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THE HOW-TO HOMEBREW BEER MAGAZINE

MAY-JUNE 2012, VOL.18, NO.3

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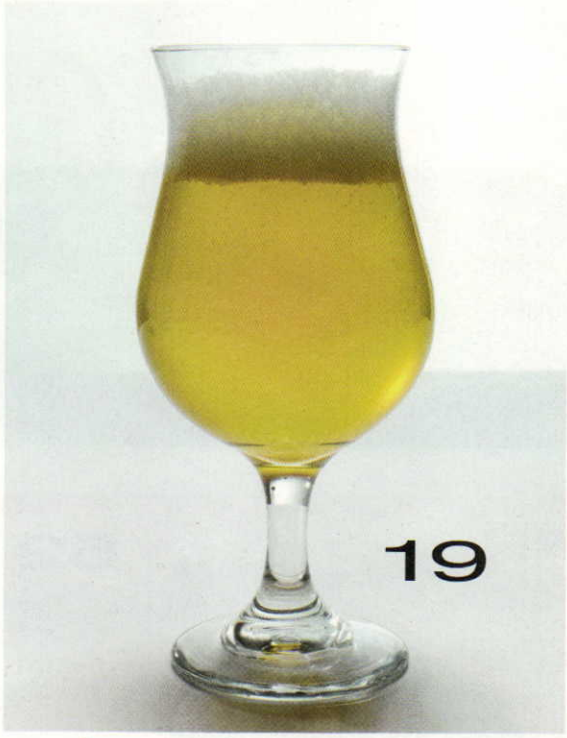
features



departments

where to find it

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BYO RECIPE STANDARDIZATION

Extract efficiency: *65%*
(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one gallon of water, would yield a wort of 1.024.)

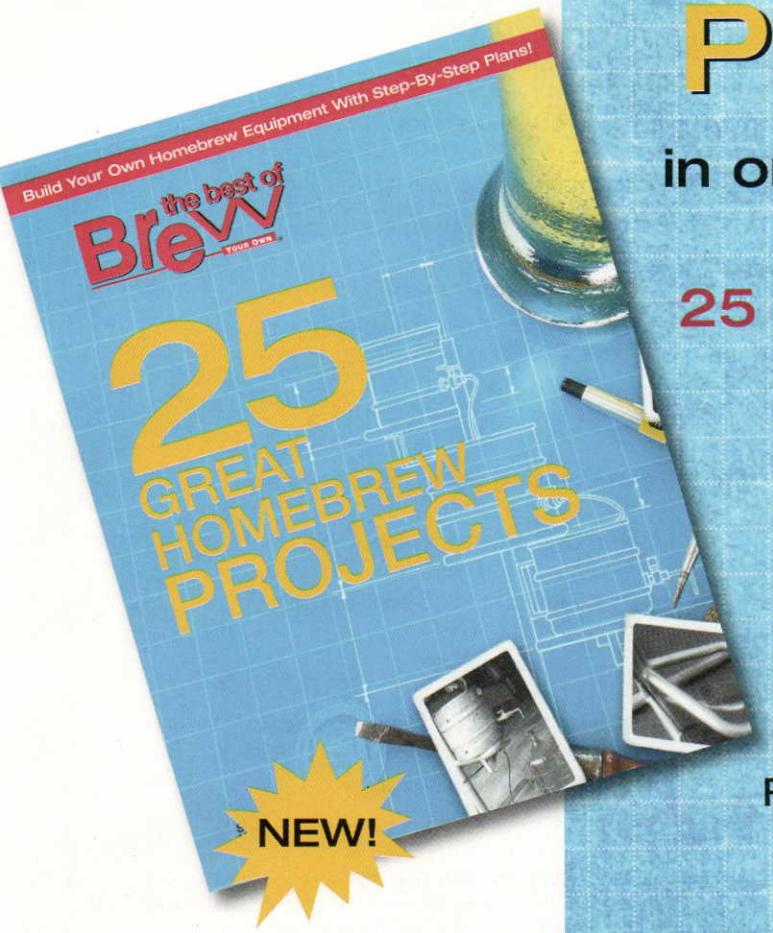
Extract values for malt extract:
liquid malt extract (LME) = 1.033–1.037
dried malt extract (DME) = 1.045

Potential extract for grains:
2-row base malts = 1.037–1.038
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033–1.035
chocolate malts = 1.034
dark roasted grains = 1.024–1.026
flaked maize and rice = 1.037–1.038

Hops:
We calculate IBUs based on 25% hop utilization for a one hour boil of hop pellets at specific gravities less than 1.050.

25 GREAT HOMEBREW PROJECTS

in one great special issue!



25 project plans include:

Cooler Mash Tun
Continuous Sparging System
Countertop All-Grain System
Electric Heat Stick
Convert Brew Pot to Kettle
Convert Keg to Kettle
Counterpressure Bottle Filler
Portable Kegerator
Rebuild a Keg & Spunding Valve
Counterflow Wort Chiller
Recirculating Wort Chiller
Carboy Spray Wand
Keg & Carboy Cleaner
Tap Handles
Home Kegerator
Nitro Kegerator
Glycol Fermenter
Inline Aerator
Yeast Stir Plate
Inline Thermometer
Pump Toolbox Combination
Water Filter
Randall-Style Hop Filter
French Press Hopback
Hop Dryer

The Ultimate Do-It-Yourself guide for homebrewers! Includes the best projects stories to run in *BYO* magazine over the past 16 years! All projects include a parts & tools list as well as detailed instructions on the build and pictures to help guide you through the project. All this for just $10.00 retail!

This special newsstand-only issue is available at better homebrew retailers or order today online at brewyourownstore.com Also available by calling 802-362-3981

* Attention homebrew supply shop owners — call us today at 802-362-3981 to discuss volume discounts to resell the BYO 25 Great Homebrew Projects issue in your shop

what's happening at BYO.COM

Cork Your Tripels

After you've brewed a tasty tripel like those in Chris Colby's story on page 36, you'll need to store it. If you want to bottle it, follow these instructions for bottling Belgian-style (as well as bottle conditioned) beers.

www.byo.com/component/resource/article/1941

Grow Hops in Containers

If you aren't ready to plant a homebrew garden — or you just don't have space — you can still grow hops! Follow Chris Colby's advice for planting rhizomes in containers.

www.byo.com/component/resource/article/1926

New To Homebrew Blog

Don't let a sea of homebrewing experts intimidate you — everybody starts homebrewing as a beginner. Check out *BYO*'s blog by Richard Bolster, who is a novice homebrewer learning the ropes, for a little reassurance that homebrewing takes a little patience and practice.

www.byo.com/blogs/blogger/Richard%20Bolster/

Cover Photo: **Charles A. Parker**

Brew Your Own — THE HOW-TO HOMEBREW BEER MAGAZINE

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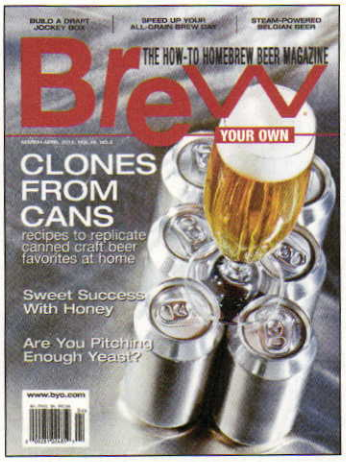
Volume 18, Number 3: May-June 2012



Honey storage

I am a beekeeper. I also use honey for baking (preserves freshness longer), cooking and flavoring. I take exception to your claim to store honey in a cool, dark place ("Brewing with Honey," March-April 2012). That may be so for some honeys, but generally speaking honey stored below 55-60 °F will crystallize quickly, sometimes in as few as a couple of days! As for overall storage of honey, anyplace in the kitchen will work as long as it is around 60 °F or slightly warmer. And it has never seemed to matter to any honey I produce or use if the honey was behind a cabinet door or on an open shelf. So anyplace is pretty alright for most honey.

And I need to add here that honey should never be fed to infants. While honey will not grow bacteria, it can give children under 1 year of age a host of problems, some of which can be deadly.

Keep on brewing, and passing on great recipes.

Janice Hamilton
Rogersville, Tennessee

The National Honey Board recommends storing processed honey at 64–75 °F (18-24 °C) and unprocessed honey below 50 °F (10 °C). [Somewhat confusingly, they also claim that the ideal storage temperature for both types of honey is 32 °F (0 °C).] The board lists 52–59 °F (11–15 °C) as the temperature range in which honey is most likely to crystallize. So, storing honey above 60 °F should indeed be safe and reduce the risk of crystallization.

Of course, crystallization isn't harmful in any way and can be undone by gently warming the honey (for example, by placing the container in a warm water bath). Thanks for your letter and give our best to your bees.

Screw canning

I'm reading your clones from cans issue (March-April 2012), and specifically the part about canning at home. A friend of mine was recently visiting his daughter in Japan and they have cans with a screw on lid. I have yet to see it, I think I'll ask him if I can get one to use on bottling day

Darren Foulds is a homebrewer and gardener from Thunder Bay, Ontario. He has combined his two interests into a single blog — *The Brew Garden: Where Homebrewing Beer and Gardening Meet*. (It can be found on the web at www.brewgarden.ca).

In this issue, Darren discusses the possibilities for growing the bitter components of homebrew in your own garden.

Of course, this means hops — and there's also more advice on growing hops in this issue's "Tips from the Pros" column, on page 13 — but he also discusses other plants that can be grown and used to bitter a gruit (a beer bittered with herbs instead of hops).

Tim Hack is a stay-at-home dad and homebrewer living outside of Chicago, Illinois. (His wife is an electrical engineer and a budding homebrewer as well).

In the summers Tim likes to grow vegetables, berries, fruit and his own hops, all of which are fair game for brewing ingredients. In the winter he spends a fair amount of his time remodeling parts of the house — including the homebrewery, where he devised his DIY carboy hangers to free up space on the floors and countertops. If you could use a little more space where you brew, check out Tim's off-the-wall hanger design in "Projects" on page 65.

Terry Foster was born in London, England and holds a PhD in chemistry from the University of London. He now lives part of every year near New Haven, Connecticut, where he often brews commercially with the brewers at BruRoom@BAR — New Haven's first brewpub.

Terry is known to many homebrewers as the author of the *Pale Ale* and *Porter* books in the Classic Beer Style Series (Brewers Publications) as well as many articles in *Brew Your Own*.

In this issue, Terry does double duty. First, on page 52, he takes us back in time to recreate a beer recipe first published in 1503 — around the time of the first Tudor King, Henry VII. Terry also tackles the topic of blending beers in the brewery in his "Techniques" column on page 57.

and see how it goes. I thought you guys might be interested into looking into this as a viable option.

Brandon Rich
Denver, Colorado

Speed kills (or at least harshes your mellow)

In response to the article, "Speeding up your all-grain day" in the March-April 2012 issue by Dave Louw, I would like to quote Charlie Papazian, "Relax . . . have a homebrew." Have you forgotten that beautiful slogan? Why would a homebrewer want to speed up the relaxing process of homebrewing? It's the "Microwave-America" mentality that has become so widespread in people's way of thinking. If you want to speed up the process . . . go buy your beer at the store! Life is too short already.

Gordon Theall
Whitesboro, Texas

Some homebrewers might cite the fact that life is short as a reason they would want to speed up a brew day. We aren't trying to tell anyone they must do it that way; we're just giving them the information so they can make an informed choice. Relax and don't worry if you prefer, or wind yourself tighter than a watch spring if that's what keeps you ticking — in either case, do enjoy your homebrew!

Project modifications

Thanks to Jay Cummings and *BYO* for an easy to follow project (January-February 2012)! I liked Jay's ideas and began to copy his design until I hit a snag — 4x4x4 junction boxes were unavailable locally.

I wondered why not use a Radio Shack project box and then realized the dimension challenges that Jay avoided by using a 4 inch high box instead of a 2 inch one. He overlaps the controller and the outlet inside! Using a Radio Shack 4x6x2 box can be done, though, but it's very close. The controller STC1000 takes a 71 mm wide hole and the project box has 75 mm clearance between the screw bosses! Close, but workable. And to make the duplex outlet fit, simply bend repeatedly and break off the entire end tabs normally used in a house box. It then fits nicely. So you have 6 inches inside to work with and the controller and outlet can be mounted in the opposing 4 inch ends.

And one tip I discovered that really made cutting the outlet holes easier was to get an outlet cover plate and attach it to the outside of the box and use it as a guide. No tracing outlines required. This allows you to use any

regular household outlet and attach it with the center mounting screw that is normally used for the cover plate.

Rudy Mayer
via email

Liked lager yeast article

I recently started receiving your magazine. I am new to brewing and I am learning new things every week. I really enjoyed your article on the origins of lager yeast (January-February 2012). It was well-written and easy to understand. Thanks for the historical perspective and the link to modern science. Keep up the good work. I will definitely renew the subscription next year.

Brian O'Day
via email

New life for Falstaff plant

I loved Bill Pierce's article on Falstaff in the January-February 2012 issue. Living in New Orleans, where an immense Falstaff brewery building stood abandoned for decades, I can happily report that it has found new life as a condominium and apartment complex. The developer took great pains to preserve and play up the heritage of the building, preserving the statue of Falstaff at the entrance and completely restoring the 100-foot+ sign and weather ball. You can see the restored building at: http://thefalstaffapartments.com/

Greg Hackenberg
New Orleans, Louisiana

In search of darkness

I brewed the recipe as listed in the December 2011 issue for Brooklyn Brewery's Local 2 clone. I realized, a little too late, that the recipe was missing something in the grain bill to provide the "dark" aspects of this ale. Can you please provide the remaining grain bill ingredients so I can give this great brew another try?

Steve Bayans
via email

Garrett Oliver, Brewmaster at Brooklyn Brewery, responds, "I don't think we did miss anything, though perhaps I needed to add some details of the candi sugar syrup. The syrup, from Ravico in Belgium, is known as 'D2.' It is very dark, and appears nearly black. 1.3 lbs. (0.59 kg) of this syrup, fully added, will give a fairly deep color. That said, we do add Simpson's chocolate malt, but only 15 lbs. (6.8 kg), which is less than 1% of our grist. Mr. Bayans may wish to add approximately 2 ounces (56 g) of chocolate malt to deepen the color a bit." BYO

homebrew nation

READER PROFILE

Brewer: Justin Baldwin

Hometown, State: Gooding, Idaho

Years brewing: 12 years

Type of brewer: All-grain

Homebrew setup (volume, style, efficiency): A 5-gallon (19-L) Frankenstein system consisting of a 9-gallon (34-L) brewpot, an 8-gallon (30-L) cooler and a 5-gallon (19-L) electric coffee pot.

Currently fermenting: A 90-shilling Scottish ale.

What's on tap/in the fridge: A dry-nibbed cacao stout, a hoppy American brown and a nutty English brown ale.

How I started brewing: In college, I developed a taste for craft beer but couldn't afford to buy it, so I starting making it. My first beer was an unmitigated disaster, each brew since then has been slightly less of a wreck.

My blog/website: 1,001 Ways to Screw Up Beer: http://screwupbeer.blogspot.com

reader tip

Martin Parmer
Calhoun, Georgia

THE HOP SPIDER (from "Projects" in the December 2011 issue of *BYO*) can also double as an additional filter when draining the mash tun. It caught some fine particulates that were getting through my grain bed. Just thought I'd share!

reader recipe

JUSTIN BALDWIN'S BRUCELLOSIS
(5 gallons/19 L, all-grain)

OG = 1.068 FG = 1.019
IBU = 66 SRM = 40 ABV = 6.3%

Ingredients

10 lb. (4.5 kg) Maris Otter pale ale malt
1.38 lb. (0.63 kg) Munich malt
1 lb. (0.45 kg) crystal malt (40 °L)
1 lb. (0.45 kg) chocolate malt
0.5 lb. (0.23 kg) malted oats
0.25 lb. (0.11) black patent malt
0.19 lb. (86 g) coffee malt
12 AAU Chinook hops (60 min) (1 oz./28 g at 12% alpha acids)
6 AAU Chinook hops (30 min) (0.5 oz./14 g at 12% alpha acids)
6 AAU Chinook hops (5 min) (0.5 oz./14 g at 12% alpha acids)
London Ale yeast

Step by step

Mash grain in 4.5 gallons (17-L) of water at 153 °F (67 °C) for 70 minutes. Sparge with 4.5 gallons (17-L) of 165 °F (79 °C) water.

Boil the wort for 60 minutes. At the beginning of the boil, add 1 oz. (28 g) of Chinook. Add 0.5 oz. (14 g) at 30 minutes and 5 minutes.

Three days before brew day make a starter. Pitch into wort at 66 °F (19 °C) and let the beer raise in tempurature to 68 °F (20 °C). Hold here for a few weeks and it should have a FG of 1.019.

Carbonate to 2 volumes of CO_2. Store at cellar temperatures. This beer is best after a few weeks but will store for a couple of years.

byo.com brew polls

What do you think about craft brew canning trends?

I don't like it — long live bottles! 38%
It's great, I love beer in a can 28%
It's ok, but not a big deal 26%
Whatever, I have no opinion 8%

social homebrews

Join *BYO* on Facebook: www.facebook.com/BrewYourOwn

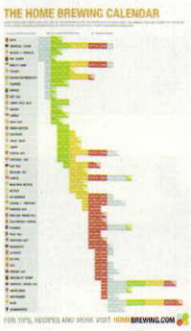
Follow *BYO* on Twitter at: @BrewYourOwn

what's new?

Brooklyn Brewery Steve Hindy Series Beer Kits

Brew your own Brooklyn Brewery-approved beer with the brewery's two Steve Hindy Edition beer making kits. Each kit contains everything you need to make a 1-gallon batch of Brown Ale or Chocolate Stout is included. Each kit includes step-by-step instructions for brewing either a brown ale or a chocolate stout complete with grain, hops and yeast as well as a racking cane, thermometer, clear vinyl tubing with clamp, 1-gallon (3.8-L) glass fermenting jug, sanitizing cleanser, airlock and screw-cap stopper.
$45 per kit, available at **http://store.brooklynbrewery.com**

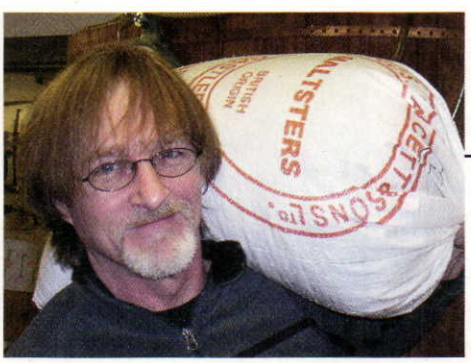
The Homebrewing Calendar



This calendar is an easy-to-use chart for knowing what to brew and when. A great reference for any brewer who has ever wondered when to start brewing a Märzen for Oktoberfest, this handy chart will guide you through what to brew this season. Download the image for free in 28x48 inches or 34x58 inches, or order a copy on heavy archival paper and ink in custom sizes.
www.homebrewing.com/articles/home-brewing-calendar.php

New American Brewers Guild Classes

The American Brewers Guild has announced two new classes for 2012: "Grain to Glass and Boots-On Brewing," a seven-day course in the science, art and practical essentials of producing quality beer (July 29th to August 4th, $2,350); and "Brewing Science for the Advanced Homebrewer," a two-day weekend program aimed at describing the essential brewing science underpinning the process of brewing (September 8th and 9th, $550). Both classes will take place at The American Brewers Guild's 5,600 square foot, modern facility in Middlebury, Vermont.
www.abgbrew.com



calendar

May 5
Greg Noonan Memorial Homebrew Competition
South Burlington, Vermont

The 3rd annual BJCP-sanctioned Greg Noonan Homebrew Competition will be held this year at the Knights of Columbus Hall in South Burlington, Vermont. In addition to the Best of Show award, The Vermont Pub & Brewery will choose an entry to be the winner of the Brewmaster's Cup. The winning beer will be brewed at the brewpub.
Deadline: April 20
Entry Fee: $6.00
Contact: Lewis Greitzer, lewis@together.net (802) 598-9972
Web: www.mashers.org/comp_2012/comp_page1.html

May 19
Annual BEER Brew Off
St. James, New York

Brewers East End Revival homebrew club (B.E.E.R.) is holding its 16th annual homebrew competition once again. The Brewer's Cup winner will have their beer brewed at John Harvard's Brew House. The doors will be open to the public at 4 pm for the awards ceremony.
Deadline: May 12
Entry Fee: $6 per entry
Contact: Matt Bollerman, mbollerm@suffolk.lib.ny.us
Web: http://beerhbc.org/

June 2
MontreAlers Ale & Lager Throwdown
Montreal, Québec

The annual M.A.L.T. competition hosted by the MontreAlers homebrew club is open to all homebrewers across Canada and entries will be accepted in all categories of the 2008 BJCP Style Guidelines except mead and cider.
Deadline: May 5
Entry Fee: $7 per entry
Contact: Anthony Wilson, competition@montrealers.ca
Web: http://montrealers.ca/competition.htm

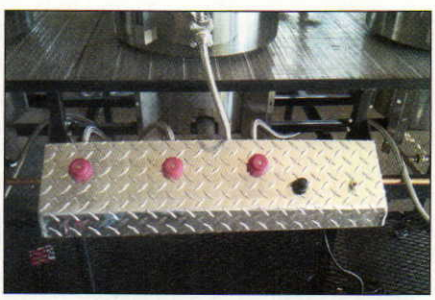
homebrew drool systems

Buffalo Trace Brewery

Jeff Trimble • Carlisle, Indiana

My friends (Dick Knotts, Kyler Knotts) and I have been brewing for a couple of years now, and wanted to step up our production, so we decided to make a new brewing set up. We do extract brewing in the interest of saving time, so this system was designed to do just that.

We started with (3) 15-gallon (57-L) Blichmann brew kettles, Blichmann burners and a March pump. We can pump water or wort from any kettle to any other kettle with the pump and plumbing set up we have. This helps tremendously to top off a kettle to the proper level for the boil.



When the boil is complete we pump through a Chillzilla into our fermenters through the same plumbing. We have a thermometer at the exit of the chiller with a valve to control our exit temperature. All of our plumbing is sweat fitted copper to keep it neat and easy to clean. We have a water filtration system mounted on the set up also. All three burners are equipped with electric spark igniters.

The stainless steel grating we used came from a friend that works in coal mining. The metal from the frame and the plumbing were sourced from local industrial supply stores. The kettle and burners we ordered on the Web. We have put roughly $3,000 into the setup, about half what a similar set up costs to buy new.

So far we have made 40 gallons (151 L) of beer (over two days) with this setup and we are planning more 20-gallon (76-L) sessions. The best feature of our brewery? No lifting hot heavy kettles - the pump does all the work!

beginner's block

BITTERING BASICS

by betsy parks

If you want to make a balanced beer, you need to know something about bittering. The alpha acids in hops bring bitter flavor to your beer so that you can balance out the sweetness of the malt.

Hops are generally divided into two types: bittering and aroma (although some hops can be used for both bittering and aroma). Bittering hops usually have higher percentages of alpha acids, which are the compounds responsible for the bitter flavor, than aroma hops. For example, Galena, one of the most commonly used bittering hops in US commercial brewing, can have anywhere from 10 to 14% alpha acids. Compare that to Cascade, a hop commonly used for aroma in US ales, which can have 4.5 to 8% alpha acids. The higher alpha acids in Galena or other bittering hops means that you could use less hops to bitter your beer than if you used a lower-alpha aroma hop, which can mean the difference between buying a half ounce of hops or two ounces. The aromatic qualities of hops tend to get boiled away, especially when added at the beginning of the hop schedule, so brewers sometimes use a more generic bittering hop at the beginning of the boil without affecting the taste of the beer too much and save their money for adding aroma hops later in the boil or after the boil is over. But like everything in brewing there are brewers who seemingly contradict the rules. The traditional noble hop varieties grown in and around Germany are prized for aroma, but historically have also been prized for their "soft" bittering properties. Some brewers still use these relatively expensive and lower alpha varieties for bittering.

Hops need to be boiled to get the bitterness into the beer. When the bittering hops are added during the boil, the alpha acids isomerize — that is, the resins are changed into different forms that are more water soluble, which are then dissolved into the wort. The more alpha acids in the brewpot, the more bitter the beer. It can take anywhere from 45 to 90 minutes of boiling to isomerize the alpha acids. The longer the hops are boiled, the greater the utilization (up to a point). This is important because timing is everything: if you want to extract a lot of bitterness you will boil the hop longer; less bitterness and more aroma means less boil time. Be sure to follow the hop schedule in your recipe closely.

You will see in *BYO* recipes that hops are measured in ingredients as AAUs, Alpha Acid Units, which is a measurement that applies only to 5-gallon (19-L) batches. For example, in the recipe for "The Replicator" on page 12, the first bittering hop added to the boil is Magnum: "7 AAU Magnum hop pellets (60 min.) (0.5 oz./14 g of 14 % alpha acid)." This is expressed this way because each batch of hops is measured for its percent alpha acids (%AA), which is the amount of bitterness the hops will provide to a beer based on measurements taken in a lab using a spectrophotometer and solvent extraction. The higher the number, the more bitter the hop. The number of ounces of hops to use is multiplied by its alpha acids to get the alpha acids unit (AAU number).

The International Bittering Units (IBU) scale measures the analytical bitterness in beer and does not always correlate with perceived bitterness. Lower values are less bitter and higher levels are bitterer. You will see hops used for bittering measured this way in homebrew recipes, such as in the recipe statistics at the beginning of each recipe in *BYO*. You will also see this information printed on labels for finished craft beers — especially those with an emphasis on hops, such as double or imperial IPAs.

homebrew nation

by marc martin

DEAR REPLICATOR, RECENTLY A FRIEND AND I TOOK TWO DAYS TO DRIVE AROUND CENTRAL TEXAS (MAINLY AUSTIN) TO VISIT NEW BREWERIES. ON OUR WAY TO FREDRICKSBURG WE WERE DRIVING THROUGH JOHNSON CITY AND NOTICED A SIGN FOR PECAN STREET BREWING. THEY HAD ONLY BEEN OPEN FOR A COUPLE OF MONTHS BUT THEY ALREADY HAD SIX HOUSE-BREWED BEERS ON TAP. MY FAVORITE WAS THE PALE ALE. I WOULD LOVE TO KNOW HOW THEY CREATE THIS TASTY BEER. CAN YOU HELP?

PHILLIP JENKINS
HOUSTON, TEXAS

I recently flew to Austin, Texas to visit friends from the local club, the Austin Zealots, where I had earlier served as "Primary Fermenter." Since a side trip to Johnson City makes for a leisurely drive through what is arguably the prettiest part of Texas I decided to check out Pecan Street Brewing myself.

The bar and restaurant Armadillo World Headquarters is one of the most famous in Austin partially because Janis Joplin played informally here. While working at the Armadillo, owners Tim and Patty Elliott met and developed their love of good beer. They opened Pecan Street in 2011 after renovating the old Blanco County Supply building in Johnson City, which was built in the 1950s. It is located right next to the 1890s county jail and that became the origin of the name for their most popular beer, County Jail Pale Ale.

Their son and brewmaster, Sean Elliott, discovered craft beer in 2000 while living in Fort Collins, Colorado. After five years of homebrewing he traveled to England to attend Brewlab in Sunderland and achieved the Certificate of Practical Brewing. He also volunteered to assist in a local English brewery to further develop his skills. Now, all of their beers are based on his previous homebrew recipes. They plan to sell about 350 barrels this year.

I too found their beers to be very good. The pale ale is clear, clean and crisp. The straw-colored body is topped by a fine white head. The late addition hops combined with aggressive dry hopping lead to a remarkable, intense hop nose. The magnum hops provide a smooth bitterness that more than balances the rich maltiness.

Phillip, now you can enjoy your new favorite pale ale anytime because you can "Brew Your Own." For further information about Pecan Street Brewing Company and their other fine beers visit the Web site www.pecanstreetbrewing.com or call the brewery at 830-868-2500. BYO

PECAN STREET BREWING COMPANY'S COUNTY JAIL PALE ALE

(5 gallons/19 L, extract with grains)

OG = 1.050 FG = 1.010 IBU = 40 SRM = 10 ABV = 5.2%

Ingredients

3.3 lbs. (1.5 kg) Coopers light, unhopped, malt extract
1.5 lbs. (0.68 kg) dried malt extract
8 oz. (0.22 kg) 2-row pale malt
22 oz. (0.62 kg) rye malt
10 oz. (0.28 kg) crystal malt (60 °L)
5 oz. (0.14 kg) Carapils dextrin malt
7 AAU Magnum hops (60 min.) (0.5 oz./14 g of 14 % alpha acid)
6.5 AAU Cascade hops (10 min.) (1.0 oz /28 g of 6.5% alpha acid)
6.5 AAU Cascade hops (5 min.) (1.0 oz /28 g of 6.5% alpha acid)
10 AAU Willamette hops (0 min.) (2 oz./57 g of 5% alpha acid)
6.5 AAU Cascade hops (dry hopped) (1.0 oz./28 g of 6.5% alpha acid)
4.6 AAU Crystal hops (dry hopped) (1.25 oz./35 g of 3.65% alpha acid)
½ Tsp. yeast nutrient (last 15 minutes of the boil)
½ Tsp. Irish moss (last 30 minutes of the boil)
White Labs WLP 001 (American Ale) or Wyeast 1056 (American Ale) yeast
0.75 cup (150 g) of corn sugar for priming (if bottling)

Step by Step

Steep the crushed grain in 2 gallons (7.6 L) of water at 152 °F (67 °C) for 30 minutes. Remove grains from the wort and rinse with 2 quarts (1.8 L) of hot water. Add the liquid and dry malt extracts and boil for 60 minutes. While boiling, add the hops, Irish moss and yeast nutrient as per the schedule. Add the wort to 2 gallons (7.6 L) of cold water in a fermenter and top off with cold water up to 5 gallons (19 L).

Cool the wort to 75 °F (24 °C). Pitch your yeast and aerate the wort heavily. Allow the beer to cool to 68 °F (20 °C). Hold at that temperature until fermentation is complete. Transfer to a carboy, avoiding any splashing to prevent aerating the beer and add the Cascade and Crystal dry hops. Allow the beer to condition for one week and then bottle or keg. Allow the beer to carbonate and age for two weeks and enjoy your County Jail Pale Ale clone.

All-grain option:

This is a single step infusion mash using an additional 3 lbs. (1.36 kg) 2-row pale malt and 3.5 lbs. (1.58 kg) of Maris Otter pale malt to replace the liquid and dried malt extracts. Mix the crushed grains with 3.7 gallons (14 L) of 172 °F (78 °C) water to stabilize at 152 °F (67 °C) for 60 minutes. Sparge slowly with 175 °F (79 °C) water. Collect approximately 6 gallons (23 L) of wort runoff to boil for 60 minutes. Reduce the 60 minute hop addition to 0.4 oz. (11 g) Magnum hop pellets (5.6 AAU) to allow for the higher utilization factor of a full wort boil. The remainder of this recipe and procedures are the same as the extract with grains recipe.

Note: Sean recommends a 75-minute boil for an all-grain batch to further caramelize the wort.

Growing Hops

From planting to harvest

by Betsy Parks

IF YOU'VE BEEN EYEING THE SIDE OF YOUR HOUSE FOR PLANTING SOME HOPS, THIS SHOULD BE THE YEAR TO FINALLY DO IT. IN THIS ISSUE, TWO HOP GROWERS ADVISE ON PLANTING SOME HOP HILLS IN YOUR BACKYARD BREWING GARDEN.

Hops grow pretty well across most of the United States, but not so well in the south. They prefer to grow above the 35° latitude, and really prefer 45°. That's not to say that they won't grow in other parts of the country and the world, but that's where they're more native. Historically hops were first cultivated in Western European countries like Germany, and those latitudes are where they tend to do really well.

Will hops grow otherwise? Yes and no. I get calls from people in places like southern Florida and where it doesn't freeze in the winter, and the fact is they're probably not going to do well. Hops like to get frozen in the winter. They are also photoperiodic, which means that they need longer days during the growing season in order to flower. In southern locales, closer to the equator, where the days and nights are more equal, the hops won't get enough light long enough to encourage them to flower. You can overcome this by supplementing light with a floodlight to try and match the days in a 45°-like latitude (like ours in Corvallis, Oregon).

If you are planting hops in the right zone and wanted to plant a few rhizomes, I'd say try planting an aroma and a higher alpha hop and see how it goes. For example, an aroma hop like Cascade and a Nugget or Galena for higher alphas. Both of those varieties are fairly vigorous and disease resistant and if you did well you could probably get perhaps a pound or up to two pounds of hops from one plant.

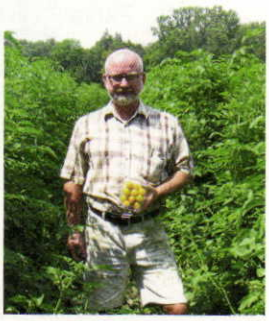
The problems that come up for home hop growers stem from the thinking that they don't think they need to pay attention to the bines. People think you can plant these things and let them go. They won't water them, the bines get mildew, aphids, Japanese beetles and so on and they don't spray. I don't care where you're growing hops, they can all get pests or disease. Commercial growers have a very vigorous spray program to combat powdery mildew, hop aphids and spider mites, the problems just depend on where you grow. Dry climates can have more problems with spider mites, for instance.

Regardless of where you grow, watch the underside of the leaf — that's where the aphids and the mites like to hang out. Check out my website http://freshops.com/hop-growing/hop-gardening for pictures of pests and molds to look out for. If you find yourself with a problem it is better to nip it in the bud early. You can spray your bines with a small backpack blower. I use a that kind of blower sprayer with a tank on it to get the leaves really blowing — whatever you spray it's got to touch the leaves and the insects. You have to decide if you're going to go organic or not, too. I try and stay as organic as possible, but sometimes I have to break out the big guns.

Hops also need to be watered a lot in the first year. The first year is spent establishing roots, so give them frequent shallow waterings. Once they get mature, the roots go three or four feet down and you can give them less frequent deep waterings with drip irrigation.

You should also fertilize — anything that grows as big as a hop bine in three months needs nitrogen. Try an all purpose fertilizer like Miracle Grow, or just add lots of compost and manure to the soil when you plant. If you want to be sure of what you need, look at your local soil and talk to local nursery staff in your area.

Dave Wills, Owner and Founder of Freshops in Philomath, Oregon. Dave is a longtime homebrewer, hop grower and also brews commercially at the Oregon Trail Brewery in Corvallis, Oregon. Freshops sells hops and hop products to home and craft brewers and homebrew retailers as well as growing some hops themselves and buying fresh hops from other producers.



Rick Pedersen, owner of Pedersen Farms in Seneca Castle, New York with his wife Laura. Rick graduated from Cornell University in 1981 with a BS in vegetable crops. He planted his first hops in 1999 and currently has 11 acres in production. Pedersen Farms sells 15 varieties of hops as fresh, whole, ground or pelleted.

Anybody can grow hops on a small scale. They are fairly easy to grow and fairly manageable. In fact some people grow hops just for the look of them — they make patterns on their house — shape of a heart, cross. You don't need a trellis. You can put them on the side of a house, barn, flagpole — anything at least 12 feet high (16 feet is better, but 12 is about the minimum).

After you plant the first year you shouldn't expect anything — you may get a few handfuls of cones. The first year the plant is just trying to get started and healthy. Leave it up after harvest, and harvest by hand. The second year, if everything goes right, expect about 80% of the crop potential, and third year a full crop.

When planting, mulching doesn't hurt and helps conserve the water. The plants need to be in full sun — anything less and you won't get a full crop. They also need good air movement rather than tucked into a corner or you will have more disease problems. They need well-drained soil as they don't like wet feet — don't plant them in a spot with a lot of clay or place where water stands anytime of the year or they will have a short life.

When you choose what to plant, do your research. There's plenty of information on the Internet to help you match something to where you live. Oregon State has produced a couple of really good publications for free with charts with varieties, yield and disease resistance. Your choice really depends on the climate. The wetter the location the more you have to worry about the molds, etc.

One of the things to keep in mind is harvesting. Harvesting five or six hills is fun; harvesting 100 hills is not so much fun. It takes about an hour to pick a vine, so keep that in mind when you plan your rhizome purchases.

If you do try growing your own hops, go on the Internet and talk to other people who are doing it — there are no end to the number of people and ideas out there for growing hops. BYO

Preventing Oxidation

Gluten-free brewing, keg pressure

by Ashton Lewis 

Q DOES ADDING PRE-BOILED WATER TO THE CARBOY AFTER I RACK MY BEER HELP AGAINST OXIDATION (LESS HEADSPACE) OR HURT IT (RISK OF SPLASHING)?

ADAM WOODS
BELDING, MICHIGAN

A Headspace can cause oxidation, especially in secondary fermenters. Anything that is done to eliminate air helps minimize oxidation. And adding de-aerated water can reduce the odds of oxidation, but the process deserves more than a simple answer. So read on Adam!

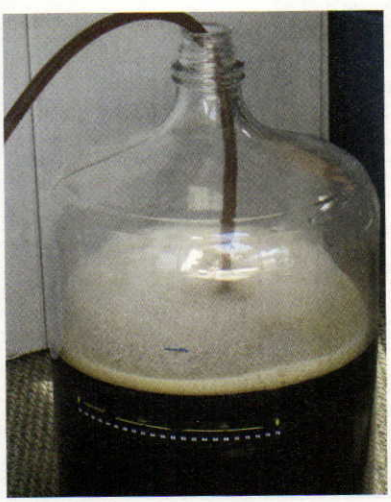
In the parlance of commercial brewing this method is typically referred to as high gravity brewing, or simply HGB. The idea with HGB is simple; a brewery can expand the production capacity of a fermenting vessel by brewing high gravity wort in the brewhouse and then diluting the beer post fermentation. The primary motivation to use HGB is monetary since fermentation vessels represent a major expense in terms of capital costs, floor space and labor associated with cleaning, filling and racking. It is fairly common to "extend" a batch by around 25% between the fermenter and package with HBG. There are some breweries who have invested a lot of serious talent into very high gravity brewing (VHGB) and routinely brew lagers with an original gravity in-line with a doppelbock, but the finished color, aroma and flavor of a pale lager.

The challenge with HGB, and particularly with VHGB, is that yeast are temperamental little critters and generally don't like it when wort gravity gets too high. In a brewery brewing a large volume of normal gravity beer and a smaller volume of high gravity specialties it is common to pitch yeast from normal brews into specials and then to retire the yeast from the special at the end of fermentation. But when you brew everything from high gravity wort much greater focus is placed on yeast because of the harsher conditions.

Furthermore, the biochemical pathways used for metabolism are affected by wort gravity and this has a direct influence on finished beer aroma. Most brewers utilizing HGB methods want to brew beers that taste very similar to beers brewed at gravity, meaning no dilution, and much of the research conducted by these brewers relates to this particular "magic trick."

Now onto your question about water . . . boiling water does indeed kill microorganisms that may be living in it and it also decreases the oxygen content. But the oxygen content does not get nearly as low as some may believe because even when water is boiling it is still being exposed to atmospheric pressure and the two variables affecting oxygen solubility in water are temperature and pressure. This means that there is still about 5 ppm of oxygen dissolved in boiling water, and this is far, far greater than the targets of commercial brewers. Most breweries these days have some method for making and storing de-aerated, carbonated water (DCW). At Springfield Brewing Company we make DCW and use it for filter and

"When you brew everything from high gravity wort much greater focus is placed on yeast because of the harsher conditions."



line presses when we move beer. High gravity brewers use DCW to blend with beer and the oxygen targets in DCW are typically less than 20 ppb . . . or 250 times lower than the oxygen content of boiled water. This means that topping your fermenter up with boiled water is actually not a good method of controlling oxidation.

Most systems used to produce DCW use gas flushing under vacuum or membrane diffusion. It is possible to strip oxygen from water by bubbling nitrogen into it. This is what we do at Springfield Brewing Company and empirically I know that it works, but since we currently do not own a dissolved oxygen meter I do not know the oxygen content of our homemade DCW. I do know that when we began making DCW that oxidized notes in our beer following filtration (our filter runs begin and end with water presses) disappeared.

To sum it up, this method you propose using does work, but you need to use water that is de-aerated by a better means than boiling. It also can be used to stretch your volumetric yield but you need to plan for this and brew beer that is concentrated and intended for later dilution.

Q

CAN 3-GALLON (11-L) BATCHES OF BEER BE FERMENTED IN 5-GALLON (19-L) CARBOYS — PRIMARY AND SECONDARY?

PAT FITZWATER
BATH, NEW YORK

A

If you brew a 3-gallon (11-L) batch and ferment the beer in a 5-gallon (19-L) carboy you will be just fine with respect to the oxidation issue, and the beer will ferment without other issues. In fact, having enough headspace to prevent foaming over during fermentation is the norm in commercial breweries where foam spewing from the top of the fermenter equals beer loss. This costs money and businesses are not keen on seeing money flowing from tanks. However, many breweries see a benefit from having trub stick to the fermenter sides and top, and in some cases false roofs are installed to help skim this bitter trub from the beer. This is one reason that brewers who use open fermenters skim their fermenters.

When fermentation is over you need to be careful not to oxidize the beer during racking. Transferring 3 gallons (11 L) of beer from a 5-gallon (19-L) fermenter into a 5-gallon secondary fermenter, a clean carboy for example, is a practice I would perform with great caution. Since yeast activity is very low at this stage of the process you can have real problems associated with air pickup.

In all honesty, racking beer into a secondary is a practice frequently omitted by home and commercial brewers because it is often times totally unnecessary. If you are racking beer onto something, like fruit, then the practice has merit. Or if you plan on prolonged aging and want to remove the beer from yeast it also makes sense. But for most beers with a two to three week total process time racking into a secondary fermenter does not do much.

Aggressively purging carbon dioxide in the carboy prior to racking is one way to greatly minimize air pick-up. The best way to do this is to put a tube all the way to the bottom of the secondary and slowly flow carbon dioxide into the vessel so that it creates a layer at the bottom of the vessel and pushes the air through the top. Another method is using a keg for your secondary; kegs can be filled with water and completely filled with carbon dioxide before filling. For the super cautious brewer, this alternative method allows racking to occur without future worry!

Q MY GOOD FRIEND IS GLUTEN FREE AND I HAVE BEEN BREWING FOR SOME TIME NOW AND WE HAVE TALKED ABOUT MAKING A GLUTEN-FREE BEER FOR HIM TO ENJOY. MY LOCAL HOMEBREW SHOP SELLS GLUTEN-FREE EXTRACT BUT I AM LOOKING FOR MORE TO ADD. HE ONCE TASTED A BLACK IPA AND ENJOYED IT A LOT. WHAT ARE THINGS I CAN ADD TO MAKE A BETTER BEER? WOULD SOAKING UNCRUSHED BLACK OR CHOCOLATE MALT IN COLD WATER RESULT IN GLUTENS? IS LACTOSE SUGAR OKAY TO USE OR WILL THERE BE GLUTENS LEFT? WHAT ARE SOME OTHER GRAINS TO ADD OR ROAST MYSELF TO ADD SOME COMPLEXITY?

MIKE DELLEMANN
STEVENS POINT, WISCONSIN

A Celiac Disease is an immune reaction to certain gluten proteins found in wheat, barley, rye and oats. This means that when a brewery brews a beverage specifically for this group of people great caution must be taken to prevent these special gluten-free beers from being contaminated by the normal brewery environment. This is not an easy thing to do in a commercial brewery since malt conveyors, mills and hoppers are not typically cleaned like other brewing equipment because dry handling equipment has different cleaning requirements than equipment used to handle liquids. At home things are much easier to control.

And this begins with yeast. If you buy liquid yeast starters there is a chance that the starter could contain gluten proteins because wort is a great growth media and brewers like pitching yeast grown in wort. Even dried yeast can be an issue since it is also grown in some media. In order to be sure you begin with gluten-free yeast, talk to your yeast supplier to be sure that it is gluten free. Or, you can grow your own yeast by beginning with microbiological plating, followed by propagation in gluten-free wort.

Gluten-free extract is a great way to make your wort since the suppliers of these extracts have really done the hard part. The most common grain used for gluten-free beer is sorghum and the gluten-free extracts I have seen are predominately made from sorghum. Other common gluten-free ingredients include honey, sugar, rice and maize.

The challenge that is often faced is adding colors and flavors to sorghum malt for specialty beers. All special grains made from wheat, barley, rye and oats are off-limits, and cold extraction methods like you describe do not make them okay to use.

Ingredients like coffee, chocolate, fruit, peppers, spices, molasses, roasted pumpkin and oak would be easy to use to augment a relatively bland sorghum extract base. A chipotle porter could be made using ingredients like chicory and cocoa as a substitute for roasted malt/barley and the beer further flavored with chipotle peppers for richness. You could also try brewing some sort of high gravity beer, darken it using black treacle, gently spicing with something like black cardamom powder and then age it on oak (or with oak chips) to add another layer of complexity.

Q I BOUGHT A KEG SYSTEM ALONG WITH A CO_2 TANK AND TWO USED 5-GALLON (19-L) SODA TANKS. I REBUILT BOTH TANKS USING NEW O-RINGS AND VALVES. I HAVE MADE FOUR BATCHES OF BEER SINCE JUNE, TWO LAGERS AND TWO ALES. THE ALES ARE ALWAYS CARBONATED, BUT THE LAGERS LOSE THEIR CARBONATION OVER TIME. ANY SUGGESTIONS?

FREDERIC DREVES
TRAVERSE CITY, MICHIGAN

A I think that there is nothing wrong with your equipment or beer. I think the problem is with the way you are setting up your dispense rig. Specifically, I think that your carbon dioxide pressure is too low for your lagers.

For the sake of argument, I will assume that your lagers are carbonated to a level of 2.6 volumes of carbon dioxide. Why do I assume this? Because this is the carbonation level of most lagers. This corresponds to about 13.5 psig at 40 °F (4.4 °C), a relationship handily displayed in carbon dioxide solubility tables (go to http://goo.gl/Ch9hu to print out a copy of this snazzy table).

As for the ales, this is where I am guessing, and my guess is that you carbonated your ales lower than your lagers, maybe around 2.45 volumes or 12 psig at 40 °F (4.4 °C). The problem is that you have two kegs of beer stored in one refrigerator and connected to the same gas tank. If the tank pressure is adjusted to maintain the carbonation level of your ales, then your lagers will slowly lose carbonation during storage. Likewise, if your gas pressure is set for your lagers, the ales will gain carbonation over time. You can carbonate your ales and lagers to the same carbonation level so that you don't need any more equipment. Or, you can set up a gas manifold with more than one line regulator and adjust the pressure on the keg to match its carbonation level. BYO

Saison

Spring and summer sipper

by Jamil Zainasheff

Sometimes I think defining saison is a lot like defining pornography: I know it when I see it (or rather, taste it). There is such a wide variation in the farmhouse ales of Wallonia (the French-speaking part of Belgium), that I think it is foolish to state that a beer brewed by one brewery is a saison and another beer is not simply because of relatively small differences in color, strength, or bitterness. The BJCP takes the approach of placing such beers in the Belgian specialty category. That is not an unreasonable approach, but it does seem somewhat limited.

The BJCP defines saison as, "A refreshing, medium to strong fruity/spicy ale with a distinctive yellow-orange color, highly carbonated, well hopped, and dry with a quenching acidity." Many knowledgeable people would argue with many elements of that statement, but we should not discount it completely. It does accurately describe a portion of the beers that most of us would call saison.

The best way to "define" saison might be to look at the intent of the brewers back in the day. In theory, they brewed this beer at the end of the fall for drinking over time through the warmer months. It had to be big enough to last for most of the year but not so strong that it was not quenching and refreshing in the summer. They used many local ingredients, and I have read that perhaps it was a method of storing excess grain.

Let us focus on the narrower BJCP example. This is a beer of high fruitiness (think citrus such as oranges and lemons) with little hop aroma of a spicy or floral character. Light spicy notes from yeast or spice additions are often present. The appearance ranges from golden to pale orange to amber in color. Malt character is low and leans more toward bready than toasty. The BJCP talks about tart sourness, but that is a function of storage time and bacteria levels. I would bet that the brewers of old started to consume their beer as soon as it was fermented and carbonated. If it was a good drink later as it soured, that was fine too. One thing that I think was important to the beer is adequate attenuation. If this were a beer to be consumed during the work of spring and summer, then a dry, refreshing finish would be important.

The base malt for this style is continental Pilsner malt. Pilsner malt lends a slightly sweet, grainy malt character to the beer. If you can source it, Belgian Pilsner malt is ideal. If you cannot, do not worry, even the Belgian brewers use other continental Pilsner malts. If you are an extract brewer, try to use an extract made from Pilsner malt. While it may seem like it is not worth the trouble, a beer like this does not have a lot of specialty malts to hide behind, so it is important to use a good quality Pilsner malt extract. While you could use just Pilsner malt, I think a portion of Munich, Vienna or wheat is a good addition. It adds that bready malt character without being overly sweet. If you are going to experiment, keep the bulk of the specialty malts targeted on the grainy/bready malt flavors (such as biscuit, aromatic, Vienna, or Munich) and not the sweet ones (crystal/caramel malts). However, a small amount of crystal malt can help dial in that orange-type color of the classic examples. Just be sure that you do not overdo it and end up with a too sweet caramel character. Some table sugar, especially for extract brewers, will help the beer finish dry and light. Keep the non-Pilsner malts around 10% of the total grist and the table sugar around the same.

Since this is a beer with a crisp finish, all-grain brewers should target a mash temperature around 149 °F (65 °C), regardless if this is a bigger or lighter example of the style. For extract brewers, most light colored

Continued on page 21

SAISON
by the numbers

OG:	1.048–1.065 (11.9–15.8 °P)
FG:	1.002–1.012 (0.5–3.1 °P)
SRM:	5–14
IBU:	20–35
ABV:	5–7%

Photo by Charles A Parker/Images Plus

Saison Ale
(5 gallons/19 L, all-grain)

OG = 1.060 (14.8 °P)
FG = 1.008 (2.0 °P)
IBU = 27 SRM = 5 ABV = 6.9%

Ingredients

9.37 lb. (4.25 kg) Best Malz continental Pilsner malt (2 °L)
0.88 lb. (400 g) cane or beet sugar (0 °L)
0.66 lb. (300 g) Best Malz Munich malt (8 °L)
0.66 lb. (300 g) Great Western wheat malt (2 °L)
0.66 lb. (300 g) Malteries Franco-Belges CaraMunich malt (60 °L)
5.64 AAU Hallertau hops (1.41 oz./40 g at 4% alpha acids) (60 min.)
3.36 AAU Hallertau hops (0.84 oz./24 g at 4% alpha acids) (0 min.)
White Labs WLP565 (Saison Ale) or Wyeast 3724 (Belgian Saison) yeast

Step by Step

Belgian Pilsner malt would be the natural choice for the base malt, but you can substitute any high quality malt of a similar flavor and color from a different supplier. I use the cheapest grocery store table sugar I can find. You can spend money on Belgian candi sugar, but I do not feel that the cost is worth it.

Mill the grains and dough-in targeting a mash of around 1.5 quarts of water to 1 pound of grain (a liquor-to-grist ratio of about 3:1 by weight) and a temperature of 149 °F (65 °C). Hold the mash at 149 °F (65 °C) until enzymatic conversion is complete. With the low mash temperature, you may need to lengthen the rest time to 90 minutes or more to get full conversion. Infuse the mash with near boiling water while stirring or with a recirculating mash system raise the temperature to mash out at 168 °F (76 °C). Sparge slowly with 170 °F (77 °C) water, collecting wort until the pre-boil kettle volume is around 6.5 gallons (24.4 L) and the gravity is 1.047 (11.6 °P).

The total wort boil time is 90 minutes, which helps reduce the S-Methyl Methionine (SMM) present in the lightly kilned Pilsner malt and results in less Dimethyl Sulfide (DMS) in the finished beer. Add the bittering hops with 60 minutes left in the boil. Add the sugar and Irish moss or other kettle finings with 15 minutes left in the boil. Add the last hop addition just before turning off the burner. Chill the wort rapidly to 68 °F (20 °C), let the break material settle, rack to the fermenter, pitch the yeast and aerate thoroughly.

You will need two packages of liquid yeast or for better results you can make a 2-L starter from one package. Pitch yeast at 68 °F (20 °C), aerate or oxygenate, and let the temperature rise slowly to 82 °F (28 °C) over the course of one week. Ferment until the yeast drops clear. With healthy yeast, fermentation should be complete in a week, but do not rush it. It is important for the beer to attenuate fully. When finished, carbonate the beer to approximately 3 volumes and serve at 45 to 50 °F (7 to 10 °C).

If you have trouble getting enough attenuation, you can hold off on adding the sugar to the boil. Instead, after the fermentation looks like it has started to slow, mix the sugar with just enough boiling water to make a syrup, then add that to the fermentation. This should encourage the yeast to consume the longer sugars before you add a substantial amount of simple sugar.

Saison Ale
(5 gallons/19 L,extract with grains)

OG = 1.060 (14.8 °P)
FG = 1.008 (2.0 °P)
IBU = 27 SRM = 5 ABV = 6.9%

Ingredients

6.6 lb. (3 kg) Pilsner liquid malt extract (LME) (2 °L)
0.88 lb. (400 g) cane or beet sugar (0 °L)
0.66 lb. (300 g) Best Malz Munich malt (8 °L)
0.66 lb. (300 g) Great Western wheat malt (2 °L)
0.66 lb. (300 g) Malteries Franco-Belges CaraMunich malt (60 °L)
5.64 AAU Hallertau hops (1.41 oz./40 g at 4% alpha acids) (60 min.)
3.36 AAU Hallertau hops (0.84 oz./24 g at 4% alpha acids) (0 min.)
White Labs WLP565 (Saison Ale) or Wyeast 3724 (Belgian Saison) yeast

Step by Step

Mill or coarsely crack the specialty malt and place loosely in a grain bag. Avoid packing the grains too tightly in the bag, using more bags if needed. Steep the bag in about ¾ gallon (~3 liters) of water at roughly 155 °F (68 °C) for about 30 minutes. Lift the grain bag out of the steeping liquid and rinse with warm water. Allow the bags to drip into the kettle for a few minutes while you add the malt extract. Do not squeeze the bags. Add enough water to the steeping liquor and malt extract to make a pre-boil volume of 5.9 gallons (22.3 liters) and a gravity of 1.051 (12.6 °P). Stir thoroughly to help dissolve the extract and bring to a boil.

Once the wort is boiling, add the bittering hops. The total wort boil time is 60 minutes after adding the bittering hops. Add the sugar and Irish moss or other kettle finings with 15 minutes left in the boil. Add the last hop addition just before turning off the burner. Chill the wort rapidly to 68 °F (20 °C), let the break material settle, rack to the fermenter, pitch the yeast and aerate thoroughly.

Follow the remaining fermentation and packaging instructions for the all-grain version.

extracts are not fermentable enough on their own, but with a portion of simple sugar (table sugar), it should attenuate enough. You will still want to buy an extract that attenuates well or you will need to make your extract-based wort more fermentable by replacing more of the extract with table or corn sugar. About 7% to 10% of the extract weight as table sugar should yield good results. There is no need to use special sugars. The cheapest grocery store brand of sugar is perfect. Beet sugar or cane sugar, it does not matter.

A big part of the dryness and bittering of a good saison comes from alcohols, carbonation, acidity and hops. I prefer to stick with noble hops such as Saaz, Hallertau or Tettnang. Styrian Goldings, Kent Goldings and in a pinch other varieties such as Mount Hood or Liberty are fine as well. I prefer a single large charge of low alpha hops near the beginning of the boil. With the light malt character, the flavor of that early addition will carry through and will provide a subtle hop character. Nowadays more brewers are experimenting with increased hop character in these beers, but it takes a deft hand to avoid overdoing it. A single, small addition near the end of the boil is about all you should add if you still want to consider the beer a "traditional" example. If you go with much more than that, you risk ending up with excessive hop character. The bitterness-to-starting gravity ratio (IBU divided by OG) ranges between 0.3 and 0.7, but I like to target approximately 0.4, because the very dry finish accentuates the bittering addition. If you are targeting a sweeter finish, then maybe you up the bittering ratio to 0.5, but rarely will you want to exceed that target.

The characteristic fruity/spicy flavors and aromas of this style come from fermentation, although some brewers do add spices. While some brewers may add spices, I prefer the more subtle and complex spiciness that fermentation develops.

There are several great yeast strains for brewing this style, but two of my favorites are White Labs WLP565 (Saison Ale) or Wyeast 3724 (Belgian Saison). Other excellent choices are WLP566 (Belgian Saison II), WLP568 (Belgian Saison Blend), Wyeast 3711 (French Saison) and Wyeast 3726 (Farmhouse Ale). You cannot go wrong with any of these yeast strains. Whatever strain you use, remember that your fermentation conditions affect what flavors and aromas the yeast produce.

Pitching rate, oxygen level, nutrients, and temperature are like dials on your control panel of fermentation flavor. Getting the right settings is your job as a brewer.

One question that many brewers have about these beers is fermentation temperature. Often homebrewers will say, "Brewery X ferments their beer at xx °F, so that is the fermentation temperature I use." That

most likely will not be the right temperature for you if you are trying to make a beer like theirs. There are many other factors that go into brewing than temperatures. For example, fermenter height plays a role in flavor development, with very tall fermenters (like big commercial cylindroconical types) suppressing ester and fusel alcohol production. The shape of the brewery's fermenters, their pitching rates, their oxygen levels, their yeast collection and repitching methods may all be different than yours, changing the production of esters, fusel alcohols and other aspects of fermentation. When you use the same fermentation temperature in your brewery with disregard for the other parameters, you may end up with fruit salad dissolved in paint thinner. Well, maybe not that bad, but pretty darn

Saison Commercial Examples

Anna
Hill Farmstead Brewery
Greensboro Bend, Vermont
www.hillfarmstead.com

Bam Bière
Jolly Pumpkin Artisan Ales
Dexter, Michigan
www.jollypumpkin.com

Fantôme Saison D'Erezée - Printemps
Brasserie Fantôme
Soy, Belgium
www.fantome.be

Hennepin
Brewery Ommegang
Cooperstown, New York
www.ommegang.com

Publication
Russian River Brewing Co.
Santa Rosa, California
www.russianriverbrewing.com

Red Barn Ale
The Lost Abbey
San Marcos, California
www.lostabbey.com

Saison 1900
Brasserie Lefèbvre
Rebecq-Quenast, Belgium
www.brasserielefebvre.be

Saison Brett
Boulevard Brewing Co.
Kansas City, Missouri
www.boulevard.com

Saison Dupont
Brasserie Dupont
Tourpes, Belgium
www.brasserie-dupont.com

Saison Regal
Brasserie Du Bocq
Yvoir-Purnode, Belgium
www.bocq.be

Saison Rue
The Bruery
Placentia, California
www.thebruery.com

close. Get to know the beer style intimately and work on adjusting your process until you are making an outstanding example.

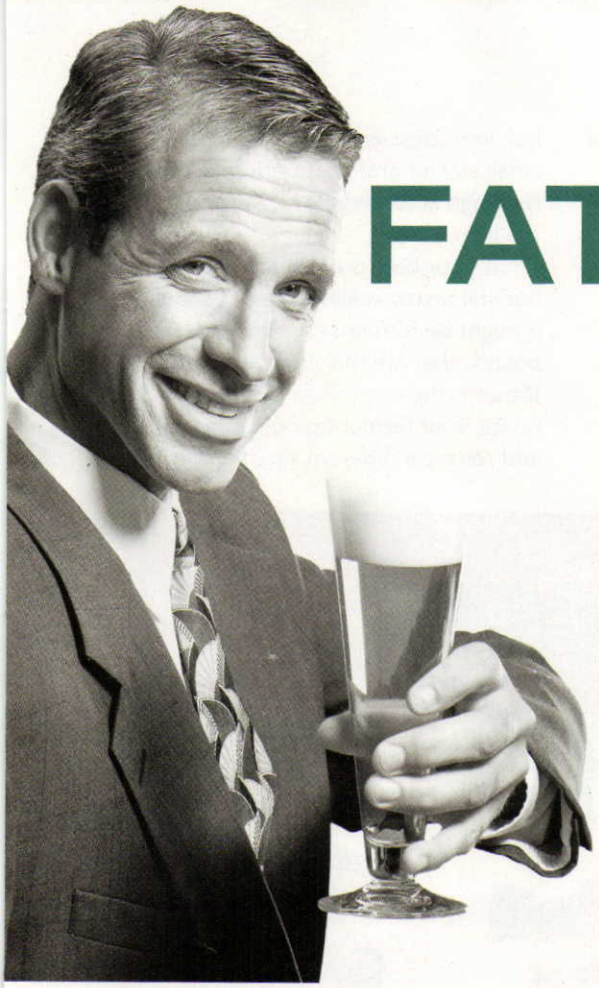
With most of these yeasts I recommend pitching at a rate of 0.75 million cells per milliliter per degree Plato (see the pitching rate calculator at www.mrmalty.com for help in calculating this for your beer). Pitch the yeast and allow 12 to 36 hours for the majority of yeast growth, then ramp up the temperature for the rest of fermentation to ensure good attenuation. For example, pitch the yeast at 68 °F (20 °C) and at the end of the next day slowly begin raising the temperature each day. Try to end up at 82 °F (28 °C) by the end of one week. You may find a higher or lower temperature or a faster or slower rise in temperature gives you the ideal result, so do not be afraid to tweak the parameters until you get it right.

One concern when brewing this style is getting enough attenuation. Many brewers go with lower and lower mash temperatures in an attempt to achieve this, but that is not always the problem. It is not that you need to get rid of all of the long chain dextrins to make a dry beer. Those dextrins are not very sweet and they can be present in a nice, dry beer. The important thing is to make sure you ferment out all of the simpler sugars completely. If you leave a lot of unfermented maltose, then the beer is going to taste sweet, even though it might attenuate well. A healthy pitch of yeast, aerating or oxygenating, and controlling temperatures are the keys to getting a dry finish.

If you are having trouble getting a dry beer, one trick that seems to help is waiting near the end of fermentation before adding the simple sugars. Wait until fermentation has started to slow and then add the sugar. Adding the sugar after the yeast has consumed the maltose is like telling your kids to finish their dinner before they can have dessert. If you do not do that, sometimes they will fill up on dessert first and won't eat their dinner afterwards. When I do this, I dissolve the sugar in just enough boiling water to make a thick syrup and add it to the beer when it has cooled.

If all else fails and you still are not getting full attenuation, you can pitch actively fermenting lager yeast into the stuck beer, which will consume some complex sugars that the ale yeast will not. Do not add this extra dose of yeast if they are not in an active fermentation state, because they will just settle out in a high alcohol, low sugar environment. Make a small starter and wait until the yeast is at high kräusen before you add it to the beer.

If your beer is attenuating properly but still tastes sweeter than it should, it might be fermentation related compounds that are making it seem sweet. If that is the case, then you need to revisit your fermentation parameters and /or try a different yeast strain. BYO



FATHER'S DAY GIFT GUIDE

Sunday, June 17th is Father's Day. Let's face it, your dad already has a closet full of ties, a glovebox overflowing with roadmap atlases and a cupboard full of #1 Dad mugs from Father's Days past. Doesn't he deserve to get some gifts this year that he'll really enjoy?

This Father's Day give him something he'll really use. Imagine his surprise when you show up with some of the fine beer and brewing related items on the next several pages to make him feel extra special. How about also bringing a six-pack, or better yet – a fresh Corney keg, of homebrew to let him know how much he means to you. If you're the homebrewing dad of the family, leave your copy of *BYO* on your wife's desk open to these pages or put them up on the refrigerator. Don't be shy – it's your day. Make sure your family knows what you'd really like to get this year that'll say, "Thanks, Dad," more than anything they might think you want.

So what are you waiting for?! Check out these goodies for great gift ideas for your homebrewing dad or to make your own Father's Day wishlist.

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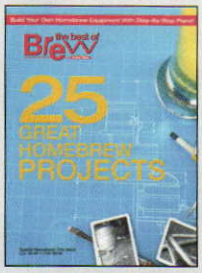

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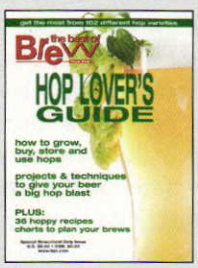

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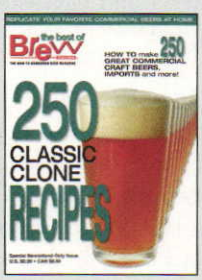

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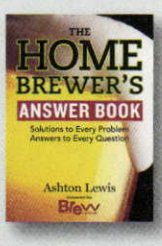

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GROW Your Own

GROWING **BITTER** ABOUT **BREWING**

Story by **Darren Foulds**

Is there a homebrewer among us who hasn't at one time or another dreamed of becoming totally self-sufficient? Well, the truth is, we will probably never isolate our own strain of yeast from the wild. Maybe someday, if we befriend a farmer, we'll grow and malt some barley. But let's not be bitter about brewing. We can grow bitter! With only a little bit of work, everything we need to bitter our brew can be planted and harvested, right in our own backyard.

What Can We Grow?

The first thing that often comes to mind when a homebrewer decides to plant a brew garden is usually hops. After all, so many of us brew our own beer because we love hops. And hops are a great place to start. With enough attention they can be grown all over the place from Canada to California.

If you're a little more adventurous, or want to try bittering in a historic style, consider a gruit garden. Gruit is an ancient mixture of herbs, historically used by brewers in Britain and across Europe

Photo by Jason Perrault

before hops became widely available and understood as a great bittering and preserving agent.

Mugwort, heather and creeping charlie are traditional plants grown for gruit. Add them to your boil with a generous helping of wild honey to brew an ancient Scottish ale.

Many herbs grow well across the country, like basil, sage and coriander. We can use them to balance our malty brews and they are super easy to include in many meals. Herbs make a good choice for the homebrewer who simply wants to add a few things to their existing garden that will serve double duty as brew ingredients and kitchen staples.

Hop It Up!

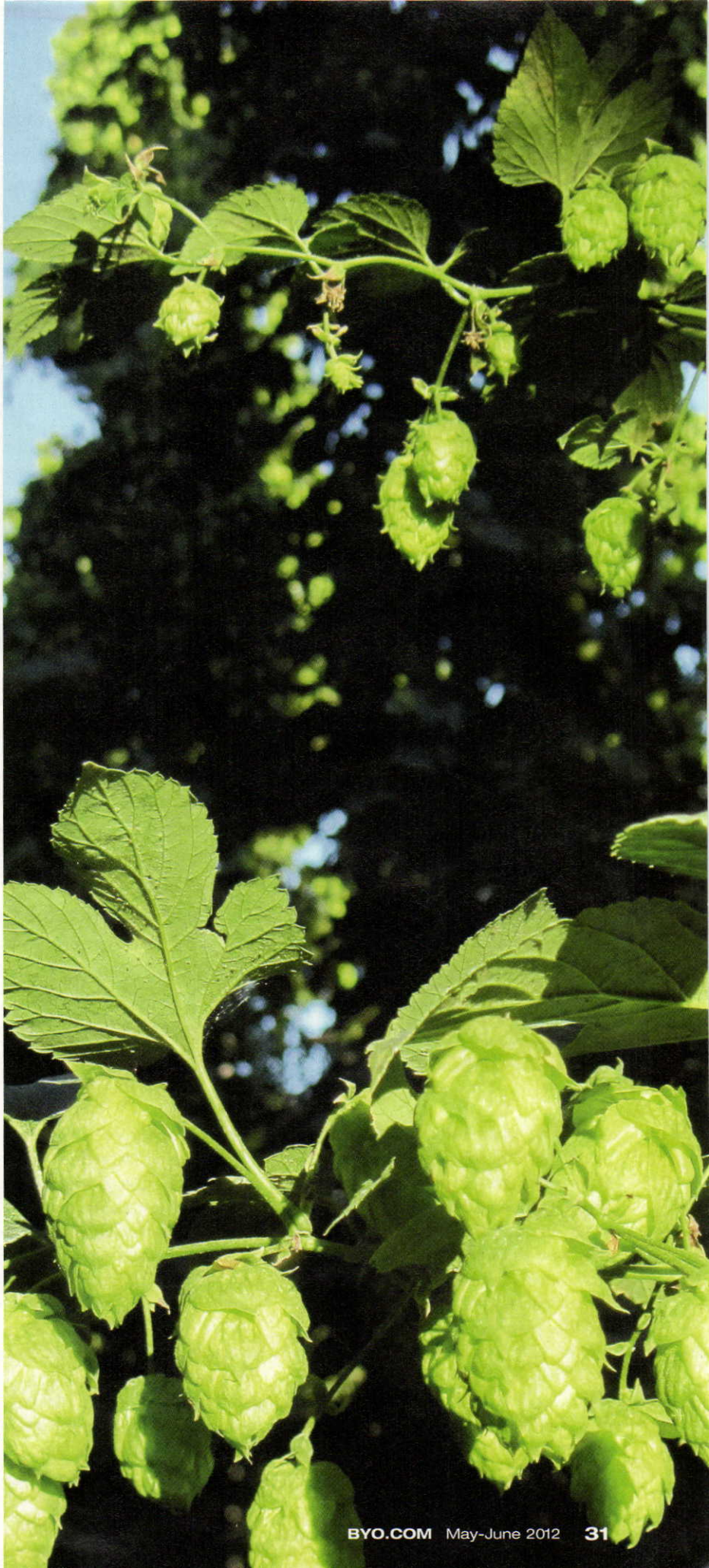
We all know that hops are the cones that bitter our brew. They provide the balance to the malty sweetness of our beers' barley backbone. Here is a brief introduction to growing your own hops. For a more complete summary, see *Brew Your Own's Hop Lover's Guide* special issue.

Hops grow best in the damp but temperate areas like the Pacific Northwest. A USDA plant hardiness zone of six or seven will provide ideal conditions for temperature and growing season, but I know of successful hop growers in Canada's Zone Three and Texas' Zone Eight. The most important requirement for growing hops is care.

Hops grow on bines, climbing vines that adhere to their substrate without tendrils. To grow them, a hop rhizome (an underground stem) is planted in some well-drained soil as early as it is workable. Roots will grow down from the rhizome and bines will pop out of the ground when the days get warm.

In the springtime, hop plants like to be well watered. They don't require soaking wet soil, but daily, deep watering will aid their early growth spurts. It's important to ensure that rain and water will drain into the soil and away from the roots. You will be able to measure your hops' growth daily in inches once they take off.

Hops also need plenty of sunshine. Plant them facing south where they'll get at least eight hours of sun a day. If



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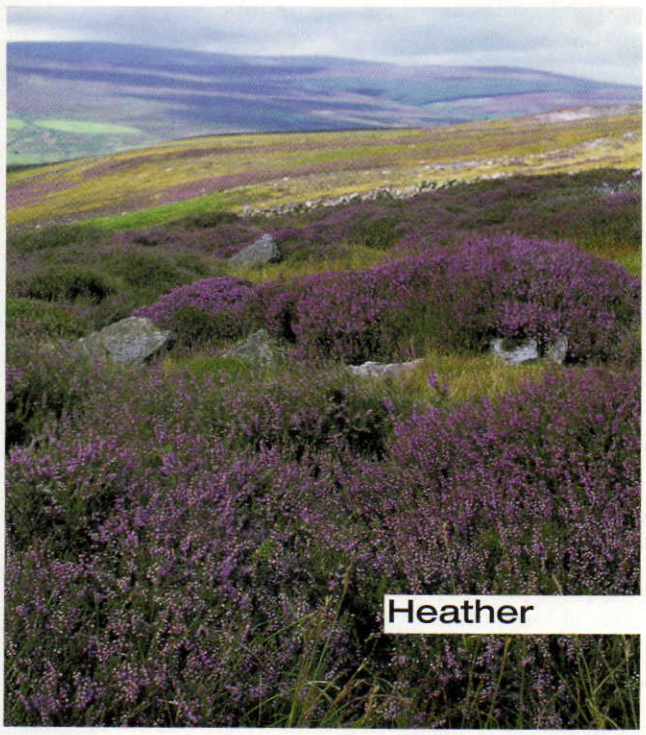
Creeping Charlie



Heather

Mugwort

If you want to go beyond just hops in your homebrewing garden, try growing your own ancient gruit garden. Before hops were discovered, beer was brewed with a mixture of herbs called gruit. (In modern times, the beer that is bittered by a mix of plants is what is called "gruit." For example, Posca Rustica from Brassiere Dupont. One herb mix for gruit includes heather (above, right), Creeping Charlie (above, left) and Mugwort (lower, left). For more information about brewing your own gruit including other herb possibilities, read Horst Dornbusch's article on gruit ales by following this link: www.byo.com/component/resource/article/734 or try brewing your own gruit at home with this recipe: www.byo.com/component/resource/article/1904

you can't plant them facing south, plant them facing west so they can warm up in the morning and soak up all the afternoon and evening rays.

In the spring, the hop rhizome will send out a number of shoots that can grow into hop bines. Select two or three healthy bines from each hill. To produce plenty of hops, we only need a few to twist up a leader. If you want to grow more, plant another rhizome about six feet away and train up two more bines. The average homebrewer, with three hills of bines, will produce enough cones to hop two or three batches of beer each year, depending on the recipe. A sixteen-foot pair of bines will yield a 2-pound (~ 1-kg) or greater harvest, when mature.

Hops love to grow high, so plant them where they can climb. For the best results, give your hop bines a leader made of twine to climb. A mature hop rhizome, two or three years old, will grow bines upwards of 30 feet (9 m) in a season. If you're planting hops beside a building, simply stake your twine to the ground and fasten it at your roofline. If you're growing in the open or along a fence, you can set up your own rigging, ensuring your hops can grow high.

At the end of the growing season, our hops are ready to harvest when they start to dry out. We may have beautiful, big, green hop cones, but if they spring back to shape with resiliency when you squeeze them, they're not ready for harvest. A hop flower that's ready to harvest will make a sound like paper crinkling when squeezed. It may spring back a bit, but shouldn't return to its full shape when crushed. When our hops start to crush like this, we harvest them.

The way I recommend picking is to release the twine leader and lower the whole bine to the ground. Cut the bine at ground level and have a few friends over to share a homebrew and help pick the cones. New bines will grow from the rhizome next season.

Many homebrewers use fresh (wet) hop cones to brew with. To hop with wet hops, we'll need five times of the weight of hops we would normally use. Just make sure the hops are ready to harvest. They should still crunch like paper. By using wet hops, our brew will taste brighter have a wonderful, fresh-hop taste and aroma.

The more conventional option is to dry our hop cones before brewing with them. Lay them out in single layer somewhere there is air circulation and turn them every day. Depending on your climate, they may dry in as little as a half week, or they may take much longer. You can also use a food dehydrator to dry your hops. After our hops are dried, we can brew with them right away, or we can freeze them.

Hops grow like weeds — underground. It's very important to keep them under control, or you'll have an infestation. Every fall, use a spade to chop extra growth from the rhizome. Keep the hop rhizome to a three foot diameter and remove the rest. You can replant the extra rhizomes, growing another pair of bines, or give them to a homebrewing friend.

The Ancient Gruit Garden

Maybe you're of the opinion that growing hops is the predictable choice to grow in a brewer's garden. Maybe you want to try something different. Then consider an ancient gruit garden.

Centuries ago, before the ancient brewers had discovered that hops was the ultimate in bittering and preserving their beer, a mixture of herbs called gruit was used in beer making. (Today, beer that is bittered by plants other than hops is also called gruit.)

Just as every brewer has their own recipe for beer, each gruit gardener had their own recipe for gruit. There were a few plants that were used in almost every recipe, and we can grow them at home for our own brews.

Heather

Heather is a traditional Scottish herb used in brewing beer, used for both bittering beer and adding aroma. Tradition says that the Scottish brewers continued using heather in their brews well after the discovery of hops. The story goes; being so far away from the hop plantations of mainland Europe and Southern England, heather was preferred. Modern beer scholars refute these tales, as there is plenty of evidence of hops being used in Scotland for hundreds of years. Still, heather can be found in many flavorful Scottish brews today.

Heather is a gruit ingredient that is well suited to a sunny corner of your brew garden. Like many other gruit plants, heather will happily spread throughout your garden, so many growers choose to grow heather in a

raised garden box or pot. Plant heather close to the surface in well drained soil. Heather prefers shallow roots so we must take care to not over mulch. Because of its tender roots, overly acidic or alkaline soils will burn heather. Add lime to an acidic soil or ashes from the fireplace to an alkaline soil to balance the pH.

Heather is a perennial shrub, so a single plant will eventually mature into a source of heather for a yearly batch of gruit or two. When brewing, add an ounce of fresh heather tips for each gallon (~7.5 g/L) of the brew, dividing half between the beginning and end of the boil.

Creeping Charlie (Common Ground Ivy)

The ancient name for Creeping Charlie, Alehoof, exposes its history in brewing. It is rich in vitamin C and adds a peppery taste to brews. Creeping Charlie added to your gruit mixture will both bitter and preserve your gruit ale.

Creeping Charlie is very invasive, so you are well advised to keep it in a pot. Fortunately, it likes cramped spaces, so that pot doesn't need to be much larger than the plant's root ball. When you notice the plant going to seed, take care. Either move it inside, so the seeds do not germinate in the yard, or take care to remove them all.

Creeping Charlie is another perennial, so one plant — when mature — is all you will likely need. Harvest Creeping Charlie's flowers and use them fresh in your brew at the halfway point of the boil. An ounce of flowers for each gallon (7.5 g/L) of your brew will do fine.

Mugwort (Wormwood)

Mugwort or wormwood, is another invasive plant. It can be found growing in the rocky soil along the side of highways all across North America.

Like hops, mugwort is a perennial that grows from a rhizome, so keep it from spreading by growing it in a pot. In the winter, cut the stalk down, bring the rhizome inside and keep it cool and dark until you bring it out again in the spring. One plant should be sufficient

to brew at least one batch of gruit a year. Mugwort is ready to harvest when it flowers, but before it goes to seed. It can be hung to dry and used over the winter in our gruit recipes. Mugwort is useful primarily for bittering, so add it to the beginning of the boil. One ounce of mugwort leaves can be used for each gallon (7.5 g/L) of gruit you brew.

Other Herbs to "Hop" With

In addition to hops and gruit, as gardening homebrewers, we can bitter our brew with herbs grown in our garden. One of my favorite herbs to brew with is basil, and sage is a wonderful addition as well.

Add fresh, whole basil leaves to the beginning of your boil, about a half to two-thirds of an ounce for each gallon (3.8–5 g/L). Basil won't bitter your beer nearly as much as hops, so don't think you'll be brewing an IPA with it. Basil will add a minty and pleasantly medicinal flavor to a good malty beer. Sage, like Creeping Charlie, will impart a mild pepper flavor to our brews.

Coriander can be used in homebrewing in more than one way. Boil some leaves (citator) in your brew to augment your hops. Try crushing an ounce (28 g) of coriander seeds and add them to the last fifteen minutes of a wheat beer boil. You can also boil the coriander root to impart a deep, intense flavor.

An internet search for each plant and the word "seed" will bring up seed companies for every plant mentioned except Creeping Charlie, which is regarded almost universally as an invasive weed. Finding some in the wild and pulling up a rhizome is your best bet for growing Creeping Charlie. (Don't use wild samples if you are unsure of your identification.)

When your friends taste a homebrew bittered with plants grown in your own back yard, you'll experience the pride that only comes with growing bitter about homebrewing. BYO

Darren Foulds is a homebrewer and gardener from Thunder Bay, Ontario, Canada. He blogs about brewing and gardening at www.BrewGarden.ca.

TRIPEL

Become a "TRIPEL THREAT"

Story by **Chris Colby**

FOR HOMEBREWERS WHO ENJOY BREWING BELGIAN-INSPIRED BEERS, OR ARE THINKING OF GIVING IT A TRY, TRIPEL IS A CHALLENGE. TRIPEL IS A WELL-BALANCED BEER THAT RELIES ON THE SKILL OF THE BREWER, NOT THE COMPLEXITY OF THE RECIPE, TO MAKE IT SHINE. THE RECIPE FOR A TRIPEL IS SIMPLE; IN FACT IT CAN BE SHOCKINGLY SIMPLE. IT'S IN THE PROCESS OF BREWING THAT YOU EITHER MAKE THE BEER GREAT OR ALLOW IT TO FALL SHORT.

Photo by Charles A. Parker/Images Plus

Tripel is pale to golden in color, and strong (the BJCP guidelines list it as OG 1.075–1.085, and 7.5–9.5% ABV). However, three things keep it from seeming like a big beer — it's relatively dry, sufficiently well-hopped and highly carbonated. There is considerable variation under the above umbrella and Belgian tripels even include beers, like Tripel Karmaliet, that are spiced. However, in most tripels, the spicy notes come from the yeast.

Water for All-Grain and Extract Brewers

Traditional Belgian tripels are brewed at a variety of locations in Belgium and there isn't a single water profile that is common to all the breweries. And, of course, modern breweries treat their water to suit their needs. So, when preparing your brewing liquor, all you really need to do is make it suitable for brewing a pale beer. As with all beers, you should carbon filter your water (if you have a large, undersink filter) or treat it with metabisulfite (usually in the form of one Campden tablet per 20 gallons of brewing liquor) to eliminate the chloramines found in most municipal tap waters.

If you are an extract brewer, an excellent option for your water is to use either all distilled or RO water, or your local tap water diluted with distilled water so the carbonate level is below 50 ppm. The minerals in the water used to produce the malt extract will all still be present in the liquid or powdered extract, so there is no need to add to them with your water. If you do a partial mash, using distilled water with a couple pinches of calcium — from calcium chloride ($CaCl_2$) or gypsum ($CaSO_4$) — would be a good option.

Pilsner Malt and Sugar

The basic grain bill for a tripel is Pilsner malt. You can use small amounts of other malts if you'd like, but all you really need is Pilsner malt. This supplies roughly 80% of the fermentable carbohydrates for the brew, with the rest coming from refined sugar. Since Pilsner malt is going to be the dominant (and perhaps the only) malt, use a good quality malt. Belgian, German or French Pilsner malts are an obvious first choice. You can even blend two or more Pilsner malts in your grist, if you'd like.

You have a few options when it comes to the sugar that will be added as a kettle adjunct. The simplest approach is just to use white table sugar (sucrose), but you can also use corn sugar (glucose) or sucrose syrup, if that's available.

In the past, many North American homebrew recipes called for "candi sugar" to be used as the adjunct in tripels. And, when you went to your local homebrew shop, "candi sugar" meant a form of crystalized rock sugar. (These days, some candi sugar is also sold as a liquid. The dark, liquid form can be nice in dubbels.) You can use candi sugar, if you'd like, but be aware that it isn't traditional (Belgian breweries never used the rock form) and it is more expensive. All you really need the sugar to do is provide a flavorless, 100% fermentable addition to the beer — to raise the OG without raising the FG.

Other Possible Malts

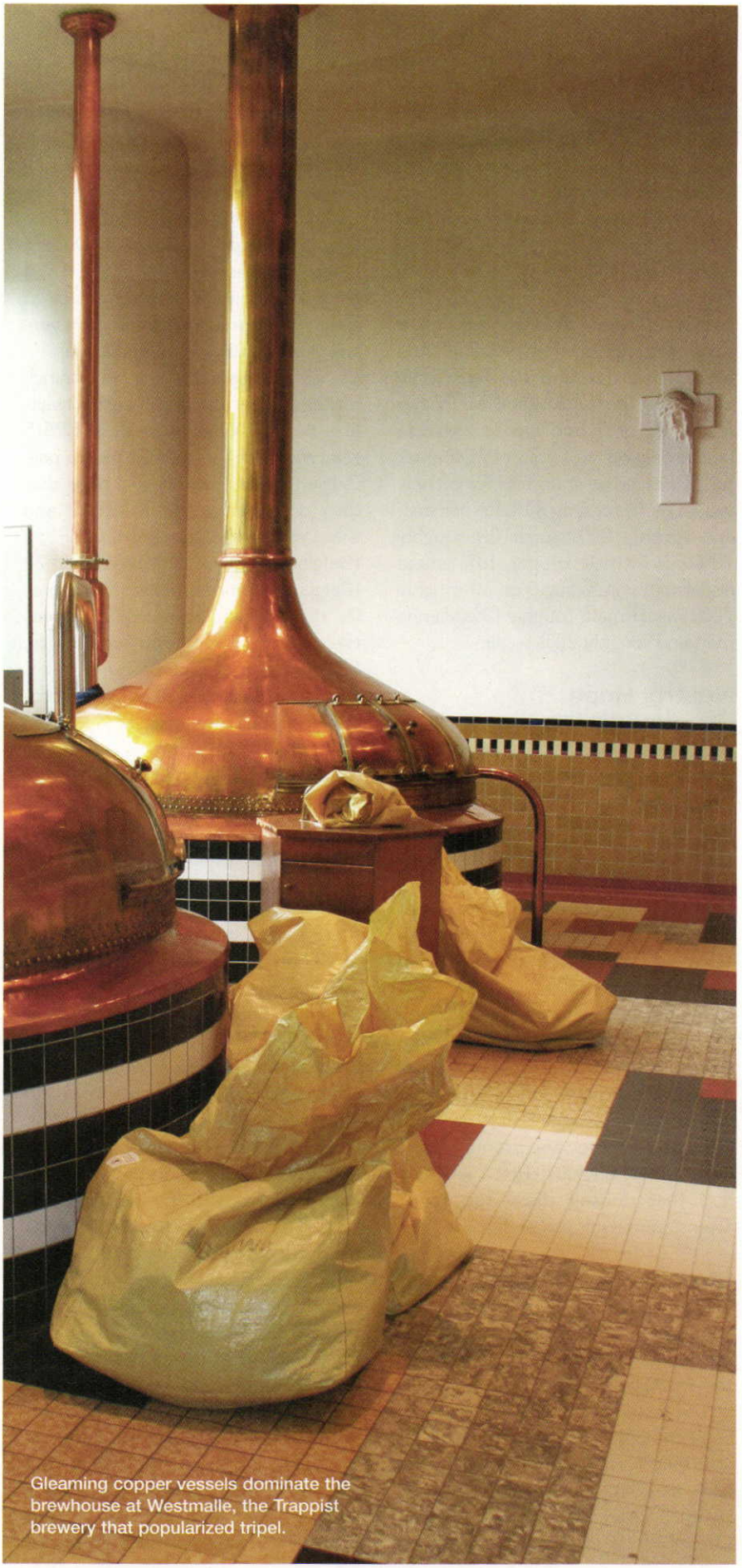
There are a variety of other malts you could use along with your base Pilsner malt, but none of them are required to make a good tripel. Some tripels use a bit of wheat (almost always under 10% of the grist), and this can be malted wheat, unmalted wheat, flaked wheat or reputedly even flour. A little bit of wheat gives that characteristic wheat "snap," and this can be a nice addition if it doesn't threaten to overshadow the Pilsner malt character.

You can also use some of the "malty malts" – Vienna or Munich — in small amounts to punch up the maltiness of the brew, and make the beer a slightly deeper shade of golden. (Tripel is 4.5–7 SRM, according to the BJCP.) Using under 10% Vienna or under 5% Munich would be the best approach — again, the idea is the Pilsner malt should dominate the malt flavor in the beer.

Don't use any crystal or caramel malts, including CaraPils. These will add body to the beer, which is unwanted, and also a caramel-like sweetness, which doesn't work well in a tripel.

A dash of acidulated malt (under 5% of the grain bill) may be just the thing if your water chemistry won't let you achieve the proper mash pH. However, too much would give the beer a lactic twang, which isn't usually a part of the flavor profile.

There are other malts that could potentially be added in small amounts to a tripel, but you should have a very good reason for including them. And in this case, "to add complexity," doesn't



Gleaming copper vessels dominate the brewhouse at Westmalle, the Trappist brewery that popularized tripel.

count as a good reason. Think about exactly how that malt is going to work with the Pilsner malt (and influence fermentability) and only add it if you think it won't interfere with the overall concept of a tripel.

Tripel is not a type of beer that benefits from using lots of different types of malt. If you want to add to the grain bill, pick one other malt — such as wheat or Vienna — and use a small amount of that. Adding little bits of this, that and the other only decreases the percentage of Pilsner malt in the grist, and you want that to be the backbone of your malt character. Three great grain bills for a triple would be 1.) roughly 80% Pilsner malt and roughly 20% sugar 2.) roughly 70% Pilsner malt, roughly 10% wheat and roughly 20% sugar or 3.) roughly 70% Pilsner malt, roughly 10% Vienna malt and roughly 20% sugar.

Neutral Hops

Like most Belgian beers, a good tripel is well-balanced. In Belgium, balance means favoring the malt slightly over the hops — at least as far as North American palates are concerned. A good tripel actually has a decent amount of hop bitterness to it, but this falls just behind the Pilsner malt character and fermentation characteristics of the yeast in the overall flavor and aroma profile.

Virtually any hop in the vicinity of "neutral" (not strongly varietally flavored) will work well, as all you want from the hops are a firm bitterness (20–40 IBUs, says the BJCP) with relatively little flavor and aroma. Noble hops are an obvious choice, but any hop that doesn't draw too much attention to itself will be fine.

Strongly-Fermenting Yeast

Pretty much any Belgian-derived strain, perhaps even those for wits or saisons, could be used to ferment a tripel, although some choices would be better than others. Arguably, your best choices might be White Labs WLP500 (Trappist Ale), Wyeast 1214 (Belgian Ale), White Labs WLP530 (Abbey Ale) or Wyeast 3787 (Trappist High Gravity). These strains come from Trappist breweries that produce tripels, the first two coming from Chimay and the last two coming from Westmalle. Some other possibilities include White Labs WLP570 (Belgian Golden Ale) or Wyeast 1388 (Belgian Strong Ale) — these are from Moortgat (makers of Duvel). Duvel is categorized by the BJCP as a Strong Golden Ale, but if you look at the descriptions of that category versus tripels, you will see similarities.

The Belgian brewery De Koninck makes a tripel and their yeast is available through White Labs as WLP515 (Antwerp Ale). Achouffe makes pale Belgian beers, including a beer that they describe as an IPA tripel, and their yeast is White Labs WLP550 (Belgian Ale) and Wyeast 3522 (Belgian Ardennes) yeast. If you prefer dried yeast, Fermentis produces two strains that you could try, Safbrew T-58 and Safbrew S-33. The latter is claimed to do well in producing Trappist-style ales.

Mash for Fermentability

Although the sugar in the ingredients will lower your fermentability, you will still need to adjust your mash conditions so you produce a highly-fermentable wort. The best way to do this is with a step mash.

There are a variety of popular step mashes out there, and if you've used one before when making other beers, it will likely work well when brewing a tripel. If not, a simple but effective step mash is one with an initial rest at 140–142 °F (60–61 °C). This is the range for optimal beta amylase activity. You can rest here for anywhere from 15 minutes to much longer (although you probably don't need to exceed 90 minutes). Next ramp the temperature up to the lower saccharification range, anywhere in the 150–153 °F (66–67 °C) range. The longer you've spent at the first rest, the less time you need at the higher rest, although you should probably spend a minimum of 20 minutes in this range. You can add a mash out step, up to 168 °F (76 °C) if you'd like.

I've found that a good "all-purpose" single-step mash for producing

Tripel Recipes

Oostmalle Tripel
(5 gallons/19 L, all-grain)

OG = 1.080 FG = 1.011
IBU = 34 SRM = 3 ABV = 9.0%

Ingredients

11.25 lbs. (5.1 kg) Pilsner malt
(or a blend of Pilsner malts)
2.7 lbs. (1.2 kg) sugar (sucrose)
10 AAU Tettnanger hops (60 mins)
(2.25 oz./64 g of 4.5% alpha acids)
White Labs WLP530 (Abbey Ale)
or Wyeast 3787
(Trappist High Gravity) yeast
(3 qt./~3 L yeast starter)
½ tsp. Wyeast Yeast Nutrient Blend
(or 1 capsule White
Labs Servomyces)
9.5 oz. (269 g) corn sugar
(for priming)

Step by Step

Treat your water such that your level of carbonates is below 50 ppm and your calcium level is in the 50–75 ppm range. (If you adjust magnesium, shoot for the 10 to 30 ppm range.) For any calcium additions, use a mixture of calcium chloride and gypsum, unless your water is already rich in either chloride or sulfates and deficient in the other. [As an option, if your carbonates are in the 50–100 ppm range, bump up your calcium to 100 ppm and swap 2.5-5% of the Pilsner malt for acidulated malt. In the above grain bill, that would be about 1–2 lbs. (0.45–0.91 kg).]

Step mash with a 45-minute rest at 140 °F (60 °C), then ramp temperature to 152 °F (67 °C) and hold for 30 minutes. (Use 16 qts. (15 L) of strike water.) If you are heating your mash tun, heat at a rate of approximately 2 °F (1 °C) every 4 minutes. Stir every minute or so. (Raising your temperature will take about 20 minutes this way.) If you are adding boiling water to instantly raise your mash temperatures, extend the second rest by about 10 minutes. You can also pull a small decoction, about ¼ of your mash, heat it to a boil and return it to the main mash to raise your mash temperature. As an option, you can raise the mash temperature to 168 °F (76 °C) for a mash out.

If you did not mash out, begin sparging with 190–200 °F (88–93 °C) water until the top of the grain bed

reaches 168 °F (76 °C). Continue sparging with water hot enough to keep the grain bed at about 168 °F (~76 °C). If you did mash out, continue sparging with water hot enough to keep the grain bed at 168 °F (76 °C). Quit collecting wort when the specific gravity of the runoff drops to 1.008 or the pH climbs to 5.8, whichever comes first. Heat your wort as you are collecting it, aiming to have the boil start right around the time the runoff ends.

Boil until your hot break appears, then examine it. If it appears as big, fluffy, "snowflake-like" flakes, then proceed with the boil. If it consists of tiny granules of break material (or if you measure the wort pH and it is above 5.2), add ¼ tsp. $CaCl_2$. Boil vigorously for about 90 minutes, or however long it will take to reduce your volume such that you yield 5.0 gallons (19 L) of wort. (This should be at least 60 minutes.) Add the hops for the final 60 minutes of the boil. Stir the sugar into the wort when 15 minutes is left in the boil. Add yeast nutrients at the same time.

Cool to 65 °F (18 °C) quickly and transfer to your fermenter. Aerate well and pitch the yeast from the yeast starter. Maintain fermentation temperature of 65 °F (18 °C) for the first day of active fermentation, then allow it to rise in the next few days up to 70 °F (21 °C). Once fermentation has concluded, let the beer sit and condition for a few days, then bottle.

Bottle the beer in heavy beer bottles, or decrease the amount of priming sugar to 6.5 oz. (184 g) of priming sugar per 5 gallons (19 L). [Note: the 9.5 oz. of priming sugar assumes that your fermentation finished at 70 °F (21 °C); if it was colder, consult the priming chart at byo.com for how much to add.] Be sure to stir priming sugar into beer well enough that the sugar is evenly distributed. Store the conditioning beer warm, optimally, warmer than room temperature — up to 80 °F (27 °C). After two weeks, chill a bottle and test for carbonation. Store carbonated beer cold for at least two weeks before serving.

Oostmalle Tripel
(5 gallons/19 L, countertop partial mash)

OG = 1.080 FG = 1.011
IBU = 34 SRM = 5 ABV = 9.0%

Ingredients

4.0 lbs. (1.8 kg) Pilsner malt
(or a blend of Pilsner malts)
4.0 lbs. (1.8 kg) dried Pilsner malt extract
(or 5 lb. 6 oz./2.4 kg liquid Pilsner malt extract)
2.7 lbs. (1.2 kg) sugar (sucrose)
10 AAU Tettnanger hops (60 mins)
(2.25 oz./64 g of 4.5% alpha acids)
White Labs WLP530 (Abbey Ale) or Wyeast 3787 (Trappist High Gravity) yeast
½ tsp. Wyeast Yeast Nutrient Blend
(or 1 cap. White Labs Servomyces)
9.5 oz. (269 g) corn sugar
(for priming)

Step by Step

Put crushed grains in a large nylon steeping bag. Heat 5.5 qts. (5.2 L) of water to 161 °F (72 °C) and pour it into your 2-gallon (7.6-L) cooler. Slowly submerge grain bag, using a large brewing spoon to ensure that the grain is mixed completely with the water. Let the mash rest, starting at 150 °F (66 °C) for 60 minutes. While the mash is resting, heat 1.0 gallon (3.8 L) of water to 148 °F (64 °C) in your brewpot and 5.5 qts. (5.2 L) of water to 180 °F (82 °C) in a large kitchen pot. When the mash is finished, recirculate by drawing off a pint or two of wort from the cooler and returning it to the top of the mash. Repeat until wort is clear or 3 quarts (~3 L) have been recirculated.

Next, collect the wort by pulling off a couple cups of wort and pouring it in your kettle, then adding the same amount of 180 °F (82 °C) water to the top of the grain bed. Repeat this until you have collected 2 gallons (7.6 L) wort from the mash — for a total of 3 gallons (11 L) in your brewpot. If you can vigorously boil more volume, up to a full-wort boil, do so. (The grain bed itself should slowly rise in temperature, but don't let it exceed 170 °F/77 °C, especially near the end of wort collection. Cool your hot water to 170 °F/77 °C if this is the case.) Stir in roughly half of the malt extract, and re-establish a temperature of 148 °F (64 °C) in your brewpot and hold it there for 15 minutes. (This is to use the enzymes from your partial mash to degrade any possible unconverted complex carbohydrates in the malt extract.) Bring wort to a boil, add bittering hops and boil for 60 minutes. Stir in the sugar and yeast nutrients for the final 15 minutes of the boil. Stir in the remaining malt extract at the end of the boil, immediately after you turn of the heat. Stir the extract into the wort thoroughly (for at least a couple minutes), then allow the wort to sit before cooling for 5 minutes (including the time spent stirring). (The very late extract addition is to minimize color pickup and the 5-minute rest before cooling should sanitize the wort.)

After this, cool the wort until the side of brewpot is cool to the touch. Transfer your wort to a fermenter, add water to make 5 gallons (19 L), aerate well and pitch yeast from yeast starter. Follow the remainder of the all-grain recipe (warning included).

Oostmalle Tripel
(5 gallons/19 L, extract with grains)

OG = 1.080 FG = 1.011
IBU = 34 SRM = 5 ABV = 9.0%

Ingredients

2.0 lbs. (0.91 kg) Pilsner malt
(or a blend of Pilsner malts)
7.0 lbs. (3.2 kg) liquid Pilsner malt extract
2.7 lbs. (1.2 kg) sugar (sucrose)
10 AAU Tettnanger hops (60 mins)
(2.25 oz./64 g of 4.5% alpha acids)
White Labs WLP530 (Abbey Ale) or Wyeast 3787 (Trappist High Gravity) yeast
½ tsp. Wyeast Yeast Nutrient Blend
(or 1 cap. White Labs Servomyces)
9.5 oz. (269 g) corn sugar
(for priming)

Step by Step

Steep crushed grains in 3.0 qts. (2.8 L) of water at 148 °F (64 °C) for 60 minutes. After the steep, place a colander over your brewpot and lift the grain bag into it. Pour the "grain tea" from the steeped grains through the bag (to strain out any floating bits), then rinse the bag with 1.5 qts. (1.4 L) of 170 °F (77 °C) water. Add roughly half of the malt extract and enough water to make at least 3.0 gallons (11 L) and bring to a boil. Add hops and boil your wort for 60 minutes. Stir in sugar and yeast nutrients for final 15 minutes of the boil. Add remaining malt extract immediately after shutdown. Follow all-grain recipe for fermentation instructions.

a highly fermentable wort consists of a 45 minute rest at 140 °F (60 °C) followed by 20 minutes at 152 °F (67 °C). With the time taken for heating the mash between rests, the overall mash takes about 90 minutes. If you add boiling water to mash out, it only takes a few extra minutes.

If you are using a mash tun that can't be heated directly, you can raise the temperature of the mash either by adding hot water or by pulling decoctions, bringing them to a boil and returning them to the main mash.

If a step mash is out of the question, try a 90-minute single infusion mash at 148 °F (64 °C); stir the mash frequently, if you can do so without losing too much heat.

If you really want to maximize the fermentability of your wort, you can extend the low temperature rest. Also, keep in mind that a mash pH in the 5.3–5.4 range yields the most highly fermentable worts (although anything in the standard 5.2–5.6 range is fine).

Lauter for Extract

When lautering, you want to get the most from your Pilsner malt, but not extract too many tannins, which will cause astringency. Heat your sparge water to the point that the grain bed temperature will rise to 168 °F (76 °C), then keep the water heated such that the top of the grain bed will remain at that temperature as you collect your wort. Once you get to the point that you have collected roughly 1 gallon of wort per every 2 lbs. of pale malt (~4 L/kg), start checking the gravity of your runnings with a refractometer. Stop collecting wort somewhere in the 2–3 °Plato range (SG 1.008–1.012).

If you have a pH meter, check the pH of your final runnings and don't exceed 5.8. You can also quickly cool small samples of run off and taste them. If they begin to taste too astringent, stop sparging.

Boil Hard

The ingredients of your tripel include a large dose of sugar. As a consequence, your fully-sparged grain bed is not going to yield an amount of wort that needs to be boiled for a long time to condense the wort (as might be the case with an all-grain barleywine in the same OG range). A 60–90-minute boil will likely do the trick for you.

Boil the wort vigorously for the entire boil period. Unless you have hot spots in your kettle, you shouldn't pick up too much color from a hard boil. Once the hot break appears, examine it. It should be fluffy and "snowflake-like." If the hot break consists of tiny specks of material (or the pH, if you measure it, is above 5.2), add about 50 ppm calcium chloride to the boil. For 5 gallons (19 L) of beer, this is roughly ¼ tsp. of calcium chloride. This should drop the boil pH into the acceptable range (5.0–5.2) — the appearance of big, fluffy bits of hot break will be your visual confirmation.

Add the hops for the final 60 minutes of the boil. As an option, you can

also add some first wort hops as you collect your wort. Generally, no late hop additions are used as tripels don't show a lot of hop flavor (in the way that American pale ales and IPAs do). You could experiment with adding a small amount of late hops — but keeping the total late hop additions (in the last 20 minutes of the boil) under ½ oz. per 5 gallons (9 g/19 L) would best preserve the classic tripel taste and aroma.

Add the sugar near the end of the boil, being careful to stir as you go. Keep stirring past the point you think all the sugar has been dissolved, just to be certain no thick sugar solution collects at the bottom of the kettle and caramelizes, darkening your wort.

Guide Your Fermentation

Your tripel wort is going to a be a highly-fermentable, high-gravity wort, with plenty of simple sugars but perhaps fewer compounds that serve as yeast nutrients because a portion of the fermentables came from refined sugar. A further complicating issue is that you don't simply want the beer to ferment completely, and to a low FG (the BJCP lists the FG as 1.008 to 1.014), you also want to coax the right character from your yeast. Specifically, you want a moderate amount of ester production (and, with the Belgian yeast strain, the "spiciness" that comes along with this). Running a good fermentation is essential to producing a good tripel, and is somewhat of a balancing act.

For starters, to get the right yeast character, you should pitch less yeast than you normally would for a strong ale. The desired yeast characteristics in a tripel come mostly from the yeast while it is growing, and if you pitch too much yeast, you will miss out on this. Pitch between half and three-quarters of the regular recommended pitching rate for an ale of this size. Do not pitch less than this and be absolutely sure your yeast is healthy. For 5-gallons (19-L) of tripel, a 2.5–3.5 qt. (2.4–3.3 L) yeast starter should do the trick.

You will want to ferment your tripel at a temperature high enough to keep the yeast active, but low enough that the estery character from the yeast isn't overblown. Start your fer-

INSIDE THE WALLS OF WESTMALLE

Philippe Van Assche, Director of Brewing Operations at Westmalle

Where did tripel come from? And when did it become popular? On a recent trip to Belgium, I discovered some interesting facts about Belgian brewing and tripels.

Tripels are not a particularly old beer style. Their creation was partly a response to a 1919 law banning cafés from serving hard liquor. Although we now think of Belgian brewers as the producers of strong beers, this was not the case back then. The move to brewing strong beers came as a result of café patrons, forbidden from ordering hard liquor, desiring a stronger beer. In 1934, to commemorate the opening of their new brewhouse, Westmalle introduced its now famous Westmalle Tripel. Even Westmalle doesn't claim to be the first brewery to make a strong pale beer and label it a tripel, but theirs today is (arguably) the most well-known and highly-revered example of the style.

Last July, I met with Philippe Van Assche (pictured above), the Director of Brewing Operations at Westmalle. We sat down for a chat in their offices, and then toured the brewery. Van Assche revealed that Westmalle was currently using mostly French malts, but wouldn't comment on which maltsters in particular. He would say that they used Saaz and Tettnang hops at the brewery because they believed these provided lots of flavor. (However, lots of hop flavor means something else to a Belgian brewer who told us he thought many US beers "lack balance.") When asked about the key to brewing a good tripel, one thing Van Asshe stressed was avoiding oxidation.

All three of Westmalle's beers are brewed from the same well water, which is treated to remove iron and is "quite hard." The brewery continues to use the same yeast they have for years (and they also supply this yeast to Westvleteren and Achel).

Westmalle Tripel is becoming more popular, compared to their dubbel. Currently, about 60% of Westmalle's production is the tripel, with most of the rest being their dubbel. Twenty years ago, 80% of their output was Westmalle Dubbel.

Their brewhouse is incredible — with huge copper vessels surrounded by detailed tile work. The old lauter tun and grant, with a line of multiple spigots, was still in place (seen behind Van Assche), but now the brewery uses a mash filter to separate the wort from the spent grains.

The beer is fermented in square fermenters (sheathed in more tilework), but a newly installed cylindrical conical fermenter was being tested for production while we were there. The brewery uses a lot of automation, especially in regards to packaging the beer and the room containing the packaging plant was cavernous. The brewery also has a very modern lab.

Most of Westmalle's beer goes into 33 cL bottles. Only 5% (and only the dubbel) gets kegged and only 1% get packaged in 750 cL bottles. This package size is mostly for export to the US. Once packaged, the beer goes to their conditioning room, a warm room to let the beers carbonate. As a homebrewer, I was thrilled to be standing next to so much beer. The stacked pallets stretched into the distance, vaguely reminscent of the final warehouse scene in *Raiders of the Lost Ark*. After the beer is conditioned, it is stored for 3–4 weeks at 50 °F (10 °C) before it is shipped.

- Chris Colby

mentation in the mid 60s °F (around 18 °C), but then let the fermentation temperature rise almost to 70 °F (21 °C) in the final days of primary fermentation. This rise will help keep the yeast working.

With the high wort gravity and all of the simple sugars available early in fermentation, you may experience a temperature spike around high kräusen. Monitor your fermentation temperature and lower your wort temperature if needed. Do not let it climb above 70 °F (21 °C) early. Conversely, keep an eye as fermentation slows that you don't chill the wort down too much. You want the fermentation temperature to rise after the most vigorous part of fermentation has finished. One way to conceptualize a tripel fermentation is to recognize that you face some challenges in fermenting this wort — you have a high gravity wort with a fair amount of sugar as an adjunct, plus you've "underpitched" — and you need to manipulate your fermentation temperature to minimize the impact of these negative factors.

Of course, you should aerate your wort throughly once the wort is chilled and immediately before the yeast is pitched. Adding yeast nutrients in the kettle is also a good idea. Take a look at what the manufacturer recommends and don't exceed that rate.

Carbonate Highly

In Belgium, tripels are both bottle conditioned and served from draft, although individual breweries may have a preference for one over the other. For example, Westmalle does not release kegs of tripel, but Chimay does. No matter how you package your tripel, you do need to carbonate it highly, to about 4 volumes of CO_2. High levels of carbonation accentuate the dryness of the beer and are an important part of the style.

If you are kegging, check a carbonation chart and adjust the CO_2 pressure depending on the temperature of your beer. (One such chart can be found at: http://www.kegerators.com/carbonation-table.php) For example, if you store your beer at 40 °F (4.4 °C), you would need to apply 29 lbs. of CO_2

pressure to yield 4.0 volumes of CO_2. A well-maintained keg will easily be able to hold this pressure, but make sure all your keg connections are clamped and tightened, just in case.

If you bottle condition your tripel, as is more common, you will need to add the right amount of priming sugar. That amount depends both on how much carbonation you desire and how much CO_2 your beer has retained after fermentation. Check out the priming carbonation chart at byo.com (click on "Resource Guide" at the top of the page then "Carbonation Priming Chart" to the left) for guidance here. If, for example, your 5 gallons (19 L) of tripel finished at 70 °F (21 °C), you would need to add 10.5 oz. (297 g) of corn sugar — about twice the normal rate for priming ales — to get the full level of carbonation. Store the bottles warm, ideally around 80 °F (27 °C), for about 10 days, then check the carbonation by chilling one overnight and opening it. Move the beer to cold storage once the beer has carbonated.

Do not package your tripel in thin-walled bottles or bottles that show any evidence of stress or cracking. If you actually drink Belgian beer regularly, you can save the sturdy 33 cL bottles that take crown caps and use them to package your tripel. Or, you can package it in 750 mL bottles using a corker and wire cages. (See Dave Louw's article in the July-August 2009 issue of *BYO* for how to cork Belgian-style beers.) If you can't find a full supply of Belgian bottles, use the thickest bottles you can find, carbonate them to about 3.0 volumes of CO_2 and store them somewhere they will not cause a problem if they burst (for example, in a sturdy case box, lined with a garbage bag).

Enjoy

Brewing the best tripel requires attention to detail — from choosing the best malt to guiding the fermentation on its way. But your efforts will be rewarded when you have a goblet full of aromatic, effervescent tripel to savor. BYO

Chris Colby is Editor of BYO. *He blogs regularly at byo.com about beer, breweries and especially homebrewing.*

COOKING WITH TRIPEL

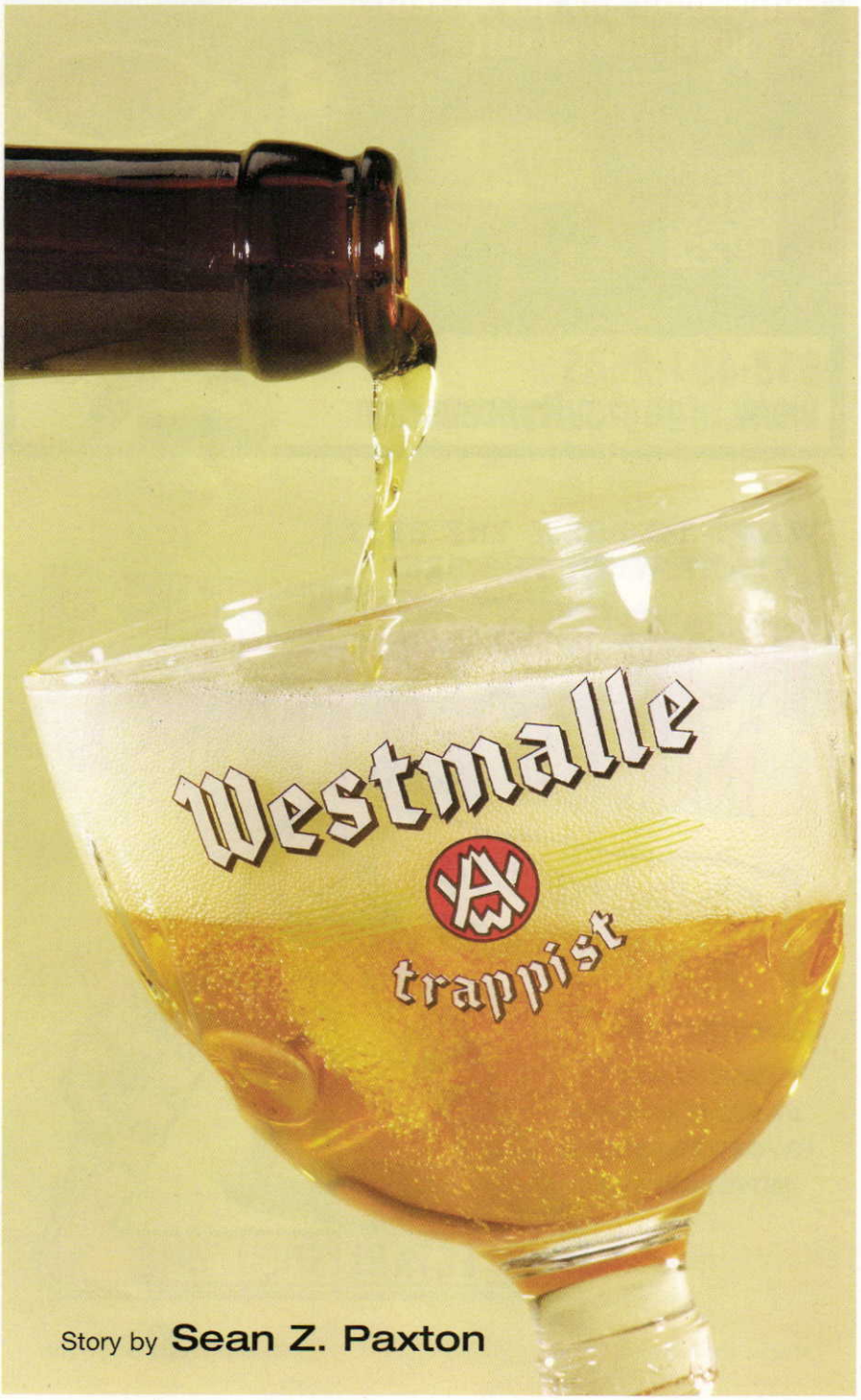


Photo courtesy of Westmalle

Story by **Sean Z. Paxton**

The Trappist tripel ale is a beautiful beverage. My first experience with a tripel was back in 1993 when I had generally been consuming mostly what could be found in the grocery aisle; lots of pale ale, amber, a few porters and stouts and a couple of German imports. I was then introduced to the magical beverage called a tripel at the Toronado, in the lower Haight neighborhood of San Francisco. The beer was presented in its proper glassware, a crystal like goblet. Looking at the color of the brew, I was expecting a Pilsner-like beer. However, as I brought it up to my nose, the aroma caused me to stop and pay closer attention. The first sip was a symphony of sparkling texture, a creamy and fluffy head with a delicate malt complexity that spoke to my inner chef. The maturity and boldness in this style inspired me there forward.

By the numbers, tripel is similar to Belgian golden strong ale. If you compare beer recipes of these two styles, you'll find they share many of the same traits that almost blur the line, similar to a stout and porter. In a conversation with Vinnie Cilurzo of Russian River Brewing Company, he agreed on the similarities between the styles. However, he did describe what distinguishes the two. "I would generally say that a golden strong style beer should

be drier and defiantly more hoppy, especially if you are comparing the most classic examples of Westmalle (tripel) and Duvel (golden strong)."

Tripel's should be a very simple brew, typically using one malt, a Pilsner type, or a few different grains, such as wheat and oats. Specialty malts such as crystal malts, caraVienna or caraMunich, or other low Lovibond color malts, add too much flavor and overshadow the clean and elegant maltiness that comes from high-quality Pilsner malt.

With the higher level of carbonation, creating a fine Belgian lace, full of tons of tiny bubbles, the initial experience is that of almost a marshmallow, meringue-like head that is so delicate, with a slight peppery, herbal hop bitterness that it melts across the palate. The first sip of the beer is complex, with flavors of lemon, orange and touch of the citrusy coriander seed. In some tripels, there is a secondary flavor of red bananas, leaving an almost berry note like strawberry or raspberry, while simultaneously having a solid balance of ester and phenolic characters. This is where the simplicity of the beer becomes complex.

Castle Pilsner malt is a great choice for this style of beer, as it has a wonderful depth of flavor, with touches of honey, light sweetness, an almost graham flour note from the husk and just a tiny taste of wheat/starch. While this malt is fully converted and only requires a single mash infusion, after many test batches and recipe tweaks, I found that a multi-step mash schedule showcased a better attenuation, creating a very drinkable mouthfeel, yet still contributing body to the finished beer.

Another important component of a tripel is the amount of sugar used as a fermentable element in the brew. The sugar increases the alcohol content of the brew, usually without flavoring it, and allows the malt complexity of the Pilsner malt to be balanced, while not become overly sweet. Tripel brewers typically use 15–20% refined sugar in each batch. Jason Perkins, Brewmaster at Allagash Brewery in Portland, Maine describes what they use in their signature brew, "We use an extra fine table sugar because it dissolves

A brewer at Brouwerij Westmalle in Malle, Belgium loads whole flower hops into a batch of their world-famous tripel.

Photo courtesy of Westmalle

Tripel Recipes

Lobster, Prawn, Mussels and Tripel Waterzooi

A traditional Flemish dish from the quaint town of Gent, Belgium, showcasing wonderfully fresh shellfish and aromatic vegetables is an elegant classy version of a stew, but lighter than an American version, while being a touch more rich than a simple soup.
Serves: 4-6

Lobster Prawn Stock

Ingredients

2 tablespoon butter, unsalted
2 each carrots, peeled and chopped
2 each onions, yellow, large, peeled and chopped
4 stalks celery, washed and chopped
3 each garlic cloves, peeled and chopped
3 each bay leaves, preferably fresh
1 bunch thyme
1 bunch Italian leaf parsley
2 tablespoon peppercorns, black
fennel tops, from the below ingredients reserved lobster and prawn shells, not rinsed
4 cups water, cold
2 cups Belgian tripel ale, preferably homebrewed

Directions

In a large stock pot or Dutch oven, placed over medium heat, add the butter and sauté the carrots, onions and celery for 9–10 minutes, or until the *mirepoix* has a bit of color and the vegetables are wilted. Add the garlic and bay leaves, sautéing for another 2 minutes. Add the thyme, parsley, peppercorns, fennel tops, lobster and prawn shells, and cook for another minute. Add the water and tripel, stirring to mix all the ingredients together. Bring the stock to a boil, and then turn the heat down to create a simmer, letting cook for at least an hour, to an hour and a half. By using some of the beer in the stock, the higher alcohol helps extract flavors from the shells and vegetables, similarly to a tomato vodka sauce. Strain the stock into a container using a cheese cloth or a fine sieve. Reserve four cups for the waterzooi. Any remaining stock can be chilled and refrigerated for 5–7 days, or frozen for up to 6 months for later use.

Lobster, Prawn and Tripel Waterzooi

Ingredients

1 each lobster whole, live, 1 ½ lb. (0.68 kg)
1 lb. (0.45 kg) prawns, peeled and deveined
4 tablespoon butter, unsalted
1 tablespoon olive oil
3 each shallots, peeled and minced
3 each leeks, white and light green parts only, about 2 ½ cups, sliced
1 each fennel, tops removed, core removed and sliced thin
2 each carrots, peeled and julienne
2 stalks celery, sliced on a bias
6 each purple potatoes, quartered
4 cups fish, lobster or vegetable stock, preferably homemade
2 cups Belgian tripel ale, preferably homebrewed
2 each bay leaf, preferably fresh
1 tablespoon thyme, fresh, leaves only
2 cups heavy cream, organic
2 lb. (0.91 kg) mussels, fresh and beards removed
sea salt and pepper
¼ cup chervil, fresh

Directions

Blanch the lobster in a large pot of boiling water with a few tablespoons of neutral vinegar (like malt) for 2 minutes. Remove the lobster from the pot and chill the shellfish in an ice bath. Once cool, remove the tail and claws from the body. Remove the lobster meat from the shell and chop into bit size chunks.

Add butter and olive oil to a large Dutch oven or 12-qt. (11-L) pot and heat over medium until the butter is completely melted and starts to foam. Add the minced shallots and sauté for 3–4 minutes. Add the sliced leeks and fennel, season with some salt and pepper and sauté for 5 minutes or enough time to slightly wilt the leeks. Add the carrots, celery, lobster prawn stock, tripel, bay leaves, thyme and cream, bringing mixture to a gentle simmer, then cook for about 6 minutes. Stir in the lobster meat, prawns and mussels, turning the heat to low. Let the shellfish slowly poach until fully cooked, about 4–5 minutes. Adjust seasoning if needed and ladle the Waterzooi into warm bowls. Arrange each bowl with a mixture of the vegetables, 3–4 mussels and some of the lobster meat and prawns, garnishing with some lightly chopped chervil.

Variation:

This dish can be made with poultry or fish instead of shellfish. Substitute the shellfish stock with chicken, duck or vegetable stock and the shellfish for chicken, duck or a mixture of white fishes (halibut, cod, snapper, haddock).

Belgian Tripel Ale

(5 gallons/19 L, all-grain)

OG = 1.080 FG = 1.012
IBU = 36 SRM = 4.4 ABV = 8.7%

Ingredients

12.75 lbs. (5.8 kg) Castle Pilsner malt
1 lb. 13 oz. (0.82 kg) candi sugar
5.25 AAU Saaz hops (60 mins) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (60 min) (0.33 oz./9.4 g of 4% alpha acids)
5.25 AAU Saaz hops (30 min) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (30 min) (0.5 oz./14 g of 4% alpha acids)
1 capsule Servomyces yeast nutrient (15 min)
Wyeast 3787 (Trappist High Gravity) or White Labs WLP530 (Abbey Ale) yeast (1 qt./1 L yeast starter)

Step by Step

In a mash kettle, add 21 quarts (20 L) of filtered water and warm to 95 °F

(35 °C). Stir in the cracked Belgian Pilsner malt and re-check the temperature, bring it to 95 °F (35 °C) and hold for 15 minutes, allowing for an acid rest. Slowly heat the mash to 122 °F (50 °C), stirring the bottom of the pot to prevent scorching and start a protein rest for another 15 minutes. Increase the temperature of the mash to 135 °F (57 °C) and let sit for 15 minutes, performing a gluten rest. Heat the mash to 144 °F (62 °C) and let sit for 30 minutes. Increase the temperature to 148 °F (64 °C) to complete the saccharification and hold for 2 hours. (Note: this rest can be shortened, if needed; the "excess" time is to promote a higher degree of fermentability.) The mash will be a great straw color and be very fermentable. This is the key to having a light body in the finished brew, giving the finished beer a smooth quaffability while the attenuation will showcase both the malt and sugar flavors.

Sparge grains with 14 quarts (13 L) of 168 °F (76 °C) water having a slow run off go into a boil pot, filled with the rock candi sugar. This will allow the sugar to dissolve into the wort, removing any issue of the sugar burning on the bottom of the pot and caramelizing the sugars into the wort. Bring the wort to a boil over high heat. Once boiling, start a timer for 90 minutes. After 30 minutes, add the first hop addition. After another 30 minutes, add the second hop addition. After 75 minutes, add the yeast nutrient and stir to dissolve. When the timer goes off, give the wort a good stir, creating a whirlpool and cover with a lid, letting sit for 10 minutes. A small handful of each hop can be added into the whirlpool, if more hop aroma is desired in the finished tripel. The desired IBU is around 36. Chill the wort to 62 °F (17 °C) and transfer to a fermenter. Hit the wort with a healthy shot of oxygen. Pitch the yeast starter and place in your fermentation area.

With this trappist yeast strain, I like to pitch on the cooler side, allowing the yeast to produce some phenolics. Let the temperature rise to 72 °F (22 °C) over the course of 2 days, changing the yeast output to create more ester flavors. The balance of these phenolics and esters is a big key for this style. Let the beer finish primary fermentation for another 4–5 days, or until the airlock is bubbling once every minute. Rack the beer into another carboy or bucket or pour off the yeast from the conical and let age for another 4–5 weeks, holding the temperature at 72 °F (22 °C). Then crash the beer to 60 °F (16 °C) and rack to a keg or bottle. If bottle conditioning, rack 2 cups of the finished beer into a sauce pan and add 1.5 cups or ½ pound of rock candy as a priming sugar. Bring to a simmer, dissolving the sugar and let cool slightly. Pour the sugar mixture into the fermentation vessel and swirl to incorporate into the finished beer. Pitch a fresh pitch of the same Trappist yeast used to ferment and swirl again, mixing well, however being careful not to over introduce oxygen into the beer. Rack into Champagne bottles and either cork or cap finish. Let the tripel warm condition for 3 weeks and open a test bottle. Serve the beer at 55 °F (13 °C) — preferably in the appropriate goblet — and enjoy.

Belgian Tripel Ale

(5 gallons/19 L, extract With grains)

OG = 1.080 FG = 1.012
IBU = 36 SRM = 4.4 ABV = 8.7%

Ingredients

2.0 lbs. (0.91 kg) Castle Pilsner malt
1 lb. 13 oz. (0.82 kg) candi sugar
8.0 lbs. (3.6 kg) liquid Pilsner malt extract (such as Weyermann)
5.25 AAU Saaz hops (60 mins) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (60 min) (0.33 oz./9.4 g of 4% alpha acids)
5.25 AAU Saaz hops (30 min) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (30 min) (0.5 oz./14 g of 4% alpha acids)
1 capsule Servomyces yeast nutrient (15 min)
Wyeast 3787 (Trappist High Gravity) or White Labs WLP530 (Abbey Ale) yeast (1 qt./1 L yeast starter)

Step by Step

Steep crushed grains in 3.0 qt. (2.8 L) of water at 148 °F (64 °C) for 60 minutes. After steeping, place a colander over your brewpot and place the grain bag in it. Pour the "grain tea" from the steeped grains through the bag (to strain out any floating bits), then rinse the bag with 1.5 qts. (1.4 L) of 170 °F (77 °C) water. Add the sugar, roughly half of the malt extract and enough water to make at least 3.0 gallons (11 L) and bring your wort to a boil. Add the first charge of hops and boil for 60 minutes; add the second charge of hops with 30 minutes left in the boil. Add the yeast nutrients with 15 minutes left in the boil and the remaining malt extract at shutdown. (Stir it in thoroughly before cooling.) Chill wort and transfer to fermenter. Top up to 5 gallons (19 L) with cool water, achieving a wort temperature of 62 °F (17 °C). Aerate wort and pitch your yeast, Follow the instruction in the all-grain recipe for fermentation and conditioning.

Belgian Tripel Ale

(5 gallons/19 L, partial mash)

OG = 1.080 FG = 1.012
IBU = 36 SRM = 4.4 ABV = 8.7%

Ingredients

4.0 lbs. (1.8 kg) Castle Pilsner malt
1 lb. 13 oz. (0.82 kg) candi sugar
6.5 lbs. (2.9 kg) liquid Pilsner malt extract (such as Weyermann)
5.25 AAU Saaz hops (60 mins) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (60 min) (0.33 oz./9.4 g of 4% alpha acids)
5.25 AAU Saaz hops (30 min) (1.8 oz./50 g of 3% alpha acids)
1.3 AAU Hallertauer Mittelfrueh hops (30 min) (0.5 oz./14 g of 4% alpha acids)
1 capsule Servomyces yeast nutrient (15 min)
Wyeast 3787 (Trappist High Gravity) or White Labs WLP530 (Abbey Ale) yeast (1 qt./1 L yeast starter)

Step by Step

See the partial mash recipe on page 39 and follow the general course of those directions, remembering that this recipe also has hops added at 30 minutes left in the boil. Follow the fermentation instructions for the all-grain recipe on this page.

easier. We have experimented with several different types of sugar, but frankly we are just looking for a 100% fermentable and clean flavor."

A brewer looking for some interesting flavors could use a sugar other than sucrose. For example, the profile of a tripel could be modified by brewing with different honey varietals. The adventurous brewer can go beyond the easy to find orange blossom, clover or wildflower honey. Try using a mango honey from Hawaii to bring out a more tropical essence from the ester profile with the slightly higher finishing temperature from the yeast. Or using a sage honey, increasing the herbal flavors from the noble hops, or a buckwheat honey to up-play the spicy ester nuances. As honey has no roasting or caramelization, different sugars can be used to add another layer of complexity with this style. Unrefined or less refined sugars, while not as clean in their flavor, offer more subtle flavors to inject into the flavor mix, adding complexity as there is so little to play with on the malt side, allowing these flavors to showcase in an experimental tripel. Indian Jaggary (a combination of sugar cane and date juice) gives extra fruity and light caramel candy notes to a batch, while a piloncillo (Mexican unrefined cone sugar) will have more rummy and molasses sweetness than that of just a plain white sugar. Coconut palm sugar is yet another alternative to plain sucrose, having a light brown sugar essence, with a more caramel overtone and a touch of toasted coconut flavor. Even clear rock candy has a different flavor and creates an interesting mouthfeel. Try a teaspoon of white sugar and a little nugget of rock candy, the sweetness is slightly higher and a touch more vanilla on the rock candy. When trying a sugar other than sucrose, think of how this will impart its essence into the brew and if the change will be desirable. Perkins says, "What we are looking for in our (Allagash) Tripel is super simple, nice and clean on the sugar side, and something that will let that yeast shine, letting the beer dry out."

Tripels are slightly darker than strong golden ales (SRM 4.5–7, per the BJCP guidelines), and adding white or rock candy to the brew kettle while the grains are being sparged not only dissolves the sugar without risks of melting onto the bottom of the boil kettle and scotching, but also allows the sucrose to caramelize with the maltose during the 90-minute boil, resulting in a touch more color to the final product.

Hop bitterness is just enough to balance out the malt and sugar bill. Using the noble hops like Styrian Goldings, Saaz and Hallertauer Mittelfrueh bring out the herbally and grassy characteristics, without being overly green or having a chlorophyll flavor. These noble hops are also much lower in alpha acids than many of the newer hop varieties. As the alpha acids are in the low 3–4%, much more hops are utilized to create an IBU level

between 30–40, bring more dominance in the seasoning of the beer. Most of the hops are added in the beginning of the boil, with an addition at 60 minutes for bitterness and 30 minutes for flavor. Cilurzo discusses his hopping for Damnation, "we do use a large amount of hops at the end of the boil in our beer (a golden strong), where you don't see this as much in a tripel." Some non-Trappist breweries have been embracing some of the newer hop varieties, tweaking the flavor of the classic, but adding their own interpretation to the style. Amarillo and Centennial hops can be wonderful in this non-traditional tripel.

Proper fermentation of this beer is key to your brewing success. The benchmark yeast is the Westmalle yeast strain. A very unique yeast, as its flavor profile is so broad and so complex. Westmalle shares its yeast with sister abbeys Westvleteren and Achel, as they have a larger lab and are able to deliver the yeast fresh each morning for brewing. Yet out of all the beers from Westmalle (Extra, Dubbel and Tripel), Westvleteren (6° Blonde, 8° Dubbel and 12° Quadruple) and Achel (Blonde 5°, Brune 5°, Blonde 8°, Brune 8°, Extra Brune, Extra Blonde), all are made with the same yeast, yet none taste the same.

Some breweries add the yeast in higher pitching rates, while others stress the yeast and use lower cell counts, each manipulating the flavor output of the yeast. Temperature is another way to manipulate the flavor profile. Pitching around 62 °F (17 °C) will produce more phenolic characters, like clove, pepper and spicy undertones that are critical in this style's profile. But if left to fully ferment at this low ale temperature, the inherent balance with the fruity ester flavors would be tilted incorrectly. Letting the temperature slowly rise to 72 °F (22 °C) over 3–4 days allows the yeast to change their interactions with the wort.

Perkins also shares, "Be careful and use a good quality and healthy yeast. We only use the yeast for our tripel once, never re-pitching. We want the yeast to be vicious while letting the temperature rise, keeping the fusel

alcohol levels low, then letting it finish high and strong." The balance of this beers' flavor of malt/sugar, hops and yeast is where each brewery brings its uniqueness to the style.

"With this style you definitely want to feel some alcohol warmth, but not a burn." advises Perkins. "You need to be careful about your alcohol percentage and where the beer finishes. We keep our tripel at 9%, which works for this particular beer, but if you push the beer too much, making the alcohol percentage higher, it shows. You want the beer to be drinkable, as crazy as that sounds, you want it to finish dry and be palatable."

Seafood and shellfish benefit from using a beer like a Westmalle Tripel or Allagash Tripel, as the herbal flavors of thyme, parsley and savory are expressed in the hops, and adding these flavors to the poaching liquid of a sauce can greatly enhance the pairing experience. Pairing with brie cheeses like camembert or a triple cream requires a brew that finishes dry with a higher carbonation level to help scrub the palate from the heavy dairy flavors and gooeyness. As this beer also has an almost Champagne-like quality, it can be replaced with a brut pairing. For a twist at an event, try adding a slice of fresh spring strawberry or a wedge of summer peach to a goblet, highlighting some of the fruity esters in the brew. Or try this beer style with a salty and briny caviar topping with a Saaz hop infused crème fraîche on a warm buckwheat blini. Indian curries like chicken tikka masala, lamb rogan josh and saag paneer pair wonderfully with the ester and phenolic attributes of the beer, while the malt, honey and candy flavors bring balance from the heat of the chilies. Try using tripel to poach chicken breasts, then use the poaching liquid afterwards to make a cream sauce.

There are many ways to explore cooking with tripel, starting with the seafood recipes found on page 46. Each cooking experience demonstrates the beers' complexity while still being a simple combination of ingredients. BYO

Sean Z. Paxton is a frequent contributor to Brew Your Own.

Tudor Beer

THE FIRST KNOWN ENGLISH RECIPE FOR BEER FROM 1503

What an idiot I am! I forgot the golden rule about answering difficult questions, namely always go with your first thought. I have hunted down all sorts of old British brewing recipes in all sorts of libraries and archives. And I have spent hours and hours attempting to re-create some of those old beers in my own brewery at home, and sometimes scaling them up to 10 barrel volumes at BrüRm@BAR in New Haven, Connecticut. Yet all the time a classic piece of history was right in front of me and I ignored it! So what could that treasure be? It is none other than the earliest known recipe for brewing beer in England.

Indeed it may just be the very first such recipe, and was published in 1503 in the time of the first Tudor King, Henry VII, and some 6 years before the infamous Henry VIII came to the throne. But note that I said "beer" and not "ale" which was a very important distinction at that time. For then it was still the case that while both were malt-based beverages, beer was brewed with hops but ale was not.

You may well be wondering why I said I was an idiot at the start of this article and where I found this recipe. Well, if you look at *BYO* for September 2011, you will find an article of mine on Welsh beers. I actually referred in this to the Kingstone Brewery in Tintern, Wales, and the fact that it brewed a re-creation of the first written English recipe for beer written in 1503. I did not say much about it in the article, because it was basically an English beer and not a Welsh one. Yet still I blithely ignored the historical importance of this recipe. What makes matters worse is that Kingstone started up in Monmouth, where I frequently vacation, and I had avidly drunk more than a few bottles of their 1503 Tudor Ale, which actually had the original 1503 recipe printed on the neck label of the bottle! I was relaxing at home a month or so after writing that article when I finally had my "Duh!" moment. I needed to look into this recipe to check its authenticity, which I had dismissed in part because there was no attribution on the bottle label. And I knew that the man who had actually re-created the recipe for Kingstone had sold the brewery and was no longer there. So I turned to my library and to H.S. Corran ("A History of Brewing"), a book which had really sparked my interest in brewing history when it was published in 1975. Second "Duh" moment! There was the attribution on page 50 and the recipe on page 51! When I next hopped across the

Story by **Terry Foster**

Tudor Recipes

Tudor Beer
(5 gallons/19 L, all-grain)

OG = 1.048 FG = 1.014
IBU = 17 SRM = 5.5
ABV = 4.4%

Ingredients

7.8 lb. (3.5 kg) Briess 2-row pale malt
1.6 lb. (0.73 kg) Fawcett oat malt
1.6 lb. (0.73 kg) Weyermann pale wheat malt
0.25 lb. (0.11 kg) Weyermann smoked malt (rauchmalz)
4.5 AAU Goldings hops (70 mins) (1.0 oz./28 g at 4.5% alpha acids)
White Labs WLP002 (English Ale) or Wyeast 1968 (London ESB) yeast (1 qt./1 L yeast starter)

Step by Step

Mash grains at 152–154 °F (67–68 °C) for 60 minutes. Run off and sparge with hot water to collect about 5.5–6 gallons (21–23 L) of wort. Add Goldings hops and boil 70 minutes. Cool finished wort to around 70 °F (21 °C), and pitch yeast (as a 1 quart /1 L starter). Ferment at 65–70 °F (18–21 °C) for 5–7 days, then rack to secondary for a further 7 days or so. Rack and bottle or keg in the usual manner.

Tudor Beer
(5 gallons/19 L, extract with grains)

OG = 1.050 FG = 1.013
IBU = 17 SRM = 6-10
ABV = 4.8%

Ingredients

5.0 lb. (2.3 kg) Muntons light liquid malt extract
1.0 lb. (0.45 kg) wheat liquid malt extract
0.75 lb. (0.34 kg) Briess 2-row pale malt
0.75 lb. (0.34 kg) Fawcett oat malt
0.25 lb. (0.11 kg) Weyermann smoked malt (rauchmalz)
4.5 AAU Goldings hops (70 mins) (1 oz./28 g at 4.5% alpha acids)
White Labs WLP002 (English Ale) or Wyeast 1968 (London ESB) yeast (1 qt./1 L yeast starter)

Step by Step

Mash the grains at 150–154 °F (66–68 °C), using 1 gallon (3.8 L) water, and hold this temperature for 45 minutes to 1 hour. Strain off liquid and rinse grain with 1 gallon (3.8 L) hot water (150–175 °F/66–79 °C). Dissolve malt extract syrups in the collected liquids, and make to around 5 gallons (19 L). Bring to a boil, add Goldings hops, boil for 70 minutes, remove trub and cool to around 70 °F (21 °C), and pitch yeast (as 1 quart/1 L starter). Ferment at 65–70 °F (18–21 °C) for 5–7 days, then rack to secondary for a further 7 days or so. Rack and bottle or keg in the usual manner.

Tudor Beer
(5 gallons,19 L, extract only)

OG = 1.049 FG = 1.012
IBU = 17 SRM = 6-10
ABV= 4.8%

Ingredients

6.0 lb. (2.7 kg) Muntons light liquid malt extract
1.0 lb. (0.45 kg) liquid wheat malt extract
4.5 AAU Goldings hops (70 mins) (1.0 oz./28 g at 4.5% alpha acids)
White Labs WLP002 (English Ale) or Wyeast 1968 (London ESB) yeast (1 qt./1 L yeast starter)

Step by Step

Dissolve liquid malt extracts in about 3 gallons (11 L) hot water, add water to make 5 gallons (19 L) of wort and bring to a boil. Add Goldings hops, boil for 70 minutes, remove trub and cool to around 70 °F (21 °C), and pitch yeast (as 1 quart starter). Ferment at 65–70 °F (18–21 °C) for 5–7 days, then rack to secondary for a further 7 days or so. Rack and bottle or keg.

pond to Britain, I checked the British Library catalog, pulled up the reference and headed to the Library itself. Very soon I was looking at an 1811 reprint of "The Customs of London," by Richard Arnold (so it is also known as Arnold's Chronicle), thought to have been originally published 1502/1503. It is a strange book giving lists of Mayors, charters, assizes, legal documents, family recipes and so on. But there was the recipe for beer I was looking for, and here it is (with the numbers changed to modern ones from the Latin versions Arnold used):

"To brewe beer 10 Quarters malt, 2 Quarters wheet, 2 Quarters oates, 40 lb weight of hoppys. To make 60 barrels of sengyll beer."

Finis. That was it, all there was, very succinct and nothing else about brewing beer anywhere else in the book. But it tells us quite a bit about Tudor beer, the first point being that his recipe is for "single" beer. In other words, all the extract from the malt goes into the beer. It has been assumed by many historians that the traditional English mode of brewing took the first, high gravity runnings from the mash to make a strong beer. The grains were then re-mashed, perhaps two or three times, and the runnings from these mashes went to make separate, weaker beers. It is further held by some that London brewers around the 1720s started to use all the worts to make one beer, which lead to it being called entire and later became porter.

Yet, 200 years earlier, Arnold is offering us a recipe for an "entire" or "single" beer! I can tell you that this is making me rethink my ideas about the origin of porter!

Translating Arnold's Recipe

The second point is that we can make a reasonable estimate as to the strength of this beer, given certain assumptions. Chief among these assumptions are the actual weight of grain in the quarter of the time. The latter is a volume measure, which would vary according to the grain, how it was dried and so forth. It is now gen-

erally reckoned that a quarter of pale malt weighs 336 lb. (152 kg), and since I don't know what form the wheat and oats were in (see below), I have made the assumption that a quarter of these had a similar weight to that of pale malt. But what sort of extract did this malt give? We know from figures given by various sources in the late 18th and early 19th Centuries that brewers were getting only about 80% of what we would expect from modern pale malt, and we can be reasonably certain that brewers in 1503 were using malt of a lower quality than was available in 1800, and that their process was rather less efficient than those of large 19th Century brewers. I have therefore made the assumption that on a 60-barrel scale, they would have achieved 60–65% of the yield we get from pale malt today. Which is convenient as it is close to the 65% we assume at *BYO* for small-scale batch brewing. If we take the lower figure of 60%, that means we expect to get a wort gravity of 1.022 from one pound of malt extracted into 1 US gallon of water, more conveniently expressed as 22 gravity points per pound per US gallon. Using that and making the further assumption that wheat and oats gave a similar yield we can calculate the OG for this beer:

Total malt = 14 quarters x 336 lb./quarter = 4,704 lb. (or 2,134 kg)

Total volume = 60 barrels x 36 Imperial gallons/barrel = 2,160 Imperial gallons (or 2,595 US gallons or 9,823 L)

So we have 4,704 lb. ÷ 2,160 gallons = 2.2 lb./US gallon = 11 lb. per 5 US gallons (or 4.99 kg/19 L)

So, total gravity points/gallon = 11 lb. x 22 "points"/pound/gallon (or "point" gallons/pound)= 242. And 242 "point" gallons ÷ 5 gallons = 48 "points," which means that OG = 1.048

So — if our assumptions were correct — our Tudor Beer was about the starting gravity of today's mainstream beers! Okay then, what about the hop rate? We do not know what variety Arnold's brewer would have used, as the advent of the classic English hops, Goldings and Fuggles, was still 200 or more years away. We can only assume that they would be low in alpha-acid, certainly as low or more likely lower than today's aroma hops, so let's say they were 3% alpha-acid, assume that they were all added at the start of the boil and see what bitterness we get:

Total weight of hops = 40 lb. (18 kg)

Total volume (see above) = 2,595 US gallons (9,823 L)

So, we have 40 lb. x 16 oz./lb. ÷ 2,595 gallons = 0.25 oz./gallon = 1.2 oz./5 US gallons, which means we have 1.2 oz. x 3.0% alpha acids = 4.6 AAU (for our 5 gallon/19 L batch), which works out to 17 IBU.

Therefore this was not a heavily hopped beer, which may have been customary at the time, but we can't tell since this is the first recipe we have! Also remember, the preserving effect of the hop was more important to brewers back in those days than hop bitterness.

Putting It Into Practice

The next step was to actually brew the beer, which entailed two further assumptions. First that Arnold's recipe used malted wheat and oats rather than the raw grain. Second I thought that the malts would probably have had some smoked character, since they had most likely been dried over a wood or straw fire. So I added a small amount of smoked malt to my grist to allow for this.

For hops I chose Goldings, pellets rather than cone hops for convenience of handling, more out of sentiment than authenticity! The recipes I came up with are seen on page 54. The extract only version uses only a barley malt and a wheat malt extract as I don't know of any oat malt extract on the market! For similar reasons, no smoked malt is included in this recipe. If you insist on keeping the oat and smoked malts in the beer, use the extract with grains recipe.

The Result

After all that talking and brewing what was the beer like? Well it was a pale gold color and formed a good dense, lasting head, as you would expect from the use of wheat malt. It had a good but relatively modest malty body, with hop bitterness just barely noticeable, and I could not detect any smoke.

Overall, it was a good crisp, fresh-tasting session beer, resembling a low-hopped version of an English summer ale. This is not so surprising when you consider that in 1503 this beer would have been in competition with the maltier and probably sweeter unhopped ale.

Would I change anything? Well, yes I would, for I regard the interpretation I have given you as only a start. I have already mentioned that there would likely have been some smoke flavor in the beer, so my next recipe would include a higher proportion of smoked malt. And it is highly likely that 16th Century pale malt was somewhat darker than today's versions, malt kilning technology having advanced a good deal since those days. So perhaps I shall try using Briess Ashburne® Mild Ale malt in place of pale malt next time. There are other possibilities, such as adding a crystal or caramel malt or raising the hop level to say 25 IBU. But there were no specialty malts available in 1503, so if we were to do that, we would be straying from the path of authenticity. (Does that matter if all we are after is good beer?)

What did our Welsh brewer Kingstone do with this recipe? The brewer would not disclose his recipe and ingredients, so my conclusions are drawn from tasting their 1503 Tudor Ale. It isn't noticeably any more bitter than my version, but it is quite dark in color and there are hints of roastiness and caramel on the palate. So I would guess they have used a medium crystal malt and some chocolate malt.

If you try brewing this, you can decide for yourself whether to make it acceptable to a beer historian or fit for a king. BYO

Terry Foster is Brew Your Own's *"Techniques" columnist.*

A Beer-Blending Primer

Beyond black and tan

by Terry Foster

There is nothing new about blending beers, wines or spirits — humankind has been doing it for centuries. It is often done at the bar, notably with cocktails, wines made from different grape varieties and with beers such as "black and tan," where Guinness and a pale beer are mixed in the glass.

When I first started drinking beer in the South of London, the local custom was to ask for a "light and bitter," the light ale being bottled and the bitter on draft. The supposed reason was that the higher carbonation of the bottled beer would add some sparkle to the relatively flat cask-conditioned bitter. Actually it was a little bit of a trick, because the drinker would ask for it to be served in a pint glass and for the draft beer to be pulled first. The barman would almost always pull more than a half-pint from the beer-engine, so that with the half-pint bottle of light ale the drinker got more than a pint, but only paid for a pint. So the happy customer figured he had gotten a free beer by this trick.

But I digress, for I want to talk about blending beers in the brewery, not at the bar. In this case you are not just looking at creating a new taste, but with creating an entirely new beer, one that is more than the sum of its constituents. Many large brewers blend all the time, even in a brewery making only one kind of beer. That is because they prize consistency over other considerations – Budweiser does not want Bud Light to taste different in New Hampshire than it does in New Mexico. But that's just ironing out small differences, not making a new beer. So what do I mean by that?

Apart from achieving consistency there are three reasons to blend beers, the first being to make a disappointing, or even downright bad beer acceptable. In other words you add a good beer to a bad one in order to save throwing away the one that you don't like. This is not a procedure I would recommend, as all you are doing is just dragging down the good beer. If you have a beer that you find undrinkable, either give it to someone who does like it, or bite the bullet and throw it away. But if you do the latter, do try to determine clearly what was wrong with it, and be sure you can fix the fault the next time you brew it.

The second reason is simply to tickle the flavor of a beer a little so as to get it where you want it. Say you have a pale ale that is a little too hoppy, and you also have another pale ale, or bitter, that you think could use a little more bite. Mix the two together and you have a beer that suits your palate, but is not really very different from the original. And you might decide that rather than blend the beers in bulk, you could simply mix them by drawing off equal proportions into your glass.

The third reason is to blend two different beers so you come up with something significantly different from its two components. You can of course do this purely on an experimental basis by mixing two different beers together just to see what comes out. Since this can be a disaster if it doesn't work well, it is best to start off by mixing small amounts together at first, tasting the results and deciding whether it is going to work or not, before you start committing whole batches. Above all this is a hit-or-miss approach, and is perhaps starting from the wrong end of the street.

A better way to blend beer is to decide what you want to achieve in blending, that is how you want the blend to turn out. Do you want a stout blended with a sour version so as to give it a little extra bite? Guinness has done this for years, producing a special flavor extract in Ireland that can be added to a beer produced overseas so that it tastes like a genuine foreign extra stout. Guinness has kept details of the extract secret, and its formula and production methods have

"In this case you are not just looking at creating a new taste, but with creating an entirely new beer, one that is more than the sum of its constituents."

changed over the years, but it was certainly originally a second beer which was aged in oak vats so as to develop both a mature flavor and a significant amount of lactic acid. This could then be added in portions to a new beer in order to achieve the requisite trademark flavor of their extra stout.

Of course blending of beers is a common practice in Belgium, where lambic sour wheat beers are often blended. The most common form of these is that of gueze, where a young lambic is mixed with an old one (perhaps one to two years in age), in order to create a further fermentation as well as to modify the flavor. The gueze may itself be aged for several years before drinking. This makes the blending a complicated procedure in terms of deciding which beers to blend in order to get the final desired flavor. I know there are US homebrewers out there making this style of beer, and that there are a lot of craft brewers making sour beers, and some of those have already gotten into blending this type of product. However, I have not tried any of them, and in any case I regard a sour beer as a brew gone wrong, and I don't propose to tell you how to go about making your own sour blends.

I have dealt with Ireland and Belgium in my stories for *BYO*, and I'm not acquainted with any blended beers from Germany or the Czech Republic, so what about England? Well, it isn't common there either, although it was once regular practice for brewers to blend old and new beers, especially porters and stouts. The old or "stale" beer as it was called was held in wooden vats for months or even years and was blended with young or "mild" Porter before shipping out. Sometimes the blending was done in the pub; indeed an early beer-engine was designed in the late nineteenth century by one Joseph Bramah for exactly this purpose. There still are English examples of beers blended in this way, a notable one being Strong Suffolk Ale from Greene King, England's foremost producer of cask-conditioned ale. Strong Suffolk is a 6% ABV beer made by blending 5% pale ale and 12% ABV Old 5X, the latter beer having been matured for up to two years in wooden vats. That means that the blended beer contains about 14% of Old 5X. Part of the idea here is that the British beer drinker is not generally into very strong ales, certainly much less so than his North American counterpart, so that sales of 12% ale would be expected to be very limited. The other part of the idea is that English beers are taxed on alcohol content, and a 12% beer would pay significantly more duty than one at 6%, and have to be sold at a much higher price (over and above processing costs considerations).

Unfortunately, probably because it can only be produced in small quantities, Strong Suffolk does not appear to be available in the US. However, a somewhat similar beer is sold here, and that is St. Peter's Old-Style Porter, also brewed in the county of Suffolk but in a brewery much

smaller than that of Greene King. This porter is a blend of "old mature ale and a younger light ale," and weighs in at just 5.1% ABV. For me this is an excellent beer, for it has some of that plummy raisiny flavor of a well-aged big beer, yet is low enough in alcohol to be very drinkable, and to fit the description of "session beer." Truly a case of having your cake and eating it, too! St. Peter's do not reveal details of these beers, so we don't know how old or how strong the aged ale is. From the flavor of the beer I would guess it must be at least six months to a year old, and it is probably somewhere around 7–10% ABV.

While writing this I came across a very interesting blended beer produced in the US by Cigar City Brewing, Tampa, Florida. It is a 10% imperial stout called Nielsbohrium (after the great physicist), and is made by blending two other 10% imperial stouts, Bohr and Dirac. The blend is then aged in a used rum cask, with added raisins and cinnamon.

Doing it yourself

I think the best approach, at least as a first shot is to look at this last idea of making an "instant" mature-tasting beer, which can be drunk in reasonable amounts without your head making unexpected contact with the floor. As is mostly the case in blending beers you have to do a little planning ahead. The first choice is which kind of beer will benefit from blending, coupled with which kind of beer you like. After all, you might not want to do it with a very hoppy IPA, because the beer is going to lose so much hop character if it is aged for a year or more. Similarly, you probably don't want to add some aged character to a Pilsner, since the chief appeal of such a beer is its crisp, clean flavor. So, fairly obviously, porters, stouts, and old/pale ale combinations are the way to go.

Blending Tools

One thing that is helpful for blending is having the right tools, but you don't need any fancy equipment. An Erlenmeyer flask, graduated cylinder and 5-mL pipette is all you need. In fact, *BYO*'s own Ashton Lewis uses these tools to blend at his own brewery, Springfield Brewing Company in Springfield, Missouri. He says, "I find it extremely useful to perform 'crude blends' to get me in the ballpark of where I envision the finished beer. I then use my lab tools to formulate 'scientific blends' to taste. Without having these tools it is very difficult to tweak a blend. And the last tool on my list are wine glasses for tasting."

You have two possible approaches, the first being to keep a few bottles of every beer you brew, something that may be easier said than done. Preferably save enough so that you can taste one of them every now and again, and measure that taste against the beers you are currently brewing. That way you can decide which of the saved beers might go best with the new beer, and you can follow that up by mixing the two in a glass and checking whether you will actually achieve a good result. If you have saved enough of the aged beer, then you can add it to the bulk of the fresh beer, before bottling or kegging the result. Note that in this case "enough" is defined as what you have measured in the tasting session, in which you will have taken careful notes. If you do not have enough of the older beer, you at least know what to expect in the future and can proceed as in the next paragraph. You might think this is a laborious and hit or miss procedure, and it is, but it is also a wonderful way of training your palate!

The second approach is to decide what beers you are going to blend right at the start, and then brew the beer, which is going to be aged. Store this carefully, preferably in bulk, and preferably in a soda keg. Use of the latter enables you to purge with CO_2 at regular intervals, so as to keep out oxygen as much as possible. Taste occasionally, and when you judge it to be ready brew the second beer. Do a little more tasting when this is ready, just to determine how much you are going to blend; it is likely that you will want to add 10–15% as aged beer. The best and safest way to do this is to rack the required volumes into a separate sterilized soda keg, which you have previously purged with CO_2. When full, purge again with the gas, shake the cask a bit to mix the beers, and you are done. Above all, be scrupulously clean and take steps to prevent ingress of air and oxygen during this whole blending process or the final results will be disappointing.

You can make two beers with the same relative proportions of malt or extract in the grist, or you can make a different aged beer. You are probably only going to use a small amount of the latter, so it makes sense to produce a relatively neutral beer just kept for blending. For example, you might consider a strong ale at, say 8-10% ABV, and about 40 IBU, even though you plan on blending it with a stout. That's because you want that mature flavor, rather than the regular malt and hops flavor of a fresh beer. And, of course, you could consider making the aged beer with a *Brettanomyces* yeast to sour it, and blend that to make an "authentic" porter or stout, or whatever else you fancy. Blending beers is a whole new craft, and one in which there are few rules, except let your palate be your guide. BYO

Terry Foster is the author of Porter *and* Pale Ale, *both books are a part of the "Classic Beer Style Series."*

Troubleshooting

A practical guide to identifying problems

by Chris Bible

Beer is a complex thing. Beer contains hundreds of different compounds and beer flavors and aromas span a very broad range of human perception. The ingredients used to produce beer are largely biologically derived and are also complex. There are dozens of different kinds of malted barley ranging from a subtle pale malt to an intensely roasted black-patent malt. The process of malting and roasting is directly responsible for the development of the flavors and aromas associated with a particular kind of malt.

There are dozens of different hop varieties that contain compounds with myriad bittering, flavor and aroma characteristics.

There are dozens of different yeast strains that are used to make beer. Yeast are responsible for conversion of fermentable sugars in the wort to ethanol, but yeast also produces many, many other flavor and aroma compounds depending upon the specific yeast strain.

Even the water used to brew beer can be a complex thing. The pH and mineral profile of the water used in the brewing process can have a direct impact on mashing efficiency, extraction of flavor and aroma compounds from barley and hops, and can ultimately have a noticeable impact on the flavor and aroma profile of the finished beer.

Beer is a complex thing. The process of brewing beer in our modern times is also complex. Although the process of brewing beer is nearly as old as human civilization, the way beer is brewed today is very different from how it was done 6,000 years ago, or even 100 years ago. As homebrewers, we are free to make our personal brewing process as simple as technically possible, or as complicated as modern technology allows. Regardless of which part of the brewing-process-complexity spectrum you might inhabit, the brewing process is — even in its simplest form — a complex thing.

In a complex process like brewing, there are many, many opportunities to make a mistake. Some mistakes may not dramatically alter the finished beer, but some mistakes can cause an otherwise noble brewing attempt to fail miserably and produce an unpleasant or undrinkable product.

Anyone can make beer, but it takes knowledge and skill to make good beer. Historically, brewers learned the craft of brewing from other brewers. Knowledge and skills were passed from master to apprentice through on-the-job training.

The table starting on page 62 is intended to summarize much of what has been learned about key brewing variables through the years. It provides knowledge about cause and effect of many of these and provides guidance about how to prevent or correct brewing mistakes. The information has been compiled from a variety of sources and is provided with sincere thanks to the great brewers that have gone before us. The chart can be used as a starting point when troubleshooting a problematic beer or to try to foresee the consequences of a problem that arose during brewing.

For beginning brewers, the chart will complement Gordon Strong's article "Evaluating Beers" in the March-April 2010 issue and Chris Colby's "Improve Your Homebrews" in the January-February 2012 issue in providing an overall plan to improving their brewing. Keep in mind that a simple chart cannot capture all the complexity of brewing. One deviation in your brewing practices can cause several changes in your beer and, conversely, a single problem may have multiple causes. This is, however, a good place to start when troubleshooting brewing problems. A longer version of this chart is posted on BYO's website (at byo.com), in the "Resource Guide" section.

> "Historically, brewers learned the craft of brewing from other brewers. Knowledge and skills were passed from master to apprentice through on-the-job training."

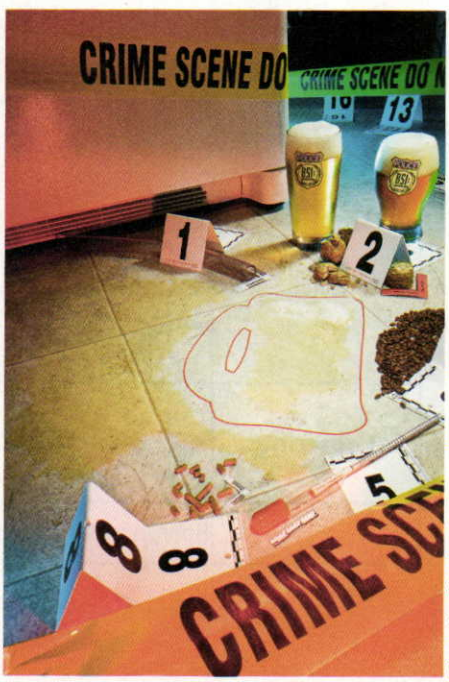


Photo by Charles A. Parker/Images Plus

Troubleshooting Chart

Process Step	Failure Mode	Effect of Failure	Impact on Beer	Mitigation Steps
Milling	Milled grain too coarse	Extract efficiency reduced	Lower than anticipated original gravity and malt flavor intensity	Mill grains to proper coarseness
	Milled grain too fine	Possible stuck mash. Possible extraction of tannins	Astringent flavor due to tannins	
Mashing / Steeping	Temperature too hot	Diminished starch conversion.	Lower than anticipated original gravity	Control temperature(s) to within ±1°F
		Possible extractions of tannins	Astringent flavor	
		Extraction of phenol compound precursors	Smokey, clove-like or plastic-like flavor	
		Higher than desired dextrin content in wort.	Higher than desired viscosity	
	Temperature too cold	Diminished starch conversion	Lower than anticipated original gravity,	Control temperature(s) to within ±1 °F.
			Starch haze	
		Lower than desired dextrin content in wort	Lower than desired viscosity	
	Duration too long	Possible extractions of tannins from grain husks	Astringent flavor due to tannins	End mashing when starch conversion is complete
		Increased potential for bacterial growth	Sour flavor	
		If too long at 122–131 °F, reduced protein content in finished beer	Reduced head retention	Ensure that duration of protein rest is not excessive
	Duration too short	Incomplete starch conversion	Lower than anticipated original gravity	End mashing when conversion is complete
			Starch haze	
	Steep water volume too high	Possible extractions of tannins from grain husks.	Astringent flavor due to tannins	Use 2–3 quarts of water per pound of grain to steep
	pH too high	Possible extractions of tannins from grain husks	Astringent flavor due to tannins. Possible darkening of color	Adjust mash / steep water to ensure pH doesn't exceed 5.6
	pH too low	Extract efficiency reduced	Lower than anticipated original gravity	Adjust mash / steep water to ensure pH doesn't fall below 5.2
Lautering	Sparge water too hot	Possible extractions of tannins from grain husks.	Astringent flavor due to tannins	Keep sparge water temperature between 165–170 °F
	Sparge water too cold	Extract efficiency reduced	Lower than anticipated original gravity	

Process Step	Failure Mode	Effect of Failure	Impact on Beer	Mitigation Steps
Lautering (cont.)	Sparge duration too long	Boil volume increased. Longer boil required.	Color darkened due to caramelization during longer boil	Do not allow specific gravity of runoff to be lower than 1.008
		Increased levels of dimethyl sulfide (DMS) in wort	Cooked cabbage or corn -like aroma / flavor	Do not allow specific gravity of runoff to be lower than 1.008.
	Sparge duration too short	Extract efficiency reduced	Lower than anticipated original gravity	Sparge only until runoff specific gravity reaches 1.008
Boiling	Boil too long	Mailard reaction progresses longer than desired	Beer color darker than desired	Boil vigorously and only as long as required
		Excessive loss of liquid volume in boiling kettle	Low wort volume yield and higher than desired specific gravity in wort	
		Potential hot-side aeration	Oxidized flavors present in beer	
	Boil too short	Hop alpha acids not fully isomerized	Lower than desired hop bitterness	
		Increased levels of dimethyl sulfide (DMS) in wort	Cooked cabbage or corn-like aroma/flavor	
		Hot break doesn't form	Chill haze in beer	
	Addition of Kettle Finings — Failure to add at end of boil	Poor hot/cold break formation	Permanent haze or chill haze in finished beer	Add Irish moss during last 15 minutes of boil
Wort cooling	Wort not cooled prior to pitching yeast	Yeast die. No fermentation.	No beer is produced	Cool wort to appropriate temperature
	Wort cooled too slowly	Potential formation of dimethyl sulfide (DMS) if using very pale malts	Corn-like aroma or flavor	Cool wort to proper pitching temperature as quickly as possible
		Potential diacetyl formation (if cooling overnight)	Buttery or butterscotch flavor present.	
		Increased risk of bacterial contamination	Off-flavors	
Oxygenation	Too little oxygen in wort	Slow initial fermentation and production of fusel oils	Off-flavors & aromas including solvent-like or nail polish	Adequately aerate/ oxygenate wort prior to adding yeast.
		Greater potential for bacterial contamination	Associated off-flavors	
Fermenting	Temperature too high	Increased production of fusel alcohols and ester compounds.	Elevated levels of esters and fusel oils. Decreased head retention.	Maintain fermentation vessel temperature within optimal temperature range.
		Yeast produces excessive diacetyl	Buttery or butterscotch flavor	

Process Step	Failure Mode	Effect of Failure	Impact on Beer	Mitigation Steps
Fermenting (cont.)		Vigorous fermentation causes increased likelihood of blow-off	Loss of beer. Potential for bacterial contamination	Ensure fermenter is properly vented and that water lock is operating properly.
	Temperature too low	Yeast metabolic rate decreases. Yeast may go dormant. Incomplete fermentation.	FG higher than desired. Presence of unfermented sugars.	Maintain fermentation vessel temperature within optimal temperature range
		Yeast did not have opportunity to absorb diacetyl	Buttery or butterscotch flavor	For lagers, perform a diacetyl rest. Agitate to re-suspend yeast.
	Pitched yeast cell count too low	Slow or stuck fermentation. Higher ester levels likely.	Ester flavors (fruity, banana) present	Ensure enough yeast is pitched into fermenter.
	Beer racked to secondary fermentation vessel too soon	Yeast did not have opportunity to absorb diacetyl	Buttery or butterscotch flavor present	Allow beer to remain in primary fermenter until initial fermentation is complete.
	Beer packaged before fermentation complete	Over carbonation	Possible "gusher" when bottles are opened	Do not package beer until specific gravity of beer remains unchanged for 2 days.
Packaging	Excess oxygen introduced into beer during packaging	Oxidation of beer	Wet cardboard/paper or sherry-like flavors and aroma in beer	Minimize agitation of beer during packaging
			Reduced shelf life	

BYO

Hanging Carboy Holder

Dry and store your carboys at the same time

by Tim Hack

After a few years of homebrewing, what is one of the things we all start to run out of? Storage space!

Horizontal storage space in our house, especially the garage, is in high demand. When I came up with this design, I was in search of a better way to store my glass carboys and drain them in one tool. There are commercially available carboy stands that let you drain your carboy sitting on a counter top or other flat surface, while allowing air to circulate and possibly keeping dust and grime out of the inside. Unfortunately this requires using premium horizontal space. And besides, it's fun to build stuff.

So I needed something different. The 6.5-gallon (25-L) and the two 5-gallon (19-L) carboys are used more frequently than our two 3-gallon (11-L) carboys. However, I didn't want to bury the infrequently used carboys in either our attic or crawl space.

To organize the garage, I hang stuff like bikes, kayaks, ladders, lumber and pipe in the rafters and I thought that may be a good solution for the carboys too. They hang a bit low but as long as you mark them and locate them close to the walls, in corners or over refrigerators or kegerators, you don't run into them as often.

Hanging them also makes them more secure than just setting them on shelves or on top of your fridge, especially somewhere like the garage. Glass carboys and concrete floors don't get along when gravity comes into play. In addition to providing a valuable and safe storage location, it also allows the carboys to drip dry without pooling the water. I've been using these hangers for about two years now without any problems or breakages or any coming loose.

This design is for hanging empty carboys only, and is not to be used as a transport system of full carboys.

"To organize the garage, I hang stuff like bikes, kayaks, ladders, lumber and pipe in the rafters and I thought that may be a good solution for the carboys too."

Tools and Materials

Materials

- Double loop #3 chain 90-lb. (41-kg) load limit
- PVC pipe union: 3-inch diameter for a 3-gallon (11-L) carboys, 4-inch diameter for a 5-gallon (19-L) carboys and 6-inch diameter for a 6.5-gallon (24-L) carboys
- ¼-inch-20 x 1-inch bolts, nuts, washer and lock washers: 3 each for 3-gallon carboys (11-L), 4 each for others
- S-hooks to match the size of the chain: 3 for 3-gallon (11-L) carboys and 4 for the others
- 2 threaded quicklinks (optional but makes things easier)
- 1 carabineer or clip of some sort for top. (Make sure it fits the chain or quicklink if you're using one.)
- Ceiling hook to install in garage to hang your hanger from. Not the cheap really thin ones. Make sure your carabineer or clip fits over it.)

Tools

- marker and ruler for layout
- mini-bolt cutter or diagonal cutter for chain
- pliers for S-hooks
- box or open end wrench for nuts
- screw driver for bolts
- awl or small finish nail setter

1. LAYOUT

There are a couple of ways to lay out your markings to drill. I chose for my smaller carboy hangers to use only three vertical chains, and for my 5-gallon (19-L) and 6.5-gallon (25-L) carboys to use four chains. For most of it you can probably just eyeball it. With the coupling set with the hole facing up, I chose to place the bolts about half way up the vertical. This is easily found on the inside since the coupling has a lip to stop the pipe from going all the way through. You can measure this on the inside and then make a mark on the outside to be drilled later.

2. MARKING

To space the holes out, there are a couple of choices. First you can use the ruler to find the longest dimension of the pipe coupling and mark both ends. This will make sure your bolts are on opposite sides and then eyeball a 90-degree and mark the next set. Another way would be to place a piece of paper under your coupling and trace the circle. Cut that out. Fold it in half and then in half again to get a ¼-circle pie wedge. When you unfold it and lay it back under your coupling, you should have your bolt pattern perfectly spaced out. Eyeball is fine for the spacing but the vertical should really be measured so your carboy isn't hanging crooked.

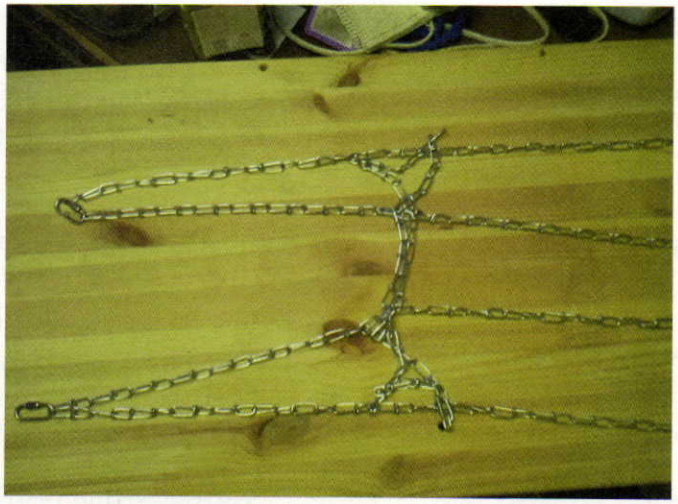
3. DRILLING

Clamp the coupling down to a table to drill. Make sure it's clamped well so it doesn't roll away from you and so it doesn't spin the coupling on you. Use the awl or the nail set to poke a starter dent to help the drill bit track. Don't hit hard with a hammer since you'll probably crack the coupling. Use a ¼-inch bit for the hole. The bolts may be tight but the plastic is soft enough you can screw them in if needed. This tight fit will help them stay put in the future too so don't ream out the hole.

4. CUTTING THE CHAINS

Use mini-bolt cutters or a pair of diagonal cutters to cut one set of the following:

6.5-gallon (25-L) carboy: (4) 28-inch (71-cm) lengths for vertical chains and (1) 40-inch for circumference chain
5-gallon (19-L) carboy: (4) 27-inch for vertical chains and (1) 36-inch (91-cm) for circumference chain
3-gallon (11-L) carboy: (3) 22-inch (56-cm) for vertical chains and (1) 30-inch (76-cm) for circumference chain



5. ATTACHING THE CHAINS

The chain I used has a smaller side and a larger side to each link. I put the bolt through the smaller loop of the link. So the order it goes on the bolt is: washer, chain, outside to inside PVC and then lock washer and nut. Make sure the nut is good and tight and that the washer isn't slipping through or off the chain on the outside. I find a box wrench easier than a crescent for this because you're on the inside curve of the pipe. Once you get all chains attached to the PVC, it's time to put the carboy (opening down) on the pipe coupling. Next, clip the tops all together on top of the carboy so the chains stay up while you're working. The circumference chain (C-chain) I placed about ⅔ of the way up the side of the carboy. Clip the S-hooks on the vertical chains where you're going to put the C-chain. For the C-chain, start with the first link on the first S-hook but don't close it yet. Wrap the C-chain inside the vertical chains all the way around and back to that first S-hook and close it to hold it. Then you can count the links and space out where the other S-hooks link to the C-chain. I use the quicklinks to connect 2 each vertical chains. This seems to help with keeping the chains organized and makes chaining up easier. Clip the carabineer to the two quicklinks or just the top of the four chains.

6. FINISH

Install the hanging hooks into your garage rafters (2 x 8's or bigger, not just into the drywall ceiling) and hang your carboys up to dry. Don't use the really cheapo flimsy hooks at least for the bigger carboys. Same goes for the carabineer too. You don't have to get the really expensive climbing ones but at least get a decent one out of the chain and rope section of the hardware store. I also use these when I've just sprayed them with sanitizer before brewing and hang them in the laundry room or clip them to the shelf in the laundry room to keep them from falling off the dryer. BYO

This is Tim Hack's first story for Brew Your Own.

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Faith Renewed

The tale of a brewing intervention

Will Siss • Watertown, Connecticut

For over a year now, I've had a debilitating problem. While my passion for beer is well known, I had yet to brew a beer on my own successfully. I'd partnered up with others and made two decent beers: a rye ale and a smoked maple wheat. However, I found the process of brewing at home stressful, mostly because I wanted to get the steps done correctly and my mind tends to wander from directions.

After that, I tried two homebrews on my own: a porter and a stout. Making the porter wasn't too tough, because I used a friend's equipment and he was there in case I made a mistake, which I did in not double checking that I had the right amount of hops (I had to borrow some). The stout was nightmarish: I scorched the bottom of my pot, couldn't bring the temperature down fast enough to put in the yeast and when it came time to bottle, I ended up spilling a quarter of the product when a coil broke on the gadget that helps you bottle.

Both beers came out undrinkable. Sanitation or bottling technique problems caused both of them to explode upon uncapping. What was left tasted sour. I was angry and ready to give up.

What complicated matters was that I'd joined a homebrew club a year ago, and some of the members were award-winning and crazy smart about every aspect of brewing. They didn't follow recipes; they made their own. They didn't brew with pots in their kitchen; they had their own three-tier brewing systems.

With a monthly meeting approaching, I made the decision to quit the club. I had my speech prepared and I figured it would be simple.

The monthly meeting fell on May 7, which was the American Homebrewers Association's National Homebrew Day — a day set aside for clubs to participate in their own "big beer." Our club, the Krausen Commandos, had members working on six batches to create 66 gallons (250 L) of beer.

With everyone's gear set up on a driveway in Thomaston and so much good will in the air, it was hard not to feel excited about brewing. Everyone wanted to help everyone else, whether it be lending a thermometer or helping set up a brewing rig. Samples of past homebrew experiments appeared, and pretty soon I was assisting a friend make a saison.

When it came time for me to make my quick announcement that I'd be letting my membership expire, I wasn't prepared for a rejection of my decision. But indeed, as the rains came, a member led what became an informal intervention right there in a garage filled with a dozen brewers.

"Are we prepared to let this guy leave the club, knowing we didn't give him the support he needed," he asked. "I'm not. I'm not going to let him down. Who's with me?"

They were all with him.

There's nothing compared to the feeling that someone believes in you. This wasn't about beer anymore. It was about trying again despite the instinct to give up. Not to get overdramatic, but being in the crosshairs of that kind of support was inspiring.

Suddenly, I bore witness to members' tales of failure. Everyone, it seemed, had created bad batches. Some as recently as last week. All of the members had faced a crisis of faith, as I was. I wasn't bringing down the club because of my naivety; I was a symbol of what could be. Not only did I want to try again for myself, but I also wanted to try again for them. BYO

Will Siss writes a monthly beer column for the Waterbury Republican-American newspaper in Waterbury, Connecticut. Read his columns at http://willsiss.wordpress.com or follow him on Twitter: @BeerSnobCT.

"Suddenly, I bore witness to members' tales of failure. Everyone, it seemed, had created bad batches. Some as recently as last week."

Photo Courtesy of Will Siss

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