



**ROUGE RIVER**

**BREWING COMPANY**

MARKHAM  ONTARIO

# KETTLE SOURING AND OTHER STUFF FOR GTA BREWS HOMEBREW CLUB

Rouge River Brewing Company

Head Brewer

Jordan Mills

Advanced Cicerone®



# Rouge River Brewing Company

- Gratuitous Corgi picture
- Worked for Mill Street Brewery. Started in Events and Marketing in 2010, got into homebrewing early 2011, transferred to brewing department in late 2014. Worked with their 60hl brewhouse for 18 months, and new 120hl brewhouse for 6 months before leaving
- RRBC opened late 2016 in Markham
- We focus on styles we enjoy to drink: hoppy IPAs/pale ales, farmhouse-style ales, sours
- Trying to bring decent beer north of the 401
  - *No LCBO or Beer Store Distribution*
  - *Distribute kegs to bars and restaurants in Ontario. Majority of sales out of our retail store/taproom in Markham*
- 2 vessel 10bbl (12hl) brewhouse

# Cicerone Certification Program and Prud'homme Program

- You don't need a certification to homebrew
  - *Still not widely known about in Canada*
  - *If you have to explain that you're famous, you're probably not that famous*
  - *Prud'homme is based out of Ontario but has a little less international recognition*
  - *May be a useful leg-up if you want to get into the industry (sales, distribution, etc.)*
- Cicerone Program is self-guided. No classes or instruction- you need to read the syllabus and figure it out yourself
- Prud'homme has classes with a much more interactive experience
- Either way this reading list is valuable to everyone trying to learn more about beer

# Summary of Program Resources by Level

Resource	Certified Beer Server	Certified Cicerone®	Advanced Cicerone™	Master Cicerone®
Tasting Beer – Randy Mosher	•	•	•	•
The Oxford Companion to Beer		•	•	•
Draught Beer Quality Manual		•	•	•
Draught Beer Quality Fact Sheets		•	•	•
Road to Cicerone: Keeping & Serving Beer Course		•	•	•
Cellarmanship – Patrick O’Neill			•	•
The Brewers Association's Guide to Starting Your Own Brewery – Dick Cantwell				•
2015 BJCP Style Guidelines	•	•	•	•
Brewers Association Style Guidelines				•
Road to Cicerone: German Beer Styles Course		•	•	•
Road to Cicerone: British & Irish Beer Styles Course		•	•	•
The Beer Bible – Jeff Alworth			•	•
Great Beers of Belgium – Michael Jackson			•	•
Amber, Gold & Black – Martyn Cornell			•	•
The Homebrewer’s Guide to Vintage Beer – Ron Pattinson			•	•
IPA – Mitch Steele			•	•
Wild Brews – Jeff Sparrow			•	•
Farmhouse Ales – Phil Markowski			•	•
Brew Like a Monk – Stan Hieronymus			•	•
Aroxa Website and Flavor Cards		•	•	•
Tasty – John McQuaid			•	•
Neurogastronomy – Gordon M. Shepherd				•
Designing Great Beers – Ray Daniels			•	•
Brewing Classic Styles – Jamil Zainasheff		•	•	•

Brewing with Wheat – Stan Hieronymus			•	•
How to Brew – John Palmer		•	•	•
Road to Cicerone: Brewing Ingredients & Process Course		•	•	•
New Brewing Lager Beer – Greg Noonan			•	•
Radical Brewing – Randy Mosher			•	•
American Sour Beers – Michael Tonsmeire			•	•
Malt – John Mallett			•	•
For the Love of Hops – Stan Hieronymus			•	•
Yeast – Chris White and Jamil Zainasheff			•	•
Water – John Palmer and Colin Kaminski				•
MBAA Handbook: Raw Materials and Brewhouse Operations – Karl Ockert			•	•
MBAA Handbook: Fermentation, Cellaring, and Packaging Operations – Karl Ockert			•	•
Malts and Malting – Dennis Briggs				•
Brewing Yeast and Fermentation – Christopher Boulton				•
Brewing Science and Practice – Briggs, Boulton, Brookes, and Stevens				•
The Brewmaster’s Table – Garrett Oliver		•	•	•
The Chef’s Companion – Elizabeth Riely			•	•
On Food and Cooking – Harold Magee				•
Mastering Cheese – Max McCalman				•
The Drunken Botanist – Amy Stewart				•
Bitter – Jennifer McLagan				•

# What is Kettle Souring?!?

- Typically a quick turnaround sour that can be made grain to glass in a conventional beer timeline (2-3 weeks)
- Typically means the souring is done in a separate step prior to sacc. fermentation
- We sour in the kettle so that we can boil it again to kill all bacteria
- Clean lactic acidity due to a pure lactic fermentation
- Doesn't have to be done in a kettle but for commercial breweries is often done as such
- Used commonly to brew Gose and Berliner-Weiss style beers but has a wide range of applications
- Advantages:
  - *Reduce risk of infecting clean beers with lactobacillus*
  - *Dial in acidity before fermenting*
  - *Neutral sour base for secondary ingredients*
  - *Shorter turn-around time than barrel aged/mixed culture sours*
- Disadvantages:
  - *Reduced overall complexity compared to mixed fermentation/barrel aged beers*
  - *Will not continue to develop over time as much as barrel aged/mixed culture sours*
  - *Fermentation will kill any yeast culture used to ferment it (particularly with low pH ferments)*



# Kettle Sour History

- Batch #4 was a kettle sour (brewed Nov 2016)
- Have been brewing approx. 1 batch per month since then
- Mostly been doing fruited kettle sours with a few dry-hop variants and recently fruited and dry hopped sours
- Personally not a big fan of straight Berliner Weiss
- Some of the fruits we've used so far: apricot, raspberry, mango, passionfruit, guava, peach, papaya, boysenberry, soursop/tangerine, cherry
- We use the Escarpment Lacto Blend (plantarum/brevis blend)
  - *Main advantage to this blend is the ability to be active over a wide temperature range (~45C to ~32C)*



# Process

- Mash/lauter as per usual
- Bring to a boil for 15 minutes to kill all native yeast/bacteria
- Cool to 45C (113F) pre-acidify wort to 4.5ph to inhibit spoilage organisms then pitch lacto culture
- Allow to sour for 24-48 hours (our culture takes us to ~3.35 in about 24 hours, extended time does not lower pH any further for us)
- Bubble co2 through oxygenation stone during entire souring process to keep vessel purged/positive pressure (our kettle stack goes outside)
- We allow the temperature to fall over the souring period (no heat applied to kettle) but the high thermal mass of the kettle preserves heat well
  - *Homebrewers may want to watch the temperature of their kettle so that temp does not drop below ~32C (90F). Either use a heat jacket, blanket to stay in the temperature range*
- Once desired pH is achieved, we crop the lactobacillus into a keg and do our second boil
- 2<sup>nd</sup> boil is where we add a small amount of bittering hops (~2 IBU) and boil for 30 minutes
- Cool and send to fermenter and ferment as per usual
  - *You will want to pitch yeast on the higher end (1-1.5 mil cells/ml/degree plato)*

# Process 2

- We have used a variety of yeasts with not much difference (even before fruiting)
  - *[Soursop Tangerine sour fermented with A04 Barbarian yeast from Imperial Yeast]*
  - *[Citra Apricot sour fermented with A15 Independence yeast from Imperial Yeast]*
- Fruit can be added at many different stages, we prefer to add once primary fermentation is fully complete
  - *Due to low ph fermentation, the yeast does not re-ferment the sugars in the fruit*
  - *You can add the fruit during the later stages of fermentation if you wish*
    - *We age on fruit for approx. 7 days then rack to brite*
- For dry hopped sours, fruit heavy hops tend to work best (Citra, Mosaic, Amarillo)
  - *Low ph environment gives amazing extraction from dry hops*
    - *You can use a lower than you might expect dry hop rate (0.25oz per gallon) and still get strong hop character, but [Apricot Citra Dry-Hopped Sour has 2.5lbs /bbl dry hop (or 9.7g/L or 1.27oz per gal.)]*



# Fruiting Rates

- Range tends to be 1/2lb per gal up to 2+lbs per gal (60g/L up to 240g/L)
- You can use juice, puree, whole fruit, extracts/concentrates
  - *Puree is best for us from a processing and flavour standpoint (easy to use, no seeds/skin, processing needed)*
  - *We have used some whole fruit but it is a pain in the ass*
    - You will also want to use higher fruiting rates for whole fruit
  - *Tough to make concentrates/extracts taste natural (trials will be necessary)*
- Darker fruits like raspberry, boysenberry tend to be more potent but depends on fruit (e.g. passionfruit has a strong flavour but is a lighter fruit)
- Depends on the level of fruit intensity you're looking for (balancing with other secondary ingredients, etc.)
- Can't seem to add too much fruit (people comment that it doesn't taste like beer anymore but it's not a complaint)
- Recently across the board we go for around 1.5lbs/gal for an intense character
- For dry-hopped sours we reduce the fruiting rate (Citra Apricot Sour is ~.75lbs per gallon)

# Culture Maintenance

- Once souring is complete in the kettle, we crop and store our lacto culture in a 20L corny keg before beginning the second boil
  - *We stored a lacto culture for 8 weeks and ended up dumping the resulting beer*
  - *Make sure to use it every 4 weeks (2 weeks is recommended by Escarpment labs)*
  - *If storing longer than 4 weeks, it is a good idea to feed the culture*
  - *See milk the funk wiki for lacto starter/ tips on maintaining a lacto culture*
  - *Our current Lacto culture is at generation 9*

# Where to get lacto/fruit?

- Escarpment lacto blend/ Omega lacto blend (same plantarum/brevis blend as Escarpment)
- White labs/Wyeast lacto strains
- Never hurts to make a starter (see milk the funk wiki for more info)
- Yogurt? Using raw grains? Probiotics?
- We use (almost) exclusively Oregon Fruit Products puree
  - *Pasteurized, strained and shelf stable*
  - *Sold to homebrewers as Vintner's Harvest Brand*
- Homebrewers have much more flexibility to use frozen/fresh fruit in smaller quantities
- Freezing the fruit helps to break down cell walls and improve extraction

# Recipe Considerations

- High percentage of Wheat/Oats/Rye/Spelt help to get some additional body and haze but don't seem to help us with head retention (despite pre-acidifying)
- We use Weyermann Pilsner as a base malt because it is more traditional (and expensive) but it doesn't seem to make a big difference in beers with large amounts of secondary ingredients (i.e. fruits, hops) but we do it anyways
- Go up to 50% wheat malt if you want to go more traditional Berliner
- Our Standard Kettle Sour Malt Bill
  - 66% *Weyermann Pilsner Malt*
  - 25% *Wheat Malt*
  - 9% *Simpsons Golden Naked Oats*
- Low IBU (1-5 IBU)
- We mash on the lower end at 64C (148F) for 60 mins
- We target a 1.052 base beer to get a 5% finished beer (accounting bit of fruit dilution)

# Possibilities?

- Berliner Weiss (traditional or not)
  - *Bastardised to your preference 3%abv-10%abv*
- Gose –very similar process but with coriander/salt addition in boil
- Sour IPA (add hops in dry hop/post souring boil for additional bitterness/hop flavour)
- Sour any other style (sour stout, sour saison, etc.) ether through blending neutral kettle sour or trying to ferment the style as per usual
  - *Usually not the best process depending on the style because yeast expression seems to be inhibited by low ph fermentations*
- We have changed our yeast strain many times for kettle sours without a big difference in character (Cal ale, San Diego Super, London Ale III, Vermont Ale, Am Ale II, etc.)
- Brett/ Barrel Aged Secondary/Primary fermentation
  - *We have tried to ferment kettle sours with Brett Brux var. Drei with mixed results*
    - 1<sup>st</sup> gen worked well, but couldn't repitch it
      - *Cost lots of \$\$\$*
      - *Didn't taste that different from a regular kettle sour*
    - Tried repitching from 2<sup>nd</sup> gen but fermentation was super sluggish and flavor wasn't very impressive
- If you want to age it, don't kettle sour

# Overall advice/best practices

- Start with a pure lactobacillus strain
- Don't add hops before souring or it will not work
- Pitching rate for lactobacillus may not be that important
  - *As long as you have clean wort bacteria can reproduce extremely quickly compared to yeast*
  - *Sanitation is still just as important*
- Take a gravity reading pre souring and post souring to make sure your lacto culture is pure (shouldn't drop more than a couple gravity points)
- Pre-acidify to 4.5pH to help ensure a clean beer
  - *Will depend on your particular water profile but we add 425ml of lactic acid to drop the mash ph to 5.2 and an additional 850ml to the kettle to reach ~4.5 into approx. 1300L of wort*
  - *Use a ph meter to be sure (hard to estimate these things)*

# Resources for More Info

- Milk the Funk Wiki ([milkthefunk.com/wiki](http://milkthefunk.com/wiki))
- Brewing Network's Sour Hour Podcast
- American Sour Beers by Michael Tonsmeire
- Get a pH meter
  - [https://www.omega.ca/pptst\\_eng/PHH-7000.html](https://www.omega.ca/pptst_eng/PHH-7000.html) worked for me for the past 3 years



# Questions?!?!

- [Jordan@rougeriverbrewery.com](mailto:Jordan@rougeriverbrewery.com)