This past October, a first-of-its-kind seminar in the United States was held in Washington D.C. Called Beer to Your Health!, the seminar was sponsored by the University of Maryland Center for Food, Nutrition and Agriculture Policy, made possible by a grant from the National Beer Wholesalers Association (NBWA) Education Foundation.

NBWA's Erin Rutherford reported in the January/February 2007 *The New Brewer* (**Zymurgy's** sister publication for professional craft brewers) that researchers are now suggesting that many of the health benefits of wine are derived from ethanol itself and may also be attributed to the moderate consumption of beer. What exactly is moderate consumption? There is no universal answer, but the U.S. government defines it as no more than one drink per day for women and two drinks per day for men. The seminar highlighted mounting scientific evidence suggesting that moderate consumption of beer or other alcohol beverages may have health benefits over not consuming alcohol at all.

Keynote speaker Dr. Curtis Ellison, chief of the Section on Preventative Medicine and director of the Institute on Lifestyle and Health at the Boston University School of Medicine, noted that aside from being linked to lower rates of heart disease, moderate alcohol consumption shows benefits relating to diabetes, obesity, cognitive disorders, metabolic syndrome and even some types of cancer. Additionally, he said, studies of overall

mortality actually suggest that moderate drinkers live longer than abstainers.

According to data provided by the NBWA, moderate consumption of beer can:

- Lower rates of heart disease. Consuming alcohol in moderation may lower coronary heart disease risk for some people by 30 to 60 percent, even those at high risk because of diabetes, hypertension or a previous heart attack.
- Aid in bone formation. Beer contains silicon, a mineral that helps build bone mass.
- Prevent cell damage that can lead to cancer and heart disease. Hops and malt are rich sources of disease-fighting antioxidants. Beer also contains polyphenols, the same antioxidants found in wine, fruits, vegetables, and green and black tea.
- Lower rates of diabetes. In one 12-year study, regular light to moderate alcohol intake was associated with a 36-percent lower risk of diabetes. Moderate consumption has been associated with reduced insulin resistance (conversely, heavy drinking and alcohol dependence is associated with increased insulin resistance).
- Protect against ischemic stroke (responsible for 80 percent of all strokes), Alzheimer's disease and dementia. Moderate consumption has been linked to improved cognition and memory.

Also discussed at the seminar was how the topic of the health benefits of beer should be presented to the public. Ellison recommended that doctors be cautious when making recommendations to their patients, but to emphasize moderate drinking and its benefits as opposed to abstinence. He said, "We're not telling people to drink more, we're telling more people to drink a little."

Cheers to your health in 2007!

**Jill Redding is editor-in-chief of Zymurgy.**



# zymurgy®

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Proper fermentation is what sets apart great beers from just OK beers, and starters can help by ensuring a beer with the correct appearance, flavor, body and aroma profile.

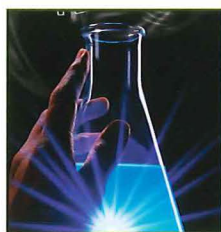
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Almost every homebrewer has been faced with how to safely store yeast. With the right information and handling, even new homebrewers can successfully accomplish this.

- 36 | **Totally Twisted Barleywines** *By Drew Beechum*  
The Maltose Falcons, perhaps suffering the effects of heat stroke, have put together some interesting July brew days in the past few years, creating some unusual barleywines.

Plus: **VOTE NOW!**

**AHA Governing Committee Ballot on page 14**



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## >> GET THERE!

### Tall Sails & Ales Cruise

This one takes the concept of beer tasting to a whole new level. Join British Columbia's foremost brew historian, Greg Evans, on the classic tall ship *Maple Leaf* for a five-day gourmet tour of B.C. small breweries and the Gulf Islands on a 92-foot tall ship.

On the tour, set for April 5-10, participants will sample the best beers of B.C. and visit breweries along the route while dining on local cuisine (some infused with beer) prepared by the onboard chef (examples include cheddar and ale soup, cream ale apple fritters and stout brownies).

The second annual tour is hosted by *Maple Leaf Adventures* (named "Best Travel Experience" by *Frommer's* travel guide) and Evans, a nationally acclaimed brewing historian and executive director of the Maritime Museum of B.C.

The tour departs from Sidney, B.C. The cost of \$1,999 Canadian (approximately \$1,750 U.S.) includes all meals, beer, shore excursions, lectures and optional sailing instruction. For more go to [www.mapleleafadventures.com](http://www.mapleleafadventures.com) or call 888-599-5323.

#### February 17-24

Toronto Barley Wine Festival San Francisco, CA.  
Contact: David Keene, Phone: 415-863-2276, E-mail: [info@toronado.com](mailto:info@toronado.com); Web: [www.toronado.com](http://www.toronado.com)

#### February 24

2nd Annual Winter Beer Festival Lansing, MI. Web: [www.michiganbrewersguild.org](http://www.michiganbrewersguild.org).

#### March 10

Washington Cask Beer Festival Seattle, WA. Web: [www.washingtonbeer.com/cbf.htm](http://www.washingtonbeer.com/cbf.htm)

#### March 10-11

16th Annual Great Arizona Beer Festival Tempe, AZ.  
Phone: 480-774-8300. Web: [www.azbeer.com](http://www.azbeer.com)

#### April 1

Classic City Brew Fest Athens, GA. Phone: 706-254-BREW, E-mail: [owen@classiccitbrew.com](mailto:owen@classiccitbrew.com), Web: [www.classiccitbrew.com/brewfest.html](http://www.classiccitbrew.com/brewfest.html)

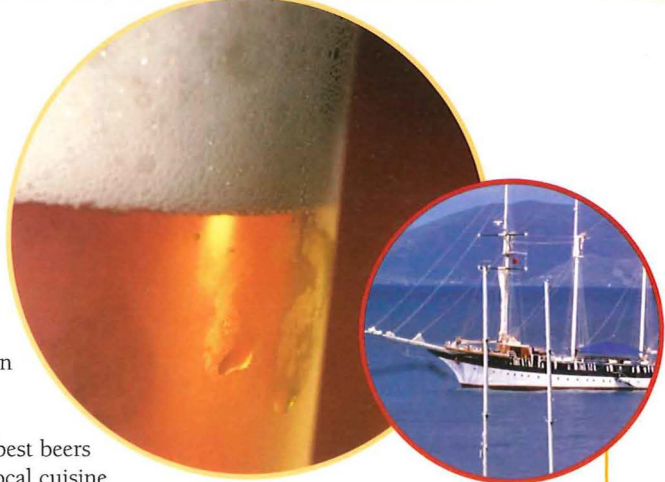
#### April 20-21

15th International Beer Festival Peoria, IL. Phone: 309-673-1100, E-mail: [mike@specialtydistributing.com](mailto:mike@specialtydistributing.com); Web: [www.jaycees.com/projects/ibf/ibf.htm](http://www.jaycees.com/projects/ibf/ibf.htm)

#### May 2-5

New England Real Ale Exhibition Somerville, MA. Web: <http://nerax.org/>

For a complete listing of beer festivals and events, see [www.beertown.org/craftbrewing/events.asp](http://www.beertown.org/craftbrewing/events.asp).



## BREW NEWS: Saint Arnold Launches Beer Campaign

On December 7, a coalition of Texas craft breweries and beer lovers called Friends of Texas Microbreweries launched a campaign to allow small Texas breweries to sell directly to patrons, according to an article on [marketwire.com](http://marketwire.com). Currently, the Texas Alcohol and Beverage Code requires microbreweries to sell only to distributors and retailers, which puts Texas craft breweries at a disadvantage to those in other states where direct sales to customers are allowed.

"We can no longer ignore the fact that 14 out of 19 microbreweries have failed in Texas in part because current regulations disadvantage microbrewing small businesses," said Saint Arnold Brewing Company founder Brock Wagner. "This common-sense proposal will allow Texas microbrewers to compete with out-of-state microbrewers on a level playing field."

In 2003, Texas voters overwhelmingly approved Proposition 11, which changed the Texas Alcohol and Beverage Code to allow Texas wineries to sell limited quantities of their beverages directly to patrons. Friends of Texas Microbreweries is proposing a similar change for microbreweries that would allow on-premises sales of no more than 5,000 barrels of ale and malt liquor annually.

"It has been three years since Texas voters clearly signaled they support common sense beverage laws," said Fritz Rahr, founder of Rahr & Sons Brewing Company in Fort Worth. "It's time Texas craft brewers offered the same customer-friendly advantages that Texas wineries already have."

Saint Arnold Brewing Company has launched a blog at [www.starnoldgoestoatx.com/blog](http://www.starnoldgoestoatx.com/blog) and also plans outreach to other bloggers throughout Texas.



## GREAT PRODUCT

WHAT'S NEW FROM WYEAST LABORATORIES INC.

Wyeast released its latest quarterly Very Special Strains available for a limited time to homebrewers.

This quarter's selections, available through March, include Flying Dog Ale Yeast, Wyeast 1469 West Yorkshire Ale, and Wyeast 2782 Staro Prague Lager.

Flying Dog ales, brewed in Denver, Colo., include Snake Dog IPA, Road Dog Porter, K-9 Cruiser Altitude Ale and Doggie Style Pale Ale. More information about the yeast can be obtained by e-mailing [brewmaster@flyingdogales.com](mailto:brewmaster@flyingdogales.com).

West Yorkshire Ale yeast comes from a well-known and highly regarded brewery in Keighley, West Yorkshire, England. It has a full chewy malt flavor and character but finishes dry, producing famously balanced beers. It has moderate nutty and stone fruit esters. Bright beers are easily achieved within days without filtration.

Staro Prague Lager yeast comes from Wyeast's archives, originally sourced from a large brewery in Prague. It does not finish as dry as other Czech Pils yeast strains. It provides medium to full body, moderate fruit and a distinct bready malt flavor. The balance is slightly toward sweetness and benefits from additional hop bitterness.

For more, go to [www.wyeastlab.com/hbrew/VSS.htm](http://www.wyeastlab.com/hbrew/VSS.htm).

## >> BEER JOKE

Bob was lonely and decided life would be more fun if he had a pet. So he went to the pet store and told the owner that he wanted to buy an unusual pet. After some discussion, he finally bought a centipede, a 100-legged bug that came in a little white box that doubled as a house.

Bob took the box back home, found a good location for it and decided he would start off by taking his new pet to the bar to have a drink.

So he asked the centipede, "Would you like to go to Frank's with me and have a beer?" But there was no answer from the box. This bothered him a bit, but he waited a few minutes and then asked him again, "How about going to the bar and having a drink with me?" But again, there was no answer from his new pet. So he waited a few minutes more, thinking about the situation. He decided to ask him one more time, this time putting his face up against the centipede's house and shouting, "Hey in there! Would you like to go to Frank's place and have a beer with me?"

A little voice came out of the box, "I heard you the first time! I'm putting on my shoes!"

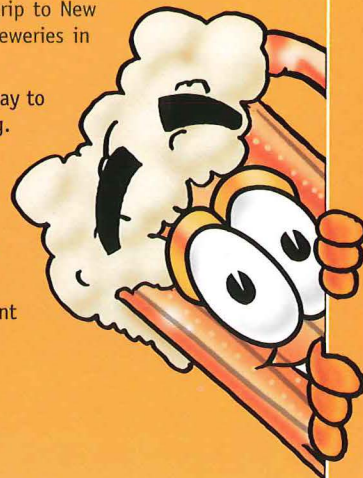


## THE LIST

Looking for some ways to make good beery memories in 2007? A few suggestions.

### 7 Things to Do in 2007

1. Participate in the Great American Beer Tour May 14-20. Visit local or not-so-local breweries and earn points for prizes. The grand prize is a trip for two to the Great American Beer Festival in October (see number 5). Details: [www.greatamericanbeertour.org](http://www.greatamericanbeertour.org).
2. Come to Denver June 21-23 for the American Homebrewers Association's National Homebrewers Conference, the world's largest conference for amateur brewers. The coinciding National Homebrew Competition is the world's largest beer competition. Learn more about homebrewing and get to know fellow homebrewers at various events in the Mile High City. Details: [www.ahaconference.org](http://www.ahaconference.org).
3. Visit an out-of-the-way brewery. Alaskan Brewing celebrated its 20th anniversary with a special packaging run of its flagship beer, Alaskan Amber, in December. If you have a hankering for Belgian Red but don't live in Wisconsin, why not plan a trip to New Glarus? Or if Colorado is in your travel plans for 2007 (hint, hint), take some extra time and visit the four craft breweries in Durango and the newly opened Pagosa Brewing Co. in Pagosa Springs.
4. Attend an American Homebrewers Association Membership Rally. Several are scheduled for this year, and it's an easy way to renew your AHA membership and introduce your friends to the great hobby of homebrewing. Details: [www.beertown.org](http://www.beertown.org).
5. Plan ahead for the Great American Beer Festival October 11-13 at the Colorado Convention Center in Denver. While you're there, check out the Falling Rock Tap House and the award-winning craft breweries within driving distance of Denver. Details: [www.greatamericanbeerfestival.org](http://www.greatamericanbeerfestival.org).
6. Try a style you've never brewed before. Use tips you find in *Zymurgy* (alternative barleywines, anyone?) or pick up a resource like Randy Mosher's *Radical Brewing* or Ray Daniels' *Designing Great Beers* for some inspiration.
7. Grill or cook with beer. For grilling tips, the newly released *Grilling with Beer* book by Lucy Saunders is an excellent resource.







*Let There Be Beer.*

IN EARLY 1933, BEFORE PROHIBITION COULD BE OFFICIALLY REPEALED, PRESIDENT ROOSEVELT SIGNED EMERGENCY LEGISLATION ESSENTIALLY DECLARING LET THERE BE BEER. IT WASN'T UNTIL DECEMBER THAT WINE AND HARD LIQUOR LEGALLY RETURNED. AFTER BEING DEPRIVED OF LEGAL ALCOHOL FOR 13 MISERABLE YEARS, THIRSTY AMERICANS NEEDED A BEVERAGE OF MODERATION.

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by Ray Daniels



## The Coming of the Beer Sommelier

**P**erhaps you have heard some of the buzz that's been building around the concept of the beer sommelier. I first heard of it at the AHA Conference in Los Angeles in 2001 where we were hosted by Phil Baxter, the self-styled beer sommelier of the Sheraton Four Points LAX. For a long time Baxter was the only person claiming that role, but in the past year things have really started to pop.

- Café d'Alsace in New York opened with a 100-plus-brand beer list and its own beer sommelier, Aviram Turgeman.
- The Beer Judge Certification Program appointed a committee to examine initiation of a Beer Sommelier program.
- The Aubergine, in London, features fancy French food from a Michelin-star chef—and has a beer sommelier.
- A major brewing company bought “beersommelier.com” and put out feelers about alternate descriptions that might substitute for the words “beer sommelier.”

All of this makes sense given where beer has been going. With more than 1,400 breweries in the United States and hundreds of notable imports available here, the range of beer styles and flavors within those styles is incredibly diverse. That alone started the ball rolling back when Baxter got into the game. But the pace quickened with the movement toward pairing beer with food. We've seen beer dinners become regular fare not just at brewpubs but at fine restaurants all over the country. Even the American Cheese Society has gotten in on the act, promoting beer as a natural accompaniment to fine cheeses.

This juxtaposition of beer with food drives the need for an expert to lead the way at the restaurant level. Even those with a great knowledge of beer styles and individual beers being offered can't know the exact



flavors of the foods being offered. The sommelier's job is to know both the beers and the foods in order to suggest pairings.

Now you may think “I don't need anyone to tell me what beer to drink!” and I certainly agree. But while we don't need anyone to lead us by the hand, it would be really nice to have someone who speaks the language of beer when you go to order. After all, how many servers have you met who didn't know the difference between malt and hops?

But this confuses the issue to some extent. Beer savvy waitstaff would be welcome everywhere decent beer is sold—and they really don't have to have years of study to achieve a helpful level of knowledge. But asking a restaurant to employ a beer sommelier is more complicated. Ultimately, it gets tied up in the issue of money.

According to a recent story about the “World's Best [Wine] Sommelier,” these folks make \$25,000 to \$50,000 per year. In exchange, they boost wine sales by “several times” their salary.

When you are selling wine at \$50 a bottle, that's not hard to do. Indeed, the wine cellar at a good restaurant probably accounts for 20 percent of all sales. Given how many people it takes to generate the food part of your revenue, having one person who can increase your revenues by 25 percent is pretty impressive. And the margins are great too.

The question is: can that work with beer? Could the presence of a beer sommelier add \$50 in beer sales to the average tab at a fancy restaurant? My bet is yes. Here's why. Let's assume that one bottle of wine is 22 ounces at 13-percent alcohol and that diners will consume the same total quantity of alcohol whether as wine or beer. If the average alcohol content of the beers involved is 6.5 percent, we are talking about twice the volume of beer, or 44 ounces.

To hit the \$50 mark, we'd have to charge more than \$1 per ounce for the beer and that seems a pretty tall order in all but London or New York pricing schemes. Still, some beers retail at and above that price point at liquor stores (Utopias, Dogfish Worldwide Stout, Deus, Cuvee de Tomme, etc.). Furthermore, I think creative serving could bring us very close. If everyone at a four-top table got a 4-ounce serving of beer with each of three courses (salad, entrée and dessert), that's 48 total ounces of beer. Charge \$4 per serving and you are pretty much there.

So . . . should you start planning your new career as a beer sommelier? I'll circle back on this topic next issue and we'll talk about what else will be required for success.

**Ray Daniels is director of Brewers Publications for the Brewers Association.**





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by Professor Surfeit



# The Professor Stands Corrected

Dear Professor,

I most humbly submit my opinion that page 382 of *The Complete Joy of Homebrewing, Third Edition* (page 387 of the 1991 edition) is incorrect as stated. There is a situation where 1 ml/l could be 1 ppm: if the solute had a density 1/1000 of that of the solvent. The correct statement for practical brewing purposes is 1 ppm = 1 mg/liter. That's milligram, Professor.

John Bell

Pasco, Wash.

(one of several fans who called The Professor out on the carpet)

Dear John, et al,

My bad. I have received a number of nice and not so nice notes from my fans. The Professor stands corrected. And I will pass the correction on to Charlie Papazian so he can request his publisher to correct page 382 of the *Complete Joy of Homebrewing, Third Edition*. Indeed 1 part per million does equal 1 milligram per liter but it does not equal 1 milliliter per liter. So the correct equivalents should be:

1 ppm = 1 mg/liter = 1 microliter/liter

How did the error perpetuate itself for nearly 15 years without being revealed? I asked Charlie and he said, "I don't know, but clearly I overextended myself for a brief microsecond or you might say one part per million of a complete second."

I asked myself as a Professor, Hb.D. how I could have completely blown it in answering Dan Blasdel (Dear Professor, November/December Zymurgy)? A millisecond worth of "lack of thoroughness."

Having had an "extreme" moment, The Professor, Hb.D.

## Gnarly Mon, Gnarly

Dear Professor,

OK, I've been staring at the recipe long enough (10 years to be exact). Gnarly Roots

Lambic Style Barley Wine Ale on page 306 of Papazian's *The Homebrewer's Companion* is soon to be bastardized with 10 pounds of peaches (unless you scream "Don't do it!").



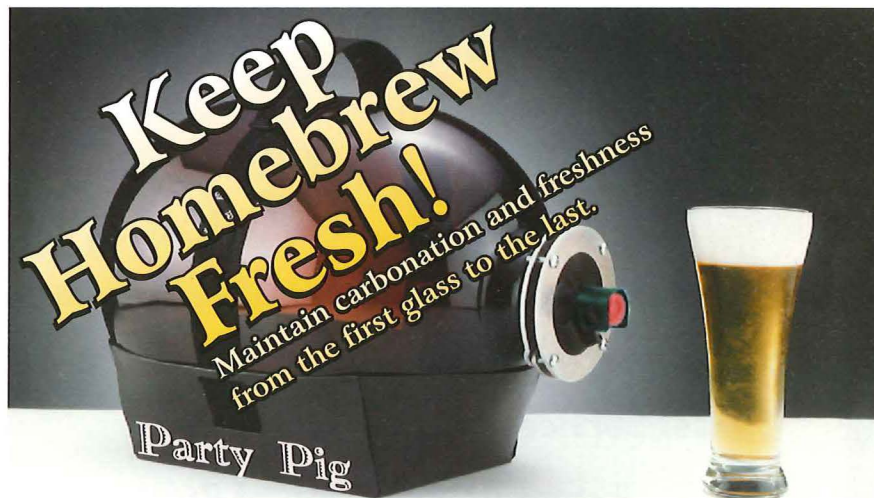
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What prompts the e-mail is reading the cherry-black currant lambic recipe in Papazian's newest book *Microbrewed Adventures*, which notes a two-year time-frame from brew to bottle.

Do you think the timelines in the *Companion* properly reflect the amount of time Gnarly

Roots should sit in the secondary? My plan is to primary in plastic for a week or so, rack to glass and add critters. Wait a month or so, then add Peche, ferment another month or so, then rack again, then wait.

With the high starting gravity, I'm still theorizing that a significant portion of gravity

will fall with the original ale yeast in suspension. I'm guessing that lambic critters don't attenuate that well? (Or just take a very long time to do their thing?). Should I be taking periodic gravity readings? I'm assuming that the final gravity doesn't necessarily equate to "time to bottle"?

Thanks for your time,  
Larry Richardson, aka Metal Larzz

Dear Metal,  
You need patience, Mon. With such a high gravity, make sure that primary fermentation is just about complete before racking to secondary. Why? Because it'll be in that secondary for a long time and the more yeast sediment you can leave behind in the primary the better.

Thinking about it, I'd add critters after a week in the primary and then keep it longer in primary or whatever it takes before it settles down. By the way, over time, those critters will attenuate your brew considerably more than just normal beer yeast.

Rack to secondary. Continue for one more month and then wait to observe the onset of clearing of the brew. You may even begin to



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observe signs of the lambic scum on top (a good sign). Then it's time to rack to a third fermenter and add your peaches and let sit for three months or so. After this period, rack off again into another fermenter (removing spent fruit) and let sit a year—no kidding. You will observe a healthy surface layer of white film, which indicates that the lambic microorganisms are working in the brew and also protecting the brew from air at the same time. When you are on the job you will be eyeballing, but patience should rule.

I have several bottles of 15-year-old Gnarly Roots and it is fantastic. Here's a "Professor" trick: Right after you bottle and cap, immerse the capped end of the bottle in melted paraffin. This minimizes oxidation and your treasured and aged brews last for decades with very little oxidation and staling.

You will be rewarded,  
The Professor; Hb.D.

### To Lager or Not to Lager

Hello Professor,  
I am going to try the German schwarzbier recipe in *The Complete Joy of Homebrewing*. It says to use lager yeast; however, it does not say if the brew is supposed to be fermented at lager temps or not. Is it a true lager or can it be fermented at ale temps?

Chris Patee

Dear Chris,  
Yes, indeed it should be fermented at lager temperatures and lagered at lager temperatures. Schwarzbiers are smooth lagers that don't scream of roasted malt characters. Yes, it's dark. Yes, there is some roast malt character, but you shouldn't be getting any burnt malt character.

Good brewing to you, my friend,  
The Professor; Hb.D.

### A Prickly Question

Dear Professor,  
I was curious to know if you might have a recommendation on how much prickly pear juice to use for the Prickly Pear Mead recipe? I found a supplier that processes ripe pears and makes a high quality juice at [www.arizonacactusranch.com/product.html](http://www.arizonacactusranch.com/product.html).

Could you offer any advice on how much juice to use in a 5-gallon batch as a substi-

tute for fresh fruit?

Stefan Leeb  
Proud member of the AHA

Dear Stefan,  
I'm figuring that this very popular recipe on page 360 of *The Homebrewer's Companion* calls for about 6 pounds of fruit. Some of that weight will be seeds, skins and pricklies. So if we are theorizing what the juice equivalent might be, I'd guess 5 pounds of juice. This might be on the high side, but a bit more will not cause the mead to suffer. If a pint's a pound the world around (water is, anyway)

then that's about 5 pints or 2.5 quarts or 80 fluid ounces or 2.38 liters.

You too will be rewarded,  
The Professor; Hb.D.

### Second Keg Blues

Dear Professor,  
My son and I have been brewing for about four years. The problem we are having is that when we brew a 10-gallon batch, the second keg goes sour. Before we keg I always take apart the kegs and clean and sanitize every part. I use bleach to sanitize everything including the racking cane and

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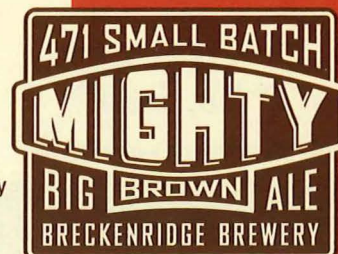
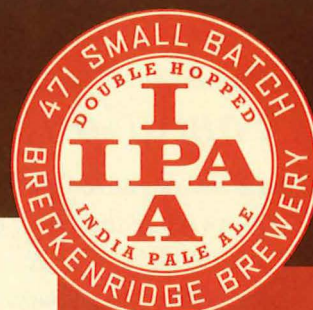
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the tubing. I rinse with very hot water a minimum of two times and follow with a rinse of cold water until there is no odor of bleach. After filling the kegs I charge them with 30 psi of CO<sub>2</sub>.

We store our kegs in the basement. The basement doesn't always stay as cool as I

would like. I think the temperature is ruining the second keg, but my son still thinks it's a sanitation problem. The brews that went bad this time were a steam, an Irish red ale and a weizenbock.

Joe and Jim D.  
Homebrewville, USA

Dear J & J,

I assume you don't tap into the second keg until you finish the first. And I assume that once you tap into the first keg, you are refrigerating it.

I'm guessing that you do have a sanitation problem. There are bacteria present in both kegs. The first is refrigerated so bacterial activity is inhibited immediately. The second keg does not get refrigerated until the first one is finished.

First, I would suggest that you buy a new siphon hose if you haven't done so within a year. But I think the real problem is the keg fixtures themselves. Take apart your corny keg and boil the parts that can fit into a saucepan. The outgoing tube needs some attention—take a coat hanger and push an ethyl grain alcohol-soaked Q-tip or some cotton ball pieces and push it/them through a few times. If it comes out filthy, then you are onto your problem. If there is no visual filth on the cotton, you still may have stuff inside. You can soak it in a weak bleach solution (be sure to totally submerge the entire length—simply turn it upside down if your bucket is not tall enough).

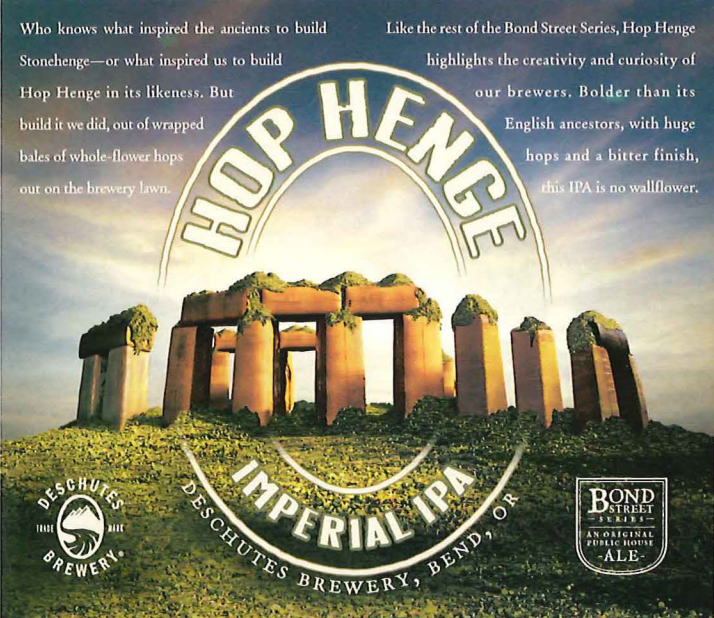
The above should solve the problem if it is indeed keg sanitation. But if you have a fermentation sanitation problem, keg attention won't exclusively help. To check if you have a fermentation sanitation issue, bottle a few bottles of your beer. If the bottles turn sour then you have fermentation sanitation problems. If you see a "ring" deposited on the glass around the neck of the bottle at the surface of the beer then you have a fermentation problem. I assume you can absolutely sanitize your bottles with a weak bleach and water solution. Caution: No matter what anyone tells you, there are many proprietary cleansers/sanitizers that will not clean and sanitize the residue film on the inside of bottles. One ounce of bleach in 5 gallons of water will do the trick. If it doesn't, the bottles are not worthy of your time and effort.

Hope this gives you some direction,  
The Professor, Hb.D.



Hey homebrewers! If you have a brewing-related question for Professor Surfeit, send it to "Dear Professor," PO Box 1679, Boulder CO 80306-1679; fax 303-447-2825; or e-mail professor@brewersassociation.org.

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# Cheers to the GABF

Dear Zymurgy,

Nice story on the Great American Beer Festival's 25th anniversary (January/February 2007). In the quest for ever-bigger crowds let's hope there remains a session for AHA members. An informative statistic for beer drinkers to track would be "time spent in



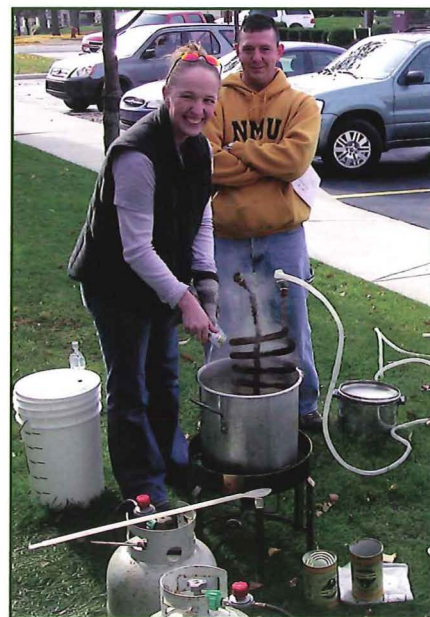
Brothers Zach and Ryan Fenton from Jackson, Wis. enjoy a nice cold beer while brewing their first batch together.

line with empty glass." Marty Jones reminded us all why Denver is a great beer destination.

Tom Ciccateri  
Kansas City, Mo.

Dear Tom,

The Connoisseur Session of the 2007 Great American Beer Festival will be open exclusively to AHA members.



A little lawn brewing, anyone?  
Photo provided by Phil Wilcox, Jackson, Mich.

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## Pump Specifications

Dear Zymurgy,  
The article "A New Twist on an Old Chiller" by Jamil Zainasheff (January/February 2007) was interesting but I could not find information on the pump specifications. Where can I find the specifications and supplier information?

Thanks,  
Dick Roberts

Jamil Zainasheff responds:

I use a March pump with my whirlpool chiller, model 809HS. This pump has a 1/25 hp, continuous-duty 1.4 amp motor and a maximum flow of 7.2 gpm with a

maximum head of 12 feet. I purchased a food grade version of this pump from Beer, Beer & More Beer ([www.morebeer.com](http://www.morebeer.com)), item number H315.


JZ  
[www.mrmalty.com](http://www.mrmalty.com)

## Hitting the Mark

Dear Zymurgy,  
Kudos for your January/February 2007 Zymurgy! It had recipes and something else that had been conspicuously absent from previous issues: how-to-build articles! This issue was especially refreshing coming on the heels of your November/December issue, which had

little, if any, pertinent information for me. I could understand an article or two on food, but not an entire issue. Please give us more Zymurgys like the current issue.

Thanks,  
Mark Pasquinelli

Send your letters to Dear Zymurgy, PO Box 1679, Boulder, CO 80306 or e-mail [jill@brewersassociation.org](mailto:jill@brewersassociation.org). Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to Kelli Gomez, Magazine Art Director, at the above address or e-mail it to [kelli@brewersassociation.org](mailto:kelli@brewersassociation.org). 

## AMERICAN HOMEBREWERS ASSOCIATION 2007 GOVERNING COMMITTEE ELECTION!

**Your AHA Governing Committee representatives play a critical role for YOUR Association.**

**The AHA Governing Committee helps develop the benefits and programs of the AHA and provides direction for the AHA Staff.**

## PLEASE CAST YOUR VOTE TODAY!

Please read candidate statements available on [www.beertown.org](http://www.beertown.org) before voting.

Candidates:

- |                                       |                                      |
|---------------------------------------|--------------------------------------|
| ▪ Drew Beechum—Valley Village, CA     | ▪ David Houseman—Chester Springs, PA |
| ▪ Michael Fairbrother—Londonderry, NH | ▪ Bob Kauffman—Lafayette, CO         |
| ▪ Chris Frey—Saline, MI               | ▪ Bill Pierce—Burlington, ON         |
| ▪ Michael Hall—Los Alamos, NM         | ▪ Patrick Rue—Irvine, CA             |
| ▪ Tom Hargrave—Huntsville, AL         | ▪ Susan Ruud—Harwood, ND             |



**VOTE NOW!** See online ballot at [www.beertown.org](http://www.beertown.org)

### AMERICAN HOMEBREWERS ASSOCIATION 2007 GOVERNING COMMITTEE OFFICIAL BALLOT



Select up to four (4) of the candidates you feel are best qualified to serve on the AHA Governing Committee.

- |  |   |
|--|---|
| <input type="checkbox"/> Drew Beechum        | <input type="checkbox"/> David Houseman |
| <input type="checkbox"/> Michael Fairbrother | <input type="checkbox"/> Bob Kauffman   |
| <input type="checkbox"/> Chris Frey          | <input type="checkbox"/> Bill Pierce    |
| <input type="checkbox"/> Michael Hall        | <input type="checkbox"/> Patrick Rue    |
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PO Box 1679, Boulder, CO 80306; or fill out the online ballot at [www.beertown.org](http://www.beertown.org).

### ELECTION GUIDELINES:

Read the candidate statements on [www.beertown.org](http://www.beertown.org). Vote online at [www.beertown.org](http://www.beertown.org) or photocopy the ballot (that way you don't have to cut your Zymurgy). Vote for up to four (4) candidates by marking the box next to the candidates' names. Fill in your name and membership number in the appropriate place. If you do not know your member number, or would like to become a member, call us toll free at 888-822-6273 or e-mail [info@brewersassociation.org](mailto:info@brewersassociation.org). Sign your ballot.

Mail completed ballots to: American Homebrewers Association, Attn: AHA Election, PO Box 1679; Boulder, CO, 80306; or fill out the online ballot at [www.beertown.org](http://www.beertown.org). Ballots must be postmarked no later than March 31, 2007.

All AHA members voting in the election are eligible for an additional entry in the Lallemand Scholarship drawing for Siebel Institute's two-week Concise Course. Check the "Enter Me" box on the ballot to submit your entry. The drawing will take place June 23, 2007 at the AHA National Homebrewers Conference in Denver, CO.



by Amahl Turczyn Scheppach

# Scottish Ales

**N**umerous styles of ale have been brewed over the years in Scotland, from the cloudy, phenolic two-penny ales made from sparging tails and consumed (according to Greg Noonan in his excellent resource *Scotch Ale*) as we consume soft drinks, to Scotch porter that rivaled and even surpassed its famed London counterpart, to Pilsners and Munich lagers, to highly-hopped India pale ales brewed from hard water wells, to the syrupy, highly alcoholic wee heavies made famous by Edinburgh brewers. This wide variety of beers was produced by skilled Scottish brewers to compete with various export markets and to appease the ever-changing tastes of the beer drinking public long before Scotland gained its worldwide reputation for distilled malt beverages.

For our purposes, however, this diverse portfolio of brewing can be reduced to one indigenous style of uniquely Scottish ale, made with soft water, pale and roast malts, English hops used only for bittering, and fermented at cool temperatures with a clean, traditional Scottish ale yeast. (Fortunately, several pure culture yeast labs carry ale yeast strains from Scottish breweries, and these should definitely be favored over other strains when brewing these styles.) This ale is then brewed to four levels of strength: light, heavy, export and Scotch. The first three of these strengths are still differentiated with the old system of schillings per barrel, though it was a somewhat arbitrary way of distinguishing one beer style from another, even when it was being used. The BJCP lists Scottish Light as 60/-, Scottish Heavy as 70/-, and Scottish Export as 80/-. The strongest of the four Scottish ales in the category is simply called "Scotch ale" or "Wee Heavy."

Scottish ales are moderate enough in gravity to be considered session ales, and weigh

in at an original gravity of 1.030–1.035, 1.035–1.040 and 1.040–1.054, respectively. All exhibit a low to moderate malty sweetness in the nose, and can also have a slight smoke aroma. This should come from the yeast, rather than from peated malt, which can result in unpleasantly harsh phenolic aromas. Traditionally, a small percentage of roast malt (up to 3 percent of the total grain bill) is used for all Scottish ales including Wee Heavy.

While its main purpose is color and a slight grain bitterness to partially offset malt sweetness, roast can contribute a slight aroma as well. Color for Scottish ales is deep amber to dark copper (9–17 SRM), with excellent clarity from extended fermentations at cool temperatures (50 to 60° F (10 to 16° C) and the traditional practice

of cold conditioning. Flavor should lean toward malt, but to maintain drinkability as a session beer, it should only slightly favor malt sweetness. Small amounts of crystal can be used for flavor, but are traditionally not part of the grain bill. Rather,



## Scottish Export 80/-

5 U.S. gallons (19 liters)

### Ingredients

<b>2 cans</b>	Coopers Light Malt Extract
<b>0.20 lb</b>	(0.09 kg) Roasted Barley
<b>1.0 oz</b>	(28 g) Brewers Gold Pellet Hops, 7% alpha acid (60 min)
<b>6 oz</b>	Wyeast 1728 Scottish Ale Yeast or White Labs WLP028 Edinburgh Scottish Ale Yeast (173 g) Coopers Dry Malt Extract for bottling

**Original Specific Gravity:** 1.050

**Final Specific Gravity:** 1.015

**IBUs:** 21.7

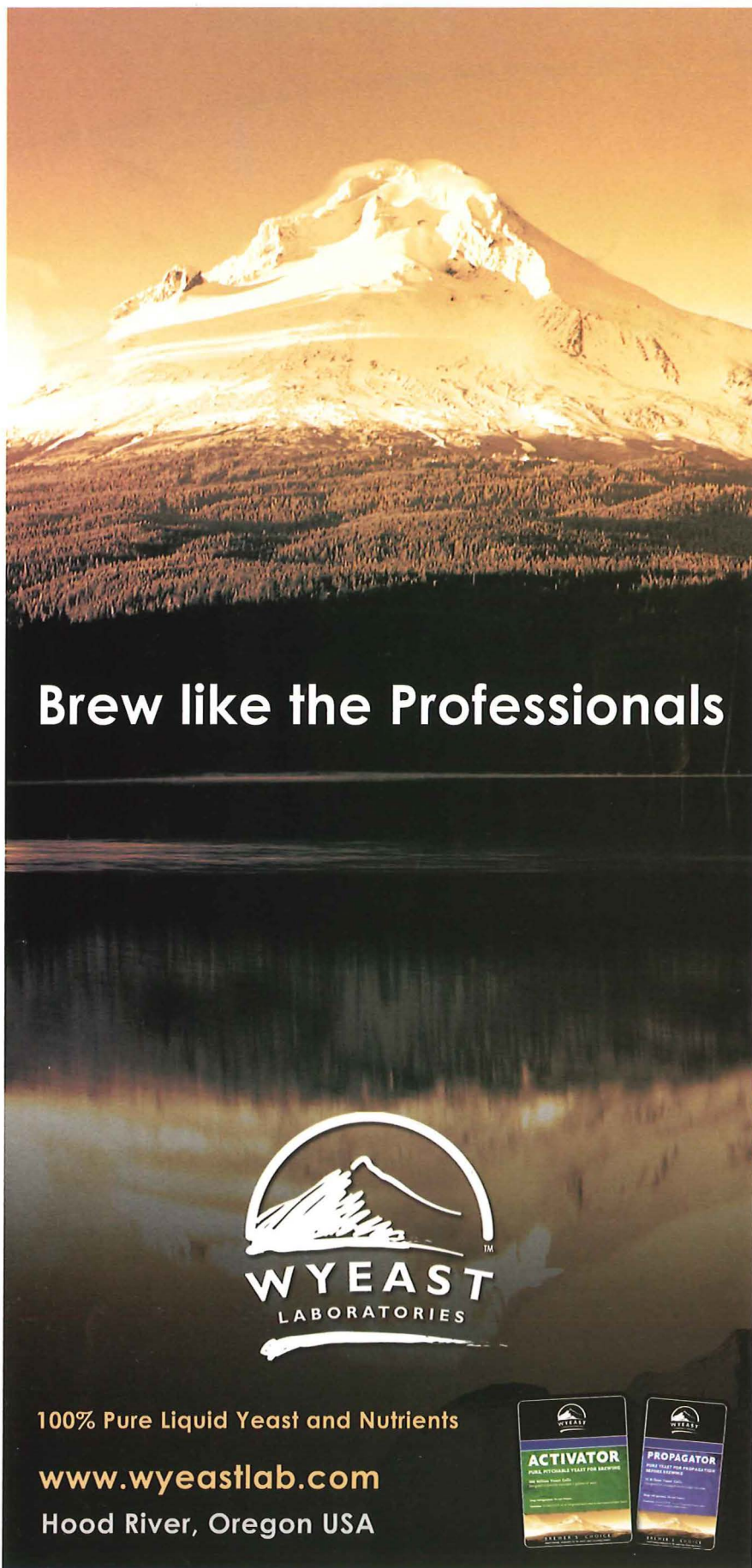
**ABV:** 4.7%




### Directions

Steep roasted barley in 0.5 gallons of 150° F water for 20 minutes. Remove grains and sparge with 0.5 gallons of 170° F water. Stir in extract and bring to a boil. Boil for 30 minutes then add 1.5 gallons of water and bring to a boil again (concentrated boil will help caramelize the wort and add malt complexity). Add hops and boil an additional 60 minutes. Strain into fermenter with enough cold water to make 5 gallons. When temperature is below 65° F, pitch yeast and aerate well. Ferment at 63–65° F for a week or until fermentation is complete, then rack to secondary. Age in secondary two to three weeks at 63–65° F. Prime with dry malt extract and bottle.





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## AMERICAN HOMEBREWERS ASSOCIATION CLUB ONLY COMPETITION

### Scottish Ale

Entries due by March 24 and judging will be held April 1.

This competition covers BJCP 2004 Category 9 A, B and C: the Scottish Light 60/-, Scottish Heavy 70/- and Scottish Export 80/- styles.

### Shipping location:

Maltose Express  
Attn: Phil Clarke  
887 Main Street  
Monroe, CT 06468

For more information, contact Phil at [homebrewersguild@yahoo.com](mailto:homebrewersguild@yahoo.com) or [www.hbd.org/nychg/](http://www.hbd.org/nychg/)

kettle caramelization of the wort should lend the malty caramel character.

Sugar adjuncts have also been used for these ales, but again are not a traditional part of the style, as their use was long considered more English in practice than Scottish. Balance of this malt sweetness is achieved with moderate to low hop bitterness from English hops (Goldings are a good choice), but hop flavor and aroma are not a traditional part of the flavor profile.

Scotch ale aroma and flavor are dominated by intense, concentrated malt and caramel, and this same caramelization can cause it to be darker in appearance as well (14–25 SRM). Legs may appear on the stronger versions, which can range from 6.5- to 10-percent alcohol by volume. Mouthfeel can be medium-bodied to thick and chewy, depending upon the attenuation of the yeast strain chosen, but again, the use of moderate bittering hops in the kettle and a small percentage of roast barley in the grain bill should serve to keep the finish from being too cloying. Alcoholic warmth may also be present in Scotch ale to balance sweetness, and a moderate carbonation is appropriate. Fermentation should be conducted at temperatures closer to 50° F (10° C), and it is very important in this stronger style to pitch a large volume of yeast initially, even more than one would for a lager. Noonan recommends 1 to 4 quarts of a very active starter per 5 gallons.

**Amahl Turczyn Scheppach** is a former craft brewer and associate editor for *Zymurgy* who lives in Lafayette, Colo. ☺



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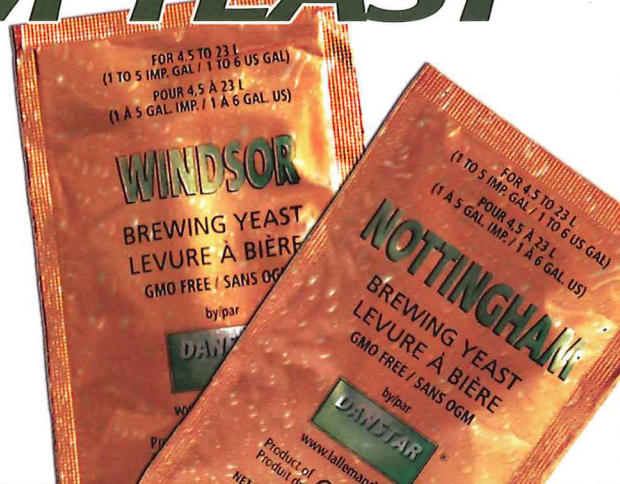


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A hand holding a glass flask containing a glowing blue liquid. Bright light rays emanate from the base of the flask, creating a starburst effect. The background is dark with faint, swirling patterns.

# MAKING A STARTER

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BY JAMIL ZAINASHEFF





ou might have heard your fellow brewers talking about starters and how important they are for making great beer. Proper fermentation is what sets apart great beers from just OK beers, and starters can help by ensuring a beer with the correct appearance, flavor, body and aroma profile. The resulting beer is also clean, complete, consistent and reproducible.

In order to have proper fermentation, you must have the right amount of clean, healthy yeast to ferment your wort. If you're a professional brewer with plenty of yeast every few days, this isn't too hard. If you're an amateur brewer, you're often starting with a new pitch of yeast, and employing a starter can often improve the performance of that yeast.

Many brewers have questions about the "best way" to make and use starters. The answers to these questions are not only based on my experience and lab work, but from conversations with David Logsdon, founder/owner of Wyeast Laboratories, Inc., Greg Doss, Wyeast microbiologist, and Neva Parker, White Labs Inc. laboratory manager. I would also like to thank Graham Sanders for his extensive feedback on this article.

#### **Q: WHAT IS THE PURPOSE OF A STARTER?**

A starter is a small volume of wort that yeast use as an initial step to become healthy, multiply and prepare themselves to ferment a batch of beer.

The starter's purpose is to create enough clean, healthy yeast to ferment your batch under optimal conditions. The primary focus of a starter should always be yeast health first and increased cell growth second. It is much better to have a smaller number of very healthy, young cells than it is to have a large number of weak cells. As Logsdon puts it, "Would you rather have an excess of 80-year-old people building your house or a smaller amount of really healthy 20-year-olds?"

#### **Q: DO I ALWAYS NEED TO MAKE A STARTER?**

No. However, in many cases, making a starter will provide better fermentation.

You should always make a starter if you suspect the viability (overall health) of your yeast might be low. If you have an old vial or pack of yeast or the yeast has been left out warm for an extended period of time (for example yeast in shipping for several days), you should make a starter.

You can also make a starter to grow a smaller amount of yeast into an appropriately sized pitch for your batch. Larger volume batches, higher gravity worts and lager fermentations require more yeast. Of course, you can pitch more containers of yeast or repitch yeast from a previous batch to get good results, but starters from a vial or pack are an excellent solution.

#### **Q: WHEN SHOULDN'T I MAKE A STARTER?**

You should never make a starter if you can't handle the steps in a sanitary way or you can't provide proper nutrition for the yeast. Also, for some small batches or low gravity beers such as an ordinary bitter, there is a slight chance you might end up over pitching if you get carried away. High pitching rates can result in a less than ideal fermentation profile (e.g. low or unexpected esters, yeast autolysis flavors, poor head retention). This is also a consideration in beer styles where the yeast-derived flavors are foremost, such as Bavarian-style wheat beers. Though I don't concur, a number of experts believe it is better to pitch at lower rates when brewing these styles of beers to increase ester formation.

Another case where you generally don't want to make a starter is with dry yeast. It is usually cheaper and easier to just buy more dry yeast than it would be to make a starter large enough for most dry yeast packs. Many experts suggest that placing dry yeasts in a starter would just deplete the reserves that the manufacturer worked so hard to build into their product. For dry yeasts, just do a proper rehydration in tap water.

#### **Q: HOW DO I MAKE A STARTER?**

You'll need a clean, sanitized container able to hold the starter plus some headspace, aluminum foil, dried malt extract (DME), yeast nutrients and some water.

When making starter wort, keep the starting gravity between 1.020 and 1.040 (5–10 °P).

You do not want to make a high gravity starter to grow yeast. As a ballpark measurement, use about 6 ounces (by weight) of DME to 2 quarts of water. If you're working in metric, use a 10 to 1 ratio. Add 1 gram of DME for every 10 milliliters of final volume. (If you're making a 2-liter starter, add water to 200 grams of DME until you have 2 liters total.) Add 1/4 teaspoon of yeast nutrient, boil 15 minutes, cool and add yeast.

Using an Erlenmeyer flask made of borosilicate glass (such as Pyrex or Bomex) is even easier. Just put the DME and water in the flask, drop in any nutrients you desire, put a piece of aluminum foil over the top and put the flask directly on the stove burner. Boil gently for 15 minutes, then let it cool.

You should add oxygen to your cooled starter or at the very least shake it every few hours to increase the amount of oxygen available to the yeast. If you have a stirplate, that works even better (for an article on how to build your own stirplate, see the January/February 2007 *Zymurgy*).

Every time you make a starter, keep in mind the four main factors that affect yeast growth and health: nutrients, temperature, sugars and pH.

Key nutrients include oxygen, zinc, amino acids and nitrogen. Oxygen is critical to the survival and growth of yeast, and tends to be the most limiting factor for most starters.

Keep the starter around room temperature (72° F, 22° C).

Use an all-malt wort for starters. The sugar in the starter needs to be maltose, not simple sugar. Yeast that have been eating a lot of simple sugars stop making the enzyme that enable it to break down maltose, which is the main sugar in wort. The yeast quickly learn to be lazy and the ability to fully attenuate a batch of beer suffers.

The pH of a starter should be around 5, but if you can't test it, don't worry. Typical wort ranges from 4 to 6 pH, so use a high quality DME to be safe.

When adding yeast to the starter, work in a draft-free area and try to keep the containers



open for as short a time as possible. The design of White Labs packaging keeps the yeast out of contact with the outside surfaces of the vial. However, it is possible for dust-borne wild yeast and bacteria to settle on the protruding lip near the top, so it doesn't hurt to sanitize the vial to keep any settled dust from dropping into your starter. If you shake the vial to loosen the yeast inside, let it rest a few minutes and slowly open the top to prevent excessive foaming.

It isn't required to "smack" a Wyeast pack before making a starter. The yeast is not in the little part that gets popped, but rather in the main pack. However, the liquid inside the little pack is a high quality nutrient and sugar source. It also helps rinse the yeast out from the main pack. Even though the chance of contamination while pouring is extremely low, you should sanitize the outside of the Wyeast pack before opening, as well as scissors if you use them.

**Q: SHOULD I ADD HOPS WHEN I MAKE MY STARTER WORT?**

No. The antibiotic effect is minimal. Remember, the final product of a good starter is healthy yeast, not beer. It is better to have less material floating around, less expense and fewer steps to worry about.

**Q: SHOULD I ADD OXYGEN TO MY STARTER?**

Yes. You'll get far healthier yeast and far

more yeast growth if the yeast have oxygen throughout the process. Adding oxygen at the beginning helps, but the most effective starters provide a continuous source of oxygen. Oxygen is critical to yeast growth. Yeast use oxygen to synthesize unsaturated fatty acids and sterols, which are critical to creating a healthy cell membrane and good cell growth. With oxygen present, yeast convert sugar to carbon dioxide and water and they grow rapidly. With no oxygen, yeast create alcohol, grow far more slowly and reach a lower total mass of cells.

There are several ways to add oxygen: intermittent shaking, a stirplate, pure oxygen, or an air pump with a sterile filter.

Shaking the starter as much as possible, every hour or two, makes a large difference in the amount of yeast growth and health. In my tests, vigorously shaking a starter every hour resulted in approximately double the number of cells versus a non-shaken starter.

A stirplate is perhaps the most effective method. In tests, a stirplate resulted in a 40-percent gain over a shaken starter. Logsdon says, "The stirplate drives off the CO<sub>2</sub> (which suppresses yeast activity) and allows for an exchange of air into the starter (increasing oxygen levels) and eliminates dead spots in the starter liquid, ensuring that the yeast have easy access

to the sugars." When using a stirplate, don't plug up the starter vessel with an airlock. A sanitary piece of aluminum foil or a breathable foam stopper is all you need. Bacteria and wild yeast can't crawl and a loose fitting cover will allow for better gas exchange. Be aware that some stirplates can generate enough heat to push the starter into a temperature range that is detrimental to the yeast. Using a thin piece of Styrofoam between the flask and the stirplate can help minimize the transfer of heat to the starter. Another thing to be aware of is that the stirplate's action of drawing air into the liquid causes the temperature of the starter to fluctuate quickly with changes in the temperature of the surrounding air.

Continuous air from a pump and sterile filter can be effective too. The major drawbacks are being able to control the flow of air to prevent excessive foaming and evaporation of the starter. Shaking is just as effective as intermittent aeration with a pump.

Continuous pure oxygen from a tank or generator is both expensive and unnecessary.

**Q: HOW MUCH YEAST OR HOW BIG A STARTER DO I NEED?**

A White Labs Pitchable Yeast vial and a Wyeast ACTIVATOR™ 125 XL Smack Pack both contain an average of 100 billion cells and are enough to pitch directly into 5 U.S. gallons (18.9 liters) of an ale wort at 1.048 SG (12 °P). This is a pitching rate of 5.3 million cells per milliliter, which is close to the pitching rate many professional breweries begin with when starting a new pitch of ale yeast. This rate works well because the health and vitality of fresh laboratory cultured yeast are superior to yeast harvested from normal fermentation. Higher gravity worts, especially once they exceed a specific gravity of 1.060 (15 °P), larger wort volumes and lager fermentations all require higher pitching rates (or a starter) for optimum results.

You might have heard that when using yeast harvested from a previous fermentation, the optimal pitching rate for ales is 6 to 10 million cells/ml, and 10 to 15 mil-

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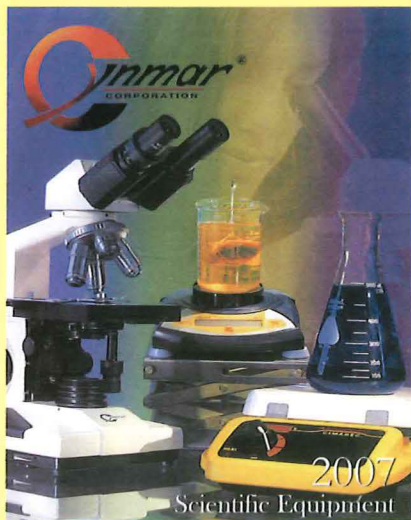
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lion cells/ml for lagers. That is a generally accepted ballpark, but it doesn't take into account the starting gravity of the wort. Higher gravity worts require more yeast and lower gravity worts require less. You want to pitch around 1 million cells of viable yeast, for every milliliter of wort, for every degree Plato (a little less for an ale, a little more for a lager.) In his book *An Analysis of Brewing Techniques*, George Fix states that you need to pitch 0.75 million cells per milliliter for an ale and 1.5 million cells per milliliter for a lager.

Here is the simple math to calculate the number of cells needed for an ale.

(0.75 million) X (milliliters of wort) X (degrees Plato of the wort)

There are about 3,785 milliliters in a gallon, and about 20,000 milliliters in 5.25 U.S. gallons.

One degree Plato is close to 1.004 of specific gravity (SG). Just divide the decimal portion of the SG by 4 to get the approximate degrees Plato (e.g., 1.060 is 15 °P).

The proper amount of yeast for 5.25 U.S. gallons of 1.060 wort is around 225 billion cells if you are pitching 0.75 million per milliliter.

(750,000) X (20,000) X (15) = 225,000,000,000

Another way to put it: you need about 3.75 billion cells for each point of OG when pitching into a little over 5 gallons (20 liters) of wort. Double that number for a lager.

With each vial or pack having around 100 billion cells, you would need two vials or packs (approximately 200 billion cells) to get close to that rate, if you didn't want to make a starter.

In general, a 2-liter starter doubles the amount of yeast in a single vial or pack. For the above example, you would only need one package of yeast if you made a 2-liter starter. To make it easier to figure out how much yeast you'll get out of a starter, Wyeast created a calculator that estimates the amount of growth from a given starter

size, which will be available soon at [www.wyeastlab.com](http://www.wyeastlab.com). Another easy way to determine how much yeast you need is the free Pitching Rate Calculator™ at [www.mrmalty.com](http://www.mrmalty.com).

There is also an upper limit to how much yeast you should add. Logsdon says, "I try to stay within 20 percent of my ideal pitch rate and I prefer to slightly under pitch rather than over pitch. This causes more cell growth, more esters and better yeast health. Over pitching causes other problems with beer flavor, such as a lack of esters. Changes in the flavor profile are noticeable when the pitch rates are as little as 20 percent over the recommended amount."

#### Q: DOES A STARTER NEED TO BE KEPT AT THE SAME TEMPERATURE AS IT IS GOING TO FERMENT THE BATCH OF BEER LATER?

No, but there are practical limits to how high or low you can go. Warmer starters (up to 98° F, 37° C) equal more rapid yeast growth, but using these very high propagation temperatures negatively affects the viability and stability of the resulting yeast. Very rapid growth or excessive growth can result in weaker cell membranes. Lager yeasts tend to be especially sensitive to high temperatures.

The cooler you ferment the starter (down to the planned fermentation temperature

for the main batch) the slower the yeast growth, but the yeast can be healthier than yeast coming from a high temperature starter. Keep starters between 65° F (18° C) and 75° F (24° C). A temperature around the low 70s (72° F, 22° C) strikes the best balance for the propagation of yeasts. Lager yeast starters can be kept a few degrees cooler and ale yeasts can be kept a few degrees warmer.

If you are going to pitch the starter at high krausen, it is best to keep the starter within 5° F (3° C) of the wort temperature of the main batch. Pitching a very warm, active starter into cold wort can stun the yeast and with lager yeasts this can cause a higher incidence of petite mutants, which can negatively affect attenuation, flocculation and hydrogen sulfide production.

You can add small amounts of cool wort to the starter over time to bring the temperature down gradually, but it is really better to keep everything closer to fermentation temperatures from the beginning. Any time yeast sense a big drop in temperature, they slow down and drop out.

#### Q: AT WHAT POINT DO I PITCH THE STARTER INTO THE WORT?

Discussion rages over this topic. Should the starter be fermented completely, the spent liquid decanted and the yeast pitched, or should the entire starter be pitched when at the height of activity?

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Most yeast experts say that when propagating yeast, moving at high krausen is optimal. The time of high krausen can range anywhere from a few hours to 24 or more. It depends on the amount of yeast added to the starter wort, yeast health, temperature, and several other factors.

Doss says a starter made from an XL pack of yeast into 2 liters of wort will reach its maximum cell density within 12 to 18 hours. If you're starting with a very small amount of yeast in a large starter, it can take 24 hours or more to reach maximum cell densities.

I like to pitch starters while they're still very active and as soon as the bulk of reproduction is finished, usually within 12 to 18 hours. This is really convenient, because I can make a starter the morning of the brew day or the night before and it is ready to go by the time the batch of wort is ready.

Of course, if you have a large starter volume in relation to your batch of beer or a starter that was continuously aerated, then you probably don't want to pitch the entire starter into your wort. Adding a large starter or a heavily oxidized starter to your wort can alter the flavor of the finished beer.

If you're going to pitch only the yeast from the starter, make sure the starter attenuates fully before decanting the spent wort. The yeast rebuild their glycogen reserve at the end of fermentation and it is this glycogen that they use when preparing to ferment a new batch of beer. Separating the spent wort from the yeast too early also selectively discards the less flocculent, higher attenuating individuals in your yeast population. You may end up with a pitch of yeast that won't attenuate the beer fully. Allow the fermentation to go complete cycle, chill, decant the beer and pitch just the yeast.

#### Q: CAN TOO SMALL OR TOO LARGE A STARTER CAN BE BAD FOR THE YEAST?

Parker says putting a fresh vial of yeast into 500 milliliters of wort and letting such a small starter go to completion can actually leave the yeast less ready to ferment a batch of beer. The yeast do not rebuild their reserves and have very little increase in cell mass.

The minimum starter size for significant yeast growth from a vial or pack of yeast is 1 liter. One vial or pack into 1 liter results in approximately a 50-percent increase in cell mass.

Some brewers make a small starter volume (500 ml or less) with the sole intent of "waking" the yeast. When making small starters, it is best to pitch the entire volume at the height of activity.

#### Q: IF I'M MAKING A HIGH GRAVITY BEER, SHOULDN'T I MAKE A HIGH GRAVITY STARTER SO THE YEAST BECOME ACCLIMATED?



No. In general, starter wort should be between 1.020 and 1.040 (5–10 °P). Lower gravity starters are easier on the yeast, but result in less growth. High gravity starters result in more growth, but are more stressful for the yeast.

Logsdon says, “Generally, you’d use the lower end of that range [1.020 SG, 5 °P] for coming off a plate or slant or very old yeast. Yeast don’t get used to a high gravity environment, and the high osmotic pressure can really stress the yeast.”

**Q: WHEN INCREASING A STARTER IN STEPS, SHOULD THE STEPS BE A CERTAIN SIZE?**

Yes, but there is plenty of leeway in the size of the steps. A “step” is when you take an active starter and increase the volume with more wort. Brewers do this to increase cell mass while keeping the rate of growth consistent.

The size ratio of one step to the next can affect the health of the yeast and the amount of cell growth. A very large step can result in a change in yeast metabolism, where the sugars that are fermented last can fall out of favor with the yeast. The yeast become lazy and subsequent generations can become less attenuative.

Making a greater number of small steps increases the chance of contamination. Every transfer, every feeding, every bit of handling you do increases the chance of contamination. Five to 10 times the size of the prior step is considered correct. Try to balance the practical considerations of handling, sanitation and cell growth.

**Q: CAN I PITCH A SMALLER PORTION OF YEAST INTO THE SAME SIZED STARTER AND GET THE SAME AMOUNT OF CELLS AT THE END?**

No. If you’re trying to grow a lot of yeast from a small amount, grow the yeast in steps to get to the final cell count desired. Keep the starter aerated and provide all of the essential nutrients for the yeast. Pushing yeast to large amounts of cell growth can negatively affect the vitality of the final yeast if they lack enough oxygen-produced sterols.

When making a bigger beer or when the

yeast has been abused or is old, a clean, properly prepared starter will result in consistent, well-fermented beers. Always try to keep your process simple and ask yourself if the beer is the way you like it. If you’re making starters, keep track of your process and the results. In the end, keep the big picture of yeast handling in mind, which is

to have healthy yeast first and proper quantities second.

**Jamil Zainasheff is a former Ninkasi winner at the National Homebrew Competition. Visit his Web site, [www.mrmalty.com](http://www.mrmalty.com), for more information.**



## Russian Imperial Stout

*Black as a moonless night, this is a big, rich, warming beer with huge chocolate, coffee and dark fruit flavors. This big beer requires a starter or repitching yeast from a previous batch to ferment properly. Brewers that make the effort will be rewarded with a beer fit for special occasions that will age well over many years.*

### Ingredients for 6 U.S. gallons (23 liters)

<b>19.50 lb</b>	(8.85 kg) British Pale Malt 3°L
<b>1.50 lb</b>	(680 g) Roasted Barley 450°L
<b>1.0 lb</b>	(454 g) Special B Malt 120°L
<b>0.50 lb</b>	(227 g) CaraMunich 75°L
<b>0.50 lb</b>	(227 g) Chocolate Malt 350°L
<b>0.50 lb</b>	(227 g) Pale Chocolate Malt 200°L
<b>1.2 oz</b>	(34 g) Magnum or Horizon pellet hops, 15% alpha acid (60 min.) (59 IBU)
<b>2.0 oz</b>	(57 g) British Goldings pellet hops, 6% alpha acid (10 min.) (7.9 IBU)
<b>2.0 oz</b>	(57 g) British Goldings pellet hops, 6% alpha acid (1 min.) (6.6 IBU)
	White Labs WLP001
	California Ale, Wyeast 1056
	American Ale Yeast, or
	Fermentis Safale US-56

**Original Target Gravity:** 1.100 (23.86 °P)  
**Approximate Final Gravity:** 1.025 – 1.030 (6.32 – 7.56 °P)

**Brewhouse Efficiency:** 70%  
**Anticipated SRM:** 55.4  
**Anticipated IBUs:** 73.4  
**Anticipated ABV:** 9.4 - 10%  
**Wort Boil Time:** 60 minutes

### Directions

Single infusion mash at 152° F (67° C) using a ratio of 1.3 quarts water to 1 pound of grain. Cool the wort to 68° F (20° C), pitch the yeast and add oxygen or aerate the wort. With enough healthy yeast, fermentation should be complete in less than 2 weeks, but don’t rush it. Carbonate to between 2 and 3 volumes and serve at 45 to 50° F (7.2 to 10° C). If you have the patience, this beer will change beautifully over time, developing new flavors and mellowing with age. Try to save a few bottles for sampling over the years or make one batch for now and one for the future.

**Yeast:** Ferment this beer around 68° F (20° C) using a clean fermenting ale yeast with attenuation in the mid-70-percent range. White Labs WLP001 or Wyeast 1056 American Ale are excellent choices. This is a big beer and you’ll need to make a starter with two packages of liquid yeast in 1 gallon of 1.040 starter wort or one package of yeast in a 2.5-gallon starter. (The starter can be a bit smaller with some form of continuous aeration.) A good dry yeast option is Fermentis Safale US-56. If you’re using dry yeast, you’ll need about 20 grams for this batch. Make sure to rehydrate the yeast properly before pitching.

**Extract with Specialty Grains:** Substitute 14 lb (6.35 kg) of English pale malt extract for British pale malt. Increase 60 minute hops to 2.25 oz (64 g). Steep grains in 2 gallons (7.6 L) of water; bring to 170° F (77° C) and rinse with 0.5 gallons (1.9 L) of hot water. Remove from heat, stir in extract and bring to a boil. Add hops as directed in recipe. After 60 minute boil, strain into fermenter with enough cold water to make 6 gallons. Pitch yeast and aerate when temperature drops below 68° F (20° C). Follow fermentation directions above.



# The Fermentation Game

Does the type of fermenter used  
make a noticeable difference?

By Chris P. Frey

Breweries typically utilize a variety of fermenter shapes and materials. But at the homebrew level, can differences in materials make a perceivable difference in the resulting beer?

That's the question I set out to answer after it was posed to me by American Homebrewers Association director Gary Glass. In devising a potential "experiment," several AHA Governing Committee members reviewed the idea and we settled on a recipe recommendation from Jeff Renner, a yeast strain recommendation from Dave Logsdon and the use of four different fermenters: a stainless steel conical, a plastic bucket, an open glass carboy and an air-locked glass carboy. Dave Houseman recruited judges from Zymurgy's Commercial Calibration department to review the final product. I also garnered feedback from three Southeast Michigan homebrew clubs.

To be a true experiment, all variables would have to be closely controlled, and the test would need to be run a number of times to show the results occurring the same way, over and over. For a homebrewer with limited resources, however, this was really a single trial observation, a collection of subjective attributes that could lead to future attempts at refinement and replication.

## The Recipe

The recipe was fairly straightforward. It was agreed that a smaller brew, with little complexity, would help highlight any potential perceived differences. A Special Bitter was selected.







Do you or your homebrew club have an idea for an experiment that you'd like to see in *Zymurgy*?

Contact *Zymurgy* editor Jill Redding at [jill@brewersassociation.org](mailto:jill@brewersassociation.org).



## Special Bitter

### Ingredients

for 20 U.S. gallons (75 liters)

27.0 lb	(12.3 kg) Maris Otter Pale Ale malt
4.0 lb	(1.8 kg) 10°L Munich malt
3.0 oz	(85 g) Chocolate malt
2.0 oz	(56 g) Willamette (5.2% AA), first wort hopped
2.0 oz	(56 g) East Kent Golding (6.6%AA), 60 minutes
1.5 oz	(42 g) East Kent Golding (6.6%AA), 20 minutes
2.0 oz	(56 g) Willamette (5.2%AA), 5 minutes
	Wyeast 1187 Ringwood Ale Yeast

### Directions

The water was treated with Camden tablets and gypsum, and the grains were doughed in at 150° F (65° C), held an hour, then raised to 168° F (75° C) and held for 15 minutes. The grains were sparged for about 90 minutes to collect approximately 22 gallons of pre-boil wort. A pico-Brewing System® was used, and wort was re-circulated between two 15.5-gallon boil kettles to ensure uniformity.

### The Controls

Several variables were controlled to minimize potential differences between the fermenting batches. These included:

- Adding a 1-gallon yeast starter into the boil kettles once the wort had been chilled to mid-70s and recirculated between the two kettles for 5 minutes.
- Ensured each fermenter was PBW washed and sanitized with Iodophor (a new plastic fermentation bucket was utilized and therefore did not get cleaned with PBW).
- Each fermentation vessel received three minutes of oxygen.
- Each vessel was placed 3 feet from the floor, bunched next to each other, in the basement where ambient temperature remained constant for the several weeks of fermentation.
- All beers were racked to glass secondaries after 13 days and bottled 10 days later.
- All beers were monitored with internal thermo probes, sending and recording precise temperature information, by the second, to a PC during the first five days to determine if there were different fermentation temperatures occurring (a tip of the hat to Matt Becker of

the Ann Arbor Brewers Guild for supplying this truly geeky setup!).

Temperatures for the stainless steel conical fermenter hit the highest primary fermentation temps, with plastic in the middle and the two glass carboys staying the coolest. After five days, they remained at 63-64° F (ambient basement temp) until bottling. See graph for fermentation temperatures over time.

### Results

The beer was brewed on October 29 and had a starting gravity of 1.052. It was bottled on November 21 and the final gravities were:

# 1 Stainless	1.012
# 2 Glass (Open)	1.014
# 3 Plastic	1.015
# 4 Glass (Closed)	1.015

### Perceived Differences

The final step was to do a blind tasting of the beer and see if there were any perceived differences. I chose the criteria listed in the chart on the next page.

The chart has the collective feedback from members of the Downriver Brewers Guild, the Ann Arbor Brewers Guild and the F.O.R.D. homebrew clubs. These were all compared within a week of each other. While there are a number of BJCP judges within these clubs, the experience ranged from beginner to pro. Some did not respond to each variable, so the numbers do not total the same in each category.

*Note: The stainless steel fermenter was used as the calibrator for all of the*

*judges*, as it fermented the hottest and finished with the lowest final gravity. Many commented on its extreme diacetyl flavor. The yeast (Ringwood) is notorious for this, and apparently the difference of just a few degrees significantly accentuated the production of this flavor.

### Glass Open Fermentation

Relative to the batch fermented in the stainless conical fermenter, the majority of tasters found the character of the batch fermented in the open glass fermenter to be equal in all respects except for fruitiness, which most tasters found more apparent in the open fermenter batch. This is not surprising, as pressure in the fermenter tends to suppress the production of esters. A number of tasters also noticed more pronounced malt character and body in the open fermenter sample.

### Plastic Fermenter

A majority of tasters reported more pronounced hop flavor and malt character in the plastic fermenter batch compared to the batch fermented in the stainless conical. Many tasters thought the batch from the plastic fermenter had more body and demonstrated more hop aroma as well.

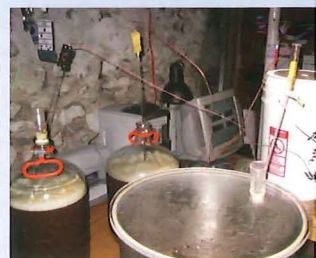
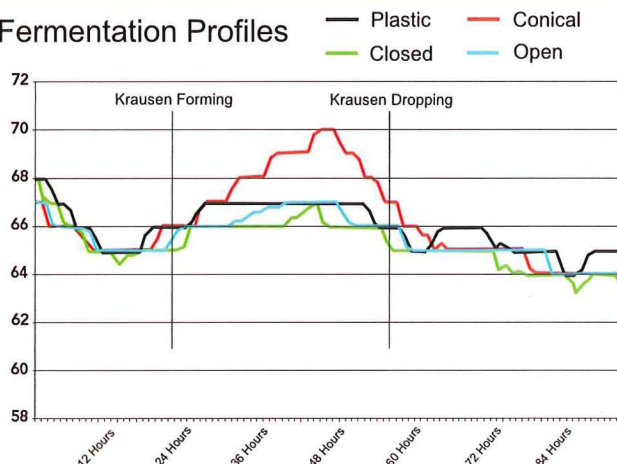
### Glass Closed Fermenter

Tasters found the batch fermented in the closed glass fermenter had more hop flavor and body than the batch fermented in the stainless conical.

### Calibration Notes

For the Calibration judges, including Houseman, Beth Zangari, Gordon Strong and Scott Bickham, two of them preferred

Fermentation Profiles





## Same Wort - Same Yeast - Different Fermenters

Homebrewers	Stainless	Glass – Open			Plastic			Glass – Closed		
	less equal more	less	equal	more	less	equal	more	less	equal	more
Hop aroma	calibrator	5	11	7	2	13	7	6	8	7
Hop flavor	calibrator	5	11	7	1	10	11	5	7	10
Malt character	calibrator	2	11	10	1	9	11	4	10	7
Body	calibrator	2	12	8	0	13	9	2	7	11
Sweetness	calibrator	6	10	7	6	10	6	7	7	6
Bitterness	calibrator	7	10	7	3	13	6	8	8	5
Fruitiness	calibrator	6	7	9	8	8	6	8	5	9

the beer fermented in the plastic bucket in a blind tasting of all four samples. "It was the driest and had the most hop profile," Strong commented.

"The finish has a balancing bitterness that is enhanced with a bit of the mineral quality characteristic of many British ales," noted Bickham. "The sample adheres the closest to the Special Bitter style due to better balance in the flavor and the finish."

Houseman rated the beer fermented in the open glass carboy the highest, calling it a "well balanced example of the style." He commented that it was "more malty" than the other examples. The beer fermented in the plastic bucket received Houseman's second-highest scores.

Zangari also praised the open glass carboy-fermented example as being "light, refreshing, balanced evenly between crystally toasted malt and earthy hop."

### Conclusion

So, what is learned? First, perception is a slippery concept. Even those with very refined palates can have differences of opinions. Again, while this work is hardly scientific, it did show that there are significant perceived differences in the measured variables between the fermenters.

There are a number of potential causal factors that could be at work here, such as:

- Exothermic heat dissipated differently

between fermenters due to differing materials of the fermenters (steel, glass and plastic).

- Pressure of CO<sub>2</sub> buildup during primary fermentation (open versus closed).
- Fermenter geometry—sloping conical presents more surface area for the yeast, which increases the exposed layer of yeast in the existing yeast bed.
- Oxygen uptake through plastic, and open fermenter versus sealed glass and steel.

For years I have encouraged homebrewers to play with each batch, whether utilizing different yeasts within the same wort, using different temperatures for fermentation, or just adding or reducing a single

ingredient to become familiar with its unique characteristic. I will continue to encourage this behavior and look forward to my next "experiment."

**Chris P. "Crispy" Frey is a member of the American Homebrewers Association Governing Committee, an active AHA Liaison, and a member of both the Ann Arbor Brewers Guild (AABG) and the Fermental Order of Renaissance Draughtsmen (F.O.R.D) homebrew clubs. He has presented at previous National Homebrewers Conferences on unique flavor profiles using different yeast strains in the same wort.**



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The

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OUTS

of Yeast Storage

By Dr. Maribeth Raines



**A**lmost every homebrewer has been faced with how to safely store yeast. An emergency arises and the brew day needs to be postponed, or you may just want the versatility to keep your own favorite strains on hand for brewing at the last minute. With the right information and handling, even new homebrewers can successfully store their yeast.

There are many different ways that brewing yeast can be stored. The most common methods used are summarized in Table 1. The choice of a method depends on how long the yeast needs to be stored and how much time, money, specialized equipment and space can be dedicated to yeast storage. The other issue is in regard to the risk of compromising the quality and subsequent performance of the yeast. The major concerns are that the yeast is free of bacterial and wild yeast contaminants, has good viability, and has not undergone any adverse genetic mutations that would affect fermentation performance or flavor profiles.

#### SHORT-TERM YEAST STORAGE

The most common yeast storage method is primarily for short-term storage (two to eight weeks) and is similar to those used in breweries where large volumes of yeast suitable for pitching directly into fermenters are stored as a slurry under water, beer or wort as cold as possible (32-38° F). These large volumes are harvested from previous fermentations, and ideally trub and hop particles are removed. Breweries typically harvest the middle third of the sediment where the bottom third contains trub and hop particles and the top third contains the less flocculent or less viable yeast.

It is a little more difficult for homebrewers to divide the yeast sediment from their fermenters since the geometry of the yeast cake is much different in a carboy than a conical fermenter. Personally, I try to resuspend only the top two-thirds of the slurry leaving residual sediment (primarily the trub) behind. Alternatively, the entire yeast cake can be resuspended and transferred to a clear jar or bottle and the yeast decanted after the trub and hop material have settled. It is important to remove the trub as it is a rich source of nutrients for bacterial growth during storage. Once the trub is removed, the yeast can be stored directly or washed further to remove residual beer. There is some controversy as to whether beer, water or wort should be used to resuspend, wash and store yeast slurries. Whichever you choose, it should be sterile to prevent additional contamination.

The key to successful storage of yeast slurries is minimizing yeast deterioration and glycogen store breakdown. These go hand-in-hand since the breakdown of glycogen stores weakens the cell wall of yeast making them more likely to lyse, or bust open. Yeast cell deterioration not only reduces the number of viable yeast cells, it also releases nutrients that microbes can feed on thereby increasing the likelihood of contamination.





Glycogen stores are made during the end of fermentation—the stationary phase. These glycogen stores are important in the early lag phase of fermentation and act as an energy supply. Just as sufficient oxygenation is important for fermentation, so are adequate glycogen reserves. Therefore conditions that lead to excessive degradation

of glycogen during yeast storage will not only accelerate yeast deterioration, but will also deplete glycogen reserves in the surviving yeast, thereby prolonging the lag phase in subsequent fermentations.

Factors that influence yeast deterioration and glycogen breakdown include time,

temperature, health of the yeast at time of storage, and the presence of CO<sub>2</sub> and oxygen. CO<sub>2</sub> generation can cause yeast toxicity and accelerate yeast deterioration and autolysis and therefore the vessel in which the yeast is stored should be vented. Oxygen, on the other hand, accelerates glycogen store degradation and should be minimized. Storing yeast in the bottom of the original carboy would therefore be detrimental to the health of the yeast.

Cold storage can minimize the breakdown of glycogen. Temperatures of 32 to 35° F are best but this is typically colder than most refrigerators. Ideally, yeast should be repitched within 48 to 72 hours with two weeks being the upper limit for reliable yeast performance. Depending on the yeast strain, as long as one to two months can be used if stored cold with a good layer of liquid on top. For these longer periods, I prefer using sterile brewing water (not distilled).

There are tales of much longer yeast slurry storage (as long as six months) but the risks of contamination and unpredictable fermentations increase with longer storage times and may be strain dependent. Excessive glycogen breakdown can be compensated for, to some extent, by overpitching and/or “feeding with fresh wort” prior to pitching. I prefer to feed any yeast slurry stored for more than a week with at least an equal volume of sterile wort once the slurry has warmed to room temperature. Most of the liquid stored on top of the slurry should be decanted and replaced with the sterile wort. If possible, this should be performed at least a day ahead of time. This simple feeding usually gives a good indication of whether the yeast is still viable.

It should also be pointed out that harvesting of yeast must occur when yeast has reached the stationary phase and glycogen stores have been synthesized and not started to break down; i.e. shortly after the terminal gravity has been reached. Also if you had poor fermentation performance in the last brew due to unhealthy yeast, repitching is not recommended as it may just amplify the problem. In summary, for yeast slurries, you should harvest healthy yeast shortly after terminal gravity is reached, wash the yeast to remove the trub, store at 32 to 38° F under water, use within one to



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**TABLE 1. YEAST STORAGE METHODS**

Method	Temperature	Shelf-life	Advantages/Disadvantages
Slurry with beer cover	32-38° F	2-5 days	Fast and easy; no feeding, questionable purity.
Slurry with sterile water cover	32-38° F	2-8 weeks	Tub needs to be removed, questionable purity; feeding recommended.
Liquid in beer	32-38° F	2-4 weeks	Convenient but low viability and genetic stability; questionable purity; requires propagation.
Yeast colony in water	Room temperature	1-2 years	Easy storage, very small quantity of yeast; extended resuscitation and propagation. Genetic stability unknown.
Agar plate	32-39° F	1-4 weeks	Pure cultures, unreliable shelf life; requires propagation and special equipment.
Agar slant	32-39° F	0.5-2 years	Easy, reliable, moderate genetic stability requires pure cultures, special equipment and propagation.
Agar stab	32-39° F	1-4 years	Easy, reliable, good shelf life, moderate genetic stability, but difficult to see yeast. Requires pure cultures, special equipment and propagation.
Frozen	-70 to -196° C	>5 years	Excellent shelf life and genetic stability. Requires pure cultures and special freezer or liquid nitrogen and propagation.

two months, warm to room temperature, and feed with an equal volume (or more) of sterile wort 24 hours before pitching.

#### LONG-TERM YEAST STORAGE

Prolonged storage of yeast requires purified cultures that can be stored as a liquid, frozen, dry or on solid media. The yeast must be resuscitated and propagated to appropriate pitching quantities; therefore sterile media and storage containers and aseptic handling conditions must be employed. For extended periods of time (years), frozen storage at ultra-low temperatures (-40 to -196° C) is the most reliable method and is used by most of the commercial yeast vendors and laboratories to store stock cultures of yeast. I have successfully stored cultures for over 15 years this way. Regular household freezers do not get this cold and have a frost-free warming cycle and therefore will not yield the same extended periods of storage as these ultra-low freezers. Freezing can be a viable option for storage but has not been the preferred method for homebrewers.

Yeast storage on slants or solid media is a common storage method among both homebrewers and professional brewers. Purified yeast cultures are stored on wort or laboratory media containing agar (1.5-2 percent) as a solidifying agent. The solid media can be prepared in petri dishes or test tubes. Agar plates allow for separation of yeast into distinct colonies, which allows for purification away from potential contaminating

yeast or bacteria. Plates are easy to work with as the yeast is readily visible and easily accessed. The main disadvantage of plates is that they are highly susceptible to mold contamination and the larger surface area allows for ample exposure to oxygen, significantly reducing the viability of the yeast over time. Although there have been claims of yeast being stored on plates for a year or longer, they are usually stable for only a month.

Yeast can be stored on agar slants in sealable test tubes for as long as one to two years in the refrigerator. Reculturing of the slants is recommended every four to six months, but the quality of the test tube and how good of a seal the cap forms may determine how long the yeast can be

stored. Indeed, a sterile overlay of mineral oil has been reported to extend the shelf life of a slant but this can be messy. Presumably the oil overlay helps keep the oxygen out, reducing glycogen breakdown.

A variation of the slant method of yeast storage that is used for long-term storage of bacteria, but can also be used for yeast, is a stab. Stabs contain semi-solid media where the yeast is introduced by inserting the inoculation loop into the agar rather than spreading across the surface. There is sufficient exposure to air for the yeast to grow in the stab but the overall exposure to air is less than a slant or a plate. I have successfully stored brewing yeast in the stab format in the refrigerator for over two years

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with no significant loss of viability. Again the type of test tube or bottle and how well it seals will impact how long the yeast cultures will remain viable.

There are reports of homebrewers storing yeast at room temperature in sterile distilled water. This is typically done with very small quantities of yeast; typically a single yeast colony is scraped into 1-2 milliliters of water. The key here appears to be that any trace of beer or propagation media must be removed. Although there are reports of storage for extended periods (one to two years), the number of yeast cells stored is extremely small compared to the other methods. Resuscitation of the dormant yeast could take significantly

longer than with other storage methods, which may increase the chances of bacterial contamination.

The nature of the media (wort versus laboratory media) used to store your yeast can also influence the storage life of the yeast. The same holds true for the liquid media used to resuscitate it. Although brewer's wort is commonly used, brewing yeast tends to grow slowly in wort and wort-based agar. Laboratory media such as YPD (yeast peptone dextrose) is also commonly used and although the brewing yeast grow well on YPD media, it does not contain the variety of sugars and other nutrients that are important for subsequent fermentation. This lack of wort nutrients can lead to

strain variability especially with respect to the loss of ability to grow and ferment certain sugars. It is for this reason that I prefer to use a modified YM media formulation (Table 2) since it contains dry malt extract as well as other components.

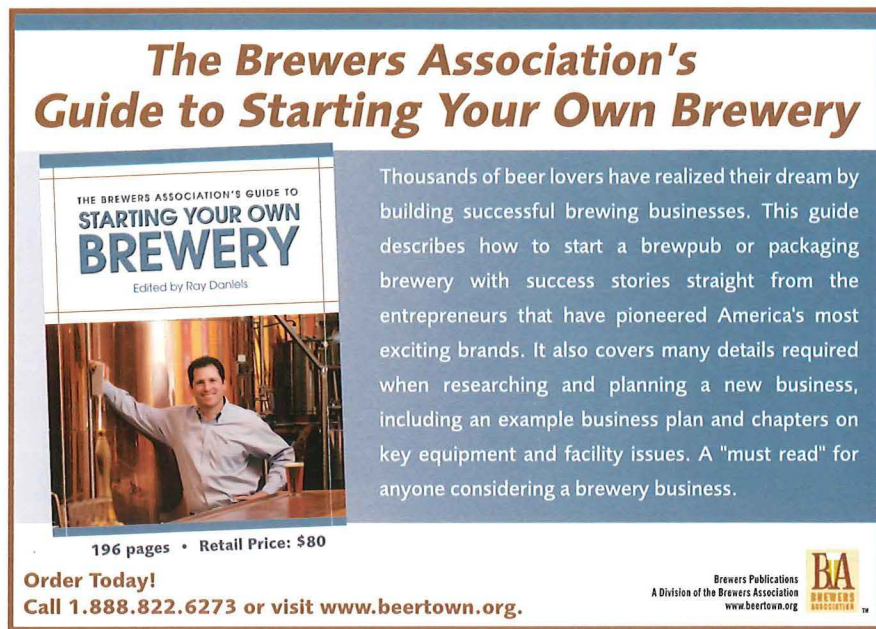
Laboratory grade peptone and yeast can be replaced with food grade brewing yeast nutrients (yeastex, Servomyces, Fermaid, superfood). Agar can be added to this media to prepare slants or stabs. Sterile tubes of the modified YM (5-10 milliliters) should be used to resuscitate yeast stored frozen or on plates, slants or stabs as it will grow faster than in wort and reduces the risk of microbial contamination. Additional propagation of the resuscitated 10-milliliter cultures, however, should be performed in brewer's wort to acclimate the yeast to fermentation conditions.

#### CONCLUSION

Homebrewers brew a variety of different beers, many of which require different yeast strains. Being able to store yeast for years rather than months allows homebrewers to maintain their own library of yeast strains, adding versatility to their brewing options. We are fortunate that commercial yeast vendors offer a diverse selection of yeast strains, so long-term storage is not the necessity that it once was. But there are still instances where commercial yeast strains are available only on a seasonal basis, or strains are isolated from other sources and must be stored for future use.

Commercially available yeast strains are typically liquid cultured and are stored dormant for some period of time and therefore may suffer from some of the same issues encountered with yeast slurries. In most cases, some resuscitation in wort is usually recommended for optimal fermentation performance. Freshly propagated yeast from a plate, slant or stab are actively growing and will produce good reliable fermentations when pitched at the proper levels.

Culturing your own yeast does have its drawbacks as it does take a considerable amount of time to prepare all of the storage and propagation media, requires investment in specialized equipment (pressure cookers, tubes, inoculating loops, etc.) and the risk of bacterial contamination is higher since the yeast is manipulated more. Advanced planning is







Examples of different types of media for agar plates.

also required since a seven- to 10-day lead time is usually necessary to propagate to pitchable quantities.

Irrespective of what source of yeast you use (commercial yeast, slurries or pure yeast cultures), all yeast is stored at some point. Understanding the basic issues surrounding yeast storage can help you make better decisions on how to handle your yeast so that you can maintain healthy, happy yeast, which will undoubtedly improve the quality of your fermentations and the beers that you brew.

**Maribeth Raines has a Ph.D. in biochemistry and has been homebrewing for 18 years. She developed the BrewTek line of yeast strains and other products including one of the first yeast culturing kits for homebrewers. She is also co-owner**



These two vials are slants, one uninoculated and one inoculated with mineral oil on top.

**and brewmaster for the Great Beer Company which produces Hollywood Blonde Kolsch style ale. She continues to be an active member in the Maltose Falcons Homebrewing Society.**

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**TABLE 2. YEAST STORAGE AND RESUSCITATION MEDIA FORMULATION**

### YM LABORATORY MEDIA

MEDIA and REAGENTS	Amount
Dry Malt extract .....	3.0 g
Glucose (same as Dextrose) .....	10.0 g
Yeast Extract .....	3.0 g
Peptone .....	5.0 g
Water .....	to 1000 ml
(Agar).....	18.0 g for plates
.....	9.0 g for stabs
adjust pH to 6.0	

### FOOD GRADE YM MEDIA

MEDIA and REAGENTS	Amount
Dry Malt extract .....	3.0 g
Glucose (same as Dextrose) .....	10.0 g
Food grade yeast nutrient (Yeastex) .....	5.0 g
Water .....	to 1000 ml
Food grade Agar .....	18.0 g for plates
.....	9.0 g for stabs
adjust pH to 6.0	

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# Totally *Twisted* Barleywines

Aitchies Imperial Brew Crew



Double Mash In - Double Devil Wine



Ingredients for Gonzo Hemp Poppy Spirit Wine





By Drew Beechum



Personally, I blame the heat. During the height of July, the San Fernando Valley transforms into a 350-square-mile frying pan peaking at record highs of 119° F. That kind of heat makes a man go addleheaded and soft in the head. Fortunately, touched men go where angels fear to tread. What happens when a brew kettle meets Bastille Day and the intense summer sun? Traditions fall by the wayside.

Each month my club stokes the fires to teach new brewers the art and obsession of fine beverages. At least that's the plan when we aren't derailed by life and the weather. Skipping the month of July was an unspoken and practical tradition until a hardy few braved heat stroke for the beer, and new celebrations were born. After all, from the brains of dummies come the rare gems that follow.

### Basic Barleywine and The Meaning of Alternative

Picasso remarked that before attempting cubism an artist should capably render the perfect still life. We won't go that far with brewing an alternative barleywine, but a grounding in the traditional style provides clues for playing with the norm.

In the latest Beer Judge Certification Program (BJCP) guidelines, barleywines cover a wide swath of the malt and hop spectrum. Dauntingly they are brewed as beers of might with malt backbones that resist all but the most ardent usage of bittering hops. Ruby red to almost deep black brown, barleywines carry an overloaded caramel flavor from groaning tuns full of barley malt and sugar. Powered by a hefty 7- to 12-plus-percent alcohol by volume, warming sensations beat the band and the cold of winter. Larger charges of bracing hops added to American versions counteract the sweeter finish of the English barleywines.

Reintroduced in the States by the pioneering Old Foghorn from Anchor Brewing, Barleywine-Style Ale (thanks ATF/TTB for the awkward name!) has become a mainstay of the craft beer world. While many craft brewers carry a barleywine in their lineups, following their adventurous hearts they have introduced variations on the style, including Golden Barleywines and the popular and line-blurring Double IPA.

Seeking a definition of "Alternative Barleywine," we set it as making strong beers grounded in the core ideas represented by barleywine—just twisted a touch. While plenty of beers, especially Belgians, match its strength, we looked to make beers with different ingredients and a spin into new presentations. Substitutions of ingredients led to Rye and Wheat Wines; strange additions of herbs, spices and spirits resulted in the head spinning Gonzo. Do lagers count? We present one for your approval.



Many of the following recipes were adapted from previous non-monsterized attempts. The Summer Time Wheatwine was based on my standard American Honey Wheat Ale, for example. Digging through your recipe library can provide inspiration for an alternative barleywine.

## Bastille Day Ryewine/ Rye Saison

Maltose Falcons' Grand Hydrometer Cullen Davis, my partner in beer crime, hatched a Bastille Day (July 14) brew celebration in 2002. Intuitively, our brains ran to the one French style of beer that we drank, *Biere de Garde*. In those days before Phil Markowski's excellent treatise, *Farmhouse Ales*, our information on the style was sketchy at best. With a sudden drying up of

the commercial *Biere de Garde* supply in the Los Angeles area, we lacked a ready source for a true blue yeast. If only we'd known we could use a lager strain!

Undaunted, Davis quipped that we should keep things French and just make a wine. For two guys in a club with a quippy name, the pun was a natural—barleywine! Taking advantage of his recent experiments and its purported origins on the French-German border, he decided to use rye malt as the added Francophilic touch. Crossing borders to the North, we tipped our hat to the original plan and made a Rye Saison from the rich second runnings.

Sitting on a base of two-row malt was a dangerously tacky 25-percent portion of

rye, flaked and malted. With only a small addition of Crystal 75L to boost the color, the runnings were brick red and sticky sweet while running slick and oily on the fingers. To prevent a problematic lauter, the mash was rested at 124° F before a saccharification rest of 154° F with a slow sparging following. A mix of low cohumulone American hops broke the beer with a smooth but insistent bitterness. The Saison's gravity got a boost from a pound of dark candi sugar. Our initial calculations planned for beers starting at 1.090 and 1.060 and yielded even better gravities of 1.098 and 1.067.

While the Rye Saison has long been relegated to Beer Valhalla, the last gallon of Bastille Day Ryewine ages in the keg, except the glass before me. Even five years on, the rye continues to shine as a spicy and slick malt presence before a mellowed hop bite rises like a toothless but meanly insistent junkyard dog.

## Bastille Day Rye Wine/Rye Saison

### Ingredients

for 5.5 U.S. gallons (21 liters) of rye wine and 5.5 U.S. gallons (21 liters) of rye saison

**23.0 lb** (10.5 kg) Domestic two-row pale malt  
**6.0 lb** (2.7 kg) Rye Malt  
**2.0 lb** (0.9 kg) Flaked Rye  
**1.0 lb** (0.5 kg) Crystal 75L

### Additional Sugar for Saison

**1.0 lb** (0.5 kg) Dark Candi Sugar

### Rye Wine Hops

**1.0 oz** (28 g) Crystal Pellet 2.1% First Wort Hop  
**1.25 oz** (35 g) Warrior Pellet 15.0% 60 minutes  
**1.0 oz** (28 g) Amarillo Pellet 8.4% 20 minutes  
**1.25 oz** (35 g) Simcoe Pellet 13.4% 2 minutes

### Saison Hops

**1.5 oz** (42 g) Styrian Goldings Pellet 5.25% 60 minutes  
**0.5 oz** (14 g) Saaz Pellet 3.5% 5 minutes

### Rye Wine Yeast

White Labs 001 California Ale or Wyeast 1056. Slurry from a previous batch preferred.

### Saison Yeast

White Labs 565 Belgian Saison fermented at 80° F (27° C).



### Rye Wine

**Original Target Gravity: 1.098**  
**IBUs: 84**

### Rye Saison

**Original Target Gravity: 1.067**  
**IBUs: 31**

### Directions

Strike with 8 gallons of water to rest for 30 minutes at 124° F (51° C). Raise to a rest temperature of 154° F (68° C) for 60 minutes. Collect the first 6.5 gallons of runoff and boil for the barleywine. Collect the second 6.5 gallons to make the saison. Add the sugar to boost the strength.

**Extract Substitution:** Unless you can find some rye malt extract, this recipe will be difficult to emulate with extract due to the large quantity of rye used.

## Summer Time Wheatwine

Bolstered by the results of our rye beer, we decided to switch up the grain and build a barleywine of golden sheaves of wheat. As we tapped the keg of Bastille Day, the brewers assembled a pale mash of imperialized American wheat beer. A single infusion mash converted the Great Western Two Row and Gambrinus Wheat Malt into a honey aided 1.084 pale yellow monster.

Departing from the usual hop loaded nature of our alternative barleywine experiments, the Wheatwine brew used a mix of American and German noble hops. Later attempts with the brew substituted more aggressive West Coast hops and a larger IBU loading with spectacular results.

Unbelievably, the Summer Time Wheatwine was in the keg and ready to drink in a month. Word of advice, though—a wheatwine may not be the best choice for a late summer beach party. The deceptive strength of such an easy drinking, smooth and slightly sweet pint sneaks up on celebrants like a wheaty ninja.

## Aitchie's Imperial Pilsner/Bohemian Pilsner

The Falcons turned a creaking 30 years old in 2004 and in celebration we dropped



a slate of large beers for the club's anniversary party in September. The last brew day of course fell in July. Inspired by Falcon John Maier and Rogue Brewing's 2003 re-release of the Morimoto Imperial Pilsner, John Aitchison, resident Pilsner fiend, whipped up an Imperial Pilsner and a small Bohemian Pilsner.

Never one to make an easy brew day, even in the murderous sun, Aitchison split the brew into two five-step mash regimes. One mash was a traditional decoction mash with the other using a HERMS to re-circulate and raise the mash temperatures. The mash schedule is an award-winning process based on Aitchison's notes from the brewers of the classic Pilsner Urquell.

To compensate for the complicated mashing and boiling schemes, Aitchison proffered the simplest grain bill imaginable, 100-percent Moravian Pilsner Malt. The hop bills followed suit. To match Rogue's efforts, the Imperial Pils received doses of Sterling pellets while the Bohemian got pure Saaz.

Once both beers were conditioned and ready to go, Aitchison held a blind tasting to determine if the flavor impact of the different mashes was noticeable. The panels could not detect discernable differences between the two versions of the Imperial Pilsner. Tasters did prefer the decoction mash-produced Bohemian Pilsner.

### Double Devil Wine

Randy Mosher's 2004 release *Radical Brewing* lit a fire under the homebrewing world. Blazing bright among the local crew was his description of an old English technique, Doble Doble brewing. In it the first runnings of a strong mash are used to strike a second mash. The liquor from this second mash is lautered as usual with a long boil to concentrate the wort and make an outrageously excessive and wasteful beer.

The Double Devil Wine started with a whopping 55 pounds of Belgian Pale Ale Malt in the first mash. After an hour's rest at 150° F, the mash was drained and sparged to collect 15 gallons of runnings. We cleared the mash tun of old grain and

## Summer Time American Wheat Wine

### Ingredients

for 5.5 U.S. gallons (21 liters)

<b>7.75 lb</b>	(3.5 kg) Domestic two-row pale malt
<b>7.75 lb</b>	(3.5 kg) Canadian Wheat Malt
<b>0.25 lb</b>	(0.1 kg) Vienna Malt
<b>0.25 lb</b>	(0.1 kg) Honey
<b>0.75 oz</b>	(21 g) Santiam Pellet 6.8%, First Wort Hopped
<b>1.75 oz</b>	(49 g) Liberty Pellet 6.8%, 60 minutes
<b>0.50 oz</b>	(14 g) Tettnang Pellet 4.5%, 20 minutes
<b>0.75 oz</b>	(21 g) Liberty Pellet 6.8%, 0 minutes
	WLP001 California Ale yeast

**Original Target Gravity:** 1.081  
**IBUs:** 39

### Directions

Strike with 4.25 gallons to rest for 60 minutes at 150° F (65° C).

**Extract Substitution:** Replace grains with 13.25 lb liquid wheat malt extract (we recommend you use a quality brand extract such as Muntons, Coopers or Briess). Mix extract and honey in 2 gallons of warm water, add first wort hops then bring to a boil. Use 3.5 oz of Liberty hops for the 60 minute addition. Follow your usual procedure for the rest of the recipe.

## Aitchie's Anniversary Imperial Pilsner/ Bohemian Pilsner

### Ingredients

for 5.5 U.S. gallons (21 liters) of Imperial Pilsner and 5.5 U.S. gallons (21 liters) of Bohemian Pilsner

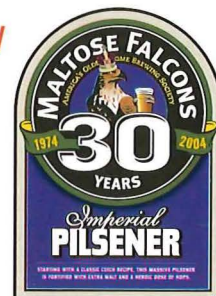
<b>24.0 lb</b>	(10.9 kg) Moravian Pilsner Malt
<b>Hops-Imperial Pilsner</b>	
<b>2.0 oz</b>	(56 g) Sterling Pellet 6.5%, 60 minutes
<b>0.5 oz</b>	(14 g) Sterling Pellet 6.5%, 15 minutes
<b>0.5 oz</b>	(14 g) Sterling Pellet 6.5%, 5 minutes
<b>2.0 oz</b>	(56 g) Sterling Pellet 6.5%, Dry Hop
<b>Hops-Bohemian Pilsner</b>	
<b>4.0 oz</b>	(113 g) Saaz Whole 3.0%, 60 minutes
<b>0.5 oz</b>	(14 g) Saaz Whole 3.0%, 5 minutes
	Wyeast 2278 Czech Pils yeast

### Imperial Pilsner

**Original Target Gravity:** 1.080  
**IBUs:** 60

### Bohemian Pilsner

**Original Target Gravity:** 1.056  
**IBUs:** 36



### Mash Schedule

Acid Rest .....	95° F .. (35° C)....	10 minutes
Protein Rest ..	125° F .. (52° C)....	10 minutes
Beta Rest .....	148° F .. (64° C)....	10 minutes
Alpha Rest .....	153° F .. (67° C)....	10 minutes
Mash Out .....	165° F .. (74° C)....	10 minutes

### Directions

Collect the first 6.5 gallons of runoff and boil for the Imperial Pilsner. Collect the second 6.5 gallons to make the Bohemian Pilsner.

**Imperial Pilsner Extract Substitution:** Replace grains with 9.5 lb extra light dry malt extract. Stir extract into 2 gallons of warm water then bring to a boil. Increase 60 minute hops to 3.25 oz. Follow your usual procedure for the rest of the recipe.

**Bohemian Pilsner Extract Substitution:** Replace grains with 6.75 lb extra light dry malt extract. Stir extract into 2 gallons of warm water then bring to a boil. Increase 60 minute hops to 6 oz. Follow your usual procedure for the rest of the recipe.

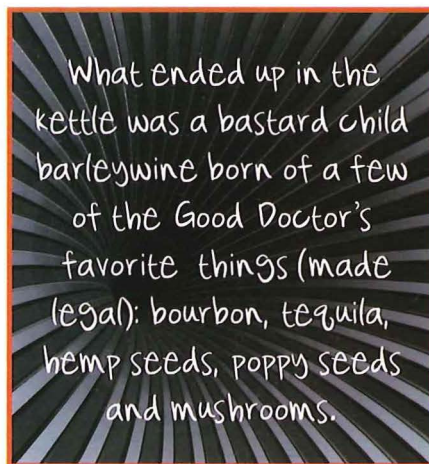


returned the first runnings to the kettle. The sugary strike liquid was heated to infuse a second mash of 54 pounds of two-row and flaked oats.

The resulting wort had 8 pounds of turbinado sugar added to boost gravity and shorten our boil time, a righteous consideration in the 100° F heat! Even with the sugar addition, we fell far short of our target original gravity. Speculation has laid the

blame with either poor lautering control or an inherent inefficiency in the process. Regardless, we brewed 21 gallons of the Devil at a resounding 1.115 original gravity. The second mash was sparged again to produce 9 gallons of "small" Half Satan Lemon Pale Ale, which started life at a modest 1.070.

When the Double Devil was tapped at our annual Oktoberfest party the ruby hued



## Double Devil Barleywine/Half Satan Lemon Strong Pale Ale

### Ingredients

for 5.0 gallons (19 liters) Double Devil Barleywine and 5.0 gallons (19 liters) Half Satan Lemon Pale Ale

#### First Mash

13.75 lb (6.2 kg) Dingeman's Two-Row Pale Malt

#### Second Mash

12.5 lb (5.7 kg) Domestic Two-Row Pale Malt

1.0 lb (0.5 kg) Flaked Oats

#### Sugar Additions for Double Devil Barleywine

2.0 lb (0.9 kg) Turbinado Sugar

#### Sugar Additions for Half Satan

1.0 lb (0.5 kg) Turbinado Sugar

1.5 lb (0.7 kg) Pale Malt Extract

#### Hops for Double Devil Barleywine

1.25 oz (35 g) Columbus Pellet 15.5%, FWH

1.75 (49 g) Centennial Pellet 7.5%, FWH

2.0 (56 g) Warrior Pellet 17.4%, 90

0.75 (21 g) Chinook Pellet 15.9, 60

0.75 (21 g) Chinook Pellet 15.9%, 45

1.0 (28 g) Centennial Pellet 7.5%, 30

1.0 (28 g) Columbus Pellet 15.5%, 15

1.0 (28 g) Centennial Pellet 7.5%, 1

1.0 (28 g) Columbus Pellet 15.5%, 1

#### Hops for Half Satan Strong Pale Ale

0.50 (14 g) Amarillo Pellet 10%, FWH

0.50 (14 g) Amarillo Pellet 10%, 60

0.75 (21 g) Palisade Pellet 9.4%, 30

0.50 (14 g) Amarillo Pellet 10%, 1

1 tsp Dried Lemon Peel added at knockout.

White Labs WLP001 California Ale or Wyeast 1056 Chico Ale

#### Double Devil Barleywine

Original Target Gravity: 1.115

IBUs: 72

#### Half Satan Lemon Pale

Original Target Gravity: 1.070

IBUs: 31

#### Mash Schedule

1st Mash Sac Rest—149° F (65° C) 60 minutes 15 gallons strike water.

2nd Mash Sac Rest—155° F (68° C) 50 minutes 15 gallons of 1st mash liquor.

Mash Out—168° F (76° C) 10 minutes.

#### Double Devil Barleywine Extract

**Substitution:** Substitute 10.5 lb of extra light dry malt extract for grains and oats. Mix extract, sugar and first wort hops with 2.5 gallons of warm water then bring to a boil. Follow your usual procedure for the rest of the recipe.

#### Half Satan Strong Pale Ale Extract

**Substitution:** Substitute 6.5 lb of extra light dry malt extract for grains. Mix extract, sugar and first wort hops with 2 gallons of warm water then bring to a boil. Increase 60 minute hop addition to 1.25 oz. Follow your usual procedure for the rest of the recipe.

brew was poured through a homemade Randall the Enamel Animal stuffed with Centennial and Columbus hops. The last minute infusion put the beer over the top and caused fainting fits. Revelers reported vague recollections of demonic laughter and burning embers of brimstone.

### Gonzo Hemp Poppy Spirit Wine

The late, great Hunter S. Thompson continues to serve as an inspiration for countless misadventures. The AHA has even had a conference named for his seminal gonzo work, *Fear and Loathing in Las Vegas* ("Beer and Loafing in Las Vegas," the 2004 National Homebrewers Conference). Rumor has it that Thompson dabbled in homebrewing.

In the spring of 2005, I was planning a variation of a Best of Show winning barleywine (Fat Man Barleywine) when the news of Thompson's suicide blasted through the gonzo nation. The waves washed out my original plan and left a memorial in its place. What ended up in the kettle was a bastard child barleywine born of a few of the Good Doctor's "favorite" things (made legal): bourbon, tequila, hemp seeds, poppy seeds and mushrooms.

The original batch was brewed in a hurry and presented to acclaim and rapid depletion at the 2005 Southern California Homebrewer's Festival. What should have been a train wreck of competing flavors and textures was instead shepherded by the Great Omnipotent Gonzo Fist into an intense yet approachable barleywine.

Encouraged by success, my cohort Jonny Lieberman and I tweaked the initial recipe to produce a drier and crazier



version of the brew for the 2006 Alternative Barleywine.

We built the beer on a bed of domestic two-row and imported Maris Otter to cross the British malt's complexity with the crispness of the home product. Blending a medium Crystal with Munich, Biscuit and Special B bolstered the body for the bracing (85 IBU) dose of American hops. Dried shiitake mushrooms hydrated in a blend of bourbon, tequila and Coca-Cola for an hour before being wrung out and discarded. The weird mélange of liquids and hemp and poppy seeds hit the kettle just before knockout.

## Gonzo Hemp Poppy Spirit Wine

### Ingredients

for 5.0 U.S. gallons (19 liters)

<b>8.00 lb</b>	(3.6 kg) Domestic Two-Row Malt
<b>7.50 lb</b>	(3.4 kg) Maris Otter Malt
<b>0.75 lb</b>	(340 g) Crystal 40L
<b>0.33 lb</b>	(149 g) Munich Malt
<b>0.33 lb</b>	(149 g) Biscuit Malt
<b>0.25 lb</b>	(113 g) Special B Malt
<b>0.12 lb</b>	(54 g) Acidulated Malt (Sauer Malt)
<b>0.50 lb</b>	(226 g) Agave Nectar
<b>0.75 lb</b>	(340 g) Brown Sugar
<b>1.05 oz</b>	(29 g) Warrior Pellet 16.0%, 60 min
<b>0.55 oz</b>	(15 g) Columbus Pellet 16.7%, 30 min
<b>0.90 oz</b>	(25 g) Palisade Pellet 9.1%, 10 min
<b>0.50 oz</b>	(14 g) Amarillo Whole 9.5%, 0 min (Bag)
<b>0.50 oz</b>	(14 g) Cascade Whole 6.5%, 0 min (Bag)
<b>2.0 oz</b>	(56 g) Amarillo Whole 9.5% Hopback
<b>1.5 oz</b>	Bourbon
<b>1.5 oz</b>	Tequila
<b>0.5 oz</b>	Coca-Cola
<b>2</b>	Dried Shiitake Mushrooms
<b>2 T</b>	Hemp Seeds (Whole Foods/Health Stores)
<b>1 T</b>	Poppy Seeds
	WLP001 California Ale or Wyeast 1056 or Wyeast 1728 Scottish Ale

### Conclusion

We've barely touched the outskirts of the barleywine fringe movement. What lies at the core is for us all to discover. What different grains can go in the brew? Spelt? Quinoa? New herbs, spices? Space hops? Mosher's command to brew with reckless abandon stands. So if you've got an idea, mangle and wrestle it into the frying pan and shout it out!

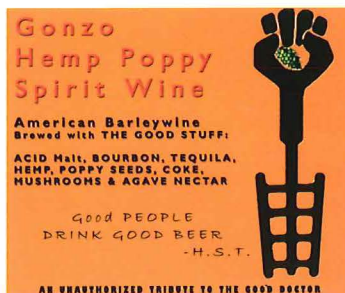
**Drew Beechum is a former president of the Maltose Falcons, America's oldest homebrew club. He lives in Los Angeles, Calif. When not busy playing with computers for pay, he plays with beer.** ☺

**Original Target Gravity: 1.090**

### Directions

Mash with 5 gallons of water at 150° F (65° C) for 90 minutes. Combine the liquids and mushrooms in a glass and let soak for an hour. Just prior to knockout, remove the mushrooms and squeeze the liquid from the mushrooms back into the glass. Add the liquids and seeds to the kettle at knockout.

**Extract Substitution:** Steep crystal, biscuit and special B malts in 2 gallons of 150° F (65° C) water for 30 minutes, sparge with 0.5 gallon of 170° F (77°) water. Stir in 10.5 lb of light liquid malt extract (we recommend you use a quality brand extract such as Muntions, Coopers or Briess), agave nectar and brown sugar. Bring to a boil and add 2 oz of Warrior hops. Follow recipe for 30, 10, and 0 minute hop additions. Stir in liquid from mushroom mixture along with the seeds. Strain through 2 oz of Amarillo hops into fermenter with 3 gallons of cold water, top up to 5 gallons if necessary.



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*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 at least the rank of Master in the Beer Judge Certification Program. Each issue they will score two widely available commercial beers (or meads or ciders) using the BJCP scoresheet. We invite you to download your own scoresheets at [www.bjcp.org](http://www.bjcp.org), pick up a bottle of each of the beverages and judge along with them in our Commercial Calibration.*



We decided to shift gears this issue, and with the International Mead Festival looming as we went to press (it was held February 9-10 in Lakewood, Colo.), mead was on our minds. Our judges were treated to two fine examples, the Juniper Mountain Honey Wine from Redstone Meadery in Boulder, Colo., and the Apple Cyser from Rabbit's Foot Meadery in Sunnyvale, Calif.

Mead has a romantic notion to it as an "elixir of the gods," and legend has it that the word "honeymoon" is derived from an ancient tradition of sending a newly married couple into seclusion for a month with mead in order to ensure their best chances of starting a family, according to the Redstone Web site. "Mead has been, and still is, considered the drink of love," the site says.

The Juniper Mountain Honey Wine is one of Redstone's bestsellers, made with two parts Orange Blossom honey and one part Desert Blossom honey. It is medium dry in sweetness and fermented with juniper berries. It is 12-percent alcohol by volume and each bottle is dated. The one our judges sampled was dated August 30, 2004.

Our expert panel praised the Juniper Mountain Honey Wine for its subtle juniper notes, with one judge calling it "dangerously drinkable." Redstone suggests serving it in a 6-ounce wineglass.

The Rabbit's Foot Apple Cyser is a blend of apples and honey making a 7-percent alcohol by volume mead. Selected apple juices and wildflower honey from Oregon are combined into a light-colored cyser. Our judges found it to be refreshing and drinkable with a pleasant tartness.

The Rabbit's Foot Web site suggests serving it extra cold in a pint glass, saying, "It makes an excellent beverage for those hot days of summer." It also suggests mixing half and half with Guinness for "an excellent black velvet."

"More so than the 'terroir' for grape wine, the character of mead and cyser comes directly from the honey itself," according to Rabbit's Foot. "This essence is derived from the type and quality of the floral sources in the region that the bees work. Our goal is to produce meads that reflect the character of that honey and in some cases augment them with complementary things such as oak or fruit and spices."

It's important to note that a judging scoresheet for mead is different from a beer scoresheet, as mouthfeel is not included as a separate item on a mead scoresheet. Instead, comments on mouthfeel are included in the flavor section.

Our expert panel includes David Houseman, a Grand Master III judge and competition director for the BJCP from Chester Springs, Pa.; Beth Zangari, a Master level judge from Placerville, Calif. and founding member of Hangtown Association of Zymurgy Enthusiasts (H.A.Z.E.); Scott Bickham, a Grand Master II 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 III judge and principal author of the new BJCP Style Guidelines who lives in Beavercreek, Ohio.



## ON THE WEB

### Redstone Meadery

[www.redstonemeadery.com](http://www.redstonemeadery.com)

### Rabbit's Foot Meadery

[www.rabbitsfootmeadery.com](http://www.rabbitsfootmeadery.com)

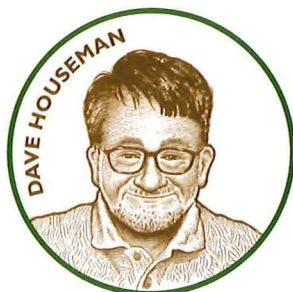
### BJCP Style Guidelines

[www.bjcp.org](http://www.bjcp.org)





## THE JUDGES' SCORES FOR JUNIPER MOUNTAIN HONEY WINE



**Aroma:** Fragrant spicy, herbal aroma from juniper is dominant up front, coming through as licorice and anise—reminds me somewhat of Absinthe. Sweet, honey aroma is very well presented with notes of orange blossoms. There are hints of a buttery, caramel character. This is a very pleasant and complex aroma. (8/10)

**Appearance:** Clear with some dull haze. Still, as expected. Definite meniscus with long-lasting legs, indicating the strength of this mead. Golden yellow color has a tinge of green; a byproduct of the juniper? (4/6)

**Flavor:** Wonderful rich expression of sweet, orange-blossom honey. Not cloying but on the sweet end of semi-sweet. Very well balanced with both light acidity and fine tannin astringency aiding in mouthfeel. Juniper adds bright, spicy/herbal notes of anise and licorice. It's not a piney, evergreen or gin-like character as one might expect from the source. The flavor coordinates well with the honey sweetness. Finishes sweeter than semi-sweet would indicate. Honey is really evident mid-palate, herb is dominant up front while acidity seems to linger in the finish. (21/24)

**Overall Impression:** A pleasure to drink, primarily as a slow sipping mead. This mead has aged very well over its two-and-a-half-year lifetime, mellowing to well-balanced and appealing as an aperitif, to be enjoyed with a pear torte for dessert, or just on its own because you like excellent mead. (9/10)

**Total Score: (42/50)**



**Aroma:** Pronounced honey sweetness, but not really identifiable as a variety. Subdued orangey citrusy note comes forward, then fades to earthy as the beverage warms a bit. (7/10)

**Appearance:** Straw with a hint of chartreuse. Clear, not brilliant. Still. "Legs" left on the sides of the glass. (6/6)

**Flavor:** Honey sweetness is like a dip in a honey pot; citrus type acidity and low-level tannic expression balances, but not much flavor of juniper berries. Subtle orange blossom flavor with note of sherry in the finish comes across like orange hop-scotch ice cream or two-tone bars. Alcohol character is balanced, not hot. Still, full mouthfeel. Finish clean and sweet, not cloying or sticky. The honey character is delicious, but earthy expression of juniper berries is barely detectable. (18/24)

**Overall Impression:** The orange blossom honey flavors are dominant and lovely; balanced toward the sweet side, with an acidity that keeps the finish from being cloying. Stronger juniper berry might detract from the honey expression. Perhaps this was more prevalent when the beverage was younger, and since it is listed as an ingredient, I expect more. The subtle earthy character brings to mind a balmy spring evening, a gentle breeze with a hint of chill that carries the aromas of freshly turned soil and a newly mowed lawn. A lovely after dinner nip. (8/10)

**Total Score: (39/50)**



**Aroma:** Sweet honey aroma with distinctive orange blossom notes. This honey smells very fresh without any noticeable oxidation or mustiness. Juniper is present but subtle, leaving an emphasis on the honey. The fermentation character is neutral, with modest ethanol and very low levels of higher alcohols. (8/10)

**Appearance:** Light straw color, and clarity is nearly brilliant. There is not even a wisp of carbonation. It leaves a series of alcohol legs when swirled in the glass. (6/6)

**Flavor:** This is a complex mead with several layers of flavors. The honey comes through initially with orange and citrus notes, then the juniper berries emerge and become much bolder than I expected from the aroma. The combination of juniper and alcohol recalls gin and perhaps even tonic had this been carbonated. The finish has noticeable tannins and a little astringency from the alcohol and berries, but it is not unpleasant and helps balance the sweetness from the residual sugars. (21/24)

**Overall Impression:** This is an excellent mead that is dangerously drinkable. The flavors seem to evolve with each sip, and the balance among honey, acidity and tannins is superb. The finish is on the dry side of semi-sweet, but that is probably the right call. (9/10)

**Total Score: (44/50)**



**Aroma:** Strong honey nose with distinctive orange blossom notes. Moderate sweetness. Nice floral qualities. Nothing off. Not much juniper (good...), but has an extra layer of complexity. Moderate alcohol but not hot. Wonderful honey expression. A touch waxy. (9/10)

**Appearance:** Mostly clear but has a little haze. Still. Deep straw color; not quite yellow. (5/6)

**Flavor:** High honey flavor—orange blossom and other, slightly dusty honey flavor (presumably Desert Blossom). Moderate sweetness with off-dry finish and moderately high acidity. Juniper must be adding a rounded flavor complexity since it isn't overtly identifiable, but the mead has more than the stated simple honey flavors. Alcohol is warming but not hot. The acidity makes the finish a bit short but the honey flavor lingers. Medium body and medium-low tannin. (20/24)

**Overall Impression:** Honey quality and age character are superb. Juniper is subtle and adds a great background character, as it should be. Honestly, I was a bit scared of the name but it's really very good. I couldn't imagine a gin-like mead but this comes off as a complex varietal mead with a great honey presence. Would be a great aperitif since it has a high acidity level and moderate sweetness, sort of like a German Riesling. (9/10)

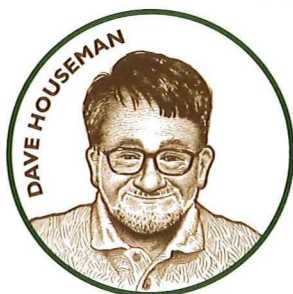
**Total Score: (43/50)**





**Apple Cyser**—Rabbit's Foot Meadery, Sunnyvale, Calif.  
BJCP Category: 25A Cyser, Still/Hydromel/Semi-Sweet

## THE JUDGES' SCORES FOR RABBIT'S FOOT APPLE CYSER



**Aroma:** Light honey aroma with a more pronounced expression of fruity apples. Some sulfur notes. No diacetyl. No phenolics. Alcohol is there but very subtle and unassuming. No oxidation. Crisp aroma that's very inviting. (7/10)

**Appearance:** Bright, if not brilliant, clarity. Thin legs fall smoothly back into the rich golden liquid. Still, as expected. No defined meniscus, indicating a smaller mead, a hydromel. This is a very pretty mead. (6/6)

**Flavor:** Light, refreshing, fruity and slightly tart. Semi-sweet as advertised. Low alcohol with no hot alcohol notes. Honey is not particularly assertive but the apple flavor is reminiscent of a green Granny Smith with a hint of sulfur. No phenols. No diacetyl. No oxidation. Body is thin, as appropriate for a hydromel but finishes with a bit of mouth-filling tannin astringency. Balance is toward acidity—accentuating the sense of apple crispness. (20/24)

**Overall Impression:** The apple character is much more assertive than the expression of honey. A bit more balanced presentation would better fit the style. However, this is still a very drinkable cyser that is comparable to a moderately sweet, fruity Gewurztraminer. This goes very well with a baked, ripe Brie en Croute. I'd recommend this to anyone who enjoys white wine as a great alternative. (7/10)

**Total Score: (40/50)**

**Aroma:** Prominent apple, sweet and sharp varieties like Gravenstein and Braeburn. Low cinnamon spicy note. Honey aroma quite subdued; no fusel or alcoholic notes. As it warms, honey comes forward, but is still subdued. (6/10)

**Appearance:** Light straw with fine mist of bubbles, likely from agitating the bottle; quickly falls still. Some "legs." Brilliant clarity. (6/6)

**Flavor:** Sweet at first, then has pronounced fruit acidity. Honey note comes in mid-palate, but overall flavor is more of cider than of honey. Neither honey nor apple variety is discernable in the flavor, but neither is declared on the label. Subtle flower "pollen" quality, like apple blossom, but flavor. Long lasting clean tartness in the finish. Body is light and still. No alcoholic warmth. Tart, back-of-the-cheek, corner-of-the-mouth lingering finish diminishes after a couple of minutes. (17/24)

**Overall Impression:** More reminiscent of a Chenin Blanc than a mead; definitely more pronounced cider character. Pleasant "no frills, no spills" Tuesday evening beverage, or a summer picnic treat. The balance of fruit and acidity is refreshing, with a moderate alcohol content that delivers a session drinkability. Pairs well with gorgonzola and freshly baked bread—still warm from the oven, or toast, of course. (8/10)

**Total Score: (37/40)**

**Aroma:** Dessert apples with a hint of sulfur and some alcohol in the background. The honey is well concealed. It has an interesting oak/wood character that adds complexity. Some acidity becomes apparent as it warms. (7/10)

**Appearance:** Crystal clear with just a wisp of carbonation. The color is a very pale gold and looks quite enticing. (6/6)

**Flavor:** The focus is on the apples, with a good blend of tartness, apple flavor and tannins. Alcohol is apparent in a long, fairly dry finish. The honey flavor is very understated and apparently primarily serves to boost the alcohol a notch. Background flavors include a slight oak character and hints of vanilla and pear. Some tannins linger in the finish, along with a slight alcoholic warmth. The acidity is a little mouth-puckering, like green apple-flavored candy. (18/24)

**Overall Impression:** This is an enjoyable cyser that would go well with many cheeses and meat dishes. More residual honey character would provide complexity, and a less tart apple blend would soften the finish. The toasted oak and vanilla flavors add an exotic complexity that helps distinguish this mead. (7/10)

**Total Score: (38/50)**

**Aroma:** Tart apple cider-like aroma with a light honey sweetness. Aged apple character hints of Calvados. Light spice—cinnamon? Generally clean. Honey character is subtle; most of the nose is apple-derived. (7/10)

**Appearance:** Medium yellow color. Crystal clear. Still. Very attractive. (6/6)

**Flavor:** Off-dry, wine-like, with a definite honey and apple flavor; very evenly balanced. The tartness of apples balances the sweetness of honey. Like a strong cider but with a rounded mouthfeel from the honey. Still. Medium-full body. Finishes rather full, not crisp. Subtle apple flavors, light tannin, no flaws. Just enough alcohol to know it's there, but very light. (17/24)

**Overall Impression:** Could have more apple complexity. Seems simple, like McIntosh or Honey Crisp apples. Good apple-honey balance (both in flavor and in sweet-tart balance). Light, as a hydromel should be. More refreshing when well-chilled, but the cold temperature kills the flavors making it seem more like a wine cooler or a Chenin Blanc. Simple, light, no flaws, well balanced, but subtle since it's a hydromel. (7/10)

**Total Score: (37/50)**





# The Pleasures of Comfort Beer

There are few beers brewed in the world that I would consider comfort beer. There are beers that refresh. There are beers that relax, beers that complement, beers that excite, beers that bring smiles, beers that are arrogant. But comfort beers are few and for the most part become very special personal experiences.

For me, the aroma of a wood fire is one of the most warming and comforting feelings I know. When the experience of beer and smoke came together for me in 1979, it helped change my view of beer forever.

That year I discovered Michael Jackson's original edition of *The World Guide To Beer*. I distinctly recall how curious I became while reading about a German style of beer called rauchbier or "smoke" beer. Divine beer experiences more often than not have become a way of life, but I was not aware of beer's attraction to me then. Within six months of having read Jackson's book, I received a package in the mail from Germany, sent by one of my former homebrew students. Among the five half-liter bottles of beer was a bottle of Schlenkerla Rauchbier from the town of

Bamberg. These were the first German beers I had ever seen in real life, other than Beck's or St. Pauli Girl lagers that were noteworthy at the time. Schlenkerla was already legendary in my mind thanks to Jackson's book. *(continued on page 47)*

## Smoktoberfest

### All-Grain Recipe

#### Ingredients

for 5 U.S. gallons (19 liters)

<b>8.5 lb</b>	(3.9 kg) German Rauchmalt
<b>1.5 oz</b>	(42 g) Weyermann black Carafa® malt
<b>1.25 oz</b>	(35 g) German Hallertauer hops 4.5% alpha (5.6 HBU/158 MBU)—60 minute boiling
<b>0.5 oz</b>	(14 g) German Hallertauer hops 4.5% alpha (2.3 HBU/63 MBU)—15 minute boiling
<b>0.25 tsp</b>	(1 g) powdered Irish moss, 10 min
	German or Bavarian type lager yeast
<b>0.75 cup</b>	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

**Target Original Gravity:** 1.048-1.052 (12-13 B)

**Approximate Final Gravity:** 1.012 (43.5 B)  
**IBUs:** about 30

**Approximate color:** 7 SRM (14 EBC)

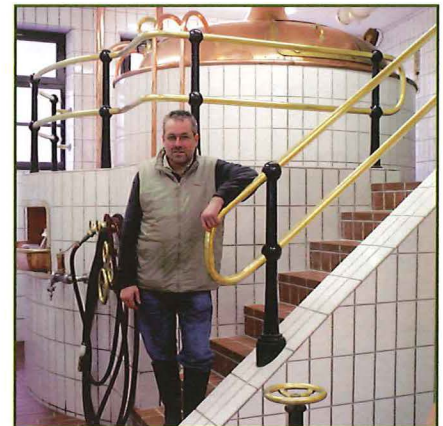
**Alcohol:** 5% by volume

#### Directions

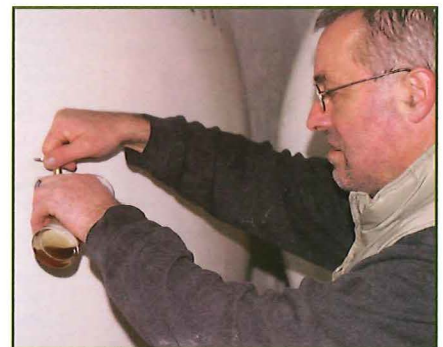
A step infusion mash is employed to mash the grains with rests at 132° F (53° C) for 30 minutes and 155° F (68° C) for about 30 minutes. Raise temperature to 167° F (75° C), laut and sparge with 3.5 gallons (13.5 liters) of 170° F (77° C) water. Collect about 5.5 gallons (21 liters) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

Add hops and Irish moss as indicated in the recipe. After a total wort boil of 60 minutes, chill the wort and transfer to your fermenter. Aerate the wort very well.

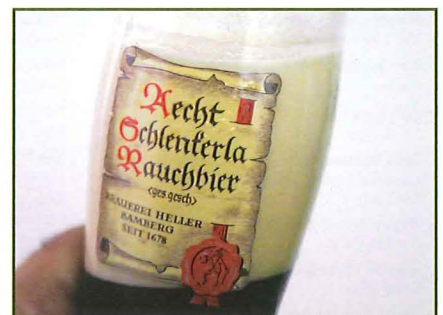
Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary. Lager the beer at temperatures between 35- 45° F (1.5-7° C) for six weeks. Prime with sugar and bottle or keg when complete.



Heller Brauerei braumeister Martin Krab



Schlenkerla fresh from the lager tanks



As fresh as it gets





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San Diego  
Rogue Ales Public House  
San Francisco  
Russian River Brewing Co.  
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Santa Barbara Brewing Co.  
Santa Barbara  
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Great Divide Brewing Co.  
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Left Hand Brewing Co.  
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New Belgium Brewing Co.  
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Odell Brewing Co.  
Fort Collins  
Old Chicago  
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Springs (4), Denver (3), Fort Collins (2),  
Grand Junction, Greeley, Lakewood,  
Littleton, Longmont, Silverthorne, Superior,  
Thornton, Westminster, Wheatridge  
Oskar Blues Grill & Brewery  
Lyons  
Pagosa Brewing Co.  
Pagosa Springs  
Phantom Canyon Brewing Co.  
Colorado Springs  
Pumphouse Brewery & Restaurant  
Longmont  
Redfish New Orleans Brewhouse  
Boulder  
Redstone Meadery  
Boulder  
Rock Bottom Restaurant & Brewery  
Colorado Springs, Denver, Englewood,  
Westminster  
Rockyard Brewing Co.  
Castle Rock  
Rosie's Brewpub  
Leadville  
Ska Brewing  
Durango  
Smugglers Brewpub & Grille  
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Walnut Brewery  
Boulder  
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Denver

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Cambridge House Brew Pub  
Granby

Hops Grillhouse and Brewery  
Manchester, Newtonton

Willimantic Brewing Co./  
Main Street Café  
Willimantic

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Dogfish Head Craft Brewery  
Milton  
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Stewarts Brewing Co.  
Bear

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A1A Ale Works  
St. Augustine  
Big River Grille & Brewing Works  
Lake Buena Vista  
Gordon Biersch Brewery Restaurant  
Miami  
Hops Grillhouse and Brewery  
Boynton Beach, Bradenton, Fort Myers,  
Gainesville, Miami, Ocala, Palm Harbor,  
Pembroke Pines, Pompano Beach, Sanford,  
West Palm Beach  
Orlando Brewing Partners, Inc.  
Orlando  
Ragtime Tavern Seafood & Grill  
Atlantic Beach  
Seven Bridges Grille & Brewery  
Jacksonville

## GEORGIA

Gordon Biersch Brewery Restaurant  
Atlanta  
Moon River Brewing Co.  
Savannah  
Rock Bottom Restaurant & Brewery  
Atlanta

## HAWAII

Gordon Biersch Brewery Restaurant  
Honolulu  
Kona Brewing Co.  
Kailua-Kona  
Maui Brewing Co.  
Lohaina-Maui

## IDAHO

Old Chicago  
Boise (2)

## ILLINOIS

Brass Restaurant & Brewery  
South Barrington  
Elmwood Brewing Co.  
Elmwood  
Flossmoor Station Brewing Co.  
Flossmoor  
Goose Island Beer Co.  
Chicago (2)  
Old Chicago  
Rockford  
Rock Bottom Restaurant & Brewery  
Chicago, Warrenville  
Windy City Grill & Tap  
Orland Park

## INDIANA

Buffalo Wild Wings Downtown  
Indianapolis

Rock Bottom Restaurant & Brewery  
Indianapolis (2)

Upland Brewing Co.  
Bloomington

## IOWA

Court Avenue Brewing Co.  
Des Moines  
Granite City Food and Brewery  
Cedar Rapids, Clive, Davenport  
Old Chicago  
Bettendorf  
Raccoon River Brewing Co.  
Des Moines  
Rock Bottom Restaurant & Brewery  
Des Moines

## KANSAS

Granite City Food and Brewery  
Kansas City, Olathe, Wichita (East),  
Wichita (West)  
Old Chicago  
Lawrence, Lenexa, Manhattan, Olathe,  
Overland Park, Topeka, Wichita (3)

## LOUISIANA

Gordon Biersch Brewery Restaurant  
New Orleans

## MARYLAND

Dogfish Head Alehouse  
Gaithersburg  
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Owings Mills  
Rock Bottom Restaurant & Brewery  
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## MASSACHUSETTS

Boston Beer Co.  
Boston  
Cambridge Brewing Co.  
Cambridge  
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Boston, Braintree

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Arbor Brewing Co.  
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Big Buck Brewery & Steak House  
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Hereford & Hops Steakhouse  
& Brewpub  
Escanaba  
Saugatuck Brewing Co.  
Saugatuck

## MINNESOTA

Granite City Food and Brewery  
Eagan, Maple Grove, Roseville, St. Cloud,  
St. Louis Park  
Old Chicago  
Apple Valley, Blaine, Duluth, Eagan, Eden  
Prairie, Minneapolis (2), Minnetonka,  
Plymouth, Roseville  
Rock Bottom Restaurant & Brewery  
Minneapolis

## MISSOURI

75th Street Brewery  
Kansas City  
Granite City Food and Brewery  
Kansas City (Zona Rosa)  
Old Chicago  
Columbia

## MONTANA

Madison River Brewing Co  
Belgrade



- Bitter Root Brewing Co.**  
Hamilton
- NEBRASKA**  
**Granite City Food and Brewery**  
Lincoln, Omaha  
**Old Chicago**  
Lincoln (2), Omaha (4)  
**Thunderhead Brewing Co.**  
Kearney  
**Upstream Brewing Co.**  
Omaha (2)
- NEVADA**  
**BJ's Restaurant & Brewhouse**  
Las Vegas  
**Chicago Brewing Co.**  
Las Vegas  
**Gordon Biersch Brewery Restaurant**  
Las Vegas  
**Rosemary's Restaurant**  
Las Vegas
- NEW HAMPSHIRE**  
**The Portsmouth Brewery**  
Portsmouth
- NEW JERSEY**  
**Ale Street News**  
Maywood  
**Triumph Brewing Co.**  
Princeton
- NEW MEXICO**  
**Blue Corn Café & Brewery**  
Santa Fe  
**Chama River Brewing Co.**  
Albuquerque  
**Il Vicio Brewing Co.**  
Albuquerque
- NEW YORK**  
**Brooklyn Brewery**  
Brooklyn  
**CH Evans Brewing Co. at the Albany Pump Station**  
Albany  
**Crooked Rooster Brewhub**  
Watkins Glenn  
**Ellicottville Brewing Co.**  
Ellicottville
- Great Adirondack Brewing Co.**  
Lake Placid  
**Lake Placid Craft Brewing Co.**  
Plattsburgh  
**Lake Placid Pub & Brewery**  
Lake Placid  
**Matt Brewing Co.**  
Utica  
**Rohrbach Brewing Co.**  
Rochester  
**Roosterfish Brewing Co.**  
Watkins Glenn  
**Southampton Public House**  
Southampton  
**Wildflower Café**  
Watkins Glenn
- NORTH CAROLINA**  
**Barleys Taproom**  
Asheville  
**Hops Grillhouse & Brewery**  
Matthews  
**Rock Bottom Restaurant & Brewery**  
Charlotte
- NORTH DAKOTA**  
**Granite City Food and Brewery**  
Fargo
- OHIO**  
**The Brew Kettle, Taproom & Smokehouse**  
Strongsville  
**Gordon Biersch Brewery Restaurant**  
Columbus  
**Rock Bottom Restaurant & Brewery**  
Cincinnati, Cleveland  
**Willoughby Brewing Co.**  
Willoughby
- OREGON**  
**BJ's Pizza & Grill**  
Eugene  
**BJ's Restaurant & Brewery**  
Portland (2)  
**Deschutes Brewery & Public House**  
Bend
- Laurelwood Public House & Brewery**  
Portland  
**Old Chicago**  
Beaverton, Gresham, Portland (2)  
**Pelican Pub & Brewery**  
Pacific City  
**Rock Bottom Restaurant & Brewery**  
Portland  
**Rogue Ales Brewery**  
(includes Brewer's on the Bay)  
Eugene, Newport (2), Portland
- PENNSYLVANIA**  
**Barley Creek Brewing Co.**  
Tannersville  
**Hereford and Hops Steakhouse and Brewhub**  
Cranberry Township  
**Iron Hill Brewery & Restaurant**  
Media, North Whales, West Chester  
**Rock Bottom Restaurant & Brewery**  
King of Prussia, Pittsburgh  
**Triumph Brewing Co.**  
New Hope
- SOUTH CAROLINA**  
**Hops Grillhouse & Brewery**  
Spartanburg
- SOUTH DAKOTA**  
**Granite City Food and Brewery**  
Sioux Falls
- TENNESSEE**  
**Big River Grille & Brewing Works**  
Chattanooga, Nashville  
**Bluewater Grille**  
Chattanooga  
**Boscows Brewing Co.**  
Memphis, Nashville
- TEXAS**  
**BJ's Restaurant & Brewhouse**  
Addison, El Paso, Houston, Lewisville, Sugar Land, Webster  
**Blue Star Brewing Co.**  
San Antonio
- UTAH**  
**Bohemian Brewery & Grill**  
Salt Lake City  
**Moab Brewery**  
Moab  
**Squatters Pub Brewery**  
Salt Lake City, Salt Lake Airport  
**Uinta Brewing Co.**  
Salt Lake City
- VIRGINIA**  
**Gordon Biersch Brewery Restaurant**  
McLean, Virginia Beach  
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Alexandria, Richmond  
**Rock Bottom Restaurant & Brewery**  
Arlington
- VERMONT**  
**Rock Art Brewery**  
Morrisville
- WASHINGTON, D.C.**  
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Washington, D.C.
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Wausau  
**Milwaukee Ale House**  
Milwaukee  
**Northwoods Brewhub & Grille**  
Chetek, Eau Claire  
**Old Chicago**  
Green Bay, Madison  
**Rock Bottom Restaurant & Brewery**  
Milwaukee  
**Stone Cellar Brewhub**  
Appleton
- WYOMING**  
**Snake River Brewing Co., Snake River Brewhub**  
Jackson, Lander

For the most up-to-date pub list, visit [www.beertown.org](http://www.beertown.org)!

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## World of Worts (continued from 45)

Shortly thereafter it was chilled and enjoyed—and the “wow” experience lingered for the rest of my life. This wasn’t “just beer.” I formulated homebrew recipes for brewing smoke-flavored beers. Since German smoke malt was not even remotely available in America, I smoked my own malt in my outdoor grill. Later in 1987 during my first visit to Germany, I began my German Beer Heaven experience in Franconia. Directly I went to the town of Bamberg. The Schlenkerla pub was a joyous stop. Fresh from the tap and consumed in comforting atmosphere, the balance of smoke, malt, hops, foam, alcohol and beer was heaven’s heaven.

Over the years I’ve come across the odd bottle of Schlenkerla. It is wonderful, but never as fresh as it is in Bamberg. Recently

I had the good fortune to experience it at its freshest—directly from the lager tanks, in caves 30 feet below the brewery.

Schlenkerla is more often than not considered a world classic. It was surprising to find that the brewery, called the Heller Brauerei, produces only 12,000 hectoliters (about 10,250 barrels) of beer a year. That such a small brewery makes a legendary beer inspires my brewing soul.

Brauerei Heller is tucked amidst residential apartment buildings. There is nothing noteworthy about the street, nor the small sign and gated entrance to the brewery’s small but busy cobblestone yard. There is no tasting room, nor tourist accommodating displays. It is all business in a confined space.

I was lucky to see it on a mild November Sunday afternoon. Retired Miller Brewing Company brewmaster and friend Gary Luther, a graduate of Weihenstephan, arranged a quick tour for both of us with his German language skills and friendly persuasion. Both of us were excited to visit a brewery that few other brewers ever see.

Braumeister Martin Krab is as dedicated and hardworking an individual any brewery could possibly have. On Sunday he was working to move beer to make room for another fermentation on the way. Gary and I felt excited about the special circumstances of which Martin afforded us.

Heller Brauerei batch malts and smokes 3,600 kilograms of its own barley twice a



week on the premises. That's about 8,000 pounds. The beer is mashed and brewed in direct-fired copper kettles. Chains are mechanically dragged on the bottom surface to minimize caramelization. Double decoction mash regimes are utilized. The wort is boiled for 90 minutes for a total evaporation of about 10.5 percent.

Two 50-hectoliter batches are made each brew day to fill their 100-hectoliter fermenters. One U.S. barrel is equal to 1.17

hectoliters. The first batch is begun the evening before at 11 p.m. and finished at 7 a.m. and the second batch follows immediately. German Hallertauer hops are highlighted in the formulation to achieve a bitterness value of about 33, but because of brewing techniques and yeast handling, the perception of bitterness seems to be what most brewers would (well, at least I would) perceive as about 27 BUs. For their most popular Schlenkerla "Maerzen" style rauchbier, a very small amount of

de bitterized black malt (trademarked as Carafa malt by local Bamberg maltster Weyermann) is added for color. Otherwise the world famous Schlenkerla is essentially 99-percent house made pale smoked malt.

The hot break of coagulated protein is removed by a whirlpool method and further proteins are removed through the formation of a cold break and a floatation method of bubbling the wort to remove much of the precipitated protein. Their lager yeast is routinely washed with cold water and passed through a sieve-like apparatus to remove the scummy and bitter *braunhefe* of the previous fermentation. Their pitching yeast is creamy white.


Primary fermentation is monitored for five to six days at about 9.1-9.5° C (48-49° F) and then lagered for six weeks at 5.1-5.5° C (41-42° F) in tanks located in sandstone caves 30 feet below the brewery.

Cold and fresh out of the tanks, the beer possesses a dense and firm head of foam, if ever there was a definition for perfectly attractive beer.

Ninety percent of their production is Maerzen-style amber colored Schlenkerla. Braumeister Krab also regularly brews a Rauch Weissbier and a Rauch Heller Lager, and during the bock season, a Rauchbock. Yes, even the wheat malt is house made and smoked at the brewery.

There were "house" secrets that braumeister Krab would not reveal, but never mind. It didn't matter as he poured sample after sample from his personal stash below street level. As we left I couldn't help but notice the large oak barrel in the corner. "Beer?" we asked. "Rauchbier Schnapps" were the only two words he uttered as we continued to climb the stairs. The beers were glorious and lived up to all expectations.

You've heard it all before, so let's cut the shuck and jive and get on with the recipes.

**Charlie Papazian is founder of the American Homebrewers Association and president of the Brewers Association.** 

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## Smoktoberfest

### Malt Extract Recipe

*Unfortunately there isn't an equivalent means to make this with malt extract due to the scarcity (if available at all) of smoked malt extract, though for a less smoky character try the following.*

### Ingredients

for 5 U.S. gallons (19 liters)

4.5 lb	(2 kg) very light malt extract syrup or 3.6 lb (1.6 kg) very light DRIED malt extract
3.0 lb	(1.36 kg) German Rauchmalt
1.5 oz	(42 g) Weyermann black Carafa® malt
1.5 oz	(42 g) German Hallertauer hops 4.5% alpha (5.6 HBU/158 MBU) 60 minute boiling
0.5 oz	(14 g) German Hallertauer hops 4.5% alpha (2.3 HBU/63 MBU), 15 minute boiling
0.25 tsp	(1 g) powdered Irish moss German or Bavarian type
	lager yeast, 10 minute boiling
0.75 cup	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

**Target Original Gravity:** 1.048-1.052 (12-13 B)

**Approximate Final Gravity:** 1.012 (43.5 B)

**IBUs:** about 30

**Approximate color:** 7 SRM (14 EBC)

**Alcohol:** 5% by volume

### Directions

Heat 3 quarts (3 liters) water to 172° F (77.5° C) and add crushed grains to the water. Stir well to distribute heat. Temperature should stabilize at about 155° F (68° C). Hold at about 155° F (68° C) for about 45 minutes.

Add heat to the mini-mash, raising the temperature to 167° F (75° C). 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 gallons (9.5 liters). Add malt extract and 60 minute hops and bring to a boil.

Add hops and Irish moss as indicated in the recipe. After a total wort boil of 60 minutes turn off the heat.

Immerse the covered pot of wort in a cold water bath and let sit for 15-30 minutes. Strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 liters) of cold water has been added. If necessary add cold water to achieve a 5-gallon (19-liter) batch size. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary. Lager the beer at temperatures between 35-45° F (1.5-7° C) for six weeks.

Prime with sugar and bottle or keg when complete.



by Amahl Turczyn Scheppach

# Australian Amateur Brewing Championship

This issue's Winners Circle takes us to the Southern Hemisphere, where fine ales and lagers are being brewed, entered and judged in the great continent of Australia. The Australian Amateur Brewing Championship has been held since 1995. Mark Hibberd of the AABA (Australian Amateur Brewing Association) was kind enough to provide some history of the event, which has served as Australia's "nationals," and like the AHA National Homebrewers Conference, has migrated from city to city over the past decade.

The first national competition was held in Sydney in conjunction with the 1995 Ausbeer Homebrew Expo organized by Colin Penrose. The call for entries was published in the magazine *Ausbeer* and entries were judged over several days preceding the Expo by a number of Sydney judges. The second national competition was held in Melbourne in 1996, again with the call for entries via *Ausbeer*. Judging was carried out at a number of brewpubs around Melbourne on a single Saturday with both local and interstate judges.

Some of the categories in 1996 had a very large number of entries—some more than 70—which made them almost impossible to judge on a single day by one panel of judges. This added weight to a long-running desire of a number of people (particularly Penrose) that the National Championship should consist of the best entries from each of the states. This would require State Qualifying Championships, which slowly developed over the years. Since 1997, there have been State/Territory Qualifying Championships each year in VIC (Victoria), SA (South Australia), ACT (Australian Capital Territory), and NSW (New South Wales), and often in QLD (Queensland).



Thus, the third national competition in 1997 in Melbourne was the first with state qualifiers. An AABC has been held each year since in Sydney, Melbourne, Canberra and Adelaide. The total number of entries in the State/Territory Qualifying Championships in 2006 was more than 800, with the majority coming from Victoria.



The AABC has continued to gain momentum over the years. The latest AABC was held on November 12, 2006. The whole event was judged in a single day with 13 categories and 133 entries. The 22 judges included four BJCP recognized judges and one BJCP certified judge. (The first BJCP exams in Australia were held at the end of

## Pumpkin Ale

Recipe by Anthony King from Barossa Brewers

### Ingredients for 5 U.S. gallons (19 liters)

<b>5.51 lb</b>	(2.5 kg) Light Malt Extract
<b>1.1 lb</b>	(500 g) Dark Brown Sugar
<b>2.2 lb</b>	(1 kg) cubed Butternut Pumpkin
<b>0.99 lb</b>	(450 g) cracked Light Crystal Malt
<b>1 tsp</b>	each of nutmeg, cinnamon, and allspice
<b>1.76 oz</b>	(50 g) grated Ginger Root (1.76 oz)
<b>0.25 tsp</b>	Amylase Enzyme
<b>2</b>	Fuggles Hop Plugs (bittering)
<b>1</b>	Hallertau Hop Plug (aroma)
<b>1</b>	Irish moss tablet
	Wyeast 2112 California lager yeast

### Directions

Cooking time is 90 minutes. Combine all ingredients using a large (20+ L) stove pot. Bring approximately 1.32 gallons (5 liters) of water to a boil, add butternut pumpkin, ginger root and Fuggles hop plugs. Allow pot to simmer at 158-167° F (70-75° C). Add light crystal malt, light malt extract and brown sugar to pot within first half hour of simmer; allow crystal malt to simmer 1 hour. During the last 20 minutes, make sure temperature is right at 158° F (70° C) and add nutmeg, cinnamon, allspice, amylase enzyme and Irish moss. During the last five minutes, add Hallertau hop plug. Pour contents of pot into fermenter through large strainer. Top fermenter with cold water to make 6.08 gallons (23 liters). Pitch a good dose of Wyeast 2112 California lager yeast. Rack at least twice after fermentation; filter if you have the means. This brew gets better with age.



2005 and about 25 have been examined to date.)

Club support definitely played an important role in bringing the event together, and nearly all states in Australia were represented. The AABC is traditionally organized by

a local committee based around one or more homebrew clubs in the hosting state. As the 2006 event was held in Melbourne, organizing fell to VicBrew, a group representing homebrew clubs in the state of Victoria with the main aim of running the state championships (also called VicBrew).

Hibberd pointed out that the lack of consistency between club rules from state to state often presents challenges for organizing a national-scale event. "Victoria has some coordination of homebrew clubs via VicBrew and ACT only has the Canberra Brewers, but in other states the homebrew



## AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR



The Beer Judge Certification Program (BJCP) has two major projects underway: revising the BJCP exam and adding a new Mead and Cider certification. Stay tuned for program changes in the upcoming year, including enhanced Web applications and new member services.

Want to discuss judging, beer styles, competitions and exams? Join the BJCP Members Forum at [www.bjcp.org/phpBB2/index.php](http://www.bjcp.org/phpBB2/index.php). We have started an Advanced Judging FAQ section based on the Commercial Calibration session at the AHA NHC 2006. Get all your judging questions answered!

To register a new competition, please go to [www.bjcp.org/apps/comp\\_reg/comp\\_reg.html](http://www.bjcp.org/apps/comp_reg/comp_reg.html). Check the AHA or BJCP Web sites to see the latest calendar of events. Competition organizers: please remember to submit your results promptly using our electronic system. Competitions not filing organizer reports will not be allowed to register in the future.

Interested in becoming a beer judge? See [www.beertown.org/homebrewing/scpl/judge.html](http://www.beertown.org/homebrewing/scpl/judge.html) for information.



### February 23

**America's Finest City Homebrew Competition**  
San Diego, CA. Contact: Christopher Toth, Phone: 619-440-2897, E-mail: [CToth14060@aol.com](mailto:CToth14060@aol.com), Web: [www.quaff.org](http://www.quaff.org)

### February 24

**BABBLE Brew-Off** Lincolnshire, IL. Contact: Bruce Dir, Phone: 847-566-8012, E-mail: [thedirs@comcast.net](mailto:thedirs@comcast.net), Web: [www.babblehomebrewers.com](http://www.babblehomebrewers.com)

### February 24

**FEBFEST 2007** Libertyville, IL. Contact: John Hardin, Phone: 630-550-9372, E-mail: [Hardin.JohnW@gmail.com](mailto:Hardin.JohnW@gmail.com)

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**2007 Peach State Brew-Off** Atlanta, GA. Contact: Colby Sheridan, Phone: 770-420-3954, E-mail: [colby.sheridan@gmail.com](mailto:colby.sheridan@gmail.com), Web: [www.coverthops.com](http://www.coverthops.com)

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**Anchorage Fur Rondy Homebrew Competition** Anchorage, AK. Contact: Breck Tostevin, Phone: 907-248-4062, E-mail: [keegan@gci.net](mailto:keegan@gci.net), Web: [www.greatnorthernbrewers.org](http://www.greatnorthernbrewers.org)

### February 24

**MCAB IX** St. Paul, MN. Contact: Curt Stock, Phone: 651-644-6098, E-mail: [curt@sphbc.org](mailto:curt@sphbc.org), Web: [www.hbd.org/mcab](http://www.hbd.org/mcab)

### March 3

**Great Arizona Homebrew Competition** Phoenix, AZ. Contact: Norman Naff, Phone: 623-386-0656, E-mail: [normannaff@yahoo.com](mailto:normannaff@yahoo.com), Web: [www.brewarizona.org](http://www.brewarizona.org)

### March 3

**IBU Open** Des Moines, IA. Contact: Ron Staab, Phone: 515-360-0435, E-mail: [ronaldgstaab@yahoo.com](mailto:ronaldgstaab@yahoo.com), Web: [www.iowabrewersunion.org](http://www.iowabrewersunion.org)

### March 3

**UNYHA 29th Annual/18th Empire State Open** Rochester, NY. Contact: Tina Weymann, Phone: 585-482-3346, E-mail: [tweymann@hselaw.com](mailto:tweymann@hselaw.com), Web: [www.unyha.com](http://www.unyha.com)

### March 3

**18th Annual Reggale & Dredhop Competition** Denver, CO. Contact: Bob Kauffman, Phone: 303-828-1237, E-mail: [acmebrew@juno.com](mailto:acmebrew@juno.com), Web: [www.hopbarley.org/dredhop](http://www.hopbarley.org/dredhop)

### March 4

**Best Florida Beer Championships at the Florida State Fair** Tampa, FL. Contact: Ric Schmelzer, Phone: 813-917-3471, E-mail: [ric\\_schmelzer@yahoo.com](mailto:ric_schmelzer@yahoo.com), Web: [www.bestflorida-beer.org](http://www.bestflorida-beer.org)

### March 8

**12th Annual Kona Brewers Festival Homebrew Competition** Kailua-Kona, HI. Contact: Rod Romanak, Phone: 808-325-7449, E-mail: [rod@rocketsuds.com](mailto:rod@rocketsuds.com)

### March 10

**9th Annual Drunk Monk Challenge** Aurora, IL. Contact: John Kleczewski, Phone: 630-621-3342, E-mail: [jkleczewski@mindspring.com](mailto:jkleczewski@mindspring.com), Web: [www.knaves.org/dmc](http://www.knaves.org/dmc)

### March 10

**SODZ 4th Annual British Beerfest Competition** Columbus, OH. Contact: Frank Barickman, Phone: 614-354-8750, E-mail: [fbarickm@columbus.rr.com](mailto:fbarickm@columbus.rr.com), Web: [www.sodz.org](http://www.sodz.org)

### March 24

**21st Annual BlueBonnet Brew-Off** Irving, TX. Contact: Dave Girard, Phone: 817-722-8096, E-mail: [jstdave\\_@hotmail.com](mailto:jstdave_@hotmail.com), Web: [hbd.org/kobb/bluebonnet/2006/bb06.htm](http://hbd.org/kobb/bluebonnet/2006/bb06.htm)

### March 24

**17th Annual Hudson Valley Homebrewers Homebrew Competition** New Paltz, NY. Contact: Al Alexsa, Phone: 845-255-8685, E-mail: [aalexsa@aol.com](mailto:aalexsa@aol.com), Web: [www.hvhb.org](http://www.hvhb.org)

### March 24

**March Mashness** Sauk Rapids, MN. Contact: Bruce LeBlanc, Phone: 320-251-0229, E-mail: [brewski1@charter.net](mailto:brewski1@charter.net), Web: [www.cloudytown-brewers.org/competition](http://www.cloudytown-brewers.org/competition)

### March 31

**BOSS Chicago Cup Challenge** Blue Island, IL. Contact: Zbig Banach, Phone: 815-485-6575, E-mail: [zbgb@yahoo.com](mailto:zbgb@yahoo.com), Web: [www.bossbeer.org](http://www.bossbeer.org)

### March 31

**March in Montreal** Montreal, QC, Canada. Contact: Martin Stutz, Phone: 450-979-1420, E-mail: [Stillbrewing@yahoo.ca](mailto:Stillbrewing@yahoo.ca), Web: [www.homebrewers.ca](http://www.homebrewers.ca)

### April 14

**Mayfaire 2007** Woodland Hills, CA. Contact: Martin Carman, Phone: 818-704-7780, E-mail: [brewer@carmanfamily.net](mailto:brewer@carmanfamily.net), Web: [www.maltosefalcons.com](http://www.maltosefalcons.com)

### April 14

**2007 South Shore Brewoff** Mansfield, MA. Contact: Kevin Farrell, Phone: 781-874-1774, E-mail: [kevin.farrell@nuance.com](mailto:kevin.farrell@nuance.com), Web: [www.southshorebrewclub.org](http://www.southshorebrewclub.org)

### April 14-30

**AHA 29th Annual National Homebrew Competition** Denver, CO. Contact: Janis Gross, Phone: 303-447-0816 x 134, E-mail: [Janis@brewersassociation.org](mailto:Janis@brewersassociation.org), Web: [www.beertown.org](http://www.beertown.org)



clubs often do their own thing, and the lack of coordination makes running the state qualifiers a bit difficult at times."

Fortunately, the event did have plenty of support when it came to sponsors, including Bell's Hotel and Brewery (in South Melbourne) where the event was held. Bell's Hotel and Brewery was established in the 1870s, has been run by the Bell family since 1933 and has brewed its own beer since 1988. Publican Bill Bell was born in the pub and follows the lead of his father and grandfather before him.

While most style categories in Australian competitions would be readily recognized by homebrewers around the world, some are indigenous styles that grew out of the country's history and culture, like Australian Pale Ale (as represented by Coopers Sparkling Ale and Coopers Pale Ale), Australian Lager and Australian Stout. There is also an Australian Dark. These local styles are integrated with BJCP styles to make up the 2006 categories (for a look at the style guidelines, go to [vicbrew.org](http://vicbrew.org)).

In fact, 2006 was the first year the AABC used BJCP style guidelines—earlier it had used a locally written version. Inclusion of the BJCP style guidelines was not without controversy, however. There was some criticism that BJCP guidelines for British ales allow American hops as well as

English hops—this is not something that is well accepted in Australia for beers meant to be true to the British styles. Among the more interesting entries were those in Category 13, Specialty Class. The category winner was a Pumpkin Ale (see recipe). Other entries in Specialty included

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### AHA/BJCP Sanctioned Competition Program

#### February 2006

Beerfest, 217 entries—John Killmister, Melbourne, Victoria.

#### July 2006

Los Angeles County Fair, 89 entries—Bob Kaisaki, Los Angeles, CA.

#### September 2006

2006 Longshot American Homebrew Contest—Boston Regional, 525 entries—Bruce Stott, East Harwich, MA.

ACT Amateur Brewing Championship, 160 entries—Craig Webber, Canberra, Australian Capital Territory.

#### October 2006

New South Wales Home Brewing Championships, 154 entries—Les Weber, Newcastle, NSW.  
Dixie Cup XXIII, 958 entries—Jim Layton, Howe, TX.

Southern New England Regional Homebrew Competition, 170 entries—John Watson and Phil Simpson, Southbury, CT.

#### November 2006

2006 THIRSTY Classic, 161 entries—Steve Fletty, Falcon Heights, MN.  
The Wizard of SAAZ Homebrew Competition, 30 entries—David Blausey, Akron, OH.  
Novemberfest, 72 entries—Roxy Hastings, Edmonton, AB.  
AHA Light Hybrid Beers Club-Only Competition, 31 entries—Russell G. Pipo, Fresno, CA.  
California State Homebrew Competition, 207 entries—Carl Townsend, Los Angeles, CA.

Michigan Fruit Festival, 3 entries—Paul Sbraccia, St. Clair Shores, MI.

2006 Sheldon Jackson Memorial Members-Only Competition, 59 entries—Jon Griffin, Las Vegas, NV.

Foam On The Range, 250 entries—Leo Vitt, Sidney, NE.

Second Annual MALT Turkey Shoot, 126 entries—Ty Ming and Mel Thompson, College Park, MD.

Franco Belgian Challenge Cup, 65 entries—John Francisco, Tucson, AZ.

11th Knickerbocker Battle of the Brews, 143 entries—Vladimir Kowalyk, New York City, NY.  
FOSSILS Porter Competition, 11 entries—David Howard, Georgetown, IN.

15th Annual Great Brews of America Homebrew Competition, 241 entries—Mark Pasquinelli, NJ.

Land Of The Muddy Water Homebrew Competition, 183 entries—Curt and Kathy Stock, St. Paul, MN.

#### December 2006

5th Annual Walk The Line on Barleywine and Strong Ale Stumble, 36 entries—David Grymonpre, Land O Lakes, FL.

New England Fall Regional Homemade Beer Competition, 168 entries—Alan Dewey, Windsor Locks, CT.

8th Annual Palmetto State Brewers Open, 409 entries—Carl Foster, Columbia, SC.

Humpy's Big Fish Homebrew Competition, 88 entries—Ed Kenna and Tracey Lewellen, Anchorage, AK.

Great Lakes Olde World Syder Competition, 135 entries—Harrison Gibbs, Williamsburg, VA.

a Smoked Mild, Flanders Red and a lager made with peat-smoked malt.

Two top awards were given out for the NHC equivalent of the Best of Show and Ninkasi awards. Daniel Rayners' Imperial Stout was named Champion Beer of the Show.

**Amahl Turczyn Scheppach is a former craft brewer and associate editor for Zymurgy, and now brews at home in Lafayette, Colo.**



## AHA SPECIAL EVENTS

### February 24

**AHA Membership Rally—Sierra Nevada Brewing Co.** Chico, CA. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org), Web: [www.AHAally.org](http://www.AHAally.org)

### March 10

**AHA Membership Rally—Oskar Blues Grill and Brewery** Lyons, CO. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org), Web: [www.AHAally.org](http://www.AHAally.org)

### April 2-13

**AHA 29th Annual National Homebrew Competition—Entry Deadline** Multiple sites across the U.S. Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: [janis@brewersassociation.org](mailto:janis@brewersassociation.org), Web: [www.beertown.org/events/nhc/index.html](http://www.beertown.org/events/nhc/index.html)

### April 14-30

**AHA 29th Annual National Homebrew Competition—First Round Judging** Denver, CO. Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: [janis@brewersassociation.org](mailto:janis@brewersassociation.org), Web: [www.beertown.org/events/nhc/index.html](http://www.beertown.org/events/nhc/index.html)

### May 12

**AHA Membership Rally—Great Divide Brewing Co.** Denver, CO. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org), Web: [www.AHAally.org](http://www.AHAally.org)

### May 15

**AHA National Homebrewers Conference Early Bird Registration Ends** Contact: Bradley Latham, Phone: 888-822-6273 x 145, E-mail: [bradley@brewersassociation.org](mailto:bradley@brewersassociation.org), Web: [www.AHAconference.org](http://www.AHAconference.org)

### June 2

**AHA Membership Rally—Arbor Brewing Co.'s Corner Brewery** Ann Arbor, MI. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org), Web: [www.AHAally.org](http://www.AHAally.org)



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Keynote Address with Peter Bouckaert,  
New Belgium Brewing Co.  
Club Night

Saturday, June 23  
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29th Annual AHA National Homebrew  
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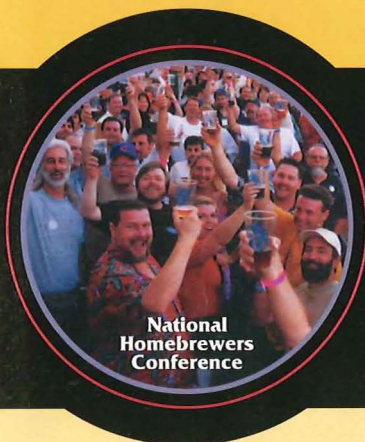
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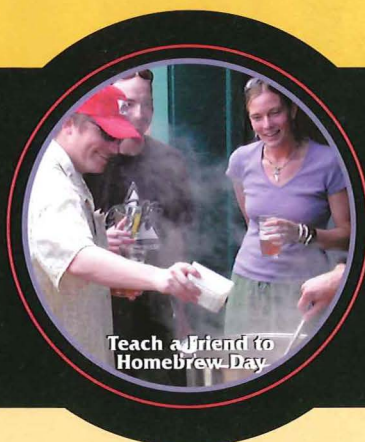
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**Reader Advisory: Warning!**

These pages are rated XG (eXtra Geeky) by the Bureau of Magazine Mucktymucks. Items in this section may contain raw data, graphic functions, full statistics and undiluted biochemistry. Keep away from poets, squeamish novices and others who may find the joyously technical nature of this prose to be mindbendingly conceptual or socially offensive. Also, because of the complex nature of brewing science, there is no guarantee that you will live longer, brew better or win any awards in the next homebrew competition based upon the conclusions presented here.

## Calculating Grain Weight

By Steve Holle

**Editor's Note:** This is the first in a series of *For Geeks Only* articles featuring a step-by-step overview of some important calculations for homebrewers. The procedures are excerpts from *A Handbook of Basic Brewing Calculations* that have been modified for use by the homebrewer.

The scientific principles used to determine a grain bill aren't difficult, but they can include a large number of variables. The following discussion begins with a detailed approach to explain the science in determining the grain bill followed by a second simplified approach frequently used by homebrewers.

Before starting our discussion on estimating the quantity of grain to produce the desired volume and gravity of wort, let's review two pertinent terms.

**Specific gravity (SG):** The density of a liquid relative to water. For example, wort with SG 1.048 is 1.048 times denser than water because it contains dissolved extract.

**°Plato (°P):** The weight of extract in wort as a percentage of total wort weight. Wort gravity of 16°P indicates that 16 percent of the wort weight is extract. A rough method to convert °Plato to SG is to multiply °Plato by 4, divide by 1,000 and add the quotient to 1.

$$SG = \left[ \frac{°\text{Plato} \times 4}{1,000} \right] + 1.0$$

Thus, 12 °P is equivalent to SG 1.048 (12 x 4 = 48; 48/1,000 = 0.048; 0.048 + 1 = 1.048).

The process of estimating the amount of grain can be broken down into two parts: 1) determining the weight of required extract (i.e. mostly dissolved sugar) in the desired volume of wort and 2) determining the percentage of the grain weight that can be converted to extract.

$$\text{Grain Weight} = \frac{\text{weight of extract required}}{\% \text{ of grain weight that can be converted to extract}}$$

### Detailed Approach

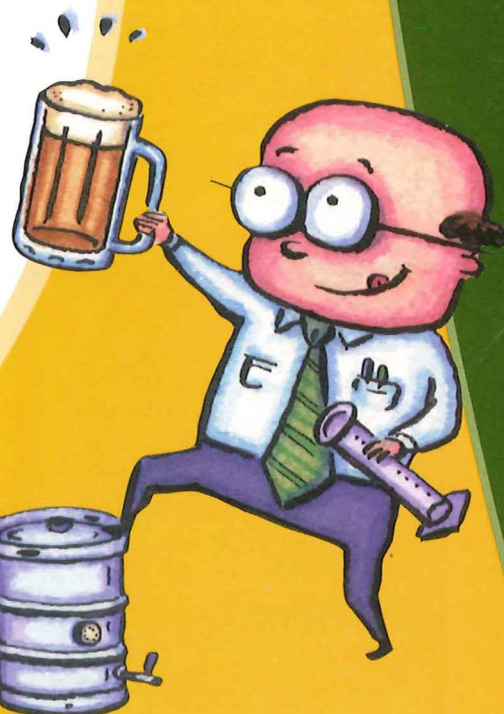
Mashing is all about the brewer's skill in converting grain weight into extract by overcoming inefficiencies in milling, the impracticality of sparging all the extract from the grain bed, and inefficiencies in the brewer's equipment that cause wort to be trapped in hoses, pipe work or in the bottom of the lautertun. Professional brewers attempt to account for most of these factors, or "inefficiencies," through refinement of the previous formula into the following detailed format.

$$\text{Grain Weight} = \frac{(\text{gal of cool wort} \times 8.32 \text{ lb/gal} \times \text{SG}) \times °\text{P}\%}{\% \text{ extract cg, "as is"} \times \text{brewhouse efficiency}}$$

To understand this detailed approach, let's look at the numerator and denominator in this formula individually.

### Numerator (weight of extract required):

A gallon of water at room temperature weighs 8.32 pounds. However, wort weighs more than water because it contains extract. Our goal is to determine the weight of that extract. Specific gravity





measures the density of wort relative to water, so wort with SG 1.048 is 1.048 times denser, or in other words, 1.048 times heavier. Multiplying the number of gallons by the weight of 1 gallon of water (8.32 lb) indicates the weight of water in the wort. Multiplying the weight of water by the wort's SG indicates the weight of the water plus extract. Because °Plato measures the percentage of wort weight that is extract, multiplying the weight of wort by °Plato estimates the weight of extract we must produce. For example, 10 pounds of 12 °Plato wort contains 12-percent extract or 1.2 pounds of extract.

**Denominator (% of grain weight that can be converted to extract):** If we could convert 100 percent of the grain weight to extract and then dissolve all of the grain's weight in water, we could ignore the denominator in the equation because it would be 1. However, we have already discussed that neither is 100 percent of the grain weight convertible to extract, nor can it all be dissolved in the wort collected, nor can all the wort produced be drained from hoses and vessels. The denominator can be broken down into two parts: *Percentage extract coarse grind, as is* (% extract cg, as is), a statistic the maltster provides in a malt analysis that indicates the percentage of the grain's weight that the maltster converted to dissolved extract in the test lab, and *brewhouse efficiency*, a statistic that measures how closely the brewer can

match the extract yield produced in the lab.

*Percentage extract coarse grind, as is:* This statistic means that the malt tested in the lab was ground coarsely as would be typical in the brewery. "As is" indicates that the tested malt wasn't dried any further and contains the same amount of moisture as the bulk malt shipped from the malt house to the brewer. Table 1 presents some common % extract cg as-is values for various malts.

*Brewhouse Efficiency:* It is also unlikely that the homebrewer will be as successful as the laboratory in recovering extract. While major commercial brewers expect to achieve 95 to 100 percent of the laboratory % extract coarse grind, as-is yield, the homebrewer should expect to achieve only 65 to 85 percent of the laboratory efficiency. The brewery's efficiency relative to the lab extract potential is known as brewhouse efficiency. Consequently, when we multiply the % *extract coarse grind, as-is* value by the *brewhouse efficiency*, we are able to estimate the percentage of grain weight that will be converted to dissolved extract and recovered. Again, this product, known as *overall efficiency*, may be 75 percent or more for large commercial breweries (e.g. 76% cg, as-is x 99% brewhouse efficiency = 75% overall efficiency). Homebrewers should not expect to exceed 70-percent overall efficiency or be surprised if it is as low as 50 percent.

The calculations could be simplified by using an overall efficiency factor of 50 to 70 percent as the denominator. If we are using malts with extract yields that don't vary greatly from a typical range of 72 to 79 percent, the use of actual *coarse grind, as-is* ratings may present a false level of accuracy for the homebrewer anyway. We might start by using a 60-percent overall efficiency factor as the denominator and then adjusting it through the actual experience of repetitive brewing.

### Simplified Approach

A simpler approach presented in home-

brewing texts is to first determine the original excess gravity of the beer we wish to brew. Excess gravity is determined by subtracting 1 from the desired SG of the beer and then multiplying by 1,000. So, a beer with an original gravity of 1.050 would have excess gravity of 50  $[(1.050 - 1.000) \times 1,000]$ . This number is then divided by the overall efficiency factor multiplied by the excess gravity of 46.2 produced by 1 pound of sucrose dissolved in 1 gallon of water. Assuming a 60-percent overall efficiency factor, the theoretical excess gravity produced from 1 pound of grain is 27.7. Therefore we would require 1.8 pounds of grain per gallon to achieve the desired SG 1.050.  $(50 \div [46.2 \times 0.60 \text{ efficiency}] \times 1 \text{ gal})$

Grain Weight=

$$\frac{\text{desired excess gravity} \times \text{gal of wort}}{46.2 \times \text{brewhouse efficiency}}$$


Using the following information, let's solve for the pounds of grain needed to produce 10 gallons of cool 12°Plato wort.

Cool kettle wort after boiling:	10.0 gal
Target gravity:	12°P (SG 1.048)
% extract cg, as is	75%
Brewhouse efficiency	80%
Overall Efficiency	60%

Grain weight =

$$\frac{48 \times 10.0 \text{ gal}}{46.2 \times 0.60} \\ = 17.3 \text{ lb}$$

After mashing and lautering, if we have estimated our extract recovery efficiency correctly and if our later calculations for mash and sparge water volumes are correct, we should produce the desired 10.0 gallons of cool wort after boiling.

**Steve Holle is author of *A Handbook of Basic Brewing Calculations*. He is a member of the Brewers Association, Master Brewers Association of the Americas and Beer Judge Certification Program, and is an associate member of the Institute and Guild of Brewing, London. He lives in Kansas City, Mo.** 

**TABLE 1. TYPICAL COARSE GRIND, AS-IS RATINGS FOR VARIOUS MALTS AND GRAINS**

Wheat malt .....	79%
Pale base malt .....	76%
Amber malt .....	75%
Light crystal .....	73%
Dark crystal .....	63%



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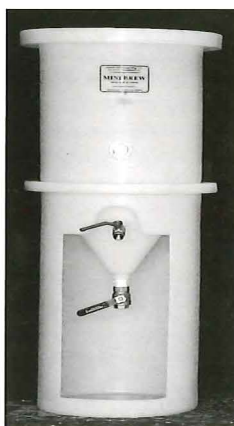
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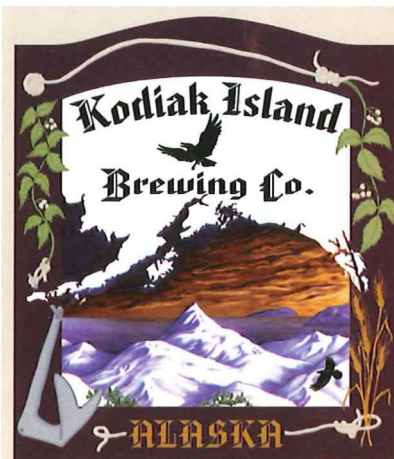
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# Big Beers, Belgians and Barleywines

If you've never been to a beer dinner (or hosted one yourself), chances are you've heard about one offered at a nearby brewpub or restaurant. As Ray Daniels notes in his *Brewing by Design* column, beer dinners have become regular fare at restaurants all over the country.

There is seemingly no limit to the possible pairings. At the January Big Beers, Belgians and Barleywines brewmasters' dinner in Vail, Colo., even chef Kelly Liken admitted that "We have a few courses that push the envelope for pairing with beer" when she introduced the lineup for the evening.

The brewmasters' dinner at the Big Beers, Belgians and Barleywines Festival has become a hugely popular event that sells out almost immediately. This was the third annual dinner for the seven-year-old festival, pairing two different brands of craft beer with a five-course dinner.

The dinner had an international flavor for the first time this year, as Hildegard van Ostaden of the Brouwerij de Leyerth in West Flanders, Belgium presented her elegant beers alongside the hearty brews of the Great Divide Brewing Co. of Denver, Colo. at Restaurant Kelly Liken.

Here's the lineup of the evening's menu.

*Chef's Selection of hors d'oeuvres (including cheese soup) paired with Koning's Hoeven Dubbel Trappist Ale and Great Divide Hibernation Ale*

*Hawaiian Yellow Tail "Escabeche" paired with Urthel Tripel and Great Divide Old Ruffian Barley Wine*

*Carolina Barbequed Quail paired with Urthel Vlaemse Bock (this was also used in the barbecue sauce) and Great Divide Titan IPA*

*A Composition of Artisan Cheeses paired with Urthel Hop-It and Great Divide Hercules Double IPA*

*Pumpkin Crème Brûlée paired with Urthel Quad and Great Divide Oak Aged Yeti Imperial Stout*

Festival organizer Laura Lodge said Liken sat down with Great Divide brewmaster and founder Brian Dunn and a representative for Urthel in December to discuss the beers and brainstorm about pairings. "Her style and flair are very modern and upscale and perhaps a little bit of a different twist for our diners," said Lodge. "It was neat to watch the gears turn in her head."

Van Ostaden's Urthel line of beers (named for a fabled race of gnomes) and Great Divide's award-winning brews provided fun (and vastly different) accompaniments to Liken's creations, showcasing the possibilities of complementing and contrasting with beer and food. Van Ostaden and Dunn spoke between each course about the beers that were selected, and Van Ostaden explained to diners that Urthel Hop-It is a tribute to American craft brewers.

"We started our brewery in 2000 and by 2001 we were exporting to the U.S.," she said. "At that time we thought Belgian beers were the only beers in the world. When we tried U.S. beers for the first time I said, 'America is indeed a strange country. They are extreme in everything.'"

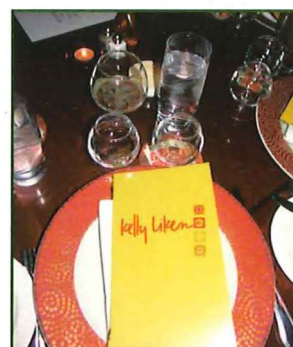
"American brewers are very innovative, and Belgian brewers are getting scared of them."

It is perhaps a testament to Belgian brewers, though, that the majority of entries in the homebrew contest associated with the festival were Belgian-style beers for the first time ever.

"We used to see mostly barleywines," said Lodge. "The trend in homebrewing that is represented by our festival has been swinging in a Belgian direction."

The next time you see a beer dinner advertised in your area, jump on it. You never know what kinds of flavors and sensations will be hitting your palate next.

**Jill Redding is editor-in-chief for Zymurgy.**



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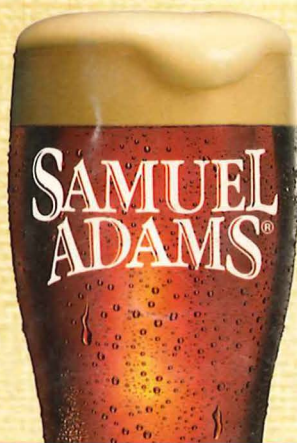


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