Growing Hops in Southern California – UCCE

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

Paul Vossen
UC Cooperative Extension

June 21-22
Retiring after 36 years (6-2016)

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Beer Goes Trendy

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

- Pliny the Elder
- Pliny the Younger
- Lagunitas Maximus IPA
- Peak Republic Black Jack IPA
- Firestone Union Jack IPA
- Deschutes Inversion IPA
- Stone Top Cutter IPA

Enjoy By 07.04.16 IPA
SAN DIEGO HOP GROWERS ASSOCIATION
SDHGA

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
The Specialness of Sonoma

- Natural beauty - diversity
- Climate
- Good soils
- Water
- Clean air
- High quality wine
- Diversity of products
California
Cold Ocean Current
Coastal California influenced by fog pattern
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.

Chuck Alek Bottle Club
Available to members only, the Bottle Club will feature quarterly allotments of Chuck & Alek Seasonal Series Beers as well as our Trading Co. Barrel Aged Series Beers.
“Sophisticated/Differentiated” Beer
Labeling Beer with the Hop Varieties

**Bale Breaker Brewing Company**

**Field 41 Pale Ale**

Don't be fooled by the powerful hop aroma of Field 41 Pale Ale. This perfectly approachable Pale Ale is easy with a smooth bitterness and is named for the hop that is native 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**

8.8% 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®, and Mosaic™ give this beer its complex citrus, fruity, and floral aromas and flavor. Named for a unique piece of farm equipment that removes hop vines from the fields during the annual hop harvest, Topcutter IPA delivers loads of hopiness all year long.

**Bottomcutter Imperial IPA**

8.2% ABV 100 IBU

Double 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 run 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, the summer seasonal is dry-hopped with two exciting new hop varieties. Equinox™ imparts the bright citrus hop notes, while the still-experimental hop variety, HBC 33A, provides a touch of tropical fruit character.
San Diego Hop Growers Assn.

14 Hop Farms
Pick your own Fresh Hops at Hopportunity Farm in Julian, CA

Posted by Jeff Hammett in homebrew

Hopportunity Farm

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

Hopportunity’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...
Star B Ranch - Hops

Article from March 2011

Tour Stop
June 22
1:30 pm
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

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 Hopportunity 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
"Hop Hopster Hop Growing Kits"

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

Click image to purchase
Local hops for local beer
Move over, avocados
By Ian Anderson, Sept. 30, 2015

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 pick the crop. A labor union attempted to organize the workers, and the resulting clampdown led to a violent upheaval that reached the floor of the state legislature.

But that’s not the only reason the name Wheatland is still important to craft beer fans today. The town’s new name may have come from a Native American word meaning “high mountain,” but the original name was “Eggalter’s Ranch.” The name? From a commercial for a popular typewriter company.

That’s the story Andrew Zimmern told in his recent documentary “Cooking Alone.” It’s a tale he could have cribbed from the beer scene’s own history.

Zimmern noted, for example, that the great craft beer boom of the last decade started with a brewer in California—a man named Ken Grossman. Therefore, Grossman is the Shirttail of the Craft Beer Movement. He made it in the 1980s, when few others were even thinking about making craft beer.

In 2007, Grossman was named California’s Entrepreneur of the Year. In 2012, the state legislature honored him with a bill of rights for the craft beer industry. Today, Grossman owns Sierra Nevada Brewing Co., one of America’s largest craft breweries.

We must also remember Grossman’s predecessor: a man named Ken Houck. Houck was a regional brewery owner back in the 1970s, when craft beer was still pretty much a novelty. Houck’s story is told in Grossman’s book: "Eggalter’s Ranch: A Great Californian Beer Story." Houck had been an employee of the well-known California brewery Anchor before going out on his own.

If you want to trace the roots of the craft beer movement back even further, you’ll find Grossman’s father, Ken Grossman, Sr., a brewer for his dad’s company.

That’s the kind of history that makes the craft beer scene, you might say, a hoppy place.
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
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
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

Wohler Bridge

SRJC Entrance

Wohler Road

River Road

Raford House

111 acres hops

41 acres hops

39 acres hops

31 acres hops

43 acres hops
Sonoma County History

- 1858: Amasa Bushnell - 1st 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 8th 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

- 1st 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
Old sulfur duster
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 2F15
Windsor 6F24

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-
Lorraine Kimes mother, grandmother and aunts – Wohler Ranch
Hand Harvest in Sonoma County

Pickers were also Pomo Native Americans, Chinese, and Japanese workers.
Traditional hop basket
Bags weighed & transported to dryer
Old hop kilns (dryers)

Woods Kiln – Wood Road Fulton

Woods Kiln – River Road

Frost Ranch – Old Story Ranch Kiln

Martinelli Winery

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
HOPGROWERS ARE NOW AT PINNACLE OF PROSPERITY

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 45 cents for next season’s crop, 40 cents for 1921 and 35 cents for 1922.

Even at these prices the present crop is not being planted as fast as it should be in order to meet the demands of the market.

G. A. PROCTOR BUYS MENDOCINO HOPS

Local Dealer Pays 50-45-40 Cents for 130,000 Pounds of Mendocino hops 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. Sturtevant, and disposited of 120,000 pounds of hops for the years 1920, 1921 and 1922. G. A. Proctor of Santa Rosa purchased the hops through local agents.

The contract calls for 20,000 pounds per pound, 50,000 pounds in 1921 at 45 of the hops of the 1920 crop at 50 cents and 50,000 pounds in 1922 at 40 cents.
Higher price for Sonoma Hops

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
Florian Dauenhauer’s Hop Picker
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.
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.
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
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

ATTRA Hops: Organic Production

Organic farming, organic certification, and the National Organic Program

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.

Developments in Crop Science 16

Hop Production

Edited by
Václav Rybáček

Elsevier
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
WSU – OSU Information

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

producer version: Suzele Gutshirt, Ann George and Herbert Hornsby

Introduction

Commercial hop acreage in Washington has increased by more than 40% since 2005. With the establishment of new hop farms in the Yakima Valley, the value of Washington hops increased by 90% to $56 million. In 2010, Washington accounted for 70% of the U.S. production of hops, with 8,000 acres of hops being grown across the state. This publication is intended to provide hop growers with a valuable tool for determining the costs of growing hops.

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

WASHINGTON STATE UNIVERSITY EXTENSION CALS, SHEET 65229

Introduction

Introduction

Objectives of Study

The objectives of this study were to develop a cost-of-production budget for commercial hop growers, to determine the feasibility of growing hops in the Yakima Valley, and to provide hop growers with a valuable tool for determining the costs of growing hops. The budget was developed using a combination of published and unpublished data, and was verified with the help of local hop growers.

Sources of Information

The data used in this study were obtained from a variety of sources, including hop grower interviews, hop production records, and published sources. The budget was developed using a combination of published and unpublished data, and was verified with the help of local hop growers.

Basic Assumptions

The assumptions used in this study were that hop production would be on a 5-acre farm, with 1,000 pounds of hops being produced per acre. The budget was developed using a combination of published and unpublished data, and was verified with the help of local hop growers.

Field Guide for Integrated Pest Management in Hops

Field Guide for Integrated Pest Management in Hops

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

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Hop Downy Mildew
Vegetable Pathology Fact Sheets

Pathogen
Hop downy mildew is caused by the fungus Plasmopara viticola. Figure 10 shows a close-up view of the downy mildew pathogen. The pathogen is highly specialized, and only affects hop plants.

Host crops and plants
Host crops include hops and other plants within the hop family. The pathogen is not known to affect other crops or plants.

Figure 10: Close-up of the downy mildew pathogen.
# Hops

## Commercial Viticulture & Small Fruit Production

**Area(s) of Specialization:**
- Commercial Small Fruit Production
- Commercial Grapes/Viticulture

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- 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 Simne, Michigan State University, July 10, 2014
Wine and Brewing Courses

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Paul Vossen Specialty Crops Advisor – UCCE (Sonoma-Marin)

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