

# Growing Hops in Southern California – UCCE

**Economics – Feasibility** – Botany – Cultural Practices – Pest Control – Harvest



*June 21-22*



*Paul Vossen  
UC Cooperative Extension*

# Retiring after 36 years (6-2016)

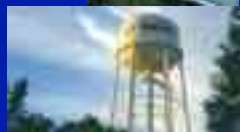
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[paulmvossen@gmail.com](mailto:paulmvossen@gmail.com)





# UNIVERSITY OF CALIFORNIA

## Division of Agriculture & Natural Resources



# Beer Goes Trendy

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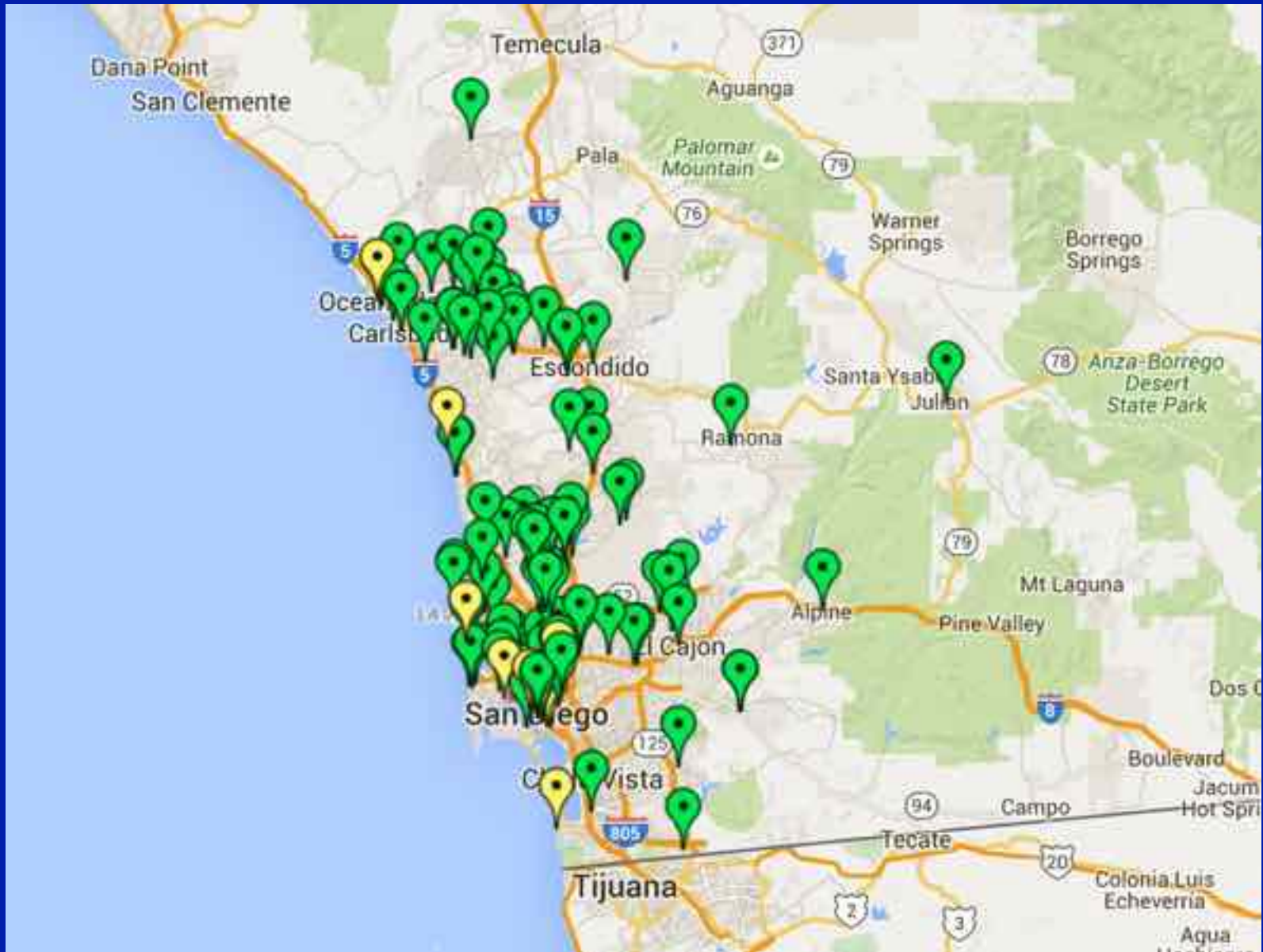
LIFE | TRAVEL | OFF DUTY TRAVEL

### A Trip to Sonoma Where Something New Is Brewing

Though it's still best known for its wines, northern California's Sonoma County has a burgeoning craft-beer scene that's drawing a crowd



# A Couple of Microbreweries







**I even  
had a SD  
beer  
named  
after me!**









# Going Big Time (*Heinagunitas*)



# Some Great Hoppy Beers





San Diego Hop Growers Association

SDHGA

[HOME](#) [HOP FARMS](#) [CONTACT US](#)

**SAN DIEGO'S BEST, LOCAL, FRESH**



**HOPS**



*Our mission is to provide a structured organization for the promotion of local hop growing by sharing research, knowledge, resources, marketing, and a common set of farming principles - recognizing our role as responsible stewards of the land.*

**NORCAL HOP GROWERS  
ALLIANCE**

# Old Standard - Newest





# Yakima Growers Can't be Bothered with FRESH hops



# Fresh Hops

- Very perishable (quickly compost & mold)
- Remove field heat ASAP (forced air cooler)
- Cold storage at 33-34°F – shallow crates
- Keep 48-72 hours





NorCal Hop Growers Alliance Members  
Sonoma County, California

Fogbelt Brewing Co.



Warm Spring Wind  
Hop Farm



Three Disciples  
Brewing Co.



Carneros Brewing Co.



Eric Johnson Hops



# Hop Growers Alliance Map of Hop Growers

# The Specialness of Sonoma

- Natural beauty - diversity
- Climate
- Good soils
- Water
- Clean air
- High quality wine
- Diversity of products





42°N



**Cold  
Ocean  
Current**

# California

**Coastal  
California  
influenced  
by fog  
pattern**

S.F.

L.A.

33°N



Can beer labeled with “**Locally Grown Hops**” sell at a high enough price to make a profit?



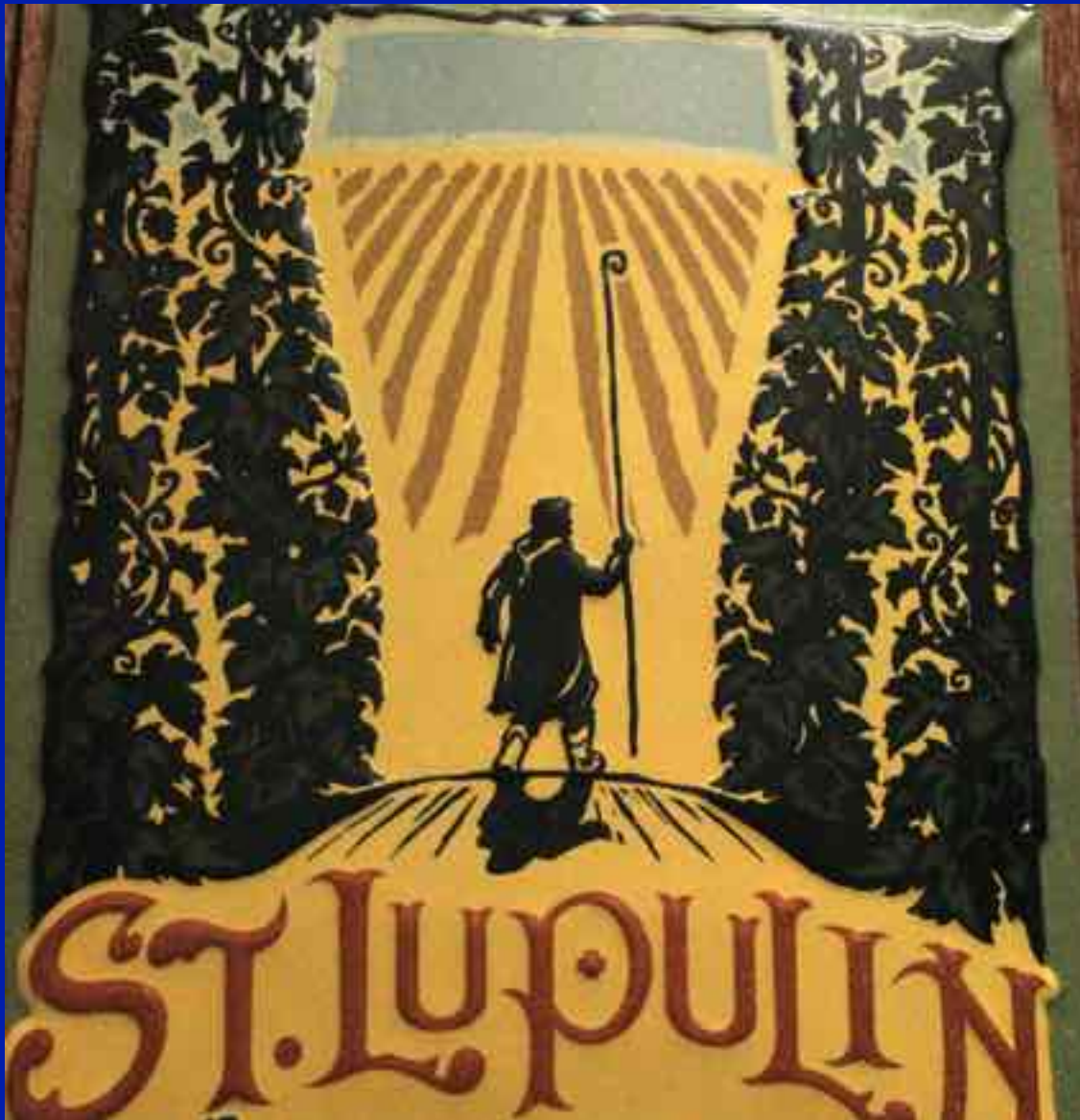
OR

If beer tastes better made from local hops





# “Sophisticated/Differentiated” Beer



# Labeling Beer with the Hop Varieties



## BALE BREAKER BREWING COMPANY



### FIELD 41 PALE ALE

4.5% ABV 30 IBU

Don't be fooled by the powerful hop aroma of Field 41 Pale Ale. Heavily dry-hopped with Simcoe® and Abnott™, this perfectly amicable Pale Ale drinks easy with a smooth bitterness and is named for the hop field that is home to Bale Breaker Brewing Company. Light and refreshing, it's the perfect beer for a day on the river or afternoon on the slopes.



### TOPCUTTER IPA

6.8% ABV 70 IBU

Our flagship IPA is a well-balanced yet aggressive West Coast IPA that showcases Yakima Valley hops at their finest. Late additions of Simcoe®, Citra®, Abnott™, and Mosaic™ give this beer its complex citrus, fruity, and floral aroma and flavor. Named for a unique piece of farm equipment that removes hop vines from the trails during the annual hop harvest, Topcutter IPA delivers loads of happiness all year long.



### BOTTOMCUTTER IMPERIAL IPA

8.2% ABV 100 IBU

Doubly dry-hopped with homegrown Yakima hops, Bottomcutter IPA may be light in color but is packed with citrus and pine hop character. This imperial IPA is brewed to finish dry, perfect for the combination of Citra®, Simcoe®, and Equinox® hops. As the bottomcutter is a tractor that leads the topcutter through the fields during harvest, this beer will lead to a new appreciation for our valley's hops.



### RAGING DITCH DRY-HOPPED BLONDE

5.3% ABV 20 IBU

Named for the maze of irrigation ditches that flow throughout the Yakima Valley's rich farmland, Raging Ditch Dry-Hopped Blonde will quench a drinker's thirst on a hot summer afternoon. While on the lighter side, this summer seasonal is dry-hopped with two exciting new hop varieties. Equinox™ imparts the bright citrus hop notes, while the still-experimental hop variety, HBC344, provides a touch of tropical fruit character.



# San Diego Hop Growers Assn.

## 14 Hop Farms

A close-up photograph of several hop cones, which are green and have a bumpy, textured surface. The text 'SDHGA' is overlaid in white on the central cone.

SDHGA

[HOME](#) [HOP FARMS](#) [CONTACT US](#)

# Stuff on Hops on the Internet

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02  
Tuesday  
AUG 2011

## Pick your own Fresh Hops at Hoppportunity Farm in Julian, CA

POSTED BY JEFF HAMMETT IN [HOMEBREW](#)

1 COMMENT

### Hoppportunity Farm

Up at about 4,000 ft elevation near the small town of Julian, just about an hour's drive outside of San Diego lies the

Hoppportunity Farm. It's one of the few hops farms in San Diego County (the only other one I know of is Star B Ranch near Ramona).

Hoppportunity's Phil Warren says that all the rain early in the year combined with the hot weather now is helping produce a healthy crop which is now ready for harvesting. Each weekend through early September the farm is inviting homebrewers and homebrew clubs up to pick fresh hops. The pick-your-Own hops go for a \$1 an ounce or \$10 per pound and varieties include Cascade, Nugget, Brewer's Gold, Magnum, Centennial, Goldings, Galena, Willamette, and a local variety said to have been brought to the area by gold miners in the 1890's.

Local homebrewer about to turn pro. Derek Freese from the local homebrew club

### Tags

[Brewer's Gold](#), [Cascade](#), [Centennial](#), [derek freese](#), [Galena](#), [Goldings](#), [Hoppportunity Farm](#), [julian hop farm](#), [Magnum](#), [Nugget](#), [san diego fresh hops](#), [san diego hop farm](#), [san diego hops](#), [san diego wet hops](#), [Willamette](#)



# Star B Ranch - Hops



**Article from  
March 2011**

---

**Tour Stop  
June 22  
1:30 pm**

# Article: Sept. 2011

## Small plant, big picture: hops in global terms

Acres of hops, worldwide: 125,512

Acres in U.S.: 31,247

Largest hop farm in U.S.: 1,800 acres

Largest hop farm in San Diego County: 2 acres

Harvest, worldwide: 111,746 tons

Harvest, U.S.: 32,477 tons

Harvest, Ramona's Star B Ranch: 350 pounds

Price for Ramona-grown hops, 2011: \$15-16/lb.

Price for some European-grown hops, 2007: \$27/lb.

Sources: U.S. Department of Agriculture; Hop Growers of America; Star B Ranch; Stone Brewing

San Diego County, experts say, is not suitable for hop farms.

One problem: someone forgot to tell the hops.

Last week, local farmers harvested the last of the green, gumball-sized cones that lend aroma and bitterness to beer. The crop is tiny — the county's largest operation, Ramona's Star B Ranch, is limited to two acres that yielded 350 pounds. In Julian, the one-acre Hoppportunity Farm may contribute 200 pounds.

In the global hop industry, which annually processes more than 100,000 tons, this is a drop in the harvest bucket. But this is a 550-pound rebuttal to conventional wisdom.

"This far south," noted Scott Stamp, owner of San Diego Brewing Co., "history shows that hops don't do that well."

"But our plants here are producing," noted Ken Childs, Star B's manager. "So much for that theory."

In San Diego's growing brewing community, these pint-size ventures have keg-sized potential. Local brewers are renowned



# SD Golden Hop Farm

[SD Golden Hop Farm of San Diego](#)

[Wet Hops for Sale](#)

[Dried Hops for Sale](#)

[Hop Rhizomes For Sale](#)

[More](#)

CART: 0

## "Hop Hopster Hop Growing Kits"

Everything You Need to Build Your Own Trellis for Growing Hops at Home



[Click image to purchase](#)



[Click image to purchase](#)



Hops grow on the Star B Ranch in Ramona  
Image by Andy Boyd

COVER STORIES | SAN DIEGO BEER NEWS



## Local hops for local beer

### Move over, avocados

By Ian Anderson, Sept. 30, 2015



IMAGE BY ANDY BOYD

A hundred years ago, the hop-farming capital of the world was about 550 miles north of San Diego, in the Sacramento Valley. The largest farm by a long shot was the Durst Brothers Hop Yard, a 640-acre concern located in the small town of Wheatland.

If that name rings a bell for anyone, it's thanks to the Wheatland Hop Riot of 1913. The Durst Brothers' farm was the largest agricultural employer in all of California at the time, enlisting thousands of workers from across the state to

**Fresh  
Hops  
article  
last  
year**



# Can San Diego Hops Compete?

**Compete against What? Dry hops, pellets, & extract with Yakima - NEVER**

- The market is for WET hops (fresh hops).
- Any “wet” hop is better than any dry hop – within reason

“If we can get 3 or 4 pounds of fresh hops out of each plant, that’s a good yield for down in San Diego,” Jordan Brownwood (Nopalito Farm & Hopyard in Valley Center) says. “The massive commercial hop yards up in Washington will get 20 pounds off a single plant.”

“Hops might be a fun thing to try.” As they’d later learn, the fun involved three people working eight to ten hours a day, six to eight months of the year, to produce about a pound of hops per plant. They expect a larger yield this year and next, as the plants mature. But they don’t see it ever becoming a major cash crop.

“It grows wild in other parts of the world, so people call it a weed,” Corie Johndro (San Diego Golden Hop Farm – Fallbrook) says. “We laugh and call it ‘the other weed’ — the one that doesn’t make as much money.”

# How its done in Yakima WA





# Production Statistics

- **PNW: 98% of U.S. production**
- **2014: 37,000 acres of hops**
- **WA: 30,000 acres - 74%**
- **OR: 5,500 acres - 14%**
- **ID: 3,800 acres – 10%**
- **2013: 38% of the world hops from USA**  
**Germany produced 33%**



# WA-OR cheap, good land





# And lots of water in WA-OR



# Low humidity – less disease



Compared to other  
growing areas



# Big Volume



# Large scale - volume





# High Yields – Far North Latitude

**8-13 bales = 6,400 to 10,400 lbs. fresh hops per acre**  
**6-10 lbs. per plant (1,037 plants per acre)**





# Dried – Pellets – Extract





# Sonoma Hops - 2,800 acres

*Early 1900's to 1950's*



**Windsor Museum  
Sonoma State Library**

Eight stack hop kilns on the Waddell Ranch (now owned by the Chickadee family, then Peterman Family). This was probably the largest drying kiln in the area.  
A later fire reduced it to a six stack kiln.

# Why the hop industry worked

- Deep soils that could be “dry farmed”
- Some irrigation water was available
  - Russian River & Mark West Creek and . . .
- Cool climate lowered water demand
- Less diseases than Midwest or N. Europe
- Available hand labor from nearby cities
- World market during prohibition
  - Dried product that was not perishable
  - Sonoma County recognized for quality hops



# SRJC Farm surrounded by hops

**Wohler  
Ranch  
1923**

31 acres  
hops

*Wohler Bridge*

43 acres  
hops

*SRJC Entrance*

41 acres  
hops

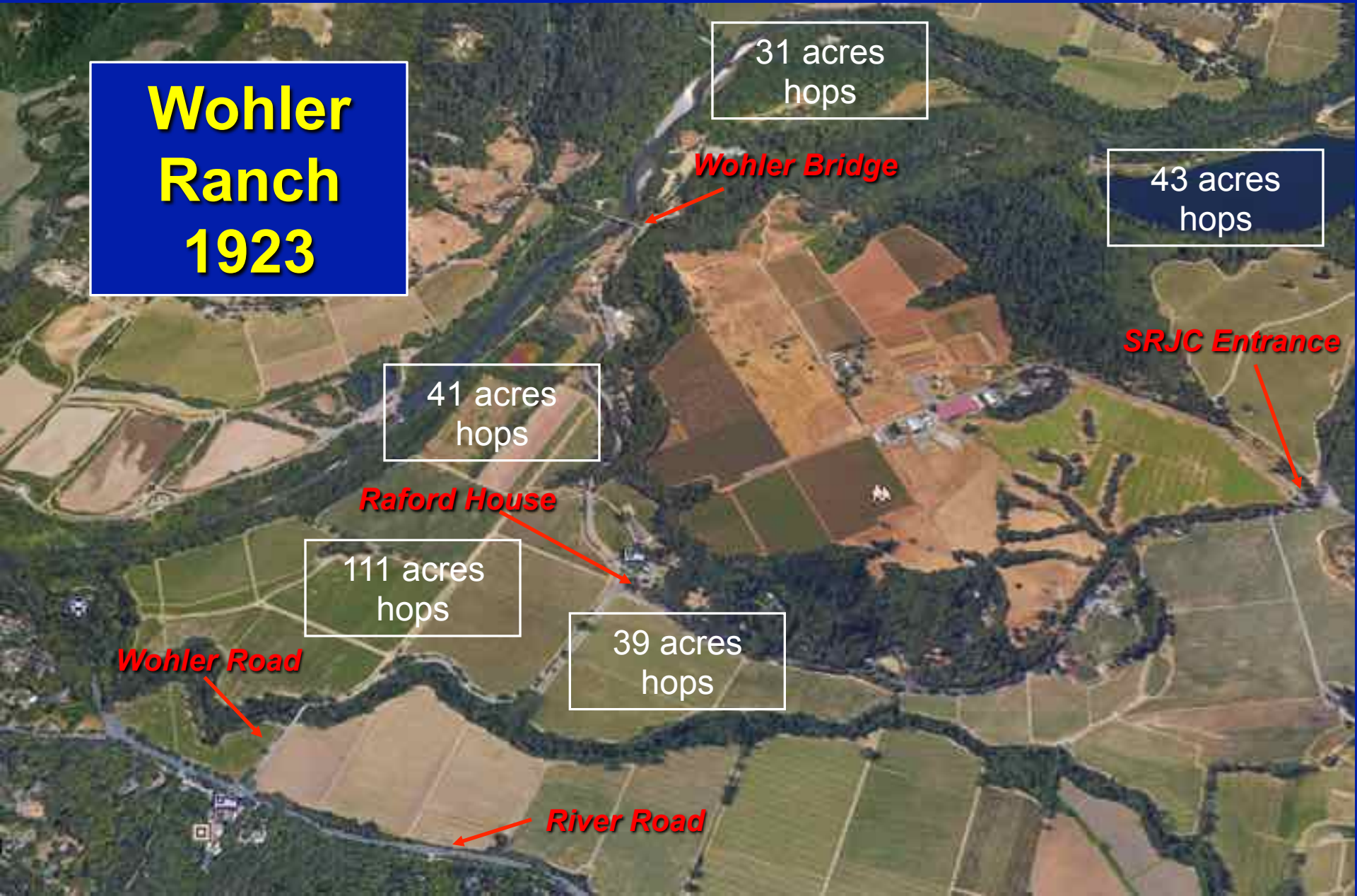
*Raford House*

111 acres  
hops

39 acres  
hops

*Wohler Road*

*River Road*



# Sonoma County History

- 1858: Amasa Bushnell - 1<sup>st</sup> hop plants (Green Valley)
- 1880-1889: Luther Burbank – Gravenstein Apple industry
  - Petaluma has one bar for every 15 voters
  - Kroncke's Park & beer garden = major Santa Rosa hangout
- 1897: Grace Brothers Brewery – to the 1960's
- 1900-1909: Hot springs resort era (Sonoma)
- 1900: Sonoma County - 10 large operating hop ranches
- 1909: Healdsburg main crops – grapes, hops, prunes
- 1920: Sonoma County ranks 8<sup>th</sup> nationally in farm production (eggs, prunes, hops, apples, dairy, livestock)
- 1920-1933: Prohibition – Hops sold to Europe
- 1930: hops production at 15,000 bales (3 million lbs.)
- 1939: Florian Dauenhauer invents hop picking machine
- 1940-1955: Profits declined - No more hops in 1960



# Historical “Facts and Figures”

*William L. Beedie*

- 1<sup>st</sup> hops in Sonoma County ~ 1880
- Peak ~ 1915-1920 = 2,800 acres
  - *Santa Rosa creek, Mark West Creek, Russian River, Larkfield, Oakmont, Sonoma*
- Mendocino County 1920 ~8,000 acres
- Lake County & Sacramento area
- CA ~12,000 A (10,500 tons – 105,000 bales)
- Good yield was 8 bales/A (dried hops)
- Yield Range: 3.5-12 bales/A (19 = record)
- 150-1,000 pickers per ranch (hand harvest)

# Historical Cultural Practices

*Video by Raford Jones*

- Winter: Trellis system & planting
- April: shoots emerge = trim & weed control
- June 1: training onto twine & weed control
- June 21: trim lower leaves (plants 8-10' )
- July 1: plants 15' – flood irrigation (sulfur dusting)
- July 11: trim lower laterals & weeding
- July 21: plants 18' – mildew & aphid control
- August 1: laterals & flowering - trim lower shoots
- August 15: cones showing & developing
- September 1: ready for harvest



# Weed Control in Old Hop Yards



# Training & trimming







**Old Manure  
Spreader  
20-30 tons/  
acre**

# Old sulfur duster and sprayer



For control of:

- Powdery Mildew
- Downy Mildew
- Mites
- Aphids



# Dusting Hops (sulfur)



# Old sulfur duster





# Hops

# 1000 HOP PICKERS WANTED

245 ACRES OF HOPS

TO PICK IN  
THE YARDS OF

## WOHLER RANCH

ON THE  
RUSSIAN RIVER

Butcher Shop, Grocery Store, Ice  
Cream Stand, Lunch Room at the Camp

FREE TENTS, WOOD AND WATER

## CHISHOLM FARMS CO.

Phones: Santa Rosa 2F 15  
Windsor 6F 24

ROUTE 1, BOX 109  
Healdsburg, California

# “Whole families” harvest

The crop is a little backward this year, but it will be immense, and pickers, who will receive \$1 per 100 pounds for picking, have an opportunity to make good money and at the same time enjoy an outing in camps provided for the pickers,” says Flint. “Whole families are headed for the hop fields and picking begins Monday. Where the heads of families do not accompany we will see that the wives and children are properly cared for and protected. There will also be need for High School students in the fields.”

## **Accommodations Provided.**

This colony of pickers will be as-





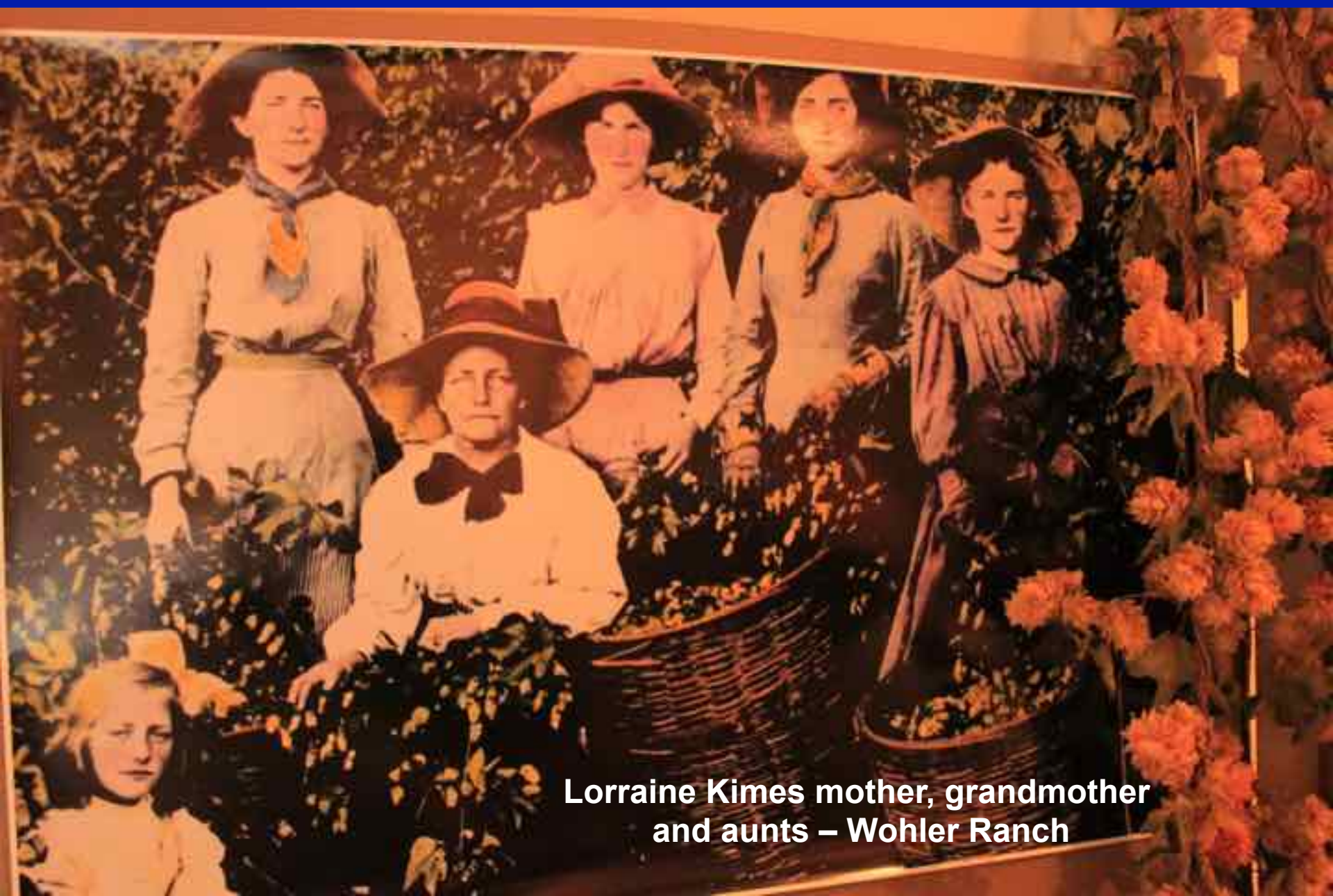


# Sonoma County Hand Harvest





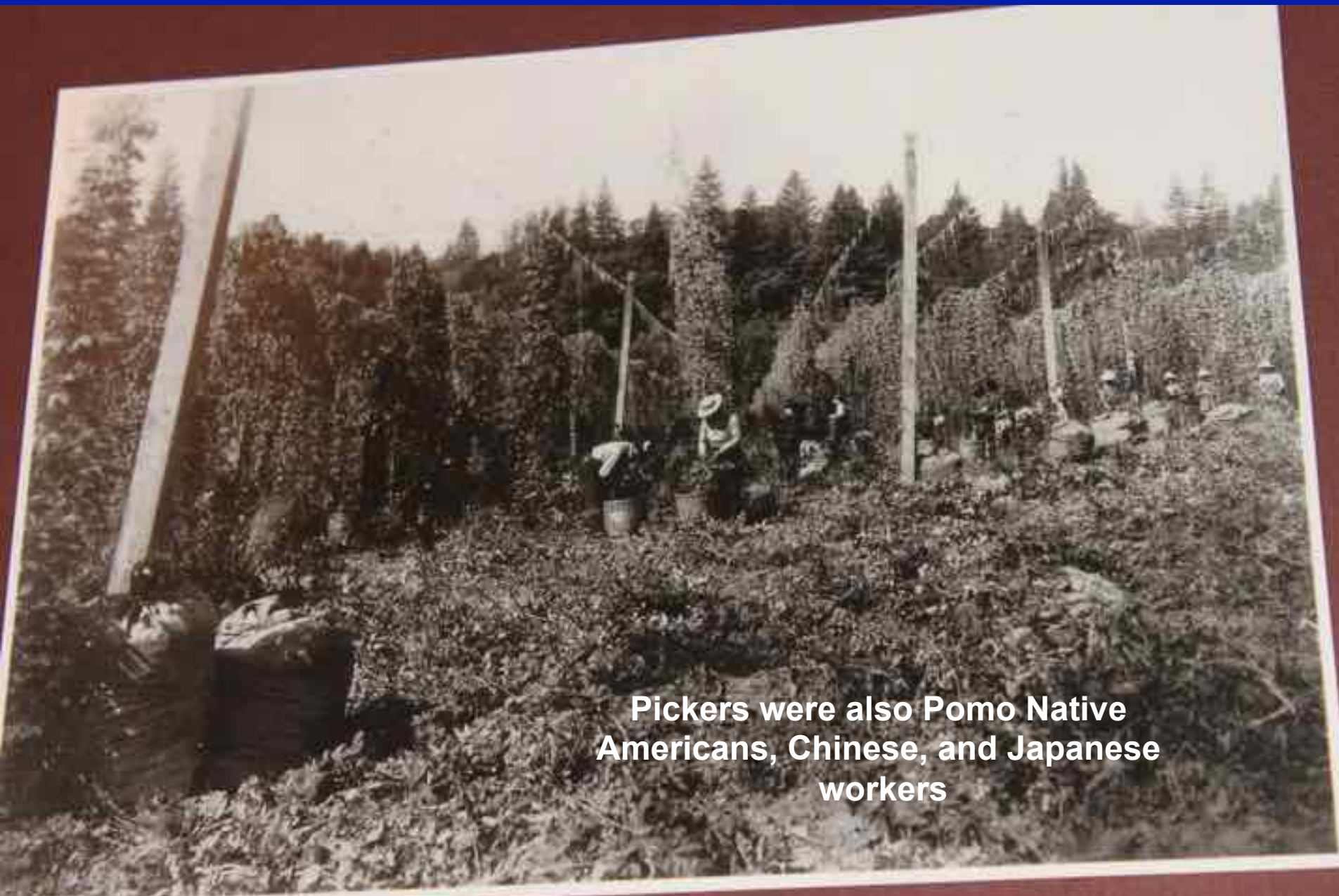
# Windsor Museum – *Steve Lehmann*



Lorraine Kimes mother, grandmother  
and aunts – Wohler Ranch



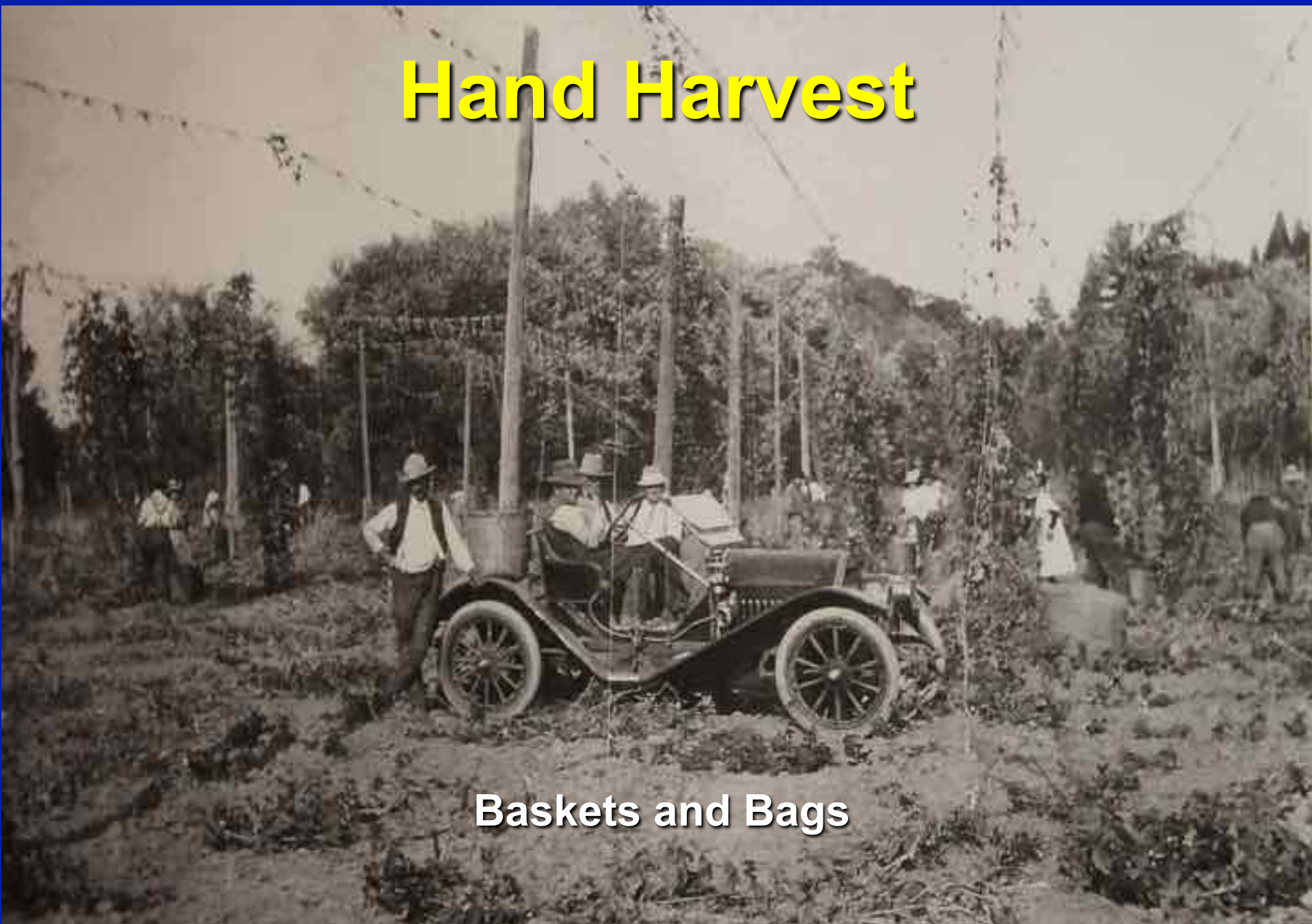
# Hand Harvest in Sonoma County



Pickers were also Pomo Native Americans, Chinese, and Japanese workers



# Hand Harvest



Baskets and Bags

# Traditional hop basket



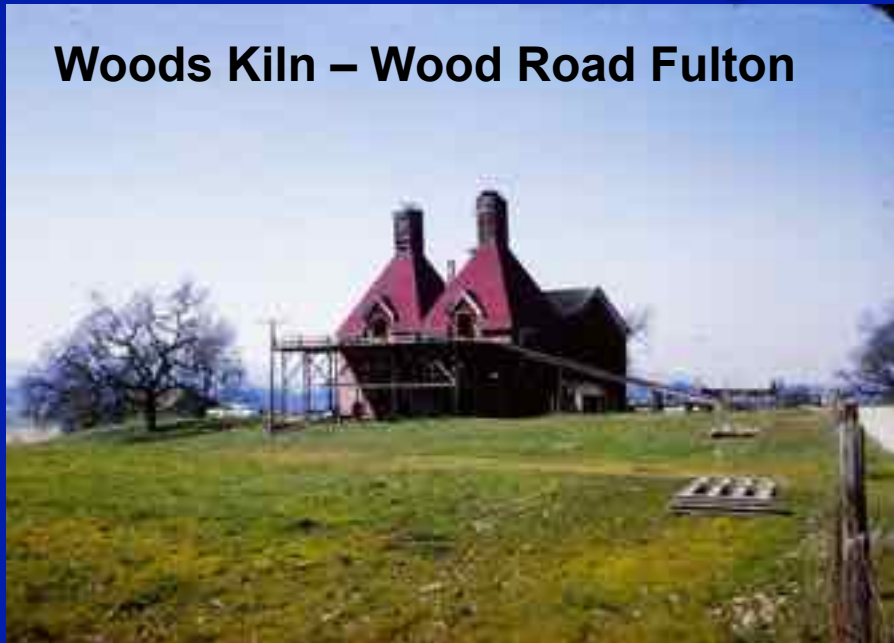


# Bags weighed & transported to dryer



# Old hop kilns (dryers)

Woods Kiln – Wood Road Fulton



Woods Kiln – River Road

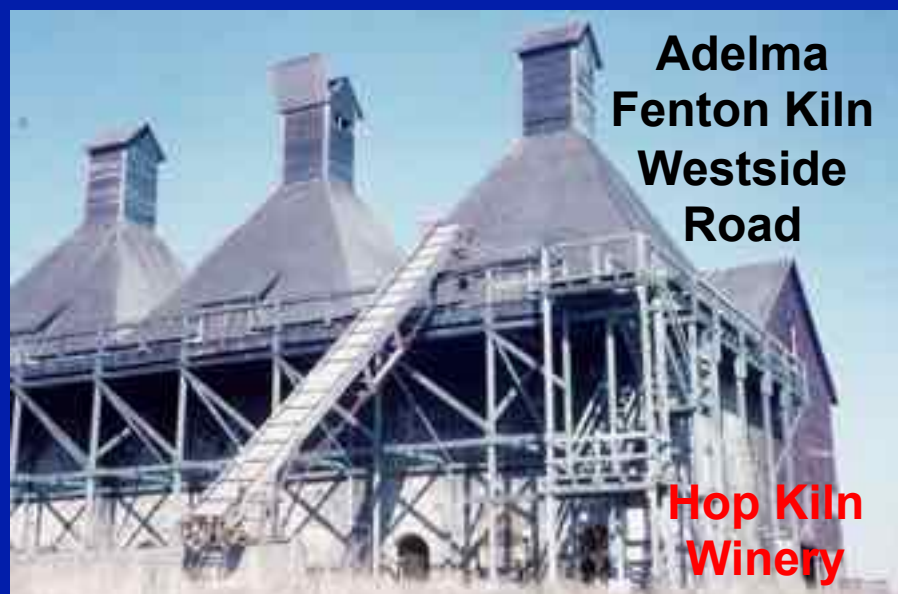


Martinelli Winery

Frost Ranch – Old Story Ranch Kiln



Adelma  
Fenton Kiln  
Westside  
Road



Hop Kiln  
Winery





**Cooling  
hops after  
drying, prior  
to bailing**

# Old hop bailers





# Old hop bailer



# Bailed hops transported to RR





# Good Market – Good Prices

**33 CTS. OFFERED FOR HOPS NOW**

Ukiah Reports a Number Sales Thursday at Thirty-two and a Half Cents Per Pound—Condition of the Market Here Thursday.

*Fading*  
*Aug 17/1917*

Thirty-three cents per pound was offered for hops in this city on Thursday. This is the top notch price so far this season and in a little over two weeks the price has jumped from fourteen and a half cents to thirty-three. And the growers believe the price will advance still higher. "Watch for more sales and prices on Thursday."

The following sales were made on Thursday at Ukiah:

K. L. Casselman, 44¢ sales; Bert Johnson, 34¢ sales; and Joe Chillingham and Charles Christensen, each 24¢ sales. A total of 1,000 lbs. and a half cents.

1917

Friday Morning..... July 18, 1918

**40,000 POUNDS OF HOPS SOLD BY GRACE AT 52 1-2 CENTS LB.**

Biggest Price Paid This Season for 1919's, and Indications Are That the Price Will Still Further Advance — Lucky Growers Who Still Have Hops to Sell.

James P. Grace on Thursday sold forty thousand pounds of his crop of hops at fifty-two and a half cents per pound. The price was paid in cash. This is the highest price for hops in the history of the county. It is still a little higher than the price for 1918. The price will be kept for to sell at

1919

SUNDAY, DECEMBER 7, 1919

**SIXTY CENTS OFFERED FOR 1920 CROP OF SONOMA HOPS**

When the hops were sold at 60 cents per pound, the price was the highest ever paid for hops in the county. The price was paid in cash. This is the highest price for hops in the history of the county. It is still a little higher than the price for 1919. The price will be kept for to sell at

1920

# Great Prices \$ \$

THE PRESS DEMOCRAT, SANTA ROSA, CALIF.

NOV 15 1919

## HOPGROWERS ARE NOW AT PINNACLE OF PROSPERITY

Democrat

NOV 11 1919

Local Market Price for 1919 Crop Reaches 85½ Cents, and Contracts Are Being Made for 1920 Crop at 52½ Cents, With Contracts for Three Years, 1920-1921-1922, Being Signed for 45, 40 and 35 Cents Per Pound; Condition Is Unprecedented.

Hop growers a year ago were fearful that with the country going dry their business would be ruined and one of California's industries wiped out of existence. Today, with war time prohibition in force and with federal constitutional prohibition soon to become a reality, hop growers are being offered as high as 42 cents for next season's crop, 40 cents for 1921 and 35 cents for 1922.

Even at these prices the present

from the Wm. P. Slusser hop farm, to be grown by H. P. Steele, and 15,000 pounds to be grown by K. T. Ross. The purchases are to be made by Siroux & Company of London, England, and Steele is to receive 45 cents a pound and Ross, whose contract was drawn up a week later, is to get 45½ cents.

Owners of the old crops held on 1915, 1916, and 1917 have been sold at from 37 to 40 cents. Of the 1918 crop and crops of prior years there are not

## G. A. PROGTOR BUYS MENDOCINO HOPS

Local Dealer Pays 50-45-40  
Cents for 130,000 Pounds of  
Mendocinos for Next Three  
Years.

UKIAH, Nov. 11.—One of the largest hop contracts of the season, which seems to guarantee that the hop growers are going to receive good prices during the next three years, was signed this week by Warren L. Brown and George A. Starlevant, and disposed of 130,000 pounds of hops for the years 1920, 1921 and 1922. G. A. Progtor of Santa Rosa purchased the hops through local agents.

The contract calls for 20,000 pounds per period, 50,000 pounds in 1921 at 45¢ of hops of the 1920 crop at 50 cents each, and 50,000 pounds in 1922 at 40 cents.



# Higher price for Sonoma Hops

## HOP PRICES STILL RISE; 31 1-2 CENT OFFER IS REPORTED

Quotations Advance From 28 to  
30 Cents in Sacramento Dis-  
trict; Higher in Sonoma  
County

Hops are still hopping and since Monday the price has advanced from 28 to 30 cents in this section, according to F. V. Flint, one of the big hop dealers of this valley. Several hundred bales were sold this week at 30 cents. In Sonoma County 31 1/2 cents has been offered this week.

Flint said that although high prices prevail it should not be taken for granted that all of the hop raisers are going to make a fortune. This good fortune comes to those who have held off and have not contracted their crops.

### Most Of Crop Contracted.

Fully 85 per cent of this year's crop has been contracted for, the larger portion for 10 and 11 cents, which will barely pull the growers through, on account of the high prices for culch...

Gene  
Slusser  
trophy  
“Best  
Hops in  
Western  
USA”

1904-1950  
prices  
ranged from  
\$0.4 to  
\$1.50 per  
pound



# Why the hop industry failed

- **Mechanical harvest reduced labor needs**
  - Hops could be grown in more isolated areas
  - Managing 1000's of people . . . . .
  - Hand labor related quality problems
- **WA and Oregon – lots of cheap land**
  - Big parcels with lots of cheap irrigation water
- **Better climate with lower humidity**
  - Less P. Mildew and Downy Mildew
- **Farther North Latitude = higher yields**
- **Quality was “relative” for big beer brands**



# California Hops

- Wheatland Hop Riot of 1913. The Durst Brother's 640 acres – 3,000 workers showed up for 1,500 jobs

Wheatland hop riot - Wikipedia, the free encyclopedia ✓

[https://en.wikipedia.org/wiki/Wheatland\\_hop\\_riot](https://en.wikipedia.org/wiki/Wheatland_hop_riot) ▾ Wikipedia ▾

The Wheatland hop riot was an outburst of physical violence which took place on August 3, 1913, at the Durst Ranch in Wheatland, California, which was ...

History ✓ · See also ✓ · Footnotes ✓ · Further reading ✓

Wheatland Hop Riot's 100th anniversary to be marked in Yuba County ... ✓

[www.sacbee.com/news/local/history/article2578288.html](http://www.sacbee.com/news/local/history/article2578288.html) ▾ The Sacramento Bee ▾

Jul 30, 2013 - The Wheatland Hop Riot ended up making history, recognized as an early shot across the bow in what would become an ongoing battle over ...

The Wheatland hop riot - Sam Lowry - Libcom.org ✓

<https://libcom.org/history/1913-wheatland-hop-riot> ▾ Libcom ▾

Nov 28, 2006 - A brief history of the riot that occurred at Wheatland in Northern California after a meeting of farm labourers of the radical union the IWW was ...

# Florian Dauenhauer's Hop Picker





# HOP PRICE UP TO 20 CENTS

Two Hundred Bales of 1921  
Crop Contracted For; Proc-  
tor Pays 13c for 1920's.

A contract for 200 bales of 1921  
Sonoma county hops was made at  
20 cents a pound Saturday, a jump  
of two cents over one contract  
made earlier in the week. For two  
days it had been rumored that 20  
cents would be paid if a taker  
could be found and Saturday the  
transaction was closed.

George A. Proctor bought a car-  
load of spots, or 1920 hops, and  
paid 13 cents a pound for the same  
Saturday, an increase of half cent  
a pound advance on an purchase  
earlier in the week.

It is positively stated that in  
view of the dirty picking of hops  
last year that English buyers will  
make no offers on the coming crop  
until after it is picked and baled  
so that they may see just what  
they are buying. Growers might  
just as well understand now as  
any time, dealers state, that there  
will be no market this season for  
dirty hops and they must be picked  
clean.

**Fluctuating prices  
Low prices**

**Poor quality  
“dirty hops”**

**1921 - English  
buyers: No market  
for dirty hops**

# Why not hops again ?

- They grow just fine here
  - Yields may not be quite as good, but . . . . .
  - Mechanical harvesters are available
- Diseases & Insects are manageable
- Drip irrigation technology
- “Locally Grown” is a marketing bonus
  - Lots of specialty microbreweries here
  - Strong interest in fresh hops
  - Fresh hops are expensive to ship
- Quality of fresh hops is likely better



# Small-scale growing



**Mike Stevenson**  
**Sebastopol**



# Small-scale hop growing

**Posts, cable,  
turnbuckles,  
anchors, drip  
tubing, cement,  
twine for 105 x 40 ft  
(0.10 acre)  
175 hop plants**





# Only way to know is to try it!

*For many years, we thought blueberries could not be grown in California's Central Valley – too hot, not enough chilling, alkaline soils, etc.*



# More Local Information

## Eric March:

- We started with 12 plants 9 years ago and most did well
- 7 years ago we planted 2 acres
- Half the plants reached 10' the first year
- Years 2-4 we weren't even able to harvest half of what we grew!
- Year 5&6 were disappointing – possibly due to virus
- We were trying to grow organically but nutrition is difficult
- This year I installed a fertilizer injector
- We imported a Wolf picking machine
- Some varieties do well here – others don't
- Chilling may be an issue in parts of the county



# More Local Information

## Zac Summers:

- Hops grew well – before last year
- This year is a recovery year
- I had water filter & nutrition issues last year
- Chinook, Centennial, & Zeus varieties do the best
- Cascade does ok
- Nugget – not so well

# More Local Information

Lyle@zpgrowers:

- I started with 15 different varieties
- 5 actually seemed to produce: Cascade, Chinook, Galena, Nugget, and Zeus
- Challenges: short daylength, alkaline soil and water, water availability, poor winter chilling
- Some farms have significant virus problems
- Pests (mites, aphids, fungus) have not been an issue





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#### Specialty Crops and OLIVES

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- Apples
- Berries
- Cut Flowers & Christmas Trees
- Fruits & Nuts

## Specialty Crops

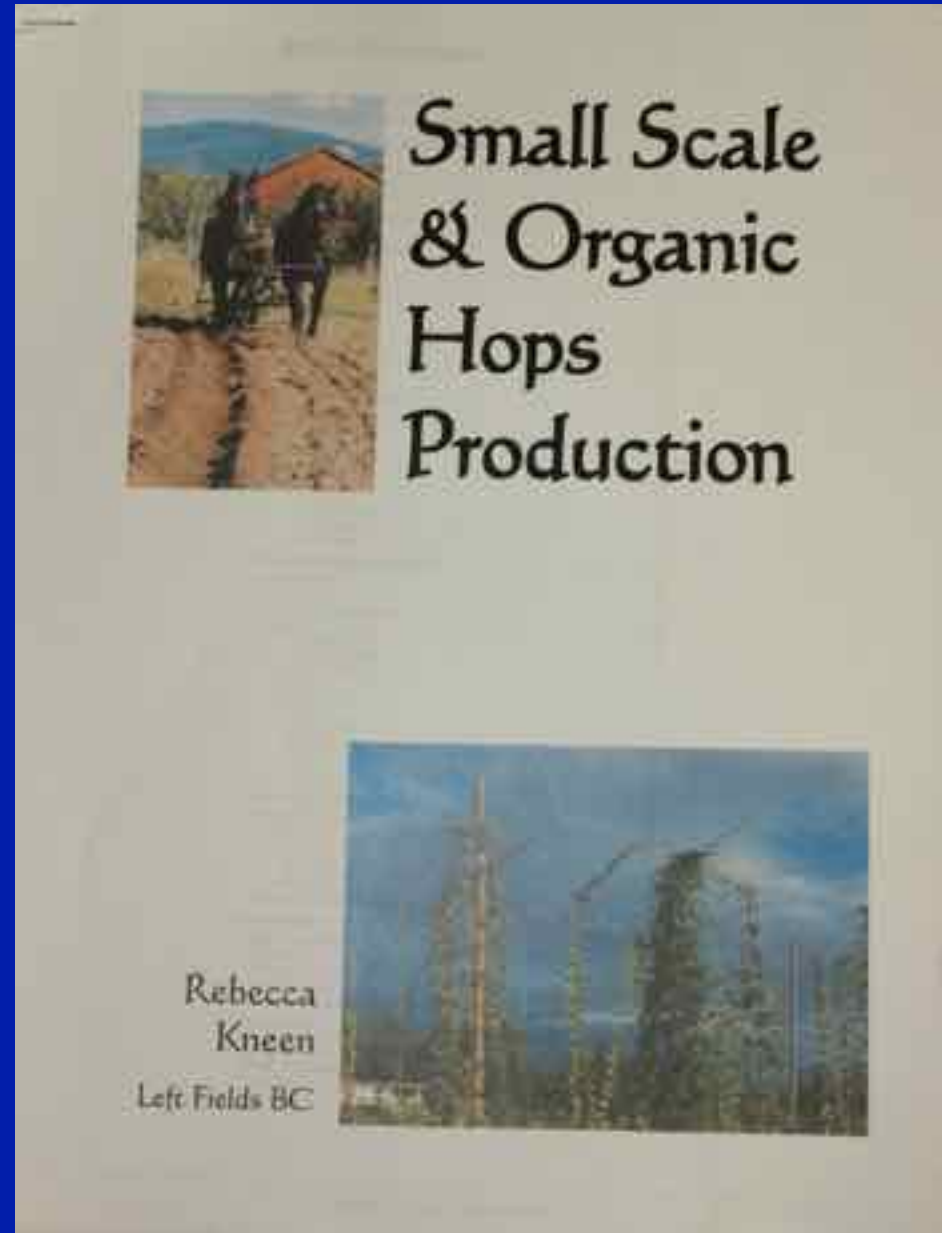
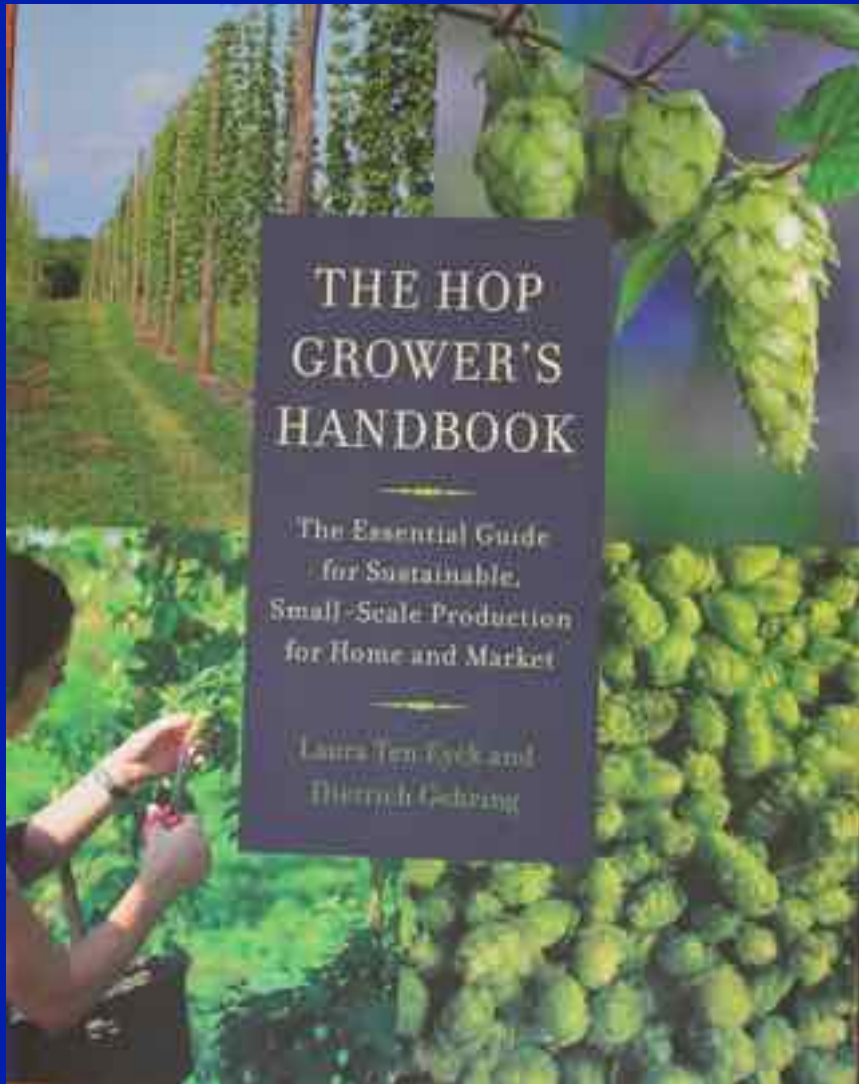


### Paul Vossen, Farm Advisor

Paul Vossen has been a Farm Advisor in Sonoma County for over 25 years. He works with the county's 800 small-scale commercial farmers who grow olives, tree fruits, nuts, berries, vegetables, herbs, cut flowers, and other specialty crops on about 8,000 acres. His goal is to help farmers, processors, and marketers make a profit in local agriculture while promoting sustainable practices. His research and educational program emphasizes crop diversity. He also manages the 200 volunteers in the

Master Gardener Program who help educate home gardeners about pest management and good cultural practices.

# More Information





# More Information



## Hops: Organic Production

A Publication of ATTRA - National Sustainable Agriculture Information Service • 1-800-346-9140 • [www.attra.ncat.org](http://www.attra.ncat.org)

By George Krueper  
Updated by  
Katherine L. Adam  
NCAT Agriculture  
Specialist  
© NCAT 2008

Organic hops production in the U.S. is finding a niche among the growing number of microbreweries that currently purchase organic hops from New Zealand and China. This publication looks at cultural requirements for organic hops, hops varieties, and recent research. It also provides a list of further hops resources.

### Contents

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### Organic Farming, Organic Certification, and the National Organic Program

Organic farmers rely heavily on crop rotations, crop residues, animal manures, legumes, green manures, composts, and mineral-bearing rock powders to feed the soil and supply plant nutrients. Insects,



Developments in Crop Science 16



## Hop Production

Edited by

Václav Rybaček

Elsevier

# Hop Culture Publication 1985

*Gordon Morehead & Paul Vossen*

## HOP CULTURE IN CALIFORNIA

The Hop plant (*Humulus lupulus*) is a vigorous growing perennial of climbing habit, with a root system of deep penetrating feeder roots, shallow underground roots or stems, and with large roots for the storage of food. The vine is deciduous, drying each fall and producing a new growth each spring. The hop is dioecious, the male and female blossoms produced on separate plants, the hop of commerce being the pistillate or female flower. These flowers, commonly called cones, consist of a number of scales or bracts borne in clusters around a short stem or axis. At the base of each bract is the flower which, if fertilized, produces a seed. It is the common practice in California to produce unfertilized hops. "On each side of the flower or seed and on stem and sides of each petal is secreted a yellow granular substance somewhat resembling pollen, known as lupulin, sometimes called hop flour or hop meal, which is largely responsible for the commercial value of hops."

## VARIETIES

Brewer's Gold - Mildew resistant. Ripens August-September. Shoots can be eaten like asparagus.

Bullion - English bittering hop; 7-8% bitterness. Good yielding.

Cascade - Fuggles X Serebrianka. Ornamental type with variegated leaves. Excellent taste. Adds flavor and aroma to light lagers; 4-6% bitterness. Hardy in Zone 4. Bred at

**USDA  
Hop  
Production  
Ag Bulletin  
1961**



# WSU – OSU Information

## 2010 ESTIMATED COST OF PRODUCING HOPS IN THE YAKIMA VALLEY, WASHINGTON STATE

producer version

Suzanne Galinato, Ann George and Herbert Hinman

### Introduction

Commercial hop acreage in Washington State has increased from 1,000 acres in 1990 to 10,000 acres in 2009.



## 2010 Estimated Cost of Producing Hops in the Yakima Valley, Washington

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • F10290

### Introduction

Commercial hop acreage in Washington State has increased from 1,000 acres in 1990 to 10,000 acres in 2009. Total hop acreage in Washington State is 10,000 acres. The total hop acreage in the Yakima Valley is 10,000 acres. The total hop acreage in the Yakima Valley is 10,000 acres. The total hop acreage in the Yakima Valley is 10,000 acres.

In previous years, growers could generally count on getting a 1.5 million yield with a crop rotation system, and having it in place for an entire season. In 2009, the estimated hop yield was 1.5 million. The estimated hop yield was 1.5 million. The estimated hop yield was 1.5 million.

### Objectives of Study

- The primary objective of this study was:
  - To provide a representative estimate of capital investment and production cost of a well-managed hop production system under dry conditions.
  - To provide producers with a perspective and a tool for evaluating the profitability of their hop production system.
  - To identify all hop production costs above the farm level to provide producers with a perspective on the total cost of producing hops and their ability to compare the costs of changing their production system.

### Sources of Information

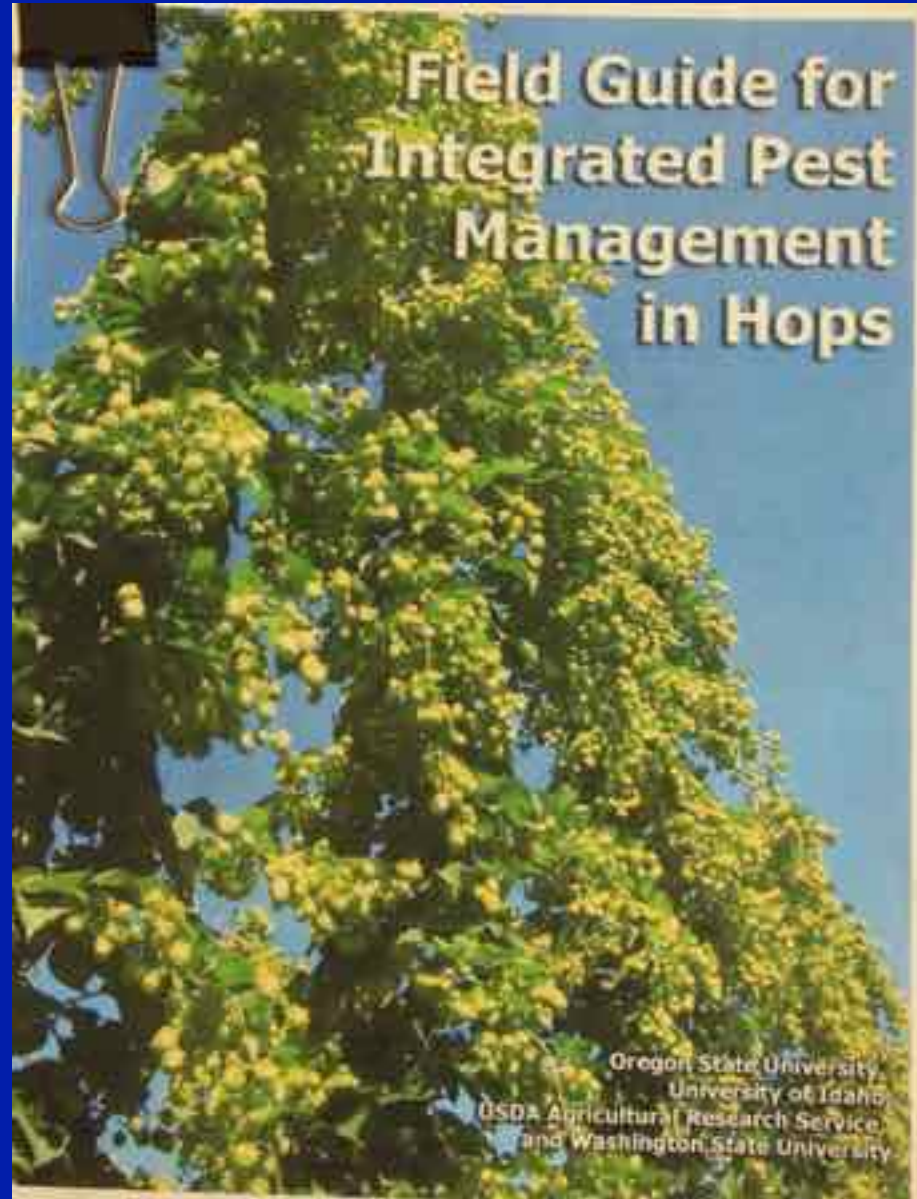
In order to conduct this study, a committee of producers and extension staff was formed. The committee was formed to provide a perspective on the total cost of producing hops and their ability to compare the costs of changing their production system.

### Basic Assumptions

The following are the general assumptions made in developing the production budget for hops grown in the Yakima Valley under dry conditions. The assumptions are based on the following:

- The representative hop yield was 1.5 million.
- The representative hop yield was 1.5 million.
- The representative hop yield was 1.5 million.

## Field Guide for Integrated Pest Management in Hops



Oregon State University  
University of Idaho  
USDA Agricultural Research Service  
and Washington State University



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# USA Hops Assn. Varieties

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# USA

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## Aroma Varieties...

For a complete copy of the USA Hop Variety Manual (updated July 2013), please click [HERE](#).

### Amarillo® VGXP01 c.v.

Amarillo® is an aroma variety of recent origin, discovered and introduced by Vigil Gamache Farms Inc. in Washington State. It is used for its aromatic qualities, as well as its bittering properties due to its lower cohumulone content.

Yield (kilos per hectare)	1350 - 1800
Yield (lbs per acre)	1200 - 1600
Alpha Acids	8 - 11%
Beta Acids	6 - 7%
Alpha-Beta Ratio	1.6
Cohumulone (% of alpha acids)	21 - 24%
Total Oils (Mls. per 100 grams dried hops)	1.5 - 1.9
Myrcene (as % of total oils)	68-70%
Caryophyllene (as % of total oils)	2 - 4%
Humulene (as % of total oils)	9 - 11%
Farnesene (as % of total oils)	2 - 4%
Storage (% alpha acids remaining after 6 months storage at 20° C)	Good (above average %)
Possible Substitutions	Cascade, Centennial

# North-East Information

2013 Cornell Integrated Hops Production Guide Now Available

The Vegetable Management Education Program (VMEP) at Cornell University is pleased to announce the availability of the 2013 Cornell Integrated Hops Production Guide. This guide is a comprehensive resource for hop growers in the Northeast, providing detailed information on hop production, including site selection, soil preparation, planting, and harvest. The guide is available in both print and digital formats.

May 2013

## Northeast Hops News

### Crowning, Pruning, and Training The Art of Growing Hops

By Steve Miller

Hops are easy to grow. At least that is what experienced hop growers claim. However, growing hops is a complex task that requires a lot of knowledge and experience. This article discusses the art of growing hops, from site selection to harvest.

June 2013

## Northeast Hops News

### Downy Mildew is Widespread

Weather conditions last fall and this spring have produced ideal conditions for Downy Mildew. Here are a collection of symptoms of Downy Mildew.

From Virginia State University Extension:

Downy mildew disease appears early in the season on hop leaves. Symptoms that appear include yellowing and necrosis of hop leaves. Downy mildew is caused by the oomycete *Pseudoperonospora humuli*. The disease is characterized by yellowing and necrosis of hop leaves. Symptoms include yellowing and necrosis of hop leaves. Downy mildew is caused by the oomycete *Pseudoperonospora humuli*. The disease is characterized by yellowing and necrosis of hop leaves.

**Photo 1**

Downy mildew on hop leaves. Symptoms include yellowing and necrosis of hop leaves. Downy mildew is caused by the oomycete *Pseudoperonospora humuli*. The disease is characterized by yellowing and necrosis of hop leaves.

**Photo 2**

Downy mildew on hop leaves. Symptoms include yellowing and necrosis of hop leaves. Downy mildew is caused by the oomycete *Pseudoperonospora humuli*. The disease is characterized by yellowing and necrosis of hop leaves.

Hop Downy Mildew | NC State University

Page 1 of 6

## Hop Downy Mildew

### Vegetable Pathology Fact Sheets

NC STATE UNIVERSITY

NC COOPERATIVE EXTENSION

#### Pathogen

Hop downy mildew is caused by the fungus-like oomycete pathogen *Pseudoperonospora humuli* (Figure 1). *P. humuli* is a specialized pathogen on hops and an obligate parasite that only can grow in living host tissue.




Figure 1. Sporangium and zoospores of *Pseudoperonospora humuli*.

Contributor: Nancy Stithers, NCDC Vegetable Pathology Lab.

#### Host crops and plants

The host is humulus, *Humulus lupulus* (also known as hops) (Figure 2). *P. humuli* can also infect aspen (*Populus sp.*) (Figure 3). The pathogen is very closely related to *Pseudoperonospora cubensis*, the common downy mildew pathogen, but *P. humuli* will not infect susceptible crops and *P. cubensis* will not infect hop. Downy mildew pathogens are highly host-specific.



## Extension Specialists

## Hops



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Bordelon

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More Ways to Connect @



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University):  Video recording,  1 slide per page

- Scouting and managing insect pests (Mr. John Obermeyer, Dept. of Entomology, Purdue University):  Video recording,  1 slide per page

- Marketing roundtable (Ms. Renee Wiatt, Purdue Extension):  Video recording,  1 slide per page

### [2015 Hops Production Workshop, Indiana Small Farms Conference, Danville, IN](#)

- 2015 Let's Get It On:  1 slide per page,  6 slides per page
- Downy Mildew and Insects:  1 slide per page,  6 slides per page
- Food Safety Considerations/Good Agricultural Practices for Hops:  1 slide per page,  6 slides per page
- Getting Started with Hops-Trellis Construction:  1 slide per page,  6 slides per page
- Hop Quality, Components and Considerations:  1 slide per page,  6 slides per page
- Indiana Hops-Becoming legit growers:  1 slide per page,  6 slides per page
- Noninsured Crop Disaster Assistance Program & Other Risk Management Tools:  1 slide per page,  6 slides per page
- Practical Pesticide Use:  1 slide per page,  6 slides per page

## Webinar Archives

- [Scouting in your Hopyard](#) – Erin Lizotte, IPM Educator, Michigan State University
- [Hops: Cost of Production](#) – Dr. Rob Simme, Michigan State University, July 10, 2014



# Wine and Brewing Courses

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