



AMERICAN  
CIDER  
ASSOCIATION

# Keeping: Basics & Practical Application

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PRESENTED BY:

Cider Institute of North America





**Your go-to cider making resource**



[ciderinstitute.com](http://ciderinstitute.com)



## Dave Takush

Co-Owner & Head  
Cidermaker

2 Towns Ciderhouse



## Yann Giles

Founder

Malus & Vitis



## Steve Selin

Owner, Orchardist &  
Cidermaker

South Hill Cider



## Dion Stepanski

Co-Owner & Head  
Cidermaker

Presque Isle Farm Cider



# AGENDA

- 1 What is Keeving?
- 2 Start tasting!
- 3 Four practical approaches
- 4 Lots of time for Q&A





# Keeping

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A concise overview



Apples are washed and milled



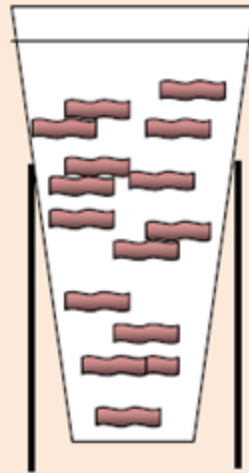
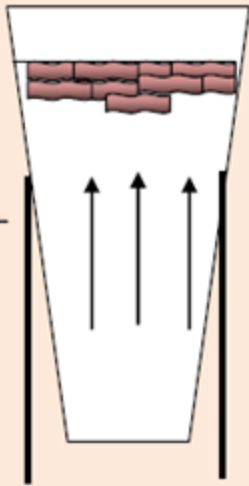
Ground apples left to macerate for a period of time



Apple pommace is pressed



Juice is chilled to 8-12c and PME and CaCl is added



Over the course of 5-7 days, CO<sub>2</sub> bubbles from the start of fermentation lifts coagulated pectin to the surface of the juice



Over-clarified, nutrient deficient juice is racked into another vessel for long term fermentation



Fermentation speed is managed by racking the fermenting juice, centrifuging, or crossflow filtering 90% of the juice.



Fermentation eventually slows to a crawl. Cider is put into bottle and left to condition for up to 6 months.

# The Apples

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- Mature apples are extremely important
- Tannic, low-acid bittersweet fruit
- General Juice Stats:
  - 3.7-4.2 pH
  - TA <3g/L (as malic)
  - YAN 40-80ppm
- Temperature 46-50F



# Pressing

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- Any style of press can be used
- Pressing is important step in extracting pectin to form chapeau brun
- Maceration helps to extract pectins
- Many producers mix pomace to expose to oxygen
  - Passive exposure to oxygen from slow pressing
- Maceration & press time influence resulting tannin content
  - slow pressing/maceration will retain less tannin
  - quick pressing/maceration will result in more tannin



# PME & Calcium

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- PME = Pectin Methyltransferase
- PME enzyme is added, mixed, rest for 24hrs
- PME dosing as per manufacturer recommendations
- Calcium Chloride is added at a rate of 5g/hL up to 40g/hL
- A 'break' occurs and you can see the pectin form rapidly



# Chapeau Brun Formation

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- 7-14 days (depending on temp)
- 8-10C (46-50F)
- Pectin rises to top of tank (co2 bubbles from preliminary natural fermentation)
- Rack clear liquid from under full chapeau



# Fermentation Management

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- Fermentation will start to accelerate up to 2 gravity points per day
- After ~6 points of gravity loss it is time to begin clarification
- Repeated racking to slow fermentation
- Use xflow or centrifuge to remove biomass. xflow or rack 70-90% of juice if needed (depending on Nitrogen content)



# Fermentation Management

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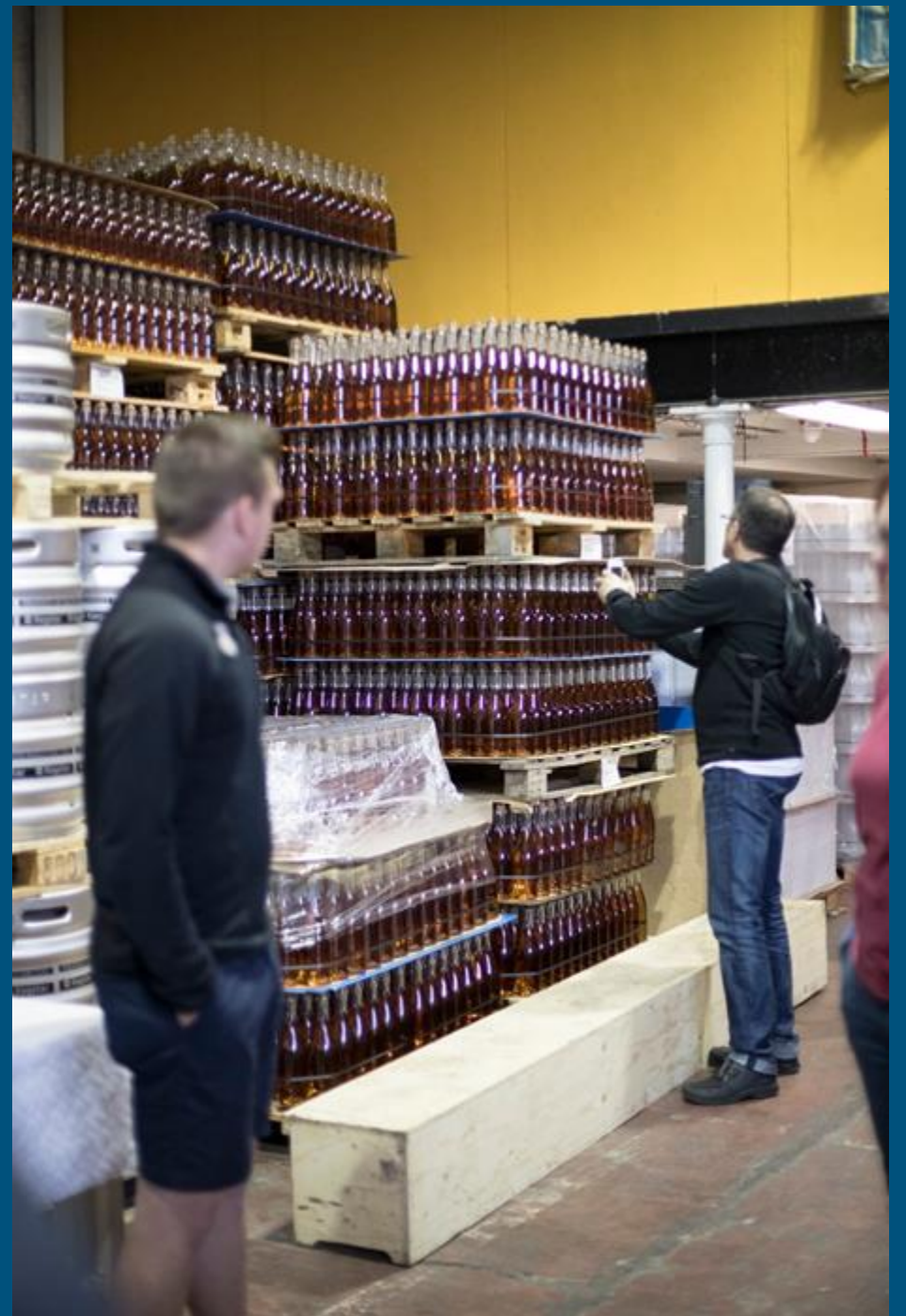
- Higher nitrogen 80-90ppm YAN will require higher 80-90% filtration
- Multiple clarification steps may be needed
  - Fermentation should be 1-3 gravity points per week
  - Should not exceed 4 gravity points per week
  - Fermentation will slow over many weeks and months



# Bottling

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- YAN should be  $<10\text{mg/L}$  (ppm)
- Higher YAN than  $10\text{mg/L}$  (ppm) can risk excessive pressure
- Bottle 2-4 gravity points above where you want to end for proper  $\text{CO}_2$
- Use only heavy duty champagne bottles or other methods of bottle stabilization (pasteurization)



# Bottling

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- Many French producers use smaller diameter corks than regular 29mm champagne corks (27mm) so it is easier to remove when the pressure is lower, and potentially helps leak gas if over carbonation occurs
- 29mm cork may be used for products that are pasteurized (to retain cork/gas)



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**STEVE SELIN  
SOUTH HILL CIDER  
SLIDES HERE**

# 2 Towns 2022 Vintage Keeve







## Apples

- 11 Bins of French low acid bittersweet fruit
- 1 bin high acid roxbury russet (2x past amount)
- Sorted
- Belt Press!
- No extra maceration
- 766gal juice
- 3 x 300gal poly tanks



## Keiving

- PME 24hrs
- Calcium Chloride
- Rack (loss= 50gal per 255gal vol tank)
- Good chapeau brun!
- not super clear juice :(
- Fermentation Management
- Trouble keeping rate down
- No YAN measurements



## Final Blending

- Lost a lot
- Had to utilize temperature to arrest fermentation
- 516gal @ 20g/L
- 150gal Doux Moen @ 37g/L
- final x-flow prior to carbonation and packaging





Cidre Pays D'Auge AOP  
Cuvée Réserve 2022  
Organic Certified

S&L Grandval  
Manoir de Grandouet

Ancestrale Method  
Residual Sugar : 40 g/L  
pH 3,80



*Yann Gilles*  
Cidrologue & Œnologue



# Must Nitrogen Scale for Keeved Cider

≈ Yan (Yeast Assimilable Nitrogen)

**Low**

30 to 50 mg/L

**Average**

60 to 90 mg/L

**High**

90 to 110 mg/L

**Very high**

> 110 mg/L

# Goals before bottling

## 1. Fostering Nitrogen Consumption by Yeasts to get a calm Cider

Amino Nitrogen and Mineral Nitrogen in the Cider < 10mg/L  
(necessary but not sufficient condition)

Slow fermentation with « normal » conditions

Stress tests to predict bottle fermentation behaviour

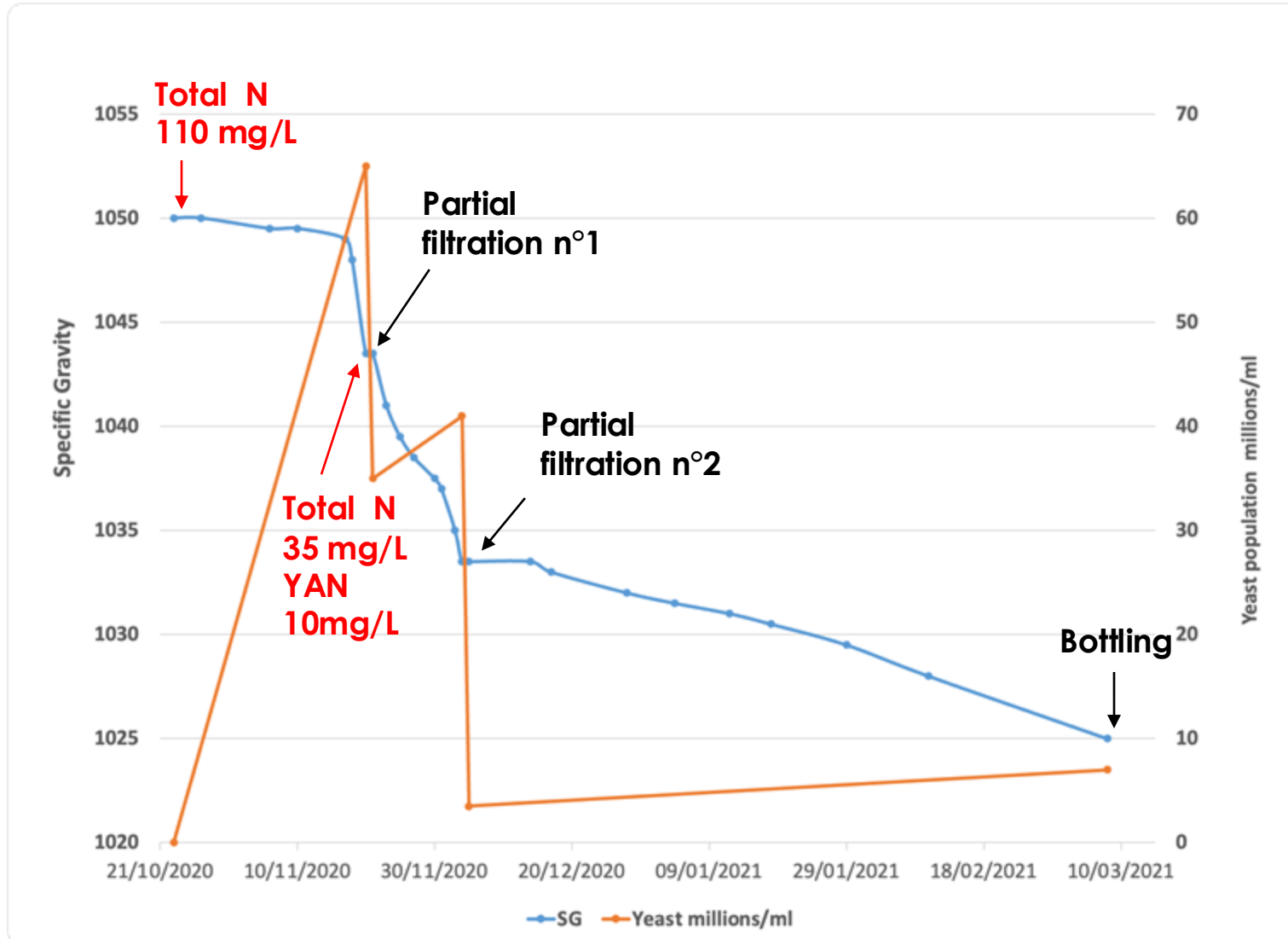
## 2. Preserve residual Sugars

# General Conditions

- 1. Adapt your fermentation management to the product**
- 2. Low Temperature (8 to 10°C = 46°F to 50°F)**
- 3. Must Clarification (keeving = brown Cap or Settling)**
- 4. Reduce the Yeast Population during the fermentation.**
  - Filtration (Diatomee earth Filter, Cross flow Filter, etc.)**
  - Centrifugation**
  - (Racking)**

# Fostering Nitrogen Deficiency

## Fermentation in tank – Example



# Adaptation to the YAN Level



## Low

SG management, do not clarify too much during fermentation (avoid fermentation stop)  
Selected Cider for high SG or early Bottling  
Increase the Bottling Yeast Population

## Average

## High

Late and/or low SG Bottling  
Blend (with a less nervous Cider)  
Decrease the Bottling Yeast Population

## Very high

Do you really want to make a keeved Cider ?

**CIDER**  
**STF**





- Started farming organic vegetables in 2014, Molly and Dion Stepanski
- First commercial pressing 2020, value added product for our farmers markets
- October 2022 opened our taproom in Alpena, Michigan.
- Started a small orchard but currently source all apples from
- Michigan farmers
- Our bottled cider is all DRY but we now offer a range of ciders and cider cocktails at our taproom
- About 2000-3000 gallons per year, most all direct sales through taproom

# **Giganticus Maximus: Keeved Cider**

- Apples Selection and Sweating
- Milling / Maceration / Pressing
- Fermentation
- Packaging

# APPLE SELECTION AND SWEATING

Giganticus Maximus: Keeved Cider

- 40% Brown Snout, 40% Golden Russet, 10% Kingston Black, 10% Dabinett



# MILLING / GRINDING



# MACERATION



# PRESSING



# FERMENTATION: EQUIPMENT





# FERMENTATION: CHAPEAU BRUN



# FERMENTATION: RACKING / TEMPERATURE



# PACKAGING: LAB ANALYSIS / NITROGEN



**Cornell AgriTech**  
New York State Agricultural Experiment Station

**Cornell C**

For  
665 W. North

E-

Sample Type:	Cider	Company:	Presque Isle
Date Sent:	4/10/2024	Contact:	Dion Stepan
Log Number:	24-1024	E-mail:	presqueislef
Sample Name:	Keeved Cider		

**Primary Amino Nitrogen Results (PAN):**  
1 ppm

# PACKAGING: Bottling / Kegging



Pressed in November 2023, Bottled 35 cases in April 2024

BOTTLED BY  
**PRESQUE  
ISLE FARM**  
11386 Bolton Road  
Posen, MI 49776

**GOVERNMENT WARNING:**

(1) ACCORDING TO THE SURGEON GENERAL, WOMEN SHOULD NOT DRINK ALCOHOLIC BEVERAGES DURING PREGNANCY BECAUSE OF THE RISK OF BIRTH DEFECTS.

(2) CONSUMPTION OF ALCOHOLIC BEVERAGES IMPAIRS YOUR ABILITY TO DRIVE A CAR OR OPERATE MACHINERY, AND MAY CAUSE HEALTH PROBLEMS.

**PROFILE**  
Very Sweet

**APPLES**  
40% Brown Snout,  
40% Golden Russet,  
10% Kingston Black,  
10% Dabinett

**INGREDIENTS**  
Apples

**VESSEL**  
Stainless Steel

**YEAST**  
Wild

Contains Sulfites



Artwork by Sawyer James Stepanski



**DRAGON SERIES: GIGANTICUS MAXIMUS** KEEVED CIDER  
5% ALC/VOL • 750ML

# QUESTIONS



**Your go-to cider making resource**



[ciderinstitute.com](https://ciderinstitute.com)











