Crisp Malt Webinar Series: Hazy IPAs
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Hazy IPA

- IPA history
- What makes a NEIPA
- Making a NEIPA

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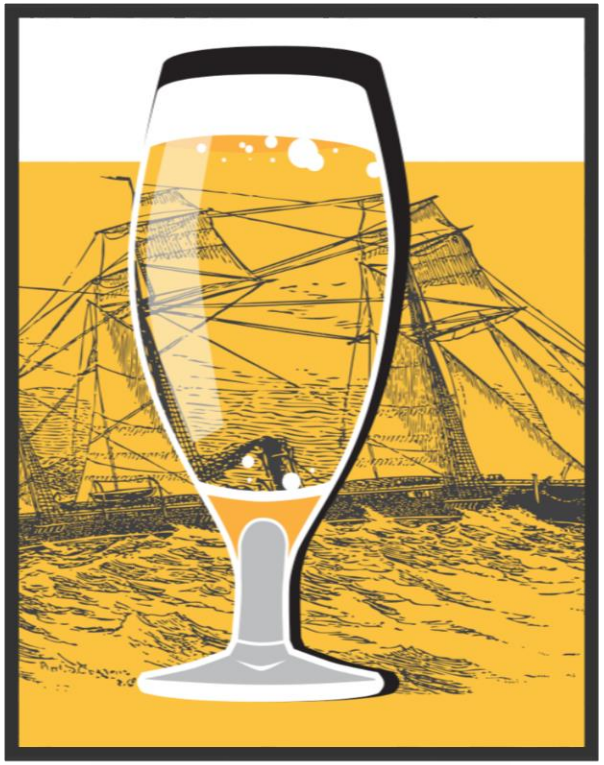
IPA History

- India Pale Ale in the 18th & 19th Century
  - Brewed in the UK and exported to India
  - Strong & Hoppy to increase shelf life
  - Fruity esters from yeast contrasted the earthy English hops
  - 5-7%
  - BU 40-75
- 20th Century
  - Average beer strength drops from 5.5% to 3.8%ABV
  - Taxation on the beers OG
  - World Wars
- Not a traditional beer and often brewed with imported malts and hops



IPA History

- The American IPA
  - Around the 1980's the pioneering American craft brewers took off
  - The lack of cash hindered capital expenditure
  - Ales became the choice
  - Importing materials from the UK was expensive so the style was adjusted to fit US malts and hops.
    - US malts clean and lightly flavoured
    - US Hops – different game!
  - Heavily dry hopped, cutting bitterness and dry finish
  - Bitterness race

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Hazy IPA History

- Around 2003, a small brew pub in Vermont called the Alchemist produced a beer called ‘Heady Topper’
- As much hop flavour and aroma as possible
  - Without process constraints
  - Without bitterness
- The clarity of the beer did not matter – it was all about the taste (although it wasn’t massively hazy either!)
- Breweries throughout New England began to brew the new IPA as a taproom style as it was fragile
- Hazy or Juicy IPAs are recognised as a distinct style in the World Beer Cup

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The aroma hop explosion

- The original US aroma hops
  - Cascade, Centennial, Columbus & Chinook
  - The backbone to the craft beer revolution
- 2000 Simcoe released
- 2003 Amarillo released
- 2007 Citra released
- 2009 Galaxy released
- 2012 Mosaic released

	US Hop Acreage	% alpha	% Aroma
2012	29,683	50%	50%
2019	58,977	24.6%	75.4%

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Bio-transformation

- The transformation of chemical compounds in a living system
  - You start with one thing and end up with something else!
- 4 examples between yeast and hops in beer are:
  - Chemical modification of terpenes
    - Terpenes make up 80% of oils in hops
    - Reduction of Geraniol to Citronellol – Citrus like aromas
  - Conversion of organic acids into esters
  - Release of thiols
    - Key role in tropical flavours – yeast can release bound thiols
  - Cleavage of glycosides
    - Carbohydrate and aglycone
    - Yeast may cleave glycosides freeing aromatic component

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NE IPA

- Appearance
  - Opaque haze
  - Orange or golden colour
  - Dense, creamy head
- Aroma
  - Wow factor
  - Fruity & tropical
- Malt Character
  - Fairly neutral
  - Grist built around body and bringing out the hops

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NE IPA

- Flavour
  - Hop forward
  - Fruity esters
  - Tropical fruity hops
  - Low bitterness
- Mouth feel
  - Soft and silky smooth
  - Chewy full body
  - Low carbonation

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Making an NEIPA - Water

- Sulphate
  - Drier, bitter flavours
- Chloride
  - Improves palate fullness & gives a mellow flavour
- Sodium Chloride
  - Levels above 150ppm can impart a sour salty flavour
  - Levels between 75 -150 ppm can improve sweetness and fullness

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Making an NEIPA – pH

- Dry hopping raises the pH in beer
- High pH can
  - Cause poor head retention
  - Leave the beer susceptible to micro contamination
  - Increase the perceived bitterness and effect the mouthfeel
  - Give a soapy character
  - Effect haze

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Making an NEIPA - Grist

- High quality base malts
  - Maris Otter® – Full flavour & malt body
  - Best Ale – Good body
  - Clear Choice® – Smooth finish
  - Chevallier - Warm cracker – full body
- Dextrin
  - Good body and mouthfeel
  - Improved head retention
- Caramalt
  - Enhances flavour and character
  - Improves body
  - Improves head retention

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Making an NEIPA - Grist

- Mixture of non malted and malted cereals
- Wheat
  - Improve mouthfeel
  - Head retention
  - Haze
- Oats
  - Creaminess & mouthfeel
- Rye
  - Improve mouthfeel
  - Toffee/caramel notes at lower usage
  - Spicy notes at higher usage

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Making an NEIPA – Hop selection & kettle addition

- Hop Selection:
  - Big tropical fruits
  - Varieties that encourage bio-transformation
  - Add where the hop works best
  - Supply
- Kettle addition
  - Very little addition at start of the boil - hops only added to control foam
  - Large loading at the end of the boil
    - Smooth / soft bitterness
    - Bags of aroma
    - Cool down to 80 ^{o}C to increase aroma
- Don’t add kettle finings

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Yeast selection

- The NEIPA is not all about hops
- Many West Coast IPAs use ‘Chico’
  - Neutral clean flavours
  - Good attenuation
- The yeast choice plays a critical part
  - Fruity esters
  - Medium attenuation
  - Bio-transformation
  - Mix different yeasts to find a good mix of attenuation and esters

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Making an NEIPA - Fermentation

- Considerations during fermentation
  - Ester production
    - Higher temperatures
    - Lower pitch rates
    - Lower O2 addition
    - Reduce trub levels
  - Dry hop at different points
    - Early dry hopping may promote haze
  - Final PG around 1015
    - Grist selection
    - Mash conditions
    - Yeast selection

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Making an NEIPA – Dry hopping

- Reduce yeast count before dry hopping
- Dry hopping in stages can increase the extraction
- Extraction is dependent on diffusion
  - Agitation
  - Temperature
- Pellets offer improved extraction over leaf
- Aroma can be reabsorbed into the spent hops
- Short dry hop times give fruity flavours
- Longer dry hop times give spicy & herbal characteristics
- Batch size
  - Larger vessel size decreases extraction

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Making an NEIPA – Hop Burn

- Vegetable bitterness
- Increased polyphenols in beer from heavy dry hopping
- Increased perceived bitterness
- Over extraction
  - Agitation
  - Temperature
  - Time

Making an NEIPA – Oxidation

- Oxidation
  - Stale off flavours
  - Poor shelf stability
  - Darkening of heavily hopped beers
- Sodium metabisulphate or potassium metabisulphate
  - Free sulphite ions bind to oxygen reducing oxygen levels
  - Allergens
- Ascorbic acid
  - Oxygen scavenger
  - In the presence of metallic ions may act as a carrier
- PAA

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Thank You

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