Harvesting, drying, and processing your hops

By Steve Miller

It’s nearing that time and with all of the work you have done so far, it is very important to do things right to maintain quality. Here is a check-list and some things to help with keeping the quality where it should be. Brewers want and deserve the best product you can supply. Brewers expect your hops to have a quality analysis done for alpha, beta, HSI, and total oils. This is extremely important.

1. Make sure all harvest, picking and drying equipment is in good working order and **clean**. Hops are a food product, not hay! No birds or rodents in drying or picking areas. To package your hops you will need a 20-C license from NYS Department of Ag and Markets for vacuum sealing. You will also need an additional schedule which I can send you from the Geneva Food Venture Center.

2. Make sure you have all of the equipment you need to determine harvest timing (i.e. Scale calculator, UVM on line dry matter/moisture calculation tables.)

3. Start testing some samples for dry matter. They will gradually increase from 15% percent or so to 20% to 22% to 24%. Many aroma varieties should be in this 22-24% range when harvested.

4. If you let them mature too much they may brown, but even more important they will begin to dry so much that the cones will shatter when run through a picker.

5. Have a notebook for records, and use it!

6. Do not cut more than you can handle through your dryer as this can lead to poor quality very quickly. Hops should be in the dryer ideally within a half hour of cutting the bine, but not more than a couple hours especially if it is hot. Keep the cut bines out of the sun.

7. Hops degrade with heat, sun and oxygen so everything you do should keep these factors in mind. Keep dryer air under 130F, lower is better but relative humidity may call for more heat to prevent molding. Dry hops that have lost some oil...
8. Once you start drying you can use a moisture meter to determine when they are done. Hops should be in the 9-10% moisture range to be stable for storage. Anything above 12% will likely mold. Most moisture meters only operate between 7 and 14%, which is why you need a scale.

9. Hops should be laid onto the kiln floor from 4-20 inches deep. Use as much air as is possible without the air punching a hole through the hops. As the hops dry they become lighter so open holes let air escape without going through the pile evenly. One trick is to use bird netting placed on top of the hops in the kiln to keep these holes from developing. You may need to experiment with this.

10. Moisture meters are calibrated to have the probe go into densely packed hops. If they are not dense it will give you a false reading. The strig will hold much more moisture than the bracts and this too can make it seem like the hops are ready. It is a good idea to let the hops condition at least for a short time and retest. Out West where they use a lot of heat and the kilns are filled deeper, they will condition even over night. Baled hops that have too much moisture will not only mold but can spontaneously combust.

11. To obtain a more accurate reading with the probe, try using a home made compactor. This one is made from a caulking gun and Michael Roy gave us this tip on his recent visit to New York. The probe goes into a small hole at the far end of this PVC capped pipe. This one is mechanical, pneumatic guns are also available.

12. Dried hops should be baled right away and stored in food grade plastic mesh bags at 34-40 degrees F. Do not store hops in coolers with produce that gives off moisture or ethylene, or any other product that could contaminate the hops.

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Virus Testing in Hop Plants

We have seen some hops in NY that are exhibiting symptoms of virus infection. We do not currently have facilities to test these at Cornell or Geneva. These however can be tested in Washington State and Tina Vasile at the Clean Plant Center of the Northwest at Washington State University outlines here how to do that:

“Our molecular lab does hop testing. One sample tested for four different viruses/viroid is $91.19. With regard to sampling, we like to have five leaves from each plant with symptoms, if that’s possible. Place each sample in a separate zip lock bag. Write some identification on each sample bag that you will recognize when we send results. Place a cold pack in a small styrofoam container, making sure the cold pack is wrapped with something to protect the samples from freezing when placed next to it in the container. This is necessary, the temperature is hitting triple digits here and we need the material to be in good condition for testing. It’s best to overnight the samples as well and included a note or card with contact information for sending results and an invoice to. Also, include a note indicating which viruses you want the material tested for. Another rule of thumb is NOT to send samples out on Thursday or Friday, send them out early in the week so we’re sure to get them before the weekend.

I prefer to send results and invoice by email if that’s possible but I can surely send it through the mail.

Our address is: 24106 N. Bunn Rd., Prosser, WA. 99350
You can address the samples to me, Tina Vasile, and I’ll see that they get to the right place for testing.”
Hops Scouting Report — Week of July 8

The short dry spell at the start of July has been helpful at giving everyone a window to spray and also to assess the downy mildew pressure. In spite of the monsoons of June, the good news is that on many farms it appears that sprays were effective at stopping the spread of the fungus. With some warmer, drier weather (hopefully) coming, there’s reason to hope this region-wide epidemic of downy mildew can be brought under control.

Washington grower Michael Roy, who spoke at 3 Cornell/Brewery Ommegang sponsored events in late June-July, emphasized that downy mildew will be one of the biggest challenges NY hops growers face, and he made 2 major recommendations: First, establish and implement a regular spray program that is preventative in nature: sprays should be put on before symptoms occur in fields where the disease has gone systemic from the previous year. He emphasized that western growers have a zero tolerance policy for downy mildew. He also showed that the powdery mildew that western growers deal with on a large scale requires at least 6-8 sprays/season. NY growers should probably plan on a similar number of sprays for downy mildew. There are both organic and chemical options, but the organic options are likely to require many more applications. Michael’s second recommendation was to maintain the lower 3’ zone of the plants so that this area is dry, with minimal foliage, few or no weeds, and decent airflow. This will act as a physical barrier to the upward spread of downy mildew through the rest of the plant. Basal pruning and better weed control will go a long way toward controlling downy mildew on NY farms.

On the pest front, potato leaf hoppers (PLH) are fairly widespread. The worst damage is in young or stressed plants. The best defense seems to be healthy, well-fed plants. Some growers have chosen to use an insecticide spray and I have seen very good control of PLH in these situations, but beneficial insects appear to also be knocked down by these sprays. When you scout for PLH, look for small, green, crab-like nymphs on the underside of leaves. They are sap feeders and will create characteristic “hopper burn,” with the edges of leaves turning brown.

Another pest to add to the hops list is the rose chafer, a leaf skeletonizer that showed up in hop yards in Onondaga County and Saratoga County, both on very sandy soils. They have not been more widespread than that, but keep an eye out. See more info here: http://www.extension.umn.edu/garden/insects/find/rose-chafers/ This insect is similar to Japanese beetles.

Spider mites are continuing to slowly rise in population. They do best in hot weather, and are likely to show up on stressed plants in the coming weeks. Japanese beetles are also slowly rising in numbers.

Healthy plants can be the best defense against both disease and pests. This summer we are focusing on the nutrient requirements of Cascades in NY, and hope to have better fertility guidelines for the future as a result of this research. Western grower Michael Roy also emphasized that Yakima Valley growers feed their hops heavily, right through burr and cone formation. Most Cascades in NY should be over the top wire, well burred-out, and pushing long side arms right now. This is a time when the plants needs all the nutrients they can get, and Michael showed that western growers continue fertilizing right through this stage, primarily injected through their drip irrigation system.

Steve’s added comments: We are carrying out a sap and petiole analysis to develop some baseline information and so far I can say that almost no yards have anywhere near enough nitrogen in the plants. More to come on that. Also, it is very important that we identify and collect samples of powdery mildew if you find some. This is a disease that we need to keep up on as soon as any is found in NY, so please contact me about any sightings that you suspect is powdery mildew.

Michael Roy also gave out a great deal of information on fertility management, crowning and training, and harvest quality.
Notes from UVM’s Hop Program:

What's Hoppening: Musings from the Hopyard!

3 Things that Matter in Pest Scouting: Location, Location, Location

*There are three things that matter in property: location, location, location.* We have found that location also matters in growing hops, particularly this spring. Southern Vermont has been exceptionally dry for long periods, while northern parts of our region have been soggy, to say the least.

The cool, wet conditions that we’ve been experiencing in the north typically favor hop aphids, however, we haven’t been seeing many aphids in Vermont hopyards this season. Perhaps they have been slow to move from their alternate host, woody plants in the genus *Prunus* (cherries, other stone fruits, etc.). Unfortunately, these conditions are quite favorable for downy mildew, so diligent downy mildew management has been a must.

Meanwhile, the relative warmth in southern portions of our region, combined with the early arrival of potato leafhoppers this year, means we are starting to see second generation leafhopper nymphs scuttling across the undersides of hop leaves. This also helps explain the early appearance of two-spotted spider mites as well as spider mite destroyers, their arch nemesis (and our friend). The aptly named spider mite destroyers (ladybugs that specialize on spider mites) can be very helpful when managing spider mites as the season progresses.

The old saying “knee-high by the 4th of July” may be more commonly used when talking about corn, but be on the lookout for our most patriotic of pests: Japanese beetles. Come July 4th, some of us begin to feel like we are knee-high in Japanese beetles.

Just remember, keep calm and hop on…

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**Around the Hop Yards**

A grower has reported a large number of European Corn Borers in his hop yard (photo on right). We expect that we will continue to see damage from insects like the European Corn Borers and the Rose Chafer (previous page) as hops continue to be reestablished in New York State as hop yards provide a good opportunity for these insects.
Summer on the farm a healthy place to be, but avoid pushing your body to the limit.

by Marybeth Vargha

I remember friends from Philadelphia coming up to visit our farm for the first time. They eagerly wanted the work experience. It didn’t take long during a weeding session for someone to say, “This is such back breaking work.” I responded, “No, I see it as back building.” I liked the exercise in the fresh air that actually resulted in healthy food for people. What I didn’t let on was that there were back breaking activities that could really cause permanent damage.

Living in our rural neighborhood you become adept at recognizing a farmer. He can be all dressed up, but there is something in the walk and posture that is peculiar to years working on tractors and hauling heavy stuff. There is a sort of forward lean and bowed legs that work stiffly, the muscle and callused hands that don’t quite make a fist, and no matter what the weather, they don’t ever run, just keep going at their same pace without ever stopping.

The work is harsh on our bodies, and without taking some time to figure out better ways of doing things you’ll be straining your back and stiffening your joints. Injury prevention comes in stages: learn what it means to have a fully functioning body, know the best way to move your body to avoid extra stresses, evaluate the work to look at ways to prevent unnecessary strains, and give yourself the time for restoration of your body after a hard day of work. Here are some tips to consider:

- Know the difference between back breaking and back strengthening work.
- Safe lifting.
- Work within your limitations.
- Think of ergonomic solutions at each work place.
- Prepare for the work.
- Limit time on tractors.
- No matter what, you probably will experience aches and pains.
- Restorative hydration.

Allow your body some restoration, but don’t wait until winter. Each day give your body the rest it needs for your muscles and joints to recover. If you feel some symptoms of strain, use an ice pack for 5-10 minutes to reduce any inflammation and then follow with a hot water bottle or hot shower to increase the blood flow into the muscles. Get a good rest so you can get up and do it all over again tomorrow!

Marybeth Vargha is a member of the Outreach Team of the New York Center for Agricultural Medicine and Health (NYCAMH) in Cooperstown, NY. She also works with her husband on Big Sky Farms in Westford, NY. Contact her at marybeth.vargha@bassett.org.

For more information about NYCAMH services for your farm or community, go to www.NYCAMH.org or call (607)547-6023.

This article is an excerpted from the Small Farm’s Quarterly. To read the complete article, including expanded tips about working within your body’s limit, check out the complete article at http://smallfarms.cornell.edu/2015/07/06/farm-work-health/
Hop Acreage in Northwest Region up 16 Percent for 2015

Areas string for harvest in 2015 for Washington, Oregon, and Idaho is forecast at 43,987 acres, 16 percent more than the 2014 crop of 38,011 acres. If realized, this will be the third highest total harvested acreage on record. Washington, with 32,205 acres for harvest accounts for 73 percent of the United States total acreage. Oregon hop growers plan to string 6,807 acres, or 16% of the United States total, with Idaho hop growers accounting for the remaining 11 percent, or 4,975 acres string for harvest. Acreage increased in all three states from 2014 and, if realized, both Washington and Idaho acres will be at record high levels.

The 2015 hop crop has been reported as very good, with normal pest and disease pressure. In Washington’s Yakima Valley, growers utilized efficient drip irrigation systems to conserve water and were supplementing reduced irrigation district supplied and groundwater. Growing areas in Idaho and Oregon have adequate irrigation water.
## Hops Area Harvested by Variety – States and United States: 2014 and Forecasted June 1, 2015 (continued)

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<tr>
<th>State and variety</th>
<th>Area harvested</th>
<th>Strung for harvest</th>
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<tr>
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<td>2015 (acres)</td>
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<tr>
<td>Washington</td>
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<td>ADHA-483 Azacorta™</td>
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<td>Other varieties 1 2</td>
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- Represents zero.

(D) Withheld to avoid disclosing data for individual operations.

R Registered
™ Trademark

1 Includes data withheld to avoid disclosure of individual operations and varieties not listed.

2 Other varieties may include Amanito, Brewers Gold, Bullion, Cashmere, Chelan, Columbia, Equinox, Eureka, Fuggle, Meridian, Mt. Rainier, Saaz, Santiam, Soriachi Ace, Triple Pearl, Tahoma, and Yakima Gold.

3 Includes 346 organic acres in 2014 and 348 acres in 2015.

### Access to NASS Reports

For your convenience, you may access NASS reports and products the following ways:

- All reports are available electronically, at no cost, on the NASS web site [http://www.nass.usda.gov](http://www.nass.usda.gov)

- Both national and state specific reports are available via a free e-mail subscription. To set-up this free subscription, visit [http://www.nass.usda.gov](http://www.nass.usda.gov) and in the "Follow NASS" box under "Receive reports by Email," click on "National" or "State" to select the reports you would like to receive.

For more information on NASS surveys and reports, call the NASS Agricultural Statistics Hotline at (800) 727-9540, 7:30 a.m. to 4:00 p.m. ET, or e-mail: nass@nass.usda.gov.
Spraying has been of critical importance this year as growers have had to combat the cool, rainy June weather that was perfect for Downy Mildew.

While spraying technology has changed significantly since 1892, growers still face many of the same challenges they did 125 years ago. Achieving sufficient leaf coverage is critical to the efficacy of a spray program. Patent number 481,718 by Franklin Salisbury of Catskill, NY was one hop grower’s answer to the challenge of implementing an effective spraying regime in his hop yard.

“This invention relates to machines for spraying fruit-trees, vines, and growing plants generally with liquids for the extermination of worms, caterpillars, beetles, moths, fluted scale or other scales, mildew, fungus, cotton and tobacco worms, and other insects and pests; and it has for its object to provide a machine of this class by means of which liquids — such as kerosene emulsions, arsenical solutions, and the like — may be applied in the form of a spray in a very rapid and effective manner and which shall be so constructed that the spray may be ejected in the desired direction thus making the machine valuable for spraying the taller fruit-trees, as well as bines, even when — such as in the case of hop vines — it shall be necessary to apply the spray from below in an upward direction, which is necessary for the successful extermination of pests peculiar to this plant.”
Annual Crops & Soils Field Day
“Innovation and Diversification”
Thursday, July 23, 2015, 10:00 a.m. to 3:30 p.m.

EVENT DETAILS
Registration starts at 9:15 a.m.
Farm tour starts promptly at 10:00 a.m.

Please join us for our UVM Extension Northwest Crops and Soils Annual Field Day at Borderview Research Farm in Alburgh, Vermont on Thursday, July 23, 2015.

Highlights this year will include:
- Innovative ways to seed cover crops and equipment
- Drone technology to monitor crops
- Heirloom dry bean trials
- Hop fertility and downy mildew management
- Oilseed crops
- Head blight control
- Milkweed as a crop
- No-till and manure management
- Heirloom grains

And much, much more! You will receive up-to-date information on our research, as well as see our many research plots and experiments.

COST: Non-farmer $25 per person. Farmer $10 per person. Includes lunch. CCA credits available.
Register online at https://www.regonline.com/cropsfieldday or contact Susan Brouillette susan.brouillette@uvm.edu at 802-524-6501 or 1-800-639-2130 (toll-free in Vt. only).

Click on this link for directions:
Borderview Research Farm
146 Line Road
Alburgh, VT 05440

To request a disability-related accommodation to participate in this program, please contact Susan Brouillette at 802-524-6501 or 1-800-639-2130 or susan.brouillette@uvm.edu by July 9, 2015 so we may assist you.
The Bluebell Hopyard
2015 Hopyard Tour & Tasting
Saturday, August 1st
Noon – 5 pm

Beer Lovers and Hopheads!

Want to learn more about hops, how they grow, and the way they help make delicious craft beer? What better way than to enjoy some fantastic craft beer brewed by local breweries with those very hops? Come join Bluebell Hopyard owners Kurt and Fred for the 2nd Annual Tour and Tasting event. This is a family friendly event. Last year was great! This year will be even better, so don’t miss out!

Event tickets at the door: $5 donation per adult, children free. Tickets will enter you into some great raffles for Bluebell Hopyard swag throughout the day.


319 Cline Rd. Victor, NY 14564
585-749-3460
If you ordered hop plants through Cornell Cooperative Extension of Madison County in collaboration with Zerillo’s Greenhouse and have not yet picked-up your plants, please check your e-mail and call Nick Zerillo to make arrangements.

If you have any questions, please don’t hesitate to reach out to Sarah at sjs299@cornell.edu

Classifieds:
Are you a grower looking to sell a piece of hops equipment? Do you provide harvesting or processing services to other growers? Are you looking for equipment or services? Is there a unique opportunity on your farm that you would like to share? If so, send in your information to Sarah (sjs299@cornell.edu) for inclusion in next month’s newsletter.

Have something you would like to see in the next Hops Newsletter?
Please share is with Sarah at sjs299@cornell.edu

Special Note for Growers with Harvesting and Processing Facilities

We are in the process of making a comprehensive database of all of the hops harvesting and processing facilities in New York State. We hope to make this database available to growers who do not have their own harvesting and processing facilities and want to use someone else’s facilities. If you are interested in being added to this list for this coming harvest season, please send an e-mail to me at sjs299@cornell.edu. Since this is such a busy time for most of you, we will also be sending out a follow-up e-mail at the beginning of October to create a more comprehensive list for next year.

Processors — Please keep an eye out for an e-mail from Sarah regarding processing. If you have not received an e-mail by the middle of next week, please either e-mail Sarah or call the office (315)684-3001 ext. 108
Upcoming Events

July 23
**Annual Crops and Soils Field Day: “Innovation and Diversification”**
*Alburgh, VT*
Farm tour of the Borderview Research Farm with exciting research on cover cropping equipment, drone technology, hop fertility and downy mildew management, and much more.

July 30
**Steuben County Hops Twilight Meeting**
*Addison, NY*
Join Cornell Cooperative Extension of Steuben County and Crooked Creek Hops Farm for an on farm discussion and demonstration of hops production and harvest. Topics to be covered include hopyard design, trellising, scouting hops for pests, and harvesting.

September 18-20
**Hop Fest Weekend**
*Oneida, NY*
The Madison County Hop Fest celebrates the past, present, and prosperous future of the hop industry of Madison County and throughout New York.

December 4-5
**Cornell Hops Conference**
*Morrisville, NY*
The annual two day Cornell hops conference held in Morrisville.

Hey Brew Partners!

Brew Central’s got a brand new website (www.brewcentralny.com) and we want to share it with you. Your stories are now featured prominently with an updated navigation, fresh copy, and new videos. Give us a shout on social media and we’ll give you one right back.

Also, many of you have reached out requesting usage of the Brew Central logo to include on your site. Let us know if you’re interested and we can send you the proper file to include on your website.

Looking forward to a great summer of brew,
Brew Central