Oklahoma State University and Oklahoma Cooperative Extension Service

Le Vigneron

A newsletter for the grape growers and wine makers of Oklahoma

Volume 3, issue 4 October-December 2008

Co-editors:

- Eric T. Stafne
- William McGlynn

Inside this issue:

Post-harvest Depression

There is just something special about holding a ripe cluster of grapes fresh off the vine in your hand. Like a newborn baby, they were nurtured and cared for, fretted over, and loved. But now, harvest is finished (for most of us anyway). It will be several months until the vines yet again begin the yearly ritual of breaking bud, pushing shoots, blooming flowers, and setting fruit. The long, cold winter months await with the anticipation of Oklahoma's unpredictable weather. Fear not though, there is a way through this post-harvest depression: Education. Learn about the vines you love so dearly. They are complex organisms that require a deep level of understanding. As a grape grower you must acquire an understanding of genetics, plant physiology, soil fertility, weed science, horticulture, plant pathology, entomology, and so much more. And don't be afraid to learn about other crops too — they may have related issues to grapes. Of course all of this is spoken as a true academic (the more you learn the more you know!), but I believe it or else I wouldn't say it. We have opportunities like the Horticulture Industries Show that not only delve into educational topics on horticultural crops, but you can also interact with others and network. There are regional grape and wine conferences like the Midwest Grape and Wine Conference held in Missouri. And, last but not least, is the OSU Grape Management Short Course. If you haven't taken it, think about it. Sign up starts in late November or early December. Beat those Post-harvest depression blues!

2008 OSU Grape Management Short Course Update

Eric T. Stafne

The 2008 Grape Management Short Course has finished up another successful year. The interest level remains high for grape production, but I sense a slight change in direction. The first year I taught the course many of the attendees already had vineyards — either well-established or just getting started. The past two years the attendees have been more on the beginner level, just trying to gauge whether or not they want to get into the business. In my opinion, that is the right time to take the course. At that stage, one can see how much attention to detail and knowledge is needed to be successful and make an informed decision. At any rate, I look forward to the next course for 2009 and welcome anyone who wishes to learn more about grape production. I hope to see you (or your friends) there!

Horticulture Industries Show – January 16 & 17, 2009

Holiday Inn City Center, Ft. Smith, AR

We would like to invite you to be an exhibitor at the 2009 Horticulture Industries Show. **"Conserving the Future – Managing Risks"** is the theme for the 28th Arkansas and Oklahoma Horticulture Industries Show, and it promises to be a excellent program. On page 8 is a copy of the Registration form. If you have any questions, please contact me with you questions. We look forward to seeing you in 2009!

Please note the date change for the 2009 Horticulture Industries Show. As the first Friday and Saturday of January is the 2nd and 3rd, the Horticulture Industries Show has been changed to the 3rd weekend of January for 2009.

Holiday Inn City Center Reservations

Phone: 800-465-4329

Please request the "Horticulture Industries Show 2009 Conference" to receive the $82 + tax rate.

A block of rooms will be available until December 16 for the HIS Conference.

2009 SARE On-Farm Research Grants and Producer Grants

The calls have been released for the 2009 Southern Region SARE Producer Grants and 2009 Southern Region SARE On-Farm Research Grants. Proposals for both programs are due by November 17, 2008. Obtain the calls at: http://www.southernsare.uga.edu/callpage.htm

Southern SARE PRODUCER GRANTS are only open to farmers and/or ranchers or producer organizations. Any farmer/rancher or producer organization in the US SOUTHERN REGION is eligible to apply for the grants which have maximums of $10,000 for individual producers and $15,000 for producer organizations to be used within two years.

Southern SARE ON-FARM RESEARCH GRANTS are open to Extension, NRCS and NGO personnel who work with farmers. Any Extension, NRCS or NGO personnel who work with farmers in the US SOUTHERN REGION are eligible to apply for a SSARE On-Farm Research Grant.

Applicants must work with at least one cooperating farmer or rancher and can apply for up to $15,000 to be used within two years. The ON-FARM RESEARCH proposals will be accepted only through an online submission form which can be found at http://www.southernsare.org.

While all SARE proposals must promote agricultural practices that are profitable, environmentally sound and good for rural communities, these two grant programs have identified nine broad focus areas. Proposals are invited that address: soil health, beneficial insect habitat, alternative crops/livestock, organic agriculture, marketing, sustainable grazing systems, improving the sustainability of existing farming practices, appropriate technology, and agroforestry.

The Southern Region is comprised of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Puerto Rico and the U.S.Virgin Islands.

Full information and instructions can be found in the calls for proposals. A copy of the calls for proposals can be obtained on the web at: http://www.southernsare.uga.edu/callpage.htm or by sending an email request to info@southernsare.org or by calling (770) 412-4787.

Fall Frost/Freeze Index Revealed

Eric T. Stafne

I have created a Fall Frost/Freeze Index (F3I) that can give a generalized idea of the risk for cold injury to grapevines during the fall months. The time assessed is October 1 through November 30. I realize fall starts earlier and runs later than that timeframe; however, the weather can still be summer-like early and winter-like late. Therefore, the two months of October and November are the most likely to have damaging temperatures from early freezes.

So far I have only done this for the Cimarron Valley Research Station at Perkins. The calculation is easy, but somewhat time consuming, so I haven't ventured out to other locations yet. The equation itself can be used for any location. The equation looks like this:

$F3I = [((L+T) \times D)) + (L+T)]$,

Where L = (average low temperature from date of first frost ($\leq$ 32 °F) to date just prior to first freeze) – 32

T = (sum of degrees below 28 °F on the date of first freeze)

D = (1 – number of days from first frost to first freeze / number of days from October 1 to first freeze)

-continued on Page 7-

Fall Fertilization? Maybe...

Eric T. Stafne

I've heard growers say that fall fertilization will help the vines go into the winter stronger. Well, that may be true to some extent, but only if the vine is nutritionally deficient. Vines can use a tremendous amount of energy on producing a crop, potentially resulting in nutrient deficiencies. However, too much late season fertilization (primarily with Nitrogen) can cause excess and late growth which will not be cold hardy. If just enough is used to relieve a deficiency and applied soon after harvest then it is a sound practice, but only if deficiency symptoms exist. In the spring vines use stored reserves for much of the first month or so of growth, so if they are deficient in the fall they will be deficient in the spring as well. Therefore, fall (late summer really) fertilization with Nitrogen must be applied judiciously with an eye toward alleviating a deficiency and not pushing a lot of new growth. Other nutrients that are not as mobile as Nitrogen such as Potassium and Phosphorous can be applied without fear of negative repercussions. Micronutrients can be applied as well at this time. But, you say, how do I know if my vines are deficient? My answer is this, a petiole analysis done during July will tell you. We don't have a complete grasp on the fertility issues that face us here in Oklahoma, but a petiole analysis of your vineyard will help you see what is going on and how to handle it.

OSU Enology Lab Update

William McGlynn

We're excited and pleased to announce that the finishing touches are being put on OSU's Enology Lab, which is located in the Robert M. Kerr Food and Agricultural Products Center. The Enology Lab project has been underway for nearly two years now and has involved both facility remodeling and equipment purchases. All this was made possible primarily by funding that was secured via an internal OSU competitive grant program. The lab will serve as a resource for both extension outreach and basic research on grape and fruit juices and wines. The facility houses both processing and analytical equipment; it gives OSU an unprecedented ability to investigate the winemaking potential of various cultivars, examine the effects of various winemaking techniques on wine quality, and so on. The lab will be a research winery – currently there are no plans to produce and sell commercial wines. We expect to begin producing research samples shortly. Interestingly, we've already had quite a number of people volunteer to help us with the sensory evaluation of our experimental wines. The scope of the lab's mission does not include performing routine analytical tests on client samples, but analytical testing will continue to be available to in-state clients on an ad hoc basis to help solve particular problems that folks may experience. Keep watching for more information and an official "Grand Opening" date.

Viticulture Education Program for Grape Growers Administered by OSU

Eric T. Stafne

Viticulture Education Program

The program is a cooperative effort among Oklahoma State University – Stillwater (OSU-S), Oklahoma State University – Oklahoma City (OSU-OKC), Tulsa Community College (TCC), and the Oklahoma Grape Growers and Winemakers Association (OGGWMA). It is administered by OSU-S.

This is a two-tier professional education program. The Basic level provides college training in the fundamentals of horticultural science, plus applied training in viticulture and related techniques through OSU Cooperative Extension. The Advanced level provides further college training in horticultural science and related disciplines, plus further applied training through OSU Cooperative Extension. There is a five-year total time limit to complete the program. The Basic level would need to be completed in two years, and the Advanced level would need to be completed no more than three years after completing the Basic level.

The list of approved courses and workshops may change over time. Participants should obtain approval from OSU-S prior to enrollment in courses or workshops other than those specifically listed. Knowledge testing will be required at completion of short courses and Extension workshops. A grade of "C" or better will be required in all college-level courses. Participants who anticipate matriculating towards a college degree in horticulture at OSU-S, OSU-OKC, or TCC should contact an academic advisor at the appropriate institution for guidance in college course selection. Those intending to eventually pursue at B.S. in horticulture should contact Dr. Brian Kahn, Department Undergraduate Advising Coordinator at OSU-S.

OSU-S will collect a one-time program registration fee of $25. Any additional fees for courses, workshops, conferences, pesticide applicator testing, etc. will be paid directly by program participants to the appropriate entities. Participants are responsible for documenting attendance at events, and agree to provide transcripts for purposes of verifying satisfactory completion of required college courses. Participants completing each level of the Viticulture Education Program will be duly recognized with a framed certificate at the annual conference of the OGGWMA.

For more information, or to register for the program, participants may contact me, visit the website (http://www.hortla.okstate.edu/grapes/viticulture_education_program.html) or write to:

Viticulture Education Program

c/o Ms. Stephanie Larimer

Dept. of Horticulture and Landscape Architecture

360 Agricultural Hall

Oklahoma State University

Stillwater, OK 74078-6027

405-744-5404

stephanie.larimer@okstate.edu

Understanding Land Grant Institutions

Eric T. Stafne

I view this newsletter as a way to introduce not only research but also new or uncommon issues that are tangentially related to grapes. In my work as an extension specialist I appreciate the support of many grape growers who comprehend what I do, but I also interact with many who don't have any idea. Believe me; I understand the lack of awareness. Before I began work as a faculty member, I had no idea either; even though I had been a student and employee at two different universities for a total of 12 years. So, this is my opportunity to relay to you some things about what we do and how it's done. I am planning for this to run as a three-part series. The first will cover the concept behind land grant institutions, the second will explore cooperative extension, and the third will be a peek inside of what a professor at a land grant institution with an extension appointment actually does.

But, let's start at the beginning. Oklahoma State University (and most other institutions of higher education you get grape information from) is a Land Grant institution. What does that mean?

A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The mission of these institutions originally was to teach agriculture, military strategy, and mechanical arts (hence the 'A&M' designation) as well as the traditional classical studies so that higher education would be available to all and not just the upper classes.

The Morrill Act of 1862 reflected an increasing need for agricultural and technical education in the United States at the time. Even though a number of already existing institutions did expand upon the traditional studies curriculum, higher education was still out of the reach of many in the working class. Therefore, the Morrill Act was put forth to provide the working classes with an education that directly impacted their daily lives instead of more esoteric studies.

Twenty-eight years later, the Second Morrill Act of 1890 prohibited distribution of money to states that made distinctions of race in admissions, reflecting the aftermath of the Civil War era, and also provided additional endowments for land-grants; however, states that had a separate land grant institution for African-Americans were eligible to receive the funds as well. Institutions that were founded or designated the land grant institution for African-Americans in conjunction with this Act are commonly known as the 1890 land grants. Native American tribal colleges are sometimes referred to as the 1994 land grants in relation to a more recent Act.

Two of the main purposes evident in the creation of the original Morrill Acts were to create an alternative to the traditional curriculum in higher education at the time and development of college level instruction focusing on the agricultural and industrial based members of society. This forward-thinking legislation has produced a system of colleges and universities managed by each state.

The federal support in the initial Morrill Act was to be the income from public lands made available to each state. The state was required to contribute to the maintenance and construction of its land-grant institution, of which a key component is the agricultural experiment station (AES) program created by the Hatch Act of 1887. The Hatch Act authorized payment of federal grant funds to each state to establish an AES in connection with the land grant institution. A portion of the Hatch Act funding supports regional research, enabling scientists to collaborate and coordinate activities and by doing so, avoid duplication of research efforts. The amount of this appropriation varies from year to year and is determined for each state through a statutory formula. A major portion of the federal funds must be matched by the state.

Because the 1890 land-grants do not receive Hatch Act funds, special programs have been created to help finance agricultural research at these institutions. The Evans-Allen program supports agricultural research with funds equal to at least 15% of Hatch Act appropriations.

The Morrill and Hatch Acts are still relevant to this day. Even though many land grant institutions have broadened their educational scope over the years, the agriculture component plays a key role in their existence. Yet increasingly, agriculture (and the many disciplines under that umbrella including horticulture) is fighting hard to maintain its identity. The once dominant agrarian society of the United States has diminished. In the university system, we must jostle among the other colleges and departments on campus for recognition. And as each year passes, it's more and more difficult to do. Our funding dwindles while the demand for output from administration increases. Do more with less is the motto now.

I urge you as stakeholders in the ideals of the land grant institution to support your local land grant. Support can come in many forms, not just financial. Attend workshops, seminars, short courses, and other programming. Read the fact sheets and publications. Call or email grape specialists at your institution and rely on their expertise. This type of support generates a quantitative assessment of programmatic usage. Bigger numbers let us justify our existence and show those who control our destiny that agricultural education and research is still needed – maybe now more than ever.

Results of fungicide evaluations for control of black rot of grape in Oklahoma, 2008

Damon L. Smith, Horticulture Crops Extension Pathologist

As most of you are aware, black rot is the most economically important disease of grapes in Oklahoma. Much of the fungicide testing for management of black rot has taken place in the Northeastern or North Central region of the U.S. In an effort to test several fungicides for controlling black rot in Oklahoma, and validate other's results, a small trial was established to test a few popular compounds. This trial was not meant to be an exhaustive evaluation of all compounds available. The purpose was to generate base-line data of fungicide efficacy and use that information for planning future studies.

Methods: Research plots were established at a grower's vineyard with a history of black rot in Shawnee, OK. Two-vine plots were established where center facing cordons were the plot area and outer cordons were used as borders between adjacent plots. Vines were spaced 8 ft apart with a between-row spacing of 10 ft. The experimental design was a randomized complete block with four replicates. The vineyard was planted on a Konawa loamy fine sand soil. Irrigation was applied as needed. Standard maintenance practices were followed throughout the growing season. Fungicides evaluated included Nova 40 WP at 5oz/acre; Flint at 2 oz/acre; Pristine at 12.5 oz/acre; and Abound at 15.4 oz/acre. Non-treated plots were also included. Fungicides were applied with a CO_2 pressurized wheelbarrow sprayer equipped with a vertical boom and TX8010 flat fan nozzles, calibrated to deliver 100 GPA. All fungicide treated plots were sprayed with Dithane Rainshield + Quintec for the first spray on 28-Apr. Subsequent sprays were comprised of the assigned fungicides for each plot, applied using a 14-day interval. A total of eight fungicide applications were conducted. Ratings of leaf incidence (percent of leaves with symptoms of black rot), leaf severity (average percent of leaf area with symptoms of black rot), fruit incidence (percent of clusters with symptoms of black rot) and fruit severity (average percent of cluster area with symptoms of black rot) were taken at regular intervals. All data were subjected to the area under the disease progress curve (AUDPC) transformation to account for season-long ratings in a single value.

Results: Weather early in the evaluation period was cool, with low humidity and limited precipitation. Later, weather was hot, very humid with above average rainfall. Highest levels of leaf and fruit disease incidence and severity were observed for plots not treated with fungicide (Table 1). All plots treated with fungicide had significantly less leaf incidence and severity compared to the non-treated checks, except plots treated with Nova. Measurements of leaf incidence and severity were not significantly different for all fungicide treated plots. Plots treated with Nova had significantly lower fruit incidence and severity but not leaf incidence and severity when compared to the non-treated check. Plots treated with Nova did not have significantly different levels of fruit incidence and severity compared to Flint treated plots. Abound, Pristine, and Flint had the lowest levels of fruit incidence and severity and were not different from each other.

Conclusions: Abound, Pristine, and Flint performed well in this particular vineyard. Nova did not perform as well, but provided better control of fruit disease than not spraying at all. Nova should not be deleted from a sound fungicide program. Fungicides should be rotated frequently to minimize the occurrence of fungicide resistant populations of pathogens in the vineyard. Abound, Pristine, and Flint are members (or have components that are members) of the strobilurin class (MOA class 11) of fungicides. No more than two consecutive sprays, and no more than four applications of strobilurin fungicides should be applied to a single vineyard in one season. The strobilurin compounds are also effective on many diseases that appear later in the season. Therefore, use of the strobilurin compounds (Abound, Pristine, Flint etc.) might be reserved for that time to take advantage of their ability to control multiple diseases. In addition to chemical management, growers should use good cultural practices in their vineyards to prevent black rot. Proper canopy management and sanitation, including removal of mummies from the canopy and cultivation or burial of debris can help limit damage caused by the black rot fungus.

-Continued on Page 10-

Fall Frost/Freeze Index Revealed, continued

Eric T. Stafne

The rationale for choosing this data to develop an index is as follows:

L : The average low from the date of first frost to the date just prior to the first freeze indicates that a higher temperature between these dates may lead to an increase in the amount of injury by freezing temperatures due to an incomplete state of dormancy.

T : The sum of degrees below 28 °F (the critical temperature on actively growing grape tissues) on the date of first freeze is important because the greater the number the more damaging the effects could be, especially when coupled with high average low temperatures from L.

D : The number of days from first frost to first freeze is used to gauge potential damage. If the days coincide or are close, then damage potential is greater. A greater level of dormancy would be induced by first frost and the days following the frost. Days to first freeze from October 1 is used because an early freeze would be problematic for vines. Later freezes would not be as damaging because the vine has had time to acclimate.

Let's go through an example. In October of 2000, an early freeze devastated a lot of plants. So, the index for this event looks like this:

F3I = ((53-32) + 5) x (1 – 1/8)) + ((53-32) + 5)

((21) + 5) x (1– .12)) + ((21) + 5)

(26 x .88) + 26

22.9 + 26

48.9

To give an idea of how catastrophic this event was, look at the scale of the index, where:

> 35 is a high probability of damage

21 – 34 is a moderate probability of damage

< 20 is a low probability of damage

A year-by-year breakdown for Perkins looks like this (1998 and 2007 missing):

1994 = 14.2 (low)	2001 = 39.2 (high)	12-year average = 24.2 (moderate)
1995 = 27.2 (moderate)	2002 = 11.7 (low)	
1996 = 13.9 (low)	2003 = 17.6 (low)	
1997 = 36.0 (high)	2004 = 6.3 (low)	
1999 = 25.3 (moderate)	2005 = 28.0 (moderate)	
2000 = 48.9 (high)	2006 = 22.4 (moderate)	

This translates to a low risk in 42% of the years surveyed, 33% had a moderate risk, and 25% had a high risk. Of course the sample size is fairly small with only 12 years of data to look assess. The take home message here is that fall can be a time when damage occurs to grapevines. The severity of that damage can vary. Even in years with a high risk, the vines may show no outward evidence of damage. More likely, the vascular tissues can be compromised to some degree. Whether or not the damage is manifested in a tangible way, it is something more of a "wait and see" situation.

You can use weather data from your own observations, the Oklahoma Mesonet, or from various other weather websites such as weatherunderground.com. Of course, the most accurate will be those observations from within your own vineyard, but general observations from locations near your vineyard may provide useful information as well.

Holiday Inn City Center, Ft. Smith, AR—16 & 17, 2009

COMMERCIAL EXHIBITOR APPLICATION MUST BE RECEIVED BY DECEMBER 10, 2008

BUSINESS OR ORGANIZATION: _____

CONTACT: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

PHONE: ( ) _____ FAX: ( ) _____ E-MAIL: _____

NAME(S) OF EXHIBIT PERSONNEL ATTENDING SHOW: _____

_____

WEBSITE: _____

COMMERCIAL BOOTH SPACE 8'x5': ($200 if received by Dec. 4; $250 after Dec. 10, 2008))..... $_____

Includes 2 chairs, draped table, sign and up to two lunch tickets each day & 2 reception tickets.

ELECTRICITY for Booth Space—$10 extra ..... $_____

LITERATURE DISPLAY: ($50) ..... $_____

If you are unable to attend, display your literature on the "silent salesman" tables.

NON-PROFIT ORGANIZATION EXHIBIT: ($60 if received by Dec. 10; $80 after Dec. 10, 2008) ..... $_____

Includes 2 chair, draped table, and sign.

EXTRA MEAL & RECEPTION TICKETS—$15 per meal/person & $6.00/person for reception..... $_____

DONATION FOR FRIDAY EVENING RECEPTION:_____$100 _____$150 _____$200..... $ _____

Company name will be displayed as a contributor to reception.

SHOW SPONSORSHIP: _____ $1,500 _____ $1,000 _____ $500 _____ $250..... $_____

DONATION FOR OUT-OF-STATE SPEAKER EXPENSES: _____ $25 _____ $50 _____ $100..... $_____

AD IN SHOW PROCEEDINGS (published after the Show):..... $_____

INSIDE FRONT COVER.....$250 INSIDE BACK COVER.....$250

FULL PAGE (7" X 10").....$200 HALF PAGE.....$120

QUARTER PAGE.....$60 BUSINESS CARD.....$25

ASSOCIATION DUES: ..... $_____

ARKANSAS STATE HORTICULTURE SOCIETY.....$20

OKLAHOMA HERB GROWERS AND MARKETERS ASSOCIATION $20

OKLAHOMA VEGETABLE ASSOCIATION $35

TOTAL:..... $_____

(MAKE CHECK OR MONEY ORDER PAYABLE TO HORTICULTURE INDUSTRIES SHOW)

NO REFUNDS WITHOUT APPROVAL FROM THE HORTICULTURE INDUSTRIES SHOW BOARD

SIGNATURE: _____DATE: _____

MAIL APPLICATION WITH FULL PAYMENT TO: DONNA DOLLINS, HIS Coordinator

BOX 1993

STILLWATER, OK 74076-1993

For questions email donna.dollins@okstate.edu or call 405-744-6460 or after December 19 call 405-377-6071 or 405-612-0959.

Cultivar Spotlight: 'Vignoles'

Eric T. Stafne

'Vignoles' (aka Ravat 51), pronounced **veen-yole**, is a French-American hybrid grape cultivar (the result of a cross between Seibel 8665 and 'Pinot de Corton') that is commonly grown for wine production in the eastern United States. It is the most successful cross from the French hybridizer J. F. Ravat. Unfortunately, few people have discovered this versatile and fruity grape. The vines are cold hardy, with moderate vigor and productivity. Since it is cold hardy, a rootstock is not absolutely necessary, but will help to increase vigor and productivity. Bud break is somewhat late in the spring, thus reducing the risk of spring freeze injury. Clusters are small, compact, and susceptible to summer bunch rots post-veraison. It is moderately resistant to black rot, but still requires sufficient sprays to keep the disease at bay.

Vines grow best in loamy, well-drained soils in full sun. They will tolerate a wide range of soil conditions, but good drainage is a must. The vines should be planted in a location well removed from frost pockets. Due to potentially high bunch rot incidence, eastern or south-eastern exposure is preferable. Because of potential rot issues, the ripe fruit can attract wasps and green June beetles. The fruit can develop very high sugar content while acidity remains high.

This is a white wine grape that is used to produce a variety of different wines from dry white to excellent sweet dessert wines. In that way it is very much like 'Riesling', but tends to be fruitier and more aromatic. The dry versions are crisp, refreshing and fruity. The aromas and flavors can be surprisingly complex and the wine is medium in body. It is also used for blending.

Viticulture & Enology
OKLAHOMA STATE UNIVERSITY

OKLAHOMA STATE UNIVERSITY AND OKLAHOMA COOPERATIVE EXTENSION SERVICE

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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.

Fungicide Evaluation, 2008 continued

Table 1. Season-long leaf and fruit incidence and severity for fungicide treatments applied to grapes (cv. 'Pinot noir') for control of black rot.

Treatment (active ingredient)[Z]	Season-long Leaf Incidence Intensity[Y]	Season-long Leaf Severity Intensity[X]	Season-long Fruit Incidence Intensity[W]	Season-long Fruit Severity Intensity[V]
Non-treated check……	647.5 A	1023.8 A	3027.1 A	2888.3 A
Nova (myclobutanil)…….	422.0 AB	688.4 AB	1203.1 B	1247.5 B
Flint (trifloxystrobin)……	242.8 B	332.3 B	609.4 BC	526.3 BC
Pristine (boscalid + pyraclostrobin)……..	266.6 B	397.9 B	215.6 C	301.1 C
Abound (azoxystrobin)…….	235.4 B	256.9 B	440.6 C	381.1 C

[Z] For the first fungicide application, all plots except the non-treated check received Dithane Rainshield (mancozeb) + Quintec (quinoxyfen) on 28-Apr. All subsequent sprays were the treatments assigned to each plot. All ratings were recorded at regular intervals from 26-May to 18-Jul.

[Y]Season-long leaf incidence is defined as the area under the disease progress curve (AUDPC) for four ratings of % leaves with symptoms of black rot. Means followed by the same letter are not significantly different according to the test of protected least significant difference; LSD=301; R^2=0.60; CV=54; P=0.05.

[X]Season-long leaf severity is defined as the area under the disease progress curve (AUDPC) for four ratings of average % leaf area with symptoms of black rot. Means followed by the same letter are not significantly different according to the test of protected least significant difference; LSD=550; R^2=0.62; CV=66; P=0.05.

[W] Season-long fruit incidence is defined as the area under the disease progress curve (AUDPC) for four ratings of % of fruit clusters with symptoms of black rot. Means followed by the same letter are not significantly different according to the test of protected least significant difference; LSD=720; R^2=0.89; CV=42; P<0.001.

[V]Season-long fruit severity is defined as the area under the disease progress curve (AUDPC) for four ratings of average % cluster area with symptoms of black rot Means followed by the same letter are not significantly different according to the test of protected least significant difference; LSD=851; R^2=0.85; CV=52; P<0.001.