

# Le Vigneron

*A newsletter for the grape growers and wine makers of Oklahoma*

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## Long, Cold Winter

Brrr. I am really tired of the cold weather. That is one of the main reasons I moved away from Michigan. In looking at some of the weather data from this winter, we had the coldest December since 2001, and the coldest January and February since before the Mesonet data I have at my disposal (1994). The good news is that budbreak is likely to be later than average. I cover the issue of budbreak timing in this edition. When cultivars break bud is crucial for us to know. Later budbreak cultivars give us a better chance to succeed on a consistent basis. Does late budbreak solve all our problems? No, but it does lessen our concerns about late spring frosts. A few individuals participated last year in the Grape Growers Data Collection Network. I gave three workshops last year on how to identify grape phenology stages and how to report them. Some of that data is given in this newsletter. If you would like to participate in the program, then take a look at the front page of [www.grapes.okstate.edu](http://www.grapes.okstate.edu). There you will find a presentation of what the phenology stages look like and a data sheet to collect the data. It is very simple, all you need to do is write down the date and some observations. I will compile the information in a database that can be used for us to understand how grapevines grow in our environment. Let me know if you have questions concerning it and I hope you will participate.

## 2010 OSU Grape Management Short Course Update

**Eric T. Stafne**

We held our first class on March 4 at the Cimarron Valley Research Station. There were roughly 26 students in the class (not sure on the exact number, some were added late) and we were able to make it out to the vineyard to discuss pruning established and young vines. The class runs officially from 1-5pm, but I didn't end up leaving until 6:05pm. Lots of questions to be answered! Since we have streamlined the information in the course into our handbook, I think it will be easier to teach. The next classes are set for April 8, May 6, and June 10.

## Lane Greer to Coordinate Grape Community of Practice Project

**Eric T. Stafne**

Lane Greer has been hired by the Oklahoma State University Viticulture and Enology program in the Department of Horticulture and Landscape Architecture in Stillwater to coordinate the project 'Development of a grape community of practice for the eXtension system', which will offer state and regionally relevant, science-based information on grape production. Dr. Greer, previously with Portland State University and Mississippi State University, received her Ph.D. from North Carolina State University, and her master's from the University of Arkansas. She will be working with Drs. Eric Stafne and Kathleen Kelsey at Oklahoma State University, Dr. Keith Striegler at the University of Missouri, and Dr. Ed Hellman at Texas A&M.

The \$850,000 project is funded through the Specialty Crops Research Initiative administered by the United States Department of Agriculture and the National Institute of Food and Agriculture. Thirteen land-grant universities are involved in the project, with backing from several state grape grower organizations, industry leaders such as Welch's, and the National Grape and Wine Initiative. The three-year grant provides for the creation of a national source of grape growing information, which will be provided through eXtension. To learn more about the mission of eXtension visit [www.extension.org](http://www.extension.org). The Grape Community of Practice (GCoP) is on target for launch to the public by the end of 2010. So far, there are nearly 30 members from Land Grant institutions.

Oklahoma State University is acting as the lead institution on this project that is designed to provide accurate, scientifically sound information 24/7 on viticulture practices. It will be geared toward commercial producers of wine, table, and juice grapes; however, hobbyists can also gain knowledge from the information that will be available.



Dr. Lane Greer

## New Blog Available

**Eric T. Stafne**

My blog is now available for all readers at <http://okgrapes.wordpress.com/> or by going to our website at [www.grapes.okstate.edu](http://www.grapes.okstate.edu) and clicking on [Okstate Grape Blog \(The Glog!\)](#). I decided to use a somewhat fanciful name in calling it a Glog (a Grape Log). This idea to have another blog was brought about by folks who had no access to the blog on the OGGWMA site — either because they were not members or could not figure out a way to access it. If you have not read my OGGWMA blog then there are 159 entries just waiting for you. Just a warning that I have not gone back and checked all the links, so some might be outdated and not work anymore. If that happens, just contact me and I will make sure the information gets to you.

You can also follow the blog by going to the ‘About the Author’ page and clicking on the box that says ‘Notify me of new posts via email’. There is another box you can click as well that lets you know if I have responded to any comments you have left. Pretty nifty stuff. Feel free to leave comments, ask questions, or just take a look around. I will be posting things intermittently as they come to my attention and as I have time.

Please send me any suggestions for topics or photos or any content that you might like to see and I will do my best to accommodate those requests. I look at this as an interactive learning environment where all of us can learn and grow as viticulturists.

**Dr. Stafne’s Glog — Talking Oklahoma Viticulture**



## Ordering the New Oklahoma Grape Handbook

**Eric T. Stafne**

If you wish to order a handbook, it is available online now at: <http://www.hortla.okstate.edu/hortla/materials.htm>. Follow the links if you want to order online, or just send a check to the address indicated on the website. The cost charged is enough to insure we cover mailing costs and also to try to put back a little so that the book can be updated and reprinted in the future. If any of you out there already have the book, please drop me a line and let me know what you like and don’t like. I know of some deficiencies that can be addressed in new editions (like a glossary of terms), but if you have other concerns let me know. We tried to cover a lot of ground in the book, but there is still a lot more to cover in the future once we have done more of the research.

## Data from the Oklahoma Grape Growers Data Collection Network, 2009

Eric T. Stafne

A few growers decided to take data last year and submit their results to me. Some just did budbreak and some did the entire season. I am grateful to all of them. In the table below are some of the results that were reported versus what was predicted (based on the equations presented in Le Vigneron vol. 4, issue 1). As is evident many of the reported and predicted dates line up. The Chardonnay budbreak at Perkins and Ardmore was right on, and just slightly off at Norman. The dates for Pinot Gris and Viognier are where we come into a little discrepancy. They were very close (if not exact) at Perkins, but way off for Agra. How do we account for these differences? There are several variables that could play a role in changing the dates — rootstock, temperature data collection point, cultural management, cold injury, and human error. One I mention is temperature data collection point. I had to use the Chandler mesonet station because there is no station at Agra. This could account for some of the variation. I think another is that the data was recorded as first budbreak and not 50% budbreak. Even so, the dates are very divergent — a week to 10 days is a lot of time. I would be interested to see another year of data, so that we might be able to see why these differences occur. It seems unlikely that the difference between 50% budbreak at Perkins and Agra is so pronounced. There must be other factors at work here. Data for Riesling was also collected and differences were also seen here.

Table 1. Reported and predicted 50% budbreak dates from the Grape Grower Data Collection Network in 2009.

Cultivar	Location	Reported Date	Predicted Date
Chardonnay	Ardmore	March 18	March 18/19
	Perkins	March 26	March 25/26
	Norman	March 25	March 23
Pinot Gris	Agra	March 23	April 3 / 4
	Perkins	April 3	April 4/5
Viognier	Agra	March 24	April 2
	Perkins	April 3	April 3 / 4
Riesling	Agra	March 24	NA
	Norman1	April 1	NA
	Norman2	April 13	NA
	Perkins	March 31	NA

# Delivering a Droplet to a Target

**Mark Chien — Pennsylvania State University Viticulture Extension Specialist**

Did you know that spray droplets bounce? A few weeks ago I wrote about spray application methodology but there is an entire science behind the practical application that, like vine physiology, if a grower can gain a fundamental understanding of the principles and physics of spraying vines, it can help increase effectiveness, efficiency, costs and even appreciation of spraying.

Dr. Andrew Landers is an applied scientist extraordinaire who has found a unique niche in our industry to apply his skills. As such, he is in demand all over the world to share his knowledge. He is a grape growers' and extension agents' best friend, the researcher who comes up with novel and practical ideas, figures out a cost effective way to bring them into the field, then extending the information out into industries he serves. Dr. Landers is well known for his pink shirts and wry British humor. Woe be to the speaker who has to follow him on an event program (sorry Bryan). I have been there myself and it's like being asked to do standup after the Marx Brothers. But even the jokes and good natured comments are embedded with information meant to deliver or emphasize a point about some practical aspect of spray technology or method. I would venture to guess that if all grape growers followed Dr. Landers' suggestions, overall wine quality would jump 2-3 notches in a single season. We spray a lot, but are we delivering the goods to the target? That is the fundamental question.

The following are some excerpts from Dr. Landers' recent presentations at the grape disease workshop in Pennsylvania.

We are trying to gain an appreciation for spraying by understanding the importance of the target and the effects of spraying. The type of target, whether bug or leaf, matters greatly to a spray droplet and the efficacy of the pesticide it is transporting. Droplet size and speed are critical characteristics. Spray droplet size falls within a wide range, from 10 to 450 microns. When a droplet is halved in size, the number of resulting droplets increases eight fold. Dr. Landers provided a visual example using a tennis ball, which if tossed into the audience might hit one person and is likely to bounce off of the target. If halved, the 8 ping pong balls will likely strike more targets with less bounce effect. Slice a ping pong ball in half and you have 64 marbles that will scatter and hit many people in the audience with even less pronounced bounce effect. It follows then that a large droplet of 500 microns when cut in half would result in eight droplets of 250 microns and if sliced again would become 64 droplets of 125 micron size and so on. Using a field example of trying to kill a Japanese beetle with a contact fungicide, what are the chances of the large droplet scoring a direct hit on the beetle target vs. many smaller droplets? The physics dictate that big droplets will tend to bounce off the target and smaller ones will have less bounce or be more likely to stick to the target. However, there is an outer limit to shrinking droplet size where drift, pollution and cost-benefit become issues. There is correct droplet size for the material you are applying, the equipment that is applying it, and the intended target.

A classification system exists for droplet sizes and Dr. Landers explained that certain pesticides should fall into specific size categories.

Fine (119-216 microns) is best for insecticides and some fungicides

Medium (217-353) for herbicides and systemic fungicides where a leaf is the target

Coarse (334-464) for soil applied materials such a pre-emergence herbicides

The bounce effect of spray droplets on targets was the object of curiosity for Dr. Landers so he set up a test to see how much bounce would occur for droplets of a certain size and velocity. A remarkable set of slides showed a 650 micron droplet hitting a pea leaf at 5 ft/sec and bouncing eight times, boing, boing, boing... decrease droplet size to 375 microns reduces bouncing to 4x.

## Droplets, cont.

**Mark Chien**

The moral of this story is to use the right nozzle and pressure to get the right size droplet for the intended target in the vineyard. You absolutely, positively cannot do this without a proper nozzle catalog with its calibration chart. Guessing what size/type nozzle to use is silly and wasteful. The correct nozzle should be selected based on output and spray quality. Three factors affect the application rate – pressure, forward speed and volume (determined by nozzle tip size).

For the grower who suffers from calibration anxiety there are some excellent training resources including two -20 minute *YouTube* videos by Dr. Landers entitled *Calibrating Air Blast Sprayers in Vineyards*:

[http://www.youtube.com/results?search\\_query=calibrating+airblast+sprayers+for+vineyards&search\\_type=&aq=f](http://www.youtube.com/results?search_query=calibrating+airblast+sprayers+for+vineyards&search_type=&aq=f)

and the excellent calibration section of the *New York and Pennsylvania Pest Management Guidelines for Grapes*:

<http://ipmguidelines.org/grapes/>

Your nozzle catalog is also very likely to have a section on sprayer calibration. Please note that calibration and nozzles for each type of spraying, e.g. fungicide vs. herbicides will be different in some aspects.

Dr. Landers insisted that there is only one way to properly calibrate a sprayer and that is right way. The output of EACH nozzle needs to be measured and this demands hose connections to collection containers for each sprayer nozzle. Run the sprayer with the fan OFF for one minute and compare outputs. Variations in quantities of water will usually indicate a defective nozzle. Use a correctly calibrated measuring container. A graduated cylinder is likely to be much more accurate than the measured buckets provided by chemical vendors.

Nozzles are the key to good spraying. Along with pressure and speed, they determine how and how much material gets to the target. They often do not get the attention and respect they deserve. Dr. Landers gave the frightful example of cleaning clogged nozzles with a Bowie knife. It has no doubt happened. He warned that nozzles should never touch the lips and suggested carrying a small can of compressed air to clean nozzles. They should be replaced when worn and properly selected for the application job. One nozzle type does not fit all targets!

Growers should be aware that air blast sprayers do not deliver the same volume, speed or direction of air from both sides of the fan outlet. Fans generally turns counterclockwise so air from the right side tends to move faster and upwards and air on the left more downward. Changing nozzle orientation is a cheap (zero cost) and quick improvement. Dr. Landers suggests turning off the right-side top nozzle completely and positioning nozzles 2 and 3 at 20 degrees below horizontal and 4/5 to horizontal. Left size nozzles should all be positioned at 45 degrees above horizontal to push the airflow upwards. Tying flagging tape to the nozzles or using tape on the end of a pole and holding it in the airstream can tell you exactly what direction the air is moving.

Air volume and speed are very important to getting materials to their target. Too little or too much of either will compromise the quality of the application. Using a patternator device Dr. Landers can evaluate the amounts and location of spray material exiting the sprayer. A fruit zone spray should hit the clusters. A shoot tip spray for JB's should not cover the entire canopy. It turns out that often a lot of what we spray is nowhere near the intended target. Dr. Landers has plans for a simple patternator that only costs about \$400 to build and is intended for grower use.



## Droplets, cont.

**Mark Chien**

This is what a sprayer should do:

- Deliver droplets from sprayer to the target
- Produce correct size droplets
- Protect droplets from the wind
- Provide shaking of the target

Spray materials should not be pushed through and past the canopy. Ideally, air and spray materials should mix around the canopy zone but excessive shaking of the target will reduce the quality of coverage.

A patternator demonstrates the potential for spray coverage but how do you know for sure that the material is getting to the target? Dr. Landers suggest three methods to check for deposition pattern and coverage. Surround is a kaolin material that has multiple purposes in vineyards but can be used as a spray coverage indicator. Water sensitive cards placed in the vine canopy will show the quality of spray penetration into the canopy. Dyes will highlight where the spray material is going. In spraying, more is not necessarily better. He gave the example of a canopy sprayed with 35 gpa vs. 70 gpa. The run-off from the higher rate resulted in greatly reduced leaf coverage. Spray amounts should be calibrated to canopy size.

The most effective sprayers direct the optimal volume and speed of air towards the canopy. In vineyards, there are many variations on canopy size and shape and a sprayer must be used to accommodate these features, from tall divided canopies, to wide horizontally divided canopies, early season growth to a full canopy and zonal spray applications. If possible, control the volume of air and direct it at the target. Tunnel sprayers like the Lipco are perhaps the most effective, and ultimately, with their recycling abilities, the most economical sprayers. The Cima and Hardi tower sprayers are very effective at covering the canopy, as are the Sardi crop sprayers that use multiple, smaller fan/spray heads that wrap around the canopy to direct spray from different angles and directions. The Landers team has also developed spray deflectors which are simple and inexpensive, wing-like retrofit devices that guide the air from the fan towards the target.

A big spray plume is not a sign of effective spraying, in fact, quite the opposite. The idea that drifting spray will eventually hit a target is false and much of it is simply lost and wasted. Dr. Landers says (contrary to my statement in my previous article) that sprayer operators should not be wedded to 540 RPMs. In fact, on flat surfaces running the sprayer at lower RPMs (he suggested 410) and reducing air speed (but maintaining pressure and ground speed) will help the effectiveness of the spray application. Lowering air speed can reduce drift up to 75%. On hilly vineyards 540 is necessary to maintain speed and power to the pump.

To adjust air intake volume Dr. Landers created the “Cornell Donut” which is placed over the fan and the size of the opening restricts the amount of air sucked in by the fan. A European device has an electrically actuated iris that can open/close according to desired volume of air. Dr. Landers’ team has taken a different approach to improving the donut and created a device that regulates the output of air from the fan via a sliding louver that adjusts the opening from one to four inches. In early season applications it can reduce drift by as much as 75% and increase target deposition by 82%.

Finally, Dr. Landers emphasized traceability as an important tool to monitor spray coverage. Every grower has missed rows or sprayed the same rows twice because, in the dullness of an eight hour spray day, it simply too hard to keep track of every pattern. Using technology a running record of spray pattern and coverage can be collected that will indicate if a not enough or too much spray material was delivered. It can even detect if a nozzle has an erratic output pattern and needs to be checked for problems.

# Predicting Budbreak for 2010

Eric T. Stafne

Last year I presented equations for determining predicted 50% budbreak on 12 cultivars. How and why could this be useful information? Knowing when your vines will be at average budbreak gives you and idea of when you need to be finished pruning, when to apply fertilizer, know how long you might need to cross your fingers to avoid frost, and when to start thinking about applying black rot sprays, just to name a few. This information allows me to determine how long I have to complete some other tasks before I need to start thinking grapes full-time. Below in Table 1, I present the predicted 2010 50% budbreak dates for 12 grape cultivars at Perkins. It looks as though Chardonnay will be right around the first of April, which is about 5 to 6 days later than average. Overall if the dates hold true, this presents itself as a good scenario for us. The usual “frost-free” date is April 15 (although the latest frost on record is May 1). I suspect frost problems will be minimal this year thanks to our cold winter conditions. However, on the flip side, there may be some cold damage to deal with. I know when I was pruning grapes at Perkins I saw some dead canes and dead buds. Retraining may need to be done as well as leaving extra buds to achieve our normal crop. I suspect that even though some minor cold damage was done over the winter, it won't be egregious. In fact, since it was so cold, the vines probably were at maximum hardiness levels when the coldest temperatures occurred. This will ultimately be borne out over the growing season. If we see vines collapsing and crown gall manifestation, then we will know the damage was more severe; however, I don't envision that scenario right now.

Table 1. Predicted 2010 50% budbreak dates at the Cimarron Valley Research Station, Perkins, OK for 12 grape cultivars.

Cultivar	Predicted 50% Budbreak Date
Chardonnay	March 31/April 1
Sangiovese	April 7/8
Viognier	April 8/9
Cabernet Franc	April 8/9
Merlot	April 8/9
Shiraz	April 9/10
Malbec	April 9/10
Pinot Gris	April 9/10
Petit Verdot	April 11
Ruby Cabernet	April 11/12
Cynthiana	April 15
Cabernet Sauvignon	April 16/17

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## Predicting Budbreak for 2010, cont.

Table 2 presents the predicted 2010 50% budbreak dates for Chardonnay at different locations around Oklahoma. Again, this data was generated based on regression equations from Perkins. The assumption is that vines respond to temperatures the same regardless of location. That may be true, but other factors are at work as well that cannot be compensated for (or done easily). My hope is to make a simple model to use that could be useful. The 50% budbreak date for Chardonnay this year looks to occur as early as March 24 in Idabel and as late as April 4 or 5 in Woodward. All of these dates are later than normal, up to a week later, which is good news for anyone growing Chardonnay (who among you out there is still growing Chardonnay with all the problems we've had the last few years?). Even with later budbreak dates this year, we are still looking at least a 2 week period of potential frost injury or damage. I chose Chardonnay for this table because it is very early. I could have done it for other cultivars too, but that gets to be a lot of number-crunching, plus I need to leave topics for upcoming issues. See if these predicted dates are accurate at your location and let me know if you get a chance.

Table 2. Predicted 2010 50% budbreak dates for Chardonnay at various locations around Oklahoma.

Location	Predicted 50% Budbreak Date
Altus	March 29/30
Ardmore	March 26
Bixby	March 30/31
Chandler	March 30/31
Claremore	March 30/31
El Reno	April 3
Eufaula	March 27
Fairview	April 3/4
Idabel	March 24
McAlester	March 28
Medicine Park	March 29
Norman	March 30
OKC-West	March 29/30
Shawnee	March 29/30
Skiatook	March 31/April 1
Vinita	April 3/4
Woodward	April 4/5

## Cultivar Spotlight: Frontenac

Eric T. Stafne

'Frontenac' is a result of crossing a *Vitis riparia* selection and a French-American hybrid, Landot 4511 from the University of Minnesota grape breeding program. In Oklahoma, this vine has shown great potential. It is extremely disease resistant and cold tolerant. It has typically borne good crops, even in late frost years like 2009. It produces small berries that birds find attractive. 'Frontenac' is grown widely throughout the Midwest, especially the upper Midwest where winter temperatures can damage less cold hardy vines. A single bud mutation of 'Frontenac' led to 'Frontenac gris', a cultivar that is nearly identical except for its fruit color. Harvest is early, ranging from late July to early to mid August. 'Frontenac' produces a deep red wine, that may require malolactic fermentation. A winemaker in Oklahoma suggests not leaving the juice on the skins too long, as some vegetal characteristics may be transferred. Overall, 'Frontenac' has some potential for Oklahoma, especially in the northern tier of the state where colder temperatures prevail during the winter. More work needs to be done to figure out the wine style for which 'Frontenac' is best suited in our climate. 'Frontenac gris' may be another alternative as well with broader appeal. Both 'Frontenac' and 'Frontenac gris' are being trialed at the Cimarron Valley Research Station in Perkins, OK.



# *Viticulture & Enology* OKLAHOMA STATE UNIVERSITY

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We welcome feedback and suggestions. Any responses can be mailed or emailed to the addresses on the left. We will strive to provide useful, pertinent, and timely information.

Initially this newsletter will be published 4 times per year in January, April, July, and October. If warranted the timing can be amended to better serve the grape growers and wine makers of Oklahoma.



'Vigneron' is the French word for someone who grows grapes for use in wine making.

## **Droplets, cont.**

As growers in the Eastern U.S. we spray a lot, a lot more than growers just about anywhere else in the world. We need to spray better and more efficiently. We are lucky to have Dr. Landers and his team working hard to help us to get our materials to their proper targets. I thank Dr. Landers for making the trip to Pennsylvania to enlighten us and encourage anyone who has made it to the end of this article to go immediately to his web site:

<http://www.nysaes.cornell.edu/ent/faculty/landers/pestapp/>

Dr. Landers has also published a book entitled *Effective Vineyard Spraying: A Practical Guide for Growers* that is expected to be available this spring. It will cover the A to Z of spraying vineyards and includes a CD with video clips of nozzle selection and sprayer calibration, a spreadsheet-based "what if" programs to help guide growers through operating parameters and costs of spraying. It should be an essential supplement to the NY-PA IPM guide. You can pre-order the book and find more information about it at:

<http://effectivespraying.com/>